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Nominee to be Under Secretary for Science
U.S. Department of Energy

Before the
Committee on Energy and Natural Resources
United States Senate

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Chairman Wyden, Ranking Member Murkowski, and Members of the Committee, thank you for the opportunity to appear before you today as you consider my nomination for the position of Under Secretary for Science at the Department of Energy (DOE). It is an honor to be here. I also very much appreciate the time Members of this Committee have taken to meet with me, and, if confirmed, I look forward to working with the Committee to address the challenges of maintaining the Department's critical efforts to ensure America's security and prosperity through vigorous and productive basic science and energy technology research programs.

I am deeply grateful to the President for nominating me for this position. I have worked on energy research for my entire career, and if confirmed, this post will allow me to apply what I have learned to the management of the DOE science and energy research enterprise.

I grew up in Texas: I was born in a small refinery town near Houston and then lived in Houston in high school. I studied chemical engineering as an undergraduate at Stanford and as a PhD student at the University of Minnesota. I interrupted my graduate studies to serve as a commissioned officer in the US Public Health Service, working initially at the National Air Pollution Control Administration and then at the Environmental Protection Agency when it was created. The experience in public service was extremely formative, and I returned to my graduate studies with helpful perspective. Those few years in Washington taught me that the government is full of talented people working hard on issues that matter, and I did a bit of growing up in the process.

In the midst of that period, my wife Susan joined me in a partnership that is now in its 44th year and counting. I will be forever grateful to our respective roommates at Stanford, who organized the blind date that introduced us when we were undergraduate students.

I worked briefly in Houston after my PhD for Shell Development Company, as a research engineer helping to develop enhanced oil recovery processes using high pressure carbon dioxide injection to produce oil that would otherwise be left behind in the subsurface. I then

moved to the New Mexico Petroleum Recovery Research Center at New Mexico Tech to lead a research group working in the same area. After seven great years there, I moved to Stanford University, where I have benefited from a much broader range of energy experience. I have had the good fortune to teach and do research with very talented students on the fundamentals of how complicated fluids flow in the rocks of the Earth's crust. Those ideas turned out to apply directly to many aspects of geologic storage of carbon dioxide in porous rocks deep in the subsurface. That area has been an important area of focus for my research group for the last 15 years as we have worked to understand the subsurface portion of carbon capture and storage.

I've also had a chance to learn about leading a wide-ranging research enterprise, first as dean of the Stanford School of Earth Sciences, working with geologists, geophysicists, petroleum engineers, and Earth system scientists. In 2002, I stepped down from my dean position to start the Global Climate and Energy Project (GCEP), a ten-year, $225 million industry-supported project of fundamental, pre-commercial research on technology options to reduce greenhouse gas emissions from energy use. That project has created a portfolio of breakthrough research on ways to convert primary energy resources (such as sun, wind, coal, oil, or natural gas) into energy services (such as electricity, light and heat, or transportation) with improved efficiency and lower emissions of carbon dioxide to the atmosphere. In addition to research, that effort has supported the graduate study of about 750 graduate students and postdocs at Stanford and at 39 collaborating institutions around the world. Those students and many more at other universities will be needed to work on the energy transitions that lie ahead.

The process of building the GCEP research portfolio taught me the value of working across disciplines, of attacking tough energy problems from differing science and engineering perspectives, of research teams working together to solve problems that go beyond those that could be attacked with the methods available within an individual research group.

Energy use is woven throughout the fabric of modern life. But it is also clear that the technology of energy conversions is only part of the challenge we face, and in recognition of that fact, we created the Stanford Precourt Institute for Energy in 2009. Its goal is to make sure that students and faculty at Stanford are working on the full range of important energy issues: from the fundamental science, to the engineering and technology, to economics, policy, finance and regulatory issues, to the behavioral side of the energy choices all of us make in our daily lives.

Our goal has been to harness the creativity and talent of 225 faculty members in 22 academic departments and create a vibrant, comprehensive conversation about all the important aspects of energy use among the community of energy students and faculty at Stanford. I note that the student Energy Club at Stanford is the largest student club on campus, an indication that our students are very engaged in these issues, as they should be. And I'm teaching a course for 60 Stanford freshmen this quarter on all the different ways of thinking

about energy for the future. Interacting with those students gives me confidence that we can chart a productive energy path for the future.

And finally, I have had the good fortune to participate in a variety of studies conducted by the National Academies' National Research Council that have broadened my energy background as well. The most recent one was entitled America's Energy Future. I know I have learned more from my fellow committee members than they learned from me, and I am grateful for the experience that effort provided.

Let me close by saying that if I am confirmed, I very much look forward to working with all of you to continue to develop the wide-ranging portfolio of fundamental science, energy science and engineering, and technology that will provide the foundation for the energy future of the United States.

I thank you again for considering my nomination, and I will be happy to answer any questions you have.