Imperfect Markets Versus Imperfect Regulation in U.S. Electricity Generation

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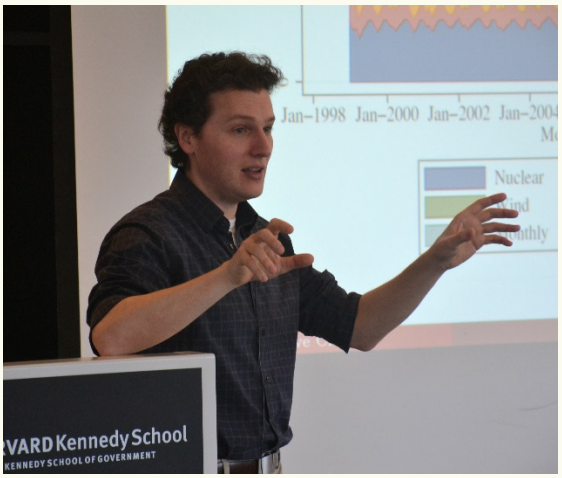
Over the past two decades or so, much of the United States has moved from a system of administrative dispatch of electricity generating plants based on engineering estimates to market dispatch based on competitive bidding. Has the introduction of competitive electricity markets in the US saved money? In Monday's energy policy seminar, Steve Cicala, a professor at the University of Chicago's Harris School of Public Policy, presented his research findings that in the short term, at least, competitive dispatch has resulted in "substantial net improvements" in efficiency, amounting to an estimated savings of approximately $3 billion per year, nationwide, as a result of more efficient plant dispatch and trading between market areas.



Cicala's research addresses a hard-to-bridge gap in the evidence on the impact of competitive electricity markets. Regional differences make comparisons of competitive and vertically-integrated electricity dispatch performance tricky, and it is hard to know, within any given market, what would have happened if competitive dispatch had not been introduced. Certainly, market competition could be working to produce overall efficiency increases, but, as some critics of electricity markets point out, such markets create opportunities for market manipulation that could in theory eclipse any competition-induced efficiencies.

With the penetration of market dispatch in the U.S. currently hovering at about 60%, the question of the benefits of markets remains highly relevant. In the absence of clear evidence, speaker Cicala noted, support for competitive markets has wavered, with recent proposals to subsidize power plants that are uncompetitive, effectively undoing market signals.

In an effort to provide solid evidence on the impact of market dispatch, Cicala conducted an analysis based on two fundamental insights. First, he observed that "out of merit" dispatch—dispatching more expensive plants instead of less expensive plants—was an area in which potential savings might be realized. If competitive markets result in less "out of merit" dispatch than would have occurred in an administrative dispatch based on engineering estimates, real savings would be realized. Similarly, saving might come through increased trading between dispatch regions, if a cheaper plant is available to serve load in a neighboring region, and adoption of a market structure makes this transaction more likely to occur.

In order to set up a valid, "apples to apples" comparison, Cicala tackled a project of data collection and analysis that he described as "not trivial." It required the collection of hourly demand figures for almost one hundred separate areas nationwide over more than ten years, along with the hourly operational supply curve, including every generating unit in these areas, over the same period. Cicala then used machine learning techniques to predict, based on administrative dispatch decisions in the years immediately prior to the introduction of market dispatch, what plants would have been operating in the absence of markets. For each area, Cicala compared the resulting hypothetical dispatch with the actual market dispatch, finding, on average, that market dispatch resulted in significantly less costs associated with out of market plant operation and significantly more savings associated with efficient trades between regions.

Cicala noted that his analysis applies directly only to gains over the relatively short term. He does not attempt to assess, for example, whether the introduction of market dispatch changes investment in new plants in ways that might add to efficiency, or, on the other hand, whether market dispatch might promote the retirements of some plants that result in higher overall system costs.

Cicala spoke as part of the Kennedy School's Energy Policy Seminar Series, which is sponsored by the Consortium for Energy Policy Research of the Mossavar-Rahmani Center on Business and Government.