REGULATION AS AN OBSTACLE OR AN ENABLER OF THE SMR PROMISE?

Diverging industry and regulatory views in Canada and Finland

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**Abstract**

Regulatory reforms are underway, nationally and internationally, to streamline and harmonise nuclear safety regulation, and thereby enable the materialisation of the techno-scientific promise of SMRs. These reforms crucially shape the legitimacy and credibility of the SMR promise in the eyes of the key stakeholders. These actors must perceive the regulatory framework not only as effective in facilitating the deployment of SMRs, but also in line with criteria such as accountability, inclusiveness, openness, and integrity. The paper explores the views of industry, safety regulators, and politicians on the rationale and the role of the recent and ongoing reforms in Canada and Finland designed to facilitate SMR development and deployment. It draws on qualitative analysis of selected key policy documents, media sources, earlier literature, and stakeholder interviews, complemented by observations and material from conferences and seminars, and by an in-depth analysis of reporting on the regulatory reforms in three leading Finnish daily newspapers. The regulatory reforms in Finland are at an early stage, and have not generated controversy. In Canada, reforms have a longer history, including a revision of the impact assessment legislation and efforts towards more performance-based safety regulation. Stakeholder views in Canada are divided between largely positive industry and government opinions and a minority of critical Indigenous, civil society, and academic voices that suspect regulatory capture. Debates on the appropriate relationships between the political and the regulatory spheres and on the legitimacy of the SMR promise are likely to intensify also in Finland, if plans for exempting individual SMR projects from the crucial Decision-in-Principle procedure move ahead.

## INTRODUCTION

Regulatory reforms are underway, nationally and internationally, to streamline and harmonise nuclear safety regulation, and thereby facilitate the deployment of SMRs. While some – both within and outside of the nuclear community – consider excessive and “fear-driven” safety regulation as the main obstacle to the commercialisation of SMRs, others in turn regard safety regulation reform as secondary, blaming the nuclear industry for its inability to harmonise industry standards [1, 32]. As any techno-scientific promise, to be materialised in the form of R&D, experimental, prototype, and commercial projects – the SMR promise needs to gain *legitimacy* and *credibility* among key stakeholders. A promise is constructed through battles between various groups in society over its legitimacy and credibility. To be legitimate, the technology must be seen as an indispensable solution to a widely recognised and urgent problem (such as climate change and energy security), whereas credibility derives from its perceived technical, political, and societal feasibility. However, also the processes and procedures for tackling the problem must respect quality criteria such as accountability, inclusiveness, openness, and integrity. The quality of the regulatory framework shapes this “throughput legitimacy” [2], while its perceived ability to facilitate SMR deployment conditions the credibility of the promise.

To explore the role of regulatory reforms in the construction of the SMR promise, this paper analyses the views of industry, safety regulators, and policy actors on the rationale and the role of the regulatory reforms in facilitating SMR development and deployment in Canada and Finland. The regulatory reforms in Finland are still at an early stage, whereas in Canada, reforms have been underway for a long time. Stakeholder views in Canada are divided between the largely positive industry and government views and doubts among Indigenous, civil society, and academic critics about regulatory capture. The paper draws on qualitative analysis of selected key policy documents, media sources, earlier literature, stakeholder interviews relating to SMR regulatory reforms, as well as observations and material from conferences and seminars, for both countries. For Finland, an in-depth analysis was conducted on reporting in the two leading Finnish-language newspapers, Helsingin Sanomat (HS) and Aamulehti (AL), as well as the country’s largest Swedish-language daily, Hufvudstadsbladet (HBL). The review period was 2000-2023 for HS and HBL, and 2015-2023 for AL. For Canada, similar analysis is underway.

## Regulatory reforms, to materialise the promise?

The “output legitimacy” of the SMR promise hinges on beliefs concerning the urgency of the problems that these reactors are expected to solve - primarily climate change and lack of energy security. The “throughput” legitimacy [2] is determined by the perceived quality of the policymaking processes – notably their efficacy, accountability, inclusiveness, and openness. Regulatory reforms are central in such policy processes, often portrayed as essential for SMR deployment.

### The multiple dimensions and definitions of regulation

Howlett and Newman [3] have defined a regulatory regime as “an institutionalized (though not necessarily codified) set of behaviours on the part of regulators and industry in which actors understand the rules and abide by them”. However, this narrow definition overlooks industry self-regulation and collaborative regulation between the authorities, industry, and the civil society. Approaches stressing the role of counter-expertise and civic vigilance, as part of a modern-day “monitory democracy” [4] are often suggested to enhance the quality and the democratic legitimacy of policymaking by expanding the range of types of knowledge involved (e.g. [5]). Such collaborative modes underline the fluid boundaries between “the political” and “the regulatory”: although formally separate, these spheres are in constant interaction (cf. [6]). The regulatory mode adopted defines the degree of interaction between politics and regulation.

When calling for regulatory reforms, SMR advocates usually refer to nuclear safety regulation, arguing for streamlining and internationally harmonising the existing regulatory frameworks designed for large NPPs to render SMRs economically viable. However, planning regulations, impact assessments, and energy market regulation are increasingly highlighted as a key obstacle, as safety regulatory reforms advance [1].[[1]](#footnote-2)

### From prescriptive to performance-based regulation?

Two generic approaches to safety regulation are often distinguished: the prescriptive approach, whereby the regulator defines in detail the required safety measures, and the performance-based approach, which only specifies the safety objectives, but allows the licensee to define the measures for reaching them [48]. Prescriptive regulation typically applies deterministic approaches to risk analysis, as opposed to the “risk-based” and probabilistic analysis involved in performance-based regulation [20].

SMR advocates often criticise prescriptive regulation for being as a hindrance to innovation. However, performance-oriented regulation places the burden of demonstrating safety upon the applicant, who cannot be sure in advance that the regulator will approve of the chosen safety solution. Prescriptive regulation also can help reassure the publics, by enhancing transparency, and thereby mitigating doubts of industry-regulator collusion.

### The risk of regulatory capture

The concept of regulatory capture describes situations in which the regulatory authority has lost its independence and falls under the influence of the industry it is supposed to regulate and control. According to Bird [6], *“when a regulatory agency that is supposed to act in the public interest instead advocates for the commercial interests of the group it oversees, it is said to be ‘captured’. A regulator could be captured by other powerful interests, though this occurs less often.”*

“Weak regulatory capture” arises from the need of the regulator to work with the industry, to obtain the technical knowledge and expertise it needs to competently regulate the technology in question [7]. Regulation then continues to serve the public interest, although to a lesser degree than in the absence of influence from the industry. The more technical and novel the area to be regulated, the greater tends to be the dependence of the authorities on the regulated entity and the risk that industry-regulator collaboration undermines the quality of regulation and/or public trust in it. For SMRs, the regulators’ unfamiliarity with and lack of expertise of these technologies accentuates the risk. Sufficient resourcing of the regulatory authorities is therefore essential for ensuring these have the requisite competences to minimise their reliance on the industry [7, 8].

## SMR policies in Canada and Finland: the current state of play

The **Canadian** government and nuclear sector seek to turn the country into a leader in SMR-led global nuclear renaissance. Canada has implemented an elaborate SMR policy framework, through a multistakeholder and cross-province process, including the SMR Roadmap adopted in 2018, the Action Plan (2020), and the Strategic Plan (2022). These foresee the deployment of SMRs under three “streams”: 1) grid-level SMRs relying on current light-water technologies; 2) advanced SMRs for industrial heat, technological innovation, and competence-building; and 3) micro-SMRs for decarbonising remote communities and heavy industries. Global First Power has proposed building a high-temperature gas-cooled demonstration Micro Modular Reactor at Chalk River and has submitted a site preparation licence application to the CNSC [9]. Ontario Power Generation applied in October 2022 for a licence to build a 300 MW GE Hitachi boiling-water reactor, BWRX-300, at the Darlington site, Ontario [10], and expects to build three more on the same site. New Brunswick Power applied in June 2023 for a site preparation licence for an ARC-100 SMR, a sodium-cooled fast-neutron reactor, at the Point Lepreau nuclear site [11]. Several other designs have been pre-reviewed by the CNSC or are going through the voluntary process of pre-licencing vendor design review.

In **Finland**, the construction of 10-20 light-water SMRs is being investigated, for an estimated total thermal output of 1000-3000 MW, primarily for district heating in large cities, as a means of meeting the ambitious carbon-neutrality targets by 2030 [12, 13]. The designs include the low-temperature, low-pressure reactor developed by the technical LUT university [14] and the 50 MWth reactor LDR-50 developed first by VTT and then by the Steady Energy start-up [50]. SMRs are also foreseen as source of process heat for the heavy industry. The Outokumpu steel producer signed in March 2023 a Memorandum of Understanding with Fortum to explore business opportunities offered by SMRs in helping to decarbonise steel manufacturing [15]. To establish a national “SMR ecosystem” [16] and adapt the regulation to the needs of possible SMRs, the Nuclear Energy Act is being reformed. The aim of removing “regulatory and licensing barriers” to enable the series-production of SMRs for climate protection enjoys broad political and business support [17]. The Conservative-populist government that took power in summer 2023 has the promotion of SMRs among its energy policy priorities [50].

##  Nuclear safety regulation in Canada and Finland

In **Canada**, the Canadian Nuclear Safety Commission, CNSC, established in 2000 under the Nuclear Safety Control Act (1997), regulates all nuclear-related activities. It replaced the former Atomic Energy Control Board (AECB), thus institutionally separating regulation from the development of nuclear power. The CNSC reports to Parliament through the Minister of Natural Resources [7, 8]. The ultimate decision-making body consists of a quasi-judicial independent tribunal of commissioners, “appointed by the Governor in Council (representative of the Queen in Canada acting on advice of the Cabinet)” [8]. The IAEA review on Canada’s nuclear safety regime found no reason to doubt CNSC’s independence but highlighted staff competences as a potential bottleneck in licensing new reactor technologies [8]. SMR-regulation challenge is compounded by the fact that CNSC’s regulations and core competences are crucially shaped by its experience of regulating the CANDU heavy-water technologies [7, 8]. CNSC officials define the Commission’s regulatory approach as a mix of performance and prescriptive-based regulation [7], with a growing tendency towards performance-orientation [19].

Until the introduction of the new Impact Assessment Act (IAA) in 2019, the CNSC was responsible for conducting an environmental assessment for nuclear activities, but the new act transferred the responsibility for major nuclear projects[[2]](#footnote-3) to a joint review panel made up of members appointed by the environment minister [7]. The CNSC holds public hearings as part of the licensing processes and requires the proponents to ensure “public engagement commensurate with the complexity of the project and public perspective” [7, 19]. The CNSC also has the mandate to disseminate scientific information to the public and consult with the Indigenous communities. The CNSC plays an active and leading role in international arenas, including IAEA initiatives for the harmonisation of international SMR regulation. Since 2019, the CNSC and the US NRC have collaborated on developing shared approaches to the regulation of SMRs and advanced reactor technologies, to reduce regulatory burdens on SMR applicants [20].

In **Finland**, the siting and licensing of nuclear installations according to the Nuclear Energy Act consist of four main steps. First, the applicant must organise an Environmental Impact Assessment (EIA), which is only advisory, but constitutes a major arena for local and national-level direct public engagement. Unlike in other major projects in which the Ministry of the Environment serves as the coordinating authority, nuclear-sector EIAs are coordinated by the Ministry of Economic Affairs and Employment (MEAE), responsible for energy policy. The licensing of a nuclear installation starts with a Decision-in-Principle (DiP), prepared by the government for Parliament ratification, after safety analysis by the Finnish Radiation and Nuclear Safety Authority, STUK. The DiP is the main stage for the political deliberation on whether the project is in line with the “overall good of society”. The subsequent construction and operation licences are in principle administrative steps, but when making its decision, the government again considers “the overall good of society”, with STUK safety assessments as the key information basis. STUK also collects statements from the Advisory Commission on Nuclear Safety and from the Ministry of the Interior. The five operating Finnish NPP units are operated by the private Teollisuuden Voima (TVO) and the 51% state-owned Fortum. The Finnish regulatory approach evolved according to the American NRC model, and has been described as more prescriptive than the Canadian regulatory approach.

##  SMR regulation reforms in canada and finland

The recent and ongoing efforts to reform **Canada**’s nuclear regulatory regime follow the regulatory reforms in the Canadian politico-administrative system [21], initiated by the Conservative Harper government that took power in 2008. Harper government’s reforms, described by Kinney as “policy dismantling”,[[3]](#footnote-4) fuelled accusations of regulatory capture [22]. Demands for nuclear regulation reforms, e.g. to facilitate the licensing of new technologies, were voiced already during the previous wave of interest in SMRs, in the late ‘00s. In 2008, the CNSC introduced pre-licensing vendor design review (VDR) as an optional step helping the vendor to prepare for the actual licensing process by providing a preliminary assessment of the design.

By the early 2010s, the CNSC had already made significant progress in identifying key challenges for SMR regulation [23]. The subsequent reforms, undertaken in consultation with industry and stakeholders since 2016, have closely followed industry demands to expedite and facilitate the possible deployment of SMRs and make regulation more technology-neutral and performance-oriented [7, 19]. The adopted “graded approach”, commensurate with risk is used for the application of rules and regulations, allows the applicants to propose alternative methods for meeting regulatory requirements, provided they ensure an ‘equivalent or superior level of safety’ [20]. The 2018 Roadmap recommended restricting the application of federal environmental impact assessment legislation, incorporating new waste streams into existing radioactive waste management plans, and revising the accident liability schemes to provide certainty for operators and suppliers [18]. The new IAA exempted from federal impact assessment nuclear reactors of less than 200 MWth capacity on a greenfield site, and 900 MWth on an existing nuclear site [18, 24].

In **Finland**, the regulatory reforms are still at an early stage. Already before the latest reform of the Nuclear Energy Act was finalised in 2018 [17], Skön and Alm-Lytz [25] anticipated that a new reform would soon be needed, for instance for the licensing of new nuclear technologies. Already in 2016, SMR advocates such as the Ecomodernist Society of Finland [45], had called for reforms to render licensing “much more efficient, much lighter and faster than today”. Senior MEAE officials [46] also called for analysis on whether the emergency planning zones might have to be revised, if SMRs for district heating were to be sited close to densely populated areas [26]. Utility representatives, such as Peter Tuomisto, the director of Fortum, blamed the increasingly strict and detailed regulations, tailored to the Finnish conditions, for possibly hindering the introduction of SMRs [27].

On 9 October 2019, the Advisory Board on Nuclear Safety issued a statement on the development needs of SMRs in Finland, arguing that "several countries see small modular reactors (SMRs) as a promising technology of the future", with a potential to help avoid the problems that have in recent decades plagued Western nuclear projects, improve the competitiveness of the industry, and “change the risk profile of nuclear energy” [27]. The board considered that although possible in theory, licensing and construction of SMRs - especially for district heating - would in Finland be very difficult under the current legislation [27]. The Board urged the MEAE to prepare a licensing reform, with the aim to introduce a site licence[[4]](#footnote-5) and type approval of plant design, and to ensure domestic expertise for the deployment of SMRs [27]. It recommended that STUK examine, jointly with stakeholders, the safety features of light-water SMRs; prepare to regulate the manufacturing of key plant components, structures and equipment; and draft regulations for SMRs concerning the defence in depth, passive operation of reactors, and redefined emergency zones [27]. Soon after, 29 parliamentarians issued a motion to promote the introduction of SMRs, calling for a type approval similar to the one applied for aircraft, licensing of reactors produced in series and for new applications such as district and industrial process heat production [28].

The energy industry [31] asked for revised emergency safety zones but considered a generic DiP for small reactors as the priority. It stressed that the aim of the DiP was not to conduct a technical assessment of reactor designs, but that this could be done through design approval or certification. Revised emergency planning zone stipulations were indeed introduced in 2024 [29] through an expedited process, prior to the remaining elements of the Nuclear Energy Act reform Bill, which the government expects to submit for comments in 2025 [30].

##  SMR regulation reforms in the Finnish and Canadian politics and media

### Canada

Industry views on Canada’s efforts to facilitate SMR regulation have been largely positive. Many SMR advocates have portrayed CNCS regulation as good practice, a model for other countries, not least for the US NRC, whose regulatory approach is often portrayed as the “gold standard” [53] but also criticised for being excessively deterministic and prescriptive, thus needlessly slowing down SMR deployment [20, 51, 52]. Although largely aligning with industry demands, the regulatory reforms have not fully satisfied SMR advocates, who often still describe regulation as a key obstacle to SMR deployment (e.g. [47]).

The CNSC has stressed the work it has already undertaken, including efforts towards international harmonisation, pointing instead the finger at the industry. At the 2023 Atlanta SMR conference, then CNSC Chief Regulatory Operations Officer Ramzi Jammal, like many other speakers, stressed the importance of industry code standardisation, arguing this lagged behind the well-advancing regulatory harmonisation [1]. The CNSC has marketed itself as an SMR-friendly regulator [7], its recent presidents, Michael Binder (2008-2018) and Rumina Velshi (2018-2023), repeatedly stressing the CNSC’s ambition towards more efficient and performance-based regulation. Also the media noticed Binder’s and Velshi’s SMR advocacy. The Globe and Mail (17/07/2021) cited Velshi’s speech touting SMRs as "potentially…the next chapter in the evolution of Canada's nuclear industry." At the Atlanta SMR conference in May 2022, Velshi underlined the importance of “regulatory efficiency and regulatory readiness,” and the CNSC’s objectives of “regulatory certainty, predictability, [and] efficiency” [32]. A CNSC official interviewed for this research compared CNSC’s work with the “rather heavy-handed approach” in the ongoing collaboration between the Czech, Finnish, and French regulators. “World-leading regulator” is a recurrent expression in the Canadian government’s and industry’s international SMR promotion.[[5]](#footnote-6)

Among civil society actors and the Indigenous communities, CNSC’s promotion of SMRs and the alignment of the reforms with industry demands have fuelled doubts. Many environmental organisations (e.g., Greenpeace, Ecojustice, Mining Watch, the Sierra Club, and the Canadian Environmental Law Association) denounced regulatory capture in the early 2010s, in reaction to Harper government’s regulatory reforms and allegedly questionable leadership appointments at the CNSC [34]. Similar complaints by many civil society organisations have continued since, through petitions and open letters, among others (e.g. [34, 35]). The suspicion has deep roots especially among the Indigenous communities. Although some community chiefs advocate for SMRs as a development opportunity, many communities strongly mistrust the nuclear industry and authorities.

Ramana and Blaise evoke several reasons for such doubts [18]. These include the CNSC’s and its President Michael Binder’s open lobbying for exempting the SMRs from impact assessment [36, 37], CNSC-Presidents’ open SMR advocacy and eagerness to ensure that the CNSC is not an impediment to SMR deployment, the rotation of personnel between the CNSC and the nuclear industry, and the CNSC’s move towards performance-based regulation, seen as a concession to the industry [38]. Critics also find it problematic that the regulator reports to the government department responsible for energy policy – the main federal governmental body advocating for SMRs. Ramana and Blaise further point out that the pre-vendor review reports are not accessible to the public, thus indirectly contesting the IAEA’s praise for openness and transparency as key virtues of the CNSC [8].

Despite the reform of the environmental assessment regulation, many industry voices still consider the lengthy and complicated siting and impact assessment procedures, instead of safety regulation, as the real bottleneck.[[6]](#footnote-7) Although civil society and Indigenous communities have criticised impact assessments for lacking policy influence, Ramana and Blaise hold the new IAA as another reason for civil society apprehension towards the regulatory system [18]. They argue that exempting SMRs from a federal impact assessment removes a key opportunity to consider the compatibility of the project with the “good of the society”, and compare its economic and environmental costs and benefits with alternatives - topics outside of the scope of the CNSC licensing process. CNSC officials have remarked [39] that projects exempt from an IA undergo an environmental protection review required by the *Nuclear Safety and Control Act*. However, this “is a science-based technical assessment conducted by CNSC staff”,[[7]](#footnote-8) and lacks the broad scope and citizen engagement characteristic of federal impact assessments.

### SMR reform in the Finnish media

The Swedish-language HBL mentioned SMR-regulation in December 2017, when the vice president of the Ecomodernist Society of Finland stated that international licensing and type approval would be beneficial but did not have concrete suggestions for the needed changes in the Nuclear Energy Act or the DiP procedures (HBL 18.12.2017). A year later, the first HS article evoking SMR regulation (HS 13.02.2018) mentioned an expert assessment, which considered SMR construction technically feasible but impossible within the prevailing legislative framework. An expert from Finnish Energy, the organisation representing electricity and district heating companies, called for a legislative reform to enable the licensing of series-produced reactors. Later that year (HS 22.04.2018), the Helsinki municipal power company Helen suggested the size of the safety zones should be reduced to enable the siting of district heating SMRs near densely populated areas. Representatives of the power companies Fortum and Fennovoima pointed to the need for international standardisation and series production as key regulatory challenges (HS 27.08.2019; HS 12.04.2021). A recurrent theme was the need to harmonise regulation, licensing, and supervision at the EU-level (AL 05.02.2019; AL 29.09.2020; HBL 22.1.2021; HS 13.01.2023). This would also help keep costs down, the CEO of Fortum argued (HBL 22.1.2021). A Green Party parliamentarian, among the active early proponents of SMRs in Finland, Atte Harjanne, demanded rapid action to reform the “inflexible legislation” that slows down the introduction of SMRs (HS 20/07/2020).

A Director-General of the MEAE mentioned “economically sustainable use of nuclear energy” as a key objective of the legislative reform, alongside safety, consistency, clarity, and comprehensibility (HS 03.12.2021). The head of SMR technology at Helen evoked the difficulty of reforming the regulatory framework when no Western-country SMRs exist (HBL 9.12.2021). In January 2022, HS observed that a will to remove legislative barriers to the construction of SMRs was there, but that scale of the needed reform was unprecedented (HS 29.01.2022). Both STUK and a report from the LUT university repeated the earlier claim that even the current legislation would enable the construction of SMRs, but that harnessing their full potential would require a regulatory reform (HS 29.01.2022, HBL 28.5.2022, HS 30.05.2022, HBL 30.5.2022). MEAE officials reminded of the need to address the SMR waste issue in the regulatory reform (AL 02.09.2019; HBL 4.5.2022).

In an interview in HS in January 2022, the Director-General of STUK, Petteri Tiippana, recommended that the DiP process would be reserved for judging the desirability of nuclear energy in general – a political consideration not repeated for each individual SMR project (HS 29.01.2022). He further recommended separating the choice of the reactor design from the DiP (ibid.).

The allegedly slow speed of the reform generated dissatisfaction among business representatives (HS 09.02.2022). The need to expedite the process became a prominent topic in 2022, following the energy crisis and in the run-up for the parliamentary elections (e.g., HBL 29.6.2022a, HS 10.09.2022, HBL 27.9.2022 HS 17.10.2022, 20.10.2022, 24.11.2022), and remained central in 2023 (HS 06.03.2023, 25.03.2023, 20.04.2023, AL 17.03.2023, HBL 7.12.2023). To speed up the process, a leading Centre Party parliamentarian called for collaboration between industry, authorities, and researchers (AL 12.10.2022). The director of Fortum suggested fast-tracking SMR regulation reform by separating it from the Nuclear Energy Act reform (HS 17.10.2022). AL (18.01.2023) noted the lengthy zoning process and the associated uncertainties as a bottleneck for SMRs.

During the latter half of 2023, the new government’s programme and its approach to regulatory change generated debate. In June, HS (16.06.2023) repeated the possibility evoked by the STUK director Tiippana in the previous year, that is, the exemption of SMRs from the DiP. HS noted that the government programme explicitly mentioned nuclear power for district heating (HS 29.11.2023) and that the director of STUK and the environment minister foresaw the removal of the safety zone requirements for SMRs (HS 22.06.2023, 29.11.2023; 20.06.2023). HBL stressed that SMR developers considered type approval as particularly important (06.02.2023, 27.06.2023).

##  Conclusions

The construction of the SMR promise is relatively advanced both in Canada and in Finland, yet in terms of institutionalisation of that promise through regulatory reforms, Canada is clearly ahead. Over the years, the country has implemented significant reforms designed to facilitate the introduction of SMRs, and further reforms are underway, whereas the Finnish reforms are still at an early phase. Debates concerning the pros and cons of regulatory reforms in Canada date back to the ‘00s, and controversies continue until today, including persistent suspicions of regulatory capture. In Finland, such debates are yet to begin. Industry players and other SMR advocates in Canada but also abroad use CNSC as a good practice example for other countries’ safety authorities, most notably the US NRC, criticised for hampering SMR deployment by excessively prescriptive regulation. Canadian SMR proponents use CNSC as a tool in marketing a Canadian-led global SMR “renaissance”, and CNSC directors have openly campaigned for SMRs. The country’s regulatory reforms have largely followed industry demands. The experience of controversial regulatory reforms in other industry sectors in Canada, and the problematic legacy of megaprojects in Indigenous communities, further help to explain the doubts among civil society, Indigenous, and academic communities concerning the independence of the regulator.

The Canadian example highlights the risks involved in regulatory reforms. Unlike in Canada, claims of regulatory capture have thus far been absent from the Finnish SMR regulation debate, in the context of exceptionally high public trust in the national nuclear safety regulator, and the absence of an “Indigenous issue” of the kind that shapes policymaking in Canada. Moreover, the more political set-up of the regulatory system in Canada (with appointed commissioners) as opposed to the civil-servant-driven system in Finland may reduce the risk of the regulator being perceived as “captured” by industry. Yet, caution is warranted even in Finland against reforms that might be perceived as compromising the integrity of the regulatory system. The extremely high public trust in the regulator, the culture of consensus, the strong mutual trust between the involved actors, and the power of “inner circles” have been highlighted as potential weaknesses in the Finnish regulatory system [40-44].

In light of the Canadian concerns over the consequences of the impact assessment reform for democratic decision-making, the suggestions to exempt individual SMR projects in Finland from the Decision-in-Principle procedure are critical. They also remind us of the fluid boundaries between “the political” and “the regulatory”. For the SMR promise to earn “throughput legitimacy”, the system must provide venues for public deliberation on the desirability of SMR technologies and clarity on the boundaries between the political and regulatory systems.

Further research could examine the historically shaped country-specific institutional, political, and cultural factors explaining differences in regulatory reforms and the debates they generate. Such analysis could draw on earlier social science research on distinct regulatory regimes, styles, and cultures, in nuclear sector and elsewhere. Future research could explore the multiple and ambiguous roles of trust, mistrust, and distrust, given Canada’s and Finland’s similarity as relatively similar high-trust societies, yet mistrust and controversies being omnipresent in the Canadian SMR landscape but hitherto largely absent from the Finnish debates.

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2. Above 200 MWth capacity on a greenfield site, and 900 MWth on an existing nuclear site. [↑](#footnote-ref-3)
3. E.g. the repeal and replacement of the Canadian Environmental Assessment Act (CeAA) [22]. [↑](#footnote-ref-4)
4. A separate site licence was among the recommendations from the IAEA in its IRRS review of Finland, 2022. [↑](#footnote-ref-5)
5. For instance, the SMR webinar, 15-16 March 2023, organised by the Canadian Trade Commissioner Service. [↑](#footnote-ref-6)
6. At the Atlanta SMR conference, May 2023, simplifying and shortening the siting procedures was a prominent theme. [↑](#footnote-ref-7)
7. <https://www.cnsc-ccsn.gc.ca/eng/resources/environmental-protection/reviews/> [↑](#footnote-ref-8)