

Forging Economic Security and Cohesion in the EU



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Forging Economic Security and Cohesion in the EU

Introduction

June 2024 will be a decisive month for shaping the future of the European Union (EU) for the next five years. The European Parliament elections from 6-9 June will provide over 400 million citizens the opportunity to vote. In this context, all EU institutions will have agenda-setting moments in which they can define the 2024 to 2029 priorities.

In 2019, the centre-right, centre-left, liberal and green political parties of the European Parliament laid the foundation for the initial vision of European Commission President Ursula von der Leyen. Together with input from heads of state and government, it shaped EU priorities and, notably, the European Green Deal, which transformed from a vision into the largest climate reform ever adopted.

New majorities, coalitions and policymaking ideas are likely to emerge in the European Parliament following the elections. **Equally, EU leaders will express their views on future priorities in the 'Strategic Agenda', expected to be adopted at the European Council from 27-28 June 2024.** Based on these inputs, the incoming European Commission President will set out priorities in a speech to get elected in the European Parliament and for the 2024 to 2029 work programme.

A range of challenges to be addressed over the next years are already clear:

- **Risk of a “two-speed” transition:** Diverging fiscal capacities to support the net-zero transition might lead to deepening economic disparities and a fragmented single market unless European coordination and additional investments are significantly scaled up. This is particularly true in the context of a possible EU enlargement.
- **High economic and political cost of the dependence on gas, oil and coal:** The era of cheap fossil fuels is over. Governments risk moving from a geopolitical vulnerability to a geoeconomic one, exposing the European economy to high international market prices. This could worsen the competitiveness of European companies and exacerbate the cost-of-living crisis for households.
- **Dependence on China’s net-zero industry and growing competition from the United States (US):** The heavy reliance on China’s zero-carbon technology poses significant risks, such as bottlenecks or disruptions to the supply chain, potentially preventing or delaying the EU’s ability to meet its climate goals. While China intends to expand its leading position, the US is gaining ground with the Inflation Reduction Act’s (IRA) financial strength and a strong position on innovation.¹ The lack of European net-zero value chains have a strong impact on competitiveness and raise concerns about deindustrialisation in the EU.

- **Risk of an unaffordable transition for households:**

Upfront costs for purchasing an electric vehicle (EV), a heat pump, renovating buildings and installing rooftop solar panels are still too high for most households. If only the wealthiest households have access to these technologies, there is a clear risk of widening disparities within society. The affordability and accessibility of climate-friendly equipment is key to ensure low- and middle-income households also benefit from the transition.

- **Growing climate impacts:** Floods, droughts and fires continue to intensify, causing serious damage to citizens and ecosystems, undermining food security and resulting in high costs. It is often the poorer regions and citizens who struggle most with the loss and damage linked to extreme weather events. The European Environment Agency warns of a 3°C of warming across Europe by 2050.²

- **Polarisation of international relations:** Russia's war on Ukraine, growing tensions in the Middle East, and a tight race on who becomes the next US president are all contributing to a challenging and uncertain international stage for leaders to navigate. Additionally, as many emerging economies are increasingly financially dependent on China, its diplomatic influence continues to grow as well.

- **Constrained and uncoordinated investments:**

The EU and its members invest as much as the US in achieving net-zero³ but Europe's financial support lacks coordination and is too complex for companies and households. National and EU investment is spread across multiple programmes and uncoordinated between countries. In addition, the end of the Resilience and Recovery Facility risks leaving a substantial investment gap after 2026.

If done well, the next phase of the European Green Deal can address these challenges through stronger energy security, an integrated European Industrial Strategy, a new financial architecture, and improved economic partnerships with developing countries.

These priorities are aligned with a net 90% greenhouse gas emission reduction (referred to in this report as a 90% climate target) by 2040 as a smart economic and security choice.

This report sets out solutions to support the reindustrialisation of Europe, make energy more affordable for companies and households, and strengthen the EU's prosperity in response to the ongoing cost-of-living crisis.

The next phase of the European Green Deal can reach a 90% climate target by 2040, combined with a European Industrial Strategy, by:

**Making energy
more affordable
for companies and
citizens by 2035:**

Reduces electricity prices by

12%.

Cuts energy bills for households by

2/3.

**Strengthening
energy security:**

Saves

€856 billion

on gas, oil and coal imports
between 2025 and 2040.

Reindustrialising Europe by 2040:

Creates

2 million jobs

in net-zero industries, and
already 1.6 million by 2035.

Generates

€233 billion

of new advanced industrial
value-add.

Saves at least

€133 billion

in technologies and
material imports.

Requires

€668 billion

of additional investment
over the next 15 years.



Executive Summary

The European Green Deal laid an important foundation for the modernisation of the EU's economy and society. It set an unprecedented speed and scale for the net-zero transition and turned into a solution to some of the many crises the EU has faced over the last five years, such as the recovery from the COVID-19 pandemic and reducing EU dependence on Russian gas, oil and coal. However, a range of geopolitical, social and economic challenges require an even stronger response. **Planning the next phase of the European Green Deal is imperative for strengthening economic security and cohesion within the EU.**

The 90% climate target for 2040 can guide strategic choices on investments and policies. If backed by an integrated European Industrial Strategy, this target can establish a clear direction and an enabling environment for companies to thrive in by making zero-carbon technologies more affordable and re-industrialising regions. This represents a major economic, security and social opportunity.

This report sets out four priorities for the next term of the European Commission from 2024 to 2029 based on a socio-economic analysis of the 'Visionary Scenario'.⁴ This

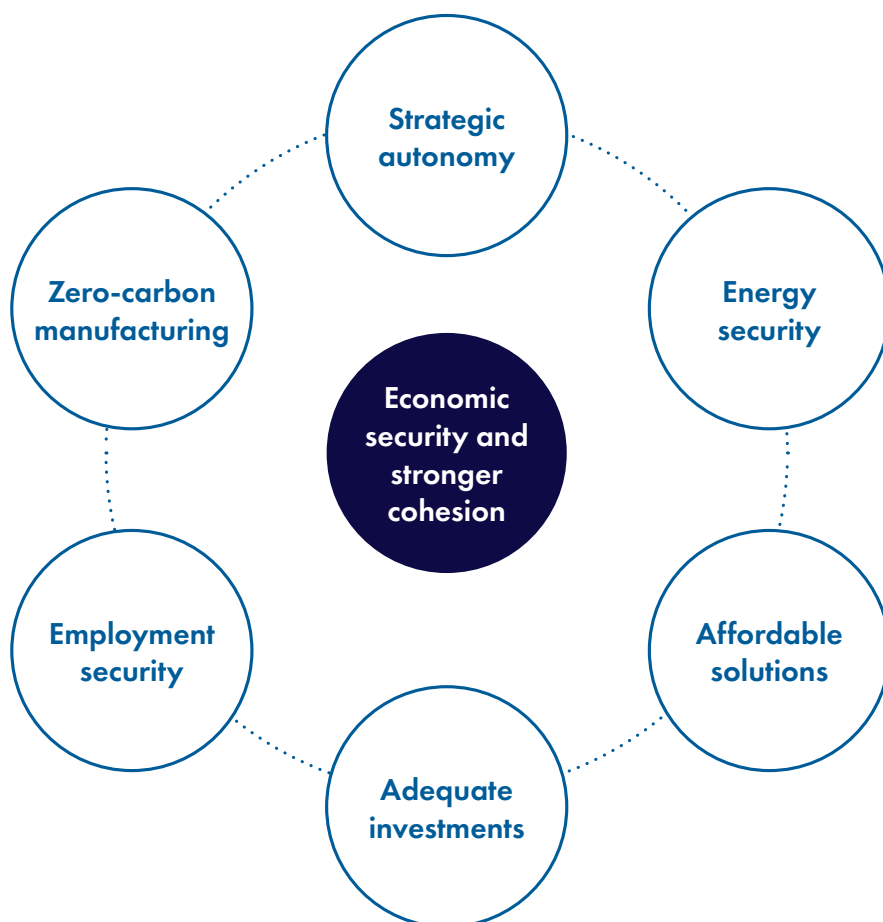


Figure 1.
Strategic Perspectives' key components for strengthening economic security and cohesion within the EU

scenario lays out a pathway to a net 90% greenhouse emission reduction by 2040: stronger energy security, an European Industrial Strategy, a new financial architecture, and improved economic partnerships with developing countries.

Securing access to affordable energy across the EU

While the EU has shifted its dependence from pipeline gas to liquefied natural gas (LNG) imports, the volatile international energy market has made its economy extremely vulnerable to price shocks, undermining its competitiveness. Decarbonising the EU's energy system can turn this trend around. The analysis shows that reaching a net 90% target can secure reliable and affordable energy for European businesses and households. **By 2035, the decarbonisation of the power sector can reduce electricity prices by 12% and household energy bills by two-thirds. This represents a potential savings of up to €449 billion for society by 2040.** The electrification of the economy will contribute to restoring the EU's competitiveness by decreasing its vulnerability to fossil fuel price volatility and geopolitical threats.

If well-designed, the next steps of the EU's net-zero transition can be turned into a proper energy security strategy. The triple development of a strong electrification of the economy, the scale-up of renewable energies, and clear efficiency gains has the potential to grow the EU's energy independence. **Our analysis shows that spending on gas, oil and coal imports could be reduced by €856 billion by 2040, resulting in major savings for the European economy.**

Impetus for a new European Industrial Strategy

Recently adopted EU climate laws have made Europe an attractive destination for green investors⁵ as they provide a clear transition pathway and predictability,⁶ but this is only the beginning. A competitive gap still exists in comparison to the US and China and turns into

a challenge for economic security and social cohesion. **The EU's industrial sector is at a crossroads, either its competitiveness gets a boost through a new European Industrial Strategy or concerns about a deindustrialisation might come true.**⁷

Today, companies are exposed to the high economic costs of the dependence on gas, oil and coal. Energy prices are twice as high in Europe compared to China and the US, putting EU industrial sectors under economic pressure.⁸ Unlike their counterparts in China, European actors do not take full advantage of their domestic market in order to reduce costs and generate economies of scale due to a lack of integration of value chains at the European level. In addition, the EU's investment approach lacks simplicity and effectiveness, especially when compared to the US, and combining EU and national funding is hardly possible. This is even more relevant as the economic conditions of the transition to zero-carbon technologies are capital-intensive. Rising interest rates due to inflation have made it difficult for developers and suppliers to secure financing at profitable margins, resulting in a temporarily weaker business case.

A holistic European Industrial Strategy that combines political commitment, sufficient funding and investment with employment security can be a game changer. It can strengthen the EU's strategic autonomy. The Net-Zero Industry Act (NZIA) is a first attempt at building net-zero manufacturing in Europe, setting the right tone on the need to strengthen economic security. However, despite a general production target and a shift in public procurement, it falls short of a solid vision of providing the necessary financial support for integrated value chains and scaling up manufacturing.

The analysis shows that a European Industrial Strategy is necessary and will bring many benefits. The cumulative investments are €668 billion between 2023 and 2040. In return, this can create €233 billion of new economic activity in industrial sectors, increasing the productivity of the economy. **In total, 2.1 million new jobs will be created across net-zero industries by 2040, 1.6 million of which already will be by 2035.** This could be especially beneficial in regions facing multiple transitions in order to provide employment security. **In a decade, Europe will move from being a green consumer to a green producer.** Without a coordinated strategy, the EU continues to be a large net-importer of

zero-carbon technologies, with persisting vulnerability to supply risks and geopolitical tensions. With an industrial strategy, the EU can reduce imports of materials by at least €42 billion and zero-carbon technologies, such as electric vehicles and heat pumps, by at least €91 billion per year between 2030 and 2040. This will contribute to de-risking from China and facing up to the US competition.

A new financial architecture

The EU faces multiple challenges which could result in competition between investment priorities. Supporting Ukraine, scaling up the defence industry, rapidly deploying zero-carbon technologies, modernising European industry, and addressing the energy and cost-of-living crises are among the key priorities for existing funding. Investing in the EU instead of in imports of technologies and materials is a major opportunity to increase economic activities, create jobs and strengthen economic security.

A new financial architecture can provide an answer to the investment deficit on economic security by combining three levels: **Firstly, a better coordination of national investments is required.** Important Projects of Common European Interests (IPCEI) offer a good framework for pulling national and European resources together so as to avoid distortion in the single market. National governments could have additional flexibilities on state aid for European projects, so long as they align with the 90% climate target. This could go hand-in-hand with a European One-Stop-Shop for companies which allows for an easy overview of available funding at EU and national level.

Secondly, a European Green Deal Investment Fund, backed by its own robust resources, could support common investments into the transition, especially in countries with more fiscal constraint. The end of NextGenerationEU will reduce European investments in climate action by €35 billion per year from 2026.⁹ A new fund can fill this gap.

Thirdly, the mobilisation of private finance will be essential. The completion of the Capital Market Union can remove national barriers for savings and incentivising banking products at the single market scale in the medium term. This will also contribute to mobilising long-term investments.

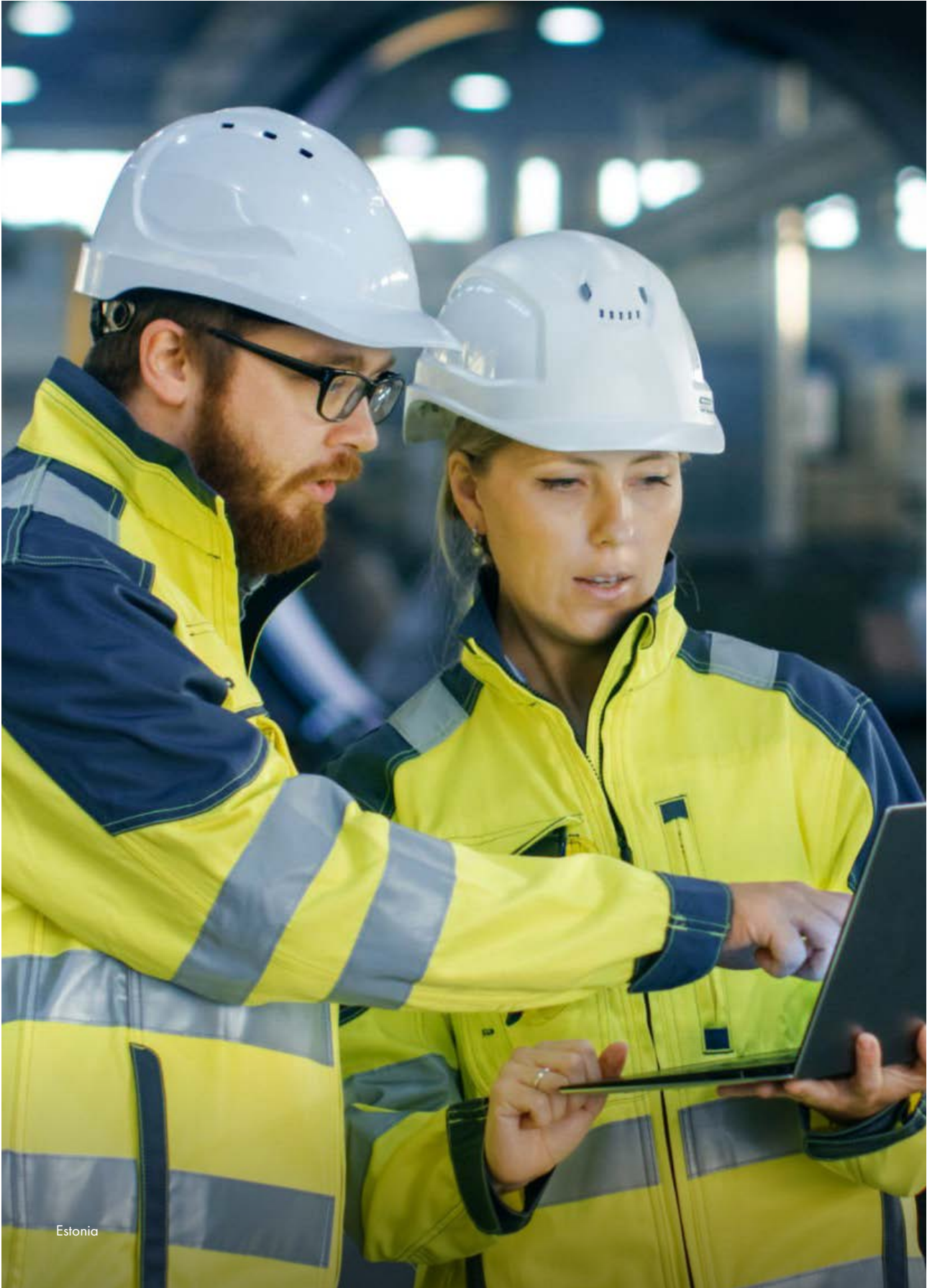
New economic partnerships to advance global decarbonisation

An international race to the top on zero-carbon technologies is underway, with China, the US and the EU in the lead. A European Industrial Strategy will increase the manufacturing of zero-carbon technologies within the EU, strengthening its competitiveness globally. However, even by scaling up domestic production of strategic zero-carbon technologies, as defined in the NZIA, the EU will never be fully auto-sufficient.

Supporting the manufacturing and deployment of zero-carbon technologies in low- and middle-income countries can foster their sustainable development pathways as well as bring down global technology prices. More countries will be able to join the race to the top on zero-carbon technologies and benefit from this new industrial era. Thus, there is a strong incentive for the EU to engage better partnerships so a triple-win can unfold:

1. Greater supply chain resilience can be achieved through a diversification of EU imports for what is not produced domestically.
2. Stronger economic and diplomatic ties can be built with like-minded countries who believe in a rules-based global world order and want to enhance their own economic security through the transition.
3. Opportunities can emerge for cooperation between EU businesses and non-EU companies in creating jobs and zero-carbon value-chains in third countries.

With more countries manufacturing and deploying zero-carbon technologies, a global race to the top will emerge. At the same time, future-proof jobs and prosperity can be created while reducing global greenhouse gas emissions.



Estonia

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Methodology

This analysis was undertaken with the global macroeconomic model E3ME by Cambridge Econometrics, which has been part of several studies on the economic impacts of decarbonisation pathways and policies both in Europe and globally. It is a model of the world's economic and energy systems and the environment, which can provide a comprehensive socio-economic analysis of policies':

- direct impacts, for example, reduction in energy demand and emissions, fuel switching and renewable energy;
- secondary effects, for example, on fuel suppliers, energy price and competitiveness impacts;
- rebound effects of energy and materials consumption from lower prices, spending on energy or higher economic activities; and
- overall macroeconomic impacts on jobs and the economy, including income distribution at macro and sectoral levels.

The modelling exercise for this report examines the energy and socioeconomic outcomes of three scenarios:

1. **A business-as-usual scenario ("EU Reference Scenario")**: calibrated to the EU's existing measures which have been implemented to date.
2. **Strategic Perspectives' 90% net greenhouse gas emission reduction policy scenario ("Visionary Scenario")**: aiming to reduce greenhouse gas emissions by 90% by 2040 relative to 1990 levels as modelled by CLIMACT (see Annex for a complete list of variables calibrated for the pathways).¹⁰

3. **An industrial policy scenario**: utilising the same basis as the 90% net reduction policy scenarios but includes additional measures to support the decarbonisation of the current industrial base and build net-zero manufacturing technologies in the EU-27 countries. This includes policies related to targeted import content and investment support (see Annex for full details).

A number of assumptions are made in the above scenarios including:

- The Emission Trading Scheme (ETS) prices and implementation of a carbon market for transport and buildings from 2027 (ETS2);
- Short-term fossil fuel price disruptions that have arisen from Russia's war on Ukraine;
- The use of ETS revenues for transition-related policy costs (with shortfalls/surplus recycled through tax adjustments);
- The implementation of the Carbon Border Adjustment Mechanism (CBAM) from 2026; and
- Net-zero or decarbonisation targets (such as Nationally Determined Contributions (NDCs), which set targets for mitigating greenhouse gas emissions) for countries outside of the EU.

The E3ME modelling was complemented by additional off-model estimations which build off the model's assumption and energy transition pathways provided by CLIMACT to assess the value of key material and low-carbon technology imports, and the potential scale of net-zero manufacturing jobs across the different scenarios. These calculations use a combination of econometric forecasting, projection from historical trends, and scenario analysis techniques (see Annex for full details).

Securing access to affordable energy across the EU


Energy security has risen to the top of the political agenda in response to Russia's war on Ukraine. The war continues to highlight the high political and economic costs of an economy dependent on cheap access to gas, oil and coal. This geopolitical exposure to Russian pipeline gas has evolved to a geoeconomic dependence on LNG, largely imported from the US and Qatar, but also from Russia. This helped to prevent major disruptions by ensuring the European gas supply lasted through the past winters. However, LNG is traded on a global, volatile gas market and is generally both more expensive and polluting compared to pipeline gas.¹¹ In fact, some industrial sites ceased production citing high energy prices, especially in the paper and glass industries. Furthermore, energy poverty has increased to the highest levels since 2015 as a direct result of the energy crisis.¹² A high reliance on expensive fossil fuels will continue to negatively impact both the European economy and households. **Today, energy prices are twice as high in Europe compared with China and the US, undermining the competitiveness of the EU.**¹³

The EU initiated a structural decline of gas consumption by increasing its renewable energy production and energy efficiency goals. If the European Green Deal is fully implemented by 2030, a third of all EU oil and gas consumption could be cut.¹⁴ Achieving the goals set out in the 2030 laws would also see renewable energy deployed 3.2 times faster than in the last two decades, resulting in reduced electricity prices for households and industry.

These early successes of the European Green Deal can form the foundation of a transformation in line with a 90% net greenhouse gas emissions reduction by 2040.

If well-designed, the next steps of the EU's net-zero transition can be turned into a proper energy security strategy. The triple dynamic of electrifying the economy, scaling up renewable energies, and improving energy efficiency has the potential to significantly increase the EU's energy independence. According to the Visionary Scenario, approximately half of the EU's economy can be electrified by 2040, significantly reducing gas, oil and coal use. **Any delay in phasing out fossil fuels in the power sector undermines the decarbonisation efforts of these sectors.** The scenario thus envisages a largely decarbonised electricity sector by 2037, with coal already being phased out by 2030. Electricity demand is expected to be approximately 4019 Terawatt hours (TWh) by 2040, compared to 2780 TWh in 2019. Assuming an 80% share of renewables in the electricity mix by 2040, this means installing an additional 70 Gigawatt (GW) per year. **This installation rate was surpassed in 2023, with a record of approximately 56 GW of solar¹⁵ and 17 GW of wind¹⁶ (14 GW onshore, 3 GW offshore) capacity added.**

As a result, our analysis shows that gas, oil and coal imports could be reduced substantially, saving up to €856 billion of fossil fuel imports between 2025 and 2040. In addition, this becomes an important security asset.

A photograph of an offshore wind farm and an oil rig in the North Sea. The wind turbines are white with red-tipped blades, and the oil rig is a complex structure with yellow legs. The sky is blue with white clouds, and the sea is dark green with whitecaps.

A 90% climate target can:

Save

€856 billion

in gas, oil and coal imports
by 2040.

Cut household energy bills by

2/3

by 2035.

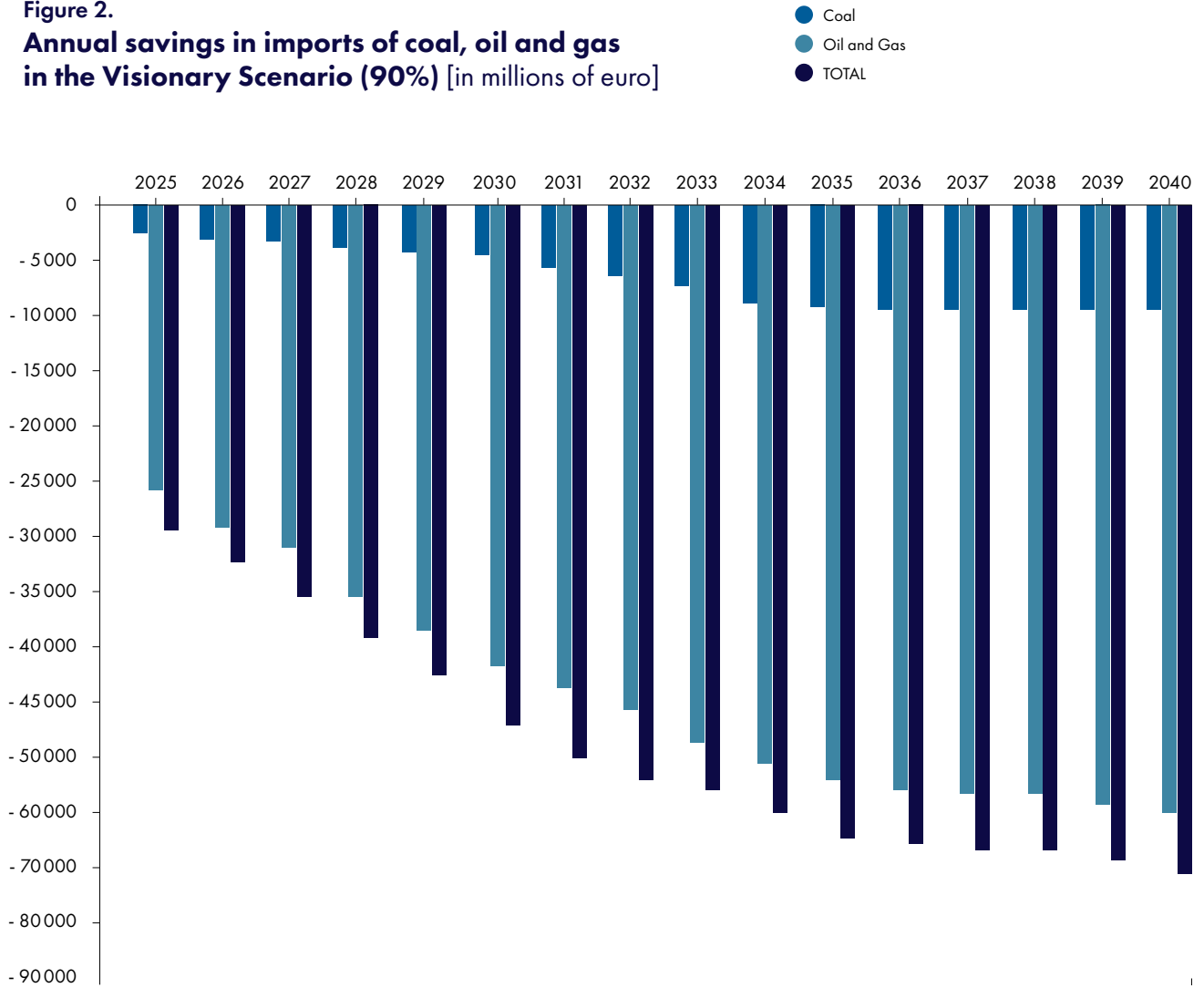
Reduce electricity prices by

12%

by 2035.

Germany

Figure 2.
Annual savings in imports of coal, oil and gas
in the Visionary Scenario (90%) [in millions of euro]



This transition can also provide reliable and affordable energy, securing supplies for European businesses and households. Decarbonising the power sector allows for strong competitiveness gains. **Wholesale electricity will already be 12% less expensive in a predominantly decarbonised energy system compared to in a fossil fuel-dependent one (the business-as-usual scenario) by 2035.** Together with the electrification of the economy, this will contribute to restoring Europe’s competitiveness by making it less vulnerable to fossil fuel price volatility and geopolitical threats.

Similarly, reaching a 90% greenhouse gas emission target provides a structural answer to the cost-of-living crisis. Deploying heat pumps and EVs, equivalent to 46% of the heating sector and 86% of the car fleet,

respectively, renewable electricity, as well as the tripling of the renovation rate for buildings will significantly reduce household energy bills. **On average, climate-friendly equipment like EVs, heat pumps or smart metres will cut energy bills by two thirds in the next decade, and by eight by 2040.** A total of approximately €449 billion can be saved across EU households by 2040. Policies targeted at low- and middle-income households will be essential to mitigate the upfront costs.

Planning the energy transition beyond 2030 is both a cost-effective and strategic choice. New enabling policies can be designed in the next mandate to reach this level of energy security and maximise the benefits for both European society and its economy.

A zero-emission electrification framework

The triple dynamic of electrifying the economy, decarbonising power, and generating efficiency gains can all contribute to reducing fossil fuel imports. Setting a clear end date for coal, oil and gas use is, therefore, the best economic and security choice. **Given the levelized cost of electricity (LCOE) is lower for renewable energy compared to fossil fuels, electrification also becomes a compelling business case.** The carbon market alone will drive neither electrification nor sufficient electricity production. A zero-emission electrification framework can thus be designed to ensure:

- **Concrete incentives for electrification across all sectors:** The CO₂ standards in the transport sector provide a clear transition plan to EVs; this is not yet the case in other sectors. Incentives would be particularly critical in those industrial sectors which can be directly electrified.
- **Electricity production of 4019 TWh:** Any shortage of fossil-free electricity could lead to coal or gas being used to close the demand gap, which can result in increased electricity prices. Predictable trajectories for renewable deployment is crucial.
- **Optimisation of energy efficiency in electrified equipment and buildings:** A stronger incentive scheme to reduce electricity use is the only way to avoid significantly increasing demand for electricity, which then would require even higher power production levels.

Electrification as an effective way to decarbonise sectors

In many sectors, electrification is the best business model for decarbonisation, particularly when zero-emission electricity is more affordable. According to the Visionary Scenario, approximately half of the EU's economy can be electrified by 2040, largely replacing gas, oil and coal use. In concrete numbers, this means that 86% of the car fleet, 58% of all heating and 63% of the industrial energy demand across the EU will require zero-

emission power in order to effectively decarbonise. In the Visionary Scenario, only 17.4% of the final energy consumption would depend on fossil fuels by 2040. The remaining fossil fuel use is largely oil, predominantly consumed in the transport sector and as feedstock (raw material) for the chemical industry. These results are comparable with the European Commission's goal of an 80% reduction in fossil fuel consumption by 2040. However, the Visionary Scenario foresees a zero-emissions power sector by 2037 to effectively decarbonise the electrified sectors. **A zero-emission electrification framework can specify which shares of sectors can electrify until 2040 and beyond.**

CO₂ standards for cars and trucks are already providing a clear and predictable transition plan which supports manufacturers in the development of electric engines and batteries. In anticipation of the law, several car companies are already planning to only sell electric cars after 2030: Renault, Mercedes-Benz, Stellantis, Volvo, Jaguar and Ford.¹⁷ As a result, EV sales in Europe increased by 37% in 2023 compared to 2022, meaning that 1.5 out of every 10 new cars sold were electric.¹⁸ While the Commission expects around 57% of the fleet to be electrified,¹⁹ we assume 86%, also due to the foreseen price parity for 2026 already. In order to lower the oil demand, additional policies may be needed to accelerate the renewal of the existing fleet, such as minimum quotas on EVs in corporate car fleets.

A similar transition plan can be required in other sectors, such as heating, to consolidate electrification trends. Despite strong deployment in 2022, heat pump sales and installations seemed to decline by the end of 2023.²⁰ If confirmed, this could slow down the phase-out of gas, oil and coal heating systems by 2040 as foreseen by EU law.²¹ The share of electrified heating can reach 58% (without district heating), of which 12% by electric heating and 46% by heat pumps, by 2040. This requires defining clear sector targets to consolidate market trends, such as was done in the Netherlands with their national gas phase-out strategy.²²

The potential in the industry sector is discussed in Chapter II.

Achieving a fossil-free power sector by 2037

A secure supply of sufficient and affordable energy for households and industries can only be achieved through proper planning. Electricity demand is expected to increase to approximately 4019 TWh by 2040 compared to 2780 TWh in 2019. **Setting a zero-emission electricity production target in the electrification framework can ensure an adequate level of electricity is generated.** Any delay in phasing out fossil fuels in the power sector undermines the decarbonisation efforts of other sectors. A complete decarbonisation of the electricity sector by 2037 is feasible, with coal already being phased out by 2030.

Renewables are the only rapidly deployable source of energy that could match the pace of growing demand in the electrification trajectory of all sectors. **70 GW of solar and wind power are required to be installed per year.** The European Green Deal already provides a strong incentive for the deployment of renewables.²³ This rate has already been surpassed in 2023, with approximately 56 GW of solar²⁴ and 17 GW of wind²⁵ (14 GW onshore, 3 GW offshore) capacity added. In 2023, renewables reached a record of 44% of Europe's electricity mix,²⁶ reducing gas and coal power generation by 15% and 26% respectively. This sets an unprecedented and structural shift. One driver for this acceleration has been the demand by companies for affordable renewable energy through

power purchasing agreements. According to market analysts, a record 16.2 GW have been concluded through contracts in 2023.²⁷ This strong demand from companies is a clear sign of what is still to come when more and more sectors advance electrification.

Plans by a number of countries to build new nuclear capacities of up to 150 GW by 2050 could also contribute to the electrification goals.²⁸ However, given the regular delays of construction, as well as the current phase-out processes in some countries like Germany and Spain, the Visionary Scenario assumes its stabilisation to around 100 GW by 2040. Planning grid expansions and modernisation will also play a key role in enabling a high share of renewable energy to penetrate the grid. **Decarbonising the power sector quickly can be a game-changer for the EU's competitiveness.** Renewables can reduce the price of wholesale electricity by 12% by 2035 compared to 2020.

While these trends and record deployment of renewable energy are encouraging, there is currently no safeguard in the system that would prevent higher electricity demand from being met by fossil fuels until 2040. **Clear end dates for coal and gas provide predictability for workers and is the only way to allow for a just transition.** Ending the dependence on volatile and often unreliable fossil fuel imports also allows for redirecting the money towards European energy production and a skilled workforce. Coal can be effectively phased out of the power sector by 2030 as the expected carbon price

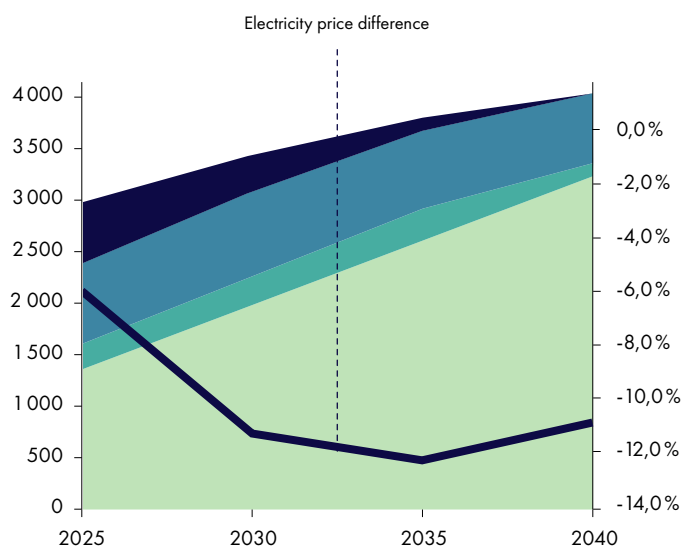


Figure 3.
Evolution of the electricity production [in TWh] in the Visionary Scenario (90%) and the changes in electricity prices compared to a business-as-usual scenario

- Fossil
- Nuclear
- Biomass
- RES

at approximately €130 per tonne of CO₂ will make coal unprofitable.²⁹ There remains a risk that the transition of workers is not prepared because only a few EU countries have adequate coal phase-out and just transition plans. The current just transition framework can be complemented by a clear end date for coal so that national governments can anticipate the phase-out, similar to how it was done in Spain and Greece in recent years. Approximately 230,000 people work in the coal industry, whether in mining or power plants, mainly in Poland, Bulgaria, Germany, the Czech Republic, Greece and Spain.³⁰ Only sufficient planning at the national level can provide employment security in coal regions and treat coal workers as assets in the transition.

The new electrification framework and revised version of the European Climate Law can set clear end dates for coal, oil and gas in each sector.

Efficiency gains to maximise electrification benefits

Electrification with a high renewable energy share can already lead to efficiency gains, given that over 60% of primary energy is wasted as heat when electricity is produced from fossil fuels.³¹ Accompanying measures can moderate the overall growth in electricity needs and maximise its cost-effectiveness.

The regular upgrade of the Ecodesign Directive will allow continuous improvement of efficiency standards for all electrified equipment. It incentivises smaller and lighter equipment, such as batteries and vehicles, or more efficient technologies. The Ecodesign Directive can become an integrated pillar of the new electrification framework, once it covers all electrified equipment.



The fair distribution of climate-friendly solutions

Households were highly impacted by the energy crisis in 2022. Their dependence on gas, oil and coal for their mobility, heating and electricity needs resulted in high energy bills. In addition, fossil fuels drove high inflation, generating a major cost-of-living crisis.³² **Only climate-friendly solutions, such as heat pumps, home renovations or EVs can shield households from this crisis and structurally cut energy bills.** However, for as long as upfront costs remain too high for low- and middle-class households, this potential gain will be unevenly distributed across society. Policies at the European and national levels can support a more affordable transition for all.

Making climate-friendly solutions more affordable maximises benefits for society

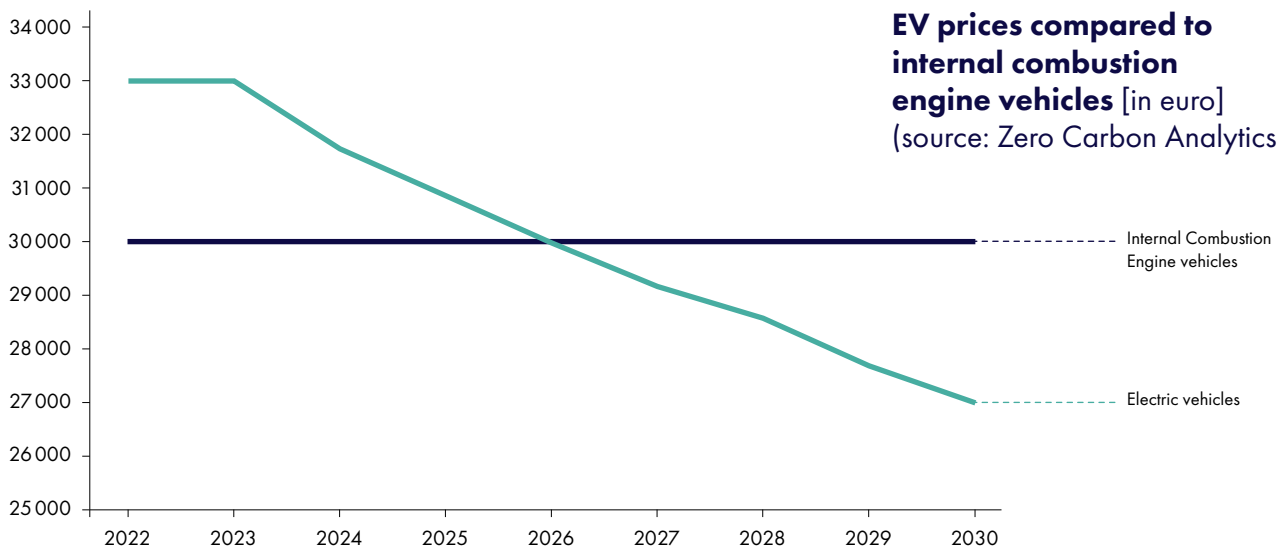
The net-zero transition has the potential to improve the quality of life for millions of EU citizens. The implementation of the European Green Deal laws can already cut energy bills by a quarter by 2030 and reduce electricity prices by 7%.³³ This is based on a high share of

renewables providing cheap electricity in the medium term. If the decarbonisation of power continues, electricity prices can be reduced by 12% by 2035.

Today, very few buildings are renovated.³⁴ A renovation rate of 3% from 2030 to 2040 is an essential lever to limit the growth of electricity demand and reduce energy bills for households and businesses. This is especially relevant with energy poverty on the rise in recent years, reaching 9.3% of households across the EU.³⁵

Some climate-friendly equipment could reach price parity with fossil fuel ones, especially in the context of high gas and oil prices. This is already the case for heat pumps in France,³⁶ Bulgaria, Greece, Ireland, Slovenia and Spain when taking into account both installation and operation costs. Public support for heat pump purchases, as well as reducing electricity taxes, can levelise prices in the EU, especially as an increase of households' investments in heat pumps is required in the next ten years.

A similar development is happening in the EV market. The recent uptake of EVs should enable price parity with internal combustion engine vehicles to be reached by 2026.

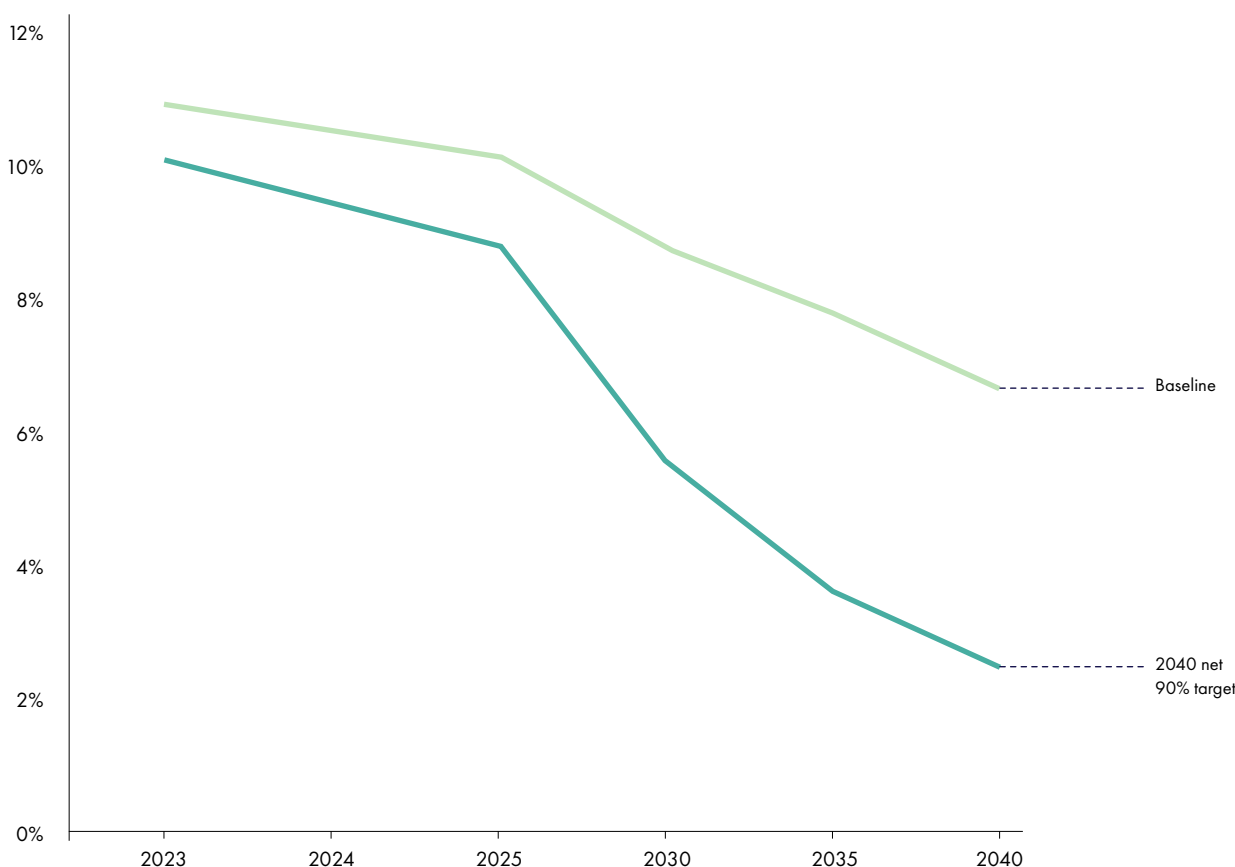


Nevertheless, this does not yet mean that EVs are affordable for all middle-income households. The recent sharp increase in the price of new electric and fossil fuel vehicles in Europe is delaying the rapid renewal of the fleet. On average, the retail sale for a medium-sized EV has increased by €10,000 between 2020 and 2023.³⁷ This is driven by the fact that European car manufacturers seek to make their margins with sport utility vehicles (SUVs) instead of small, low-emission vehicles. SUVs account for 51% of car sales in Europe. **Incentivising smaller and lighter EVs, as well as growing the second-hand market, are key components in making EVs more affordable, increasing the share of low-emission vehicles on European roads.** Policies that support the rapid

conversion of corporate fleets to EVs could significantly amplify this development, as the average use of a car in the corporate market is only four years.³⁸ The Netherlands have implemented a good incentive for companies to green their fleet by reducing value-added tax (VAT) and other taxes on EVs.³⁹

If all policies are implemented to ensure access to climate-friendly equipment, households will be able to cut their energy bills by two thirds in the next decade by eight by 2040. This is an economic gain that accounts for €449 billion in total. This demonstrates that the net-zero transition can act as a strong shield against the cost-of-living crisis and protect households' budgets.

Figure 5.
Share of households' energy and fuel expenditures in their total budget



Targeting climate-friendly solutions for households that need them most

The EU Social Climate Fund (SCF) opens the door for a better and more targeted climate policy, supporting low- and middle-income households in accessing climate-friendly equipment. Valued at €86.7 billion between 2026 and 2032, the SCF has the potential to become a promising instrument in supporting access to net-zero solutions. Designing policies that target low-and middle-income households so they will not be affected by the future carbon market is key.

Good examples of a more targeted climate policy exist in national governments. The public 'social leasing' offer for small EVs in France⁴⁰ has been oversubscribed, reaching close to 100,000 demands for just 50,000 available EVs.⁴¹ The scheme aims to offer an EV to any low-and middle-income households in need of a car for only €100

per month. This is a very promising model which has the potential to make EVs more affordable, although this needs to be largely scaled up in order to match demand.

Similar schemes exist for the renovation of buildings and the shift to renewable heating. **The Irish⁴² and Czech⁴³ governments, for example, have both launched schemes to cover 100% of renovation costs for the most vulnerable households and people on social assistance.** Both cases marry financial support with simple service access assistance.

Governments can use the carbon market (ETS) revenues and the windfall profit tax on fossil fuel companies to finance redistribution policies which effectively deliver climate-friendly solutions to the households that can benefit the most. This was successfully done in Spain wherein rail climate tickets were financed for workers. Regardless, strengthening the SCF may be necessary to scale up these schemes across Europe to ensure a strong social climate policy beyond 2030.

Strategic Perspectives thus calls for a zero-emission electrification framework, which includes:

- A zero-emissions electricity production goal in the range of 4000-4100 TWh for 2040, and interim milestones per electricity source to ensure enough new renewable energy capacities are deployed to meet sectoral demand. A stable nuclear base can support this goal.
- Clear end dates for coal and gas across sectors to provide predictability for workers and is the only way to allow for a just transition.
- Ecological and efficiency standards for electric equipment such as EVs and heat pumps to optimise the efficiency of electrified end uses and limit the demand for raw materials.
- A fair distribution of climate-friendly solutions through an amplified SCF and a platform for exchanging national best practices that make electric equipment affordable and accessible for all households.



Spain

Impetus for a new European Industrial Strategy

Investing in a European Industrial Strategy is a strategic choice to improve economic security and cohesion within the EU and back the net-zero transformation. It has the potential to put Europe on track for a 90% climate target by 2040, while simultaneously making Europe a strong industrial powerhouse.

In the global race to the top on zero-carbon technologies, the Green Deal has positioned the EU at the forefront of the competition, creating a market which will be worth \$117 billion USD per year by 2030.⁴⁴ However, a large part of this demand is currently supplied by Chinese manufacturers, which creates an important geoeconomic and political risk. China accounts for 60% of the zero-carbon technologies value chain, with ambitions to become the green factory of the world.⁴⁵ As a reaction, the IRA has unlocked the US's potential to quickly catch up and attract major industrial projects, create jobs and foster innovation.⁴⁶ EU climate laws have made Europe an attractive destination for green investors as they provide a clear transition pathway and predictability,⁴⁷ but it is not enough to build a strong industrial base. There is untapped potential for an enabling environment that can ensure businesses thrive and for reindustrialising regions facing multiple transitions.

A new European Industrial Strategy can complement the Green Deal and together, they can become the new prosperity agenda for the EU. The 90% climate target by 2040 can be the first brick of such a strategy by providing an overarching view of material and component needs across sectors. This can provide the basis for a discussion about which materials and technologies will

be manufactured in the EU and which will be imported. The European carbon market (ETS) alone cannot deliver a robust industrial transformation; a broad set of additional policies is needed. A European Industrial Strategy that coordinates national governments can combine:

- **The creation of an integrated European value chain** including a mine to technology approach to reduce supply chain risks and maximise the territorial development of the new industrial era in Europe.
- **The modernisation of the current industrial base** through electrification and circularity.
- **The reform of the single market** so it is fit for net-zero and supports the continuous improvement of EU-made technologies through lead markets and public procurement.

Only through a holistic industrial strategy can the EU capture the benefits of the new industrial era.



**A new European
Industrial Strategy
can:**

Create

2 million jobs

in net-zero industries, and
already 1.6 million by 2035.

Reduce material and technology
imports by

€134 billion

per year.

Require a

€668 billion

investment into the European economy.

Germany

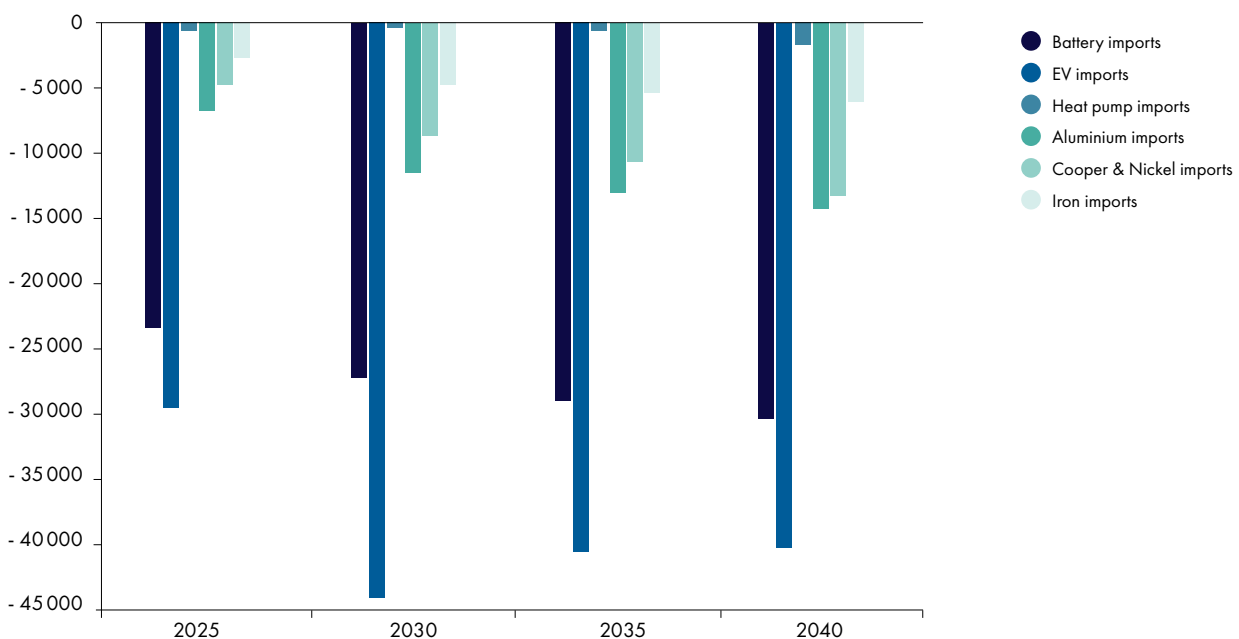
Turning the net-zero transition into climate jobs and reindustrialisation: the role of a European Industrial Strategy

The net-zero transition could turn into a robust reindustrialisation of the economy through a holistic European Industrial Strategy. This strategy can complement and secure the implementation of the Green Deal and be the backbone of a 90% climate target for 2040. The necessities are threefold: First, decarbonising and incentivising circularity of the current industrial base to reduce exposure to gas, coal and oil prices and supply chain risks. Second, ensuring European economic security through manufacturing zero-carbon technologies domestically. Third, increasing investments in building factories and generating jobs in the EU.

These necessities can largely reduce geoeconomic dependencies. Following the NZIA benchmark, 60% of

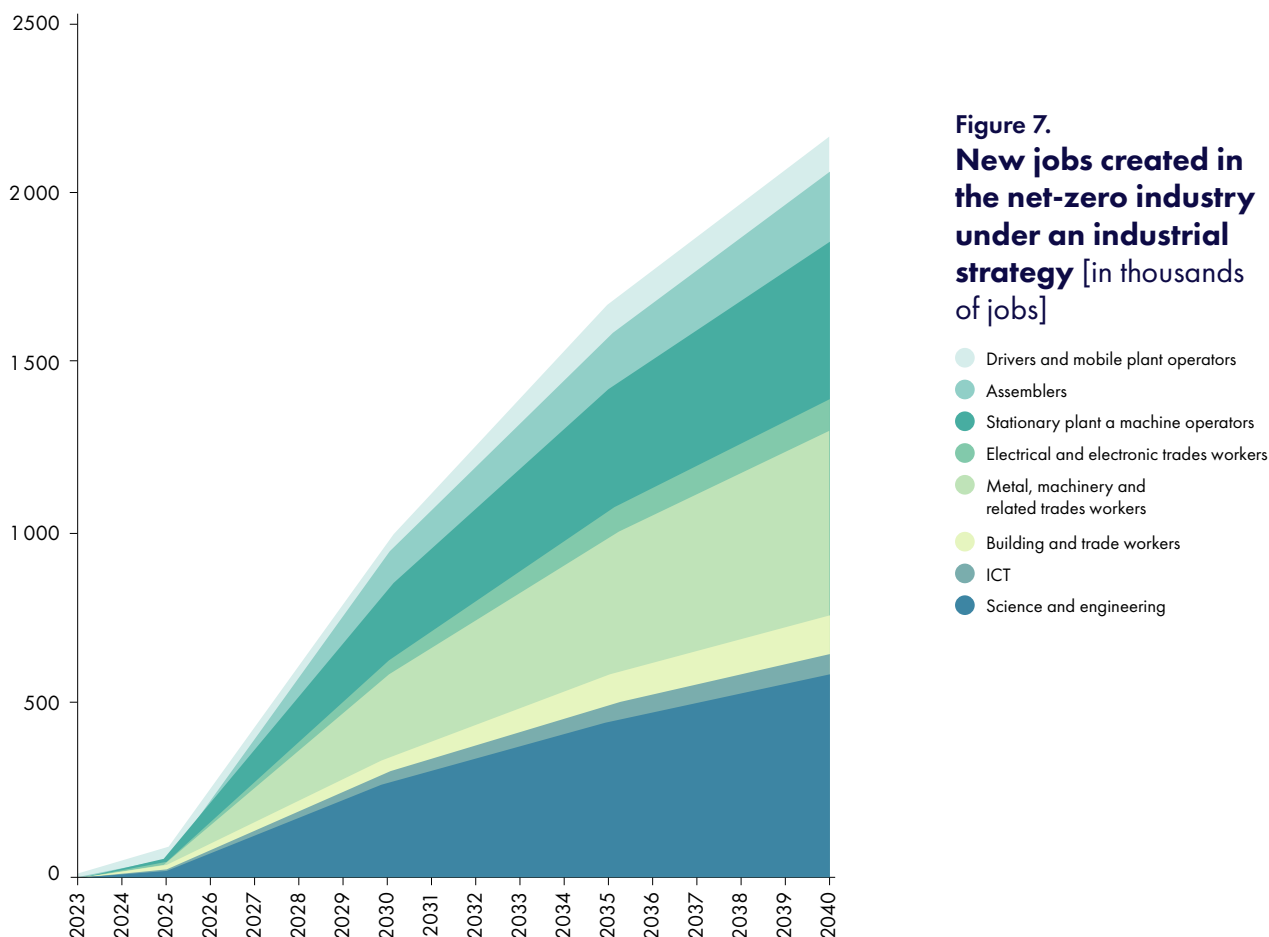
heat pumps, 85% of wind power, 90% of batteries, 100% of electrolysers and 45% of solar used for the transition could be produced in Europe by 2030.⁴⁸ Imports of zero-carbon technologies such as heat pumps, EVs and batteries could be lowered to an annual savings of at least €91 billion by 2040. Similarly, the circular economy uptake can reduce annual material imports such as aluminium, iron and copper by at least €42 billion by 2040. In the next decade, Europe will move from being a green consumer to a green producer. This will contribute to de-risking from China, facing up to the US competition and strengthening strategic autonomy. Without a coordinated industrial strategy, the EU continues to be a large net-importer of zero-carbon technologies, maintaining the vulnerability to supply risks and geopolitical tensions.

Figure 6. Import savings for key materials imports (aluminium, copper, nickel and iron) and key zero-carbon technologies (EVs, batteries and heat pumps) under an industrial strategy [in gross euro]



Our analysis shows that, with a European Industrial Strategy, 1.6 million additional green jobs can be created in manufacturing by 2035, with a total of 2.1 million by 2040. **If the strategy supports the construction of new factories in regions facing multiple transitions, it will maximise the benefits to the economy through reindustrialisation and improved cohesion.** This is already happening with the emergence of a European

battery valley in Hauts-de-France; a heat pump valley in Silesia, northern Czechia and Slovakia; and a robust wind value chain in northern Spain. Similarly, the transformation of existing industries to produce green steel or recycled glass can help restructure entire regions. **Investing in the EU is an opportunity to seize the new era of industrialisation.**



Without an industrial strategy, the climate target risks uncoordinated government action, and a high CO₂ price could unnecessarily increase companies' production prices. This could lead to a decline of the manufacturing sector in the European economy while the industrial strategy would not only maintain the current strong industrial base but strengthen it. The productivity gap has worsened between the US and EU economies in recent years.⁴⁹ **A European Industrial Strategy has the potential to increase the productivity of European net-zero advanced manufacturing by 10%, generating more than**

€233 billion value-add by 2040, boosting Europe's competitiveness.

Additional investments needed for an industrial strategy are estimated to be approximately €668 billion more compared to reaching a 90% climate target by 2040 without an industrial strategy, however, this brings major benefits for the European economy. Investing in a European Industrial Strategy is an opportunity to increase competitiveness and economic resilience, create jobs and strengthen our supply security.

Resilient and competitive European value chains through domestic manufacturing of zero-carbon technologies

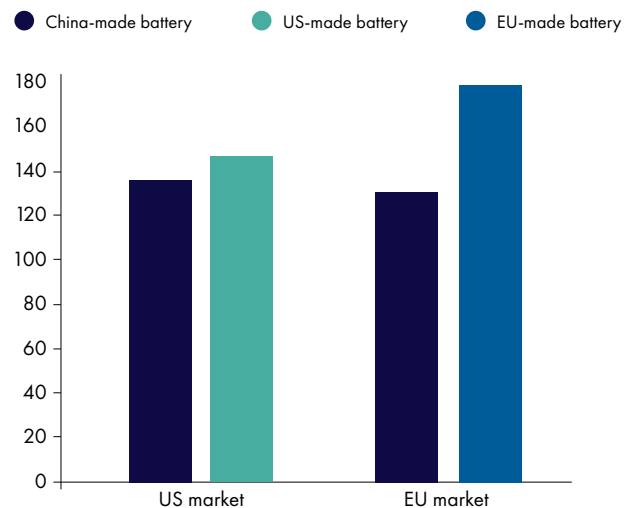
The lack of integrated zero-carbon technology value chains is both a major economic security risk and a competitive disadvantage for Europe in the global net-zero industrial race. The NZIA introduces a 40% EU production target for strategic technologies. Achieving this requires scaling up support for EU manufacturing and building integrated value chains in Europe: from the mine to the technology and recycling. This is the only way to ensure a minimum supply security and create robust European industries as set out in the NZIA. A diversification of supply chains through new economic partnerships is also key to reduce the dependence on single importers.

Directly supporting EU production of zero-carbon technologies

In 2023, an EU-made battery was, on average, 32% more expensive than a China-made battery delivered to Europe.⁵⁰ The US managed to reduce this difference down to 7% in 2023. Similarly, the average retail price of a medium-sized EV sold in Europe is €12,000 more expensive than a China-made EV. Trade measures can only partially reduce the competitiveness gap, but they will not structurally strengthen the European industrial base.

As long as significant economies of scale are not achieved and the competitiveness gap between manufacturers in the EU and China remains substantial, increasing production in Europe will require targeted public investment, both in capital (CAPEX) and operations (OPEX), in order to reduce production costs and help expand activities. Public support, taking the form of tax credit, direct support and de-risking, will be essential in reaching the mining, refining, recycling and manufacturing targets included in the NZIA and the Critical Raw Material (CRM) Act.

Figure 8.
Price difference between China-made batteries, US-made batteries and EU-made batteries, delivered in the EU and US markets in 2023 [in USD/KWh] (source: Zero Carbon Analytics)



A net-zero industrial base is already under construction in Europe, particularly in the battery sector, where manufacturing increased by 90% in 2022 to 130 GWh of production capacity per year.

Industrial manufacturing projects for heat pumps and batteries will reach a minimum level to secure the supply of the European economy if the right policy environment is implemented, according to the International Energy Agency (IEA) forecast.⁵¹ The same is true for electrolyzers, where production could exceed domestic demand. **However, the European wind and solar industries are not performing as well.** Higher production costs and lower subsidies are making the European solar industry face a substantial competitive disadvantage. Only through innovation, targeted support and the production of future



generations of solar equipment can the sector compete and remain in the EU. For the wind industry, the recent economic disruptions linked to supply risks and energy prices have weakened the sector, putting investment at risk. The Wind Power Action Plan has been a useful first step, and more public support and a zero-emissions power goal can further strengthen its manufacturing base.

So far, EU funding is effective in supporting innovation, but falls short when it comes to scaling up to pilot projects followed by large-scale production.

Private finance is unlikely to invest in these risky phases, also known as “valleys of death”.⁵² Given the global competition on subsidy schemes, many EU governments feel obliged to match US support in order to attract and retain manufacturing in Europe. State aid is considered the

main tool, but this risks creating a ‘two-speed Europe’ as Germany⁵³ and France⁵⁴ are among the few countries with the fiscal space to access it. European public funding can fill the gap in supporting CAPEX and OPEX investments.

The Innovation Fund is often cited as most useful for companies and could expand its scope. In the short term, it can launch dedicated “zero-carbon technology manufacturing calls” supporting innovators and pre-commercial demonstration projects in scaling up to the market and operations. An initial call was recently launched on battery manufacturing which could serve as an example for other key technologies.⁵⁵ Some cohesion criteria could be applied to support the location of production sites in regions facing multiple structural changes to ensure a fair distribution of projects across all countries.

Building integrated value chains from the mine to technology and recycling

Beyond attracting factories, economies of scale and resilience can only be reached by building integrated value chains. The lack of industrial clusters and integrated value chains create a major economic risk. Although Europe has production facilities for EVs and a substantial mining potential, especially in Portugal and Sweden, it still imports most of the batteries and refined components. The vast majority of raw materials extracted are sent to China for refining, increasing the cost for European producers and maintaining critical vulnerabilities.⁵⁶ The recent bankruptcy of Volta Trucks, a Swedish leading manufacturer of electric trucks, after its US battery supplier decided to cut deliveries in order to focus on the US market, highlights the risk of only relying on external suppliers.⁵⁷ **Investing in the EU is also an opportunity to seize the new net-zero industrial era.**

A reform of the Important Project of Common European Interest (IPCEI) could support this development. Today, IPCEIs are perceived as too complex and too slow⁵⁸ and exclude many countries with fewer fiscal capacities.⁵⁹ A simplification of the framework and a pan-European supervision of the mapping and projects can ensure a robust development of value chains while ensuring the fair distribution of the factories. **If quickly deployed, IPCEI could be a powerful instrument for building an industrial base.**⁶⁰

Mapping the competitive advantages of each European region to identify potential synergies will be key to launch adequate European industrial alliances in strategic sectors. For instance, European battery alliances could be expanded to better integrate Portuguese lithium mines⁶¹ so they are connected to battery manufacturers in Spain or France, especially as Extremadura and Hauts-de-France are both becoming important European battery valleys. Joint industrial investments could be made to develop refining and recycling activities in Portugal, maximising the industrial

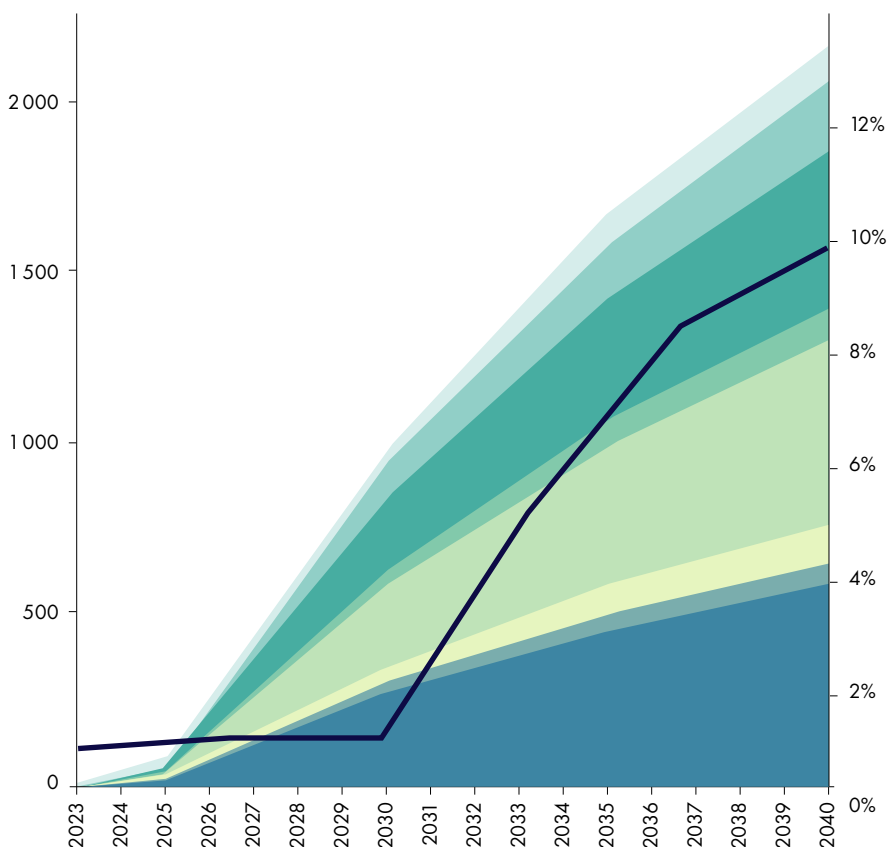


Figure 9.
New jobs created in the net-zero industry under an industrial strategy and increase of productivity compared to a business-as-usual scenario
[in thousands of jobs]

- Drivers and mobile plant operators
- Assemblers
- Stationary plant machine operators
- Electrical and electronic trades workers
- Metal, machinery and related trades workers
- Building and trade workers
- ICT
- Science and engineering
- Productivity evolution in the manufacturing sector

potential. Similarly, a heat pump action plan that identifies the needs of the sector could be launched.⁶² As a result, new heat pump clusters could emerge to develop more efficient, larger and fluorinated gas-free heat pumps. The 'heat pump valley' between Poland, the Czech Republic and Slovakia is well-positioned to lead this transformation.⁶³ The same can be said for Northern Italy, which could be part of a heat pump cluster, bringing together energy-intensive companies to provide innovation in industrial heat pumps.

More than a simple economic security asset, building integrated value chains in Europe can generate 1.6 million additional green jobs by 2035 and 2.1 million by 2040 in the manufacturing sector, reindustrialising entire regions and improving cohesion. The productivity of these sectors will increase by 10%, showing major innovation potential that can be harvested through new training and re-skilling programmes. The European Commission estimates that 10% of the workforce will need to be trained to be able to adapt to the net-zero transition each year.⁶⁴



Modernising Europe's industrial base

Decarbonising the existing industrial base is also a strategic decision, as these companies are the backbone of the net-zero transition. A European Industrial Strategy requires a debate and decision of which industrial sectors are essential in ensuring Europe's economic security when decarbonising.⁶⁵ Zero-emission components such as green steel, chemical or glass will be crucial in accelerating the transformation of the economy. Recent gas price hikes and volatility or potential supply shocks have highlighted the need to decarbonise those sectors to increase their resilience. **The EU emission trading scheme (ETS) provides a clear direction, but the price signal alone might be insufficient for all changes required.** A politically acceptable CO₂ price is unlikely to decarbonise the power sector or incentivise circularity at the speed and rate needed.

The number of new emissions allowances released on the ETS are reduced consistently until 2038. This will result in scarcity, creating a direct competition for buying allowances between gas companies and industrial actors or increasing the price. A carbon price of €120-150 per tonne might not affect a gas company as much because the price can be passed on to the consumer, whereas energy-intensive industries are in a global competition and any increase in production costs have an immediate, negative impact on their competitiveness. Therefore, it is in the interest of policymakers and industry actors alike to ensure that power is decarbonised as fast as possible so as to leave more time (and ETS allowances) to the industry sector. Renewable energy provides more affordable energy already today whereas industrial processes take more time to transform. **A complementary enabling framework that encourages direct electrification, circularity and green hydrogen is essential for modernising Europe's industrial base.**

Electrification as a key asset for industrial competitiveness

The direct and indirect electrification of industrial processes has an untapped potential to make European industry more resilient to gas and coal price

volatility. In the Visionary Scenario, 63% of the industry's energy demand⁶⁶ could be supplied by electricity by 2040 compared to 33% today.⁶⁷ The zero-emission electrification framework could set electrification targets for industry sub-sectors, providing an opportunity for businesses to lower their gas dependency.

Low temperature industrial heat processes in the food, beverage, packaging and textile sectors could be largely decarbonised by 2035 if stronger incentives are set. Most of the technologies are available on the market. For higher temperatures, European pilot projects give confidence that this can be reached in the coming years, such as through industrial heat pumps. For heavy industry, electrification can also be a strong driver for decarbonisation. Electric arc furnaces in the steel industry increase efficiency gains substantially when compared to primary production of steel.

For processes that cannot be directly electrified easily, the development of green hydrogen capacities and infrastructures will be needed. **A European green hydrogen plan could be initiated in order to build hydrogen infrastructures linked to energy intensive industrial clusters.** Businesses can jointly develop green hydrogen capacities and local infrastructures and invest in energy-efficient electrolyzers. European industry and partner countries would have predictability of the demand and location of future green hydrogen; some countries such as Germany⁶⁸ and Denmark⁶⁹ have plans already. This is considered a no-regret option as it can generate economies of scale and maximises the use of a scarce resource.⁷⁰ This requires access to sufficient and cheap energy supplies for industry.⁷¹

Embracing circularity to reduce supply risk

The increased global competition to access raw materials, the recent disruptions of global supply chains, and the dominant position of China in material processing has created a new imperative for the circular economy in Europe. **The 'reduce-reuse-recycle' principle can make**

European industries more resilient to supply shocks and reduce dependence on primary raw materials.

Improving the recyclability of products can significantly reduce their carbon footprint while increasing their value. 68% of steel, 64% of glass and 40% of chemicals could be recycled by 2040. Annual savings in aluminium, iron, copper and nickel imports could reach €42 billion by 2040 as a result.

Fostering a circular economy can generate new economic activities and jobs. The EU can be at the forefront of this development by setting standards and quotas for recycled products. Some companies are already investing in recycling materials to reduce their carbon footprint and limit their dependence on scarce primary raw materials, such as rare earth and critical minerals. These 'low-hanging fruits' also exist in traditional sectors. Saint Gobain, for example, aims to achieve 50% of its glass production from recycled glass and cullet by 2025.⁷²

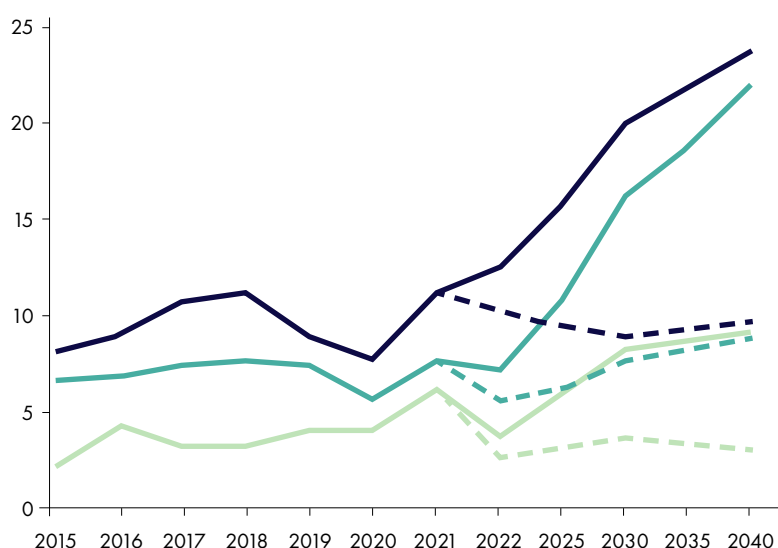


Figure 10.
Import savings of aluminium, copper, nickel and iron under an industrial strategy and a business-as-usual scenario [in millions of euro]

- Aluminium (baseline)
- - Aluminium (industrial scenario)
- Copper & Nickel (baseline)
- - Copper & Nickel (industrial scenario)
- Iron (baseline)
- - Iron (industrial scenario)

Financial support in decarbonising the industrial base until border adjustment works

Decarbonising the current industrial base represents a significant financial cost which will become visible with increasing CO₂ prices and transformations that companies are undergoing. With the 'Transition Phase' of the CBAM launching in December 2025, the price scheme will be set up and free allocation reduced. While this will apply the same carbon price to EU production and

imports, complementary support and demand forecasts can provide reassurances for businesses. **One option is to create 'lead markets' that define a growing share of green or recycled material or components to be used.**⁷³ For example, a growing share of 'green steel' can be used in the automotive or industry sector to provide estimations of future demand. In addition, rules that provide predictability for investors and a targeted financial support such as Carbon Contract for Difference (CCfD) as used in Germany could be introduced to decarbonise industrial sectors until the CBAM is fully implemented. This might be more targeted or could be complementary to public procurement in order to prevent the fragmentation of the single market, while supporting the implementation of the lead market rules.

A single market fit for the net-zero industrial transformation

A European Industrial Strategy starts with growing markets for green products made in the EU. **A well-designed reform of the single market is a prerequisite for achieving economies of scale and creating a favourable and predictable investment environment for industries.** So far, European products cannot compete on a cost-competitive level playing field with products from China or the US. Key standards can help them to remain competitive, fostering market differentiation by offering more innovative, quality and sustainable technologies.⁷⁵

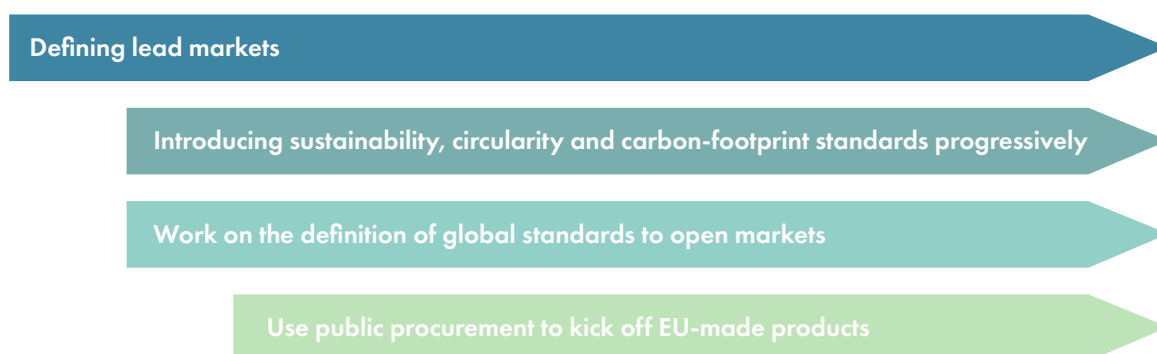
Creating lead markets for net-zero products

A number of EU companies are currently transforming their production to substantially lower emissions. However, these companies do not have predictability about the future demand for their products nor the assurances they will be bought if their prices are initially higher than less 'green' imports.

Designing lead markets for green products in the EU is a way to forecast demand, secure investments and ensure a business-case for innovative net-zero transformations. A 90% greenhouse gas emission reduction by 2040 provides the right framework for identifying future demand for net-zero products and components. For example, we estimate the production for green steel and aluminium to double by 2040 compared to 2020 levels.

In key strategic sectors, standards to incentivise the use of green materials and products can strengthen the business case and allow predictable forecasting of the volumes needed over time. For example, the automotive or wind power industries could be required to use a quota of green or recycled steel in their production, leading to predictability for steelmakers. A definition of what 'green' means for each material and product needs to be established as one component for a standard. While applying globally, the standards could be set in a way that they initially de-facto prioritise European companies.

Figure 11.
Sequence to implement lead market standards





Setting standards for growing these lead markets

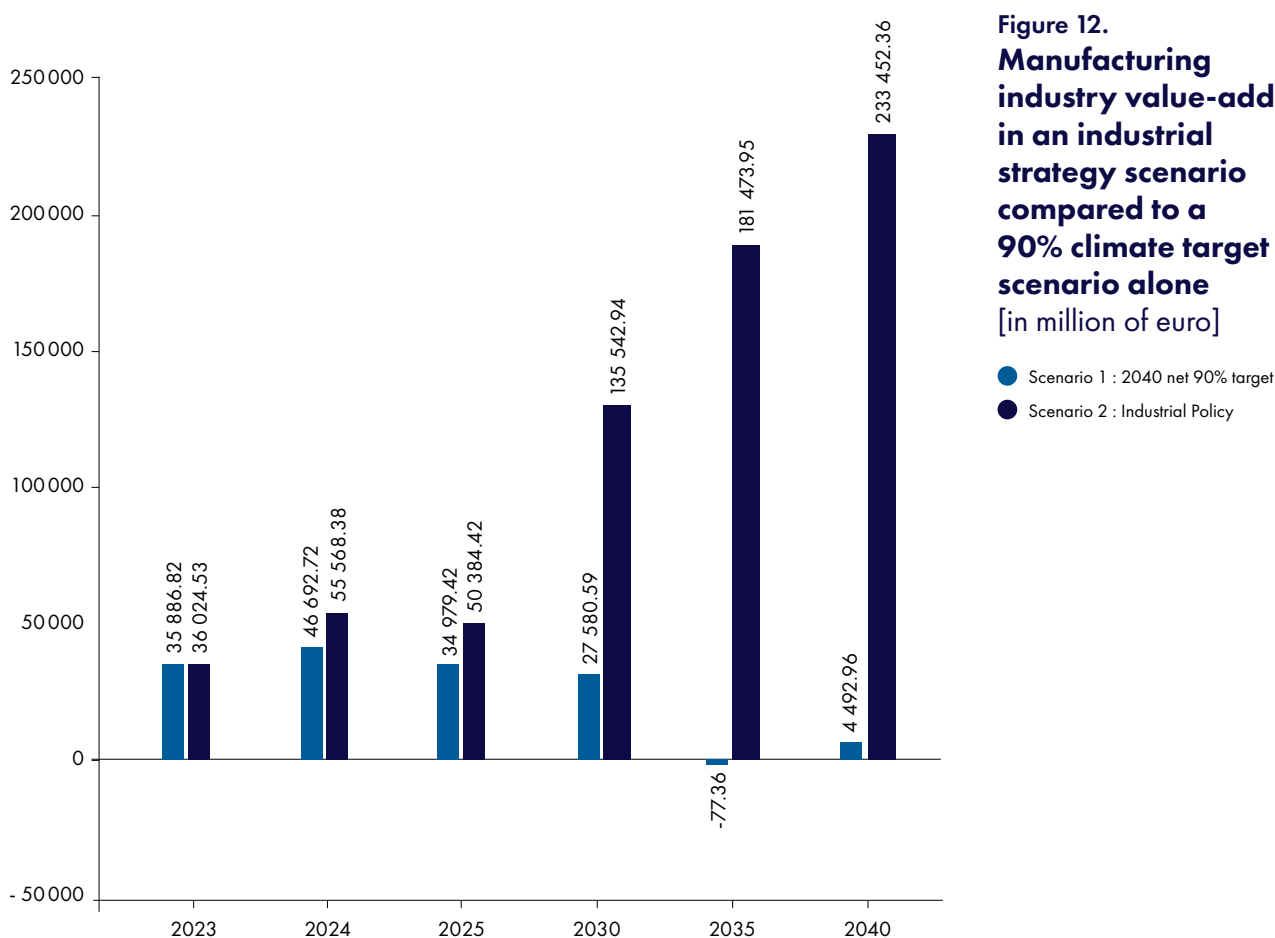
Sustainable, circularity or carbon footprint standards could be progressively applied to a set of clearly-defined sectors to de-facto support EU-made products. The EU Battery Regulation set an important precedent in improving the circularity and sustainability of batteries on the single market over the past decade by reducing raw material demand.⁷⁶ The predictability of

the evolution of the market allows for more innovations and new economic sectors to emerge. European battery manufacturers such as Northvolt, ACC and Verkor are convinced it provides a strong competitive advantage to European actors compared to Chinese manufacturers.⁷⁷

Binding standards can be introduced in sectors through dedicated legislation or a reformed Ecodesign Directive. **As European suppliers innovate, these standards can be progressively strengthened to evolve markets.** Being the first movers with a high integration of green steel in production or more efficient heat pumps can

help European companies regain global technological leadership. This could be the case in the solar industry as well⁷⁸ as the Waste Electrical and Electronic Equipment Directive already sets a target of 80% for reuse and recycling for solar products.⁷⁹ European producers could use this as a competitive advantage. Standards that will better-performing, more efficient, recyclable solar panels could help restructure the sector around innovation and high added value in Europe. **This would allow European solar companies to compete on a different level instead of only on cost.**

A European Industrial Strategy that combines standards and investments can increase the productivity of the economy and innovation. By 2040, our modelling shows that more than €233 billion of additional value-add could be generated in the advanced manufacturing sectors which are contributing to the net-zero transition. The European economy will be able to build robust technological leadership and regain competitiveness at the international level on net-zero sectors.



Whenever the EU sets strong standards for its market, the likelihood is high that companies across the globe will adjust to them in order to have access to the world’s biggest single market. Some developing

countries might need support to be able to meet EU standards, as recent concerns on CBAM show. The Climate Club has the potential to be a constructive platform to discuss industrial policies and high technology standards.

Using public procurement and auctions to kick off the support for EU-made net-zero products

The NZIA created a mindset change by introducing sustainable and resilient criteria in public procurement rules. One step further can be taken with the development of lead market standards in the single market: public authorities can introduce them more rapidly in public procurements, auctions and any financial support to economic actors and consumers. **With more than 14% of the GDP, public procurement can guide industries in the early implementation of lead market standards.** For example, public car fleet procurements or wind power auctions could apply a green or recycled steel minimum content standard before it is fully enforced across the whole single market.

This can also apply to any kind of financial support that public authorities give to households and businesses, such as the recent eco-bonus introduced in France to support household access to EVs. Only EVs weighing less than 2.4 tonnes and with a production carbon footprint of less than 14.75 tonnes of CO₂ are eligible under the eco-bonus scheme, which de-facto excludes all EVs manufactured in China. A similar scheme could be harmonised at the EU level in the form of an 'EU value chain bonus',⁸¹ rewarding zero-emission products that have low emissions and a minimum number of manufacturing steps within the EU.

Public authorities can condition the support of EU-made products to companies constantly improving the quality and the sustainability performance of those products.⁸² As sustainability and resilience standards come with a high price for public authorities,⁸³ EU funding could cover the extra costs of European-made technologies for public authorities with fewer financial resources.

Strategic Perspectives thus calls for a European Industrial Strategy that includes:

- Building European value chains for each strategic zero-carbon technology by defining priority technologies where domestic production creates higher independence, and have the potential to generate jobs. Coordinating public investments from all decision levels and building European industrial alliances through IPCEI will be key.
- Unlocking new European investment, both for the installation of net-zero production capacity and for operations, where there is a competitive gap with key extra-EU competitors.
- Setting clear electrification goals for industrial sectors such as steel, chemicals, food and beverages, packaging and textiles to help progressively phase out the use of fossil fuels.
- Creating "lead markets" for green and recycled products through quotas and standards to ensure a minimum use and predictable demand.
- Updating public procurement policies that support innovative, green and more circular products and matching EU-level financial support to address the price gap to the lowest price competitor.

A new financial architecture

Europe faces multiple challenges which could create competition between investment priorities. Supporting Ukraine and the Middle East, scaling up the defence industry, rapidly deploying zero-carbon technologies, supporting European industry, and addressing the energy crisis and cost-of-living crisis are among the key priorities for existing fundings. The annual investment required to fully implement the European Green Deal and unlock its economic benefits by 2030 is estimated at approximately €813 billion.⁸⁴ Today, only half of this is being delivered, leaving a significant deficit. **While some sectors are attracting sufficient investment, such as battery storage, others are lagging far behind.** The wind sector, for example, has a cumulative annual shortfall of

approximately €74 billion, putting the economic viability and necessary speed of deployment at risk.

Achieving a 90% target by 2040 will also require scaling up net-zero investments significantly after 2030. The European Commission estimates that between 2030 and 2040, investment needs will increase to €1.5 trillion per year. Our modelling shows that implementing a European industrial strategy that increases domestic manufacturing for a 90% target will require €668 billion of cumulative investment by 2040. The potential to re-industrialise regions, grow economic activity and create jobs in the EU might be worth the cost.

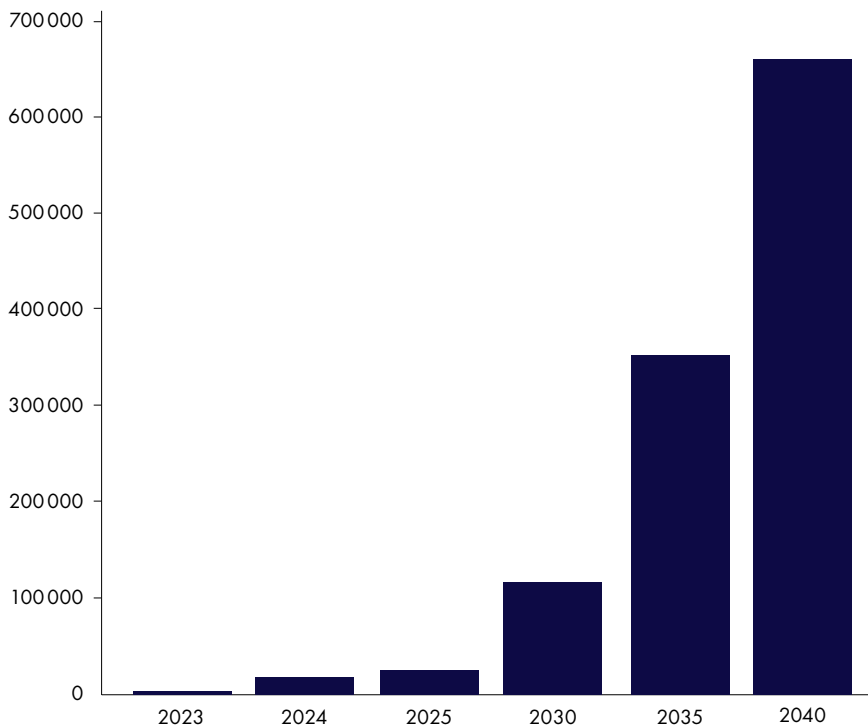


Figure 13.
Difference of investments between a 90% scenario and a 90% backed by an industrial strategy
 [in millions of euro]



Lithuania

To put it into perspective, in 2022, direct and indirect support for fossil fuels was approximately €290 billion within the EU.⁸⁵ Although shifting support from fossil fuels to zero-carbon technologies is advancing too slowly, it represents an opportunity to reduce the investment deficit and begin financing a re-industrialisation strategy in Europe. **The next institutional cycle is an opportunity to unlock investment in Europe through a new financial architecture that combines:**

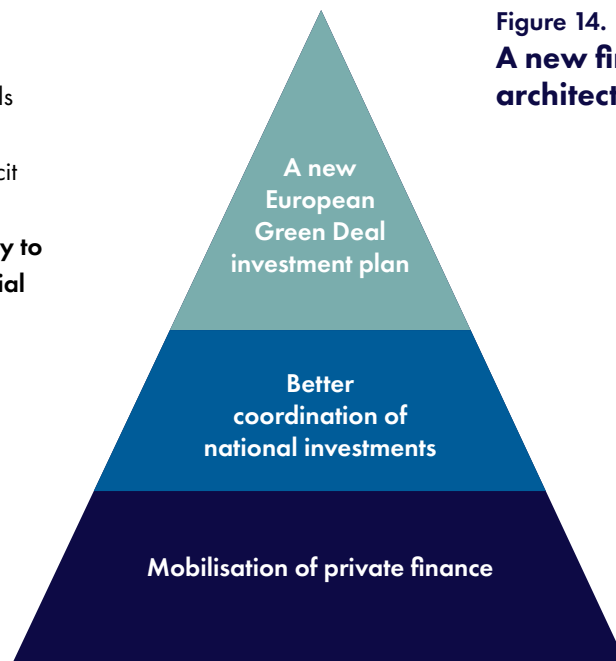


Figure 14.
A new financial architecture

A better coordination of investments within the EU

Europe’s approach lacks the simplicity and effectiveness of the IRA. The EU and its national governments have the same level of investment planned for the zero transition as the US’s IRA. However, funding opportunities are spread across multiple programmes, which makes access highly complex for industrial companies, especially small- and medium-sized enterprises (SMEs). **In the short term, a European One-Stop-Shop could be set up to ease financial aid for CAPEX and OPEX, allowing for an easy overview of available funding at EU and national level and build synergies between all sources of funding at the European level.** This could include the Innovation Fund, Cohesion Fund, the ETS and the CBAM revenues, or European Investment Bank (EIB) financial instruments. It could directly support companies and public authorities with appropriate financial tools, such as subsidies, de-risking, loans or carbon contracts for difference.

The Temporary Crisis and Transition Framework, which facilitates state aid until the end of 2026, risks leading to a two-speed Europe where only national governments with a high fiscal space will be able to benefit from the net-zero transition.⁸⁸ To better coordinate investments and avoid distortion in the single market while reaching European collective goals, national governments could have additional flexibilities on state aid for projects in line with the 90% target. **If largely simplified, the IPCEI can be the right framework for pulling national and European resources together and provide better coordination.** The European Peace Facility can be seen as a good example of this as it combines EU and national funds to send military support to Ukraine.⁸⁹ This approach can also help reduce redundancies at the EU level and significant costs compared with an uncoordinated approach. Coordinating infrastructure plans at the EU level, such as for grid expansion, allows for a better security of supply and avoids redundant backup or flexibility options at the national level.

A new European Green Deal Investment Fund

The end of NextGenerationEU will reduce European investments in climate actions by €35 billion per year as of 2026.⁹⁰ A new financial architecture will need to not only reorient existing fundings, but also unlock fresh investments in key strategic areas. More and more voices are calling for a European long-term investment plan on climate based on joint borrowing for the net-zero transition to replace NextGenerationEU after 2026.

Strategic Technologies for Europe Platform (STEP) was established with a goal of investing in long-term strategic transformations and changing the mindset of EU investments. This could be turned into a larger European Green Deal Investment Fund, backed by its own robust resources. Additional public funding needs could reach between 0.5% to 1% of GDP. This new fund could support national governments with more fiscal constraint to reach this level and invest directly into pan-European projects.

A Capital Market Union

Although it is not the focus of this report, mobilising private finance will be key to supporting a European Industrial Strategy as national governments' fiscal space shrinks. One medium-term solution suggested by some governments could be the completion of a Capital Market Union in order to unlock the savings of Europeans and finance the long-term transformation of the economy.⁹¹

Today, more than 80% of savings are immobilised within the EU. Similarly, cross-border banking activities are very limited, reducing financial opportunities for project holders.⁹² Removing national barriers for mobilising savings and incentivising banking products at the European scale can help mobilise long-term investments.

Strategic Perspectives thus calls for a new European financial architecture that includes:

- Facilitating synergies, better access and aggregation between existing public funding opportunities, such as ETS and CBAM revenues and EU and national funds, to scale up support where needed.
- A reform of the state aid guidelines to ensure cohesion in the single market, contributing to European projects and supporting activities that transition in line with the 90% target.
- Setting environmental and social criteria in tenders and auctions which support high-value production in Europe in line with World Trade Organization rules.
- A new European investment instrument based on joint borrowing for the net-zero transition to replace the NextGenerationEU after 2026.

New economic partnerships to advance global decarbonisation

An international race to the top on zero-carbon technologies is happening, with China, the US and EU leading the competition.⁹³ China is clearly leading in solar photovoltaics (PVs) manufacturing and is drastically scaling up its EV production. In fact, more than 90% of imported solar PV modules⁹⁴ and 54% of imported EVs⁹⁵ in 2022 came from China. The EU's position is also challenged by the US in the context of the IRA. The US invests substantially in attracting manufacturing capacities and leads innovation, which will shape future global markets.

The race to the top could soon become a global one. The 28th United Nations Climate Change Conference (COP28) in Dubai, United Arab Emirates (UAE) showed that the transition away from fossil fuels has become a consensus, a major diplomatic success for the EU. **The clear commitment to triple renewable energy and double energy efficiency by 2030 confirms that the majority of countries are ready to advance their energy transitions.** As global markets for zero-carbon technologies are increasing, there is growing interest from many countries to start manufacturing them domestically to enter this race to the top. Annual clean energy investments need to reach approximately \$4.5 trillion USD according to the IEA, a clear opportunity for technology providers.⁹⁶ The EU can use this momentum to strengthen its partnerships with these countries and help mobilise investments.

Strategic Perspectives' report *Competing in the new zero-carbon industrial era* highlighted how a mix of political will, financial incentive schemes, and accompanying policies is providing an ideal enabling environment in China, the EU and the US.⁹⁷ While Japan has the necessary fiscal space, it lacks the policy clarity to be among the leading countries. It is the opposite case for India: it has the policy ambition on renewable energy but not enough financial means for sufficient investments to compete with the others. The same applies for a number of other countries who would need targeted support to be able to enter the global race on zero-carbon technologies. This year's COP29 in Baku, Azerbaijan will focus on agreeing on a new collective quantified goal for climate finance. This is a good context for the EU to establish more concrete economic partnerships which can be mutually beneficial, advance global decarbonisation and catalyse financial flows for the transition.



South Africa

The EU benefits from new economic partnerships

The chapter on a European Industrial Strategy has shown the benefits of increasing manufacturing of zero-carbon technologies within the EU and how this can strengthen its competitiveness globally. Further, the EU's domestic success on the Green Deal demonstrates the socio-economic

benefits of a transition to climate neutrality. It will be an asset that supports its credibility at the international level. **However, even when scaling up domestic production of strategic zero-carbon technologies as defined in the NZIA, the EU will never be fully auto-sufficient.**

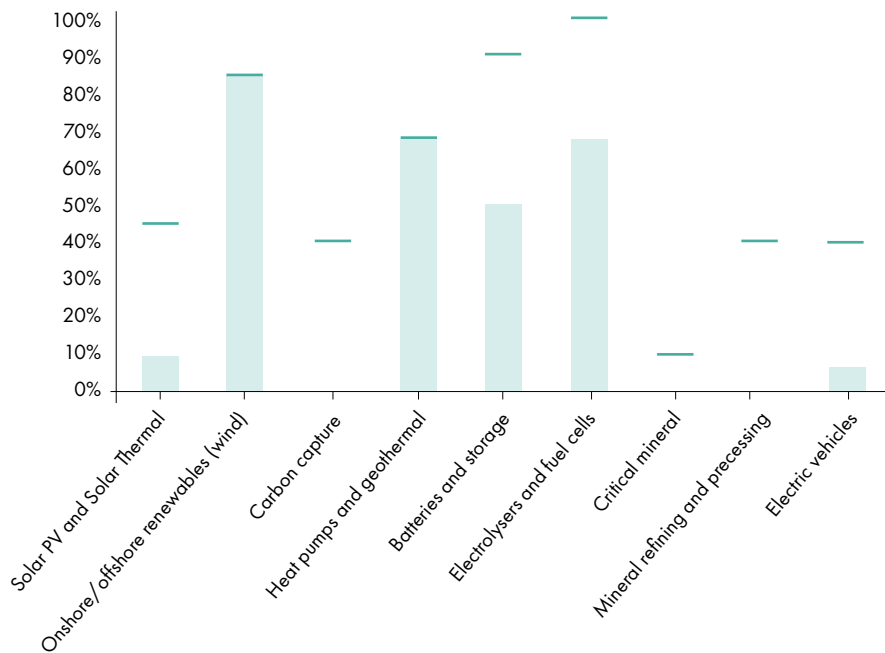


Figure 15.
Share of domestic versus foreign content of net-zero technologies as defined in the NZIA

● Baseline
● 2030 target

Any strong dependence on a single supplier of imports is a risk, no matter whether technologies, materials or components are involved. Russia's war on Ukraine has demonstrated this very clearly. As such, there is a strong imperative for the EU to engage in better partnerships so a triple-win scenario can emerge:

1. Greater supply chain resilience can be achieved through a diversification of EU imports for what is not and can not be produced domestically.
2. Stronger economic and diplomatic ties can be built with other like-minded countries that believe in a rules-based global world order and want to enhance their own economic security through the transition.
3. Opportunities for EU business cooperation can emerge with non-EU companies in creating jobs and zero-carbon value-chains in third countries.

In some cases, these new economic partnerships could be integrating deals on resources or raw materials to align all cooperation areas. In this case, special attention would need to be given to human rights, environmental standards and the concerns of local communities so as to avoid any allegations of exploitation. **A more coherent approach to partnerships across EU and national governments can further strengthen trade relations with like-minded countries and increase both the relevance and recognition of the EU on the global stage.** These partnerships can also support the upgrading of local production to meet European lead market standards and thus provide access to the single market. For example, targeted investments can help local steel producers decarbonise their production so that they can trade steel with the EU.

Establishing new economic partnerships

The next European Commission can prioritise cooperation with like-minded developing countries that want to accelerate the transition to climate neutrality from 2024 to 2029. New economic partnerships have a higher chance of success if they go beyond exports and are development-centred, rights-based and involve local communities from the beginning. Decentralised renewable energy can support access to energy, cleaner cooking facilities, cooling and heating in partnering countries. The transport sector offers opportunities through electric mobility with tangible benefits in terms of air quality. **The focus can be on cooperation that decarbonises one or more sectors and creates local value chains for zero-carbon technology production in partner countries.** This can help create jobs, support local communities and strengthen the low carbon development in the partner countries, increasing their economic value-add and leveraging their comparative advantages.

While it is difficult to define the geographical scope of these partnerships, a few priorities can be established. Many traditional EU allies in developing countries were puzzled by the fact that the outgoing Commission prioritised developed countries such as Japan, Norway and Canada for its 'green partnerships'. The priority for 2024 to 2029 should focus on strengthening our cooperation with developing countries, particularly in Africa, Latin America and Southeast Asia. The EU's Neighbourhood and Accession countries offer particular opportunities for greater integration into EU supply chains for zero-carbon technologies and low-carbon industrial, including a reconstructed Ukraine. **Special attention can be given to like-minded fossil-fuel exporting countries seeking fossil-free revenues to create new 'green' export models, such as Colombia.**

Fossil fuel phase-out in Colombia

At COP28, Colombian President Gustavo Petro was vocal on the need for a fossil fuel phase-out. He is positioning his country as a key advocate for the global energy transition amid domestic tensions. Colombia can become a powerful example to showcase how a fossil-fuel-producing country can decarbonise. Colombia is the world's sixth largest coal exporter while oil and gas contribute 8% to national GDP and 60% of the country's exports. 12.2% of imported coal in the EU was from Colombia in the third quarter of 2023.⁹⁸ President Petro has proposed a \$32 billion USD package of projects to advance, notably on green transportation, clean energy and climate adaptation.⁹⁹ As the EU embarks on its own fossil fuel phase-out, it is in its best interest to build trade relations with Colombia on decarbonisation and diversification of production.¹⁰⁰ The timing could not be better, given the EU's debate on energy decarbonisation in the context of its 2040 target setting. It can work closely with Colombia and other countries on exchanging best practices, useful policies and an inclusive just transition, as well as aligning standards. Prioritising partnerships with like-minded countries seeking to accelerate the energy transition allows for turning the promises made at COP28 in Dubai into reality.

A better integration of efforts across national governments, the European Commission and European External Action Service (“Team EU”) ensures a coherent approach towards partners, strengthens the impact on the ground, and shows EU alignment. **Team EU can support these partnerships with a clear financial package from both public and private sources.** A variety of tools can be combined, including a plan to scale up EIB and European Bank for Reconstruction and Development (EBRD) funds for industrial decarbonisation, de-risking or offtake agreements. Public

finance support can be used as leverage for private finance in alignment with policy ambitions. There is a necessity to accelerate the decarbonisation of all sectors. **As a result, a new paradigm for economic cooperation can be established with countries where the partnerships cover a range of sectors, such as energy transport, heating or industry.** The political commitment, policy development and financial support can be formalised into a Memorandum of Understanding (MoU) to conclude the partnership.

Green hydrogen cooperation with Namibia

The governments of Germany and Namibia have initiated cooperation on producing two million tonnes of green ammonia, a hydrogen derivative, per year before the end of the decade. Together, they are building 7 GW of wind farms and solar PVs in Namibia for green ammonia. The total project investment is envisaged at approximately \$10 billion USD and includes a number of other funders. According to the company Hyphen, 15,000 jobs will be created during the construction and 3000 permanent jobs thereafter. The hydrogen industry alone is expected to directly create an estimated 185,000 jobs in Namibia. The project also foresees the creation of scholarships for Namibian scientists and engineers. The European Commission is involved as part of a strategic partnership on sustainable raw materials, in addition to renewable hydrogen. Local communities are expected to benefit through improved infrastructure, access to energy and water salination plants. This is an emerging example of what a good partnership can look like that both benefits the partnering country and involves European actors. This project will be the first step towards Namibia’s green hydrogen industrialisation, part of the country’s growth agenda. Green hydrogen and derivatives are seen as the intermediaries which can connect Namibia’s high solar and wind resources to global markets. In the meantime, Namibia will develop local solar panel, wind turbine and electrolyser manufacturing sites to serve the needs of renewable electricity production and green hydrogen production, with an estimated total investment of \$620 million USD by 2050.

The following principles can apply when partnerships are established:



Figure 16.
Principles for successful new economic partnerships

Based on these partnerships, Team EU can strengthen the diplomatic ties at the multilateral level where a range of fora exist. The EU can regularly convene the countries that supported the Global Pledge on Renewable Energy and Energy Efficiency to exchange how to scale up finance and accelerate deployment on the ground. Involving businesses and public and private financial actors is key in this regard. Promoting stronger cooperation also links to the work

of existing alliances (Powering Past Coal Alliance, Beyond Oil and Gas Alliance) and clubs (Carbon Club, upcoming Critical Raw Materials Club). In addition, they can foster implementation or increasing ambition in the next round of pledges under the Paris Agreement (NDCs), expected to be submitted well ahead of COP30 in 2025. Concrete economic cooperation can increase confidence that the goals set out in the NDCs can be met and finance will flow.

Taking the new zero-carbon industrial era globally

Once Team EU manages to systematically broaden and strengthen its economic partnerships, the impact could become visible at the global level. **Supporting the manufacturing and deployment of zero-carbon technologies in the Global South can bring down**

global prices and allow for sustainable development pathways in these countries. More countries will be able to join the race to the top on zero-carbon technologies and benefit from the new industrial era.

Boosting renewables in Africa

At the margins of the African Climate Summit in September 2023, the 'Accelerated Partnership for Renewables in Africa' was launched by Kenyan President William Ruto. Ethiopia, Namibia, Rwanda, Sierra Leone and Zimbabwe joined the initiative alongside Kenya. This partnership recognises the abundant renewable energy potential in Africa and the investment required to deploy it. It intends to mobilise finance, provide technical assistance and capacity building and involve the private sector. Germany, Denmark, the IEA and the International Renewable Energy Agency (IRENA) have voiced their support for the initiative, highlighting that it is locally-owned which puts African interests and development priorities at its centre.

Kenya has the ambition to achieve 100% renewable power by 2030 and fuel green industries by 2040. With such clear policy goals, the basis for the four principles is established. It is now an opportunity for Team EU to work closely with African countries to achieve their plans.

For many countries, sustainable development, energy security or industrial competitiveness are the main drivers for change. **When the political economy in these countries shifts towards net-zero, it can affect global power dynamics and geopolitics.** This was visible with COP28's host, the UAE. With growing investments in renewable energy manufacturing, their economic model has diversified away from a heavy reliance on fossil fuels. As a result, their negotiation and brokering position during the summit allowed for the best possible outcome, given the geopolitical situation.

With more countries benefiting from the new zero-carbon industrial era, global decarbonisation advances even further. This ultimately strengthens the regular progress as set out in the Paris Agreement. The global stocktake and the 'ambition cycle' under the Paris Agreement provide the right framework and timeline to create this new economic cooperation. **A fairer global race to the top will emerge as more countries are able to manufacture and deploy zero-carbon technologies. At the same time, future-proof jobs and prosperity can be created while reducing global greenhouse gas emissions.**



Colombia

ANNEX

Scenario Assumptions

Energy Transition

As indicated in the Methodology, our analysis primarily used data from the CLIMACT Energy Transition Pathways and calibrated them to produce two scenarios:

1. A scenario equivalent to EU-27 With Existing Measures 2022.
2. A scenario with a net 90% emissions reduction in the EU-27 by 2040.

The following data was used from the Visionary Scenario :¹⁰⁴

- Population
- Final energy demand (by fuel type and fuel user/sector)
- Power generation capacity (by power generation technology)
- CO2 emissions (aggregated and by fuel user/sector)
- Heating capacity (by heating source)
- Transport demand by private passenger vehicles or fleet size (by vehicle type)
- Material demand, total and imported (by material type)

In both scenarios, in line with agreed policies, the CBAM arrangements are linearly introduced from 2026 to reach full implementation by 2035 and cover the following sectors:

- Iron and steel
- Cement
- Fertilisers
- Aluminium
- Hydrogen
- Electricity

For these sectors, CBAM is modelled as an additional cost to imports from other countries into the EU. The cost is derived according to the difference in carbon pricing and carbon intensity of these sectors between the EU and the rest of the world.

Industrial Policy

A number of assumptions were made when calculating the industrial policy scenario. The scenario builds on the 90% emissions reduction scenario, but adds assumptions on policy measures which reflect a more ambitious effort to create low-carbon industries in the EU, and include:

Targeted import content (for selected industries)

The targets are set according to the EU's NZIA,^{105 106} which aims to meet at least 40% of needs within the EU for key technologies by 2030, and the CRM Act.¹⁰⁷ Beyond 2030, these targets will be extrapolated linearly based on the

Technology/Value-chain process	Technology-specific target for domestic content (2030 target)	Extrapolated targets (2040 target)
Solar PV and Solar Thermal	45%	85%
Onshore/Offshore renewables (wind)	85%	85%
Carbon capture	40%	97%
Heat pumps and geothermal	60%	75%
Batteries and storage	90%	97%
Electrolysers and fuel cells	100%	100%
Critical minerals	10%	24%
Mineral refining and processing	40%	97%
EVs	40%	83%

Figure 17. Net-zero technology production targets set in the NZIA and projection for 2040

implied trends from 2023 to 2030. The linear extrapolation results in very high shares across all technologies and processes by 2040. Whilst such high shares might not be achievable in all cases, they serve as an indication of what maximum strategic autonomy and sufficiency in supplies could look like. The costs and gains in terms of job creation, labour productivity, reduced technology, material and fuel imports are set out in the report.

Investment to build EU-based industries

The European Commission’s Staff Working Document (SWD), “Investment needs assessment and funding availability to strengthen EU’s Net-Zero technology manufacturing capacity,” indicates that at least €92 billion is required to expand zero-carbon technology manufacturing capacities from 2023 to 2030. This amount is based on the assumption that the technology-specific manufacturing shares from NZIA are met. Additional investment in refining and processing capacities for critical materials is estimated in the impact assessment for the CRM Act. This additional investment, as identified by the CRM Act and the above-mentioned SWD, is to be split across the relevant manufacturing industries and spread linearly over the modelled period.

The above investment estimates do not consider all technologies present in the NZIA. The excluded technologies are: solar thermal, tidal and wave

technologies, storage other than batteries, geothermal, fuel cells, biogas and biomethane technologies, and grid technologies. As such, the estimated values in this report may be underestimated and values may be higher as these technologies in the medium- to long-term achieve higher technological readiness levels and/or have increased practical applications in the economy. However this is difficult to estimate due to current limited data availability.

Public and private investment

According to the SWD, an estimated 17-20% of the investment will be funded by the government, with sector-specific subsidy rates specified in Figure 17.

It is assumed that governments will pay for storage needs which result from a high share of renewables in the power mix, as opposed to letting the electricity producers pay, as this would be in a higher electricity price premium. Similarly, additional subsidies for purchasing EVs is part of the assumptions and could reach 30% of the cost of a small-or-medium-sized EV produced in the EU.

From 2035, net-zero technology (industrial policy) subsidy rates are linearly reduced as the manufacturing capacities increase and economies of scale are generated. Hence they are on a trajectory in line with the EU carbon neutrality target.

Technology	Investment for the period 2023-2030	CAPEX subsidy	OPEX subsidy
Solar PV	€7.6 billion	30%	30%
Electrolysers	€1.3 billion	40%	25%
Onshore wind and offshore renewables	€6.1 billion	20%	8%
Batteries	€68.2 billion	25%	35%
Carbon capture and storage	€3.5 billion	20%	-
Heat pumps	€5.6 billion	20%	18%
Material extraction, refining and processing	€11.16 billion (€20.88 billion by 2040) for batteries + €3.4 billion for rare earth materials + €3.1 billion for others	35% (based on range of 32-41% from American Battery Materials Initiative)	-

Figure 18.
Level of investments and share of public support for both capital (CAPEX) and operations (OPEX)

Off-model calculations

The estimation of net-zero manufacturing jobs is primarily based on the sectoral jobs estimates produced for different scenarios from E3ME and translated into occupational employment using Eurostat data for historical sector-specific occupational distribution. For each scenario, additional considerations for future changes in occupational distributions due to technological developments in each sector are incorporated in order to provide forward-looking estimates.

The following occupations are assumed to include a significant proportion of economic activities that would contribute to the net-zero transition:

- Science and engineering professionals
- Science and engineering associate professionals
- Information and communications technology professionals

- Information and communications technicians
- Building and related trade workers, excluding electricians
- Metal, machinery and related trade workers
- Electrical and electronic trade workers
- Stationary plant and machine operators
- Assemblers
- Drivers and mobile plant operators.

Additionally, the calculations included 'green factors' in order to estimate the proportion of activities in each sector that would likely be zero-carbon. These factors allow for the share of zero-carbon and, subsequently, green jobs, to vary over time and between scenarios according to the technology and energy mix, as well as the presence of industrial policies which impact the proportion of such activities that generate jobs within the EU.



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