2006–2007 Congressional Science Fellow Final Report

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My Congressional Science Fellowship ended over a month ago, and I'm still not quite sure what to make of it. It was undoubtedly the most enriching professional experience of my life, and I am deeply grateful to the U.S. Geological Survey and the Members of GSA for making this possible. I am also grateful to the Idaho National Laboratory for supporting me as an employee during my one-year tenure in Washington D.C., and to my family for their support during a year that was, at times, as challenging as it was rewarding.

The greatest highlight of my year was the experience of working with Senator Dianne Feinstein and her staff, learning what public service truly means, and devoting myself to that cause. One such cause was improving automobile fuel economy; I contributed meaningfully to the legislative team that passed improved fuel economy standards through the Senate this year—raising requirements for the first time in over 30 years. Another cause was developing legislation to reduce greenhouse gas emissions, which was a major part of my work. I contributed significantly to the development of legislation to implement a cap-and-trade system for both the electric utility sector and the economy-at-large. Such legislation would impact many facets of American life, create new costs for business, and create a new type of wealth—potentially worth tens of billions of dollars. A cap-and-trade system is a tricky proposition, and doing it wrong could create more problems than it solves.

In addition to these contributions, I have found great value in the lessons I learned about policy, leadership, service, and how the political process works. I observed first-hand how a leader in the Senate develops and manages an impressive staff, cuts through the chaff to get to the essence of an issue, and builds coalitions to achieve difficult policy goals. These lessons on how to be an effective leader are extremely valuable, perhaps even more valuable than my new understanding of how the political process works.

My challenge now is to apply these lessons to the next stage of my career, working with the technical and business leadership at the Idaho National Laboratory to help build a research and development program in "carbon management." I believe this challenge is well-suited to the capabilities I've developed over the past year. The first step is to determine what exactly "carbon management" means and whether there are research opportunities beyond the development of new technologies and supporting science for carbon capture and sequestration (CCS). I believe that, while there is much work to do on CCS, there are many opportunities to optimize carbon transfers between diverse energy systems. Hence, carbon management also involves the development of a broad range of technologies and supporting science to reduce, recycle, and reuse waste CO_2 in order to generate more energy with less net carbon emissions to the atmosphere. In addition to CCS, this may include (i) improving our ability to utilize CO_2 for enhanced oil recovery, (ii) building on the work of Donald Brown and Karsten Pruess to develop technologies to use CO_2 as a heat transfer fluid for deep geothermal energy, (iii) developing technologies to cost-effectively generate H_2 from water and recombine it with waste CO_2 to create synthetic fuels, and/or (iv) finding new ways to cultivate and utilize biomass. Such opportunities have been somewhat limited in the past because there were few costs to emitting CO_2 to the atmosphere, but the development of regulatory systems that require the private sector to include the cost(s) of managing waste carbon into the price of a product changes this situation and creates new needs for science and technology development.

Improving our capabilities in carbon management requires investment in science, technology, and policy. Science and technology cannot solve these problems on their own. Policy must set a reasonable rate for reducing greenhouse gas emissions and prioritize public investments to help CO_2 evolve from an unmanageable waste stream to a valuable commodity. This, in turn, requires improved knowledge of our technological capabilities, knowledge that is itself dependent on policy decisions. For example, the accepted sequestration capacity of a reservoir is somewhat dependent on the method(s) used to quantify and manage it, and those need to be codified in policy. Progress in one is dependent upon progress in the other; that is, improving our ability to manage waste carbon requires advances in both science and policy. The Congressional Science Fellowship experience has helped to prepare me for this challenge and continues to help the geosciences provide service to society. Thank you for this opportunity to learn and to serve.

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