

# The End of Coal: Ontario's coal phase-out

IISD REPORT



International Institute for  
Sustainable Development

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June 2015

Written by Melissa Harris, Marisa Beck and Ivetta Gerasimchuk



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## Executive Summary

Ontario has successfully implemented its policy to put an end to coal use by the end of 2014. The coal phase-out in Ontario has become “the single largest GHG reduction measure in North America” (Ontario Power Authority [OPA], 2013a). Since 2007, when coal accounted for about 25 per cent of its electricity generation, the province has reduced its greenhouse gas (GHG) emissions by approximately 34 megatonnes (Mt) or 17 per cent.

To Ontarians, this success is proof of the power of grassroots movements and a progressive subnational government. To some readers from outside Canada, though, this is welcome leadership coming from a seemingly unlikely place: a heavily industrialized province the size of France and Spain combined, part of Canada, a country often referred to as one of the world’s “biggest climate laggards” (CAN Canada, 2015).

Very few jurisdictions have committed to coal-phase out, let alone implemented it. But the interest in the mechanics of coal phase-out has been growing, which makes Ontario’s success and leadership on this issue particularly interesting.

G7 countries have recently committed to phasing out the use of fossil fuels by the end of the 21st century (The Guardian, 2015). Outside of the G7, coal phase-out has been moving up policy discussions in both Denmark and Finland, while several countries, including China, have been gradually reducing their coal use (International Energy Agency [IEA], 2015).

What lessons can be learned from Ontario’s coal phase-out experience? How can its success be replicated in other parts of the globe? This paper explores these questions for all those around the world who may draw inspiration and lessons learned from Ontario: policy-makers, campaigners, entrepreneurs and others interested in transitioning to a low-carbon future.

This analysis has been informed by a comprehensive review of existing literature and semi-structured interviews with 10 high-level experts from Canadian political and academic circles, industry and civil society. Due to the small sample and the snowballing method of interviewee selection, the experts’ perspectives on what happened remain anecdotal.

We rely on the concept of the “window of opportunity” and suggest that all elements critical to a sustainable energy transition can be clustered within the four “panes” of this “window”: context, champions, concerns and complementary policies. These “panes” provide the basis for the structure of this paper.

**Context.** Within Canada, the generation, transmission and distribution of electricity are matters of provincial legislation, which made it possible for Ontario to pass and implement coal phase-out legislation without going through the federal government. Coal-fired plants were publicly (state) owned and relatively old, and it was easier to make the case for their shutdown, especially as the Ontario government absorbed the costs of the phase-out. The fact that Ontario imported most of the coal used in power generation, rather than producing it locally, also played a major role. Internationally, Canada could be held accountable for cross-border pollution under the Air Quality Agreement with the United States and the North American Free Trade Agreement, which factored in to the phase-out as well.

**Champions.** As it is often the case, at the helm of the early phase of the Ontario coal phase-out campaign in 1997–2003 were a few dedicated individuals and organizations working together on the same cause. Environmentalists (Ontario Clean Air Alliance), doctors (Ontario Medical Association) and foundations joined efforts toward the common goal of phasing out coal. Much of the initial campaigning was focused on the negative health impacts of coal-fired generation. The success of the campaign made health concerns around coal a key issue in the 2003 provincial elections. Each of the three main parties—Progressive Conservative, Liberal and New Democratic—were convinced of the health impacts and the public concern, so they promised a coal phase-out, though with different timelines. Political buy-in from all parties was crucial to take the reform



forward because it meant consistent, long-term support. It signalled to industry, the public, the bureaucracy and any opposition that, regardless of which party formed the government, this agenda would be steadily advanced.

**Concerns.** Health concerns have been by far the most prominent driver of coal phase-out in Ontario. Other issues that drove the phase-out initiative included concerns about the environment, climate change and interest in Ontario-based green energy.

**Complementary policies.** While extremely important for most structural reforms in other contexts, measures to mitigate the possible negative impacts of the reform were not a significant part of Ontario's coal phase-out campaign. One of the reasons was that coal plants were owned by the government, which absorbed their shutdown costs. At the same time, the provincial government integrated coal phase-out into a broader set of policies. Of particular interest among them is the overall reform of the Ontario electricity sector and the policies promoting renewable energy, including the 2009 Green Energy and Green Economy Act.

The circumstances surrounding coal phase-out initiatives in other jurisdictions can be quite different from those described above. Yet, there are several lessons learned that stand out from Ontario's coal phase-out experience.

**A context-bound, realistic reform plan and timeline are everything.** Haste can be costly, and preference should be given to a gradual reform and achievable timeline—that is why in Ontario the initial aggressive phase-out goal of 2007 was changed to the end of 2014.

**Champions need to build broad-based support for the reform.** The coal phase-out campaign has led to a multi-party commitment to this reform. In turn, the multi-party commitment provided a clear signal to all players in Ontario that the phase-out would be implemented. At all stages of this process, the reform champions organized broad-based consultations with stakeholders: municipalities, civil society and industry. In a democratic society, only such broad-based consultations can expand “ownership” of the reform plan and thus secure its implementation.

**Arguments supporting the reform should be specific, transparent and evidence-based.** The phase-out campaign period (starting in 1997) was in the relatively early days of the climate change awareness efforts in Canada, so climate change arguments did not play a big role in this decision. But health and local pollution arguments did, which makes them powerful instruments in promoting climate-friendlier policies. Unlike “global commons” arguments on climate change, calls to address concerns over health and pollution are specific and local, which makes them appealing to the public and policy-makers. At the same time, all arguments used by reform supporters to encourage a coal phase-out should rely on rigorous analysis regarding expected air quality and public health outcomes, GHG savings, energy costs, employment results, technological feasibility of the reform and available alternatives. Failure to do so may discredit the campaign. It is also essential to select the most trusted messengers of these arguments—in Ontario's case, on public health concerns, they were doctors—to deliver the message to the public and policy-makers.

**Reform plans should be operationalized with complementary policies.** Like most energy sector reforms, coal phase-out cannot be implemented in isolation from other policy changes. It is important to have a long-term, big-picture plan about what will replace coal, how and when—and how this reform relates to other reforms in the energy sector and more broadly. For instance, if electricity prices are expected to increase and some working places can be lost, how can vulnerable households be protected? How can competitiveness of large industrial consumers be supported through energy efficiency and other measures? How can the potential of renewable energy be unlocked for it to replace coal and gain economies of scale in the energy mix? How is the fuel switch linked to the energy sector's restructuring and attracting investment into new generation capacity?

**There are always unintended outcomes: good and bad.** A key intended outcome of Ontario's coal phase-out was improving the air quality. This has been achieved, but can be attributed not just to coal phase-out in Ontario itself. Mitigation of air pollution across the border in the United States has played a significant role too. At the design stage, at least some of the reform visionaries expected the replacement of coal-fired generation



with renewables. In reality, however, the province has shifted from one fossil fuel to another by replacing much of the coal with natural gas. While Ontario has pioneered some progressive clean energy policies in parallel with the coal phase-out, natural gas remains a cheaper substitute. Finally, climate change mitigation benefits were not a major (public) consideration at the reform design stage, but have become one of its main successes. The precedent set by what has become the “single largest greenhouse gas reduction measure in North America” should not be underestimated. Ontario’s success is a critical example that can inspire political will and public engagement in other parts of the world. The organizations and individuals who have made Ontario coal-free deserve every credit for demonstrating that the end of coal is feasible.



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## 1.0 Introduction and Objectives

Following the provincial government’s commitment to phasing out coal from its electricity system, the proportion of coal-fired electricity in Ontario plummeted from approximately 25 per cent of the energy mix in 2003 to zero by the end of 2014. The Ontario Power Authority (OPA, 2013a) describes this shift as “the single largest greenhouse gas reduction measure in North America.”

To Ontarians, this success is proof of the power of grassroots movements and a progressive subnational government. To some readers from outside Canada, though, this is welcome leadership coming from an unlikely place: a heavily industrialized province the size of France and Spain combined, part of Canada, a country often referred to as one of the world’s “biggest climate laggards” (CAN Canada, 2015).

Very few countries have committed to coal-phase out, let alone implemented it. But the interest in the mechanics of coal phase-out has been growing, which makes Ontario’s success and leadership on this issue particularly interesting.

G7 countries have recently committed to phasing out the use of fossil fuels by the end of the 21st century (The Guardian, 2015). Outside of G7, coal phase-out has been moving up policy discussions in both Denmark and Finland, whereas several countries, including China, have been gradually reducing their coal use (International Energy Agency, 2015).

What lessons can be learned from Ontario’s coal phase-out experience? How can its success be replicated in other parts of the globe? This paper explores this question for all those around the world who may draw inspiration and lessons learned from Ontario: policy-makers, campaigners, entrepreneurs and others interested in transitioning to a low-carbon future.

To this end, the objectives of the case study have been:

- To establish what factors made it possible to phase out coal-fired electricity in Ontario
- To review the main outcomes of the coal phase-out
- To summarize lessons learned from it





## 2.0 Approach and Scope

This analysis has been informed by a comprehensive review of existing literature and semi-structured interviews with 10 high-level experts from Canadian political and academic circles, industry and civil society. Due to the small sample and the snowballing method of interviewee selection, the experts' perspectives on what happened remain anecdotal.

Having reviewed literature on frameworks for policy change analysis (see the Annex), we have drawn on four of them to analyze the Ontario coal phase-out case. These are the IISD-GSI's framework for fossil fuel subsidy reform (Beaton et al., 2013), Advocacy Coalition Framework (Sabatier, 1988; Weible et al., 2011), the concept of multiple streams by Kingdon (2003) and Ford Foundation's theory of social change (Kim, 2014).

The analysis below relies on the concept of the “window of opportunity” and suggests that all elements critical to a sustainable energy transition can be clustered within the four “panes” of this “window”: context, champions, concerns and complementary policies (Figure 1).

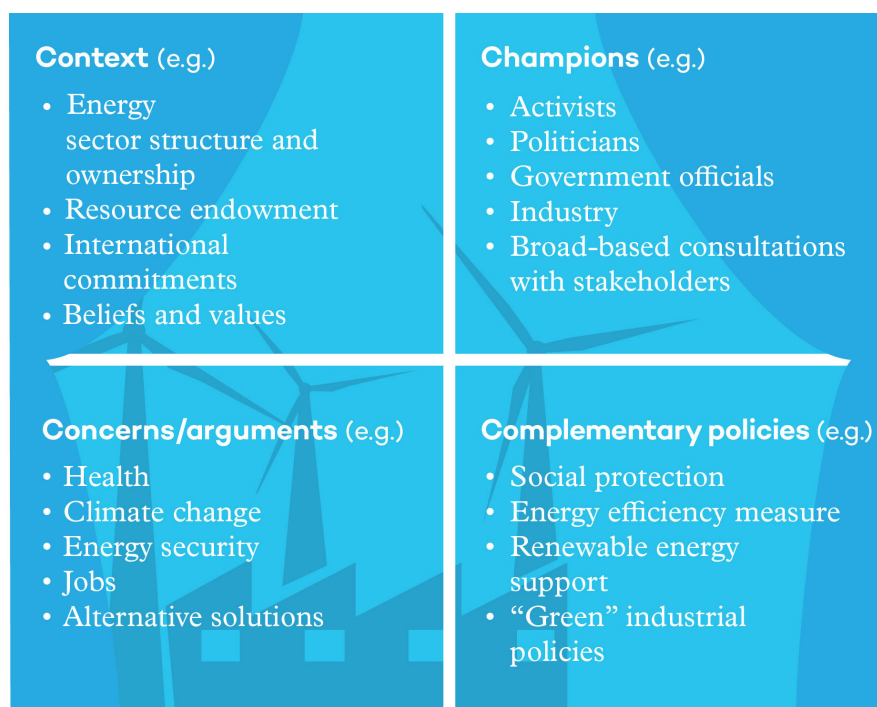


FIGURE 1. “WINDOW OF OPPORTUNITY” FOR ENERGY SECTOR REFORM

Source: IISD

To determine which factors merited more discussion, in this paper we relied on opinions already circulating in the Ontario discourse. In particular, we reviewed publicly available sources, including: government documents, publications by industry and other stakeholders, and media articles on the topic. In 2014–2015 we also conducted 10 semi-structured interviews, beginning with key actors as identified in the literature, thereafter using snowball sampling. Interviews were conducted with the following experts:

### Government:

David Argue, Ontario Ministry of Environment and Climate Change

Dennis Brown, Mayor of Atikokan

Gordon Miller, Ontario Environmental Commissioner

Hon. Elizabeth Witmer, former Ontario Minister of Health and Minister of Environment

**Industry:**

David Butters, Association of Power Producers of Ontario

Robert Lyng, Ontario Power Generation

**Leaders related to the Campaign:**

Ted Boadway, Ontario Medical Association

Jack Gibbons, Ontario Clean Air Alliance

Bruce Lorie, Ivey Foundation

**Academia:**

Daniel Rosenbloom, Carleton University

These interviews are referenced in the text as “IISD Interview with Last Name.” The scope of this case study is 1997 to 2014, and it is focused entirely at the provincial level because in Canada the generation, transmission and distribution of electricity are matters of provincial legislation.



## 3.0 Context

The key features of the context in which coal has been phased out from the electricity sector in Ontario include natural resource endowment and electricity supply, public (state) ownership of coal plants, the values that Ontarians identify with as well as their relations with the rest of Canada and foreign nations. The sections below focus on each of these elements.

### 3.1 Natural Resource Endowment and Electricity Supply

Historically, Ontario has largely relied on hydropower for its electricity supply. Niagara Falls, a world leading hydro-electrical facility, provided inexpensive energy to fuel Ontario's industrialization but proved insufficient to meet Ontario's rising demands in the post-war economic boom. In the 1960s Ontario invested heavily in coal-fired power plants for baseload supply. In the 1970s the government also began an extensive nuclear power construction program, building 20 reactors over the next 20 years. By the end of the 20th century, Ontario's fossil fuel fleet included five coal-fired power plants in Ontario—Nanticoke, Lambton, Lakeview, Thunder Bay and Atikokan. Figure 2 illustrates Ontario's electricity mix immediately before and during the coal phase-out.

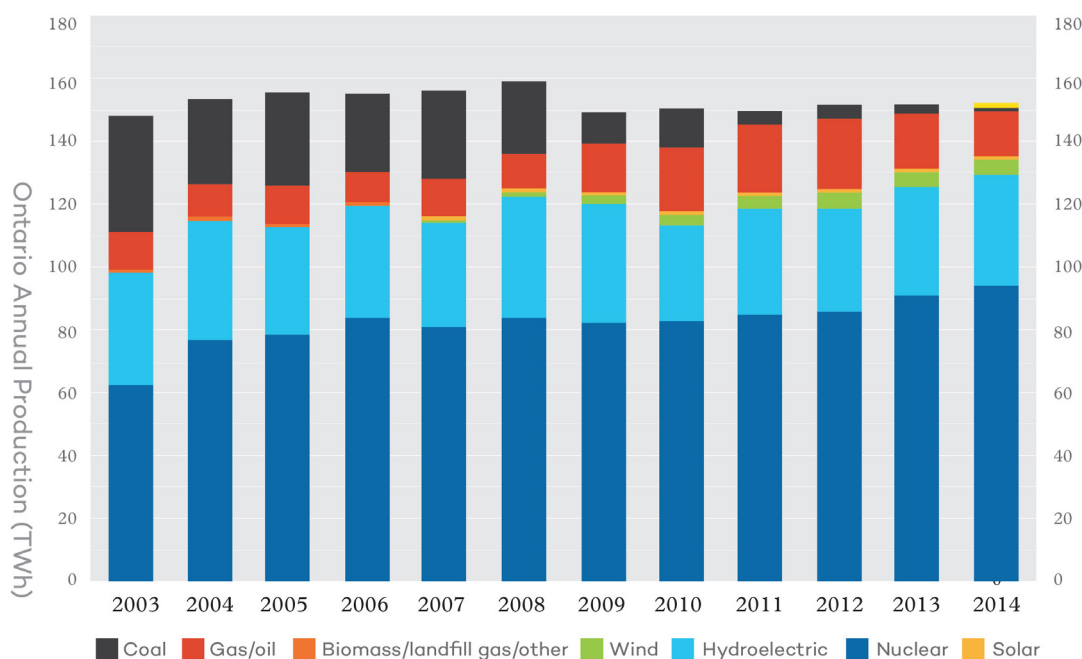


FIGURE 2. FUEL MIX IN ONTARIO'S ELECTRICITY SECTOR IN 2003–2014.

Source: Compiled by IISD with data from OPA, 2014 and Independent Electricity System Operator, 2015

Ontario has no exploitable coal reserves. Instead, coal was imported primarily from the United States, and to a lesser extent from other Canadian provinces with large coal reserves such as Saskatchewan. This fact played an important role in the political decision to phase out coal because it meant that no jobs in coal production would be lost as a result, as that could have resulted in significant public and political resistance (Adams, MacDonald, & Houle, 2012).

In addition to extensive hydropower capacity, the province also has excellent potential for producing wind, solar and biomass energy. The fact that Ontario is rich in biomass that can be burned in converted coal power plants or in new generation facilities offers interesting options for the phase-out. In 2007, Purchase (p. 12) estimated that replacing all coal used in Ontario (for electricity and other purposes) would require about 30 million metric tonnes of dry biomass per year, which is only half of a conservative estimate of the amount available in Ontario. In 2011 the Pembina Institute investigated the sustainability of using biomass to replace coal-fired power



generation in Ontario. The analysis, which was based on simulation modelling, concludes that “harvesting of forest biomass for electricity production can be done in such a way as to not systematically decrease forest carbon stores over time” (Kennedy et al., 2011, p. 3). The report also finds that “it is to be expected that Ontario Power Generation and the Province of Ontario will experience economic gains from using an energy resource that can be sustainably sourced within Ontario rather than importing fossil fuels” (Kennedy et al., 2011, p. 3).

### 3.2 Identity of Ontarians: Democracy and Values

In Ontario, values such as human health and lifestyle are generally high on the political agenda. Public health was an obvious argument put forward in support of the coal phase-out. Rowlands (2007) describes how the framing of the electricity issue in Ontario changed in the late 1990s and early 2000s from being framed as a cost problem to being framed as a public health problem.

The perception of environmental and health policy issues in Ontario is likely to have been influenced by the Walkerton incident in 2000. In May 2000, *Escherichia coli* bacteria entered the drinking water system in Walkerton (a small community in Ontario) due to farm runoff leading to groundwater contamination, causing the death of seven people and illness in over 2,000 inhabitants. As Rowlands (2007) explains, the lack of environmental regulation was considered an important factor and “the public at large also thought that the Progressive Conservative Government shared at least some of the blame for the tragedy” (p. 194). Environmental issues had been lower on the government’s political agenda and the budget had been cut in previous years. After Walkerton, however, “the importance of ‘the environment’ was rising up the public agenda in Ontario, while the popularity of the government was falling” (p. 197). The incident raised the level of public awareness on and political sensitivity to the link between environment and health, which may explain the high priority and the sense of urgency given to the news on health risks caused by coal-fired power generation in Ontario.

### 3.3 Energy Sector Structure and Ownership

In Canada, the generation, transmission and distribution of electricity are matters of provincial legislation. Historically, the electricity sector in Ontario was under public ownership. In the late 1980s and early 1990s, Ontario’s electricity system faced serious challenges related to nuclear and coal plants. Coal-fired generation facilities and infrastructure were aging and in need of replacement or refurbishment. At the same time, the costs of supply were higher than expected while demand growth fell short of expectations. As a result, Ontario Hydro found itself in significant debt of CAD 35 billion by the mid-90s (Adams, MacDonald, & Houle, 2012, p. 11).

To address some of these challenges, in 1999 Ontario opened its electricity market to private investors. The government attempted to sell the assets to private investors, but this plan met strong opposition from environmental and labour groups (Adams, MacDonald, & Houle, 2012; Swift & Stewart, 2005). Thus Ontario’s coal-fired generation plants remained publicly (state) owned.

Eventually, after the breakup of Ontario Hydro, the coal facilities became part of Ontario Power Generation (OPG), a public company that is accountable to the Ministry of Energy. This is one of the most important enabling conditions of coal phase-out in Ontario and is considered to have significantly facilitated the phase-out decision. As the shareholder, the Government of Ontario, was prepared to write off their own assets (IISD’s Interview with Lyng). In particular, the government did not have to renegotiate long-term supply contracts with private owners (Adams, MacDonald, & Houle, 2012). In addition, Ontario’s coal plants were also relatively old, mostly in the second half of their lifespan, so it was easier to make the case for closing them down (IISD’s Interview with Lorie, 2015; Adams, MacDonald, & Houle, 2012, p. 12).



### 3.4 Canada-U.S. Agreements

The Canada-U.S. Air Quality Agreement was signed in 1991, committing both countries to address transnational air pollution that leads to acid rain by cutting sulphur dioxide (SO<sub>2</sub>) and nitrogen oxide (NO<sub>x</sub>) emissions. In 2000 the two governments agreed on an expansion of the Agreement (the Ozone Annex), including tighter targets on certain air pollutants that are major contributors to ground-level ozone and, thus, smog. Ontario, in particular, was required to cut NO<sub>x</sub> emissions by 39 per cent by 2007 compared to 1990 levels and 44 per cent by 2010 (Environment Canada, 2000). These commitments made by the federal government went beyond the level of ambition of the provincial government at the time (Toronto Star, 2000) and may therefore have added some pressure on politicians in Ontario to take effective action on air pollution.

The pressure rose when, in May 2003, New York's Attorney General, together with 48 Canadian and United States non-governmental organizations and two towns in New York state, filed a complaint against Canada with the Commission for Environmental Co-operation (CEC)<sup>1</sup> under the North American Agreement on Environmental Cooperation, an environmental side accord to the North American Free Trade Agreement (NAFTA) (CEC, 2003). In the words of the Attorney General, the basis for the complaint was that "Ontario's massive coal-fired power plants operate with wholly inadequate pollution controls and are a major factor contributing to acid rain and respiratory disease in New York and throughout the northeast" (Toronto Star, 2003). By failing to address pollution problems in Ontario, the CEC considered Canada as failing to meet its obligations under the Canadian Environmental Protection Act and the Fisheries Act (CEC, 2003). The submission was dropped in 2004 based on Ontario's response and media reports about the planned closure of coal-fired power plants (CEC, 2004).

While it is difficult to estimate the exact impact of the U.S.-Canada agreements and the enabling environment they generated for the decision to phase out coal, it at least shows that pressure for action came through a number of different channels and from different levels of governance, ranging from local grassroots action to bilateral agreements.

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<sup>1</sup> The CEC acts as an intergovernmental environmental watchdog under the North American Free Trade Agreement.



## 4.0 Champions

The phase-out of coal in Ontario’s electricity system is a result of 15 years’ leadership by campaigners, politicians and government officials. Opposition to reform existed, but was not strong for a number of reasons discussed throughout the paper.

Figure 3 below introduces key actors who expressed support or concern for a coal phase-out policy in Ontario.

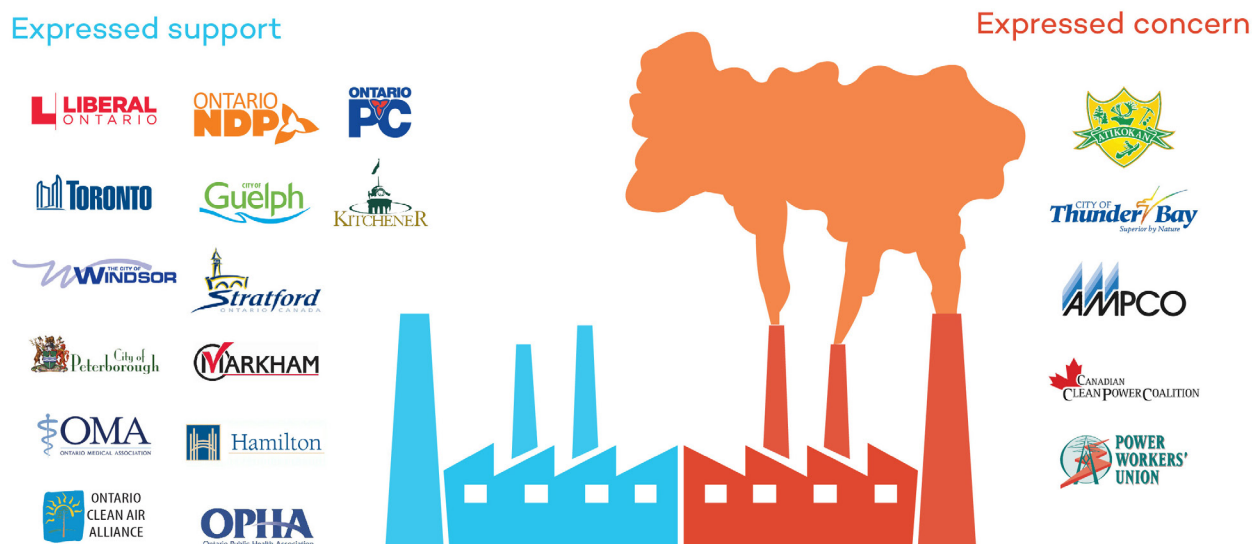


FIGURE 3. KEY ACTORS IN THE ONTARIO COAL PHASE-OUT

Note: This is not an exhaustive list of all main stakeholders in Ontario’s coal phase-out, but reflects key actors as identified in interviews

Source: IISD

## 4.1 Campaigners

As is often the case, at the helm of the coal phase-out campaign were a few dedicated individuals and organizations who formed a coalition. Environmentalists, doctors and foundations joined efforts toward the common goal for clean air. The Ontario Clean Air Alliance (OCCA) was a formal coalition, but there were several other key players, most notably the Ontario Medical Association and foundations, who did not have a formal membership in OCCA. Instead, they were connected by a shared vision of the desired policy change.

**Environmentalists.** In the 1970s and 1980s, most environmental groups had programs focused on mercury and toxics. Analysis on these topics led to the findings that burning coal was one of largest contributors to mercury, smog and greenhouse gas (GHG) emissions.

In 1997 health and environmental concerns regarding coal-fired power stations in Ontario led to the establishment of the OCCA. It started with six<sup>2</sup> members but has grown to encompass 90 groups comprising over 6 million Ontarians in health care, unions, environmental groups, faith groups and municipalities (Adams, MacDonald, & Houle, 2012). “Our coalition wasn’t just the usual suspects. Eleven municipalities, including the City of Toronto were members of the OCCA. We also had public health organizations, hydro utilities, unions and faith groups as members” (IISD’s Interview with Gibbons).

<sup>2</sup> The six original members of OCCA were: Canadian Institute for Environmental Law and Policy, Pollution Probe, Canadian Association of Physicians for the Environment, Ontario Lung Association, Sierra Club of Canada, Consumers Association of Canada (Ontario Chapter).



The OCAA and, in particular, its campaign director Jack Gibbons played a critical role in publicizing the message about health risks and the economic costs of air-pollution-related illnesses (Adams, MacDonald, & Houle, 2012; Rowlands, 2007, p. 191). Everyone we interviewed agreed that the coal phase-out would not have happened without the efforts of Gibbons, an energy economist with a strong background in regulatory issues.

The OCAA decided that, rather than running separate campaigns to address these outcomes, they would instead focus on one campaign to eliminate the source: coal (IISD's Interview with Lorie). The OCAA also recognized early on that people were not often motivated to change behaviour out of concern for the environment, but were much more motivated if they are worried about health. Thus the campaign was primarily designed around addressing health issues.

Against this backdrop, one of the most important early campaign design elements was the recognition that, as environmentalists, they could not credibly talk about health; they needed doctors to talk about health (IISD Interview with Lorie). The OCAA was able to build much of its campaigning on publicizing the findings published by the Ontario Medical Association (OMA) regarding the severe harms to public health and the related economic costs in its campaigning against electricity generation from coal.

**Doctors.** In 1998 and 2000 the OMA, a group of highly credible doctors, published two studies documenting deteriorating air quality in the province and the link between Ontario's coal-fired power plants and considerable implications for public health (OMA, 1998, 2000). The OMA's involvement in the coal phase-out effort was championed by Executive Director Ted Boadway, who led a number of OMA's campaigns, understood the media and was able to move issues and research through the media and political systems (IISD's interview with Lorie).

According to Jack Gibbons of the OCAA, "the involvement of the OMA in the air pollution issue changed everything. While the politicians could ignore the environmentalists when they said that smog kills, they couldn't ignore Ontario's doctors. And neither the politicians nor Ontario Power Generation dared to challenge the doctors when they said that air pollution is a public health crisis in Ontario. As a result, the politicians had to find a solution to this crisis" (IISD's Interview with Gibbons).

The OMA was very clear that they were not advising on energy policy, as Ted Boadway said, "the minute doctors start talking about how to generate electricity there's a problem" (IISD's Interview with Boadway). The OMA developed the illness costs of air pollution (ICAP) model, now used across the country, to show which groups of people and parts of the health care system were particularly susceptible to the impacts of air pollution. The ICAP model allowed OMA to quantify the impacts in a transparent and easily understandable way, which had huge implications for the coal phase-out campaign (IISD's Interview with Boadway).

**Funders.** Both the OCAA and the OMA garnered financial support for their cause from hundreds of individuals, companies, associations, government agencies and foundations. One of the earliest and most consistent supporters of the campaign was the Laidlaw Foundation, which was driven in large part by Bruce Lorie, for whom the coal-phase out was a personal and professional priority (IISD's interviews with Gibbons and Lorie).

**Coalition in action.** The OMA and the OCAA spoke to the media, wrote op-eds and got the message out to the public via TV, radio and newspapers. The OCAA put up billboards, produced coal phase-out postcards for the public to send to the Ontario premier, and had a large mailing list of people sending emails to politicians requesting the phase-out. They were able to mobilize public support while providing important information politicians needed to champion the decision (IISD's interviews with Gibbons and Boadway).

OCAA also garnered the support of several municipalities. For instance, Hazel McCallion, a popular public figure and mayor of the Mississauga municipality, did a press conference with OCAA calling for the end of coal burning at the Lakeview Generating Station. "The next day, a large picture of Hazel and I appeared in the Toronto Star with Lakeview's smokestacks in the background. As a result of this photo, many people concluded that if Hazel agrees with the OCAA, then a coal phase-out must make sense" (IISD's interview with Gibbons).



In a May 2014 speech, Jack Gibbons identified six key reasons for the OCAA's success:

1. A clear message
2. Addressing an important political issue
3. A pragmatic solution
4. A credible messenger (OMA)
5. Strong public support for the message that the OCAA has built up
6. Persistence

## 4.2 Politicians and Government Officials

Faced with continued smog alerts and calls to action from activists, in 2001 the Ontario Legislature appointed the Select Committee on Alternative Fuel Sources to investigate and recommend clean alternatives to the existing conventional power sources. The all-party committee published its final report in June 2002, including detailed discussion of coal-fired electricity on public health and 141 specific policy recommendations. These recommendations included promotion of renewable energy generation, energy efficiency and conservation, and the long-term elimination of conventional fossil fuel-based generation by 2015 (Legislative Assembly of Ontario, 2002). The committee also recommended closing two of Ontario's coal-fired stations by 2005 in Atikokan and Thunder Bay.

In 2001 the Government of Ontario, under Progressive Conservative Premier Mike Harris, issued a regulation requiring the phase-out of coal burning at the Lakeview Generating Station in Mississauga by April 30, 2005. One of the early champions of coal phase-out in the Progressive Conservative party was Hon. Elizabeth Witmer. In an interview with Elizabeth Witmer, she explained that, as Minister of Health and Long-Term Care and then Minister of the Environment, she had seen the impact of air pollution from coal generation on the health of the people of Ontario and the link to emergency room admittance rates, illness and death. She asked her Deputy Minister Jan Rush to develop a realistic plan and timelines to eliminate coal-fired electricity generation in Ontario. They met with stakeholders, received input and presented the findings and a plan to phase out coal plants by 2014 to cabinet. Witmer explained that at one point she temporarily took the plan off the table because she was not sure she would get the support of her colleagues; but over time, and by working in collaboration with others, she was able to bring cabinet, caucus and Premier Mike Harris onside. Witmer highlighted the necessity of a strong advocate to drive the issue and the importance of the support of her deputy and staff to gain the support of Premier Harris and her cabinet colleagues. It was a collaborative effort (IISD's Interview with Witmer).

Premier Harris was not commonly perceived as progressive on environmental issues, so this early action by the PC government was highly influential. Following the Select Committee's report and efforts of campaigners, air quality and health concerns around coal-fired generation became key issues in the 2003 provincial elections. The 2001 regulation signalled PC support for the issue and likely incited action by other parties who considered themselves more environmentally friendly. By the election time, there was agreement among the three main parties—Progressive Conservative, Liberal and New Democratic—that coal should be phased out.

Political buy-in from all parties was crucial to take the reform forward because it meant consistent, long-term support, and it also signalled to industry, the public, the bureaucracy and any opposition that, regardless of which party formed the government, this agenda would be steadily advanced.

In their 2003 election platforms, all three major parties promised a coal phase-out, but with different timelines. The Progressive Conservative (the party in power) and its premier, Ernie Eves, adopted the goal of phasing out coal power by the end of 2014. The Liberal Party (the party that won the elections) and New Democratic Party announced their goals to end coal-use by 2007. This difference in proposed coal phase-out timelines reflects the different agendas and different leadership objectives of the parties.





It was the Liberal Party, with leader Dalton McGuinty, who won the 2003 election. The coal phase-out goal was politically popular among McGuinty's supporters for health and environmental reasons, and was an important part of his election campaign. McGuinty ultimately became the single biggest political actor in the phase-out. "Without McGuinty's leadership, the phase-out would not have been possible and the majority of the coal plants closed under his leadership" (IISD's Interview with Gibbons).

When the Liberal government under Premier McGuinty came into power in October 2003, he reaffirmed his election commitment to phase out coal within four years. At the time, coal-fired generation represented 7,560 megawatts (MW) of capacity—approximately 25 per cent of Ontario's total capacity of roughly 30,000 MW (Purchase, 2007). The supply gap caused by the phase-out was to be filled primarily with nuclear, natural gas, wind and solar.

However, it soon became apparent that the initial phase-out timeline of 2007 would not be possible on the grounds of electricity reliability, cost and supply (IISD Interview with Butters). After 18 months in office, the McGuinty government pushed back the deadline for the phase-out to 2009, and it was eventually delayed a second time when it was decided that the final coal plant was due to be closed or converted to other fuels before the end of 2014. This timeline was put into law in 2007,<sup>3</sup> and the Government of Ontario successfully ended coal-fired electricity generation by the end of 2014 (see Figure 4 below).

### 4.3 Opposition to Coal Phase-Out

Due to the nature of Ontario's electricity system, the existing coal-consuming power generators and producers were not a politically strong force in Ontario. Coal was not mined in the province and the coal for the generators was imported. This meant that there was little for the government to lose in terms of tax receipts and the votes of employees from producers (Adams, MacDonald, & Houle, 2012). Suppliers of coal outside of Ontario, especially U.S. producers, also did not have strong leverage in Ontario.

The power-generating business represented by OPG did not oppose the reform because it was fully aligned with its owner, the Government of Ontario, which absorbed the costs of coal plants' shutdowns. Under different circumstances, if the utility was fully privatized, there may have been more vocal opposition, but the clear directive of their shareholders neutralized what would have been primary opposition. OPG also owned natural gas and nuclear power stations, so those two industries were not independent players in the reform design either.

The main resistance to the coal phase-out came from the Association of Major Power Consumers of Ontario (AMPCO), which represented industrial power users in Ontario. AMPCO was opposed to the plan due to fears of rising energy costs and reduced competitiveness. AMPCO commissioned research highlighting the relatively high electricity prices in Ontario (AMPCO, 2006). The study indicated that electricity prices in rates in Ontario had increased by 60 per cent since 2001. However, AMPCO did not manage to leverage a lot of political capital to fend off political interventions. The health arguments and costs put forward were deemed more persuasive and identified as a higher priority, and the unanimous support from all three major political parties left little recourse for opponents.

<sup>3</sup> In the Ontario Regulation made under the Environmental Protection Act: Cessation of Coal Use—Atikokan, Lambton, Nanticoke and Thunder Bay Generating Stations.



## 5.0 Concerns

Phase-out of coal in the Ontario electricity sector has been primarily driven by concerns about coal-fired generation's impacts on public health, environment, climate change, and prospects for Ontario-based green energy. This section discusses each of these factors in more detail.

### 5.1 Health Concerns

All of the interviews conducted and literature reviewed identified health concerns as the primary driver of the phase-out. Coal-fired power generation emits ground-level ozone, fine particulate matter, sulphates, nitrogen dioxide and sulphur dioxide, which contribute to smog. As reported by the Ontario Public Health Association (OPHA) in 2002, Ontario's coal-fired power plants accounted for about 23 per cent of the SO<sub>2</sub> and 14 per cent of the NO<sub>x</sub> emitted in the province in 2001.

The adverse health impacts of smog, gaseous pollutants, high concentrations of fine particulate matter in the air and high ozone levels are well documented. The OMA published a report in 2000 to present the results of model-based cost benefit calculations related to the health impacts of two pollutants (ozone and particulate matter) in Ontario. The calculations indicated that, in 2000, air pollution would lead to 1,900 premature deaths, 9,800 hospital admissions, 13,000 emergency room visits and 46 million illnesses (OMA, 2000). Annual total economic damages were estimated at CAD 10 billion and expected to increase significantly through 2020 without mitigation measures.

A 2005 study, prepared by DSS Management Consultants considered the financial, environmental and health impacts of four scenarios for Ontario's energy mix, including business as usual, additional gas and nuclear, and abatement (DSS Management Consultants, 2005). In terms of the health impacts of phasing out coal, the analysis estimated that the equivalent of 660 premature deaths could be avoided, as well as 920 hospital admissions, 1,090 emergency room visits and 331,000 minor illness cases per year. In the 2005 report, the average annual health damages of the status quo were estimated at approximately CAD 3 billion per year compared to a range of CAD 0.3 billion to CAD 1.0 billion in the alternative scenarios. According to another source, the total health costs of coal use amounted to CAD 4.4 billion per year in health, environmental and financial costs (OPA, 2013a) prior to the introduction of the phase out policy. The 2005 cost-benefit analysis concluded that the lowest cost was to be found from a combination of a coal phase-out with additional nuclear and gas to make up the shortfall.

Criticism of the above estimates pointed out that a 2003 cost-benefit analysis showed almost no economic benefits of the phase-out while the 2005 report showed CAD 4 billion in benefits (McKittrick, 2014). However, such discrepancies are not unusual in cost-benefit analyses and are explained by different assumptions, especially on the discount rate and economic value of different public health elements.

Overall, the evidence on the health impacts of air pollution (in particular the OMA publications from 1998 and 2000) had a strong effect on public perception of the air pollution issue. Ted Boadway explained that the reports got significant public attention because it was something everyone could relate to. Not only does air pollution exacerbate issues in people with asthma, bronchitis, cardiac disease, angina and disproportionately affect children and the elderly, but lung function tests showed even healthy people are affected. This message really resonated with the community (IISD's Interview with Boadway). According to Rowlands (2007, p. 192), polls from 1999 and 2001 "revealed that a majority of southern Ontario survey respondents wanted a phase-out of coal-fired power stations and were willing to pay more for their electricity in order to convert the coal-fired power stations to natural gas." For the public, and their representatives, health concerns trumped electricity price concerns.



## 5.2 Environmental Concerns

While health concerns were identified as the main driver of the phase-out, for Jack Gibbons at the OCAA and some others within the coalition, the main motivation was the environmental impact of coal.

Acid rain, caused by SO<sub>2</sub> and NO<sub>x</sub> emissions, continued to be a serious environmental issue in the early 2000s, despite introduced regulation (OPHA, 2002). Coal is also a major source of mercury, a highly toxic element that is capable of entering and bioaccumulating in the aquatic food chain (OPHA, 2002). Consumption of mercury-contaminated fish can cause illness in adults, but it is most dangerous for unborn children. In 1994 a target was set to reduce mercury emissions by 90 per cent by the year 2000. Yet, in 2002 mercury emissions from Ontario's electrical sector had increased rather than declined.

Dennis Brown, Mayor of Atikokan, commented that concern about pollution was not a key driver at the political level. Since politicians were aware that most pollutants came from coal-fired plants in the United States, closing plants in Ontario did not make sense to address environmental impacts (IISD's Interview with Brown).

According to Environment Commissioner of Ontario Gordon Miller, the public was generally aware of the link between coal-fired generation and acid rain (IISD's Interview with Miller). While acid rain was largely addressed by the mid-2000s, the public awareness campaign in the 1980s and 1990s resulted in greater public understanding and concern regarding coal plants and air quality. Similar to the case of acid rain, Miller argued, much of the pollutants were coming across from U.S. sources. However, with Nanticoke operating as the largest coal-fired plant in North America, Ontario could not complain about U.S. emissions without first addressing its own (IISD's Interview with Miller).

## 5.3 Climate Change Concerns

There are mixed opinions on the role of climate change concerns in the coal phase-out. Certainly the plants emitted GHGs. In 2001 Ontario's coal-fired power plants were responsible for 20 per cent of GHG emissions and about 78 per cent of the GHG emissions that Ontario would need to cut in order to achieve its 2014 target (OPHA, 2002).

For environmental groups, climate change was always a central concern, but it did not become a big driver until the last few years when the campaign was largely done (IISD's Interview with Lorie). Not much of the media coverage or literature from the early days of the campaign make reference to the climate impacts of coal. As a response to climate change, the phase-out plan was also questioned as economically inefficient compared to alternatives such as the imposition of a carbon tax or cap-and-trade system.

In the OPHA report from 2002, climate change is mentioned as the number one reason for abandoning Ontario's reliance on coal, but mainly due to the significant impacts that climate change has on public health worldwide and the economic costs related to these impacts.

According to the Hon. Elizabeth Witmer, the former Ontario Minister of the Environment, "climate change did influence the phase-out. With the Kyoto Protocol under discussion in 1997 and both Ontario and Quebec attending the Bonn Climate Change Conference in 2001, there was a strong focus on climate change and conservation" (IISD's Interview with Witmer). Gordon Miller, Environment Commissioner of Ontario, added that climate change and GHG emissions became important drivers after Ontario's first Climate Change Action Plan in 2007, and the government featured the coal phase-out prominently in the strategy (IISD's Interview with Miller). By 2010 the two fundamental reasons of health impacts and fighting climate change were quoted together as the reasons for the policy (OPA, 2010).



## 5.4 Green Energy Expectations

It is noticeable that, for most actors, the plan to phase out coal has been closely linked with plans to boost energy efficiency and the development of alternative generation technology. In the 2003 elections, the energy platforms of all three major parties included provisions on conservation and renewable energy technologies in addition to the coal phase-out. Ontario-based jobs have always been of paramount importance in elections, and some of these jobs were expected to be in the “green energy” sector.

The OPHA (2002) also claimed that three parallel actions are needed to address the health and environmental impacts of coal-fired electricity generation: the promotion of energy-efficiency measures, the promotion of renewable energy sources and the phase-out of coal-fired power generation. In 2005, following the decision to eliminate coal-fired generation, OPA recommended that the Ontario government expand the use of renewable sources in Ontario’s supply mix, maintain the share of nuclear generation and increase the share of gas-fired generation in order to fill the supply gap (OPA, 2005).

The plan to use biomass instead of coal as a source of baseload power garnered significant attention. The Pembina Institute’s 2011 sustainability analysis indicated some local development opportunities related to the development of the entire biomass supply chain in Ontario and claims that over 3,500 full-time jobs could be created from harvesting and using biomass (Kennedy et al., 2011, p. 2).

However, as reported by Adams, MacDonald, & Houle (2012, p. 13) and reiterated by many of the interviewees, it was clear early on that renewable energy promotion and conservation efforts would be insufficient to fully replace Ontario’s coal capacity at least in the short run.



## 6.0 Phase-Out Implementation and Complementary Policies

The coal phase-out plan involved five coal-fired plants: Lakeview, Nanticoke (Ontario's largest coal plant), Lambton, Atikokan and Thunder Bay. One by one, their generating units have been either shut down for good or set for conversion to other fuels. Figure 4 below includes the reform's implementation milestones.

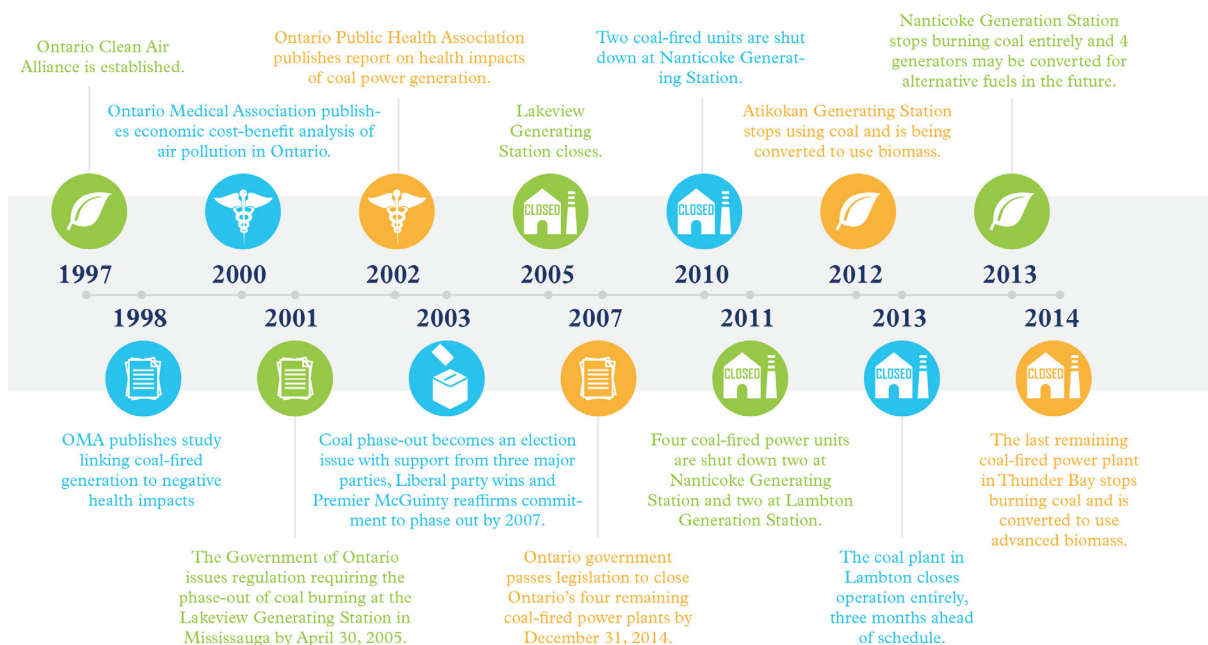


FIGURE 4. ONTARIO COAL PHASE-OUT TIMELINE

Source: IISD

The phase-out plan's implementation started with the closure of Lakeview Generating Station in Mississauga in April 2005. Over 2010–2013 three more coal-fired plants were taken offline. In April 2014 the last remaining coal-burning station in Thunder Bay was closed (CBC, 2014). The Atikokan and Thunder Bay coal-burning plants in Northwestern Ontario have been converted to burn conventional and advanced biomass respectively. The conversion of the plants helped maintain grid stability and minimize the economic impact on the communities.

Normally, a major structural policy reform such as fossil fuel phase-out would need operationalization by a suite of complementary policies to mitigate the negative impacts of the transition and provide alternative solutions to cover Ontario's energy needs. In Ontario, however, mitigation measures and transitional policies were not a major element of the reform for four reasons (Rosenbloom & Meadowcroft, 2014, p. 676). First, the contribution of coal to Ontario's electricity supply was comparatively small—25 percent at its height. Second, since coal was not mined within Ontario, the job market impacts were limited. Third, the lower-than-expected growth in demand balanced some of the upward pressure on retail power prices caused by the coal exit. Lastly, growing abundance and affordability made natural gas an attractive substitute for coal.

Nevertheless, the affected stakeholders point at the lack of mitigation measures as a major weakness in the reform's design. Dennis Brown, Mayor of Atikokan (1997–present), cautioned that “before you make a decision, the local people who will be directly impacted should be consulted. If a plant is going to be closed, costing hundreds of jobs, there needs to be a plan to retain jobs. In larger communities, one plant closing may not be a big deal, but in a small community it's everything. There should be a clear explanation about why the change needs to happen, and a detailed plan in place for what happens next. The Town of Atikokan were left to come up with the plan themselves” (IISD's Interview with Brown).



The government, however, integrated coal phase-out into a broader set of policies. Of particular interest among them is the overall reform of the Ontario electricity sector and the policies promoting renewable energy.

## 6.1 Restructuring the Ontario Electricity Sector

The decision to phase out coal in Ontario coincided with the need to restructure the electricity sector following the failed period of deregulation and privatization from 1998 to 2002 (Rosenbloom & Meadowcroft, 2014). The sector suffered from under-investment, aging generation facilities and soaring rates. The Liberal government intervened and reformed the market, implementing what Rosenbloom and Meadowcroft (2014) call a hybrid regime, where major generation facilities remain under public ownership and centralization plays a greater role than market forces.

The restructuring of the sector as well as the establishment of the OPA in 2004 were undertaken with certain objectives in mind: phasing out coal, ramping up conservation and promoting renewable energy technologies by means of multiple support mechanisms (Rosenbloom & Meadowcroft, 2014, p. 675). This may have helped to facilitate the introduction and successful implementation of the phase-out.

## 6.2 Shift Toward Energy Conservation and Renewables

Energy conservation and renewable energy sources provided at least partial responses to the two main concerns related to the phase-out: a gap in electricity supply that can only be filled with more expensive fuels, which would increase electricity rates. The OPHA report (2002) claimed that, for the coal phase-out, both natural gas and nuclear would only provide transitional solutions to the electricity supply gap, since both impose health and environmental risks themselves.

Established in 2001, the Ontario Sustainable Energy Association (OSEA) became a lobby organization for the development of a progressive renewable energy policy and community power projects in Ontario. OSEA's advocacy work has been mainly focused on the establishment of support mechanisms for renewable energy producers such as the feed-in tariff program. As such, OSEA's work did at least implicitly support the decision to phase out coal—implicit in that they supported renewables rather than actively campaigning against coal.

In 2009 Ontario passed the Green Energy and Green Economy Act (GEGEA). In an interview with Daniel Rosenbloom from Carleton University, he emphasized that it was the coal phase-out that lent legitimacy to the GEGEA and helped to create the space for the policy. (IISD's Interview with Rosenbloom). The GEGEA introduced a comprehensive program for the promotion of renewable energy technologies and energy efficiency, including a feed-in tariff program. The program offered an opportunity for the Liberal Party to address the electricity supply gap that was created by the phase-out with the positive side effect of building a new green industry sector and creating innovative jobs.

The Atikokan Generating Station has been converted to use biomass instead of coal as a feedstock. Four generators of the Nanticoke Generation Station may be converted for alternative fuels in the future. Rosenbloom's analysis of written sources found that, overall, coal capacity in the province was largely replaced by natural gas, with renewable energy playing a secondary role in this shift (IISD's Interview with Rosenbloom). This can be explained in part by the plummeting price of natural gas in the US.



## 7.0 Implications of the Coal Phase-out

While the coal phase-out in Ontario has been largely heralded as a success, there is an ongoing discussion of whether its benefits have outweighed its costs. As always in cost-benefit analysis, the answer to this question largely depends on the scope of costs and benefits considered, discount rate employed and timeline chosen.

On the one hand, GHG emission reductions from the phase-out have been tremendous. Since 2007, when coal accounted for about 25 per cent of its electricity generation, the province has reduced its GHG emissions by approximately 34 Mt or 17 per cent. The coal phase-out in Ontario has become “the single largest GHG reduction measure in North America” (OPA, 2013a).

On the other hand, the 2007 conference report entitled *The Future of Coal in Ontario? Towards a Clean, Secure and Competitive Energy Portfolio* includes statements describing the phase-out as ineffective in achieving both environmental and health-related benefits, and posited that it was costly and inconsiderate of geopolitical concerns (Purchase, 2007).

Structural reforms like coal phase-out tend to have larger impacts over time. Not enough time has passed yet to see the broader and fuller outcomes of the reform—for instance, health benefits and the demonstration effect for encouraging coal phase-out and climate action in other jurisdictions, both in Canada and abroad.

### 7.1 Impact on Electricity Prices

Coal was a cheap source of electricity but, as previously mentioned, was costly in other ways. Plant closure was also more expensive than retrofitting to reduce pollution from existing plants. OPG maintains that, by the time of the reform launch, it was already among the cleanest power generators in North America, and that cost-effective technology existed to address mercury and SO<sub>x</sub>, NO<sub>x</sub>, PM, from generation (IISD’s Interview with Lyng).

Energy Probe stated that the inflation-adjusted average cost of power in Ontario increased by about 51 per cent over the period 2004–2013 and has continued to increase by about 7–8 per cent since then (T. Adams, personal correspondence, January 14, 2015). One estimate puts the impact of the reform on the increase in the electricity bill of households and firms in Ontario at approximately CAD 5 billion per year (McKittrick, 2013).

Some interviewees commented that initially there was an upward impact on energy prices, as gas largely replaced coal and gas was a significantly higher priced commodity. However, natural gas is now cheaper and more efficient than it was in 2007 (Ontario Energy Report, 2014).

Bruce Lorie points out that “part of the costs associated with the phase-out were long-term infrastructure investment costs. When you shut down something old and build something new, it’s going to cost more, no matter what you build” (IISD’s Interview with Lorie, 2015).

### 7.2 Impact on Air Quality and Public Health

Because health concerns have been such an important driver in the phase-out decision, the impact of the reform on air quality is one of the most important outcomes of the reform.

Opinions on this topic vary. A report by Ross McKittrick (2013) claims that the coal phase-out led to extremely small improvements in air quality and that these improvements could have been achieved through the retrofit of emissions treatment equipment at a lower cost. Participants of the 2007 conference *The Future of Coal in Ontario? Towards a Clean, Secure and Competitive Energy Portfolio* argued that air pollution in Ontario is mainly caused by U.S. industry south of the border.

Ted Boadway of the OMA and Ontario Environment Commissioner Gordon Miller testify to a steady improvement in air quality in Ontario during and after the phase-out. In 2014 and in early 2015, there have been no smog advisories (Ministry of Environment and Climate Change [MOECC], n.d.), which is a drastic improvement over the last 12 years. At the same time, Miller notes that “while reports clearly show an



improvement, we can't specifically attribute this to the Ontario coal phase-out; it could also be U.S. efforts" (IISD's Interview with Miller). Others explain that the U.S. Clean Air Act had much more of an impact on air quality in Ontario than phasing out coal did, and that the United States and Ontario vehicle regulations were what really made the impact (IISD's Interview with Lyng).

### 7.3 Contribution to Jobs

The phase-out had an impact on jobs in Ontario. While exact numbers are not known, some estimate that thousands of jobs were lost due to decreased production, and others highlight that those jobs have been replaced with "green" jobs. For example, Dennis Brown, Mayor of Atikokan, explained that phasing out coal at the Atikokan Generating Station meant the loss of 90 well-paying jobs there. However, he also pointed out that, with the conversion to biomass, new jobs have been created for forestry operators, people making wood pellets and truck drivers to take the pellets from the plant to the generating station (IISD's Interview with Brown).

### 7.4 GHG Emissions Savings

The coal phase-out is often cited as the "single largest greenhouse gas reduction initiative in North America" (OPA, 2013a; MOECC, 2013). Although emission reduction was not initially a primary driver of the policy, it is undoubtedly one of its greatest successes. Since 2007, overall emissions in Ontario have declined by approximately 34 Mt or a total of 17 per cent. Emissions from the electricity sector have decreased by more than 55 per cent, which is largely attributable to the phasing out of coal-fired electricity generation (MOECC, 2015). Thanks to the phase-out, Ontario was able to surpass its 2014 target to reduce GHGs by 6 per cent below the 1990 level.

### 7.5 Political Implications

Domestically, through the campaign around the phase-out, Ontarians became more aware of environmental issues. According to Ontario's Commissioner for the Environment Gord Miller, this awareness also provided opportunities for renewable energy and policies supporting it. "The phase-out created space for a conservation first policy, opened doors for innovation, helped the public understand what was a highly technical issue, and now we're on the path towards a smart grid" (IISD's Interview with Miller).

David Butters of the Association Power Producers of Ontario argues that "the phase-out gave the government confidence that they could manage these kinds of environmental issues and move ahead with more extensive renewable energy programs like the feed-in tariff and Green Energy Act. It brought to their attention the importance of working on long-term investments in the energy sector, and we are still seeing those implications" (IISD's Interview with Butters).

The management of the phase-out was also criticized for a failure to properly integrate the plan with neighbouring states and provinces and the fact that the deadline for the phase-out was extended from 2007 to 2014. Despite these and other criticisms, there was no significant political backlash from the coal phase-out policy. The Liberal government of the day stuck with the decision and was re-elected in 2014.

In terms of geopolitics and external relations, stakeholders point out both minuses and pluses. On the downside, critics have raised energy security issues, including the increased exposure to natural gas markets due to the increase in electricity produced from natural gas imported from the United States (Purchase, 2007). On the upside, "the phase-out was hugely important because it put Ontario on the map for environmental policy" (IISD's Interview with Miller). The bold coal phase-out policy arguably laid the groundwork for strong GHG emission reduction policies, such as the recently announced Ontario cap-and-trade system. The phase-out showed politicians and the public alike that effective action can be taken without hindering economic growth.

The broader and longer-term geopolitical implications that we are yet to see is the inspiration and the demonstration effect that the phase-out of coal in Ontario can have on other jurisdictions seeking or considering coal-phase out as a step towards a low-carbon climate resilient future.





## 8.0 Lessons Learned

A number of regions and nations are considering coal phase-out. Each case has unique local circumstances, and the “blueprint” from Ontario will require modifications. In each case, the reform champions will have to work within the existing context, address different concerns, and encourage appropriate complementary policies. But the experience of coal phase out in Ontario provides important inspiration and insights for campaigners and policy entrepreneurs both in Canada and abroad. Key lessons are summarized below.

- *“Effective and credible communication is key.” – Ted Boadway, OMA*  
For the success of the campaign, it was essential that strong communicators talked about what they knew: doctors discussed health impacts of air pollution and environmentalists provided solutions to environmental protection issues. As Ted Boadway said, “the minute doctors start talking about how to generate electricity there’s a problem” (IISD’s Interview with Boadway). Both OMA and OCAA were very deliberate in selecting spokespeople that could convey a clear and concise message to the public across various platforms. Media training is a worthwhile campaign investment.
- *“Realistic timeline is everything.” – Gordon Miller, Ontario Environment Commissioner (2000–2015)*  
It is important that the reform targets and timeline are achievable. Even the OCAA agreed that the initial phase-out goal of 2007 was too aggressive a timeline. It made sense from a political view, but it was not realistic and led to broken promises and further delays (IISD’s Interview with Gibbons). Realistic timelines are also important for the campaign itself. Ted Boadway explains that the average public policy campaign takes seven years and campaigners need to understand this commitment upfront (IISD’s Interview with Boadway).
- *“Political will is crucial and if you have consensus it is much easier to move forward.” – David Butters, Association of Power Producers of Ontario*  
What is needed across different political and public opinion entities are “strong change agents that are highly aware of how conditions are changing to advance convincing narratives and [that] can align themselves with political parties” (IISD’s Interview with Rosenbloom). The Ontario phase-out would have been difficult to do if the Government of Ontario did not own OPG and did not have the political will to accept the financial consequences of the policy. The government was willing to write off its own assets, and this was key (IISD’s Interview with Lyng). It is important to have champions both within and outside of government. Equally important is to undertake broad consultations with stakeholders to increase “ownership” of the reform.
- *“Do a careful and honest analysis of the local opportunities and costs.” – Bruce Lorie, campaign funder*  
The broader and more methodologically solid the review of social, economic and environmental costs and benefits of the reform is, the better. From climate change and environmental perspectives, there should be a credible analysis of air quality improvements and GHG emissions savings. From a public health standpoint, “health costs are really important. The public has to know the health consequences and that burning coal is not a benign activity” (IISD’s Interview with Miller). Further, reformers should look carefully at the costs of alternative sources of power, the reliability impacts of coal power and its alternatives, and the most efficient measures to mitigate pollution emissions from coal power. Local context is important—for instance, the cost of capital and costs of coal alternatives.
- *“Have a detailed plan.” – Dennis Brown, Mayor of Atikokan (1997–present)*  
It is important to have a long-term, big-picture plan about what will, and how and when to replace coal—and how this reform relates to other reforms in the energy sector and more broadly. For instance, if electricity prices are expected to increase and some working places can be lost, how can vulnerable households be protected? How can the competitiveness of large industrial consumers be supported through energy efficiency and other measures? How can the potential of renewable energy be unlocked



to make it replace coal and gain economies of scale in the energy mix? How is the fuel switch linked to the energy sector's restructuring and attracting investment into new generation capacity? Daniel Rosenbloom outlined that eliminating coal-fired generation was a huge step for Ontario towards a low-carbon society, but it has initially resulted in a shift from one fossil fuel to another by replacing coal with natural gas. He cautions, "whenever you invest in a fossil-fuel-based facility, you need to be cognizant of large sunk costs that will drive continued use of energy sources that don't fit with a carbon constrained world" (IISD's Interview with Rosenbloom).

- *"There are always unintended outcomes: good and bad."* – *International Institute for Sustainable Development*  
For the authors of this report, one of the most striking lessons learned was the discrepancy between the stated objectives of the reform and its actual outcomes. The main intended outcome of Ontario's coal phase-out was improving the air quality. This has been achieved, but can be attributed not just to coal phase-out in Ontario itself. Mitigation of air pollution across the border in the United States has played a significant role, too. At the design stage, at least some of the reform visionaries expected the replacement of coal-fired generation with renewables. In reality, however, the province has shifted from one fossil fuel to another by replacing coal with natural gas. While Ontario has pioneered some progressive clean energy policies in parallel with the coal phase-out, the "shale gas revolution" made natural gas a cheaper substitute. Finally, climate change mitigation benefits were not a major consideration at the reform design stage, but have become one of its main successes. The precedent set by what has become the "single largest greenhouse gas reduction measure in North America" should not be underestimated. Ontario's success is a critical example that can inspire political will and public engagement in other parts of the globe. The organizations and individuals who have made Ontario coal-free deserve every credit for demonstrating that the end of coal is feasible.



## References

- Acemoglu, D. & Robinson, J. (2001). A theory of political transitions. *American Economic Review*, 91 (4), 938–963.
- Adams, J. L., MacDonald, D., & Houle, D. (2012). *The coal industry and electricity policy CPSA submission*. Toronto: University of Toronto.
- Association of Major Power Consumers of Ontario. (2006, April 10). New research finds Ontario becoming increasingly uncompetitive because of higher electricity rates. Retrieved from <http://ampco.org/details.php?sID=56>
- Beaton, C., Gerasimchuk, I., Laan, T., Lang, K., Vis-Dunbar, D. & Wooders, P. (2013). *A guidebook to fossil-fuel subsidy reform for policy-makers in South-East Asia*. Geneva, Switzerland: Global Subsidies Initiative of the International Institute for Sustainable Development. Retrieved from <http://www.iisd.org/publications/guidebook-fossil-fuel-subsidy-reform-policy-makers-southeast-asia>
- CAN Canada. (2015, May 15). Canada announces climate commitment and it's weaker than it looks. Retrieved from <http://climateactionnetwork.ca/2015/05/15/canada-announces-climate-commitment-and-its-weaker-than-it-looks/>
- CBC. (2014). *Thunder Bay Generating Station stops burning coal*. Retrieved from <http://www.cbc.ca/news/canada/thunder-bay/thunder-bay-generating-station-stops-burning-coal-1.2610782>
- Commission for Environmental Cooperation. (2003, May 7). *CEC receives submission aimed at Ontario power plants*. Press Release. Montreal, Canada: CEC.
- Commission for Environmental Cooperation. (2004, May 7). *CEC dismisses revised Ontario Power Generation submission*. Press Release. Montreal, Canada: CEC.
- Collier, P. (2003). *Natural resources, development and conflict: Channels of causation and policy interventions*. Washington, D.C.: World Bank.
- Corduneanu-Huci, C., Hamilton, A. & Ferrer I. M. (2013). *Understanding policy change: How to apply political economy concepts in practice*. Washington, D.C.: World Bank.
- Dahl-Østergaard, T., Unsworth S., Robinson M., & Jensen R.I. (2005). *Lessons learned on the use of power and drivers of change analyses in development co-operation*. Paris: Organisation for Economic Co-Operation and Development, Development Assistance Committee Network on Governance.
- Department for International Development. (2005). *How-To Note: Lessons learned—Planning and undertaking a drivers of change study*. Practice Paper. London, U.K.: DFID.
- DSS Management Consultants. (2005). *Cost benefit analysis: Replacing Ontario's coal-fired electricity generation*. Toronto: Ontario Ministry of Energy.
- Environment Canada. (2000). *Canada-United States Air Quality Agreement*. Retrieved from <http://www.ec.gc.ca/air/default.asp?lang=En&n=83930AC3-1>
- Foxon, T. (2010). *A coevolutionary framework for analysing a transition to a sustainable low carbon economy*. Leeds: Sustainability Research Institute, University of Leeds.
- Fritz, V., Levy, B. & Ort, R. (2014). *Problem-driven political economy analysis: The World Bank's experience*. Washington, D.C.: World Bank.
- Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions*, 1, 24–40.



- Independent Electricity System Operator. (2015). Monthly energy output by fuel type. Retrieved from <http://www.ieso.ca/Pages/Power-Data/Supply.aspx>
- International Energy Agency. (2015). Global energy-related emissions of carbon dioxide stalled in 2014. Retrieved from <http://www.iea.org/newsroomandevents/news/2015/march/global-energy-related-emissions-of-carbon-dioxide-stalled-in-2014.html>
- Kennedy, M. et al. (2011). *Biomass Sustainability Analysis: An assessment of Ontario-sourced forest-based biomass for electricity generation*. Pembina Institute.
- Kim, J. (2014). *Behind the curtain: One theory of social change*. Ford Foundation. Retrieved from <http://www.fordfoundation.org/equals-change/post/behind-the-curtain-one-theory-of-social-change>
- Kingdon, J. (2003). *Agendas, alternatives, and public policies*. Boston: Little, Brown and Co.
- Legislative Assembly of Ontario. (2002). *Select Committee on Alternative Fuel Sources: Final Report*. Toronto, Canada: Legislative Assembly of Ontario.
- Meadowcroft, J. (2009). What about the politics? Sustainable development, transition management, and long term energy transitions. *Policy Science*, 42, 323–340.
- McKittrick, R. R. (2013). *Environmental and economic consequences of Ontario's Green Energy Act*. Toronto, Canada: Ontario Prosperity Initiative, Fraser Institute.
- Ministry of the Environment, and Climate Change. (n.d.). Summary of special air quality statements and smog and air health advisories. Retrieved from [http://www.airqualityontario.com/aqhi/advisories\\_stats.php](http://www.airqualityontario.com/aqhi/advisories_stats.php)
- Ministry of the Environment and Climate Change. (2015). *Ontario's climate change update 2014*. Retrieved from <https://dr6j45jk9xcmk.cloudfront.net/documents/3618/climate-change-report-2014.pdf>
- Ontario Energy Report. (2014). *Ontario energy report Q4 2014*. Retrieved from [http://www.ontarioenergyreport.ca/pdfs/Energy%20Quarterly\\_Electricity\\_Q4.pdf](http://www.ontarioenergyreport.ca/pdfs/Energy%20Quarterly_Electricity_Q4.pdf)
- Ontario Medical Association. (1998). *OMA ground level ozone position paper*. Toronto, Canada: Ontario Medical Association. Retrieved from <http://www.godel.net/environment/smog/OMAGroundlevelozone.htm>
- Ontario Medical Association. (2000). *The illness costs of air pollution in Ontario: A summary of finding*. Toronto, Canada: Ontario Medical Association.
- Ontario Power Authority. (2005). *Supply mix advice report*. Retrieved from: <http://www.powerauthority.on.ca/integrated-power-system-plan/volume-1-advice-and-recommendations>
- Ontario Power Authority. (2010). *Ontario's long-term energy plan: Building our clean energy future*. Toronto, Canada: Queen's Printer for Ontario.
- Ontario Power Authority. (2013a). *Achieving balance: Ontario's long-term energy plan*. Toronto, Canada: Ministry of Energy Toronto, Ontario.
- Ontario Power Authority. (2013b). *Making choices reviewing Ontario's long-term energy plan*. Toronto, Ontario: Ministry of Energy. Retrieved from <http://www.powerauthority.on.ca/sites/default/files/Making-Choices.pdf>
- Ontario Public Health Association (2002). *Beyond coal: Power, public health and the environment*. Toronto, Canada: Ontario Public Health Association.
- Purchase, B. (2007). *The future of coal in Ontario? Towards a clean, secure and competitive energy portfolio*. Mississauga, Canada: Council for Clean & Reliable Electricity.



- Rosenbloom, D. & Meadowcroft., J (2014). The journey towards decarbonization: Exploring socio-technical transitions in the electricity sector in the province of Ontario (1885-2013) and potential low-carbon pathways. *Energy Policy*, 65, 670–679.
- Ross, M. (2013). *Oil curse: How petroleum wealth shapes the development of nations*. Princeton: Princeton University.
- Rowlands, I. H. (2007). The development of renewable electricity policy in the Province of Ontario: The influence of ideas and timing. *Review of Policy Research*, 24 (3), 185–207.
- Sabatier, P. (1988). An advocacy coalition framework of policy change and the role of policy-oriented learning therein. *Policy Sciences*, 21 (2–3), 129–168. doi:10.1007/BF00136406
- Swift, J. & Stewart, K. (2005). Union power: The charged politics of electricity in Ontario. *Just Labour* 5, 14–22.
- The Guardian. (2015, June 8). G7 leaders agree to phase out fossil fuel use by end of century. Retrieved from <http://www.theguardian.com/world/2015/jun/08/g7-leaders-agree-phase-out-fossil-fuel-use-end-of-century>
- Toronto Star. (2000, October 17). *Progress on smog*.
- Toronto Star. (2003, May 5). *Clean air plan needed*.
- Vidican, G. & Johnson, O. (2013, October 17–18). *Sustainable and inclusive energy transitions: Negotiating knowledge, politics and policy*. Paper presented at the PEGNet Conference, Copenhagen.



Weible, C., Sabatier, P., Jenkins-Smith, H., Nohrstedt, D., Henry, A.D. & deLeon, P. (2011). Quarter century of the Advocacy Coalition Framework: An introduction to the special issue. *Policy Studies Journal*, 39(3), 349–360.

Winfield, M. S. (2012). *Blue-green province: The environment and the political economy of Ontario*. Vancouver, British Columbia: UBC Press.

## Annex: Comparison of Frameworks for Energy Sector Reform Analysis

The conceptual literature applicable to energy sector transformations as an individual case of social and policy change is growing. In very broad terms, there are two types of publications.

First, there is both academics' and practitioners' analyses of successful and unsuccessful attempts at policy transformations in the past. Some of these publications start by reviewing the context: given factors such as political regimes or resource endowment (Collier 2003; Ross 2013) as well as institutions (Acemoglu & Robinson, 2001). This literature also looks at complementary policy measures, innovation systems and technology development (Foxon 2010; Geels 2011; Meadowcroft 2009). A large amount of publications deal with natural resource endowment and the “resource curse” as a major factor of entrenched energy and policy choices (Collier 2003; Ross 2013).

Second, there are more action-oriented methodologies and handbooks on the “how-to” of energy transitions (Beaton et al., 2013; Fritz, Levy & Ort 2014; Corduneanu-Huci, Hamilton & Ferrer 2013; Dahl-Østergaard et al., 2005; Department for International Development, 2005). Researchers in this group typically pay more attention to the role of policy “entrepreneurs” (policy-makers, activists) and their alliances and coalitions (Vidican & Johnson, 2013). The simplest exercise in this respect is stakeholder mapping, but there are much more sophisticated approaches. For example, the Advocacy Coalition Framework (ACF) (Sabatier, 1988; Weible et al., 2011) looks at how bringing usual and unusual allies together can drive change, and how policy entrepreneurs can learn to replicate successes of coalitions.

For all researchers, the challenge is always to determine causality, feedback loops and interdependencies among different factors influencing the reform. This probably explains why many frameworks and “theories of change” are still struggling to explain the mechanisms behind social transformations to provide clear guidance on transition to sustainable development.

In preparing this draft, we have drawn on four approaches, in particular the IISD-GSI's framework for fossil fuel subsidy reform (Beaton et al., 2013), ACF (Sabatier, 1988; Weible et al., 2011), the concept of multiple streams by Kingdon (2003) and Ford Foundation's theory of social change (Kim, 2014). These frameworks have been extremely useful in diagnosing various elements of the reform's infrastructure and its political, economic, social and environmental components; as well as mapping stakeholders. But for fitting the description of the actual reform in Ontario to either of them, an explanation of the frameworks themselves would require too much of a reader's attention. Further, these frameworks exclude the “complementary policies” aspect of the reform, which has always been of particular interest to IISD.

Therefore, to help the reader navigate the analysis, we relied on the concept of the “window of opportunity” and suggested that all elements critical to a sustainable energy transition can be clustered within the four “panes” of this “window”: context, champions, concerns and arguments, and complementary policies (Figure 1 in the main body of the report).

The table below explains how this “window of opportunity” framework roughly corresponds to the approaches by Beaton et al. (2013), Sabatier (1988), Weible et al. (2011), Kingdon (2003) and Kim (2014).



IISD'S "WINDOW OF OPPORTUNITY"	FACTORS UNDER ANALYSIS	ELEMENTS OF IISD-GSI'S FRAMEWORK FOR FOSSIL FUEL SUBSIDY REFORM	ELEMENTS OF ACF	ELEMENTS OF FORD FOUNDATIONS' THEORY OF SOCIAL CHANGE	ELEMENTS OF KINGDON'S CONCEPT OF MULTIPLE STREAMS
Context	Infrastructure and enabling conditions	Non-subsidy economic and social assistance	Relatively stable parameters Long-term coalition opportunity structures	Organisational infrastructure	Policy
Champions	Campaigners, politicians and officials	Building support for reform	Policy subsystem and elements that coalesce	Engaged individuals	Politics
Concerns and arguments	Social, economic and environmental considerations	Fiscal, social, economic and environmental problems caused by subsidies. Knowledge & transparency on subsidy costs and impacts	External subsystem events Short-term constraints and resources of subsystem actors	Political opportunity	Problems
Complementary policies	Regulations and alternative solutions	Getting the prices right Managing Impacts	-	-	-

Source: IISD



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