EU Climate Funding Tracker

TECHNICAL DOCUMENTATION

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Content

1 What is the EU climate funding tracker?

The EU climate funding tracker (EU CFT hereafter) displays the amounts of EU funding that will be available for or is allocated to climate investment during the current EU budget period 2021-2027. This document explains the methodology and data sources behind the charts.

For EU programmes like Cohesion Policy or the spending in the national recovery and resilience plans, the EU CFT presents the data published by the European Commission. In this case, the official climate tracking methodology is followed and no major additional assumptions are made. Instead, for instruments like the Innovation and Modernisation Fund, major assumptions are necessary to determine the amount of funding available and its country allocation, for instance the future average carbon price in the EU Emissions Trading System (EU ETS).

The first chart in the EU CFT compares the estimated available grants to the national public spending needs. This comparison accounts for the effect current and expected cost inflation has by eroding the purchasing power of EU funds, which are not adjusted for actual inflation. A description of the methodology used to calculate the national public spending needs is presented below. Moreover, for this chart only, ad-hoc adjustments are made to ensure consistency between the two elements compared.

2 EU funding available for climate investment

The EU climate funding tracker intends to measure the level of EU financial support to Member States to reach the 2030 EU climate targets. The focus is non-repayable grants available from different EU-financial instruments to subsidize investment in low-carbon technologies across Member States. The term non-repayable refers to the direct beneficiary. For instance, grants can be received by firms from a programme in the EU budget and by national governments from the Recovery and Resilience Facility (RRF). They differ from the loans provided by the InvestEU programme or the loan component of the RRF. In these cases, the beneficiary will have to repay the money received, with the accrued interests, and the main benefit lies in borrowing costs generally below market rates.

Focussing on non-repayable grants allows us to single out the part of climate investment that will be financed by common EU financing, characterized by solidarity and high risk-sharing. Loans, guarantees, and other support instruments from the InvestEU, European Investment Bank or similar entities are therefore not included.

As only grants are considered here, for the RRF-funded national recovery plans only the grant component is reported in the EU CFT. The national plans describe the milestones and targets for both the non-repayable support component and the loan component. However, the numbers reported here are derived by applying the overall share of grants in a Member State's recovery plan to its climate share. For instance, in Italy's plan, there are 76 billion euros allocated to the green transition. As 36% of Italy's plan is financed by RRF grants – the rest is loans – then the amount of climate funding recorded in the EU CFT is adjusted down to 27.4 billion euros.

Horizon Europe and Common Agricultural Policy (CAP) are not included in the EU CFT to avoid overestimating the available funding for climate change mitigation. Horizon Europe finances green R&D by universities and private companies and early-stage clean technologies. While this kind of investment is important for the long-term success of the EU green transition, it makes a marginal contribution to closing the funding gap for the needed large-scale investments in clean energy and energy efficiency. The CAP foresees to spend billions of euros on green projects in the agricultural sector. While this

spending may address a series of environmental problems – from biodiversity to water management including climate change adaptation – the impact on climate change mitigation is unclear. Even if this was the case, the investment needs of the land use sector are generally not fully covered in investment needs analyses.

2.1 Ensuring consistency between funding and spending needs data

Published estimates of EU climate investment needs in most cases refer to the cost of deploying technologies that reduce greenhouse gas emissions through clean energy, resource and energy efficiency. This is especially the case for analyses based on energy system models. The investment needs for R&D, green skills development, the expansion of clean tech manufacturing capacity and transport infrastructures are rarely addressed, and they are not covered by our analysis of the public spending needs detailed below. Notably, the European Commission's assessment of the investment needs to reach the 2030 EU climate target does not cover the investment needed for rail and local public transport infrastructures[1] and does not properly quantify the spending needs in R&D and the land use sector.

As mentioned above, Horizon Europe and CAP are excluded to ensure a correct assessment of how much of the climate investment needs can be financed through EU instruments. In the chart showing the comparison with the public climate investment needs, we take a step further and exclude the EU funding for transport infrastructures and clean tech manufacturing. The transport part of the Connecting Europe Facility is excluded here. In the comparison of funding with spending needs, we deduct from the Cohesion Policy and Recovery plan data the amounts allocated to transport infrastructures, e.g. rail, cycling, maritime, urban and cross-country transport infrastructures. Funding for the decarbonisation of vehicle and train stocks is however included in the EU CFT, as this component is better covered by existing investment needs analyses. Regarding the support to clean tech manufacturing capacity, the only adjustment made is deducting the amount from the Innovation Fund of the amount that we expect to be eventually allocated to this sector (see Table 1).

Table 1 summarizes the references and assumptions behind the construction of the EU funding data displayed in the EU CFT. All values are expressed in percentages of the Gross Domestic Product (GDP) in 2024, as forecasted by the European Commission in the Spring 2023 Economic Forecasts.

1 The EC's estimate of climate investment needs is "*around EUR 390 billion per year*" and "*infrastructure investment needs for transport are partly included. […] They include investment in recharging or refuelling stations but do not include for example investments in rail or road infrastructure.*" (European Commission, COM(2021) 662)

Table 1: National allocation of EU climate funding – sources and assumptions

Instrument / Programme	Climate share	Transport infrastructure share (for comparison with public spending needs)	Notes
Multiannual Financial Framework (MFF) incl. Next Generation EU top-ups			
Cohesion policy	ESF+: based on EU average of national plans (5.9%); ERDF and CF: based on individual national plans; ETC: 30% (as for ERDF minimum target)	ESF+: none; ERDF and CF: based on individual national plans; ETC: same as ERDF.	For the climate and transport infrastructure spending in the Cohesion programmes agreed upon with Member States for 2021-27, we refer to the data provided through this **link**.
Connecting Europe Facility	Only the Energy programme is included and accounts fully as climate spending. Funding transferred from Cohesion policy is counted as 60% climate.	None	
Just Transition Fund	100% climate investment.	20% (author's estimate).	
Recovery and Resilience Facility			
National recovery plans	We use data on the funding allocated in each recovery plan to climate investment, as reported by the European Commission using the climate tagging methodology.	Shares according to individual national recovery and resilience plans.	The source is the European Commission's Recovery and Resilience Scoreboard database. For Member States that also requested loans from the RRF, only the grant component is reported here (see Section 1).
RePowerEU	Based on available information, we assume that 90% of the RePowerEU grants will be spent on climate change mitigation and the rest is invested in fossil fuel infrastructures.	None	

Instrument / Programme	Climate share	Transport infrastructure share (for comparison with public spending needs)	Notes
ETS-based funds			
Innovation Fund	The total available funding over 2021-2027 (23.4 billion euros) will in part be spent to support clean tech manufacturing. We foresee 5 billion euros allocated to this sector, which is deducted from the total funding available.	None	The assumed average EUA price for the period 2023-2030 is 95 EUR/ton CO_2e. The forecasted revenues are added to the financing already secured in 2020-2022. The total for 2020-2030, which excludes the contribution to RePowerEU, is used to derive the funding available in 2021-2027. The country allocation is based on weights combining Member State's share in awarded projects up to the end of 2022 and their share of EU GDP.
Modernisation Fund	100% climate investment	None	The fund is the sum of the contributions defined in Article 10(1), III and IV and the transfers from Article 10(2)(b) & 10c. The assumed average EUA price for the period 2023-2027 is 95 EUR/ton CO_2e. The total for 2021-2030 is used to derive the funding available in 2021-2027.
Social Climate Fund	Part of the SCF will be spent on income support and not on investment. This share of social spending is excluded for consistency, and it is set to the maximum of 37.5% allowed by the regulation.	15% of investment spending (author's estimate).	Some degree of spending frontloading is assumed so that 43% of the fund resources are invested before the end of 2027.

Agora Energiewende (2023)

3 Investment and public spending needs

It is essential to compare the available EU funds for climate action with the investment needs in each country, and in particular the share the public sector will have to pay to trigger the required amount of investment. There are very few national studies that assess the climate investments needed in each Member State to reach the current EU's 2030 climate targets. Analyses of the associated public spending needs are even more scarce.

The numbers shown in the EU CFT are mainly based on our analysis of the national public spending needs, explained in detail below. For a few countries,

however, the results of this analysis are combined with the estimates from other sources.[2]

The public spending needs reported in the EU CFT are limited to the deployment of clean energy, resource, and energy efficiency technologies. Green R&D, clean tech manufacturing support, and transport infrastructures are not included, as they are not generally assessed by national studies and National Energy and Climate Plans (NECPs). The NECPs published in 2020 focus on the core energy sectors, namely energy supply, buildings, and industry.

3.1 Regression analysis of national non-transport investment needs

The latest NECPs, published in 2020, provide a wealth of information on national climate investment needs. They are not always very detailed and, when they are, they refer to the country's contribution to the previous EU's 2030 greenhouse gas emission reduction target (at least 40% reduction), alongside those in a baseline scenario. Therefore, they cannot be used as they are to quantify the investment needs for the updated EU target (at least 55% reduction).

Nevertheless, the NECPs offer sufficient information to extrapolate the investment costs to the new target. Each report contains a specific section where the investment needs are illustrated, often by sector. They are calculated for two scenarios: a baseline (With Existing Measures - WEM) and one compatible with the previous EU's emission reduction target (With Augmenting Measures – WAM). For each scenario and country, we analyse the statistical relationship between the estimated investment needs and two variables: the depth of achieved emission reduction and the country's income level. Using the estimated coefficients and the expected countries' emission reduction by 2030 under the new climate policy regime, we can obtain an estimate of the investment needs.

The data sample contains only information from NECPs providing a sufficient level of detail regarding investment needs and the emission changes achieved by sectors. As the transport sector is often omitted or only partially covered (vehicles only) by the investment needs assessments, this sector is excluded from the following analysis. The NECP data are complemented with results from a few other national studies: Boston Consulting Group (2021) for Germany, McKinsey (2020) for Poland, Office for Budget Responsibility (2021) for the UK.[3] The result is a total of 30 observations.

In the regression analysis, the dependent variable is the cumulative investment needs in a specific scenario (for instance, the WEM scenario in the NECP for Greece), divided by the GDP of the country in 2019 (deflated to the same reference year). The natural logarithm is applied to this ratio. The investment ratio is regressed on the emission reduction achieved in the same scenario and the logarithm of the Gross National Income (GNI) per capita in 2019. Alternative models were considered, for instance adding one variable as the carbon intensity of GDP, the share of coal in primary energy consumption, the interaction term between income and emission reduction, or the square of the emission reduction. Adding these variables does not significantly increase the explanatory power and the smaller linear model is preferred. According to this model, emission reduction is positively correlated with the investment needs and the coefficient of the GNI per capita is negative, suggesting that abatement costs take a larger share of the national GDP in poorer countries.

2 Pisani-Ferry and Mahfouz (2023) for France, Krebs and Steitz (2021) for Germany.

3 The UK is included to increase the sample size, even if it is not part of the following analysis.

The simulation of the investment needs takes the national greenhouse gases emissions reduction in non-transport sectors by 2030 from the European Commission's impact assessment of the latest 2030 target.[4] These national emission reductions deliver the EU's 2030 target under the current regulation (e.g. Effort Sharing) in a cost-optimal way. These inputs are listed in Table 2 alongside the investment needs resulting from their use with the estimated equation. These investment needs are total amounts and not additional.

3.2 From investment to public spending needs

The public spending needs in non-transport sectors are obtained by applying country-specific coefficients to the estimated investment needs, which are the sum of private and public investments. The coefficients are constructed based on Baccianti (2022) and Agora Energiewende (2023). The resulting public spending needs, averages per year, are shown in Table 2. The public sector's shares of total climate investment used here are intended to also include

Table 2: Non-transport investment and public spending needs in 2021-2027

Member state	Emission reduction, 2019-2030 (%)	Investment needs (annual, % GDP)	Public spending needs (annual, % GDP)	Member state	Emission reduction, 2019-2030 (%)	Investment needs (annual, % GDP)	Public spending needs (annual, % GDP)
EU	40%	2.5%	0.8%	Ireland	31%	1.0%	0.3%
Austria	38%	1.6%	0.5%	Italy	46%	3.1%	1.1%
Belgium	14%	0.9%	0.3%	Latvia	26%	3.2%	1.0%
Bulgaria	42%	8.1%	2.8%	Lithuania	16%	1.9%	0.6%
Croatia	39%	4.9%	1.5%	Luxem-bourg	49%	1.3%	0.4%
Cyprus	41%	3.3%	1.0%	Malta	N/A	N/A	N/A
Czechia	47%	3.8%	1.1%	Nether-lands	39%	1.6%	0.5%
Denmark	27%	1.1%	0.4%	Poland	42%	5.2%	1.5%
Estonia	53%	5.1%	1.5%	Portugal	48%	4.9%	1.5%
Finland	46%	2.5%	0.8%	Romania	31%	3.8%	1.3%
France	40%	2.1%	0.7%	Slovakia	38%	4.5%	1.4%
Germany	42%	1.8%	0.6%	Slovenia	26%	2.1%	0.6%
Greece	45%	6.0%	1.9%	Spain	43%	3.2%	1.0%
Hungary	33%	3.7%	1.1%	Sweden	32%	1.4%	0.5%

Agora Energiewende (2023)

Opex support which is relevant in a few sectors like heavy industries and hydrogen supply. These shares, around one-third, assume an efficient use of public funding and relatively high leverage of private capital. Therefore, the resulting public spending needs should be interpreted as a lower bound for national public spending needs, given the estimated total investment needs.

Public spending needs for the decarbonisation of road vehicles are added to the total shown in the EU CFT. The EU-wide estimate from Baccianti (2022) covering spending needs for vehicle purchase subsidies and recharging infrastructures is allocated to each Member State based on its share of the EU road transport emissions.

3.3 Conversion to current prices

The annual public spending needs derived so far are first translated into euros using the 2019 GDP and then converted into current prices for the period 2021-2027. For this, a price index is constructed using the deflators for gross fixed capital formation in national accounts data. The AMECO database provides data from the Commission's Economic Forecasts[5] for individual deflators by country until 2024. The deflators for residential and non-residential construction investment, equipment, and vehicles, are aggregated based on weights reflecting the spending needs in different sectors. The aggregate deflator for the period 2025-2027 is projected using its long-term average annual change between 2015 and 2024. The aggregate deflator is applied to the spending needs to obtain values in current prices through 2027, assuming spending in constant prices is equally distributed over the years.

This step allows us to account for the effect of inflation and to incorporate in the EU CFT the loss of purchasing power of EU funds when nominal investment costs rise faster than the default 2% adjustment in the MFF or the carbon price in the ETS-based funds.

5 Numbers from the Spring 2023 Economic Forecast are used in the calculation.

4 References

Agora Energiewende (2023). *Breaking free from fossil gas: A new path to a climate-neutral Europe.* Available online at: https://www.agora-energiewende.de/en/publications/breaking-free-from-fossil-gas-1/

Baccianti, Claudio (2022). *The Public Spending Needs of Reaching the EU's Climate Targets, in Floriana Cerniglia and Francesco Saraceno (eds),* Greening Europe: 2022 European Public Investment Outlook. Cambridge, UK: Open book Publishers, 2022.

Boston Consulting Group (2021). *Climate Paths 2.0 A program for climate and Germany's future development.* Available online at: https://www.bcg.com/germany/climate-paths

Krebs, Tom and Janek Steitz (2021). *Öffentliche Finanzbedarfe für Klimainvestitionen im Zeitraum 2021–2030*, Forum for a New Economy Working Papers 3–2021. Available online at: https://www.agora-energiewende.de/veroeffentlichungen/oeffentliche-finanzbedarfe-fuer-klimainvestitionen-2021-2030/.

McKinsey and Company (2020). *Carbon-neutral Poland 2050.* Available online at: https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/carbon-neutral-poland-2050-turning-a-challenge-into-an-opportunity

Office for Budget Responsibility (2021). *Fiscal risks report - July 2021.* Available online at: https://obr.uk/frs/fiscal-risks-report-july-2021/

Pisani-Ferry, Jean and Selma Mahfouz (2023). *Climate action : a macroeconomic challenge*. Available online at: https://www.strategie.gouv.fr/english-articles/climate-action-macroeconomic-challenge

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