



# European Construction Sector Observatory

Country profile **Denmark**

September 2021



## In a nutshell

**The Danish Gross Domestic Product (GDP), after having reported consistent growth in the last decade, experienced a 2.7% decline in 2020, reaching DKK 2.2 trillion (EUR 300.0 billion).**

The Danish broad construction sector exhibited positive trends in 2020, as compared to 2010. The **number of enterprises** in the broad construction sector stood at 71,924 in 2020, representing a growth of 13.7% since 2010. The number of enterprises in narrow construction sub-sector was the highest amongst the sub-sectors with 32,742 enterprises, thus accounting for 45.5% of the total number of enterprise in the sector.

Similarly, the **volume index of production** in the narrow construction sub-sector increased by 17.8% during the 2015-2020 period. This was driven by the growth in the volume index of production in construction of buildings (+20.0%) over the same period. On the other hand, the volume index of production in construction of civil engineering slightly declined by 0.6%.

The **turnover** of the Danish broad construction sector reached EUR 71.2 billion in 2018, representing a 60.5% growth over the period 2010-2018. It further increased to EUR 72.9 billion in 2020<sup>1</sup>, representing a 64.3% and 2.4% growth from the 2010 and 2018 respectively. The **gross operating surplus** of the broad construction sector totalled EUR 21.5 billion in 2018<sup>2</sup>, increasing by 158.2% from 2010. The **gross operating rate** of the broad construction sector<sup>3</sup>, an indicator of the sector's profitability, stood at 30.2% in 2018<sup>4</sup>, 11.4 percentage points (pps) higher than the 2010 level and 13.5 higher than the EU-27's 2018 average (16.7%).

In 2020, the **number of persons** employed in the broad construction sector reached 322,456, which represents a 24.8% growth from 2010. Amongst the sub-sectors, the architectural and engineering activities sub-sector experienced the highest growth (+47.9%), followed by the narrow construction (+22.1%), real estate activities (+20.0%) and manufacturing (+18.5%) sub-sectors, over the 2010-2020 period.

The Danish **housing market** is characterised by a continuous rise in prices. In 2020, the house price index for dwellings increased by 23.2% above the 2015 level, being largely driven by price increases in the existing dwellings. According to the government, the housing prices rose by 4.7% in 2020 alone – despite the negative impact from the COVID-19 pandemic (such as the rise of unemployment). The prices kept increasing in 2021 as well, driven by low interest rates (which in turn fostered the housing demand) and limited supply of homes. In fact, the number of **building permits** issued in Denmark reduced by 40.8% in 2020 in comparison to 2019.

House price index for total dwellings between 2015 and 2020  **23.2%**

To address the shortage of homes in the country, the government proposed a project of an artificial island named Lynetteholm, to be constructed on the harbour waters just north of Copenhagen city. Upon completion in 2050, the island is expected to accommodate around 35,000 people. Moreover, the government also announced its plans to build 24 new homes for young people with disabilities in Copenhagen. It is expected to welcome new residents by 2023.

In relation to **the civil engineering and infrastructure**, an amount of EUR 2.0 billion had been allotted to increase public investments in the 2021-2025 period.

**In 2021, the Danish government has also introduced a new EUR 21.5 billion plan – the ‘Denmark Forward for infrastructure looking ahead to 2035’.**

It aims to improve national road and railway systems. It also contains plans for the implementation of initiatives to support the green transition in the transportation sector.

Presently, the Danish construction sector faces three major challenges. The foremost being the **late payments**, which affects half of the total value of B2B (business to business) invoices in 2020, 28.0% higher than 2019. Secondly, the construction sector faces an acute **shortage of skilled workers**. Around 75.0% of construction firms have reported this issue to be the most important one in the context of their activities. Lastly, the limited level of **innovation activity** in the construction sector is a major challenge, with around 72.0% of the firms reporting that they are least likely to innovate in 2020, which is well above other economic sectors such as manufacturing (42.0%) and infrastructure (59.0%) sectors<sup>5</sup>.

The COVID-19 pandemic had impacted almost all facets of the Danish construction sector, such as access to finance and entrepreneurship, shortage of

skills and employment, payment duration, company demography, investment volumes and innovation. However, the government recently introduced recovery schemes and measures in 2020 and 2021 supporting economic operators. This is expected to also benefit the construction sector. For example, the government’s scheme – **Match financing** (*Matchfinansieringen*) introduced by the **Danish Growth Fund** (*Vækstfonden*), aims to fund those projects based on innovation whose financing has been suffering from lack of funds due to COVID-19.

**In June 2021, Denmark’s Recovery and Resilience Plan (RRP) was adopted wherein it was allocated EUR 1.5 billion in grants under the Recovery and Resilience Facility (RRF) over the 2021-2026 period.**

This includes various investment measures such as EUR 259.0 million for supporting green transportation, EUR 242.0 million for green research and development, EUR 89.0 million for digitalisation initiatives, EUR 63.0 million for energy efficiency in households as well as EUR 40.0 million for energy renovations in public buildings. This financing is expected to support the green and digital growth of the construction sector.

**Given the COVID-19 pandemic’s rather limited impact on the Danish construction sector along with government’s prompt recovery measures, the sector is set to achieve the pre-pandemic levels by end-2021.**

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## 1

## Key figures

## Construction market

In 2020<sup>6</sup>, the **number of enterprises** in Denmark in the broad construction sector stood at 71,924, reflecting an increase of 13.7% since 2010. The architectural and engineering activities sub-sector reported the highest growth (+26.2%), followed by the real estate activities (+24.5%) and narrow construction (+3.7%) sub-sectors, over the 2010-2020 period. Conversely, the manufacturing sub-sector saw a 1.7% decline over the same period. The number of enterprises in the narrow construction sub-sector accounted for 45.5% i.e. 32,742 enterprises of the total (Figure 1), followed by the real estate activities (42.8%, i.e. 30,751 enterprises), architectural and engineering activities (9.9%, i.e. 7,135 enterprises) and manufacturing (1.8%, i.e. 1,296 enterprises) sub-sectors.

Number of enterprises in the broad construction sector between 2010 and 2020

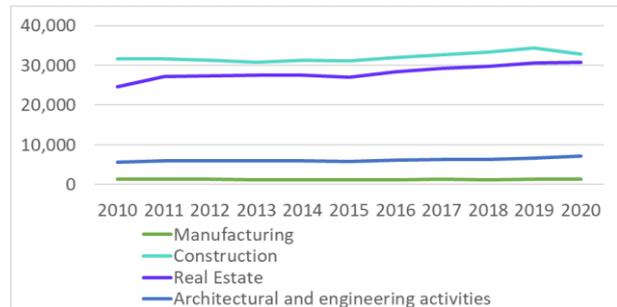
↑ 13.7%

The **volume index of production** in the narrow construction sub-sector increased by 17.8% in 2020 as compared to 2015 level (Figure 2). This increase was primarily driven by the growth in volume index of production in construction of buildings (+20.0%). On the contrary, the volume index of production in construction of civil engineering depicted a decline by 0.6% between 2015 and 2020.

Volume index of production in the construction of buildings between 2015 and 2020

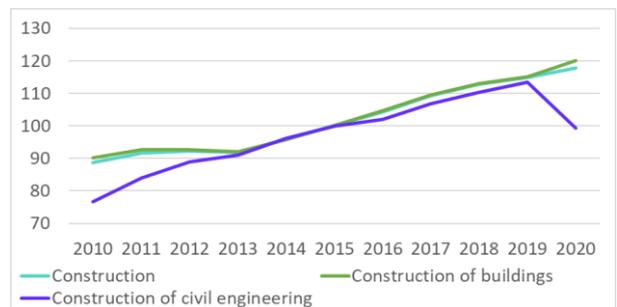
↑ 20.0%

Figure 1: Number of enterprises in the Danish broad construction sector between 2010 and 2020



Source: Eurostat, 2021.

Figure 2: Volume index of production in the Danish construction sector between 2010 and 2020 (2015=100)



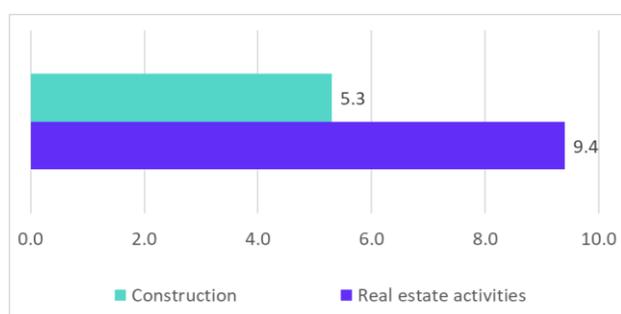
Source: Eurostat, 2021.

In 2020<sup>7</sup>, the **total added value of the broad construction sector** amounted to EUR 39.3 billion, registering a growth of 97.2% since 2010. Amongst the sub-sectors, the real estate activities sub-sector registered the highest growth of 175.3% over the period 2010-2020, reaching EUR 20.3 billion. This was followed by architectural and engineering activities sub-sector, which increased by 58.8%, over the same period, thus reaching EUR 4.7 billion. The manufacturing and narrow construction sub-sector also reported a growth of 49.7% and 49.1% over the same period, reaching EUR 2.2 billion and EUR 12.1 billion, respectively. The real estate activities sub-sector accounted for 51.5% of the total added value of the broad construction sector, followed by the narrow construction

(30.8%), architectural and engineering activities (12.0%), and manufacturing (5.6%) sub-sectors.

The **share of gross value added** by the broad construction sector in the GDP reached 16.5% in 2018<sup>8</sup>, same as the EU-27 average. Amongst the sub-sectors, the share of gross value added by the real estate activities sub-sector in 2018 was the highest (9.1%), followed by narrow construction (5.2%), architectural and engineering activities (1.5%), and manufacturing (0.7%) sub-sectors. In 2020, the share of gross value added of the real estate activities and the narrow construction sub-sectors reached 9.4% and 5.3% respectively (Figure 3)<sup>9</sup>.

Figure 3: Gross value added as a share of GDP in the Danish broad construction sector in 2020<sup>10</sup> (%)



Source: Eurostat, 2021.

Denmark consists of five NUTS 2 regions, namely *Hovedstaden*, *Sjælland*, *Syddanmark*, *Midtjylland* and *Nordjylland*. The gross value added is not equally split over these regions. In 2019, *Midtjylland* accounted for almost 26.4% of the gross value added in the narrow construction sub-sector, followed by *Hovedstaden* (25.3%) and *Syddanmark* (23.4%). In the real estate activities sub-sector, *Hovedstaden* accounted for the highest share (29.9%) of the gross value added in 2019, followed by *Midtjylland* (22.7%) and *Syddanmark* (22.4%). This reflects the locations of the biggest cities in these regions (Copenhagen, Aarhus and Odense respectively).

## Productivity

**The apparent labour productivity<sup>11</sup> in the broad construction sector reached EUR 120,613.5 in 2018<sup>12</sup>, representing a growth of 56.3% over the period 2010-2018.**

In 2020<sup>13</sup>, the labour productivity in the real estate activities sub-sector reached EUR 318,525, representing highest growth (+129.5%) amongst

sub-sectors since 2010. In the manufacturing sub-sector, it reached EUR 80,475 in 2020<sup>14</sup>, representing an increase by 26.4% since 2010. This was followed by the narrow construction and architectural and engineering activities sub-sectors, which experienced a 21.9% and 7.4% growth over the 2010-2020 period, reaching EUR 67,187 and EUR 92,646, respectively in 2020<sup>15</sup>.

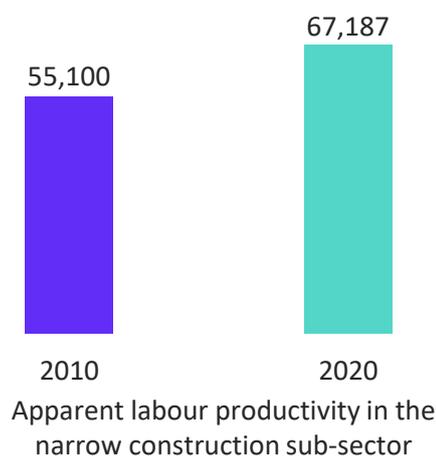
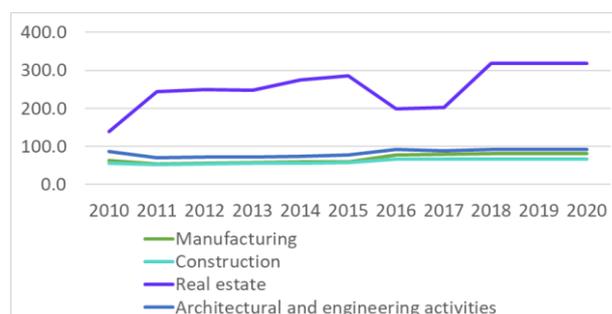


Figure 4: Labour productivity in the broad construction sector in Denmark between 2010 and 2020 (EUR k)



Source: Eurostat, 2021.

**The potential output is expected to increase by an annual average of 1.7% from 2020 till 2025. This is due to the increasing structural labour force and the increasing hourly productivity<sup>16</sup>.**

## Turnover and profitability

The **turnover** of the broad construction sector in Denmark has been increasing since 2010. It reached EUR 71.2 billion in 2018, representing a growth of 60.5% over the period 2010-2018. It then further increased to EUR 72.9 billion in 2020<sup>17</sup>, 64.3% above the 2010 level and 2.4% above 2018 level. In 2020, half (50.0%) of the total turnover was generated by the narrow construction sub-sector, followed by the real estate (28.6%), architectural and engineering

activities (13.4%) and manufacturing (8.1%) sub-sectors.

The **gross operating surplus** of the broad construction sector amounted to EUR 21.5 billion in 2018<sup>18</sup>, representing a 158.2% increase from 2010. Amongst the sub-sectors, the real estate activities sub-sector experienced the highest growth over the 2010-2018 period (+190.1%), reaching EUR 17.1 billion in 2018<sup>19</sup>. It also featured the highest share (79.4%) of the gross operating surplus of the broad construction sector. It was followed by the narrow construction, the architectural and engineering activities and the manufacturing sub-sectors, which featured a 13.8%, 4.2% and 2.6% share of the total gross operating surplus in 2018.

The Danish construction sector enjoyed a high profitability in 2018<sup>20</sup>. The **gross operating rate** of the broad construction sector<sup>21</sup>, which gives an indication of the sector's profitability, stood at 30.2% in 2018, 11.4 percentage points (pp) higher than in 2010, and higher than the EU-27's 2018<sup>22</sup> average of 16.7%. Amongst the sub-sectors, the real estate activities sub-sector enjoyed the highest profitability in 2018 (85.2%), followed by the architectural and engineering activities (10.5%), manufacturing (9.9%) and narrow construction (8.0%) sub-sectors.

In parallel, construction costs for residential buildings followed the same trends, with the **construction cost index** rising by 5.8% over 2015-2020, mainly due to an 11.3% increase in indexed labour costs for the period 2015-2020. The indexed input prices for materials grew by 3.5% over the same period (Figure 5).

Figure 5: Construction cost index between 2010 and 2020 (2015=100)



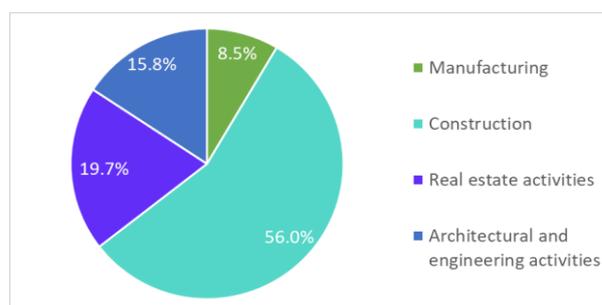
Source: Eurostat, 2021.

## Employment

In 2020, there were 322,456<sup>23</sup> persons employed in the broad construction sector, representing a growth of 24.8% since the 2010 levels, but a decline of 1.6% since 2019. The narrow construction sub-sector employed 56.0% of the total construction workforce in 2020, followed by the real estate activities (19.7%), architectural and engineering activities (15.8%) and manufacturing (8.5%) sub-sectors (Figure 6).

The number of persons employed in the architectural and engineering activities sub-sector experienced the highest growth, increasing by 47.9% from 34,342 persons in 2010 to 50,805 in 2020. In the narrow construction sub-sector, the number of persons employed saw an increase of 22.1% from 147,747 in 2010 to 180,448 in 2020. The growth in the real estate activities sub-sector stood at 20.0%, up from 53,072 people in 2010 to 63,668 in 2020, whereas the manufacturing sub-sector rose by 18.5%, from 23,241 in 2010 to 27,535 in 2020.

Figure 6: Percentage of people employed by construction sub-sectors in Denmark in 2020



Source: Eurostat, 2021.

In addition, the number of **self-employed workers** in the narrow construction sub-sector slightly declined by 0.7% over the period 2010-2020. Out of the total self-employed workers in the general economy, 14.3% came from the narrow construction sub-sector in 2020. At the same time, the number of **full-time** and **part-time employees** in the narrow construction sub-sector increased by 10.5% and 36.0% over the period 2010-2020.

On the contrary, the number of self-employed workers in real estate activities sub-sector, increased by 15.4%, over the period 2010-2020. Out of the total self-employed workers in the general economy, 1.5% came from the real estate activities sub-sector in 2020.

In parallel, the number of full-time and part-time employees in the real estate activities sub-sector increased by 52.7% and 40.0% respectively, over the period 2010-2020. Lastly, number of full-time and part-time employees in the manufacturing sub-sector decreased by 4.4% and 10.1% respectively, over the period 2010-2020.

The number of persons employed in the narrow construction sub-sector in *Hovedstaden* reported the highest increase (+23.7%) among other regions, between 2010 and 2019<sup>24</sup>. Whereas, in the real estate activities sub-sector, the highest increase (+12.5%) in the number of persons employed was observed for *Syddanmark* between 2010 and 2019<sup>25</sup>. The regions of *Hovedstaden*, *Midtjylland* and *Syddanmark* together accounted for 74.5% and 80.9% of the total employment in the narrow

construction sub-sector and real estate activities sub-sectors respectively.



**As for employment by specific occupations, in the narrow construction sub-sector, the number of technicians and associate professionals grew by 263.5% over the period 2010-2020, whereas the number of managers declined by 44.7%.**

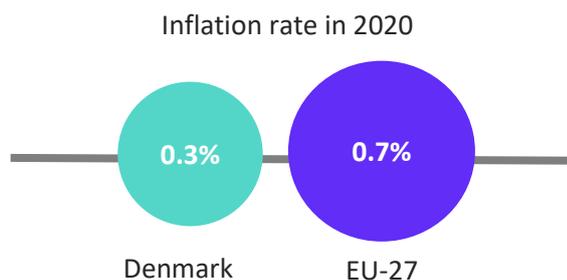
In the manufacturing sub-sector, professionals recorded the highest growth of 42.6% over the period 2010-2020. In contrast, clerical support workers recorded the largest decline of 54.9% over the same period. Lastly, in the real estate activities sub-sector, clerical support workers recorded the highest growth of 91.7% over the period 2010-2020.

## 2

## Macroeconomic indicators

### Economic development

The Danish **GDP** reached DKK 2.2 trillion (EUR 300.0 billion) in 2020, representing a year over year (YoY) decline of 2.7%. The potential GDP stood at DKK 2303.3 billion (EUR 309.7 billion) in 2020. The **output gap** in 2020 stood at -4.07%, the highest in the decade. These trends can partly be attributed to the global pandemic COVID-19, which affected the Danish economy in 2020<sup>26</sup>. Last, Denmark's **inflation rate** stood at 0.3% in 2020, lower than EU-27 average (0.7%) and Denmark's 2019 level (0.7%).



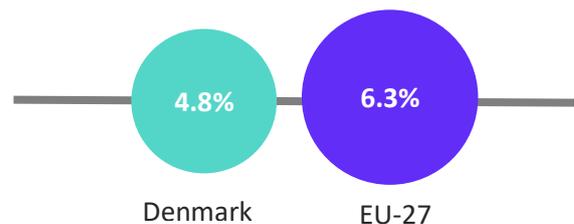
### Demography and employment

In terms of demographics, Denmark's **total population** reached 5.8 million in 2020. It is projected to increase to 6.0 million by 2030 (+2.6%) and to 6.1 million by 2050 (+4.9%). The **working age population** in Denmark stood at 3.7 million in 2020, accounting for 63.7% of the total population. It is further projected to decrease to 3.6 million by 2050 (-3.0%). By 2050, this share will shrink to 58.9% of the total population. The **ageing population** in Denmark reached 1.2 million in 2020, accounting for 19.9% of the total population. This is expected to reach up to 1.4 million by 2030 (+17.4%) and up to 1.6 million by 2050 (+34.8%). By 2050, the share of ageing population will increase up to 25.6% of the total population in Denmark. Furthermore, the **net migration** stood at 9,473 in 2019<sup>27</sup> (43.8% decline since 2010 and 77.4% decline since 2015). These

factors may adversely affect the supply of workers in Denmark.

Though Denmark's **unemployment rate** has been declining continuously since 2012, reaching 4.3% in 2019, it rose to 4.8% in 2020. However, it lies below the EU-27 average of 6.3% in 2020. Similarly, **youth unemployment rate** (below the age of 25) had been continuously declining since 2010, reaching 10.1% in 2019. However, it increased to 11.6% in 2020, lower than the EU-27 average of 16.8% in 2020.

Unemployment rate in 2020



Though the latest figures have shown improvement, the global pandemic led to a higher level of unemployment in Denmark in 2020. According to the data from the Danish Ministry of Employment 172,870 people have registered themselves as jobseekers in August 2020<sup>28</sup>.

### Public finance

In 2020, **general government expenditure** in Denmark accounted for 54.0% of GDP, which represents a significant increase from the previous year (49.2%). However, this is in line with the EU-27 average, which stood at 53.4% in 2020. Denmark's **general government deficit** in 2020 stood at -1.1% of GDP as compared to -3.8% in the previous year and -6.9% for EU-27 average in 2020. For the same year, the **general government gross debt** in Denmark was 42.2% of the GDP, higher than the previous year (33.3%), but significantly lower than the EU-27 average in 2020 (90.7%).

**The rise in the general government gross debt in 2020 is attributable to the economic downturn as a result of the global pandemic COVID-19<sup>29</sup>.**

Lastly, the Danish Central Bank (*Nationalbanken*) made a slight change to the **official interest rate** in 2020. It increased its interest rate from -0.68% in 2019 to -0.66% in 2020.

## Entrepreneurship and access to finance



**According to the World Bank Doing Business 2020 report, Denmark ranked 45<sup>th</sup> out of 190 countries in ease of starting a business in 2019. This is a decline in comparison with previous year's ranking (42<sup>nd</sup>)<sup>30,31</sup>.**

As per the report, starting a business in Denmark requires five procedures, taking 3.5 days and costing 0.2% of income per capita<sup>32</sup>.

In order to boost entrepreneurship in Denmark, the 'Open Entrepreneurship' initiative has been launched in 2021. Under this initiative, experienced businessmen from the private sector are paired with researchers from universities. It is being supported by the Danish Industry Foundation and is based on collaboration between several universities such as Technical University of Denmark (DTU), Aalborg University, Aarhus University, etc., and a number of private companies and international partners. It aims to develop and test new collaboration models that will allow Danish universities to get better at commercialising research and create more research-based start-ups<sup>33</sup>.

Another such initiative named **Business support strategy 2020-2023** (*Erhvervsfremme i Danmark 2020-2023*), being formally announced in 2020, aims to promote all Danish business at local, regional and national level. It highlights actions in regards with the key drivers behind the growth of Danish businesses (qualified labour, entrepreneurship, green transition/circular economy, innovation, digitalisation/automation and internationalisation), and highlights 13 specific sectors where Denmark has a specific strong position. It is a strategy for 2023 on Danish business promotion at local, regional and national level<sup>34</sup>.

In addition, the Danish Growth Fund (*Vækstfonden*) introduced **Match financing** (*Matchfinansieringen*) in May 2020. This initiative funds projects based on new ideas whose financing has been suffering from lack of financing due to COVID-19. It provides match private funding with three times the amount in the form of a loan (the SME brings funding of 25.0% of the amount required and can apply for a loan of 75.0% of the amount required)<sup>35</sup>.

However, entrepreneurship is less attractive than employment for people with tertiary education. Due to availability of ample opportunities to gain salaried jobs in Denmark, and companies offering lucrative salary packages in a low-risk environment, relatively few people are attracted by self-employment. The OECD (Organisation for Economic Co-operation and Development) data show that Denmark has the 2<sup>nd</sup> lowest rate of self-employment among all workers with tertiary education in the OECD<sup>36</sup>.

**In terms of access to finance, Denmark ranked 48<sup>th</sup> out of 190 countries for the ease of getting credit. This is a decline in comparison with previous year's ranking (44<sup>th</sup>)<sup>37,38</sup>.**

**Access to finance** has been an important concern in Denmark<sup>39</sup>. In 2020, these firms were most frequently reported to be dissatisfied with the required **collateral and the cost of finance**. Specifically, firms in the manufacturing and infrastructure sectors as well as SMEs (small and medium enterprises) were reported to be the most dissatisfied with collateral requirements and/or the cost of finance<sup>40</sup>.

In fact, the financing requirements have reportedly increased in 2020 over the previous year. The highest increase in the requirements has been seen for bank loans, followed by equity needs, trade credit and credit lines. As a result, the availability of financing has decreased in 2020 over the previous year. Specifically, the highest decrease in availability of financing was observed for availability of trade credit, followed by availability of leasing and credit lines. The reported needs and availability of financing were partly affected by the COVID-19 pandemic<sup>41</sup>.

The **outstanding loans to non-financial corporations** in the general economy has also dropped to DKK 349.4 billion (EUR 46.9 billion) in 2020. This represents a decline of 25.9% from 2010 level (DKK 471.6 billion (EUR 63.4 billion)), as well as an annual decline of 3.9% (DKK 363.6 billion (EUR 48.9 billion)).

Outstanding loans to non-financial corporations in the general economy between 2010 and 2020

 **25.9%**

To address this issue, the Ministry for Industry, Business and Financial Affairs and the Danish Growth Fund (*Vækstfonden*) introduced in March 2020 a **state guarantee on loans**, which would be given to enterprises where the turnover dropped by at least 30.0%, due to COVID-19. This allows the state to guarantee up to 70% of the loans provided through the Danish Growth Fund<sup>42</sup>.

The Ministry for Industry, Business and Financial Affairs also introduced a **COVID-19 compensation scheme for self-employed and small enterprises** (*Kompensationsordningen for selvstændige og små virksomheder*) in April 2020. As per the scheme, the state shall compensate for loss of income due to COVID-19 by covering 75.0% of the lost turnover up to of DKK 23,000 (EUR 3,093) per month per self-employed. This scheme covers all self-employed and small enterprises with 10 employees or less<sup>43</sup>.

**In order to support SMEs struggling due to COVID-19, the Danish tax authorities have implemented a measure named 'VAT loans for SMEs' (*Momslån til SMV'er*) in May 2020. This intends to provide loans without interest rates to SMEs to help them pay VAT and wage sum tax. The loans ran until April 2020 and can be renewed subject to the development of the COVID-19 crisis.**

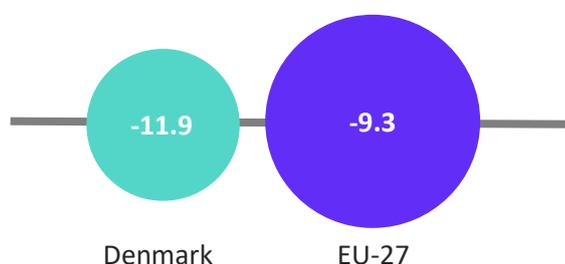
## 3

## Key economic drivers of the construction sector

### Business confidence

The **consumer confidence indicator** for Denmark reached to 0.7 in 2020, significantly below the 2010 (6.8) and 2019 (3.8) levels. However, it is still higher than the EU-27 average for 2020 (-14.6). Similarly, the **industry confidence indicator** decreased to -11.7 in 2020 from -3.7 in 2010 and -6.5 in 2019. This is still above the 2020 EU-27 average of -14.4. Lastly, the **construction confidence indicator** dropped to -11.9 in 2020 from -4.0 in 2019. This, however, lies above the 2010 level (-41.9), and is in line with the EU-27 (-9.3).

Construction confidence indicator in 2020



Denmark's business confidence showed a weaker performance in the beginning of 2021. Especially the confidence of the firms in the construction and manufacturing sectors became more pessimistic. However, while entering the second quarter of 2021, the confidence levels increased in the overall economy<sup>44</sup>.

Though the optimism of business confidence continued to increase in the overall economy and specifically for the manufacturing sector, it dropped back again as for the construction sector by the end of second quarter of 2021<sup>45</sup>.

According to **2020 Atradius Payment Practices Barometer** report for Denmark, around 62.0% of businesses in the domestic economy expect the business confidence to grow again<sup>46</sup>.

Meanwhile, the **investment ratio** has been increasing consistently since 2010, from 18.2% to 22.6% in 2020. The **investment per worker** has seen a considerable uptick since 2013. In 2018<sup>47</sup>, it recorded a value of EUR 72,057, representing an increment of 13.7% since 2010. Amongst the sub-sectors, investment per worker in the narrow construction sub-sector increased by 12.2% over the 2010-2018 period. Contrarily, investment per worker in the real estate activities and architectural and engineering activities sub-sector declined by 7.3% and 54.9% respectively over the same period.

### Domestic sales

The ranking of the **most domestically sold construction products** in Denmark has remained constant since 2010. Among the top five domestically sold construction products in Denmark, "Prefabricated structural components etc. (group 236112)" experienced the highest growth of 233.4% over the period 2010-2019<sup>48</sup>. "Ready-mixed concrete (group 236310)" grew by 89.0% over the same period. The growth for "Windows, French windows and their frames (group 162311)" was 7.0% over the same period.

The top five most domestically sold construction products are stated below in Table 1 representing 59.6% of total domestic construction product sales in 2019<sup>49</sup>.

Table 1: Top five domestically sold construction products in Denmark and in the EU in 2019<sup>50</sup>

y	Denmark			EU-27
	Product	Value (EUR m)	Share in construction product domestic sales (%)	Product
1	Prefabricated structural components (group 236112)	848.0	16.8	Other structures (group 251123)
2	Other structures (group 251123)	834.5	16.6	Doors, windows, etc. (group 251210)
3	Windows, French windows, etc. (group 162311)	685.6	13.6	Ready-mixed concrete (group 236310)
4	Pellets and briquettes (group 162915)	347.8	6.9	Prefabricated buildings of metal (group 251110)
5	Ready-mixed concrete (group 236310)	289.6	5.7	Prefabricated structural components (group 236112)

Source: PRODCOM, 2021.

## Export of construction-related products and services

The ranking of the **most exported construction products** has changed since 2010. The top five most exported construction products in Denmark and in the EU-27 are summarised in Table 2. Together, these made up 60.2% of all construction products exports in 2019<sup>51</sup>. Amongst the top five most exported construction products from Denmark, “Portland cement, aluminous cement etc. (group 235112)” experienced the highest growth of 31.0% over the period 2010-2019<sup>52</sup>. “Towers and lattice masts etc. (group 251122)” and “Windows, French windows and frames etc. (group 162311)” experienced decline of 39.4% and 17.1% over the period 2010-2019<sup>53</sup> respectively.

Table 2: Top five exported construction products in Denmark and in the EU in 2019<sup>54</sup>

y	Denmark			EU-27
	Product	Value (EUR m)	Share in construction product exports (%)	Product
1	Towers and lattice masts of iron or steel (group 251122)	237.7	15.8	Ceramic tiles and flags (group 233110)
2	Other structures (group 251123)	222.3	14.8	Other structures (group 251123)
3	Windows, French windows, etc. (group 162311)	175.1	11.6	Fibreboard of wood (group 162115)
4	Pellets and briquettes (group 162915)	173.2	11.5	Doors, windows and their frames etc. (group 251210)
5	Portland cement, aluminous cement, etc. (group 235112)	99.4	6.6	Marble, travertine, alabaster (group 237011)

Source: PRODCOM, 2021.

In terms of **cross-border provision of construction services**<sup>55</sup>, Denmark **exported** services worth EUR 3.0 billion worldwide in 2020, 28.3% above the 2010 value (EUR 2.3 billion). Specifically, in 2020, 29.1% of exports (EUR 869.6 million) went to the EU-27. This is 26.4% higher than the 2010 level (EUR 688.2 million).

In parallel, Denmark **imported** a total of EUR 2.6 billion in construction services in 2020, a 63.8% increase since 2010 (EUR 1.6 billion). Specifically, in 2020, 39.7% of imports (EUR 1.0 billion) came from EU-27 countries. This is 54.8% higher than the 2010 level (EUR 675.3 million). Denmark therefore achieved a **trade surplus** of EUR 355.0 million in 2020.

As per the Denmark's Convergence Programme 2021, exports have been resilient during the crisis (COVID-19). Thus, international GDP weighted by shares of Danish exports is expected to grow in 2021 and 2022.<sup>56</sup>

## Access to finance in the construction sector

In 2020, around 24.0% of firms operating in the Danish broad construction sector reported **availability of finance** as a long-term barrier<sup>57</sup>. The rising macroeconomic uncertainty has influenced the availability of external finance<sup>58</sup>. Therefore, the **internal source of financing** continued to be preferred for about 72.0% of Danish firms in 2020. Specific to the Danish broad construction sector, around 78.0% firms relied on internal source of financing in 2020. Around 20.0% of them relied on external sources of financing, whereas 2.0% relied on both internal and external sources. However, the share of construction firms happy to rely exclusively on internal sources for financing has almost halved down in 2020 (21.0%), as compared to 2019 (45.0%)<sup>59</sup>. This may be explained by liquidity issues – affected by the issue of late payments.

In Denmark, credit lines had been the major source of financing, with 51.0% of SMEs considering relevant and 41.0% using it in 2020. Leasing as a source of finance was relevant for 47.0% of SMEs, while 30.0% made actual use of it in 2020. As for bank loans, these were relevant for 25.0% of SMEs, however only 9.0% reported using it. The majority of the financing received by SMEs was utilised as working capital, followed by fixed investments, new products/services, hiring/training and refinancing in 2020<sup>60</sup>.

Specific to the construction sector, leasing has been the major **source of external finance** in 2020, followed by bank loans, other bank financing and factoring. In 2020, major part of the finance utilised by the construction firms was for machinery and equipment, followed by land/business buildings/infrastructure, information technology, employees' training and business processes.

With regards to future investment priorities for construction firms, most of them have prioritised replacement as an investment need, followed by capacity expansion and then new products/services<sup>61</sup>.

Impacted by the global pandemic COVID-19, around 20.0% of firms in the Danish broad construction sector have invested less than planned. This is however the least impacted sector, in comparison with services (49.0%), manufacturing (47.0%) and infrastructure sectors (27.0%)<sup>62</sup>.

As a result, a lesser share (9.0%) of the firms in the broad construction sector likely to abandon or delay at least some of their plans to be implemented in 2021 or beyond, as compared to other sectors<sup>63</sup>. Apart from this, around 78.0% of the firms in the Danish broad construction sector reported no change in the amount planned to be invested.<sup>64</sup>

**Outstanding loans** to the broad construction sector in Denmark reached DKK 21.1 billion (EUR 2.9 billion) in 2020. This represents a 0.7% and 12.4% decrease as compared to 2010 and 2019 levels.

## Access to housing

The **number of households** in Denmark has been increasing since 2010, representing a growth of 4.2% and reaching 2.4 million in 2020. Moreover, the **mean equivalised net income** stood at DKK 256,434 (EUR 34,346) in 2020 - 28.0% above the 2010 level. At the same time, the **share of population living in densely populated area** increased to 37.2% in 2020 from 33.4% in 2010. However, this has reduced from the previous year (37.6%). Alongside, the **interest rates on mortgages** have been declining persistently from 2014, reaching 1.7% in 2020.

Total number of households in Denmark between 2010 and 2020

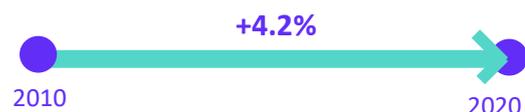
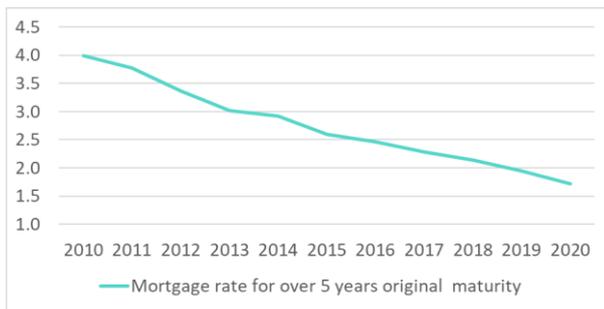


Figure 7: Mortgage rates for loans for over five years original maturity (%) between 2010 and 2020

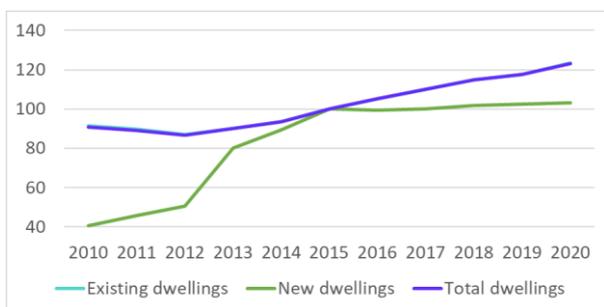


Source: ECB MFI Interest Rate Statistics, 2021.

As a result, the housing loans to households have also been increasing continuously since 2010, with **outstanding residential loans** growing from EUR 224.0 billion in 2010 to EUR 258.8 billion in 2019 (+15.5%). These factors, altogether, are stimulating the demand for dwellings.

The **house price index** (Figure 8) for dwellings surged by 23.2% above the 2015 level in 2020. Specifically, the house price index for existing dwellings reported an increase of 23.4% in 2020 since 2015, much higher in comparison with the house price index for new dwellings (3.3%) (Figure 8). The actual **rentals for housing** have also been on an increasing trend since 2015, growing by 6.1% in 2020, since 2015.

Figure 8: House price index in Denmark between 2010 and 2020 (2015=100)



Source: Eurostat, 2021.

According to the government figures and despite the COVID-19 pandemic, housing prices rose by 4.7% in 2020. In a forecast by the finance ministry, the housing prices were expected to grow as much as 11.2% in 2021, driven by low interest rates and a limited supply of homes<sup>65</sup>.

In congruence to this forecast, the house prices in 2021 have hit record levels in Denmark, which has the highest household indebtedness among rich nations<sup>66</sup>. This is raising concern about bank lending to homeowners, as per the Danish central bank<sup>67</sup>.

The number of total **building permits** issued in Denmark went up from 17,171 in 2010 to 21,050 in 2020, representing 22.6% growth. However, this has declined significantly since 2019 (-40.8%). The majority of the permits issued in 2020 was for multi-dwelling houses, which comprised 33.1% of the total permits issued in 2020. This was followed by detached houses, which comprised 29.7% of the total permits. The terraced, linked or semi-detached houses and other buildings comprised of 23.9% and 13.2%, respectively<sup>68</sup>.

Finally, **home ownership** in Denmark reached its lowest level in a decade (59.3%) in 2020, compared to the peak (68.7%) recorded in 2011. Likewise, the share of owners among **population earning over 60% of the median equivalised income** declined from its peak (71.9%) in 2011 to its lowest level in the decade (63.2%) in 2020. The share of owners among **population earning below 60% of the median equivalised income** also reduced from its peak (45.1%) in 2011 to 31.0% in 2020.

Denmark's **housing cost overburden rate**<sup>69</sup> stood at 15.6% in 2019, above the EU-27 average of 9.4%<sup>70</sup>, indicating issues around affordability. However, it decreased to 14.1% in 2020<sup>71</sup>. Conversely, the **overcrowding rate**<sup>72</sup> in Denmark stood at 10.0% in 2019, well below the EU-27 average of 17.1%<sup>73</sup>. In 2020, it dropped to 9.5%<sup>74</sup>. Lastly, the **severe housing deprivation rate**<sup>75</sup> in Denmark reached 2.8% in 2019, against an EU-27 average of 4.0%<sup>76</sup>. Further in 2020, this remained unchanged for Denmark (2.8%)<sup>77</sup>.

## Infrastructure

According to the 2019 Global Competitiveness Report Denmark ranked 15<sup>th</sup> out of 141 economies, in terms of its overall infrastructure quality<sup>78</sup>.

It performed best in terms of efficiency of seaport services (ranked 6<sup>th</sup>) under transport infrastructure. Efficiency of air transport services (11<sup>th</sup>) and quality of road infrastructure (14<sup>th</sup>).

On the contrary, efficiency of train services (23<sup>rd</sup>), road connectivity (36<sup>th</sup>) and airport connectivity (36<sup>th</sup>) ranked the lowest<sup>79</sup>.

Denmark's crisis policy, discussed in the Denmark's Convergence Programme 2021, aiming to help the economy to recover from the COVID-19 crisis, also aims to actively invest in the future and in the long-term development of the country. The initiatives include investments in the green transition, digitisation, renovation of **infrastructure** and further training and education of the work force<sup>80</sup>.

Additionally, an approximate amount of DKK 15.0 billion (EUR 2.0 billion) had been allotted to increased public investments in 2021-2025 as part of the new 2025-frame presented in August 2020.

The increase in public investments is amongst other things part of the basis for the government's newly proposed infrastructure plan **Denmark Forward – Infrastructure Plan 2035** (Chapter 7 – TO 1), announced in April 2021<sup>81</sup>.

Under its Recovery and Resilience Plan (RRP), Denmark has allocated DKK 180.0 million (EUR 24.2 million) for the construction of bicycle infrastructure. This will contribute to public health, and it can limit congestion and reduce carbon dioxide emissions. Out of this, DKK 170.0 million (EUR 22.8 million) will be invested annually in 2022-2023. As such, DKK 10.0 million (EUR 1.4 million) will be invested in the installation of charging stations for electric bicycle across 200 locations by 2024<sup>82</sup>.

## 4

## Key issues and barriers in the construction sector

### Company failure

The business demography in Denmark has been particularly dynamic for all construction sub-sectors. Particularly, in the narrow construction sub-sector, **company births** increased by 32.6% over the period 2010-2018<sup>83</sup>, reaching 3,544 in 2018. Likewise, in the real estate activities sub-sector, it increased by 23.7% over the period 2012-2018<sup>84</sup>, reaching 2,525 in 2018. Lastly, in the architectural and engineering activities sub-sector there was an increase by 9.4% over the period 2010-2018<sup>85</sup>, reaching 864 in 2018.

Company births in the narrow construction sub-sector between 2010 and 2018

 **32.6%**

With regards to **company deaths**, the narrow construction sub-sector witnessed a decline by 5.9% over the period 2010-2018<sup>86</sup>, reaching 3,652 in 2018. Conversely, company death in the real estate activities sub-sector reached 2,662 in 2018, representing an increase of 22.1% since 2012<sup>87</sup>. Likewise, in the architectural and engineering activities sub-sector it reached to 939 in 2018, representing a 24.7% increase since 2012.

The number of **bankruptcies** in the first nine months of 2020 was lower than the first nine months of 2019. The sectors which have been hit the hardest have been tourism and transportation, following the advent of the COVID-19 pandemic<sup>88</sup>.

In 2020, Denmark saw a total of 5,614 bankruptcies. This represents a decline of 33.8% from 2019<sup>89</sup>.

### Trade credit

Currently, 63.0% of the Danish businesses surveyed consider '**trade credit**' for their B2B sales for 2020, which is higher than the average for Western Europe (55.0%)<sup>90</sup>. In fact, around 43.0% of the businesses tend to increasingly use trade credit the onset of the COVID-19 pandemic<sup>91</sup>.

With regards to the use of trade credit, around 52.0% of businesses reported that they most often accepted requests for trade credit from large enterprises to encourage sales on the domestic market. Another 28.0% of businesses granted trade credit to stay competitive. The remaining 21.0%, reported that they used trade credit as a means to provide short term finance to their customers<sup>92</sup>. Around 49.0% of businesses had reportedly planned to employ trade credit insurance in 2021 – to mitigate credit risks<sup>93</sup>.

According to the **2020 survey on the access to finance of enterprises (SAFE) analytical report**, trade credit was used by 9.0% of Danish SMEs between April 2020 and September 2020 (against a 14.0% average for the EU-27). Around 17.0% of Danish SMEs applied for trade credit between April 2020 and September 2020 (31.0% for the EU-27 average). During the same period, 39.0% of SMEs did not apply because of sufficient internal funds (33.0% for the EU-27 average). Whereas 6.0% of them did not apply due to fear of getting rejected<sup>94</sup>.

In May 2020, the European Commission announced its decision to approve, under the state aid rules, a Danish guarantee scheme to support the trade credit insurance market due to the global pandemic COVID-19. This guarantee scheme amounting to DKK 30.0 billion (EUR 4.0 billion) was announced on April 2020 by the Danish government. As per the European Commission, the scheme is targeted to amend the serious disturbances caused to the Danish economy<sup>95,96</sup>.

## Late payment

**Late payment** conditions in Denmark have improved in 2020 over the previous year. Around 25.0% of the SMEs experienced problems due to late payments, comparatively lesser than the previous year (39.0%) and the EU 27 average (44.0%). In 2020, around 9.3% of SMEs faced the problems of late payment on a regular basis, less than the previous year (15.0%) and the EU-27 average (13.0%)<sup>97</sup>.

However according to **2020 Atradius Payment Practices Barometer** report for Denmark, the total value of overdue invoices in Denmark increased to 44.0% in 2020. This is significantly higher than the 2019 average of 25.0%. Around 41.0% of businesses reported having to wait for an extra 10 days in average in comparison to 2019 to turn overdue invoices into cash. Practically, this translates to an average waiting period of 20 days after the due date to cash in overdue invoices. This is still lower than the 22-day average for Western Europe<sup>98</sup> overall<sup>99</sup>.

After the onset of the pandemic, on an average, 8% of the total value of receivables was written off as uncollectable and 7.0% of the total value of receivables was still unpaid at 90 days. Around 26.0% of businesses in Denmark reported of payment delays to their own suppliers, lesser than the Western Europe<sup>100</sup> average (34.0%)<sup>101</sup>.



With reference to the broad construction sector in Denmark, late payments affected 50.0% of the total value of B2B invoices, up from 28.0% observed in the previous year<sup>102</sup>

Moreover, more than half (57.0%) of the businesses in the Danish construction sector reported of having to wait longer to turn overdue invoices into cash, up to 25 days past the due date. For around 36.0% of businesses, there were no changes in average invoice-to-cash turnaround time. Around 20.0% of businesses reported of experiencing liquidity issues caused by the pandemic<sup>103</sup>.

## Time and cost of obtaining building permits and licenses

As per the World Bank's Doing Business 2020 Report, Denmark ranked 4<sup>th</sup> with respect to "Dealing with construction permits"<sup>104</sup>. In order to facilitate the comparison between permit procedures across economies, the example of building a warehouse has been used. Completing the formalities to build a warehouse<sup>105</sup> requires only seven administrative procedures (considerably lower than the OECD high-income average of 12.7) and takes 64 days compared to the 152.3 OECD average (Table 3). The average cost is below OECD high-income average of 1.5%, as it represents 0.6% of the warehouse value.

Table 3: Construction procedures timing and costs in Denmark

Procedure	Time to complete	Associated costs
Request and obtain building permit from the Municipality	21 days	no charge
Obtain foundation permit from Municipality	15 days	no charge
Notify the Centre for Construction of commencement of work	0.5 days	no charge
Receive construction inspection from the Supervising Authorities	1 day	no charge
Send notice of completion to the Centre for Construction	0.5 days	no charge
Receive final inspection and obtain occupancy permit	21 days	no charge
Request and obtain connection to water and sewage	5 days	DKK 133,994 (EUR 17,953)

Source: Doing Business overview for Denmark, World Bank, 2020<sup>106</sup>.

## Skills shortage



Availability of skilled staff has been reported as a major concern for around 75.0% of firms in the Danish broad construction sector, being the highest among other sectors in Denmark<sup>107</sup>.

Particularly, the shortage of skilled staff in the Danish broad construction sector in the first quarter of 2020 stood at 4,278<sup>108</sup>.

The number of **job vacancies** in the narrow construction sub-sector has increased significantly in Denmark over the 2010-2020 period. In 2020, job vacancies in the narrow construction sub-sector reached 4,027, representing a significant growth of 217.6% since 2010. In the real estate activities sub-sector, it reached 546 in 2020, representing a growth of 43.0% since 2010. These findings have been confirmed by the Confederation of Danish Industry (DI), whose internal survey of 500 of its member companies, revealed that 9 out of 10 of them tried to recruit new workers and a third of them were not successful in doing so due to lack of labour supply<sup>109</sup>.

Job vacancies in narrow construction sub-sector between 2010 and 2020

↑ 217.6%

There has been a significant reduction in **adult participation in education and training** (18 to 64 age group). Particularly for the narrow construction sub-sector it reduced to 18.8% in 2020, from 28.9% in 2010. Similarly, in the real estate activities sub-sector, it reduced to 18.1% in 2020, from 30.5% in 2010. This drop could be attributable to high economic activity, during which employers may have allowed less time for training. Among the ones taking part in adult learning, no significant differences in terms of skills level or educational background had been observed. The participation of men (20.7%) stood lower than that of women (30.0%)<sup>110</sup>.

The number of **tertiary students in engineering, manufacturing and construction** increased by 66.2% over the period 2010-2019, reaching 9,968 in 2019<sup>111</sup> from 5,999 in 2010. Specifically, tertiary students in engineering and engineering trades increased by 121.1% over the same period. Over the same period, tertiary students in manufacturing and

processing, and architecture and building increased by 49.5% and 15.2%, respectively. The tertiary education attainment rate has continued to increase from the past years reaching 49.0% in 2019. Notably, the attainment rate for women (57.1%) has strongly outnumbered men (41.2%) in 2019<sup>112</sup>.

According to Denmark - 2020 Skills forecast report published in November 2020 by CEDEFOP (European Centre for the Development of Vocational Training), the employment growth in the Danish broad construction sector is expected to shrink over the period 2014-2030. For the period, 2014-2018, the average annual employment growth stood at 2.7%, against 1.2% for the period 2018-2022, and 0.7% for the period 2022-2030<sup>113</sup>.

As per the government, the challenge of labour shortage in Denmark has been persistent, and could threaten economic growth in forthcoming years. Moreover, the country needs to make it more attractive for its youth to seek vocational education. Despite the improvement in labour figures, unemployment rates remain higher than normal, while at the same time companies are struggling to find workers<sup>114</sup>.

Shortages of skilled workers in the Danish construction sector under job titles – bricklayer, joiner, carpenter, travelling fitter and plumber fitter have been listed in the most recent "Positive List" of in-demand professions. The list has been released in July 2021, by the Danish Agency for International Recruitment and Integration (SIRI). It is a list of professions experiencing a workforce shortage within Denmark<sup>115</sup>.

In addition, applications for building construction have increased by 12.0% over the previous year<sup>116</sup>.

In order to address the challenge of labour shortage in Denmark, the government launched the 'National Coalition for digital skills and jobs' in February 2019, which aimed at promoting digital skills. With more than 10,000 members, it supports actions to supply high-quality graduates in line with labour market needs. Besides this, a fund amounting to DKK 102.0 million (EUR 13.7 million) had been set aside as per a political agreement in October 2019. It aimed to ease the shift from unskilled to skilled

work – **job rotation scheme**, and to address labour shortages by ensuring the supply of skilled workers with necessary competences<sup>117</sup>.

**In 2020, the continuation of this job rotation scheme was agreed upon, allowing unskilled workers in certain sectors (e.g. health) to take part in training to become a skilled worker in the same field, while an unemployed person fills the position while training takes place<sup>118</sup>.**

## Sector and sub-sector specific issues

### Material efficiency and waste management

**As per Statistics Denmark, the Danish construction sector generated 5.0 million tonnes of wastes in 2019<sup>119</sup>. This comprises of 4.8 million tonnes of non-hazardous and 0.2 million of hazardous wastes<sup>120</sup>.**

This represents an increase of 55.1% of the total (hazardous and non-hazardous) wastes generated in volume terms, as compared to 2011<sup>121</sup>. In 2019, out of the wastes generated by the Danish construction sector, around 4.3 million tonnes comprised of the materials recovered. Whereas, 0.4 million tonnes of wastes were incinerated, and remaining 0.2 million tonnes were deposited<sup>122</sup>. In terms of municipal wastes generated in 2018<sup>123</sup>, Denmark was the highest among the EU-28<sup>124</sup>, with 766.0 kg of waste per person being generated<sup>125</sup>.

Notwithstanding some initiatives on waste prevention, Denmark's municipal waste generation per capita is still the highest in the OECD. Most of this waste was incinerated (destroyed by burning) with energy recovery<sup>126</sup>. Denmark is Europe's top waste burner. Incineration accounts for about a fifth of district heating and about 5.0% of its electricity<sup>127</sup>.

As for the building and construction sector, the waste generated accounts for more than one-third of the total waste generated in Denmark<sup>128</sup>. The

country has improved the recycling of household waste and going forward, it aims to add value to construction waste such as reusing bricks in construction, instead of crushing them, for using them as road materials<sup>129</sup>.

Denmark's total waste generation rose by 30.0% between 2010 and 2016<sup>130</sup>, from 15.0 million tonnes to about 20.0 million tonnes. This increase reflects a rise in **construction and demolition waste (CDW)** as well. The share of CDW in the total waste produced stood at 60.0% (4.3 million tonnes) in 2016<sup>131</sup>. Moreover, almost half of domestic national material consumption comprises of non-metallic minerals, including stone, gravel and sand extracted for construction activities. This turns CDW a vital sector for transitioning to a circular economy<sup>132</sup>.

CDW is regulated by the following legislation: the Environmental Protection Act no. 879 26/06/2010; the Statutory Order no. 1309/2012 on waste, the Statutory Order no. 1662/2010 on recycling of residual products and soil in building and construction work, and on the recycling of sorted, unpolluted CDW; and the Circular of 15 July 1985 on the use of crushed asphalt in road construction<sup>133</sup>.

### Climate and energy

**Emissions of greenhouse gases** (carbon dioxide, methane and nitrous oxides) from activities in the narrow construction sub-sector amounted to 1,681,123 tonnes in 2019<sup>134</sup>, representing 11.0% increment from 2010 levels. Whereas emissions from activities in the real estate activities sub-sector amounted to 122,176 tonnes in 2019<sup>135</sup>, representing a decline 6.3% from 2010 levels.

According to the **EIB Group survey on investment and investment finance 2020 for Denmark**, around 36.0% of firms in the construction sector are likely to invest in energy efficiency, being the least in comparison to manufacturing, services and infrastructure sectors. However, compared to firms in other sectors, construction firms are more likely to believe that lower carbon emission will be positive for market demand<sup>136</sup>.

## 5

# Innovation in the construction sector

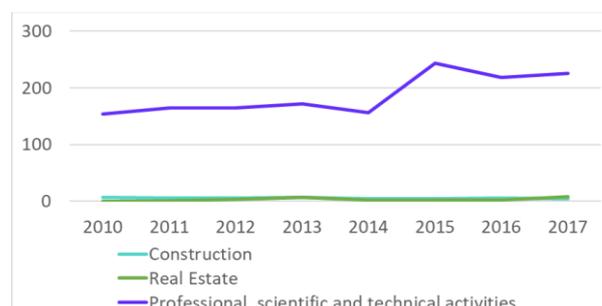
## Innovation performance

Denmark is considered as an Innovation Leader according to the European Innovation Scoreboard 2021<sup>137</sup>.

Denmark's areas of strength, under the innovation performance, include attractive research systems, intellectual assets and human resources. The highest scoring indicators include public-private co-publications (under linkages), lifelong learning (under human resources) and design applications (under intellectual assets). Conversely, sales impacts, firm investments and employment impacts form country's relatively weak areas. Particularly, sales of innovative products (under sales impacts), innovation expenditures per employee (under firm investments) and government support for business R&D (under finance and support) are amongst country's lowest scoring indicators<sup>138</sup>.

**Business enterprise R&D expenditure (BERD)** in the broad construction sector has shown a generally declining trend since 2010 except for professional, scientific and technical activities (Figure 9). Professional, scientific and technical activities, which reported the highest BERD, experienced a 46.4% increase from EUR 154.2 million in 2010 to EUR 225.7 million in 2017. Likewise, the BERD in the real estate activities sub-sector, which was negligible in 2010, increased to EUR 7.7 million in 2017. Conversely, BERD in the narrow construction sub-sector declined from EUR 7.5 million to EUR 4.8 million over 2010-2017 (-35.1%)<sup>139</sup>.

Figure 9: Business enterprise R&D expenditure (BERD) per construction sub-sector in Denmark between 2010 and 2017<sup>140</sup> (EUR m)



Source: Eurostat, 2021.

The total **R&D personnel** (full-time equivalents – FTE<sup>141</sup>) in the professional, scientific and technical activities had been fluctuating since 2010. In 2017, it went up from to 1,541 from 1,479 in 2010, representing 4.2%) increase. Likewise, the number of FTEs in the real estate activities that were negligible in 2010 increased to 76 in 2017. Last, the narrow construction sub-sector experienced a 19.6% growth, from 46 in 2010 to 55 in 2017.

In parallel, the number of yearly **construction-related patent applications** has been increasing at an average of 62.3 over 2010-2020, with 2020 recording 78. Last, only one Danish Construction & Materials firm was ranked within the top 1,000 EU companies for R&D in 2020<sup>142</sup>.

Since 2016, the share of SMEs introducing innovation has been gradually increasing from 36.8% to 41.5% in 2018 and 43.7% in 2020 (compared to the EU-27 average of 35.9% in 2020)<sup>143</sup>.

With regards to innovation activity in the Danish construction sector, firms are the least likely to innovate. Around 72.0% of these firms have reported no innovation activity, being the highest in comparison with manufacturing (42.0%) and infrastructure (59.0%) sectors in 2020<sup>144</sup>.

## Eco-innovation and digitalisation

According to Eco-Innovation Scoreboard 2021, Denmark has been declared as the Eco-Innovation Leader, with a score of 150. This is higher than the EU-27 average (121)<sup>145</sup>.

With regards to Eco-Innovation indicators, Denmark had scored above the EU-27 average under eco-innovation inputs (125), eco-innovation outputs (210) and socio-economic outcomes (177). However, the country scored below the EU-27 average under eco-innovation activities (92) and resource efficiency outcomes (143)<sup>146</sup>.

In line with the core priorities set by the EU for the national Recovery and Resilience Plans – i.e. supporting a green and digital transition, **Denmark's Recovery and Resilience Plan 2021** includes investments and support for an integrated green innovation strategy. This is expected to contribute to reducing carbon dioxide emissions in the most emitting sectors in Denmark and in a cost-effective and socially just way. This will translate in measures such as green and digital investments supported by the Danish government through various subsidy schemes, as well as tax deductions for citizens and enterprises investing in new green and digital technology, research and development<sup>147</sup>.

Under its RRP, Denmark has allocated EUR 580.0 million towards green tax reforms, EUR 242.0 million towards green research and development and EUR 89.0 million towards promoting digitalisation initiatives in the country<sup>148</sup>.

This includes digitalising the public administration, strengthening digitalisation within businesses and industries as well as supporting SME enterprises in digitalising their business systems.

In addition, the Danish Parliament has adopted a new **National strategy for sustainable construction** that ensures the phasing in of CO2 requirements from 2023 for all major buildings larger than 1,000 square meters. The strategy contains 21 different initiatives to promote sustainable solutions in the construction industry<sup>149</sup>.

However, the upscale and dissemination of successful new technologies and digital solutions across the public sector in Denmark, typically in close collaboration with businesses, are often slow and fragmented. Hence, the utilisation and dissemination of emerging technologies and innovative solutions from the private sector remain an important area of development<sup>150</sup>. According to **EIB Group survey on investment and investment finance 2020 for Denmark**, 75.0% firms have implemented, either fully or partially, at least one of the digital technologies in 2020, well above the EU-27 average (63.0%).

Specific to the Danish construction sector, the share of firms that adopted the concept of drones stood at 31.0%, higher than the EU-27 average (19.0%). Similarly, around 17.0% of the construction firms adopted augmented or virtual reality in Denmark in 2020, whereas the EU-27 average for the same stood at 11.0%. 3-D printing was adopted by 10.0% of Danish construction firms in 2020, in line with the EU-27 average (10.0%).

Conversely, automation via advanced robotics was adopted by 20.0% of Danish construction firms in 2020, slightly below the EU-27 average (22.0%)<sup>151</sup>.



As per the Digital Economy and Society Index (DESI) 2020 report, Denmark ranks third with a score of 69.1, higher than the EU-27 average (52.6) and previous year's score (66.0)<sup>152</sup>.

Denmark has improved its results (scores) on almost all DESI dimensions. Specifically, under the connectivity dimension, Denmark showed a significant improvement in score, reaching 65.8 in 2020 from 59.2 in 2019. Under the human capital dimension, the score in 2020 stood at 61.3, slightly above 2019 (61.1). For use of internet services dimension, the score remained unchanged in 2020, as compared to previous year (75.2). The score for integration of digital technology dimension improved from 61.2 in 2019 to 65.1 in 2020. Lastly, under digital public services, the score increased significantly from 82.7 in 2019 to 87.1 in 2020<sup>153</sup>.

On the basis of national green research strategy focusing on challenges where the need for new solutions and the potential for meeting the green objectives are the largest in the country, the Danish government has decided to set aside DKK 700 million (EUR 94.1 million) in 2021 for the green research and innovation program. It aims to accelerate the development of new green technologies and solutions. The funding of the program is part of an extraordinary priority of research in green innovation and solutions<sup>154</sup>.

With respect to **Building Information Modelling (BIM)**, Denmark, being one of the most developed countries worldwide regarding the digital construction sector, had been the first country to mandate its usage back in 2007. More than a decade the country has mandated its state clients (from Ministries to Universities) to adopt BIM practices both for new construction projects and restoration

of already existing buildings.

Since 2011, BIM has been mandated for all local and regional projects exceeding the value EUR 2.7 million and all government buildings starting from a value of EUR 677,000<sup>155</sup>. As a result, by 2016, around 78.0% of Danish companies were mindful of BIM and used it for various purposes (3D visualisation, etc.). In addition, more than 65.0% of companies that use BIM, expect to use it for all projects during the next couple of years<sup>156</sup>.

Amongst others, two significant Danish projects are **New Hospital Bispebjerg in Copenhagen (merger between the Frederiksberg Hospital and Bispebjerg Hospital scheduled to be in use by 2023)** and the **Ringsted-Fehmarn rail link project (initiated by Denmark and Germany to connect the fixed link across the Fehmarnbelt, whose construction works started in 2021)**<sup>157</sup>.

## 6

# National and regional regulatory framework

## Policy schemes

In June 2018, the Danish government proposed a ‘**new housing strategy**’ consisting of four key dimensions including safe housing, sustainable debt, better living environment and efficient construction processes<sup>158</sup>.

- in the context of safe housing, the government has prepared a report to make amendments to the Disposal Act, revise the insurance scheme and establish an authorisation scheme for appraisers.
- as per the strategy, the government also wants to simplify the planning and building legislation to avoid the slow pace of housing development due to unnecessary regulations.
- with regard to the housing debt, the government has planned to continue the mortgage loan regulations to contribute to a more sustainable development of household debt.
- recently the homeowners in Denmark have also worked on establishing debt registers as well as rent restrictions through platforms such as Airbnb to ensure safe and good living environments around the country.

The government has also doubled its Craftsman deduction and service deduction scheme (BoligJobordning), from the previous EUR 1000 to EUR 2000<sup>159</sup>.

Denmark has entered into an agreement with 24 municipalities under the “**2018-2021 Action Plan Against Homelessness**”. This aims at providing support to the municipalities, including an

assessment for identifying gaps in the present municipal approach to homelessness, advisory services for helping these municipalities execute Housing First principles, with funding for preliminary projects. Municipalities are funded to implement an innovative approach recognised by the central government, or to implement their self-designed solution<sup>160</sup>.

**As a national strategy to combat homelessness, the national government allocated DKK 154.0 million (EUR 20.5 million) to ten initiatives. Among other things, the initiatives must contribute to the spread of the Housing First-approach in general, and to the development and testing of a new Housing First-approach towards young people<sup>161</sup>.**

Furthermore, over DKK 70.0 million (EUR 9.5 million) were dedicated to investment funds, which are intended to support the local authorities in investing in more pre-emptive, comprehensive and coherent social services for homeless people. In addition, means were allocated towards the formation of national guidelines about combating homelessness<sup>162</sup>.

As an emergency support measure to support the homeless and prevent homelessness, in response to the COVID-19 pandemic, the Danish government introduced a financing measure **extra capacity at emergency shelters** in 2021. During the height of the two waves of the COVID-19 pandemic – in the spring of 2020 and again in the winter 2020/2021, the Danish government along with the Parliament provided extra funds to civil society aimed at securing more housing opportunities spaces for homeless<sup>163</sup>.

Moreover, the government had introduced **Partnership for marginalised adults** (*Partnerskab*

for *udsatte voksne*) in 2021, with the aim of addressing social isolation. These partnerships with civil society organisations, KL (Local Government Denmark) and Danish Regions is aimed at addressing both local and national problems quickly and discuss initiatives to combat loneliness amongst marginalised adults during the pandemic<sup>164</sup>.

Social housing plays an important role in Denmark's policies<sup>165</sup>. The former Ministry of Immigration, Integration and Housing (now Ministry of Transport, Building and Housing) has set up various **subsidies for social housing**.



As an instrument for ensuring mixed cities and lower housing prices, municipalities can demand 25.0% social housing in new housing areas, to ensure affordable housing<sup>166</sup>.

The Danish government had also proposed the allocation of DKK 30.0 billion (EUR 4.0 billion) from the **National Building Fund (*Landsbyggefonden*)** for green renovations in the social housing sector during 2020-2026<sup>167</sup>. This will be the first step towards a green recovery of Denmark. Out of the total allocation, DKK 18.4 billion (EUR 2.4 billion) will be used for renovating 72,000-social housing. With a focus on the green transition, the remaining DKK 11.6 billion (EUR 1.5 billion) will be used to serve upcoming renovations till 2026<sup>168</sup>.

In May 2021, the Danish government revealed its design plans for 24 new homes for young people with developmental disabilities in Valby, Copenhagen. The new housing will consider the needs of residents, and focus on sustainability, and accessibility, and shall begin welcoming residents in the spring of 2023<sup>169</sup>.

An initiative named “**Denmark without parallel societies – no ghettos by 2030**”, has come into effect since December 2018. It aims at integrating neighbourhoods characterised as “ghettos”. An upper limit of 40.0% social housing has also been introduced<sup>170</sup>. This should be obtained by a combination of demolition, new building and sale of dwellings to private investors. Overall, some 12.0% of all social dwellings are now subject to these rules.

The Ministry also offers developers and housing associations subsidies for the construction of permanent dwellings, known as ‘**alternative homes**’ (*skæve boliger*), for the homeless and other

disadvantaged beneficiaries. Support amounts to up to DKK 400,000 (EUR 54,000) per housing unit<sup>171</sup>.

In 2020, the Danish government initiated a law which releases municipalities from the agreed construction ceiling of DKK 19.1 billion (EUR 2.6 billion). This has been agreed between Danish government and local government. Additionally, the government will release the regions from the construction ceiling (DKK 2.5 billion) agreed upon with the Danish Regions<sup>172</sup>.

Under its RRP, Denmark has allocated EUR 63.0 million towards energy efficiency in households as well as EUR 40.0 million towards energy renovations in public buildings<sup>173</sup>.

Denmark is also investing in **urban renewal** initiatives, seeking to boost the development and transformation of more deprived urban areas to improve their attractiveness and the living standard of the population. This includes the regeneration of the housing stock, municipal infrastructure and social spaces. To this end, DKK 136.1 million (EUR 18.3 million) has been allocated to urban renewal in 2017, DKK 65 million (EUR 8.7 million) both for 2018 and 2019 and DKK 82 million (EUR 11.0 million) for 2020<sup>174</sup>.

Furthermore, the two urban regions of Denmark, Copenhagen and Aarhus, have set smart city targets. Copenhagen, with an aim to be the world's first carbon-neutral city, is implementing innovative solutions for water and heating supplies, transportation, waste management and alternative energy sources<sup>175</sup>. The country, collectively, also aims to become carbon neutral by 2050<sup>176</sup>. While Aarhus is creating a digitalisation strategy in collaboration with its citizens, academia, private companies and public authorities<sup>177</sup>. Moreover, the Danish city of Aalborg and Tumakuru Smart City Ltd. signed a memorandum of understanding to improve city's infrastructure under a smart city initiative. Cities will cooperate in the field of smart education, energy efficiency initiative, transportation, urban water management, digitisation, technology for the construction of green buildings, waste management to attain healthy and liveable cities, e-governance and health<sup>178</sup>.

Policy measures to offset potential risks related to the low mortgage rates and house price increases have also been adopted<sup>179</sup>. The Danish Financial Stability Authority (*Finanstilsynet*) introduced the

'Supervisory Diamond for Mortgage Credit Institutions (MCIs)'. It is built on five indicators containing the limits on the risk of the institutions<sup>180</sup> for securing the stability of the mortgage market. The indicators include the share of loans without amortisation, the interest-rate risk of the borrower and lending growth. In 2017, an agreement on a new housing tax system was signed, which implies that housing taxation from 2021 follows new and more accurate property and land assessments<sup>181</sup>.

**In 2021, the Danish government introduced the National Strategy for Sustainable Construction. The strategy focuses on five main pillars: i) more climate-friendly buildings and construction; ii) Durable, high-quality buildings; iii) Resource-efficient buildings; iv) Energy-efficient, healthy buildings; and v) Digitally-supported construction.**

## Building regulations

Construction activity in Denmark is regulated by the **Building Regulations 2018 (BR18)**, which replaced the BR15 in January 2018. These dictate the rules for the construction of both private and commercial buildings, providing both the legally binding requirements (regarding e.g. building interiors, fire behaviour, energy consumption, installations, etc.) as well as comments and guidelines to such requirements<sup>182</sup>. BR18 specifies detailed requirements for building construction under the Building Act. The requirements of the building regulations are primarily designed to ensure building construction achieves minimum standards in fire, safety and health terms<sup>183</sup>.

The **Building Act (Byggeloven)** together with voluntary agreements shape construction activities. The Building Act sets the framework ensuring that buildings are designed and constructed in such a way that they provide satisfactory security against fire, as well as meeting health and safety standards. The Building Act is currently undergoing a revision with the purpose of providing the legal basis to set requirements in the Building Regulation regarding life cycle assessment (LCA) and CO<sub>2</sub> threshold levels, life cycle cost (LCC) and use of resources on the construction site and documentation of dangerous substances in building materials<sup>184</sup>.

Voluntary agreements define the relationship between construction parties. Namely, AB 92 defines contractual arrangements between construction professionals, AB 93 applies to turnkey contracts whereas AB Forbruger is used in contracts between a building company and a private client<sup>185</sup>.

Amendments to the Building Act were passed by the Parliament in April 2016 and became effective as of July 2016<sup>186</sup>. The amended Act will make buildings in Denmark cheaper and easier through several changes, including:

- the introduction of a certification scheme for the documentation of the technical aspects of complex constructions (e.g. multi-storey buildings) removes the need for municipalities to assess compliance with the technical conditions stated in the building regulations, thus speeding up the issuing of construction permits;
- the exemption of rental properties from building insurance requirement will make it less expensive for developers to build rental properties;
- the two fire legislations on the design and operation of buildings are merged in the Act and simplified, thus alleviating some of the administrative burden of obtaining building permits.

The amendments to the Building Act also entail a general requirement for the installation in buildings of heating based on renewable energy<sup>187</sup>.

**The Danish building directive have called for a 2020 target of a 75.0% reduction in energy consumption for new buildings compared to the 2006 levels. The overall target is to reduce the greenhouse gas emissions by 40.0% compared to 1990<sup>188</sup>.**

A residential building can be classified as '**Building Class 2020**', which is the highest energy class in Denmark<sup>189</sup>, when the overall requirement for solar gain for heating, ventilation and hot water per m<sup>2</sup> of heated floor area does not exceed 20 kWh annually. This will help to ensure that the homes are tough, well insulated and have a high-performing building envelope.

The Danish government will publish a legal framework by Q4 2021 for the energy renovations in public buildings. This legal framework shall define the conditions for receiving funding under the subsidy scheme for energy renovations in public buildings, such as maximum grant size or target group<sup>190</sup>.

The Recovery and Resilience Plan (RRP) of Denmark includes measures that aim to speed up the removal of oil burners and gas furnaces as heat sources and support the transition to heating based on green and sustainable sources while simultaneously promoting energy renovations in residential, commercial and public buildings. The proposed funding amounts to DKK 645.0 million (EUR 86.7 million) in the period 2021-2025. This is expected to reduce carbon dioxide emissions by a further 0.04 Mt by 2025. The scheme is expected to mitigate pollution, create labour-intensive renovation jobs, generate demand for high energy and resource-efficient equipment thereby boosting the construction sector and support SMEs and local jobs<sup>191</sup>.

**As per the National Strategy for Sustainable Construction, the government will test a life-cycle assessment (LCA) requirement with a view to phasing it into the building code as a requirement for all buildings by 2023.**

In addition, the Strategy also introduces a threshold limit value into the building code for the environmental impact of new buildings of more than 1,000 m<sup>2</sup> from 2023.

## Insurance and liability related regulations

In Denmark, property developers are required to take out compulsory building insurance, which is valid for 10 years and covers major building defects<sup>192</sup>. This requirement is governed by the **Building Insurance Ordinance** (*Bekendtgørelse om byggeskadeforsikring*) and seeks to strengthen the consumer's legal position by providing access to damage repair or compensation from the insurance company in case of serious damage in a newly established residential unit<sup>193</sup>. Disputes between parties in construction contracts are settled by arbitration in the **Danish Building and Construction Arbitration Board** (*Voldgiftsnævnet for Bygge- og Anlægsvirksomhed*)<sup>194</sup>.

In addition, under the general conditions in the standard construction contracts, AB 92 and ABT 93, the employer has to take out and pay for the usual fire and storm and tempest insurance from the commencement of the construction work until any defects identified at handing-over of the construction have been rectified. A public employer is not obliged to take out this insurance as he/she can be considered as a self-insurer<sup>195</sup>.

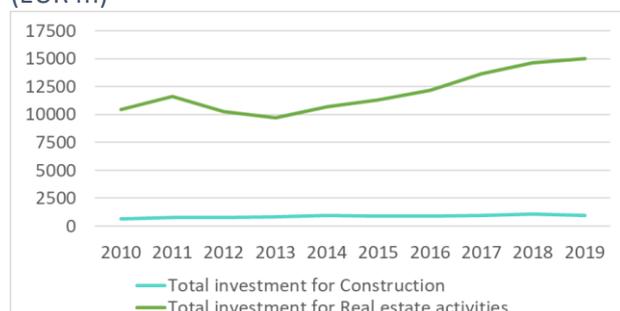
There are no legal requirements to take out specific insurance for construction work. Building owners must maintain their usual fire and storm or tempest insurance, but the existence of construction work is irrelevant in this respect. Clients in public works contracts must be self-insured under AB92/AB18 and ABT93/ABT18 general conditions. A client must take out (or maintain) its usual fire and storm or tempest insurance (section 8(1), AB92, section 11(1), AB18)<sup>196</sup>.

# Current status and national strategies to meet Construction 2020 objectives

## TO 1 – Investment conditions and volumes

Total investment by the broad construction sector<sup>197</sup> has been fluctuating between 2010 and 2019<sup>198</sup> (Figure 10). The total investment by the narrow construction sub sector reached EUR 982.5 million in 2019<sup>199</sup>, an increase of 46.2% over the 2010-2019 period. Similarly, the total investment by the real estate activities sub-sector reached EUR 15.0 billion in 2019<sup>200</sup>, representing an increase of 44.0% from 2010 level.

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



Source: Eurostat, 2021.

Total investment by the narrow construction sub-sector between 2010 and 2019

↑ 46.2%

Total investment by the real estate activities sub-sector between 2010 and 2019

↑ 44.0%

The investment index in the broad construction sector<sup>201</sup> increased by 29.3% between 2015 and 2019<sup>202</sup> (Figure 11). In particular, the investment

index in dwellings by the whole economy increased by 36.0% over 2015-2019<sup>203</sup>, whereas those in non-residential construction and civil engineering grew by 23.9% over the same period. In absolute terms, investment in the construction sector totalled EUR 32.8 billion in 2019<sup>204</sup>, of which EUR 15.4 billion was invested in dwellings and EUR 17.4 billion in other buildings and structures<sup>205</sup>.

Figure 11: Investment index in the Danish construction sector between 2010 and 2020 (2015=100)



Source: AMECO, 2021.

Total inland infrastructure<sup>206</sup> investment as a share of GDP has been fluctuating since 2010. From 0.5% in 2010, it reached 0.8% in 2018<sup>207</sup>. Investment in rail infrastructure surged from EUR 396.4 million in 2010 to EUR 1.4 billion in 2018 (+240.9%). Similarly, investment in road infrastructure increased from EUR 936.6 million in 2010 to EUR 1.1 billion in 2018 (+15.7%). Meanwhile, investment in road infrastructure maintenance increased from EUR 1.1 billion in 2010 to EUR 1.2 billion in 2018<sup>208</sup> (+8.8%).

Household renovation spending has seen an increasing trend since 2010. It grew from EUR 874.0 million in 2010 to EUR 1.6 billion in 2019<sup>209</sup> (+82.0%), accounting for 1.0% of household disposable income, compared to 0.7% in 2010 and slightly above than the EU-27 average of 0.9%.



Since 1973, the European Investment Bank (EIB) Group has been active in Denmark financing 317 projects, amounting to EUR 23.5 billion to date<sup>210</sup>.

In 2020 alone, the EIB Group invested EUR 21.0 million in infrastructure, EUR 289.0 million in SMEs financing, EUR 170.0 million in environment development and EUR 330.0 million in innovation investment<sup>211</sup>.

As of January 2021, the total financing under the European Fund for Strategic Investments (EFSI) in Denmark amounted to EUR 1.2 billion and is set to trigger EUR 6.1 billion in additional investments. Specific to infrastructure and innovation projects, 21 approved projects have been financed by the EIB with EFSI backing, totalling to EUR 626.0 million. This is set to trigger EUR 4.3 billion in total investment<sup>212</sup>.

Besides these investments, the Danish government is presenting a comprehensive plan for Denmark's infrastructure of more than DKK 160.0 billion (EUR 21.5 billion) towards 2035, including DKK 106.0 billion (EUR 14.3 billion) for new projects and initiatives. Additionally, a preliminary reservation of almost DKK 13.0 billion (EUR 1.8 billion) has been set aside for handling infrastructure at Lynetteholmen (a new artificial island expected to be ready by 2050)<sup>213</sup>.

**'Denmark Forward Plan', as it is titled, features numerous road and rail improvements including significant investments in reducing congestion on Danish roads and a significant boost in public transport, as well as initiatives geared towards supporting the green transition in the transportation sector. The plan also seeks to improve several existing motorway links and roads<sup>214</sup>.**

The plan includes extension of motorways from Regstrup to Kalundborg, Næstved to Rønnede, and Tværvej to Frederiksbund. Others include expansion of present motorways between Aarhus S and Aarhus N, Vejle and Skanderborg, and near Odense. The strategy also involves looking into the possibility of a fixed link across the Little Belt strait between south Funen and Als<sup>215</sup>. Over DKK 86.0 billion (EUR 11.5 billion) has been set aside for public transport projects, around DKK 64.0 billion (over

EUR 8.6 billion) for the construction of future roads and DKK 11.0 billion (over EUR 1.4 billion) for three key regional development projects. Finally, DKK 3.0 billion (EUR 403.0 million) will be geared towards building new cycling infrastructure such as bicycle lanes in municipalities and along state roads<sup>216</sup>.

The plan also includes investment of EUR 11.0 billion geared towards the so-called train fund. Out of this amount, around EUR 1.6 billion will be used for two Bus Rapid Transport (BRT) projects where buses will acquire their own high-speed lanes. Amongst the railway projects, the noteworthy ones include a new railroad track from Silkeborg to Aarhus, which will cost EUR 0.2 billion and the S-Train from Copenhagen which will be upgraded, for providing the next-generation S-Train for the link to Roskilde<sup>217</sup>.

Among the green initiatives, the main priority is promoting usage of climate-friendly asphalt in future state road projects in order to reduce CO<sub>2</sub> emissions. The government also aims to bring more convenience in owning electric cars by having more charging stations nationwide<sup>218</sup>. Around DKK 500.0 million (EUR 67.2 million) will be invested to improve the charging infrastructure of electric vehicles<sup>219</sup>. In fact, under its national RRP, Denmark has allocated EUR 259.0 million towards supporting green transportation. This includes constructing new bicycle paths and infrastructure for electric bicycles<sup>220</sup>.

**In June 2021, the European Commission adopted a positive assessment of Denmark's Recovery and Resilience Plan. This is an important step paving the way for the EU-27 to disburse EUR 1.5 billion in grants under the Recovery and Resilience Facility (RRF) over the period 2021-2026. This financing will support the implementation of crucial investment and reform measures outlined in Denmark, enabling the country to emerge stronger from the COVID-19 pandemic<sup>221</sup>.**

With regards to the **Fehmarn Belt Tunnel** project – an 18.0 kilometre long tunnel linking Germany and Denmark, the work had started in January 2021 (as scheduled) with a virtual ground-breaking ceremony. With a EUR 7.4 billion budget (partly financed by EU Funds)<sup>222</sup>, the tunnel will comprise a four-lane motorway and two electrified rail tracks<sup>223</sup>. The work, which has started on the Danish

side at Rødby, is focusing on the construction of a large factory that will manufacture concrete box girders which will be sunk to make the tunnel between Denmark and Germany. Upon scheduled completion in mid-2029, the link will cut the journey between the German and Danish coasts to just seven minutes by train and 10 minutes by car. The project is expected to involve a workforce of 2,000 employees at the peak of activity<sup>224</sup>.

## TO 2 – Skills

The participation in **vocational education and training (VET)** in Denmark still lies below the national target. There are significant regional differences with the lowest participation rates in the larger Danish cities. In 2018, 37.7% of learners at the upper secondary level were enrolled in a VET programme, which is below the EU-27 average (48.4%)<sup>225</sup>. According to the national data, VET programmes have the highest dropout rates when compared to other educational paths. Additionally, according to the most recent available data from the 2016 EU labour force survey, the exposure of VET students to any form of work-based learning is still below the EU-27 average (53.1% in Denmark, as compared to 59.5% in the EU-27 average)<sup>226</sup>.

With regards to the **employment rate among recent VET graduates**, it slightly decreased in 2019 reaching 84.7%, from 85.0% in 2018, but still lies above the EU-27 average (79.1%). Besides, the employment rate of recent graduates in Denmark by educational attainment, though lying above the EU-27 average (80.9%), has also dropped down to at 85.1% in 2019, from 86.2% in 2019<sup>227</sup>.

Amongst the main **challenges** in the VET participation in Denmark, the lack of suitable training placements enterprises is frequently cited as a primary reason for learner dropout (even though several policy initiatives – such as implementation of 50 practical training centres (2013) and the planned 1,000 new placements (2014), have sought to address this issue)<sup>228</sup>. Moreover, VET schools in Denmark, though having re-opened after the COVID-19 pandemic, have started to rely more on the use of distance learning. However, teachers and learners expressed their worries about the lack of opportunities for hands-on experience in practical subjects. Evaluations point out that groups at risk will become further challenged if distance learning is prioritised<sup>229</sup>.

**In order to increase the VET participation and address the underlying challenges in VET, in November 2020, the Danish Government, the national association of municipalities, the national association of Danish Regions and their social partners made a tripartite agreement. It aimed at increasing the number of people completing VET programmes and ensuring more apprenticeship placements and an increasing number of skilled workers<sup>230</sup>.**

The agreement aims to ease the process of gaining an apprenticeship contract by placing a greater responsibility on schools to ensure placements. As per the agreement, DKK 500.0 million (EUR 67.0 million) will be financed through the Employers' Reimbursement Fund for apprenticeship support initiatives. Through the professional committees, social partners must aid the work of guaranteeing apprenticeships for VET students<sup>231</sup>.

Besides this, a project named **Digital avenues for growth - SME competence** had been rolled out for the period May 2018 to May 2021. It aimed at supporting the growth potential of SMEs through digitalisation, automation and innovation. The project involves 90 of the Zealand region's SMEs and supports the skills development of 370 participants. The objective is to create 40 new jobs by 2021 and to upskill 333 participants (around 90.0% of the total). The project involves a cost of EUR 2.8 million, half of which (EUR 1.4 million) is being funded by European Social Fund<sup>232,233</sup>.

Moreover, in 2020, the Danish government and the social partners also finalised an economic agreement aiming to secure apprenticeships both during and after the COVID-19 crisis. Specifically, the agreement is to spend EUR 725.0 million on subsidising apprentice salaries. The money set aside as per the agreement is to be used so that private companies can cover 75% of the salary costs for apprentices for the rest of the year (2020). Due to the different kind of apprenticeships in Denmark covered by this agreement, not all companies can ensure apprenticeships during a whole educational period. Therefore, new short-term contracts were promised to receive 45.0% of salary while regular education agreements (where entire training internships are agreed) shall be receiving 90.0% of salary<sup>234</sup>.

## TO 3 – Resource efficiency / Sustainable construction

**Sustainable construction is growing fast in Denmark. The target of achieving a reduction in greenhouse gases by 70.0% till 2030, is set to bring in opportunities of restructuring the Danish economy and preparing it for the global transition to a low carbon society<sup>235</sup>.**

Additionally, the strategy of the Danish government in relation to energy efficiency and renovation of the existing building stock, named **‘The road to energy-efficient buildings in the Denmark of the future’** (*Vejen til energieffektive bygninger i fremtidens Danmark*), consists of 21 initiatives to support renovation. This is in compliance with the Energy Efficiency Directive and Energy Performance of Buildings Directive. The initiatives aim at reducing net energy consumption for hot water and heating in the present buildings by 35.0% by 2050<sup>236</sup>.

The National Building Fund supports the **energy efficiency renovation of social housing** in Denmark, through a budget of DKK 18.1 billion (EUR 2.4 billion) spanning over the period 2015-2020. Of the total budget, DKK 350.0 million (EUR 47.1 million) had been dedicated to annual energy-saving measures; DKK 400.0 million (EUR 53.8 million) for improving the accessibility of the dwellings for elderly and disabled occupants; and DKK 160.0 million per year (EUR 21.5 million) for infrastructure upgrades in vulnerable areas<sup>237</sup>.

With regards to energy efficiency and conversion of heat supply, energy efficiency and new technology, biogas and new district heating capacity, the National Energy and Climate Plan (NECP) expects an additional investment between DKK 10 billion and DKK 30 billion (EUR 1.3 to 4.0 billion) until 2030<sup>238</sup>.

Presently, Copenhagen features **“green building”** structures with sustainability as an essential component. Several governmental incentives and favourable framework conditions are in place to support green innovation<sup>239</sup>. During 2020, the Danish government made several agreements with a strong focus on sustainability. This includes the **Agreement on Green Renovation of Social Housing** that earmarks DKK 30.2 billion (EUR 4.1 billion) from the National Building Foundation for social housing sector renovation over the period 2020-2026. Furthermore, the Climate Agreement for Energy

and Industry dedicates DKK 22.5 billion (EUR 3.0 billion) to the green transition towards 2030<sup>240</sup>.

Besides, the governance of the Nordic housing and construction had launched a four-year action plan in 2020 with measures aimed at making the housing and construction sector more environmentally friendly through a range of innovative and green solutions. As a part of this initiative, in early 2023, 60 new circular built apartments in a suburb of Aarhus city will get their first residents, where it would be possible to separate and reuse up to 90.0% of all the construction materials. This kind of sustainable and circular construction is being accelerated. The building should be constructed in accordance with “Design for separation” – which means parts can be changed without the need to change major building systems, and that they can be reused<sup>241</sup>.

Denmark’s proposal for a green recovery implies important CO<sub>2</sub> savings, reduced energy bills and job creation in the construction sector. According to the Ministry of Transport and Housing, two-thirds of the projects in the renovation queue relate to climate proofing (facades, roofs, and windows) and will thus reduce heat consumption and increase energy savings. In this line, the agreement is estimated to result in a reduction of up to 50,000 tonnes of CO<sub>2</sub> and approximately 500 gigawatts hour of energy consumption, which corresponds to the heat consumption of 40,000 apartments. Moreover, by 2021, the proposal is estimated to contribute to the creation of 7,800 full-time jobs in the construction sector<sup>242</sup>.

In the past 25 years, Denmark has achieved significant reductions in energy consumption and greatly improved energy efficiency. At the same time, almost 40.0% of the country’s total energy consumption relates to buildings, so there is still significant potential for reducing that consumption, also in government-owned buildings. As part of the ambitious goal of reducing emissions by 70.0% by 2030, Denmark has agreed to new energy saving efforts for government-owned buildings towards 2030. The new agreement sets independent requirements for the buildings owned and used by state administration and for other government-owned buildings. This was decided in a new circular letter, which entered into force 1<sup>st</sup> January 2021<sup>243</sup>.

**The Danish government aims to reduce energy consumption by 42,480 megawatt hours in buildings owned and used by state administration<sup>244</sup>.**

To ensure that the entire government works purposefully to reduce its energy consumption, the circular letter contains a national obligation that goes beyond the requirements set by the **EU Energy Efficiency Directive**. The national obligation means that other government-owned buildings should save at least 10.0% over the next 10 years. This is the equivalent of approximately 173,000 MWh from 2021 to 2030<sup>245</sup>.

Under its national RRP, Denmark has allocated EUR 65.0 million towards expanding district heating grids and supporting households in converting to electric heat pump systems<sup>246</sup>. The energy efficiency component of the Recovery and Resilience Plan (RRP) aims to deliver at least 6,125 energy renovation projects in private households by Q2 2026; improve the energy rating for 40% of supported municipal and regional public buildings; save at least 0.33 Mt of carbon dioxide through industrial energy efficiency improvements; and replace at least 10,100 residential oil or gas boilers with district heating or heat pumps<sup>247</sup>.

The RRP also includes the following measures<sup>248</sup>:

- **Energy savings in public buildings-** a subsidy scheme of DKK 315.0 million (EUR 63.0 million) targeted at energy savings in public buildings. The subsidy will focus on energy renovations in regional and municipal buildings with the lowest energy performance certificate standards as well as buildings that are heated by oil burners and gas furnaces. The measure is expected to reduce greenhouse gas emissions by 0.004 Mt carbon dioxide in 2025 and 2030.
- **Energy efficiency in households-** It will provide support (EUR 40.0 million) to an already existing scheme called “the building pool” with a funding of DKK 565.0 million (EUR 75.9 million). The measure will incentivize energy renovation and the replacement of heating by oil burners and gas furnaces with heat pumps in residential buildings. The initiative is expected to result in a reduction of carbon dioxide in 2025 by 0.05 Mt.

Denmark also allocated EUR 80.0 million towards SME support measures for energy renovation. This involves supporting SMEs in generating local employment with projects such as energy renovation of buildings or boosting energy efficiency for industry.

**In March 2021, Denmark agreed on a national strategy for sustainable construction. The CO<sub>2</sub> requirements for new buildings larger than 1,000 square metres will be set in 2023, and from 2025 onwards requirements for all new constructions will be in place<sup>249</sup>.**

## TO 4 – Single Market



**Denmark’s performance regarding the transposition of EU directives such as transportation deficit, overdue directives and conformity deficit improved in 2019. It performed well with regard to the Internal Market Information Systems<sup>250</sup>.**

Denmark reported a better performance with respect to several of the metrics of the **EU Single Market Scoreboard**, compared to last year. Denmark’s performance regarding the transposition of EU directives such as transportation deficit (0.2%; EU-28<sup>251</sup> average 0.6%), overdue directives (2 in 2019) and conformity deficit (1.2%; EU-28 average 1.2%) improved in 2019, compared to 2018. The number of pending cases under infringement has also improved in 2019 (21 cases) from 2018, but still lies below the EU-28 average (29 cases).

**Denmark’s recovery and resilience plan 2021 forms a part of an unprecedented, coordinated EU response to COVID-19 crisis, which among others aims to strengthen the cohesion of the Single Market<sup>252</sup>.**

Furthermore, its performance in public procurement was satisfactory in 2019. Lastly, Denmark continues to perform well with regard to the Internal Market Information Systems<sup>253</sup>. However, the average delay for Transposition worsened in 2019 from 2018 (32.2 months; EU-28 average 11.5 months).

Denmark has a well-functioning and advanced procurement system, supervised by the Danish Competition and Consumer Authorities. The risk of

encountering corruption, mismanagement or irregularities in Denmark's public procurement process is medium to low. As a result, Denmark is considered to be amongst the world's least corrupt countries. Corrupt practices like bribery do not act as an obstacle for business. However, few businesses reported that existence of corruption may affect public procurement or that procurement officials are likely to show favouritism when deciding on contracts<sup>254</sup>.

According to the **Innovation Procurement Policy Framework Benchmarking (2018)**, Denmark ranked 19<sup>th</sup> position of the overall ranking covering most EU Member States, with a score of 18.6%, below the European average (26.6%). From the 30 countries analysed, Denmark lies in the group of low performing countries in implementing a mix of policy measures that are conducive for mainstreaming innovation in procurement. This may be important for the construction sector when it comes to implementing BIM requirements and other innovative tools or methodologies. Out of the 10 indicators mentioned in the framework, Denmark scores above the European average in two indicators<sup>255</sup>.

The Danish government has taken numerous steps to build up transparency and enable better access of SMEs for public procurements. In 2019, the Danish Competition and Consumer Authority reported progresses in the total number of bids, increased proportion of flexible and innovation promoting procedures and a considerable increase in the share of EU tenders won by small-scale companies with less than 50 employees (KFST 2019). In 2019, as a part of the government strategy on '**intelligent public procurement**', a national strategy on Green Public Procurement is being implemented by the Danish government<sup>256</sup>.

As part of this strategy, the '**Partnership for Green Public Procurement**' is a collective effort of 12 municipalities, two regions and other stakeholders, in order to reduce their own environmental impact from their procurement actions. This will thereby drive the market in a greener direction<sup>257</sup>.

As for the implementation of **Eurocodes**, all Parts are published as National Standards, with 41 being obligatory for structural design and Public Procurement, as stated in the "Building regulation" (BEK Nr 810 of 28/06/2010) and in the "Load and calculation rules for track carrying bridges and

earthworks and Public Roads Act". National Annexes have been published on these 41 Parts, but not on 2 Parts of EN 1991, 8 Parts of EN 1993, EN 1998, and 2 Parts of EN 1999. No other National Standards are used in parallel with the Eurocodes<sup>258</sup>.

## TO 5 – International competitiveness



According to the **Doing Business 2020 report**, Denmark ranked 1<sup>st</sup> out of 190 economies, with a score of 100, in terms of trading across borders<sup>259,260</sup>.

The country was the best performer in the EU-28<sup>261</sup> regarding internationalisation. In terms of trade openness, it ranked 21<sup>st</sup> out of 141 economies. Under trade openness – border clearance efficiency and trade tariffs were the best performing indicators, where the country ranked 4<sup>th</sup> and 7<sup>th</sup> respectively<sup>262,263</sup>. Denmark has a set of national policies and schemes focused on export guarantees and advisory services to help SMEs to access foreign markets<sup>264</sup>.

Most of the SMEs in Denmark are experienced in exporting, though on a small scale. Moreover, in 2018, the share of Danish SMEs directly exporting goods and services to another country stood at 52.7%, compared to the EU-27 average of 43.6%. However, in 2020, this share slightly reduced to 52.2%<sup>265</sup>.

With the purpose of supporting the export businesses of Denmark and encouraging the coaching of SMEs by large companies in order to bring them to international markets, the Danish Trade Council under the Ministry of Foreign Affairs adopted a measure – **Export and investment promotion package** (*Eksport- og Investeringspakken*) in March 2020. A number of changes have been made to this measure as part of a package to stimulate Danish exports and investments, such as – free COVID-19 emergency advice (15 hours per export market); reduced hourly rates on export advice (half price with a further 50.0% reduction for SMEs) and free public service advice (now five hours instead of one hour. The advice is given by the Danish embassies and is typically focused on specific issues such as presenting a specific export opportunity or help with getting advice on export promotion)<sup>266</sup>.

The Ministry for Industry, Business and Financial Affairs had introduced a measure named '**Forum for restarting SMEs**' (*Forum for genstart af SMV'ere*) in August 2020. The measure aims at restarting SME export and encouraging the efforts of SMEs to internationalise and become high growth enterprises including through participation in innovative clusters. The forum consists in a team with representatives from the public sector, employers as well as employees to look into what is needed to restart the Danish export from SMEs.<sup>267</sup>

Despite these measures, the exports in the construction sector have been declining consistently over the previous years. The value of **exports for all construction-related** products in Denmark for 2019<sup>268</sup> stood at EUR 1.5 billion, a decline of 7.0% over the period 2010-2019. The share of exports value of all construction-related products as a percentage of total value of production in 2019 stood at 35.9%, representing a decline of 8.9 percentage points over the same period.

The value added at factor cost of **Inward FATS**<sup>269</sup> for the manufacturing, narrow construction and real estate activities sub-sectors, in 2018<sup>270</sup> increased to EUR 8942.2 million (+27.8%), EUR 890.9 million (+65.6%) and EUR 1575.9 million (+245.8%) respectively, from 2010.

Similarly, the turnover for the manufacturing, narrow construction and real estate activities sub-sectors increased to EUR 33.9 billion (+33.9%), EUR 3.5 billion (+128.2%) and EUR 1.8 billion (+129.5%) respectively, from 2010.

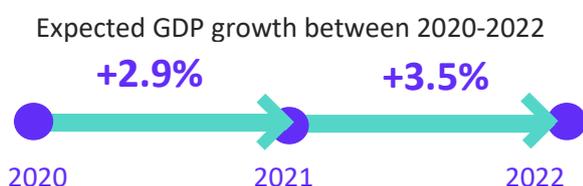
The turnover values of **Outward FATS**<sup>271</sup> for 2018<sup>272</sup> in manufacturing and real estate activities sub-sectors amounted to EUR 73.9 billion and EUR 2.9 billion, representing an increase of 13.0% and 10.3%, respectively, from 2010. Contrarily, in the narrow construction sub-sector, it amounted to EUR 1.9 billion in 2018, representing a decrease of 5.2% from 2010.

The **Foreign Direct investment (FDI)** in the manufacturing sub-sector specific to EU-27 countries in 2018<sup>273</sup> stood at EUR 24,726.5 million, representing an increase of 8.9% since 2013<sup>274</sup>. However, for the countries outside EU-27, it reached to EUR 13,260.8 million in 2018, representing a decline of 9.2% since 2013. The FDI in the narrow construction sub-sector specific to EU-27 countries reached EUR 43.8 million in 2018, marking a 406.3% growth since 2013. Whereas in the countries outside EU-27, it reached EUR 60.9 million in 2018, representing a 62.8% growth since 2013. Lastly, the FDI in the real estate activities sub-sector specific to EU-27 countries reached EUR 2486.6 million in 2018, a 116.2% growth since 2014<sup>275</sup> and in countries outside EU-27, it reached EUR 349.8 million, representing a slight growth of 2.1% since 2014.

## 8

## Outlook

The **GDP** in Denmark is expected to reach DKK 2274.3 billion (EUR 305.9 billion) in 2021, representing 2.9% growth from 2020. This will bring the country's GDP at par with pre-COVID-19 level in 2019. Further in 2022, it is expected to reach DKK 2353.6 billion (EUR 316.5 billion), marking an annual increment of 3.5%.



Mirroring the GDP growth, the volume index of **production in the broad construction sector** is forecasted to recover from the steep decline in 2020. It is therefore expected to increase annually by 4.2 index points (ip) in 2021, and further increase annually by 4.8 ip in 2022. Mirroring this trend, the volume index of production in construction of buildings is forecasted to increase annually by 5.3 ip and 4.4 ip in 2021 and 2022 respectively. Similarly, volume index of production in construction of civil engineering is expected to increase annually by 2.9 ip and 4.4 ip in 2021 and 2022 respectively.

Similarly, the total **turnover** in the broad construction sector is expected to grow annually by 8.1% in 2021, reaching EUR 78.8 billion. This is forecasted to be driven mostly by an increase in the real estate activities sub-sector (+13.3%).

The total **value added** in the broad construction sector in 2021 is also projected to increase annually by 9.8%, totalling EUR 43.2 billion. This is forecasted to be driven by an increase in the real estate activities sub-sector (+13.3%), which is also forecasted to account for a major share (53.2%) of the total value added in the broad construction sector in 2021.

The **number of persons employed** in the broad construction sector is expected to reach 346,324 in 2021, marking an annual increase of 7.4%. This is forecasted to be driven majorly by increase in the real estate activities sub-sector (+13.3%). Amongst the sub-sectors the narrow construction sub-sector is expected to form the major share (55.1%) of the total number of persons employed in 2021.

Following the pandemic<sup>276</sup>, the **housing market** is expected to accelerate in 2021. Considering the low interest rates and limited housing supply, the housing prices are expected to grow as much as 11.2% in 2021<sup>277</sup>. Moreover, the trend of working from home in itself has fuelled the motivation for the population to become homeowners, and the effect is largest around the bigger Danish cities. By the end of 2023, the prices are expected to have risen significantly above the level expected before the pandemic<sup>278</sup>.

With regards to the **non-residential construction**, an increase in the demand is being forecasted for areas in and around central Copenhagen. However, vacancy rates are expected to increase in 2021<sup>279</sup>.

**The government has proposed the construction of a new artificial island called Lynetteholm, on the harbour waters just north of Copenhagen's city centre. If approved, the 1.1 square miles landmass will build enough houses so as to accommodate around 35,000 people. The project is expected to be ready by 2050. Thus, the Lynetteholm project is supposed to not only ease the Danish capital's chronic housing shortage but also act as a springboard for an ambitious update of the city's infrastructure<sup>280</sup>.**

With regards to infrastructure, the Danish government has put forward a new plan to spend DKK 160.0 billion (EUR 21.5 billion) on infrastructure looking ahead to 2035 called "Denmark Forward". The plan is put in place to further improve the national road and railway

systems benefiting people and businesses. It also features numerous green initiatives to support the green transition in the transportation sector. These initiatives include reducing heavy traffic in cities, sustainable asphalt, and improvement of the conditions for electric vehicles are featured<sup>281</sup>.

In June 2021, Denmark's Recovery and Resilience Plan (RRP) of Denmark was adopted wherein it was allocated EUR 1.5 billion in grants under the Recovery and Resilience Facility (RRF) over the

2021-2026 period. This financing is expected to support the sustainable growth of the construction sector, and to its overall recovery.

**This comprehensive set of measures, as planned under the RRP, are set to support the economy as a whole and the Danish construction sector specifically, in recovering from the negative impacts following the COVID-19 pandemic.**

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268 Data unavailable for 2020

269 A foreign affiliate as explained in inward FATS statistics is an enterprise resident in a country which is under the control of an institutional unit not resident in the same country.

270 Data unavailable for subsequent years

271 Outward FATS are statistics explaining the activity of foreign affiliates abroad controlled by the compiling country.

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