Nuclear Reactions

Nuclear Power for electricity generation keeps generating heated debate...

Nukes are the blues

by Helen Caldicott

There is a huge propaganda push by the nuclear industry to justify nuclear power as a panacea for the reduction of global-warming gases.

At present there are just over 440 nuclear reactors in operation around the world. If, as the nuclear industry suggests, nuclear power were to replace fossil fuels on a large scale, it would be necessary to build 2000 large, 1000-megawatt reactors. Considering that no new nuclear plant has been ordered in the US since 1978, this proposal is less than practical.

The true economies of the nuclear industry are never fully accounted for. The cost of uranium enrichment is subsidized by the US government. The nuclear industry's liability in the case of an accident is subsidized — 98% of the insurance lia-

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Nukes are green

by Nicholas D. Kristof

If there was one thing that used to be crystal clear to any environmentalist, it was that nuclear energy was the deadliest threat this planet faced…

It's increasingly clear that the biggest environmental threat we face is actually global warming, and that leads to a corollary: nuclear energy is green.

Nuclear power, in contrast with other sources, produces no greenhouse gases. So US President Bush's overall environmental policy gives me the shivers, but he's right to push ahead for nuclear energy. There haven't been any successful orders for new nuclear plants since 1973, but several proposals for new plants are now moving ahead — and that's good for the world we live in.

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bility is covered by the US federal government. The cost of decommissioning all the US nuclear reactors is estimated to be $33 billion. These costs — plus the enormous expense involved in the storage of radioactive waste for a quarter of a million years — are not now included in the economic assessments of nuclear electricity.

Contrary to the nuclear industry's propaganda, nuclear power is not green and it is certainly not clean.

It is said that nuclear power is emission-free. The truth is very different.

In the US, where much of the world's uranium is enriched, including Australia's, the enrichment facility at Paducah, Kentucky, requires the electrical output of two 1000-megawatt coal-fired plants, which emit large quantities of carbon dioxide, the gas responsible for 50% of global warming.

Also, this enrichment facility and another at Portsmouth, Ohio, release from leaky pipes 93% of the chlorofluorocarbon gas emitted yearly in the US. The production and release of CFC gas is now banned internationally by the Montreal Protocol because it is the main culprit responsible for stratospheric ozone depletion. But CFC is also a global warmer, 10,000 to 20,000 times more potent than carbon dioxide.

In fact, the nuclear fuel cycle utilises large quantities of fossil fuel at all of its stages — the mining and milling of uranium, the construction of the nuclear reactor and cooling towers, robotic decommissioning of the intensely radioactive reactor at the end of its 20 to 40-year operating lifetime, and transportation and long-term storage of massive quantities of radioactive waste.

In summary, nuclear power produces, according to a 2004 study by Jan Willem Storm van Leeuwen and Philip Smith, only three times fewer greenhouse gases than modern natural-gas power stations.

Contrary to the nuclear industry's propaganda, nuclear power is therefore not green and it is certainly not clean.

The dire subject of massive quantities of radioactive waste accruing at the 440-plus nuclear reactors across the world is also rarely, if ever, addressed by the nuclear industry. Each typical 1000-megawatt nuclear reactor manufactures 33 tonnes of thermally hot, intensely radioactive waste per year.

Already more than 80,000 tonnes of highly radioactive waste sits in cooling pools next to the 103 US nuclear power plants, awaiting transportation to a storage facility yet to be found. This dangerous material will be an attractive target for terrorist sabotage as it travels through 39 states on roads and railway lines for the next 25 years.

A study by the National Academy of Sciences shows that the cooling pools at nuclear reactors are subject to catastrophic attacks by terrorists, which could unleash an inferno and release massive quantities of deadly radiation — significantly worse than the radiation released by Chernobyl, according to some scientists.

The long-term storage of radioactive waste continues to pose a problem. The US Congress in 1987 chose Yucca Mountain in Nevada, 150km northwest of Las Vegas, as a repository for America's high-level waste. But Yucca Mountain has subsequently been found to be unsuitable for the long-term storage of high-level waste because it is a volcanic mountain made of permeable pumice stone and it is transected by 32 earthquake faults.

Plutonium is one of the most dangerous elements made in nuclear power plants. Plutonium is also the fuel for nuclear weapons — only 5kg is necessary to make a bomb and each reactor makes more than 200kg per year. Therefore any country with a nuclear power plant can theoretically manufacture 40 bombs a year.

Nuclear power leaves a toxic legacy to all future generations, because it produces global warming gases, because it is far more expensive than any other form of electricity generation, and because it can trigger proliferation of nuclear weapons.

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Global energy demand will rise 60 % over the next 25 years, according to the International Energy Agency, and nuclear power is the cleanest and best bet to fill that gap.

Solar power is a disappointment, still accounting for only about one-fifth of 1 % of the nation's electricity and costing about five times as much as other sources. Wind is promising, for its costs have fallen 80 %, but it suffers from one big problem: wind doesn't blow all the time. It's difficult to rely upon a source that comes and goes.

In contrast, nuclear energy already makes up 20 % of America's power, not to mention 75 % of France's.

A sensible energy plan must encourage conservation—far more than Mr. Bush's plans do—and promote things like hybrid vehicles and hydrogen fuel cells. But for now, nuclear power is the only source that doesn't contribute to global warming and that can quickly become a mainstay of the grid.

Nuclear energy seems much safer than our dependency on coal, which kills more than 60 people every day.

Is it safe? No, not entirely. Three Mile Island and Chernobyl demonstrated that, and there are also risks from terrorist attacks.

Then again, the world now has a half-century of experience with nuclear power plants, 440 of them around the world, and they have proved safer so far than the alternatives. America's biggest power source is now coal, which kills about 25,000 people a year through soot in the air.

To put it another way, nuclear energy seems much safer than our dependency on coal, which kills more than 60 people every day.

Moreover, nuclear technology has become far safer over the years. The future may belong to pebble-bed reactors, a new design that promises to be both highly efficient and incapable of a meltdown.

Radioactive wastes are a challenge. But burdening future generations with nuclear wastes in deep shafts is probably more reasonable than burdening them with a warmer world in which Manhattan is submerged under 20 feet of water.

Right now, the only significant source of electricity in the US that does not involve carbon emissions is hydropower. But salmon runs have declined so much that we should be ripping out dams, not adding more.

What killed nuclear power in the past was cold economics. Major studies at MIT and elsewhere show that nuclear power is still a bit more expensive than new coal or natural gas plants, but in the same ballpark if fossil fuel prices rise. And if a $200-per-ton tax was imposed on carbon emissions, nuclear energy would become cheaper than coal from new plants.

So it's time to welcome nuclear energy as green (though not to subsidize it with direct handouts, as the nuclear industry would like). Indeed, some environmentalists are already climbing onboard. For example, the National Commission on Energy Policy, a privately financed effort involving environmentalists, academics and industry representatives, issued a report in December 2004 that favors new nuclear plants.

One of the most eloquent advocates of nuclear energy is James Lovelock, the British scientist who created the Gaia hypothesis, which holds that Earth is, in effect, a self-regulating organism.

"I am a Green, and I entreat my friends in the movement to drop their wrongheaded objection to nuclear energy," Mr. Lovelock wrote last year, adding: "Every year that we continue burning carbon makes it worse for our descendents… Only one immediately available source does not cause global warming, and that is nuclear energy."

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