MAKING WAVES

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NAGGING AND NUDGING: COVID, SMALL NUCLEAR REACTORS AND THE FAILURE OF BEHAVIOURAL PUBLIC POLICY

While policy attention continues to be, quite rightly, focused on the immense challenges posed by the pandemic, the last few weeks have seen a number of announcements indicating that business is expected to continue much as it always has, whatever the brave talk about a "post-pandemic society" might suggest to the contrary. On the climate change front, two stood out: the federal government's adoption of more ambitious greenhouse gas (GHG) mitigation targets (apparently after a bit of naming and shaming from the Biden administration in the US[1]) and the publication of a feasibility study for small modular reactors (SMRs) by a working group from the major utilities in the SMR-leaning provinces, Ontario, New Brunswick, and Saskatchewan[2].

Both might attract an equally cynical response. In the emissions targets case, Canada has had a variety of targets for more than 20 years, some ambitious, some less-so, and the only thing they all have in common is that we have failed to reach them. Without a more serious focus on implementation, the new target is likely to go the way of the older ones – which is where the feasibility study for SMRs comes in. Large scale climate and energy studies, such as those produced by the IEA[3] or the IPCC[4], continue to show that increasing the proportion of electricity generated by nuclear power remains the most cost-effective way of delivering GHG reductions in the electricity sector, especially in the case of more ambitious scenarios from which natural gas (a GHG emitter) will need to be removed at a relatively early stage. And so, you might suppose, the utilities would be eager to recommend the adoption of nuclear. As interested parties, their report can be dismissed as the usual self-serving policy analysis designed to support a conclusion already reached on other grounds. Back to daydreams about lounging on a sun-drenched beach in the post-pandemic society.

Not so fast. What concerns the utilities is not nuclear in the abstract, but nuclear in their backyard and, specifically, its potential impact in their bottom line as businesses. In the current climate of arm's length operation for state-owned enterprises, this is true even for traditional Crown corporations such as SaskPower or NB Power. And here the plot thickens, for the proposal by the provinces that have signed a MoU to cooperate on the development of new nuclear power generation focuses on a particular kind of nuclear technology, namely, SMRs. That preference is in many ways an odd one. The IEA and IPCC calculations are based on information about the cost of large nuclear builds, of the kind currently being deployed in China, India, and South Korea[5], which are designed to make the most of economies of scale. Doubling the power output of a nuclear reactor will generally not double the cost of the materials needed to build the plant, nor the cost of operation and maintenance so, other things being equal, bigger is better. Small nuclear reactors defy that logic. From a business point of view, they are a rather risky proposition, so the endorsement of the utilities is worth a closer look.

In the case of large nuclear, of course, other things have turned out to be very much unequal. Large reactor builds have been plagued with design, regulatory approval, and construction delays and, in countries where governments are at least mildly sensitive to public opinion, they have experienced siting difficulties (anyone for a large nuclear reactor in their backyard?) and political protests. As a result, they have generally arrived onstream late and very considerably over budget, eating up those economies of scale and more before a single watt has been generated. The excitement over small nuclear stems in large part from the hope that SMRs will be able to sidestep these problems and be delivered on time and on budget in places where heat and power are actually needed rather than years late and on some remote promontory requiring miles of high voltage cable for connection.

The feasibility study offers a fascinating insight into the calculations of the utilities with respect to the costs of building SMRs in Canada and deploying them on their grids. Small nuclear may have a better chance of arriving on time, but if the cost of electricity generated by SMRs is absurdly expensive in comparison with other options, they are no real help at all. For comparative purposes, this cost is usually calculated by estimating the total cost of a facility from the drawing board to decommissioning divided by the total amount of electricity that a facility will generate over its lifetime, known as the levelized cost of electricity or the LCOE. The study suggests that the LCOE of the first of a kind SMR (which is proposed for an existing nuclear site at Darlington, Ontario, to avoid site search and approval), will be in the order of $163 Mw/hr. In the utilities' view, the LCOE will have to be reduced to something closer to $87 Mw/hr in later builds and this reduction will be achieved by a combination of reduced borrowing costs, reduced costs of construction (for example by the modular bit in SMR) and "learning". As they very clearly state, the utilities believe that achieving this

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dramatic reduction will be almost completely dependent on public policy, through, for example, public financing and/or loan guarantees, guaranteed orders, a congenial regulatory environment, support for R&D, and so forth. In other words, the utilities are not prepared to lose their shirts on SMRs, so that not inconsiderable risk is to be assumed by governments (and taxpayers).

Nonetheless, the enthusiasm of the signatory governments for SMRs seems undimmed, with the report being widely welcomed and publicized. Mr. Moe even tweeted about it. Why are these governments willing to take such a punt? Here we must return to the lessons of Covid. The pandemic and the climate crisis pose a common challenge to governments of all stripes, but particularly to conservative governments. We will not solve either of these problems without some very significant changes in public behaviour which our governments have clearly signalled that they are unwilling to bring about with the traditional tools of public policy, regulation and taxation. Instead, they have relied on exhortations to do the right thing, accompanied by experiments in communication which have promised to both sugar-coat the message and disguise its impact and consequences from those who are receiving it. This combination of nagging and nudging has spectacularly failed to address either problem, whose structure is such that each citizen believes that their own contribution to the problem is so small that what they are doing individually really makes no difference. Because most other citizens feel the same way, all contribute to making things worse. Governments continue to advise against "non-essential travel", for example, but, since for each individual their own travel plans are obviously essential, the advice is largely useless. I came across such a person just the other day, digging up rare wildflowers to take away, and, as you may imagine, my comments about the consequences of their actions on a societal scale were neither well received nor had any effect on the outcome.

If governments are unwilling to govern in the traditional way, there remains another alternative to nagging and nudging that has been embraced with similar enthusiasm. Perhaps technology can save us by removing the problem altogether so that we can go on as we have always done – vaccines in the case of the pandemic and SMRs for climate change. And perhaps it can, which is why conservative provincial governments, in particular, have turned to SMRs as a "get out of jail free" card for their GHG mitigation problem (which they are otherwise only prepared to address through regulation and taxation with the very lightest of light touches, the latter only after an expensive constitutional challenge). It is more likely, however, that technology will turn out to be a vital part of the solution but only a part. Solving the problem will continue to evade us until we can change citizens' behaviour as the other part of the puzzle. Vaccination is looking increasingly like that partial solution to the pandemic and its effectiveness is already being diminished the more people are encouraged to treat it as a magic bullet. I hope that SMRs can deliver on the promises of those who advocate for them and that they will be able to compete on a level playing field with other power generation technologies in rapidly decarbonizing not just power generation but other industrial processes as well – and I hope for the success of vaccines even more fervently. But if SMRs are not to be just another god that failed, the analysis of their comparative strengths and weaknesses must be conducted in a clear-headed and dispassionate way, something that is unlikely to happen if they are also being relied on to solve the problem of governments who refuse to govern.

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