

Nuclear power closer than 40 years away

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Politicians and businessman like to talk about the nuclear option. Nuclear option!?! There is only one nuclear option and it's not the one they are talking about. Nuclear reactions can take two forms. The more powerful, nuclear fusion, welds two isotopes together at very high temperatures to form a new element. The energy required to do this is enormous but the dividend is that much more energy is released than was input. Solar energy results from fusion reactions going on in the sun. Nuclear physicists have managed to fuse hydrogen isotopes together in uncontrolled reactions to create the hydrogen bomb. Controlled reactions are much more problematic. The joke is that "fusion reactors are forty years in the future and always will be."

When most of us think about nuclear power, we think of traditional nuclear fission reactors that were supposed to be the panacea for our energy future when they were introduced in the 1950's. That dream never materialized. These reactions split heavy, highly radioactive isotopes of uranium or plutonium, releasing a smaller amount of energy than fusion and creating a lot of highly radioactive waste. Because of safety and security concerns, the need to safely store the lethal waste for a million years, a couple of nuclear reactor accidents, and cost overruns, ascendance of fission-generated power was over by the early 1980's. It is now our most expensive form of electrical generation and promises to be even more expensive if new fission reactors are ever built.

Let's say we want to build a gigawatt of generating capacity to replace an antiquated coal-fired plant that is going offline in the current economic situation. Unsubsidized wind power is already competitive with heavily subsidized nuclear power (read: your tax dollars).

A gigawatt is roughly 300 3.6 Mw wind turbines. Offshore wind power capacity in

Europe is growing very quickly. The UK, Denmark, Germany, and the Netherlands are all forging ahead with offshore fields. In the UK, installation cost is ~ \$20 million per turbine in an offshore field. (300 x \$20 million = \$6 billion.) Three hundred offshore turbines could be installed and generating in existing sites on the eastern continental shelf in less than two years. Suppose a hurricane hits the field dead-on destroying all of the blades; the towers will remain intact. Repair costs might run into hundreds of millions of dollars but blades would need to be replaced periodically anyhow. The field would be operating again at full capacity within a year. The entire system is sustainable. Solar energy that generates the wind keeps coming down and there is no waste product. Society lives in relative harmony with its environment.

Now let's look at the current "nuclear option". Few existing sites are viable because nobody wants to live near a nuclear reactor. Although things rarely go wrong, when they do go wrong it can be horrific. Wall Street will not finance nuclear projects because they are too "expensive and risky". Your tax dollars build the whole thing but a power company will operate it and make a profit by selling you your electricity. Case in point: President Obama just announced an \$8 billion loan guarantee for a proposed reactor in Waynesboro, GA. Licensing of a site takes 5-10 years. Individual reactors cost \$10-\$20 billion, so you know that is just the beginning. Cost overruns have traditionally at least doubled the estimated cost. Construction time will be between 10-15 years. By the time the station comes online it will be far and away the most expensive power source we have. Nothing in the system is sustainable. A breakdown of any component shuts the system down. A single, unsuccessful terrorist attack—let's not even think of what a successful one would do (shudder)—would shut down the entire nuclear industry for months to years while procedures were reassessed and security at each site is upgraded (\$ kaching \$--your tax dollars at work). Upkeep and maintenance are expensive because any leak would be catastrophic. After the nuclear fuel is expended, society (your tax

\$) has to isolate it and protect it for the next million years because it will remain lethal for that long.

Proponents argue that converting to renewable energy is not economical and will bankrupt future generations. What the hell is so economical about their nuclear option??? Conservatives argue for enormous government intervention to subsidize nuclear projects (I thought conservatives didn't like taxes.). Instead of relying on Uncle Sam to build nuclear plants, why aren't conservatives rallying to let free enterprise build wind farms? I argue that renewable energy is a concept that should be close to conservative hearts and ideals. In fact, not a week goes by without another large corporation going green based on the realization that the long-term bottom line is a lot safer in a green world than the short-term profit in a world powered by carbon and nukes. Conventional nuclear power is not about conservative ideals; it's about greed and short-sightedness.

The biggest argument touted for nuclear power is that it provides base load capacity—that is--generating more than enough power for you so that it is there when you need it. The base load capacity concept hails from the 1920's. We do things that way because that's the way we have always done them. It's true that the sun and wind are not always on at a given site but the wind blows stronger at night and the sun shines in the day. Numerous ingenious, sustainable, storage ideas have been proposed to hold excess power until it is needed. My favorite is Vehicle to Grid (V2G) where excess capacity is stored in car batteries plugged into the grid at night and withdrawn during the day, as needed. This requires a "smart grid" which I will address in a future essay. This system is already active in test markets, such as Newark, DE. It will be a few years before this acquires wide appeal but it will still be here before the first new nuclear power plant is up and operating, probably obviating the need for the already uneconomic facility.