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Long-Term Nuclear Value



Nuclear power has long-term value that may not be recognized by short-term commercial decision-making, but that is recognized by governments and others.



About a decade ago, I helped a municipal utility consider an investment in the expansion of their existing nuclear power plant. We reviewed the analyses and plans of the municipal utility and advised the City Council on how to proceed.

City Council members, focused on rate impacts, were divided on how to proceed. The Mayor had the deciding vote and called a meeting of local business leaders to help him make a decision.

The business leaders were presented two alternatives:

- If the City Council voted to go ahead, the municipal utility would embark on a nuclear expansion project that would double the already large amount of nuclear energy used by the City. This would come at a cost: rates would be higher in the early period of the nuclear project, but rates would be lower for much of the 60-year (or longer) life of the nuclear power plant. The nuclear plant expansion would reduce the City's use of generation using natural gas and coal fuel.
- If the nuclear expansion project were rejected, the City would need to invest in some other type of generation, likely including renewables (including generation to "firm-up" these intermittent resources), gas-fired power plants, and more coal-fired power plants. Rates might be somewhat lower in the initial period, but might be higher in the long-term. Compliance with emissions standards might be more difficult.

After the introduction, each of the business leaders talked about their views.

Each of the business leaders supported the nuclear project and recommended that the Mayor vote yes. The reasons they gave for their support were compelling:

- I was here when the original nuclear power plant was built and remember the delays and cost overruns at the time. Despite these cost overruns, the original nuclear power plant is one of the best-performing nuclear power plants in the country.
- I remember the increases in municipal electricity rates when the original nuclear power plant was built. But today, the city's municipal electricity rates are among the lowest in the country largely as a result of the nuclear power plant being part of our generation portfolio.
- The U.S. nuclear power industry, including the companies building nuclear power plants and the NRC, had some real problems when the existing plant was built. The nuclear power industry has learned a lot since then. I do not expect that the expansion project would have the same level of delay and cost overruns as the original project.
- I travelled to China recently and saw the air pollution in Beijing. I do not want to live in a city or a country that has pollution like that. Nuclear power is justified by the clean air benefits alone.

- I am happy to pay more for electricity today to get the long-term benefits of another nuclear power plant. I want my children and grandchildren to have the same clean and cheap electricity that I have today.

A common thread here is that nuclear power brings long-term value.

It takes up to 10 years to develop and build a new nuclear power plant that will operate for 60 years or longer. Electricity markets and financial markets may not recognize the full value of these long-term nuclear power plant assets.

Electricity markets focus on short-term spot markets (i.e., using hourly or even 5-minute market clearing periods) and may add on a short-term capacity market (i.e., 3 to 5 years). The long-term value of nuclear power is not reflected in these markets.

Financial evaluation of a nuclear power plant project involves analyses of discounted future cash flows. Cash flows that are more than about 25 years in the future have little or no value when discounted to today (i.e., have a net present value of zero).

An investor looking at a nuclear power project would see a 10-year development and construction period with a large capital investment and would expect that the returns on this investment would come from cash flows during only the first 15 years of operation. The traditional financial approach ignores 45 years or more of operation and cash flows from the nuclear power plant.

One result of this is that all existing nuclear power plants are the result of investments made by governments and regulated utilities.

Nuclear power assets are valuable long-term infrastructure investments that are too important to be left to the market and should be regulated or owned by governments.

The long-term value provided by nuclear power is why nuclear power is moving ahead in government economies like China, where the government is both the owner and beneficiary of the value created by nuclear power. This value also explains why regulators in non-market regions of the U.S. support new and existing nuclear power plants.

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