Hearing on U.S.-China Clean Energy Cooperation

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1. Describe the current and future projects you are working on.

I serve as the project director of the China Energy and Climate Project (hereafter CECP) at the Massachusetts Institute of Technology. The CECP is part of the MIT Joint Program on the Science and Policy of Global Change and associates closely with the MIT Energy Initiative. The CECP at MIT was launched in October of 2011 with the support of four founding sponsors for an initial period of five years. MIT researchers involved in the CECP collaborate closely with researchers at Tsinghua University in the Institute of Energy, Environment, and Economy. Our collaborative team studies energy and environmental management and policy decisions in China, in many cases by employing new energy-economic modeling tools developed by the team. We have around five studies in progress at any given time, led by one or several team members. Studies fall into four broad thematic areas: 1) integrated assessment of the impacts of climate and energy policy proposals on China's economy and energy system, 2) transportation energy, 3) low carbon electricity and heat, and 4) industrial energy use and trade. To conduct studies, we employ modeling tools developed by the research group as well as a range of empirical social science research techniques. Studies result in published, peer-reviewed academic papers along with press coverage and, in some cases, policy briefs. More information can be found on the project's web site (globalchange.mit.edu/cecp).

2. Are there economic or national security concerns associated with U.S.-China cooperation on clean energy? What about Chinese investment in U.S. clean energy/clean technology?

Our project is not focused on energy technology development. Therefore, it avoids many of the common economic or national security concerns associated with U.S.-China cooperation on clean energy. The type of work our project conducts has the potential to mitigate economic and national security concerns to the extent that it creates a stronger shared basis for policy dialogue on related issues, specifically around energy and climate change. Creating this basis is

an explicit goal of our research effort. Specifically, the project is focused on developing analysis tools and publishing research that reflects the latest available data on China's energy system and careful study of the economics of energy and associated technologies in the Chinese context. Having a body of research and a research community spanning the U.S. and China proficient in the same set of energy data and energy system analysis tools creates an obvious starting point for bilateral dialogue and decision-making.

3. To what extent is each country benefiting from the joint initiatives? Is the United States accruing benefits to the same extent as China? How has clean energy cooperation with China advanced U.S. energy policy goals, enhanced U.S. energy security, or benefitted U.S. companies or citizens?

The benefit to China and to the U.S. is approximately equal. In the U.S., the project allows MIT researchers—senior personnel, postdocs, and students—to broaden understanding of China's energy system and policy. This understanding is the result of frequent interaction between U.S. and Chinese researchers, who have a strong mutual interest in formulating research and co-authoring manuscripts based on the latest available data and policy proposals from China. These learnings have been incorporated into modeling systems and analysis conducted in parallel on the U.S. side by the project's parent organization, the MIT Joint Program. For instance, CECP inputs have helped to shape assumptions for China as part of ongoing analysis within the MIT Joint Program to simulate future energy and climate policy initiatives by individual countries and regions. CECP studies also investigate ways in which the U.S. and Chinese economies and energy systems are connected, for instance, by understanding the carbon emissions associated with the production of goods imported from China into the United States. Since October of 2013, cooperative agreement between the MIT Joint Program/CECP and the Energy Information Administration at the U.S. Department of Energy has engaged our team to support ongoing model development efforts within the agency, leveraging our capabilities of modeling future energy demand in China's transportation system. We are also actively conducting research on the trans-boundary impacts of air pollution in China on the United States, and the possible benefits that would result in both the U.S. and China from stronger policies to cut carbon and air pollution emissions. The CECP also helps to increase the presence of MIT as well as our project sponsors in China.

Meanwhile, our collaborators in China benefit from the opportunity to send students to MIT for training, which over the long term raises the caliber of research at our partner institute. Our collaborators also benefit from the association with a leading U.S. research institution, which gives additional weight to their proposals within the policy community in China and helps the group to secure funding. Exposure to more demanding international research standards and practices in the course of conducting joint studies has raised awareness and led to the adoption of similar practices at our partner institute at Tsinghua University. The connection with MIT and internal changes in standards and practices resulting from the interaction enables our collaborators to further improve their weight and visibility in global research circles. Finally, our project is producing improved tools and new analysis that are being used to support China's domestic energy management, pollution reduction, and climate change mitigation efforts, which over the long term will deliver environmental and human health benefits in China and globally.

4. How has each side invested human, technological, and financial resources in the bilateral clean energy cooperation programs? What are the major government and nongovernmental actors on each side? What are their respective objectives and goals for the clean energy partnership?

Human, technological, and financial resources are organized separately at the two partner institutions. Human resources are deployed at the direction of the MIT and Tsinghua project directors, creating small teams of researchers responsible for the completion of particular studies of mutual interest to the collaborating institutions.

Technological resources include the models developed under the collaboration, as well as data sources, policy documents, and other primary and secondary research materials. Both the MIT and Tsinghua participants maintain access to an archive of all resources while they are involved with the project, including modeling tools. All outputs resulting from the project are placed in the public domain.

Financial support for the CECP at MIT is provided by founding project sponsors Eni (Italy) (an energy company), Shell (U.S. and Netherlands) (an energy company), ICF International (U.S.) (a consultancy), and the French Development Agency (France) (an international development assistance provider). MIT has also received limited funding for

synergistic studies from the Energy Information Administration at the U.S. Department of Energy and the Energy Foundation. Researchers on the Tsinghua side access funding from various Chinese government sources as well as several corporate sponsors.

None of the founding sponsors of the CECP are part of the U.S. government. The only U.S. government actor on the U.S. side is the Energy Information Administration at the U.S. Department of Energy, which engages with researchers in our group as part of a cooperative agreement. Non-government actors include our founding sponsors Eni, Shell, and ICF International. As corporate partners, their interests center on better understanding the current situation and likely future evolution of China's energy system and related policy. The French Development Agency (AFD) is associated with the French government. AFD supports our research in part because it informs long-range planning with respect to their activities in China.

5. How are the costs of the programs allocated among the governments and companies?

Research efforts in the U.S. (MIT) and China (Tsinghua University) are funded separately. Sponsorship of the MIT component involves annual contributions and a multi-year commitment. We also occasionally apply for additional grants to investigate specific research questions, including grants from the U.S. Department of Energy and the Energy Foundation. We are not involved in the allocation of funding at Tsinghua University, our partner institution.

6. What steps has the U.S. side taken to ensure protection of U.S. intellectual property utilized in cooperative programs?

The project has developed new energy-economic models based on templates that are either open-source or made available by the parent groups for research purposes only. As part of the project, researchers on the MIT side have shared models developed at MIT for the purpose of helping students involved with the CECP collaboration design two new models that include unique national or regional detail for China. Both the MIT and Tsinghua sides have agreed that these models are exclusively for use in ongoing research activities within the broader parent groups at both MIT and Tsinghua, although versions of both models will eventually be placed in the public domain in China and the U.S., along with all other outputs from the research effort.