

MEMORANDUM

December 22, 2023

TO: Department of Energy, the Environmental Protection Agency, and the National Oceanic and Atmospheric Administration

FROM: Council of Economic Advisers, Office of Management and Budget, Department of the Treasury

CC: Office of Clean Energy Innovation and Implementation, Climate Policy Office, Office of Science and Technology Policy, National Economic Council

SUBJECT: Tools to support the management of near-term macroeconomic and financial climate risks

BACKGROUND

Climate change is here and is affecting communities across the Nation. Unprecedented extreme weather events—deadly heat waves, massive flooding, wildfires, and stronger storms—are challenging communities around the country. These trends follow the warnings from over 40 years of climate science: unchecked greenhouse gas emissions pose major threats to the health, economic prosperity, and security of the United States. At the same time, researchers and experts have illustrated what a net-zero emissions economy can look like. Their work has shown how a rapid build-out and deployment of clean energy technologies can stabilize the climate while also providing high-quality jobs, cleaner air and water, and lower energy costs.

These messages have been heard. Through the Invest in America agenda, the Biden-Harris Administration is implementing our commitments to reach net-zero greenhouse gas emissions by 2050, doing our part to stabilize global temperatures at below 1.5° Celsius above pre-industrial levels. Our policies are driving a generational increase in manufacturing investment, led by the clean-energy technologies that will power the low-carbon future.

This Administration is committed to sound financial and fiscal management, which now requires integrating climate risks into all areas of economic decision-making. Under Executive Order (EO) 14030 of May 20, 2021, agencies across the government are taking steps to quantify, assess, and integrate the economic and financial risks of climate change into near-term decision-making. However, to support this work managing the “here and now” of the climate crisis, policy-makers need new kinds of information from the research community to support the work required over the coming decades.

Section 6 of EO 14030 requires Office of Management and Budget (OMB), the Department of the Treasury, the Council of Economic Advisers (CEA), the National Economic Council (NEC), and the National Climate Advisor to assess climate-related risks for the long-term (25-year) budget outlook and develop methodologies to quantify these risks in the Administration’s

macroeconomic forecast. Over two years executing on these directives in close collaboration with agency partners, CEA, OMB, and Treasury have identified the need for new modeling and data tools to support the quantification, assessment, and management of economic and financial climate risks.

This memorandum provides guidance on how CEA, OMB, and Treasury should coordinate with agencies to support climate-economic policy formation and decision-making to realize our net-zero goals and minimize the impacts of climate change.

AREAS TO IMPROVE CLIMATE-ECONOMIC MODELING

Based on two years of engagement with agencies through two working groups as well as discussions with experts within academia and at institutions such as the International Monetary Fund, World Bank, Organisation for Economic Co-operation and Development, and other national governments, the CEA, OMB and Treasury have identified the following set of enhancements that could improve Federal Government modeling tools for economic risk-management applications:

- *Include nonprice policies*: Many climate policy models focus on the effects of a carbon price, but many countries' climate policies have included alternative climate policies. For example, the Inflation Reduction Act includes production and investment tax credits for clean energy that help accelerate deployment.
- *Account for transitional dynamics and frictions*: Market failures and adjustment frictions can impact macroeconomic outcomes of climate change and climate policies. For example, skill mismatches in the labor market or geographic dislocation of workers can produce lingering increases in unemployment as workers take time to search for or retrain for other jobs in response to climate impacts.
- *Account for interaction between physical and transition risks*: Current models of physical risks are considered independently from transition risks; an integrated climate-macroeconomic model could account for important interactions between the two. For example, a faster transition to clean energy may reduce physical risks (e.g., extreme climate events) while potentially imposing greater transition risks (e.g., labor dislocation).
- *Account for effects on particular income groups, subnational units, and subsectors of the economy*: Place- and people-based policies can address the distributional effects of physical and transition risks from climate change. For example, certain communities may be geographically more susceptible to climate-related disasters while others may be more susceptible to declining labor demand for fossil-fuel industry jobs.

- *Account for extreme event risks:* Rather than including only information on changes in average climate conditions, improved integrated climate-macroeconomic models would include extreme climate events and their social and economic consequences.
- *Include short- and intermediate-term timescales and greater spatial granularity:* Current climate modeling is oriented around long timescales and large spatial scales. Modeling that assesses impacts over shorter timeframes (1-25 years) and at finer geographic levels would better inform economic policymaking.

OPPORTUNITIES TO IMPROVE EXISTING TOOLS

Although the Federal Government has world-leading capacity in modeling both the physical climate system and net-zero-aligned energy systems, the questions now being asked of these tools are different than those they were originally designed to answer. This Administration is keenly aware of the danger climate change poses to national welfare and the need for a meaningful reduction of greenhouse gas emissions. Information is needed now to support near-term decisions on mitigation and adaptation policy, which necessitates repurposing, reorienting, and reimagining existing tools in order to support climate-related economic and social priorities over the coming decades.

1. *Economic Dynamics of Net-Zero Climate Policies*

The United States is embarking on a generational investment to transform its energy system, using a range of policy tools to subsidize cleaner technologies, to lower risk in new technology investment, to drive down the costs of new low-emission technologies, and to advance energy efficiency, electrification, and the use of clean fuels across economic sectors.

To ensure a smooth but fast build-out of low-carbon technologies that maximizes opportunities for all Americans, effective tools must:

- 1) Simulate macroeconomic dynamics when the energy system is rapidly changing;
- 2) Incorporate capital, supply-chain, and labor market frictions;
- 3) Represent the Administration's technology and innovation policies, including the benefits of these policies for global clean energy deployment and decarbonization; and
- 4) Capture regional inequalities and local economic conditions.

To address these needs, CEA, OMB, and Treasury, in consultation with the National Climate Advisor and the Office of Science and Technology Policy (OSTP), should coordinate with the Department of Energy (DOE) and the Environmental Protection Agency (EPA) to plan for the development of models that can link energy systems within a broader macroeconomic framework to assess the Administration's energy and climate policies over the next 25 years.

2. *Economic Effects of Extreme Weather Risks in a Changing Climate*

More frequent and more intense extreme weather events pose enormous risks to the economic and social welfare of the Nation. Intense heat, hurricanes, drought, and flooding are all exacerbated by a changing climate. These unprecedented events produce large economic costs and social disruption. Assessment and management of climate change risks must account for these unpredictable and highly variable extremes, the significant costs they impose and the emergence of systemic risks.

Our economy needs to be resilient in the face of these events. For example, they are having immediate effects on everyday homeowners, such as through the growing costs and decreasing accessibility of home insurance. Agencies' inability to quantify these risks is limiting federal, state, and local capacity to mitigate risk and develop effective adaptation strategies.

Therefore, CEA, OMB, and Treasury, in consultation with OSTP, should coordinate with the National Oceanic and Atmospheric Administration, EPA, and other agencies as appropriate to develop a plan to:

- 1) Implement the recommendations of the [President's Council of Advisors on Science and Technology](#) to quantify extreme event risk for the next 25 years at a high spatial resolution across the country;
- 2) Create a National Catastrophic Modeling platform able to quantify extreme weather risks, integrating the effects of climate change, and provide recommendations on agencies suitable to host such a platform;
- 3) Develop dynamic macroeconomic models that assess how extreme weather events exacerbated by climate change affect national and regional economies; and
- 4) Assess the economic benefits of enhanced resilience and their distribution amongst communities, including the benefits of adaptation investments.

3. Socio-Economic Data to Support Climate-Risk Management

Socio-economic modeling is only as good as the data used to support it, and is of most value when it helps serve communities. The Biden-Harris Administration is committed to ensuring the benefits of clean energy flow to all communities, particularly underserved communities and those historically dependent on fossil fuel energy systems. Designing policies to address regional and economic disparities requires high-resolution microeconomic data as well as regional projections of expected demographic and socioeconomic change.

Therefore, CEA, OMB, and Treasury should coordinate with EPA, DOE, and other agencies as appropriate, to develop a plan to generate regional projections of demographic and socioeconomic changes. These projections will aid the assessment of how climate benefits, risks, and climate policy consequences are distributed across the country.