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Public Hearing on
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My testimony is based on research performed at Carnegie Mellon University, some of which is documented in 300 papers in peer-reviewed scientific journals, and some of which has been published in the books "Variable Renewable Energy and the Electricity Grid", published in 2014 by Taylor & Francis and "Carbon Capture and Sequestration, published in 2012 by RFF Press.

At Carnegie Mellon University, I am a full professor in the Tepper School of Business and in the Engineering College. I am also co-director of the Carnegie Mellon Electricity Industry Center[1].

I commend the EPA for searching for flexible ways to reach the goals of reducing the atmospheric concentration of pollutants (including carbon dioxide), enhancing energy security, maintaining electric supply reliability, and controlling costs. The proposed rules are very likely to decrease forms of pollution that are even more immediate issues than greenhouse gas control. A recent peer-reviewed research paper in The New England Journal of Medicine shows that even well after the Clean Air Act of 1990, further reductions of particulate matter would greatly increase life expectancy[2]. The National Academies reported[3] that "The aggregate [human health] damages associated with emissions from coal-fired facilities in 2005 were approximately $62 billion." Reducing these costs at the same time that greenhouse gasses are controlled is a great strength of the proposed rule.

The flexibility in the rules is praiseworthy. Rather than mandating a particular technology, they allow the states to choose what is most appropriate for them,

[1] The opinions here are mine and do not necessarily reflect the views of Carnegie Mellon University, or any other institution.
[2] Pope CA III, Ezzati M, Dockery DW. 2009. Fine-particulate air pollution and life expectancy in the United States. New England J of Med 360:376-386.
[3] National Research Council. Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use. Washington, DC: The National Academies Press, 2010.

whether it be nuclear, renewables, efficiency, or fossil fuels with greenhouse gas capture.

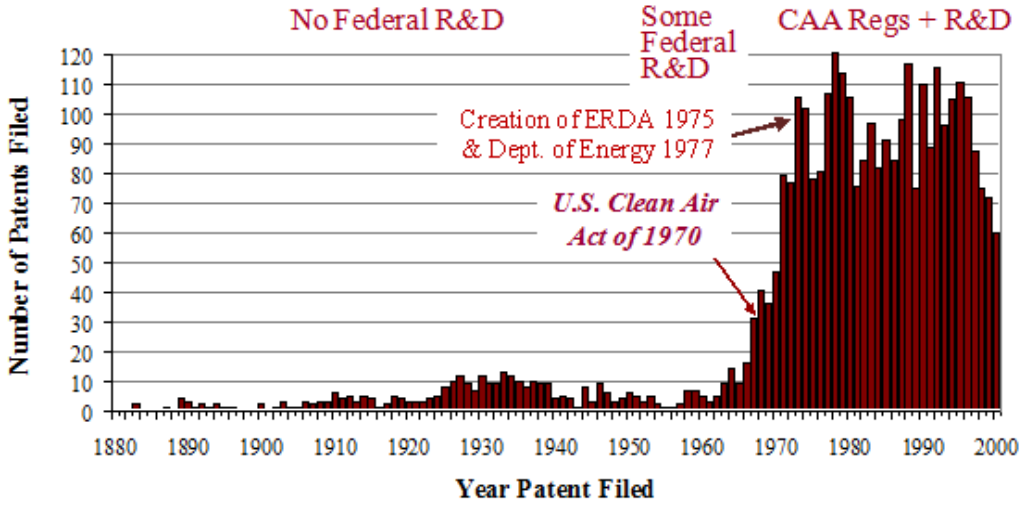
I have spent much of the past decade studying renewable power. Wind currently provides about 4% of all the electric power in the USA. In my view, wind can certainly grow to provide 20%, before issues arising from land use are likely to restrict further wind plants. Solar may grow greatly, from its present 1/500th of all power to perhaps 5%.

Low-pollution nuclear power now supplies 20% of our electricity. That leaves a big gap between our needs and what nuclear and renewables can supply .

It is simply not in the cards to generate enough power without using America's abundant coal and gas resources. But the issue with coal and natural gas is this: long before we run out of fossil fuels we will run out of atmosphere into which to dump their combustion products (like CO_2). Doomsday predictions of coal's demise are overblown. In fact, Bloomberg News reported July 16th that US imports of coal will increase 26% in 2014 over 2013. The EPA's proposed rules allow the use of America's vast reserves of carbon-based fuels without emitting much carbon dioxide to the air. That is a big advantage. The proposal also allows the use of

uranium, transformed into energy by bright engineers like those at Westinghouse nuclear here in Pittsburgh.

I teach in a business school; I believe in American industry's ability to innovate when there is a reason to do so. We did exactly that in response to the Clean Air Act of 1970. The number of patents filed for sulfur dioxide pollution control technologies increased by a factor of 20 after the regulations. And we profited by selling that technology around the world.



US SO_2 control patent activity over time[4].

EPA's proposed rule will foster innovation and create jobs. Coal power plant CO_2 pollution control is feasible, and the first plants are being constructed at scale now. Southern Company's 582 MW Kemper plant will be in operation in the next year,

[4] Source: Taylor, M.R., E.S. Rubin, and D.A. Hounshell, Regulation as the Mother of Innovation: The Case of SO2 Control. Law & Policy, 2005. 27(2): 348-378.

as will a 110 MW plant in Canada. Just this month NRG Energy announced that they are moving forward on their 240 MW coal plant with CO_2 capture in Texas.

This proposed rule provides the proper incentives for low-pollution power, and the flexibility for states to reduce pollution in sensible ways. It should be adopted.

Thank you.