CANADIAN CENTRE FOR POLICY ALTERNATIVES-SK

Saskatchewan Notes

Is Nuclear the Answer to Global Warming?

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The evidence steadily mounts that we must quickly replace greenhouse gas (GHG) emitting fuels (coal, oil, gas) as our main energy source if we are to avert catastrophic climate change. Three criteria can help steer the decisions about this urgent conversion to sustainable energy. First, new energy systems must significantly reduce the GHGs emitted: we must move to low or, preferably, ***no-carbon energy sources***. Second, the new energy systems must not create other ***environmental or peace and security issues***: they must be ecologically and socially sustainable. As part of this they must be much more equalitarian. And third, the new energy systems must be able to ***rapidly enter the market*** and be cost effective.

Before we apply these criteria to nuclear, it is vital to understand the makeup and sources of GHGs. Carbon dioxide (CO2) accounts for ¾'s (76%) of them, so reducing CO2 is fundamental to any strategy for averting extreme climate change. However, only one-third of the CO2 comes from electrical power plants – mostly from coal. The other two-thirds come from transportation (mostly cars and trucks) and from buildings, including factories and home heating. The rest of the GHGs come from methane (13%), nitrous oxide (5%) and fluorocarbons, which includes the ozone-depleters.

When anyone proposes nuclear replacing coal as a magic bullet for global warming they are therefore only addressing ¼ of the sources of GHGs. We have to assess nuclear's capability in the context of reducing GHGs from electrical power plants. This must include doing cost and risk comparisons with other sources of electricity such as efficiency, wind and solar (photovoltaic) energy.

IS NUCLEAR CLEAN?

The Canadian Nuclear Association (CNA) aggressively promotes nuclear as "clean". Since the nuclear fuel system produces cancer-causing radiation from uranium tailings to spent fuel this is clearly untrue. Recent research accepted by the international radiation monitoring body, and reported in its BEIR VII report, has confirmed ***there is no safe level of radiation***.

By "clean" it's clear the CNA wants us to believe that nuclear doesn't produce GHGs. There is some trickery here, as it is true that the nuclear power plant does not release GHGs. But ***the overall assertion is untrue***, as the nuclear industry is extremely energy-intensive, using massive GHG-producing fossil fuels – from mining and milling to enriching uranium, to constructing and decommissioning huge nuclear power plants, to transporting and storing nuclear wastes.

Saskatchewan is now the biggest uranium-producing region in the world and half of its exports go to the U.S. where uranium is enriched using two dirty coal-fired plants at Paducah, Kentucky. According to the U.S. Department of Energy the most potent of the GHGs – the otherwise banned ozone-depleting CFC 114 – continues to be released through this uranium enrichment.

CAN NUCLEAR REPLACE COAL?

Though not at all "clean", nuclear is a lower-carbon fuel than coal, which presently produces 64% of global electricity. What kind of expansion in nuclear would be required to make a significant global dint in the emissions of GHGs from these power plants?

Two global scenarios have recently been studied, both assuming a growth of electricity of 2.1 % a year. The first from a 2003 MIT study looked at the impact of a three-fold increase in nuclear electrical capacity – to 1,000 Gigawatts (GW) – by 2050. Taking into account shut-downs of aging, ever more dangerous, nuclear plants, this scenario would require a new nuclear power plant ***being built somewhere every 15 days from 2010-2050***. And even if this was accomplished (hypothetically), electricity from nuclear would still only grow from 16% to 20% of global electrical production (and from 5% to 6% of total energy use), and ***GHGs would continue to rise***. This totally unrealistic scenario clearly shows that ***nuclear is not a magic bullet for global warming***. It should therefore be out rightly rejected as a policy option for we'd end up with more radioactive contamination and still not curtail the rise in GHGs. This is going "from the frying pan of global warming into the nuclear fire."

The second scenario, studied by Brice Smith (see references below), makes the same assumptions as the MIT study, except it calculates the number of nuclear power plants required to bring GHGs from power plants to 2000 levels by 2050. This scenario would require about 2,500 GW of nuclear electricity and would see nuclear playing the same relative role as coal does today. However, if the first scenario is unrealistic, this one is delusional, for it would require more than one nuclear plant being built somewhere every week. This is simply not going to happen**.**

These two scenarios confirm earlier work by energy analyst Charles Komanoff and the U.S.-based Union of Concerned Scientists (UCS). They show ***the nuclear option fails to meet the first criteria of being capable of reducing GHGs even in the one area of power plants.***

The danger is that, in the blind search for a magic bullet while in the thrall of immense nuclear propaganda, nuclear will be embraced for political-economic reasons and distract from the urgent task at hand. This typifies both the Federal Conservative Government, that wants nuclear to help produce heavy oil - the dirtiest of all fossil fuels (so much for the magic bullet), and the Saskatchewan NDP Government, that just doesn't seem to "get it" that nuclear is not sustainable development in either the economic or ecological sense.

WHAT ARE NUCLEAR'S RISKS?

Nuclear cannot realistically reduce GHGs, but any expansion of nuclear power would increase the chance of a catastrophic nuclear accident and the dangers of accumulating nuclear wastes and proliferation. As such it ***totally fails on the second criteria***. Smith estimates that the chances of such an accident occurring in the U.S. by 2050 are 75% with the MIT scenario and 90% with his own. This is not reassuring. And he rightly points out that a major nuclear accident would increase global opposition to further nuclear expansion, and we'd be back to the drawing board while being still further along the extreme climate change scenario.

Nuclear power becomes even more dangerous with global warming due to the importance of its coolant system to avert a meltdown. As the Saskatchewan Environmental Society (SES) said in its 2006 pamphlet: "During France's heat wave in 2003, engineers told the government they could no longer guarantee the safety of the country's 58 nuclear plants. This kind of problem will likely become more common with climate change."

And, lest we forget, the nuclear fuel going into all these French reactors, which could contaminate Europe if any of them were to melt down, comes from Northern Saskatchewan, where the huge French nuclear conglomerate Areva (Cogema) operates. If (when?) a nuclear accident happens in France, or another country depending on Saskatchewan uranium such as Japan or the U.S., what will we say? Will the very short-term economic benefits here have been worth the loss of arable land and death and suffering of so many others elsewhere?

The case against nuclear grows the more nuclear amnesia is challenged. If nuclear were to expand there would be a steady accumulation of deadly

nuclear wastes - for example ***plutonium,*** which is ***toxic for 800 generations***. The scenarios of global nuclear growth discussed above would require the ***building of a permanent storage site every 3 to 5 ½ years***.

Mined geological repositories have been talked about since 1957, but, as Smith points out, "not one spent fuel rod has yet been permanently disposed of anywhere in the world." This is the same system that the AECL and Nuclear Waste Management Organization (NWMO) are presently lobbying First Nations bands about in Northern Saskatchewan.

THE DISECONOMICS OF NUCLEAR?

These reasons are more than enough for any reasonable and compassionate person to support a sustainable, renewable energy system that addresses global warming, and, in the process, ***phases-out nuclear energy***. But there is more. At its peak, even with huge subsidies, France, the country most dependent on nuclear-generated electricity (80%), only built a few reactors a year. It is obviously not economically realistic to consider a nuclear power plant being built every week. Not only would this rob labour and capital from making the quick transition to sustainable, renewable energy, but the world's financiers are generally not predisposed to nuclear's costly and risky technology. Without government legislation (e.g. Canada's *Nuclear Liability Act*) that protects the nuclear industry from liability in the case of multi-billion dollar accidents, the industry wouldn't even be in the energy market. ***Nuclear therefore fails on the third criteria.***

Cost comparisons of nuclear vs. sustainable, renewable alternatives should put the final nail in the nuclear coffin. While the nuclear industry says new reactors could produce electricity for 6-7 cents per kWh, these estimates depend on the nuclear industry continuing to be heavily subsidized by the taxpayer. When the cost of borrowing money is factored in, Ontario's *Energy Probe* estimates that subsidies to the AECL total around $75 billion. Several studies (e.g. reported in *New Scientist*, and discussed in Helen Caldicotts new book) have shown that without these direct and hidden subsidies, the cost of nuclear would increase three-fold (i.e. 300%) to the consumer. This holds true for Ontario's Hydro's consumers who suffer from a serious case of "nuclear dependence", which has created a public debt of $35 billion.

Even without a level playing field, energy efficiency, co-generation and wind are already cheaper than nuclear (or coal) – at 4-6 cents per kWh. According to Amory Lovins of the Rocky Mountain Institute, renewable energy, worldwide, has already passed nuclear as a source of electricity (20% to 16%). This is partly due to wind, biomass and solar power, but is also due to co-generation from waste heat. Wave (tidal) power will soon accelerate this trend. In 2004 small-scale renewables added 6 times the capacity to generate electricity and 3 times the electrical output as did nuclear. According to the SES, by 2010, "renewable energy is projected to outstrip nuclear power's energy output by 43% globally".

While Saskatchewan's NDP government has made an important step towards wind, its policies hold back decentralized energy production (we need net-metering) and still emphasize an economy based on exporting polluting and toxic non-renewables such as uranium and oil. (In 2003, 78% of the primary energy exported from Saskatchewan came from uranium; 20% came from fossil fuels.) We are quickly becoming known as the main world region for exporting radioactivity (uranium) as well as having Canada's highest per capita GHGs emissions.

JOBS, BUT NOT AT ANY COST

All aspects of economics, including job-creation, go against nuclear. Being extremely capital-intensive, nuclear, including its front-end uranium mining, produces very little employment per amount invested. (Each job in uranium mining involves $750,000 or more of capital.) Uranium mining has delivered a pittance of the royalties originally promised to the province and one-half of the jobs promised to northern Indigenous people. And it is making the North a Nuclear Sacrificial Area.

Meanwhile, study after study has confirmed that a renewable energy sector produces many more jobs: ***wind, like solar, produces 5 times the employment as nuclear*** per amount invested. Yet, according to the Federation of Saskatchewan Indian Nations (FSIN), SaskPower turned down a request to partner on a wind farm with a northern Band. Co-op Wind Farms in rural Saskatchewan should also be encouraged.

Since its decision to phase-out nuclear power, renewable energy in Germany has grown to provide 250,000 jobs. Solar energy is beginning to replace fossil-fuel generated electricity and lower GHGs and it is expected to produce 200,000 jobs by 2020. By then 27% of Germany's electricity will come from renewables. And Germany's quick transition from nuclear to renewables shows how important it is to ***resist privatization of public utilities here and elsewhere***. Unlike places like New Zealand, which privatized electricity during its neo-liberal days, Germany was able to pass 2000 legislation that provides cash incentives for shifting to renewable energy, and this has worked. Power companies must pay 49 cents a kWh to buy solar electricity for the grid and this still saves money in capital costs of nuclear or coal plants and the projected costs of climate change. Meanwhile Saskatchewan asks consumers to pay extra for "Green" Wind Power. We clearly have to get serious and not just engage in a face-lift on an unsustainable and dangerous non-renewable energy policy.

THE SASKATCHEWAN CHOICE?

Saskatchewan has an important choice to make over the near future. Will Cameco, Cogema and the ill-informed Saskatoon Chamber of Commerce, with its amoral approach to economic development, prevail? Will Saskatchewan expand the costly and dangerous nuclear fuel system with a uranium refinery and perhaps a nuclear waste dump? Will it support nuclear power for the tarsands?

As we've seen ***this will do nothing to avert global warming***, though some big business would make huge profits. However, this would rob capital and labour from truly making the urgent conversion to a sustainable, renewable energy system. And, perhaps most vital, it will condemn future generations to accumulating radioactive weapons and wastes while failing to help make the necessary transition needed to avert catastrophic climate change. This would be a double-whammy for our children's children.

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References

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