The Coalition of Finance Ministers for Climate Action

Determining investment needs for decarbonization and adaptation: the challenge and opportunity for Ministries of Finance in the EU

European Union—European Commission

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The transition to climate neutrality will require a significant increase in energy system investment

The electrification of the economy, improvements in energy efficiency, and the transition away from fossil fuels will generate a shift away from operational expenditure toward capital expenditure. The European Commission has quantified the projected increase in investment needs with a fair degree of precision and detail for some time on the basis of detailed energy system modeling. Most recently, the Commission estimated that investment in the energy system would need to reach around €660 billion (3.2% of GDP) per annum in 2031–2050 in order to reach the climate neutrality objective (European Commission, 2024, Part 3/5). The analysis shows that investment needs will increase on the supply side to decarbonize power generation, improve grid infrastructure, produce decarbonized fuels, and put in place the necessary carbon capture and storage infrastructure. On the demand side, investment will be required to decarbonize industrial processes, to improve energy efficiency in buildings while decarbonizing energy uses, and to decarbonize transportation.

The additional investment required and the public finance impact of climate mitigation investments deserve further consideration and analysis

While the overall investment needs are relatively well defined, the precise scope or level of *additional* investment required by decarbonization objectives is not always straightforward to determine, particularly in a context where expanding economies and asset depreciation lead to investment needs under all possible future scenarios. In addition, the extent to which additional investment may need to be directly funded or supported by the public sector remains uncertain. This is not just a modeling issue, because the role of the public sector in funding investment for the climate transition will be determined to a significant extent by national policy choices and will depend on the type of funding mechanisms mobilized to accompany, for instance, the deployment of renewables, industrial decarbonization, the renovation of buildings, or the shift toward zero-tailpipe-emission vehicles. These outstanding questions are of the utmost importance to Ministries of Finance, as they affect future trajectories for public expenditure, possible needs for reforms in the financial markets, and the economy-wide saving and investment balance.

The costs of climate hazards are large but not reliably measured

In addition to the investment requirements for climate mitigation, the socioeconomic impacts of climate change are closely related to the assessment of adaptation investment needs. A range of modeling tools (top-down as well as bottom-up) have been used to assess the impacts of climate hazards under a range of warming scenarios across the European Union Member States. The PESETA IV project of the European Commission's Joint Research Centre (JRC) assesses climate change impacts in a range of areas using a bottom-up approach.[1] The project uses biophysical models and covers, e.g., agriculture, energy supply, human mortality, and riverine floods. It also provides a broader assessment of socioeconomic and welfare effects. The Commission also recently assessed the macroeconomic impacts of a range of climate hazards using a macroeconometric model. The analysis concluded very conservatively that GDP could be 7% lower than would otherwise be the case by the end of the century (European Commission, 2024, Part 2/5).

The costs of inaction will likely be very large and far surpass any potential costs from the transition to climate neutrality

The findings of the existing models are nevertheless subject to major uncertainties and in most instances omit potentially very significant factors, including natural capital (e.g., biodiversity or ecosystem services) and the quantification of climate tipping points. Improved knowledge of the

1 The objective of the PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis) is to make a multi-sectoral assessment of the impacts of climate change. For more information visit: https://joint-research-centre.ec.europa.eu/peseta-projects/jrc-peseta-iv_en

socioeconomic impacts of climate hazards is critical for enabling MoFs to plan for the long-term, assess contingent liabilities in the short and medium term, and gain a broad understanding of the full set of implications on public finances.

Investment needs for adaptation are poorly quantified

Adaptation is a critical component of climate policy and a necessity to protect people and prosperity. In the EU, significant progress has been made in identifying key vulnerabilities, notably with the publication of the European Climate Risk Assessment (European Environment Agency, 2024). Member States have also made progress with their adaptation strategies. However, the scale of investment needs for adaptation and the role of the public and private sectors in their deployment are not adequately quantified. Methodological issues make doing so a particularly complex exercise that requires the precise identification of climate hazards to adapt to, a definition of the time horizons, the estimation of vulnerabilities, a definition of the degree of adaptation needs, and the assessment of the types of adaptation measures to be considered. Defining and measuring adaptation investment needs should nevertheless be a priority, including for MoFs. A recent World Bank report developed in partnership with the European Commission offers evidence and tools to help countries take a more strategic approach to boost their climate resilience.[2]

MoFs are well positioned to fill some knowledge gaps for (public) investment needs in mitigation and adaptation

A first essential step in filling the knowledge gaps is to further develop green budgeting tools, building on a solid methodological framework.[3] A detailed understanding of the greenhouse gas emissions impacts of government revenues and expenditure, e.g., in relation to energy uses or public procurement, can serve as the basis for assessing where mitigation investment may be most needed. Similarly, Ministries of Finance are well positioned, in cooperation with other line Ministries, to assess where public support for private investment in mitigation may be most needed, and how it can be best structured financially. In terms of adaptation, Ministries of Finance are well positioned to evaluate expenditures and budget plans to identify adaptation gaps, as well as to structure financial instruments in support of adaptation investment by the private sector.

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2 See, for example, the portfolio-level assessment of emergency response-related assets in Croatia, or the vulnerability and benefit-cost analysis prepared for National Wildfire Risk Reduction Program in Portugal at https://documents1.worldbank.org/curated/en/099050224072033005/pdf/P17907015a302401f1b7e51fc14ed9b73ef.pdf. For more tools and reports, visit the website of Economics for Disaster Prevention and Preparedness in Europe (World Bank, 2023).

3 See for example the Green Budgeting initiative at the EU level, led by the European Commission (Pojar, 2023; https://economy-finance.ec.europa.eu/economic-and-fiscal-governance/green-budgeting-eu_en).