

Small Modular Nuclear Reactors (SMRs)

A dangerous distraction from real climate action in Canada

The Issue

The recently released "SMR Action Plan" by Natural Resources [Minister](#) Seamus O'Regan signals Canada's intention to invest in small modular reactors (SMRs), touting them as a form of "clean energy" and a solution to climate change. In response, [30+ public interest organizations](#) from across Canada have criticized the federal government for supporting this theoretical, yet-to-be tested nuclear reactor design. These nuclear reactors, ranging in size from 1MW to 300MW of electricity, are [proposed](#) for demonstration in Ontario and New Brunswick, and future commercial use in off-grid, Indigenous communities in Canada, and for resource extraction projects like the Ring of Fire mining in Ontario and the tar sands in Alberta.

The [UN has warned](#) we have just 10 years to get climate change and our greenhouse gas emissions under control. If we invest in a technology that will not even have a demonstration reactor ready until the 2030s, we will miss this narrow 10-year window to limit climate change and decarbonize. SMRs are a distraction from the urgent work needed to respond to the climate emergency.

The Problem

1. SMRs are expensive and commercially unviable

SMRs are the nuclear industry's latest attempt to deliver on its promise of cheap energy but global experts conclude there are ["few signs"](#) hinting at an SMR breakthrough. Why? Because of delays, [poor economics](#), and the increased availability of low-carbon alternatives in comparison to cost-plagued nuclear technology. Over the last five years, the cost of nuclear has risen over 50 percent, while renewables have now become the [cheapest](#) of any type of power generation. The cost-competitiveness of SMRs depends on their mass production. Thus, to be economically viable, most of the proposed SMR designs (of which there are 50 globally and [many under review in Canada](#)) would require hundreds if not thousands to be deployed. Even then, studies report the cost of SMRs is [over ten times](#) greater than hybrid, or mixed, energy generation alternatives. What's more, it's been found that nuclear and renewables ["don't mix"](#) since large-scale investment in nuclear power risks suppressing the greater and more immediate climate benefits of renewables.

2. SMRs are not immune from accidents

All nuclear facilities, including SMRs, can experience severe accidents causing widespread and long-lived contamination. For instance, the High Temperature Gas Cooled Reactor (HTGR) – the kind of small nuclear reactor furthest along review by Canada's [nuclear safety regulator](#) – could undergo severe accidents if water or air get into the core; such accidents could result in radioactive materials being released into the environment. This type of reactor also has a [history of poor performance](#) and persistent problems. Other SMR designs require "reprocessing" existing high-level waste to make new fuel for the new reactors, a process that has caused widespread environmental contamination in other countries. History suggests we cannot take the industry's promises of safety at face value: accidents are a real possibility.

3. SMRs are not clean energy and its waste burdens future generations

If we are serious about climate action and the timescale that requires, we cannot ignore the long-lived environmental, health and nuclear weapons risk that accompanying SMRs and the future generational burdens this creates. For these same reasons, nuclear energy has been excluded from the EU's post-COVID just transition [recovery plan](#). This is not only an environmental issue but also an ethical one: SMR wastes will also have higher concentrations of radiation and the SMR designs that claim to "burn up" existing radioactive waste will create new, even more toxic waste streams. Leaving the oversight and responsibility of our nuclear waste to future generations is neither equitable nor [sustainable](#). After 50 years of nuclear energy production in Canada, the nuclear industry is still decades away from a permanent facility for Canada's radioactive waste stockpiles. In addition, our existing plans were not designed for the wastes that will be produced by some of the SMR designs, such as the HTGR proposed for construction in Ontario.

4. SMRs rely on enriched uranium that can be used to make nuclear weapons

All the proposed small nuclear reactor designs would use some form of enriched fuel, unlike the existing fleet of CANDU reactors, and some SMRs propose to create enriched fuel from irradiated (spent) CANDU fuel. It is easier to convert such enriched fuel into material that can be used to make bombs as compared to the natural (un-enriched) fuel used in CANDU reactors. Building SMRs in remote and rural regions would also mean increased transport of radioactive loads on roads and railways across the country. This poses unique [proliferation risks](#) since the enriched fuels contain plutonium that could be diverted to malicious purposes. Military-level security will be required to safeguard fuel transportation and storage, raising additional concerns about civil liberties for Canadians living near SMRs.

5. SMRs are exempt from Canada's foremost environmental assessment law

Even though wind and solar farms must undergo federal or provincial environmental assessments, small nuclear reactors are [exempted](#) from Canada's federal environmental assessment (EA) law, the Impact Assessment Act, because the reactors designs don't meet the [200MW threshold](#) for review. Environmental assessments ensure a "[look before you leap](#)" approach, and an upfront public review of the ecological, socioeconomic and cultural impacts of a proposed project. More narrowly framed, [regulatory hearings](#) before Canada's nuclear safety regulator are not a stand-in for EAs, which give the public a chance to be meaningfully informed and consulted before a decision is made. The exclusion of small nuclear reactors from Canada's Impact Assessment Act deprives the public, including Indigenous peoples, of an opportunity to weigh in on the need for the project, its purpose, and potential alternatives.

The Solution

SMR technology provides too little, too late, with too many risks. Instead of investing in SMRS, Canada should support renewable generation technologies which are socially acceptable, cost effective and scalable now.