

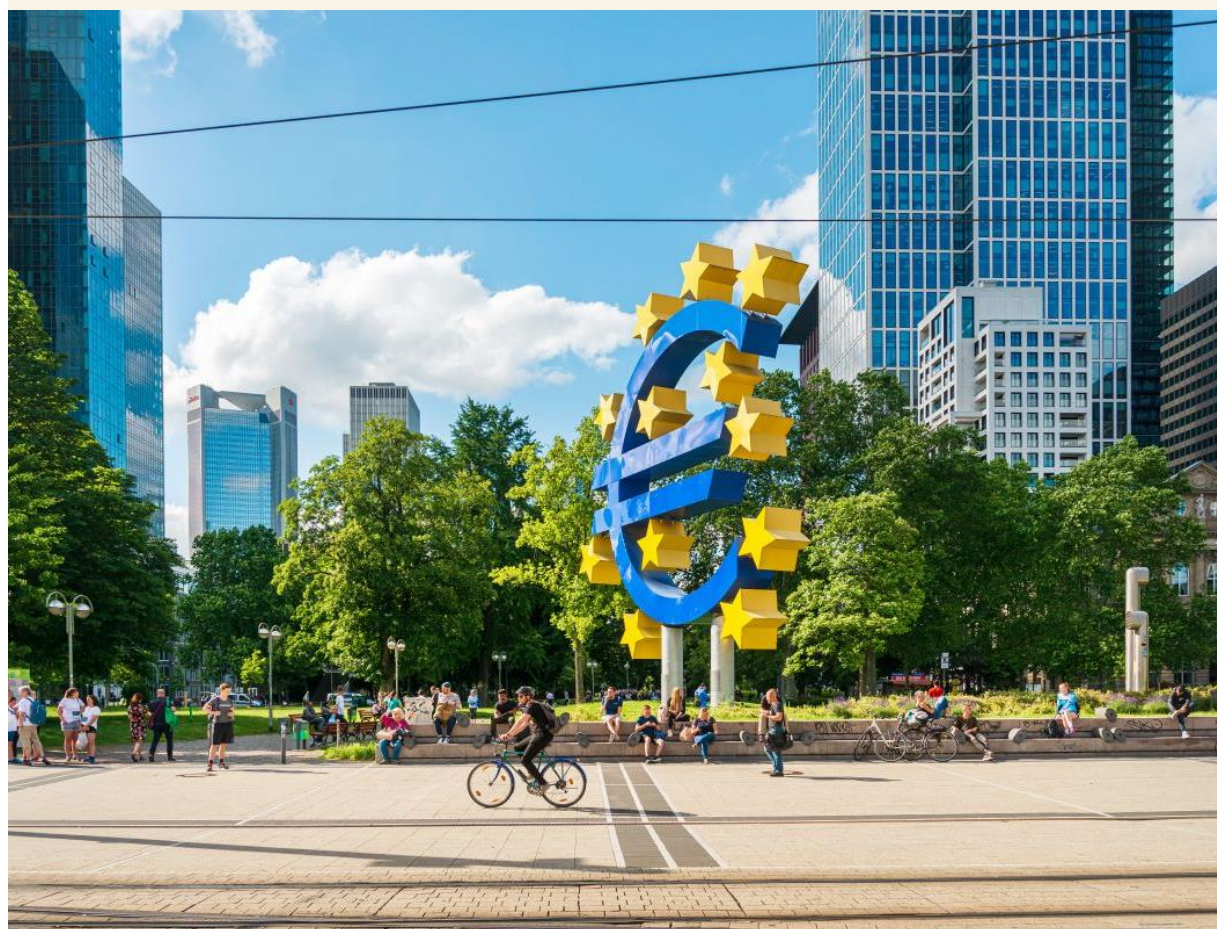


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REPORT September 2022

ALIGNING EU FISCAL POLICY WITH THE ENERGY TRANSITION

**RONAN PALMER, DILEIMY OROZCO, CIARÁN HUMPHREYS,
JOHANNES SCHROETEN**





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

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

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Cyclists and pedestrians gather around the euro sign in front of the European Central Bank ECB in Frankfurt, Germany. Photo via Adobe.



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SUMMARY

EU fiscal policy is not properly aligned with the union's ambitious climate action. Despite the urgency of the energy transition and the scale of net zero commitments that governments have made,¹ the transition is still not central to macroeconomic management.

It will be impossible to achieve the energy transition without a transformation in thinking about EU fiscal policy. Ministries of finance are well placed to provide the impetus: they understand both the risks posed by climate change, and how investment can be unlocked.

This report examines the gaps that the EU must address to bring about this transformation, and makes recommendations about the necessary steps that ministries of finance must take to make fiscal policy fit for the energy transition. They must incorporate climate change into how they analyse the economy, to enable more effective climate action. They must also properly address the investment needs to achieve the energy transition, and collect, allocate and redistribute the necessary resources to direct it.

These changes to fiscal policy are not only vital for meeting climate targets, but also for securing the EU's continued leadership and credibility on climate on the global stage.

Recommendations

1. The European Commission should mandate the development of climate-macroeconomic models in all member states as part of its review of the fiscal rules.
2. EU member states should be required to set out climate investment plans to 2030. The EU Commission and the Council should agree a methodology that allocates sufficient expenditure to meet the Climate Law obligations.
3. As part of the review of the fiscal rules, the Commission should propose a permanent climate investment facility to be approved by the Council, financed by member states and EU taxation.

¹ [Global net zero commitments tracker](#)



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INTRODUCTION

Under its Climate Law, the EU has set ambitious climate targets of reducing net greenhouse gas emissions by at least 55% by 2030, with the ultimate objective of achieving net zero by 2050. At the same time, the European Commission is reviewing the EU fiscal rules, which have been suspended again until the end of 2023.

There appears to be no political consensus within the EU on reforming the fiscal rules. Equally, there is limited political appetite for more joint borrowing.² The EU seems to be bound by a set of financial constraints, making it ill-suited to adequately react to the multiple challenges it faces.

This report argues that the national and EU funding being allocated to investment in the energy transition falls considerably short of what is needed to comply with the Climate Law. As a result, the EU's commitment to meeting its climate obligations faces a significant credibility problem.

The nature of these challenges has been exacerbated by the fallout from Russia's invasion of Ukraine. The EU must simultaneously wean itself off Russian gas, accelerate the energy transition, enhance its defence capabilities, deal with the costs of a potentially long-drawn-out war, and plan for post-war reconstruction and expansion to encompass potential new eastern members. It cannot expect to succeed without a shift in its fiscal policy.

Given their central role in economic management, ministries of finance must provide the impetus for changes to fiscal policy. The Coalition of Finance Ministers for Climate Action, formed in 2019, has stated that finance ministers hold the keys to accelerating climate action. They know most clearly the risks posed by climate change, and recognise how taking action could unlock trillions in investments and create millions of jobs through 2030.³

However, finance ministers do not currently view the energy transition as equivalent in importance to their traditional role in macroeconomic management. The main focus for finance ministries remains growth, jobs,

² Financial Times, 2022, [German finance minister urges EU to rein in public spending](#)

³ The Coalition of Finance Ministers for Climate Action, 2022, [The Coalition of Finance Ministers for Climate Action: An Overview](#)



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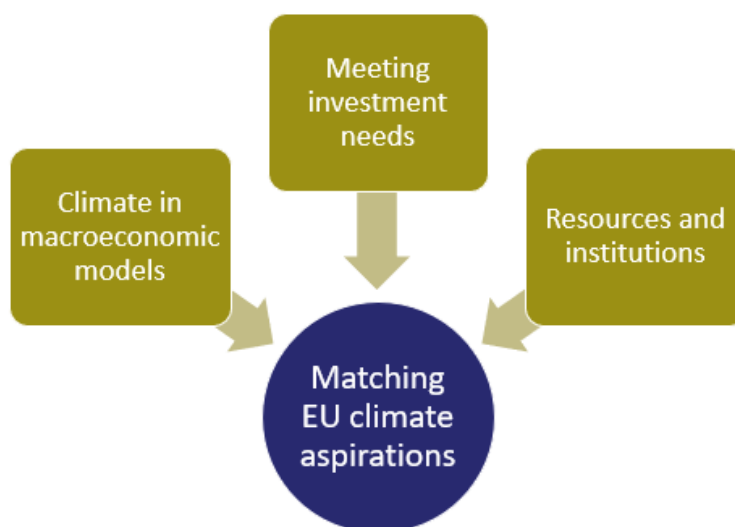
inflation and public debt.⁴ Climate action comes behind the traditional priorities of budgetary policy and macroeconomic management.

The transition to net zero requires that climate change mitigation and adaptation policies are mainstreamed in macro-fiscal and other relevant policy planning, budgeting, public investment management and public procurement.

To ensure that adequate resources and capabilities match climate aspirations, economic policy makers at both the national and EU level will have to bridge a number of gaps, in particular:

- > how climate features in macroeconomic models
- > addressing investment needs
- > fiscal resources and institutions.

Figure 1: Bridging the gap to meeting EU climate aspirations.



Closing these gaps will be necessary if the EU is to meet the commitments it has set itself under the EU Climate Law. More broadly, if the EU is to tackle the entire sequence of challenges it faces, aligning its macroeconomic policy with its climate ambitions is a necessary but not sufficient step. However, it may also act as a spur towards addressing these wider challenges.

⁴ See for example the [Department of Finance of the Government of Ireland](#).



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CHAPTER 1

INTEGRATING CLIMATE CHANGE INTO MACROECONOMIC MODELS

“It is crucial that countries integrate considerations of climate change into economic, financial, and fiscal policy and decision-making, to promote a sustainable green recovery following the pandemic. Climate-informed macroeconomic modelling can support assessments of the economic effects of policies related to decarbonisation, mitigation, and adaptation, as well as of the physical effects of climate change. Modelling can reveal how economic policies affect climate objectives and vice versa, so that the identified effects can inform decision-making.”⁵

The absence of carbon emissions from macroeconomic models

Modelling is the foundation of macroeconomic policy. However, climate considerations are largely absent from current macroeconomic models. A number of international organisations, including the World Bank⁶, the OECD⁷ and the European Commission,⁸ have developed methodologies for integrating the macroeconomic modelling of climate change into economic policy-making.⁹ To date, the take-up of these models has been relatively limited. In part, this is due

⁵ OECD, 2021, **Introductory note on integrating climate into macroeconomic modelling drawing on the Danish experience**

⁶ World Bank Group, 2021, **Climate Modelling for Macroeconomic Policy: A Case Study for Pakistan, 2021**

⁷ OECD, 2021, **OECD Strengthening Climate Resilience**

⁸ **Coalition of Finance Ministers for Climate Action, Helsinki Principles**

⁹ Many different macroeconomic models can be used to assess climate risks and factor this into economic policy decisions. E3 models are econometric input–output models containing economy, energy and emissions modules that can be designed to evaluate the economic impacts of climate change. Another type of macroeconomic model is the dynamic general equilibrium model with optimising agents. An example is the European Commission’s General Equilibrium Model for Economy–Energy–Environment (GEM-E3), which can assess the economic effects of various cost-efficient climate policy instruments, such as taxes, auctioning, and various forms of pollution permits and regulatory interventions in the context of climate and energy policies.



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to a lack of technical capabilities for climate modelling within finance ministries.¹⁰ The wider context is that separate government departments generally have political and policy responsibility for climate action. At present there are limited linkages between countries' growth models and their emissions reduction plans.

In April 2019, the Coalition of Finance Ministers for Climate Action endorsed the Helsinki Principles,¹¹ which promote national climate action, especially through fiscal policy and the use of public finance. As part of the coalition's work to integrate climate into every aspect of fiscal policy, Principle 4 requires that climate change is taken into account in macroeconomic policy, fiscal planning, budgeting, public investment management, and procurement practices, including integrating climate in economic modelling.

To advance this principle, Denmark's Ministry of Finance has recently funded the development of "GreenREFORM", a climate-economic model for the Danish economy. This analytical model aims to provide an integrated assessment of the environmental and climate effects of economic policies, as well as the economic effects of environmental and climate policies.¹² The goal is to provide policymakers in the Ministry of Finance with analysis that will enable them to make better-informed policy decisions regarding Denmark's emissions targets: a reduction of 70% by 2030, and net zero thereafter.

The final model will be able to forecast both traditional macroeconomic metrics, like growth and employment, and CO₂ emissions. It can simulate both on a no-policy change basis, and the impact of policy changes like taxes and spending programs on both economic and emissions dimensions.¹³

It is clear from discussions with ministries of finance in a number of member states that models of this nature are still in their infancy. This gap must be addressed to ensure that the appropriate fiscal policy is in place to achieve the EU's emission reduction targets within the 2030 and 2050 timeframes. It will be critical to accelerate the development of such models, together with analytical tools that provide an integrated assessment of the environmental and climate

¹⁰ Based on discussions with a number of EU Ministries of Finance

¹¹ **Coalition of Finance Ministers for Climate Action, Helsinki Principles**

¹² Danish Research Institute for Economic Analysis and Modelling, **GreenREFORM Model**

¹³ OECD, 2021, **Introductory note on integrating climate into macroeconomic modelling drawing on the Danish experience**



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effects of economic policies, as well as the economic effects of environmental and climate policies.

The development of such models would represent a significant shift in mainstream economic thinking within finance ministries. The approach to calculating output gaps, expenditure rules, and conventional fiscal rules would be radically different if carbon emissions were to be added as an output to current models.

Benefits of climate-informed models

Economic policy making based on models that take carbon emissions into account would, in principle, enable more effective climate action. It would anchor policy choices in broader considerations than the conventional macroeconomic ones of employment, growth, and inflation. For example, an estimated level of growth would have to be accompanied by an emissions estimate, and this would be linked back to national and EU commitments. Economic policies would have to be critically revised to ensure growth and emissions reductions are aligned.

Integrating climate change into macroeconomic models would also build better links between the mandates of environment and finance ministries. Climate action within government would be significantly improved by a much deeper understanding of the incentives, trade-offs and second-round effects of any proposed measure in the policy development process.

For there to be an orderly energy transition, economic modelling that integrates climate is likely to become a critical function for ministries of finance. As the Bank for International Settlements has recently observed, an orderly transition that features a timely increase in green energy investment could deliver persistent long-term gains, measured in terms of economic output. A disorderly shift, on the other hand, would involve significant costs in both the short and long run.¹⁴

Given that the balance of economic risks favors an orderly transition, it should be at the top of the agenda for finance ministries. They should therefore prioritise building technical capacity and expertise in this area. Models that move beyond the traditional domains of macroeconomics are likely to give economists and

¹⁴ BIS, 2022, [Annual Economic Report](#)



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policy experts within ministries of finance a broader and more systemic understanding of the economic constraints and opportunities that the transition to net zero will involve.

This will ultimately enable better political decisions. Governments, and oppositions, could point to a better basis for understanding the issues, identifying winners and losers, and enabling political choices on necessary action. Citizens can in turn gain a better understanding of the choices made and hold governments accountable for meeting climate commitments. While the development of such models will not be a panacea, as Professor Adam Tooze puts it:

“Without quantification, we have no sense of proportion, no way of scaling the importance of key interactions. No way of prioritizing and managing trade-offs. No way of gauging the balance of forces.”¹⁵

Recommendation 1

The European Commission should mandate the development of climate-macroeconomic models in all member states as part of its review of the fiscal rules.

¹⁵ Adam Tooze, 2022, **Chartbook #131 Calibrating the polycrisis - with the help of the Bank of International Settlements**



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CHAPTER 2

INVESTMENT NEEDS AND THE ENERGY TRANSITION

The transition to net zero is the largest infrastructure project in history. It involves rapidly removing and replacing the vast majority of the fossil fuel superstructure that is embedded in every part of the world economy.

The necessary emissions reductions to 2030 can be achieved with currently available technologies. However, by 2050 nearly 50% of reductions to reach net zero come from technologies that are now only at the demonstration or prototype phase.¹⁶

To date, the world has not properly reckoned with the public and private investment that will be necessary to achieve net zero.

Of greater concern is that investment must be accelerated in this crucial decade to 2030 in order to reset the world's emissions trajectory towards the ultimate net zero frontier by 2050. The International Energy Agency's report *Net Zero by 2050*¹⁷ illustrates the scale of the transition needed (see Figure 2).

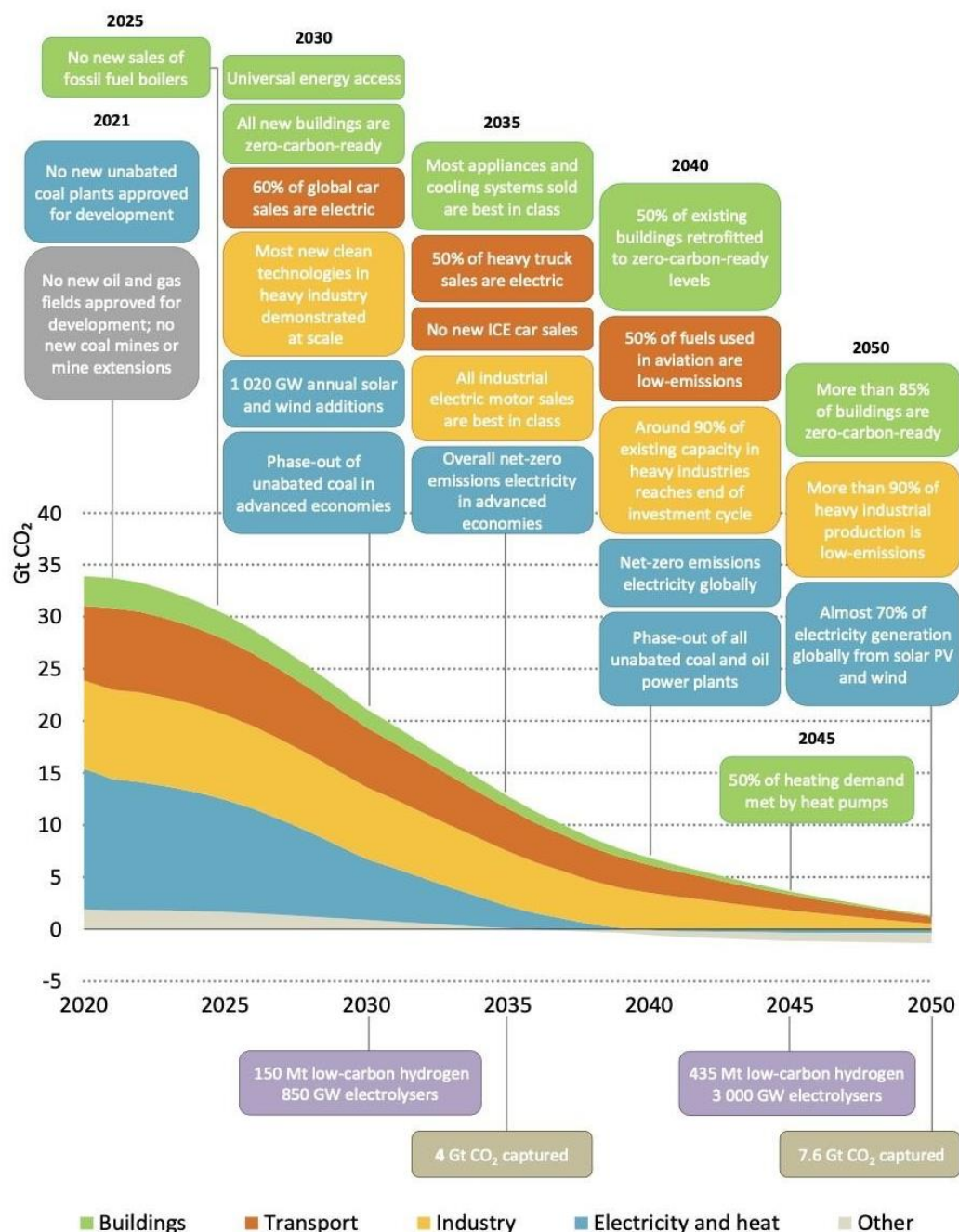
¹⁶ International Energy Agency, 2021, *Net Zero by 2050*

¹⁷ International Energy Agency, 2021, *Net Zero by 2050*



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Figure 2: Transition to net zero by 2050 requires huge changes to energy infrastructure, starting in the decade to 2050.



Source: IEA (2021), Net Zero by 2050, all rights reserved



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The investments necessary for the transition to net zero include:

- > Decarbonising the energy system.
- > Reducing the energy intensity of economic activity and energy consumption through greater efficiency and behavioural change.
- > Developing and deploying carbon capture, storage and removal technologies.
- > Transforming agriculture and land use.
- > Electrifying heavy industry, construction and transport.

The transition will involve a fundamental reallocation of capital, labour and technology away from carbon-intensive activities. There will be significant costs, including stranded assets, loss of employment and relocation. Investments in net zero must therefore also include the cost of a just transition.

Quantifying the investment gap

The IPCC's 2018 report *Global Warming of 1.5 °C* provided figures for the investments needed to limit global temperature rises.¹⁸ It found that the mean annual **additional** investment in the energy sector required to keep the rise in temperature “well below” 2 °C was 0.36% (between 0.2 and 1%) of global GDP between 2016 and 2035. The total incremental investments for all sectors to remain within a pathway that was consistent with the 1.5 °C pathway was 2.4% of total global investment (2.53% if investments in transportation were scaled up proportionally with energy investment).

Breaking this down further, the extent of the investment needed this decade was shown in the IPCC's 2022 mitigation report.¹⁹ It found that limiting warming to 2°C or 1.5°C requires yearly investments for 2020 to 2030 three to six times greater than current levels. Investment gaps are wide for all sectors, and widest for the agriculture, food and land-use sectors. The mitigation report further estimates that global yearly average low-carbon investment needs until 2030 across all relevant sectors are between 3% and 6% of the world's GDP.

The IPCC's figures are consistent with those of other official bodies. The International Monetary Fund estimates that aligning infrastructure with net zero

¹⁸ Intergovernmental Panel on Climate Change, 2018, [Global Warming of 1.5 °C](#)

¹⁹ Intergovernmental Panel on Climate Change, 2022, [Climate Change 2022: Mitigation of Climate Change](#)



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emissions requires an additional public investment in the range of 0.5–4.5% of GDP cumulatively over the next decade.²⁰

Meanwhile, the European Commission estimates that an increase of 1.5–1.8% of GDP is needed in the period 2021–2030 compared to 2011–2020.²¹ While the majority of the new investment will be from private sources, the public sector will bear a significant burden of what is required. Based on World Bank data, the IPCC’s Global Warming of 1.5 °C report estimates that public investment will comprise around one quarter of the overall climate-related investments in energy and transport.²²

The extent of the investment gap is also highlighted in a recent report from Bruegel,²³ which summarises a number of separate studies and suggests a headline figure of 2% of GDP for the net annual additional investment to 2030. In the longer term, the investment need tapers somewhat, though remains in excess of 1% of GDP annually.

While these estimates are useful, significant gaps remain to comprehensively track how funding is being deployed. At a national level, there is the risk of a mismatch between national action plans and the assessment of investment needs, with the likelihood that many such plans are not properly funded. As such, it is a distinct possibility that current assessments significantly underestimate the levels of investment necessary to achieve net zero. This tension can be readily observed in the EU: only a handful of countries have to date carried out systematic studies of the flow of funds to climate mitigation in their domestic economies.

Despite numerous estimates of the investment gap in the EU’s energy transition, there is no agreement on, or consistency in, what is included in those estimates. This means that it is difficult to compare the different sources of finance involved. However, it is clear from any comparison of estimated needs and current investment levels that Europe is confronted by a fundamental investment challenge.

²⁰ G20, 2021, [Reaching Net Zero Emissions](#)

²¹ At €438 billion in 2021–2030, this represents the average annual energy system investment needs (excluding transport) to achieve the Fit for 55 levels of ambition: European Commission, 2020, [Stepping up Europe’s 2030 climate ambition](#)

²² Intergovernmental Panel on Climate Change, 2018, [Global Warming of 1.5 °C](#)

²³ Bruegel, 2022, [Greening Europe’s Post-Covid-19 Recovery](#)



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EU investment gaps are growing

While there is no single agreed number for the investment needed for the EU's energy transition, there is increasing evidence that the investment gap is increasing over time. A 2020 European Commission staff working document spelt out a requirement for €470 billion of investment every year until 2030 for the EU to meet its environmental objectives, including the Paris Agreement emissions targets.²⁴

The Commission stated that “the pandemic recovery plans take a step in the right direction, but we need a much more ambitious long-term path”. It went on to break down the basis for its analysis of the investment needs:

“This amount includes the additional investments needed to reach the EU's current 2030 climate and environmental policy goals, which are around €470bn per year [...]. The total green investment needs cover not only the current 2030 climate and energy targets (€240bn additional annual investment) but also investment needs to deliver on Europe's wider transport infrastructure (€100bn per year) and environmental objectives (€130bn per year).”²⁵

In the same document, the Commission went on to state that it was not possible to quantify all green investment needs at that stage. The €470bn per annum estimate is therefore a rather conservative benchmark for adequate green investment levels. The estimate does not include the increases in ambition under the EU Climate Law, nor the strategies for various environmental objectives, some of which are currently under adoption or in preparation. The Commission itself acknowledges that the estimates relating to the broader environmental objectives do not account for investments into climate change adaptation, notwithstanding the reality that this will be an increasing factor in responding to climate change.

The investment gap has been exacerbated by Russia's invasion of Ukraine. In response to the commitment of EU leaders to phase out imports of Russian fossil

²⁴ European Commission, 2020, [Identifying Europe's recovery needs](#)

²⁵ European Commission, 2020, [Identifying Europe's recovery needs](#)



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fuels by 2027, the REPowerEU plan identifies additional investments of €210 billion above what has previously anticipated between now and 2027.²⁶

Agora Energiewende recently estimated that EU member states need to commit 1% more of GDP to public investment to keep on track to reach 2030 climate goals.²⁷ Agora argues that the resources allocated to climate investment through national recovery plans are far from what is needed to reach the 2030 targets, given that EU countries have to cut more emissions over the next nine years than they have over the last thirty.

Recommendation 2

EU member states should be required to set out investment plans to 2030. The EU Commission and the Council should agree a methodology that allocates sufficient expenditure to meet the Climate Law obligations.

²⁶ European Commission, 2022, [REPowerEU: affordable, secure and sustainable energy for Europe](#)

²⁷ Agora Energiewende, 2022, [How to align the EU fiscal framework with the Green Deal](#)



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CHAPTER 3

FISCAL RESOURCES AND INSTITUTIONS

A clear public sector funding gap arises from the analysis of investment needs. While private sector financing and innovation will play a major role in achieving the ambitious targets the EU has set, they cannot be met without public sector investment playing a central role.

Politically, this is not accepted in all quarters. Significant faith is still placed in the role of private finance, which some may believe can be mobilised largely unaided by public investment.

Agora Energiewende has estimated the fiscal space that is currently being made available to meet the relevant climate investment needs. The picture that emerges is of a significant gap without identified revenue sources to finance this (see Figure 3).

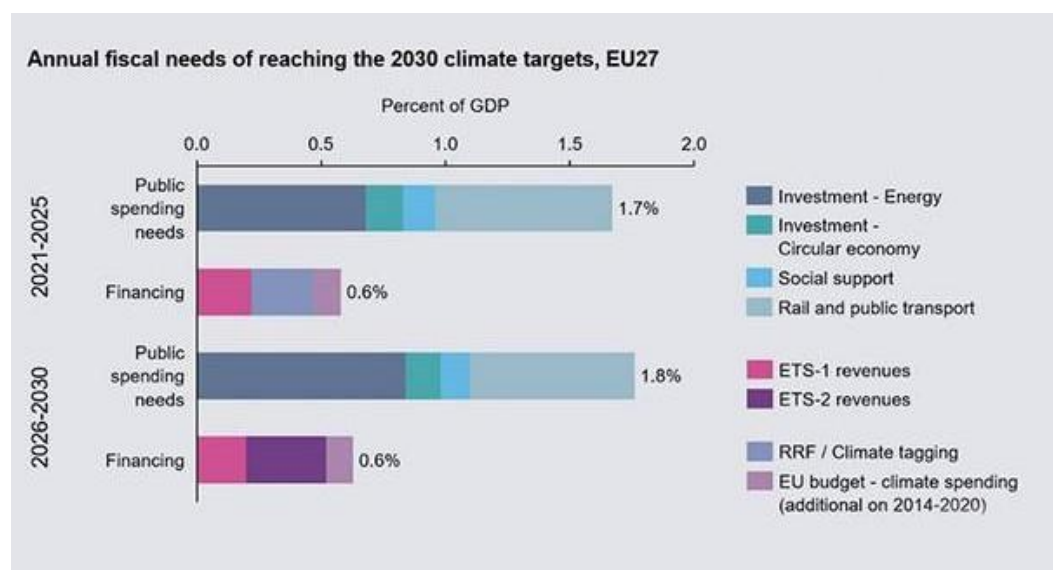
The funding gap can be addressed at both the national and EU level. However, the EU's fiscal rules may be an obstacle for some economies, and this might have an impact on cross-border projects more broadly. It will ultimately require a political consensus on the sources of financing – whether this is additional, national or EU taxation and/or borrowing – and the consequent impact of that financing on the trajectory for the fiscal rules and any specific funding instruments.

Several options for EU fiscal reform have been put forward in recent months, both to facilitate the energy transition and to advance other emerging policy priorities, including defence enlargement and post-war reconstruction. These options include a “green golden rule”, a climate investment fund, and new revenue streams.



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Figure 3: There is currently a large funding deficit for EU public spending required to meet 2030 climate targets.



Source: Adapted from Agora Energiewende (2022), *How to align the EU fiscal framework with the Green Deal*. Notes: Investment – Energy includes power, industry, buildings, transport (vehicles and recharging stations). Rail and public transport is based on a European Commission’s estimate (SWD(2020) 98 final/2). Social support is the cost of compensating low-income households for higher heating and power costs. ETS-1 revenues are from auctioning permits in the existing ETS covering the power and industry sectors. The ETS-2 is the proposed new ETS for the buildings and transport sector. Carbon pricing assumptions (constant prices): ETS-1, €70/ton (2021–2025) and €90/ton (2026–2030); ETS-2, €30/ton in 2026 and €80/ton in 2030. The RRF item is the amount of spending tagged as climate-relevant in the Commission’s review of the 22 approved national recovery and resilience plans (assumed to be spent before 2026).

Green golden rule

Eurogroup and Ecofin have discussed a “green golden rule” that would exempt certain green investments from the strict application of the fiscal rules. A similar approach has been enacted by Germany to fund future defence spending in order to overcome its constitutional debt brake. There are legitimate concerns that such a rule would incentivise greenwashing, with governments counting current spending as green capital investment. However, a strong taxonomy and strict central oversight could mitigate such a risk.

Notwithstanding this, it may still be very challenging for states with unsustainable debt trajectories to fund such investments through increased deficits.



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Climate investment fund

Another option is a new climate investment fund financed by joint borrowing following on from the Recovery and Resilience Facility (RRF). Indeed, the RRF has already been used by many member states who lack the domestic fiscal space to make the necessary climate investments.

An advantage of a permanent extension of the RRF to invest in the transition to net zero is that it would avoid the risk of greenwashing, as national climate investment plans would have to be approved by the Commission and the Council. Furthermore, such a fund would enable member states to invest without undermining their fiscal sustainability. Eurostat does not count domestic spending financed by RRF grants in national deficit and debt indicators, whereas spending financed by RRF loans is.

We have seen growing consensus in recent months among economic and climate policy stakeholders that fiscal reform would be the preferred approach to addressing the financing gap. This should be accompanied by the creation of a permanent fiscal facility that allocates funding for green investment. Agora Energiewende argues as follows in support of this approach:

“Like the RRF, a permanent fiscal facility would have redistributive elements via joint EU borrowing and, possibly, distribution of grants, which would support countries with fragile public finances. An advantage would also be that, as with the RRF, receipts of funds, loans or grants, could be conditioned on achieving agreed-upon milestones and implementing growth-friendly reforms, which would also help bring down public debt levels in high-debt countries.”²⁸

New revenue streams

Understanding where revenues are going to come from is key to facilitating spending. In short, the transition will affect both the tax base and the shape of the tax revenue. Anticipating these changes is squarely within the mandate of ministries of finance, for example in the transition from internal combustion engines to EVs.

²⁸ Agora Energiewende, 2022, [How to align the EU fiscal framework with the Green Deal](#)



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Unexpected events will also impact revenues. For example, Russia was going to be a key source of revenues from the EU's Carbon Border Adjustment Mechanism (CBAM). The invasion of Ukraine might therefore affect these revenues. The steep drop in fossil fuel use needed to achieve net zero will erode a significant part of the tax base. The OECD has found that in recent years, energy-related taxes accounted for an average of around 4% of total government tax revenues in advanced economies, and 3.5% in developing economies. Another key element that goes together with this is inefficient fossil fuel subsidies.²⁹

Based on the Agora analysis, the EU's Emissions Trading Scheme (ETS) would generate €30 billion per year in auction revenues if prices average €70 per tonne of CO₂ in 2021–2025 and €90 per tonne in 2026–2030. At 0.2% of GDP, this would contribute to, but not fully meet, the financing need. In addition, the proposed ETS for buildings and transport could bring additional revenue worth €48 billion per year (0.3% of GDP) between 2026 and 2030 if agreed. After 2030, the revenues from carbon pricing will decline, while electrification will significantly reduce the revenue that governments obtain from motor fuels taxation. As such, there is clearly a need for new sources of revenue at both the national and EU level to fund a more permanent fiscal capacity.

Recommendation 3

As part of the review of the fiscal rules, the European Commission should propose a permanent climate investment facility to be approved by the Council, financed by member states and EU taxation.

²⁹ European Court of Auditors, 2022, [EU's energy taxation policies don't square with its climate goals](#)



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CONCLUSIONS

While the EU Climate Law is among the most ambitious in the world, it will be impossible to meet its requirements without a transformation in the fiscal policy of the EU and its member states. This shift requires bridging a number of gaps in macroeconomic modelling, investment and financing.

The political downsides of the EU not matching its climate aspirations with the necessary fiscal resources will be severe. By setting targets that are not reachable on the current trajectory of fiscal policy, the EU and individual member states risk undermining the EU's global leadership on climate and ceding it to others.

For an EU that aspires to becoming a geopolitical player, it is inconceivable that it would fail to meet the urgency of the energy transition by either paralysis or kicking the can down the road on fiscal reform.

The price of the transition is minimal compared to the cost of not acting in a way that is consistent with the commitments that the EU has set for itself.

Acknowledgements

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