

## SYNERGIES IN THE TWIN GREEN AND DIGITAL TRANSITION IN THE CONSTRUCTION SECTOR: AN EMPIRICAL ANALYSIS OF THE ROMANIAN CONTEXT

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### **Abstract**

*This study examines the green–digital transition profile relevant to the Romanian construction sector through a comparative analysis of EU Member States and the EU-27 aggregate during 2018–2025. Using Eurostat data, the analysis integrates indicators of material pressure, resource productivity, recyclable mineral raw-material flows, digital human capital, sector-specific digital business adoption and the economic relevance of construction. The results reveal an asymmetric profile. Romania combines high and increasing consumption of non-metallic minerals with comparatively low resource productivity, while its expanding extra-EU trade in recyclable mineral raw materials has become increasingly import-oriented. Digital capacity remains below the EU-27 level, and web-sales adoption among construction enterprises is relatively limited and volatile. At the same time, construction represents a particularly important and increasing share of the Romanian economy. The findings indicate substantial but underexploited potential for green–digital synergies and highlight the importance of connecting digital capabilities with resource efficiency, material traceability and secondary-material circulation.*

**Keywords:** twin transition; construction sector; circular economy; digitalisation; resource productivity; Romania

**JEL Classification:** L74, O33, Q56

### **1. Introduction**

The construction sector plays an important role in the transition towards a more resource-efficient and digitally enabled economy. Its substantial demand for materials creates significant opportunities for improving resource productivity, strengthening the recovery and recirculation of secondary materials and reducing dependence on primary resources. At the same time, digitalisation can facilitate these processes by improving information management, traceability, coordination and market interaction. The green and digital transformations are therefore increasingly interconnected, particularly in material-intensive sectors such as construction.

Romania represents a relevant case for examining this interaction because the construction sector combines considerable economic importance with persistent challenges related to material

efficiency and digital development. Assessing these dimensions jointly can provide a clearer understanding of whether environmental and digital developments evolve in a complementary manner or whether structural imbalances limit the potential benefits of the twin transition.

The objective of this study is to assess Romania's green-digital transition profile in construction during 2018–2025 in comparison with the other EU Member States and the EU-27 aggregate. The analysis integrates material pressure, resource productivity, recyclable mineral raw-material flows, digital capacity, sector-specific digital adoption and the economic relevance of construction. By examining these dimensions together, the study aims to identify structural disparities and underexploited opportunities for green-digital synergies in the Romanian construction sector.

## **2. Literature review**

The green and digital transformations are increasingly conceptualised as a twin transition, reflecting their potential to interact in the pursuit of environmental sustainability and economic transformation. However, digitalisation does not automatically generate positive environmental outcomes. Bianchini et al. [4] show that the environmental effects of digital technologies depend on their interaction with green technological capabilities, supporting the need to analyse the two transitions jointly. In the construction sector, Papadonikolaki [23] and Papadonikolaki et al. [24] further demonstrate that the twin transition depends not only on technological adoption, but also on stakeholder coordination and on the ability of firms and projects to acquire, assimilate and exploit digital and sustainability-related knowledge.

The construction sector is particularly relevant to this transition because of its intensive use of material resources and the persistence of linear patterns of extraction, consumption and disposal. Çimen [7] emphasises that circular-economy strategies in the built environment should reduce primary-resource use, extend the lifetime of buildings and components, and strengthen material recovery, reuse and recycling. In Romania, Mihai [21] similarly identifies persistent challenges associated with construction and demolition waste management and the reintegration of recovered materials into productive use. These findings highlight material consumption, resource productivity and secondary-material circulation as important dimensions of the green transition and provide the environmental basis for analysing potential green-digital synergies in construction.

Digital technologies may support circular construction by improving information availability, traceability, lifecycle management and the matching of secondary-material supply and demand. Çetin et al. [5] link digital technologies with strategies for narrowing, slowing and closing resource loops through the Circular Digital Built Environment framework, while Çetin et al. [6] show how digital marketplaces and data-based technologies may facilitate material reuse and lifecycle management. BIM-based approaches, BIM-LCA integration and material passports can further improve the identification, recovery and reuse of construction materials and components, as demonstrated by Akanbi et al. [1], Honic et al. [15], Mao and Cao [20] and Xue et al. [28]. More broadly, Elghaish et al. [8], Banihashemi et al. [3], Keles et al. [17], Lu et al. [19], Asif et al. [2], Statsenko et al. [25] and Vararean-Cochisa and Crisan [27] identify BIM, digital twins, IoT, artificial intelligence, blockchain and digital platforms among the principal technologies capable of supporting sustainability and circularity in construction.

Nevertheless, technological potential does not necessarily translate into widespread implementation. Thirumal et al. [26] and Banihashemi et al. [3] identify investment costs, limited digital skills, fragmented stakeholder structures, interoperability and standardisation problems, insufficient data and organisational resistance among the main barriers to digital-circular transformation. Statsenko et al. [25] and Vararean-Cochisa and Crisan [27] likewise emphasise that construction digitalisation depends on technological, organisational and institutional conditions. Evidence from Romania supports this perspective: Leontie et al. [18] document uneven use of information technologies among Romanian construction firms, while Ioniță et al. [16] identify

limited expertise and resource constraints among the barriers to wider BIM adoption. Morosan-Danila et al. [22] additionally underline the relevance of integrating financial, social and environmental dimensions when assessing the sustainability performance of Romanian construction companies.

Taken together, the literature suggests that the twin transition in construction should be assessed not only through technological availability, but through the combined evolution of material pressure, resource efficiency, secondary-material circulation, digital capacity and sector-specific digital adoption. Nevertheless, comparatively limited empirical attention has been given to integrating these dimensions with the economic relevance of construction within a common EU comparative framework, particularly for Romania. The present study addresses this gap by examining Romania in relation to all EU Member States and the EU-27 aggregate during 2018–2025. The empirical framework therefore uses Eurostat data on material consumption (Eurostat [9]), resource productivity (Eurostat [10]), extra-EU trade in recyclable mineral raw materials (Eurostat [11]), ICT specialists (Eurostat [12]), web sales by construction enterprises (Eurostat [13]) and construction gross value added (Eurostat [14]) to identify structural mismatches and underexploited opportunities for green–digital synergies.

### **3. Methodology**

This study employs a comparative longitudinal descriptive approach covering the period 2018–2025. Romania represents the focal case and is compared with all EU Member States and the EU-27 aggregate. The empirical analysis is based on Eurostat data and combines six indicators reflecting the main dimensions considered relevant to the twin transition: domestic material consumption of non-metallic minerals, resource productivity, trade in recyclable mineral raw materials, ICT specialists as a share of total employment, construction enterprises with web sales and construction gross value added as a share of GDP.

The selected indicators combine broader economic conditions with construction-specific evidence. Domestic material consumption, resource productivity and ICT-specialist employment are economy-wide indicators and are therefore interpreted as contextual measures of material pressure, resource efficiency and digital capacity. Construction enterprises with web sales provide a sector-specific proxy for digital business adoption, while construction gross value added reflects the economic importance of the sector. Extra-EU recyclable mineral raw-material trade is assessed through both imports and exports; the trade balance is calculated as exports minus imports, while total trade volume is calculated as imports plus exports.

The analysis focuses on annual trends, changes between 2018 and 2025, differences between Romania and the EU-27 aggregate and Romania’s relative position among Member States. Percentage changes and percentage-point differences are used according to the measurement unit of each indicator. Missing observations are treated as unavailable and are not converted into zero values. The indicators are interpreted jointly to identify converging or divergent developments across the green, digital and sectoral dimensions. The study is descriptive and comparative and does not infer causal relationships between the indicators.

#### ***Limitations of the study***

The study has several limitations. First, domestic material consumption, resource productivity and ICT-specialist employment are economy-wide indicators and therefore do not measure the construction sector exclusively. Second, web sales represent only a proxy for digital business adoption and do not capture the use of advanced technologies such as BIM, digital twins or material passports. Third, recyclable mineral raw-material trade covers extra-EU flows and does not reflect intra-EU exchanges, while trade balance and total trade volume do not measure circularity directly. In addition, missing, estimated, imputed or provisional observations may affect comparability across

countries and years. Finally, the relatively short 2018–2025 period and the descriptive comparative design do not allow causal inference or firm-level conclusions.

#### 4. Results analysis and interpretation

The results are organised around four complementary dimensions of the twin transition: material pressure and resource efficiency, circular material flows, digital capacity and sector-specific digitalisation, and the economic relevance of construction. Romania is examined comparatively against the EU-27 aggregate and the other Member States to identify both temporal developments and structural disparities during 2018–2025.

##### 4.1. Material pressure and resource efficiency

The first dimension examines the relationship between material pressure and resource efficiency through the evolution of non-metallic mineral consumption and resource productivity.

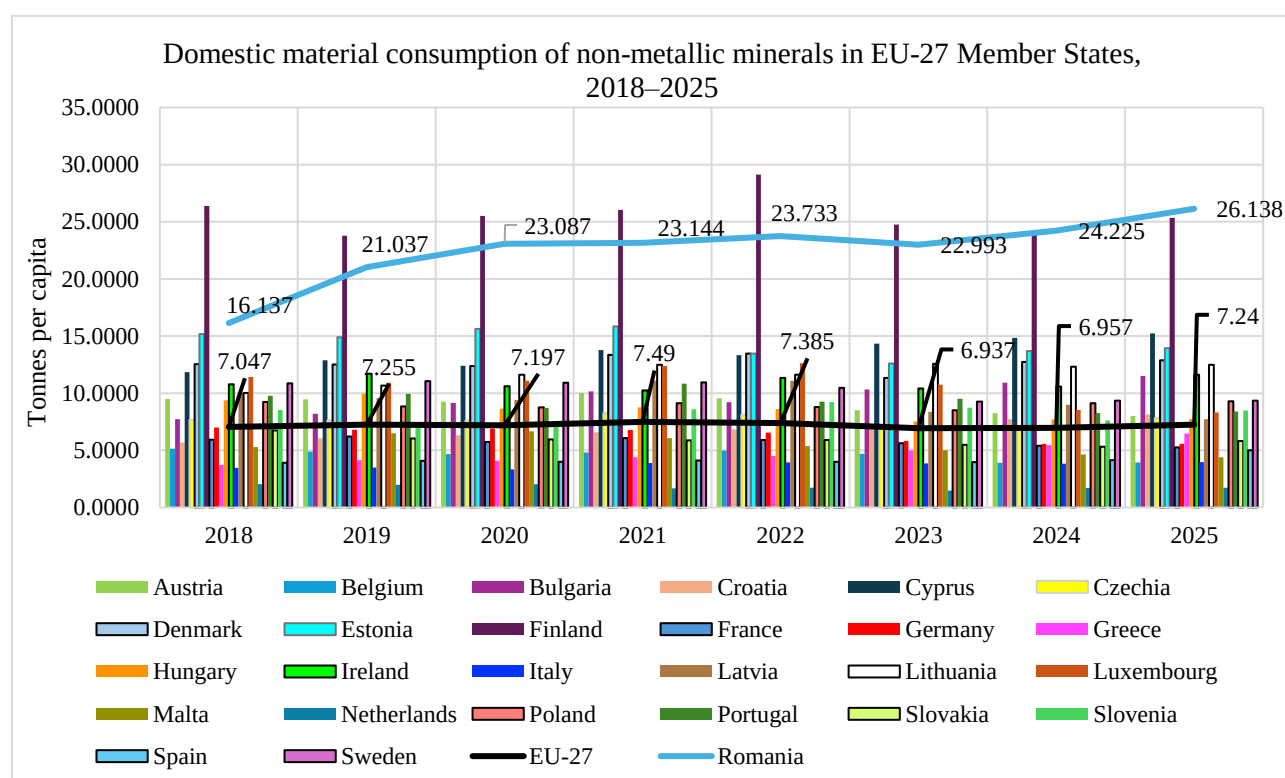


**Figure 1.** Evolution of domestic material consumption of non-metallic minerals in the EU-27 Member States, 2018–2025

*Source: Authors' processing based on Eurostat data [env\_ac\_mfa]*

**Figure 1** indicates substantial heterogeneity in domestic material consumption of non-metallic minerals across EU Member States during 2018–2025 (Appendix 1). At the EU-27 level, the indicator remained broadly stable, increasing only slightly from 7.047 tonnes per capita in 2018 to 7.240 tonnes per capita in 2025. This aggregate stability, however, conceals markedly different national trajectories. Several Member States recorded substantial increases, particularly Greece, Bulgaria, Croatia, Cyprus and Romania, whereas countries such as Luxembourg, Belgium, Germany and Latvia experienced notable declines. Finland remained characterised by very high material consumption throughout most of the period and reached a peak of 29.135 tonnes per capita in 2022, while countries such as the Netherlands, Italy, Belgium and Spain consistently recorded comparatively low values. The results therefore reveal persistent differences in the material intensity of EU economies rather than a uniform European convergence pattern.

Romania followed one of the most pronounced upward trajectories among the Member States. Domestic material consumption of non-metallic minerals increased from 16.137 tonnes per capita in 2018 to 26.138 tonnes per capita in 2025, representing an increase of approximately 62.0%, compared with only about 2.7% for the EU-27 aggregate. The difference between Romania and the EU-27 consequently widened from 9.090 tonnes per capita in 2018 to 18.898 tonnes per capita in 2025. Romania initially remained below Finland, but surpassed it in 2024 and recorded the highest value among EU Member States in 2025, when its consumption was approximately 3.6 times the EU-27 level. Overall, the results point to a persistent and increasing material pressure in Romania and reinforce the need for measures aimed at improving resource efficiency, recovery and recirculation of materials. In the context of the twin transition, this material-intensive trajectory provides a strong rationale for examining how digital solutions can support more efficient circular material flows in the construction sector.

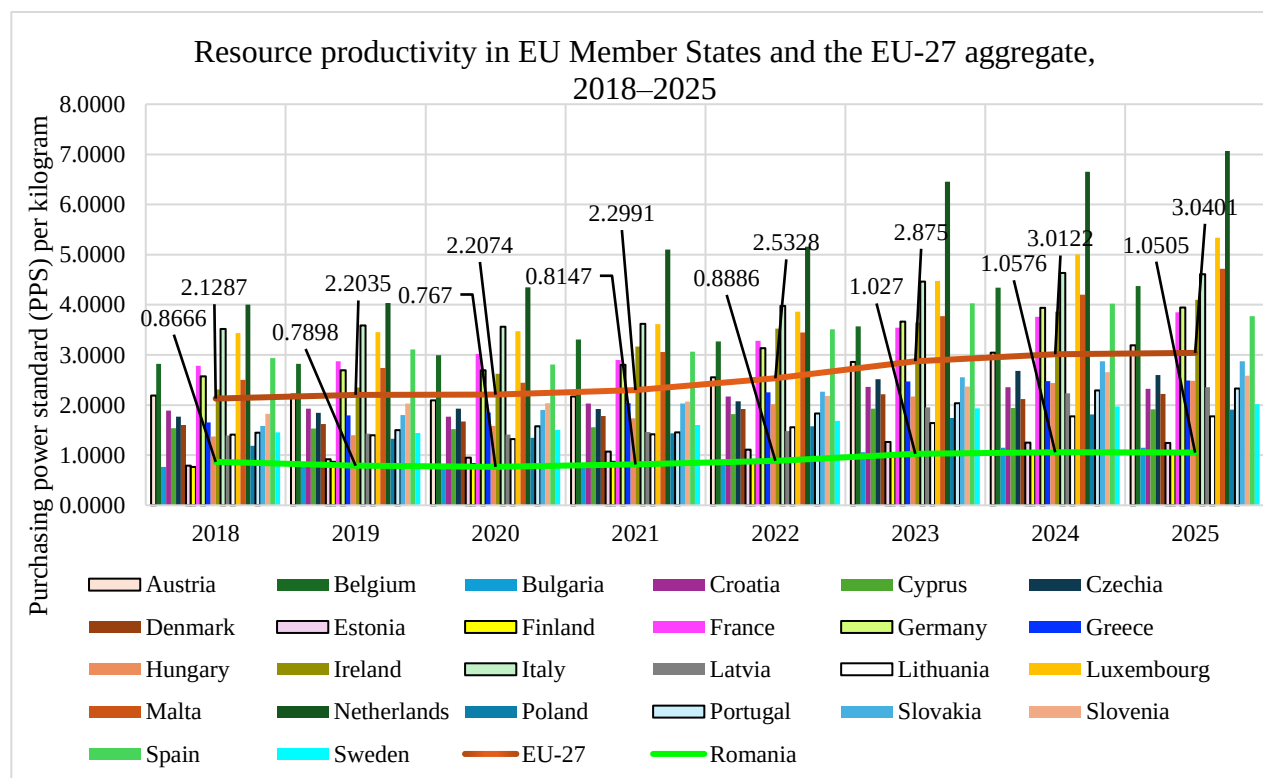


**Figure 2.** Evolution of resource productivity in EU Member States and the EU-27 aggregate, 2018–2025

*Source: Authors' processing based on Eurostat data [cei\_pc030]*

**Figure 2** shows a general improvement in resource productivity across EU Member States during 2018–2025, although substantial differences between countries persist (Appendix 2). At the EU-27 level, resource productivity increased from 2,1287 PPS/kg in 2018 to 3,0401 PPS/kg in 2025, corresponding to an increase of approximately 42.8%. All Member States recorded higher values in 2025 than in 2018, but the magnitude of improvement varied considerably. In 2025, the Netherlands recorded the highest resource productivity (7,0658 PPS/kg), followed by Luxembourg (5,3378), Malta (4,7173), Italy (4,6073) and Belgium (4,3738), while Romania, Finland, Bulgaria and Estonia remained at the lower end of the EU distribution. This pattern indicates an overall improvement in the economic value generated per unit of material consumed, alongside persistent disparities in resource efficiency across the EU.

Romania followed a considerably weaker trajectory than the EU-27 aggregate. Resource productivity decreased from 0,8666 PPS/kg in 2018 to 0,767 PPS/kg in 2020, before recovering to

1,0576 PPS/kg in 2024 and slightly declining to 1,0505 PPS/kg in 2025. Overall, Romania recorded an increase of approximately 21.2% between 2018 and 2025, only about half the growth registered at EU-27 level. Moreover, Romania's relative position deteriorated: its resource productivity represented approximately 40.7% of the EU-27 level in 2018 but only 34.6% in 2025, when it recorded the lowest value among the Member States analysed. Combined with Romania's high consumption of non-metallic minerals identified in Figure 1, these results point to a significant resource-efficiency challenge. In the context of the twin transition, this reinforces the need to examine how circular practices and digital solutions can contribute to more efficient material use, recovery, traceability and recirculation, particularly in material-intensive sectors such as construction.

#### 4.2. Circular material flows and trade in recyclable mineral raw materials

The second dimension examines the scale and direction of Romania's extra-EU recyclable mineral raw-material flows through the trade balance and total trade volume.

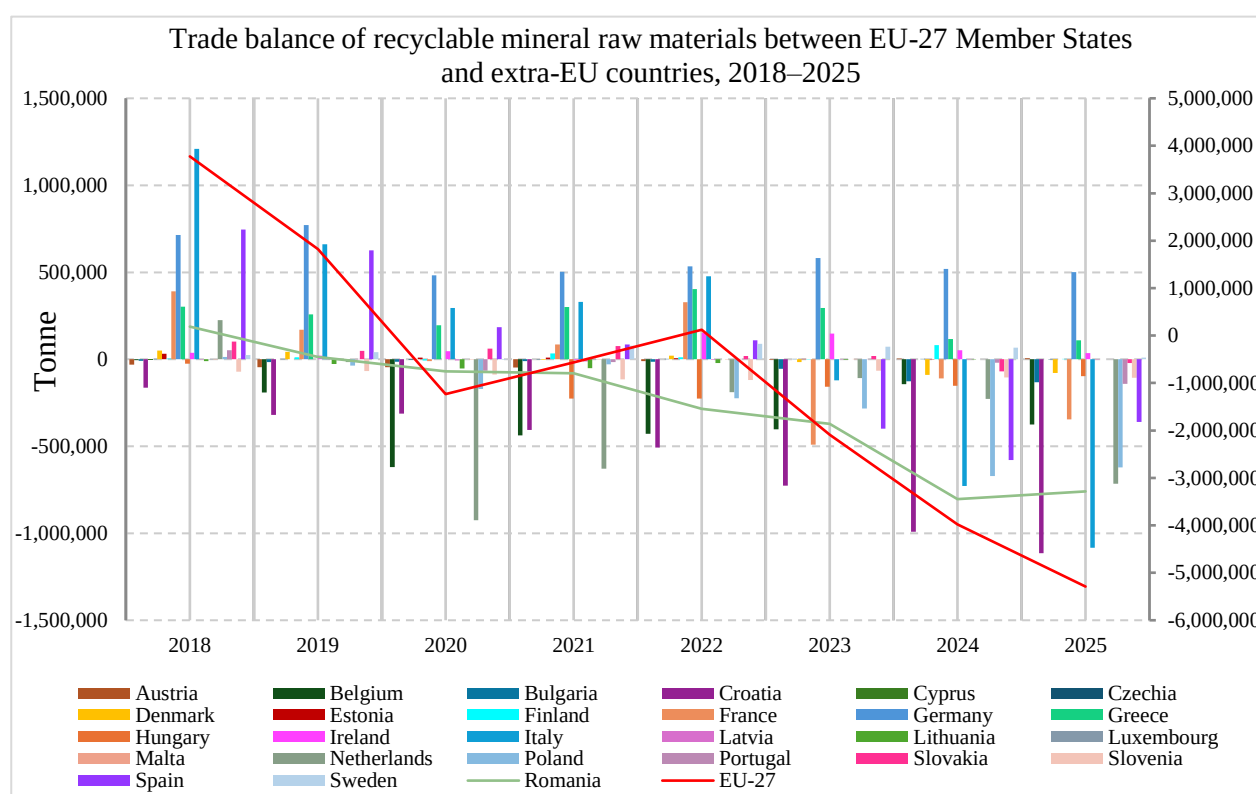


**Figure 3.** Evolution of the trade balance of recyclable mineral raw materials between EU-27 Member States and extra-EU countries, 2018–2025

*Source: Authors' calculations based on Eurostat data [env\_trdrmm]*

The trade balance of recyclable mineral raw materials was calculated as the difference between exports and imports (Exports – Imports), using the underlying Eurostat data reported in Appendix 3.1 for imports and Appendix 3.2 for exports; the resulting country-level balances are presented in Appendix 3.3. **Figure 3** reveals a marked deterioration in the EU-27 external trade balance during 2018–2025. The EU-27 shifted from a trade surplus of 3.776 million tonnes in 2018 to a deficit of 1.234 million tonnes in 2020, temporarily returned to a small surplus of 0.125 million tonnes in 2022, and subsequently recorded increasingly large deficits, reaching 5.290 million tonnes in 2025. Considerable differences persisted among Member States. In 2025, Croatia and Italy recorded the largest trade deficits, exceeding one million tonnes each, followed by Romania, the Netherlands and Poland, whereas Germany and Greece maintained positive trade balances.

Overall, the results indicate a substantial reorientation of EU extra-EU trade in recyclable mineral raw materials towards a net import position.

Romania experienced an especially pronounced transition, moving from a trade surplus of 187,815 tonnes in 2018 and 14,373 tonnes in 2019 to a persistent deficit from 2020 onwards. The deficit widened from 69,479 tonnes in 2020 to 803,698 tonnes in 2024, before narrowing slightly to 759,851 tonnes in 2025. In 2025, Romania recorded the third-largest trade deficit among Member States with available data, after Croatia and Italy. This development resulted from the simultaneous expansion of imports and contraction of exports: between 2018 and 2025, Romanian imports increased from 12,207 to 776,595 tonnes, while exports decreased from 200,022 to 16,744 tonnes. Combined with the previously identified high consumption of non-metallic minerals and low resource productivity, this growing net import position highlights the need to strengthen domestic recovery, reuse and recirculation of secondary mineral resources. From a twin-transition perspective, digital traceability, information platforms and improved matching between suppliers and users of recovered materials could support more efficient circular material flows, particularly in material-intensive sectors such as construction.

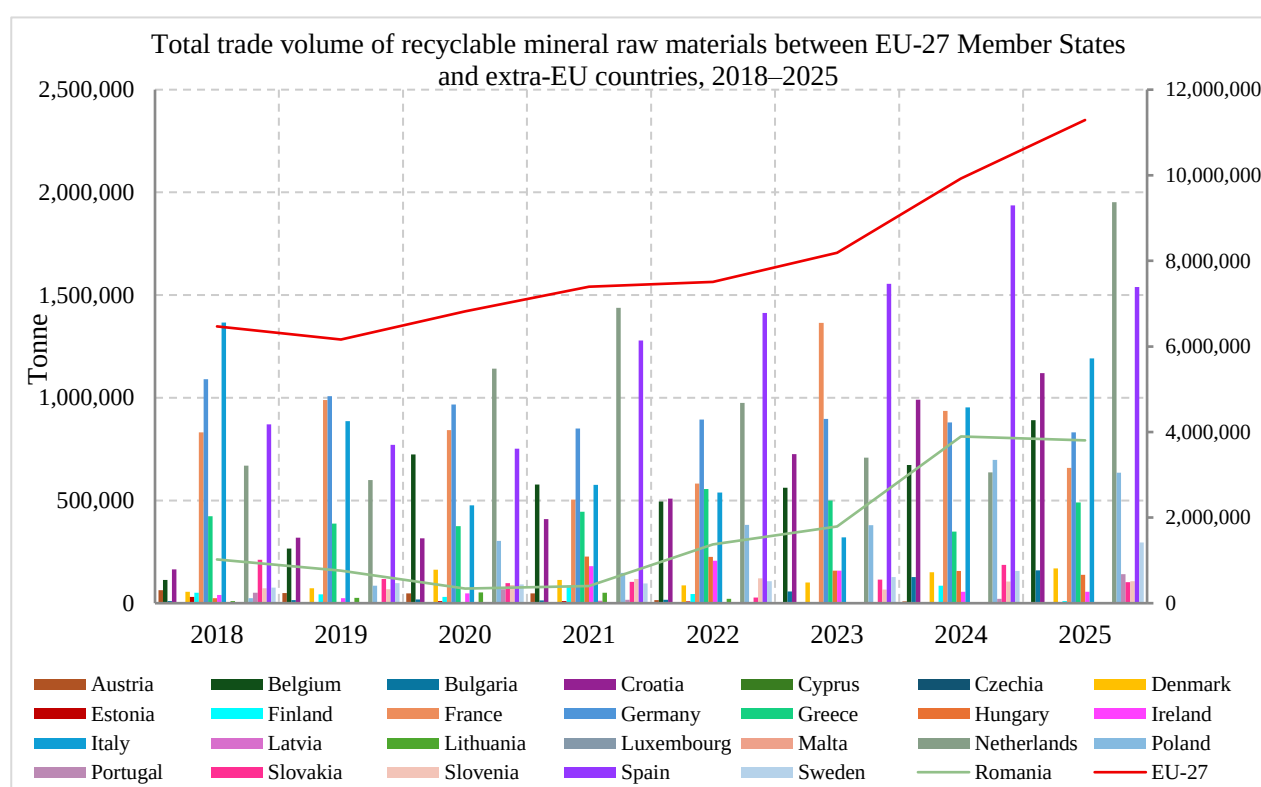


**Figure 4.** Evolution of the total trade volume of recyclable mineral raw materials between EU-27 Member States and extra-EU countries, 2018–2025

*Source: Authors' calculations based on Eurostat data [env\_trdrmm]*

**Figure 4** presents the evolution of the total trade volume of recyclable mineral raw materials, calculated as the sum of imports and exports (Total trade volume = Imports + Exports). The underlying import and export data are reported in Appendix 3.1 and Appendix 3.2, respectively, while the resulting country-level calculations are presented in Appendix 3.4. At the EU-27 level, total trade volume increased from 6.468 million tonnes in 2018 to 11.291 million tonnes in 2025, representing an increase of approximately 74.6%. Although national trajectories remained heterogeneous, several Member States recorded substantial increases in their involvement in extra-EU trade. In 2025, the Netherlands, Spain, Italy and Croatia registered the highest total trade volumes among the Member States with available data. The overall EU trend therefore indicates a

significant expansion in the scale of extra-EU trade in recyclable mineral raw materials over the period analysed.

Romania recorded an even more pronounced increase in total trade volume, from 212,229 tonnes in 2018 to 793,339 tonnes in 2025, corresponding to an increase of approximately 273.8%. After declining to 71,167 tonnes in 2020, trade activity expanded rapidly from 2021 onwards, reaching a peak of 811,686 tonnes in 2024 before decreasing slightly in 2025. By the end of the period, Romania ranked among the Member States with relatively high extra-EU trade volumes in recyclable mineral raw materials. However, when interpreted together with the trade balance presented in Figure 3 and Appendix 3.3, this expansion primarily reflects the growing importance of imports rather than a balanced increase in both trade directions. Overall, the simultaneous rise in trade volume and deterioration of the trade balance suggests increasing integration into international secondary-material flows, but also a greater reliance on extra-EU imports within the observed trade flows. In the context of the twin transition, this reinforces the relevance of digital tools for material traceability, market matching and the development of more efficient domestic circular-material networks.

#### 4.3. Digital capacity and sector-specific digitalization

The third dimension combines broader digital human-capital capacity with a construction-specific indicator of digital business adoption.

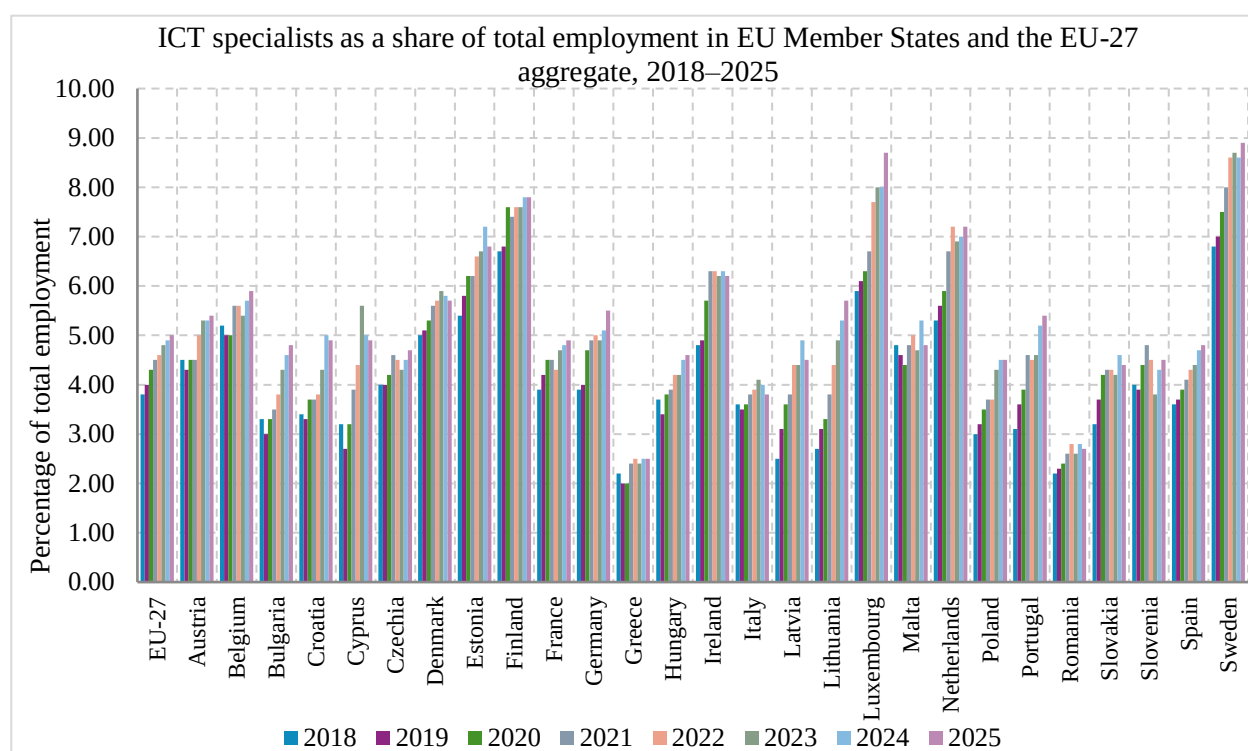


**Figure 5.** Evolution of ICT specialists as a share of total employment in EU Member States and the EU-27 aggregate, 2018–2025

*Source: Authors' processing based on Eurostat data [isoc\_sks\_itspt]*

**Figure 5** shows a general increase in the share of ICT specialists in total employment across the EU during 2018–2025, although substantial differences between Member States persist (Appendix 4). At the EU-27 level, the indicator increased steadily from 3.8% in 2018 to 5.0% in 2025, corresponding to an increase of 1.2 percentage points. The strongest digital labour-market capacity was concentrated in a group of northern and western Member States. In 2025, Sweden recorded the highest share of ICT specialists (8.9%), followed by Luxembourg (8.7%), Finland

(7.8%), the Netherlands (7.2%) and Estonia (6.8%). Conversely, several southern and eastern Member States remained below the EU-27 level, indicating persistent disparities in the availability of specialised digital human capital across the Union.

Romania remained consistently below the EU-27 aggregate throughout the analysed period. The share of ICT specialists increased from 2.2% of total employment in 2018 to 2.7% in 2025, an improvement of only 0.5 percentage points, compared with 1.2 percentage points at EU-27 level. After reaching 2.8% in 2022, the indicator declined to 2.6% in 2023, recovered to 2.8% in 2024 and decreased slightly again to 2.7% in 2025. Consequently, the gap between Romania and the EU-27 widened from 1.6 percentage points in 2018 to 2.3 percentage points in 2025; in the final year, Romania recorded the second-lowest share in the EU, ahead only of Greece. This persistent gap suggests a comparatively limited pool of specialised digital human capital, which may constrain the adoption and management of advanced digital solutions. However, because this indicator refers to total employment rather than construction specifically, it should be interpreted as a measure of the broader digital capacity available to the economy; the subsequent sector-specific indicator provides a more direct assessment of digitalisation within construction.

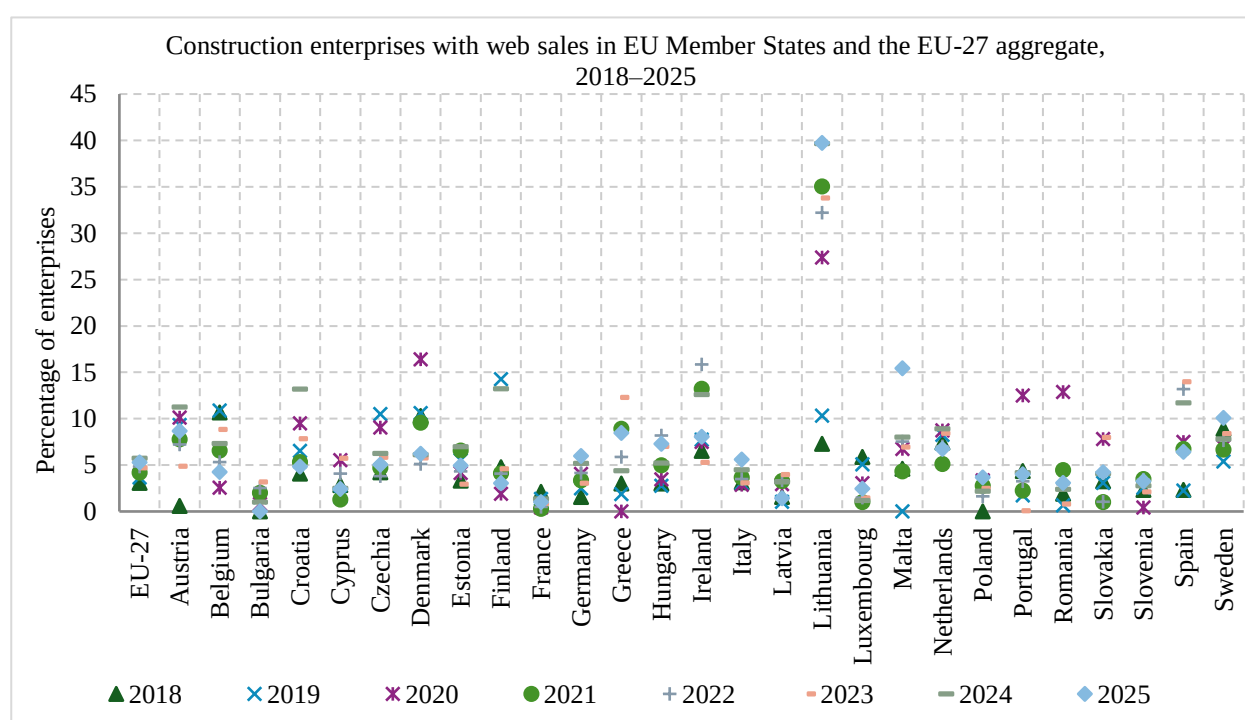


**Figure 6.** Evolution of construction enterprises with web sales in EU Member States and the EU-27 aggregate, 2018–2025

*Source: Authors' processing based on Eurostat data [isoc\_ec\_eseln2]*

**Figure 6** reveals substantial heterogeneity and volatility in the adoption of web sales by construction enterprises across EU Member States during 2018–2025 (Appendix 5). At the EU-27 level, the share of construction enterprises with web sales increased from 3.06% in 2018 to 5.29% in 2025, although the trajectory was not linear, with fluctuations from 5.11% in 2020 to 4.18% in 2021, followed by a peak of 5.72% in 2024. Cross-country differences were particularly pronounced. In 2025, Lithuania recorded by far the highest share (39.72%), followed by Malta (15.42%), Sweden (10.09%), Austria (8.66%), Greece (8.47%) and Ireland (8.06%), while several Member States remained below 4%. The results therefore indicate that digital integration into the commercial activities of construction enterprises remains highly uneven across the EU, with no clear pattern of convergence over the analysed period.

Romania displayed an especially volatile trajectory. The share of construction enterprises with web sales decreased from 1.89% in 2018 to 0.67% in 2019, rose exceptionally to 12.89% in 2020, and subsequently fell to 4.47% in 2021, 2.94% in 2022 and only 0.80% in 2023, before recovering moderately to 2.39% in 2024 and 3.08% in 2025. Consequently, despite an overall increase of 1.19 percentage points between 2018 and 2025, Romania remained 2.21 percentage points below the EU-27 aggregate in the final year and recorded the sixth-lowest value among Member States with available data. The temporary 2020 peak should therefore be interpreted cautiously, as it did not translate into sustained digital adoption. Together with the previously identified deficit in specialised ICT human capital, these results suggest that Romania's construction sector continues to display relatively limited and unstable digital business integration. This may constrain the development of digital marketplaces, information exchange and other digital mechanisms capable of supporting more efficient circular material flows within the twin transition.

#### 4.4. Economic relevance of the construction sector

The final dimension assesses the economic weight of construction in order to contextualise the potential significance of green–digital improvements for Romania.

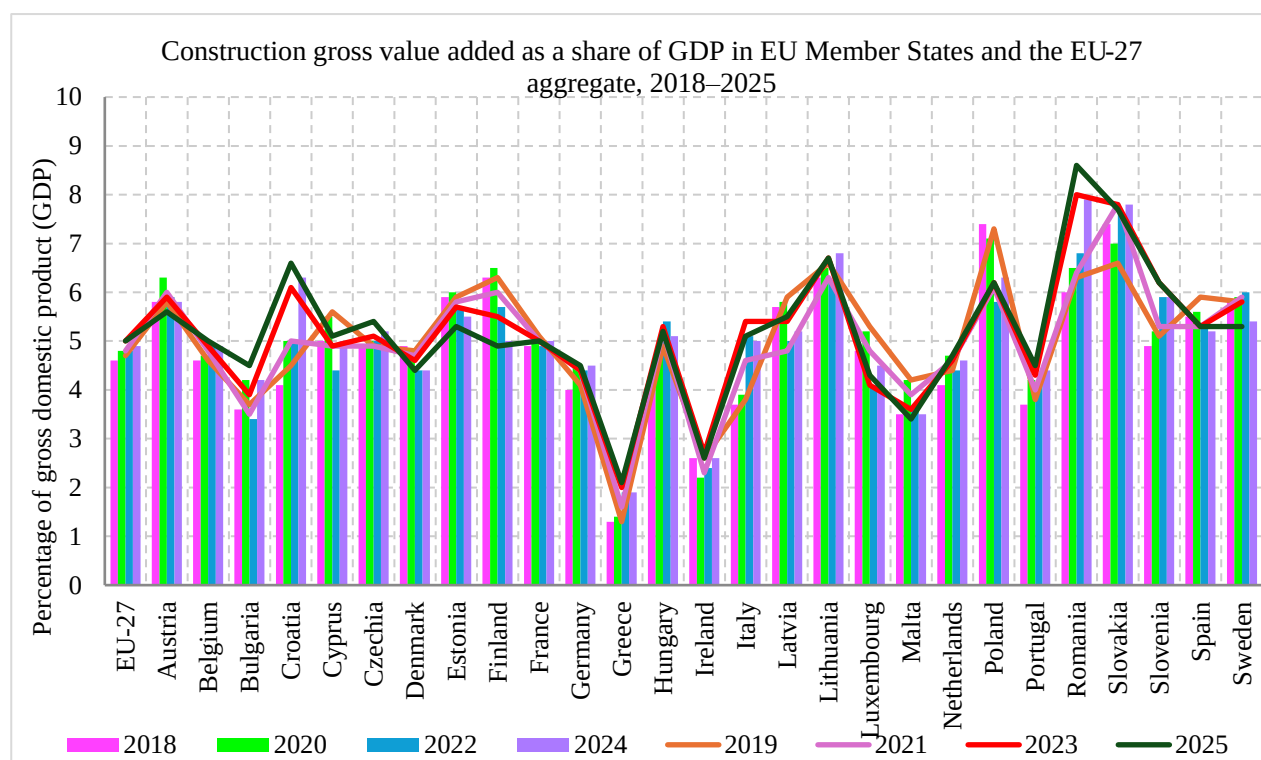


**Figure 7.** Evolution of construction gross value added as a share of GDP in EU Member States and the EU-27 aggregate, 2018–2025

*Source: Authors' processing based on Eurostat data [nama\_10\_a10]*

**Figure 7** shows that the economic contribution of construction remained relatively stable at EU-27 level during 2018–2025, while considerable differences persisted across Member States (Appendix 6). Construction gross value added increased from 4.6% of GDP in 2018 to 5.0% in 2025 at EU-27 level, corresponding to a modest increase of 0.4 percentage points. National trajectories were substantially more heterogeneous. In 2025, Romania recorded the highest share of construction gross value added in GDP (8.6%), followed by Slovakia (7.7%), Lithuania (6.7%) and Croatia (6.6%), whereas Greece (2.1%), Ireland (2.6%) and Malta (3.4%) recorded the lowest

values. These differences indicate substantial variation in the economic weight of construction across EU Member States.

Romania displayed a markedly stronger expansion than the EU-27 aggregate. Construction gross value added increased from 6.0% of GDP in 2018 to 8.6% in 2025, representing an increase of 2.6 percentage points, or approximately 43.3%, compared with an increase of only 0.4 percentage points at EU-27 level. The gap between Romania and the EU-27 therefore widened from 1.4 percentage points in 2018 to 3.6 percentage points in 2025. After remaining between 6.0% and 6.8% during 2018–2022, the indicator rose to 8.0% in 2023, remained high at 7.9% in 2024 and reached 8.6% in 2025, with both observations reported as provisional. Romania’s leading position confirms the particularly strong economic relevance of construction and reinforces the importance of accelerating both resource-efficiency improvements and sector-specific digitalisation. In the context of the present study, the size of the sector increases the potential economic impact of green–digital synergies and strengthens the case for digital solutions supporting circular material management.

Taken together, the results reveal an asymmetric twin-transition profile in Romania: high and increasing material pressure is accompanied by comparatively low resource productivity and expanding but increasingly import-oriented participation in extra-EU recyclable mineral raw-material flows, while sector-specific digitalisation remains relatively limited. Given the significant economic contribution of construction, these disparities point to substantial but still underexploited potential for green–digital synergies in the sector.

## **5. Conclusions**

The results reveal an asymmetric twin-transition profile in Romania. During 2018–2025, high and increasing consumption of non-metallic minerals was accompanied by comparatively low resource productivity, while participation in extra-EU recyclable mineral raw-material trade expanded but became increasingly import-oriented. At the same time, Romania remained below the EU-27 level in digital human-capital capacity, and digital business adoption among construction enterprises was relatively limited and volatile. These disparities are particularly relevant given the substantial and increasing economic contribution of construction to the Romanian economy.

Overall, the findings indicate considerable but still underexploited potential for green–digital synergies. Improving resource efficiency and strengthening domestic secondary-material circulation could be supported by greater digital capacity and adoption, particularly through better material information, traceability, data exchange and market matching. The transition should therefore be approached as an integrated process in which digitalisation supports circular-resource management rather than as two independent transformations.

From the perspective of the analytical framework adopted in this study, Romania’s main challenge lies in addressing the imbalance between high material pressure and the substantial economic weight of construction, on the one hand, and comparatively weaker resource-efficiency and digital capabilities, on the other. The simultaneous improvement of material efficiency, secondary-material circulation and sector-specific digital adoption could create more favourable conditions for the twin transition in construction. The study therefore highlights the need for coordinated green and digital development, while future research could extend this comparative perspective through firm- and project-level data and more direct indicators of circular practices, BIM, digital twins and material-passport adoption.

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## Appendix

## Appendix 1. Domestic material consumption of non-metallic minerals in the EU-27 Member States, 2018–2025

| Dataset: <b>Material flow accounts [env_ac_mfa]</b><br>Time frequency: Annual<br>Environmental indicator: Domestic material consumption<br>Materials: Non-metallic minerals<br>Unit of measure: Tonnes per capita |        |        |        |        |        |        |        |        |                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------------|
| COUNTRY / AGGREGATE                                                                                                                                                                                               | 2018   | 2019   | 2020   | 2021   | 2022   | 2023   | 2024   | 2025   | 2025 observation flag |
| EU-27                                                                                                                                                                                                             | 7,047  | 7,255  | 7,197  | 7,49   | 7,385  | 6,937  | 6,957  | 7,24   | i                     |
| Austria                                                                                                                                                                                                           | 9,476  | 9,463  | 9,256  | 10,02  | 9,553  | 8,506  | 8,256  | 8,004  | i                     |
| Belgium                                                                                                                                                                                                           | 5,146  | 4,894  | 4,658  | 4,813  | 4,966  | 4,711  | 3,914  | 3,943  | i                     |
| Bulgaria                                                                                                                                                                                                          | 7,718  | 8,205  | 9,162  | 10,156 | 9,199  | 10,33  | 10,93  | 11,515 | i                     |
| Croatia                                                                                                                                                                                                           | 5,67   | 6,033  | 6,324  | 6,577  | 6,828  | 7,267  | 7,72   | 8,153  | i                     |
| Cyprus                                                                                                                                                                                                            | 11,841 | 12,873 | 12,398 | 13,772 | 13,324 | 14,332 | 14,841 | 15,232 | i                     |
| Czechia                                                                                                                                                                                                           | 7,66   | 7,643  | 7,607  | 8,244  | 8,104  | 7,091  | 7,019  | 7,847  | i                     |
| Denmark                                                                                                                                                                                                           | 12,539 | 12,507 | 12,379 | 13,363 | 13,453 | 11,342 | 12,74  | 12,884 | i                     |
| Estonia                                                                                                                                                                                                           | 15,176 | 14,895 | 15,613 | 15,849 | 13,475 | 12,606 | 13,703 | 13,943 | i                     |
| Finland                                                                                                                                                                                                           | 26,369 | 23,776 | 25,52  | 26,033 | 29,135 | 24,741 | 24,061 | 25,341 | i                     |
| France                                                                                                                                                                                                            | 5,922  | 6,207  | 5,743  | 6,062  | 5,894  | 5,62   | 5,395  | 5,268  | i                     |
| Germany                                                                                                                                                                                                           | 6,996  | 6,799  | 6,904  | 6,772  | 6,551  | 5,826  | 5,567  | 5,561  | i                     |
| Greece                                                                                                                                                                                                            | 3,715  | 4,126  | 4,075  | 4,4    | 4,517  | 5      | 5,442  | 6,458  | i                     |
| Hungary                                                                                                                                                                                                           | 9,383  | 9,958  | 8,64   | 8,755  | 8,632  | 7,525  | 7,689  | 7,765  | i                     |
| Ireland                                                                                                                                                                                                           | 10,784 | 11,709 | 10,619 | 10,253 | 11,334 | 10,411 | 10,586 | 11,616 | i                     |
| Italy                                                                                                                                                                                                             | 3,481  | 3,508  | 3,335  | 3,878  | 3,936  | 3,873  | 3,834  | 3,984  | i                     |
| Latvia                                                                                                                                                                                                            | 10,009 | 9,571  | 9,415  | 11,091 | 11,074 | 8,38   | 8,999  | 7,721  | i                     |
| Lithuania                                                                                                                                                                                                         | 10,029 | 10,661 | 11,62  | 12,5   | 11,626 | 12,575 | 12,31  | 12,482 | i                     |
| Luxembourg                                                                                                                                                                                                        | 11,422 | 10,922 | 11,087 | 12,383 | 12,625 | 10,754 | 8,527  | 8,309  |                       |
| Malta                                                                                                                                                                                                             | 5,286  | 6,505  | 6,653  | 6,079  | 5,376  | 5,018  | 4,63   | 4,389  | i                     |
| Netherlands                                                                                                                                                                                                       | 2,044  | 1,98   | 2,037  | 1,688  | 1,73   | 1,471  | 1,696  | 1,738  | i                     |
| Poland                                                                                                                                                                                                            | 9,246  | 8,856  | 8,756  | 9,128  | 8,779  | 8,495  | 9,114  | 9,306  | i                     |
| Portugal                                                                                                                                                                                                          | 9,776  | 9,927  | 8,697  | 10,832 | 9,259  | 9,531  | 8,269  | 8,402  | i                     |
| Romania                                                                                                                                                                                                           | 16,137 | 21,037 | 23,087 | 23,144 | 23,733 | 22,993 | 24,225 | 26,138 | i                     |
| Slovakia                                                                                                                                                                                                          | 6,75   | 6,058  | 5,958  | 5,882  | 5,908  | 5,493  | 5,307  | 5,813  | i                     |
| Slovenia                                                                                                                                                                                                          | 8,549  | 7,234  | 7,104  | 8,605  | 9,245  | 8,737  | 7,619  | 8,468  | i                     |
| Spain                                                                                                                                                                                                             | 3,911  | 4,085  | 4      | 4,099  | 4,006  | 3,984  | 4,131  | 5,015  | i                     |
| Sweden                                                                                                                                                                                                            | 10,874 | 11,06  | 10,921 | 10,942 | 10,462 | 9,256  | 9,344  | 9,362  | i                     |
| Observation flags:<br>i = value imputed by Eurostat or other receiving agencies                                                                                                                                   |        |        |        |        |        |        |        |        |                       |

Source: Eurostat, Material flow accounts [env\_ac\_mfa]

## Appendix 2. Resource productivity in EU Member States and the EU-27 aggregate, 2018–2025

| Dataset: <b>Resource productivity [cei_pc030]</b><br>Time frequency: Annual<br>Unit of measure: Purchasing power standard (PPS) per kilogram |        |                |        |                |        |                |        |                |        |                |        |                |        |                |        |                |
|----------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| COUNTRY / AGGREGATE                                                                                                                          | 2018   | 2018 Obs. flag | 2019   | 2019 Obs. flag | 2020   | 2020 Obs. flag | 2021   | 2021 Obs. flag | 2022   | 2022 Obs. flag | 2023   | 2023 Obs. flag | 2024   | 2024 Obs. flag | 2025   | 2025 Obs. flag |
| EU-27                                                                                                                                        | 2,1287 | i              | 2,2035 | i              | 2,2074 |                | 2,2991 |                | 2,5328 |                | 2,875  |                | 3,0122 |                | 3,0401 | i              |
| Austria                                                                                                                                      | 2,1891 |                | 2,2093 |                | 2,0932 |                | 2,1689 |                | 2,5516 |                | 2,8617 |                | 3,0477 |                | 3,193  | i              |
| Belgium                                                                                                                                      | 2,8195 |                | 2,8193 |                | 2,9928 |                | 3,308  |                | 3,267  |                | 3,5685 |                | 4,3384 |                | 4,3738 | i              |
| Bulgaria                                                                                                                                     | 0,7648 |                | 0,8005 |                | 0,8083 |                | 0,8186 |                | 0,8903 |                | 1,0609 |                | 1,1485 |                | 1,1477 | i              |
| Croatia                                                                                                                                      | 1,8903 |                | 1,9302 |                | 1,767  |                | 2,0296 |                | 2,1699 |                | 2,3638 |                | 2,3576 |                | 2,326  | i              |
| Cyprus                                                                                                                                       | 1,5367 |                | 1,529  |                | 1,5198 |                | 1,5599 |                | 1,8219 |                | 1,9277 |                | 1,9426 |                | 1,9126 | i              |

| Dataset: <b>Resource productivity [cei_pc030]</b>             |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |
|---------------------------------------------------------------|--------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|
| Time frequency: Annual                                        |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |
| Unit of measure: Purchasing power standard (PPS) per kilogram |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |
| COUNTRY /<br>AGGREGATE                                        | 2018   | 2018<br>Obs.<br>flag | 2019   | 2019<br>Obs.<br>flag | 2020   | 2020<br>Obs.<br>flag | 2021   | 2021<br>Obs.<br>flag | 2022   | 2022<br>Obs.<br>flag | 2023   | 2023<br>Obs.<br>flag | 2024   | 2024<br>Obs.<br>flag | 2025   | 2025<br>Obs.<br>flag |
| Czechia                                                       | 1,7645 |                      | 1,8443 |                      | 1,9277 |                      | 1,9213 |                      | 2,075  |                      | 2,5155 |                      | 2,6833 |                      | 2,5991 | i                    |
| Denmark                                                       | 1,5999 |                      | 1,6178 |                      | 1,6742 |                      | 1,7774 |                      | 1,9221 |                      | 2,2133 |                      | 2,1184 |                      | 2,2202 | i                    |
| Estonia                                                       | 0,7884 |                      | 0,9187 |                      | 0,9481 |                      | 1,0742 |                      | 1,11   |                      | 1,2632 |                      | 1,2502 |                      | 1,2458 | i                    |
| Finland                                                       | 0,7633 |                      | 0,8646 |                      | 0,8219 |                      | 0,8704 |                      | 0,8486 |                      | 0,9935 |                      | 1,052  |                      | 1,0538 | i                    |
| France                                                        | 2,7824 |                      | 2,8695 |                      | 3,0184 |                      | 2,896  |                      | 3,2829 |                      | 3,5456 |                      | 3,7606 |                      | 3,8488 | i                    |
| Germany                                                       | 2,5716 |                      | 2,6925 |                      | 2,6962 |                      | 2,7995 |                      | 3,1364 |                      | 3,6661 |                      | 3,9375 |                      | 3,9483 | i                    |
| Greece                                                        | 1,6544 |                      | 1,7915 |                      | 1,8513 |                      | 2,0347 | e                    | 2,253  |                      | 2,4709 |                      | 2,4782 |                      | 2,4882 | i                    |
| Hungary                                                       | 1,3736 |                      | 1,3996 |                      | 1,5844 |                      | 1,7358 |                      | 2,0161 |                      | 2,1683 |                      | 2,4379 |                      | 2,4798 | i                    |
| Ireland                                                       | 2,3082 |                      | 2,3486 |                      | 2,6263 |                      | 3,1647 |                      | 3,5254 |                      | 3,6454 |                      | 3,8638 |                      | 4,0966 | i                    |
| Italy                                                         | 3,5178 |                      | 3,5858 |                      | 3,5615 |                      | 3,6173 |                      | 3,9788 |                      | 4,4614 |                      | 4,6339 |                      | 4,6073 | i                    |
| Latvia                                                        | 1,391  |                      | 1,4278 |                      | 1,411  |                      | 1,4609 |                      | 1,4807 |                      | 1,9528 |                      | 2,2314 |                      | 2,3567 | i                    |
| Lithuania                                                     | 1,4071 |                      | 1,4002 |                      | 1,3225 |                      | 1,4151 |                      | 1,5553 |                      | 1,6407 |                      | 1,7757 |                      | 1,7725 | i                    |
| Luxembourg                                                    | 3,4337 |                      | 3,4513 |                      | 3,4717 |                      | 3,6106 |                      | 3,8619 |                      | 4,4729 |                      | 5,0082 |                      | 5,3378 |                      |
| Malta                                                         | 2,4994 |                      | 2,7354 |                      | 2,4416 |                      | 3,0607 |                      | 3,4495 |                      | 3,7705 |                      | 4,2038 |                      | 4,7173 | i                    |
| Netherlands                                                   | 4,0004 |                      | 4,0352 | e                    | 4,3475 |                      | 5,1042 | e                    | 5,1607 |                      | 6,4528 | e                    | 6,6504 |                      | 7,0658 | i                    |
| Poland                                                        | 1,1874 |                      | 1,327  |                      | 1,3477 |                      | 1,435  |                      | 1,5773 |                      | 1,7447 |                      | 1,8154 |                      | 1,9075 | i                    |
| Portugal                                                      | 1,4477 |                      | 1,4982 |                      | 1,5771 |                      | 1,4541 |                      | 1,8306 |                      | 2,0346 |                      | 2,2933 |                      | 2,3303 | i                    |
| Romania                                                       | 0,8666 | i                    | 0,7898 | i                    | 0,767  |                      | 0,8147 |                      | 0,8886 |                      | 1,027  |                      | 1,0576 |                      | 1,0505 | i                    |
| Slovakia                                                      | 1,5826 |                      | 1,7998 |                      | 1,9012 |                      | 2,0312 |                      | 2,2668 |                      | 2,5549 |                      | 2,8746 |                      | 2,8738 | i                    |
| Slovenia                                                      | 1,8232 |                      | 2,0323 |                      | 2,0346 |                      | 2,0676 |                      | 2,1849 |                      | 2,3663 |                      | 2,6543 |                      | 2,5849 | i                    |
| Spain                                                         | 2,9342 |                      | 3,1065 |                      | 2,8064 |                      | 3,0655 |                      | 3,5132 |                      | 4,0254 |                      | 4,0191 |                      | 3,7728 | i                    |
| Sweden                                                        | 1,4568 |                      | 1,4448 |                      | 1,5079 |                      | 1,6029 |                      | 1,6865 |                      | 1,9347 |                      | 1,9739 |                      | 2,017  | i                    |
| Observation flags:                                            |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |
| b = break in time series                                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |
| e = estimated                                                 |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |
| i = value imputed by Eurostat or other receiving agencies     |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |        |                      |

Source: Eurostat, Resource productivity [cei\_pc030]

### Appendix 3.1. Imports of recyclable mineral raw materials from extra-EU-27 countries into EU Member States and the EU-27 aggregate, 2018–2025

| Dataset: <b>Trade in recyclable raw materials by partner [env_trdrmm]</b> |           |           |           |           |           |           |           |           |
|---------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Time frequency: Annual                                                    |           |           |           |           |           |           |           |           |
| <b>Stock or flow: Imports</b>                                             |           |           |           |           |           |           |           |           |
| Raw materials: Mineral                                                    |           |           |           |           |           |           |           |           |
| Geopolitical entity (partner): Extra-EU27 (from 2020)                     |           |           |           |           |           |           |           |           |
| Unit of measure: Tonne                                                    |           |           |           |           |           |           |           |           |
| COUNTRY /<br>AGGREGATE                                                    | 2018      | 2019      | 2020      | 2021      | 2022      | 2023      | 2024      | 2025      |
| EU-27                                                                     | 1.345.628 | 2.169.433 | 4.025.438 | 3.978.375 | 3.692.258 | 5.140.043 | 6.948.609 | 8.290.303 |
| Austria                                                                   | 46.260    | 47.730    | 46.668    | 47.037    | 13.286    | 3.307     | 2.299     | 61        |
| Belgium                                                                   | 58.685    | 228.225   | 671.609   | 507.317   | 461.725   | 482.783   | 407.888   | 632.856   |
| Bulgaria                                                                  | 9.886     | 15.516    | 15.989    | 12.517    | 15.078    | 56.380    | 126.480   | 145.701   |
| Croatia                                                                   | 163.784   | 319.365   | 314.091   | 407.709   | 508.019   | 726.258   | 990.883   | 1.117.445 |
| Cyprus                                                                    | 1         | 1.403     | 1.202     | 301       | :         | 2.564     | 2.302     | 607       |
| Czechia                                                                   | 130       | 285       | 2.879     | 1.722     | 2         | 1         | 1         | 1.512     |
| Denmark                                                                   | 2.918     | 15.236    | 80.610    | 58.079    | 32.752    | 58.253    | 119.941   | 124.086   |
| Estonia                                                                   | 0         | :         | 0         | 168       | 891       | 1.310     | 168       | :         |
| Finland                                                                   | 23.322    | 15.689    | 18.691    | 25.624    | 15.961    | 2.300     | 1.886     | 3.568     |
| France                                                                    | 220.323   | 409.365   | 426.327   | 209.753   | 127.100   | 927.673   | 522.391   | 502.084   |
| Germany                                                                   | 188.684   | 118.076   | 242.766   | 173.949   | 179.593   | 157.239   | 179.867   | 164.646   |
| Greece                                                                    | 60.378    | 65.000    | 89.811    | 72.377    | 76.050    | 102.172   | 115.823   | 190.682   |
| Hungary                                                                   | 24.773    | 147.237   | 119.132   | 226.479   | 225.523   | 157.931   | 154.927   | 117.538   |

| Dataset: Trade in recyclable raw materials by partner [env_trdrmm]<br>Time frequency: Annual<br><b>Stock or flow: Imports</b><br>Raw materials: Mineral<br>Geopolitical entity (partner): Extra-EU27 (from 2020)<br>Unit of measure: Tonne |         |         |           |           |         |         |           |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|-----------|-----------|---------|---------|-----------|-----------|
| COUNTRY / AGGREGATE                                                                                                                                                                                                                        | 2018    | 2019    | 2020      | 2021      | 2022    | 2023    | 2024      | 2025      |
| Ireland                                                                                                                                                                                                                                    | 1.336   | 1.374   | 1.256     | 92.213    | 27.506  | 5.153   | 1.514     | 10.032    |
| Italy                                                                                                                                                                                                                                      | 78.531  | 112.587 | 90.908    | 123.627   | 29.983  | 220.909 | 840.859   | 1.137.224 |
| Latvia                                                                                                                                                                                                                                     | 1.391   | 2.154   | 5.983     | 12.119    | 3.565   | 1.887   | 938       | 596       |
| Lithuania                                                                                                                                                                                                                                  | 10.046  | 26.635  | 53.135    | 50.807    | 20.642  | 3.125   | 526       | 651       |
| Luxembourg                                                                                                                                                                                                                                 | 446     | 508     | 450       | 499       | 324     | 799     | 602       | 354       |
| Malta                                                                                                                                                                                                                                      | 308     | 314     | 106       | 115       | 145     | 0       | 170       | 272       |
| Netherlands                                                                                                                                                                                                                                | 222.015 | 307.662 | 1.033.637 | 1.032.781 | 582.102 | 408.050 | 432.366   | 1.333.605 |
| Poland                                                                                                                                                                                                                                     | 5.234   | 61.179  | 236.230   | 87.964    | 302.665 | 331.135 | 684.453   | 627.976   |
| Portugal                                                                                                                                                                                                                                   | 84      | 13      | 67.101    | 16.272    | 6       | 72      | 20.071    | 140.611   |
| Romania                                                                                                                                                                                                                                    | 12.207  | 72.056  | 70.323    | 81.863    | 284.972 | 372.100 | 807.692   | 776.595   |
| Slovakia                                                                                                                                                                                                                                   | 54.382  | 34.525  | 18.347    | 13.990    | 4.247   | 48.120  | 127.270   | 62.085    |
| Slovenia                                                                                                                                                                                                                                   | 72.295  | 68.048  | 87.743    | 116.738   | 119.926 | 65.955  | 104.581   | 106.362   |
| Spain                                                                                                                                                                                                                                      | 62.287  | 71.713  | 283.635   | 597.142   | 651.467 | 976.757 | 1.257.951 | 949.954   |
| Sweden                                                                                                                                                                                                                                     | 25.923  | 27.539  | 46.810    | 9.215     | 8.726   | 27.811  | 44.756    | 143.203   |
| : = not available                                                                                                                                                                                                                          |         |         |           |           |         |         |           |           |

Source: Eurostat, Trade in recyclable raw materials by partner [env\_trdrmm]

### Appendix 3.2. Exports of recyclable mineral raw materials from EU Member States and the EU-27 aggregate to extra-EU-27 countries, 2018–2025

| Dataset: Trade in recyclable raw materials by partner [env_trdrmm]<br>Time frequency: Annual<br><b>Stock or flow: Exports</b><br>Raw materials: Mineral<br>Geopolitical entity (partner): Extra-EU27 (from 2020)<br>Unit of measure: Tonne |           |           |           |           |           |           |           |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| COUNTRY / AGGREGATE                                                                                                                                                                                                                        | 2018      | 2019      | 2020      | 2021      | 2022      | 2023      | 2024      | 2025      |
| EU-27                                                                                                                                                                                                                                      | 5.121.983 | 3.991.753 | 2.790.941 | 3.414.765 | 3.817.641 | 3.050.527 | 2.972.658 | 3.000.584 |
| Austria                                                                                                                                                                                                                                    | 16.430    | 1.885     | 381       | 51        | 1.915     | 313       | 7.107     | 5.743     |
| Belgium                                                                                                                                                                                                                                    | 54.136    | 37.966    | 52.071    | 70.521    | 33.641    | 79.627    | 265.381   | 257.350   |
| Bulgaria                                                                                                                                                                                                                                   | 521       | 175       | 1.793     | 1.177     | 1.795     | 1.331     | 847       | 14.049    |
| Croatia                                                                                                                                                                                                                                    | 83        | 189       | 1.827     | 1.913     | 751       | 171       | 194       | 2.196     |
| Cyprus                                                                                                                                                                                                                                     | 842       | :         | :         | :         | :         | :         | :         | :         |
| Czechia                                                                                                                                                                                                                                    | 505       | 443       | 361       | 16        | 35        | 25        | 16        | 510       |
| Denmark                                                                                                                                                                                                                                    | 52.304    | 57.760    | 82.169    | 55.698    | 53.413    | 42.092    | 30.735    | 45.866    |
| Estonia                                                                                                                                                                                                                                    | 30.942    | 23.508    | 10.665    | 10.511    | 7.644     | 3.180     | 159       | 381       |
| Finland                                                                                                                                                                                                                                    | 27.226    | 26.908    | 12.591    | 59.682    | 27.892    | 247       | 83.261    | 6.769     |
| France                                                                                                                                                                                                                                     | 611.544   | 580.080   | 416.358   | 295.247   | 455.005   | 437.267   | 413.070   | 156.669   |
| Germany                                                                                                                                                                                                                                    | 902.290   | 889.059   | 725.026   | 677.157   | 714.366   | 739.926   | 700.018   | 666.499   |
| Greece                                                                                                                                                                                                                                     | 363.004   | 322.303   | 285.908   | 372.973   | 479.090   | 397.912   | 233.138   | 299.475   |
| Hungary                                                                                                                                                                                                                                    | 198       | :         | :         | 17        | 0         | 62        | 1.928     | 20.526    |
| Ireland                                                                                                                                                                                                                                    | 38.748    | 22.751    | 46.963    | 88.538    | 179.467   | 153.720   | 53.784    | 45.443    |
| Italy                                                                                                                                                                                                                                      | 1.287.354 | 773.968   | 385.302   | 453.015   | 507.913   | 99.430    | 111.983   | 53.935    |
| Latvia                                                                                                                                                                                                                                     | 1.111     | 42        | 1         | 164       | 402       | 360       | 95        | 115       |
| Lithuania                                                                                                                                                                                                                                  | 44        | 6         | 8         | 5         | 2         | 0         | 0         | :         |
| Luxembourg                                                                                                                                                                                                                                 | 120       | :         | :         | 0         | :         | :         | :         | :         |
| Malta                                                                                                                                                                                                                                      | 62        | 30        | 33        | 61        | 27        | 6         | :         | :         |
| Netherlands                                                                                                                                                                                                                                | 447.415   | 291.113   | 108.755   | 404.356   | 392.413   | 300.786   | 204.541   | 618.616   |
| Poland                                                                                                                                                                                                                                     | 19.401    | 24.337    | 66.421    | 59.603    | 78.190    | 49.214    | 12.538    | 6.653     |
| Portugal                                                                                                                                                                                                                                   | 51.413    | 550       | 582       | 694       | 375       | 475       | 478       | 133       |

|                   |         |         |         |         |         |         |         |         |
|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Romania           | 200.022 | 86.429  | 844     | 1.980   | 628     | 1.061   | 3.994   | 16.744  |
| Slovakia          | 156.717 | 83.685  | 79.312  | 90.389  | 23.549  | 66.241  | 58.520  | 39.859  |
| Slovenia          | 820     | 596     | 211     | 1.354   | 358     | 8       | 55      | 484     |
| Spain             | 808.436 | 698.605 | 468.768 | 682.251 | 761.022 | 577.752 | 678.589 | 589.960 |
| Sweden            | 50.297  | 69.363  | 44.592  | 87.390  | 97.748  | 99.320  | 112.224 | 152.609 |
| : = not available |         |         |         |         |         |         |         |         |

Source: Eurostat, Trade in recyclable raw materials by partner [env\_trdrmm]

**Appendix 3.3.** Trade balance of recyclable mineral raw materials between EU Member States and extra-EU-27 countries, 2018–2025 (tonnes)

| Trade balance of recyclable mineral raw materials |           |           |            |          |          |            |            |            |
|---------------------------------------------------|-----------|-----------|------------|----------|----------|------------|------------|------------|
| Note: Trade balance = Exports – Imports.          |           |           |            |          |          |            |            |            |
| Unit of measure: Tonne                            |           |           |            |          |          |            |            |            |
| COUNTRY / AGGREGATE                               | 2018      | 2019      | 2020       | 2021     | 2022     | 2023       | 2024       | 2025       |
| EU-27                                             | 3.776.355 | 1.822.320 | -1.234.497 | -563.610 | 125.383  | -2.089.516 | -3.975.951 | -5.289.719 |
| Austria                                           | -29.830   | -45.845   | -46.287    | -46.986  | -11.371  | -2.994     | 4.808      | 5.682      |
| Belgium                                           | -4.549    | -190.259  | -619.538   | -436.796 | -428.084 | -403.156   | -142.507   | -375.506   |
| Bulgaria                                          | -9.365    | -15.341   | -14.196    | -11.340  | -13.283  | -55.049    | -125.633   | -131.652   |
| Croatia                                           | -163.701  | -319.176  | -312.264   | -405.796 | -507.268 | -726.087   | -990.689   | -1.115.249 |
| Cyprus                                            | 841       |           |            |          |          |            |            |            |
| Czechia                                           | 375       | 158       | -2.518     | -1.706   | 33       | 24         | 15         | -1.002     |
| Denmark                                           | 49.386    | 42.524    | 1.559      | -2.381   | 20.661   | -16.161    | -89.206    | -78.220    |
| Estonia                                           | 30.942    |           | 10.665     | 10.343   | 6.753    | 1.870      | -9         |            |
| Finland                                           | 3.904     | 11.219    | -6.100     | 34.058   | 11.931   | -2.053     | 81.375     | 3.201      |
| France                                            | 391.221   | 170.715   | -9.969     | 85.494   | 327.905  | -490.406   | -109.321   | -345.415   |
| Germany                                           | 713.606   | 770.983   | 482.260    | 503.208  | 534.773  | 582.687    | 520.151    | 501.853    |
| Greece                                            | 302.626   | 257.303   | 196.097    | 300.596  | 403.040  | 295.740    | 117.315    | 108.793    |
| Hungary                                           | -24.575   |           |            | -226.462 | -225.523 | -157.869   | -152.999   | -97.012    |
| Ireland                                           | 37.412    | 21.377    | 45.707     | -3.675   | 151.961  | 148.567    | 52.270     | 35.411     |
| Italy                                             | 1.208.823 | 661.381   | 294.394    | 329.388  | 477.930  | -121.479   | -728.876   | -1.083.289 |
| Latvia                                            | -280      | -2.112    | -5.982     | -11.955  | -3.163   | -1.527     | -843       | -481       |
| Lithuania                                         | -10.002   | -26.629   | -53.127    | -50.802  | -20.640  | -3.125     | -526       |            |
| Luxembourg                                        | -326      |           |            | -499     |          |            |            |            |
| Malta                                             | -246      | -284      | -73        | -54      | -118     | 6          |            |            |
| Netherlands                                       | 225.400   | -16.549   | -924.882   | -628.425 | -189.689 | -107.264   | -227.825   | -714.989   |
| Poland                                            | 14.167    | -36.842   | -169.809   | -28.361  | -224.475 | -281.921   | -671.915   | -621.323   |
| Portugal                                          | 51.329    | 537       | -66.519    | -15.578  | 369      | 403        | -19.593    | -140.478   |
| Romania                                           | 187.815   | 14.373    | -69.479    | -79.883  | -284.344 | -371.039   | -803.698   | -759.851   |
| Slovakia                                          | 102.335   | 49.160    | 60.965     | 76.399   | 19.302   | 18.121     | -68.750    | -22.226    |
| Slovenia                                          | -71.475   | -67.452   | -87.532    | -115.384 | -119.568 | -65.947    | -104.526   | -105.878   |
| Spain                                             | 746.149   | 626.892   | 185.133    | 85.109   | 109.555  | -399.005   | -579.362   | -359.994   |
| Sweden                                            | 24.374    | 41.824    | -2.218     | 78.175   | 89.022   | 71.509     | 67.468     | 9.406      |

Source: Authors' calculations based on Eurostat data [env\_trdrmm]

**Appendix 3.4.** Total trade volume of recyclable mineral raw materials between EU Member States and extra-EU-27 countries, 2018–2025

| Total trade volume of recyclable mineral raw materials |           |           |           |           |           |           |           |            |
|--------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Note: Total trade volume = Imports + Exports.          |           |           |           |           |           |           |           |            |
| Unit of measure: Tonne                                 |           |           |           |           |           |           |           |            |
| COUNTRY / AGGREGATE                                    | 2018      | 2019      | 2020      | 2021      | 2022      | 2023      | 2024      | 2025       |
| EU-27                                                  | 6.467.611 | 6.161.186 | 6.816.379 | 7.393.140 | 7.509.899 | 8.190.570 | 9.921.267 | 11.290.887 |
| Austria                                                | 62.690    | 49.615    | 47.049    | 47.088    | 15.201    | 3.620     | 9.406     | 5.804      |
| Belgium                                                | 112.821   | 266.191   | 723.680   | 577.838   | 495.366   | 562.410   | 673.269   | 890.206    |
| Bulgaria                                               | 10.407    | 15.691    | 17.782    | 13.694    | 16.873    | 57.711    | 127.327   | 159.750    |
| Croatia                                                | 163.867   | 319.554   | 315.918   | 409.622   | 508.770   | 726.429   | 991.077   | 1.119.641  |

| Total trade volume of recyclable mineral raw materials |           |           |           |           |           |           |           |           |
|--------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Note: Total trade volume = Imports + Exports.          |           |           |           |           |           |           |           |           |
| Unit of measure: Tonne                                 |           |           |           |           |           |           |           |           |
| COUNTRY / AGGREGATE                                    | 2018      | 2019      | 2020      | 2021      | 2022      | 2023      | 2024      | 2025      |
| Cyprus                                                 | 843       |           |           |           |           |           |           |           |
| Czechia                                                | 635       | 728       | 3.240     | 1.738     | 37        | 26        | 17        | 2.022     |
| Denmark                                                | 55.222    | 72.996    | 162.779   | 113.777   | 86.165    | 100.345   | 150.676   | 169.952   |
| Estonia                                                | 30.942    |           | 10.665    | 10.679    | 8.535     | 4.490     | 327       |           |
| Finland                                                | 50.548    | 42.597    | 31.282    | 85.306    | 43.853    | 2.547     | 85.147    | 10.337    |
| France                                                 | 831.867   | 989.445   | 842.685   | 505.000   | 582.105   | 1.364.940 | 935.461   | 658.753   |
| Germany                                                | 1.090.974 | 1.007.135 | 967.792   | 851.106   | 893.959   | 897.165   | 879.885   | 831.145   |
| Greece                                                 | 423.382   | 387.303   | 375.719   | 445.350   | 555.140   | 500.084   | 348.961   | 490.157   |
| Hungary                                                | 24.971    |           |           | 226.496   | 225.523   | 157.993   | 156.855   | 138.064   |
| Ireland                                                | 40.084    | 24.125    | 48.219    | 180.751   | 206.973   | 158.873   | 55.298    | 55.475    |
| Italy                                                  | 1.365.885 | 886.555   | 476.210   | 576.642   | 537.896   | 320.339   | 952.842   | 1.191.159 |
| Latvia                                                 | 2.502     | 2.196     | 5.984     | 12.283    | 3.967     | 2.247     | 1.033     | 711       |
| Lithuania                                              | 10.090    | 26.641    | 53.143    | 50.812    | 20.644    | 3.125     | 526       |           |
| Luxembourg                                             | 566       |           |           | 499       |           |           |           |           |
| Malta                                                  | 370       | 344       | 139       | 176       | 172       | 6         |           |           |
| Netherlands                                            | 669.430   | 598.775   | 1.142.392 | 1.437.137 | 974.515   | 708.836   | 636.907   | 1.952.221 |
| Poland                                                 | 24.635    | 85.516    | 302.651   | 147.567   | 380.855   | 380.349   | 696.991   | 634.629   |
| Portugal                                               | 51.497    | 563       | 67.683    | 16.966    | 381       | 547       | 20.549    | 140.744   |
| Romania                                                | 212.229   | 158.485   | 71.167    | 83.843    | 285.600   | 373.161   | 811.686   | 793.339   |
| Slovakia                                               | 211.099   | 118.210   | 97.659    | 104.379   | 27.796    | 114.361   | 185.790   | 101.944   |
| Slovenia                                               | 73.115    | 68.644    | 87.954    | 118.092   | 120.284   | 65.963    | 104.636   | 106.846   |
| Spain                                                  | 870.723   | 770.318   | 752.403   | 1.279.393 | 1.412.489 | 1.554.509 | 1.936.540 | 1.539.914 |
| Sweden                                                 | 76.220    | 96.902    | 91.402    | 96.605    | 106.474   | 127.131   | 156.980   | 295.812   |

Source: Authors' calculations based on Eurostat data [env\_trdrmm]

#### Appendix 4. ICT specialists as a share of total employment in EU Member States and the EU-27 aggregate, 2018–2025 (%)

| Dataset: <b>Employed information and communications technology (ICT) specialists</b> |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| [isoc_sks_itspt]                                                                     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Time frequency: Annual                                                               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Unit of measure: Percentage of total employment                                      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| COUNTRY /<br>AGGREGATE                                                               | 2018 | 2018 | 2018 | 2019 | 2019 | 2019 | 2020 | 2020 | 2020 | 2021 | 2021 | 2021 | 2022 | 2022 | 2022 | 2023 |
|                                                                                      | Obs. | flag |      | Obs. | flag |      | Obs. | flag |      | Obs. | flag |      | Obs. | flag |      | Obs. |
| EU-27                                                                                | 3,8  | e    | 4,0  | e    | 4,3  | e    | 4,5  | be   | 4,6  | e    | 4,8  | e    | 4,9  | e    | 5,0  | e    |
| Austria                                                                              | 4,5  |      | 4,3  |      | 4,5  |      | 4,5  | b    | 5,0  |      | 5,3  |      | 5,3  |      | 5,4  |      |
| Belgium                                                                              | 5,2  |      | 5,0  |      | 5,0  |      | 5,6  | b    | 5,6  |      | 5,4  |      | 5,7  |      | 5,9  |      |
| Bulgaria                                                                             | 3,3  | e    | 3,0  | b    | 3,3  |      | 3,5  | b    | 3,8  |      | 4,3  |      | 4,6  | b    | 4,8  |      |
| Croatia                                                                              | 3,4  | e    | 3,3  | e    | 3,7  | e    | 3,7  | be   | 3,8  | e    | 4,3  | e    | 5,0  | e    | 4,9  | e    |
| Cyprus                                                                               | 3,2  |      | 2,7  |      | 3,2  |      | 3,9  | b    | 4,4  |      | 5,6  | e    | 5,0  | e    | 4,9  |      |
| Czechia                                                                              | 4,0  |      | 4,0  |      | 4,2  |      | 4,6  | b    | 4,5  |      | 4,3  |      | 4,5  |      | 4,7  |      |
| Denmark                                                                              | 5,0  | e    | 5,1  | e    | 5,3  | e    | 5,6  | b    | 5,7  |      | 5,9  | b    | 5,8  |      | 5,7  |      |
| Estonia                                                                              | 5,4  |      | 5,8  |      | 6,2  | e    | 6,2  | b    | 6,6  |      | 6,7  | e    | 7,2  | e    | 6,8  | e    |
| Finland                                                                              | 6,7  |      | 6,8  |      | 7,6  |      | 7,4  | b    | 7,6  |      | 7,6  |      | 7,8  |      | 7,8  |      |
| France                                                                               | 3,9  |      | 4,2  |      | 4,5  |      | 4,5  | bd   | 4,3  | d    | 4,7  | d    | 4,8  | d    | 4,9  | d    |
| Germany                                                                              | 3,9  |      | 4,0  |      | 4,7  | b    | 4,9  | b    | 5,0  |      | 4,9  |      | 5,1  |      | 5,5  |      |
| Greece                                                                               | 2,2  | e    | 2,0  | e    | 2,0  | e    | 2,4  | b    | 2,5  |      | 2,4  |      | 2,5  |      | 2,5  |      |
| Hungary                                                                              | 3,7  | b    | 3,4  |      | 3,8  | e    | 3,9  | be   | 4,2  | e    | 4,2  | e    | 4,5  | e    | 4,6  | e    |
| Ireland                                                                              | 4,8  | e    | 4,9  | e    | 5,7  | e    | 6,3  | be   | 6,3  | e    | 6,2  | e    | 6,3  | e    | 6,2  | e    |
| Italy                                                                                | 3,6  | be   | 3,5  | e    | 3,6  | e    | 3,8  | be   | 3,9  | e    | 4,1  | e    | 4,0  | e    | 3,8  | e    |
| Latvia                                                                               | 2,5  | e    | 3,1  | e    | 3,6  | e    | 3,8  | b    | 4,4  |      | 4,4  |      | 4,9  |      | 4,5  |      |
| Lithuania                                                                            | 2,7  |      | 3,1  | e    | 3,3  |      | 3,8  | b    | 4,4  |      | 4,9  | e    | 5,3  |      | 5,7  |      |

| Dataset: <b>Employed information and communications technology (ICT) specialists</b><br>[isoc_sks_itspt]<br>Time frequency: Annual<br>Unit of measure: Percentage of total employment                            |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|
| COUNTRY /<br>AGGREGATE                                                                                                                                                                                           | 2018 | 2018<br>Obs.<br>flag | 2019 | 2019<br>Obs.<br>flag | 2020 | 2020<br>Obs.<br>flag | 2021 | 2021<br>Obs.<br>flag | 2022 | 2022<br>Obs.<br>flag | 2023 | 2023<br>Obs.<br>flag | 2024 | 2024<br>Obs.<br>flag | 2025 |
| Luxembourg                                                                                                                                                                                                       | 5,9  | e                    | 6,1  | e                    | 6,3  |                      | 6,7  | b                    | 7,7  |                      | 8,0  |                      | 8,0  |                      | 8,7  |
| Malta                                                                                                                                                                                                            | 4,8  |                      | 4,6  |                      | 4,4  | e                    | 4,8  | be                   | 5,0  |                      | 4,7  |                      | 5,3  |                      | 4,8  |
| Netherlands                                                                                                                                                                                                      | 5,3  |                      | 5,6  |                      | 5,9  |                      | 6,7  | b                    | 7,2  |                      | 6,9  |                      | 7,0  |                      | 7,2  |
| Poland                                                                                                                                                                                                           | 3,0  |                      | 3,2  | b                    | 3,5  |                      | 3,7  | b                    | 3,7  |                      | 4,3  |                      | 4,5  |                      | 4,5  |
| Portugal                                                                                                                                                                                                         | 3,1  | e                    | 3,6  | e                    | 3,9  | e                    | 4,6  | b                    | 4,5  |                      | 4,6  |                      | 5,2  |                      | 5,4  |
| Romania                                                                                                                                                                                                          | 2,2  |                      | 2,3  | e                    | 2,4  |                      | 2,6  | b                    | 2,8  | e                    | 2,6  |                      | 2,8  | e                    | 2,7  |
| Slovakia                                                                                                                                                                                                         | 3,2  | e                    | 3,7  |                      | 4,2  |                      | 4,3  | b                    | 4,3  |                      | 4,2  |                      | 4,6  |                      | 4,4  |
| Slovenia                                                                                                                                                                                                         | 4,0  | e                    | 3,9  | e                    | 4,4  | e                    | 4,8  | b                    | 4,5  |                      | 3,8  |                      | 4,3  | e                    | 4,5  |
| Spain                                                                                                                                                                                                            | 3,6  | e                    | 3,7  | e                    | 3,9  | e                    | 4,1  | bd                   | 4,3  | d                    | 4,4  | d                    | 4,7  | d                    | 4,8  |
| Sweden                                                                                                                                                                                                           | 6,8  | b                    | 7,0  |                      | 7,5  | e                    | 8,0  | b                    | 8,6  |                      | 8,7  | e                    | 8,6  |                      | 8,9  |
| Observation flags:<br>bd = break in time series, definition differs (see metadata)<br>be = break in time series, estimated<br>b = break in time series<br>d = definition differs (see metadata)<br>e = estimated |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |      |

Source: Eurostat, Employed information and communications technology (ICT) specialists  
[isoc\_sks\_itspt]

#### Appendix 5. Construction enterprises with web sales in EU Member States and the EU-27 aggregate, 2018–2025 (% of enterprises)

| Dataset: <b>E-commerce sales of enterprises by NACE Rev. 2 activity [isoc_ec_eseln2]</b><br>Time frequency: Annual<br>Size classes in number of persons employed: 10 persons employed or more<br>Statistical classification of economic activities in the European Community (NACE Rev. 2):<br>Construction<br>Information society indicator: Enterprises with web sales (via websites, apps or marketplaces)<br>Unit of measure: Percentage of enterprises |       |                      |       |                      |       |                      |       |                      |       |                      |       |                      |       |                      |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|
| COUNTRY /<br>AGGREGATE                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2018  | 2018<br>Obs.<br>flag | 2019  | 2019<br>Obs.<br>flag | 2020  | 2020<br>Obs.<br>flag | 2021  | 2021<br>Obs.<br>flag | 2022  | 2022<br>Obs.<br>flag | 2023  | 2023<br>Obs.<br>flag | 2024  | 2024<br>Obs.<br>flag | 2025  |
| EU-27                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3,06  |                      | 3,66  |                      | 5,11  |                      | 4,18  |                      | 4,84  |                      | 4,70  |                      | 5,72  |                      | 5,29  |
| Austria                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0,60  |                      | 9,33  |                      | 10,10 |                      | 7,76  |                      | 7,23  |                      | 4,88  |                      | 11,24 |                      | 8,66  |
| Belgium                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10,68 |                      | 10,86 |                      | 2,56  |                      | 6,55  |                      | 5,31  |                      | 8,83  |                      | 7,33  |                      | 4,25  |
| Bulgaria                                                                                                                                                                                                                                                                                                                                                                                                                                                    | :     | u                    | 1,57  |                      | 0,79  |                      | 2,02  |                      | 2,53  |                      | 3,18  |                      | 1,00  |                      | :     |
| Croatia                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4,08  |                      | 6,51  |                      | 9,48  |                      | 5,31  |                      | 4,75  |                      | 7,85  |                      | 13,19 |                      | 4,83  |
| Cyprus                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2,84  |                      | 1,59  |                      | 5,53  |                      | 1,28  |                      | 4,07  |                      | 5,72  |                      | 2,48  |                      | 2,41  |
| Czechia                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4,20  |                      | 10,50 |                      | 9,03  |                      | 4,71  |                      | 3,79  |                      | 5,83  |                      | 6,24  |                      | 5,03  |
| Denmark                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10,30 |                      | 10,59 |                      | 16,41 |                      | 9,55  |                      | 5,10  |                      | 5,78  |                      | 6,11  |                      | 6,21  |
| Estonia                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3,31  |                      | 5,51  |                      | 4,14  |                      | 6,57  |                      | 4,31  |                      | 2,95  |                      | 6,97  |                      | 4,93  |
| Finland                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4,76  |                      | 14,26 |                      | 1,89  |                      | 4,10  |                      | 4,06  |                      | 4,58  |                      | 13,23 |                      | 3,05  |
| France                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2,12  |                      | 1,36  |                      | 0,41  |                      | 0,29  |                      | 0,50  | b                    | 0,86  |                      | 1,36  |                      | 0,99  |
| Germany                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1,55  |                      | 2,50  |                      | 4,03  |                      | 3,35  |                      | 4,14  |                      | 3,05  |                      | 5,18  |                      | 5,99  |
| Greece                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3,00  |                      | 1,85  |                      | :     | u                    | 8,91  |                      | 5,88  |                      | 12,29 |                      | 4,39  |                      | 8,47  |
| Hungary                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2,99  |                      | 2,77  |                      | 3,46  |                      | 4,97  |                      | 8,19  |                      | 7,00  |                      | 5,22  |                      | 7,29  |
| Ireland                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 6,51  |                      | 7,73  |                      | 7,48  |                      | 13,23 |                      | 15,83 |                      | 5,29  |                      | 12,60 |                      | 8,06  |
| Italy                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3,16  |                      | 3,05  |                      | 2,86  |                      | 3,66  |                      | 3,49  |                      | 3,07  |                      | 4,48  |                      | 5,60  |
| Latvia                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1,57  |                      | 1,04  |                      | 2,95  |                      | 3,28  |                      | 3,36  |                      | 3,98  |                      | 3,19  |                      | 1,42  |
| Lithuania                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 7,29  |                      | 10,33 |                      | 27,36 |                      | 35,04 |                      | 32,20 |                      | 33,78 |                      | 39,64 |                      | 39,72 |
| Luxembourg                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5,87  |                      | 5,06  |                      | 3,03  |                      | 1,02  |                      | 1,49  |                      | 1,44  |                      | 1,18  |                      | 2,47  |
| Malta                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4,58  |                      | :     | u                    | 6,74  |                      | 4,30  |                      | 7,52  |                      | 6,95  |                      | 8,02  |                      | 15,42 |

| Dataset: <b>E-commerce sales of enterprises by NACE Rev. 2 activity [isoc_ec_eseln2]</b>       |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
|------------------------------------------------------------------------------------------------|------|----------------------|------|----------------------|-------|----------------------|------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|----------------------|
| Time frequency: Annual                                                                         |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
| Size classes in number of persons employed: 10 persons employed or more                        |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
| Statistical classification of economic activities in the European Community (NACE Rev. 2):     |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
| Construction                                                                                   |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
| Information society indicator: Enterprises with web sales (via websites, apps or marketplaces) |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
| Unit of measure: Percentage of enterprises                                                     |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
| COUNTRY /<br>AGGREGATE                                                                         | 2018 | 2018<br>Obs.<br>flag | 2019 | 2019<br>Obs.<br>flag | 2020  | 2020<br>Obs.<br>flag | 2021 | 2021<br>Obs.<br>flag | 2022  | 2022<br>Obs.<br>flag | 2023  | 2023<br>Obs.<br>flag | 2024  | 2024<br>Obs.<br>flag | 2025<br>Obs.<br>flag |
| Netherlands                                                                                    | 7,42 |                      | 8,25 |                      | 8,75  |                      | 5,10 |                      | 7,01  |                      | 8,41  |                      | 8,92  |                      | 6,74                 |
| Poland                                                                                         | :    | C                    | 3,21 |                      | 3,36  |                      | 2,75 |                      | 1,62  |                      | 2,48  |                      | 2,19  |                      | 3,67                 |
| Portugal                                                                                       | 4,35 |                      | 1,72 |                      | 12,50 |                      | 2,23 |                      | 3,26  |                      | 0,08  |                      | 4,18  |                      | 4,00                 |
| Romania                                                                                        | 1,89 |                      | 0,67 |                      | 12,89 |                      | 4,47 |                      | 2,94  |                      | 0,80  |                      | 2,39  |                      | 3,08                 |
| Slovakia                                                                                       | 3,25 |                      | 3,06 |                      | 7,81  |                      | 1,02 |                      | 1,03  |                      | 7,98  |                      | 4,07  |                      | 4,22                 |
| Slovenia                                                                                       | 2,32 |                      | 2,54 |                      | 0,41  |                      | 3,48 |                      | 3,43  |                      | 2,10  |                      | 2,77  |                      | 3,23                 |
| Spain                                                                                          | 2,31 |                      | 2,25 |                      | 7,48  |                      | 6,73 |                      | 13,17 |                      | 13,97 |                      | 11,71 |                      | 6,43                 |
| Sweden                                                                                         | 8,89 |                      | 5,40 |                      | 6,98  |                      | 6,66 |                      | 7,65  |                      | 8,38  | b                    | 7,81  |                      | 10,09                |
| Observation flags:                                                                             |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
| : = not available                                                                              |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
| b = break in time series                                                                       |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
| u = low reliability                                                                            |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |
| C = confidential                                                                               |      |                      |      |                      |       |                      |      |                      |       |                      |       |                      |       |                      |                      |

Source: Eurostat, E-commerce sales of enterprises by NACE Rev. 2 activity [isoc\_ec\_eseln2]

#### Appendix 6. Construction gross value added as a share of GDP in EU Member States and the EU-27 aggregate, 2018–2025

| Dataset: <b>Gross value added and income by main industry (NACE Rev.2) - annual data [nama_10_a10]</b> |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |                      |
|--------------------------------------------------------------------------------------------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|----------------------|
| Time frequency: Annual                                                                                 |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |                      |
| Unit of measure: Percentage of gross domestic product (GDP)                                            |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |                      |
| Statistical classification of economic activities in the European Community (NACE Rev. 2):             |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |                      |
| Construction                                                                                           |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |                      |
| National accounts indicator (ESA 2010): Value added, gross                                             |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |      |                      |                      |
| COUNTRY /<br>AGGREGATE                                                                                 | 2018 | 2018<br>Obs.<br>flag | 2019 | 2019<br>Obs.<br>flag | 2020 | 2020<br>Obs.<br>flag | 2021 | 2021<br>Obs.<br>flag | 2022 | 2022<br>Obs.<br>flag | 2023 | 2023<br>Obs.<br>flag | 2024 | 2024<br>Obs.<br>flag | 2025<br>Obs.<br>flag |
| EU-27                                                                                                  | 4,6  |                      | 4,7  |                      | 4,8  |                      | 4,8  |                      | 4,8  |                      | 5,0  |                      | 4,9  |                      | 5,0                  |
| Austria                                                                                                | 5,8  |                      | 5,8  |                      | 6,3  |                      | 6,0  |                      | 5,9  |                      | 5,9  |                      | 5,8  |                      | 5,6                  |
| Belgium                                                                                                | 4,6  |                      | 4,6  |                      | 4,7  |                      | 4,8  |                      | 4,9  |                      | 4,9  |                      | 4,9  | p                    | 5,0 p                |
| Bulgaria                                                                                               | 3,6  |                      | 3,7  |                      | 4,2  |                      | 3,5  |                      | 3,4  |                      | 3,9  |                      | 4,2  |                      | 4,5 p                |
| Croatia                                                                                                | 4,1  |                      | 4,5  |                      | 5,0  |                      | 5,0  |                      | 5,0  |                      | 6,1  |                      | 6,3  | p                    | 6,6 p                |
| Cyprus                                                                                                 | 5,0  |                      | 5,6  |                      | 5,5  |                      | 4,9  |                      | 4,4  |                      | 4,9  |                      | 5,0  | p                    | 5,1 p                |
| Czechia                                                                                                | 4,9  |                      | 4,9  |                      | 5,0  |                      | 4,9  |                      | 5,0  |                      | 5,1  |                      | 5,2  |                      | 5,4                  |
| Denmark                                                                                                | 4,9  |                      | 4,8  |                      | 4,7  |                      | 4,7  |                      | 4,4  |                      | 4,6  |                      | 4,4  |                      | 4,4                  |
| Estonia                                                                                                | 5,9  |                      | 5,9  |                      | 6,0  |                      | 5,8  |                      | 5,7  |                      | 5,7  |                      | 5,5  |                      | 5,3                  |
| Finland                                                                                                | 6,3  |                      | 6,3  |                      | 6,5  |                      | 6,0  |                      | 5,7  |                      | 5,5  |                      | 5,0  |                      | 4,9                  |
| France                                                                                                 | 4,9  |                      | 5,1  |                      | 5,0  |                      | 5,0  |                      | 4,9  |                      | 5,0  |                      | 5,0  | p                    | 5,0 p                |
| Germany                                                                                                | 4,0  |                      | 4,1  |                      | 4,5  |                      | 4,4  |                      | 4,4  | p                    | 4,4  | p                    | 4,5  | p                    | 4,5 p                |
| Greece                                                                                                 | 1,3  |                      | 1,3  |                      | 1,4  |                      | 1,6  |                      | 1,9  |                      | 2,0  | p                    | 1,9  | p                    | 2,1 p                |
| Hungary                                                                                                | 4,3  |                      | 4,9  |                      | 4,8  |                      | 5,2  |                      | 5,4  |                      | 5,3  |                      | 5,1  |                      | 5,2 p                |
| Ireland                                                                                                | 2,6  |                      | 2,6  |                      | 2,2  |                      | 2,3  |                      | 2,4  |                      | 2,7  |                      | 2,6  |                      | 2,6                  |
| Italy                                                                                                  | 3,7  |                      | 3,8  |                      | 3,9  |                      | 4,6  |                      | 5,1  |                      | 5,4  |                      | 5,0  |                      | 5,1                  |
| Latvia                                                                                                 | 5,7  |                      | 5,9  |                      | 5,8  |                      | 4,8  |                      | 5,0  |                      | 5,4  |                      | 5,2  |                      | 5,5                  |
| Lithuania                                                                                              | 6,3  |                      | 6,6  |                      | 6,5  |                      | 6,3  |                      | 6,2  |                      | 6,7  |                      | 6,8  |                      | 6,7                  |
| Luxembourg                                                                                             | 4,8  |                      | 5,3  |                      | 5,2  |                      | 4,8  |                      | 4,1  |                      | 4,1  |                      | 4,5  |                      | 4,3 p                |
| Malta                                                                                                  | 3,5  |                      | 4,2  |                      | 4,2  |                      | 3,9  |                      | 3,6  |                      | 3,6  |                      | 3,5  |                      | 3,4                  |
| Netherlands                                                                                            | 4,1  |                      | 4,4  |                      | 4,7  |                      | 4,6  |                      | 4,4  |                      | 4,6  |                      | 4,6  |                      | 4,7                  |

Dataset: **Gross value added and income by main industry (NACE Rev.2 ) - annual data**  
**[nama\_10\_a10]**

Time frequency: Annual

Unit of measure: Percentage of gross domestic product (GDP)

Statistical classification of economic activities in the European Community (NACE Rev. 2):

Construction

National accounts indicator (ESA 2010): Value added, gross

| COUNTRY /<br>AGGREGATE | 2018 | 2018 | 2019 | 2019 | 2020 | 2020 | 2021 | 2021 | 2022 | 2022 | 2023 | 2023 | 2024 | 2024 | 2025 | 2025 |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                        | Obs. | flag | Obs. | flag | Obs. | flag | Obs. | flag | Obs. | flag | Obs. | flag | Obs. | flag | Obs. | flag |
| Poland                 | 7,4  |      | 7,3  |      | 7,1  |      | 6,1  |      | 5,8  |      | 6,2  |      | 6,3  |      | 6,2  |      |
| Portugal               | 3,7  |      | 3,8  |      | 4,2  |      | 4,0  |      | 4,1  |      | 4,3  |      | 4,4  | p    | 4,5  | p    |
| Romania                | 6,0  |      | 6,3  |      | 6,5  |      | 6,4  |      | 6,8  |      | 8,0  |      | 7,9  | p    | 8,6  | p    |
| Slovakia               | 7,4  |      | 6,6  |      | 7,0  |      | 7,8  |      | 7,6  |      | 7,8  |      | 7,8  |      | 7,7  |      |
| Slovenia               | 4,9  |      | 5,1  |      | 5,2  |      | 5,3  |      | 5,9  |      | 6,2  |      | 5,9  |      | 6,2  |      |
| Spain                  | 5,5  |      | 5,9  |      | 5,6  |      | 5,3  |      | 5,3  |      | 5,3  | p    | 5,2  | p    | 5,3  | p    |
| Sweden                 | 5,8  |      | 5,8  |      | 5,9  |      | 5,9  |      | 6,0  |      | 5,8  |      | 5,4  |      | 5,3  |      |

Observation flags:

: = not available

e = estimated

p = provisional