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An investment strategy to keep the European Green Deal on track

Jean Pisani-Ferry and Simone Tagliapietra

Executive summary

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FOSTERING INVESTMENT IN clean energy and transport systems is essential if the European Union is to achieve the 2030 climate goal of a 55 percent emissions reduction relative to 1990. However, getting to the required levels of investment during 2025-2030 is likely to be exceptionally difficult. Clean electricity generation and electricity transmission systems need to be expanded rapidly, while industrial decarbonisation must be boosted and the green transformation of buildings and transport accelerated sharply.

BUT POLICYMAKERS FACE growing constraints on the public sector's ability to support the necessary investments. At EU level, potential obstacles include the end of the NextGenerationEU post-pandemic recovery instrument, the lack of a green carve-out in the reformed EU fiscal framework, the increasingly difficult trade-offs between decarbonisation, competitiveness and security, and the spreading false narratives on climate policy promoted by populist nationalist parties. The latter two challenges are set to be further exacerbated by the return of President Trump in the United States.

THE UPSHOT IS that Europe is not on track to reach its climate targets. It is at a juncture where political resistance to decarbonisation is mounting and where budgetary means to buy off consent are becoming scarce, at both EU level (because the main source of financing is drying up) and national level (because the fiscal rules leave little room for green investment).

IN THIS POLICY BRIEF, we assess the investment needed to achieve the 2030 climate goal and climate neutrality by 2050, and discuss why current estimates might be either over- or underestimated. Second, we discuss the roles of the private and public sectors in making these investments happen. Third, we analyse the obstacles to reaching the desired investment levels during 2025-2030, especially for the public sector.

FINALLY WE PROPOSE measures to overcome or circumvent these obstacles. The business strand consists of innovations destined to ensuring credibility and the full mobilisation of savings. The public strand aims to maximise the firepower of limited fiscal resources.

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1 How much green investment does the EU need?

There is no green transition without green investment. Stimulating this will be the core challenge for the European Green Deal in the next five years, making or breaking the European Union's chances of achieving its climate targets and strengthening its competitiveness and security.

But how much green investment is really needed to achieve the EU climate targets? To assess this¹, good-quality country-level information is required. But despite the European Green Deal and the many initiatives it has triggered, this remains surprisingly incomplete and inconsistent. At best, some of the national energy and climate plans (NECPs) of EU countries² provide general estimates of the amount of investment needed to reach the 2030 target, without specifying how such estimates were calculated, making it impossible to assess their reliability, compare them in a consistent manner or monitor progress towards decarbonisation (ECA, 2023).

In the absence of reliable official national information, Europe's green investment needs can best be grasped by looking at European Commission *ex-ante* estimates for the EU as a whole, in the impact assessments underlying the 2030 and proposed 2040 climate targets (European Commission, 2020, 2024).

According to the Commission, between 2011 and 2020, total investments in energy supply (ie power plants and the power grid), energy demand (ie buildings, industry, agriculture) and transport (ie cars, trucks, public transport) averaged 5.8 percent of GDP. Achieving the EU 2030 climate target will require additional annual investments of about two percent of GDP between 2021 and 2030, a level that must be sustained for two decades to reach net-zero (Table 1).

Table 1: EU total annual investments in energy and transport systems (2023 euros)

	2011-2020		2021-2030 <i>To meet EU 2030 climate target</i>		2031-2050 <i>To achieve net-zero by 2050</i>	
	% of GDP		% of GDP		% of GDP	
Energy supply	€80 billion	0.6%	€150 billion	0.9%	€308 billion <i>70% of which for the power sector</i>	1.5%
Energy demand	€167 billion	1.1%	€374 billion	2.2%	€356 billion <i>70% of which for residential buildings</i>	1.7%
Transport	€616 billion	4.1%	€780 billion	4.6%	€873 billion <i>60% of which for cars</i>	4.2%
Total	€863 billion	5.8%	€1304 billion	7.7%	€1537 billion	7.4%

Source: Bruegel based on European Commission [2020, 2024]. Notes: this refers to the MIX scenario in the 2030 impact assessment and to the S2 scenario in the 2040 impact assessment. Under the so-called LIFE scenario in the same Commission impact assessments, substantial savings are achieved through circular-economy and shared-mobility actions. Average annual GDP figure used: €14,879 billion [2011-2020]; €17,045 billion [2021-2030]; €20,906 billion [2031-2050].

These estimates are broadly in line with the findings of Pisani-Ferry and Mahfouz (2023) for France and with global estimates from the International Energy Agency (IEA, 2023b), the International Renewable Energy Agency (IRENA, 2023) and Bloomberg New Energy Finance

1 We refer to 'investment' as the costs related to the climate transition, including but going beyond investments in a strict sense. We include items that national accounts would classify as durable-goods consumption, such as purchases of electric vehicles. This approach is in line with the convention followed by the European Commission.

2 NECPs are available at https://commission.europa.eu/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans_en.

(BNEF, 2024)³. They are also aligned with the estimates for additional green investment needs in 2025-2030 in the Draghi (2024) report on European competitiveness, which are themselves based on European Commission and European Central Bank calculations⁴. Finally, Bizien *et al* (2024) confirmed that the gap between current EU climate investments and Commission estimates of future needs amounted in 2022 to around 2.5 percent of GDP.

2 EU climate investment needs: adjustments and caveats

The European Commission's headline green-investment need estimates are flawed. The investment cost of some major items is overstated. Other important climate-related investment needs are not included. Even after adjusting for over- and understatements, the figures are subject to significant uncertainty.

2.1 Overstatements

The Commission's headline numbers have transport as the main spending item by far, but 60 percent of this investment need would arise from replacement of cars that would happen anyway (based on an average car lifespan of around 10 years; ACEA, 2023). If this is taken out, the Commission expects additional transport investments consistent with reaching net-zero to be limited: 0.5 percent of GDP annually from 2021 to 2030. Instead, the power sector and buildings are expected to be the main sectors requiring additional efforts to achieve climate targets. In these two sectors, investment needs are expected to almost double as a share of GDP over the same period.

The Commission's headline numbers also attempt to factor-in behavioural change. This is likely significant, as further behavioural measures (eg accelerated modal shifts and sustainable mobility patterns, energy conservation, recycling) could reduce EU green investment needs by about eight percent (Table 2).

Table 2: The role of behavioural change in lowering EU green annual investment needs, 2031-2050 (2023 euros)

	European Commission S2 scenario*	European Commission LIFE scenario*	Reduction in annual investment needs due to behavioural change
Energy supply	€308 billion	€272 billion	€36 billion
Energy demand	€356 billion	€345 billion	€11 billion
Transport	€873 billion	€791 billion	€82 billion
Total	€1537 billion	€1408 billion	€129 billion

Source: Bruegel based on European Commission (2024). Note: * See note to Table 1.

3 These different exercises have of course different sectoral scopes, calibrations and overall methodological approaches.

4 Draghi (2024) estimated that achieving the EU 2030 climate target will require additional annual investment amounting to €300 billion for energy systems and €150 billion for transport, for a total of €450 billion, in line with the European Commission estimates presented in Table 1.

2.2 Understatements

The European Commission's numbers refer only to capital expenditures (CAPEX) and do not include financing costs. This is worth mentioning because while CAPEX represents the main cost item in the green transition, the cost of financing investment will be significant for cash-constrained agents and public finances will need to step in with de-risking instruments to facilitate private investment.

The Commission's numbers also only look at the deployment side of decarbonisation, and do not include its manufacturing side. That is, these figures do not take into account the clean-tech manufacturing costs required to reach EU industrial policy objectives, such as what is outlined in the Net-Zero Industry Act (NZIA, Regulation (EU) 2024/1735)⁵. The Commission estimates that ramping up clean-tech manufacturing capabilities in Europe to meet at least 40 percent of the EU's annual deployment needs by 2030 would require additional total investments of about €100 billion in the period 2024-2030. This is about 0.1 percent of GDP.

We consider this estimate to be very conservative, in particular because the NZIA focuses only on a limited selection of technologies and domestic supply chains, and overlooks the costs of skill-enhancement programmes and of securing access to underlying strategic critical raw materials. In addition, green investment needs in manufacturing might be much greater if economic security is deemed to require aggressive reshoring.

Finally, the Commission's estimates deal only with the mitigation side of climate action and do not include climate adaptation investment. This is a major gap, as the EU's need for climate adaptation already is and will be substantial, even if mitigation proceeds on schedule. Estimates of adaptation investment involve considerable uncertainty. For the EU they are currently estimated to range between €35 billion and €500 billion annually, a huge range that reflects different underlying assumptions and methodological approaches (EIB, 2021a). It is urgent to narrow the range of plausible estimates and develop better assessment of the distribution of those investments over time and across countries.

2.3 Additional uncertainty

The above estimates are underpinned by a number of assumptions, including on the trajectory of the carbon price, timing of decarbonisation efforts, the role of innovation in slashing clean-tech costs and system substitutability. These of course could change. It should also be clear that the estimates are only for decarbonisation investments, and do not include the other environmental and circular economy parts of the European Green Deal. Nor do they include the investments required to mobilise all the necessary resources, such as reskilling/upskilling of workers from brown to green industries and measures to tackle the social implications of climate policy. This last point is particularly relevant, because there will be a great need from 2025-2030 to deal with the complex distributional implications of buildings and transport decarbonisation, from which emissions reductions have so far been relatively small. Avoiding political backlash may involve offering financial incentives to households in return for adopting costlier green technologies.

To summarise: because behavioural changes could be more significant than assumed, the European Commission's headline investment estimates could be overestimating overall and private mitigation-related investment needs (section 2.1). However, total climate-related transition needs should also include adaptation investments, the costs of reskilling and the cost difference between investment in green tech and the investment in brown tech that would

⁵ The NZIA is an industrial policy to promote clean-tech manufacturing, organised in four steps. First, it lists net-zero technologies considered to be 'strategic.' Second, it sets an overall benchmark target for EU domestic manufacturing in these technologies to meet at least 40 percent of the EU's annual deployment needs by 2030. Third, it outlines a governance system based on the identification by EU countries of Net-Zero Strategic Projects. Fourth, it outlines a set of policy instruments, mostly at national level, to support the selected NZIA projects. See Tagliapietra *et al* (2023).

otherwise have happened. The size of these excluded items is very uncertain, mostly because of uncertainty surrounding adaptation needs. Consequently, the total investment need for the green transition up to 2030 is likely to exceed the Commission's estimates by a wide margin. This is even more the case for the transition up to 2040.

3 Public investment needs to reach the EU 2030 climate goal

If achieving the EU climate goals requires a substantial increase in investment, who is going to pay? The European Commission does not provide specific figures for this, mentioning only that the private sector is expected to be the main source of investment in the electricity system and industry, while public funding is expected to play a substantial role in the buildings and transport sectors, and in supporting innovative clean-tech uptake in the energy system and the industrial sector.

EIB (2021b) and Darvas and Wolff (2022) estimated the public share of green investment to be about 25 percent. However, these exercises are characterised by high uncertainty. For instance, by providing estimates for each category of investment, Pisani-Ferry and Mahfouz (2023) estimated this share to be higher for France: 50 percent in an optimal scenario for the country, also because of France's larger public sector and greater share of public buildings than other countries. This higher figure is in line with a granular analysis by Baccianti (2022)⁶ for the EU, the central scenario of which also points to a roughly 50 percent public share of green investment.

Based on these different exercises, we can assume the public share of additional green investments from 2025-2030 to range between 25 percent and 50 percent. Given that the annual additional investments to reach the EU 2030 climate target are estimated at two percent of GDP, the additional public effort to reach the EU 2030 climate target would thus range between 0.5 percent and one percent of GDP over 2025-2030.

Given limited public finances, it will be crucial to make all the necessary efforts to stay at the lower end of this range. In other words, the available resources should be focused on those areas where private finance alone cannot deliver (ie where clear market failures exist). This includes:

- *R&D support and support for early adoption of innovative clean technologies.* This is what allows the creation of economies of scale, leading to steep cost reductions, which in turn progressively reduce the need for public support as the 'green premium'⁷ thins out. This has happened with wind and solar energy. IRENA estimated that between 2010 and 2022, the average cost of generating electricity from solar PV fell by 89 percent – currently almost one-third cheaper than the cheapest fossil fuel globally – while the cost of generating electricity with onshore wind fell by 69 percent⁸. This is why countries including Germany

⁶ Baccianti (2022) estimated that the additional public investments will be mainly required in the transport and buildings sectors. Other major public investment items are expected to be waste and circular economy and power grids.

⁷ The 'green premium' is the additional cost of choosing a clean technology over one that emits more greenhouse gases.

⁸ See IRENA press release of 29 August 2023, 'Renewables Competitiveness Accelerates, Despite Cost Inflation', <https://www.irena.org/News/pressreleases/2023/Aug/Renewables-Competitiveness-Accelerates-Despite-Cost-Inflation>. The quoted figures are for generation and do not include system integration costs.

The EU has embarked on a transformational transition without mapping out in detail how much investment this will require

have been able to rethink their investment support for renewables⁹, and why the share of public investment to meet EU climate targets in the power sector is estimated in the relatively low range of 15 percent to 20 percent (Baccianti, 2022).

- *Financing electricity and transport infrastructure*, as well as renovation of public buildings. For example, public funding will need to pay for a significant share of investment in railway networks, public transport and district heating (Baccianti, 2022; OBR, 2021).
- *Provision of financial de-risking tools to lower the cost of capital for private investors in green projects*. Many clean technologies are characterised by high CAPEX and low operating costs (OPEX). This is true for wind and solar generation, electric vehicles and buildings retrofitting. The cost of capital thus plays a key role in the green transition, providing a critical benchmark to assess the risk and return preferences of investors, and acting as a lever for financial flows to influence prices and choices in the real energy economy (IEA, 2021). Lowering the cost of capital to foster private investment can be done through instruments such as preferential loans and guarantees to both firms and households. For instance, zero-interest loans in France, granted under the éco-Prêt à Taux Zéro (éco-PTZ) programme boosted energy-renovation rates across the country thanks to high take-up among the middle class (Eryzhenskiy *et al*, 2022).
- *Provision of direct financial support and compensation to the most vulnerable to ensure a socially fair transition*. For most vulnerable households, direct public support is needed to compensate for the higher energy costs linked to climate policy, and to ensure take-up of green alternatives. For example, the phase-in of an EU carbon price on household and road transport emissions¹⁰ will likely be regressive, disproportionately affecting vulnerable households that rely on fossil fuels for domestic heating and lack the resources needed to change their vehicles. Directing support to the most vulnerable would help reduce both emissions and energy poverty. For instance, prioritising grants for the worst-performing buildings, often occupied by vulnerable consumers, will yield climate benefits and benefits in terms of improved air quality, health, productivity, energy security and lower future government outlays to alleviate energy poverty (Vailles *et al*, 2023; Keliauskaite *et al*, 2024).

The upshot is that the EU has embarked on a transformational transition without mapping out in detail how much investment this transition will require, and without equipping itself with the capacity to monitor, either at EU-level or national level, the actual efforts and the remaining investment gap. Knowing the rough direction of travel is like crossing the Atlantic without a compass, and is not enough.

⁹ In July 2024, Germany announced that, as of 2025, the government will replace the country's feed-in tariff scheme that *de facto* guarantees earnings to renewable energy generation no matter the wholesale price, with a much lighter investment support scheme.

¹⁰ Under a second EU emissions trading scheme, ETS2, which will operate fully from 2027. See https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/ets2-buildings-road-transport-and-additional-sectors_en. See also our proposal 6 in section 5.2.

4 A perfect storm for 2025-2030

Even if governments can ensure the substitutability of public finance with private finance, achieving the EU's 2030 climate goal will still require public investment during 2025-2030 of at least 0.5 percent of GDP. Delivering this will be tough for five main reasons.

4.1 The main source of EU grants for the green transition is running out

Since the launch of the European Green Deal in 2019, the EU has played an increasingly direct role in fostering green investment, including through carbon pricing and regulations, and also by offering financial incentives. Balancing prohibitions and incentives is crucial to ensure the political viability of the green transition and to avoid a dangerous 'blame game' with national capitals (Pisani-Ferry *et al*, 2023). Two major steps have been taken on the financing of the green transition. First, it was decided to set a 30 percent minimum green spending threshold in the EU budget (the multiannual financial framework, MFF), amounting to about €1 trillion for 2021-2027. Second, a 37 percent minimum green spending threshold was established for the main part of the NextGenerationEU post-pandemic instrument, the Recovery and Resilience Facility (RRF), which was endowed with financial firepower of €723 billion for 2021-2026, including €338 billion in grants.

The RRF is currently the largest source of EU grants for the green transition, especially for buildings and transport decarbonisation (Lenaerts and Tagliapietra, 2021). On top of the MFF, green grants from the RRF and other instruments – the Innovation Fund, the Modernisation Fund and the Just Transition Fund – amount to about €50 billion per year.

But the RRF ends in 2026. This will leave a major gap in EU funding for the green transition, which will decrease to slightly less than €20 billion per year. In other words, a gap of about €180 billion for the 2024 to 2030 period will open up (Pisani-Ferry *et al*, 2023). This is highly problematic. It will happen just as EU countries are required to deepen their decarbonisation efforts substantially, starting with difficult sectors such as buildings and transport. The risk of political pushback from national capitals will likely be serious as a result.

4.2 The reformed EU fiscal framework is not conducive to green investment

A reform of the EU's fiscal framework – which implements the EU Treaty requirement for countries to keep their budget deficits within 3 percent of GDP, and their public debt within 60 percent of GDP – took effect in April 2024. The framework as updated imposes restrictions that could make the financing of new green investment at national level very difficult for countries with debts and deficits considered excessive. Furthermore, the reformed fiscal framework does not include a 'green golden rule', which would exclude any increase in net green public investment from the fiscal indicators used to measure compliance with the fiscal rules. Nor does it provide exemptions even for EU-endorsed national green investments (see Box 1). These constraints make public investment for decarbonisation harder to realise.

Box 1: The limitations of the EU fiscal framework

The updated EU fiscal framework gives countries with debts and deficits considered excessive four years to bring those debts and deficits under control, but prevents those countries from increasing deficit-financed investment early in the adjustment period, even if it is entirely offset in later years (Darvas *et al*, 2024). The fiscal rules also do not provide substantial exemptions for national co-financing of EU programmes. The main incentive provided in the fiscal rules for green investment is the possibility for a country to extend its adjustment period from four to seven years, thereby gaining breathing space to ease costly annual fiscal adjustments. However, this clause applies only to growth-enhancing reforms and investments. Because green investment can distract resources from the financing of produc-

A gap in EU funding for the green transition of about €180 billion for the 2024 to 2030 period will open up

Green investment is fundamental for the EU to meet its competitiveness and security objectives, even if complex trade-offs exist

tivity-enhancing expenditures, it barely qualifies for being regarded as growth-enhancing (Pisani-Ferry, 2024).

The reformed EU fiscal framework could have been made more investment-friendly by introducing a ‘fiscally responsible public investment rule’ that would have exempted Council of the EU-approved public investment in decarbonisation (and possibly other EU priorities) from the application of the excessive deficit procedure (EDP) – the fiscal framework’s main enforcement procedure – conditional on adequate monitoring of implementation. With such a rule, requirements on debt sustainability would continue to apply but room for additional public financing would be created, provided an investment surge could be regarded as temporary. A rule of this type would have been instrumental in facilitating the green transition, while staying consistent with the objective of keeping public debt sustainable.

There are obviously other ways than the provision of direct support for governments to trigger green investment – for example through regulation. Yet regulation does not alleviate the investment burden. It merely shifts the costs from the public to the private sector. For example, high-carbon emission vehicles could be banned from the roads or poorly insulated homes could be banned from the rental market. However, such burden-shifting may entail political and social risks.

4.3 False narratives on climate policies are increasingly promoted

Even before the 2024 US presidential election, swings to populist nationalist parties in large countries including Germany and France suggested unease among voters about climate policy. These parties indeed often preach the false belief that decarbonisation is detrimental to competitiveness and security, when it is exactly the opposite. Green investment is fundamental for the EU to meet its pressing competitiveness and security objectives, even if complex trade-offs exist between these different societal objectives.

Being poorly endowed with domestic resources, Europe is highly dependent on fossil-fuel imports, as dramatically illustrated by the 2022-2023 energy crisis. This exposes the EU to global oil and gas market volatility, undermining competitiveness¹¹ and threatening security. For Europe, the only structural solution is the green transition. The EU is endowed with abundant domestic renewable energy resources, which can be exploited in a cost-effective manner, as generating electricity with wind and solar energy is now cheaper than doing so with coal and gas (Ember, 2024).

It is important to note that these estimates exclude subsidies, tax credits and system integration costs (eg grid connection and flexibility solutions to cope with intermittent renewable energy sources). It should also be mentioned that deploying renewables rapidly will not only lower wholesale power prices, but also cut bills for households, even accounting for additional costs such as grid expansion (Ember, 2024). This is the result of the global roll-out of clean technologies and continuing cost reductions in this sector (Claeys *et al*, 2024). According to the IEA (2023a), EU electricity consumers saved €100 billion during the peak of the energy crisis in 2021-2023 thanks to additional electricity generation from newly installed solar PV and wind capacity.

While decarbonisation was a priority in its own right until 2022, it is now the only available way to structurally secure energy supplies¹² and to lower energy costs for the European

¹¹ Reliance on imported fossil fuels has long made the cost of gas and, consequently, of electricity in Europe substantially higher than in other large economies, including the US, China and Korea. In 2023, energy costs were identified as a major obstacle to investment by 53 percent of EU respondents and only 23 percent of US respondents (EIB, 2023).

¹² Dolphin *et al* (2024) estimated that by meeting its emission reduction targets, the EU could significantly enhance energy security already by 2030.

economy¹³. However, it will take time to get there. Most modelling exercises, including the European Commission's, expect renewables to really cut electricity prices only in the early 2030s (Gasparella *et al.*, 2023). For this to happen, massive investments will be required for renewable generation build-up, electricity grid expansion and provisions of flexibility solutions, such as electricity storage.

4.4 The trade-offs between decarbonisation, competitiveness and security are increasingly difficult

Decarbonisation raises three main issues: the fiscal cost, impact on competitiveness and implications for economic security. All three objectives of fiscal sustainability, competitiveness and economic security are worth pursuing, but cannot be achieved simultaneously, at least over a five-to-15 year period. Policy must therefore confront trade-offs. For example, relying on Chinese green equipment may help contain the fiscal cost of the transition and be good for competitiveness, but at the cost of undermining economic security. Conversely, European sourcing may head off economic security risks, but is likely to increase the fiscal cost of the transition.

Moreover, the nature or the acuteness of the trade-offs depend on the instruments chosen to reach net zero. Carbon pricing (through taxation or the auctioning of emission permits) alleviates the budget constraint but raises issues of social acceptability. Regulation does not raise fiscal concerns, but by shifting the decarbonisation cost onto the business sector, it may negatively affect competitiveness. Subsidisation of green investment may be good for economic security and competitiveness, but entails a fiscal cost (which the US Inflation Reduction Act (IRA) suggests could be major). Trade-offs are therefore instrument-specific.

EU green investment needs, and the public share of them, depend on the industrial policy approach. A strong industrial reshoring strategy would, for instance, lead to higher costs for clean technologies and therefore to higher green-investment needs. On the contrary, a more balanced and innovation-driven industrial policy might foster clean-tech cost reductions and therefore reduce green-investment needs. As industrial competitiveness will be a major driver of the 2024-2029 EU cycle, this trade-off will have to be confronted by policymakers at both EU and national levels.

In summary, Europe is currently not on track to reach its climate targets. It is at a juncture where political resistance to decarbonisation is mounting and where budgetary means to buy off consent are becoming scarce, at both EU level (because the main source of financing is drying up) and national level (because the fiscal rules leave little room for green investment). Moreover, the EU faces increasingly acute trade-offs between fiscal sustainability, competitiveness and economic security.

4.5 The return of President Trump further exacerbates the problem

The return of President Trump is set to exacerbate competitiveness and economic security challenges. His expected dismantling of US climate and environmental policies will fuel the narrative of populist nationalist parties in Europe, while his agenda is set to worsen Europe's decarbonisation, competitiveness and security conundrum. As more public spending is likely to be needed in the defence sector, less public resources might be available for the green transition.

Confronting this challenge, it must be clear that Europe's own economic interest is to push ahead with the green transition, for at least three reasons. First, global decarbonisation is vital for the EU in seeking to limit increasingly expensive climate damage in the future. Second, it will help the EU enhance its economic competitiveness and economic security. Third, it

Political resistance to decarbonisation is mounting and budgetary means to buy off consent are becoming scarce

¹³ The importance of the green transition for Europe's competitiveness has been stressed by, among others, IEA *et al.* (2023). It is worth mentioning the work of Cevik and Ninomiya (2022), according to which renewable energy deployment in Europe is associated with a significant reduction in wholesale electricity prices, with an average drop of 0.6 percent for each percentage point increase in the share of renewables.

represents a clean-tech export opportunity for Europe. The EU must stick with its plan even as difficult trade-offs get tougher, and try to turn this situation into an opportunity to attract those clean investments that might now not materialise in the US, at least over the next four years.

It is important to stress that Trump's fossil-fuel agenda is in the selfish interest of the US but it has no content for the EU, which is not endowed with fossil-fuel resources. Trump will aim to make the US not just 'energy independent', but 'energy dominant'. He has pledged to halve natural gas and electricity prices within a year, largely through increased natural gas production. If this happens, it would widen the EU-US energy price gap, further undermining EU industrial competitiveness. As previously illustrated, the only way for Europe to provide a structural solution to this problem is to accelerate green investments. Trump's return should thus be taken as a substantial boost to the implementation of the EU's clean investment agenda.

5 Six proposals to make the necessary climate investments happen

To reach the EU's 2030 climate target, the European Commission should put forward a new transformation programme, with both a private and a public strand. For the private strand, policy should aim at ensuring the credibility of the climate-policy strategy, and at creating the framework conditions for a full mobilisation of savings. For the public strand, the aim should be to maximise the firepower of limited fiscal resources.

5.1 The business strand: ensure credibility and the full mobilisation of savings

Proposal 1: Ensure the credibility of the EU climate-policy framework and overall policy consistency

Credible carbon pricing signals and credible climate and environmental regulations drive expectations and underpin the green investment decisions of households and firms. Effective implementation of this toolkit can reduce the overall fiscal cost of the green transition.

The European Green Deal must thus be implemented fully, avoiding the temptation to water down its provisions because of competitiveness concerns. Reopening and weakening laws agreed after years of negotiations would do nothing to support the competitiveness of European industry and would only risk postponing the green investment decisions of families and businesses by undermining confidence in the reliability of Europe's green trajectory¹⁴.

An element that should not be neglected is taxation. Current European taxation systems still provide generous fossil-fuel subsidies and it is urgent to rethink them. After previous failed attempts, the now more than two-decades old EU Energy Taxation Directive (Council Directive 2003/96/EC) must be revised to align European taxation systems with EU climate policy, and to incentivise clean-tech uptake.

Proposal 2: Unleash green private investments through a capital markets union that works, an effective sustainable finance framework and a stronger European Investment Bank
As the private sector will have to account for most green investment, the capability to adequately leverage private investments will ultimately make or break the European Green Deal. The EU can take two important actions on this: i) deliver an effective capital markets union

¹⁴ This applies, for example, to the 2026 revision clause for the ban on the sales of internal combustion engine cars starting in 2035.

The EU financial system is ill-suited for enabling the investments needed for the green transition through the provision of private capital

(CMU); ii) deliver an effective sustainable finance framework and iii) increase the firepower of the European Investment Bank (EIB).

i) A CMU that works

The cost of accessing finance is an important factor in determining whether households and firms can undertake capital-intensive green investments. The EU financial system is highly bank-dominated and fragmented along national lines, making it ill-suited for enabling the massive investments needed for the green transition through the provision of private capital. As a consequence, as noted by Letta (2024), the EU's share of global capital-market activities – including equity issuance, total market capitalisation and corporate bond issuance – does not align proportionately with its GDP¹⁵. Economic analysis suggests that this situation makes the EU more prone to crises and more likely to grow at a slower rate (Sapir *et al*, 2018).

Twin projects have been undertaken to move from fragmented national financial systems to a single European financial system that can finance projects at a European scale: the banking union (since 2012) and the capital markets union (since 2014). Although integrating and deepening capital markets has been a long-standing EU goal, actual progress on the CMU has been very limited¹⁶. Giving substance to this project is now urgent to spur the private investments needed for the green transition. As suggested by Merler and Véron (2024), the European Commission should advance the CMU primarily by focusing on the integration of capital-markets supervision at EU level, as that is the area with the most immediate potential for progress.

Reform should also streamline the jumble of market infrastructures, asset management and auditing frameworks that currently prevent the efficient pan-European allocation of European savings to European projects, including those needed for the green transition. After years of procrastination, it is time to move and create a direct connection between the funding of the green transition and the development of the CMU.

ii) Deliver an effective sustainable finance framework

The EU has been a first mover in sustainable finance. However, as pointed out by Merler (2024), the EU's legal framework on sustainable finance suffers from three flaws:

1. Its centrepiece – the Taxonomy Regulation (Regulation (EU) 2020/852), which defines what counts as sustainable – is hampered by conceptual and usability shortcomings and as a result has not gained traction as the reference framework among corporates and investors for issuance or investment.
2. The second pillar – the EU Sustainable Finance Disclosure Regulation (Regulation (EU) 2019/2088) – suffers from a structural weakness: its key concept of 'sustainable investment' is not clearly defined.
3. Lastly, the EU lacks a coherent framework for transition finance, which is currently not properly defined in EU legislation.

These flaws risk limiting the effectiveness of EU regulation in leveraging financial markets to meet climate goals. As suggested by Merler and Véron (2024), the EU should take three actions to address this problem: i) better define 'sustainable investment' in the disclosure regulation, and 'transition finance' in the EU legal framework; ii) develop a standard for sustainability-linked bonds and other types of transition-finance instruments; iii) review how environmental, social and governance (ESG) ratings are regulated to make them more impactful.

¹⁵ Letta (2024) also noted that the EU is home to a staggering €33 trillion in private savings, predominantly held in current accounts (34 percent). This wealth, however, is insufficiently leveraged to meet the EU's strategic needs. On the contrary, European resources are diverted towards the US economy and US asset managers. This phenomenon underscores a significant inefficiency in the utilisation of EU savings, which, if redirected effectively within EU economies, could substantially aid in achieving the EU's strategic objectives, starting with the green transition.

¹⁶ Nicolas Véron, 'European capital markets union: make it or break it', *First Glance*, Bruegel, 19 March 2024, <https://www.bruegel.org/first-glance/european-capital-markets-union-make-it-or-break-it>.

iii) Increase the firepower of the EIB

The EIB has played an important role in fostering clean investments under the auspices of the so-called Juncker Plan (now renamed InvestEU), a 2015 EU initiative to boost investment. EIB guarantees should amount to €33.7 billion to support about €370 billion in private investments by 2027. But more can and should be done to increase the role of the EIB in fostering investment across the EU, and also to increase its risk profile.

An important but still modest step has been taken by the EIB Board of Governors, which in 2024 proposed to change the statutory limit on its gearing ratio (ie how much it can lend in relation to its own resources), raising it from 250 percent to 290 percent¹⁷. With a total balance sheet close to €600 billion, the EIB has played an increasingly significant role in the financing of the green transition, in accordance with its 2019 decision to become ‘the EU’s climate bank’, and to devote more than 50 percent of its investments to projects supporting climate action and environmental sustainability.

The EIB Board of Governors in June 2024 confirmed the financing of the green transition as the bank’s first priority, envisaging an increase in its lending to interconnectors and grids, energy efficiency, energy storage and renewables, and clean-tech manufacturing projects (EIB, 2024a). Financing activity of up to €95 billion is foreseen for 2024-2027, with well above half of investments going to the green transition. This compares to financing activity of €84 billion in 2023, of which more than half is already focused on the green transition (EIB, 2024b).

This is a good step but a modest one, given the scale of investment the EU needs in the coming years. The EIB should be more ambitious on the level of its financial activity. The EU should continue to provide the EIB with sufficient mandates and guarantees from the MFF, as these are essential to maintain the EIB’s current funding levels and to deploy more high-risk impact finance – similarly to national promotional banks (eg Germany’s KfW, France’s Groupe Caisse des Dépôts, Italy’s Cassa di Risparmio di Roma and Spain’s Instituto de Crédito Oficial), which are underwritten by national guarantees.

An additional step to form up the EIB’s role in fostering private green investment was proposed by Letta (2024): the launch of a European Green Guarantee (EGG). This would entail the European Commission and EIB developing jointly an EU-wide scheme of guarantees to support bank lending to green investment projects and companies, with the EIB evaluating specific proposals from commercial banks and/or national financial institutions, and awarding the guarantee that would enable them to provide the necessary funding to companies. Based on a resource multiplier of 12 (like the original Juncker Plan), €25 billion to €30 billion in guarantees would trigger €300 billion to €350 billion in green investment. Under this scheme, European banks would be able to play a greater role in funding green companies, as the EGG would neutralise the so-called ‘green transition risk’, which prices the inherent risk of lending to green companies. The EGG would thus allow the EIB to reinforce significantly its catalytic role in private green investment.

5.2 The public strand: maximising the firepower of limited fiscal resources

Proposal 3: Turn NECPs into national green-investment strategies and attach conditions to the disbursement of EU funds

The national energy and climate plans (NECPs) of EU countries remain bureaucratic exercises without substantial impact on the formulation and implementation of national energy policies (Pisani-Ferry *et al*, 2023). NECPs must be turned into real national green-investment strategies, providing a point of reference for investors, stakeholders and citizens in making investment decisions. Governments should be obliged to set out in their NECPs a detailed, bottom-up analysis of their green investment needs, and an implementation roadmap with clear milestones or key performance indicators (KPIs).

¹⁷ The final decision is still to be taken, at time of writing, by the EIB member states.

National energy and climate plans of EU countries remain bureaucratic exercises without substantial impact on national energy policies

The reform of the EU fiscal framework has not left adequate room for green public investment

The disbursement of EU green funds should be made conditional on the efficient achievement of these KPIs. This would be in line with the approach of linking the future EU budget with national reforms and investments, put forward by Ursula von der Leyen ahead of the European elections¹⁸. As part of this, EU funds should be better focused on European green public goods with a high level of additionality (eg electricity interconnections) and measures that tackle the distributional impacts of climate policy.

Much more coordinated development of renewable energy and electricity-grid investment across Europe would yield substantial ‘techno-economic’ benefits, based on the design and operation of several European national electricity systems jointly, rather than individually. These benefits will increase massively with the development of renewables because of the harnessing of regional advantages, reducing the need for expensive back-up capacity and enhancing resilience to shocks (Zachmann *et al*, 2024).

Proposal 4: Revise the EU fiscal framework to introduce a ‘fiscally responsible public investment rule’

The reform of the EU fiscal framework has not left adequate room for green public investment. The framework should be revised by exempting well-specified public investment in decarbonisation, approved by the Council of the EU, from the application of minimum adjustments required under the EDP and the associated safeguards.

The problem with public investment in decarbonisation is that many of these investments are unprofitable at the current carbon price, taking into account the prevailing discount rate (for households) or the cost of capital (for businesses and local governments). Belle-Larant *et al* (2024) estimated that in France, only one-third of green investments in the transport and building sectors are profitable at the current carbon-price level. This implies that they won’t happen without public support.

Governments should thus play an important role here. But the new EU fiscal rules prevent countries that are subject to the EDP from sustaining clean investments. The framework should be amended so that economically-sound public investment that is expected to result in measurable reductions in emissions can happen. As a rule, this exemption should be conditional on: (a) the allocation of the future savings from reductions in fossil-fuel consumption to the reduction of public deficits and (b) adequate monitoring of implementation.

Proposal 5: Put the EU budget at the service of the green transformation

Increasing the minimum green spending threshold in the EU Multiannual Financial Framework (MFF) from 20 percent in 2014-2020 to 30 percent in 2021-2027 was an important step, consistent with the EU’s tougher climate goals. However, no interim assessment has been performed on compliance with the threshold and effectiveness of the spending. This should be done, taking into account that the European Court of Auditors found that the reported green spending in the MFF from 2014-2020 was not always relevant to climate action and that climate investment reporting was overstated (ECA, 2022).

In the context of the approaching phase-out of the Recovery and Resilience Facility, maintaining the current green spending threshold in the 2028-2034 MFF should be seen as a bare minimum for the EU. New strategic priorities, including security and defence, should be met in parallel – and not at the expense – of the green transition. The EU budget should also be more focused on European green public goods and measures aimed at leveraging national actions to tackle the distributional impacts of climate policy. As we have noted, the disbursement of the EU green budget should be made conditional on the achievement of KPIs.

Commission President von der Leyen is right to propose the creation of a new European Competitiveness Fund to invest in clean-tech manufacturing, AI, space and biotech technologies (von der Leyen, 2024). EU countries should not kill this proposal, as was done with

¹⁸ Henry Foy, ‘Ursula von der Leyen backs EU budget links to economic reforms’, *Financial Times*, 20 May 2024, <https://www.ft.com/content/8de55955-502b-46cd-856d-d8b7498b2436>.

the European Sovereignty Fund¹⁹, and should instead consider different funding options, including new EU joint borrowing as suggested by Draghi (2024). The European Competitiveness Fund should accompany the implementation of a truly European industrial policy, and could become the main EU industrial policy investment vehicle in the context of which other tools, such as the EU Innovation Fund, could be framed while maintaining their operational autonomy. That is, the European Competitiveness Fund should be a one-stop-shop able to ensure the availability and accessibility of EU funds for clean-tech manufacturing.

Availability and accessibility are essential to maximise the impact of public money. Without such a vehicle at EU level, public incentives to spur private investment in clean tech and other technologies would predominantly come from national state aid, which would create risks of single-market fragmentation. The new Competitiveness Fund should:

- Focus on supporting the development and scaling-up of pan-European public-private eco-systems, for instance topping-up national support for Important Projects of Common European Interest (IPCEIs);
- Support the whole innovation cycle in an integrated manner, from disruptive innovation to deployment at scale;
- Prioritise areas in which market, network and transition failures are most likely and government selection failures least likely, ensuring additionality and leveraging of other (member state) public and private funding (Tagliapietra *et al*, 2023).

Proposal 6: Maximise the use of ETS revenues

As the EU carbon price has increased significantly in recent years, so too have the revenues accruing to governments from auctioning off emission permits – rising from around €5 billion in 2017 to €38.8 billion in 2022. Of the total auction revenues generated in 2022, €30 billion went directly to EU countries, while the rest went into the EU Innovation Fund (€3.2 billion) and the Modernisation Fund (€3.4 billion) (EEA, 2023). However, while between 2013 and 2022 national governments only spent around three quarters of the total revenues they received on climate-related activities, the ETS rules now oblige them to spend all their revenues for green purposes²⁰.

In May 2023, EU countries agreed to introduce a second emissions trading scheme (ETS2). This will put a price on emissions from direct fuel combustion, including gas and oil boilers in private homes, and fuel combustion in road transport. Taking effect in 2027, ETS2 will require upstream fossil-fuel suppliers to surrender carbon certificates equivalent to the emissions generated by consumers of their fuels. The auctioning of ETS2 allowances will also generate substantial revenues of about €50 billion annually at a carbon price of €45/tonne (in 2020 prices) – the level of the cap that will be in place during the first three years of operation of ETS2. A maximum of €65 billion from the 2026-2032 revenues will be allocated to the Social Climate Fund (SCF), which is intended to support vulnerable households, micro-enterprises and transport users who face higher costs.

To access the SCF, EU countries must develop by June 2025 social climate plans that outline how they will use these funds to support vulnerable communities. In addition, countries must contribute at least another 25 percent of the costs of their social climate plans, increasing SCF resources to at least €87 billion (Cludius *et al*, 2023). The remaining ETS2 revenues will be managed by national governments; EU rules require these revenues to be used to deploy low-emission solutions in transport and heating, or to mitigate social impacts.

19 Frédéric Simon, 'EU closes deal on scaled-back clean tech sovereignty fund', *Euractiv*, 7 February 2024, <https://www.euractiv.com/section/energy-environment/news/eu-closes-deal-on-scaled-back-clean-tech-sovereignty-fund/>.

20 The three-quarters figure is questioned by researchers and NGOs, highlighting reporting and accountability issues related to ETS revenues allocation (WWF, 2022; Branner *et al*, 2022).

Cautiously assuming an ETS carbon price of €75 in 2030, and an ETS2 carbon price of €45, total revenues would amount to €65 billion in that year, of which €50 billion would accrue to EU countries. If carbon prices rise by 2030 to €130 and €100 on the ETS and ETS2 markets respectively, total revenues would be €134 billion in that year, of which around €100 billion would accrue to member countries. Being in the order of €50 billion to €100 billion in 2030, ETS revenues accruing to member states would thus be significant, and should be used to maximum benefit for the transition. The EU should closely monitor member state policies to ensure the money is well spent.

6 Conclusion

To achieve its climate targets, the EU will require additional annual investments of about two percent of GDP between 2025 and 2030, comparable to EU R&D spending in 2022 – estimated at 2.2 percent of GDP (Eurostat, 2024). These investment needs are significant, but manageable.

Finding the sums is also urgent and necessary. With the European Green Deal, the EU has positioned itself as the global frontrunner in climate policy. Given the political economy of global climate action and the likely withdrawal of the US from the Paris Agreement, the success of the European Green Deal is vital for global decarbonisation to stand a chance. This is more important than ever, as climate-change impacts around the world are becoming increasingly visible and costly.

From this global perspective, it should be recalled that the cost of climate action is far lower than the cost of inaction, especially for Europe which is the fastest-warming continent. Extreme flooding in Slovenia in 2023, for example, caused damage estimated at around 16 percent of national GDP (IMF, 2024). Such events cause severe, direct impacts on settlements, infrastructure, agriculture and human health. They also led to wider economic impacts in the affected regions and major fiscal challenges at national levels.

As we have shown, the public share of the additional investments needed for the EU to meet its 2030 climate target should range between 0.5 percent and one percent of GDP in 2025-2030. Fiscal constraints must not stand in the way of mobilisation of these resources. Public debt for such investments should be seen as ‘good debt’, fully justified by the one-off financing needs of an extraordinary and temporary transition that will massively benefit future generations. It should also be stressed that public spending on climate mitigation today will lessen the potentially much higher needs for public spending on climate adaptation in the future. A responsible green investment framework along the lines we suggest would help convince markets that this green debt can and must be financed.

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