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Impact Assessment Agency of Canada

Ottawa, Ontario

Re: Discussion Paper on the Project List Review

Dear IAAC,

I am a Professor of Environmental and Urban Change at York University and Co-Chair of the Faculty of Environmental and Urban Change's Sustainable Energy Initiative. I am co-editor of Sustainable Energy Transitions in Canada (UBC Press 2023), and author and co-author of numerous articles and book chapters on energy, electricity and climate change issues in Canada.

My general comments on the assessment of nuclear projects as proposed in the Discussion Paper on the Project List Review document are as follows excerpted from Winfield, M. "Assessing Ottawa's paths to net zero through an energy sustainability lens," for D.VanNijnatten, ed., *Canadian Environmental Politics and Policy (5th edition)* (Oxford University Press 2024). A full copy of the chapter is available upon request, as it is of relevance to the overall approach contained in the discussion paper regarding the review of "clean growth" projects under the Impact Assessment Act.

14.2 Energy Sustainability and Energy Systems Transitions

In the context of the growing evidence of the impacts of an already changing climate, many argue the urgency of the climate crisis requires an overriding focus on the (cost-effective) achievement of the net-zero target by mid-century, if not sooner, a perspective sometimes described critically as 'carbon tunnel vision.'[1] Others argue that energy system transitions in the direction of net-zero need to advance wider sustainability goals, such as reconciliation with Canada's Indigenous peoples, as discussed in the Introduction to this volume. It is noted, for example, that "Clean and Affordable Energy" and "Climate Action" only constitute two of the United Nations' seventeen Sustainable Development Goals (SDGs),[2] and that they therefore need to be seen as part of a wider transition in the direction of sustainability.

Winfield, Hill, and Gaede (2023), reviewing Canadian, international, and Indigenous literatures relevant to energy and sustainability, identify nine principles (outlined in Table 14.1) as contributing to energy sustainability. These principles are used in the chapter to provide a framework for evaluating the federal government's approach to a net-zero energy transition.

Table 14.1: Principles of Energy Sustainability and Their Foundations.[3]

Principle	Foundations
Maintain ecological, social, and cultural integrity	All perspectives; cultural and social dimensions highlighted in Indigenous perspectives and values
Intragenerational justice and decolonization	Brundtland; Indigenous rights and values; sustainability assessment; energy democracy and justice
Intergenerational justice	All perspectives
Community and relationships	Indigenous values; energy justice and democracy
Energy democracy and governance	Sustainability assessment; energy justice and democracy; Indigenous values
Complexity and interconnectedness of human and non-human systems	Indigenous perspectives; systems thinking
Precaution, adaptation, and avoidance of catastrophic risks	Systems thinking; sustainability assessment; Indigenous values
Economic and resource efficiency and opportunity	Economic perspectives; sustainability assessment; Indigenous values
Shared responsibility for geopolitical risks	Energy justice

Literatures dealing with multi-dimensional approaches to sustainability, such as those on sustainability assessment,[4] highlight the importance of identifying the impacts of different choices and pathways on the achievement of these goals. Potential trade-offs among sustainability goals, where a particular approach may advance some goals significantly but can result in serious losses in other areas, require specific attention. Pathways that cause substantial losses in relation to sustainability goals, or that replace one problem with equally serious, but different, problems should be avoided. Rather, the importance of focusing on transitional pathways that minimize or avoid such trade-offs or outcomes to the greatest extent possible is emphasized. Such an approach, elements of which were incorporated into the 2019 IAA, guides this chapter's assessment of the federal government's policy and technological choices in its climate strategy.

"14.4 Assessing the Federal Approach to a Net-Zero Transition

As noted earlier, the federal government has no stated framework for assessing the policy and technological choices it has made in its climate policies. There is an implicit assumption that the choices being made reflect the most cost-effective options for reducing GHG emissions, although the modelling underlying the 2030 emissions reduction plan suggests that even this might not entirely be the case. There is no evidence of any systemic consideration of the wider implications of the choices being made, such as those introduced through Table 14.1, a point emphasized by the exemption of “clean” economy projects from the IAA. Substantial lobbying has taken place on the part of existing economic interests, particularly from the energy sector, around the formulation of the government’s strategies.[5] These efforts, often with very strong support from provincial governments, have been particularly focused on CCUS, SMRs, hydrogen-based pathways, and “critical” minerals.

Some of the choices made by the federal government fit well within an energy sustainability framework, in the sense that they potentially advance many of the key principles simultaneously and avoid significant trade-offs among them. Support for building energy efficiency retrofits, methane capture in waste management, plastics waste reduction, the regulation of methane emissions from oil and gas operations, and nature-based solutions, particularly the conservation and enhancement of carbon sequestration sites, all likely fall, subject to good program design, into this category.

Other dimensions of the federal government’s strategy for achieving its climate change goals present more complex questions from an energy sustainability perspective. These are explored below.

“Clean” Electricity

The 2020 HEHE paper makes an explicit link between “clean” electricity and the electrification of transportation. The 2022 budget included funding for renewables, grid modernization, and the strengthening of regional interties. Clean electricity regulations were proposed[6] in July 2022 for the purpose of bringing the grid’s greenhouse gas emissions to net-zero by 2035, specifically through the phase-out of coal-fired generation and the “phase-down” of natural gas and diesel fired generation.

Technologies identified in the proposal as potentially “clean” and to be encouraged included energy efficiency (see Box 14.1), demand side management, dynamic pricing, solar, wind, hydropower, distributed energy systems (see Box 14.2), grid interties, energy storage, and geothermal. These are all relatively low-impact options, with low risks of technological lock-in. They are generally seen to fit well within an energy sustainability framework as a result. New large hydro projects, in contrast, would face significant challenges in a sustainability context. The Site C and Muskrat Falls projects in BC and Labrador respectively, have raised major questions about the economic viability of such projects.[7] Significant issues around ecological, social, and cultural integrity, particularly in terms of their impacts on Indigenous communities, would be certain to emerge as well.

Small Modular Reactors (SMRs)

Other technologies that are proposed to be classified as “clean” or “non-emitting” also present significant sustainability challenges. These include CCUS (discussed below), nuclear energy in general and small modular nuclear reactors (SMRs) in particular, and hydrogen-based technologies (discussed below as well). SMRs have been the subject of an aggressive promotional campaign on the part of Natural Resources Canada (NRCan); the provinces of Ontario, New Brunswick, Saskatchewan, and Alberta; the Canadian Nuclear Association; and nuclear operators, notably Ontario Power Generation and New Brunswick Power. An SMR roadmap was published in November 2018.[8] Proposals have been made for SMR installations at the Darlington Nuclear Power Plant in Ontario and Point Lepreau facility in New Brunswick.

Implicit in the focus on SMRs is a recognition that large new build nuclear facilities are not economically viable even in the context of strong carbon pricing regimes. This is due to their high initial capital costs and extremely long planning and construction timeframes.[9] From a sustainability perspective nuclear energy offers the potential for large energy outputs with relatively low greenhouse gas emissions. In a Canadian context, nuclear also offers a low-risk fuel supply geopolitically. Northern Saskatchewan is a major uranium producer and fuel processing and manufacturing takes place in Ontario. [10]

Against these potential advantages nuclear offers a series of extremely serious negative trade-offs from a sustainability perspective. These include very high non-GHG environmental and health impacts, notably the production of extremely hazardous and long-lived waste streams, particularly uranium mining tailings and waste, and waste reactor fuel bundles. These materials will require care for environmental and security reasons on timescales of hundreds of thousands of years, effectively transferring significant risks and costs onto future generations. Nuclear generation facilities are associated with high lock-in effects, and low operational flexibility. They also suffer from unique and uniquely severe risks of catastrophic accidents, as demonstrated by the 1977 Three Mile Island, 1986 Chernobyl, and 2011 Fukushima disasters. Civilian nuclear technologies and materials can be transferred to military purposes by determined governments, and nuclear facilities themselves can be significant terrorist, or as seen recently in the Ukraine war, military targets. Governments have had to assume ultimate liability for nuclear waste management, decommissioning, and accident risks as both a market and regulatory requirement.[11] These considerations have generally made nuclear an unacceptable option from an energy sustainability perspective.[12]

The SMR concept seeks to avoid some of these problems by offering scalability and reduced costs and risks of path dependence with shorter planning and construction timelines, although the challenges related to fuel cycles, as well as accident and security risks, would largely remain the same. The SMR technologies being proposed for Canada are immature, with no existing functional examples or even prototypes.[13] The business models for SMRs are undefined, as is their ability to attract private investment, a point highlighted by the CIB’s status as the only significant investor in the Darlington SMR project. Their construction and operation would still require governmental assumption of ultimate liability for waste management, decommissioning, and accident risks.[14] SMR design issues remain unresolved,[15] and their outputs/wastes remain uncertain.”

The status of “clean” electricity options as assessed in a sustainability context in the chapter are as follows:

Table 14.2: Summary Assessment: Federal Climate Strategy and Energy Sustainability

Plan Element (HEHE and Budgets)	Advances Sustainability	Negative Trade-Off Risk
“Clean” electricity	Low-impact, low-risk, distributed options advance ecological integrity, intergenerational justice, economic and resource efficiency; avoidance of catastrophic risks; potential links to energy democracy	Some options (nuclear, new large hydro) are high risk, high potential for significant negative environmental, social cultural impacts; adverse effects on reconciliation; intergenerational and catastrophic event risks. SMR technology immature, raise serious geopolitical risk concerns

In light of these observations, I make the following specific comments regarding the proposals with respect to nuclear projects.

Proposal	Response
exempt all single SMR proposals using previously licensed technologies when proposed on Class 1A licensed sites;	These proposals make no sense given the currently undefined and undemonstrated status of SMR technologies. Such an approach would be reckless, inviting major environmental and economic risks.
explore increasing thresholds or other basis for exempting multiple SMRs using previously licensed technologies when proposed on Class 1A licensed sites.	See above.
removing all SMR as well as large-scale nuclear reactors using known technologies (e.g., a technology licensed by CNSC) when proposed on Class 1A licensed sites	No SMR technology can be considered “known” as no operational examples exist. Past experience indicates CNSC licencing is not a guarantee of safety, and CNSC processes have generally excluded wider sustainability considerations contained in the Impact Assessment Act. Large scale nuclear reactors carry a wide range of safety, security environmental, economic and technological risks. They

	are high risk, high impact technologies which should be subject the highest levels of scrutiny in all circumstances.
exempting or scoping down assessments of nuclear projects using known technologies when proposed on brownfield fossil fuel electricity generating sites.	See above. This is a dangerous and reckless proposal. Sites would have to be assessed for their suitability for any type of nuclear facility, including proximity to population centres, geological conditions (e.g. fault lines and other geological hazards including locations for form oil or gas wells.

Taken as a whole the proposals contained in the discussion paper regarding nuclear projects can only be described as reckless and dangerous.

All SMR and new build nuclear projects should be subject to comprehensive assessment under the *Impact Assessment Act* in light of their environmental, economic, catastrophic accident, security and weapons proliferation risks. Given the scope and scale of their impacts, uranium mining, milling, and refining operations, including tails and waste rock management facilities and any waste nuclear fuel disposal or reprocessing facilities should also be included in the Physical Activities Regulations.

I would be pleased to respond to any questions you may have regarding my views on these matters.

Yours sincerely,

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