Many are licensed but few are built

We built nearly 100 plants in the 50's and sixties until a combination of the reduction in electricity demand, public protest, and regulatory overkill in the 1970's made further building of power reactors too uncertain and expensive. Now over 30 years later we have not completely overcome this lost momentum and actually started building plants again.

The regulatory environment is now more predictable (but way too slow), demand is up, and as people have gotten more familiar with nuclear power their earlier fears have dissipated. Now over 60% of our population wants to expand the use of nuclear power (and virtually all of the technically competent). Of course we still have some techno-phobics and can expect lawsuits attempting to derail almost any energy project. However, nuclear has proven to be the safest, and most healthy heat source for generating significant electrical power.

The licensing process is very slow, but the NRC has set up a regime in which, once construction has started, challenges to prevent operation should be very difficult. The process now consists of a two licenses. The first certifies the design of a type of plant. Four plant designs have been certified and 4 more are under review. A number of others are in a pre-review phase. As long as a builder picks a certified design that portion of the project is exempt from further review except to insure the design is carried out. The second license is the Combined License (COL) which is specific to a site and covers the builder's qualifications, environmental impacts, operation, site safety, design safety, and construction verification. As of March 9, 2009 the NRC has received COL applications for 26 plants at 17 sites. At least 13 of these sites already have operating nuclear plants, so the new reactors represent an expansion.

How many of these new plants will be built is open to question. Since the NRC process takes years, the operators must anticipate future power requirements at least half a dozen years in advance. Current economic conditions might well suppress demand for some years. The effect of a new a administration is also unknown. President Obama has said he favors nuclear power, but his actions seldom correspond to his words. We will have to see.

Meanwhile current developments in small nuclear power plants suggest that small factory produced reactors may be a way to compress the approximately 4 year build time (regulatory matters take many additional years) for a large reactor.

Meanwhile, there are 104 operating power reactors in the United States producing nearly 20% of our power. The utilities operating these reactors are carrying bundles of cash to the bank because their fuel costs are so low and their capital costs have been recovered.

Short, medium and "permanent" storage of nuclear waste

The difference between short term (5-30 years), & medium term (10-500 years) storage of nuclear waste; and permanent storage has become politically huge. I have written a paper on the very long term storage of high level waste which is attached.

The cost of short term and medium term storage is very manageable, but predicting the cost of storage for some forms of very long term storage is more difficult. I would assert that the remaining problems are primarily political and driven by lack of information dissemination. The government has been collecting fees from all U.S. nuclear power generators to provide this long term storage, but so far they have missed every deadline, and Obama just back-burnered the facility that was expected to take the long term storage. Meanwhile most plants have adjusted and can keep the waste on-site for a few hundred years after which it is much safer to handle.

One of the differences between nuclear waste and ordinary chemical waste is that nuclear waste steadily degrades to safer end products and does this on a predictable and very reliable schedule. Unfortunately for some parts of the waste this is a very long time. Chemical waste on the other hand is essentially eternal in the absence of a chemical reaction to change it to a safer material. Compared to the waste from a coal plant the waste from a nuclear plant is also very tiny.

President Carter committed the U.S. to a once through fuel cycle which uses about 3% of the slightly enriched uranium placed in the reactor's fuel rods. He had some reasons, but they were questionable at the time, and have become even less relevant as the years have passed. I'll be glad to describe this at length at our next lunch.

Reprocessing the fuel reduces the waste dramatically and also permits the plutonium (with a very long half-life) to be "burned" as reactor fuel. This in brief is why some of us did not want to see the (slightly) used fuel being "permanently" stored.

Nuclear power in Alaska

Alaska has a different set of power requirements than the other states. The scale of our power is much smaller and in fact electricity for the entire state could be generated by one plant of the type the NRC has certified so far. Of course there would be no reasonable way to transmit the power to the locations where it is needed.

At the same time, nuclear and hydro power offer the only consistent, reliable, significant scale generation capability that will free Bush centers from their reliance on fuel oil generation. Wind can contribute a bit in some communities but is not reliable or cost effective. Wind is usual grouped with solar and geothermal and described in the industry as "piddle" power. I've enclosed an Excel spreadsheet showing the 2007 percentages of power produced using the various fuels.

Planned for Galena is a 10 MWe Toshiba 4S. This is less than 1% of the size of reactors

the NRC has certified. They have had a series of pre-certification meetings and a formal certification application may be submitted this year. If all goes well, it would be possible to have a 4S in Galena in 2015.

A number of other communities around the state should consider these. I have written a letter to the Governor to suggest a few things the state could do that would have vast long term benefits for regional Bush locations. I have enclosed a copy.

In brief, these include helping suppliers and communities deal with federal regulatory issues, helping with technical evaluations, and getting federal security measures adjusted for small and underground reactors.

Nuclear Power in Anchorage

Anchorage has a number of good choices for additional power generation (Wind is a poor choice). The initial implementation may be more natural gas since the area has additional power requirements in a shorter time frame than nuclear or hydro power can be brought on-line. This is indeed unfortunate as it will drive electric rates to high levels and draw on the heating supply for gas that is better used in that venue.

I prepared a report for the Chugach Electric board (attached) and Marvin Yoder and I gave reports to the board. They are currently playing catch-up for past years of weak forward planning. They see a wider variety of fuel sources in their future.

One idea currently being discussed is to order a Toshiba 4S (possibly in the 50 MWe configuration) as a test demonstration of it's viability for the Bush and as an incremental power source for the railbelt.

Alaska State Law

A few sentences in Alaska state law could also slow or stop our progress toward more consistently affordable electricity. Representative Craig Johnson is working up a draft bill to submit (Jeanne Ostnes is currently collecting comments). The draft from the 12th is attached. I hope you can co-sponsor this legislation and push it through.

Good luck with the final push of this session!

Cheers,
Don

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PS: I will also sent copies (with notes) to Sarah Palin's office, Johnny Ellis, and the Alaska Energy Authority.