



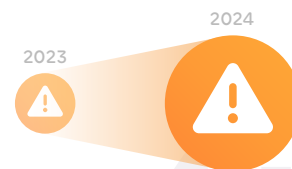
# Industry



**Far too slow**

The EU needs a globally competitive and sustainable industry for economic prosperity and security. Cutting emissions in industry will depend on availability of zero-carbon energy and feedstock carriers and infrastructure, circularity, and energy efficiency.

## 4.3 Industry



**Past progress:** The development in the EU industrial sector was **far too slow** in the period assessed, which means there is no change to the classification from last year. Nevertheless, progress accelerated in many areas, notably regarding GHG emission reductions, share of zero-carbon energy carriers, and energy efficiency of industrial processes. Importantly, the assessed data ends in 2022, the year in which the sector still increased its activity compared to 2021 despite the onset of the energy crisis. The positive changes were partly a consequence of the global energy markets’ volatility observed after Russia’s full-scale invasion of Ukraine in February 2022. For that reason, and due to the sluggish progress in circularity and persisting significant data gaps for availability of zero-carbon energy sources and infrastructure, ECNO’s assessment of progress has not changed, yet might in the next report if the latest trends persist.

**Policy context:** The EU’s legislative framework for industrial transition spans multiple policies. The reforms in the ‘Fit-for-55’ package aim at enhancing ambition: the revision of the Emissions Trading System (ETS) Directive and the Carbon Border Adjustment Mechanism (CBAM) will provide a stronger carbon pricing signal for industrial enterprises to cut emissions, while the revisions of Renewable Energy and Energy Efficiency Directives stimulate energy savings and uptake of renewable energy sources. The sector is also impacted by the revision of the Energy Performance of Buildings Directive (EPBD), including stricter requirements concerning lifecycle carbon footprint of buildings. Policy support for scaling up the production of the EU’s cleantech and industrial decarbonisation technologies is a part of the Green Deal Industrial Plan, with the Net Zero Industry Act (NZIA) and Strategic Technologies for Europe Platform (STEP) as headline sets of measures (which do not involve financial instruments). The Circular Economy Action Plan (CEAP) and the Industrial Carbon Management Strategy (ICMS) are strategies that outline planned actions to enhance circularity and the deployment of carbon capture and storage (or use) technologies. Finally, the 2024 revision of National Climate and Energy Plans (NECPs) is a step towards implementing these policies at the national level.

**Areas of action:** For industry, a key focus area is the effective implementation of recently introduced policies. To accelerate the industrial transition, sufficient financial support is needed, especially for electrification, infrastructure, and energy efficiency. Special political attention should be paid to enhancing circularity and green public procurement. Finally, comprehensive monitoring is needed to track progress in availability of zero-carbon energy sources and infrastructure.



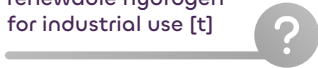





**Table 8: Progress in industry towards the objective and enablers**

OBJECTIVE	ENABLERS		
Progressing towards net zero industrial GHG emissions with clean energy and feedstock carriers 	Ensuring availability of zero-carbon energy and feedstock carriers and infrastructure 	Boosting circular economy 	Enhancing energy efficient industrial processes 

Note: Large circles show the progress classification of this year and small circles the one from last year’s progress assessment. Arrows indicate positive or negative changes in classification. See Table 35 for further information.

Source: ©ECNO.

Table 9: Details on indicators' past progress and required change

2023 ▼	2024 >	Historical data			Required change	
		Time period	Relative change p.a.	Absolute change p.a.	Benchmark	Absolute change p.a.
<b>OBJECTIVE: Progressing towards net zero industrial GHG emissions with clean energy carriers</b>						
GHG emissions from industry [MtCO <sub>2</sub> e] 	2017–2022 (EEA, 2023b)	-2.3% per year	-17.8 MtCO <sub>2</sub> e per year	97% reduction compared to 2015 value, by 2050 (EC, 2020a)	-23.9 MtCO <sub>2</sub> e per year (2022–2050) → 1.3 times faster	
Share of clean energy carriers in energy and feedstock use [%] 	2017–2022 (Eurostat, 2024c)	0.7% per year	0.2%-points per year	n/a	n/a	
<b>ENABLER 1: Ensuring availability of zero-carbon energy and feedstock carriers and infrastructure</b>						
Annual production of renewable hydrogen for industrial use [t] 	n/a	n/a	n/a	n/a	n/a	
Amount of CO <sub>2</sub> captured [tCO <sub>2</sub> /yr] 	n/a	n/a	n/a	n/a	n/a	
<b>ENABLER 2: Boosting circular economy</b>						
Circular material use rate [%] 	2017–2022 (Eurostat, 2024b)	-0.1% per year	-0.01%-points per year	23.4% by 2030 (EC, 2020h)	1.5%-points per year (2022–2030)	
Resource productivity [PPS/kg] 	2017–2022 (Eurostat, 2024p)	3% per year	0.1 PPS/kg per year	n/a	n/a	
<b>ENABLER 3: Enhancing energy efficient industrial processes</b>						
Final energy consumption in industry [Mtoe] 	2017–2022 (Eurostat, 2024c)	-1.3% per year	-4.3 Mtoe per year	n/a	n/a	
Energy intensity of output [Mtoe/EUR] 	2017–2022 (Eurostat, 2024c, 2024l)	-2.3% per year	-0.003 Mtoe per year	n/a	n/a	

Note: Icons indicate progress classification of this year's progress assessment and coloured lines the change in classification; See Table 35 for further information. n/a indicates that data are not available.

Source: ©ECNO.

## Objective: Progressing towards net zero industrial GHG emissions with clean energy carriers

**Past progress:** Progress toward the objective was assessed as

**far too slow** (see Table 9), even though, compared to last year, progress accelerated both for reducing GHG emissions from industry and increasing the share of clean energy carriers in the overall energy and feedstock use in industry. The latter headed marginally in the **wrong direction** in the previous assessment, but a significant annual decrease in total energy consumption in industry (by over 9% in 2022, while the sectoral economic activity increased by 3%), driven mostly by a decrease in conventional energy carriers, contributed to a reversing of the indicators dynamics. Overall, the pace of progress in the period assessed was still **far too slow** to reach the EU climate targets. The pace of industrial GHG emission reductions almost doubled compared to last year, but the improvement is still **too slow** to be compatible with reaching the 2050 climate neutrality target.

### Indicators:

- GHG emissions from industry
- Share of clean energy carriers in energy and feedstock use

**Policy context:** The GHG emissions from industry are to a large extent covered by the EU ETS. Its revision, adopted in 2023, will reduce the supply of allowances to reach alignment with the new 2030 climate target, thus stimulating deeper GHG emission reductions. The planned phase-out of free allocation of allowances for industry starting in 2026 is coordinated with the introduction of CBAM, whose role is to ensure that the carbon price of products imported to the EU is equivalent to the carbon price of domestic production, thus helping to avoid carbon leakage. The launch of the EU ETS2 widens the scope by including smaller and less energy-intensive industrial plants into the system. The ICMS is a long-term plan for handling inherent emissions, linked to the annual injection capacity target of at least 50 Mt CO<sub>2</sub> by 2030, as set in the NZIA. The switch to zero-carbon energy and feedstock sources in industry is supported on the EU level through numerous hydrogen-related initiatives following the implementation of the Hydrogen Strategy. Indirect measures are included in revision of the Renewable Energy Directive (RED III), which aims at accelerating the renewable energy and network deployment. However, their effectiveness will depend on national implementation.

**Areas of action:** The main focus in this area should be the careful implementation of adopted policies. It concerns both the joint EU initiatives (where the main challenge is the effective introduction of CBAM, see 4.13) as well as national legislation (with high-quality national planning and facilitation of infrastructure development, as well as national-level funding). More attention should be given to ensure the consistency and quality of national strategies related to industrial transition, as well as to the electrification of industry, particularly through stronger incentives for heat pumps. The idea of providing EU-level funding for investments in the industrial transition needs to be revisited.

## Enabler 1: Ensuring availability of zero-carbon energy and feedstock carriers and infrastructure

**Past progress:** Industrial enterprises need access to sufficient amounts of zero-carbon energy and feedstock carriers and related infrastructure to reduce their GHG emissions. The transition in this sector will require mostly carriers such as electricity, ambient heat, biomass, hydrogen, and synthetic fuels (Tsiropoulos et al., 2020b). Infrastructural needs also include CO<sub>2</sub> transport networks and storage, as some of the industry branches will need to rely on long-term geological storage of CO<sub>2</sub> to drive emissions down. Just as in last year's assessment, there was still not enough data available to assess developments regarding this enabler in a comprehensive way. The indicator switch from 'CO<sub>2</sub> injection capacity' to 'amount of CO<sub>2</sub> captured' reflects which measure is preferred to more accurately track the scale of deployment of carbon capture technologies.

### Indicators:

- Annual production of renewable hydrogen for industrial use
- Amount of CO<sub>2</sub> captured

**Policy context:** There has been signs of policy progress mainly through the NZIA, which focuses on scaling up domestic manufacturing capacity of strategic clean technologies through lowering the administrative burden and facilitating permitting, enhancing access to relevant data and knowledge, facilitating access to markets, and supporting innovation through regulatory sandboxes. The new Industrial Carbon Management Strategy (ICMS) (EC, 2024c) sets three different stages of developing industrial carbon management, initiates preparatory work on a CO<sub>2</sub> transport regulatory package, and supports the uptake of CCS (Carbon Capture and Storage) and CCU (Carbon Capture and Utilization) technologies. The ICMS does this through a platform for demand assessment and aggregation, the creation of an investment atlas of potential CO<sub>2</sub> storage sites, and by developing guidance for permitting processes for relevant projects. Policies related to CO<sub>2</sub> networks are also part of Trans-European Networks for Energy (TEN-E) Regulation. The support for hydrogen projects is available through the European Hydrogen Bank, launched in 2022. The Bank is a financing instrument, whose role is to accelerate private investments in hydrogen value chains and provide support for domestic production of renewable fuel of non-biological origin (RFNBO) hydrogen. Support for industrial decarbonisation in the coming years will also be coordinated through STEP. The Platform will, however, not provide new European-level funding. Projects in this area can benefit, depending on the degree of their innovativeness, from funding via Horizon Europe, the Innovation Fund, the Connecting Europe Facility (CEF) and the Modernisation Fund.

**Areas of action:** A key issue for the provision of zero-carbon energy sources and infrastructure is the effective implementation of existing policies and a follow-up on the ICMS. Improvement of NECPs seems crucial for facilitating the successful implementation and optimal distribution of the funds, as so far conclusions from ECNO (2024b) indicate that national strategies are currently not detailed and consistent enough. Another area of action is the creation of a comprehensive monitoring framework, including robust indicators in this area, which would enable tracking progress, and hence improve the quality of planning, policy design, and evaluation.

## Enabler 2: Boosting circular economy

**Past progress:** Increased circularity has the potential to contribute to reducing GHG emissions from industry in a cost-efficient way, as it implies lower demand for primary materials, and hence a decrease in upstream emissions and lower overall energy and feedstock input. However, in the five years through 2022, changes in the area of circular economy were progressing **too slowly** to meaningfully support reduction targets in the industrial sector. What is especially concerning is the prolonged stagnation of progress on circular material use, despite the target, outlined in the CEAP (EC, 2020f), of doubling it until 2030 relative to the 2020 level. In 2022, the indicator was equal to 11.5%, having been oscillating around this level since 2017 without forming a clear trend. Resource productivity increased in 2022 by a satisfactory 8% compared to 2021. This may reflect a slowdown in more resource-intensive branches of industry, which were a result of the fossil-fuel crisis. However, this latest change is still **too slow** to improve the trend's dynamics sufficiently to classify it as **on track**.

### Indicators:

- Circular material use rate
- Resource productivity

**Policy context:** The EU aims to transition to a more circular economy in order to achieve more sustainable economic growth and facilitate the transition to climate neutrality. Policy instruments, which are planned to be implemented to achieve this, are outlined in the CEAP. So far, the EU has formally adopted the Ecodesign for Sustainable Products Regulation (pending final approval), Empowering Consumers for the Green Transition Directive, Batteries and Waste Batteries Directive, Common Charger Directive, and Classification, Labelling, and Packaging of Chemicals Regulation. However, many legislative procedures are likely to face delays due to their more stringent environmental requirements, which need to be discussed by various stakeholder groups. In most directives and regulations, the requirements are less stringent at the end of negotiations compared to the first version published by the European Commission.

**Areas of action:** The main actions in the updated CEAP focus on engaging consumers in the transition towards a circular economy (CE), introducing sustainable products as the norm in the EU market, creating systemic frameworks for managing emissions, waste, resources, materials, and products in line with CE principles, and effectively implementing CE to strengthen decarbonisation efforts. Member States will likely face problems related to consumer engagement challenges, support for circular economy models, volatility in mandatory schemes, and technology gaps in targets. However, the adaptation of policy instruments and tools by Member States will determine the success or failure of the transition from linear to circular models.

## Enabler 3: Enhancing energy efficient industrial processes

**Past progress:** The latest trends point to a notable improvement of the energy efficiency of industrial processes, but the changes were still **too slow** in the period assessed. Recent positive developments have been triggered by economic consequences of the Russian large-scale invasion of Ukraine, leading to higher energy prices and increased volatility in 2022. As a result, the final energy consumption in industry dropped to the lowest value since 1990, when the data first started to be collected – notably also below the 2020 level, when industrial activity plunged due to the COVID-19 crisis. The continuation of post-pandemic recovery efforts in industry was associated with higher output in 2022 (Eurostat, 2024l), leading to an improvement of the energy intensity of the output. The positive developments with respect to energy efficiency are likely to prove durable if industrial enterprises continue to diversify their energy mix to avoid dependency on imported fossil fuels.

### Indicators:

- Final energy consumption in industry
- Energy intensity of output

**Policy context:** The EU ETS is the main political instrument driving progress on the energy efficiency of industrial processes, as it increases the relative costs of using energy from fossil fuels in the plants covered by the scheme both directly (large emitters) and indirectly (via electricity consumption). The revision of the EU ETS, which was adopted in 2023 as part of the Fit For 55 package, will provide further stimulus by reducing the supply of allowances to reach alignment with the new 2030 climate target. The planned phase-out of free allocation of the EU ETS allowances in the period of 2026–2034, which will be introduced in parallel to CBAM, constitutes another stimulus for increased efforts related to energy efficiency in industry. The extension of emissions trading to industrial plants via ETS2, which was previously not covered by EU ETS, will provide incentives for smaller and less energy-intensive industrial plants to further optimise their energy use. Moreover, strengthening of Energy Efficiency Directive in 2023, adopted as part of the REPowerEU plan, set a stricter energy efficiency target of reducing final energy consumption by at least 11.7% compared to projections of the expected energy use for 2030, with an associated framework for national-level actions.

**Areas of action:** Increased electrification, especially with regard to low temperature heat processes, can be an effective avenue for enhancing overall energy efficiency. To unlock this source of energy savings, a clear industrial electrification strategy and dedicated support is needed, especially focused on removing barriers to deployment – both cost-related and non-cost-related (such as administrative and permitting burdens). To manage financial limitations to investment, additional resources should be provided in this area – either within existing frameworks (e.g. Innovation Fund) or by launching new funding tools.