# The Case For Nuclear Power

Nuclear power creates large amounts of energy from relatively small amounts of fuel without releasing smokestack pollutants. In today's world of climate change, that is a significant advantage.

A pound of uranium yields as much energy as 3 million pounds of coal.[i] A typical large nuclear plant consumes something like 30 tons of enriched uranium per year. In contrast, a similarly sized coal plant (for instance, the Rush Island power plant in Jefferson County, Missouri) uses 720 tons of coal *every hour.*[ii]

In addition, because the uranium is not burned, nuclear power plants require no smokestack and emit no smokestack pollution: no $CO_2$, $SO_2$, $NO_X$, particulates, or mercury.[iii] Electrical generation in the U.S. produced 2,460 million metric tons of $CO_2$, 9.5 million metric tons of $SO_2$, and 3.8 million metric tons of $NO_X$ in 2006.[iv] $CO_2$ is the primary climate change gas, while $SO_2$ and $NO_X$ have been implicated as the cause of acid rain and as contributing to numerous health problems, including heart disease and lung cancer. Nuclear proponents claim that if we derived all of our electricity from nuclear sources, our emissions of these problematic pollutants would be drastically reduced. (Nuclear power has its own disadvantages, of course. Those will be discussed separately.)

Advances in nuclear technology hold out the possibility of nuclear power with significantly fewer problems than in the past. Spent fuel can be reprocessed back into usable nuclear fuel via more than one process. Doing so reduces the amount of nuclear waste, although the waste becomes more highly radioactive, takes longer to become non-radioactive, and can be used in bombs, where before it could not. Pebble-bed modular reactors involve a change in design that cannot go supercritical (cannot melt down or explode as in the Chernobyl disaster)—their physics causes them to slow down when they get too hot. They are easier to refuel, and can be built using modular construction, so they can be scaled easily.[iii]

The nuclear processes described so far all involve fission—the splitting of uranium atoms. There is another nuclear process, however: fusion. This is the power that powers the sun and the hydrogen bomb. Fusion has captured the dreams of nuclear scientists for decades because its raw material is water, of which there is an unlimited, easily obtained supply. It produces more power than fission, and, like a pebble-bed reactor, it shuts itself down if things get too hot. Despite the hope and hype, however, the technological barriers are tremendous, and we won't solve them for decades, if ever.[iii]

Thus, the argument for nuclear power is that it is a proven way to reliably provide large amounts of electricity to meet escalating demand without emitting huge amounts of pollutants into the atmosphere. We must accomplish that goal, and nuclear is one way of doing it.

[i] Uranium. (2007). In *Encyclopædia Britannica.* Retrieved November 26, 2007, from Encyclopædia Britannica Online: http://www.britannica.com/eb/article-9074425

[ii] Rush Island Plant, AmerenUE. Viewed online 11/26/2007 at http://www.ameren.com/aboutus/adc_au_RushIsland.asp.

[iii] Nersesian, Roy. (2007). *Energy for the 21st Century.* Armonk, NY: M.E. Sharpe.

[iv] *Emissions from Energy Consumption for Electricity Production and Useful Thermal Output at Combined-Heat-and-Power Plants,* Energy Information Administration. Viewed online 11/26/2007 at http://www.eia.doe.gov/cneaf/electricity/epa/epat5p1.html.