Climate in the National Spotlight

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For five years before starting as the GSA-USGS Congressional Science Fellow in the U.S. Senate, I spent most of my time studying the physics and chemistry of the atmosphere as a Ph.D. student. My days could not have been more different than those during my time in the Senate—long periods of reading, struggling with code to run and analyze simulations, performing calculations, and, when the time was right, writing. Despite rich collaborations with my mentors and other scientists throughout the world, my Ph.D. was largely a solitary and gradual pursuit, in stark comparison to the fast-paced teamwork reacting to often hourly changes that characterized my time in the Senate.

And yet, the science I produced as a Ph.D. student was part of a body of work that I have been privileged to witness firsthand affect decision making at the national level. This confirmed to me that many optimistic scientists are right to believe that science can shape the largest decisions we make as a nation and society—that the slow pursuit of new knowledge and higher precision creates a baseline of evidence from which to act. I also learned that the process of making those large-scale decisions could not be more different from the process of producing the knowledge that leads to them. I now appreciate even more that an understanding and experience with both processes can lead to impactful work and outcomes.

While the fate of the Build Back Better Act remains undecided, my responsibilities as a Congressional Science Fellow were dedicated mostly to certain climate provisions in that package that were priorities of Senator Edward J. Markey (D-MA), in whose office I served. I witnessed targets that had been distilled by decades of scientific research and public engagement on acceptable risks (e.g., 1.5 °C of average surface temperature warming compared to preindustrial temperatures, a net zero economy by 2050, 100% carbon-free electricity by 2035) serve as both goalposts and litmus tests for the results of complex negotiations.

To be sure, many scientists take rightful issue with such simplified distillations of complex physics and social trade-offs. To be a climate scientist is to understand that there is no magical point of no return, that each marginal bit of warming brings more changes to the climate system, and that the farther we get from our baseline climate, the larger the unknowns about the behavior of the system and other potential dangers. To be a climate policy professional is to understand that those dangers are in large part a function of the social and economic structures that organize our society, which in turn are what lead to warming. We cannot promise with absolute precision how a 1.5 °C world would differ from a 1.6 °C world.

But still, simple tests are remarkably useful for reaching a deal in a multilateral negotiation, because they serve as markers to certify that all parties can be confident that their needs are being met. I frequently heard the question asked as to whether one party or another—be it a leader or a set of stakeholders—would be able to accept certain conditions. From my vantage point, in constructing the Build Back Better Act, climate science had as much of a seat at the table as the President; a climate bill had to be acceptable to the conditions determined by the science, just as the bill had to be acceptable to the major political entities pursuing its creation. The biggest question about the climate portion of the bill was, does this combination of incentives and new programs reach emissions reduction targets consistent with 1.5 °C warming? If those conditions, with their origins deep in the field of climate science, were not met, the bill was not going to be acceptable physically, politically, or otherwise.

It is not surprising that our field was given such a prominent seat at the table this past year. Climate science and climate change seemed to reach into the public consciousness more than at other point in recent memory. On top of the many notable and arresting climate disasters of 2021, a new Intergovernmental Panel on Climate Change assessment report warned with increased precision of the consequences of continued global warming and stated with lower uncertainty that present climate disasters were due to historic warming. The Nobel Prize in physics was awarded to a humble giant in my field not far from Washington D.C., Professor Syukoro "Suki" Manabe at Princeton. The presidential campaigns in the 2020 Democratic primary took bolder stances on climate than ever before. Perhaps due to this increased public awareness, advocates of climate policy were more optimistic than they had been in at least a decade that major climate policy could be passed.

These advocates are right to be optimistic, and despite the recent political challenges to enacting climate legislation as conceived at the end of 2021, should continue to be. One reason for optimism is that while scientists worked to identify the problem of climate change and refine our understanding of the risks to a point where policy makers could act to deal with it, another group of thinkers worked to create a menu of potential policy options to deploy, representing a broad swath of the political spectrum in their approaches. I learned through smaller-scale action on The Hill that a problem is not enough for our political system to act—there must already be potential solutions ready to deploy, and ideally a critical mass and broad coalition of support to address the issue. This is now finally the case with climate.

History took place when the Build Back Better Act passed the House on 21 Nov. 2021, regardless of whether the bill becomes law in that exact form. It was a privilege to see my own scientific field influence federal legislation at such close range, and as I continue to pursue a career that enables climate action consistent with scientific knowledge, I will take numerous lessons from this experience with me. Foremost among them is that simple thresholds that capture the essence of scientific knowledge—if not the full complexity—can be useful and even necessary to achieve results in political negotiations. In addition, a problem in search of a solution is not enough for political action; potential solutions and political coalitions of support are necessary for success. The tremendous amount of scientific work done to characterize climate change and to quantify its risks with precision was effort on the scale of the problem, an undertaking that continues to serve the greater good.

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