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**REPORT** OCTOBER 2023

# INDUSTRIAL TRANSFORMATION FOR ALL EUROPEANS

NAVIGATING THE POLITICAL ECONOMY IN  
CENTRAL AND EASTERN EUROPE

**ALEKSANDRA WALISZEWSKA, MIHNEA CĂTUȚI, DOMIEN  
VANGENECHTEN**





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## About E3G

E3G is an independent climate change think tank with a global outlook. We work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Our goal is to translate climate politics, economics and policies into action.

E3G builds broad-based coalitions to deliver a safe climate, working closely with like-minded partners in government, politics, civil society, science, the media, public interest foundations and elsewhere to leverage change.

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### Cover image

Abandoned steel factory in Hunedoara, Romania. Photo by Ammit on Adobe.



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## SUMMARY

A rapid acceleration of both climate action and industrial policy is underway in the European Union (EU). If done right, it can mitigate intra-EU disparities, and usher in a new era of green growth, creating sustainable, well-paid jobs in all corners of the continent. However, the emerging EU industrial policy approach is failing to respond to the particularities of industrial transformation in Central and Eastern European member states (CEE).<sup>1</sup> Unless these issues are addressed at both national and EU-level, the risk of a two-speed transition in Europe will increase and economic convergence efforts will be undermined.

Catching up economically while greening its large industrial base offers both opportunities and challenges to the region. CEE countries currently have “factory economies” based on cheap labour and technological transfers. They can replace this, and ensure long-term economic growth, by pursuing an accelerated industrial transformation focused on innovation and reskilling the current workforce. Countries can navigate the challenges by employing strategic planning based on their comparative advantages to develop and implement new technologies for the transition.

At the EU-level, the timeline for decarbonising emissions-intensive industrial sectors – such as steel, cement and chemicals – has recently accelerated. The revision of the EU Emissions Trading System (ETS) will lead to increased exposure of EU industrial emitters to the carbon price. This sends a clear signal to industry, which in CEE accounts for some of the highest shares of employment and value added in the EU. Transformative private and public investments need to be implemented rapidly, otherwise these industries risk facing a disorderly decline.

At the same time, the EU has responded to geopolitical pressures from the global green subsidy race<sup>2</sup> with its own Green Deal Industrial Plan (GDIP). CEE countries, already home to some flourishing clean technology manufacturing industries, are well placed to benefit from the cleantech investment boom.<sup>3</sup>

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<sup>1</sup> In this report we define CEE countries as: Visegrad Group countries (V4) – Czech Republic, Slovakia, Poland and Hungary – as well as Bulgaria and Romania. Baltic states and Slovenia have not been considered due to resource constraints.

<sup>2</sup> Euractiv, Feb 1 2023, [EU announces own green industry plan in global subsidy race](#)

<sup>3</sup> IEA, 2023, [Energy Technology Perspectives 2023](#)





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Leading examples are the Polish–Slovak–Czech “heat pump valley”<sup>4</sup>, and the globally competitive Polish and Hungarian lithium-ion battery production capacity.<sup>5</sup> However, with GDP primarily relying on national subsidies through state aid, many CEE countries are at risk of being outspent by larger EU member states. The proposed Strategic Technologies for Europe Platform (STEP) fails to provide an answer to this challenge, while it risks reallocating vital funding away from EU social objectives.

**This report identifies both national- and EU-level barriers that should be addressed to facilitate industrial transformation in CEE and capitalise on the region’s strengths and unique opportunities.** The main challenges relate to the capacity for long-term strategic planning, misuse of available funding, and inequitable outcomes of EU-run programmes, such as the Innovation Fund.

While progress in the region has been slow, there are best-practice examples emerging. Slovakia, for instance, has a long-term vision for transforming heavy industry. It is also mobilising resources available under the Recovery and Resilience and Modernisation Funds for industrial decarbonisation, while enhancing domestic administrative capacity for monitoring spending.

Overall, there are too few concrete projects for industrial decarbonisation developed by companies in the region, including of plants owned by multinationals with ambitious group-level climate commitments. Some notable exceptions include the first projects to decarbonise cement production in Poland and Bulgaria.<sup>6</sup> Innovation capacity is also moving in the right direction in several countries: Poland, Czechia and Hungary have managed to grow their innovation capacity at a higher rate than the EU average,<sup>7</sup> but are still lagging behind in relative spending on research and development as a share of GDP.

In conclusion, while to date there has been little political will in the region to seriously plan for a green industrial transition, CEE countries are now facing an ambitious transformation timeline. The region can significantly benefit from this transformation if it prepares to grab the opportunities it presents and if the existing EU framework is adapted to address the identified barriers. Considering the ambitious timeline, it has only one shot at getting it right.

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<sup>4</sup> Innovation Origins, 7 June 2023, [Eastern Europe emerges as heat pump manufacturing powerhouse](#)

<sup>5</sup> The Recursive, 30 May 2023, [Why CEE countries are in top 5 battery manufacturers worldwide](#)

<sup>6</sup> European Commission, [Innovation Fund projects per country](#) (accessed September 2023)

<sup>7</sup> European Commission, [European innovation scoreboard](#) (accessed September 2023)





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## Recommendations for national institutions

- > **Governance:** Develop comprehensive industrial decarbonisation strategies consistent with pathways for reaching climate neutrality by mid-century, with sectoral targets and investment plans, for rolling out the necessary electricity, hydrogen, and CCS infrastructure. The revised National Energy and Climate Plans (NECPs) should take the industry sector's energy and investment needs into account and include trajectories for industrial transformation. Administrative capacity needs to be urgently strengthened to facilitate design and implementation, while stable regulatory frameworks are needed to provide certainty for businesses.
- > **Funding:** Better operationalise national spending plans for industrial decarbonisation, taking into account potential cleantech manufacturing deployment, and the need to increase domestic innovation and workforce capacity. This should entail more strategic and targeted use of the Modernisation Fund, ETS revenues and structural funds, as well as adopting green criteria in public procurement to create demand for decarbonised industrial products, especially green steel and cement. Revenues from the Modernisation Fund and ETS alone can provide more than €160bn to the region by 2030, part of which should target industrial decarbonisation. Slovakia and Czechia have already developed funding programmes that serve as best-practice examples.
- > **Regional cooperation:** Improve regional cooperation on strategic planning and developing industrial clusters. Cross-CEE cooperation is essential to foster mutual learning and form common CEE objectives to communicate at the EU-level and engage more actively in already established European frameworks for cross-border cooperation and infrastructure development.

## Recommendations for EU institutions

- > **Governance:** Provide targeted assistance for strategic planning and administrative capacity. Expand the reporting obligations under the NECPs to better account for industrial transformation and introduce national granularity in the presentation of modelling results and impact assessments, such as that for the 2040 targets. A good opportunity is the upcoming review and revision of the Governance Regulation.<sup>8</sup>

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<sup>8</sup> European Union, 2018, **Regulation 2018/1999 on the Governance of the Energy Union and Climate Action**

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- > **Funding:** Improve the geographical balance of support instruments for innovation such as the Innovation Fund and IPCEIs, and provide guidance on how the Modernisation Fund can be used to fund industrial decarbonisation investments. Ensure that STEP-coordinated funding is easy to access and distributed fairly, based on fiscal capacity criteria accompanied by robust environmental and social conditionalities. Ensure that the post-2027 Multiannual Financial Framework focuses more on climate funding and cleantech innovation, while incorporating green public procurement standards into instruments such as the Cohesion Fund, the European Regional Development Fund, and the Connecting Europe Facility.
  - > **Regional cooperation:** Establish a dedicated high-level platform to improve regional cooperation on industrial policy, similar to the high-level initiative for Central and Southeastern Europe energy connectivity (CESEC).



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# CHAPTER 1

## THE NEW EU INDUSTRIAL POLICY CONTEXT

A new era of European industrial policy is shaping up. Recent political and legislative developments have consequences for both the future of the current industrial base and the development of new value chains for clean technologies, which play an important role in delivering climate neutrality. Understanding the impact this new context has is essential for devising holistic industrial policies at both EU and national level.

As explored throughout the remainder of this report, an integrated approach is needed both towards and within CEE countries to enable the industrial transformation of the region. If the barriers outlined in Chapter 3 are effectively addressed, green manufacturing can become a motor for the climate transition and future economic development in CEE.

### New EU policy developments are driving an accelerated calendar for industrial decarbonisation and setting up new green industrial value chains

Responsible for a fifth of EU emissions, heavy industry is one of the sectors most lagging behind in decarbonisation.<sup>9</sup> The EU cannot afford delays in abating industrial emissions if it is to meet its objective of achieving climate neutrality by 2050, firmly enshrined in the European Green Deal and the Climate Law.

Through a series of cross-cutting legislative files, the Fit-for-55 package has revised the EU's energy and climate policy toolbox to deliver its 2030 ambitions. The Renewable Energy Directive has updated the overall renewable target and set specific targets for the use of renewable fuels of non-biological origin in industry. The Energy Efficiency Directive and the Industrial Emissions Directive are set to impose new energy efficiency requirements and reporting obligations on industrial emitters.

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<sup>9</sup> EEA, 2023, [Greenhouse gases – data viewer](#)



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However, the most consequential changes for industry are the revision of the EU Emissions Trading System (ETS) and the introduction of a border adjustment mechanism (CBAM), which in conjunction will gradually expose industrial emitters to the pressure of carbon pricing, while also raising funds that will be made available to help industry decarbonise.

### **The revised EU ETS: from preserving the status quo to making industry pay for its GHG emissions**

The sectors covered by the EU ETS have overall reduced their GHG emissions by over 35% since 2005. However, heavy industry emissions have flatlined over the last decade. Deemed at risk of carbon leakage,<sup>10</sup> most heavy industries have been shielded from the carbon price through the receipt of free emissions allowances based on their historical activity and against a series of emissions intensity benchmarks.

With the introduction of the CBAM, a new carbon leakage protection system has been adopted that will make carbon costs for importers of certain products equal to those faced by EU producers. As intended, this opened the political space to gradually eliminate free allowances – a system which was approaching its practical and political limitations<sup>11</sup> – between 2026 and 2034 for covered industries. Additionally, the EU ETS directive includes the renewed ambition to achieve 62% GHG emissions reduction by 2030 and updated, more ambitious benchmarks for remaining free allowances. EU industry will increasingly start to feel pressure from the carbon price, which is currently over €80/tonne,<sup>12</sup> and is expected to keep increasing.

The ETS “endgame” is fast approaching:<sup>13</sup> the emissions cap reaches zero in 2039 in absence of further changes,<sup>14</sup> removing liquidity on the primary market for allowances.<sup>15</sup> Unless transformative investments are quickly implemented, the risk is that the system will now move from one with weak decarbonisation

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<sup>10</sup> Carbon leakage can occur when economic activities are displaced, or investment or consumption patterns change, for reasons of costs related to climate policies. This could directly or indirectly cause GHG emissions to be displaced to other countries with no or laxer emissions constraints in place.

<sup>11</sup> Agora Energiewende, 2020, **A clean industry package for the EU**

<sup>12</sup> Ember, 2023, **Carbon Price Tracker**

<sup>13</sup> Gunther, C., Pahle, M., Osorio, S., & Quemina, S., 2023, **Europe needs to urgently prepare for carbon market ‘endgame’**

<sup>14</sup> Future revisions of the EU ETS could impact this, for example through the possible expansion in sectoral scope; allowing of offsets; linking to the separate ETS for fossil fuel use in buildings, transport and other industry; etc.

<sup>15</sup> CAKE, 2023, **View on EU ETS 2050: Changing the scope of the EU ETS**



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incentives for emissions-intensive industries to an accelerated timeline that risks resulting in chaotic industrial closures if not properly managed. The window of action is tight, being less than one investment cycle away for most industrial producers.

Companies may face difficulties in dealing simultaneously with financing new investments and having to pay the carbon price for an increasingly higher share of their emissions. This will result in greater need for companies to recover those carbon costs. With CBAM better insulating the EU market from high-carbon competition, their ability to pass those costs to consumers will also increase. This will change competition dynamics within Europe, as lower carbon products will become comparatively less costly and more attractive to consumers. Early movers on decarbonisation could set to benefit, including through increased windfall profits.<sup>16</sup>

While these developments will provide much needed increased incentives to decarbonise industry, they risk having the adverse effect of exacerbating internal imbalances in the EU. Many of the current innovation-centred support instruments have disproportionately benefited industry in Western and Northern Europe over the past few years.<sup>17</sup> These new competition dynamics could pose new challenges to CEE countries and companies. Without adequate measures to address current imbalances, there is a real risk that the existing economic and industrial power divergences within the EU will increase.

### **The increasing focus on cleantech value chains in EU green industrial policy**

In parallel to the efforts to decarbonise heavy industry, countries globally are developing industrial policies aimed at securing a portion of the growing market for the clean technologies (cleantech) and critical minerals that are fuelling the green transition. That market is expected to reach \$650 billion per year by 2030.<sup>18</sup>

In early 2023, the EU put forward its Green Deal Industrial Plan (GDIP) in response to recent policy developments in major economies – notably the US

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<sup>16</sup> Windfall profits refers to revenues gained through passing through (opportunity) costs to consumers which are higher than the actual costs incurred. For evidence on windfall profits in the EU ETS, see CE Delft, 2021, **Additional profits of sectors and firms from the EU**

<sup>17</sup> See Chapter 3

<sup>18</sup> IEA, 2023, **Energy Technology Perspectives 2023**



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Inflation Reduction Act<sup>19</sup> – and perceived geoeconomic challenges around the need to secure access to, and participate in, cleantech value chains.

The GDIP is intended to provide a more supportive environment for scaling up the EU’s cleantech manufacturing and critical mineral processing and recycling capacities.<sup>20</sup> It does so mainly through proposed administrative reforms, including simplified permitting, while giving national authorities increased flexibility to provide direct financial support<sup>21</sup> to covered industries. The Net Zero Industry Act,<sup>22</sup> a core part of the GDIP, focuses on ramping up domestic manufacturing of select clean technologies, especially related to EV batteries, energy storage, fuel cells, electrolyzers, solar PV, wind, and CCS technologies.

As industrial policy in the EU remains largely a competence of the member states, the fact that the GDIP’s main financial instrument is more liberal and flexible use of national state aid<sup>23</sup> should be considered problematic. Member states vary significantly in their ability and willingness to provide state aid, which raises concerns about competition within the internal market as smaller or more fiscally constrained countries will be disadvantaged.

This approach and lack of any meaningful EU funding have raised concerns about the “level playing field” of EU industrial policy, possibly exacerbating the risk of a “two-speed transition” in Europe.<sup>24</sup> Companies in “less developed regions” can receive higher subsidies under the revised state aid framework, but this may be insufficient.

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<sup>19</sup> Jackson, S. & Hellmich, M., 2022, **the Inflation Reduction Act and the EU**

<sup>20</sup> A key objective of the Commission since the adoption of the new industrial strategy for Europe in 2020. See European Commission, 2020, **A New Industrial Strategy for Europe**

<sup>21</sup> European Commission, 2023, **State aid: Commission adopts Temporary Crisis and Transition Framework to further support transition towards net-zero economy**

<sup>23</sup> State aid rules have been revised through the **Temporary Crisis and Transition Framework** and the **General Block Exemption Rules**. This allows member states more flexibility until 2026 in providing temporary support for the production of strategic net zero technologies and even to deploy instruments without prior European Commission approval. Under the revised rules, aid can be offered for interventions to lower energy prices, as well as for the decarbonisation of industrial processes through electrification and electrolytic hydrogen.

<sup>23</sup> State aid rules have been revised through the **Temporary Crisis and Transition Framework** and the **General Block Exemption Rules**. This allows member states more flexibility until 2026 in providing temporary support for the production of strategic net zero technologies and even to deploy instruments without prior European Commission approval. Under the revised rules, aid can be offered for interventions to lower energy prices, as well as for the decarbonisation of industrial processes through electrification and electrolytic hydrogen.

<sup>24</sup> CEPS, 24 May 2023, **An industrious initiative, yet the Net-Zero Industry Act won’t end concerns about cleantech cash**

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## CHAPTER 2

# THE IMPORTANCE OF INDUSTRY IN CEE ECONOMIES

Industry has been a centrepiece of CEE economies, especially around the early industrial hubs in Czechia and Poland more than a century and a half ago. The sector expanded rapidly between 1945 and 1990, as a result of centrally planned industrialisation during the communist era. Oftentimes, the development of large industrial plants was driven by ideologies of self-sufficiency rather than economic competitiveness,<sup>25</sup> which led to the eventual collapse of the sector during the period of transition to free markets.<sup>26</sup> Much of the industrial “decarbonisation” in the region, especially in the 1990s, can be attributed to this. However, a strong industrial base remains.

As shown in Figure 1, manufacturing emissions have dropped significantly over the last 25 years. Simultaneously, following the accession to the EU, CEE economies have gradually been catching up with their European peers, transforming towards more service-dominated economic output.

However, while the relative weight of industry in CEE economies has declined significantly since the late 1980s, the industry sector in most CEE countries still provides a considerably higher share of employment and gross value added (GVA) than the EU average, as shown in Figure 2. Heavy industry plays an important role there, alongside other key sectors, such as automotive manufacturing.

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<sup>25</sup> EPG, March 2023, **Decarbonising Romania’s industry**

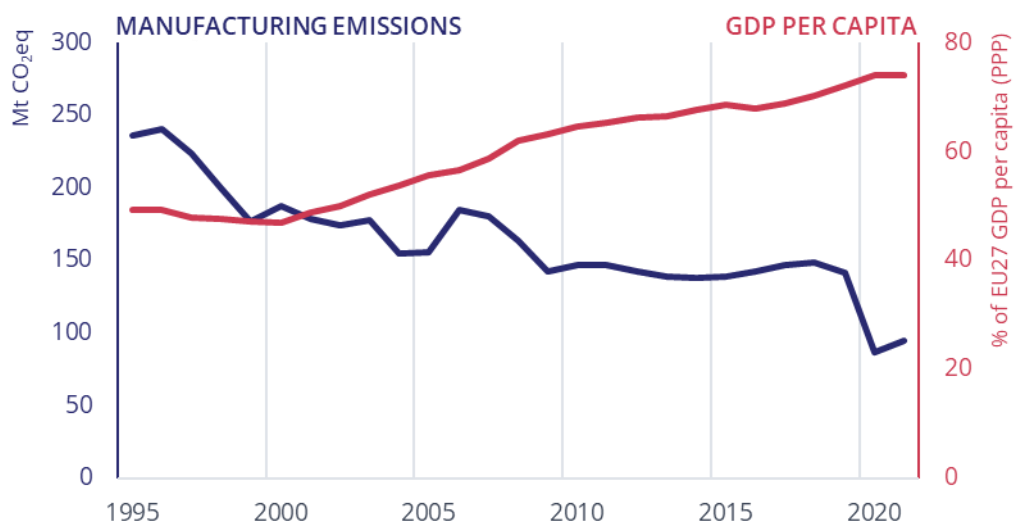
<sup>26</sup> Especially in Romania and Bulgaria: Kirov, V., 2016, **Industry in Bulgaria: state of the play** (PDF)





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### CEE manufacturing emissions and economic convergence over time



Source: Eurostat (Purchasing power parities (PPPs), price level indices and real expenditures for ESA 2010 aggregates; EEA greenhouse gas emissions by source sector)

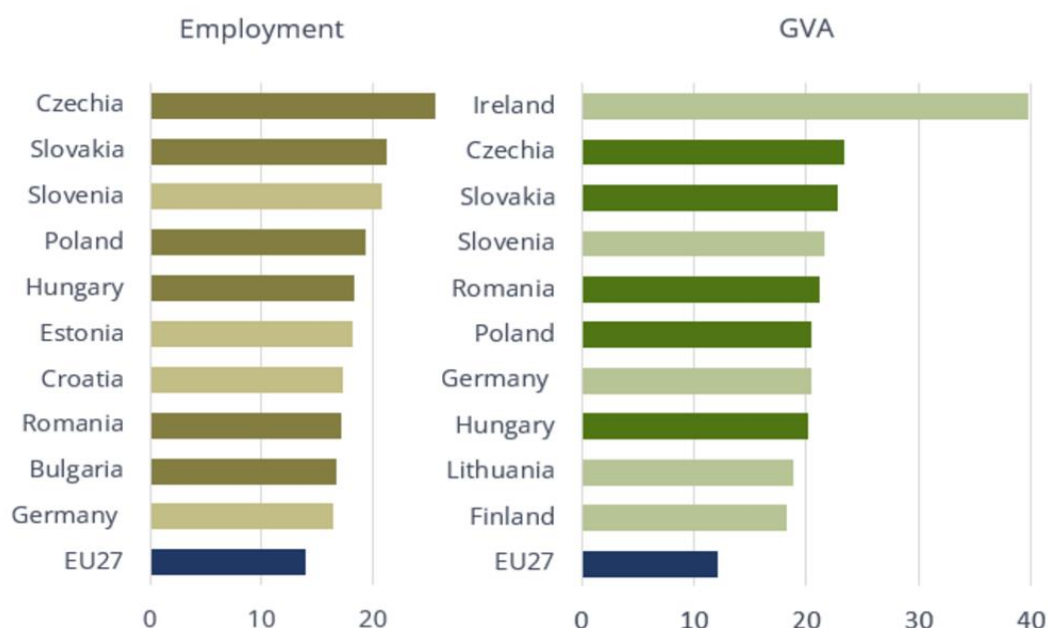


*Figure 1: The CEE region has, so far, been able to achieve economic growth while reducing emissions from manufacturing. However, it has not yet caught up with the rest of the EU. Note: this graph is limited to CEE countries of the Visegrad Group (Poland, Czechia, Slovakia and Hungary), Bulgaria and Romania. GDP data is calculated using the expenditure approach.*



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### EU member states with highest industry employment and GVA shares (% of total) - 2022



Source: Eurostat, Employment and gross value added by A\*10 industry breakdowns, 2022



Figure 2: The CEE region is characterised by some of the highest industrial employment shares and industrial gross value-added shares in total GVA in the EU. Graphs show the top ten countries on each measure; CEE countries covered in this report are shown in darker coloured bars.

## Energy-intensive industries such as steel, cement and chemicals are responsible for the bulk of industrial emissions

CEE still has significant production capacity in steel, cement, chemicals, and petrochemicals, representing the bulk of industry emissions.<sup>27</sup> Figure 3 shows that sources of industrial emissions are dispersed around the region, though there is some geographical concentration in regions such as Moravia and Silesia. Figure 4 provides an overview of emissions from the cement, chemicals, and iron and steel sectors in each country.

<sup>27</sup> There is also significant manufacturing capacity for aluminium, ceramics, glass, pulp and paper, which are not covered in this report.



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## Geographical distribution of key industrial GHG emissions in CEE countries - 2021

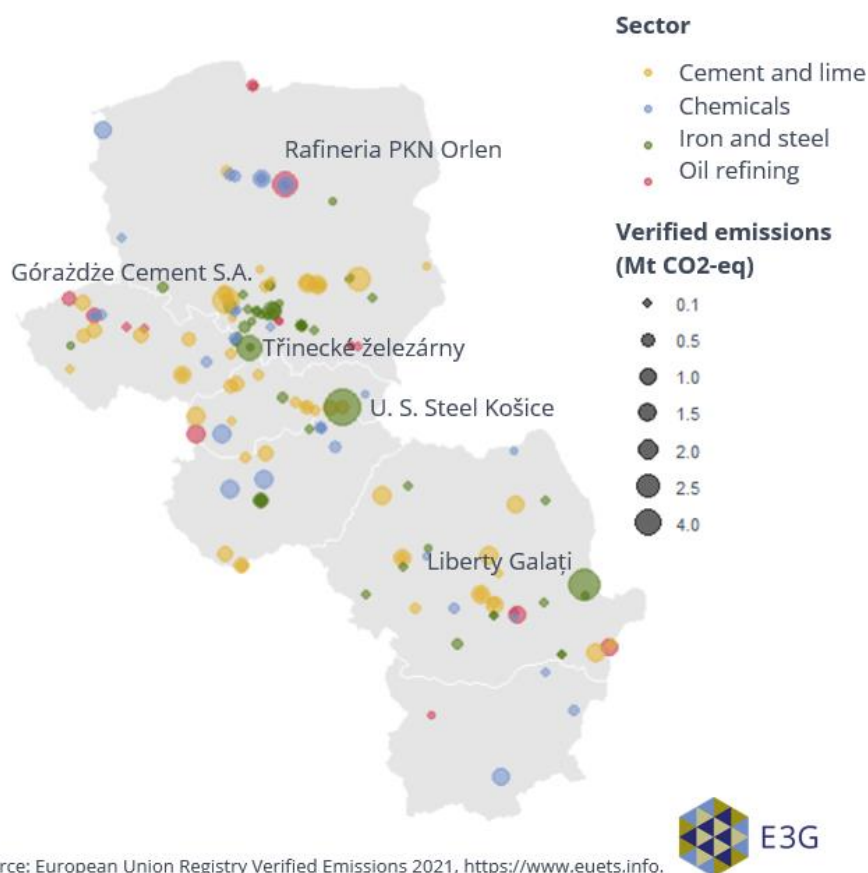


Figure 3: Large emitters in key manufacturing sectors can be found in all CEE countries. Note: emissions of some large installations have not been verified for 2021 or no allocation has been made – these do not show up in the figure. Only installations listed under activity codes explicitly linked to the 4 highlighted sectors were included (with the exception of U. S. Steel Košice, which is reported under “fuel combustion” but is a key emitter in the steel sector).

### Iron and steel

There are significant primary and secondary steel production capacities in the region. 7 steel plants operate BF-BOF<sup>28</sup> facilities, while 18 operate EAFs.<sup>29</sup> The largest plants in Slovakia and Romania emit more than 4.2 MtCO<sub>2</sub>/year.

<sup>28</sup> The Blast Furnace-Basic Oxygen Furnace (BF-BOF) route is one of the basic routes of steel production. Blast furnaces produce iron from iron ore. In a second step a basic oxygen converter turns iron, with some additions of scrap, into steel.

<sup>29</sup> The EAF process uses electricity to melt scrap steel and other sources of metallic iron such as direct-reduced iron or hot metal, and additives are used to adjust the steel composition to the desired specifications.



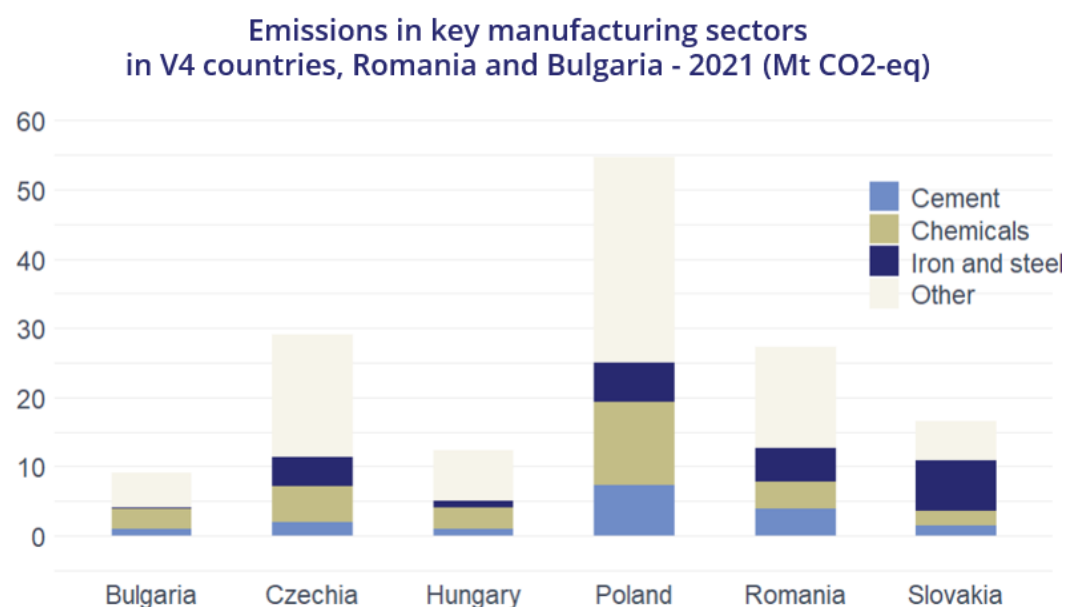
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### Cement

There are 29 rotary kilns for clinker production in the region. In line with domestic demand figures, the majority of emissions stem from the nine kilns in Poland and seven in Romania, which typically emit more than 0.8 MtCO<sub>2</sub>/year. The cement plants in the rest of the region have annual emissions of around 0.5 MtCO<sub>2</sub>/year.

### Chemicals and petrochemicals

The chemicals and petrochemicals sectors are responsible for the highest share of industrial emissions in the region. Being a more heterogeneous sector with many different products, the sector also accounts for the highest number of individual point sources. Several of the region's refineries emit more than 1 MtCO<sub>2</sub>/year.



Source: Eurostat, Greenhouse gas emissions by source sector (EEA), 2021



*Figure 4: GHG emissions from the basic materials sector constitute a large proportion of overall manufacturing emissions. Note: the graph shows the cumulative process and fuel combustion emissions except for the cement industry values, which represent only process emissions due to limited data availability. The petrochemical industry's emissions are included within the chemical industry emissions.*



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## Cleantech value chain opportunities in CEE

A particular challenge for the region going forward is slashing emissions while moving away from a “factory economy” paradigm (focussing only on provision of lower-wage labour) towards building robust, high-value-added production networks. This will require both rigorous planning and implementation capacity.

The business environment in industrial manufacturing sectors across CEE is largely dominated by export-oriented, highly productive subsidiaries of multinationals that are usually driven by foreign direct investments (FDI) – for instance in the automobile sector.<sup>30</sup> This profile stems from extremely liberal trade and FDI policies following the fall of communism.<sup>31</sup> However, the past economic model where the comparative advantage of the region was based on low production costs (and thus low wages) cannot be a foundation for long-term development, especially as wages and standards of living have been constantly increasing over the past three decades.

The region could overcome this by applying more strategic and future-oriented thinking about its comparative advantages, to ensure a futureproof approach to maintaining economic growth. The cleantech investment boom presents a key opportunity to do so.

CEE countries are already home to some flourishing clean technology manufacturing industries, who benefit from clear regulatory frameworks that give investors certainty and contribute to local demand creation. Growing domestic demand can also stimulate the movement away from a purely FDI-oriented growth model. A spike in domestic demand, which can be partly attributed to the development of dedicated national strategies on offshore wind and heating, is what prompted wind turbine (Vestas<sup>32</sup>) and heat pump (Bosch<sup>33</sup>) manufacturing capacity in Poland to dramatically ramp up. Other examples point to the role of national cleantech deployment support schemes in creating local demand for manufacturing – such as solar PV module manufacturing in Poland.<sup>34</sup>

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<sup>30</sup> Friedrich Ebert Stiftung, 2021, **A new growth model in EU-CEE**

<sup>31</sup> <https://library.fes.de/pdf-files/id-moe/17843.pdf>Friedrich Ebert Stiftung, 2021, **A new growth model in EU-CEE**

<sup>32</sup> Notes from Poland, 19 October 2022, **Danish firm to build wind turbine plant on Poland’s Baltic coast**

<sup>33</sup> Polskie Radio, 20 April 2023, **New Bosch heat pump plant will aid Poland’s energy transition: PM**

<sup>34</sup> Solar Power Europe, 2022, **EU market outlook for solar power 2022–2026**; PV Magazine, 8 February 2023, **Unimot to triple PV manufacturing capacity in Poland**



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## Green industry champion sectors in CEE

### Batteries

As the transition from internal combustion engines to electric vehicles is changing the cost structure of a car, component and software production becomes more valuable.<sup>35</sup> Existing large-scale automobile production<sup>36</sup> in the CEE region provides the necessary demand-pull for domestic lithium-ion battery and battery component manufacturing.<sup>37</sup> Hungary and Poland are currently among the top five manufacturers in this sector globally and are projected to maintain their high positions in the ranking.<sup>38</sup>

### Heat pumps

Central and Eastern Europe is also home to a rapidly growing “heat pump valley” at the intersection of Poland, Slovakia and Czechia,<sup>39</sup> attracting a large share of investment in the market.<sup>40</sup> Poland registered the highest year-on-year growth in heat pump sales (102%) among all EU countries in 2022, the highest country-level increase in Europe since 2020.<sup>41</sup>

### Critical raw materials

The European Commission has defined strategic raw materials (SRMs) as those that are key for the energy transition, planning to ramp up EU production capacity. The more general category of critical raw materials is still relevant but will not enjoy the same benefits, such as streamlined permitting and easier access to finance.

Currently, extraction of SRMs in the CEE region is not significant. The exception is Hungarian gallium, used in semiconductors, which accounts for around 5% of EU supply of the mineral.<sup>42</sup>

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<sup>35</sup> Friedrich Ebert Stiftung, 2023, **The transition to electric vehicles in CEE**

<sup>36</sup> Friedrich Ebert Stiftung, 2023, **The transition to electric vehicles in CEE**

<sup>37</sup> Friedrich Ebert Stiftung, 2021, **A new growth model in EU-CEE**

<sup>38</sup> The Recursive, 30 May 2023, **Why CEE countries are in top 5 battery manufacturers worldwide**

<sup>39</sup> Innovation Origins, 7 June 2023, **Eastern Europe emerges as heat pump manufacturing powerhouse**

<sup>40</sup> Euractiv, 1 June 2023, **Europe’s ‘heat pump valley’ takes root in the East**

<sup>41</sup> EHPA, 8 February, 2023, **PORT PC: 2022 was the year of heat pumps in Poland**

<sup>42</sup> European Commission, 2018, **Report on critical raw materials and the circular economy**



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However, there are sizeable deposits<sup>43</sup> of relevant minerals in the Carpathian–Balkan belt,<sup>44</sup> which largely overlap with the CEE region’s political borders. Looking into the potential for exploring Polish cobalt, Slovakian magnesium or other mineral occurrences could be a crucial step in developing a competitive edge in the emerging cleantech value chains,<sup>45</sup> while making sure mining regions benefit from it.<sup>46</sup> Czechia alone is estimated to have 3% of the world’s lithium resources,<sup>47</sup> amounting to the largest deposits in Europe, with production expected to kickstart after 2026.<sup>48</sup>

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<sup>43</sup> Mineral occurrences with confirmed economic viability.

<sup>44</sup> Lewicka, E., Guzik, K. & Galos, K., 2021, **On the possibilities of critical raw materials production from the EU’s primary sources**, *Resources*, vol. 10, p. 50

<sup>45</sup> Fraunhofer ISI, 21 December 2022, **Battery cell production in Europe: In which countries will European manufacturers dominate – and where do international companies want to gain a foothold?**

<sup>46</sup> E3G, May 2023, **Making clean technology value chains work for EU economic convergence**

<sup>47</sup> Euractiv, 17 May 2023, **Czech lithium could contribute to European energy security, says PM**

<sup>48</sup> Euractiv, 21 September 2023, **Czech government pushes for lithium mining despite regional scepticism**

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## CHAPTER 3

# CURRENT CHALLENGES AND BARRIERS

The CEE region will need to overcome a range of existing and potential barriers to tap into the opportunities for industrial transformation. The challenges relate to national political priorities, strategic vision, access to finance, skills, and the EU policy environment (summarised in Table 1).

*Table 1: Summary of the barriers to green industrial transformation in CEE*

Area	Category	Barrier
<b>National conditions</b>	Industrial transformation plans	Missing, delayed or incomplete industrial strategies  Inadequate integration of industry into existing national energy and climate plans
	Clean infrastructure plans	Insufficient planned infrastructure for electricity, hydrogen, and CCS
	Public funding	Inadequate allocation of available public resources for industrial decarbonisation  Public support for industry decarbonisation dependent on limited EU funding due to fiscal space constraints  Underutilisation of green public procurement
	Technology & innovation	Below average domestic innovation capacity and high reliance on technological transfers  Underutilisation of European innovation instruments
	Skills base	Highly educated workforce but gaps in training and reskilling for green jobs



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Area	Category	Barrier
<b>Political system and influence</b>	Governance	Low institutional and administrative capacity
	Government	Low political salience of industrial decarbonisation as a policy priority
	Business	Foreign-owned companies focus on labour-intensive production in CEE while focusing innovation activities abroad
		Low number of site-specific projects in CEE, despite some companies having decarbonisation plans
Civil society	Weak capacity and only emerging focus on industry	
<b>EU dimension</b>	Industrial policy	Ambitious calendar for industrial decarbonisation not matched by sufficient funding support for the region
		Insufficient EU-level coordination on industrial policy
	Competition policy	Over-reliance of new industrial policy on state aid risks exacerbating existing intra-EU industrial power imbalances instead of incentivising EU-wide clean technology value chain development

## No CEE country has a dedicated industrial transformation strategy

Transforming industry relies on:

- > access to affordable clean energy and related infrastructure
- > deployment of (new) clean technologies
- > establishment of lead markets favouring low-carbon products
- > regulatory and financial incentives to shift production
- > a robust governance framework to coordinate this unprecedented rapid industrial transformation.



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Clear, high-level national plans are needed to set out how this will be achieved, providing new business cases and giving investors certainty.

Despite the role that industry plays in national economies, none of the countries analysed have a dedicated strategy or plan for industrial transformation and related cleantech value chains.<sup>49</sup> Existing energy and climate plans do not integrate the future needs of industry, focusing mainly on the power sector. This lack of strategic insight results in piecemeal policies and a fragmented approach,<sup>50</sup> despite incumbent companies' interest in cooperating to develop a cohesive framework. Public institutions remain undersized and are largely unprepared for managing the transition.

### **National Energy and Climate Plans**

Industry is treated mostly superficially in the main decarbonisation strategies that have been prepared as part of the implementation of the Governance Regulation:<sup>51</sup> the National Energy and Climate Plans (NECPs) for 2030 and long-term strategies (LTSS) for 2050. This is particularly visible in the NECPs,<sup>52</sup> which tend to cover industrial decarbonisation scantily. They focus mainly on energy efficiency measures for marginal reductions of energy consumption, falling short of the transformative investments required. This can create significant challenges as current plans may underestimate the renewable energy capacity and infrastructure developments that are needed to further electrify industrial processes.

The Slovak NECP stands out as an outlier, acknowledging the enormity of the challenge of decarbonising emissions-intensive industry, while the Polish NECP puts a price tag for its industrial transition at €30–60 billion. Meanwhile, the Czech plan fails to provide credible estimates of the increase in electricity consumption due to electrification.<sup>53</sup>

The shortcomings of current NECPs when it comes to accounting for the cleaner energy needs for decarbonising industry is also reflected in the latest announced clean power rollout targets.<sup>54</sup> Slovakia, Hungary, and Romania have some of the

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<sup>49</sup> Poland is currently working on developing a draft of such a strategy.

<sup>50</sup> Wise Europa, 2023, **Decarbonisation barriers to energy-demanding industries in Poland**

<sup>51</sup> EU, 2018, **Regulation 2018/1999 on the Governance of the Energy Union and Climate Action**

<sup>52</sup> Available from European Commission, **National energy and climate plans**

<sup>53</sup> ISFC, undated, **Czechia: Decarbonisation of the industrial sector – Sustainable finance as an opportunity?**

<sup>54</sup> Ember, updated May 2023, **EU power sector 2030 targets tracker**

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most ambitious targets among EU member states, while Bulgaria, Czechia and Poland fall notably behind. Grid expansion and reinforcement plans are generally included in outline, but the pace of actual project development trails behind what is needed to meet the necessary decarbonisation timelines.

### **Long-term strategies**

Even more problematic is the lack of clear vision for long-term decarbonisation in the LTSs for 2050. Of the countries analysed, only three have adopted a plan so far (Hungary, Slovakia, and Czechia). The Polish strategy is still in the making, while Romania and Bulgaria have sent drafts for review to the European Commission. As the deadline for submitting the LTSs was 1 January 2020, these delays are telling of the insufficient administrative capacity in these countries and the lack of governmental prioritisation for decarbonisation.

Most of the published strategies have unconvincing chapters on industry and fail to provide clear timelines for investments and infrastructure development. The Romanian draft strategy,<sup>55</sup> for example, only vaguely mentions some available technologies for the steel sector and sets a goal to capture 50% of the GHG emissions from cement manufacturing by 2050. The Slovak strategy<sup>56</sup> once again stands out, explaining the measures through which industrial emissions should be abated in a way that also maintains competitiveness.

## **Infrastructure developments to enable decarbonisation of industrial processes are lacking**

### **Energy infrastructure plans**

Grid constraints and regulatory bottlenecks are restricting the growth in deployment of renewable energy in CEE, which must be resolved to unlock the region's full economic potential.<sup>57</sup> For both existing and new industrial production, there needs to be a strong focus on ensuring access to low-cost and reliable clean energy.<sup>58</sup> This requires the accelerated decarbonisation of the electricity mix through large-scale deployment of renewable energy, grid expansion and reinforcement, and investments in flexibility sources, such as storage and demand response. Current plans do not sufficiently take into account the different requirements of a decarbonised industrial base. Often,

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<sup>55</sup> Government of Romania, **Long Term Strategy of Romania**

<sup>56</sup> Available from European Commission, **National long-term strategies**

<sup>57</sup> Ember, May 2023, **In it together: The road to a cleaner, cheaper CEE power system**

<sup>58</sup> Bruegel, May 2023, **Adjusting to the energy shock: The right policies for European industry**



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there is strong business interest in developing ambitious renewable projects, but government action is lagging.<sup>59</sup>

Regional cooperation on joint clean energy infrastructure also remains low. Due to varying geographical conditions for wind and solar energy generation across the region, collaboration can enable access to cheap green electricity, essential for improving the competitiveness of industrial production in the region.

### **Hydrogen strategies**

Except for Romania<sup>60</sup> and Bulgaria, all CEE countries included in this study have adopted hydrogen strategies. However, the actual sector development plans are lacklustre. Hydrogen use in the transport sector seems to be the top priority across the region, while demand from industry is either underestimated<sup>61</sup> or pushed to after the mid-2030s. Insufficient attention is given to the additional renewable energy required for hydrogen production, or alternative decarbonisation options.

### **Carbon capture and storage strategies**

None of the countries have a dedicated CCS strategy. Infrastructure plans are missing, and barriers to CCS deployment persist.<sup>62</sup> In Poland only storage demonstration projects are allowed, while in Romania public backlash to a potential onshore storage site has bogged down any further initiatives.<sup>63</sup> The Bulgarian draft LTS has a strong focus on CCS, including for the power sector. The Slovak Ministry of Finance<sup>64</sup> provides estimates of the total societal costs for turning CCS into reality, while also showing the industrial emissions abatement potential achievable through CCS.

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<sup>59</sup> E3G, April 2021, **Boosting renewable energy in the Visegrad region**

<sup>60</sup> First draft of the RO strategy has recently been published, see Ministry of Energy of Romania, 2023, **Proiectul Strategiei Naționale a Hidrogenului și Planul de Acțiune pentru implementarea sa 2023 – 2030**

<sup>61</sup> Wise Europa, 2023, **Decarbonisation barriers to energy-demanding industries in Poland**

<sup>62</sup> CCS4CEE, 2021, **Assessment of current state, past experiences and potential for CCS deployment in the CEE region (PDF)**

<sup>63</sup> EPG, March 2023, **Decarbonising Romania's industry**

<sup>64</sup> Ministry of Finance of the Slovak Republic, 2022, **Decarbonization of the Slovak economy by 2030**



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## Financial support for industry transformation is very EU-dependent and remains underleveraged

Given the lack of a coherent vision, it is unsurprising that there are only few large-scale support schemes to incentivise industry decarbonisation. Private capital markets are immature, access to credit is more difficult, and cost of capital is higher than in other parts of Europe.<sup>65</sup> With relatively limited fiscal space for bankrolling generous subsidies, most available funding is channelled through EU mechanisms.

Meanwhile, almost all support leveraged through state aid was aimed at crisis relief to compensate for high energy costs, with no conditionalities for deploying cleaner technologies, enhancing energy efficiency or adopting decarbonisation plans.<sup>66</sup>

This leaves the region largely reliant on EU funding. Countries such as Poland and Romania are among the top receivers in absolute terms of EU funding for climate investments.<sup>67</sup> In relative terms, EU funding dedicated to climate spending as a percentage of total GDP is highest in Bulgaria, Croatia, Romania, Czechia, and Poland.<sup>68</sup> However, spending is insufficiently targeted towards the investments necessary for industrial transformation.

### Recovery and Resilience Facility

These funding shortcomings could have been addressed through the once-in-a-generation opportunity of the Recovery and Resilience Facility (RRF) funds allocated through National Recovery and Resilience Plans (NRRPs).<sup>69</sup> The governance framework, which is focused on investment funding conditional on reforms, is ideal for implementing the transformative changes required. While there are some efficiency and circularity investments in the NRRPs of Poland, Czechia, Romania, and Bulgaria, these are only about marginal improvements and funding is minor. The Polish, Romanian, and Bulgarian plans have important hydrogen components, but, again, the largest beneficiary will likely be the transport sector.

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<sup>65</sup> E3G, February 2023, **Financing the transition in Central and Eastern Europe**

<sup>66</sup> Bruegel, June 2023, **National fiscal policy responses to the energy crisis**

<sup>67</sup> Agora Energiewende, 2023, **EU climate funding tracker – Version 1.0**

<sup>68</sup> Ibid

<sup>69</sup> Hungary's NRRP has been approved, but funding has been frozen because of rule of law concerns. See Reuters, 30 November 2022, **EU approves Hungary's recovery plan, but withholds cash, moves to freeze other funds**<sup>done</sup>



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The notable exception is Slovakia, which has an entire component of its plan dedicated to industrial decarbonisation. To encourage the adoption of the best currently available technologies, two schemes worth over €1.1 billion were approved by the DG Competition (combining RRF with Modernisation Fund spending), mentioning the importance of industry in reducing fossil gas consumption. The goal is to reduce GHG emissions by more than 1.3 MtCO<sub>2</sub>e. To ensure enforcement, the plan also funds the Slovak Environmental Inspectorate, strengthening its monitoring capacity. This is an example to be followed and replicated across the region, as it combines RRF and MF funds and focuses on expanding domestic administrative capacity.

### **Revenues and funds related to the EU Emissions Trading Scheme**

The revenues from auctioning allowances under the ETS largely flow back to national coffers. Each ETS country share of revenues is largely dependent on historical emissions, but CEE countries get additional revenues through the inclusion of a solidarity mechanism.

To date, the use of these revenues has largely failed to provide support for industrial transformation. Until the ETS revision concluded earlier this year, how these revenues were used was a national prerogative, with only a weak provision to use half of the revenues for climate and energy purposes. Analysis shows that there has been a widespread tendency to misallocate funding to actions with limited or questionable GHG emissions impact.<sup>70</sup> From next year onwards, following the revision of the EU ETS directive, **all** revenues will have to be spent on climate and energy objectives, though the criteria of what constitutes such spending remain loosely defined.

### **The Modernisation Fund**

The Modernisation Fund (MF) is a dedicated fund to support EU member states with below-average GDP levels in modernising their energy systems. Most countries have not yet leveraged it for industrial decarbonisation. Some funding programmes for industry have been announced in Czechia, Romania and Slovakia, but no investments have yet materialised. This is partly because the ETS Directive and the implementing acts of the MF do not provide much clarity on how the revenues can be used for industrial decarbonisation. It should be possible to do so as long as emissions reductions or efficiency gains can be demonstrated, but more guidance is needed from the Commission. Some

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<sup>70</sup> WWF, 2022, **Where did all the money go? How EU Member States spent their ETS revenues – and why tighter rules are needed**

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progress has been made more recently, as the Commission has approved a €2.5 billion Czech scheme to support the decarbonisation and energy efficiency of industrial processes.<sup>71</sup>

### **Just Transition Fund**

Romania and Hungary have mobilised Just Transition Fund spending to fund investments in non-coal regions dominated by the steel, chemicals, and petrochemicals sectors. However, this is not the most adequate financing source for investment support as it should be focused on mitigating socio-economic impacts. Support for local SMEs and (re)skilling programmes should instead be the priority. Financing programmes developed through the Territorial Just Transition Plans targeted to such support should be urgently put into action.

### **Public procurement**

Public procurement can amount to up to 15% of GDP in CEE countries,<sup>72</sup> and could therefore act as a key lever for creating demand for decarbonised industrial products. While most countries in the region have some basic legislation on green public procurement, it is either not focused on industrial products such as green steel or cement, or seldomly used. The lowest price remains the dominant selection criterion for public tenders.

## **Administrative capacity, political will, and workforce availability are lacking**

Administrative, institutional, and workforce capacity are crucial for planning and implementing ambitious industrial decarbonisation programmes. Some CEE countries lack the necessary institutional or administrative capacity,<sup>73</sup> which results in a fragmented and ineffective policy space. This is often amplified by the limited political salience of industrial transformation. Political buy-in is paramount, as shown by the example of Slovakia (outlined in the RRF section above), whose generally better planning can be attributed to early adoption of

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<sup>71</sup> European Commission, 6 October 2023, **State aid: Commission approves €2.5 billion Czech scheme to support the decarbonisation and energy efficiency of industrial processes to foster the transition to a net-zero economy**

<sup>72</sup> Though this varies significantly between countries. See World Bank, **Global Public Procurement Database** (Accessed 25 September 2023)

<sup>73</sup> Baun, M. & Marek, D., 2017, **The Limits of Regionalization: The Intergovernmental Struggle over EU Cohesion Policy in the Czech Republic**

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ambitious decarbonisation goals.<sup>74</sup> Yet, most decision makers remain “unfazed by the threat industrial emissions pose”.<sup>75</sup> The topic of decarbonisation more broadly is politically sensitive and thus often avoided,<sup>76</sup> being regarded as a top-down EU-imposed burden. Industrial decarbonisation is mainly interpreted through the lens of the negative consequences potential plant closures could cause, following the elimination of free allocations.

Weak administrative capacity is also a leading cause of the structural problem of insufficiently high absorption of EU funds.<sup>77</sup> Absorption capacity, both administrative and financial, is lacking,<sup>78</sup> which leads to recurrent delays in accessing funding available through the Multiannual Financial Framework (MFF). The implications of this challenge are vast, as until 2027 CEE countries will have to absorb EU funding amounting to between 4% and 8% of GDP.<sup>79</sup>

Civil society capacity focusing on industrial decarbonisation is growing, with numerous organisations making valuable contributions to strategic planning in their respective member states. However, expertise and capacity are still lower than in Northern and Western Europe, while the comparatively weaker<sup>80</sup> civil society in CEE faces significant political pressure.<sup>81</sup>

The lack of human capital and rigid education systems across the region also make the labour force unprepared for the “twin transformation” – digitalisation and decarbonisation – of manufacturing. Insufficient investment is channelled into reskilling programmes and vocational schools, with curricula inadequate for supporting the deployment of new technologies.<sup>82</sup> This makes it difficult for the region to move on from its traditional low-wage paradigm.

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<sup>74</sup> Rástocká, L. & Letovanec, M., 2023, **Industrial Decarbonisation in Slovakia: Sustainable Finance as an Opportunity?**

<sup>75</sup> Kobyłka, K. et al., **Industrial Decarbonisation in Poland : Sustainable Finance as an Opportunity ?**

<sup>76</sup> E3G, February 2023, **Financing the transition in Central and Eastern Europe**

<sup>77</sup> E3G, 2023, **How to make the best of the Green Deal Industrial Plan**

<sup>78</sup> Katsarova, I., 2023, **Library of the European Parliament Briefing: The (low) absorption of EU Structural Funds**

<sup>79</sup> Alcidi, C., Gros, D. & Corti, F., 2020, **Who will really benefit from the next generation EU funds?**

<sup>80</sup> Kutter, A. & Trappmann, V., 2010, **Civil society in Central and Eastern Europe: The ambivalent legacy of accession**

<sup>81</sup> Narsee, A. et al., 2023, **Civic space report 2023. Fighting for democratic empowerment and resilience**

<sup>82</sup> ETUI, 2017, **Condemned to be left behind? Can Central and Eastern Europe emerge from its low-wage model?**



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## Company plans are not sufficiently backed by concrete projects

Multinationals generally have more ambitious company-level emissions reduction targets than domestic companies active in the region. Nonetheless, there are only few concrete investment projects currently being developed to implement the decarbonisation plans, mainly in the cement industry. Some multinational companies may even prioritise investments elsewhere in Europe, either because of the better financial support they can attract or based on how they prioritise their asset base.

### Iron and steel

The majority of primary steel production is owned by multinational companies such as Arcelor Mittal (Poland), Liberty (Czechia and Romania) and US Steel (Slovakia). All of them have ambitious group-level emissions reduction commitments, but there are no green steel projects currently under development in the region. This stands in stark contrast with over 30 projects being developed in Northern and Western Europe.<sup>83</sup> Liberty is the most ambitious steel company in CEE, aiming to decarbonise its production by 2030, but actual investments in replacing blast furnaces with direct iron reduction facilities are yet to start. Meanwhile, the few exceptions of domestically or regionally owned steel plants lack clear decarbonisation commitments.

### Cement

The multinational ownership of production facilities is perhaps most prominent in the cement sector. Heidelberg, CRH, Holcim (including former Lafarge), Dyckerhoff, and Cemex own the vast majority of the 29 rotary kilns for clinker production. Most companies active in the region have made group-level net zero pledges with ambitious emissions cuts also planned for 2030. With the exception of two Innovation Fund-financed projects in Poland and Bulgaria,<sup>84</sup> most facilities lack any clear decarbonisation plans.

### Chemicals and petrochemicals

Given the plethora of products, the chemical and petrochemical sectors show a larger fragmentation of ownership and emissions are dispersed across a higher number of facilities. Unlike steel and cement, regional companies dominate the

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<sup>83</sup> Leadit, **Green Steel Tracker**. (Accessed 25 September 2023)

<sup>84</sup> European Commission, **European Climate, Infrastructure and Environment Executive Agency**, (Accessed 25 September 2023)



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manufacturing of basic chemicals, fertilisers, and refined petroleum products in CEE.

Polish-owned PKN Orlen operates assets in both Poland and Czechia, Hungarian-owned Mol in Hungary and Slovakia, and Austrian-owned OMW in Romania. Importantly, Russian-owned Lukoil has refineries in Romania and Bulgaria. There is also Chinese presence in chemical companies in Czechia and Hungary. Except for domestic production in Romania and to some extent in Poland and Hungary, the region can be considered oil and gas poor, so most hydrocarbons have to be imported, mainly through pipelines from the Russian Federation. This exposure has made the region particularly vulnerable to Russian pressures, the war in Ukraine making decarbonisation of the sector even more urgent. While PKN Orlen, Mol, and OMW have made commitments to decarbonise by 2050, no large-scale projects are currently underway.<sup>85</sup> Domestically owned fertiliser production is particularly lacking any concrete plans.

## While innovation capacity has long been underfunded, R&D spending as share of GDP is catching up with EU27 in several CEE countries

Domestic R&D in CEE slowly deteriorated during the post-1990 transition to market economies, due to brain drain, low expenditure, poor connections between business and scientific research, and generally low innovation capacity.<sup>86</sup> CEE allocates less to innovation than its European peers from the funds it has available. For example, 12.8% of Cohesion Fund spending in Bulgaria goes to innovation compared to 69.2% in Denmark.<sup>87</sup> Current innovation spending focuses mainly on hardware transfers and upgrades of existing facilities rather than developing domestic innovation capacity.<sup>88</sup> Local research efforts are often reliant on foreign inputs, with limited spillover effects to local firms. This results in particularly low scores in innovation capacity indicators in CEE.<sup>89</sup>

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<sup>85</sup> Some smaller scale projects are being implemented by PKN Orlen and Mol.

<sup>86</sup> Galgóczi, B. & Drahekoupil, J., 2017, **Condemned to be left behind? Can Central and Eastern Europe emerge from its low-wage model?**

<sup>87</sup> Ibid.

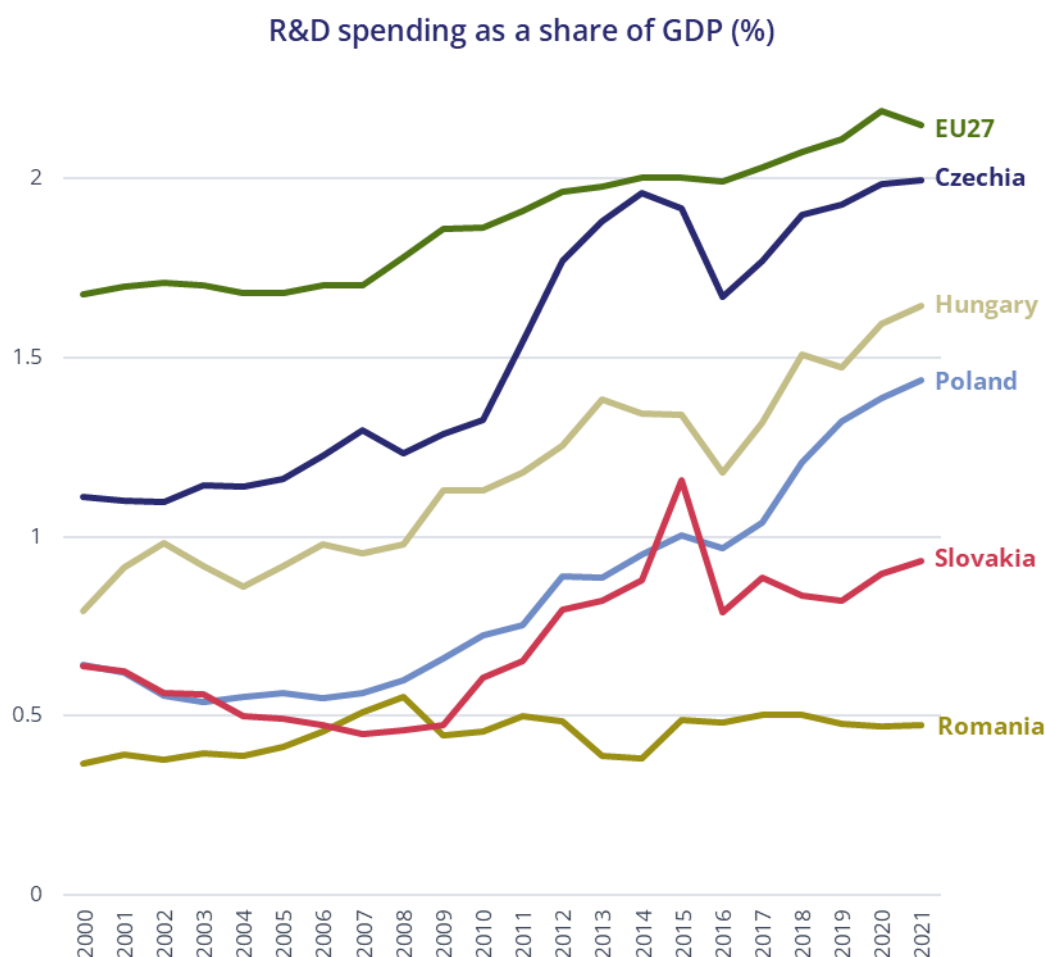
<sup>88</sup> Kordalska, A. & Olczyk, M., 2022, **Upgrading low value-added activities in global value chains: a functional specialisation approach**

<sup>89</sup> European Commission, **European innovation scoreboard** (Accessed 25 September 2023)



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Nonetheless, there are some signs that this trend is reversing, as R&D spending as a share of GDP is growing. Czechia, Hungary, and Poland in particular are increasing their performance at a higher rate than the EU itself (Figure 5).<sup>90</sup> Maintaining this growth is essential, especially for ensuring that more well-paid high-skill jobs are created in the region.



Source: OECD, Gross domestic spending on R&D, <https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm>



Figure 5: R&D spending as a share of GDP in select CEE countries has been generally increasing over the past two decades but still trails behind the EU average.

Note: Bulgaria was not included in this figure because the OECD database does not record the same type of data on the country.

<sup>90</sup> European Commission, **European innovation scoreboard** (Accessed 25 September 2023)



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### Inability to access EU financing for innovation

CEE countries lack capacity to secure dedicated EU funding for innovation. Out of 184 demonstrators of technologies for climate neutrality in energy-intensive industries financed through Horizon Europe, Horizon 2020, the Innovation Fund and by member states through IPCEIs<sup>91</sup>, only 11 are being implemented in the countries covered in this report.<sup>92</sup> As shown in Table 2, these projects cover only a limited range of industries and technological solutions.

Table 2: Demonstrator projects for climate neutrality in energy-intensive industries in CEE<sup>93</sup> (state: July 2023).

Country	Funding instrument	Project	Funding (€m)
<b>Bulgaria</b>	Innovation Fund	ANRAV-CCUS (CCUS demonstration at a cement plant)	190
	Horizon Europe	FLEXIndustries (demonstrate an energy efficiency technology in a steel plant)	12
<b>Czechia</b>	Horizon 2020	CO2OLHEAT (demonstrate a technology to produce power from waste heat in a cement plant)	18.8
	Horizon Europe	DECAGONE (demonstrate a waste heat to power technology in the steel sector)	18
	ERDF	Reduction of energy performance (technological process) of steel heat treatment in forge production	0.79
	Horizon Europe	SPIRIT (demonstrating energy recovery from waste heat)	1.35
	Innovation Fund	Volta (aims to combine cold-top electric melting and oxy-gas combustion in an integrated glass furnace in flat glass production)	N/A

<sup>91</sup> Important Projects of Common European Interest

<sup>92</sup> European Commission, 2023, **Scaling up innovative technologies for climate neutrality: Mapping of EU demonstration projects in energy-intensive industries**

<sup>93</sup> Hungary, Poland, Czechia, Slovakia, Romania, and Bulgaria.



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<b>Poland</b>	Innovation Fund	GO4ECOPLANET (first-of-a-kind in the cement industry that will demonstrate a CCUS technology)	228
	Horizon 2020	Novum (pilot based on novel manufacturing technologies for cellulose-based electrical insulation components)	6.5
	Horizon 2020	ACCSESS (project demonstrates CCUS in the cement industry)	15
	Innovation Fund	Green H2 (small-scale green H2 production facility next to a refinery)	4.5
<b>Romania</b>	Horizon 2020	ConsenCUS (demonstrator for a carbon capture technology in the oil refineries)	12.9
	Horizon 2020	RETROFEED (demonstrate a circularity technology in the steel sector)	9.9

Source: European Commission, 2023, **Scaling up innovative technologies for climate neutrality** and European Commission, 2023, **Innovation Fund: projects selected for grant preparation**

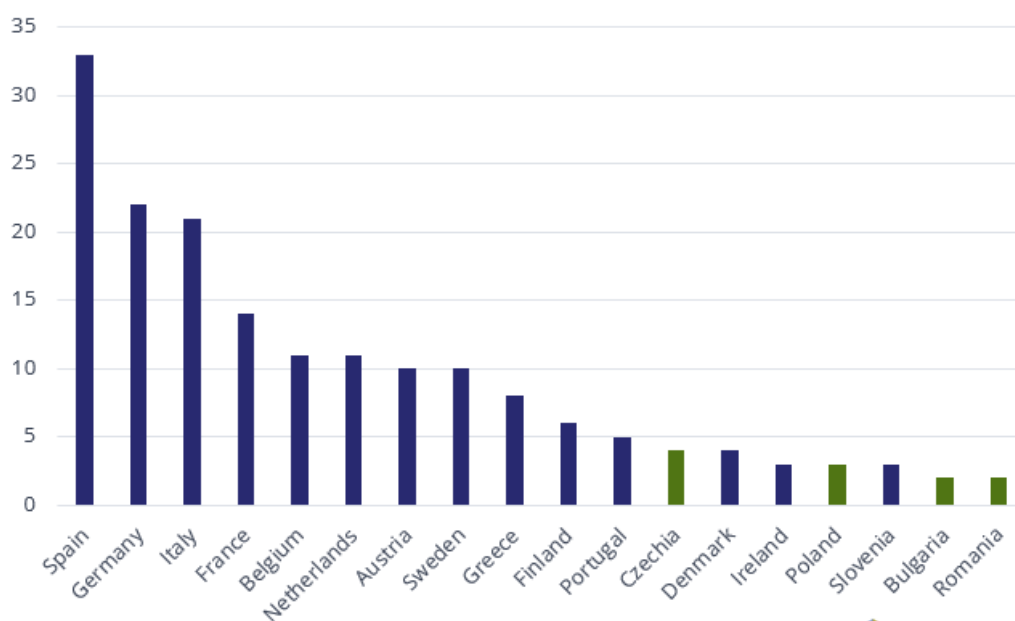
Lack of uptake of funding instruments such as the Innovation Fund in CEE can be partly explained by the lower number of applications from these countries. Without changes, this trend will likely be exacerbated as recent policy changes have both increased the size of the Innovation Fund and front-loaded spending. While geographical balance criteria exist, they have been poorly operationalised by the European Commission. National contact points have been arranged and the European Investment Bank can help with preparing applications, but the results are still tilted towards Northern and Western countries (Figure 6). Other than three notable projects for the cement sector in Bulgaria, Czechia and Poland, funding for other heavy industries has mainly been received by countries such as Sweden, Belgium and France.





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### Number of climate-related demonstrator projects in energy intensive industries by country



Source: European Commission, Scaling up innovative technologies for climate neutrality, 2023



Figure 6: CEE countries (shown in green) are among the ones with the least climate-related demonstrator projects in energy-intensive industries. Note: the graph does not depict EU member states with 0 demonstrator projects. These include Hungary and Slovakia, other CEE countries beyond the scope of this paper (Estonia, Latvia, Lithuania, Croatia), and Luxembourg, Malta and Cyprus.

Meanwhile, the Cohesion Policy (CP) has been the main motor of intra-EU resource reallocation with the stated goal of minimising the economic disparities between EU regions. The policy has a strong innovation component, but this remains underutilised in the region. CP funding is often spent based on short-term considerations, responding to either urgent problems or for political considerations, rather than being aimed at long-term strategic development.<sup>94</sup> In CEE, given the weak technological capabilities and insufficient state support, most funding goes towards labour-intensive and low-value-added manufacturing<sup>95</sup> and transport infrastructure.<sup>96</sup>

<sup>94</sup> Galgóczi, B. & Drahoukoupil, J., 2017, **Condemned to be left behind? Can Central and Eastern Europe emerge from its low-wage model?**

<sup>95</sup> Galgóczi, B. & Drahoukoupil, J., 2017, **Condemned to be left behind? Can Central and Eastern Europe emerge from its low-wage model?**

<sup>96</sup> Agora Energiewende, **EU Climate Funding Tracker: Data visualisation on the EU's contribution to national climate investment in 2021-2027** (Accessed 25 September 2023)



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Important Projects of Common Interest (IPCEIs) have also shown their utility for deploying cleantech value chains, by leveraging state aid at the initiative of member states. However, only two such projects have been approved, one for batteries<sup>97</sup> and one for hydrogen,<sup>98</sup> with a majority membership of Northern and Western EU countries.

## EU-level barriers can also hinder the industrial transformation in CEE

While tapping into the opportunities presented by industrial transformation in CEE will primarily require national-level action, including better and more strategic use of EU funding, there are also EU-level challenges requiring a European resolution. A series of governance and funding shortcomings are standing in the way of maximising the potential of the region. Moreover, the latest plans and policy proposals aimed at expanding cleantech manufacturing risk exacerbating intra-EU disparities.

### Funding

As explained in the section on national-level barriers to funding, accessing EU financial instruments for industrial transformation could be improved. This can be partly attributed to design issues. For example, while the rules of the Innovation Fund mention geographical balance, this is not effectively operationalised or enforced, as demonstrated by the East–West disparity in the number of projects granted support. IPCEIs, which require the active involvement of companies, are struggling to take off where public–private cooperation is more strenuous, like in CEE. In the absence of a combination of earmarking and administrative support, this issue will persist.

There is also room for improvement on financial instruments that target CEE countries more directly. For the Modernisation Fund, for example, it is unclear how governments can develop funding schemes dedicated to the electrification or uptake of renewable energy in industry. The possibility of developing Carbon Contracts for Difference (CCfDs) using Modernisation Fund allocations is also unclear.

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<sup>97</sup> European Commission, 9 December 2019, **State aid: Commission approves €3.2 billion public support by seven Member States for a pan-European research and innovation project in all segments of the battery value chain**

<sup>98</sup> European Commission, **Internal Market, Industry, Entrepreneurship and SMEs** (Accessed 25 September 2023)



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Meanwhile, The Cohesion Fund and even the European Regional Development Fund, as well as the Connecting Europe Facility (especially its transport component), are key sources of financing for infrastructure investments in CEE. Potential climate co-benefits are underleveraged, and such investments could be significantly more impactful if they had green procurement criteria attached to them, especially for green materials that can be made domestically.

Recently proposed instruments are looking even more problematic, especially as GDP did not come with a substantial additional funding stream.<sup>99</sup> The proposed Strategic Technologies for Europe Platform (STEP) is meant to provide only €10bn in new resources to finance EU cleantech value chain efforts, as the vast majority of the money (€150bn) would constitute reallocated funding from existing pots (InvestEU, Innovation Fund, Horizon Europe, European Defence Fund, RRF, EUHealth, Digital Europe and structural funds). Additional flexibility is also due to be added to Cohesion funds to allow front-loading and higher shares of co-financing<sup>100</sup> for strategic projects. Decisions on reprogramming and transfers of relevant funds remain in the hands of competent national authorities.<sup>101</sup>

This falls short of the expectations that have built up for the previously announced Sovereignty Fund, which was meant to compensate for potential intra-EU imbalances created through uneven deployment of state aid. While falling short of both expectations and what's needed, even this limited amount of new funding faces stark opposition within the European Council and is at risk of being further watered down. Moreover, this reshuffling approach poses the risk of compromising on other key policy goals, in particular related to social and environmental aspects. There are concerns that the STEP proposal would take away funding from regions and from investments in public services such as public transport or the grid, while the relocated funding carries no guarantees for positive social outcomes.<sup>102</sup>

A welcome announcement includes earmarking additional resources to be added under the Innovation Fund to support countries with below average GDP,

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<sup>99</sup> European Commission, 20 June 2023, **EU budget: Commission proposes to reinforce long-term EU budget to face most urgent challenges**

<sup>100</sup> European Commission, 20 June 2023, **EU budget: Commission proposes to reinforce long-term EU budget to face most urgent challenges**

<sup>101</sup> European Commission, 20 June 2023, **Questions and Answers on EU budget: Commission proposes the Strategic Technologies for Europe Platform (STEP) to support European leadership on critical technologies**

<sup>102</sup> CAN-Europe, 21 June 2023, **REACTION: The STEP proposal: recovery funds and cohesion policy should not be cannibalised for financing dubious objectives**

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allowing for targeted support in CEE. However, securing this additional funding is uncertain, so the impact of the measure is limited if not applied to existing funding as well.

The underwhelming provisions of STEP mean that industrial policy will continue to be financed nationally, which will be advantageous for countries with deeper pockets as the subsidy race lingers on. Uncoordinated industrial policies fail to capitalise on the advantages of the EU single market and could undermine the level playing field across Europe.<sup>103</sup> The varying abilities of member states to support their industrial transformation efforts will lead to fragmentation in the single market. Such approaches will also likely prove economically inefficient and wasteful, and could even result in higher energy prices for household consumers. This raises concerns of fairness. The single market has long been presented as a motor of long-term competitiveness and productivity.<sup>104</sup>

### **Strategy and governance**

The current EU climate governance framework is inadequate for addressing these challenges. While strategic planning is a national prerogative, successful implementation of the growing body of legislation shaping EU industrial transformation requires a more coherent and comprehensive governance structure. The templates of national plans that need to be drafted by member states as part of the Governance Regulation should reflect the planning needs for industrial decarbonisation, at the very least. As all the additional planning and reporting requirements can put strains on the administrative capacity of some CEE countries, they can only be effective if they are complemented by administrative support.

The results of EU-level modelling and impact assessments also lack national granularity. It is important to understand not just how the EU as a whole can achieve its targets, but also what role each member state needs to play. This can improve coordination and better align national priorities, reducing duplication and redundancy.

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<sup>103</sup> Bruegel, 2023, **Rebooting the European Union's Net Zero Industry Act**

<sup>104</sup> European Commission, 2023, **Industrial Policy for the 21st Century: Lessons from the Past**

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## CHAPTER 4

# WAY FORWARD

Industrial transformation can become the engine of decarbonisation and economic development in CEE. Countries in the region already have a strong industrial base that can serve as a good starting point for net zero compatible manufacturing. Responsibilities are split between the national and EU-level, with different time-horizons for implementation.

### Recommendations for national institutions

#### **Governance**

CEE countries should improve the governance of their industrial transformations by developing comprehensive strategies for the sector. These should be future-oriented and technology-driven (as opposed to company-focused), seeking to identify comparative advantages and opportunities for development, rather than merely focusing on protecting incumbents at all costs.<sup>105</sup>

Sub-sectoral targets for different industries should reflect their distinct challenges, but also the level of prioritisation given by the government. Strategic decisions need to be made about which sectors in which locations are likely to have a competitive edge and help to accelerate decarbonisation, rather than attempting to provide indiscriminate support for entire sectors.<sup>106</sup>

These strategies should then inform infrastructure deployment plans for clean electricity, hydrogen, and CCS, which in turn should be included in the NECP and LTS revision processes.

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<sup>105</sup> European Commission, 2023, **Industrial Policy for the 21st Century: Lessons from the Past**

<sup>106</sup> Bruegel, 2023, **Adjusting to the energy shock: the right policies for European industry**



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Table 3: Progress required from CEE countries on strategic policy direction.

NECP update/LTS	<ol style="list-style-type: none"><li>1. Clarity on <b>planned industrial electrification and decarbonisation pathways</b>.</li><li>2. Modelling of transformative <b>investment needs</b> in specific heavy industry sectors.</li><li>3. Modelling of <b>power demand spike</b> due to planned industrial electrification pathways.</li><li>4. Clear <b>timelines</b> for necessary investments and infrastructure development, including on hydrogen and CCS.</li></ol>
Dedicated industrial transformation strategy	Publication of a <b>national industrial transformation strategy</b> with sectoral chapters, including strategic considerations around comparative advantages for future green value chain development.
Technology- specific strategies	Publication of strategies outlining deployment plans for enabling infrastructure, especially hydrogen and CCS.

To develop and implement these strategies, CEE countries should strengthen their administrative capacities as fast as possible. Targeted assistance will also be required for domestic companies that may lack the internal resources to develop ambitious projects, especially in the case of SMEs.<sup>107</sup>

At the same time, governments should directly engage with companies which need to develop more concrete decarbonisation projects and contribute their share of financial efforts for implementing the required investments. Company commitments to slashing GHG emissions can be strengthened by joining business-led climate initiatives, such as Science Based Targets initiative<sup>108</sup> and RE100,<sup>109</sup> or by developing climate partnerships<sup>110</sup> in collaboration with governmental authorities.

<sup>107</sup> E3G, 2023, **Financing the transition in Central and Eastern Europe: Investing in the future of Czechia and Poland**

<sup>108</sup> Science Based Targets, **What are 'science-based targets'?** (Accessed 7 October 2023)

<sup>109</sup> Climate Group RE100, **About us** (Accessed 7 October 2023)

<sup>110</sup> One example are the climate partnerships developed in Denmark. See The Danish Government's Climate Partnerships, **Climate Partnerships 2030** (Accessed 7 October 2023)



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### Funding

Existing funding instruments should be better leveraged for industrial transformation. The ETS revenues from auctioning and the Modernisation Fund are particularly relevant, but sums can vary between countries (Table 4).

Beneficiaries that have not transferred additional allowances to the Modernisation Fund according to available ETS flexibilities should be mindful of ensuring that programmes supporting industry do not cannibalise the much-needed resources for decarbonising the power mix. At the very least, dedicated financing programmes can be designed for decarbonising electricity consumption within industry.

For investments in the deployment of decarbonisation technologies in heavy industry, ETS revenues could be used to financially support the preparatory stages of project applications for instruments such as the Innovation Fund. Particular attention needs to be dedicated to developing training and reskilling programmes for cleantech sectors.<sup>111</sup>

Table 4: Estimated ETS-related revenues 2021–2030

Country	Auctioning revenues	Modernisation Fund
Bulgaria	€11.5bn	€2.5bn
Czech Republic	€7.1bn	€20.0bn
Hungary	€6.3bn	€3.0bn
Poland	€54.2bn	€18.0bn
Romania	€5.4bn	€21.0bn
Slovakia	€3.6bn	€5.7bn

Note: Assuming an average carbon price of €90/ton.

Source: E3G calculations using Climact ETS model.

In the longer run, Cohesion Policy spending should be better targeted to increase domestic innovation capacity and support the necessary infrastructure deployment, while support for innovation in SMEs should be concentrated more

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<sup>111</sup> Galgóczi, B. & Drašković, J., 2017, **Condemned to be left behind? Can Central and Eastern Europe emerge from its low-wage model?**



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on expanding capacity rather than technology transfers.<sup>112</sup> Green public procurement criteria should be implemented for public spending coming from both national and EU funding streams, especially to incentivise the consumption of green steel and cement.

### **Regional cooperation**

CEE will only be able to realise its full potential by collaborating across borders on joint projects, co-financing projects, trading clean energy, and infrastructure planning.<sup>113</sup> Regional exchange can also help form common CEE objectives to communicate at the EU-level and engage more actively in already established European frameworks for cross-border cooperation and infrastructure development. Strategic cooperation and joint planning is essential to developing cross-border industrial hubs and innovation valleys which can reap the benefits of economies of scale. Common projects could be developed through Cohesion Policy investments to improve connectivity between Interreg's energy project investments and expand on the regional component of NECPs.<sup>114</sup> Involvement in the Just Transition Platform Working Groups on steel, cement, and chemicals<sup>115</sup> offers a good opportunity for mutual learning and lessons sharing between regions most affected by industrial decarbonisation.

## **Recommendations for EU institutions**

### **Governance**

EU industrial policy strategy must account for regional disparities and come up with concrete solutions for addressing intra-EU cleavages. To improve the governance, the scope of NECPs should be expanded by introducing requirements for member states to prepare industrial transformation plans and to account for all related energy and infrastructure needs. The upcoming review and revision of the Governance Regulation constitutes a good opportunity for this. EU-level modelling, such as that for the 2040 targets, should increase national granularity. Targeted assistance for strategic planning and administrative capacity should be provided, for instance through DG REFORM support, as was the case in the development of some of the NECPs and Territorial Just Transition Plans. Focus should be given, however, to

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<sup>112</sup> Galgóczi, B. & Drahokoupil, J., 2017, **Condemned to be left behind? Can Central and Eastern Europe emerge from its low-wage model?**

<sup>113</sup> Ember, 15 May 2023, **In it together: the road to a cleaner, cheaper CEE power system**

<sup>114</sup> EPC, 2023, **Addressing Cohesion Policy's identity crisis in a changing European Union**

<sup>115</sup> European Commission, 2023, **Just Transition Platform Working Groups: Implementation Plan**

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strengthening internal capacity, rather than becoming over-reliant on outsourcing the development of strategies to external consultants. One way to ensure this is to introduce the obligation for 1% of investments to become available for capacity building for member states that need additional support.<sup>116</sup>

### **Funding**

Deployment support is necessary to ensure a timely transformation of European industry, but an intra-EU subsidy race risks putting strain on the single market while endangering convergence efforts. Widening internal disparities pose a risk to the entire decarbonisation process and, ultimately, the European integration project – we need to avoid a “Eurozone crisis painted in green” and avoid a “two-speed decarbonisation”.<sup>117</sup>

Funding opportunities for the region should be expanded by earmarking resources for CEE, especially in the Innovation Fund (including from existing funding, not just the additional funding proposed through STEP).

Processes for applications such as those for IPCEIs should be simplified and supported. Guidance on how the Modernisation Fund can be used to fund industrial decarbonisation would be beneficial, especially to countries that have expanded the size of their national allocations.

STEP-coordinated funding should be easy to access and distributed fairly, based on fiscal capacity criteria accompanied by robust environmental and social conditionalities. The main beneficiaries should not be those that have already deployed generous state aid mechanisms through the TCTF. The funding relocations in the STEP proposal should minimise conflicts between new industrial policy objectives and social and environmental funding leveraged through the Cohesion Policy and the Just Transition Fund.

In the medium term, the negotiations on the next multiannual financial framework can ensure that the EU financing instruments with built-in convergence mechanisms are better aligned with the EU’s emerging industrial policy. The redesign of the post-2027 Cohesion Policy can also address the growing concerns regarding the post-2026 drop in funding for climate and innovative technologies as the RRF comes to its end. Green public procurement provisions could be introduced in the Cohesion Fund and even the European

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<sup>116</sup> E3G, 2023, **How to make the best of the Green Deal Industrial Plan: Pragmatic Recommendations for Policy Makers**

<sup>117</sup> Ibid.



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Regional Development Fund, as well as the Connecting Europe Facility (especially its transport component). To ensure that demand is created locally, green public procurement criteria could be introduced first for cement, a less intensely-traded commodity.

### **Regional cooperation**

The EU could contribute to improving regional cooperation by establishing a dedicated high-level platform. The high-level initiative for Central and Southeastern Europe energy connectivity (CESEC) is an example of an organisational structure that both brings together regional partners and provides a forum in Brussels for pushing issues of regional importance on the EU agenda.