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**Competing Policy Paradigms and Hard Path Inertia: The Search for Sustainability  
in Ontario Electricity Policy**

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The design and role of Ontario's electricity system have been central elements of debates about the province's economy and environment since the system's origins at the beginning of the twentieth century. Although electricity accounts for only one-fifth of the province's total energy consumption, questions around the generation, distribution and conservation of electrical energy dominate Ontario's energy policy discourse (Joshi, 2012). The scale of Ontario's electricity system is substantial. The province plans expenditures in the range of \$87 billion over the next thirty years on its maintenance and expansion (Ministry of Energy, 2010), a level of investment comparable to that anticipated in the development of Alberta's oil sands.<sup>2</sup> The consequences of the decisions made about the Ontario system's direction are of no less economic, social and environmental importance to Canada's future.

For the first seventy years of their existence, the institutions and policies that defined the province's electricity system operated in an environment of relative stability. In contrast, the past three decades have been characterized by growing policy instability. Since the late 1970s Ontario has moved through a succession of apparently contradictory policy models: supply planning; "soft" energy paths and integrated resource planning; a "market" model; a "hybrid" model combining market and planning elements; a renewable energy paradigm centred around the 2009 *Green Energy and Green Economy Act* (GEGEA); and most recently an *ad hoc* approach driven by political management considerations. The consequences of the latter model played no small role in Premier Dalton McGuinty's October 2012 announcement of his intention to resign (Howlett, Morrow and Waldie, 2012).

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<sup>1</sup> The authors wish to thank Sarah Goldstein for her research and editorial assistance in preparing this chapter.

<sup>2</sup> The Government of Alberta currently estimates domestic and international investment commitments to the oil sands in the range of \$100 billion (Alberta, 2012).

In a political economy context, the primary focus of discussions of energy policy has been on the tensions between the liberal and particularly neo-liberal emphasis on markets as the most efficient mechanism for making decisions about developing energy resources and, alternatively, state-centred approaches, which stress the importance of democratic control over energy policy. Progressive students of energy policy in contrast, generally following the pioneering work of Amory Lovins (1980), have emphasized the importance of the technical and planning paradigms around which energy systems have been designed as being more central to understanding energy policy decisions. These approaches are grounded in the observation that both publicly and privately owned and controlled energy utilities have suffered from the same ‘hard’ path pathologies of massively overbuilding large, capital intensive, inflexible, high environmental impact, high catastrophic event risk energy supply technologies (e.g. nuclear and coal), and underemphasizing the ‘soft’ path options of energy efficiency and smaller, more flexible low-impact renewable energy sources. Authors working on energy-related questions within political economy frameworks have tended to highlight the centrality of the specific material character of energy resources (e.g. their particular physical properties and nature of the technologies and infrastructure required for their use) to the understanding of governance and public policy issues around them (Mitchell, 2011).

The underlying normative framework for the chapter considers how the Ontario electricity system can be configured to advance sustainability and system stability. Sustainability is defined here as incorporating the core Brundtland elements of intergenerational and intragenerational justice.<sup>3</sup> The chapter also draws on more recent reflections on sustainability (Gibson, 2006) and works specific to energy issues (Jaccard, 2005; Winfield, Gibson, Martvart, Gaudreau, and Taylor, 2010). These contributions incorporate considerations regarding the importance of system resilience, adaptive capacity, and the avoidance of path dependency; precaution, particularly with respect to the potential for catastrophic events; the need for economic and resource efficiency; the centrality of socio-ecological civility and democratic governance; and the

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<sup>3</sup> Classically expressed in the Brundtland World Commission on Environment and Development report *Our Common Future* (Oxford University Press:1987) as “development that meets the needs of the present without compromising the ability of future generations to meet their needs.”

avoidance of geopolitical risks in energy system design. Such a framework leans towards the 'soft' path technological options, but also highlights the importance of the role of the state in system planning to ensure democratic governance.

Within these theoretical contexts, the following chapter argues that the electricity policy situation in Ontario reflects the extent to which the long-standing historical consensus around the objectives of the province's electricity system of providing cheap and abundant electricity, and the planning models used to support those objectives, has broken down. New actors, including organized environmental interests and, more recently, an emergent renewable energy industry, have challenged the system's traditional assumptions and directions in terms of their environmental and social consequences, ability to deliver electricity reliably and at least cost, and to adapt and respond appropriately to the rapid changes occurring in the province's economy and society. The result has been a highly unstable policy environment in which different constituencies have been able to take advantage of the "policy windows" (Kingdon, 1995) created by convergences of problems and 'crises', political circumstances and the availability of new policy ideas, to take control of the electricity policy agenda – until the arrival of the next window.

In this environment, decision-making around electricity became explicitly politicized to an extraordinary degree during the latter stages of the McGuinty government, with no clearly defined path forward. Rather, the policy environment has come to be defined by a combination of low legitimacy and high instability. The province's new premier faces decisions about the overall design and course of the province's electricity system in the face of uncertainty about the future direction of electricity demand and the shape of the province's economy, as well as more specific questions about the fate of Ontario's "green" energy initiatives and its quietly increasing reliance on nuclear energy. These are questions that will require more than day-to-day political management to resolve.

In attempting to understand the origins of the province's current situation, the chapter pays particular attention to the competing policy and governance paradigms (Skogstad, 2008) for the electricity system being advanced by different actors. The importance of the role of underlying normative concepts and factors in understanding

public policy, particularly energy policy, has been highlighted by a number of authors (Doern and Toner, 1985; Doern and Gattinger, 2003; Dryzek, 2005; Winfield, 2012). There has been a tendency in the mainstream Canadian public policy literature to address these questions through proxies of state and non-state actors rather than treating them as important variables in their own right. As such the paper explores the six policy paradigms that have defined the system from its origins in 1906 under the auspices of Sir Adam Beck's Ontario Hydro-Electric Power Commission (HEPC), in terms of their normative assumptions, the institutional and societal actors that supported them, and the circumstances which led to their demise and the emergence of new paradigms.

### **Paradigm 1: Supply Planning**

A supply planning paradigm guided Ontario's electricity system over the first seventy years following the creation of the Ontario Hydro-Electric Power Commission (HEPC) by the government of James Whitney in 1906. The supply planning model sought to expand electricity capacity to meet projected demand growth by way of centralized, large-scale generation facilities whose economies of scale yielded lower electricity rates (Swisher, Jannuzzi, and Redlinger, 1997). Supply planning typically led to monopoly system structures, rapid capacity expansions in the form of capital-intensive energy mega-projects, hierarchical transmission and distribution systems, the active encouragement of electricity consumption as it was believed to be essential to economic growth, and political interventions to keep rates low. In Ontario, the HEPC and its successor, Ontario Hydro, are widely regarded to have been archetypical supply planning entities – monopolies responsible for planning, building and operating the electricity generation and transmission system. The model defined the role and approach of most publicly and privately owned utilities in North America until the 1980s.

Anticipating ever-increasing demand for electric power, the HEPC set out in the 1920s to develop or purchase all of the viable hydroelectric sites available in Ontario. The exhaustion of accessible and economic hydraulic sites, coupled with increasing post-World War II electricity demand, led to the addition of coal-fired generation from the early 1950s onwards (Macdonald, Carr, Gillespie, Grant, McKeough, Sutherland,

and Waverman, 1996). The availability of uranium deposits in Northern Ontario prompted recommendations that in the longer-term, large-scale nuclear power plants provide the foundation of both new supply and the development of an export-oriented nuclear industry in the province. By the late 1960s the province's first nuclear generating station (Douglas Point) was online, another (Pickering) was under construction, and plans for further stations announced (Freeman, 1996, p. 126).

Private industry played a major role in sustaining the supply planning model in Ontario. Major industrial energy consumers supported the supply planning model believing that its 'economies of scale' approach provided cheap, abundant and reliable supplies of energy. The interests of three primary actors were supported by this governing paradigm, namely the HEPC and its successor (Ontario Hydro), industrial energy consumers, and the Progressive Conservative "dynasty" that dominated the province's politics for most of the twentieth century (Swift and Stewart, 2004, p. 14).

## **Paradigm 2: Supply Planning Meets Soft Energy Paths – Integrated Resource Planning**

Debates began to emerge throughout North America over the prudence of the supply planning policy paradigm from the mid-1970s onwards. These arguments were driven by a combination of concerns over the widespread and massive cost-overruns on the utility-sponsored nuclear projects that the model had spawned, the environmental impacts of coal-fired electricity, energy security concerns resulting from the 'oil shocks' of the mid-1970s and the safety implications of the 1978 Three Mile Island nuclear accident (Swift and Stewart, 2004, p. 3). The central figure in the emerging critique was Amory Lovins, an energy researcher trained in physics. Lovins (1980) challenged the supply planning based "hard" energy path and its emphasis on large-scale centralized technologies on the basis that:

- It is inflexible and results in path dependency limiting the ability of future decision-makers to adopt new and superior technologies;
- It is inefficient and costly due to its capital-intensive nature and its tendency to overbuild supply; and

- The scale and complexity of hard path infrastructure subjects the system to greater risk of malfunction and disruption.

Lovins argued instead for an approach based on “soft” technologies such as energy efficiency and renewable energy. The principles of the “soft” path paradigm were as follows:

- Perpetual growth in electricity demand is not necessary for economic prosperity;
- The environment is a finite system – the environment has limits;
- Distributed generation is preferable to centralized control;
- The electricity system should be flexible, diverse, sustainable and benign;
- Conservation and efficiency should be pursued first, renewables second;
- Energy supply should be matched to end-use needs in terms of scale and quality;
- There must be opportunities for broad participation in the energy system; and
- Low impact fossil-fuel technologies (e.g. natural gas) should be used to enable the phase-out of nuclear and other “hard” path technologies (pp. 176 and 191).

Lovins’ critics, particularly established actors in the energy sector, viewed his ideas as unnecessary, infeasible and even dangerous (Robinson, 1982, p. 27). To others, however, they represented an alternative policy paradigm - one that, to this day, continues to provide much of the intellectual foundation of critiques of conventional approaches to energy system planning and technological choices. In Ontario, criticism of the supply planning model and Ontario Hydro’s expansionary aspirations had begun to emerge even before Lovins’ articulation of the “soft” path concept. A diverse and fragmented group of anti-nuclear advocates, environmental organizations, opposition party politicians and energy experts had already started to argue that Ontario Hydro was grossly overestimating future electricity demand, hiding the true costs of nuclear projects, ignoring the potential for improvements in energy efficiency and the emergence of new renewable energy technologies (Swift and Stewart, 2004).

In response to the emerging public concerns over Ontario Hydro’s approach and activities, a Royal Commission on Electric Power Planning, chaired by Arthur Porter,

was established by the Davis government in 1975. The Porter Commission, as it was known, was mandated to investigate Hydro's demand forecasts and nuclear program. The Commission's 1980 final report challenged the soundness of Ontario Hydro's planning assumptions and recommended that "the rigidity of supply planning, with its fixation on large-scale nuclear plants, be abandoned for the flexibility of demand management and smaller-scale additions to generation capacity" (Swift and Stewart, 2004, p. 28). The government nominally accepted the bulk of the Commission's recommendations, and Ontario Hydro initiated some energy conservation programs, but the focus on the development of major nuclear energy projects, particularly the Darlington facility east of Toronto, continued (Winfield, 2012, p. 34).

The fall of the Progressive Conservative "dynasty" after the 1985 provincial election and its replacement by a minority Liberal government, led by David Peterson, seemed to reinforce the shift in a 'softer' path direction. Neither partner in the Liberal-NDP accord that brought Peterson to power was politically committed to nuclear energy; indeed both parties had been regular critics of Ontario Hydro's approach to electricity matters during the Davis period. The 1986 final report from the Legislature's Select Committee on Energy, established under the auspices of the accord and delivered in the aftermath of the Chernobyl nuclear accident in the Ukraine, echoed many of the Porter Commission's conclusions, further legitimizing the "soft" path option. The committee found that Ontario Hydro's nuclear expansion plans impeded conservation efforts and recommended a focus on small-scale generation and investments in energy efficiency (Swift and Stewart, 2004, pp. 54-56).

Despite concerns over the extent of the cost overruns on the Darlington project, the Peterson government ultimately authorized its completion, but also pressed Ontario Hydro to move in the direction of more integrated resource planning (IRP) that considered the supply *and* demand sides of the province's electricity needs while adding conservation and renewable energy sources to its list of more traditional options. The resulting 1989 Ontario Hydro Demand Supply Plan (DSP) seemed to reflect some of these directions, incorporating extensive conservation programs and environmental analyses of the options it proposed. But the plan also still strongly reflected Ontario Hydro's supply planning heritage - based on assumptions that economic growth

required increasing amounts of electric power and calling for the construction of new nuclear and natural gas-fired generating facilities (Winfield, 2012, p. 59).

Bob Rae's NDP government, which succeeded the Peterson Liberals in 1990, seemed poised to move even more substantially in a "soft" path direction, with strong policy commitments to energy efficiency in its platform, and the announcement of a moratorium on future nuclear construction in its initial Speech from the Throne. These directions would, however, be overtaken by a series of new crises involving the electricity file. The recession of the early 1990s resulted in declining, rather than growing, electricity demand, first leading to the deferral of any new generating projects and then the withdrawal of the 1989 DSP. Dramatic increases in electricity rates, excessive generating capacity in the context of declining demand as the Darlington facility came into service, and a \$26 billion debt largely arising from Darlington and the earlier Pickering and Bruce nuclear projects, led Ontario Hydro's incoming chairman, Maurice Strong (1992-1995), to declare the utility a "corporation in crisis" (Ontario Power Generation Review Committee, 2004). Plans for both nuclear construction and energy efficiency programs were abandoned as the corporation's staff was reduced by 30 per cent (Winfield, 2012, p. 75).

The effort to create an Integrated Resource Planning model by injecting the supply planning model with 'softer' path elements effectively had collapsed. The province found itself in a vacuum with respect to the direction of electricity policy and with a provincial utility whose credibility as the planner, builder and manager of Ontario's electricity system was seriously damaged (Trebilcock and Daniels, 1996, p. 63).

### **Paradigm 3: Deregulation and Competitive Markets**

The *Common Sense Revolution* platform that helped carry Mike Harris' Progressive Conservatives to victory in the 1995 provincial election said little about electricity policy beyond the promise of a five-year rate freeze. In practice however, the Harris government, propelled by the combination of the ongoing collapse in confidence in Ontario Hydro, its own strong neoliberal ideological orientation, and the influence of market-based policy models being adopted in the United Kingdom and the United



States in response to failures of supply planning models in those jurisdictions, embarked upon the most significant restructuring of the province's electricity system ever undertaken to that point.

The market-based policy paradigm pursued by the Harris government was outlined by the government's Advisory Committee on Competition in Ontario's Electricity System, chaired by former federal Liberal finance minister and previously chair of the federal royal commission that recommended the free trade agreement with the United States, Donald Macdonald. The Committee sought to transition the electricity system from a publicly-owned monopoly to a competitive system controlled and administered by a mix of private or public enterprise (Macdonald et al., 1996, p. 27). The system planning functions of Ontario Hydro would be eliminated. Instead, private investors would make decisions about investment in new generating capacity, acting in response to the potential returns on investment that would flow from meeting anticipated future demand. In theory this would avoid the problem of the massive over-construction of generating assets that had led Ontario Hydro and many US utilities into financial crisis.

Rather than having prices set by Ontario Hydro or a utility regulator, the consumer price of electricity would be determined by the wholesale market, into which any qualified generator could sell power. As a result, electricity consumers would face a rate system characterized by far greater price fluctuations and potential for price increases in response to high demand than the previous model. Ontario Hydro itself would be broken up, and the portion of the electricity market controlled by its successor companies reduced (Macdonald et al., 1996, pp. 26, 33, 34).

The market-based model was to be implemented through the 1998 *Energy Competition Act*. The Ontario Energy Board (OEB) was given an expanded mandate to regulate the wholesale and retail electricity markets and an Independent Market Operator (IMO) (later renamed the Independent Electricity System Operator (IESO)) was created to manage the day-to-day operation of the electricity market. Ontario Hydro itself was split into a series of provincially-owned entities: Ontario Power Generation (OPG) assumed control of Ontario Hydro's generating assets; Hydro One took responsibility for the management and operation of the transmission and rural distribution network; and the Ontario Electricity Financial Corporation (OEFC) absorbed

\$22 billion of Ontario Hydro's 'stranded' debt<sup>4</sup>, effectively transferring it from the successor corporations to the provincial government. An Electrical Safety Authority took over Ontario Hydro's electrical safety regulation functions.

The drive towards markets was not based on widespread public support. In fact, the constituency for the market model was relatively narrow - principally academic economists; large industrial power users represented by the Association of Major Power Consumers of Ontario (AMPCO); the market-oriented environmental group Energy Probe; potential builders of new generating facilities; and investment dealers hoping to profit from the anticipated privatization of OPG's fossil-fuel and hydro-electric assets and Hydro One (Swift and Stewart, 2004, pp. 120, 147, 154).

The government's initial plan was for competitive electricity markets to open within two years of the adoption of the *Energy Competition Act*. In practice the process of introducing markets proved much more complex than suggested by the elegant neo-classical economic theories that had underlain the Macdonald and subsequent market design committee reports. The implementation of competitive markets required the development of major new capacities and regulatory frameworks on the part of the OEB, IESO and local electricity distribution companies.

In the meantime, seven of the province's twenty nuclear power reactors had to be taken out of service in 1997 as a result of serious concerns over maintenance and operating practices under the auspices of a Nuclear Asset Optimization Plan (NAOP). The missing power was made up through dramatic increases in generation from OPG's coal-fired plants. The resulting growth in air pollution and greenhouse gas (GHG) emissions made the plants the target of high-profile campaigns. Environmental and public health organizations, led by the newly established Ontario Clean Air Alliance and including the Ontario Medical Association, advocated the plants' closure, rather than sale to private operators. The repair and refurbishment of the "laid-up" reactors at the Pickering and Bruce facilities was itself subject to major delays and cost-overruns (Winfield, 2012, p.140). The government's attempt to privatize Hydro One was blocked

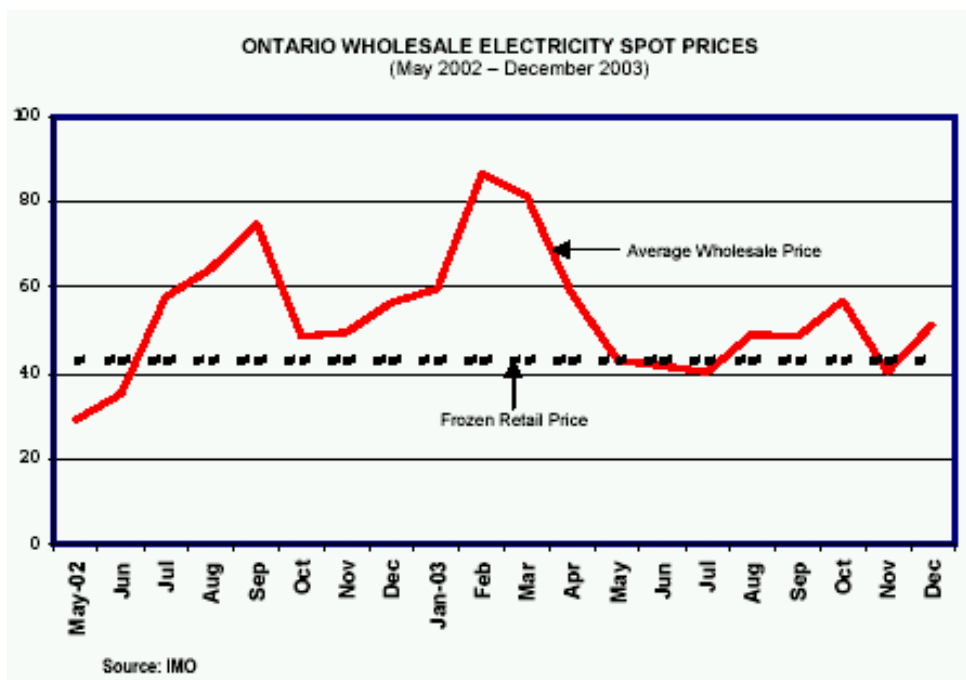
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<sup>4</sup> This was debt that the corporation had no reasonable prospect of being able to repay and which would have rendered the successor corporations, particularly OPG and Hydro One, unable to function effectively. The debt is being paid down through a "debt retirement charge" on consumers' electricity bills.

by a court challenge led by the Canadian Union of Public Employees and the Communications, Energy and Paperworkers Union (Gans, 2002). The rising executive salaries at Ontario Hydro's successor companies to 'match' private sector expectations added more fuel to the growing political fires.

Competitive wholesale and retail electricity markets did eventually open in Ontario on May 1, 2002, nearly two years behind the government's original schedule. Complications began to arise almost immediately. The summer of 2002 was exceptionally hot, with the result that electricity demand, driven by air conditioning loads, reached record highs. The retail and wholesale markets reacted to this situation precisely as they had been designed, pushing consumer electricity costs upwards, as shown in Figure 1 below. The public, which had been repeatedly assured by Premier Harris and Minister of Energy, Science and Technology Jim Wilson that markets would "help keep [electricity] prices low" (Benzie, 2001) reacted angrily. The government responded with a major retreat from the market model, terminating the competitive retail electricity market in November 2002 and fixing the consumer electricity price at 4.3 cents per kWh for the next six years, retroactive to May 1, 2002. Picking up on themes raised in the June 2002 report of the Legislature's Select Committee on Alternative Fuels (Galt, 2002), a number of modest initiatives related to energy conservation and renewable energy, options that had been almost completely ignored in the design of competitive markets, were announced at the same time.

Figure 1: Ontario Wholesale Electricity Spot Prices May 2002 – December 2003  
(Electricity Conservation and Supply Task Force, 2004)



Adding to the government's problems were growing concerns, particularly among major industrial electricity consumers, about the security of the province's long-term electricity supply. Industrial consumers, who had originally been strong supporters of the move to competitive markets, now began to question the model's ability to ensure that future demand would be met through private investments in new generating capacity, particularly as the bulk of the province's coal-fired and nuclear power plants would reach the end of their normal operational lives over the coming twenty years. In response, an Electricity Conservation and Supply Task force was established by the government in June 2003 with a mandate to develop a plan for attracting new generation, promoting conservation, and enhancing system reliability. The task force's creation signaled a further potential retreat from the market model.

The concerns about security of supply and the government's management of the system were dramatically reinforced by the August 2003 blackout that affected Eastern North America. The episode highlighted questions about the ability of the electricity transmission system to cope with the stresses being placed on it by the introduction of competitive electricity markets throughout North America.

The Harris government's response to the apparent failure of the supply and integrated resource planning paradigms and resulting financial and operational crises at

Ontario Hydro was a dramatic move in the direction of a competitive electricity market. When that model began to collapse in the face of a host of practical and political challenges the government of Harris' successor, Ernie Eves, responded with a series of *ad hoc* measures: the termination of the retail electricity market; the implementation of a consumer rate freeze; a (largely symbolic) reengagement with the "soft" path options of conservation and renewables; a retreat from the privatization of Ontario Hydro's successor companies and assets; and perhaps most importantly the establishment of the Electricity Conservation and Supply Task Force. But by the time of the October 2003 election, no coherent vision for the way forward with the electricity system had emerged.

#### **Paradigm 4: The Planning/Market Hybrid**

The Conservatives' misadventures with the electricity file perhaps did as much as the Walkerton water disaster (O'Connor, 2002) to undermine their reputation for administrative competence, and played no small role in their defeat in the 2003 provincial election. The province's new Liberal government, led by Dalton McGuinty, arrived with a commitment, driven by concerns over the air quality impacts of the post-1997 NAOP expansion of coal-fired generation, to phase out coal-fired electricity by 2007 but little else in terms of a sense of the way forward on the electricity file.<sup>5</sup> The new government was ideologically neutral with respect to the electricity system, but had built strong alliances while in opposition with the environmental and public health critics of the market model adopted by the previous government. In practice the McGuinty government would find itself compelled to invent a new policy paradigm combining planning and market elements as it responded to a new succession of crises, both perceived and real.

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<sup>5</sup> The NDP made a similar commitment. The Conservatives committed to a 2014 phase-out. The Liberals also made references to a modest renewable energy portfolio standard similar to that adopted by the government (at least 5 per cent of their electricity from new, clean, renewable sources by 2007 and 10 per cent by 2010), expansion of power generation at Niagara Falls and the creation of "thousands of new clean energy jobs" but made no references to their plans for overall system design such as the relative roles of planning and market mechanisms.

The origins of this new ‘hybrid’ paradigm lay in work of the Electricity Conservation and Supply Task Force – the body established by the previous government to review the electricity system in the face of the effective collapse of the market experiment. The task force delivered its report in January 2004, warning that electricity demand in the province would continue to grow and that an “electricity supply shortfall” was looming in Ontario as a result of the premier’s commitment to a coal phase-out and the anticipated end of life of the nuclear facilities. The task force, whose members were primarily large industrial power consumers, effectively recommended a return to long-term planning, to be led by the IMO. But they also concluded that “private investment and risk taking.... be the mainstay of the future power system, following competitive principles” (Electricity Conservation and Supply Task Force, 2004).

In response to the Task Force’s recommendations, an *Electricity Restructuring Act* was adopted at the end of 2004. The Act’s central feature was to create the Ontario Power Authority (OPA) to conduct long-term planning for electricity generation, demand management, conservation and transmission and to develop an integrated power system plan (IPSP) for Ontario. At the same time the OPA was also mandated to facilitate a long-term transition towards a market-based model. As an interim measure until the IPSP was developed by the OPA and approved by the OEB, the Act permitted the Minister of Energy to issue “directives” to the OPA and other agencies regarding the development of new generation and conservation resources.

The OPA’s planning mandate was first put into practice in May 2005, when the Minister of Energy sent a request to the OPA for advice on options for an appropriate supply mix for Ontario’s future electricity system. This would then provide the basis for the Minister’s Supply Mix Directive to the Authority. The Directive, issued to the OPA on June 13, 2006, took the unusual approach of specifying targets for individual technologies within the plan as opposed to setting high-level policy objectives under which the OPA could formulate a plan and the OEB review it. While identifying minimum targets for conservation and demand management (CDM) activities and new renewable energy supplies, the directive made it clear that nuclear power would remain the foundation of the province’s electricity system, calling for 14,000 MW of nuclear generating capacity - a target which would require refurbishing existing nuclear plants

and building new reactors. The directive also required that the OPA plan for the phase-out of coal-fired generating facilities as early as possible - a retreat from the original 2007 phase-out target (Duncan, 2006). Breaking with the precedent established during the handling of the 1989 Ontario Hydro DSP, the IPSP was exempted from review under Ontario's *Environmental Assessment Act*. Rather the OPA was required to demonstrate that it had "considered" environmental sustainability in developing the plan (Winfield et al., 2010).

The McGuinty government would never issue a white paper or any other document explaining how the new model was to actually function. In practice, the model evolved in a direction where the OPA undertook planning activities in response to the minister's directives, determined the need for new resources, and then contracted the construction of new supply from the private sector. Such contracts were sometimes established on a competitive bid/request for proposal (RFP) basis, although sole-source contracts were employed with respect to the nuclear refurbishment projects at the Bruce and Pickering facilities with Bruce Power and OPG respectively.<sup>6</sup> In an atmosphere of near panic about the future of the province's electricity supply the contracts for new supply typically guaranteed both minimum prices and minimum revenues for project developers, regardless of whether the facilities were actually required to generate power, or the power could be used by the electricity system. The potential for new generation to be developed on a market basis by private developers without contracts with the OPA, as envisioned in the original market model, virtually disappeared as the OPA contracted new nuclear, natural gas and renewable energy projects. The latter types of projects were acquired through both RFPs and a small Feed-in-Tariff (FIT) program for projects under 10MW, initiated in 2006.<sup>7</sup> Although with the entry of new private and community-based sources of generation OPG's portion of total generation fell relative to that of Ontario Hydro (85 per cent as of 1997), the provincially owned

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<sup>6</sup> Bruce Power is a private consortium that took over operation of the Bruce Nuclear Facility in 2001 as a result of the Harris government's directive that OPG reduce its share of the province's electricity generation capacity from over 85 per cent to 35 per cent by 2010.

<sup>7</sup> This was called the Renewable Energy Standard Offer Program (RESOP).

company's assets still dominated the system, providing approximately 64 per cent of total output in 2012.<sup>8</sup>

With the OPA's submission of the first IPSP to the Ontario Energy Board (OEB) in August 2007 (OPA, 2007), the re-election of the McGuinty government a few months later and the initiation of OEB hearings on the plan in September 2008, it looked as if some form of closure was at hand with respect to the future direction of the province's electricity system. In practice it would prove to be anything but. A host of unresolved issues around the province's direction, in combination with radically changed economic circumstances, would provide the opportunity for the emergence of another new policy paradigm.

### **Paradigm 5: The Renewable Energy Economy**

The OPA's Supply Mix Advice and the government's Supply Mix Directive regarding the IPSP had been the target of extensive criticism from environmental organizations following the electricity file. Greenpeace Canada, the Pembina Institute, the Ontario Clean Air Alliance and WWF-Canada found that the product of the hybrid model looked suspiciously like the outputs of the old supply planning model. It emphasized "hard" path supply options, particularly the central role of nuclear power, was grounded on ambitious projections of growing electricity demand and seemed hostile to larger roles for conservation and renewables (Gibbons, 2008).

These criticisms, which had been pointedly ignored by the OPA, would find an apparently more receptive ear in the new energy minister, George Smitherman, who was appointed after the 2007 election. A few weeks into the OEB's hearings on the IPSP, Smitherman directed the OPA to revise the plan to incorporate more ambitious targets for renewable energy sources and conservation, compelling the authority to withdraw the plan while it was redrafted. While the new directive seemed to signal a greater emphasis on the role of 'softer' energy sources and technologies in the displacement of coal power, the minister also reiterated the province's commitment to a

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<sup>8</sup> Based on OPG's reported output of approximately 90tWh in 2012, and total system demand of 142tWh.

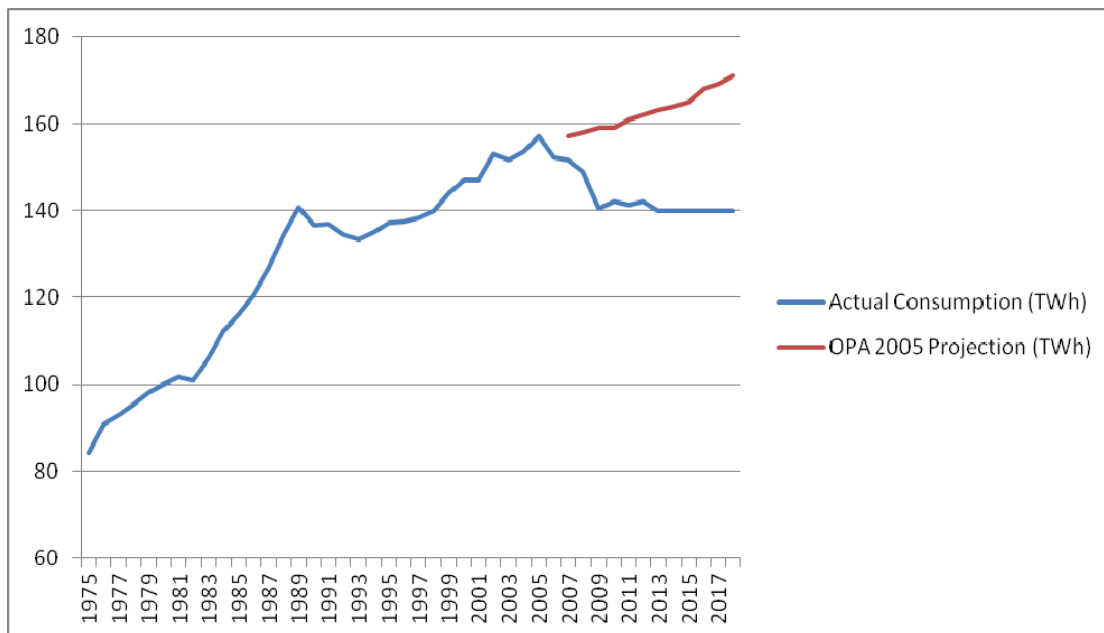


nuclear capacity goal of 14,000MW and the continuation of its new build nuclear procurement process (Smitherman, 2008).

At the same time, the new minister began to be exposed to new policy ideas regarding the potential for the rapid expansion of renewable energy sources, particularly wind and solar photovoltaic energy, in Ontario. The adoption of feed-in-tariff programs in Germany, Spain and Denmark for these technologies had produced dramatic growth in their deployment in Europe (Hamilton, 2008b). These programs paid renewable energy developers a guaranteed price for any energy they produced, and assured them access to the electricity grid. The strong commitments of the incoming Obama administration in the United States on renewable energy and energy conservation (Weiss, 2010), and growing state-level activity around these options (Rabe, 2010) further reinforced the province's interest in the potential expansion of their roles in Ontario. A coalition of environmental, agricultural, aboriginal and renewable energy interests had already come together over the summer of 2008 under the banner of the Green Energy Act Alliance to begin lobbying for a "Green Energy Act" establishing a large/utility scale European-style FIT program in Ontario (Hamilton, 2008).

The final element in the downfall of the original IPSP and the emergence of a new policy paradigm defined by "green" energy was the fall 2008 global economic downturn. Contrary to the OPA's projections, as shown in Figure 2, electricity demand in Ontario had already begun to decline rather than grow from 2005 onwards, a trend that was accelerated by the 2008 crisis. The impact of this downward trend affected the province's manufacturing sector particularly strongly (Ministry of Finance, 2010). The downturn had the twin effects of further undermining the assumptions behind the IPSP regarding the growth in electricity demand, and creating demand for a provincial economic recovery plan.

**Figure 2 Ontario Electricity Consumption 1975-2013(Forecast 2013-2018)**  
tWh/yr<sup>9</sup>



In this context, the Green Energy Act Alliance demonstrated some extremely deft policy entrepreneurship and positioned its proposed green energy legislation as an economic development strategy. A rapidly expanding renewable energy industry would offer support for renewable energy development in aboriginal and rural communities, and also provide the basis for the emergence of a new green energy technology manufacturing and services sector similar to that which had developed in Germany and Denmark in response to their FIT programs. Within this ecological modernist (Dryzek, 2005) vision “green” industry would become a driving force of Ontario’s future economy (Green Energy Act Alliance, 2008). The government itself repeatedly highlighted the potential for a green energy strategy to produce 50,000 jobs in Ontario (Ministry of Energy, 2011b). Domestic content requirements regarding the sourcing of renewable

<sup>9</sup> Data from IESO 2012a and the Pembina Institute

energy equipment would be built into the resulting program to promote the development of a renewable energy industry in the province (OPA, 2010). In addition, an agreement with the South Korean industrial giant Samsung would be signed in January 2010, exchanging guarantees of a portion of the FIT contracts available under the program for promises of investment in Ontario in renewable energy technology manufacturing activities (Canwest News Service, 2010).

The resulting *Green Energy and Green Economy Act* (GEGEA) was adopted by the Ontario legislature in May 2009. The Act mandated the development of a FIT program for renewable energy projects, streamlined the approvals process for such projects and provided the Minister of Energy and Infrastructure with expanded authority to issue directives to the OPA and OEB to ensure its implementation (Bill 150, 2009).<sup>10</sup> The following month Smitherman announced the suspension of the province's new build nuclear procurement process, citing the unexpectedly high cost estimates contained in all of the competing bids (Winfield et al., 2010). In doing so he apparently further cemented the emergence of a new green energy policy paradigm.<sup>11</sup>

As an expression of policy paradigm, the GEGEA emphasized the ecological modernist theme of the potential for positive links between green technologies and economic development, and seemed to embed an open-ended commitment to adding renewable energy sources, developed by community-based and private sector proponents, to the electricity supply mix through the FIT program. OPG was excluded from the FIT program, and local distribution utilities were limited to projects under 10MW. The program implied a significant disruption of the OPA's IPSP planning process, further delaying the revision of the plan.

At the same time, there were concerns, even among members of the Green Energy Act Alliance itself and particularly on the part of those with long-standing involvement on energy issues, about the extent to which the legislation provided a

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<sup>10</sup> Legislation also established a process for setting CDM targets for electricity distribution utilities, but also eliminated the position of Chief Energy Conservation Officer and the Conservation Bureau within the OPA. The Energy Conservation Officer's reporting responsibilities were transferred to the Environmental Commissioner of Ontario.

<sup>11</sup>Smitherman indicated in no uncertain terms that replacing some of Ontario's aging nuclear fleet with new nuclear units was a prudent measure and would be pursued if a contract bid deemed acceptable was received.

complete and coherent model for the path forward. The legislation departed from the conventional “soft” path model in a number of important ways, emphasizing the development of renewable energy over other resources, including conservation.<sup>12</sup> More broadly, there were concerns about the extent to which the leadership of the alliance distanced itself from earlier critiques of the planning assumptions that guided the IPSP (Ontario Sustainable Energy Association, n.d.), avoiding criticizing the government’s overall policy direction in order to pursue a FIT program (confidential interview, May 2010). The alliance’s approach was seen to ignore the risk that if electricity demand turned out to be less than the OPA’s predictions, the centrality of nuclear energy in the IPSP process would ultimately restrict the potential for the expansion of renewable energy sources.

The initial public and investor response to the FIT and accompanying MicroFIT<sup>13</sup> programs, launched in October 2009, was extremely strong. The MicroFIT program generated 47,000 applications, while the overall program produced applications for nearly 21,000 MW of new renewable energy capacity (Weis, Gipe, Green Energy Alliance, and Shine Ontario, 2011). As of April 2011, contracts were in place under the program for 3,675 MW of new renewable energy generating capacity (Auditor General of Ontario, 2011). With respect to economic development, the government claimed that \$26 billion in investment had been committed as a result of the legislation and 20,000 jobs created through the program by the end of 2011 (Ministry of Energy, 2011c). Notwithstanding the government’s rosy assessment, the FIT program has faced a host of complications. As a result, the future of the program, and of the green energy paradigm of which it was the expression, are in serious doubt. The GEGEA and FIT program were never popular with the major institutional actors within the province’s electricity system – the OPA, IESO and OEB. These entities saw the GEGEA as a political override and effective rejection of the supply and/or integrated resource planning models that had re-emerged through the hybrid system planning paradigm.

There were, moreover, strongly held views among the major institutional players, given public voice through the Auditor General of Ontario’s 2011 *Annual Report*, that the

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<sup>12</sup> Among other things the legislation eliminated the position of Chief Energy Conservation Officer within the OPA.

<sup>13</sup> For projects 10 Kilowatts or less in capacity.

FIT program's architects had underestimated complications associated with processing the volume of applications received, assessing the feasibility of connecting them to the grid, undertaking the actual work of providing grid connections for FIT projects, and problems associated with then having to manage large amounts of intermittent renewable energy sources on the electricity grid.<sup>14</sup>

The institutional landscape was further complicated by energy minister Smitherman's departure to run (unsuccessfully) for the position of Mayor of Toronto in the November 2009 municipal election, robbing the GEGEA of its most important internal champion beyond the premier himself. Declining electricity demand, driven by the province's weak economic situation and longer-term restructuring of the Ontario economy away from energy intense manufacturing and resource processing industries, added to the challenges. With demand declining rather than growing as the OPA had assumed, the province began to face surpluses of electricity supply, principally as the new natural gas-fired and nuclear refurbishment projects committed to during the perceived 2003-2008 supply "crisis" (Spears, 2011) produced an expansion of the province's installed generating capacity from 30,006MW in 2003 to 35,858MW in 2012 (Ministry of Energy 2010, Figure 5; IESO 2012a).

In this context the FIT program was seen to be encouraging new supply that was no longer needed. This was particularly the case if the government attempted to proceed with its plans for new nuclear reactors at Darlington and the refurbishment of the existing Darlington and Bruce B nuclear facilities. However, the economic viability of these projects, in comparison to conservation, renewable energy and natural gas based alternatives has been seriously questioned (Ontario Clean Air Alliance, 2010; Haines, Weiss and Anderson, 2011).<sup>15</sup> The operational inflexibility of the existing nuclear facilities was already the primary driver of the IESO's need to offer negative electricity prices to in- and out-of-province consumers during periods of low demand to use

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<sup>14</sup> An energy source whose operation is reliant on weather conditions as opposed to being able to be "dispatched" as needed.

<sup>15</sup> The technological and accident risks and lifecycle environmental and legacy (e.g. waste management and decommissioning) issues associated with new or refurbished nuclear facilities must be considered relative to the alternatives as well (Winfield et al., 2006).

surplus supply from sources of generation whose output could not readily be reduced (IESO, 2012b).

The rates paid for electricity under the FIT program became a major target of criticism. Under the program solar FIT prices ranged from 44.3 cents/kWh to 71.3 cents/kWh (34.7 cents/kWh to 54.9 cents/kWh after the October 2011 review) depending on the size of the system.<sup>16</sup> The rate for wind developments of any size was 13.5 cents/kWh (11.5 cents/kWh after the review) (OPA, 2010b; OPA, 2012). The rates were established on the basis of generating a “reasonable rate” of return over the life of the projects (OPA, 2012a). The FIT prices were well above the typical hourly electricity price in the Ontario wholesale market, prompting arguments that the province was paying more than it needed to for new supply (Auditor General of Ontario, 2011; Dachis and Carr, 2011). The government itself indicated that electricity bills were likely to rise 7.9 per cent per year over the next five years, and that the FIT program would account for 56 per cent of those increases (Auditor General of Ontario, 2011, p. 89). The solar component of the project was a particular target, accounting for nearly ten per cent of the capital costs but only 1.5 per cent of new generation in the government’s Long-Term Energy Plan.

It was pointed out by FIT supporters that the market price largely reflected the costs of supply from historic nuclear and hydro-electric assets whose capital costs had since been retired or “stranded”, as opposed to the actual contracted or projected costs of conventional (i.e. gas or nuclear) new supply. These costs were, at best, much closer to the FIT rates, particularly for wind, especially if consideration was given to the avoided environmental costs and fuel price risks provided by renewables. As a result, the impact of the program on consumer rates relative to the costs of developing non-renewable alternatives was marginal (Weis and Partington, 2011), although these arguments found limited political traction. The criticisms over costs were sufficient to prompt the province to introduce an “Ontario Clean Energy Benefit,” effectively reducing residential electricity bills by ten per cent, and an additional Northern Energy Benefit for northern residents (Ministry of Energy, 2011). The costs of the ‘benefit’ programs have

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<sup>16</sup> The MicroFIT program paid 80.2 cents/kWh for rooftop solar systems less than 10kW capacity.

been estimated as exceeding \$1 billion per year, and criticized for encouraging energy consumption rather than conservation (Environmental Commissioner of Ontario, 2011).

Renewable energy proponents also found themselves facing the emergence of some surprisingly well-organized local resistance to wind energy projects in rural southern Ontario. While the arguments of wind opponents regarding negative health impacts of wind energy seem increasingly discredited (Ontario Chief Medical Officer of Health, 2010; Ellenbogen et al., 2012; Saxe, 2013), significant conflicts have emerged in rural communities between wind proponents, including farmers and landowners hosting facilities, and their critics, who were often newer, ex-urban arrivals concerned about aesthetics, property values and wildlife impacts. The situation has become serious enough to prompt the Ontario Federation of Agriculture, a key member of the original Green Energy Act Alliance, to adopt, at the beginning of 2012, a new position of opposition to further wind development in rural areas until the current conflicts are resolved.

Even the GEGEA's proponents were disappointed at relatively low levels of community-based participation in the FIT program. In Germany and Denmark, individuals, cooperatives and other community-based actors constitute a high proportion of FIT project proponents (Gipe, 2007; Szarka, 2007). By contrast, as of May 2011 such proponents constituted less than 4 per cent of the total number of FIT contracts and less than 9 per cent of the total power contracted in Ontario (Martin, 2011, Table 7). Rather, participation in the program had been dominated by large corporate investors.

The overall result was increasing uncertainty over the government's actual direction. A new Supply Mix Directive was issued in February 2011 (Dugiud, 2011). The new directive, by its very existence, seemed to reaffirm the government's commitment to the hybrid planning model managed by the OPA. That view was reinforced by the consideration that the directive limited the total contribution of new, non-hydro, renewable energy sources to 10,700 MW. In practice this left little room for growth beyond what has already been contracted through the FIT program and previous initiatives. The plan also maintained a commitment to a system that was approximately 50 per cent nuclear, justifying both the pursuit of the refurbishment of the existing Darlington facility and the construction of two new reactors at the same location. Finally,

the directive affirmed the OPA's assumptions that growth in demand would continue and in fact accelerate beyond 2018.

The political focus on electricity intensified in the run-up to the October 2011 election. Local conflicts over proposed off-shore wind projects, and their potential impact on the government's electoral fortunes, particularly in southern Ontario, led to an abrupt ban on such projects in February 2011. The decision reversed the government's 2008 position in favour of such projects and abandoned provisions in the FIT program specifically designed to encourage them, further shaking confidence in the government's commitment to green energy. The GEGEA itself became a significant issue in the 2011 election campaign. Tim Hudak's Progressive Conservatives proposed an outright repeal of the legislation, while the NDP committed to limiting the FIT program to community-based projects and, to the dismay of "soft" path energy advocates, turning large scale renewable energy development over to OPG. Even the Green Party made reference to restoring "local decision-making for energy projects" (Green Party of Ontario, 2011), its platform in an attempt to appeal to wind energy opponents in rural Ontario. In the midst of the campaign, the government abruptly stated that it would relocate proposed gas-fired electricity plants that were the targets of strong local opposition from Liberal-held ridings in Oakville (Jenkins and Artuso, 2012) and Mississauga (CBC News, 2011).

Given the positions of the opposition parties, the GEGEA's proponents breathed a sigh of relief over the McGuinty government's re-election, albeit as a "major minority", (Canadian Press, 2011) with its implication of the continuation of the FIT program.<sup>17</sup> Indeed, the government's November 2011 Throne Speech noted: "Your government remains fully committed to clean energy and the 50,000 new, good jobs in one of the world's fastest-growing economic sectors." In practice the commitment would prove less categorical, particularly as some of the government's losses of rural seats were blamed on conflicts over GEGEA-inspired wind energy projects (Howlett and Ladurantaye, 2011).<sup>18</sup> A scheduled two-year review of the FIT program was initiated immediately after

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<sup>17</sup> The election outcome was Liberals 53 seats; Progressive Conservatives 37; and NDP 17.

<sup>18</sup> Specifically the Minister of Education, Leona Dombrowski (Hastings-Prince Edward), and Minister of the Environment John Wilkinson (Perth-Wellington). There were also arguments that the legislation helped the



the election, but was accompanied by a moratorium on new FIT applications for the duration of the review.

The review report, prepared by the Deputy Minister of Energy and delivered in March 2012, recommended a continuation of the FIT program, and even the possible expansion of the province's renewable energy targets, subject to reductions in the FIT rates and an increased focus on projects that were community initiated or supported (Amin, 2012). The report also belatedly recommended the development of a sectoral industrial development strategy for the renewable energy sector. The strategy was initiated in the aftermath of the report (Ministry of Energy, 2012). However, it was not until December 2012 that a short (two month) window for up to 200MW of new "small" (<500Kw) FIT applications was opened. Among other things, the more than year-long moratorium on new projects had a devastating effect on the emerging renewable energy sector (Hamilton, 2012), whose development was one of the main purposes of the legislation. The sector's fortunes were further darkened by a preliminary World Trade Organization ruling, in response to complaints from Japan and the European Union, against the local content requirements of the FIT program (Blackwell, 2012).

### **Paradigm 6: Political Management**

Given the indeterminate state of the government's response to the FIT review, the fate of the green energy policy paradigm seems precarious at best. However, despite an endorsement of the government's overall direction on electricity in the February 2012 report of the Commission on the Reform of Ontario's Public Services (a.k.a. the Drummond Commission (Drummond, 2012, ch.12)) the OPA's 'hybrid' planning paradigm found itself in little better shape. The plan's forecasts of resumed demand growth continued to collapse in the face of the province's weak economic performance and changing economic structure. In fact the Drummond report's only forecast about the future was to describe it as a "cone of uncertainty that broadens the further out into the future we look" (Drummond, 2012, ch.1).

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Liberals retain urban seats and with younger voters, pulling support from the Greens and NDP (Winfield, 2012, p. 200).

The federal government's June 2011 sale of Atomic Energy of Canada (AECL) to SNC Lavalin removed any possibility of the realization of the province's long-held hope of a federal underwriting of the risks of new nuclear project cost overruns or delays in Ontario. Along with SNC Lavalin's stated lack of interest in new build projects (McCarthy, 2011), and the March 2011 Fukushima nuclear disaster, this raised questions about the viability of any future new build nuclear project, a core element of the plan.<sup>19</sup>

The McGuinty government's final response to this situation was to move to formalize the drift towards a model of short-term decision-making driven by political management considerations, exemplified by the introduction of the Clean Energy Benefit, the off-shore wind moratorium, mid-election natural gas plant relocations and hesitation on the continuation of even a modified FIT program. Bill 75, the *Electricity System Operator Act*, introduced in April 2012, was on the surface another response to opposition criticism of the government's handling of the electricity file, particularly the proliferation of an 'alphabet soup' of new agencies, merging the OPA and the IESO. However, the bill also incorporated an abandonment of any pretense of long-term planning, removing the OPA's mandate to produce an IPSP, and instead making it clear that the system was to be guided solely by ministerial directives. The bill died on the order paper with Mr. McGuinty's October 2012 prorogation of the legislature.

### **Conclusion: Advancing Sustainability and Stability**

A supply planning model governed electricity policy from the beginning of the twentieth century. By the 1970s, the weaknesses of this model were becoming evident. The 'bigger is better' mentality was contested by emerging social movements responding to the negative environmental, social and economic costs of such a model. Its planning assumptions were challenged by emerging economic realities. Attempts to incorporate emerging 'soft' energy path elements related to conservation and renewable energy sources into an integrated resource management model collapsed as the financial legacy of the supply planning model drove Ontario Hydro towards virtual bankruptcy.

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<sup>19</sup> A licence for construction of a new facility at Darlington was granted by the Canadian Nuclear Safety Commission in August 2012, although no contract is in place for the actual construction of a facility.

The adoption of the market model attempted to improve the efficiency of the province's electricity system by moving away from central planning and instead relying on private investment to plan the system. The failure of that paradigm led to an *ad hoc* 'hybrid' model, which attempted to incorporate elements of both the integrated resource planning and market models.

A combination of criticism of the resulting IPSP, particularly over-optimistic demand forecasts and underestimated nuclear costs, the emergence of new ideas regarding the potential roles of 'green' energy options and the 2008 economic crisis opened a window for yet another potential paradigm, embodied in the 2009 GEGEA. However, the state of that paradigm is anything but certain given the resistance from key institutional actors in the electricity system, criticism over costs and technical viability and the emergence of well-organized local opposition to wind energy projects. In its final stages the McGuinty government moved in the direction of dropping any pretense of rational planning, and formalizing a framework of explicit political management through the proposed Bill 75.

Table 1 summarizes the elements that have come together to create policy windows through which each new system paradigm has advanced over the past century, as well as the key policy entrepreneurs responsible for pushing the paradigm forward.

**Table 1: Policy Paradigms in Ontario Electricity Policy, 1906-2012**

Paradigm	Policy	Problem	Politics	Policy Entrepreneur
Supply Planning (1906-1980)	"Power at cost".	Private development of Niagara hydroelectric resources.	"The Politics of Development".	Sir Adam Beck.
Integrated Resource Management (1980-1995)	Lovins; 'soft' energy paths; Porter Commission.	Darlington delays and cost overruns; supply over-construction.	Fall of the 'dynasty'; Liberal/NDP 'Quiet revolution.'	Liberal and NDP ministers and staff, ENGOS.
Markets (1995-2002)	Competitive market models from US and UK.	Collapse of DSP and Ontario Hydro in "crisis".	The "common sense revolution."	Academic economists; Energy Probe; AMPCO .
Planning/Market Hybrid (2002-2009)	Electricity Conservation and Supply Task Force	Failure of market experiment.	2003 election; arrival of McGuinty government.	Minister, political staff and premier's office.

	report; Select Committee on Alternative Fuels.			
Green Energy (2009-2011)	Germany and Denmark FIT programs; US states and incoming Obama administration.	2008 Economic downturn; coal-phase-out.	ENGO criticism of IPSP; 2007 election and Smitherman appointment; need to respond to economic downturn .	Green Energy Act Alliance.
<i>Ad Hoc</i> Management (2011-)	Premier's office and ministers' offices.	Collapse of IPSP demand assumptions; wind opposition; gas plant opposition; FIT cost debates.	2011 election – opposition pressure on energy file.	Premier's Office, party and ministerial staff.

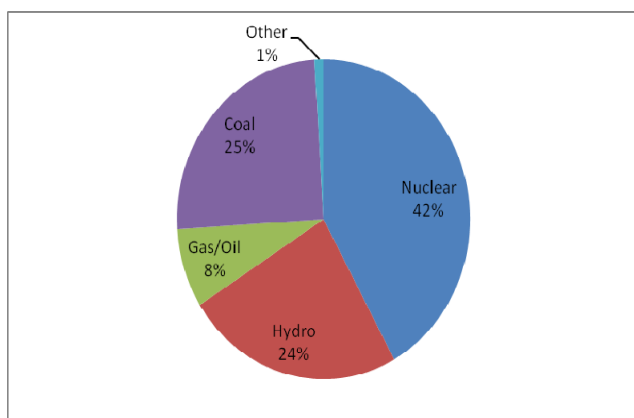
The overall picture over the past three decades is one of remarkable policy instability, where different constituencies have taken the opportunity provided by each policy window to move the system in radically different directions. The primary contributor to this instability has been the increasing complexity of the political, social and economic environment in which electricity policy must be formulated and implemented.

The historical consensus around the system's goal of cheap and abundant electricity has collapsed in the face of the need to address wider societal concerns around environmental sustainability and develop more sophisticated economic strategies. Core assumptions about demand growth and its relationship to economic prosperity and the cost, safety and reliability of nuclear energy have broken down, while new ideas, technologies and constituencies have emerged and gained strength. However, none of the policy paradigms of the past thirty years has carried sufficient legitimacy to survive the next policy window, a problem enhanced by the increasing politicization of decision-making.

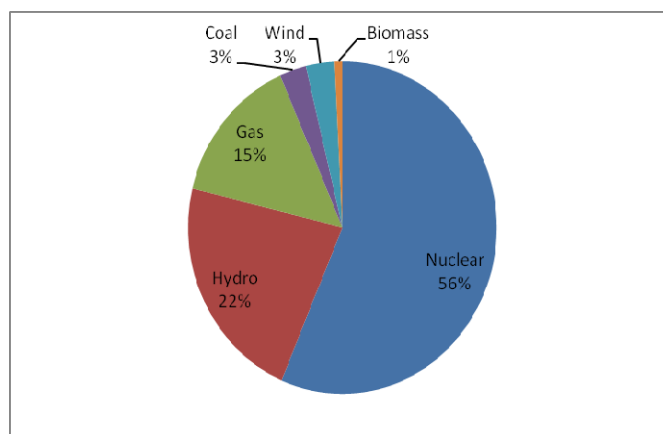
At the same time, despite the instability in terms of the various governments' policy directions, the inertia of Ontario Hydro's hard path, supply orientation has continued to define much of the system's actual path. As shown in Figures 3 and 4, nuclear now constitutes a substantially higher portion of supply than it did at the beginning of the decade (56.4 per cent of generation in 2012 vs. 42 per cent in 2003). This hard path momentum has continued to carry the system in the opposite direction to

the principles of sustainability outlined at the beginning of the chapter. The pattern of radical changes in policy direction and hard path inertia seems destined to continue unless steps are taken to build consensus around the system's goals and structure.

**Figure 3: Energy Output by Fuel Type  
2003 (Ministry of Energy, 2010)**



**Figure 4: Energy Output by Fuel Type 2012  
(IESO, 2012a)**



Although there have been a number of semi-formal and *ad hoc* reviews, there has been no comprehensive and open review of the system's goals, structure and options since the report of the Porter Commission, now more than thirty years ago. Such a review, undertaken by an entity outside of the existing institutional structure and without interests within it, may be the only way that assumptions about the system's role in the province's society and economy, and the social, economic, environmental and technological context within which the system must operate can be examined and debated openly. Such a process offers the best hope for overcoming conflicting visions and the emergence of some form of enduring consensus around the system's purposes and direction.

Whatever emerges, the system will need a planning framework to guide its long-term direction. That framework, however, needs to be vastly more resilient, flexible and adaptive than anything that has gone before it. It must also integrate the wider range of objectives now being sought through the province's electricity system in a manner that

captures an appropriate democratic and ecological balance while advancing sustainability.

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