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Climate

Nuclear Power Is Losing Money At An Astonishing Rate

by Joe Romm

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Half of existing nuclear power plants are no longer profitable. The New York Times and others have tried to blame renewable energy for this, but the admittedly astounding price drops of renewables aren't the primary cause of the industry's woes — cheap fracked gas is.

The point of blaming renewables, which currently receive significant government subsidies, is apparently to argue that existing nukes deserve some sort of additional subsidy to keep running — beyond the staggering $100+ billion in subsidies the nuclear industry has received over the decades. But a major reason solar and wind energy receive federal subsidies — which are being phased out over the next few years — is because they are emerging technologies whose prices are still rapidly coming down the learning curve, whereas nuclear is an incumbent technology with a negative learning curve.

The renewable red herring aside, existing nukes can make a reasonable case for a modest subsidy on the basis of climate change – though *only* because they are often replaced by carbon-spewing gas plants. That said, the "$7.6 billion bailout" New York state just decided to give its nuclear plants appears to be way too large, as we'll see.

What's Causing Nuclear Power's Economic Death Spiral ?

A July Bloomberg New Energy Finance analysis concluded that nukes producing 56 percent of U.S. nuclear power "would be unprofitable over the next three years."

As you can imagine, if *existing* nuclear power plants have become unprofitable, then *new* nuclear power plants make no economic sense whatsoever. Perhaps no surprise, then, that a Reuters headline blared last month, "New Nuclear Reactor Builds Fall To Zero In First Half Of 2016 – Report."

The utility consultancy Brattle Group came to a similar view on existing nukes in a 2014 analysis, concluding that 51 percent of the merchant (deregulated) nuclear fleet, some 23 Gigawatts, could be unprofitable by 2015. In researching this post, I spoke at length with economist Peter Fox-Penner, one of the country's leading experts on both the electric grid and decarbonization, the author of *Smart Power : Climate Change, the Smart Grid, and the Future of Electric Utilities*. Fox-Penner is the former chair of the Brattle Group.

I asked Fox-Penner, who is currently director of Boston University's Institute for Sustainable Energy, to comment on Eduardo Porter's argument in the business section of the Times, "How Renewable Energy Is Blowing Climate Change Efforts Off Course," which I debunked last week. He replied :

> Porter frames his article as blaming wind and solar for causing low prices that have unintended harmful consequences. While I agree that premature closure of safely operating existing nuclear is a terrible idea from the climate policy standpoint, he overlooks the fact that this consequence is neither "unintended" nor the "fault" of solar and wind. This is the very-much-intended result of the way electric markets were designed, and you can be sure this design was not formulated by wind and solar producers and is in so sense their fault. It is the design of these markets that should change, not the amount of wind and solar we will deploy to meet climate policy goals. He also overlooks the much larger role cheap natural gas has played in eroding nuclear plant economics.

The primary reason existing nuclear power plants are in trouble is because of cheap natural gas. This is widely understood. In fact, the New York Public Service Commission (NYPSC) staff itself, in its July proposal to bail out ailing nukes, explained :

> Staff's analysis shows that due to low natural gas prices, forecasted wholesale market prices are significantly lower than the average operating costs of the upstate nuclear units.

Another major reason nuclear power is in trouble is that we don't have a price on carbon pollution, which would make many existing nukes more profitable, as I discuss below. Ironically, or, rather, tragically, some of the people complaining the loudest now about the need for nuclear subsidies are

those who fought the hardest to kill the best chance this country ever had to enact a carbon price, the 2009 climate and energy bill.

Another major reason nuclear power is in trouble is the industry itself. "The industry hasn't done itself any favors," as a Bloomberg article, "The U.S. Nuclear Power Industry's Dim Future," explained back in 2013. "A radioactive steam leak and a botched repair job have led to the permanent closure of three reactors in the last several months, two in California operated by Southern California Edison, and another in Florida run by Duke Energy. "

Another major reason nuclear power is in trouble is that U.S. electricity demand growth has been flat for nearly a decade, thanks in large part to state and federal energy efficiency policies. That is not a trend that is likely to change in the next decade, thanks in part to the LED lighting revolution, as I explained earlier this week. Flat demand growth inevitably means lower power prices.

Finally, yes, the rapidly dropping price of solar and wind power has started to create problems for inflexible and costly power sources like nuclear power. While their market penetration is vastly lower than nuclear power, there are times during the day when there is an excess of very-low-cost renewables " since they don't have the high fueling and operations and maintenance (O&M) costs nuclear has.

Nuclear advocates want you to believe that this problem with renewables is long-term and unsolvable " whereas it is in fact short-term and straightforward to solve (see "Why The Renewables Revolution Is Now Unstoppable"). It's not a surprise the usually slow-to-change utility system was unprepared for the astonishingly rapid growth of low-cost solar and wind power. But with electricity storage prices collapsing and literally hundreds of businesses now starting to emerge to find uses for cheap, over-abundant carbon-free power during the day, this is really a short-term problem.

What Kind Of Short-Term Subsidy Should Existing Nukes Get, If Any ?

It is true that some existing nuclear plants are shutting down prematurely because they can't compete with cheap fracked natural gas. That means we are going to end up with more fracked gas and more carbon pollution (both carbon dioxide and methane) " in the short term. And nobody wants that.

So, existing nukes can make a reasonable case for a modest subsidy on the basis of climate change. Or as the NYPSC staff put it in their bail-out proposal, "As a component of the Clean Energy Standard (CES), New York State shall provide a subsidy for zero-emissions attributes to Zero Carbon Electric Generating Facilities when there is a public necessity to encourage the preservation of their zero-emission environmental values or attributes for the benefit of the electric system, its customers and the environment."

But how much should that subsidy be ? The staff argue "payments for zero-emissions attributes would be based upon the U.S. Interagency Working Group's (USIWG) projected social cost of carbon (SCC)." They proposed an SCC in the $50 per short ton range (it actually starts a bit below that and rises to $65 by the late 2020s). They also subtract out what the nukes get from the power markets and from the CO2 price established by the Regional Greenhouse Gas Initiative (RGGI).

On the surface, that sounds reasonable. If we had a national carbon price set at the SCC, then every nuclear plant would get that benefit anyway. But, of course, we don't. And because we don't, simply handing out a subsidy to nuclear power based on that SCC may not be optimal use of that money from a CO2 perspective for two reasons.

First, the nuclear plants probably don't need all that bail-out money to stay economic. Second, the money they get " particularly the money they don't need " could almost certainly achieve greater

CO2 savings if used for other purposes.

Now it is impossible for anyone to know what the right subsidy is without getting the nuclear operators to open up their (financial) books to the NYPSC. But two years ago, the Brattle Group offered up this analysis of what CO2 subsidy was needed to keep the merchant nukes profitable :

CREDIT : Brattle Group

Yes, this analysis is a couple years old. On the other hand, Brattle did accurately predict the impending shift to unprofitability of half the U.S. merchant nukes. Their key conclusion bears repeating :

> About half the threatened nuclear fleet could be supported with an average cost per ton of CO2 avoided below $10/ton The average cost would be $20/ton.

So it seems as if the NYPSC is severely overpaying their nukes. That seems especially likely given that the nukes in New York State already get a RGGI benefit whose baseline level the PSC calculates at $10.41 per ton (that number is then later adjusted to reflect the actual RGGI price, which fluctuates, and is currently closer to $5).

I also have serious doubts that this subsidy needs to last until 2029. Within a decade, we are likely to find that existing nukes are even less valuable than we thought. As I ve said, the rapid advances in renewables, batteries and other storage, demand response, efficiency, and electric vehicles mean that integrating low-cost renewables into the grid will almost certainly be far easier and cheaper and faster than people realize. But that is the subject for another post.

Tags

- Climate Change
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