



Nuclear energy: Obstacles and Possibilities

Harvard Kennedy School Energy Policy Seminar Series, Spring 2016

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In a discussion in the Harvard Kennedy School's Energy Policy Seminar moderated by Professor Henry Lee, Professor Matthew Bunn (of HKS) and Joe Lassiter (of HBS) pondered the future of nuclear energy, and how likely it might be to play a significant role in reducing future carbon emissions.

Bunn and Lassiter were in agreement that some of the new types of nuclear plants currently on the drawing board might have significant advantages over the currently prevalent light water reactors, with the potential to be cheaper to build and safer to operate. But Bunn warned that past proposals have failed to meet such goals.

How fast might such plants become widely available? Here, the perspectives of Professor Lassiter and Professor Bunn differed. Professor Lassiter, reviewing information provided to private investors (and presumably considered plausible by these investors who invested more than \$1.6 billion over the past 10 years), sees projections that new nuclear could be competitive with coal in terms of cost and scalability in a relatively short period of time (the next 10-15 years), at least outside the United States. A new approach,



“test-then-license,” Lassiter noted, has the potential to help speed up the development of new technologies—as part of an overall effort to “de-militarize” the existing nuclear technology development, licensing, construction and procurement processes that Lassiter sees as being absolutely necessary to significantly reduce the cost and increase the speed of nuclear deployment. Three of the more promising new ventures have recently announced their intention to develop their first prototypes and go to market in China, Indonesia and Canada using very different strategies than would be permitted in the United States.

Professor Bunn, however, noted that in the United States official government thinking is that the timescale for development of these new technologies is likely to be much slower—and that costs might well be higher given the United States recent experience, quoting Admiral Rickover's observation that “Paper reactors will always beat real reactors.” Bunn presented data from a survey of industrial, government, and academic nuclear experts, most of whom projected that nuclear costs in 2030 would be even higher than today.

Professor Bunn went on to review the growth rates of nuclear power that would be needed in order for nuclear energy to play a significant role in meeting carbon emissions reduction targets. New nuclear plants would need to be built at about ten times the pre-Fukushima rate in order for nuclear to supply even 1/15th of the carbon-free energy needed to meet generally accepted carbon reduction goals, Bunn noted—a rate that would match the International Atomic Energy Agency's most optimistic growth forecast.

There are “reasons for pessimism” about achieving this kind of nuclear build rate anywhere in the world, Bunn noted. In the United States, getting notoriously risk-averse utilities to invest in nuclear technology at this rate, given the availability of plentiful low-cost natural gas, would make progress even more unlikely. On the other hand, the capacity of nuclear energy to reduce particulate emissions while increasing energy production—a pressing problem in countries like China, India, and Indonesia—provides additional incentives for accelerated deployment of existing and development of new nuclear power alternatives outside the United States.

If nuclear power is to become more widespread, Bunn noted, good governance and regulation will be especially important. Current light water reactors remain vulnerable to human error and accident. And while Bunn and Lassiter agreed that safer (perhaps much cheaper) plants may be on the horizon, the speakers could only agree that the United States was likely to be a follower, not leader in the deployment of the next generation of nuclear plants.

Bunn and Lassiter spoke as part of the Kennedy School's Energy Policy Seminar Series, which is jointly sponsored by the Energy Technology Innovation Policy research group of the Belfer Center and by the Consortium for Energy Policy Research of the Mossavar-Rahmani Center on Business and Government.