



**The Coalition
of Finance Ministers
for Climate Action**

India's net zero transition: the challenges within existing modeling approaches of economic impacts

Centre for Social and Economic Progress (CSEP)

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A contribution to the 'Compendium of Practice from a Global Community of Ministries of Finance and Leading Organizations: Economic analysis and modeling tools to assist Ministries of Finance in driving green and resilient transitions'

Topic: Addressing the climate policy questions facing Ministries of Finance: the economic and fiscal impacts the green transition

June 2025

Access the full Compendium at www.greenandresilienteconomics.org

This contribution was prepared at the request of, and with guidance from, the Ministry of Finance of Denmark as Lead of the Coalition's Helsinki Principle 4 initiative 'Economic Analysis for Green and Resilient Transitions' and its Steering Group, with input from its Technical Advisory Group. The views, findings, interpretations, and conclusions expressed are those of the authors. While many Coalition members and partners may support the general thrust of the arguments, findings, and recommendations made in this contribution, it does not necessarily reflect the views of the Coalition, its members, or the affiliations of the authors, nor does it represent an endorsement of any of the views expressed herein by any individual member of the Coalition.

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As with other countries, a range of traditional climate-economic models have guided analyses of the consequences of India's transition to net zero. In general, these models assume climate effective policies in key sectors that shift the mix of activities (e.g., the fossil-fuel-to-renewables shift in power generation, and the shift from the internal combustion engine to electric vehicles in transportation, etc.) and then look to trade-off or balance the speed of decarbonization against the costs to growth and jobs until a new equilibrium is reached; this is because of increased demand through scaling up investments and employment in the shift. Overall, desirable outcomes can be achieved by adjusting policy settings in relation to GDP growth trends. This involves finding pathways that range from highly ambitious to conservative or realistic approaches, depending on whether the aim is for lower or higher growth with minimal sacrifice. The modeling tools are useful for finding such pathways that are robust to different assumptions about costs, optimal taxation, finance, and other uncertainties.

However, in a 2021 review by Kohli,¹ which analyzed the macroeconomic implications of various model outputs looking at the economic impacts from net zero (Agarwal et al., 2021), some limitations in the modeling approaches became apparent. First, the economic structure typically remains unchanged in model results for three decades, e.g., the manufacturing share was no different at net zero than at present, pointing to the inability of many existing modeling approaches to represent fundamental changes in the structure of the economy, which must be independently assessed. Second, and not unrelated, these approaches do not take into account the forecasted shift from public to private sector activity—while India's fossil-fuel industry is mostly publicly owned (except for one-third of refining), the clean energy capacities are largely privately owned. The investment-employment consequences (both direct and indirect) of such a structural shift could be significantly large and uneven, with implications for macroeconomic policy maneuverability, yet these are not captured by the model. Third, the forecasted intersectoral employment shifts do not take into account key frictions: governed by climate policy, the smooth fossil-fuel-to-low-carbon jobs transition projected masks significant churn underneath—these frictions are not limited to issues such as differential geographical impacts, the flexibility of different labor markets, the mobility and ability of workers engaged in the fossil-fuel economy to adapt, reskill, and so on.

Climate-effective policies will be broad and structural in nature, triggering productivity-driven changes in aggregate supply and through investments, consumption, and wages, as well as changes in demand. Many existing climate economic models are limited in capturing the resultant macroeconomic transformations, increasing the uncertainties about the long-run consequences of the transition and providing limited meaningful information to inform Ministries of Finance and other economic decision-makers.

However, even as all these effects can be anticipated, the modeling analysis helps identify where the changes will likely be substantial. The MoFs therefore stand to gain from insights about sectors, industries, and regions where the incidence will likely be disproportionate. They are therefore relevant in guiding further analysis. The key analytical questions MoFs can ask in the context of designing better modeling tools are the following How can the permanent output-employment losses be minimized? What is the likely investment-employment effect along the fossil fuel-economy supply chain? What about the coal-concentration regions that will be more substantially impacted? What kind of policy packages can be designed to mitigate and offset the losses?

To address such challenges, economists need to anticipate the effects across the economy, guided by climate economic models, and employing more data and a broader range of tools. Economists across countries need to share knowledge, best practices, and data, where data availability and generation are key enabling factors. Qualitative analyses, backed by granular data and helped by simulations where possible, will help MoFs in this regard.

¹ "India: Net Zero—Transformation Challenges and Macroeconomic Impact," Submission to the Shakti Sustainable Energy Foundation, based on India Energy Policy Simulator (EPS) model by the World Resources Institute ahead of CoP26, September 2021, Unpublished.

Reference

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