RGI
Regulatory Governance Initiative

Coal-Fired Electricity
A Regulatory Case Study, in a Narrative of Canada-US Harmonization

Mike Beale

Practitioner-in-Residence, School of Public Policy and Administration, Carleton University

The author was the responsible Assistant Deputy Minister at Environment Canada at the time this regulation was developed; however, all elements of this case study are in the public domain. Research assistance was provided by Amjad Navid.

Carleton UNIVERSITY

Recommended citation:

Beale, M., (2019). Coal-Fired Electricity – a Regulatory Case Study, in a Narrative of Canada-US Harmonization. Carleton University, School of Public Policy and Administration.
doi: 10.22215/sppa/2019.01

Introduction

Canada's coal-fired electricity regulations were published in 2012 and were the first federal regulations targeting greenhouse gas (GHG) emissions from stationary sources. They have since been strengthened. This case study tells the policy story of how the regulations came about, and how in the space of 18 months the government's regulatory approach evolved from one based on emissions intensity, to cap-and-trade, to capital stock turnover. It also tells the technical story of how a simple regulation based on the length of time a facility has to operate can still build in elements of trading and other flexibilities. It ends with some observations around lessons learned.

What was the regulation?

In September 2012 Canada published the coal-fired electricity regulations, which effectively require the closure of all traditional coal-fired electricity generating stations after they reach their end of economic life.

Why does it matter?

This was Canada's first federal regulation addressing GHG emissions from stationary sources, and was significant in terms of impact. Coal-fired electricity was a major GHG emitting sector, accounting for 77 Mt or about 11% of Canada's total emissions of 670 Mt in 2010. The regulations were estimated to reduce cumulative GHG emissions by about 214 Mt over the period 2015-2035 and reduce emissions by 30 Mt in 2035 alone (excluding any impact in Ontario, where the provincial government independently decided to close down its coal plants). The regulations were also estimated to deliver significant air quality benefits.

The regulation has an unusual design. While it is a simple prescriptive regulation, its core metric is time rather than emissions or emissions intensity, and it nevertheless incorporated various flexibilities to accommodate individual circumstances of regulatees.

The regulation was approved despite the fact that it imposed meaningful costs on individual corporate regulatees.

The regulation also ushered in the first modern federal-provincial equivalency agreement under the *Canadian Environmental Protection Act* (CEPA).[1] In addition, the regulation fit in a narrative of Canada-US harmonization; the story of the regulation demonstrates the winding path that harmonization can take.

> An equivalency agreement is an agreement between the federal government and a province recognizing that the province has a regulation that achieves equivalent environmental outcomes to the federal regulation, and that therefore the federal regulation will stand down in that province. It is accompanied by an Order in Council which legally stands down the federal regulation.

What was the political context?

In the fall of 2008 Canada's climate change policy was evolving. Prior to the October 14, 2008 federal election, the government's climate change plan was *Turning the Corner*, which had been first announced in April 2007; its central element was a proposed regulatory requirement that industrial emitters reduce their emissions intensity, combined with emissions trading.[2] In terms of North American cooperation, Canada was "exploring opportunities with US partners for linking Canada's emission trading system with regulatory-based emissions trading systems at the regional and state level and with any that may be established at the federal level".[3]

The US was also in election mode in the summer and fall of 2008. Both Presidential candidates, Barack Obama and John McCain, favoured cap-and-trade for GHGs, and represented a major change in climate policy from that of President George W. Bush.

In Canada, the Conservative Party election platform reflected this expected change in US policy. The platform confirmed the commitment to *Turning the Corner*, but also committed to working with the provinces, territories, US and Mexico to "develop and implement a North America-wide cap and trade system for greenhouse gases and air pollution". The platform did not detail how those two approaches – industrial intensity regulations and cap-and-trade – would be reconciled. Following the election, on October 30, Jim Prentice was sworn in as Environment Minister, replacing John Baird who had been the Minister responsible for *Turning the Corner*.

On November 4, 2008 Barack Obama was elected President of the United States with a commitment to implementing a cap-and-trade system domestically that would "dramatically reduce" emissions, as well as leading global efforts to reduce GHG emissions. Two weeks

[1] There was a previous agreement from 1994 with Alberta on the control of toxic substances.
[2] Facilities would be required to reduce their emissions per unit of output by a certain percentage relative to a base year.
[3] Environment Canada, "A Climate Change Plan for the Purposes of the *Kyoto Protocol Implementation Act*", May 2008, p29

later in Canada, the new government's Speech from the Throne undertook to "work with the provincial governments and our partners to develop and implement a North America-wide cap and trade system for greenhouse gases" -- there was no reference to *Turning the Corner*.

Cap-and-trade

Canada's interest in a North American cap-and-trade system was not reciprocated by the Obama Administration. During President Obama's visit to Ottawa in February 2009, the most that could be agreed in this regard was a commitment to a "Clean Energy Dialogue", with a focus on research. In his posthumously published book *Triple Crown*, then Environment Minister Jim Prentice observes that "the new administration didn't see Canada as a helpful ally on climate change", and "was never really willing to seriously engage Canada to search out continental solutions on the important issues surrounding energy and the environment". He states that, in the two years that followed the Obama visit, "the administration would repeatedly reject our invitation, on multiple fronts and in multiple ways, to expand the relationship between our two countries on energy and the environment".[4]

> In a cap-and-trade system, the government sets an overall cap on emissions and issues allowances to emitters up to the level of the cap; emitters require an allowance for each unit of their emissions, and can trade allowances among themselves. A key and controversial design issue in any cap-and-trade system is how allowances will be distributed, e.g. by auction, free allocation or some combination.

From another perspective, Eric Pooley's book *The Climate War* makes clear that at this time not only were there very different views among supporters of cap-and-trade in the US on key components of the approach (such as the role of auctioning vs. free allocation of allowances) but also divergent views within the Administration as to the degree to which the President should associate himself with the initiative.[5] It may simply be that the Administration was too preoccupied with domestic policy to consider the Canadian dimension.

Over the course of 2009 and much of 2010, various legislative initiatives were brought forward in the US Congress to implement cap-and-trade. After much deliberation, the House of Representatives passed the *American Clean Energy Security Act* (commonly known as the Waxman-Markey Bill) in June. The focus then passed to the Senate, where a series of different bills was proposed. A recurring concern of the Canadian government at that time was that US climate legislation might impose "green tariffs" on imports from countries with less stringent climate policies (eg Globe and Mail March 4, April 10, June 30 and July 1, 2009).

---

[4] Jim Prentice, "Triple Crown, Winning Canada's Energy Future", 2017, pp85, 102
[5] Eric Pooley, "The Climate War", 2010, pp348, 414

Even if Canada's proposal for a North American cap-and-trade system was finding little traction in Washington, in the course of 2009 the Canadian government worked to develop elements of a domestic cap-and-trade system. In an interview with the Globe and Mail in April 2009, Environment Minister Jim Prentice spoke specifically about a cap-and-trade system for coal-fired electricity: "The approach that we've been working towards involves a cap-and-trade system relating to thermal coal, and the requirement of phasing out those facilities as they reach the end of their useful, fully-amortized life". Over time, the first part of that statement would be set aside, while the second part would form the core of the eventual coal-fired electricity regulations; Minister Prentice later stated that the Government rejected cap-and-trade for electricity due to the complexities of the approach and European experience.[6]

Efforts to legislate a US cap-and-trade system continued intensively in the Senate into 2010, through several iterations, including Kerry-Boxer and Kerry-Graham-Lieberman draft bills. The difficulties of achieving Senate approval became increasingly evident, however, and by the summer of 2010 those legislative efforts ceased.

Plan B – regulation

While Congress was struggling with a legislative approach to climate change, the Obama Administration was working on a Plan B, which was the use of Executive powers. As early as April 2009, and consequent to a Supreme Court decision, the EPA proposed an "endangerment finding" on GHGs, which would enable and in fact require the regulation of GHGs under the *Clean Air Act*. What followed was a sequencing of finalizing the endangerment finding, and introducing regulations: in March 2009 the US had already announced fuel economy standards for 2011 model year vehicles; in May 2009 President Obama announced there would be a new national standard for light-duty vehicles for the model years 2012-16 that would combine a GHG emissions standard issued by the EPA with a fuel efficiency standard under the Department of Transportation; the endangerment finding was finalized in December 2009; the joint fuel efficiency/GHG emissions rule was finalized in April 2010; a rule for heavy-duty vehicles followed in September 2011.

> The EPA's "endangerment finding" concluded that current and projected concentrations of GHGs in the atmosphere threaten public health and welfare. The finding *enabled* the regulation of GHGs under the *Clean Air Act*, and *required* the regulation of, at a minimum, vehicle emissions.

There was a widely held view that, in addition to regulating vehicle emissions, the endangerment finding also required the US to regulate emissions from stationary sources,

[6] Triple Crown, p175

through permitting requirements.[7] To make this task manageable, the EPA finalized in May 2010 the "tailoring rule", which reduced the number of facilities that would be covered by this permitting requirement and thereby increased the feasibility of stationary source regulation (the Tailoring Rule was struck down by the Supreme Court in 2014).

Just as the Government of Canada was interested in alignment with the US on cap-and-trade, it was equally committed to alignment on a regulatory approach. In an interview reported in the Globe and Mail on July 1, 2009, Minister Prentice affirmed that Canada was committed to match US climate rules through Canadian regulation, and would be as tough on Canadian industry as the US was on its industry.

This commitment to harmonization, in whatever form, was expanded upon by Minister Prentice in a speech in Calgary in February 2010, as reported by the National Post:

"Our determination to harmonize our climate change policy with that of the United States also extends beyond greenhouse gas emission targets: we need to proceed even further in aligning our regulations. We will only adopt a cap-and-trade regime if the United States signals that it wants to do the same. Our position on harmonization applies equally to regulation. Canada can go down either road – cap-and-trade or regulation – but we will go down neither road alone".[8]

As it happened, Canada was well-placed to harmonize with the US regulatory approach, as it had implemented its version of the endangerment finding in 2005; adding GHGs to Schedule 1 of the *Canadian Environmental Protection Act* (CEPA) enabled, though did not require, the regulation of GHGs in Canada.

Just as in the US, vehicle emissions were the first to be regulated in Canada. The intent to harmonize fuel efficiency standards across the transportation grid, starting with passenger vehicles, was stated as early as during President Obama's visit to Ottawa in February 2009.[9]

Already in October 2006, the Government of Canada had announced its intent to regulate GHG emissions from passenger automobiles and light trucks of the 2011 and later model years; at the time, the intent was to use the *Motor Vehicle Fuel Consumption Standards Act* (MVFCSA) for that purpose. Over time, however, it became clear that the Act would require significant amendments, including provisions for credit trading, in order to align with US fuel economy standards; this would risk delaying regulatory action. In addition, the US was signaling a possible move to a GHG emissions-based regulatory approach. The Government

[7] This section on the endangerment finding draws heavily on Cass Sunstein, "Changing Climate Change, 2009-2016", Harvard Environmental Law Review March 5, 2018, pp255-262
[8] National Post, February 1, 2010
[9] Triple Crown, p99

determined that using GHG regulations under CEPA would be a stronger approach as it would allow for alignment with both US fuel economy and GHG standards.[10]

In April 2009, therefore, the Government announced its intention to use CEPA to regulate vehicle GHG emissions for the 2011 model year in alignment with the US fuel economy standards for that year. Following consultations, and in step with US developments, the Government then developed regulations under CEPA to align with the US fuel economy standards for the 2011 model year, and with EPA GHG standards for the 2012 and later model years; these regulations were published in draft form in April 2010, and were finalized in October 2010, thereby lagging the US regulations by about 6 months. Canada's regulation on heavy-duty vehicle GHG emissions, in alignment with the US, was finalized in February 2013.

As it became more and more evident that the US would be in a Plan B world, Canada's planned regulatory initiatives moved beyond vehicle emissions to include stationary sources. Specifically, in April 2010, as reported by the Globe and Mail, Minister Prentice told Canada's electricity producers that they would have to gradually retire their coal-fired plants; the plan was announced publicly in June 2010, thereby launching the regulatory process.

By the time the coal-fired electricity regulations were finalized in August 2012, Canada's climate change plan involved regulating GHGs on a sector-by-sector basis and was understood to be similar to the approach being followed by the US EPA. Given the integration of the two economies, this was seen as allowing Canada to make concrete progress towards meeting emission reduction objectives while minimizing competitiveness impacts.[11]

What was the economic and policy context?

The multilateral climate change agenda was another driver of Canada's policy evolution. At this time Canada was still a signatory to the Kyoto Protocol, but Canada's government was signalling difficulty if not impossibility in meeting Kyoto emission targets. The international community placed great emphasis on the 15th Conference of the Parties to the United Nations Framework Convention on Climate Change – UNFCCC CoP-15 – held in Copenhagen in December 2009, as an opportunity to lay the foundation for a new international climate change agreement to succeed the Kyoto Protocol.

[10] Canada Gazette II, "Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations", Regulatory Impact Analysis Statement, p1888; October 13, 2010
[11] Canada Gazette II, "Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations", Regulatory Impact Analysis Statement, section 10.1; August 30, 2012

Leading up to Copenhagen, Canada's position was to "work closely with the United States, seeking to align the countries' positions where possible".[12] Coming out of Copenhagen, Canada's emissions target was fully harmonized with that of the US, with a commitment to adjust as necessary to align with the final US target. Canada's 2010 Climate Change Plan emphasized the need to complement harmonization of targets with harmonization of actions, and to deliver results on key sources of emissions.[13]

In addition, 2008 saw a global financial crisis and economic downturn. In May 2009, Canada's Climate Change Plan cited this development, together with the election of a new US Administration, as reasons to revisit the approach to industrial GHG regulation that had been set out in *Turning the Corner*.[14] Then Environment Minister Prentice later noted his conviction that "seemingly small differences on the industrial price of carbon, imposed on one side or the other of the Canada-US border, would significantly skew capital investment decisions, unfairly penalizing either country". [15] The new approach was to involve "improving the orderly transformation of capital energy stock to less carbon intensive alternatives", thereby signalling the approach that would be taken in the coal-fired electricity regulations.[16]

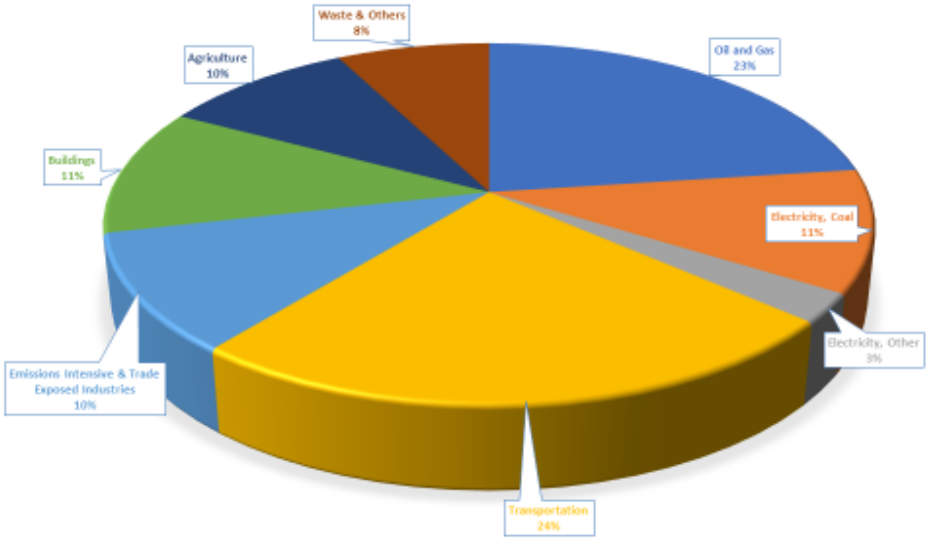
Why coal, and what was in the regulation's favour?

Canada's government did not make a clear statement on why it chose coal-fired electricity as the first stationary GHG emissions source to be regulated in Canada, complementing a harmonized approach to vehicle emission regulation, but there would appear to be several contributing factors.

First, coal-fired electricity was a significant sectoral source of GHG emissions in Canada – the third-largest, at 11% (see Figure 1) -- and a decision had already been taken to regulate the largest, transportation.

[12] Environment Canada, "A Climate Change Plan for the Purposes of the *Kyoto Protocol Implementation Act*", May 2009, p33
[13] Environment Canada, "A Climate Change Plan for the Purposes of the *Kyoto Protocol Implementation Act*", May 2010, p4
[14] Environment Canada, "A Climate Change Plan for the Purposes of the *Kyoto Protocol Implementation Act*", May 2009, p1
[15] Triple Crown, p172
[16] Environment Canada, "A Climate Change Plan for the Purposes of the *Kyoto Protocol Implementation Act*", May 2009, p1

FIGURE 1 -- GHG EMISSIONS BY ECONOMIC SECTOR 2010



Source: Environment Canada, National Inventory Report and Canadian Environmental Sustainability Indicators

Second, while oil and gas was a larger sectoral emitter, regulating oil and gas emissions may have been seen as a more complex and risky endeavor. For one thing, Canada's oil and gas industry is more directly exposed to international competitive pressures than coal-fired electricity. In addition, within oil and gas, the largest source of emissions was oil sands extraction and upgrading,[17] and the economic downturn and oil price collapse of late 2008 hit the oil sands sub-sector hard.[18] Moreover, the guiding principle of the day was harmonization with the US, and there was no US equivalent of Canada's oil sands industry.

Third, and importantly in the context of harmonization, coal-fired electricity was by far the largest sectoral source of emissions in the US, and was likely expected to be the first stationary source to be targeted by US GHG regulation (as it was, through the Clean Power Plan, which however never came into effect). President Obama had indicated as early as the 2008 campaign that he would consider banning new coal plants without "clean coal" technology. In addition, the US EPA was taking significant measures to address air pollutant emissions from coal-fired power through the Clean Air Interstate Rule, which came into force in 2010 and would be replaced and strengthened by the Cross-State Air Pollutant Rule; the

[17] Environment Canada, "Canada's Emissions Trends 2012", p24
[18] Globe and Mail, December 30, 2008

EPA was also working on the Mercury and Air Toxics Standards which were finalized in 2011. The Government of Canada recognized that these measures were expected to result in the closure of a significant number of the oldest US coal-fired units.[19]

At the same time, the government was well aware of the differences between the Canadian and US electricity sectors, as noted by the Globe and Mail on April 25, 2010. It reported Minister Prentice as indicating that a unilateral move by Canada on electricity would showcase Canadians' leadership in clean power, and deflect criticism targeting growing oil sands emissions.

Fourth, the age profile of Canada's coal-fired electricity capital stock made the sector particularly amenable to a regulatory approach that focused on capital stock turnover. Nearly two-thirds of Canada's coal-fired electricity units in 2010 were forecast to cease operations by 2025[20]; in a sense, the proposed regulation would backstop an accounting perspective by giving it the force of law.

Fifth, Ontario had shown the way through the provincial government's decision to close Ontario's coal plants. The initial announcement to close one plant was made in 2001; a commitment to full coal phase-out followed in 2003. While the phase-out date was later extended twice – from 2007 to 2009 to 2014 – by 2010 Ontario's coal capacity had already fallen significantly from its level of 8, 800 MW in 2001.[21] Ontario's coal phase-out has been called the single largest GHG reduction initiative in North America.[22]

Ontario's regulation to phase out coal helped the federal regulation in two ways. It set a precedent for closing coal plants for environmental purposes – to reduce air pollution and GHGs – with the confidence that they could be replaced with alternatives that had fewer air emissions (natural gas, renewables, nuclear). Perhaps more importantly, it took those Ontario plants off the table for purposes of the federal regulation – the province's coal units would already have been closed by the time the federal regulation would come into force on July 1, 2015. Before phase-out, Ontario's coal-generating capacity was the largest in Canada, exceeding Alberta's. Had the Ontario regulation not existed, the federal regulation would have necessarily been much broader in scope, and therefore in economic as well as environmental impact, than it was. And the federal regulation would have been more complex in design; as noted below, the federal regulation contained specific features to address the needs of the different provinces affected – there would have needed to be additional complexity in the regulatory design if Ontario was added to the list of provinces affected.

---

[19] Canada Gazette II, August 30, 2012; section 4
[20] Ibid section 3
[21] Government of Ontario "The End of Coal", https://www.ontario.ca/page/end-coal
[22] See for example Clean Energy Canada "Ontario's Coal Phase-out in Perspective", January 17, 2017

Finally, as well bringing about significant GHG emission reductions, early closure of coal plants could be expected to bring significant air pollutant reductions, with corresponding health benefits. Indeed, air pollution was a key driver of Ontario's coal phase-out. As an illustration, when they were finalized, the federal coal-fired electricity regulations were estimated to reduce cumulative sulphur oxide emissions over the 2015-2035 period by almost 1.2 megatonnes, and mercury emissions by almost 6.7 tonnes; by way of comparison, in 2016, total Canadian sulphur oxide emissions were 1.1 megatonnes, and total mercury emissions were 4.3 tonnes.[23]

Profile of coal-fired electricity generation affected by the regulation

Table 1 shows the distribution of coal-fired generation across Canada's provinces in 2010. It can be seen that, with Ontario taken out of the equation, Alberta was by far the most important coal-burning province, accounting for 61% of Canada's coal capacity (with Ontario excluded). At time of writing, the governing structure of the electricity sector in Alberta continues to evolve; in 2010, it was a complex, quasi-market-based approach, where different sources of generation competed in the energy-only market through hourly auctions. Unlike most other provinces, there was no provincially-owned electric utility, but a number of private sector competitors. A system of government-mandated Power Purchase Arrangements (PPAs) governed the older coal generating units. Under a PPA, the coal generator – the "PPA seller" – sold the power from that unit to the "PPA buyer", earning a regulated rate of return; the PPA buyer in turn then sold that power in the competitive market, making a profit or loss depending on energy market conditions. The PPA buyer was frequently itself a gas-fired electricity generator, who was selling gas-fired power into the energy market in competition with the coal-fired power. PPAs had different expiry dates, but they all expired by 2020.

[23] Canada Gazette II, August 30, 2012; section 7.4.2; Environment and Climate Change Canada, "Air Pollutant Emission Inventory Report 2018", sections 2.2 and 2.9

Table 1 -- Coal Generation 2010

Region	Number of Coal Plants	Number of Coal Units	Coal Generating Capacity (MW)	Share of Total Coal Capacity for Canada
Alberta	7	18	6305	38%
Ontario	4	15	6077	37%
Saskatchewan	3	9	1822	11%
Manitoba	1	1	97	1%
Nova Scotia	4	8	1288	8%
New Brunswick	3	3	891	5%
Total	**22**	**54**	**16481**	**100%**

Source: Canada Gazette II, August 30, 2012; section 5.2.5

This structure of the electricity sector in Alberta had a number of implications for regulatory development. First, there were three major coal generators in the province (ATCO, Capital Power, TransAlta), and therefore at least three companies directly affected by the regulation, unlike other provinces where there was only one. Moreover, each of the three companies had a unique coal fleet, in terms of age profile and operating performance; while they sometimes operated in partnerships, and had some overlapping interests, they also had some diverging interests, and were competitors. Second, the gas-fired generators (ENMAX, TransCanada) were also relevant stakeholders in regulatory development; as well as being current and future competitors with coal-fired generation, they were the current marketers of coal-fired power into the grid. This meant that they had divergent interests from the coal generators in both the immediate and longer term. In the immediate term, while the PPAs were in place, the gas generators would benefit from any increase in the market price of electricity, in their dual role as marketers of both coal-fired and gas-fired power. In the longer term, as competitors with coal generation, they would benefit from anything that disadvantaged coal.

In short, unlike other provinces, the Alberta electricity sector did not speak with a single voice.

Saskatchewan's situation was simpler in terms of ownership structure – all coal units were owned and operated by the provincial Crown utility SaskPower – but had its own complexities. The key decision points revolved around the coal units at the Boundary Dam (BD) location. SaskPower had indicated its intention to close two of its coal units – BD1 and BD2 – in the near term, and was considering the installation of carbon capture and storage (CCS) at BD3; installation of CCS would allow BD3 to meet the requirements of the federal regulation and continue to operate. The Government of Saskatchewan would confirm this

plan for BD3 in April, 2011.[24] There was a question mark as to the future of BD4, 5 and 6 – the economic analysis supporting the draft federal regulation in 2011 assumed those units would simply retire at end of life, as required by the regulation, while the economic analysis supporting the final regulation in 2012 assumed that CCS would be installed at those units, allowing them to continue to operate.

Nova Scotia (Nova Scotia Power) would be the province with the third-largest exposure to the regulation. Again, it had an aging fleet, and the province was already committed to a transition to more sustainable energy sources; a major part of the province's strategy involved accessing hydroelectricity from the Lower Churchill in Labrador. Moreover, the province had introduced regulations in 2009 that would have a similar emissions impact to the federal ones, as would later be recognized by the Canada-Nova Scotia Equivalency Agreement.

New Brunswick (New Brunswick Power) had three coal units that were expected to cease operations in the 2030s, while Manitoba (Manitoba Power) had one small unit that was only used for stand-by purposes.[25]

Finally, this diversity in the electricity sector across Canada was necessarily reflected in the industry association, the Canadian Electricity Association, which also included non-fossil fuel generators, such as hydro-based utilities, among its membership.

What was the policy and regulatory process?

As noted previously, the Globe and Mail reported on April 29, 2009 the government's intent to regulate coal-fired electricity through an approach based on capital stock turnover; another report the next day noted some industry opposition, and that Minister Prentice had been meeting with companies involved. Evidently discussions continued over the following year, with the Globe and Mail reporting again on April 25, 2010 that Minister Prentice had met the previous week with chief executives of the coal generators.

In his book, Minister Prentice summarizes the basis for the regulation as follows:

- Most coal-burning units needed to be phased out anyway – they were nearing the end of their economic life and would demand reinvestment or replacement
- The companies that owned those facilities were pressing for certainty around the long-term investment decisions they needed to make
- A critical concern was to maintain stable electricity prices while ensuring a cleaner future

[24] Canada Gazette II, August 30, 2012; section 5.2.5
[25] Canada Gazette II, August 30, 2012; section 5.5.5

- The government was therefore presented with a unique opportunity – a capital stock turnover approach would allow for a gradual conversion of each facility, as it reached the end of its useful economic life, to a cleaner energy source.[26]

The pre-regulatory process was officially launched on June 23, 2010 in a speech by Minister Prentice where he outlined the key features of the approach. There was some media speculation that the timing reflected the fact that the G8 and G20 summits would be held later that week in Huntsville and Toronto respectively.[27] In his book, Minister Prentice does not address that timing issue, but does acknowledge more generally that the policy approach had a strategic purpose "to help silence Canada's international critics on GHG emissions because no other industrial democracy in the world has the capacity to build an electricity system that emits less carbon than Canada's". He continues that the policy was a "demonstrable illustration of global leadership", and a story that Canada has "failed to tell the world about".[28]

Consultations with provinces and a wide range of stakeholders continued for the rest of 2010, leading to publication of the draft regulation in August 2011. Following additional consultations, and some refinements to the regulatory design, the final regulation was published in September 2012. In all, Environment Canada met about 60 times with 23 stakeholders, and an additional 25 times with affected provinces. Over 5,000 submissions were received during the official consultation period following publication of the proposed regulation.[29]

What were the key features of the regulation?

The capital stock turnover approach as conceived by Minister Prentice (see above) needed to be implemented through a regulation under CEPA. The specific regulatory design that was chosen for implementation would require new coal units, and units that had reached the end of their economic life, to meet a performance standard set at the emission performance of a high-efficiency natural gas unit. Since this standard was unreachable for a traditional coal-fired unit, the regulation effectively required existing units to close down at the end of their economic life unless they installed a CCS system, and banned the construction of new traditional coal units.[30]

---

[26] Triple Crown, pp193-194
[27] National Post, June 24, 2010
[28] Triple Crown, p195
[29] Canada Gazette II, August 30, 2012; section 10
[30] Installation of CCS was the only technology option that would allow a coal-burning unit to meet the standard – there was no end-of-pipe technology option, such as scrubbers (which were effective for sulphur dioxide reduction).

In addition to this basic framework, the regulation built in a number of incentives for the installation of CCS; included a "swapping" provision that allows a unit that closes prematurely to transfer unused time to another unit; and provided a time-limited exemption for emergency situations.

What challenges did the regulation have to overcome?

The regulation was taking away a profit-making opportunity from coal generators. As noted, the core of the regulation was to require a coal-fired unit to close down at the end of its economic life. It was this core feature that allowed Minister Prentice to conclude that the regulation was "smart economic policy".[31] In practice, however, coal units frequently continued to operate beyond the end of their economic life; since capital costs would have already been recovered, this late period of operation was an opportunity for a coal operator to make profits, an opportunity that was now being taken away. This was particularly the case in Alberta: the coal generators (the PPA sellers) who were currently earning a regulated return, were expecting to be able to operate the unit in a competitive market for some years after the end of the PPA, and earn profits.

It was this concern around so-called "stranded value", as well as a desire to moderate price impacts to consumers, that led to the most significant refinement that was made to the proposed regulation, which was to provide a more generous definition of economic life. In the proposed regulation, economic life was generally 45 years; in the final regulation, this was extended to 50 years. However, the final regulation also recognized milestone years of 2020 and 2030 – any unit that would previously have closed down by 2020 would still be required to do so, and similarly for 2030. This was important given that Canada's Copenhagen emissions target was for 2020; in other words, the softening of the regulation did not affect expected emission reductions in 2020.[32]

The regulation was required to be simple. In announcing it, Minister Prentice stated that the regulation would have "No trading, no offsets, no credits", leading one commentator to label the approach "all cap and no trade", and to wonder what had happened to cap and trade.[33] Any incentives or flexibilities to address the different circumstances of different provinces would need to respect these constraints, and instead be built around the core concept in the regulation, that of economic life – essentially, a flexibility would add operating time to a qualifying unit.

The explanation of why there could be no trading likely lies in the underlying philosophy of the regulation, which was about taking advantage of capital stock turnover. If a company

[31] Triple Crown, p194
[32] Canada Gazette II, August 30, 2012; section 10.1
[33] Terence Corcoran, National Post, June 24, 2010

could continue to operate a coal unit beyond the end of its economic life by acquiring emission allowances or credits from another company, the integrity of the capital stock turnover approach would arguably be violated.

The regulation was required to be of general application; absent an equivalency agreement under CEPA, it would apply in all provinces, and needed to apply in the same way. Any accommodation for the specific circumstances of one province or company, therefore, needed to be available to all.

How was the regulation innovative?

- It accommodated Alberta's PPA regime. In the CG1 draft, this accommodation was provided in two ways: economic life was defined as the later of 45 years from the commissioning date or the end of the PPA, and for PPAs that ended before 2020, the performance standard was deferred for up to three years, until the end of 2016. In the final regulation, the definition of economic life was extended somewhat, meaning the explicit link to the PPAs was no longer necessary.

- It accommodated Saskatchewan's interest in carbon capture and storage (CCS) by providing several incentives. First, CCS is the only known technology that would allow a unit to meet the performance standard while burning coal. Second, units that took early action by installing CCS before needed to meet the performance standard would earn a two year deferral of the performance standard that could be transferred to another unit. Third, a company could receive a deferral of the performance standard in advance of a final investment decision to proceed with CCS, provided it met certain implementation/construction milestones; this addressed a specific circumstance of SaskPower, which had committed to install CCS at its Boundary Dam 3 unit, but was still contemplating whether to install the technology at other Boundary Dam units.

- It accommodated Manitoba's use of a coal unit for standby purposes only. Manitoba, a heavily hydro-based province, had one coal unit that was available for standby purposes only, thereby adding reliability to the provincial grid. The regulation accommodated this situation by exempting units that operate below a 9% capacity factor.

- It accommodated Nova Scotia's situation through the "swapping" provision, as well as through equivalency. As noted, the swapping provision allowed a company that closes a unit before it is required to do so, to transfer the remaining years of that unit to another unit, thereby allowing that second unit to operate longer than would

otherwise be possible. Text in the regulation's Regulatory Impact Analysis Statement suggests that provision was aimed at Nova Scotia.

- The regulation was accompanied by an equivalency agreement with Nova Scotia, which was the first modern CEPA equivalency agreement. A remarkably simple agreement, it allowed the federal regulation to stand down in Nova Scotia on the basis that the province's own legally binding regime would provide an equal or better environmental outcome.

What were the economic impacts?

The regulation was estimated to achieve its environmental benefits – in particular, an estimated 214 Mt in GHG reductions over the 2105-2035 period – with a very limited impact on GDP. It was estimated to achieve an excess of benefits over costs of $7.3 billion (net present value in 2015). Electricity price increases due to the regulation would be focused on Alberta, Saskatchewan and Nova Scotia; the share of household budget spent on electricity would remain relatively constant, while price increases were not expected to have significant impacts on the industrial sector.[34]

What was stakeholder and expert reaction?

The fact that the final regulation was published just over two years after the regulatory framework was announced suggests that, overall, stakeholder reaction was manageable; it likely also reflects the consultation efforts undertaken by Minister Prentice even before the June 2010 announcement.

The Regulatory Impact Analysis Statement accompanying the final regulation sets out in detail the comments received on the proposed regulation. Clearly a recurring theme from industry stakeholders was a desire for enhanced flexibility. Some advocated for a fleet-based rather than a unit-based approach; in some cases this went as far as requesting that all large emitters in the economy be included in the regulatory approach, which would appear to imply a total departure from the sub-sector capital stock turnover approach of the regulation. Interestingly, the regulation led industry stakeholders to request further regulation, this time of new gas-fired units.[35]

The Pembina Institute, one of Canada's leading environmental organizations, originally considered the proposed regulatory framework to be "heading in the right direction",[36] then

[34] Canada Gazette II, August 30, 2012; section 1
[35] Canada Gazette II, August 30, 2012; section 10.1
[36] National Post June 24, 2010

considered the proposed regulations to be a "welcome step",[37] but found the final regulations to be a "drastic weakening".[38]

A number of commentators would compare Canada's approach to the evolving US approach, which was similar in a couple of respects – use of a natural-gas based performance standard, and incentive for CCS. Despite the concerns noted above, the Pembina Institute in June 2013 found it not possible to compare Canada's approach overall with the plan announced by President Obama, and that Canada had the advantage with respect to existing units.[39] Professor Andrew Leach in September 2013 found that Canada had "the edge, for now".[40] The International Institute for Sustainable Development found US rules more "meaningful, substantial".[41] Of course, the US rules would not in fact become law, other than the standards for new plants.

What lessons can we learn?

1. Regulations reflect the context in which they are conceived and developed
   - In this case, the driving principle for policy action was harmonization with the US; the fact that a regulatory instrument was chosen, rather than cap-and-trade, reflected choices made in the US
   - Several factors may have facilitated bringing forward a regulation which, while respecting the capital stock turnover cycle, nevertheless imposed costs on coal-fired generators. It may be relevant that the original sponsoring Minister was a senior Minister based in Calgary and with political responsibility for Alberta. In addition, the fact that Alberta's electricity sector was partially deregulated, with different private sector players, and with competition between coal and gas sources of electricity, meant there were different industry voices at the table, with the gas-fired sector openly favouring the regulation of their coal-fired competitors.

2. Policy and regulatory development is a long and winding road. Canada's policy approach in fall 2008 was one of moving forward with comprehensive emission intensity regulations, on a unilateral basis if necessary. It transitioned to seeking a North American cap-and-trade system, and from that to matching any regulation the US might bring in. Still under the same government, it evolved into implementing an electricity regulation ahead of US action, and with a regulatory design that the US

[37] Pembina Media Release August 19, 2011
[38] Pembina Media Release September 5, 2012
[39] PJ Partington, Pembina blog, June 26, 2013
[40] Andrew Leach, Macleans, September 20, 2013
[41] CBC News, Sept. 18, 2014

would propose to adopt in part. At time of writing (winter 2019), Canada's regulation has been law for almost seven years, and has now been enhanced under a new government; the US has still not regulated GHG emissions from existing power plants.

3. Harmonization can take different forms, and does not necessarily mean like-to-like. US regulations on air pollutant, mercury and air toxics emissions from coal plants, together with the decline in natural gas prices resulting from the shale gas revolution, have in practice driven significant early closure of US coal plants even in the absence of US GHG regulation. To some extent, therefore, there has been *de facto* partial harmonization of coal generation policy with the US, even in the absence of a US GHG regulation on the sector; and with both countries moving off coal, there has certainly been harmonization of outcomes. (A similar theme will emerge in the methane case study, where Canada's regulation on methane in oil and gas is to some extent catching up to an existing US regulation on volatile organic compounds.)

4. A specific regulatory design is not inevitable (or, there is more than one way to skin the cat).
   - Was it inevitable that the government would regulate GHG emissions from electricity? Probably. Electricity was the third-largest sector in terms of GHG emissions; the largest, transportation, was being regulated; and the second-largest, oil and gas, arguably raised more issues in terms of competitive pressures.
   - Was it inevitable that this particular regulatory design would be chosen? Not at all. In the space of about 18 months from fall 2008 to spring 2010 the same government changed its preferred regulatory approach from an emission-intensity approach to cap-and-trade to a capital stock turnover approach.

5. Simple doesn't mean stupid – this was a very basic regulation but with lots of tailored provisions
   - Flexibilities can be built into and around any metric, in this case time. As per Minister Prentice's initial commitment, the regulation did not include emissions trading, but it did allow trading of operating time among units in a given company.
   - A simple, targeted regulation can achieve a lot. The estimated emission reductions are significant and relatively certain to occur, being based on mandated plant closures.

6. Some elements of regulatory design are more important than others. There were two notable changes in design between CG1 and CG2. Both of these were perceived as "weakening" the regulation; in fact, however, only one was significant.
   - Raising the natural gas-based emission standard from its original 375 t/GWh to 420 t/GWh was seen by some observers as a weakening of the regulation. In fact,

however, the change was essentially without significance, as either standard was effectively unreachable by existing units; the change was essentially cosmetic.

- Allowing a more generous definition of "economic life" was indeed a weakening of the regulation. However, the regulation remained significant in environmental terms.