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Why The Economics Don't Favor Nuclear Power In America

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From 2011 through 2013, as the overwhelming majority of the new reactors that had been proposed as part of the "Nuclear Renaissance" were abandoned or delayed, the industry blamed low natural gas prices. In 2013, when five old reactors were retired early, and today with many old reactors being considered for early retirement, the industry blames low wholesale prices that result from a market that is distorted by the entry of subsidized wind power.

The irony in these complaints is that for fifty years the selection of generating capacity has been rigged in favor of nuclear power with socialized accident insurance and waste management costs, forced purchase of overpriced power, and advanced recovery of construction costs. Nuclear advocates complaining about policies that balance things out a bit to give other generation resources a decent chance of delivering electricity would be laughably hypocritical, if it weren't so important. In fact, if the playing field were actually level, nuclear would be in even more trouble than it is.

The nuclear hypocrisy does not stop with complaints about subsidies. The nuclear utilities continue to complain about the challenges of the safety and licensing requirements imposed by the Nuclear Regulatory Commission, even after they convinced Congress to streamline and reform the process in the 2005. Yet, these challenges are matched by the obstacles utilities put in the path of alternatives at the public utility commissions, with hostile interconnection requirements, unfair contract conditions and uneconomic tariffs.

The fifty year failure of nuclear power to be economically competitive compels nuclear advocates to label every pro-consumer analysis as anti-nuclear. The anti-nuclear label is used to avoid the inconvenient truth about nuclear: it is

and has been unable to compete economically with the alternatives available. More importantly, it is not likely to be able to compete for the foreseeable future.

The economic reality is that efficiency and natural gas can keep the lights on and computers running at a fraction of the cost of nuclear power and the cost of wind and solar have been declining dramatically. Utility scale solar with storage is entering the market, as is utility scale battery storage. The decision to give them a boost, is paying off. These alternatives have exhibited the one characteristic that has always eluded nuclear, declining costs driven by innovation, learning, and economies of scale.

In contrast to the success of the alternatives, the projected cost of nuclear power has increased five-fold since technology vendors and academic boosters declared the "Nuclear Renaissance" in the mid-2000s. If the industry had been able to deliver on the hype of a decade ago, it would not be in such dire straits. Having failed miserably a second time, the industry is demanding another round of massive subsidies, relaxed oversight, and pampered treatment for a third bite at the apple.

The buzz surrounding small modular reactors among nuclear advocates over the past couple of years is another example of the nuclear hype cycle. The industry is demanding massive subsidies and further relaxation of licensing and safety requirements. Independent analysts think the cost per kilowatt hour will not be less than the cost for the current crop of large reactors and is likely to be more for a significant period. The economic traits that are supposed to make small reactors attractive—small size, short construction periods, flexible deployment—are exhibited by many of the other alternatives. Westinghouse, one of the leading U.S. vendors, has recently nixed further investment in small reactors, even though its partner in Missouri, Ameren, had extracted $40 million in support from the state. The reason Westinghouse gave – "no customers" – was a quintessential real world market answer.

The hope that concerns about climate change would revive the prospects of nuclear power has also not panned out and the problem is not that most nations have refused to impose heavy costs on carbon. The problem is that most of the alternatives are low carbon resource and get exactly the same boost from climate policy as nuclear does. Even natural gas, which emits about half the carbon as coal, remains less costly unless the carbon price is quite high. Even then, nuclear has become so costly that it has trouble competing with natural gas facilities that add carbon capture and storage.

The most important impact of the nuclear hypocrisy lies in the fact that nuclear utilities are wedded to the mid-20th century concept of massive base load facilities that require huge investments on which they can earn large profits. While they build and maintain electricity grids to serve the needs of those facilities, the decentralized, smaller scale generation technologies that have become less costly require a different approach, using intensive information and control technologies to manage the grid. Given the expense

of nuclear power, a commitment to nuclear crowds out the alternatives. In the current context, it will slow or prevent that transition to a 21st century industrial structure.

The ultimate irony is that small modular reactors and large scale carbon capture and storage are both hypothetical resources that are a decade or more away. In the meantime, the other alternatives are advancing like a freight train. By the time the new base load technologies reach their cost floor, it is very likely they too will be unable to compete.

Unable to compete today and unready to even attempt to compete for a decade or more, nuclear advocates would like to have a hundred year debate, declaring that the alternatives will be unable to achieve the decarbonization goal set for the end of the century, a claim that is hotly contested. Given the history of failed nuclear promises, the recent dramatic success of the alternatives, and the fact that currently available renewable technologies and efficiency can meet the demand for low carbon electricity for the foreseeable future, the path that a prudent decision maker would take is to maximize their contribution. The biggest mistake policy makers could make is to allow the search for yet another nuclear holy grail to delay the transition to a 21st century electricity grid.
