Conclusions and Recommendations – excerpted from:

Business Risks and Costs of New Nuclear Power

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CONCLUSIONS

This Paper has identified the following significant Nuclear Business Risks:

1. *Costs to Build the Nuclear Plant May Significantly Exceed Estimates*

Capital costs to build all power plants have been rising much faster than inflation. A power plant with a long lead time (e.g. nuclear or coal) is exposed to much greater risks of cost overruns, than generation units with short lead times (e.g. natural gas, wind, or solar). Total "all-in" costs to build new nuclear are likely to equal approx. $8,900- $10,500/KW. Paying for this capital cost alone would cost approximately 17- 22 cents/kWh.

2. *Nuclear Construction Schedules May Be Delayed*

The nuclear industry has a history of major construction delays causing billions in cost overruns. New generation nuclear has gotten off to a bad start, with delays occurring on facilities now under construction worldwide. The industry still faces substantial organized opposition. If costs exceed funds lined up to fund the project, a project may be abandoned after billions have already been spent, as has occurred with past nuclear plants.

3. *The Utility's and/or Customers' Credit Ratings May be Downgraded*

The very high capital costs and long lead times to construct a nuclear facility are expected to result in a "risk premium" affecting the cost of capital for nuclear utilities. Attempting to "fix" the utility's cash problems by assessing billions on ratepayers years before any kWh's are delivered simply shifts the cash flow and credit rating problems to the utility's ratepayers. The cost of capital never goes away – money always has its cost.

4. *New Nuclear Will Require Very High Electric Rates*

Costs at the power plant (not including distribution & G&A costs) of new nuclear power are likely to be 25-30 cents/kWh in the first year of full operation of the facility: 17-22 cents/kWh for capital costs; 1 cent/kWh O&M; 2 cents/kWh property taxes; 2 cents/kWh to fund plant decommissioning & nuclear waste; and 3 cents/kWh for nuclear fuel.

5. *Higher Rates May Cut Customer Demands But Not Utility's Costs*

Energy efficiency and distributed power sources offer new ways for customers to buy fewer kWh's. High rates needed to fund a nuclear plant may drive customers to cut use. As almost all nuclear costs are fixed, the utility has to pay these costs even if demand falls. If the utility cannot sell enough kWh's at a high enough rate to pay these costs, it may face insolvency.

6. *Local Economy Could Be Rendered Less Competitive*

High electric rates may make the local economy less competitive with other areas of the U.S., whose utilities are developing low-cost electricity sources (e.g. wind power).

RECOMMENDATIONS

1. *Pursue a Least Cost Approach to Meet Needs*

A "Least Cost" approach allows the utility to employ non-conventional methods to meet the needs of its customers, and save money for all ratepayers in the process.

For instance, 25 compact florescent light bulbs which save 40 watts each compared to a 60 watt light bulb, can eliminate 1,000 watts (one KW) for a total cost of approximately $50. The same KW in new power plant capacity could cost over $10,000 if it was nuclear.

Utilities employing the Least Cost approach ask themselves – which of these options has the Least Cost? Utilities nationwide employing this approach are now paying customers to implement measures which are known to decrease demand for new power plants – rebates for more efficient a/c units, insulation, solar panels, Energy Star appliances, etc.

The "Least Cost" approach also allows a utility to consider new technologies, or new combinations of technologies, as ways to meet needs, because they are more cost effective.

2. *Switch to Shorter Lead Time Technologies*

The very long lead time to pursue a nuclear project forces utilities to make major commitments *now*, to meet projected customer needs at least a decade from now.

This very long lead time exposes the utility to uncertainties about the accuracy of the demand forecast. As new energy technologies are now aggressively entering the marketplace, if there was ever a time to avoid being forced to act on a 10 year forecast, it would certainly be *this next 10 years.*

The long construction time also exposes the project to a severe risk of cost overruns, as utilities have been experiencing double-digit inflation in costs to build new power plants. A technology with a short construction time (e.g. wind, solar, natural gas) is far less exposed to cost increases than projects with long construction times (e.g. coal, nuclear).

3. *Use the Strengths of a Diverse Portfolio of Technologies*

A combination of technologies, rather than reliance on one technology to do everything, may prove the best choice to meet future KW capacity and kWh generation needs.

For instance, it may soon become common to refer to a *system* of Combined Cycle Gas and Wind Turbines (CCGWT) which would employ wind turbines at zero fuel cost, supplemented by natural gas turbines as needed. Such a *system*, *taken as a whole,* would minimize fossil fuel consumption and total fuel costs. The total costs to construct would be moderate, and would be "modular", i.e. able to be deployed more closely in alignment with needs curves. This *system* may often have the lowest *overall* costs per kWh delivered.

The systems approach addresses the fact that with increasing fuel costs and environmental concerns, each technology has its strengths and weaknesses, and a combination may be necessary to achieve system reliability, lowest overall cost, and greenhouse gas reductions.

4. *Share Resources Across the Country*

America has abundant solar, wind, and geothermal energy resources. However, the most abundant renewable energy resources are typically located in areas of low population, far from the load centers where the electricity is most needed.

An efficient national transmission grid is clearly needed, to carry electricity from areas with abundant zero-fuel-cost resources and deliver it to high-usage areas.

Even without this improvement, however, utilities can already take advantage of the existing *natural gas* distribution network. If a Midwest utility installs thousands of MW of wind farms, it will use less natural gas than it might have otherwise. If a Nevada utility installs solar farms, that Nevada utility will also use less natural gas to meet its needs. As these utilities in renewable resource-rich areas cut their natural gas usage, the natural gas "freed up" will be more available to be used by utilities elsewhere, helping to alleviate concerns about natural gas supplies and pricing.

5. *Get the Job Done, With the Least Business Risks*

As noted earlier in this paper, an electric utility is in a unique position, with the critical responsibility to "keep the lights on" at the most reasonable cost, for everyone in its service territory.

Utilities must legally and ethically put a priority on *prudence,* and should therefore "get the job done" choosing the options and systems which pose the least business risks.

The goal should be a reliable and cost effective utility network. This is the goal – not a particular type of power plant or a particular set of plans to defend.

Utility management shouldn't be *too* exciting. If an idea starts to look like it could have excessive business risks and costs, it is best to re-assess and find less risky ways to meet the goals. The last generation of utility managers nationwide reached this conclusion about nuclear power. This Paper has shown reasons why these executives were right, even though they had to cancel nuclear plans they themselves, plus a powerful nuclear lobby and a pro-nuclear government, had at one point advanced.

If current-day utility executives and utility regulators will now consider these facts, the nation can proceed to address the energy challenges we face, with far less rancor and risks, and lower costs overall, than if a futile attempt is made at great cost to revive a nuclear industry that has never kept its promises to provide a competitive and viable generation source.