Institute *for*
Policy Integrity
NEW YORK UNIVERSITY SCHOOL OF LAW

Gauging Economic Consensus on Climate Change – Issue Brief

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Thousands of economists have spent years or decades studying the interaction between climate change and the economic systems that underlie modern life. The views of these experts can help clarify how climate change will likely affect our society and economy, and how policymakers should approach greenhouse gas emission reduction efforts.

We conducted a large-sample global survey on climate economics, which we sent to all economists who have published climate-related research in the field's highest-ranked academic journals; 738 responded. To our knowledge, this is the largest-ever expert survey on the economics of climate change. The results show an overwhelming consensus that the costs of inaction on climate change are higher than the costs of action, and that immediate, aggressive emissions reductions are economically desirable.

Respondents expressed striking levels of concern about climate impacts; estimated major climate-related GDP losses and a reduction in long-term economic growth; and predicted that climate impacts will exacerbate economic inequality both between countries and within most countries. The economists surveyed also expressed optimism about the viability and affordability of many zero-emissions technologies. And they widely agreed that aggressive targets to reach net-zero emissions by mid-century were likely to be cost-benefit justified.

More detailed analysis of this research can be found in our full report, available at: https://policyintegrity.org/files/publications/Economic_Consensus_on_Climate.pdf

Survey Details

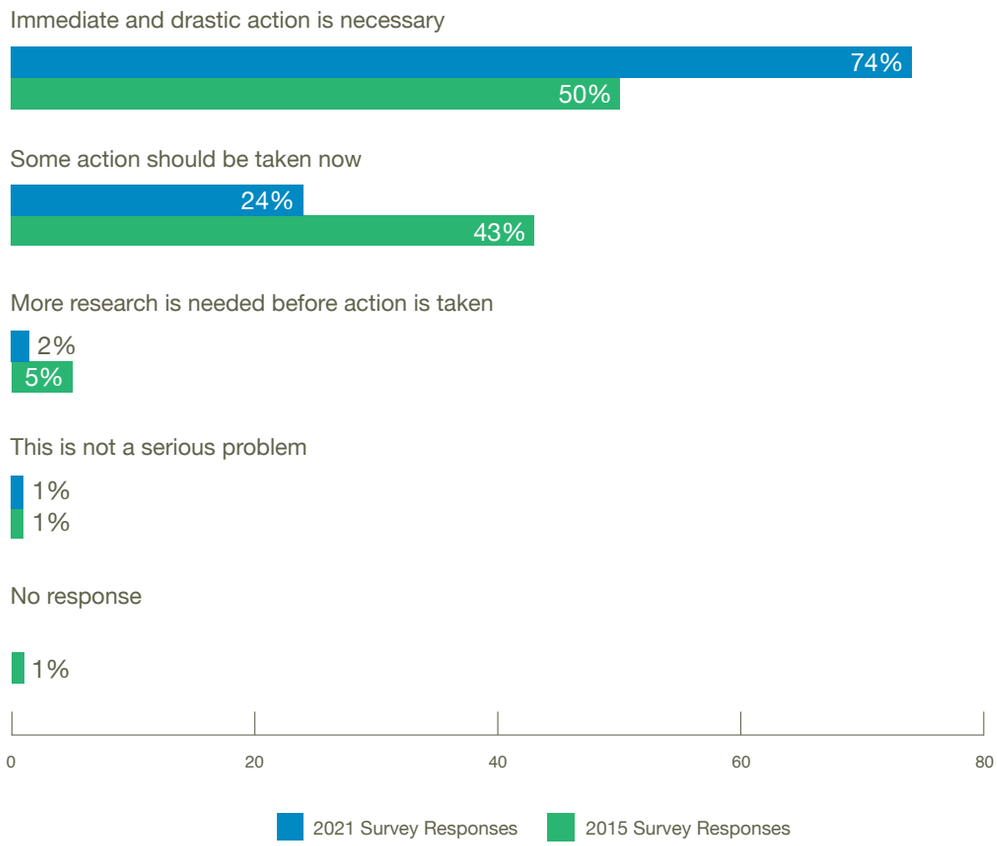
This project expands on similar surveys conducted by the Institute for Policy Integrity in 2015 and 2009, but uses a larger and more geographically diverse sample. Expert-elicitation projects like this one have recently played an influential role in climate economics, helping establish consensus on such topics as the appropriate "discount rate" to use when evaluating climate policies, and the expected magnitude of climate damages.

We invited 2,169 Ph.D. economists to take a 15-question online survey focused on climate change risks, economic damage estimates, and emissions abatement. Of this pool, 738 participated, a response rate of 34% (not all respondents submitted a response to every survey question, so the sample for some questions is smaller). These economists have all published an article related to climate change in a leading economics, environmental economics, or development economics journal, and their areas of expertise cover a wide range of issues in climate economics. The survey design and related analysis sought to minimize selection bias, response bias, and anchoring bias.

Growing Concern About Climate Change

When asked about their professional opinions on climate change, an overwhelming majority of respondents (74%) said that "immediate and drastic action is necessary." In sharp contrast, less than 1% believe that climate change is "not a serious problem." Compared to our 2015 survey, a significantly larger share of respondents now believe that drastic action is needed, while far fewer believe that more research is needed before action is taken.

Which of the following best describes your views about climate change?



Nearly 80% of respondents also self-report an increase in their level of concern about climate change over the past five years, underscoring the high level of overall concern among this group. This broad majority suggests that even respondents who have characterized the situation as urgent in the past may feel that the nature of the climate change challenge is rapidly escalating. When asked to identify items that most affected their views on climate change in recent years, the most common answer by a significant margin was "observed extreme weather events attributed to climate change." The next most influential factors identified were new research findings, both in climate science and in climate economics and the social sciences.

A Threat to Economic Growth

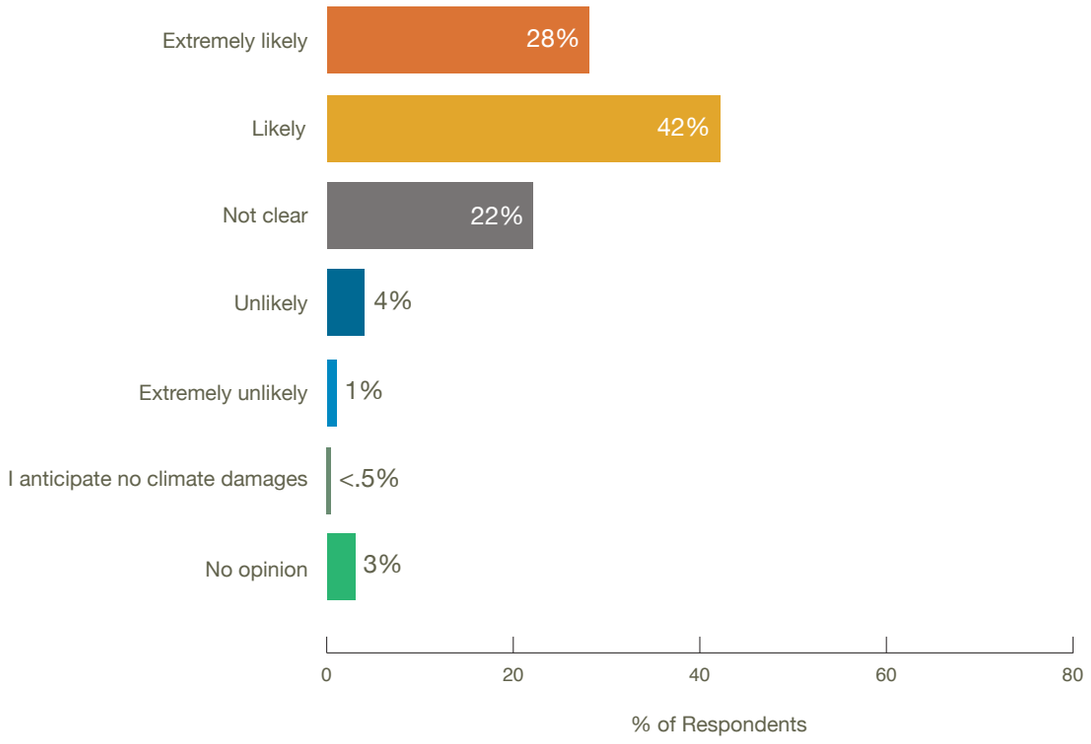
Economists have traditionally modeled climate damages by focusing on changes to GDP in a specific year (i.e., a level impact), but some research has suggested evidence of reduced economic *growth* as a result of current climate impacts. In total, 76% of survey respondents think it is likely or very likely that climate change will negatively affect global economic growth rates. Maybe more notable is the dearth of respondents who find this prospect unlikely (3%) or extremely unlikely (2%).

Increasing Inequality Between Countries and Within Countries

The vast majority (89%) of respondents believe that climate change will exacerbate income inequality between high-income and low-income countries (the lower third of countries by per-capita income versus the upper third). This could create enormous difficulties for many countries that already face profound economic challenges and high rates of poverty.

Approximately 70% of economists also believe it is likely or extremely likely that climate change will exacerbate inequality within most countries (between the lower third of households by household income and the upper third).

What is the likelihood that climate change will increase economic inequality within most countries, between the lower third of households by household income and the upper third of households by household income?



The Promise of Zero-Emissions Technologies

Over the last decade, the costs of solar and wind energy technologies have dropped rapidly (-7% annually for solar photovoltaic systems and -4% annually for onshore wind). When asked whether a similar pattern is likely to be replicable for some other emerging zero-emission and negative-emission technologies, 65% of respondents said this is likely or very likely, while less than 3% disagreed.

Economists predict rapid expansion of clean energy technologies, estimating that more than 50% of the global energy mix will consist of zero-emission technologies by 2050—the current share is roughly 10%. They are also bullish about negative-emissions technologies eventually becoming viable, with a majority predicting this during the second half of this century (though a very high percentage of "No Opinion" responses underscores the uncertainty of this projection).

Climate Damages Will Be Very Costly

Respondents were asked to estimate the economic impacts of several different climate scenarios. They project that economic damages from climate change will reach $1.7 trillion per year by 2025, and roughly $30 trillion per year (5% of projected GDP) by 2075 if the current warming trend continues. Their damage estimates rise precipitously as warming intensifies, topping $140 trillion annually at a 5°C increase and $730 trillion at a 7°C increase. As expected, experts believe that the risk of extremely high/catastrophic damages significantly increases at these high temperatures.

Consistent with the view that society can better adapt to climate change if the rate of warming is slower or if society is wealthier, the economists project somewhat lower climate damages in scenarios with slower rates of warming or higher global income. However, even these damage estimates are high, with a loss of at least 4% of GDP expected in each future climate scenario presented (and a 6% GDP loss expected in a scenario with faster warming).

To provide context, another survey question asked respondents to estimate the GDP change in 2020 (this information was not available at the time of the survey, in early February 2021). Respondents' GDP loss estimates for 2020, when a pandemic devastated the global economy, are far smaller than their estimates for annual damages from climate change under a 3°C warming scenario (-3% of GDP vs. -5 %). And unlike the pandemic-related downturn, the climate impacts projected by survey respondents would recur annually (on average) and worsen over time.

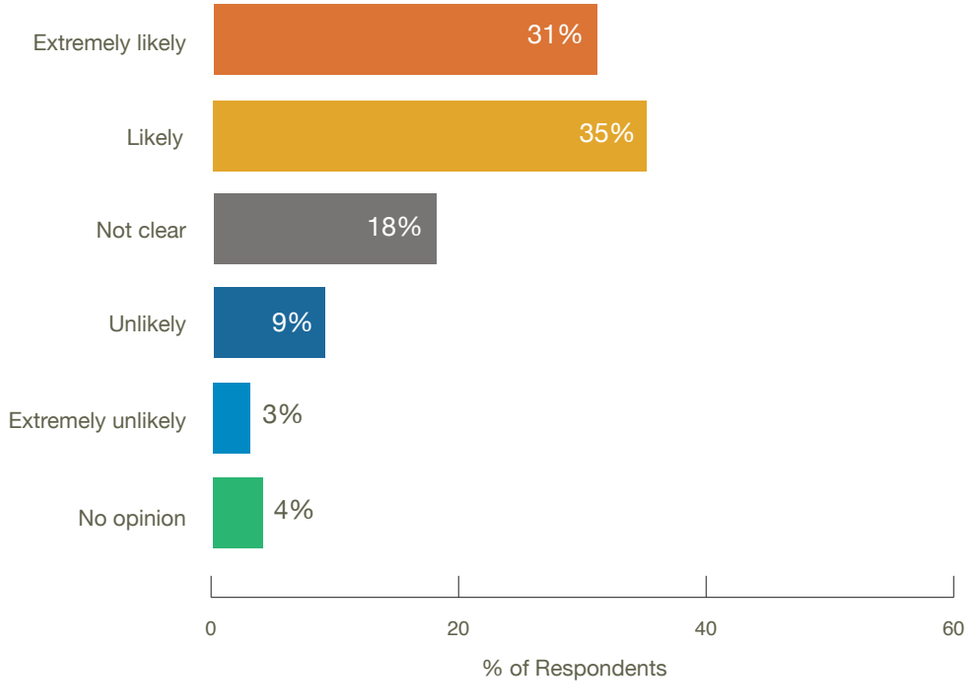
The Costs of Inaction Outweigh the Costs of Reducing Emissions

The survey findings reveal a clear consensus that ambitious emissions reductions are likely to cost less than the expected damages from climate change. Respondents overwhelmingly agree that the benefits of reaching net-zero emissions by 2050 would likely outweigh the costs—66% view this as likely or very likely, compared to only 12% who disagree. Respondents' abatement cost projections are higher than estimates from some other sources (roughly 3-4% of GDP in some scenarios). Yet they still clearly indicate that aggressive emissions reduction efforts in line with the Paris Agreement targets are economically justified, as projected economic damages from climate change are far higher.

Many government entities have set goals to reach net-zero GHG emissions by roughly mid-century (this would be consistent with a global average surface temperature limit of 1.5° to 2°C according to many projections).

Are the expected benefits of mid-century net-zero GHG targets likely to outweigh the expected costs?

Please account for any relevant co-benefits and co-costs in your implicit present-value estimates.



Costs are often cited as a reason to delay or avoid strong action on climate change, but this survey of hundreds of expert economists suggests that the weight of evidence is on the side of rapid action.

These results can be useful to both policymakers and economic researchers. In particular, economic modelers who calibrate "Integrated Assessment Models" (which calculate the Social Cost of Carbon for use in policy analysis) could use these findings to help ensure that key model assumptions align with the consensus views of experts. The U.S. government is currently reviewing the methodology used for this modeling, and these survey findings could inform improved calibration of several model parameters.

This survey reveals a clear consensus that immediate and meaningful efforts to reduce emissions are needed to limit the enormous economic risks of climate change. Policymakers should heed these findings.

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