

Nuclear Energy Deserves to be On Everyone's List of Clean Energy Alternatives

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Nuclear energy has a fifty year history of safe and reliable operation. Atomic fission, the only new power source developed during the 20th century, produces the energy equivalent of 12 million barrels of oil per day from approximately 440 commercial nuclear power plants. That energy equivalence figure does not include the energy produced on board the more than 100 nuclear powered ships operating in the Navies of the US, the UK, France, Russia, and China because those organization do not report their information to the energy statistics gathering agencies.

Comprehensive studies of the emissions levels from nuclear energy put its [CO2 production at approximately the same level as that of wind turbines](#), but even those numbers are dominated by assumptions about the type of enrichment systems used and the electrical power sources that supply the enrichment plants. If a best available technology assumption is used where the enrichment plants are gas centrifuges and they run on power from nuclear energy plants instead of from coal, the emission levels from nuclear plants are essentially zero.

Some anti-nuclear commentators like to talk in vague terms about the amount of diesel fuel used to mine and transport uranium, but the total world demand for uranium on an annual basis is less than 70,000 tons. That is about the same mass as the amount of coal consumed in a single 1000 MWe power plant in two days. Moving that amount of material around the world uses so little fuel as to be insignificant compared to the quantity of energy produced.

Even the often repeated "waste issue" favors nuclear energy. All nuclear power plant wastes get retained and isolated from the environment in well protected locations. No one has ever been harmed by exposure to the used materials from nuclear power plant operation. There is no doubt that the materials **could** harm someone if they were not properly handled and stored; fortunately, proper handling and storage only requires a straightforward application of simple principles and materials.

For all of the above reasons, nuclear energy has **earned** a place on everyone's list of clean energy options. I know it is not a position that endears me to anyone, but when I see a list of energy alternatives that does not prominently feature nuclear energy, I suspect ulterior motives on the part of the author. Nuclear energy is a formidable competitor to the world's largest and most reliably profitable industry - the fossil fuel industry. It makes investments in unreliable alternatives to fossil fuels seem like distractions. Of course, it is possible that my suspicions are entirely unfounded.

Both fossil fuel combustion and nuclear fission produce the same end product - reliable, controllable heat energy. The technologies and resources (including humans) required to get to that end product, however, involve such a different set of inputs as to be almost incompatible

within the same companies. Organizations that are really good at producing energy using fossil fuels can rarely adapt to producing energy using uranium, plutonium and thorium.

There are a few utility companies that manage to own capable fossil and nuclear groups, but they are largely separate operations. Some people reject my arguments about competition as a reason for anti-nuclear actions by pointing to more flexible responses in the high technology world. They talk about concepts like "creative destruction" where a technology company simply adopts technology improvements and kills off less efficient ways to reach the same goals. I then explain just how different fission is from combustion. That is a difficult discussion unless the participants are patient and intensely curious.

Some observers of energy politics associate nuclear energy with people on the "right" end of the political spectrum, but that assumption is belied by some key examples. The Cato Institute, for example, is normally considered to be a right leaning organization, but its energy experts regularly damn nuclear energy with faint praise or ignore it all together. Here is a quote from an [August 2010 appearance on CNN by Patrick Michaels](#), Cato's expert on climate and global warming issues:

MICHAELS: *It's very clear the planet's warmer than it was and that people have something to do with it. What you're concerned about is the magnitude and the rate of the warming. And I think it's quite demonstrable that the rate of observed warming is at the low end of the range of projections made by the United Nations. And furthermore, simply saying that one is going to reduce emissions could actually be the wrong thing to do at the moment **if you don't have the technology to really effectively** do this and to do it globally. What you could wind up doing is spending large amounts of capital that would be dissipated when it could be invested in the future in technologies that frankly you and I don't even know about. So —*

ZAKARIA: *What do you mean we can't do it effectively? We know how to reduce greenhouse gas emissions. We stop using fuels that emit it. It may not be economically pleasant. But that's different from — we know how to do it.*

MICHAELS: ***We don't have a replacement technology right now.***

ZAKARIA: *Well, we don't —*

MICHAELS: *We simply **don't have it.***

I know that Dr. Michaels is well aware of nuclear energy and its capabilities. Though nuclear energy would have a difficult time making an impact on vehicle fuel use, it has already proven its ability to replace fossil fuels in electrical power production and ship propulsion. Those applications alone represent at least half of all CO2 emissions around the world.

Stating that there is no fossil fuel replacement technology available exposes a negative assumption that might be best explained by noting that Cato espouses the philosophies of its founders. The organization promotes freedom from high taxation and freedom from excessive government interference in matters of business or personal choices. Those positions are popular

on the right, even for people of limited means. However, since Cato's founders have wealth and power that is dependent on activities associated with selling fossil fuel, they have an economic motive for disrespecting nuclear energy by either directly criticizing its economics or ignoring its existence.

The German government has recently announced that it will grudgingly allow its 17 nuclear power stations to remain in operation for either 8 or 14 years longer than planned when it made its famous decision to phase out the power source. The companies who operate the plants will pay tribute to the government to the tune of about \$3.3 billion dollars per year in additional taxes on both nuclear fuel and power output.

The plant owners are not pleased with the deal, but there are some people that are so angry that the government will not force the planned shutdowns that they are threatening dramatic protests. Renewable energy system suppliers are accusing the government of hindering their business prospects by allowing the nuclear plants to continue "[clogging the energy mix](#)" on the electricity grid with low cost production that is at maximum output almost 8760 hours per year.

So far, the coal and natural gas industries have maintained discipline and [not complained too loudly in an identifiable way](#) about the issue of nuclear being so good at producing emissions free, reliable, affordable power that it is "clogging up" the market. However, there are at least some indications that politicians are making the explicit connection between extending nuclear and not buying as much coal as previously planned. Interestingly enough, [it seems that some of the coal defenders call themselves center-left Social Democrats](#).

I guess that is not really surprising; after all, the initial decision to force the nuclear plants to shut down after just 32 years of operation was made under the leadership of Gerhart Schroder, a Social Democrat who governed in a coalition with the Greens. After he was beaten in an election, he [nearly immediately took a job with Gazprom, the Russian natural gas supplier](#).

Some have implied that Schroder's lucrative position was related to the political support he gave to the development of a Gazprom pipeline through the Baltic Sea, but most observers have failed to mention that the pipeline project would not be viable unless there was an assured market for a significant portion of the gas it might transport. Gazprom would profit immensely from a German nuclear plant shutdown; replacing the output from 17 large nuclear plants entirely with gas would require about 4 - 5 billion cubic feet of gas day. For another viewpoint with more interesting details about Schroder's motives, I recommend reading [Gerhard Schröder, Gazprom and German foreign policy](#).

I acknowledge that there are some people who produce lists of fossil fuel alternatives that inadvertently leave nuclear energy off. Those sincere people will gladly add it back to their list if gently reminded that it deserves to be there. On September 3, 2010, Senator Tom Carper (D - DE) published a first hand report on the Huffington Post titled [The Latest Oil Platform Accident Is a Grim Reminder of Our Energy Challenges](#) that favorably mentioned the safety culture in the nuclear industry, but then failed to include nuclear energy in a paragraph detailing alternatives to continued deep dependence on petroleum.

I was surprised by that oversight because I have listened to Senator Carper speak about his support for new nuclear power plant construction on a number of occasions. After reading his op-ed, I sent an email to his press office asking if there had been some mistake. His representative responded within hours, even though I sent my email early on Saturday of the Labor Day weekend. By early Tuesday morning, Senator Carper had modified his op-ed to include the following sentence in his list of alternatives:

And, we've got to make even bigger strides in harnessing the energy of the sun, deploying nuclear energy, and utilizing other safe, clean energy sources to meet more of our energy needs.

About the Author Rod Adams gained his nuclear knowledge as a submarine engineer officer and as the founder of a company that tried to develop a market for small, modular reactors from 1993-1999. He began publishing Atomic Insights in 1995 and began producing The Atomic Show Podcast in 2005.