European Commission

European Construction Sector Observatory

Country profile **Germany**

January 2020

In a nutshell

Despite a challenging external environment, the German economy maintained a solid growth over 2015-2018, driven by a strong domestic demand.

Mirroring this trend, the construction sector also exhibited positive development. The **volume index of production** of the narrow construction sector registered an overall growth of 9.3% over 2015-2018, a 16.5 index points increase from 2010. In particular the volume index of production in construction of civil engineering sub-sector recorded a 13.1% increase between 2015 and 2018.

Volume index of production in the narrow construction sector between 2015 and 2018 ↑ **9.3%**

As a result, the broad construction sector experienced an increase in total **turnover**, reaching EUR 575.6 billion in 2018 (+52.5% compared to the 2010 levels). This was mainly driven by the narrow construction sub-sector, which turnover accounted for 49.4% of the total turnover, and increased by 66.4% over the same period. In terms of **profitability**, however, developments have been less favourable. The broad construction sector's profit margin on sales only rose by 0.5 percentage point between 2010 and 2017. This may be partly explained by the parallel rise of **construction costs** and especially the labour costs (+7.9% and 10.4% respectively between 2015 and 2018).

In parallel, **employment** in the broad construction sector in Germany increased considerably since 2010, growing from 2,938,001 to 3,973,029 in 2018 (+35.2%).

Turnover in the broad construction sector between 2010 and 2018 ↑ **52.5%**

Employment in the broad construction sector between 2010 and 2018 ↑ **35.2%**

The **housing market** continues to be fuelled by strong demand, owing to rising incomes, low interest rates as well as high level of net migration. In parallel, supply has not kept up with demand for a prolonged period. The combination of the above factors contributed to a continued increase in property prices, in particular in big cities. The **house price index** recorded a 21.7% increase between 2015 and 2018, a 37.8 index point increase between 2010 and 2018.

House prices index between 2015 and 2018 ↑ **21.7%**

Rising prices have made it more difficult for low and middle income households to afford adequate housing. The rising price has led the German Central Bank to raise concerns about a potential overheating of the German housing market. According to Bundesbank, real estate overvaluations in German towns and cities ranged between 15% and 30% in 2018.

Total **investments in the broad construction sector** increased by 7.2% over between 2015 and 2018, a 14.7 index point increase between 2010 and 2018.

This increase was driven by the housing market, as reflected by the **investments in dwellings**, which rose by 8.7% between 2015 and 2018. **Investments in non-residential constructions** also increased, albeit at a slower pace, by 4.9% between 2015 and 2018. Following a long period of low public investments in infrastructures, the federal government took several measures to unlock investments at federal, regional and municipal levels. This includes the announcements of EUR 86 billion investments in the national rail infrastructure, as part of a total funding of EUR 269.6 billion for the **2030 Federal Transport Infrastructure Plan**. This will support the infrastructure activities in Germany, which in turn will boost the construction sector growth.

Investments in the broad construction sector between 2015 and 2018

↑ **7.2%**

Despite government's efforts and favourable economic conditions, the construction sector still faces some challenges. A rising number of companies is encountering difficulties in filling up vacant positions. This issue, related to **skills and labour shortage,** will be partly addressed by the Skilled Labour Immigration Act, which will take effect on March 1, 2020. This in turn will facilitate non-EU immigration, as a way to cope with labour shortage.

Overall, the outlook for the German construction sector is strong, driven by a dynamic housing market, improved infrastructure spending and positive developments for all market segments.

Table of Contents

1

Key figures

Construction market

In 2018[1], there were **655,109 enterprises** operating in the broad construction sector in Germany, with the narrow construction sub-sector accounting for 51.6% of the total (Figure 1). The latter was followed by the real estate activities, architectural and engineering activities and manufacturing sub-sectors, which accounted for 24.7%, 19.6% and 4.1% respectively of the construction enterprises in 2018.

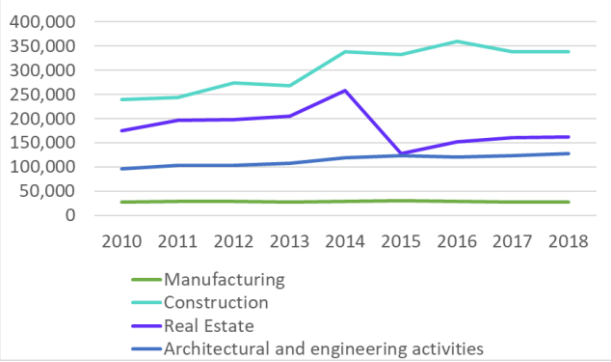
The number of companies in the broad construction sector has increased by 22.0% since 2010 (536,874). This was mainly driven by a 41.5% rise in the number of enterprises in the narrow construction sub-sector, followed by the architectural and engineering activities sub-sector (+34.4%). Conversely, the real estate activities sub-sector experienced a 7.3% decline over the same period.

Number of enterprises in the broad construction sector between 2010 and 2018

↑ **22.0%**

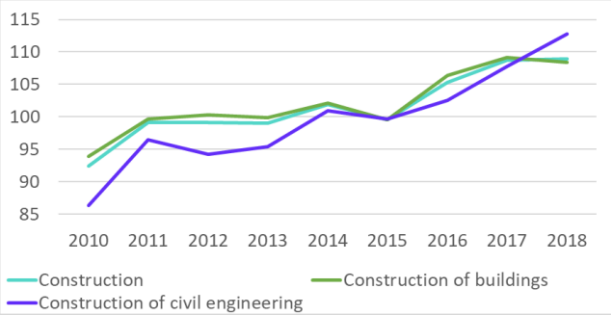
Correspondingly, the **volume index of production** in the narrow construction sector recorded a growth of 9.3% between 2015 and 2018. The volume index of production in construction of civil engineering and buildings experienced a 13.1% and 8.8% increase over the same period (Figure 2).

Figure 1: Number of enterprises in the broad construction sector in Germany between 2010 and 2018



Source: Eurostat, 2019

Figure 2: Volume index of production in the broad construction sector in Germany, between 2010 and 2018 (2015=100)



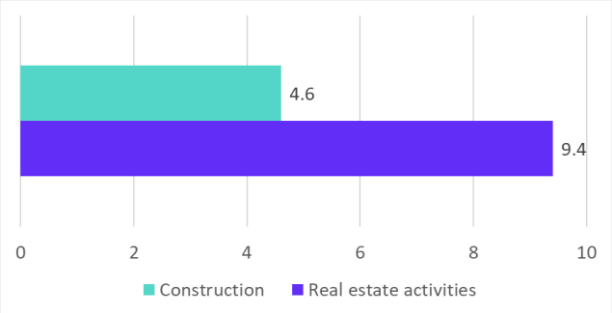
Source: Eurostat, 2019

In 2018[2], the total **value added at factor cost** of the broad construction sector stood at EUR 278.8 billion, 61.9% higher than that in 2010, EUR 172.2 billion. The narrow construction sub-sector had the largest share in the total value added, standing at 45.9%, or EUR 128.0 billion in absolute terms. It was followed by the real estate activities sub-sector with EUR 82.3 billion, architectural and engineering activities with EUR 44.2 billion, and manufacturing sub-sector with EUR 24.3 billion.

The real estate activities and narrow construction sub-sectors **gross value added as a share of GDP**[3]

accounted for 9.4% and 4.6% respectively in 2018 (Figure 3).

Figure 3: Gross value added as a share of GDP in the broad construction sector in Germany in 2018 (%)



Source: Eurostat, 2019.

Germany counts 38 NUTS-2 statistical region. 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 9.6 billion, EUR 8.9 billion and EUR 7.4 billion, respectively. The situation is similar with 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 24.0 billion, EUR 19.9 billion and EUR 18.2 billion, respectively.

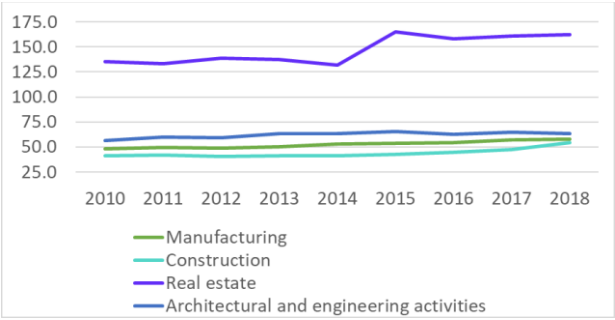
Productivity

Apparent labour productivity[4] in the broad construction sector has been gradually increasing since 2013, reaching EUR 66,100 in 2017, a 12.7% increase from EUR 58,600 in 2010. The apparent labour productivity in 2016 was EUR 63,200, compared to the EU-28 average of EUR 52,100.

This increase is reflected in all the broad construction sector's sub-sectors. The narrow construction sub-sector's apparent labour productivity experienced the strongest (+32.4%) increase, going from EUR 41,100 in 2010 to EUR 54,400 in 2018[5]. The real estate activities and manufacturing sub-sectors delivered similar growth rising by 19.8% each, over the same time period. The real estate sub-sector, which experienced some fluctuations between 2010 and 2018, exhibited the highest level of labour productivity with EUR 162,300 in 2018. Last, the apparent labour productivity of the architectural and engineering services sub-sector also grew, rising by 13.3%, to reach EUR 63,700 in 2018 (Figure 4).

The consistent, albeit stagnating, increase in productivity in the country could be attributed to improvements in the digitalisation in the construction sector. However, firm level data has indicated a widening gap between the most and the least productive companies, thereby suggesting challenges in technology diffusion and effective reallocation of resources to their most productive areas. This widening gap may be explained by the differences in financial and human resources between large construction firms and micro, small and medium sized enterprises (MSMEs). Further, to reap the benefits of digitalisation in the long term, continued investments in education, upskilling, as well as in digital infrastructure will be required. In that regard, Germany lags behind the EU-28 in deployment of very high capacity broadband at national level, thereby further impacting digitalisation and productivity[6].

Figure 4: Labour productivity in the broad construction sector in Germany between 2010 and 2018 (EUR k)



Source: Eurostat, 2019.

Turnover and profitability

In 2017, the broad construction sector in Germany reached a total **turnover** of EUR 548.0 billion, a 45.2% increase from the EUR 377.3 billion in 2010. The turnover growth for the broad construction sector is expected to remain strong in 2018 as well, with a growth of 5.0% between 2017 and 2018 to reach EUR 575.6 billion in 2018 (+52.4% in comparison to the 2010 levels)[7]. The narrow construction sub-sector registered the largest share of turnover within the sector in 2018, accounting for 49.4%, followed by real estate activities sub-sector (24.5%), architectural and engineering activities sub-sector (13.5%) and manufacturing sub-sector (12.6%).

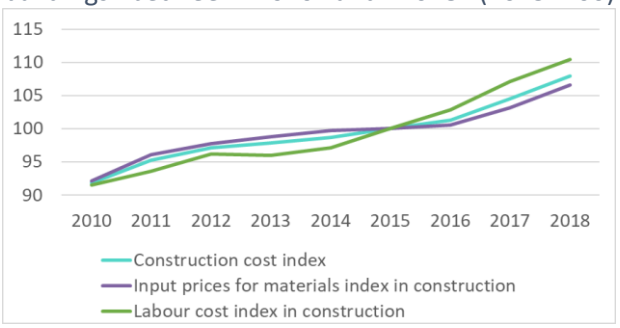
Total turnover in the broad construction sector between 2010 and 2018 ↑ **52.4%**

In parallel, the **gross operating surplus** of the broad construction sector increased by 48.9% between 2010 and 2017[8] from EUR 85.2 billion to EUR 126.8 billion. This was largely driven by the narrow construction sub-sector (+108.8%) and architectural and engineering activities sub-sector growth in gross operating surplus (+50.0%).

On the other hand, the **gross operating rate** of the broad construction sector[9], which gives an indication of the sector's profitability, has not experienced such significant increase, fluctuating within 22% to 23.5% over 2010 and 2017. In 2017, the gross operating surplus stood at 23.1%, a marginal increase from 22.6% in 2010.

In parallel, **construction costs** have gone up steadily over the past decade (Figure 5). They increased by 7.9% between 2015 and 2018. This rise is driven primarily by an increment in labour costs, which grew by 10.4% between 2015 and 2018. The input prices for materials also experienced an increase of 6.6% during the same time period.

Figure 5: Construction cost index for residential buildings between 2010 and 2018 (2015=100)



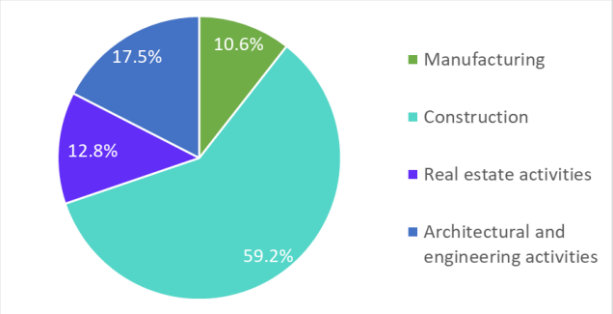
Source: Eurostat, 2019.

Employment

The number of **people employed** in the broad construction sector in Germany has been increasing considerably since 2010, growing from 2,938,001 to 3,973,029 in 2018 (+35.2%). The sector represents 8.9% of all employment in the general economy. The narrow construction sub-sector accounted for 59.2% of the total sector workforce in 2018 (Figure 6), and grew by 43.5% since 2010, reaching 2,351,772 people. More generally, employment increased in all sub-sectors over the 2010-2018 period, with the largest increase coming from the architectural and engineering activities sub-sector (+53.6%). More modest increases were recorded in the real estate activities (+15.0%) and manufacturing (+3.4%) sub-sectors. These sub-sectors respectively totalled 507,074, 420,284 and 693,899 workers in 2018.

In terms of **specific occupations**, the largest increase in employment was recorded in the categories "Service and sales workers" and "Technicians and associate professionals" in the narrow construction sub-sector. They witnessed respective jumps of 730.8% and 180.9% between 2010 and 2018.

Figure 6: Percentage of people employed by construction sub-sectors in Germany in 2018



Source: Eurostat, 2019.

The number of **self-employed** people in the narrow construction sub-sector stood at 434,100 in 2018, accounting for 12.2% of the self-employed in the general economy. In the real estate sector sub-sector, this number reached 40,800 persons, and represented 1.1% of the self-employed persons in the general economy. Regarding Germany's **regions**, Oberbayern employed the largest share of persons in the narrow construction sub-sector amounting to 140,400 in 2016[10]. This was followed by Düsseldorf and Stuttgart with 129,700 and 120,600, respectively. The real estate activities sub-sector recorded a somewhat similar situation. The areas with highest employment levels were Berlin (42,600 persons), Düsseldorf (35,100) and Darmstadt (32,100).

2

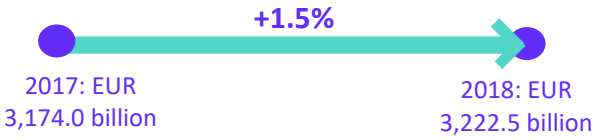
Macroeconomic indicators

Economic development

In 2018, the GDP of Germany amounted to EUR 3,222.5 billion, representing a 1.5% increase in comparison to 2017.

This is less than in the growth recorded in 2016 and 2017 of 2.2% and 2.5% respectively. This slowdown has been driven by weaker export growth, lower private consumption in second half of 2018 and a reported rise of protectionism during the year[11]. The **potential GDP** in 2018 was EUR 3,184.4 billion, resulting in a positive **output gap** of 1.2%, which indicates that the economic output is above the economy's full capacity for output. This helped supporting investments, thus mitigating the challenges linked to the external environment. The **Inflation rate** grew by 1.5% in 2018, driven by energy prices.

Annual growth rate of the German GDP



Demography and employment

The average **unemployment rate** in Germany hit a record low of 3.2% in 2018. In comparison, the EU-28 unemployment rate stood at 6.1% in 2018. Youth unemployment (below 25 years) stood at 6.2%, and is also well below the EU-28 average of 15.2%, highlighting the competitiveness of the German economy. A consistent increase in job vacancy rates has helped the reductions in unemployment. However, labour shortages have become an emerging concern in Germany. The labour shortage is expected to particularly affect the economically strong regions of southern Germany, like Bavaria, Baden-Württemberg as well as those in the eastern part of Germany, Thuringia. Healthcare, engineering and Information technology are among the key sectors affected by the shortage. Construction has also started being affected with around 15.8% firms reporting labour shortage as a key factor limiting production in 2018[12].

Unemployment rate in 2018 (in %)

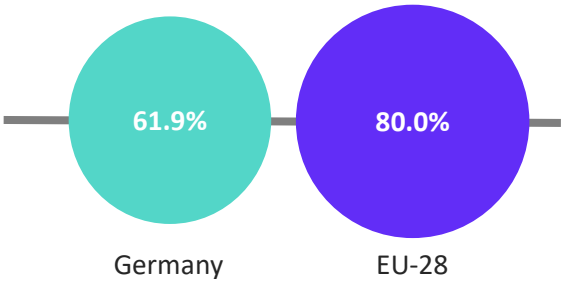
In terms of demographics, the **total population** of Germany amounted to 82.9 million people in 2018. While the population in Germany shrank between 2002 and 2010, this trend has reversed since 2013 due to positive **net migration**. Immigration peaked in 2015, when net migration stood close to 1.2 million people. The net migration in 2018 stood at 394,213 people. The population of Germany is expected to increase by 1.2% by 2030. It is, however, expected to decrease by a marginal 0.1% by 2050, signalling an eventual decrease in the net migration. In 2018, Germany's **working age population** accounted for 65.1% of the total. However, this is projected to decline to 57.8% by 2050. At the same time, the proportion of elderly people is forecasted to rise from 21.4% in 2018 to 28.3% in 2050.

Public finance

General **government expenditure** in Germany has been fairly constant over the past years, reaching 44.6% of GDP in 2018. This is line with the corresponding EU-28 average of 45.6%. The general **government deficit** in 2018 stood at 1.9% of GDP, below the 3% deficit threshold of the EU's Stability and Growth Pact (SGP). The EU-28 average in 2018 was -0.6%. Last, the general **government**

gross debt has been continuously declining since its peak in 2010 (82.4%) reaching 61.9% in 2018. It is also lower than EU-28 level of 80.0% in 2018.

General government gross debt (% GDP)

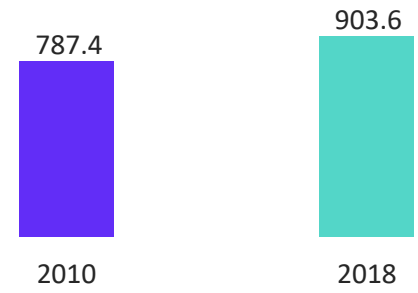


Entrepreneurship and access to finance

Germany ranked 25th out of 141 economies (down from the 21st rank in 2018) in terms of development of financial system, according to the 2019 Global Competitiveness Report.

The country performed well in terms of financing of SMEs (7th), and venture capital availability (7th). In terms of the parameter domestic credit to private sector, the country ranked 40th out of 141 economies[13].

Loans to non-financial corporations have been consistently increasing since 2015, reaching EUR 903.6 billion in 2018, a 14.8% increase from EUR 787.4 billion in 2010. Germany's banks have regained stability since the financial crisis, with low levels of non-performing loans (1.7%), half as much as the EU-28 average of 3.4%. As a result, financing conditions for firms are overall positive. Instead, the key challenge of the German banking system is relatively higher costs and high competition, weighing on profitability[14].



Loans to non financial corporations in Germany (in billion EUR)

Germany ranked 125th out of 190 in 2019, in terms of starting a business. Nine procedures are required to register a firm, above the OECD high income average of 4.9, these take 8 days to be completed (below the OECD average of 9.2)[15].

Germany performs well in regards with the implementation of the Small Business Act (SBA) recommendations. The country's strength lies in high job creation expectation rate (28.9 as compared to EU-28 average of 21.5) and high status given to successful SMEs (74.8 versus 69.2 in EU-28).

However, Germany scores less well in terms of entrepreneurship. In fact, entrepreneurship is among the country's weakest SBA principles, with Germany ranking third lowest among EU-28 in terms of early-stage entrepreneurial activity and entrepreneurial intentions (7.6 versus 13.6 EU-28 average). Similarly, the country's scores below EU-28 average in terms of entrepreneurship as a desirable career choice (49.6 versus 59.8) and early stage entrepreneurial activity by female population (3.3 versus 5.7).

The SBA factsheet for Germany outlines several policy initiatives taken since 2008, such as the support scheme for women entrepreneurs (*FRAUEN unternehmen*) and refugee entrepreneurs (*Start Up your Future*). However, the country hasn't been able to effectively leverage these schemes[16]. During 2018, Germany announced several measures to enhance entrepreneurship. These include the **'Young Entrepreneurs in Science'** workshop series, **GO! Start-Up Campaign** (*Gründungsoffensive GO! Gut für Dich. Gut für Deutschland*) and the **'Gruenderplattform.de'** platform for entrepreneurs. The Young Entrepreneurs program is a workshop series, run by Falling Walls Foundation, to help PhD students with various approaches like design thinking and other creative techniques, to develop business ideas. Similarly, the GO! Campaign aims to promote start-ups by encouraging entrepreneurship culture and supporting business creation. The Gruenderplattform.de platform, an interactive portal, in turn, will support entrepreneurs with different aspects of successfully setting up a business. In 2019, the German Ministry of Finance founded the **FinTech Council** (*FinTechRat*), aimed at promoting digitalisation in the financial industry.

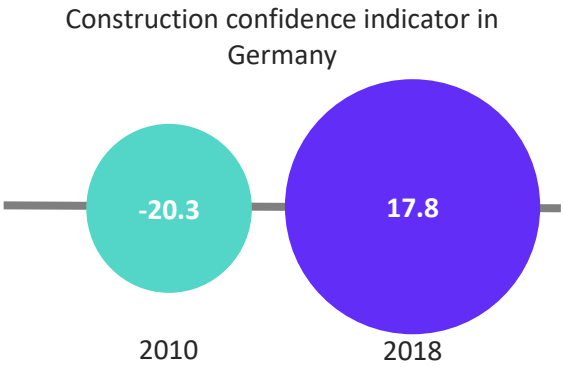
Additionally, the Federal Ministry for Economic Affairs and Energy and the Federal Ministry of Finance have adopted a blockchain strategy. This will enable leverage of the blockchain technology for further digital transformation in German businesses. A key focus area will be adoption of appropriate regulatory framework for crypto assets[17].

3

Key economic drivers of the construction sector

Business confidence

Overall, business confidence in the German economy is positive, reflecting the country's robust economic performance. The **consumer confidence** indicator stood at 1.1 in 2018, which well above the 2010 levels of -4.6 and the EU-28 average of -4.7 in 2018. **Industry confidence**, which remained negative between 2012 and 2016, recovered reaching 10.8 in 2018. This is higher than the 2010 levels of 0.4 in 2010 and the EU-28 average of 6.0 in 2018. Similarly, the **construction confidence** index improved from -20.3 in 2010 to 17.8 in 2018, faring better than the EU-28 figure, which stood at 4.1 in 2018.



In parallel, the **investment ratio** has generally increased since 2013, reaching 20.7% in 2018, as compared to 19.6 in 2010. **Investment per worker**, on the other hand, has decreased over the same period. In 2017[18], it stood at EUR 91,700, down from EUR 106,600 in 2010.

Domestic sales

The ranking of the **most domestically sold construction products** has predominantly recorded increases in sales between 2010 and 2018. However, the most sold product category "Other structures", after experiencing some fluctuations during the 2010-2013 period, recorded a 6.4% decrease in 2018, even though it increased continuously between 2014 and 2017. The highest increase in sales value was in "Tiles, flagstone, bricks", which (more than) doubled (+112.6%) between 2010 and 2018. The top five most domestically sold construction products, both in Germany and in the EU, are presented in Table 1. Together, these made up 45.0% of all German construction products sales in 2018.

Table 1: Five most domestically sold construction products in Germany and in the EU in 2018

	Germany			EU-28
	Product	**Value (EUR m)**	**Share in construction product domestic sales (%)**	**Product**
1	Other structures (group 251123)	5,272.3	14.7	Other structures (group 251123)
2	Doors, windows, etc. (group 251210)	3,639.8	10.2	Doors, windows and their frames (group 251210)
3	Ready-mixed concrete (group 236310)	2,869.3	8.0	Ready mixed concrete (group 236310)
4	Prefabricated wooden buildings (group 162320)	2,156.5	6.0	Prefabricated buildings of metal (group 251110)
5	Windows, French windows and their frames (group 162311)	2,149.7	6.0	Prefabricated structural components (group 236112)

Source: PRODCOM, 2019.

Export of construction-related products and services

Table 2 presents the **top five most exported construction products**, both in Germany and in the EU. These accounted for 50.2% of all construction exports from Germany in 2018. Overall, the value of sales experienced some increase between 2010 and 2018. The product categories "Prefabricated structural components" (+100.2%), "Windows, French windows and their frames" (+85.3) and "Assembled parquet panels" (74.2%) experienced the largest growth in sales. Conversely, the values of the exports of "Builders' joinery and carpentry" and "Portland cement, aluminous cement, etc." fell by 8.6% and 5.9%, respectively.

Table 2: Five most exported construction products in Germany and in the EU in 2018

	Germany			EU-28
	Product	**Value (EUR m)**	**Share in construction product export sales (%)**	**Product**
1	Other structures (group 251123)	2,472.7	21.1	Ceramic tiles and flags (group 233110)
2	Fibreboard of wood (group 162115)	1,619.3	13.8	Other structures (group 251123)
3	Doors, windows, etc. (group 251210)	841.0	7.2	Marble, travertine, alabaster, worked, and articles thereof (group 237011)
4	Particle board (group 162112)	494.0	4.2	Prefabricated buildings of metal (group 251110)
5	Windows, French windows and their frames (group 162311)	468.0	4.0	Doors, windows, etc. (group 251210)

Source: PRODCOM, 2019

As for the **cross-border provision of construction services**[19], Germany exported EUR 2.0 billion worldwide in 2018, 1.3% less than in 2014[20]. Specifically, 61.0% of exports (EUR 1.2 billion) were made to the EU-28, which is 6.6% above that of the previous year. Still, this represents a decline of 6.5% compared to the corresponding figure in 2014, when Germany exported EUR 1.3 billion worth of construction services to EU-28. Conversely, the value of exports to countries outside the EU-28 experienced an 8.1% increase, from EUR 727 million in 2014 to EUR 786 million in 2018. In parallel, Germany imported a total of EUR 1.6 billion in construction services in 2018, a slight decrease (-3.2%) since 2014. Overall, Germany generated a **trade surplus** of EUR 456 million in 2018 in the cross-border provision of construction services.

Access to finance in the construction sector

Banks' lending to SMEs has been accelerating in recent years, reaching its highest level in 2018, since 2010. As of 2019, around 60% of corporate loans issued by German banks, were issued to SMEs. Additionally, the implementation of Basel III norms, unlike previous expectations, have not been found to affect SME lending[21].

Access to finance is the most important concern for 5% of German SMEs as opposed to the EU-28 average of 7%. While, bank loans are a relevant source of financing for 42% of German SMEs, only 14% used them in 2019. Leasing and credit lines were more relevant sources, with 32% and 35% of SMEs using them[22].

Loans to the construction sector have been growing above average rates. This is due to the continued strength in the German construction sector, driven by high capacity utilisation, rising real estate prices and the resultant high rates of residential real estate financing[23].

Between 2010 and 2018, bank **credit extended to the narrow construction sub-sector** grew by 16.5%, amounting to EUR 71.9 billion. The dependency of construction businesses on bank finance is not excessive, considering that construction companies often finance their operations with payments in advance or instalment payments. However, smaller construction firms in Germany have been grappling

with weak equity ratios and a limited financial scope. This could render them financially weak and vulnerable to payment defaults[24].

Access to housing

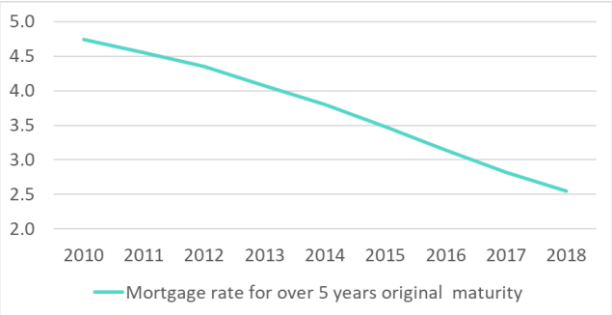
The **number of households** in Germany grew by 5.7% over 2010-2018, reaching 40.8 million in 2018. More than a third of the German population (36.1%) was reported to live in cities in 2018, 1.1 percentage point higher than in 2010. Combined with the positive migration rate of the country, the demand for new residential constructions is increasing. Furthermore, the increase in the mean annual **equivalised net income** to EUR 25,882 in 2018 (+20.5% since 2010) is also a positive driver for the sector, and contribute to support housing demand.

Positive migration, demographic changes, rising incomes and record low unemployment levels have contributed to a boost in housing demand. Another driving forces behind the positive developments in the residential construction is the decline in interest rates[25].

The **mortgage rate** fell from 4.7% in 2010 to 2.6% in 2018, making housing loans more affordable and investments in residential construction more attractive (Figure 7). Total **outstanding residential loans** amounted to 1.4 billion in 2018, which represents an increase by 25.5% from the 2010 levels.

Total outstanding residential loans between 2010 and 2018 ↑ **25.5%**

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



Source: ECB MFI Interest Rate Statistics, 2019.

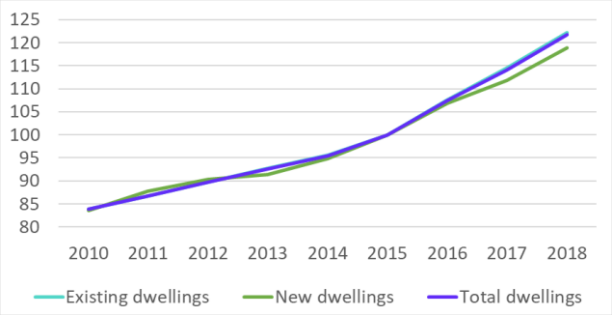
In regards with the housing supply, the number of **building permits** issued for residential buildings increased by 15.4% between 2015 and 2018, a 51.4 index point increase between 2010 and 2018. While this is a significant increase, it did not match the growing housing demand, resulting in increasing house prices.

House prices in Germany have been rising strongly over recent years. The house prices index recorded a 21.7% increase between 2015 and 2018, a 37.8 index point increase between 2010 and 2018. This increase was fuelled by the strong demand and a prolonged supply shortage. Despite rising needs, the ratio of housing investments to GDP has remained almost unchanged since 1991. In 2018, it stood at 6.3%, compared to a 6.1% average over the past three decades[26].

House prices index between 2015 and 2018 ↑ **21.7%**

House prices have been continuously on the rise, particularly since 2011 (Figure 8). The German Central Bank has raised concerns about a potential overheating of the market. Indeed, property prices are rising quickly, in particular in big cities, making it more difficult for low- and middle-class households to afford housing. In fact, as per a 2019 survey, the annual expected nominal real estate price growth over the next five year period is expected to be about 2.9, corresponding to an overall growth of 15.6% by 2024. Similarly, the forecasted growth of rents is expected to increase by 22.2% between 2019 and 2024. This indicates that German house prices and rents are expected to grow more than the inflation rate, thus causing serious concerns in regards with housing affordability. According to Bundesbank, **overvaluations** in German towns and cities ranged between 15% and 30% in 2018. These price dynamics, combined with the fact that lending terms have been relaxed between 2016 and 2018, leads the Central Bank to predict significant risk exposure to real estate financing organisations[27].

Figure 8: House prices index in Germany between 2010 and 2018 (2015=100)

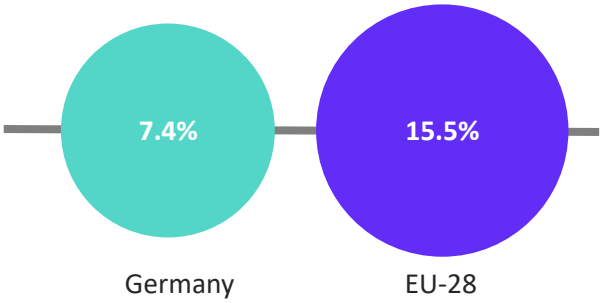


Source: Eurostat, 2019.

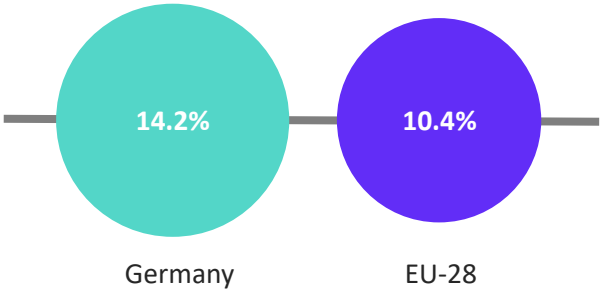
The German housing market is still characterised by a low rate of **home ownership** and a preference for rental housing. In 2018, 51.5% of the building stock was held by homeowners (down from 53.2% in 2010), while 48.5% was in the hands of tenants. Only 25.2% of people earning below 60% median equivalised income own their home, while this figure reaches 56.5% for people earning above 60% 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 **overcrowding rate**[28] stood at 7.4% in 2018, thus comparing well with the EU average of 15.5%[29]. Furthermore, in 2018, the **severe housing deprivation**[30] affected only 2.3% of the population, while this figure reaches 4.0% in the EU-28[31]. Additionally, the **housing cost overburden**[32] is a persistent, yet declining, challenge. In 2018, it impacted 14.2% of the population compared to 10.4% in the EU. The indicator, while still higher than EU-28 average, has shown consistent decline since its peak of 16.6% in 2012[33]. This shows that housing affordability is a concern in urban areas in Germany.

Overcrowding rate in Germany 2018



Housing cost overburden rate in Germany 2018



Infrastructure

According to the 2019 Global Competitiveness Report, Germany ranks 8th internationally for the quality of its infrastructures, scoring higher than average for advanced economies[34].

Germany performs well in terms railroad density (7th), airport connectivity (7th), road connectivity (11th) and liner shipping connectivity (7th). The quality of its road infrastructure ranked at the 22nd place, comparing well to most economies worldwide. However, this is down from the 19th rank of the previous year. Germany is advanced in terms of timely completion of the Trans-European Transport Network (TEN-T), which is completed for inland waterways and has a completion rate of 94% and 58% for conventional and high-speed rail network respectively. It has completed 59% of the target of TEN-T for road infrastructure[35].

4

Key issues and barriers in the construction sector

Company failure

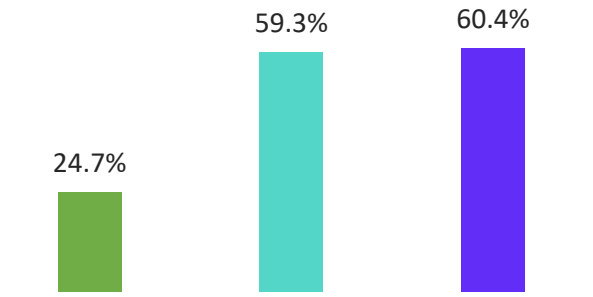
The business demography within the German broad construction sector has been declining between 2010 and 2017[36], partly driven by its consolidation[37]. Both the number of company births and the number of company deaths have decreased across all sub-sectors.

The downward trend in business demography is particularly pronounced in the real estate sub-sector, where **company births** dropped by 45.9% to 11,827 over that period. At the same time, **company deaths** decreased by 52.2% reaching 10,523. The narrow construction sub-sector and the architectural and engineering activities experienced negative trends in terms of company births and deaths between 2010 and 2017. In the narrow construction sub-sector, the number of company births and deaths declined by 19.0% and 3.5% respectively. In the architectural and engineering activities sub-sector, company births and deaths declined by 34.5% and 14.7%, reaching 7,358 and 10,499 respectively.

Insolvencies in the construction sector have been declining and are expected to remain stable in 2019, due to improving profit margins and higher demand[38].

Trade credit

Trade credit in the German economy was not as widespread as in other countries until 2018, with only about 24.7% of the **value of domestic business-to-business sales** being transacted on credit terms. However, this figure grew exponentially in 2019, reaching 59.3% (compared to an average of 60.4% in Western Europe). The sudden increase is indicative of the resilience and still healthy domestic demand amidst a slowdown in export oriented sectors such as manufacturing, automotive, and industrial sector. Amidst this, the businesses are granting more trade credit to increase customer base, and retain them[39].



Proportion of total B2B sales made on credit

In 2019, 17% (compared to 6% in 2018) of SMEs respondents in the survey on access to finance indicated having used trade credit in the past six months.

In parallel, the share of companies not considering trade credit as a relevant source of finance also declined from 86.0% in 2018 to 69% in 2019[40]. This highlights a change in the general risk-averse approach to trade credit, despite the increase in late payments in 2019, in line with the past couple of years.

Late payment

According to the European Payment Report 2019, Germany ranks above average in terms of its payment practices, presenting an average risk payment profile[41].

Financial difficulty of debtors and administrative inefficiencies of customers are perceived as the main causes for payment delays, quoted by 51.0% and 48.0% of German respondents, respectively. In 2019, 77% of German businesses faced problems with debtors paying after due date, as compared to an EU-28 average of 51%. Longer payment terms are the second area of concern, with 52% of German businesses quoting this as the key area of concern. On average, B2B transactions took the longest time to close – 28 days in 2018, up from 24 in the previous year and one day more than the payment terms allowed by business. This was closely followed by public sector transactions, taking 27 days on average, down from 33 in 2018. Furthermore, issues relating to cashflow, limited investments including in human resources and loss of income are quoted as some of the key consequences of late payment mentioned by German businesses[42].

In 2019, payments in the German construction sector took around 45-60 days. It is considered riskier than other sectors owing to higher proportions of non-payment notifications and credit insurance claims. Poor payment behaviour, especially of public sector buyers, remain a pressing concern[43].

Although many companies do experience payment delays, Germany actually ranks better than EU-28 average. In 2018, 67.1% of businesses recorded on-time payments, well above the 42.8% average of the EU-28. The German construction sector reports one of the highest shares of payments performed by due date (71.5%). However, this is less than in 2016, when 85.0% of payments were made by due date. In addition, only 0.7% of businesses in construction reported excessively late payments of over 90 days[44].

Time and cost of obtaining building permits and licenses

Germany ranked 22nd out of 190 economies in terms of "Ease of doing business" (up from the 24th rank in 2018). The country, however, ranked 30th in "Dealing with construction permits", down from the 24th rank in 2018[45].

Completing the formalities to build a warehouse[46] 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%. In particular, **obtaining a building permit** takes 25 days and costs EUR 7,339[47].

Table 3: Construction procedures timing and costs in Germany

Procedure	Time to complete	Associated costs
Obtain topographic survey of the land plot	30 days	EUR 2,175
Obtain building permit	25 days	EUR 7,339
Apply for approval of static calculation	21 days	EUR 4,288
Receive fire safety inspection from District Chimney Sweeper	1 day	EUR 31
Receive inspection of the building shell	1 day	EUR 2,600
Receive inspection after completion of the building ("*Foermliche Bauabnahme*")	1 days	no charge
Apply for water connection	1 day	EUR 7,500
Receive inspection by water company	1 day	no charge
Obtain water connection	45 days	no charge

Source: Doing Business overview for Germany, World Bank, 2020.

Skills shortage

The number of **job vacancies** in the narrow construction sub-sector increased by 134.6%, reaching 121,736 in 2018, from 51,892 in 2010. Conversely, job vacancies in the real estate activities sub-sector grew at a slower pace (+14.2%) over the same period, from 5,216 in 2010 to 5,956 in 2018. These trends reveal large skills shortages in the narrow construction sub-sector, and to a lesser extent in the real estate activities sub-sector. While job prospects are favourable in both the real estate and the narrow construction

sub-sectors, the former experiences less obstacles in hiring qualified workers.

Job vacancies in narrow construction sub-sector between 2010 and 2018 ↑ 134.6%

In parallel, **adult participation rate in education and training** in the narrow construction sub-sector slightly decreased, from 9.4% in 2010 to 9.0% in 2018. In the real estate activities sub-sector, adult participation in training increased slightly from 11.0% in 2010 to 11.2% in 2018. The number of **tertiary students in engineering, manufacturing and construction** has been increasing continuously. Specifically the number of students in architecture and building rose by 45.3% over 2010-2017[48], reaching 23,681. This was followed by students in manufacturing and processing, growing by 44.6% to 7,094. Conversely, the number of tertiary students in engineering and engineering trades dropped by 11.1% over the same period, standing at 47,271.

However, demographic changes constitute a particular threat for the German construction sector, creating difficulties in filling up the increasing number of vacancies originating from the growing proportion of retiring construction workers. In 2016, 10,784 new construction apprenticeship contracts were signed, compared to the 13,500 workers that retired in the same year. The ratio of apprentices to skilled workers was 8.7 in 2014, below the critical value of 10, evidencing an unmet demand for skilled workers, particularly in enterprises with fewer than 100 employees[49].

With increasing demand for construction works, the industry is confronted with labour and skills shortage. As of 2018, there were around 1.2 million unfulfilled positions in Germany, with around 250,000 positions open for crafts sectors, like construction. There has been specific shortage of professions such as electricians, plumbers, plasterers, sanitation workers, heating and ventilation technicians, and the likes[50].

The construction sector is among a number of sectors in Germany which are affected by the lack of qualified personnel.

In 2018, 79.0% of companies in construction assessed skills shortage as the biggest risk for their businesses. This compares to 21.0% in 2010[51]. Additionally, in 2019, 85% of construction firms and 86% of infrastructure firms, quoted lack of availability of skilled staff as a major long term constraint to their investment and development activities[52].

Migration mitigates to some extent the labour shortage, with every sixth worker in the broad construction sector being a foreigner in Germany[53]. However, more facilitated access to the labour market is needed to meet demand and fill vacancies. New legislative changes to the immigration law are tackling barriers to the labour market to ease the situation (see TO 2 – Skills).

Sector and sub-sector specific issues

Material efficiency and waste management

In 2016, over 222.8 million tonnes of **construction and demolition (C&D) waste** were generated in Germany, representing 54.1% of all waste generated[54]. This was 15.4% higher than the waste generated in 2010, i.e. 191.0 million tonnes[55].

Germany was struggling with a shortage of landfill capacity until the last decade, doubling waste disposal costs. Some landfills were closed or could not accept waste outside of their immediate surroundings, often forcing construction companies to transport their waste to other landfills farther away. This led to the so-called "Waste tourism" (*Mülltourismus*), which placed an additional burden on the environment and on road traffic. Germany's construction industry association (*Landes-vereinigung Bauwirtschaft*) therefore stressed the importance of the identification and opening of new landfills to improve the management of contaminated C&D waste[56].

To address some of these challenges, the country established a modern waste management system consisting of modern sorting, treatment and

recycling technologies to enhance its recycling capacity. As a result, according to Statistics Germany, 88.0% of all C&D waste were treated in 2016. The majority of treated waste was recycled for material re-use, while 0.8% was utilised for energy generation. This is well above the 70% target for 2020 set by the EU Waste Framework Directive[57].

Additionally, there has been a strong focus on developing the Circular Economy to transform waste management into a resource management system. The initiative Circular Economy Bau (*Kreislaufwirtschaft Bau*) fosters the circular economy by regularly publishing monitoring reports and bringing together key construction stakeholders[58]. The Bau includes, what is known as the polluter-pays principle, a five-tier waste hierarchy and a provision of shared public and private responsibility for waste management. The ultimate aim is to conserve natural resources, and limit environmental impact of waste management activities[59].

Climate and energy

Emissions of greenhouse gases (carbon monoxide and dioxide, methane, nitrous oxides and particulate matter) from activities in the narrow construction and real estate sub-sectors amounted to 12.9 million tonnes and 0.6 million tonnes in 2018, respectively. While, the narrow construction sub-sector experienced a 31.4% increase in the emission of greenhouse gases, the real estate activities sub-sector reported a 46.3% decline in the emissions as compared to 2010.

5

Innovation in the construction sector

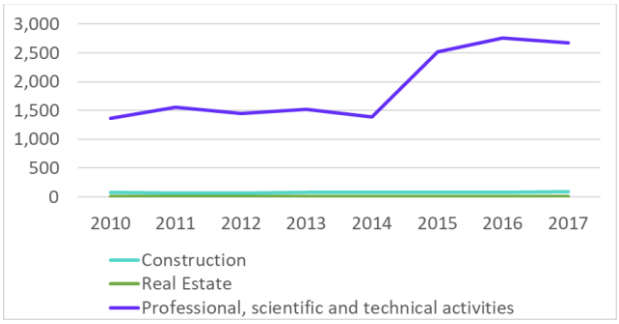
Innovation performance

With an overall innovation and R&D expenditure performance well above the EU average, Germany is classified as a **Strong Innovator**, according to the European Innovation Scoreboard 2019[60]. Germany's performance between 2010 and 2018 has remained stable. The country's strongest innovation dimensions are Intellectual assets, Firm investments and Innovators. On the other hand, Attractive research systems and Human resources are some of the weak dimensions around innovation in the country. Within these, the country scored the lowest for the indicators Foreign doctorate students, Population with tertiary education, and Venture capital expenditures.

In line with the country's strong innovation performance, the business enterprise R&D expenditure (BERD) in the broad construction sector has consistently displayed a positive trend.

Increases in expenditure were recorded for all sub-sectors between 2010 and 2017[61] (Figure 9). BERD expenditures in the real estate and the professional, scientific and technical activities sub-sectors increased significantly, by 200.0% and 95.5% between 2010 and 2017, thus reaching EUR 1.5 million and EUR 2.7 billion. However, the professional, scientific and technical activities sub-sector recorded a 2.9% YoY decline from EUR 2.8 billion between 2016 and 2017. The narrow construction sub-sector also experienced a growth, albeit at a slower pace (+10.6% over the same time period), and reached EUR 84.6 million in 2017.

Figure 9: Business enterprise R&D expenditure (BERD) per construction sub-sector in Germany between 2010 and 2017 (EUR m)



Source: Eurostat, 2019.

The total number of **R&D personnel** (full-time equivalents – FTE[62]) has been increasing across all sub-sectors. In the narrow construction sub-sector the number reached 1,147 in 2017[63]. This represents a 40.0% increase compared to 2010, surpassing the peak of 2014 (1,062 FTEs). Similarly, the number of FTE in the professional and technical activities sub-sector has more than doubled over 2010-2017, reaching 27,438. This was 129.6% higher than the 2010 levels of 11,950. The total R&D personnel in the real estate activities sub-sector amounted to 26 FTEs, a 136.4% jump from 11 FTEs in 2010.

R&D personnel (FTE) in professional, scientific and technical activities sub-sector between 2010 and 2017 ↑ **129.6%**

The number of USPTO and EPO **patent applications** in the German broad construction sector has shown a fluctuating trend. In 2018, they stood at 1,093, 9.4% below the 2010 level.

According to the 2019 EU Industrial R&D Investment Scoreboard, six German companies in construction and materials, five enterprises in real estate investment & services, and six in the household goods & home construction sectors are ranked among the top 1,000 by R&D spending[64].

The share of innovative SMEs in Germany has been fluctuating over recent years, reaching 23.0% in 2018, down from 27% in 2017. This is almost half as compared to the peak in 2004-2006 period, where such a share stood at 43%. This is also reflected in the construction sector. The latter accounted for the lowest share of innovative SMEs in 2018 (12%), down from 15% in 2017 and nearly one-third from the peak of 2002-2004 period (30%). Notably, 67.0% of SMEs in construction, report that innovation activities are not needed. This could be explained by the current economic boom in the sector, but also of the inherent (traditional) nature of the construction sector[65].

A number of policy measures aims to innovation in the construction sector. In 2006, the Federal Ministry for Environment, Nature Conservation, Building (*BMUB*) and Nuclear Safety in collaboration with Fraunhofer IRB launched the '**Future of Building**' (*Zukunft Bau*) research initiative which focuses on solutions related to climate change, mobility as well as demographic change. It aims to strengthen the competitiveness of the German construction industry and, in particular, to expand knowledge and insights in the area of technical, architectural and organizational innovations[66]. Since the founding of the initiative, more than 1,000 research projects have already been funded with almost EUR 115 million in federal funding. In 2017, EUR 11 million were made available for grant applications[67].

In 2016, the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety introduced the **Reform Bundesbau** – its strategy for improvements in the costs, timeliness and quality of construction in federal buildings, which includes a set of measures, meant to address noted deficiencies with public sector construction projects.

Eco-innovation and digitalisation

According to the 2018 Eco-Innovation Index, Germany ranks 2nd in the EU, with a score of 137, well above the EU-28 average of 100. The country performs especially well in terms of eco-innovation inputs, and activities trends. In particular, Germany is a leader in waste management[68].

The Federal Ministry of Economics and Technology promotes an array of construction research projects as part of the **Energy-Optimised Construction** (EnOB) initiative[69], which in 2014 was allocated a budget of EUR 23.7 million[70]. The EnOB comprises five research areas, as follows:

- **EnBau** (Energy-Optimised New Buildings): it entails the planning and construction of offices, administration, public and commercial buildings with minimal energy requirements.
- **EnSan** (Energy-Oriented Refurbishment): involves the testing of innovative refurbishment technologies and materials.
- **EnBop** (Energy-Oriented Operation Optimisation): entails the optimisation of the performance of both traditional and innovative non-residential buildings through the development of innovative tools and services.
- **LowEx** (Low-Exergy Technologies): focuses on the development of innovative systems for buildings and energy supply, also using renewable sources (e.g. solar energy).
- **ViBau** (Vacuum Insulation in the Building Trade): involves the development of highly efficient vacuum insulation panels (VIP) and their integration in construction products, among others.

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**[71]. The road map, which provides a roadmap for leveraging BIM as a

standard planning tool for all federal infrastructure projects by 2020. Similar plans are scheduled for other public works. As per a survey conducted by the Fraunhofer Institute for Industrial Engineering, as of 2018, about one-third construction businesses in Germany, with projects worth more than EUR 25 million are using BIM. However, smaller companies find it difficult to leverage the digital planning system owing to high software costs[72]. In addition to efforts by the public authorities, an industry alliance called “planen und bauen 4.0 GmbH" supports the digitisation of the construction sector[73].

In 2017, the Ministry of Construction, Ministry of Economics and representatives of the construction, architecture and, engineering industry associations launched an industry dialogue under the heading “**Digital construction**” (*Digitaler Hochbau*). This aims to strengthen the networking of the players in the construction value chain and initiate solutions for digital transformation processes in the planning and construction sectors[74].

The Federal Ministry for Economic Affairs and Energy (BMWi), in partnership with more than 40 leading companies and associations launched the **Smart Living Initiative** in March 2017. The 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 legal framework, roadmap for 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[75]. In line with this, as per a 2019 survey, around 31% of German homes consist of at least one smart home application, a notable increase compared to 26% in 2018. Smart lights and smart heating systems are the most common categories of smart devices being used[76]. This is not a surprise considering the fact that around 85% of energy consumption by private households in Germany is for heating and hot water[77].

6

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 main actors shaping policies affecting the construction sector at the country level.

The *Energiewende* is Germany's largest post-war infrastructure project. It heavily affects the construction sector through investments in energy infrastructures, researches and new energy regulations for new and existing buildings.

Germany's ambitious goal is to reduce its energy usage by half until 2050. This includes the heating requirements of the building stock (see Section TO 3 – Resource efficiency/Sustainable construction). The federal government has dedicated EUR 17.0 billion over 2015-2020 to foster energy efficiency measures for the German economy[78]. Investments in the energy sector is expected to reach about EUR 15 billion annually, including EUR 9-10 billion invested in new renewable energy capacity in the 2014-2024 period[79]. However, preliminary estimates show that Germany is already lagging behind in reaching its energy saving targets for 2020[80].

In terms of **housing policies**, the first stage of the 2006 German federal reforms (*Föderalismusreform I*), transferred the entire responsibility of implementation of **social housing programmes** to the federal states, the *Länder*. Therefore, policies vary considerably in focus and size across German federal states[81]. Apart from this, the *Länder* also lead different local policy activities, like vocational trainings or regional financing schemes that have an impact on the construction sector. However, the strained situation of German housing market, coupled with rising housing prices and rents, especially in metropolitan areas, has led the federal government to play a bigger role in social housing projects.

Accordingly, the new Article 104d of the Basic Law (*Gesetz zur Änderung des Grundgesetzes*), allows the Federal government to provide direct, ring-fenced financial assistance to the Länder for the construction of social housing in the future[82].

Funding mechanisms such as increasing the Länder's share of VAT revenues and providing higher supplementary grants to financially strapped Länder, starting from 2020, are being employed by the federal government to support the Länder. Overall a total of EUR 5 billion will be made available by the Federation for the construction of social housing over the 2018–2021 period[83]. Additionally, the central government also implements a number of measures aimed at alleviating housing affordability supporting the housing supply. Indeed, in 2016 the BMUB introduced the so-called **Housing Construction Campaign** (*Wohnbauoffensive*) - a comprehensive package of measures aimed at tackling housing shortages and rising house prices. The policy aims to increase the annual stock of completed dwellings from 270,000 completed dwellings to at least 350,000 dwellings a year by removing barriers and providing incentives at all federal levels[84]. A 2017 review of the progress of the package showed early success in the implementation of measures related to increasing the Federal Compensation Fund for Social Housing (*Kompensationsmittel des Bundes für den sozialen Wohnungsbau*), revision of the land sales and allocation rules, setting up necessary bodies to

simplify construction standards, and increasing awareness and acceptance of the project among the citizens[85]. This initiative was completed with the **Alliance for Affordable Housing and Building**, a cooperation launched by the BMUB in 2014 bringing together key construction stakeholders to address the challenge of rising house prices.

Housing cooperatives play an important role in providing social housings and affordable rents. Such cooperatives are eligible for funding from the EUR 1.5 billion Federal Compensation Fund for Social Housing[86]. In 2018, the federal government gathered stakeholders for a **Housing Summit** (*Wohngipfel*). The government announced a new package of measures for strengthening housing affordability. The aim is to support the building of 1.5 million new dwellings. The package includes provisions for securing land for building, lowering of construction costs and tackling skill shortages in the construction sector[87]. 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 billion during 2018-2021. The effort will enable an additional 100,000 units of social housing by 2021[88].

Additionally, with the aim of strengthening social cohesion, the central government has come up with targeted measures in the areas of social security and inclusion, among others.

In line with this, a new home ownership related child grant scheme (*Baukindergeld*) was introduced in September 2018.

The state grant scheme, aimed at low-income families with children and single parents, finances the first purchase of house or condominium. 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 shouldn't exceed EUR 90,000 for family with one child. The maximum income requirement increases by EUR 15,000 per additional child. Additionally, the children should be under the age of 18 years and the purchase contract should be dated on or after January 1, 2018[89]. A sum of EUR 570 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[90].

The government also intends to increase the housing allowance for people with low incomes in 2020. This policy is enshrined in the **Law on Housing Allowance** (*Wohngeldgesetz*). The amount of the allowance was increased in 2016 and ranges from approximately EUR 300 to EUR 1,000 depending on the size of the household, the cost of the rent and the overall household income[91]. Furthermore, it plans to finance the building of 100,000 **social housing units** and will provide EUR 5.0 billion for this project. Future legislative changes are possible, that could allow the federal government to continuously support the construction of social housing[92].

Furthermore, a new **tenant protection law** (*Mieterschutzgesetz*) entered into force in January 2019. It aims to address the housing crisis in urban areas, where young families and single parent families are faced with worsening affordability. The new law provides more protection for tenants in rented housing and changes in the rental price break (*Mietpreisbremse*). As of January, only 8% instead of the previous 11% of the modernization costs can be allocated to the annual rent[93].

Finally, the Government supported the adaptation of residential buildings through the programme "Rebuilding according to age" (*Altersgerecht Umbauen*), running from 2009 to 2011, with a yearly budget of EUR 80-100 million. The programme was reintroduced in a loan form (2012) and grant variant (2014), funded by the public development bank *Kreditanstalt für Wiederaufbau* (KfW). The programme helped to finance 700,000 barrier-free apartments, which represents about 2% of the apartments stock. Nevertheless, the demand for such housings is estimated at 2.9 million by 2030 due to demographic developments[94].

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[95]. 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 Utilisation Ordinance (*Baunutzungsverordnung*)[96]. 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[97], 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 *Energieeinspar-verordnung* (Energy Saving Act and Energy Saving Ordinance).

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 fur 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[98]. Therewith, the German DIN standards have official status and are mandatory for building projects and for the production of 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[99].

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. Additionally, a limitation period of five years applies for construction related to works, resulting in the manufacturing, maintenance or alteration of a building[100].

In 2018, the Construction Contract Law as part of the Civil Code came into effect. The new law includes 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 damages claims in case of delays. The law also introduces 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% 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. Furthermore, construction sector chambers with experts specializing in construction law should be available in future in order to decide on open questions quickly and competently[101]. The new law has been welcomed by industry associations[102].

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[103].

7

Current status and national strategies to meet Construction 2020 objectives

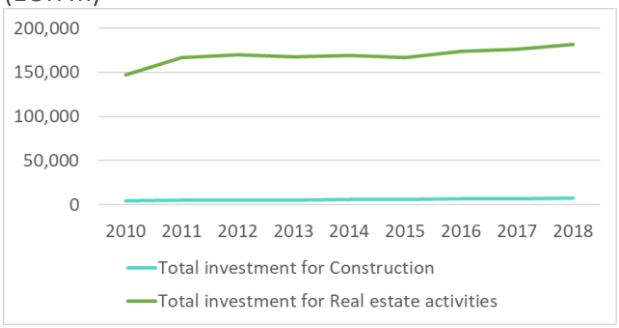
TO 1 – Investment conditions and volumes

Total **investments by the broad construction sector**[104] increased substantially over the past years (Figure 10). Notably, investments by the narrow construction and real estate activities sub-sectors increased by 56.4% and 23.3% respectively, between 2010 and 2018. In absolute terms, investments by real estate activities sub-sector stood at EUR 181.8 billion in 2018, while investments by the narrow construction sub-sector stood at EUR 7.3 billion. **Investments in intellectual property** by the narrow construction and real estate activities sub-sectors also followed an upward trend, increasing by 10.5% and by 49.5%, respectively between 2010 and 2018[105].

Investments by narrow construction sub-sector between 2010 and 2018 ↑ **56.4%**

Investments by real estate activities sub-sector between 2010 and 2018 ↑ **23.3%**

Figure 10: Investment by the German broad construction industry between 2010 and 2018 (EUR m)

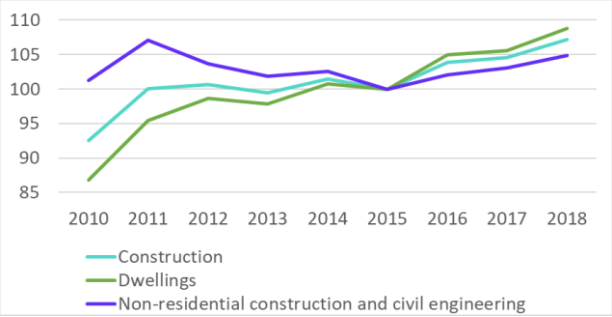


Source: Eurostat, 2019.

Total **investments in the broad construction sector**[106] increased by 7.2% between 2015 and 2018, a 14.7 index point increase between 2010 and 2018 (Figure 11). It is expected to continue growing over the 2019-2021 period. In particular, investments in dwellings experienced an 8.7% growth over 2015-2018, a 22.0 index points (i.p.) increase from 2010. In contrast, investments in non-residential constructions and civil engineering remained relatively stagnant over the same period and increased by 4.9% between 2015 and 2018. In absolute terms, investments in the broad construction sector totalled EUR 326.6 billion in 2017[107], out of which EUR 198.3 billion were invested in dwellings and EUR 128.3 billion were devoted to non-residential constructions and civil engineering[108].

Investments in broad construction sector between 2010 and 2018 (index points) ↑ **14.7 i.p.**

Figure 11: Investment in the German broad construction sector between 2010 and 2018 (2015=100)



Source: AMECO, 2019.

The **investment in infrastructures** amounted to 0.6% of GDP in 2017[109]. This relatively low ratio is partly explained by the capacity and planning constraints at the municipal levels[110]. The largest share of that financing was dedicated to road infrastructure, amounting to EUR 13.2 billion, followed by rail infrastructure with EUR 5.5 billion. They both accounted for 88.7% of total infrastructure investment in 2017, with the remainder being divided among air, inland waterways and sea infrastructure investment. The rail infrastructure investments have also seen the highest increase in investment over the 2010-2017 period, growing by 45.0%. Investments in road infrastructure grew by 17.5% during this period. On the other hand, investments in air, inland waterways and sea saw declines of 25.0%, 21.8% and 57.5%, respectively during this period.

While public investment increased, net investments at the municipal level has remained negative, with investment backlogs increasing to 5% of GDP in 2018. The biggest shortfall has been in education and infrastructure sectors[111]

As a result, existing infrastructure depreciated faster than it could be replaced. Additional investments of 0.3% of GDP is necessary over the next 10 year to close the gap[112].

The central government introduced measures to strengthen its own investments spending, as well as that of the federal states and municipalities. One such measure is the **municipal investment promotion fund**, whose allocation was doubled, reaching EUR 7.0 billion. It was set up for the 2015-2020 period as part of the **Municipal Investment Promotion Act** to boost spending on the maintenance, repair and conversion of local infrastructures and the rehabilitation of schools[113]. By mid-2018, EUR 3.3 billion of the funding available for infrastructures investments has been committed to more than 12,000 different investment projects. 4,145 of these projects involve the energy efficient refurbishment of public infrastructures. Energy efficiency renovations represent also the majority of projects in educational infrastructures, such as refurbishment of school buildings[114]. In parallel, the federal government is reforming federal fiscal relations in order to facilitate investment at municipal level, addressing in particular bottlenecks in implementing transport infrastructures. The reform will come into effect in 2020[115].

Regarding transport infrastructures, the **2030 Federal Transport Infrastructure Plan** (*Bundesverkehrswegeplan - BVWP),* adopted in 2016, 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[116]. 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 is planned as part of the plan, of which EUR 141.6 billion will be invested in maintenance of existing infrastructure. Around EUR 98.3 billion are earmarked for the upgrade and new infrastructure construction. Of the total planned funding of EUR 269.6 billion, 49% or EUR 132.8 billion are earmarked for investments in federal trunk roads, 42% (EUR 112.3 billion) for investment in railway network and the remaining 9% (EUR 24.5 billion) will be for improvements of waterways[117].

A number of important transport infrastructure projects have been announced in Germany. For instance, in July 2019, the Central Government, in partnership with the national railway operator, Deutsche Bahn, agreed to invest EUR 86 billion in the German railway network maintenance and improvement until 2030. Majority of the investment (EUR 62 billion) will be provided by the government, with the remainder (EUR 24 billion) to be contributed by Deutsche Bahn. The 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[118]. Additionally, as part of the trans-European road network (TEN-T), Germany estimates an investment need of EUR 115 billion between 2021 and 2030 for the German sections of the TEN-T core and comprehensive network[119]. Additionally, the renovation and expansion of A7 motorway, has been initiated through a PPP between the government and a private contractor, for a total cost of EUR 600.0 million[120]. The project is also being supported by the European Investment Bank (EIB) with EUR 170.0 million under the **European Project Bond Initiative**[121].

The EIB has financed a number of infrastructure projects in Germany. This includes 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 around EUR 142 million, with a proposed EIB financing of EUR 60 million, aims at electrification of Hamburg's fleet of public bus transport between 2019 and 2023[122].

Renovation spending by households amounted to EUR 12.9 billion in 2018, which represents and increase by 26.4% since 2010. However, the spending as a share of total household disposable income remained stable (0.6%). Energy-related expenditure features prominently among investments in existing dwellings. Indeed, in 2015 EUR 36.4 billion (28%) were dedicated to this purpose, however this is slightly lower in 2010, namely EUR 38.6 billion (32%)[123].

Households renovation spending between 2010 and 2018 ↑ **26.4%**

Finally, a significant portion of **EU Funds** are spent on infrastructures in Germany. Specifically, the planned allocation of Community Funding for 2014-2020 on transport amounts to EUR 555 million[124]. Furthermore, under the Connecting Europe Facility, EUR 1.9 billion worth of projects have been signed by 2016, while nine projects in the area of transport have been signed/approved for financing from the European Structural and Investment Fund (EFSI) managed by the EIB[125].

TO 2 – Skills

Germany has a strong tradition in vocational education and training (VET), characterised by high quality. This is reflected in the high employment rates for graduates, which reached 92.4% in 2018, and is the highest in the EU-28 (well above the EU-28 average of 79.5%). The share of upper secondary students enrolled in VET has decreased slightly to 45.6% in 2017, below the EU-average of 47.8%. In parallel to this trend, the number of vacant apprenticeships has increased continuously over the recent years. In 2018, 57,700 places in VET programmes did not receive any applications, up from 49,000 in 2017[126].

Skills shortage is one of the biggest problems for the German construction sector. To tackle this, the central government, in partnership with regions (Länders), has launched 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[127].

In 2013, the construction sector in Germany launched the "**Berufsstart Bau**" pilot project, which financially supports measures for training in the construction industry. Under the project, regional measures are being set up in around 200 cross-company training centres throughout Germany in cooperation with local construction companies. The inter-company training centres bring in experience, know-how and existing contacts[128]

Some Länder set up campaigns aimed at raising interest in the construction sector among young

students. An instance is the youth campaign "**BAU – Dein Ding**" (Construction – your thing), initially launched in Baden-Württemberg and operated by the local construction industry association[129]. The initiative aims to inspire local students to explore construction-related professions through a variety of materials, including the "Construction Bus" (*BauBus*), visiting students directly in schools. Additionally, the initiative has also launched various innovative learning aids such as the BauBox, BauSimulator/BauBoard, BauChecker and BauFilme which enhance the learning experience through a number of interactive options[130]. The programme was then adopted by other regions such as North Rhine-Westphalia[131].

At regional level, Berlin-Brandenburg launched the initiative '**Ready for Apprenticeship**' (*Startklar für Ausbildung*) to offset the lack of young talents. The programme started in 2013, with an approximate annual budget of EUR 365,000. The main goal of the initiative is to reduce the skills mismatch by helping young unemployed to discover a range of construction-related professions. It is designed as a 6-months training scheme, running between April-October each year, facilitating the transition into a construction profession[132].

"**Deutschland baut**!" (Germany builds!) is an additional initiative by an association of private companies across the entire construction value-chain. It aims to provide a common platform for all companies in the construction sector and create a network to facilitate cooperation among industry stakeholders. The initiative's ultimate goal is to mitigate the shortage of qualified workers by attracting and upskilling young people. In November 2015, the association launched an 18-months trainee programme enabling technical/engineering graduates to gain first-hand experience within adhering construction companies[133].

To stimulate interest in the construction sector for young people, the Construction Federation of Nordrhein (*Baugewerbeverband Westfalen*) launched the so-called **Azubi Portal**, which provides key information on apprenticeships in the construction sector. It allows interested candidates to submit their application directly through the portal[134].

The recent influx of migrants provides an opportunity to recruit workers and to facilitate their integration. In this respect, the pilot project "**Arrivo Bauwirtschaft**" run by the City of Berlin aims at coaching asylum seekers to be fit for regular professional training[135].

Additionally, after years of debates over skills shortages, a new legislative proposal was submitted by the Interior Ministry. The draft bill aims to simplify **migration law** ("*Zuwanderungsgesetz*") and make it easier for non-EU professionals to enter the German job market.

In June 2019, the German parliament passed the Skilled Labour Immigration Act, which comes into effect on March 1, 2020. The new rule, which permits qualified workers from non-EU countries to work in Germany, is expected to bring an additional 25,000 skilled workers each year.

As per the Act, obtaining official recognition of educational qualifications from a competent German authority is a primary criterion to obtain visa. Once recognised, the applicant may apply for visa and come to Germany to take up the relevant job offer. For applicants who haven't got a job offer, but have a recognised professional education, they may obtain a residency permit for six months to find a suitable job. During the job hunt, they could also take up probationary work or internship, not exceeding 10 hours a day. The basic criterion being a level B2 proficiency in German language. The rules also allow the candidates to take up further training and education in Germany, in case 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". Certain occupations suffering from labour shortage, including craftsmen and other skilled workers in construction sector, electrical and other engineers, are expected to benefit from this Act[136].

TO 3 – Resource efficiency / Sustainable construction

Since the political push to decarbonise the economy (*Energiewende*), Germany made substantial efforts to make its building stock more energy efficient. Given that buildings make up approximately 35% of energy consumption, they have important energy savings potential[137].

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% by 2050, compared to 2008[138].

The legal requirements for energy conservation in Germany are laid out in the Energy Conservation law, a legislation which is continuously adjusted to account technological development, as well as dynamic political and economic considerations. The most important standards governing energy efficiency in buildings are set out in Energy Conservation Act (*EnEG*), the Energy Conservation Ordinance (*EnEV*), and the Renewable Energies Heat Act (*EEWärmeG*). The **Energy Conservation Act** (*EnEG*) promotes energy transition in building sector by creating appropriate legal framework. The last amendment for the act entered into force in July 2013. The **Energy Conservation Ordinance** (*Energieeinsparverordnung – EnEV*) implement the goals of the Energy Concept and Energy Efficiency Strategy. They also transpose the EU Directive on the energy performance of building (2010/21/EU)[139]. The Energy Saving Act was amended through the Fourth Act in 2013, which introduces the obligation for new buildings to be constructed as nearly zero-energy buildings. The Energy Savings Ordinance, introduced in May 2014 increases energy efficiency standards by 20-25% starting in 2016[140]. In parallel, the **Renewable Energies Heat Act** (*EEWärmeG*) sets the obligation to use renewable energies in new buildings, aiming to increase their share in the heat sector to 14% by 2020[141]. 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[142].

The Federal government aims to merge the three pieces of legislation—EnEG, EnEV and EEWärmeG—into a new law, the Buildings Energy Act (GEG). The ultimate aim is to adopt a universal set of rules governing both energy efficiency and the use of renewables in the buildings sector.

The aim was also to restructure and standardise energy conservation law for buildings by uniting the above laws and regulations within the GEG Act[143]. The Act is, however, still under consultation by a committee of federal ministers as of May 2019[144]. There has also been some criticism of the Act, with industry, environmental organisations and politicians stating that it would fall short of meeting the emission reduction targets[145].

In addition to the current legislative framework for energy efficiency in buildings, the German government introduced the **Green Paper on Energy Efficiency** in 2016. This serves as a starting point for a reflection on how to further boost energy efficiency, including in the building stock[146]. This led the Ministry of Economic Affairs and Energy presented a new energy audit tool - the 'tailored renovation roadmap' (*individuelle Sanierungs-fahrplan*) in 2017. The roadmap is a software-based tool that serves to provide an overview of the modernisation work a particular building will require over time. In doing so, it provides insights on untapped possibilities and costs involved for energy conservation as well as usage of renewables. It is one of the key ministry's efforts to implement the government's Energy Efficiency Strategy for Buildings[147].

So-called '**Building check**' and '**Heating Check'** are on-site consulting services that offer practical recommendations on how to reduce energy consumption. Finally, the information portal **Deutschland macht's effizient** (www.machts-effizient.de) provides information and advice on all topics related to energy efficiency. A free hotline is also available for questions[148].

The Ministry for Economic Affairs (BMWi), in September 2018, adopted the 7th Energy Research Programme defining the energy research policies until 2022, at a total budget of EUR 6.4 billion[149].

The programme, which is part of the Ministry's **"Research network – Energy in Buildings and Districts"** programme launched in 2015, 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 total funding of the programme corresponds to a 45% increase from the previous period 2013-2017 and will be implemented in coordination with three Federal Ministries—Economic Affairs and Energy (BMWi), Education and Research (BMBF) and Food and Agriculture (BMEL)[150]. As part of it, the BMWi provided funding for 4,036 research projects in 2018. Out of these, more than 1,000 new projects with a focus on energy system transformation were launched in the same year. The key focus is on applying energy efficiency and use renewable sources in industry and commerce, buildings and neighbourhoods, and in the transport sector[151].

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.

For example, home owners, switching to renewable energy sources such as a solar thermal system, a biomass system or a heat pump, are eligible for grants ranging from EUR 2,000 to EUR 4,500. 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% 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. The funding preference is given to SMEs to convert their heating and cooling systems to renewable sources. Finally, municipalities investing in renewable heating and cooling systems with nominal output of more than 100 kilowatts can get subsidised loans with repayment grants[152]. The MAP programme was revised in January 2018 to enable applicants to apply for the funding even before the commencement of work. Additionally, in February 2018, equipment funding was also included within the purview of MAP. This would benefit biomass installations and deep geothermal installations[153].

Additionally, the **Energy Efficiency Incentive Programme** aims to expand the support available to the building sector to boost investment in energy efficiency renovation of homes. Measures include investment grants for fuel-cell heating systems, as well as awareness campaigns and advisory services for home-owners[154]. The **Heating Optimisation Funding Programme** launched in 2016 gives financial support for optimising the heating system, such as the installation of high-efficiency pumps. The programme covers up to 30% of optimisation expenses for a maximum amount of EUR 25,000[155].

The German development bank KfW implements some of the best-known support schemes for sustainable buildings in Europe. The **KfW programmes** are playing an important role in meeting the energy targets. For instance, the **Energy-efficient Refurbishment Programme** covers 30% of the costs for energy-efficient renovations of a building. Home owners, businesses as well as municipalities are eligible for the KfW low-interest loans and grants. Since 2016, the KfW programme was updated and now also covers support to heating and ventilation. The KfW funding contributed very significantly to improving energy efficiency in buildings, as approximately one out of three retrofits benefited from it[156].

Furthermore, the federal government has earmarked EUR 150 million for the new research initiative "**Solar-powered Buildings/**

Energy-efficient Cities". This initiative was launched in the context of the Energy Research Programme. The projects are funded for a period of up to five years, with the first call for proposals launched in 2016.

Additionally, 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 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[157].

"*EnEff.Gebäude*.2050" supports innovative projects for achieving nearly climate-neutral building stock by 2050. The funding initiative, launched in 2016, is available for exemplary innovation and transformation projects in the building sector. It aims to contribute to the removal of barriers on the path towards a virtually climate-neutral building stock[158].

Further support for the promotion of energy efficiency in construction comes from the **Guidelines for Sustainable Construction** (*Leitfaden für Nachhaltiges Bauen*). In 2013, they were made compulsory by the Federal Ministry of Transport, Building and Urban Affairs for federal buildings. A number of criteria defines sustainable building constructions, including ecological quality, economic quality, socio-cultural and functional quality, technical quality and process quality. The latter addresses matters of energy efficiency, resource efficiency and waste prevention. The Assessment System for Sustainable Building complements the guidelines and can result in the award of a **Sustainable Building Certificate**.

Germany's 2017 **National Energy Efficiency Action Plan (NEEAP)** reaffirms the country's commitment to reaching the targets provided in the Energy Efficiency Directive. NEEAP highlights measures for implementing the long-term strategy for mobilising investment in the renovation of the national building stock[159].

TO 4 – Single Market

Germany reports an average performance with respect to the metrics of the 2019 EU Single Market Scoreboard

In terms of Single Market Governance Tools, the country performed above average across the e-Certis, EURES and Your Europe indicators. The country is in line with the EU-28 average in terms of Transposition of law, EU Pilot, Internal Market Information System, and SOLVIT indicators. However, it performed below average in terms of Infringements.

Germany deals with a large number of pending infringement proceedings related to Single Market legislation. In 2019, the pending infringements cases amounted to 44, almost twice the EU-28 average of 25. The most problematic areas of infringements are transport, especially road and rail transport, direct and indirect taxation, and environment, which account for 64% of all pending cases[160].

Against the Single Market Policy areas, Germany performed above average in terms of professional qualifications. Finally, the country performed above average in foreign direct investment, while it is in line with EU-28 in terms of trade in goods and services[161].

In terms of **Public Procurement**, the country is rated as average. While it performs average in terms of SME Bids and SME contractor indicators, the country scores unsatisfactory rating in 6 of the 12 criteria—single bidder, publication rate, procedures divided into lots, missing calls for bids, missing seller registration numbers and missing buyer registration numbers[162]. These reflect widespread competition and bureaucracy, with lesser transparency about the buyers and sellers and little openness in terms of public procurement advertisements. Additionally, a lower proportion of tenders are divided into lots, indicating lesser opportunities for SMEs[163].

Germany, despite having a strong institutional and legal anti-corruption framework, 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 apparent close ties

between authorities and large companies. Around a third of Germans believe prevalence of corruption in issuing building permits[164].

Competition on the German construction market has become tougher over the last decade, particularly following the EU enlargement. According to the Central Association of the German Construction Industry, one of the reasons for this is EU law. Foreign firms are allowed to operate for several months under the social security system of their country of origin, even when securing contracts in other Member States[165]. This has led to a considerable difference in labour costs between the German and Eastern European workforce, making Eastern European companies more competitive than German ones.

With respect to the use of Eurocodes, Germany published all Eurocodes 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 Eurocodes Parts are restricted according to the Regulation MLTB 03/2014. There is no particular obligation to make use of Eurocodes in public procurement[166].

TO 5 – International competitiveness

Germany ranked 7th in the 2019 Global Competitiveness Index in terms of the competitiveness of its economy. This is a decline as compared to previous year, when it was ranked on the 3rd position[167].

The country ranked 5th (down from 2nd in 2018) in terms of business dynamism, especially in terms of growth of innovative companies, companies embracing disruptive ideas and insolvency and regulatory framework. Germany also retained its 1st rank regarding innovation capability. The economy is characterised by advanced cluster network development, high quality of scientific researches, publications and research institutions.

A 2018 global study of the competitiveness capacity of 63 countries ranked Germany on the 15th position, highlighting few obstacles. The study surveys managers and business leaders, who quoted the German tax system as problematic. Other hurdles revealed by the study include burdensome bureaucracy and complicated procedures for establishing start-ups. On the other hand, one of the strengths of the German economy remains the availability of highly qualified human resources. High levels of political stability is quoted by two-thirds of business leaders as positive and decisive factor for attracting investments[168].

Despite 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 2018 by sales. This was comparable to other European countries including Belgium, Switzerland, Finland or Norway, but well behind countries such as the UK, Spain and France. The latter countries had 12, 7 and 3 companies, respectively within the ranking. Nevertheless, due to its renowned engineering expertise, the German construction industry has also been increasingly successful in securing international contracts, particularly for infrastructure and civil engineering projects. On the other hand, several issues have been reportedly limiting opportunities for German construction businesses wishing to operate across the EU, particularly linked to public procurement[169].

Public procurement procedures to secure tenders in other EU-28 countries are often deemed too expensive and complex. This is linked to companies having to comply with technical and administrative requirements to which they are not accustomed. These challenges have resulted in construction firms being discouraged to participate in EU tenders. This was the case for a German company initially tendering for a road construction project in Poland. Subsequently it decided not to enter the EU public procurement process again due to the higher costs and administrative burden incurred[170].

Germany's performance in terms of the internationalisation has been above the EU-28 average, being the third-best performing Member State in terms of Small Business Act (SBA) principles.

The country is among the top performing in two of the indicators — automation of formalities, and percentage of German SMEs with extra-EU exports of goods (16.9% against 9.8% in EU-28). In terms of percentage of SMEs with extra-EU online exports, the country performs above the EU-28 average (7.1% against 5.0%). Germany performs below the EU-28 average in terms of only two indicators— advance rulings and formalities-procedures. The country is in line with EU-28 in terms of information availability and involvement of trade community[171].

According to the Federation of European International Contractors, German member contractors had the third largest turnover in 2017 (EUR 27.8 billion). Interestingly, 42.3% of this came from the North American region (USA and Canada), while 39.4% came from Oceania/Australia region. Europe, including EU-28, non-EU and Russia, accounted for only 12.1% of the turnover in 2017[172]. In 2016, the international volume of turnover for German construction firms totalled EUR 24.8 billion, 89% of which came from outside of the EU[173]. Currently, the presence of the German construction sector spans over 70 countries across all continents, with the dominance of North America and Australia increasing over that of Europe and Asia[174].

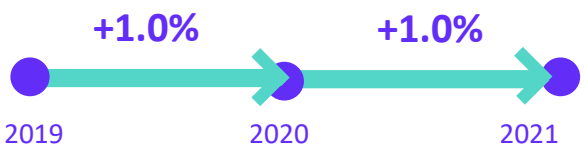
Finally, the wider Central and Eastern Europe markets (including Ukraine, Turkey and Russia) represents important growth opportunities for German construction companies. To better take advantage of these opportunities, the German Construction Industry Federation developed a Central and Eastern Europe Portal, which includes relevant market and construction related information for each country[175].

8

Outlook

The **outlook** for the German economy continues to be solid with an annual **GPD** growth predicted at 1.0% in both 2020 and 2021. Strong domestic demand, and robust labour market are expected to remain the main economic drivers, alongside investments in housing. In line with the developments in the general economy, the outlook for the construction sector is also positive.

Expected GDP growth between 2019-2021



The **production** and consequent turnover in the sector are also on the rise after a decline in 2010. In fact, the **volume index of production** in the broad construction sector is expected to increase by 15.5% between 2015 and 2020, a 6.6 index point increase from 2018. As a result, the total turnover of the broad construction sector is expected to grow by 10.7% between 2019 and 2021, reaching EUR 637.0 billion. This will be driven by the growth of the narrow construction sub-sector, which turnover is forecasted to increase by 13.1% over the same period.

In turn, the **value added** of the broad construction sector is expected to grow, with an annual forecasted growth of 4.7% and 5.7% in 2019 and 2020, respectively – reaching EUR 308.4 billion in 2020. The **apparent labour productivity**, on the other hand, is expected to remain at the same level across the sub-sectors between 2018 and 2020. This, combined with increases in the prices of construction materials and personnel costs, may in turn have an impact on the broad construction sector profitability.

Turnover in the broad construction sector between 2019 and 2021 ↑ **10.7%**

Value added in the broad construction sector between 2018 and 2020 ↑ **10.6%**

The **number of workers** employed in the broad construction sector is projected to increase by 11.5% over 2018-2020, reaching 4.4 million people.

Number of persons employed by the broad construction sector between 2018 and 2020 ↑ **11.5%**

The sector's continued growth is partly attributed to the expansion of the **housing market.** To address the current housing shortage, an additional 350,000 – 400,000 apartments and residential units need to be built annually for the five next year. In turn, this would require investments amounting to 1.0-1.5% of GDP over the next five years. In fact, the government also announced its intentions to build over 1.5 million new units by 2021[176]. Such investments, if realised, could contribute to the sector's medium-term growth. In the meantime, the weak supply is expected to put continued upward pressure on house prices, especially in conurbations and major cities[177].

In terms of **civil engineering**, construction activity is expected to continue its growth path. This is driven by a rise in investments in the German rail infrastructure by the Federal Government in partnership with Deutsche Bahn. The EUR 86 billion plan includes several large-scale projects, such as the bridge renovation programme and an expansion of the railways network, are expected to

secure the segment's growth. Investments in the German highways as part of the TEN-T core and comprehensive network continue driving the positive trend[178].

The main challenge for the continued growth of the sector remains the wide spread **skills shortages**. The Skilled Labour Immigration Act passed in June 2019, in conjunction with other initiatives to enhance worker skills, is expected to mitigate the effects of skill shortages.

The German construction sector is expected to continue growing driven by robust order situation in the residential construction as well as in the infrastructure segments. However, a slowdown of the construction sector may be expected in the mid-term.

References

1 Please note that 2018 is a nowcast. Please refer to the methodology for further information.
2 Please note that 2018 is a nowcast. Please refer to the methodology for further information.
3 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.
4 Apparent labour productivity refers to the Gross Value Added per person employed
5 Please note that 2018 is a nowcast. Please refer to the methodology for further information.
6 European Commission, European Semester Country Report Germany, 2019, https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-germany_en.pdf
7 Please note that 2018 is a nowcast. Please refer to the methodology for further information.
8 Data unavailable for subsequent years.
9 The gross operating rate is the ratio of Gross Operating Surplus to Turnover, and is an indicator of profitability.
10 No data available for subsequent years.
11 European Commission, European Semester Country Report Germany, 2019, https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-germany_en.pdf
12 European Commission, European Semester Country Report Germany, 2019, https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-germany_en.pdf
13 World Economic Forum, Global Competitiveness Report, 2019. http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf
14 European Commission, European Semester Country Report Germany, 2019, https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-germany_en.pdf
15 World Bank Group, Doing Business 2020, Germany Economy Profile, October 2019, https://www.doingbusiness.org/content/dam/doingBusiness/country/g/germany/DEU.pdf
16 European Commission, SBA Fact Sheet, Germany 2019. https://ec.europa.eu/docsroom/documents/38662/attachments/12/translations/en/renditions/native
17 European Commission, SBA Fact Sheet, Germany 2019. https://ec.europa.eu/docsroom/documents/38662/attachments/12/translations/en/renditions/native
18 Data for subsequent years not available.
19 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.
20 Data for prior years not available.
21 Deutsche Bundesbank, Financial Stability Review, November 2019, https://www.bundesbank.de/resource/blob/814946/bb47a78259e2dc63c97bf35f17e04dd4/mL/2019-finanzstabilitaetsbericht-data.pdf
22 European Commission, SME access to finance conditions, 2019 SAFE Results. https://ec.europa.eu/docsroom/documents/38421
23 Deutsche Bundesbank, Financial Stability Review, November 2019, https://www.bundesbank.de/resource/blob/814946/bb47a78259e2dc63c97bf35f17e04dd4/mL/2019-finanzstabilitaetsbericht-data.pdf
24 Atradius, Market Monitor Construction Germany 2019, February 2019, https://group.atradius.com/publications/market-monitor-construction-germany-2019.html
25 Deutsche Bundesbank, Financial Stability Review, November 2019, https://www.bundesbank.de/resource/blob/814946/bb47a78259e2dc63c97bf35f17e04dd4/mL/2019-finanzstabilitaetsbericht-data.pdf
26 Deutsche Bundesbank, Financial Stability Review, November 2019, https://www.bundesbank.de/resource/blob/814946/bb47a78259e2dc63c97bf35f17e04dd4/mL/2019-finanzstabilitaetsbericht-data.pdf
27 Ibidem.
28 The overcrowding rate is defined as the percentage of the population living in an overcrowded household.
29 Eurostat, Overcrowding rate. http://ec.europa.eu/eurostat/product?code=ilc_lvho05a&language=en&mode=view
30 Eurostat, Severe housing deprivation rate is defined as the percentage of population living in the dwelling which is considered as overcrowded, while 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 dark.
31 Eurostat, Severe housing deprivation rate by age, sex and poverty status - EU-SILC survey. http://ec.europa.eu/eurostat/product?code=ilc_mdho06a&language=en&mode=view
32 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.
33 Eurostat, Housing cost overburden rate by age, sex and poverty status - EU-SILC survey. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_lvho07a&lang=en
34 World Economic Forum, The Global Competitiveness Report 2019. http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf

35 European Commission, EU Transport Scoreboard 2019. https://ec.europa.eu/transport/facts-fundings/scoreboard/countries/germany/investments-infrastructure_en

36 Data for subsequent years unavailable

37 See more information at: https://www.gtai.de/resource/blob/64322/20b5326422cc889a35ad3cdce5c43696/fact-sheet-green-building-germany-en-data.pdf

38 Atradius, Market Monitor Construction Germany 2019, February 2019, https://group.atradius.com/publications/market-monitor-construction-germany-2019.html

39 Atradius, Payment Practices Barometer Germany. October 2019. https://group.atradius.com/publications/payment-practice-barometer-germany-2019.html

40 European Commission, SME access to finance conditions, 2019 SAFE Results., https://ec.europa.eu/docsroom/documents/38421

41 Intrum Justitia, European Payment Report, 2019. https://www.intrum.com/media/5755/intrum-epr-2019.pdf

42 Ibidem.

43 Atradius, Market Monitor Construction Germany, 2019, February 2019. https://group.atradius.com/publications/market-monitor-construction-germany-2019.html

44 CRIBIS D&B, Payment Study 2019. https://www.dbisrael.co.il/pdf/D&B_Payment_Study_2019.pdf

45 World Bank Group, Doing Business 2020, Germany Economy Profile, October 2019. https://www.doingbusiness.org/content/dam/doingBusiness/country/g/germany/DEU.pdf

46 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.

47 World Bank Group, Doing Business 2020, Germany Economy Profile, October 2019. https://www.doingbusiness.org/content/dam/doingBusiness/country/g/germany/DEU.pdf

48 Data for subsequent years unavailable

49 Deutsche Bauindustrie, Bedarf an Facharbeitern nicht mehr gedeckt. http://www.bauindustrie.de/zahlen-fakten/bauwirtschaft-im-zahlenbild/ausbildung-der-bauwirtschaft/

50 DW.com, A shortage of skilled labor, July 2019. https://www.dw.com/en/a-shortage-of-skilled-labor/av-49719679

51 Deutsche Bauindustrie, Fachkräftemangel, https://www.bauindustrie.de/zahlen-fakten/bauwirtschaft-im-zahlenbild/fachkraeftemangel_bwz/

52 EIB, Investment Survey, Germany, November 2019. https://www.eib.org/attachments/efs/eibis_2019_germany_en.pdf

53 KfW Research, Fachkräfteengpässe im Bauhandwerk beeinträchtigen zunehmend den Wohnungsbau, https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-Fokus-Volkswirtschaft/Fokus-2018/Fokus-Nr.-221-August-2018-Fachkraefteengpaesse-im-Bauhandwerk.pdf

54 Statistisches Bundesamt, Abfallaufkommen in Deutschland stagniert. June 2017. https://www.destatis.de/DE/PresseService/Presse/Pressemitteilungen/2017/06/PD17_196_321.html

55 Eurostat. Generation of waste by economic activity. https://ec.europa.eu/eurostat/tgm/refreshTableAction.do;jsessionid=s6y4t-FNe_uGP1oZ4kgizWKUizvhjHvo_VKfAYoIdI-oITh0b0jm!-1619364693?tab=table&plugin=1&pcode=ten00106&language=en

56 Bauwirtschaft Baden-Württemberg, Deponieknappheit: Wohin mit nicht wiederverwertbaren Baumassenabfällen?. November 2015. http://bauwirtschaft-bw.de/2015/11/30/Deponieknappheit-Wohin_mit_nicht_wiederverwertbaren_Baumassenabfaellen/6171,11

57 Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Waste Management in Germany 2018 | Facts, data, diagrams, March 2018. https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/abfallwirtschaft_2018_en_bf.pdf

58 Deloitte, Construction and Demolition Waste management in Germany, September 2015. http://ec.europa.eu/environment/waste/studies/deliverables/CDW_Germany_Factsheet_Final.pdf

59 Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Waste Management in Germany 2018 | Facts, data, diagrams, March 2018. https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/abfallwirtschaft_2018_en_bf.pdf

60 European Commission, European Innovation Scoreboard 2019, Germany, June 2019 https://ec.europa.eu/docsroom/documents/35891

61 Data for subsequent years unavailable

62 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.

63 Data for subsequent years unavailable

64 European Commission, The 2019 EU Industrial R&D Investment Scoreboard, https://iri.jrc.ec.europa.eu/sites/default/files/2019-12/SB2019_Final_18Dec2019_0.pdf

65 KFW, SME Innovation Report 2018, July 2019. https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-Innovationsbericht/KfW-Innovationsbericht-EN/KfW-SME-Innovation-Report-2018_EN.pdf

66 Federal Ministry for Education and Research. Bundesbericht Forschung und Innovation 2014. https://www.bundesregierung.de/Content/DE/_Anlagen/2014/05/2014-05-21-bericht-forschung-innovation.pdf?__blob=publicationFile&v=1

67 Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Hendricks fördert Forschungsprojekte im Bauwesen mit 11 Millionen Euro. August 2017. https://www.bmub.bund.de/pressemitteilung/hendricks-foerdert-forschungsprojekte-im-bauwesen-mit-11-millionen-euro/

68 European Commission, Eco-Innovation Scoreboard 2018, Germany, https://ec.europa.eu/environment/ecoap/indicators/index_en
69 EnOB, http://www.enob.info/en/research-areas/
70 Bundesministerium für Wirtschaft und Energie (BMWi), Bundesbericht Energieforschung 2015. April 2015. https://www.bmwi.de/BMWi/Redaktion/PDF/Publikationen/bundesbericht-energieforschung,property=pdf,bereich=bmwi2012,sprache=de,rwb=true.pdf
71 Federal Ministry of Transport and Digital Infrastructure, Road Map for Digital Design and Construction, 2016. https://www.bmvi.de/SharedDocs/EN/publications/road-map-for-digital-design-and-construction.pdf?__blob=publicationFile
72 Germany Trade & Invest (GTAI), Construction and Green Building in Germany Fact Sheet, Issue 2018-2019, https://www.gtai.de/resource/blob/64322/20b5326422cc889a35ad3cdce5c43696/fact-sheet-green-building-germany-en-data.pdf
73 Planen bauen 4.0, http://planen-bauen40.de/
74 Federal Ministry of Environment, Nature protection, Construction Building and Nuclear Safety, Bauministerium und Wirtschaftsministerium initiieren den Branchendialog "Digitaler Hochbau", September 2017. https://www.bmub.bund.de/pressemitteilung/bauministerium-und-wirtschaftsministerium-initiieren-den-branchendialog-digitaler-hochbau/
75 Federal Ministry of Economic Affairs and Energy, Business Initiative Smart Living, March 2017. https://www.smart-living-germany.de/SL/Redaktion/EN/Dossiers/business-initiative-smart-living.html
76 Bitcom, 3 von 10 Deutschen haben ein smartes Zuhause, August 2019. https://www.bitkom.org/Presse/Presseinformation/3-10-Deutschen-smartes-Zuhause
77 GTAI, Energy Efficiency in Buildings. https://www.gtai.de/gtai-en/invest/industries/energy/energy-efficiency-in-buildings
78 Die Welt, Deutschland scheitert auch am zweiten Ziel der Energiewende, https://www.welt.de/wirtschaft/article186805596/Energiewende-Deutschland-ist-nicht-so-effizient-wie-geplant.html
79 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
80 Mitsubishi Electric, German Energy Act For Buildings (GEG) Still At The Draft Stage. https://www.ecodan.de/en/knowledge/german-energy-act-for-buildings-geg/
81 Housing Europe, Social housing in Europe: Germany http://www.housingeurope.eu/resource-107/social-housing-in-europe
82 Federal Ministry of Finance, German Stability Programme, 2019. https://ec.europa.eu/info/sites/info/files/business_economy_euro/economic_and_fiscal_policy_coordination/documents/2019-european-semester-stability-programme-germany-en.pdf
83 Ibidem
84 Federal Ministry of Environment, Nature protection, Construction Building and Nuclear Safety, Bundesbauministerin Hendricks wirbt für eine Fortsetzung der Bündnisarbeit nach der Bundestagswahl, June 2016. https://www.bmub.bund.de/pressemitteilung/hendricks-buendnis-fuer-bezahlbares-wohnen-und-bauen-ist-ein-erfolgsmodell/
85 Federal Ministry of Environment, Nature protection, Construction Building and Nuclear Safety, Bericht des Expertengremiums zum Umsetzungsstand der Wohnungsbau-Offensive, July 2017. http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Wohnungswirtschaft/umsetzungsstand_wohnungsbau-offensive_bf.pdf
86 Federal Ministry of Environment, Nature protection, Building and Nuclear Safety, November 2016, http://www.bmub.bund.de/presse/pressemitteilungen/pm/artikel/wohnungsgenossenschaften-stehen-fuer-bezahlbare-mieten-und-schaffen-neuen-wohnraum/?tx_ttnews%5BbackPid%5D=3001
87 BMI, Wohngipfel 2018: Historisch einmaliges Maßnahmenpaket, https://www.bmi.bund.de/SharedDocs/pressemitteilungen/DE/2018/09/wohngipfel.html
88 Federal Ministry of Economic Affairs and Energy, National Reform Programme 2019, Germany, April 2019. https://www.bmwi.de/Redaktion/EN/Publikationen/national-reform-programme-2019.pdf?__blob=publicationFile&v=3
89 KfW, Mit dem Baukindergeld das eigene Zuhause leichter finanzieren. https://www.kfw.de/inlandsfoerderung/Privatpersonen/Neubau/Baukindergeld/
90 Federal Ministry of Finance, German Stability Programme, 2019. https://ec.europa.eu/info/sites/info/files/business_economy_euro/economic_and_fiscal_policy_coordination/documents/2019-european-semester-stability-programme-germany-en.pdf
91 Federal Ministry of Environment, Nature protection, Building and Nuclear Safety, Wohngeld - ein Zuschuss zur Miete oder zur Belastung, http://www.bmub.bund.de/themen/stadt-wohnen/wohnraumfoerderung/wohngeld/
92 Die Zeit Online, Bund will Wohngeld 2020 erhöhen, https://www.zeit.de/politik/deutschland/2018-09/wohngipfel-bund-wohngeld-erhoehung-redaktionsnetzwerk-deutschland-sozialwohnungen-mietrecht
93 Die Welt, Das ändert sich für Deutschlands Mieter https://www.welt.de/finanzen/immobilien/article184544380/Neues-Gesetz-Das-aendert-sich-fuer-Deutschlands-Mieter.html
94 Federal Ministry of Environment, Nature protection, Construction and Nuclear Safety, Förderprogramm "Altersgerecht Umbauen". http://www.bmub.bund.de/themen/stadt-wohnen/wohnraumfoerderung/altersgerecht-wohnen/foerderprogramm-altersgerecht-umbauen/
95 Germany Trade & Invest, http://www.gtai.de/GTAI/Navigation/EN/Invest/Investment-guide/The-legal-framework/planning-and-building,t=construction-laws,did=6832.html
96 DLA Piper, Applicable legislation and governance for planning and zoning controls, Oct 2019. https://www.dlapiperrealworld.com/law/index.html?c=DE&t=zoning
97 Germany Trade & Invest, http://www.gtai.de/GTAI/Navigation/EN/Invest/Investment-guide/The-legal-framework/planning-and-building,t=building-permits,did=6834.html

98 Deutsches Institut für Bautechnik (DIBt), https://www.dibt.de/.
99 European Commission, Liability and insurance regimes in the construction sector: national schemes and guidelines to stimulate innovation and sustainability. April 2010 http://www.elios-ec.eu/sites/default/files/pdf/EliosspecialreportonT27MemberStates.pdf
100 DLA Piper, Germany, Limitation Period, http://www.dlapiperrealworld.com/law/index.html?t=construction&s=liability&q=limitation-period&c=DE
101 FAZ, Mehr Rechte fürs Bauen. January 2018. http://www.faz.net/aktuell/wirtschaft/wohnen/neues-gesetz-was-steht-im-neuen-bauvertragsrecht-15408747.html
102 Bauindustrie zur Einigung im Bauvertragsrecht, February 2017. https://www.bauindustrie.de/presse/presseinformationen/bauindustrie-zur-einigung-im-bauvertragsrecht/
103 DLA Piper, Germany, Insurances, http://www.dlapiperrealworld.com/law/index.html?t=construction&s=forms-of-contract-procurement-methods&q=insurances&c=DE
104 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).
105 Data on investments in machinery and equipment, vehicles, dwellings and other buildings was not available.
106 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.).
107 Data for subsequent years unavailable.
108 The indicator gross fixed capital formation in non-residential and civil engineering refers to the Eurostat indicator «Other buildings and structures»
109 Data for subsequent years unavailable
110 European Commission, European Semester Country Report Germany, 2019. https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-germany_en.pdf
111 European Commission, European Semester Country Report Germany, 2019, February 2019, https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-germany_en.pdf
112 European Commission, European Semester Country Report Germany, 2019, February 2019, https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-germany_en.pdf
113 Bundesministerium der Finanzen, Förderung von Investitionen finanzschwacher Kommunen, January 2018. http://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Oeffentliche_Finanzen/Foederale_Finanzbeziehungen/Kommunalfinanzen/Kommunalinvestitionsfoerderungsfonds/Foerderung-von-Investitionen-finanzschwacher-Kommunen.html
114 Bundesministerium der Finanzen, Umsetzung des Kapitel 1 des Kommunalinvestitionsförderungsgesetzes (KInvFG I) in den Ländern, January 2019. http://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Oeffentliche_Finanzen/Foederale_Finanzbeziehungen/Kommunalfinanzen/Kommunalinvestitionsfoerderungsfonds/Umsetzung-KInvFG.pdf?__blob=publicationFile&v=6
115 European Commission, Country Report Germany 2017, February 2017. https://ec.europa.eu/info/file/96680/download_en?token=nd9QlBAW
116 Federal Ministry of Transport and Digital Infrastructure, The 2030 Federal Transport Infrastructure Plan, August 2016, http://www.bmvi.de/SharedDocs/EN/Documents/G/ftip-2030.pdf?__blob=publicationFile
117 Federal Ministry of Transport and Digital Infrastructure, The 2030 Federal Transport Infrastructure Plan. https://www.bmvi.de/SharedDocs/EN/Articles/G/federal-transport-infrastructure-plan-2030.html
118 Railway Technology, Germany to invest €86bn for railway infrastructure maintenance. July 2019. https://www.railway-technology.com/news/germany-to-invest-e86bn-for-railway-infrastructure-maintenance/
119 European Commission, European Semester Country Report Germany, 2019. https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-germany_en.pdf
120 Die Welt, Gabriels Masterplan für die marode Bundesrepublik. February 2015. http://www.welt.de/wirtschaft/article137496860/Gabriels-Masterplan-fuer-die-marode-Bundesrepublik.html
121 European Investment Bank, A7 extension: first financing operation in Germany with EU project bonds. August 2014. http://www.eib.org/infocentre/press/releases/all/2014/2014-182-a7-extension-first-financing-operation-in-germany-with-eu-project-bonds.htm
122 European Investment Bank, VHH Hamburg E-mobility Programme. September 2019. https://www.eib.org/en/projects/pipelines/all/20180665
123 European Commission, Country Report Germany 2017, February 2017. https://ec.europa.eu/info/file/96680/download_en?token=nd9QlBAW
124 European Commission, EU Transport Scoreboard 2016, https://ec.europa.eu/transport/sites/transport/files/de_en.pdf
125 EIB, EFSI Project List, http://www.eib.org/efsi/efsi-projects/index?c=DE
126 European Commission, Education and Training Monitor 2019, Germany, https://ec.europa.eu/education/sites/education/files/document-library-docs/et-monitor-report-2019-germany_en.pdf
127 Ibidem.
128 SOKA Bau, Pilotprojekt „Berufsstart Bau“. https://www.soka-bau.de/arbeitgeber/leistungen/berufsausbildung/berufsstart-bau/
129 Bauwirtschaft Baden-Wruttenberg, Bau - Dein Ding!. http://bauwirtschaft-bw.de/verband/leistungen/beratungsleistungen/nachwuchsmarketing/bau-dein_ding
130 Bau - Dein Ding. https://www.bau-dein-ding.de/bundesweit-de
131 Deutsche Bauindustrie Nordrhein-Westfalen, START DER NACHWUCHSKAMPAGNE „BAU–DEIN–DING“ IM DEZEMBER 2015. http://www.bauindustrie-nrw.de/start-der-nachwuchskampagne-bau-dein-ding-im-dezember-2015/
132 Lehrbauhof, Berlin, STARTKLAR FÜR AUSBILDUNG. https://lehrbauhof-berlin.de/de/projekte/startklar/

133 Deutschland Baut!. https://www.deutschland-baut.de/
134 Azubiportal, http://www.azubi-bau.de/
135 Meistertipp, Fachkräftemangel belastet die Bauwirtschaft, July 2016, http://www.meistertipp.de/aktuelles/news/fachkraeftemangel-belastet-die-bauwirtschaft
136 The Federal Government, Make it in Germany. Current information on the Skilled Immigration Act. https://www.make-it-in-germany.com/en/visa/kinds-of-visa/work/skilled-immigration-act/
137 Federal Ministry for Economic Affairs and Energy, Gebäude energieeffizienter machen, https://www.bmwi.de/Redaktion/DE/Dossier/energiewende-im-gebaeudebereich.html;jsessionid=EC90D19E565C2E868BBA55136E9D7091
138 Federal Ministry for Economic Affairs and Energy, Energy Efficiency Strategy for Buildings. http://www.bmwi.de/EN/Topics/Energy/Buildings/energy-efficiency-strategy-for-buildings.html
139 Federal Ministry for Economic Affairs and Energy, Energy Saving Legislation. http://www.bmwi.de/EN/Topics/Energy/Buildings/energy-saving-legislation.html
140 Federal Ministry for Economic Affairs and Energy, Energy Saving Legislation. https://www.bmwi.de/Redaktion/DE/Artikel/Energie/gebaeude-energieeinsparrecht.html
141 Federal Ministry for Economic Affairs and Energy, Erneuerbare-Energien-Wärmegesetz http://www.erneuerbare-energien.de/EE/Navigation/DE/Recht-Politik/Das_EEWaermeG/das_eewaermeg.html
142 Federal Ministry for Economic Affairs and Energy, Energy Conservation Legislation. https://www.bmwi.de/Redaktion/EN/Artikel/Energy/energy-conservation-legislation.html
143 Federal Ministry for Economic Affairs and Energy, Energy transition in building sector – Relevant regulations. https://www.bmwi.de/Redaktion/EN/Dossier/enhancing-energy-efficiency-in-buildings.html
144 GTAI, Federal Ministries Consult Each Other on Building Energy Act, May 2019. https://www.gtai.de/gtai-en/invest/industries/energy/may-2019-federal-ministries-consult-each-other-on-building-71278
145 Clean Energy Wire, German building energy draft law unfit for emissions reduction, critics say, September 2019. https://www.cleanenergywire.org/news/german-building-energy-draft-law-unfit-emissions-reduction-critics-say
146 Federal Ministry for Economic Affairs and Energy, Green Paper on Energy Efficiency, https://www.bmwi.de/Redaktion/EN/Publikationen/green-paper-on-energy-efficiency.pdf?__blob=publicationFile&v=3
147 Federal Ministry of Economic Affairs and Energy. Ministry presents new energy audit tool: the tailored renovation roadmap, May 2017. https://www.bmwi.de/Redaktion/EN/Pressemitteilungen/2017/20170504-bmwi-stellt-neues-instrument-der-energieberatung-vor.html
148 Federal Ministry for Economic Affairs and Energy, Enhancing energy efficiency in buildings, https://www.bmwi.de/Redaktion/EN/Dossier/enhancing-energy-efficiency-in-buildings.html
149 Federal Ministry for Economic Affairs and Energy, 7th Energy Research Programme, September 2018. https://www.bmwi.de/Redaktion/EN/Publikationen/Energie/7th-energy-research-programme-of-the-federal-government.pdf?__blob=publicationFile&v=5
150 Ibidem
151 Federal Ministry for Economic Affairs and Energy, More than 4,000 projects in energy research - Federal Economic Affairs Ministry publishes new "Innovation through Research" report, May 2019. https://www.bmwi.de/Redaktion/EN/Pressemitteilungen/2019/20190513-federal-economic-affairs-ministry-publishes-new-innovation-through-research-report.html
152 Federal Ministry for Economic Affairs and Energy, Wärme aus Erneuerbaren: das Marktanreizprogramm (MAP) für Privatpersonen, Unternehmen und Kommunen. https://www.erneuerbare-energien.de/EE/Navigation/DE/Foerderung/Marktanreizprogramm/marktanreizprogramm.html
153 Federal Ministry for Economic Affairs and Energy, Changes to the application procedure for the Market Incentive Programme (MAP), January 2018. https://www.bmwi.de/Redaktion/EN/Meldung/20180119-aenderungen-zur-antragstellung-beim-marktanreizprogramm-map.html
154 Federal Ministry for Economic Affairs and Energy, Energy Efficiency Incentive Programme. http://www.bmwi.de/EN/Topics/Energy/Buildings/energy-efficiency-incentive-programme.html
155 Federal Ministry for Economic Affairs and Energy, Saving energy by optimising the heating system and replacing the pump, https://www.bmwi.de/Redaktion/EN/Dossier/enhancing-energy-efficiency-in-buildings.html
156 Federal Ministry for Economic Affairs and Energy, Enhancing energy efficiency in buildings, https://www.bmwi.de/Redaktion/EN/Dossier/enhancing-energy-efficiency-in-buildings.html
157 EIB, Germany: More living space for Berlin - EIB lends EUR 240 million to Gewobag, January 2020, https://www.eib.org/en/press/all/2020-005-more-living-space-for-berlin-european-investment-bank-lends-eur-240-million-to-gewobag
158 Federal Ministry for Economic Affairs and Energy .Neue Forschungsinitiative stärkt Energiewende in Gebäuden und Städten, April 2016. https://www.bmwi.de/Redaktion/DE/Pressemitteilungen/2016/20160411-neue-forschungsinitiative-staerkt-energiewende-in-gebaeuden-und-staedten.html
159 National Energy Efficiency Action Plan (NEEAP) 2017 for the Federal Republic of Germany, March 2017. https://ec.europa.eu/energy/sites/ener/files/documents/de_neeap_2017_en.pdf
160 European Commission, Single Market Scoreboard – Germany 2019 https://ec.europa.eu/internal_market/scoreboard/_docs/2019/member-states/de_en.pdf
161 European Commission, EU Single Market Scoreboard, Performance Overview, 2019. https://ec.europa.eu/internal_market/scoreboard/performance_overview/index_en.htm
162 European Commission, EU Single Market Scoreboard. Public Procurement Performance. https://ec.europa.eu/internal_market/scoreboard/performance_per_policy_area/public_procurement/index_en.htm

163 Ibidem
164 GAN Business Anti-Corruption Portal, Germany Corruption Report. https://www.ganintegrity.com/portal/country-profiles/germany/
165 Deutsche Welle, Die Sorgen waren umsonst. May 2014. http://www.dw.com/de/die-sorgen-waren-umsonst/a-17591643
166 European Commission, Joint Research Center, State of implementation of the Eurocodes in the European Union, 2015. http://eurocodes.jrc.ec.europa.eu/show_Entity.php?file_id=EC_00000114
167 World Economic Forum, The Global Competitiveness Report 2019. http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf
168 Die Welt, Deutschland verliert im Standortvergleich, https://www.welt.de/wirtschaft/article176632900/IMD-Studie-Deutschland-bei-Wettbewerbsfaehigkeit-hinter-Katar-auf-Platz-15.html
169 Deloitte, Global powers of construction (GPoC) 2018. https://www2.deloitte.com/global/en/pages/energy-and-resources/articles/deloitte-global-powers-of-construction.html
170 European Commission, Businesses are discouraged from participating in foreign public tenders. http://ec.europa.eu/internal_market/20years/singlemarket20/challenges/display/challenge-16_en.htm
171 European Commission, Germany SBA Factsheet, 2019. https://ec.europa.eu/docsroom/documents/38662/attachments/12/translations/en/renditions/native
172 European International Contractors (EIC), Volume of turnover 2017, https://www.eic-federation.eu/sites/default/files/fields/files/eic_2017_statistics_turnover.pdf
173 European International Contractors (EIC), Volume of turnover 2016. http://www.eic-federation.eu/media/uploads/newsitem/2016_statistics_turnover_short.pdf
174 Deutsche Bauindustrie, Das internationale Baugeschäft, http://www.bauindustrie.de/themen/internationales-bauen/das-internationale-baugeschaft/
175 Deutsche Bauindustrie, Mittel- und Osteuropa Portal, http://www.bauindustrie.de/themen/internationales-bauen/mittel-und-osteuropa-portal/
176 See more information at: https://www.reuters.com/article/germany-housing/update-1-germany-builds-285900-new-dwellings-highest-in-16-years-idUSL8N23540V
177 European Commission, European Semester Country Report Germany, 2019, February 2019. https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-germany_en.pdf
178 Ibidem.