



**Opinion of the European Economic and Social Committee**  
**Building blocks for strengthening Europe's manufacturing base in cleantech**  
**(own-initiative opinion)**

(C/2026/14)

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## 1. Conclusions and recommendations

1.1. The EU hosts diverse cleantech ecosystems, from well-established industries such as wind power to emerging sectors like electrolysers, battery production, carbon capture, and water-efficient technologies. However, while the EU has strong expertise in research and development (R&D), the transition from innovation to commercial deployment remains problematic, especially when compared to global competitors such as China and the US.

1.2. The EU is a net importer of cleantech in many sectors and relies heavily on China for solar panels, batteries and raw materials, creating a strategic risk. US and Chinese policies challenge Europe's ability to increase investments and strengthen its cleantech industry, including in sectors where it is leading.

1.3. The fragmented policies and funding mechanisms included in the European Green Deal only partially address the EU's cleantech manufacturing ambitions. Uncoordinated EU and national policies and funding hamper efficiency, current State aid measures disproportionately benefit wealthier Member States and funding remains difficult to navigate by project developers. Global competitive distortions challenge the EU's cleantech industry. If Europe adopts the right policies, it could turn energy and water-related challenges into opportunities for job creation, new skills and business growth.

1.4. For all these reasons, the EESC calls on the Commission to:

- Adopt a revised consolidated industrial strategic framework to support the production of cleantech for decarbonisation and water efficiency.
- Recognise cleantech as a distinct industrial sector and support its development by designing technology roadmaps, de-risking innovation through pilots and partnerships, and enhancing funding – especially via Horizon Europe and the 10th Framework Programme (FP10).
- Mainstream the EU's cleantech goals across policy areas.

- Simplify regulations and deploy infrastructure for market entry, address supply chain and public approval issues, and improve access to funding and intellectual property rights (IPR) protection for start-ups; foster collaboration across research centres, start-ups and industry to accelerate the commercialisation of new technologies, and promote innovation-friendly frameworks such as regulatory sandboxes under the Net-Zero Industry Act (NZIA).
- Promote incentives for the circular economy, including for second-life use, local sourcing, and quotas or labels for recycled content.
- Complement each technology roadmap with a human and social dimension roadmap to support the skills' transition for all workers. Such roadmaps should integrate data provided by the Clean Energy Technology Observatory and European Skills Intelligence Observatory.
- Where necessary, invest in up- and re-skilling policies that develop learning content in cleantech sectors, including a water dimension, while monitoring the effectiveness and impact of programmes that have already been launched (e.g. European Solar Academy, European Battery Academy).
- Strengthen cleantech skills through an EU-wide assessment of labour shortages for the clean-energy and water-technology sector while ensuring high job quality and inclusive access for women and other disadvantaged groups. The Commission should establish a specific cleantech stream within the European Skills Intelligence Observatory under the Union of Skills to ensure rapid availability of those skills.
- Develop tools such as an EU skills passport, harmonised certification, and stronger links between education and industry to ease transitions into net-zero jobs.
- Boost EU cleantech manufacturing through a European Competitiveness Fund, repurposed Innovation Fund, and frontloaded EIB investments, while ensuring cohesion and small and medium-sized enterprises' (SMEs) access.
- Coordinate and streamline funding, reform State aid frameworks, and strengthen administrative capacities to improve fund absorption and market fairness.
- Invest in regional cleantech clusters, electricity grids and capital market integration, while accelerating permitting.
- Strengthen cleantech demand by implementing NZIA with mandatory non-price procurement criteria, green and water-efficient product quotas, clean water technologies and sustainability standards that account for embodied carbon.
- Integrate decarbonisation and water efficiency into trade agreements, and build strategic partnerships to strengthen cleantech supply chains.
- Constantly monitor the evolution of the EU's cleantech sector and report on the outcomes of policy implementation.

## 2. Background on the state of cleantech manufacturing in Europe

2.1. Europe has seen a significant increase in cleantech investment since 2021, driven especially by battery cell manufacturing. However, in other sectors such as solar photovoltaic (PV), European companies heavily rely on imports, especially from China <sup>(1)</sup>. While investments are spread across the EU, most projects are concentrated in a handful of countries.

2.2. Macroeconomic conditions, including high interest rates, led to a slowdown in equity investments in cleantech in the EU in 2024, by 24 % year-on-year (from EUR 11.6 billion in 2023 to EUR 8.8 billion in 2024). The equity contraction was offset by debt investment worth EUR 23.4 billion in 2024, a significant improvement from EUR 7.9 billion in 2023 <sup>(2)</sup>.

<sup>(1)</sup> Bruegel: Clean industrial transformation: where does Europe stand?.

<sup>(2)</sup> Cleantech for Europe: Financial Year 2024 Briefing.

2.3. While the EU maintains a strong industrial footprint in cleantech, the EU cleantech landscape varies by sector. The solar PV industry faces restructuring due to global competition, while wind energy is growing slowly and is geographically uneven, putting competitiveness at risk. Battery production is expanding with gigafactories, but electric vehicle (EV) demand depends on financial incentives provided by governments. Heat pump production is rising despite macroeconomic hurdles. Electrolyser capacity is set to grow, yet investment and demand uncertainty persist. Carbon capture and storage is developing, and biogas is growing with policy support. The EU leads in geothermal and solar thermal ocean and maritime cleantech <sup>(3)</sup>.

2.4. Coordinated EU industrial policy can reduce the inefficiency of having 27 competing approaches to reindustrialisation. A robust EU industrial policy governance framework should go beyond what the European Commission has proposed and, where necessary, sectoral industrial strategies and common EU support programmes should be considered. The EU needs to move from a largely reactionary approach to a future-oriented industrial strategy.

2.5. As the promoter of the EU Blue Deal flagship initiative, the EESC emphasises that clean technologies should be both energy- and water efficient, while horizontal measures, such as better data collection, expanding infrastructure, energy savings, digitalisation, and improving access to affordable energy and water are essential for boosting the competitiveness of EU cleantech manufacturing.

### 3. Boosting the cleantech innovation ecosystem

3.1. According to the International Energy Agency, only half of the technologies needed to achieve full decarbonisation are market-ready. The next generation of cleantech needs to be developed and deployed.

3.2. More than one-fifth of clean technologies worldwide are developed in the EU. However, for many early-stage technologies, the EU is squandering resources because its innovation potential is not translating into manufacturing capabilities.

3.3. In 2023, China, the EU and the US accounted for 85 % of public R&D spending, with USD 17.5 billion, USD 13.5 billion, and USD 11 billion invested respectively <sup>(4)</sup>. Public investment in clean energy research and innovation (R&I) has been increasing in the EU, but private investment remains insufficient.

3.4. The EESC calls on the Commission to:

3.4.1. Design technology roadmaps for emerging technologies to support the upgrading of their Technology Readiness Level (TRL), outlining their role in achieving the 2040 and 2050 climate targets.

3.4.2. Further strengthen European funding for cleantech R&I; protect and expand Horizon Europe funding, safeguarding it during the negotiations on the multiannual financial framework (MFF).

3.4.3. Make cleantech a priority in the upcoming FP10 programme for 2028-34.

3.4.4. De-risk technologies by supporting demonstration projects, pilot projects and the creation of public-private partnerships (including joint EU undertakings).

3.4.5. Enforce the protection of IPRs and make funding mechanisms (such as the Innovation Fund) more accessible for start-ups.

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<sup>(3)</sup> Clean Energy Technology Observatory: Overall strategic analysis of clean energy technology in the EU.

<sup>(4)</sup> Strategic Perspectives: The global net-zero industrial race is on.

#### 4. Access to critical raw materials and circularity

4.1. Adopting circular economy principles can foster new economic opportunities and reduce reliance on critical materials. Establishing recyclability and resource efficiency standards would create strong incentives for industries to decrease dependence on primary raw materials.

4.2. The EESC recommends the following:

4.2.1. The upcoming Circular Economy Act should drive recycling investments and promote circular material use through digital technologies and business models.

4.2.2. Member States should enhance their domestic mining and refining capacities for key minerals and midstream processing capabilities, while maintaining high environmental and social standards.

4.2.3. Incentives should be provided for local sourcing of Circular Resources and Waste, with mandatory quotas or voluntary labels for recycled materials.

#### 5. Workforce deployment and skills

5.1. Cleantech sectors have some of the highest (re)skilling needs. Deeper analysis of the social impact of deploying cleantech will be needed to anticipate and manage structural challenges.

5.2. Jobs in clean technologies are growing faster than in the rest of the economy <sup>(5)</sup>. An ambitious Clean Industrial Deal (CID) that supports EU located net-zero manufacturing can generate an additional 1.6 million jobs by 2035, rising to 2.1 million by 2040 <sup>(6)</sup>, and potentially more if the water dimension is taken into account.

5.3. In this respect, the EESC recommends:

5.3.1. Investing in strengthening cleantech skills, promoting targeted training, and conducting an EU-wide assessment of skills shortages in net-zero technology sectors, designing targeted learning programmes, and creating NZIA academies where needed.

5.3.2. Constantly monitoring the cleantech workforce gap through the recently announced European Skills Intelligence Observatory. Cleantech should be given a key priority role in the observatory to deliver early warning alerts regarding skills shortages and ensure rapid availability of those skills on the labour market.

5.3.3. Prioritising job attractiveness by maintaining high labour standards, aiming for secure, well-paid and socially respected jobs. The Quality Jobs Roadmap proposed in the CID should guide project assessment in the NZIA and the Critical Raw Materials Act (CRMA).

5.3.4. Prioritising reskilling for disadvantaged groups such as older workers and those in precarious employment. Classifying net-zero jobs as shortage occupations can ensure financial stability during training until workers enter the labour market <sup>(7)</sup>; increase the workforce participation of women in Science, Technology, Engineering, and Mathematics.

5.3.5. Developing an EU skills passport and harmonisation of EU certification schemes.

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<sup>(5)</sup> Strategic Perspectives: The global net-zero industrial race is on.

<sup>(6)</sup> Strategic Perspectives: The global net-zero industrial race is on.

<sup>(7)</sup> E3G: How to make the best of the Green Deal Industrial Plan.

5.3.6. Establishing intermediate institutions that aim to bridge the gap between education and work, including partnerships between cleantech sectors and technical universities to strengthen workforce development <sup>(8)</sup>.

5.3.7. Aiming for a fair distribution of jobs among regions with declining industries or in need of restructuring <sup>(9)</sup>, by making use of existing funding streams (e.g. Just Transition Fund).

## 6. Unlocking investments

6.1. As fiscal room is limited, existing funding programmes should be focused on those stages of the cleantech value chains where the EU can develop comparative advantages. The EU should seek to raise additional common European funding for financing its industrial ambitions.

6.2. The end of NextGenerationEU in 2027 will lead to EUR 35 billion of net-zero investment being discontinued, creating a financing gap <sup>(10)</sup> that could be partly offset through the upcoming Industrial Decarbonisation Fund, a future EU Blue Deal Transition Fund or the envisaged European Competitiveness Fund (next MFF).

6.3. The current State aid framework has driven investments but also caused market distortions and regional disparities persist. From 2022 to 2023, a few leading regions increased investments by USD 15-17 billion, while Southern, Central and Eastern Europe saw only a USD 3 billion rise <sup>(11)</sup>.

6.4. To make financial support (both public and private) even more effective, the EESC supports the following proposals:

6.4.1. Creating a European Competitiveness Fund in the new MFF, potentially supported by new EU joint borrowing via a European safe asset (2026). The fund should support growth equity and target clean technology value chains, aiming to foster European cohesion and prevent a two-speed Europe.

6.4.2. The Innovation Fund should be transformed into a deployment fund and earmark a share for cleantech manufacturing. More attention should be paid to improving access to such instruments for SMEs.

6.4.3. Notwithstanding social objectives, mandating Member States to invest at least 25 % of their Emissions Trading System (ETS) revenues in cleantech manufacturing, including by using the Auction-as-a-Service <sup>(12)</sup> function of the Innovation Fund. Spending plans should be included in National Energy and Climate Plans (NECPs) <sup>(13)</sup>.

6.4.4. Streamlining and coordinating all funding devoted to the manufacturing of cleantech, for example by using centralised portals such as the Strategic Technologies for Europe Platform; coordinating and harmonising national support schemes, setting up European one-stop shops and uniform application procedures.

6.4.5. Frontloading cleantech investments made possible through ETS revenues, including through European Investment Bank (EIB) borrowing.

6.4.6. Facilitating cleantech innovation by deepening capital markets and making it easier for start-ups and scale-ups to access risk capital, especially through a Capital Markets Union.

6.4.7. Stepping up the role of the EIB (and national promotional banks) in fostering private investments through the expansion of (counter) guarantees to include cleantech sectors.

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<sup>(8)</sup> Strategic Perspectives: Poland, a strategic cleantech hub for Europe.

<sup>(9)</sup> Ecorys: The net-zero manufacturing industry landscape across Member States.

<sup>(10)</sup> Strategic Perspectives: The global net-zero industrial race is on.

<sup>(11)</sup> Strategic Perspectives: The global net-zero industrial race is on.

<sup>(12)</sup> European Commission: Competitive bidding.

<sup>(13)</sup> Cleantech for Europe: Open letter.

6.4.8. Creating regional cleantech clusters, especially in transitioning areas, by using smart specialisation and existing funds, and by promoting active collaboration between all stakeholders, linking public resources to social and environmental criteria.

6.4.9. Simplifying State aid procedures under the forthcoming Clean Industrial State Aid Framework, building on insights from the Temporary Crisis and Transition Framework and the General Block Exemption Regulation, while aiming to ensure regional fairness and avoid distortions to the single market.

6.4.10. Reforming IPCEIs and providing financial and administrative support to help low-income regions join EU value chains more easily, including by strengthening administrative capacity in countries struggling to absorb funds.

6.4.11. Accelerating planning and permitting procedures for new cleantech projects.

6.4.12. Investing massively in modernising and connecting European electricity grids as deployment of cleantech is currently being hampered by the slow progress of electrification.

## 7. Developing markets and lead market creation

7.1. Many clean technologies are still emerging and require stronger market uptake. This can be supported by incentivising adoption by the private sector and by embedding local content and resilience criteria into both public and private procurement processes.

7.2. Auctions under NZIA should include criteria for the water consumption and for responsible business conduct, cybersecurity and execution capabilities, with sustainability and resilience factors accounting for 15-30 %.

7.3. To further strengthen European lead markets, the EESC calls for the following:

7.3.1. The NZIA should be implemented through public procurement and renewable energy auctions that include mandatory non-price criteria (including social conditionalities). Sustainability standards must be strengthened to reflect the carbon and water footprint of materials used in net-zero technologies, going well beyond current benchmarks <sup>(14)</sup>.

7.3.2. Member States should enhance regulations to drive demand for renewable products by integrating explicit sustainability and resilience criteria.

7.3.3. A net-zero 'EU-value-chain bonus' and quotas for green, water-efficient products in key sectors like steel and batteries could help restore Europe's cleantech leadership. To accelerate industrial decarbonisation, the Industrial Accelerator Decarbonisation Act could set similar quotas, such as clean steel use in cars and wind turbines.

7.3.4. Introducing common EU product passports (e.g. battery passports), quality labels or mandatory carbon and water footprint declarations for products would increase transparency, helping consumers and businesses make informed decisions (including export markets).

7.3.5. The cost premium of clean technology solutions should be reduced through mechanisms such as contracts for difference for energy or fixed premium subsidies linked to the environmental performance of products.

## 8. Levelling the international playing field and establishing cooperation

8.1. Europe's cleantech sector faces mounting pressure from global subsidies, looser environmental standards and unfair competition, leading to increased dependence on third countries. A growing trade deficit with China, driven by its dominance in rare earths, State-sponsored industrial strategies and low-price exports, highlights Europe's competitiveness challenges. The EU lags behind in venture capital, attracting only 5 % compared to the US' 52 %, limiting its ability to scale up innovations. The EU must boost domestic production, diversify resources and coordinate international trade and industrial policies to ensure fair competition and resilient supply chains.

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<sup>(14)</sup> E3G: How to make the best of the Green Deal Industrial Plan.

8.2. The EESC recommends that:

8.2.1. Trade agreements dedicate specific chapters to decarbonisation, water efficiency and cleantech. These chapters should promote the deployment of cleantech, secure supply chains and support market access.

8.2.2. The EU must build strategic industrial partnerships with like-minded countries to strengthen supply chain resilience, as full value chain control as pursued by China and the US is unlikely. Clean Trade and Investment Partnerships can enhance cooperation, but the EU must clarify its value proposition to partners.

8.2.3. The EU should strengthen trade defence, modernise energy infrastructure through the Global Gateway, and attract investment while promoting technology transfer. It should balance free trade benefits with sustainability, ensuring responsible mineral sourcing and supply chain due diligence.

8.2.4. Options for promoting cleantech exports through World Trade Organization-compliant instruments should be explored.

Brussels, 18 September 2025.

*The President*  
*of the European Economic and Social Committee*  
Oliver RÖPKE

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