POWER SHIFTS: THE POLITICS OF SUSTAINABILITY TRANSITIONS IN ELECTRICITY SYSTEMS AND THE POSSIBILITIES FOR FIRST NATIONS PARTICIPATION

A Thesis Submitted to the College of

Graduate Studies and Research

In Partial Fulfillment of the Requirements

For the Degree of Doctor of Philosophy

In the Johnson-Shoyama Graduate School of Public Policy

University of Saskatchewan

Saskatoon

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ABSTRACT

Many sustainability concerns have led to a push for more sustainable electricity systems. Governments and utilities have responded to these pressures by making changes ranging from minor incremental adjustments to sweeping transformations. This dissertation is focused on determining how we can best understand such transitions of electricity systems and what possibilities exist for First Nations to participate in them.

This dissertation involves case studies of three Canadian provinces – Nova Scotia, Ontario and Saskatchewan – based on a review of relevant documents and semi-structured interviews. The theoretical basis of this dissertation is derived from the sustainability transitions field and discourse coalition theory.

The conclusion of this research is a helpful and robust integrated sustainability transition framework, which is developed by combining elements of the multi-level perspective (MLP) and technological innovation system (TIS) frameworks from the sustainability transitions field, and supplementing those elements with features from discourse coalition theory. This integrated sustainability transition framework can usefully explain the complex dynamics involved in transitions of electricity systems. The typology of transition pathways – distinguishing between the possibilities of reproduction, transformation, technological substitution, reconfiguration, and de-alignment/re-alignment – provides insights into the direction of the transition. The various TIS functions add a needed element of agency and provide insights into the rate of progress along the particular transition pathway. Discourse coalition theory adds a greater degree of agency by uncovering the political dynamics involved.

By considering factors for successful First Nations participation as important TIS functions, the integrated sustainability transition framework presented in this dissertation helps

explain the possibilities for First Nations participation. Successful First Nations participation is more likely to occur where governments are proudly engaging in reconciliation efforts and resurgence support and where they embrace distributed, clean energy projects and deliberately open up space for new actors to participate in the electricity sector. In order to achieve the momentum needed to take advantage of a window of opportunity to participate, First Nations need a project champion, stable governance, access to cash, partnerships with the private sector, and must ensure that the focus remains on sustainable development and delivery of benefits to the entire community.

ACKNOWLEDGMENTS

The Government of Canada supported my PhD program and the research reported in this dissertation through its Vanier Canada Graduate Scholarship program. I am tremendously grateful for this support and was truly honoured to be a Vanier Scholar.

My advisor, Dr. Jeremy Rayner, deserves special thanks for his wise counsel, helpful advice, and good humour. I am grateful to members of my advisory committee – Dr. Kathy McNutt, Dr. Daniel Béland, Dr. Ken Coates and Dr. Greg Poelzer – for their guidance and encouragement. I am grateful as well to Dr. Michael Atkinson and the faculty at the Johnson-Shoyama Graduate School of Public Policy, from whom I have learned much. Thanks as well to my external examiner, Dr. James Meadowcroft, Canadian Research Chair in Governance for Sustainable Development at Carleton University's School of Public Policy and Administration.

A huge thanks to my friends and family, who supported me throughout this PhD endeavour. They made this journey all the sweeter with their kindness and patience. Now that this monumental task is finished, I very much look forward to seeing them all a fair bit more regularly.

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LIST OF ACRONYMS

AANDC	Aboriginal Affairs and Northern Development Canada
ACEP	Aboriginal Community Energy Plan
ALGP	Aboriginal Loan Guarantee Program
AREF	Aboriginal Renewable Energy Fund
AREN	Aboriginal Renewable Energy Network
AOPP	Association of Ontario Power Producers
APCFNCS	Atlantic Policy Congress of First Nations Chiefs Secretariat
BC	British Columbia
CCPA	Canadian Centre for Policy Alternatives
CCS	Carbon capture and sequestration
CEA	Canadian Electricity Association
CHRC	Canadian Human Rights Commission
CO_2	Carbon dioxide
COMFIT	Community Feed-in Tariff
DSM	Demand-side management
EAC	Ecology Action Centre
EHRC	Electricity Human Resources Canada
EIA	Energy Information Administration
EMGC	Electricity Marketplace Governance Committee
HEPCO	Hydroelectric Power Commission of Ontario
FIT	Feed-in tariff
FNEA	First Nations Energy Alliance
FNPA	First Nations Power Authority
FSIN	Federation of Saskatchewan Indian Nations
GEI	Global Electricity Initiative
GHG	Greenhouse gasses
GDP	Gross domestic product
GEGEA	Green Energy and Green Economy Act
HEPCO	Hydro-Electric Power Commission of Ontario
IEA	International Energy Agency
IESO	Independent Electricity System Operator
IGCC	Integrated Coal-Gasification Combined Cycle
IPP	Independent power producer
IPSP	Integrated power supply plan
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office (Mi'kmaq Rights Initiative)
KW	Kilowatts
KWH	Kilowatts hours
MLP	Multi-level perspective
MOU	Memorandum of understanding
$MtCO_2e$	Megatonnes of carbon dioxide equivalent
MW	Megawatts
NSP	Nova Scotia Power
OEB	Ontario Energy Board
OMA	Ontario Medical Association
OPA	Ontario Power Authority

OPEC	Organization of Petroleum Exporting Countries
OPG	Ontario Power Generation
OSEA	Ontario Sustainable Electricity Association
PPA	Power Purchase Agreement
RESOP	Renewable Energy Standard Offer Program
RFP	Request for proposals
SIGA	Saskatchewan Indian Gaming Authority
SNM	Strategic Niche Management
SRC	Saskatchewan Research Council
STP	Science and technology push (TIS motor)
STRN	Sustainability Transitions Research Network
TIS	Technological Innovation Systems
TM	Transition Management
TRC	Truth and Reconciliation Commission
UDP	Uranium Development Partnership
WBCSD	World Business Council on Sustainable Development
WWF	World Wildlife Fund

CHAPTER 1
INTRODUCTION

In 1928, the Hudson Bay Mining and Smelting Company and the Churchill River Power Company began constructing the Island Falls hydroelectric facility in northern Saskatchewan. According to the Saskatchewan Power Corporation, which eventually purchased the Island Falls dam, the project had various negative impacts on First Nations. Flooding had significant effects on traditional lifestyles, wildlife and the landscape. Many First Nations people worked as labourers on the construction project but, in order to do so, they had to relinquish their status as registered Indians. Giving up this official status meant that the Crown was no longer responsible for guaranteeing certain rights and benefits to them, including on-reserve housing, education and exemptions from some federal and provincial taxes. Relinquishing status as registered Indians also meant they were no longer guaranteed the treaty right to hunt, trap and fish. The First Nations workers built homes around the new dam in order to be close to the worksite and benefit from a sense of community, but the Hudson Bay Mining and Smelting Company soon forced them to leave those homes, abandon their community and move across the water, in order to make room for non-Aboriginal workers brought in from southern Saskatchewan. This new, exclusive community for the non-Aboriginal workers had electricity, running water and indoor plumbing and included a golf course, hockey rink, tennis courts, swimming pool, grocery store and a nurse. The First Nations workers and their families were not only evicted to make way for this new community, but they were largely barred from the community, able only to purchase groceries one day a week, and only from the back door of the grocery store (Rude, 2013).

The story of the Island Falls hydroelectric facility and its effects on local First Nations is hardly isolated. Similar stories exist throughout Canada. In many instances, First Nations communities have borne the brunt of the negative impacts of hydroelectric development while experiencing few if any of the benefits (Rude, 2013). One might expect that such a negative history with electricity generation projects would mean First Nations would steer clear of this sector, but that is not the case. Today, more and more First Nations communities are keen to participate in the electricity sector. In particular, many First Nations are looking at smaller-scale sustainable electricity ventures as smart projects in which to be involved.

With current electricity systems under increasing pressure and with a growing desire for more sustainable modes of electricity generation, there are windows of opportunity for non-traditional actors, including First Nations, to have a role in transitioning our electricity systems to more sustainable modes. In this dissertation, I analyze the role of politics in not only enabling or constraining such sustainability transitions, but also the role of politics in facilitating or restricting the potential participation of First Nations in those transitions. If we are going to move toward more sustainable modes of electricity generation, then I am interested in the possibilities for First Nations to participate in those transitions and experience some much needed economic and social benefits. To that end, I draw on First Nations economic development literature, discourse coalition theory, and sustainability transition studies – an emerging field of study focused on long-term and multi-dimensional transformation processes aimed at improved sustainability. This dissertation is intended for an audience engaged in those particular fields, as well as being of interest to policy makers, First Nations leaders, and stakeholders concerned with sustainability transitions, electricity generation, and First Nations economic self-sufficiency.

This introductory chapter discusses the reason current electricity systems are under pressure and why there is a growing desire for more sustainable pathways. It also outlines the possible convergence of the move toward more environmentally benign electricity systems with a

move to address the stark poverty and lack of economic opportunities that are persistent in many First Nations throughout Canada. This introductory chapter then discusses the purpose and objectives of this research and outlines the research questions addressed by this dissertation.

1.1 The Need for More Sustainable Electricity Pathways

Current electricity systems[1] are under pressure. Combustible fuels account for nearly 61 per cent of electricity generation in member countries of the Organization for Economic Co-operation and Development (IEA, 2013a). Such electricity systems produce heat-trapping greenhouse gas (GHG) emissions that contribute to climate change as the global average temperature increases, sea levels rise, oceans acidify, and extreme weather events intensify (Climate Change Congress, 2009). In the year 2000, Canada's electricity sector contributed 129 megatonnes of CO_2 equivalent ($MtCO_2e$), or nearly 18 per cent of total national emissions. The latest figures show that emissions from Canada's electricity sector have declined by 39 megatonnes to 90 $MtCO_2e$. This decline is attributed to a variety of factors, including an economic downturn, the return to service of some nuclear units, some fuel switching to natural gas, the closure of coal-fired electricity generation facilities in the province of Ontario, and a variety of efficiency incentives throughout the country (Environment Canada, 2013b). But nearly 21 per cent of Canada's electricity sector is still based on fossil-fuel combustion (CEA, 2012). As a result, the electricity sector continues to contribute approximately 13 per cent of Canada's total greenhouse gas (GHG) emissions (Environment Canada, 2013b).

Fossil-fuel based electricity generation is also the largest uncontrolled industrial source of mercury emissions in Canada and accounts for a significant proportion of the country's emissions

[1] I broadly define the electricity system as the infrastructure, rules, and actors that enable the supply and demand of electricity in a defined geographical area.

of nitrogen oxide and sulphur dioxide, which contribute to smog, acid rain and fine particulate matter (Environment Canada, 2013a). Environment Canada (2013a) points out that the electricity sector has substantial negative effects on water, habitat and species. The Millennium Ecosystem Assessment, which was initiated by the United Nations and involved more than 1,360 experts worldwide, revealed that the manner in which we are using nearly two-thirds of ecosystem services[2] is unsustainable (Millennium Ecosystem Assessment, 2005). Canada has the seventh largest per-capita ecological footprint in the world; when combined with the effects of heating and transportation, electricity generation accounts for half of Canada's ecological footprint (WWF, 2013).

For many, these sustainability concerns underscore the need to transition to more sustainable[3] pathways, especially when combined with concerns about the security of the supply of non-renewable energy sources. The International Energy Agency (2013) has emphasized that, "electricity generation must get cleaner, and do so quickly." The World Business Council on Sustainable Development (2013) says that, "electricity is at the heart of the global energy challenge. … The sector plays an essential role in ensuring an effective transition toward a low-carbon economy." At the 2011 United Nations Climate Change Conference, 25 major electrical utilities, representing 10 per cent of the world's power production, established the Global Electricity Initiative, based on the premise that, "clean electricity is a fundamental solution to the challenge of climate change" (GEI, 2013). These organizations, along with the myriad of policy makers, public intellectuals and academics that have weighed in on the topic, offer various

[2] Ecosystems provide 24 distinct services, including: *provisioning* services, such as food, water, timber and fibre; *regulating* services, such as water quality and waste treatment; and *supporting* services, such as soil formation and pollination (Millennium Ecosystem Assessment, 2005).

[3] Sustainability, in this context, is primarily understood from an environmental perspective, meaning pathways that are more environmentally benign than current systems, with fewer greenhouse gas emissions, fewer impacts on sensitive ecosystems, and less pollution and waste.

prescriptions and have different motivations, but they are all clear on one thing: we need to transition our electricity systems to more sustainable modes of production and consumption.

1.2 Political and Policy Considerations Related to Electricity Generation

When decisions are made about electricity generation, a variety of political and policy considerations are at play. Decision makers consider the capacity factor for each generation technology, which is the ratio of its actual output to its potential output if it could operate at its full nameplate capacity. Generally, the capacity factor for natural gas generation, using combined-cycle technology, is 87 per cent; for coal generation it is 85 per cent; for hydro it is 53 per cent; for wind it is 35 per cent; and for solar photo-voltaic it is 25 per cent. Decision makers also consider the levelized cost of electricity (LCOE), which represents the per-kilowatt-hour cost of building and operating a power plant over its assumed life span, including: capital costs; fixed and variable operating and maintenance costs; and transmission investments. The Energy Information Administration (EIA) outlines both the capacity factor and the estimated LCOE for new generation resources entering service in 2019 (Table 1-1). While the capacity factor and the costs will vary somewhat due to a variety of factors, including region, geography and existing infrastructure, the EIA estimates provide a good indication of the relative capacity and costs of each of the generation options. It must be noted that any carbon-pricing mechanisms are not included in these estimates from the EIA, and would certainly add costs for the coal- and gas-based power plants.

Table 1-1. Estimated levelized cost of electricity for new generation resources (EIA, 2014)

		Avg. LCOE (2012 $/MWh) for plants entering service 2019				
Plant type	Capacity factor (%)	Capital cost	Fixed O&M	Variable O&M (incl. fuel)	Trans. inves.	Total system LCOE
Dispatchable technologies						
Conventional coal	85	60.0	4.2	30.3	1.2	95.6
IGCC	85	76.1	6.9	31.7	1.2	115.9
IGCC with CCS	85	97.8	9.8	38.6	1.2	147.4
Natural gas-fired						
Conv. combined cycle	87	14.3	1.7	49.1	1.2	66.3
Advanced combined cycle	87	15.7	2.0	45.5	1.2	64.4
Advanced CC with CCS	87	30.3	4.2	55.6	1.2	91.3
Conv. combustion turbine	30	40.2	2.8	82.0	3.4	128.4
Adv. combustion turbine	30	27.3	2.7	70.3	3.4	103.8
Advanced nuclear	90	71.4	11.8	11.8	1.1	96.1
Geothermal	92	34.2	12.2	0.0	1.4	47.9
Biomass	83	47.4	14.5	39.5	1.2	102.6
Non-dispatchable technologies						
Wind	35	64.1	13.0	0.0	3.2	80.3
Wind-offshore	37	175.4	22.8	0.0	5.8	204.1
Solar PV	25	114.5	11.4	0.0	4.1	130.0
Solar thermal	20	195.0	42.1	0.0	6.0	243.1
Hydro	53	72.0	4.1	6.4	2.0	84.5

Increasingly, decision makers also tend to consider the environmental impact of each of the generation options. These considerations include the relative GHG emissions of the various electricity generation options, which are outlined in Table 1-2.

Table 1-2. Relative GHG emissions intensity of electricity generation sources (WNA, 2013)

	Tonnes CO_2e/GWh		
Technology	Mean	Low	High
Lignite	1,054	790	1,372
Coal	888	756	1,310
Oil	733	547	935
Natural gas	499	362	891
Solar PV	85	13	731
Biomass	45	10	101
Nuclear	29	2	130
Hydroelectric	26	2	237
Wind	26	6	124

Decision makers also consider the relative impact on population health as a result of emissions of CO_2, sulphur oxides, nitrogen oxides and fine particulate matter. In addition to costs, generation capacity, and emissions, decision makers consider economic implications, including jobs, the impact on local resource development, and local spin-off effects.

1.3 The Possibilities for First Nations Involvement

Electricity-system transitions open up possibilities for non-traditional actors to enter the electricity sector. Such participation of non-traditional actors could help achieve greater sustainability while also allowing those actors to secure the benefits associated with that transition. First Nations[4] are one such group of non-traditional actors that may seek to contribute to and benefit from electricity-system transitions.

First Nations communities have a significantly lower standard of living than the rest of Canada, with glaring health, social, and economic disparities. Compared to non-Aboriginal

[4] Section 35 of *The Constitution Act, 1982* identifies three distinct peoples as Aboriginal: Indian, Inuit, and Métis peoples. There are 633 individual Aboriginal nations across Canada. This dissertation will focus exclusively on Indian bands, now commonly referred to as First Nations.

people in Canada, the First Nations population has worse outcomes in terms of education, employment, economic well being, health, housing and social inclusion. The Canadian Human Rights Commission reviewed a number of studies conducted between 2005 and 2010 and concluded that First Nations:

- Are less likely to attend university;
- Are more likely to rely on employment insurance and social assistance;
- Have lower median after-tax incomes;
- Are more likely to be victims of violent crimes and physical, emotional and sexual abuse;
- Are more likely to suffer from obesity;
- Are less likely to report 'very good' or 'excellent' states of mental health;
- Are more likely to be incarcerated and less likely to be paroled;
- Are more likely to live in housing that requires major repair; and
- Are less likely to vote in municipal, provincial or federal elections (CHRC, 2013).

As well, fewer than 50 per cent of First Nations children living on reserve complete their high school education (CHRC, 2013) and half of First Nations children in Canada live below the poverty line (CCPA, 2013).

Because of the stark poverty and lack of economic opportunities that afflict many First Nations in Canada, it is not surprising that some First Nations communities are pursuing opportunities to establish, own, and operate sustainable electricity generation projects. Such projects could deliver economic and social benefits to First Nations in a manner that is in keeping with their cultural and spiritual connections to the environment. According to Krupa (2012), "in Canada, historically marginalized Aboriginal peoples remain one of the groups with the greatest potential for meeting [Canada's] enormous renewable energy development needs" (p. 710) and:

> Renewable energy is an attractive choice as a central pillar of a First Nations development strategy. … Aboriginals generally possess a sophisticated understanding of the intricate

> complexity of the natural world and the importance of reducing societal impacts on the environment in which they live (p. 711).

1.4 Research Questions and Objectives

Sustainability transitions are long-term, multi-dimensional transformation processes toward more sustainable modes of production and consumption (Kemp, 1994; Geels & Schot, 2010). They are distinguished from other socio-technical transitions[5] by their normative goal of achieving increased environmental sustainability. Environmental sustainability is rarely an absolute objective; rather, sustainability is generally a matter of degree. Therefore, the normative goal of sustainability transitions is to achieve *greater* sustainability, with systems that are *more* environmentally benign, with *fewer* greenhouse gas emissions, *fewer* impacts on sensitive ecosystems, and *less* pollution and waste. The purpose of this dissertation is to improve our understanding of such sustainability transitions, particularly in electricity systems, as well as to examine what opportunities may exist for First Nations to participate in and benefit from those sustainability transitions, and what role politics plays in enabling or constraining sustainability transitions, as well as the participation of non-traditional actors such as First Nations in those transitions. The primary objective underlying this research is to make several important contributions to the emerging field of sustainability transition studies and to increase our understanding of the various dynamics affecting the likelihood of First Nations participation in electricity generation.

[5] Historical examples of other socio-technical transitions include transitions from cesspools to sewer systems, sailing ships to steam ships, traditional factories to mass production, and horse-drawn carriages to automobiles. These historical transitions are discussed on pages 21 and 22.

The research questions that form the basis of this dissertation are as follows:

- **How can the various elements of sustainability transition studies be combined and augmented to develop an integrated sustainability transition framework that is relevant to the Canadian context?**
- **How can insights provided by an integrated sustainability transition framework help us understand the likelihood of First Nations participation in sustainable electricity transitions?**

In answer to these questions, I first develop an integrated sustainability transition framework, drawing on the existing literature as well as my research. I then extend that framework to address the issue of First Nations participation in sustainable electricity transitions.

This dissertation makes several important contributions to the field of sustainability transition studies. It provides research from a non-European context, which is rare in the field. As far as I am aware, the focus on the role of indigenous groups is a first for sustainability transition studies. The Sustainability Transitions Research Network (STRN) recognizes that, "research across a broader range of countries and diversity of contexts will improve our understanding of the dynamics of transitions, in order to both inform policy and practitioners appropriately, and to improve concepts and theory" (Markard et al., 2010, p. 2).

This dissertation also helps flesh out the role of political dynamics in sustainability transitions. An understanding of political dynamics is not yet well entrenched within sustainability transitions research. The STRN has called for "research that focuses on improving our understanding of how purposeful governance processes can actively engage with and shape sustainability transitions, with a focus on the politics that are involved and the ways in which power plays out" (Markard et al., 2010, p. 8). This dissertation helps fill this void.

Finally, this dissertation presents an integrated sustainability transition framework that is relevant to the Canadian context, pertinent to the issue of the involvement of non-traditional actors, such as First Nations in Canada, and cognizant of the role of politics in transition processes. The STRN identifies as one of its key research priorities: "*synthesizing* perspectives

and approaches that can help to frame the study of transitions [emphasis added]" (Markard et al., 2010, p. 6). Markard and Truffer (2008a) argue that, "a combined framework may offer benefits that – for certain analytical tasks – reach beyond the merits of each approach" (p. 15). This dissertation helps to meet that.

Beyond its contribution to the sustainability transitions field, this dissertation also helps to increase our understanding of how spaces are opened up for First Nations communities interested in pursuing sustainable electricity projects, so such projects are no longer "frustratingly elusive dreams" (Cornell & Kalt, 1998, p. 2) and so First Nations are no longer forced to further their projects "through the cracks left open, by unexpected events and the passage of time, in the [the dominant society's] own discourses" (Blaser et al., 2004, p. 3). To that end, this dissertation delivers relevant insights for policymakers and First Nations leaders about the various dynamics affecting the likelihood of First Nations participation in sustainable electricity transitions.

1.5 Overview of the Dissertation

In Chapter Two, I explore the sustainability transitions literature, outline the four approaches to the theoretical framing of sustainability transitions, and find that there have been growing calls for an *integrated* sustainability transition framework. I find that political dynamics have not yet been well entrenched within the field of sustainability transition studies, and that numerous scholars within the field have expressed the need to address this research gap. I also discuss the initial work done to incorporate politics in the field of sustainability transition studies, which employed an ideational view of politics.

In Chapter Three, I focus on First Nations in Canada. I start off with a discussion about the history of colonialism and paternalism and the ongoing effects of that extended era. I find that the very concept of economic development is a controversial one for First Nations, but that the desire for economic self-sufficiency is universally shared. I outline the variety of factors that

contribute to economic self-sufficiency for First Nations. And I explore the literature on First Nations participation in renewable electricity generation, uncovering the multiple factors that contribute to the success of such ventures.

In Chapter Four, I outline the methodology used in this dissertation. I explain the rationale for the case study approach and justify the choice of my particular cases. I outline the analytical framework and discuss how I will operationalize its main concepts. And I reflect on the limitations of the research design.

Chapter Five, Six and Seven contain the empirical analysis of this dissertation. Chapter Five spells out the situation in Nova Scotia. Chapter Six focuses on Ontario. And Chapter Seven looks at Saskatchewan.

In Chapter Eight, I transform the specific explanation of the cases into general, theoretically based explanations. I answer the first research question by proposing an integrated, augmented sustainability transition framework that is relevant to the Canadian context. I answer the second research question by specifying how the integrated, augmented sustainability transition framework can explain First Nations involvement in the electricity sector. Based on this research, I present several insights for First Nations leaders, policy makers, and activists. And I conclude by summarizing the contributions this dissertation makes to the field of knowledge and outlining potential avenues for further research.

CHAPTER 2
SUSTAINABILITY TRANSITIONS

Sustainability transitions are long-term, multi-dimensional transformation processes through which socio-technical systems undergo fundamental shifts to more sustainable modes of production and consumption (Kemp 1994; Geels & Schot, 2010). Geels (2004) defines a socio-technical system as, "the linkages between elements necessary to fulfill societal functions" (p. 900). In the specific case of electricity, Kern (2009) identifies various elements of the socio-technical system, including knowledge, fuel and transmission infrastructure, markets and user preferences, cultural and symbolic meanings, and regulations and policies (Figure 2-1).

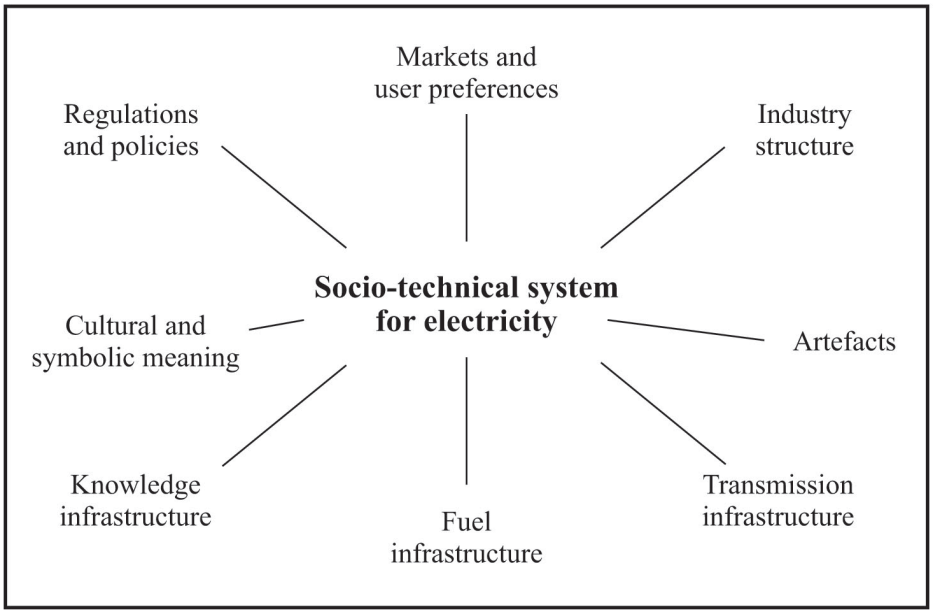

Figure 2-1. Electricity socio-technical system (own illustration, based on Kern, 2009, p. 8)

Transitions of socio-technical systems can occur for a variety of reasons. What distinguishes *sustainability* transitions from other socio-technical systems is the normative goal of achieving increased sustainability. According to Markard et al. (2014),

> Sustainability transitions have been conceptualized as an *intentional* endeavour of socio-technical transformation, guided by public policies. Such a process is not just inherently value-laden but also affects a broad range of stakeholders, which win or lose depending on how the transition unfolds (p. 5).

Sustainability, in this context, is understood primarily from an environmental perspective. As such, the normative goal of sustainability transitions is to achieve socio-technical systems that are more environmentally benign than current systems, with fewer greenhouse gas emissions, fewer impacts on sensitive ecosystems, and less pollution and waste.

Over the past couple of decades, there has been a growing recognition of a variety of factors related to sustainability transitions, especially that:

- Technical innovations, on their own, tend to be insufficient to solve environmental problems, so they often must be accompanied by shifts in socio-cultural and economic conditions;
- Traditional policy approaches tend to be incapable of meeting many of our current challenges because what are truly needed are radical, large-scale, integrated socio-technical changes;
- When considering policies related to sustainability and the environment, not enough attention is generally given to the important criteria of social and political feasibility; and
- Network interactions and system failures, such as lock-in, are not yet systematically incorporated into most policy considerations (van den Bergh et al., 2011).

The recognition of such factors has led to a growing interest in the emerging field of sustainability transition studies (van den Bergh et al., 2011). Research within this field builds on earlier work in institutional theory, technology and innovation studies, evolutionary economics, and sociology (Foxon et al., 2009).

Other approaches to sustainable development tend to focus on just one of three aspects: (1) technical expertise and administration; (2) market reforms; or (3) behavioural change. In

contrast, the field of sustainability transition studies takes a broader perspective by focusing on co-evolutionary approaches and multi-dimensional interactions (STRN, 2012). The main argument that serves as the foundation of the field is as follows: change does not merely involve technology, but rather technical changes must be assessed in their institutional and social contexts; socio-technical systems tend to be stable and path dependent and thus resistant to change; but under certain conditions and given enough time, socio-technical systems can be reconfigured or replaced in order to achieve greater sustainability (STRN, 2012).

The field of sustainability transition studies recognizes that fundamental transitions of socio-technical systems involve the interaction of both quick and protracted mutually reinforcing developments, including those that are technological, economic, institutional, political, socio-cultural and ecological (Rotmans et al., 2001). Such transitions tend to unfold over a significant period of time – generally 25 to 50 years or even longer (Markard et al., 2012). Because the field views sustainability transitions as open-ended journeys, "the analytical emphasis is on processes such as learning, radical innovation, experimentation, searches for new paths, participatory approaches, multi-actor interactions, selection processes, reactions, and network evolution" (Markard et al., 2010).

As a result, one of the main focuses in the field of sustainability transitions is on the various factors that sustain a socio-technical system. Smith and Stirling (2010) assert that:

> Some socio-technical systems are entrenched more deeply than others, in the sense that they enjoy greater institutional support, larger economic significance, more supportive infrastructures, better integration with other social practices, and broader political legitimacy. These strongly embedded, self-reinforcing systems are referred to as socio-technical regimes, and form a meso level of analysis. Electricity systems based on centralized generation from fossil fuels and distributed to users through grids is an example of a regime in wealthy societies, which contrasts with systems using local renewables, for example, for which institutional support is less entrenched (para. 11).

Socio-technical regimes stabilize existing trajectories through a variety of mutually reinforcing processes that are often highly institutionalized, including:

- Regulations and standards;
- Markets and economies of scale;
- Sunk investments in machines, infrastructures and competencies;
- The cognitive routines, knowledge and abilities of the various actors involved in maintaining and supporting the existing systems;
- Entrenched infrastructures and institutions that service and sustain existing systems;
- The social significance of the existing systems;
- The connections between the existing systems and political power; and
- The adaptation of lifestyles to the existing systems (Geels & Schot, 2007; Markard et al., 2010).

As a result of such mutually reinforcing processes, socio-technical regimes are characterized by temporal and structural persistence; they tend only to undergo incremental change along well-established pathways and it is difficult for more sustainable alternatives to find the needed space to trigger meaningful transitions. As a result, the other main focus in the field of sustainability transition studies is on determining the factors that destabilize existing regimes and consequently allow for the emergence of new, more sustainable regimes (Markard et al., 2012).

2.1 Theoretical Approaches to Sustainability Transitions

There are four different approaches to the theoretical framing of sustainability transitions: (1) strategic niche management; (2) transition management; (3) the multi-level perspective; and (4) technological innovation systems (Table 2-1).

Table 2-1. Theoretical framing of sustainability transitions (Markard et al., 2012)

Approach	Key concepts	Key Sources
Strategic Niche Management	When niche-level innovations gain momentum through social learning and experimentation, they can trigger shifts in the socio-technical regime. As such, SNM focuses on the deliberate creation and support of niche innovations	Kemp et al., 1998; Smith, 2007; Raven & Geels, 2010
Transition Management	TM is a model for both *understanding* and *managing* policy change. The management of transitions involves problem structuring, convening multi-stakeholder 'arenas' to undertake envisioning exercises, establishing new coalitions of actors, using multiple experiments, and ongoing evaluation and monitoring	Kern & Smith, 2008; Loorbach, 2010; Rotmans et al., 2001
Multi-Level Perspective	The multi-level perspective understands that the alignment of developments at multiple levels can lead to transitions. Like strategic niche management, this perspective involves both the niche and regime levels, but it adds the landscape level as well, which consists of the natural environment, macro-economy, political culture, demographic characteristics, and worldviews. Transitions occur through the interaction of stabilizing mechanisms at the regime level, regime-destabilizing dynamics at the landscape level, and the breakthrough of niche-level innovations	Geels, 2002; Geels & Schot, 2007; Smith et al., 2010
Technological Innovation Systems	The technological innovation systems framework focuses on a broad set of innovating actors, their networks, and their dependence on various institutional contexts to develop, diffuse, and utilize technological innovations. The driver behind transitions is understood to be the systematic interplay of firms and other actors within a particular institutional infrastructure. The goal of TIS analysis is to identify system failures – including inadequately functioning networks, infrastructure failures, and institutional failures – in order to correct them through regulations and policies at particular points where such interventions are likely to be effective. A typical task in such analysis is to identify drivers and barriers to innovation and transitions	Bergek et al., 2008; Jacobsson & Johnson, 2000; Hekkert et al., 2007; Jacobsson & Bergek, 2011

2.2 Quasi-Evolutionary Approaches

The first three approaches to the theoretical framing of sustainability transitions are closely related to one another (Markard & Truffer, 2008a). Strategic niche management, transition management and the multi-level perspective can broadly be grouped under the category of *quasi-evolutionary approaches* (Suurs, 2009). Each of these approaches focuses, to varying degrees, on the concept of a multi-level framework, consisting of meso-level socio-technical regimes, micro-level niche innovations and macro-level landscape pressures.

Strategic niche management (SNM) focuses primarily on the role of innovations at the niche-level: through social learning processes and multiple experiments, niche-level innovations can gain enough momentum to effectively compete with the technologies that are dominant in the socio-technical regime. In this largely bottom-up approach, the *management* component of SNM focuses on the purposeful creation, support and protection of such niche-level innovations (Raven & Geels, 2010; Smith, 2007). SNM emerged early on as a possible way of sparking transitions (Kemp et al., 1998), however much of its promise has waned. Suurs (2009) notes that, "most SNM studies have not been able to show how niches transcend their niche status" (p. 24). As a result, though it has been the focus of many studies, SNM has not emerged as a leading school of thought within the field of sustainability transition studies.

Transition management (TM) focuses on the role of reflexive and evolutionary governance processes in *managing* transitions. TM theorists believe that it is not possible to fully control long-term societal transitions, so *management* within the framework refers instead to the processes of shaping and steering (Kemp & Loorbach, 2003). As such, TM as a governance approach involves attempting to influence the process of societal change by seeking "promising pathways for the evolution of key societal sectors" (Meadowcroft & Bregha, 2009, p. 211); encouraging innovation and experimentation to accelerate movement along those pathways;

reflexively adapting along the way; and eventually achieving a new dynamic equilibrium (Kemp & Loorbach, 2003). Despite numerous TM studies and attempts at practical application, its effectiveness in actual policy contexts has not yet been demonstrated (Markard et al., 2012).

The main features of the literature on the quasi-evolutionary theories are best captured in the *multi-level perspective* (MLP) (Figure 2-2). The MLP focuses on three levels:

1. The niche level consists of innovative practices;
2. The regime consists of the existing structure, including technology, science, markets/user preferences and policies; and
3. The landscape consists of long-term, exogenous trends, including the natural environment, macro-economy, political culture, demographic characteristics, and worldviews (Grin, 2012).

Smith et al. (2010) note that, "the allure of the MLP is that it provides a relatively straightforward way of ordering and simplifying the analysis of complex, large-scale structural transformations in production and consumption demanded by the normative goal of sustainable development" (p. 441).

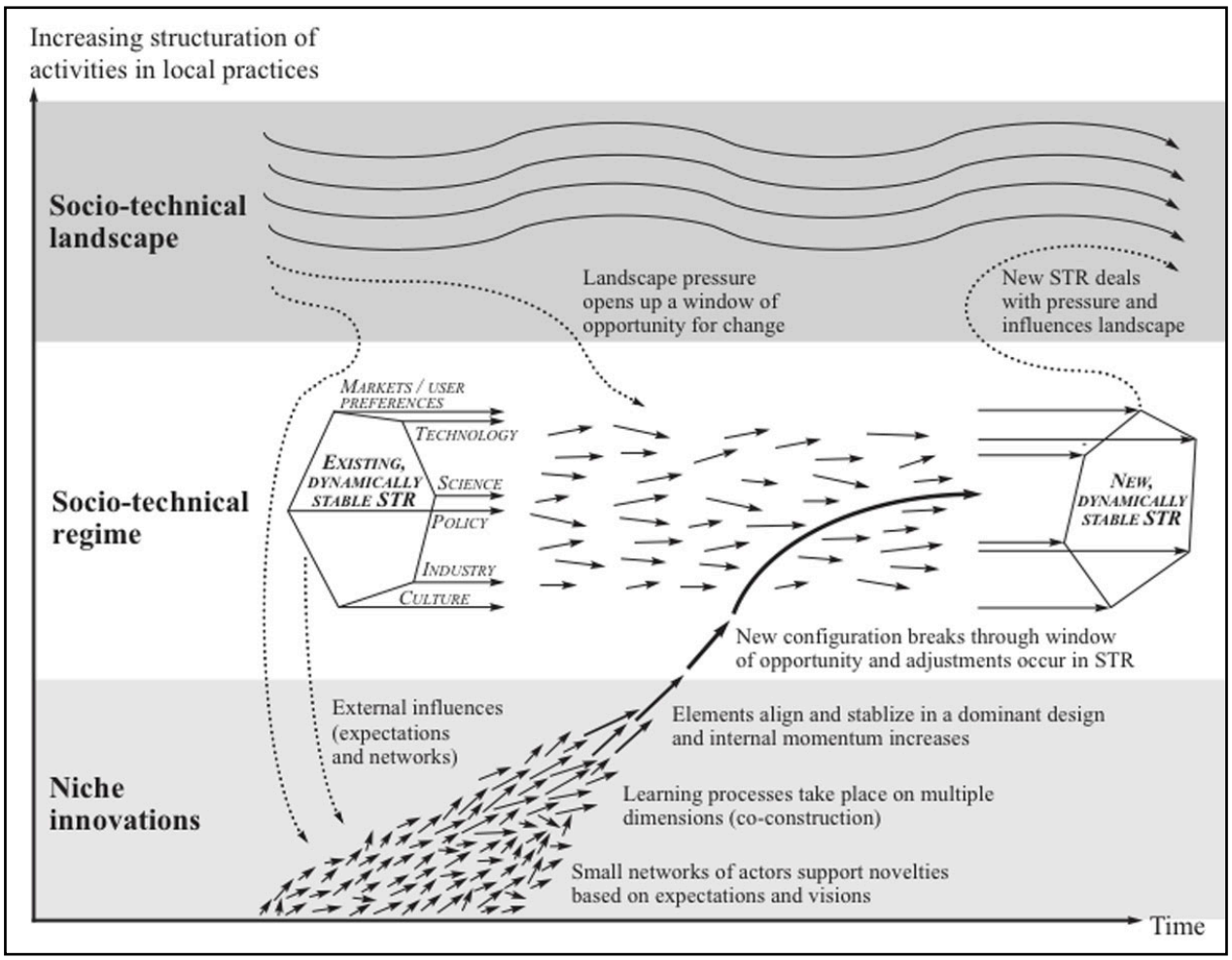

Figure 2-2. Multi-level perspective (own illustration, based on Geels & Schot, 2007)

The key processes under consideration within the MLP are the stabilizing mechanisms at the regime level and the regime-destabilizing dynamics at the landscape and niche levels. Regimes and niches work through sociological structuration while landscapes "provide deep-structural 'gradients of force' that make some actions easier than others" (Geels & Schot, 2007, p. 403). Within the MLP, transitions are understood to result from an alignment of developments in the landscape, regime and niche levels, with meso-level socio-technical regimes experiencing downward pressure from macro-level societal landscapes as well as upward breakthroughs from micro-level niche innovations. An alignment of factors in these three levels creates a window of opportunity to transition toward a more sustainable socio-technical regime. Niche-level

innovations have a higher likelihood of destabilizing, reconfiguring, or replacing socio-technical regimes if there are simultaneous landscape pressures on the socio-technical regime (Geels, 2002; Geels & Schot, 2007; Markard et al., 2010; Smith et al., 2010; Geels, 2011).

Geels & Schot (2007) emphasize the importance of both the nature and timing of the interactions between the niche, regime and landscape levels. *Reinforcing* landscape developments have stabilizing effects and do not serve as an impetus for a transition, whereas *disruptive* landscape developments apply pressure on the regime and act as a driver for a transition. Niche innovations have a *competitive* relationship with the regime when they serve to destabilize and replace it, whereas they have a *symbiotic* relationship with the regime when they can serve as competence- and performance-enhancing add-ons to the regime (Geels & Schot, 2007). The timing of landscape pressure on regimes relative to the state of niche developments is important and will lead to different transition pathways (Geels & Schot, 2007).

Geels and Schot (2007) outline four transition pathways: (1) transformation; (2) reconfiguration; (3) technological substitution; and (4) de-alignment/re-alignment. Of course, in the absence of sufficient external landscape pressure, the socio-technical regime will remain dynamically stable and simply follow a *reproduction process*, but if landscape pressure exists to the degree that the regime is unable to withstand it, one of the following pathways will likely be followed, depending on the nature and timing of the multi-level interactions:

1. *Transformation:* this pathway tends to be followed when moderate landscape pressure occurs and fully developed niche innovations already exist. Regime actors respond to the landscape pressure by adjusting their development paths, including through the adoption of niche innovations that add to the regime without substantially altering its basic architecture. An example of a historical socio-technical transition involving this pathway is the hygienic transition from cesspools to sewer systems in the Netherlands: in the 1850s, when physicians initially raised concerns about the statistical correlation between infectious diseases and unsanitary conditions, including waste being dumped onto streets and into canals as well as the existence of overflowing cesspools, regime actors responded with minimal incremental improvements. However, the decades that followed saw a gradual adjustment in several key factors, including perceptions of disease and waste, expectations of authorities, and expectations about appropriate waste disposal. Developments at the landscape level, including industrialization and increasing

democratization, were crucial to this transformation pathway. Another important factor was the struggle between regime actors and outsiders, including coalitions of physicians and engineers that were heavily focused on sanitary reform. While the switch from cesspools to sewer systems involved some aspects of the *technological substitution* pathway, it is most correctly deemed a *transformation* process because sewer systems were not disruptive to the socio-technical regime and the new knowledge involved was simply added on to the existing knowledge (Geels & Schot, 2007, p. 407).

2. *Technological substitution:* this pathway tends to be followed when there is significant landscape pressure and sufficiently developed niche innovations. Until landscape pressure is no longer bearable, regime actors remain satisfied with incremental improvements and pay minimal attention to niche innovations. But when landscape pressure becomes intolerable, niche innovations that have already stabilized and gathered internal momentum can finally break through and replace the existing regime, often by entering increasingly larger markets. Britain's switch from sailing ships to steamships is a historical example of a socio-technical transition involving the technological substitution pathway. In 1838, the British government created a mail-steamer subsidy with the aim of improving communication within the British Empire through a faster pace and more reliable arrival times for its steamships. The market niche that resulted from this subsidy allowed a devoted community of steamship builders to emerge, leading to better proficiencies in steam technology and iron working and, most importantly, leading to improved performance of steamships. Despite this niche, and other niches such as steam tugs in ports, the sailing-ship regime remained both stable and innovative. But when landscape pressures in the form of political revolutions and the Irish potato famine caused mass emigration from Europe to North America – which boosted the trans-Atlantic passenger-ship market beginning in the late 1840s – steamships were ready to seize the opportunity. The opening of the Suez Canal in 1869 allowed for steamships to take a crucial role in oceanic freight trade, because sailing ships had the distinct disadvantage of having to travel around Africa. As a result, between 1870 and 1890, steamships replaced sailing ships through economic competition. Following the breakthrough of steamships, there were many adjustments in the socio-technical regime that helped facilitate further diffusion of steamships, including the enlarging of ports and the creation of global coal infrastructure (Geels & Schot, 2007, p. 411).

3. *Reconfiguration:* this pathway tends to be followed when the socio-technical regime adopts symbiotic niche innovations to solve regime problems and improve performance; these changes subsequently generate further adjustments that alter the regime's basic architecture, including technical changes and changes in user practices, perceptions and search heuristics. Geels and Schot (2007) note that, "while regime actors survive in the reconfiguration path, competition and tensions occur among component suppliers" (p. 411). The American transition from traditional factories to mass production is a historical example of socio-technical transition involving the reconfiguration pathway. Several external landscape pressures influenced this change, including the emergence of a national market, population and economic growth, the rise of engineers, increasing pervasiveness of electricity, and the efficiency movement. Multiple component innovations – including the division of labour, mechanization, application of machine tools, and continuous-materials-handling techniques – interacted with the regime, initially through the adoption of particular innovations to solve specific problems, and then

serving to overhaul the basic architecture of the factory regime (Geels & Schot, 2007, p. 411).

4. *De-alignment and re-alignment:* this pathway tends to be followed when there is significant landscape pressure that causes major internal problems for the regime, leading regime actors to lose faith and reduce investments in the regime, including in related research and development. In such cases, if no clear regime substitute exists because niche innovations are not yet fully developed, then space is opened up for multiple niche innovations to co-exist and compete until one becomes dominant and stabilizes into a new regime. The American transition from horse-drawn carriages to automobiles is a historical example of a socio-technical transition involving the de-alignment and re-alignment pathway. Many landscape pressures existed that created problems for the horse-based transportation regime, including urbanization, immigration, the hygiene movement, electricity, political reform, a burgeoning middle class, and new values such as active sporting and the pursuit of fun. Multiple novelties that could replace horse-drawn carriages emerged and co-existed for a short period of time. Electric trams, bicycles and automobiles – including electric, gasoline and steam varieties – all benefited from this initially. But automobiles, particularly of the gasoline variety, eventually won out and were "supported by institutions such as fast food restaurants, shopping malls on the edge of cities, [and] drive-in movies" (Geels & Schot, 2007, p. 409).

2.3 Technological Innovation Systems

The other strand of research within the field of sustainable transition studies is *technological innovation systems* (TIS), which focuses on the "emergence of novel technologies and the institutional and organizational changes that have to go hand in hand with technology development" (Markard et al, 2012, p. 5). TIS analysis focuses on technological innovation and is explores the various dynamics that influence the emergence of a new technology or a new product. Markard and Truffer (2008a) define a technological innovation system as a "set of networks of actors and institutions that jointly interact in a specific technological field and contribute to the generation, diffusion and utilization of variants of a new technology and/or a new product" (p. 16). Suurs and Hekkert (2009a) point out that the TIS literature "stresses the importance of path dependency, positive feedback and cumulative causation for understanding technological change and long-term economic growth" (p. 1003). Suurs (2009) notes that:

> Technological innovation can be understood as the development of a set of interlinked technologies and institutions being shaped (and reshaped) through the activities of actors. In the course of time, the outcomes of these activities result in an accumulation of

> structures. With these structures in place, the innovation process typically gains more direction and speed. Once a technological innovation takes off, it is expected to replace or rearrange important structures that support incumbent technologies, thereby possibly establishing a contribution to a transition (p. 17).

The TIS perspective utilizes different language than the quasi-evolutionary frameworks, but some of its core concepts are similar. It focuses primarily on two key components:

- A *production* component encompassing the established technologies, which only undergo incremental innovations in the absence of significant external challenges. This component has a similar role to that of the regime in the quasi-evolutionary approaches, in that it serves to stabilize and support existing technologies; and

- An *innovation* component, in which the established production component undergoes fundamental transformation or replacement through the creation, diffusion, and utilization of new technologies, most often involving different actors, networks, and institutions than those involved in sustaining and reinforcing the established system. This component has some similarities to the concept of niches, in that it generates innovations that challenge the dominant technologies (Markard & Truffer, 2008a).

The TIS approach is "essentially a growth model based on the notion of cumulative causation" (Suurs, 2009, p. 26). This framework, which explains the emergence of new technologies or new products, involves a build-up process encompassing seven key system functions (Bergek et al., 2008; Suurs, 2009; Suurs & Hekkert, 2009a; Suurs & Hekkert, 2009b):

1. *Entrepreneurial experimentation* – projects, including experiments and demonstrations, that are intended to prove the usefulness of the emerging technology;

2. *Knowledge development* – learning activities, typically through universities and research institutes, with a focus primarily on the emerging technology, but also on markets, networks, users, and so on;

3. *Knowledge diffusion* – through networks, knowledge is interactively exchanged between actors by way of partnerships, meetings, workshops, conferences, etc.;

4. *Guidance of the search* – positive or negative signals, such as expectations, promises, and policy directives, serve to steer technology development;

5. *Market formation* – the normal phases are 'nursing market' in which the TIS forms, 'bridging market' in which there are increases in volume and number of actors, and 'mature market';

6. *Resource mobilization* – the distribution of needed financial, material and human capital to support the emerging technology; and

7. *Support from advocacy coalitions* – in order to overcome inertia associated with resistance from actors in the incumbent system, other actors must provide necessary support, including political lobbying (Bergek et al., 2008; Suurs & Hekkert, 2008; Suurs, 2009).

Bergek et al. (2008) also note the role played by the development of positive externalities for the emerging technology, which results from the strengthening of each of the other seven functions.

Suurs and Hekkert (2009b) argue that, "the system functions should not be regarded as independent variables, or static criteria. Rather, they are processes that can reinforce each other. In fact, they should reinforce each other, or otherwise there can be no build-up in the TIS" (p. 676). To that end, Suurs (2009) identifies a sequence of 'motors', which generally represent successive steps in a cumulative causation growth model, in the sense that each motor builds upon another. The successive motors are: (1) the science and technology push (STP) motor; (2) the entrepreneurial motor; (3) the system building motor; and (4) the market motor (Figure 2-3).

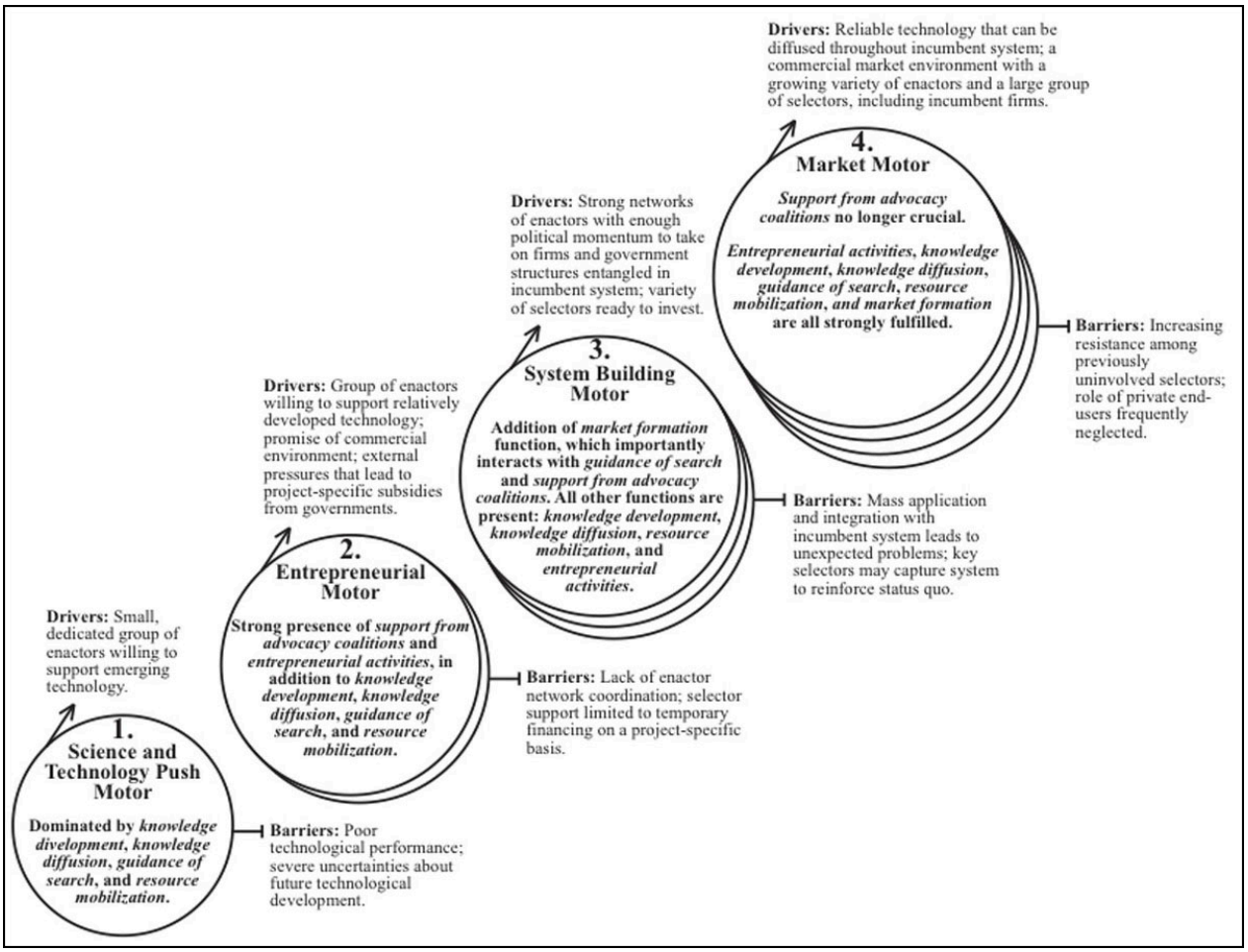

Figure 2-3. Sequence of TIS motors (own illustration, adapted from Suurs, 2009)

Suurs notes that immature technological innovation systems generally do not develop anything other than an STP motor and that the entrepreneurial motor only emerges once the TIS is sufficiently developed to open up opportunities for firms. The system building motor represents a transformation of the entrepreneurial motor while the market motor typically develops from those structures shaped by the system building motor (Suurs, 2009).

Bergek et al. (2008) identify two significant inducement mechanisms that influence the functional pattern of TIS development: a belief in growth potential affects market formation, entrepreneurial experimentation, and direction of the search; and government research and development policy provides resources for research and experimentation and signals attractiveness and therefore affects the direction of search, legitimation, resource mobilization,

and knowledge development and diffusion. Bergek et al. (2008) also identify six primary blocking mechanisms that impede emerging TISs:

1. Uncertainties of needs among potential customers;
2. Inadequate knowledge of relations between investments and benefits;
3. Lack of capacity and inadequate understanding of demand;
4. Lack of standards;
5. Few university programs in the field; and
6. Weak advocacy coalitions.

From the TIS perspective, the role of policy makers is not only to provide project-specific support as well as support for research and development programs, but also to identify and address system failures, including inadequately functioning networks, infrastructure failures, and institutional failures (Bergek et al., 2008; Jacobsson & Johnson, 2000; Hekkert et al., 2007; Jacobsson & Bergek, 2011). TIS analysis often brings forward technology-specific policies in order to overcome barriers to innovation and transitions (Markard et al., 2012).

2.4 Actors, Strategies and Resources

A wide variety of actors can play important roles in transitions, including private firms, venture capitalists, policy makers, government agencies, non-governmental organizations, universities, research institutes, associations, social movements, customers, and citizens. Geels (2005) says, "the linkages between processes at different levels are made by actors in their cognitions and activities, the dynamics are not mechanical, but socially constructed. … [and] transitions are contested and different groups struggle, negotiate and form coalitions" (p. 453). Meadowcroft (2009) also notes that an important aspect of sustainability transitions is the broadening out of the decision space and the creation of new coalitions of actors. Based on their comprehensive review of a range of other transition studies (including Bakker et al., 2012; Budde

et al., 2012; Konrad et al., 2012; Penna & Geels, 2012; Quitzao et al., 2012; and Schuitmaker, 2012), Farla et al. (2012) outline the roles of the main actors in transitions (Table 2-2).

Table 2-2. Main actor roles in transitions (Farla et al., 2012, p. 995)

Actors	Role in transitions
Policymakers and government agencies	Traditionally, policymakers and government agencies have financially supported innovations until they reach a competitive phase. More recently, they have also proactively facilitated the creation of niches. Policymakers and government agencies "tend to be constrained by relationships with wider publics and industry actors, following and reacting to the outcomes of the societal debate" (Farla et al., 2012, p. 995)
Firms	Firms actively engage with innovation trajectories by creating positive externalities for their innovations as they seek to gain momentum against incumbent technologies and competing niche innovations. Firms actively involved in the incumbent regime only engage in innovation when pressured to do so
Social movements	In their struggle against incumbent regimes, social movements use political contacts, deployment of financial resources and public information campaigns in their attempt to mobilize public and consumer support and action on the part of policymakers
Research institutes and experts	Research institutes help influence expectations; including how sensitive other actors are to hype/disappointment dynamics, which can lead those actors to adjust their strategies

Geels and Schot (2007) assess the main actors and types of actions and interactions in the different MLP pathways (Table 2-3).

Table 2-3. Main actors, actions and interactions in transition pathways (Geels & Schot, 2007)

Transition pathway	Main actors	Types of actions and interactions
Transformation	Regime actors, outside voices	Pressure on regime exerted by external forces, including outsiders who critique regime; institutional power struggles and negotiations occur as incumbent actors adjust various regime rules and even adopt non-disruptive niche innovations
Technical substitution	Incumbent firms versus new firms	Market competition occurs, as newcomers develop novelties that compete against existing regime technologies, resulting in power struggles between incumbent and niche firms, as preferred incumbent technology is exchanged for a disruptive niche innovation
Reconfiguration	Regime actors, suppliers	There is competition between incumbent and niche suppliers, as regime actors begin adopting innovation components developed by niche suppliers. Adoption of niche components leads reconfiguration of system, through cumulative component changes and new practices
De-alignment/ re-alignment	New niche actors	Deep structural changes create substantial pressure on the existing regime. The regime erodes and eventually collapses as incumbents lose legitimacy. Multiple novelty innovations emerge. New niche actors compete for attention, resources and legitimacy. One niche innovation eventually wins and the regime re-stabilizes.

Markard and Truffer (2008b) point to the importance of resource endowments, which serve as "an indicator for the innovation potential of actors and a determinant of actor configuration within the system" (p. 444). Markard and Truffer (2008a) assert that the *distribution* of resources is also crucial: "how resources are distributed among actors … [helps to] explain the development of networks and the innovation potential of actors" (p. 14) (Table 2-4).

Table 2-4. Dynamics based on distribution of resources (Markard & Truffer, 2008b, p. 446)

Distribution of resources	Dynamic
A minimal number of actors control a broad range of critical resources	The very few actors with control of resources dominate both the system structure and the direction of any innovation processes
Different actors control different critical resources	No single actor dominates the system structure or direction of the innovation process; coordination and collaboration are fundamental to advance the innovation process
Many actors control substitutable resource profiles	Coordination and collaboration are less likely in such an environment; imitation and competition is the dominant interaction mode

2.5 Toward an Integrated Framework

While most sustainability transitions scholars tend to adhere to one of the particular frameworks within the field, there is a growing desire among many in the field to establish an integrated sustainability transition framework. The Sustainability Transitions Research Network (STRN) identifies as one of its top priorities the following: "*synthesizing perspectives and approaches* that can help to frame the study of transitions [emphasis added]" (Markard et al., 2010, p. 6).

With the goal of an integrated framework in mind, Markard and Truffer (2008a) focus on what possibilities may arise through the combination of the TIS and MLP frameworks:

> The innovation systems approach and the multi-level framework represent different perspectives on processes of innovation and socio-technical transformation. They are however comparable in terms of basic concepts and theoretical roots, they share a number of similarities and they have complementary strengths. Especially the latter aspect leads us to conclude that *a combined framework may offer benefits that – for certain analytical tasks – reach beyond the merits of each approach* [emphasis added] (p. 15).

In terms of similarities, Markard and Truffer (2008a) note that both approaches emphasize the importance of networks, learning processes, and institutions and they both recognize similar phenomena, including path dependency, interdependence and non-linearity. Suurs (2009) also

identifies that "both apply a holistic perspective including a variety of interrelated factors to explain the outcome(s) of these processes. And most importantly, the approaches both stress the importance of sustainable innovation to be understood as a build-up process" (p. 25).

In terms of complementary strengths, Markard and Truffer (2008a) identify as the key contribution of the MLP framework its explanation of the transition process as stabilizing mechanisms at the regime level, regime-destabilizing pressures from the landscape level, and the emergence of niche-level innovations. This understanding of transition processes "leaves room for contingencies such as external shocks or disruptive changes at the landscape level" (Markard & Truffer, 2008a, p. 14). Markard and Truffer (2008a) assert that this may serve as a good complement to the TIS perspective, which is rather myopic and tends to ignore the system's broader environment. Meanwhile, the key contributions of the TIS framework are its "more analytical approach with its elaborated framework of structural and functional analyses … [along with the fact that] it is a meso-level concept that reaches well beyond niche level processes … [and it] has the potential to more explicitly deal with firm strategies and agency" (Markard & Truffer, 2008a, p. 14). Markard and Truffer (2008a) note that this may serve as a good complement to the MLP framework, which has largely confined its focus on emerging innovations to the niche level but has not yet developed the elaborate concepts and tools necessary to adequately investigate niche-level dynamics. Markard and Truffer (2008a) also assert that the strengths of the TIS framework may help the MLP framework make up for the fact that it has little to offer with regard to the agency, roles and strategies of different actors or actor groups.

2.6 The Politics of Sustainability Transitions

While there is no question that political dynamics play an important part in transitions, exactly what role they play is not yet well entrenched within the sustainability transitions field.

Grin (2011) acknowledges that, "more research into the two-way relationships between transition dynamics and its politics is needed" (p. 87). Avelino and Rotmans (2009) say that, "whereas *implicit* references to power are obvious, an *explicit* integration of power concepts is lacking and confronts transition studies with a conceptual weakness" (p. 545). The STRN also recognizes the need for "research that focuses on improving our understanding of how purposeful governance processes can actively engage with and shape sustainability transitions, with a focus on the politics that are involved and the ways in which power plays out" (Markard et al., 2010, p. 8). The STRN's research priorities in the area of 'governance, power and politics' include devising approaches that take into account an understanding of how "transitions involve mobilizations of power and legitimacy whilst simultaneously changing the sources of power and legitimacy" (Markard et al., 2010, p. 8).

Traditional notions of politics have focused heavily on interests and power struggles, but scholars have increasingly embraced an *ideational* understanding of politics. For example, Fischer (2003) views politics as "a struggle for power played out in significant part through arguments about the 'best story'" (Fischer, 2003, p. x). Fisher (2003) says:

> Political action is constituted by discourses, from hegemonic discourses embedded in the existing institutions … to the oppositional efforts of other groups attempting to create new discourses. … Public policies are not only influenced by the discourses of particular groups, they are shaped and supported by the institutional processes in which specific discursive practices are embedded, processes which can have a life of their own (p. 45).

Stone (2002) shares Fischer's view, asserting that "the essence of policy-making in political communities" is a "struggle of ideas" (p. 11). Hajer (1993; 1995; 2005; 2013) also holds an ideational understanding of politics and focuses heavily on the importance of discourse. Hajer (1995) defines *discourse* as "a specific ensemble of ideas, concepts and categorizations that is produced, reproduced and transformed in a particular set of practices and through which meaning is given to physical and social realities" (p. 60). Discourses frame certain problems and they

deliberately ignore other problems; they distinguish certain aspects of a situation and intentionally disregard other aspects. Hajer (1993) notes that:

> The ideas, concepts and categories that constitute a discourse vary in character: they can be normative or analytical convictions; they can be based on historical references; they can reflect myths about nature. As such, discourses provide the tools with which problems are constructed. Discourse at the same time forms the context in which phenomena are understood and thus predetermines the definition of the problem (p. 45).

For Hajer (1993), politics is ultimately a struggle for discursive hegemony in which different actors from various backgrounds form coalitions around specific rhetorical arguments and persuasive practices with the aim of bringing new actors in and garnering increased support for their particular definition of reality.

Hajer (1993) defines a *discourse coalition* as "the ensemble of a set of storylines, the actors that utter these storylines, and the practices that conform to these storylines, all organized around a discourse" (p. 47). Table 2-5 outlines the important components of the discourse coalition approach. Hajer (1995) asserts that:

> Storylines are devices through which actors are positioned, and through which specific ideas of 'blame' and 'responsibility', and of 'urgency' and 'responsible behavior' are attributed. Through storylines, actors can be positioned as victims or polluters, as problem solvers, as perpetrators, as top scientists, or as scaremongers (p. 65).

These new storylines can reorder the way in which we understand policy problems and, as a result, they can facilitate change (Hajer, 1995). The acceptability of new storylines depends on a few factors: whether actors like the way in which they have been positioned and framed in the storyline; whether actors find that subject-positioning and the overall structure of the storyline credible; and whether actors trust the individuals, groups, organizations or institutions that are creating and disseminating the storyline (Hajer, 1995).

Table 2-5. Components of the discourse coalition approach (Hajer, 1993; 1995)

Term	Meaning
Discourse	"A specific ensemble of ideas, concepts and categorizations that is produced, reproduced and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1995, p. 60)
Storylines	Generative narratives through which actors give meaning to social and physical phenomena. Judged by the criteria of attractiveness, credibility and trust
Discourse coalition	"The ensemble of a set of storylines, the actors that utter these storylines, and the practices that conform to these storylines, all organized around a discourse" (Hajer, 1993, p. 47).
Discourse structuration (discursive hegemony)	A particular discourse essentially becomes dominant, in that it affects the way a society views the world
Discourse institutionalization	When discourse through which many people conceptualize the world solidifies into an institution through organizational practices or a dominant mode of reasoning
Discursive cement	Simple, generative metaphors and storylines that bind together diverse discourse coalitions
Discursive order	The routinization of the cognitive commitments implicit in storylines, so that they appear 'natural'
Discursive closure	An interpretive process leading to the selection of simple metaphors to represent complex storylines and policy ideas. Erases the uncertainty and contingency of the knowledge upon which storylines are based.

In a nutshell, actors use storylines to reduce the discursive complexity of a particular problem and open up new possibilities for addressing that problem. According to Fogel (2002), "storylines become *tropes* or figures of speech that rationalize a specific approach to what seems to be a coherent problem and allow actors to understand where their work and lives fit into a larger picture" (p. 65). This leads to the development of a broad discourse coalition and, "as more actors start to use a given storyline, it acquires a ritual character that gives permanence to the

debate" (Fogel, 2002, p. 65). In their review of the discourse coalition literature, Leifeld and Haunss (2012, p. 385) reveal seven characteristics of successful discourse coalitions:

1. Their core frames and actors are stable over time;
2. Their members exhibit strong ideational congruence;
3. Their members stand united against rival coalitions;
4. They attract a sizeable constituency;
5. They effectively dominate the core frames of a particular discursive struggle;
6. They can effectively integrate their frames into a consistent and compelling storyline; and
7. Their 'frame bundle' is broad enough to draw in other actors and build a strong coalition, without being too diverse.

Hajer (2013) points to three general advantages of using a discourse coalition approach:

1. It provides the theoretical tools to analyze disagreements over specific issues within their broader political milieu and to analyze strategic action within the context of discourses and institutional practices;
2. Rather than simply referring to interests, it takes the explanation further by analyzing how those interests are played out in the context of discourses and institutions; and
3. It clarifies how different actors reproduce or contest a given bias without actually sharing deep values or coordinating their actions.

Szarka (2004) notes that, "the value of [the discourse coalition] approach is that it illuminates how discourse becomes a means to political action" (p. 319).

With the aim of addressing the significant research gaps with regard to the role of politics in sustainability transitions, Kern (2009; 2012) employs a 'discursive lens' and concludes that the politics of sustainability transitions "can usefully be conceptualized and explained as struggles about meaning. These are shaped in turn through discursive interactions between actors as well as existing institutions" (Kern, 2009, p. xi), and that, "political struggles about meaning within existing institutional contexts enable, shape, and constrain policy initiatives" (Kern, 2009, p. 187). Frantzeskaki et al. (2012) say that, "by introducing discourse analysis [to sustainability

transition studies, Kern] provides us with the conceptual language to analyze the political nature of the governance of sustainable transitions" (p. 177).

Rosenbloom and Meadowcroft (2014) assessed the history of the electricity sector in Ontario, utilizing the MLP framework, and concluded that: "political intervention was decisive in consolidating major shifts in the system of electricity provision" (p. 671); "politico-economic coalitions have played a pivotal role in instigating change and/or resisting it" (p. 677); and

> Politics has played a fundamental role in propping up, directing and tearing down successive electricity regimes. Indeed, understanding regime change in this context was only possible through a close inspection of impinging political dynamics. Bringing political developments from the background to the foreground has yielded important insights with respect to the evolution of Ontario's electricity system (p. 678).

CHAPTER 3
FIRST NATIONS AND DEVELOPMENT

Oral tradition tells us that First Nations have lived on this land since time immemorial. There is well-documented evidence of their presence going back at least as far as 40,000 years (Royal Commission on Aboriginal Peoples, 1996). In the 1500s, Europeans began forming permanent settlements in North America and, beginning in 1701, numerous formal treaties were signed between the newcomers and First Nations. In 1763, King George issued a Royal Proclamation recognizing Aboriginal rights and title to the land and thereby setting the constitutional basis for future negotiations of treaties. In 1867, when the Dominion of Canada was created, section 91(24) of *The British North America Act* entrenched the federal government's responsibility for "Indians and Lands reserved for Indians." Between 1871 and 1921, the 11 numbered treaties were signed between the Crown and First Nations (Figure 2-1), ensuring Canadian sovereignty over the vast territory and allowing for coordinated European settlement and access to natural resources. At the time, First Nations tended to welcome the treaties because their communities faced considerable distress due to epidemic and famine as well as economic challenges resulting from the extinction of bison (AANDC, 2010a).

Figure 3-1. Historical treaties in Canada (own illustration)

3.1 The Legacy of Colonialism

Much of the early contact between First Nations and newcomers showed signs of promise; relationships were characterized by cooperation, sharing, partnerships, intermarriage, and treaties (Miller, 2000; Dickason & McNabb, 2008). Poelzer and Coates (Forthcoming) argue that the initial relationships forged between First Nations and newcomers, particularly through the fur trade, "provided the first, longest lasting and most successful example in Canadian history of our ability to find common ground" (p. 37).

But, despite that initial promise, much of Canada's history with First Nations has been marked by colonialism, assimilation and attempts at cultural extermination (Asch, 2000; Coon Come, 2004; Blaser et al., 2004; Hoffman, 2008; Ralston Saul, 2008; Sutton Lutz, 2007). According to Hoffman (2008), colonialism involves a "deep form of control and subordination [in that it] necessitates the denigration of Aboriginal systems of social organization and governance since … the process of forming a community means 'unforming' the existing community" (p. 104). Hoffman (2008) argues this insidious form of domination, manipulation and control of First Nations people and communities has been so pervasive that its effects will still likely be felt decades after colonialist approaches are shelved for good.

Throughout Canadian history *The Indian Act* has served as a significant tool of colonialism. Introduced in 1867, this federal legislation consolidated various existing regulations and increased the authority of the federal Indian Affairs department. In particular, it provided the department with the power to have significant intervention in the lives of First Nations people and their communities and to make sweeping policy decisions on a variety of topics, including determining who legally counted as an Indian; controlling Indian lands, resources and finances; and "promoting civilization" (AANDC, 2010a, p. 8). The Government of Canada now acknowledges that:

> The principle behind the Act was that it was the Crown's responsibility to care for and protect the interests of First Nations people by acting as their 'guardians' until such time as they could reach a level of sophistication that allowed them to fully integrate into Canadian society. The Indian Act was frequently amended in the 70 years after it was passed into law in 1876. The amendments were largely concerned with assimilation and civilization of First Nations people. Amendments to the Indian Act became increasingly restrictive and imposed ever-greater controls upon the lives of First Nations peoples (AANDC, 2010a, p. 8).

Restrictions under *The Indian Act* included a ban on traditional spiritual and cultural ceremonies as well as a prohibition against political organizing without prior government approval. *The Indian Act* also outlined parameters for "Indian Reserves – tracts of land, the legal title to which

is vested in Her Majesty, that have been set apart by Her Majesty for the use and benefit of a band" (Canada, 2013). Figure 2-2 shows the First Nations reserve territory throughout Canada.

Figure 3-2. Reserve territory in Canada (own illustration)

Craik (2008) argues that treaties and agreements reduced the area available to maintain First Nations economies and traditional modes of life: "the relationships forged with Aboriginal nations by the colonial newcomers were processes of displacement and dispossession that, over time, left the Aboriginal nations with little, or nothing" (p. 281). Neu (2000) notes that "the reserve land base was insufficient to sustain either the traditional hunter/gatherer lifestyle or the

agrarian lifestyle … neither the reserve land base, including the quality of the land, nor the assistance provided was sufficient to sustain Indigenous peoples" (p. 275).

In the late 1800s, First Nations reserves became largely childless zones when government-funded, church-run residential schools were established for First Nations children. The underlying motivation for the establishment of these schools was to "kill the Indian in the child" (TRC, 2013). All of these colonialist policies and actions adversely affected First Nations' systems of social organization and governance. These historical arrangements, which limited the land base of First Nations and tore apart their family and community structures, served as significant impediments to advancing their own projects and achieving their full potential, individually and collectively.

The Royal Commission on Aboriginal Peoples notes that, for much of Canada's history, First Nations were viewed as an obstacle to development:

> More and more, non-Aboriginal immigrants were interested in establishing permanent settlements on the land, clearing it for agricultural purposes, and taking advantage of the timber, fish, and other resources to meet their own needs or to supply markets elsewhere. They were determined not to be frustrated or delayed unduly by those who claimed title to the land and used it in the Aboriginal way. In something of a return to earlier notions of the 'civilized' and 'savage' uses of land, Aboriginal people came to be regarded as impediments to productive development (Royal Commission on Aboriginal Peoples, 1996, vol. 1, ch. 5).

As a result of such a view, government and industry actors tended to employ harsh colonialist approaches against First Nations.

But then things started turning around, slowly. Because First Nations people participated in the First and Second World Wars and the Korean War, a committee consisting of both members of parliament and senators was struck in 1946 to review the federal government's policies related to First Nations affairs. Thus began the very long and slow process of "rolling back paternalism" (AANDC, 2010a, p. 9). In 1951, the ban on First Nations ceremonies was lifted; in 1960, First Nations men were given the vote in federal elections; in 1982, the federal

government affirmed Aboriginal and treaty rights in section 35 of the newly repatriated constitution; in 1991, the Royal Commission on Aboriginal Peoples was established to examine historical and contemporary relations; in 1995, the federal government formally recognized Aboriginal self-government as an existing, inherent right under section 35 of the constitution; in 2008, the federal government formally apologized for the mistreatment of First Nations children in residential schools, including emotional, physical and sexual abuse as well as separation from families and communities; and, also in 2008, the federal government established the Indian Residential Schools Truth and Reconciliation Commission.

Despite this progress, First Nations academic Pam Palmater (2011) notes that, "while Canada has publicly denounced the attitudes of superiority upon which assimilatory laws and policies were previously based, the majority of these laws and policies remain unchanged" (p. 114). The sluggish pace of the 'roll back of paternalism' has led to many significant disputes and protests over the last few decades, including but certainly not limited to: the Oka crisis in 1990; the Gustafson Lake standoff in 1995; the Ipperwash land dispute in 1995; and the Caledonia land dispute in 2006.

In December 2012, the Idle No More movement began, including mass protests and flash-mob demonstrations throughout Canada along with high-profile hunger strikes. The Idle No More manifesto includes the following statement:

> The spirit and intent of the Treaty agreements meant that First Nations peoples would share the land, but retain their inherent rights to lands and resources. Instead, First Nations have experienced a history of colonization which has resulted in outstanding land claims, lack of resources and unequal funding for services such as education and housing (Idle No More, 2013).

Several First Nations leaders and authors have articulated similar sentiments. Coon Come (2004) says that First Nations people strive not only to survive the negative impacts of development, but they also want to share in the benefits of development, a struggle that is rooted in their desire for self-governance and self-determination. Harries-Jones (2004) argues that the ability to control

their own forms of development is of utmost importance to First Nations. Blaser (2004) focuses on the importance of 'life projects' for First Nations, which "encompass visions of the world and the future [that] diverge from development in their attention to the uniqueness of people's experiences of place and self and their rejection of visions that claim to be universal" (p. 26). Blaser et al. (2004) conceive of place and identity as a knot made up of two kinds of 'threads': (1) *horizontal threads*—the trans-place linkages in a spatial sense; and (2) *vertical threads*—connections comprised of specific histories and landscapes. According to Blaser et al. (2004), development has altered the previous knot mix by suppressing the vertical threads. As a result, First Nations life projects tend in many ways to be devoted to reestablishing those vertical threads. According to Blaser et al. (2004):

> Ever since the newcomers secured their domination over Indigenous peoples, they refused to recognize the latter's conceptions of right and the pursuit of their life projects … As a consequence of the subordination of Indigenous peoples, their life projects have had to be furthered through the cracks left open, by unexpected events and the passage of time, in the oppressors' own discourses (p. 3).

A presenter to the contentious MacKenzie Valley pipeline inquiry in 1975 also asserted that First Nations communities have had little say over their own destinies: "Do you think that this is the way the Indian people chose to have this community? Do you think that people here had any voice in planning this community?" (Phillip Blake, quoted in Watkins, 1977, p. 5). Sen (1999) refers to such restrictions as 'unfreedoms', which "arise either through inadequate processes … or through inadequate opportunities that some people have for achieving what they minimally would like to achieve" (Ch. 1, para.10). There are various types of unfreedoms, including those related to political, economic, and social matters and a lack of transparency or security (Sen 1999). Sen (1999) argues that policymakers must pay attention to expanding people's capabilities "to lead the kind of lives they value—and have reason to value" (Ch. 1, para. 12). To this end, Sen (1999) envisions a critical role for institutions and policies:

> Our opportunities and prospects depend crucially on what institutions exist and how they function. Not only do institutions contribute to our freedoms, their roles can be sensibly evaluated in the light of their contributions to our freedom. … Public policy has a role not only in attempting to implement the priorities that emerge from social values and affirmations, but also in facilitating and guaranteeing fuller public participation (Ch. 5).

For decades, institutions, policies and discourses have created a legacy of colonialism and paternalism and served to hinder First Nations from realizing their own life projects and from leading the kinds of lives they value and lives they have reason to value.

3.2 First Nations Economic Development

For First Nations, the very concept of 'economic development' is contested and controversial. Some, like Clarence Louie, chief of the Osoyoos Indian Band in the Okanagan region of British Columbia, assert that economic development is of pivotal importance. Chief Louie says that, "economic development is how we hunt today. If you call yourself a leader, give all your people a chance at the dignity of a job, equal opportunity and the individual responsibility to earn a living" (Helin, 2006, p. 235). At the same time, others, like Kahnawake Mohawk academic Taiaiake Alfred, see economic development as a defeat of First Nations values and traditional ways of being. Alfred (2005) contends that:

> Today, self-government and economic development signify the defeat of our people's struggles just as surely as, to our grandparents, residential schools, land dispossession, and police beatings signified the supposed supremacy of white power and the subjugation and humiliation of the first and real peoples of this land (p. 37).

Clifford Atleo, a member of the Nuu-chah-nulth and Tsimshian First Nations in British Columbia, argues that economic development has come to dominate discussions about First Nations self-sufficiency for two reasons: (1) "the 'Indian problem' continues to be framed in the context of persistent colonial assumptions about Indigenous 'primitivism' on the one hand, and Western 'progress' on the other … [and] solutions inherently seek to address 'gaps' between the two societies" (Atleo, 2009, p. 3); and (2) "Indigenous peoples find themselves in the unenviable

positions of having to choose between feeding their families, often compromising their principles in the process, and starvation" (Atleo, 2009, p. 3). Such concern about First Nations economic development is understandable, given the fact that, as Anderson (2005) notes:

> Throughout the middle decades of the 20th century, Indigenous people, along with other poor populations of the world, were the target of a wide range of initiatives, efforts and programs to assist in economic development. In large part these top-down, externally developed, modernization-based efforts failed to improve the economic circumstance of the world's poor, including Indigenous people, while at the same time damaging the traditional economy, leaving communities less self-reliant and therefore worse off than before. Reacting to these circumstances and the centuries of colonization that caused them, Indigenous peoples are struggling to reassert their nationhood within the post-colonial states in which they find themselves (p. 1).

Though there is disagreement related to the emphasis on economic development, there is apparent agreement on the importance of economic *self-sufficiency*. Even Taiaiake Alfred (2005), who passionately asserts that economic development represents a 'defeat' for First Nations, states that, "political approaches to making change that do not include a solid plan for economic self-sufficiency on either a personal or collective level are doomed to fail" (p. 223).

A decade-long study at Harvard University – the Project on American Indian Economic Development – examined why some First Nations communities achieve economic self-sufficiency while others do not. The commonly heard explanations tend to centre around low levels of educational achievement, inhibited access to capital, poor quality land bases, and minimal resource endowments, but the Harvard study points instead to other factors. In particular, Cornell and Kalt identify institutions of governance, both those that are imposed and selected, as well as the cultural norms that bind formal and informal institutions (Cornell and Kalt, 1990; 1995; 1997a; 1997b; 2000). Cornell and Kalt (1998) conclude that, "without sovereignty and nation-building, economic development is likely to remain a frustratingly elusive dream" (p. 2). They contrast two distinct approaches to economic development in First Nations communities: (1) *a jobs and income approach*, which focuses on having businesses established on the reserve in an often unsuccessful attempt to solve the problem of poverty and

unemployment; and (2) *a nation-building approach*, which recognizes that jobs and businesses are important, but knows that what is needed is a more ambitious and comprehensive approach of nation building and a broad resurgence of First Nations (Cornell and Kalt, 1998).

In keeping with Cornell and Kalt's findings in their extensive study, Anderson (2005) notes the occurrence of "a second wave of Indigenous development (the first being top-down, state-directed efforts usually aimed at modernization), one in which Indigenous peoples are striving to rebuild their nations and improve their lot through economic development on their own terms" (p. 1). Anderson (1997) identifies eight key characteristics of successful First Nations economic development:

1. *Collective approach* – individual First Nations exhibit a collective approach to economic development;
2. *Focus on self-sufficiency* – attaining self-sufficiency is a primary objective;
3. *Focus on improving socioeconomic circumstances* – improving people's quality of life is also a key objective;
4. *Focus on strengthening traditions* – through any development activities, there is a strong emphasis on preserving and strengthening traditional culture, values and language;
5. *Desire to exercise control* – by creating and operating businesses, First Nations seek to achieve control over their own economic destiny;
6. *Desire to compete profitably* – like all those who create and operate businesses, First Nations aim for long-term profitability;
7. *Focus on alliances* – to achieve success, it is common to form alliances and joint ventures with other First Nations as well as non-First Nation partners; and
8. *Building capacity for economic self-sufficiency* – First Nations work for self-sufficiency through education and training, through institution- and nation-building efforts, and through the fulfillment of their Aboriginal and treaty rights.

A study initiated by the Atlantic Policy Congress of First Nations Chiefs Secretariat (2010) arrived at similar conclusions: First Nations businesses often have a substantial cultural component; are characterized by broader obligations to family and community; and are oriented

toward "setting the stage for a more solid future for one's children and for future Aboriginal generations in general" (p. 5).

Shanks (2005) examines "the reasons why most First Nations find themselves in a quagmire of under-performing or virtually non-existent economies" (p. 4) and asserts that the reason "is a complex mix of historic circumstance, purposeful public policy and social dynamics" (p. 4). Shanks (2005) identifies the broad themes that emerged through interviews with key First Nations stakeholders:

- *A culture of dependency versus a culture of striving for excellence* – a significant impediment to economic self-sufficiency is a "communal inferiority complex [that] appears to manifest itself as an attitude of waiting for rather than seeking opportunity" (Shanks, 2005, p. 11). By contrast, First Nations that have moved toward economic self-sufficiency "have created a culture of striving for excellence" (Shanks, 2005, p. 12);

- *Planning versus being reactive* – a significant lack of human and financial resources impedes effective planning on many First Nations. As such, "they are usually not well-positioned to realize any benefits from real opportunities, much less maximize potential opportunities for lack of trained management or workers or means of accessing necessary capital" (Shanks, 2005, p. 12);

- *The need for an updated approach to land management* – "most First Nations economic development practitioners believe … the current system [of land management] is too ponderous, overly complicated, and fraught with uncertainty" (Shanks, 2005, p. 13);

- *The challenges amassing sufficient equity* – First Nations communities tend to have significant difficulty accruing the equity needed to participate in economic opportunities;

- *The challenges accessing capital* – because of "a strong anti-reserve bias within the mainstream business community" (Shanks, 2005, p. 15), First Nations encounter significant barriers when seeking to access financial resources;

- *Compromised business management* – business management can be compromised by undue political interference, and it can also be compromised because of the limited number of people with management skills and experience, which is a result of limited on-reserve entrepreneurship;

- *Not enough job training* – due to a lack of resources and lack of planning, job training has generally been insufficient;

- *Lack of economic infrastructure* – a significant lack of infrastructure on most First Nations impedes economic activity of any significant scale; and

- *Considerations with regard to First Nations culture* – "cultural considerations do appear to factor into the kinds of businesses that First Nations will pursue, or to the extent possible, allow within their territories" (Shanks, 2005, p. 18).

Shanks (2005) also points to the ongoing 'omnipresent' and 'invasive' nature of *The Indian Act* and its adverse impact on First Nations economic development, noting that "some find its existence so overwhelming that economic development is not even attempted" while "others recognize it as out of date and out of touch with modern realities and look for ways to work around its anachronistic requirements" (p. 9).

In collaboration with the First Nations Leadership Council, the British Columbia Ministry of Technology, Trade and Economic Development conducted an examination of economic accomplishments and challenges within First Nations. The Ministry identified two different approaches to First Nations economic development: (1) supporting First Nations entrepreneurs and their individual enterprises; and (2) developing community-owned and operated enterprises (British Columbia, 2008). The key themes that emerged from this examination are as follows:

- *Understanding both the historical and current context of communities* – economic success requires understanding both the historical and current context of First Nations communities, including the fact that "First Nations have historically not been afforded the opportunity for meaningful participation and engagement in economic development projects" (British Columbia, 2008, p. 13);

- *Understanding the impediments arising from limited opportunities* – First Nations economic success is impeded by limited opportunities for self-government; no equity accumulation for First Nations homeowners; complicated application processes for licenses and tenures; and limited expertise, training and capacity in each of these areas;

- *Planning* – due to limited planning expertise and capacity, and due to limited access to funding for planning processes, many First Nations do not engage in much needed planning exercises, thereby failing to engage the broader community and create accountability by establishing clear anticipated outcomes;

- *Leadership, corporate governance and capacity* – the Ministry noted that, "Chief and Council have the ultimate responsibility for the success of economic activities in their communities, but they need to fulfill that responsibility without interfering in day-to-day business operations" (British Columbia, 2008, p. 19);

- *Benefit- and revenue-sharing agreements* – despite the fact that First Nations would obviously benefit immensely from benefit- and revenue-sharing agreements, there are no guidelines or standards for such agreements;

- *Partnerships* – partnerships assist First Nations by bringing capital and expertise to the table, but the problem is that, "industry and First Nations are unsure of how and where to find prospective partners [and there is a] lack of First Nations expertise related to the negotiation of agreements in a range of different economic sectors" (British Columbia, 2008, p. 22); and

- *Access to capital:* for most First Nations, "sources of capital for economic ventures are limited, unaffordable, restrictive and insufficient" (British Columbia, 2008, p. 23).

Despite the many barriers to economic self-sufficiency, Anderson (2005) asserts:

> Aboriginal people in Canada are not standing idly by accepting the status quo. They are pursuing a strategy of economic development with entrepreneurship – the identification of unmet or under-satisfied needs and related opportunities, and the creation of enterprises, products and services in response to these opportunities – at its heart. It is believed that, through entrepreneurship and business development, they can attain their socioeconomic objectives (p. 2).

Table 3-1 outlines the key characteristics of First Nations economic development identified in the literature.

Table 3-1. Characteristics of First Nations development

Characteristics of First Nations development	Sources
Tends to be devoted to reestablishing connections to histories and landscapes ('vertical threads')	Blaser et al. (2004)
Collective approach, characterized by broader obligations to extended family, the local community and broader First Nations community	Anderson (2005); APCFNCS (2010)
A strong cultural element, with a focus on strengthening traditions	Anderson (2005); APCFNCS (2010); Shanks (2005)
The Indian Act has ongoing, omnipresent and invasive nature	Shanks (2005)
Impeded by continuing challenges stemming form historical context	British Columbia (2008)
Impeded by limited and insufficient sources of capital and generally limited opportunities	British Columbia (2008); Shanks (2005)
Impeded by limited experience with appropriate corporate governance and business leadership	British Columbia (2008); Shanks (2005)
Focus on building alliances	Anderson (2005); British Columbia (2008)
Desire to exercise control	Anderson (2005)
Desire to compete profitably	Anderson (2005)
Focus on building capacity	Anderson (2005); British Columbia (2008); Shanks (2005);
Focus on self-sufficiency	Anderson (2005)
Focus on improving socioeconomic circumstances and setting the stage for future generations	Anderson (2005); APCFNCS (2010)

3.3 First Nations Participation in Sustainable Electricity Generation

One approach to modern First Nations economic development – or pursuit of economic self-sufficiency – is through involvement in sustainable electricity generation. For the bulk of history, electricity generation projects have left a bad taste in the mouths of First Nations communities. As demonstrated in the case of the Island Falls hydroelectric project discussed in Chapter One, such projects have generally consisted of large-scale hydro developments and there are four primary reasons for the historical bad taste: (1) governments and utilities have tended to engage in unilateral decision making; (2) the interests of the hydro developments have tended to come first; (3) there have been substantial, negative impacts on habitat, flooding and traditional livelihoods; and (4) there has been minimal First Nations participation in these projects (Henderson, 2013, p. 48). Even relatively recent developments share these characteristics. For example, Warner (1999) assesses the 1975 agreement in northern Quebec between the Cree, Inuit, Hydro Quebec, the Government of Canada, and two development corporations. Warner (1999) notes that there was a definite *fait accompli* nature to those negotiations: construction of access roads began four years before the agreement was reached; construction of the first dam began two years before the agreement was reached; and a court injunction that briefly halted construction was quickly overturned on appeal. This is not surprising, because the dominant view reflected the *terra nullis* arguments of old, as outlined by then premier, Robert Bourassa: "this inhospitable and desolate land, inhabited only by a handful of Inuit and Crees, is today becoming Quebec's new frontier" (Martin, 2009, p. 23). Waldrum (1998) argues that these practices are highly reminiscent of the colonialist philosophies and tactics employed by government and industry in the 19th century:

> A resource is identified as valuable to the general society, and the Natives who are using that resource must be convinced that they should surrender it for the 'common good'. … Once the resource has been secured and the Native people have been appeased, they are

> largely ignored. Poverty and hardship frequently result, as the people discover that they can no longer make a living from the resources (p. 4).

Hoffman and Bradley's (2008) assessment of the situation in northern Manitoba reflects the divide-and-conquer approach that Waldrum identified: "this isolationist strategy also confronts individual communities with a remarkable reality … they are unable to negotiate as anything other than small, isolated and impoverished communities in a manner that essentially pits them against other equally powerless communities" (p. 154).

Despite an overwhelmingly negative history in relation to electricity generation projects, more and more First Nations communities today are looking at smaller-scale sustainable electricity ventures as smart projects in which to be involved. Krupa (2012) argues that, "in Canada, historically marginalized Aboriginal peoples remain one of the groups with the greatest potential for meeting [Canada's] enormous renewable energy development needs" (p. 710). Krupa (2012) also notes that:

> Renewable energy is an attractive choice as a central pillar of a First Nations development strategy. … Aboriginals generally possess a sophisticated understanding of the intricate complexity of the natural world and the importance of reducing societal impacts on the environment in which they live (p. 711).

Henderson (2013) notes that First Nations involvement in renewable power is "a reality that is snowballing across Canada" (p. 15). Despite being a low-margin business, sustainable electricity ventures can provide a reliable stream of income that steadily grows as debts decline, and such projects also allow communities to build business management skills and provide good jobs and spin-off contract opportunities (Henderson 2013). Henderson (2013) identifies four stages of development in terms of First Nations involvement in sustainable electricity projects (Table 3-2).

Table 3-2. Stages of First Nations involvement in electricity generation (Henderson, 2013)

'Early' stage 1987—1999	'Pioneering' stage 2000—2009	'Growth' stage 2010—2020	'Diversified' stage 2020—2035
First Nations communities began considering sustainable electricity generation projects as a way to revitalize their local economies. Pic River First Nation in northern Ontario was an early entrant with its Wawatay Generating Station.	Many electricity markets became more liberalized and open for competition. This allowed new actors, including First Nations, to enter the electricity sector. The China Creek Hydro Project of the Hupacasath First Nation and a biomass-energy project in Ouje-Bougamou, Quebec, are two key examples.	Initially, First Nations in Ontario and BC led the way with sustainable electricity projects. First Nations in nearly all provinces and territories are now pursuing projects.	It is expected that, following the growth stage, the number of First Nations electricity projects brought on line each year will occur at a more moderate pace and the overall mix will be relatively diverse.

Ultimately, the most fundamental factor for First Nations to be able to pursue sustainable electricity generation projects is the opening of a window of opportunity that allows change to occur in the existing electricity generation system and specifically allows new actors to participate in the sector. However, Krupa (2012) and Henderson (2013) identify various other elements of successful First Nations participation in electricity generation projects (Table 3-3). Both authors focus on the importance of sufficient financial resources; enhanced capacity, capability and confidence; and a strong sustainable development focus, seeking to deliver economic, environmental and social benefits to the whole community. They also identify the need for partnerships with private firms; long-term clarity about the electricity sector; governments, Crown utilities and electricity regulators that embrace clean energy projects as an important part of achieving a more sustainable future; and government programs that foster First Nations participation in the electricity sector. Henderson (2013) also identifies the need for a local project champion and strong governance. And Krupa (2012) notes that significant health,

social and economic disparities frequently impede First Nations economic development, including within the electricity sector; as such, projects are successful where greater equality has already been achieved.

Table 3-3. Elements of successful First Nations participation in electricity generation

Theme	Krupa (2012)	Henderson (2013)
Committed and capable local leader to serve as the project champion		✓
Strong governance to support the project and ensure accountable and transparent financial management		✓
Access to sufficient financial resources to enable revenue-generating activities	✓	✓
Governments, Crown utilities and energy regulators that embrace clean energy projects as a crucial part of achieving a more sustainable future	✓	✓
Government policies and programs that foster participation, including mechanisms that facilitate the sale of electricity to provincial grids	✓	✓
Partnerships with private construction, technology and development agencies (rather than just contracts)	✓	✓
Long-term clarity regarding the electricity sector, what policy changes will occur, what incentives will exist, and so on	✓	✓
The capacity, capability and confidence of First Nations are enhanced	✓	✓
A focus on sustainable development – the project needs to focus on delivering economic, environmental and social benefits to the whole community, in a manner that develops skills and capacity within the community, and is sustainable over the long term	✓	✓

Theme	Krupa (2012)	Henderson (2013)
Greater equality (health, social and economic disparities that are lessened)	✓	

✓ = directly discussed by author | ✓ = generally alluded to by author

CHAPTER 4
RESEARCH STRATEGY

This dissertation is aimed at answering two questions: (1) how can the various elements of sustainability transition studies be combined and augmented to develop an integrated sustainability transition framework that is relevant to the Canadian context? And (2) how can insights provided by an integrated sustainability transition framework help us understand the likelihood of First Nations participation in sustainable electricity transitions? With the aim of answering these research questions, this dissertation involves case studies of three provinces. This chapter justifies the research design of this dissertation and provides details of the methodology used.

4.1 Analytical Framework

Sustainability transition studies forms the basis of this dissertation's analytical framework (Figure 4-1). As noted in Chapter Two, the sustainability transitions field is broad, with four main approaches to the theoretical framing of sustainability transitions. My focus in this dissertation is on determining how the various elements of sustainability transition studies can be combined and augmented to develop an integrated sustainability transition framework that is relevant to the Canadian context. In particular, this dissertation combines elements of the MLP and the TIS approaches. As discussed in Chapter 2, Markard and Truffer (2008a) and Suurs (2009) undertook initial work on integrating the MLP and TIS approaches. Markard and Truffer (2008a) assert that both the MLP and TIS approaches emphasize the importance of networks, learning processes, and institutions and recognize similar phenomena, including path dependency, interdependence

and non-linearity. Suurs (2009) also identifies that "both [the MLP and TIS approaches] apply a holistic perspective including a variety of interrelated factors to explain the outcome(s) of these processes. And most importantly, the approaches both stress the importance of sustainable innovation to be understood as a build-up process" (p. 25). Markard and Truffer (2008a) identify as the key contribution of the MLP framework its explanation of the transition process as stabilizing mechanisms at the regime level, regime-destabilizing pressures from the landscape level, and the emergence of niche-level innovations. This understanding "leaves room for contingencies such as external shocks or disruptive changes at the landscape level" (Markard & Truffer, 2008a, p. 14). Markard and Truffer (2008a) assert that this could serve as a good complement to the TIS perspective, which is rather myopic and tends to ignore the system's broader environment, but has a "more analytical approach [than the MLP] with its elaborated framework of structural and functional analyses … [along with the fact that] it is a meso-level concept that reaches well beyond niche level processes … [and it] has the potential to more explicitly deal with firm strategies and agency" (Markard & Truffer, 2008a, p. 14). Markard and Truffer (2008a) note that this may serve as a good complement to the MLP framework, which has largely confined its focus on emerging innovations to the niche level but has not yet developed the elaborate concepts and tools necessary to adequately investigate niche-level dynamics.

As noted in Chapter 2, the TIS approach has traditionally focused on the various dynamics at play in the emergence of new technologies and new products. My analytical framework deviates from this approach, in that I do not incorporate the TIS functions in a manner that is focused on moving a *new* technology from the concept phase to the commercialization phase. Rather, my analytical framework is more interested in the end phase of the traditional focus of TIS analysis – which is the deployment of technologies to new contexts. My analytical

framework also examines the functions necessary for new actors to participate the electricity sector.

In recognition of the fact that political dynamics are not yet well entrenched within the field (Shove and Walker, 2007; Avelino & Rotmans, 2009; Markard et al., 2010; Grin, 2011; Markard et al., 2012), I supplement the sustainability transition theory by incorporating insights from discourse coalition theory in order to effectively add political dynamics to this dissertation's analytical framework. In using a discursive approach to incorporate political dynamics into sustainability transition studies, I am following the lead of Kern (2009; 2012).

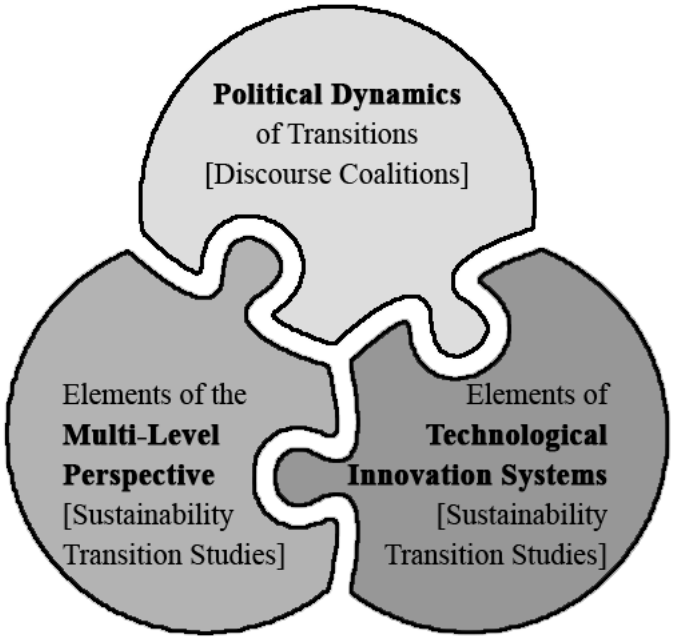

Figure 4-1. Overview of analytical framework

The final product – an integrated, augmented sustainability transition framework that is relevant in the Canadian context – sheds light on the second key focus of this dissertation: determining how insights provided by an integrated framework might help to better understand the likelihood of First Nations participation in sustainability transitions, particularly within the electricity sector.

This particular research is not conducive to the establishment of specific hypotheses from the outset. As Loorbach (2007) notes:

> A societal transition theory in a nascent stage is not fully falsifiable in the Popperian sense and will never be, in view of the fundamental uncertainties and the impossibility to measure the different dimensions of transitions exactly. Transition research is therefore exploratory; it aims at developing and adjusting research hypotheses as an integrated part of the research process. … The basic hypothesis which is to be tested and elaborated in transition research is that the multi-level and multiphase concepts [such as technological innovation systems] form a sound and adequate heuristic framework to describe and explain the complex dynamics of societal transformations (p. 32).

This dissertation is hardly starting from scratch in terms of theoretical development because many of the puzzle pieces are already known. Chapter Two explored in detail the important elements of sustainability transition studies and discourse coalition theory. The question this dissertation addresses is how exactly those puzzle pieces can fit together in a way that is relevant to this particular context.

4.2 Research Strategy

Based on the nature of this dissertation, I used a *qualitative* research approach. According to Cresswell (1998), "the [qualitative] researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting" (p. 15). Fischer (2003) emphasizes the importance of undertaking qualitative research when studying policy change: "The key to explaining how change comes about has to be grounded in a detailed examination of the circumstances at play in specific cases. For this purpose, quantitative methods have to take a back seat to qualitative research" (p. 108).

In keeping with Fischer's (2003) view that it is vital to undertake "a detailed examination of the circumstances at play in specific cases" (p. 108), I opted for a case-study methodology for this dissertation. Yin (1994) defines case-study research as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between

phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" (p. 13). Flyvbjerg (2006) asserts that case studies help researchers develop a "nuanced view of reality" (p. 223). This is highly applicable to this dissertation, given that my research questions aim to uncover and develop empirically rich descriptions of the political and policy processes that contribute to sustainability transitions of electricity systems and the participation of non-traditional actors, such as First Nations.

Within the broader case-study methodology, my chosen research strategies for this dissertation are process tracing and discourse analysis. The aim of process tracing is to identify contingent mechanisms. Kern (2009) asserts that:

> When theories are underspecified, process tracing can be used to further develop middle-range theory by identifying one or more causal processes that explain an outcome. … [I]t does not aim at establishing general laws (if X, then Y) but at identifying contingent mechanisms (X leads to Y in this case, through steps A, B, C). The process tracing method does not necessarily rely on simple linear reasoning but, through detailed case studies, can take interacting causal variables into account (such as ideas, institutions and interests) for the explanation of complex processes (p. 63).

According to various authors (Yee, 1996; Campbell, 2002; and Kern, 2009), process tracing is particularly valuable in revealing the causal influence that discourse has in policy processes. Campbell (2002) says process tracing allows researchers to demonstrate "how specific actors carried certain ideas into the policy-making fray and used them effectively" (p. 29).

I combine a process-tracing approach with discourse analysis in this dissertation. Hajer (2013) defines discourse analysis as follows:

> Discourse analysis is a method to analyze what language does, the politics of meaning that takes place, the way in which it affects perceptions and cognitions, the way in which it distributes power to some and less to others. Discourse analysis suggests furthermore that there are certain regularities. This is what makes it different from narrative analysis. Discourse analysis suggests that there are certain structures in language that influence politics.

The University of Sussex's guide to qualitative research methods notes that the combination of a process-tracing approach with discourse analysis is an appropriate one:

> Process tracing is, basically, a system that offers a way to researchers for organizing the data collected in a systematic way. By pointing at the nodal points and raising interactions between actors and their context, it helps in identifying not only mechanisms but also common discourses or narratives that can be later analyzed with other methods such as discourse analysis (University of Sussex, 2014).

4.3 Case Selection

This dissertation focuses on case studies of three Canadian provinces: Nova Scotia, Ontario and Saskatchewan (Figure 4-2).

Figure 4-2. Map of Canada identifying selected provinces

I opted for province-wide case studies because, under the Canadian constitution, provinces are responsible for the development, conservation and management of electricity. This means that the majority of political and policy factors that influence the electricity sector occur at the provincial level. This constitutional responsibility has also resulted in electricity companies that tend to

serve just one province, as is the case in the three selected provinces. The unit of analysis in this dissertation is the selected policy initiatives aimed at both increasing the sustainability of the electricity system and opening up space for First Nations to be involved in the electricity sector.

The rationale for this particular case selection is not because these are necessarily representative cases; rather, Nova Scotia, Ontario and Saskatchewan were selected based on a strategic sampling approach that seeks cases which "cover the known range and variation" (Hakim, 1994, p. 64) and also display a high degree of the particular phenomenon being researched (Pettigrew, 1990). In Nova Scotia, all 13 First Nations are involved in the electricity sector; in Ontario, 35 First Nations are involved in the electricity sector, representing approximately 26 per cent of First Nations in the province; and in Saskatchewan, eleven First Nations are involved in the electricity sector, representing about 15 per cent of total First Nations in the province. A substantial degree of polarity is added in that each of the provinces has undertaken different policy approaches with regard to their electricity systems and to the involvement of First Nations in those systems. And, while Nova Scotia and Saskatchewan are similar in terms of the challenge of providing electricity to small, dispersed populations and also in terms of their history of reliance on coal-fired generation, Ontario's reality is significantly different: a large, highly concentrated population with substantial reliance on nuclear generation rather than coal-fired generation. Table 4-1 presents an overview of the selected cases.

Table 4-1. Overview of selected cases

	Nova Scotia	Ontario	Saskatchewan
Main electricity generation players	Nova Scotia Power (Private)	Ontario Power Generation (Crown corporation) (70%) Bruce Power (Private) (20%)	SaskPower (Crown corporation)
Specific measures to encourage First Nations participation	Community Feed-in Tariff Program Funding and professional assistance to develop capacity on energy issues Funding to assist the development of a Mi'kmaq-specific Renewable Energy Strategy	Feed-in Tariff Program Aboriginal Price Adder Aboriginal Energy Partnerships Program Aboriginal Renewable Energy Network Aboriginal Renewable Energy Fund Aboriginal Community Energy Plans Aboriginal Advisory Committee Aboriginal Energy Working Group Aboriginal Transmission Fund Aboriginal Loan Guarantee Program	Long-term power purchase agreements (PPAs) First Nations Power Authority (FNPA)
Total number of First Nations	13	133	74
Number of First Nations involved in electricity generation	13 (100%)	35 (26%)	11 (15%)

4.4 Data Collection and Analysis

The analysis of the three case studies relies on three sources of data:

- Review of relevant literature (discussed in Chapters Two and Three);
- Analysis of relevant policy documents (including media reports, legislative transcripts, government publications, and internal documents); and
- Semi-structured interviews with key actors.

The analysis triangulates between the information from these different sources, which is recommended as an effective approach to case study research (Denzin & Lincoln, 1994).

I received approval for this research from the Research Ethics Board at the University of Saskatchewan in October 2013. In general, I followed Hajer's approach to discourse-focused research, starting with standard desk research to establish an initial chronology and a first reading of how events played out through a survey of relevant documents. Then, I took in several presentations and had numerous informal side conversation at two relevant conferences: *Generation West: The Future of Electricity in Western Canada* conference, which took place in Regina on December 10 and 11, 2013, and the *International Indigenous Energy Conference*, which took place in Vancouver on January 27 and 28, 2014. These presentations and informal discussions were in place of what Hajer (2005) refers to as 'helicopter' interviews, with the aim of clarifying the focus of the next steps of my research. I then engaged in in-depth document analysis in order to clarify the process of events and understand the structuration and production of the various discourses. I then conducted semi-structured interviews with significant actors to generate more information about the causal chains – or "which led to what" (Hajer, 2005, p. 306) – and to strengthen the understanding of the meaning of particular events, how cognitive shifts occurred and how reframing of issues occurred. Between May 21, 2014 and September 22, 2014, 10 interviews were conducted with actors in Nova Scotia, 14 interviews were conducted with actors in Ontario, and 10 interviews were conducted with actors in Saskatchewan (Appendix A);

these interviews were based on a flexible schedule (Appendix B) and were recorded, with all relevant aspects transcribed for further analysis. The empirical analysis of the information gathered through the document analysis and interviews focused on bringing clarity to the account of circumstances under investigation through identification of key incidents, identification of argumentation sites, analysis of positioning effects, and uncovering meaning and causal mechanisms. This is helpful for reconstructing discourses and cognitive shifts that are relevant to the analysis. Fischer (2003) notes that: "[because] meanings are not directly observable, the realm of meaning has to be approached through reflection and interpretive analysis" (p. 139). As such, the aim of the researcher is to try "as it were, to get inside the heads of the particular players in an effort to figure out the thinking behind the actions at issue" (Fischer, 2003, p. 141). Kvale (1996) describes this approach as follows:

> The researcher has a perspective on what is investigated and interprets the interviews from this perspective. The interpreter goes beyond what is directly said to work out structures and relations of meaning not immediately apparent in a text. This requires a certain distance from what is said, which is achieved by a methodological or theoretical stance, recontextualizing what is said in a specific conceptual context (p. 201).

The main analytical concepts of this dissertation provide the context for this interpretation: storylines, processes of coordinative and communicative discourse, the effects of the discourse, and the nature and timing of the interaction between the niche, regime and landscape levels. To structure the rich empirical data in line with these key concepts, I used NVivo qualitative research software to manually code the policy documents and transcripts from the semi-structured interviews.

4.5 Operationalization of Analytical Framework

This section outlines how the concepts of the analytical framework guide the empirical analysis (Table 4-2). The analysis within each case study is carried out in six steps. First, I outline the historical context of the socio-technical regime. Second, I outline the parameters and explore

the details of established systems. Through reviewing policy documents, I identify the various components that serve to stabilize those existing institutions. Third, based on findings from media reports and interview transcripts, I investigate and discuss the regime-destabilizing dynamics at the niche and landscape levels. Fourth, I uncover and discuss the storylines employed by different actors, including the behind-the-scenes 'coordinative' discourse as well as the public 'communicative' discourse. I also discuss the coalition of actors that develop and utilize those storylines. Fifth, I examine whether many people use the discourse to conceptualize their world (referred to as *discourse structuration*) and whether the discourse has solidified into policy, institutions and organizational practices (referred to as *discourse institutionalization*). Sixth, I explore whether the structuration and institutionalization of the discourse have had any profound effect on the existing regime – either to destabilize or reinforce it. By undertaking these steps, I am evaluating whether a sustainability transition framework, with political dynamics included, provides a sound and adequate heuristic framework to describe and explain the complex dynamics of electricity-system transformations.

Table 4-2. Operationalization of main concepts of analytical framework

Concept	Definition	Key dimensions	Sources of information
Socio-technical regime	The established, dynamically stable structure and institutions that, in the absence of regime-destabilizing dynamics, tend to undergo only incremental change along well-established trajectories (Kemp et al., 1998)	Various components (including policy, science, technology, industry, markets/user preferences and culture) that serve to stabilize and support the existing institutions	- Policy documents

Concept	Definition	Key dimensions	Sources of information
Niche-level innovations	The creation, diffusion and utilization of new technologies (involving new actors, networks and institutions) with aim of transforming or replacing the established system (Markard and Truffer, 2008a)	Different technologies, actors, networks and institutions than those stabilizing and supporting the existing institutions	- Media reports - Interview transcripts
Landscape	"Deep structural gradients of force that make some actions easier than others" (Geels & Schot, 2007, p. 403)	Natural environment, macro-economy, political culture, demographic characteristics and worldviews	- Media reports - Policy documents - Interview transcripts
TIS Functions	The TIS approach is "essentially a growth model based on the notion of cumulative causation" (Suurs, 2009, p. 26). This build-up process encompasses seven key system functions (Bergek et al., 2008; Suurs, 2009; Suurs & Hekkert, 2009a; Suurs & Hekkert, 2009b).	TIS functions: (1) entrepreneurial experimentation; (2) knowledge development; (3) knowledge diffusion; (4) guidance of the search; (5) market formation; (6) resource mobilization; and (7) support from advocacy coalitions TIS motors: (1) science and technology push (STP) motor; (2) entrepreneurial motor; (3) system building motor; and (4) market motor	- Media reports - Policy documents - Interview transcripts

Concept	Definition	Key dimensions	Sources of information
Storyline	"The medium through which different actors try to impose their view of reality on others, suggest certain social positions and practices, and criticize alternative social arrangements" (Hajer, 1993, p. 47)	Narratives, structuring ideas and themes, problem framing, metaphors, analogies, historical references, appeals to fear or guilt, cognitive and normative ideas	- Media reports - Policy documents - Legislative transcripts - Interview transcripts
Coordinative discourse	"Policy ideas are generated and constructed through communication between key policy actors" (Kern, 2009, p. 49)	Behind-the-scenes discussions and negotiations involving elected officials, civil servants, experts and interest groups	- Interview transcripts - Internal documents
Communicative discourse	"Political communication with the public about policy problems and their envisaged solutions" (Kern, 2009, p. 50)	Public discussion of ideas and public announcements of decisions	- Policy documents - Legislative transcripts - Interview transcripts
Discourse coalitions	"The ensemble of a set of storylines, the actors that utter these storylines, and the practices that conform to these storylines, all organized around a discourse" (Hajer, 1993, p. 47)	The coalition of actors producing and using a particular storyline	- Media reports - Policy documents - Legislative transcripts - Interview transcripts - Internal documents - Secondary literature
Effects of discourse	Discourse structuration – whether people use the discourse to conceptualize the world (Hajer, 1995, p. 60)	Key actors' use of ideas, concepts and categories	- Policy documents - Interview transcripts

Concept	Definition	Key dimensions	Sources of information
	Discourse institutionalization – whether the discourse has solidified into policy, institutions and organizational practices (Hajer, 1995, p. 61)	Effects on government policy and organizational practice	- Policy documents - Interview transcripts
Transition dynamics	Whether discourse structuration and institutionalization have served to either reinforce or destabilize the existing regime	Changes in the regime	- Media reports - Policy documents - Interview transcripts

4.6 Limitations of the Research Design

All research designs have strengths and weaknesses and it is important to be transparent about the limitations of the chosen research design. It is also important to discuss how those limitations have been addressed in order to deliver a strong, valid and useful contribution to the field of knowledge.

The sheer complexity of the electricity sector, including the layering of multiple generation technologies and the central role of electricity to both economic development and public welfare, makes it challenging to cleanly apply sustainability transition frameworks. Rosenbloom and Meadowcroft (2014) argue that:

> Socio-technical regime changes [in the electricity sector] are rather different from more straightforward socio-technical system replacement observed in other sectors (sailing ships to steam ships, outhouses to piped sewage systems, canals to railroads, and so on). From an alternative perspective, it could be argued that only through a fundamental break with the centralized model of electricity provision – for example, a shift to a dramatically decentralized system relying on widely distributed renewable generation – would a really radically different electricity 'regime' emerge. However, we believe that telling the story this way would be to brush over the societal significance of [the changes in electricity systems] (p. 678).

Despite the difficulty in easily applying sustainability transition frameworks to electricity systems, I agree with Rosenbloom and Meadowcroft (2014) that the field of sustainability transitions has significant insights to offer in terms of sustainability transitions in electricity systems. Uncovering what some of those insights are, within the particular context of Nova Scotia, Ontario and Saskatchewan, is the purpose of this dissertation. After all, as Loorbach (2007) argues: "The basic hypothesis which is to be tested and elaborated in transition research is that the multi-level and multiphase concepts form a sound and adequate heuristic framework to describe and explain the complex dynamics of societal transformations" (p. 32).

Since the focus of many transition studies has been historical, involving the examination of a full transition that occurred in the past, some may critique this dissertation for focusing on sustainability transitions in electricity systems that have not fully played out. Not surprisingly, I disagree. As already discussed, transitions in the electricity sector are not as clear-cut as many of the well-studied historical transitions, especially because of the layering of multiple generation technologies and the central role of electricity to both economic development and public welfare (Rosenbloom & Meadowcroft, 2014). As well, this dissertation is focused on one key aspect of transitions – the opening up of space for new actors to participate in the sector. In each of the jurisdictions studied in this dissertation, policy changes have occurred over the last decade in relation to their electricity systems and varying degrees of policy measures have been undertaken to open up space for new actors, including First Nations to participate in the electricity sector. That is precisely what this dissertation assesses and, in so doing, it yields useful insights that advance knowledge in the field of sustainability transition studies.

Discourse is a complicated causal variable to investigate and, as a result, some may question the internal validity of the research design in this dissertation. Schmidt (2003) asserts that: "the ideas [that discourse] articulates cannot easily be separated from the interests that find expression through it, from the institutional interactions that shape its expression, or from the

cultural norms that frame it" (p. 129). Kern (2009) argues that: "interests and institutions do not exist independently of discourse. Interests are defined by discursive positioning and institutions are understood as past discourses 'solidified'" (p. 61). Further to that, Hajer (1995) says:

> Discourse analysis is not to be counter posed with institutional analysis, but is rather a different way of looking at institutions that is meant to shed new light on the functioning of those institutions, how power is structured in institutional arrangements, and how political change in such arrangements comes about (p. 264).

Fisher (2003) says: "political action is constituted by discourses, from hegemonic discourses embedded in the existing institutions … to the oppositional efforts of other groups attempting to create new discourses" (p. 45). Discourse is an appropriate causal mechanism to investigate. The research design of this dissertation was selected in order to address any concerns about the causal mechanism under investigation and to ensure the internal validity of this study. According to Campbell (2002), process-tracing case studies are effective research approaches for research involving discourse. Campbell (2002) says, "one way to explain how ideas affect policy making is to show through careful process tracing how specific actors carried certain ideas into the policy-making fray and used them effectively" (p. 29).

Critics may argue that results from case-study research are not statistically generalizable. That point is true, but it neglects to consider how the case-study approach contributes significantly to scientific development. Yin (1994) argues that the value of case studies lies in their 'analytic generalizability' in that, "a previously developed theory is used as a template with which to compare the empirical results of the case study. If two or more cases are shown to support the same theory, replication may be claimed" (p. 32). I also reiterate Fischer's (2003) point, that: "the key to explaining how change comes about has to be grounded in a detailed examination of the circumstances at play in specific cases. For this purpose, *quantitative methods have to take a back seat to qualitative research* [emphasis added]" (p. 108).

A final criticism of this dissertation's research design is that it has limited capacity in terms of providing specific policy prescriptions. This is not an unanticipated criticism, because the field of sustainability transitions has struggled with delivering effective policy prescriptions since its inception. Strategic niche management emerged early on as a potential approach to spark transitions, but its initial promise has largely waned (Kemp et al., 1998). There have been numerous attempts at practical applications of the transition management approach, but its promise has also waned (Markard et al., 2012). The technological innovation systems approach points to the need to correct system failures through policy interventions at particular points where such interventions are likely to be most effective (Jacobsson & Bergek, 2011), but the literature has largely neglected to outline specific policy prescriptions beyond that general assessment. At the same time, discourse analysis is also not amenable to delivering specific policy prescriptions either. Kern (2009) notes that:

> Discourse analysis does not lead to identification of the 'right thing to do' for policy makers to support a transition towards a more sustainable electricity system. Nor does a discourse analytic approach allow evaluation of the … case studies in terms of which approach is (going to be) more successful. Its aim is more modest: by identifying discursive processes it sheds light on the specific situational logic on which policy framing and practices are based and can thus contribute to more reflexivity about the role and importance of discourses (p. 82).

With this in mind, this dissertation is appropriately aimed at *analyzing* policy making, rather than at *prescribing* specific policy approaches. Nevertheless, the insights offered through this dissertation should be informative and enlightening for policy makers, First Nations leaders and stakeholders concerned with sustainability transitions, particularly in electricity systems, as well stakeholders concerned with First Nations sustainable development and economic self-sufficiency more broadly.

It is also important to note that this dissertation is not aimed at assessing the public policy merits or the economic viability of the particular policy approaches undertaken in the three selected provinces. The unit of analysis in this dissertation is the selected policy initiatives aimed

at both increasing the sustainability of the electricity system and opening up space for First Nations to be involved in the electricity sector. The focus is on ascertaining the various dynamics that contributed to those policy initiatives and looking at how successful they were in opening up space for First Nations participation in the electricity sector. The focus of this dissertation is not to assess the overall wisdom of the particular approaches followed in each of the provinces.

CHAPTER 5
NOVA SCOTIA

Nova Scotia's electricity regime has faced a variety of landscape pressures over the past couple of decades, including the decline in domestic coal supplies, the soaring costs of importing coal, public resentment toward the privatized electrical utility, the trend toward increased competition within electricity sectors elsewhere, and the growing pressure for climate change mitigation. In response to these landscape-level pressures on its electricity regime, Nova Scotia took several significant steps along a *transformation* pathway, in which it adopted proven niche innovations in a manner that did not significantly disrupt the existing regime, and in which it invited new actors to participate in the system while keeping the main incumbent actor in place. Progress along the transformation pathway was tentative at first, with the introduction of a very minimal voluntary target for new renewable power in 2001. A series of mandated targets were introduced in 2006, early 2009 and mid 2009, which accelerated progress along the transformation pathway. In 2010, the government released its renewable electricity strategy, laying out its plan to achieve 25 per cent renewable power by 2015 and 40 per cent renewable power by 2020. As part of its plan, the government split large-scale renewable projects between Nova Scotia Power and independent power producers (IPPs) and it introduced a community feed-in tariff (COMFIT) program and an enhanced net-metering program for individual homes.

The province's progress along the transformation pathway has been powered by various technological innovation system (TIS) functions. The government provided positive signals (TIS function: *guidance of the search*) through policy directives, such as the renewable portfolio standard and the COMFIT. It also provided negative signals through its policy directives, such as

the imposition of hard caps on Nova Scotia Power's emissions. With increases in the volume of renewable electricity and the number of actors involved in the sector (TIS function: *market formation*), Nova Scotia has largely developed a 'bridging market,' which is the middle phase between a 'nursing market' and a 'mature market.' Nova Scotia has made a concerted effort to mobilize and distribute the needed financial, material and human capital to support the deployment of renewable electricity generation (TIS function: *resource mobilization*), by providing incentives for participation in the sector and offering assistance with capacity enhancement and planning. And advocacy groups played an important role in encouraging government action (TIS function: *support from advocacy coalitions*). However, as a result of government policy, which is clearly entrenched within legislation and largely supported across party lines, support from advocacy groups is increasingly less crucial. As a result of the interplay of these TIS functions in the Nova Scotia case, the province has developed several TIS motors: an *entrepreneurial motor*, a *system building motor* and a promising *market motor*.

Employing an ideational understanding of politics and, specifically by applying a discourse coalitions lens, it is clear that political dynamics helped fuel each of those TIS motors and played a crucial role in the ongoing transition of Nova Scotia's electricity sector. The dominant discourse regarding changes to Nova Scotia's electricity regime involved a variety of interrelated elements: bringing stability and affordability to electricity rates; unshackling from foreign coal; taking back control of the province's energy future; creating jobs and boosting the economy; creating a cleaner, greener province; and leading Canada, North America and the world; in significant part, by supporting local, community-based renewable electricity projects. This dominant discourse solidified into institutions and organizational practices and facilitated adjustments in the socio-technical regime.

One of the significant changes to the Nova Scotia's electricity regime – and a key one under examination in this dissertation – is the opening up of space for new actors, especially First

Nations, to participate in the electricity sector. Nova Scotia accomplished this with the introduction of its COMFIT program. Under the COMFIT, the 13 Mi'kmaq[6] First Nations and their business enterprises are able to qualify for the community feed-in tariff for any projects located on reserve land and land they lease or own. All 13 Mi'kmaq Nations are involved in renewable electricity generation projects, with 13.4 per cent of overall approved COMFIT generation coming from Mi'kmaq projects (Nova Scotia, 2012c; 2012d; 2013b; 2013c).

This chapter delves into the sustainability transition in Nova Scotia's electricity system. It explores the broader context, including an overview of the history of electricity generation within the province. It then explores the factors that contributed to recent changes in Nova Scotia's electricity regime, especially the inclusion of new actors within the sector, and the significant involvement of First Nations in renewable electricity generation projects.

5.1 History of Power Generation in Nova Scotia

By the early 1890s, most urban areas in Nova Scotia were electrified to some degree, often by small generating stations that were only capable of handling the electrical load required to light the town (King, 1999, p. 25). Low population density, few major urban centres, and the significant distances between those centres contributed to a highly fragmented electricity system. King (1999) asserts that:

> Perhaps the most recurrent theme in the history of electrification in Nova Scotia has been the persistence of systemic fragmentation … a chaotic, unintegrated network: instead of a province-wide (or even district- or county-wide) web of interconnected power stations linked by transmission lines … [Nova Scotia had] a plethora of small utility companies, each owned by a petty local entrepreneur and serving a very limited area, often just one town (p. 24).

[6] Mi'kmaq is the proper plural usage. Mi'kmaw is the singular form of Mi'kmaq. Mi'kmaw can also serve as an adjective where it precedes a noun (i.e., Mi'kmaw Nation).

In 1919, the provincial government established the Nova Scotia Power Commission as a publicly owned utility focused primarily on developing the province's hydro resources (Archer, 1969). Despite the establishment of the commission, Nova Scotia still had 53 distinct electrical utilities in 1934, the year that the *Report of the Royal Commission – Provincial Economic Inquiry* was released. The Royal Commission commented on this fragmentation: "In a community of half a million people and in a country 21,000 square miles in area this multitude and diversity of organizations is remarkable" (Biss, 1934, p. 80). Because these 53 separate utilities were not able to benefit from economies of scale, they provided generally inadequate service and charged higher-than-average rates. As a result, among its key recommendations, the Royal Commission urged the creation of a central agency to co-ordinate the fragmented electrical utility system (King, 1999).

In 1937, with the passage of *The Rural Electrification Act*, the Nova Scotia Power Commission's role was expanded from that of a generally passive development body to that of an active, competitive utility. Over the next three decades, the Commission slowly addressed the long-standing systemic fragmentation. It started by integrating its own electrical systems, moved on to establish linkages with other utilities, and then focused on purchasing other utilities and integrating them into the Commission's system (King, 1999). In 1972, the Nova Scotia Power Commission bought out the only remaining investor-owned utility in the province, the Nova Scotia Light and Power Company. A year later, the Commission became the Nova Scotia Power Corporation (King, 1999), which, for the next two decades, served as the province's Crown-owned monopoly electricity provider.

In 1992, the provincial government opted to privatize Nova Scotia Power in order to obtain a significant infusion of cash to alleviate the growing provincial deficit (Clancy et al., 2000). The price tag for Nova Scotia Power was $851.4 million; this was the largest to-date equity transaction completed in Canada (Nova Scotia Power, 2011a). An article in *The Wall*

Street Journal noted that, "the decision to privatize Nova Scotia Power Corp. is highly unusual in Canada, where most electric utilities … remain state-owned" (McGee, 1992). A business columnist in *The Globe and Mail* praised the privatization move:

> Across the country, these great bastions of state ownership … have ballooned into vast wastelands of inefficiency and debt. In almost every case, the power companies have become pawns of politicians, and badly managed uneconomic enterprises with poor environmental records and bloated bureaucracies (Corcoran, 1992).

Some environmental advocates also applauded the privatization:

> Lawrence Solomon of Energy Probe, a Toronto-based environmental advocacy group, called the privatization "a small first step" on the way to breaking the monopoly of large state-owned utilities that his group contends leads to economic waste and environmental problems … [including] costly and polluting megaprojects (McGee, 1992).

However, reaction the following year indicated some initial displeasure with the perceived consequences of the privatization of Nova Scotia Power.

> In the past, the Corporation treated environmental issues as political obstacles: now that the utility is no longer responsible to the Legislature it will be even less sensitive to environmental criticism. It's thus not surprising that sulphur dioxide emissions at the Tufts Cove generating plant in Dartmouth began to increase almost immediately after privatization. People in the area are tasting the free market with every breath they take (Webster, 1993).

Table 5-1 outlines the history of electricity generation in Nova Scotia.

Table 5-1. History of electricity generation in Nova Scotia

	Pre-1919	1919-1971	1972-1991	1992-2009	2010-
Ownership	Private	Mixed but increasingly public	Public	Private	Private, with some community-based generation
Guiding principles	Profit maximization	Expansion and industrial development	Service to citizens	Profit maximization	Profit maximization, increased sustainability and reliance on renewables

	Pre-1919	1919-1971	1972-1991	1992-2009	2010-
Planning	Market directed	Combination of gov't and market direction	Central command and control	Market directed	Primarily market directed, but increasing government direction
Market	Free market	Combination of gov't and market direction	Non-market	Regulated monopoly	Regulated monopoly, with some competition for generation
System organization	Fragmented, decentralized	Still largely fragmented, but increasingly centralized	Centralized	Centralized	Still primarily centralized, with increasing distributed generation
Technology preference	Oil-fired thermal	Oil-fired thermal, with some hydro	Coal-fired thermal	Coal-fired thermal	Decreasing coal-fired thermal, with growing preference for renewables

Oil was the primary source of electricity for many decades in Nova Scotia, until the OPEC crisis in the 1970s. The disruptive landscape developments created by the OPEC crisis destabilized the socio-technical regime and led the province to quickly shift its electricity generation system to coal. Nova Scotia converted some of its oil power plants to coal-fired generation and, in the years that followed, it built new coal generation stations (Nova Scotia, 2001). While this involved some aspects of *technological substitution*, it is more correctly deemed a *transformation* process, because the main regime actors remained in place and simply responded to landscape pressure by adjusting their development paths and adopting non-disruptive innovations to respond to landscape pressure.

Provincial coal supplies managed to meet Nova Scotia Power's fuel requirements from the 1970s through the mid-1990s, but then rising costs and international competition started leading to closures of the province's coalmines. As a result, in 1996, Nova Scotia Power had to start importing coal to meet its fuel requirements (Nova Scotia, 2001). The percentage of Nova Scotia's electricity generated by burning coal peaked at 80 per cent in 2006 (Nova Scotia Power, 2011a). By 2012, that percentage had declined to 59 per cent (Nova Scotia, 2014e).

Nova Scotia Power, which remains a virtual monopolist in the supply of electricity in the province, currently operates four coal power plants; one power plant that runs on natural gas or oil; one tidal and 33 hydro stations; two wind farms and two additional wind turbine sites; and a biomass power plant. In addition to the 59 per cent of its electricity generated using coal in 2012, 18 per cent came from renewable sources; 21 per cent from natural gas; and the remaining two per cent was either imported or generated using oil (Nova Scotia Power, 2014).

5.2 Moving toward Sustainability in Nova Scotia

In the absence of destabilizing pressure, socio-technical regimes tend to undergo only incremental change along well-established trajectories (Kemp et al., 1998). Much of the pressure comes from the landscape level – the "deep structural gradients of force that make some actions easier than others" (Geels & Schot, 2007, p. 403). As early as 2001, the effects of certain landscape pressures on Nova Scotia's electricity sector were apparent. That year, the Nova Scotia government undertook a consultation process to develop a new energy strategy. The initial consultation document pointed to three challenges for its electricity sector: (1) the Kyoto Protocol of 1997 which, "established new targets for environmental management and emissions that contribute to climate change … [and] also increased many people's awareness of environmental issues involving the energy industry;" (2) the fact that "domestic coal is now less available and less used in generating electricity;" and (3) the trend toward increasing competition in the

electricity sector in other jurisdictions (Nova Scotia, 2001a, p. 6). Progressive Conservative Premier John Hamm wrote in the introduction to the consultation document:

> In a rapidly changing world, the energy industry and government must balance their social obligations with an environment that fosters commercial development. Trends to introduce market competitiveness into the generation, transmission and distribution of electricity, and the increase in concerns over environmental effects of the production and use of hydrocarbons on air quality and global warming must be strategically managed. Nova Scotia must also continue to ensure its business climate is competitive and attractive so that the energy sector significantly contributes to the province's future economic growth (Nova Scotia, 2001, p. 3).

Changes in worldviews, the macro-economy and political culture were beginning to put pressure on Nova Scotia's electricity sector.

The government released its new energy strategy late in 2001. The strategy focused on a variety of themes, including: thinking long-term; learning lessons from elsewhere; maximizing economic benefits within the province; improving the environment; increasing renewable energy production; and taking a cautious approach to competition in the electricity sector (Nova Scotia, 2001b). The government said:

> In electric power generation, competition will be gradually introduced. This will enable the province to develop new sources of renewable energy and create opportunities to export power. Municipal utilities will gain access to the transmission system so they can buy power from any generator. There will be open competition for new power generation. Renewable energy standards will be set (Nova Scotia, 2001b).

This strategy largely represented a *reproduction* pathway, in which the socio-technical regime remained dynamically stable. However, in some ways, it represented an extremely preliminary step down a *transformation* pathway – in the words of Premier Hamm, it was a "careful, measured response" (Power Engineering International, 2001). The regime actors responded to the moderate landscape pressure by incrementally adopting a very small amount of niche innovations in a manner that would not significantly disrupt the existing socio-technical regime. For example, the government set a voluntary target of 2.5 per cent or 50 MW of new renewable generation and its overall energy strategy strongly reinforced the existing system:

> The strategy recognizes that coal will continue to play a major role in electrical generation in the province for many years to come. It encourages the development of local coal resources where it is economically and environmentally feasible. Opportunities for surface mining as part of land reclamation are expected to be identified in Cape Breton. Other mine developments may also be possible with advances in clean-coal technology (Nova Scotia, 2001b).

The focus of the energy strategy can mostly be characterized as a *reproduction* process, leaving the existing electricity regime dynamically stable, but it is clear that at least one foot was slowly making its way toward the *transformation* pathway, in which proven niche innovations are adopted without significantly disrupting the existing regime, and in which space is opened up for new actors to participate in the system but the main incumbent actor is not displaced.

In 2002, the government established the Electricity Marketplace Governance Committee (EMGC), with the stated purpose of "report[ing] to the Minister of Energy and recommend[ing] the implementation, development, structure, economic considerations, and rules to introduce electricity competition in Nova Scotia" (Nova Scotia, 2002). The EMGC consisted of various stakeholder groups – Canadian Federation of Independent Business, Canadian Manufacturers and Exporters, Consumers' Association of Canada, Electricity Consumers Alliance of Nova Scotia, Municipal Electric Utilities of Nova Scotia Cooperative, Renewable Energy Industries of Nova Scotia, and Nova Scotia Power (Nova Scotia, 2003a). In late 2003, in its final report, the EMGC made the broad recommendation "that Nova Scotia generate more power using renewable energy sources and gradually introduce competition in the province's electricity marketplace" (Nova Scotia, 2003b). This represented added pressure on Nova Scotia's existing electricity socio-technical regime.

In 2003, the Nova Scotia government released its green strategy, entitled *Toward a Sustainable Environment*. The plan acknowledged that Canada had become a signatory to the Kyoto Protocol in 2002 and it said, "the Province of Nova Scotia is committed to addressing climate change and supports the development of a fair and realistic national plan" (Nova Scotia,

2003c, p. 5). It focused on the need for "an integrated approach" which included a pledge to "create a regulatory climate that encourages the development of a renewable energy industry within the province" (Nova Scotia, 2003c, p. 19). However, it would take several years for the government to enact significant regulatory changes to that effect, implying that the landscape pressure on the existing electricity regime was largely bearable.

In 2004, Nova Scotia Power brought together 135 randomly selected customers to discuss energy planning. The 'Customer Energy Forum' utilized an innovative deliberative-polling approach for the first time in Canada, in which participants were provided with access to balanced information. At the end of the forum, nearly three-quarters of participants supported increased reliance on renewable energy sources. In fact,

> When asked if Nova Scotia Power should only meet federal and provincial requirements in the production of electricity as a means to produce electricity as inexpensively as possible or whether Nova Scotia Power should go beyond the current requirements to reduce pollution or greenhouse gases, even if that meant higher bills—the response to go beyond was three to one at 73 per cent, with 26 per cent saying meet current requirements (Guild et al., 2004).

When asked about their willingness to pay for particular options, wind power received the highest median response at five dollars more per month (Guild et al., 2004). This was useful information for government actors and Nova Scotia Power and what it told them was that, when provided with unbiased information about renewable electricity, Nova Scotians largely support it and are even willing to pay more for it (interview 10).

Also in 2004, an independent study revealed that Nova Scotia was responsible for one-quarter of all sulphur-oxide emissions in Canada, a fact mostly attributable to the province's heavy reliance on coal-fired power plants (Auld, 2004). In response, a *Halifax Herald* editorial, which was reprinted in the *Toronto Star*, criticized the electrical generation system in Nova Scotia and called for the provincial government to demonstrate leadership:

> Nova Scotia is the little engine that could. Pollute, that is. … Part of the solution is to turn up the heat on Nova Scotia Power. The utility should be legally bound to make renewable

> energy a growing percentage of the power supply. … Real strides in developing renewable energy … won't be made without legislative impetus, simply because no one seems to be in a hurry to explore alternatives ("Struggling to find more green energy", 2004).

In 2006, government acted to push for increased reliance on renewable power, taking several actual steps down the *transformation* pathway. Early that year, Rodney MacDonald was sworn in as premier, following the resignation of John Hamm. Under a new premier, the Progressive Conservative government moved "to force Nova Scotia Power to purchase more electricity generated by wind and solar power" ("Nova Scotia wants 20 per cent", 2006), with the aim of doubling renewable power to roughly 20 per cent. Through these initiatives, regime actors were responding to increased landscape pressure – the rising costs of importing coal; public resentment toward the privatized electrical utility; the trend toward increased competition within electricity sectors; and the growing pressure around climate change mitigation. The regime actors responded to those increased landscape-level pressures by adjusting their development paths, including through the adoption of non-disruptive niche innovations. The new requirement for the incumbent actor to *purchase* more renewable power, rather than *generate* more renewable power, also opened the door for new actors to participate in the electricity sector.

In response to the government's regulatory changes, Nova Scotia Power forecasted higher power bills, arguing that, "the proposed 2013 standard [doubling the current percentage] of energy from renewable sources may not be technically achievable," and it explicitly questioned whether it was an approach that really "works best for Nova Scotians" ("Nova Scotia wants 20 per cent", 2006). Despite Nova Scotia Power's opposition, the government pushed ahead. In 2007, the government unveiled new renewable energy regulations, which set a clear renewable energy standard: 20 per cent renewable power by 2013, representing a 15 per cent increase in renewable electricity generation. The regulations also restricted the first five per cent of new renewable power to IPPs, further opening up space for new actors to participate in the existing

socio-technical regime and representing further progress along the transformation pathway (Nova Scotia House of Assembly, 2007).

Also in 2007, the government introduced *The Environmental Goals and Sustainable Prosperity Act,* with the stated aim of ensuring that the province has "one of the cleanest and most sustainable environments in the world by the year 2020" (Nova Scotia House of Assembly, 2007). All three political parties in the Nova Scotia House of Assembly unanimously supported this legislation. Included among the 21 commitments within the legislation was a 10 per cent reduction of GHG emissions, below 1990 levels, by 2020.

Two years later, the government unveiled yet another new energy strategy, as well as a climate change action plan, which included new emission reduction targets for 2015, 2020 and 2050, and staged emission caps on Nova Scotia Power for 2010, 2015 and 2020. The plan also boosted smaller-scale renewable electricity projects with a commitment to net metering, allowing Nova Scotia customers to install wind turbines or other renewable electricity projects up to one megawatt in size to get credit against their power bill for the electricity they generate annually (Nova Scotia, 2009b). Again, this represented additional steps – however small they may be – along the *transformation* pathway, in response to landscape-level pressure, in which the the incumbent actor was left in place but space was opened up for new actors and the province's reliance on renewable electricity generation was slowly increased.

5.3 Embracing Community Power in Nova Scotia

A provincial election was held in Nova Scotia in June 2009. Throughout that campaign, it was evident that a degree of discursive hegemony had already occurred, with each of the political parties emphasizing within their respective campaign platforms the importance of increasing the province's reliance on renewable electricity. This is not surprising, given that each of the three political parties in the Legislative Assembly had unanimously embraced *The Environmental*

Goals and Sustainable Prosperity Act two years earlier. During the 2009 campaign, the Progressive Conservatives emphasized their record in government, pointing to their recently released *Energy Strategy and Climate Change Action Plan*, which they argued would ensure that, "by 2020, Nova Scotia will be cleaner, greener and more prosperous" (Nova Scotia Progressive Conservatives, 2009, p. 18). The Official Opposition New Democrats promised to increase renewable energy to 25 per cent by 2015, as part of their pledge to "create the secure jobs Nova Scotia's economy need" (Nova Scotia New Democrats, 2009, p. 4). The New Democrats also focused on the affordability of electricity, with a key campaign plank pledging to "roll back the Conservatives eight per cent tax increase on home electricity" (Nova Scotia New Democrats, 2009, p. 4). The third party Liberals also included a focus on renewable energy, pledging that they would: "focus on the development of a renewable energy industry that will generate jobs, guarantee economic growth and provide energy security into the future" (Nova Scotia Liberals, 2009, p. 1).

The New Democrats won the 2009 election and, as the new government, promptly announced the accelerated renewable targets the party had promised during the campaign: 25 per cent renewables by 2015, moving the previous government's target up by five years. Following a consultation process, the provincial government released its *Renewable Electricity Plan: A Path to Good Jobs, Stable Prices and a Cleaner Environment* in April 2010. The government identified six principles that guided the development of its renewables plan: (1) managing costs for ratepayers; (2) strengthening security through diversity; (3) building economic opportunities in rural Nova Scotia; (4) protecting the environment and ensuring sustainability; (5) maximizing community involvement and social benefits; and (6) holding themselves accountable (Nova Scotia, 2010a, p. 8). These guiding principles reveal the various discursive elements at play in the politics of Nova Scotia's electricity transition.

In its renewable electricity strategy, the government pointed to the landscape-level developments that were increasingly putting pressure on the existing socio-technical regime and, in so doing, the government revealed what would become a vital component of the discussion surrounding the transition of its electricity sector:

> The motivation for this plan is simple: nearly 90 per cent of the province's electricity supply comes from fossil fuels – most of it coal. Coal made more sense when it was mined here in Nova Scotia, but now we buy it from others. This over-reliance on a single fuel source weakens our energy security, binds us to the volatile and upward trend of international prices, and drains wealth away from the province. Equally important, it has a negative impact on both our health and our environment (Nova Scotia, 2010a, p. 2).

The government also said, "Nova Scotia's economy has been exposed to insecure overseas supplies of an increasingly expensive, unhealthy, environmentally unfriendly fuel. We need to begin changing that, and this is the plan for doing so" (Nova Scotia, 2010a, p. 5). The plan included enshrining within legislation the government's already-established commitment to have 25 per cent renewable power by 2015. It also included a new target of 40 per cent renewable power by 2020.

The government's renewable electricity plan said the transition would be well organized and that it would involve many actors:

> The province will make an orderly transition to new, local, renewable energy sources. This plan uses several different mechanisms to achieve that transition. It creates a role for everyone from Nova Scotia Power – who will continue their regulated obligations – and large independent producers, to community organizations and committed citizens (Nova Scotia, 2010a, p. 2).

To open up space for new actors to be involved in the electricity sector as IPPs, the government's renewables plan explicitly committed that it would evenly split large- and medium-sized renewable energy projects between Nova Scotia Power and IPPs, taking another step along the *transformation* pathway by further adjusting the regime rules in order to adopt to niche innovations that add to the regime without substantially altering its basic architecture.

As a specific measure to facilitate the participation of new actors in the electricity sector, the government established the COMFIT program, the first known feed-in tariff program in the world to specifically target *community-based* wind, biomass, in-stream tidal and run-of-river hydro projects. Through the COMFIT program, First Nations, municipalities, co-operatives and not-for-profit groups receive an established price per kilowatt hour (kWh) of electricity they produce using renewable electricity generation projects. Nova Scotia's COMFIT rates, designed to reflect basic cost recovery, are as follows:

- Wind power, up to 50 kW: 49.9¢ per kWh
- Wind power, over 50 kW: 13.1¢ per kWh
- Small-scale in-stream tidal: 65.2¢ per kWh
- Run-of-the-river hydroelectricity: 14.0¢ per kWh
- Combined heat and power biomass: 17.5¢ per kWh (Nova Scotia, 2010b).

The COMFIT focused on supporting technologies that had already been proven elsewhere and that were also deemed relatively affordable; the COMFIT did not support solar because the government deemed it unaffordable (interviews 4 and 9).

The idea behind the COMFIT initiative was to provide project proponents with enough economic certainty to invest in local renewable energy projects. These projects are connected to the grid at the distribution level and, due to constrained capacity at that level, are generally less than 2 MW, but can be up to 6 MW in some areas of the province. With the exception of municipalities, these community-based entities are required to own a majority of the proposed project in order for it to qualify for the COMFIT program (Nova Scotia, 2010a). According to the government's estimation, for every megawatt of energy produced through the COMFIT program, between $2 million and $3 million in economic activity is generated for the local community (Nova Scotia, 2013c).

While the government acknowledged that there are various economies of scale that allow large-scale renewable projects to produce electricity cheaper than smaller-scale projects, it said it made "a conscious decision" not to extend the COMFIT program to large projects, "partly to ensure widely dispersed energy sources, and partly to encourage rural community economic development" (Nova Scotia, 2010a, p. 26). Another key rationale for the community focus was that the government anticipated increased community buy-in to renewable projects as a result of the COMFIT; the government said it expected the COMFIT to "promote greater public understanding and acceptance of renewable resources" (Nova Scotia, 2010a, p. 11). A community activist said:

> I really love talking about the COMFIT because it's a really good example of Nova Scotia doing a good job of watching what's happening elsewhere and responding to that appropriately. So, what I put that down to is Nova Scotia deciding that a feed-in tariff would be kind of an appropriate program for the province and saying, hey, Ontario has implemented a feed-in tariff there. And watching Ontario, it was very obvious that a huge part of the problem with the way the feed-in tariffs were implemented in that province was that they did not have enough of a community focus, there wasn't enough of an emphasis on developers actually communicating effectively and meaningfully with communities that they were putting projects up in, and ensuring that those communities directly benefited from those projects. And so now in Ontario what they have is a situation where there are several municipalities that have banned wind development in their borders and there are huge community groups that have been formed to make sure that wind development is consistently stalled in Ontario because there is this impression that it's all just big foreign enterprises coming into Ontario and ruining their land and their communities in order to reap profits that they just take away. So I would say that the COMFIT here in Nova Scotia was directly informed by watching that experience in Ontario and thinking of the best way to avoid it (interview 6).

Other interview participants also identified increased community support as a primary motivating factor for the development of the COMFIT program (interviews 2, 3, 5, 7 and 9). And a former government politician notes that: "the COMFIT was really about empowering communities to recognize that they could be a part of getting us off of coal and natural gas and putting us onto a sustainable path forward for electricity in this province that we haven't seen ever before" (interview 4).

Another important motivating factor for the COMFIT was that it involved the government taking on Nova Scotia Power in a small, but significant way. Several interview participants noted that, when the government is seen to take action against Nova Scotia Power, it resonates with most Nova Scotians (interviews 4, 5, 6 and 9). A prominent insider notes that there is a "built-in hate factor" that many Nova Scotians have for Nova Scotia Power, in part because:

> The public has an ownership of Nova Scotia Power that they've clung onto even though it's been almost 25 years since it's been a private company. And some people are still upset about that. They don't understand why government did it. All they know is that there used to be a lot more people working there and they used to pay a lot less. … You don't see Nova Scotia Power or [its parent company] Emera do things as good corporate citizens, they do it exactly to the rule of law, and I've watched incarnations of how they've gone about their public relations aspects, but at the end of the day, the tone might change but the actions are identical. The only way to deal with Nova Scotia Power is by legislation and regulations, it is the only way which they understand. That's it, that's all they understand. … The government always has to talk tough, and they always have to pass a rule or make a law, and it's never quite enough for the public but it always pisses Nova Scotia Power off. … It's a very, very challenging relationship (interview 7).

A former government politician also acknowledges that taking on Nova Scotia Power was indeed part of the motivation behind the COMFIT program: "[the COMFIT] is essentially getting rid of that idea that Nova Scotia Power has a monopoly on power generation" (interview 4).

Nova Scotia Power was relatively cautious in its public statements regarding the government's imposition of the new renewable portfolio standard: "publicly, [Nova Scotia Power] said they're working toward this [renewable portfolio], but of course they wanted to dictate their own rules" (interview 7). Nova Scotia Power wanted to protect its monopoly on electricity generation:

> Nova Scotia Power has had a policy of fighting any independent power production. They've been very jealous of their monopoly. And I mean, why give up something you've got, why open yourself up to any kind of competition. The notion around IPPs, and what they can do, Nova Scotia Power has fought it every single inch of the way. Everything has been forced upon them. They have not willingly done anything (interview 7).

Another insider has a somewhat different perspective on the corporation's response to IPPs: "They didn't want to disadvantage their own business, … It wasn't a bigoted or doctrinaire

opposition that they espoused, like, oh my God, this can never happen, and I think they realized that they would legitimately have to accommodate that and try to make it work" (interview 10).

Other than from Nova Scotia Power, there was minimal discernible opposition to the COMFIT component of the government's renewable electricity plan. However, as can be expected in any parliamentary democracy, there were disagreements and a fair amount of political posturing by the other two political parties about other details of the government's renewable electricity plan. Much of the focus was on affordability. After all, the government readily admitted that electricity prices would have to rise in the short term in order to pay for its renewable electricity plan, but it argued its plan would ultimately lead to price stability and affordability:

> The transition from imported fuels to renewable electricity and cleaner local fuels will increase power bills in the short term, but offer lower and more stable rates in the long run. *Not* making this transition would shackle ratepayers to the wild price swings and the relentless upward march of international energy markets. And, in the long run, this plan is about making life more affordable – doing nothing would cost more. … We can keep going down that path and doom consumers to an unsustainable future, or we can bite the bullet and make the necessary investments to have a secure, safe, affordable, and sustainable energy economy. How hard is that bullet? Government estimates that measures in this plan will result in a 1% to 2% increase annually on electricity bills. To reach 2015, this would add an average of approximately $10-$20 annually to the average single family home electricity (closer to $20-$40 if electricity is used for heating) (Nova Scotia, 2010a, p. 26).

The third party Progressive Conservatives attempted to make some political points by playing off the government's 'bite-the-bullet' line. Progressive Conservative leader Jamie Baillie said:

> [The government] cranked up their own renewable targets to the most aggressive in North America, patted themselves on the back, passed the cost on to you and me, and then told you [that] you need to bite the bullet and pay more, finally confessing that it's two per cent more on every bill ("Jamie Baillie's Unforced Error", 2011).

The Official Opposition Liberals largely focused their attention on Efficiency Nova Scotia, an arms-length non-profit corporation created by the New Democrat government to better manage use of electricity, which the Liberals argued was costing Nova Scotians too much ("Stephen McNeil's Brownout", 2012). The Liberals also focused heavily on their desire to open up the

electricity market to competition, a move they argued would lead to increased affordability for Nova Scotians ("The Strange Case of Dr. Jekyll and Mr. Baillie", 2012). Despite some concerns about the pace of change with the renewable electricity strategy and its effect on affordability for Nova Scotians, the COMFIT program itself was largely supported (interviews 4, 7 and 9).

The heavy focus of Nova Scotia's Opposition parties, and the governing party as well, on affordability of electricity rates is understandable. Gifford (2013) points out the anger of Nova Scotians about increases to their electricity rates:

> Nova Scotians are angry about the increases in electricity rates from [Nova Scotia Power] over the last several years. Electricity rates increased by almost 58% from 2001 to 2012. Most of those increases occurred before 2009, but the latest rounds have incensed Nova Scotians more than ever as stories of [Nova Scotia Power's parent company] Emera's record profits and million dollar salaries for top executives along with requests for annual rate increases make them particularly galling (p. 1).

Abreu (2013) says the anger of Nova Scotians over increases in electricity rates had a significant polarizing impact on the political discourse.

> Public debate is polarized and politicized. [Nova Scotia Power] and the provincial New Democratic Party government link rate increases to the rising cost of coal and demand decline. The [Liberal] Official Opposition pinpoints the cost of Nova Scotia's efficiency programs as an undue burden for ratepayers. The Progressive Conservative caucus warns against the costs of investing in too much renewable energy too fast. Solidarity Halifax and other advocacy groups demand that NS government expropriate the private utility. The Lower Power Rates alliance connects high electricity rates to what it calls a "broken system" where regulatory authority is too weak to protect Nova Scotians (p. 10).

The Ecology Action Centre (EAC) (2013) argued that: "Energy has become a political football in Nova Scotia. In response to public concern over rate increases, Nova Scotia's political parties do Nova Scotians the disservice of crafting arguments that focus on short-term savings while often ignoring the big picture" (p. 2).

The discourse around renewable electricity was certainly not limited to affordability, however. In fact, the broad storyline in the case of Nova Scotia's renewable electricity consisted of the following interconnected elements: bringing stability and affordability to electricity rates; unshackling from foreign coal; taking back control of the province's energy future; creating jobs

and boosting the economy; and creating a cleaner, greener province; all, in significant part, through supporting local, community-based renewable electricity projects. Because its domestic coal industry was decimated, Nova Scotia imports most of its coal from Colombia (EAC, 2013). The Ecology Action Centre (2013) notes that Nova Scotia's "reliance on fossil fuel imports is unique in Canada" (p. 2). Between 2005 and 2011, the price of coal jumped 75 per cent, which put significant upward pressure on electricity rates (Nova Scotia, 2011a). Thus, the discourse around electricity generation focused heavily on delivering more affordability to Nova Scotians and ending the volatility of Nova Scotia's reliance on costly foreign coal. Premier Darrell Dexter said: "We are putting our energy future where it belongs; back in Nova Scotians' hands" (Nova Scotia, 2010d); "the government has established aggressive targets to help reduce the province's dependence on fossil fuels, a move that will make life more affordable for families by ensuring lower, more stable power rates in the long term" (Nova Scotia, 2011a); and "the days of double-digit increases are over. By working together with partners … we are taking control of Nova Scotia's energy future. This is an affordable, made-in-Atlantic Canada approach to a problem that has been around for more than a generation" (Nova Scotia, 2013d). By and large, this storyline was used by a broad range of actors to conceptualize the problem in Nova Scotia (interviews 3, 4, 5, 6, 7 and 10), achieving what Hajer (1995) calls *discourse structuration* or *discursive hegemony*.

While opposition political parties and Nova Scotia Power called the government's approach to renewable energy 'aggressive' (Doucette, 2009), the government did not view that as a negative. In fact, the government enthusiastically embraced that term; using it 23 times in 19 separate news releases between July 2009 and October 2012. The government also routinely used the word 'ambitious' to refer to its plan. The 'aggressive' and 'ambitious' labels fit well with the government's narrative, which pushed the argument that Nova Scotia could punch well above its weight and provide leadership to Canada, North America and the entire world on renewable

energy (interviews 4 and 6). For example, in its 2010 Speech from the Throne, the government said: "Once Nova Scotia was known for shipbuilding, coal, and steel. Now, clean energy could be Nova Scotia's next big industry. Nova Scotia's ambitions in the area of clean energy are world class" (Nova Scotia, 2010c). In its 2010 budget speech, the government said, "Nova Scotia will take its rightful place as a leader in the renewable energy sector. Last summer, we announced a target of 25 per cent renewable energy by 2015 – the most aggressive standard of any government in North America" (Nova Scotia, 2010e). In its 2011 Speech from the Throne, it said: "Clean energy is the fuel of the future. Nova Scotia was the first province in Canada to institute hard caps on greenhouse gas emissions, and has set the most aggressive renewable energy standards in the world" (Nova Scotia, 2011b). In May 2013, in the Legislative Assembly, Premier Dexter said,

> The people of Nova Scotia know that the renewable electricity plan put forward by this government was not only the first one, but it was widely praised as one of the most progressive plans anywhere in North America. The kinds of things that we have done with respect to renewable energy have been praised by the David Suzuki Foundation. It is far and away the most rational, most progressive renewable energy and electrical plan in our country (Nova Scotia House of Assembly, 2013).

Positioning Nova Scotia as a nation-, continent- and world-leading jurisdiction was a key part of the government's narrative, and it became a component of the dominant discourse around renewable electricity in Nova Scotia.

Unshackling from foreign coal, taking back control of the province's energy future, creating jobs and boosting the economy were all crucial elements of the political discourse, and key motivating factors for the government's policy direction. Leading Canada, North America and the world as well as creating a cleaner, greener province were also part of the discourse, but they were not as significant as the other pieces. However, the affordability aspect was undoubtedly what Nova Scotians cared most about. A former government MLA notes:

> So the unshackling of foreign coal, I mean I used that all the time ... when I did interviews and talked to people on the doorsteps, and you get the head nod from it, but at the end of

> the day, what people want is affordable energy. And, because, you know, our average price for energy is about 12 cents a kilowatt hour, when in a province like Manitoba, it's 6 cents a kilowatt hour, people go 'huh?'" (interview 4).

Addressing this affordability angst was a key motivation in the government's decision to increase community-based renewable power. It also motivated the government to eventually embrace the Maritime Link, the underwater cable that would bring electricity from the Muskrat Falls hydroelectric project in Labrador to Nova Scotia; however, at the time the government released its renewable electricity plan, it was still just exploring the possibilities around the Maritime Link, so its focus was heavily on domestic renewable electricity generation (Nova Scotia, 2010a).

When the COMFIT program launched, the government's target was 100 MW of electricity generated from such projects. By early 2014, the program had received 123 applications totaling about 280 MW of capacity. The government approved 89 COMFIT projects, with a total generation capacity of 200 MW (Nova Scotia, 2014e).

The Nova Scotia government also negotiated an equivalency agreement with the federal government in 2012, allowing the province to use its own regulatory approach instead of following federal regulations for coal-based generation (Nova Scotia, 2012f). The government said:

> This is a made-in-Nova Scotia solution that wouldn't have been possible if not for the strength of our greenhouse gas regulations and renewable energy plan. There is only one way to make sure we're getting the lowest, fairest prices – make the shift from imported coal to stable renewable energy right here in Atlantic Canada (Nova Scotia, 2012f).

As already outlined, the dominant discourse regarding changes to Nova Scotia's electricity regime involved a variety of interrelated elements: bringing stability and affordability to electricity rates; unshackling from foreign coal; taking back control of the province's energy future; creating jobs and boosting the economy; creating a cleaner, greener province; and leading Canada, North America and the world; in significant part, by supporting local, community-based renewable electricity projects. The discourse coalition – the various actors that produced and used

this storyline – included a loose blend of government, political parties, First Nations, and advocacy groups. The *coordinative*, behind-the-scenes discourse focused on a variety of factors: meeting the province's aggressive renewable electricity targets; reducing the province's reliance of costly foreign coal; challenging Nova Scotia Power's monopoly on power generation; empowering communities to recognize that they could benefit from the transition to renewable energy; supporting local economic development and job creation; learning lessons from Ontario, where a feed-in tariff had been introduced a few years earlier; and blunting criticism from some of the New Democrat government's supporters who wanted any renewable electricity projects to be owned by the provincial government. The *communicative* discourse, which takes place in the public, focused primarily on affordability issues. It also included discussion about taking back control of the province's energy future, boosting the economy and creating jobs.

In many ways, the dominant discourse around the transition of the electricity sector has solidified into institutions and organizational practices, what Hajer calls discourse institutionalization. There are relatively aggressive targets for renewable power and emission reductions. The government is increasing the use of locally produced natural gas and establishing the Maritime Link to increase the capacity of the grid to absorb intermittent energy from local renewable sources. The COMFIT has resulted in many new actors entering the electricity sector and becoming increasingly entrenched as they gain expertise in renewable electricity generation. Enhanced net metering has given individuals and businesses the chance to participate in renewable electricity projects that are up to one megawatt. Other institutional components have been added to buttress this plan, including: a renewable electricity administrator, to manage the bidding process through which IPPs compete for projects; a sustainable energy planning group to "co-ordinate and support the efforts of various departments, regional development authorities, municipalities, regional sustainability offices, and non-governmental organizations" (Nova

Scotia, 2010a, p. 21) and "a variety of programs to assist community groups in the technical, financial, and regulatory work needed to develop these projects" (Nova Scotia, 2010a, p. 21).

For the purposes of the renewable electricity generation technologies employed in Nova Scotia, several of the TIS functions – primarily entrepreneurial experimentation, knowledge development, and knowledge diffusion – are not relevant, because the technologies under consideration are already well-established and proven; they did not require experimentation, development and knowledge diffusion within the Nova Scotia context.[7] However, the remaining TIS functions are indeed relevant and they serve to provide insight into the progress Nova Scotia has made on renewable electricity:

- *Guidance of the search* – the government has provided positive signals through policy directives, such as the renewable portfolio standard, COMFIT and enhanced net metering, all of which support increased use of renewable electricity generation technologies; the government has also provided negative signals through policy directives, such as hard caps on Nova Scotia Power's emissions and relatively stringent GHG emission reduction targets;

- *Market formation* – with increases in volume and number of actors, Nova Scotia has developed a 'bridging market', which is the middle phase between a 'nursing market' and a 'mature market';

- *Resource mobilization* – Nova Scotia has made a concerted effort to distribute needed financial, material and human capital to support the deployment of renewable electricity generation, through initiatives such as the COMFIT and through funding the Mi'kmaq renewable energy advisor position and the Mi'kmaq-specific renewable energy strategy; and

- *Support from advocacy coalitions* – as a result of government policy, which is clearly entrenched within legislation and largely supported across political party lines, support from advocacy groups is increasingly less crucial.

As a result, applying Suurs (2009) typology of motors, Nova Scotia appears to have developed several TIS motors:

- *Entrepreneurial motor* – government responded to landscape pressures with project-specific subsidies, primarily in the form of the community feed-in tariff; government

[7] The exception to this would be with regard to large-scale tidal power, which the Nova Scotia government continues to support through R&D funding.

regulation guaranteed a sizeable commercial environment and enactor support for specific technologies;

- *System building motor* – government legislation requires the monopoly selector, Nova Scotia Power, to support renewable electricity enactors, thereby tackling the entanglements of the incumbent system; and

- *A (promising) market motor* – as a result of government policy, the niche actors are increasingly entrenched within the system and, therefore, ongoing support from advocacy coalitions is less vital as it was throughout the earlier stages.

This analysis, taking into account the perspective of TIS functions and motors, provides insight into the progress Nova Scotia had made along the *transformation* pathway.

5.4 Involvement of First Nations in the Electricity Sector in Nova Scotia

Nova Scotia is home to 13 Mi'kmaq First Nations. There are over 13,500 registered Indians in Nova Scotia, 65 per cent of which live on reserve (Nova Scotia, 2014a). The nature of the mid-18th century Treaty of Friendship has left a unique situation in Nova Scotia. In 1752, Chief Jean Baptiste Cope signed the Treaty of Friendship with Peregrine Thomas Hopson, governor of the province of Nova Scotia. The aim of this treaty was to end hostilities between the British and Mi'kmaq; it was not for the First Nations to cede or surrender rights to the land and resources. The federal government acknowledges this:

> Unlike later treaties signed in other parts of Canada, the Peace and Friendship Treaties did not involve First Nations surrendering rights to the lands and resources they had traditionally used and occupied. … First Nations maintain that they continue to hold Aboriginal rights and title throughout their traditional territory. This creates a special situation unlike any other found in Canada. There is no model or generic approach to follow on how to proceed in these negotiations (Government of Canada, 2014).

Successive court cases, especially the Donald Marshall Jr. case in 1999 regarding fishing rights, forced the federal and provincial governments to begin negotiations with the Mi'kmaq. The Nova Scotia government acknowledges this, saying:

> Over the past thirty years, courts in Nova Scotia and Canada have recognized the existence and validity of Aboriginal and treaty rights and have tried to clarify the nature and extent of these rights. Canadian courts have consistently encouraged governments and

> First Nations to approach questions of Aboriginal and treaty rights through negotiations rather than litigation. Such was the case in 1999 when the Supreme Court of Canada in the Donald Marshall Jr. case confirmed the existence of Mi'kmaq rights as outlined in the Treaties of 1760-61. The Supreme Court did not define how these rights were to be implemented, but instead encouraged the Parties to negotiate a resolution in a fair and equitable manner (Nova Scotia, 2014c).

A former CEO of one of Nova Scotia's First Nations says,

> We'd been telling them for a long time, up until 1998, that we had Aboriginal title and Aboriginal rights, and significant pre-Confederation Treaties that the Crown recognized us as equal. But of course the government and Canada and the province said, no, no, no you don't. We control your destiny and you have to follow our rules. And by the fact that we won that case, it significantly changed the dynamic. I think it really affected the business community especially, who then pressured the province and the feds and said you have to do something here, we have to get certainty, we have to get some kind of relationship going (interview 1).

As a direct result of the Supreme Court decision, the Mi'kmaq-Nova Scotia-Canada Tripartite Forum was established in 1997 "to provide the Mi'kmaq and federal/provincial government a place to resolve issues of mutual concern … [and to] build a foundation for prosperous and vibrant Mi'kmaw communities through partnership, commitment and respect" (Nova Scotia, 2014b). In 2002, the three parties signed the Umbrella Agreement, committing to work together in good faith to resolve mutual issues and to enter formal negotiations on constitutionally protected Mi'kmaq rights. In 2007, the federal and provincial governments and the Assembly of Nova Scotia Mi'kmaq Chiefs signed the Mi'kmaq-Nova Scotia-Canada Framework Agreement, establishing the Made-in-Nova Scotia Process, which is "the forum for the Mi'kmaq, Nova Scotia and Canada to resolve issues related to Mi'kmaq treaty rights [and] Aboriginal rights, including Aboriginal title, and Mi'kmaq governance" (Nova Scotia, 2014d). The three parties meet monthly at the main negotiation table and also have various working groups (KMKNO, 2014).

In 2007, the government established an Aboriginal set-aside for the Sydney Tar Ponds and Coke Ovens cleanup project, giving bidders with majority Aboriginal ownership and control priority on the cooling pond remediation project. A senior advisor for Membertou First Nation

said at the time: “This is the first Aboriginal set-aside for the province of Nova Scotia and we are looking forward to having an opportunity to do some of the cleanup work. Hopefully this will be a stepping stone for future work as the project progresses” (Nova Scotia, 2007). The following year, the government signed a procurement strategy with the Assembly of Nova Scotia Mi’kmaq Chiefs that identified numerous other aspects of the Sydney Tar Ponds and Coke Ovens remediation project that were set-aside for companies with majority Aboriginal ownership and control. The total value of the Aboriginal set-aside was $19 million, about five per cent of the total project costs (Nova Scotia, 2008a).

In 2008, for the first time in Nova Scotia’s history, the premier and cabinet had a formal joint meeting with the Assembly of Nova Scotia Mi’kmaq Chiefs. Premier MacDonald said, “Today’s meeting marks the beginning of a new era in relations between the provincial government and the Mi’kmaq leadership. It represents an opportunity to map out a way for the future and allows us to reaffirm our commitment to work together on issues that benefit everyone” (Nova Scotia, 2008b).

In 2009, when the New Democrats formed government, Premier Darrell Dexter chose to serve as the Minister of Aboriginal Affairs, seeking to elevate the importance of the provincial government’s relations with the Mi’kmaq First Nations in Nova Scotia. As a senior member of the New Democrat government noted, “[Premier Dexter] felt that was the only way forward to having true dialogue with Aboriginal communities” (interview 4). In 2010, the federal and provincial governments and the Assembly of Nova Scotia Mi’kmaq Chiefs signed the Mi’kmaq-Nova Scotia-Canada Consultation Terms of Reference, which lays out a process for the parties to follow for consultation with the Mi’kmaq. The provincial government notes:

> After centuries of no dialogue, this is the first time that the Mi’kmaq of Nova Scotia and governments have had meaningful conversation on such a wide array of social, economic, cultural and governance issues. The Made-in-Nova Scotia Process has contributed substantially to creating stable and respectful relationships on rights matters among the parties. While differences remain, respect has grown, trust is on the rise and the parties

> are engaged in consistently meaningful and constructive dialogue on important issues (Nova Scotia, 2013a).

A former researcher with the Atlantic Policy Congress of First Nations Chiefs Secretariat notes, "One of the advantages in Nova Scotia, possibly that doesn't happen elsewhere, there's only one Aboriginal group – the Mi'kmaq – they're very organized, they have the Assembly of Nova Scotia Chiefs, so they're able to mobilize quickly" (interview 5).

In 2010, when the provincial government established its renewable energy policy, it went out of its way to open up space for First Nations to participate in and benefit from the renewable electricity sector. The Department of Energy and Office of Aboriginal Affairs provided funding to the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), otherwise known as the Mi'kmaq Rights Initiative, for the development of a Mi'kmaq Renewable Energy Strategy. The strategy is intended to "support the Assembly of Nova Scotia Mi'kmaq Chiefs in successfully pursuing direct and indirect renewable energy opportunities in Nova Scotia and ensuring the participation of the Mi'kmaq of Nova Scotia in the renewable energy sector" (Nova Scotia, 2012b). The provincial government also provided funding to the KMKNO to hire an energy professional to help develop capacity and support the implementation of the renewable energy strategy (Nova Scotia, 2012b). And the provincial government devoted $2 million to establish a Mi'kmaq Major Resource and Energy Fund, in part to help provide capital for renewable energy projects.

In its 2010 renewable electricity strategy, the government said:

> The Mi'kmaq have expressed interest in collaborating on the development of Nova Scotia's renewable energy sector. Continuing to build a positive relationship with the Mi'kmaq is a key priority for the province. Nova Scotia consults with the Mi'kmaq on all energy projects through the Mi'kmaq-Nova Scotia-Canada Consultation Terms of Reference. All the tools this plan provides – enhanced net metering, the community feed-in tariff, the tidal array feed-in tariff, and competitive bidding – are available to the Mi'kmaq (Nova Scotia, 2010a).

According to an insider, the government's motivation was to provide an opportunity for First Nations to earn ongoing revenue in a new sector:

> We wanted to empower First Nations to be part of it, because, like every Aboriginal community in the country they get their funding from the federal government, but if they don't have any sort of economic development tools, other than casinos, which in Nova Scotia, that's been the old approach … We felt that the only way forward was to empower them to have an ongoing revenue source from the most profitable corporation in Nova Scotia, which is Nova Scotia Power and Emera (interview 4).

A senior advisor with the KMKNO says First Nations did not have to push for inclusion in the COMFIT program:

> It was sort of a given. But it wasn't easy though. And the one thing the province had to kind of work around, and we gave them assistance on this, the province assumed initially that the bands would just use their own lands for wind projects or for something else, and we had to tell them that, as a result of our own study, that there's not a lot of potential to use band lands, because of access to grid, wind regimes, and other factors, and so we said we need the policy to reflect that reality. So we had to craft out language that would enter the COMFIT. It speaks to the fact that the COMFIT award can be applied on both Mi'kmaq lands or on leased lands. This was important to us because for financing it would have been nearly impossible, given the constraints in the Indian Act, to finance wind projects on our land. … I have to say that the province has been nothing but helpful. I can't think of any situation where they weren't helpful. And never once can I think of a case where they were putting up any kind of roadblocks (interview 3).

The government approved a total of 26.8 MW of Mi'kmaq COMFIT applications, amounting to 13.4 per cent of approved COMFIT projects:

1. Millbrook First Nation – 6 MW wind project in the Millbrook area (Nova Scotia, 2012a);
2. Assembly of Nova Scotia Mi'kmaq Chiefs – 4.6 MW wind project in Ketch Harbour (Nova Scotia, 2012c);
3. Assembly of Nova Scotia Mi'kmaq Chiefs – 6 MW wind project in the Amherst area (Nova Scotia, 2012d);
4. Assembly of Nova Scotia Mi'kmaq Chiefs – 4 MW wind project in the Whynachts Settlement (Nova Scotia, 2013b);
5. Membertou First Nation – 1.8 MW project near Lower Wedgeport (Nova Scotia, 2012e).
6. Eskasoni First Nation – 4.4 MW project, co-located with the 6 MW Millbrook-owned project (Nova Scotia, 2013c).

This research reveals that most of the key elements identified in the literature as necessary for successful First Nations participation in the electricity sector (Krupa, 2012; Henderson, 2013) were fulfilled in Nova Scotia (interviews 1, 2, 3, 5 and 8). Of course, among the most crucial elements is that government embraces clean energy projects, fosters participation through mechanisms that facilitate the sale of electricity to the grid, and provides a degree of long-term clarity regarding the electricity sector, all of which have been fulfilled in Nova Scotia. As well, there are committed and capable local leaders serving as project champions, including a provincially funded Mi'kmaq renewable energy advisor to help coordinate and lead the collective efforts of the 13 First Nations and to enhance the capacity, capability and confidence of each of the First Nations. There is strong governance to support the projects and ensure accountable and transparent financial management, especially through the appropriate separation of political leaders and day-to-day business decisions. Partnerships with the private sector have been crucial to most of the renewable electricity projects, which have allowed First Nations to benefit from the expertise and capital-leveraging ability of those private companies. And there has been a strong focus on delivering benefits to the whole community, which has increased the level of buy-in on the part of First Nations people. While all 13 Mi'kmaq First Nations are involved in renewable electricity generation projects through their collective ownership of the Mi'kmaq Resource Partnership, individual First Nations that have access to sufficient financial resources to enable revenue-generating activities have found it easier to also take on their own renewable electricity projects.

4.5 Conclusion

Nova Scotia faced landscape-level pressures, including the decimation of its domestic coal industry, soaring costs of purchasing foreign coal, public resentment toward the privatized electrical utility, a trend toward increased competition within electricity sectors in other

jurisdictions, and growing pressure for action to mitigate climate change. The province responded to these pressures by adjusting its regime rules, including by implementing aggressive renewable electricity targets and creating a suite of programs to ramp up its reliance on renewable electricity and invite new actors to participate in the electricity sector, without substantially disrupting the existing system. Nova Scotia's progress along this *transformation* pathway is related to its fulfillment of the various TIS functions, specifically: *guidance of the search*, with positive and negative signals through policy directives; *market formation*, with the creation of a 'bridging market' through increases in the volume of renewable electricity and in the number of actors involved in the sector; *resource mobilization*, through providing incentives for participation in the electricity sector and offering assistance with capacity enhancement and project planning; and *support from advocacy coalitions*, which was important but is increasingly less crucial because government policy is quite well-entrenched within legislation and is largely supported across partisan lines. As a result of the interplay of these TIS functions, Nova Scotia has developed several TIS motors: an *entrepreneurial motor*, a *system building motor* and a promising *market motor*.

Political dynamics have been crucial in the ongoing transition of Nova Scotia's electricity sector. The government, each of the political parties, First Nations, and advocacy groups all produced and used a storyline that focused on: bringing stability and affordability to electricity rates; unshackling from foreign coal; taking back control of the province's energy future; creating jobs and boosting the economy; leading Canada, North America and the world; and creating a cleaner, greener province; in significant part by supporting local, community-based renewable electricity projects. This discourse has already solidified into institutions and organizational practices, fueling the TIS motors and leading to adjustments in the socio-technical regime.

A crucial aspect of those adjustments in the socio-technical regime involved opening up the electricity sector to community participation, including First Nations, through the COMFIT

program. As a result of this particular initiative, along with other related government support, all of Nova Scotia's Mi'kmaq Nations are involved in renewable electricity generation projects. These 13 First Nations are not only benefiting from their participation in the renewable electricity sector, but they are also helping Nova Scotia move further down the *transformation* path, as it seeks an electricity sector that is more sustainable.

Table 5-2 outlines the operationalization of the analytical framework in Nova Scotia.

Table 5-2. Operationalization of analytical framework in Nova Scotia

Concept	Key dimensions	Nova Scotia case
Socio-technical regime	Various components (policy, science, technology, industry, markets/user preferences and culture) that serve to stabilize and support the existing institutions	- Centralized coal-fired thermal generation, which is privately owned by a publicly traded company, and which functions as a regulated monopoly

Concept	Key dimensions	Nova Scotia case
Niche-level innovations	Different technologies, actors, networks and institutions than those stabilizing and supporting the existing institutions	- *Technologies:* Renewables (primarily wind, hydro, some biomass, and an R&D push for tidal) - *Actors:* provincial government, as regulator; IPPs, including community groups and First Nations, as enactors; - *Networks:* Electricity Marketplace Governance Committee, consisting of a variety of stakeholder groups, which urged increased use of renewable energy sources in 2003; Nova Scotia Power's Customer Energy Forum, which brought together 135 randomly selected customers in 2004 for a deliberative polling event that uncovered significant support for increased reliance on renewable energy sources; Ecology Action Centre, a non-profit environmental activist organization with a membership base of over 2,500; the Lower Power Rates Alliance, a broad coalition of business owners and concerned citizens pushing for more affordable electricity rates - *Institutions:* New legislation and regulations setting renewable-portfolio standards and emission reductions, beginning in 2007 and strengthened in 2009, 2010 and 2011; the community feed-in tariff (COMFIT), which supports community involvement in the electricity sector
Landscape	Natural environment, macro-economy, political culture, demographic characteristics and worldviews	- Massive increases in the costs of importing coal from South America (Nova Scotia's own coalmines started closing in mid-1990s, due to rising costs and international competition) - Growing awareness of climate change and increasing policy agenda to address climate change (including impending federal coal regulations) - Nova Scotians' significant resentment of Nova Scotia Power and their irritation at hundreds of millions of dollars leaving the province to pay its parent company's shareholders - Successive court cases which forced better engagement with the Mi'kmaq

Concept	Key dimensions	Nova Scotia case
TIS Functions	TIS functions: (1) entrepreneurial experimentation; (2) knowledge development; (3) knowledge diffusion; (4) guidance of the search; (5) market formation; (6) resource mobilization; and (7) support from advocacy coalitions. TIS motors: (1) science and technology push (STP) motor; (2) entrepreneurial motor; (3) system building motor; and (4) market motor	- Entrepreneurial experimentation, knowledge development and knowledge diffusion not crucial. - Each of the following functions fulfilled: guidance of the search (with positive and negative signals established through policy directives); market formation (with a bridging market); resource mobilization, with incentives and support programs; and support from advocacy coalitions. - Nova Scotia has developed several TIS motors: an entrepreneurial motor, a system building motor and a promising market motor.
Storyline	Narratives, structuring ideas and themes, problem framing, metaphors, analogies, historical references, appeals to fear or guilt, cognitive and normative ideas	- Bringing stability and affordability to electricity rates - Unshackling from foreign coal - Taking back control of the province's energy future - Creating good jobs and boosting the economy - Leading Canada, North America and the world - Creating a cleaner, greener province - All of the above, in significant part, by supporting local, community-based renewable power projects

Concept	Key dimensions	Nova Scotia case
Coordinative discourse	Behind-the-scenes discussions and negotiations involving elected officials, civil servants, experts and interest groups	- Meeting the aggressive renewable electricity targets - Reducing the use of costly foreign coal - Helping to address the public's ongoing annoyance with Nova Scotia Power by getting rid of the idea that it has a monopoly on power generation - Empowering communities to recognize that they could benefit from the transition to renewable energy - Supporting local economic development and job creation - Learning lessons from what happened in Ontario, where a feed-in tariff had been introduced a few years earlier - Blunting the criticism from some New Democrat supporters that these projects should be owned by the provincial government (by having them owned by community groups, municipalities and First Nations)
Communicative discourse	Public discussion of ideas and public announcements of decisions	- Primary focus on bringing stability and affordability to electricity rates, by unshackling from foreign coal and taking back control of the province's energy future - Additional focus on supporting local job creation and economic development as well as leading the nation, continent and world - Minimal focus on climate change and greenhouse gas emissions
Discourse coalitions	The coalition of actors producing and using the transition storyline	- Loose blend of government, political parties, First Nations actors and advocacy groups, like the Ecology Action Centre
Effects of discourse	Key actors' use of ideas, concepts and categories	- General embrace of storyline by all political parties (with some disagreement over pace or relatively minor elements)
	Effects on government policy and organizational practice	- The government approved 89 COMFIT projects, with a total generation capacity of 200 MW, including six First Nations projects amounting to 26.8 MW - All First Nations involved in transition

Concept	Key dimensions	Nova Scotia case
Transition dynamics	Changes in the regime	- Reduced use of coal - Increased reliance on renewable power - Generation of electricity opened up to new actors and no longer monopolized

CHAPTER 6
ONTARIO

A variety of landscape-level dynamics put pressure on Ontario's electricity regime. The most significant was the impact of coal-fired electricity generation on population health. An increasing number of smog days and growing awareness about the consequences of smog on human health led influential outsider groups to voice their concerns and articulate their demands, prompting government to take steps to rid the province's electricity generation mix of coal and increase the province's reliance on renewable power. The blackout of August 2003 led to concerns about the stability and reliability of Ontario's electricity grid, compelling regime actors to respond with both rhetoric and actual measures to convince Ontarians that the province's electricity system would be strengthened. The economic crisis of 2008 and 2009 hit Ontario particularly hard and led the government to develop new approaches in which it could use energy policy to subsidize businesses, create jobs and grow the province's economy.

Ontario's responses to the landscape pressure and outside criticism set the province along a *transformation* pathway: it adopted proven niche innovations in a manner that did not significantly disrupt the existing regime, and invited new actors to participate in the system while keeping incumbent actors in place. Ontario forced coal-based generation out of its electricity regime and adopted already proven technologies and invited in an abundance of new actors to participate in the sector, all without seriously disrupting its existing electricity socio-technical regime. The province's progress along the *transformation* pathway has been powered by several TIS functions: the government guided the search by providing positive signals, such as the feed-in tariff (FIT), as well as negative signals, such as *The Ending Coal for Cleaner Air Act.* With

increases in the volume of renewable electricity and the number of actors involved in the sector, Ontario has already formed a 'bridging market' and is well on its way to developing a 'mature market.' Ontario has made a concerted effort to mobilize and distribute the needed financial, material and human capital to support the deployment of renewable electricity generation, through a variety of mechanisms. While advocacy groups played an important role in encouraging government action, their support is increasingly less crucial because of the significant progress that has already been made and the fact that government policy is already well entrenched. As a result of the interplay of these various TIS functions, Ontario has developed several TIS motors – an *entrepreneurial motor*, a *system building motor* and a promising *market motor* – all of which help to explain its progress along the transformation pathway.

Political dynamics served to fuel each of those TIS motors and played a crucial role in the ongoing transition of Ontario's electricity regime. The dominant storyline regarding changes to Ontario's electricity sector involved a variety of interrelated elements: phasing out dirty coal-fired power plants means cleaner air and, therefore, better health for Ontarians; more renewable energy means new investments in the province's economy and more jobs for Ontarians; Ontario is delivering a more reliable and resilient electricity system as well as more opportunities for smaller power producers by focusing on distributed generation using smaller and cleaner sources, instead of exclusively relying on large, centralized power plants; and, by doing all of this, Ontario is leading North America. This dominant discourse solidified into institutions and organizational practices and served to facilitate transformation of the socio-technical regime.

This chapter delves into the sustainability transition in Ontario's electricity system. It explores the broader context, including a brief overview of the history of electricity generation in Ontario. It then explores the factors that contributed to the province's move toward a more

sustainable electricity system, the inclusion of new actors within its electricity sector, and the involvement of First Nations in renewable electricity generation projects.

6.1 History of Power Generation in Ontario

Privately owned coal-fired generators initially dominated Ontario's electricity sector, but a major strike by Pennsylvania coal miners in 1902 resulted in a significant shortage of fuel for electricity generation in Ontario. This landscape pressure contributed to the province's relatively rapid transition from coal-fired generation to hydroelectric development (Nelles, 2005). In 1906, the provincial government established the Hydro-Electric Power Commission of Ontario (HEPCO), which was the first provincially owned power utility in Canada. HEPCO's initial mandate was primarily to regulate private electricity companies and build grid infrastructure, but that expanded significantly in the years that followed. HEPCO weakened incumbents by restricting their export contracts to the United States and imposing limits on the amount of water they could use at Niagara; once the private firms were sufficiently weakened, HEPCO purchased them (Nelles, 2005). In 1922, HEPCO bought the largest remaining private electricity generation firm (Rosenbloom & Meadowcroft 2014).

Hydroelectric generation remained dominant in Ontario until the 1950s, when coal- and nuclear-based generation emerged as the preferred technologies and remained so until the 1970s and 1990s respectively. Coal fell out of favour in the 1970s due to rising prices, which further entrenched nuclear technology within the province's electricity regime and nuclear power became increasingly politically divisive, especially after the Three Mile Island and Chernobyl incidents. As a result, natural gas was the preferred fuel for electricity generation in the late 1990s and early 2000s. Since then, the sector has had a preference for mixed generation, including a focus on increased renewable energy sources, which largely resulted from new, politically imposed guiding principles (Rosenbloom & Meadowcroft, 2014).

A strong preference for public ownership remained a dominant characteristic of Ontario's electricity sector until 1998, when the government introduced *The Energy Competition Act*, dismantling HEPCO, which was by then renamed Ontario Hydro, into five separate entities: Ontario Power Generation (OPG), responsible for electricity generation; Hydro One, responsible for transmission and distribution; the Electrical Safety Authority, responsible for administering safety regulations; the Ontario Electricity Financial Corporation, responsible for managing Ontario Hydro's remaining debt; and the Independent Electricity System Operator (IESO), responsible for managing the competitive market (Rosenbloom & Meadowcroft, 2014). The government's ultimate goal was to privatize these entities and deregulate the electricity market, but it never achieved its desired model. Electricity prices rose substantially, due to "a perfect storm of landscape developments" (Rosenbloom & Meadowcroft, 2014), including California's energy crisis – in which market manipulations led to a shortage of electricity supply and blackouts – as well as the collapse of Enron, a major summer heat wave, and lengthy repairs to Ontario's nuclear reactors. The public reacted with anger and the government froze electricity rates in 2002, largely abandoning its plan to move to a deregulated, privatized model.

When a new government was elected in 2003, it promptly shifted the guiding principles of Ontario's electricity system. The new focus was on phasing out coal-based generation, ramping up conservation and significantly increasing the province's reliance on renewable energy. The new government also restored some central planning to the electricity system, asserting a significant degree of political direction (Spears, 2011).

Table 6-1 outlines the history of electricity generation in Ontario.

Table 6-1. History of electricity generation in Ontario (Rosenbloom & Meadowcroft, 2014).

	Pre-1906	1906-1922	1922-1998	1998-2002	2003-
Ownership	Exclusively private	Predominantly private, with creeping public ownership	Public	Still predominantly public, but clear push for privatization	Mixed
Guiding principles	Profit maximization	Mixed (profit and service)	Expansion and industrial development	Profit maximization	Phasing out coal, increasing conservation, green energy strategy
Planning	Market directed	Combination of gov't and market direction	Central command and control	Market directed	Central planning and market direction
Market	Free market	Regulated monopoly	Non-market	Competitive	Regulated/ competitive
System organization	Centralized with fragmented grid	Centralized	Centralized megaprojects	Centralized with some distributed smaller projects	Predominantly centralized with increasing distributed generation
Technology preference	Coal (pre 1902) and Hydro (post 1902)	Hydro	Hydro (1922-50s); Coal (1950s-70s); Nuclear (1950s-90s)	Natural gas and other cost-competitive sources	Mixed, with preference for cleaner technologies

6.2 Pushing to Phase Out Coal in Ontario

Concerns about smog and its health consequences served as significant landscape-level pressure, which significantly affected Ontario's electricity socio-technical regime. Rosenbloom and Meadowcroft (2014) point out that: "concerns over the environmental and health impacts of conventional generation have gradually increased since the 1970s" (p. 676). In 1998, Ontario's

doctors began sounding the alarm over the effects of smog on population health ("Get tough on smog", 1998). That year, the Ontario Medical Association (OMA) partnered with the Greater Bay Area Foundation and the Muskoka Lakes Association – groups representing cottagers in the Georgian Bay and Muskoka Lakes areas – to release a report entitled, *Health Effects of Ground Ozone* (OMA 2000). Two years later, the OMA again partnered with these two cottagers' associations to release *The Illness Cost of Air Pollution* (OMA, 2000). The research contained in the reports showed that smog led to 1,900 premature deaths and 13,000 emergency-room visits every single year in Ontario; the reports also demonstrated that smog cost the province $1.1 billion in health care service costs and reduced economic productivity every year ("Plan to clean the air good for Ontario", 2002). These population health arguments put pressure on the existing socio-technical regime and led to a significant degree of political consensus about the need to phase out coal-based electricity generation (interviews 1, 12, 13 and 14); in the lead up to the 2003 election, all three main political parties agreed that coal should be removed from the province's electricity generation mix (Spears, 2011).

When the Liberals won the 2003 election, they promptly responded to the landscape pressure and criticism from outside voices by shifting the guiding principles of the province's electricity regime, with a key focus on phasing out coal and restoring an element of central planning to the electricity system (Spears, 2011). A former cabinet minister identifies the multi-faceted rationale for the government's move as follows:

> Well, at the macro level, it was the government's commitment to be the first jurisdiction in North America to eliminate coal-fired generation, in part to meet our share of the Kyoto commitment, but there were certainly more pressing political imperatives at play than that … we had just experienced a major blackout [in August 2003], so the real political imperative was that we were going to become energy independent, we were not going to be reliant on a system where a squirrel could jump onto a wire in Ohio and our lights would go out. So there was a huge political imperative on that. … But the other thing that was happening is that urban Ontario was experiencing consistently increased numbers of smog days. And, of course, in a public health care system, in a jurisdiction like ours, we had cheap electricity because it was coal, but we were paying for the fact that the number one reason that children were being admitted to emergency rooms was

> because of asthma, and the number one reason for the asthma was poor air quality, and the number one reason for the poor air quality is that Ontario owned the largest single source of air pollution in North America, at Nanticoke, which was our massive, eight-boiler coal-fired power plant in the Niagara peninsula, which, wouldn't you know it, with prevailing winds, that pollution would always blow into the GTA-Golden Horseshoe, where the majority of people lived, so people were starting to get the connection that, yes, we had cheap power, but we were subsidizing it through the health care system. I mean, I remember one year we had 38 smog days. On a smog day, children are not supposed to go outside, old people are not supposed to go outside, people that are sick are not supposed to go outside. So, at the time, there was a huge demand to clean up the air, and getting rid of coal was seen as something that the government could actually do and that's why we did it. We were responding to a real need that regular people perceived because they experienced the blackouts and the smog days (interview 6).

The government's commitment to eliminate coal required the replacement of about a quarter of the province's electricity generation capacity. Rosenbloom and Meadowcroft (2014) assert that:

> This political decision, which was first taken in response to concerns over criterion air pollutants, was facilitated by: (1) the limited presence of coal within the generating mix; (2) the absence of coal production in Ontario (so no domestic jobs would be lost); (3) relatively quiescent demand growth (so the costs of new projects did not feed rapidly into retail power prices); and (4) the growing abundance and affordability of natural gas, which blunted calls for a continued reliance on coal (p. 676).

An Environics poll conducted near the end of the 2003 election campaign reveals another key factor that facilitated the political decision to eliminate coal: public support. The poll results revealed that: 67 per cent of Ontarians believed that environmental problems had direct effects on their health; 78 per cent agreed with the statement that "the economy does not need to suffer to ensure a healthy environment;" and 59 per cent disagreed with the statement that "we worry too much about the environment and not enough about prices and jobs" (Smith, 2003).

Despite many factors facilitating its political decision, the new government faced challenges implementing its coal-free agenda. A former cabinet minister states:

> In our first term of office, from 2003 to 2007, the government was stymied many, many times by the electricity sector who said, listen, your predecessors – and by the way you guys have formed government over the last 100 years, so you were part of that – have set up the laws to govern the electricity sector and, what you want to do now, we're not going to do, because you're going to have to change the regulations and the law to make it possible. … So there was a great deal of institutional resistance to what we wanted to do.

> … And I think there was a naïveté on our part in terms of how many levers would have to be pulled in order to get to that coal-free system (interview 6).

In the interests of self-preservation, the socio-technical regime resisted change and managed to somewhat thwart the efforts of a perhaps overly ambitious government. An expert in the electricity industry argues that the government was in too much of a hurry to get off coal: "I think their whole off-coal policy was a mistake in terms of, well, they were in such a hurry to do it, they wanted to do it so quickly that they didn't understand all the implications of doing it" (interview 12).

The government took several steps in its first term to achieve its objectives. In 2004, it shook up the electricity sector by introducing *The Electricity Restructuring Act*, which established the Ontario Power Authority (OPA) to oversee planning of the electricity system. The OPA was given a "legislated mandate to ensure a reliable, sustainable and cost-effective electricity system for the future of Ontario" (OPA, 2012). The government assumed powers of ministerial direction over the OPA, restoring a significant element of central planning to the electricity sector. As a result of this move, political actors had more direct control over the province's electricity sector than ever before (Wyman, 2008).

In April 2005, yet another independent study was released that advanced the argument that coal-based electricity generation had profound public health consequences. The study estimated that, every single year, air pollution in Ontario led to 688 premature deaths, 928 hospital admissions, 1,100 emergency room visits, and 333,660 minor illnesses, including headaches and coughing. The government cited these statistics as further evidence for why its plan to shut down coal power plants was the right policy direction (Ontario, 2005a).

After undertaking the first comprehensive review of electricity supply in Ontario in 15 years, the OPA released a 1,100 page report, entitled *Supply Mix Advice and Recommendations*,

in 2005. The report acknowledged that the electricity sector does not exist in isolation, but is heavily integrated with a variety of other systems:

> This supply mix exercise has convinced OPA that *power system planning overlaps with a number of aspects of public policy in Ontario*. While such overlap certainly makes power system planning more complex, at the same time it truly opens the door to smarter solutions that benefit Ontarians in more than one area [emphasis added] (OPA, 2005a, p. 10).

The OPA (2005b) pointed to several challenges facing the province's electricity sector:

> The nature of the problem is clear: a lack of investment to expand electricity capacity in Ontario in the past decade. With supply already tight as a result of this under-investment, the sector faces the loss of a major part of its current supply mix as most units of its nuclear fleet reach the end of their design life over the next several years. The loss of nuclear generation would come immediately on the heels of replacement of coal-fired stations, scheduled for completion by 2009. Together, the combination of demand growth and generation retirements would create a gap of roughly 24,000 megawatts (MW) by 2025, equivalent to about 80% of Ontario's current capacity.

The *Supply Mix Advice and Recommendations* report identified several elements of a solution, including: maximizing conservation and demand management; pursuing "an aggressive course for renewables within current restraints, while looking at ways to reduce these constraints;" "tak[ing] advantage of the benefits of natural gas-fired generation but limit[ing] exposure to its price and supply risks;" and continuing nuclear generation to meet the province's base-load needs (OPA, 2005b). At the time of the report, Ontario's electricity generation system relied on the following configuration: nuclear – 51 per cent; renewables – 23 per cent; coal – 19 per cent; and natural gas – seven per cent (OPA, 2005b). The OPA recommended that, by 2025, the province's electricity generation consist of the following mix: nuclear – 50 per cent; renewables – 43 per cent; natural gas – six per cent; and gasification – one per cent (OPA, 2005b; Brennan & Spears 2005). And the OPA (2005a) pointed out that, while the government would be active in both planning and directing, it would rely on fully commercial entities to actually do the implementation:

> The politics of power in Ontario have reached a new equilibrium in which both market forces and centralized planning co-exist. The new centralized planning, while it does not

> have the command and control role of [the old] Ontario Hydro, nevertheless must develop plans based on the broad public good. The parties providing the new resources will, however, be fully commercial entities, not Crown agencies (p. 20).

The provincial government unveiled the details of its Renewable Energy Standard Offer Program (RESOP) in March 2006. Ontario's RESOP provided 20-year contracts to any business, organization, cooperative or homeowner that could connect their electricity generation project to the grid; and it paid 11 cents per kWh for electricity generated from wind, biomass and small-scale hydro and 42 cents per kWh for electricity generated from solar (Hamilton, 2006).

In 2007, the OPA produced its first 20-year energy plan, known as the Integrated Power Supply Plan (IPSP). The IPSP focused on creating "a sustainable energy supply and improv[ing] current natural gas and renewable assets at a sustainable and realistic cost" (Lilley, 2010). However, the following year, as the IPSP was still being reviewed by the Ontario Energy Board (OEB), the government intervened and asked the OPA to "to review and fine-tune the province's 20-year energy plan with the goal of accelerating conservation efforts and adding more renewable energy to the electricity mix" (Hamilton, 2008).

Landscape-level pressure – primarily the growing awareness about the consequences of smog on human health, along with concerns about the stability and reliability of Ontario's electricity grid in the wake of the August 2013 blackout – led government to take several important steps to rid the province's electricity generation mix of coal and increase the province's reliance on renewable power. But the economic crisis of 2008 and 2009 opened up another window of opportunity to further adjust the existing electricity socio-technical regime in the province. Ontario was particularly hard by the economic downturn, which led the government to develop new approaches in which it could use energy policy to subsidize businesses, create jobs and grow the province's economy.

6.3 Introduction of the Feed-In Tariff in Ontario

In 2009, the government's introduction of *The Green Energy and Green Economy Act* (GEGEA) had an almost revolutionary effect on the province's electricity sector (interviews 1, 3, 6, 7, 8, 11, 13 and 14). The purpose of this new legislation was to "expand renewable energy generation, encourage energy conservation and promote the creation of clean energy jobs" (Queen's Printer for Ontario, 2010). Then Deputy Premier and Energy Minister George Smitherman said in a speech to the Toronto Board of Trade:

> Since 2003, the government of Ontario, with the re-affirmed support of Ontarians, has been moving forward with the most ambitious climate change initiative in North America – the elimination of coal. Our progress to date – a renaissance of our energy system, reflected by billions in new investments – has been so successful that today, Ontario is prepared to raise the bar on our collective ambitions (Ontario, 2009a).

Smitherman went on to argue that this new legislation would "turbocharge the creation of renewable energy" in Ontario and "set the standard for green energy policy across this province" (Ontario, 2009a).

The same rationale for the government's initial pledge to eliminate coal, made five years earlier, served to motivate the government's introduction of the GEGEA. The main argument was based on improved health outcomes, more jobs and a stronger economy (interviews 1, 3, 6, 7, 8, 11, 13 and 14). Smitherman, who served as the province's health minister from 2003 until 2008, before taking on the role of energy minister from 2008 to late 2009, introduced the GEGEA. Smitherman publicly acknowledges that the prospect of significant health benefits was a compelling argument for transitioning the electricity system to cleaner modes of generation: "I'm an asthmatic, and I'd been health minister for nearly five years. So the health benefits associated with the transformation of our electricity sector had a lot of appeal" (Spears, 2011). But it was not just population health arguments that propelled Ontario to continue transforming its electricity sector; investment and jobs were also increasingly important factors, especially

because the worldwide financial crisis of 2008 and 2009 was profoundly affecting Ontario's economy. Smitherman publicly acknowledges that, in the midst of that economic crisis, "the government saw an opportunity for the promotion of renewable energy to be a source of new investment and new jobs" (Spears, 2011). In an interview for this dissertation, Smitherman, who waived anonymity, said,

> I think there were three factors which made the Green Energy Act possible. The first is that Premier McGuinty, before he was premier, had staked out the elimination of coal as an aspirational goal for Ontario. I consider that what I describe as the domino decision point. That set things in motion. The second factor was that predecessor ministers of energy in the same government I was in enjoyed quite a lot of success with two different renewable energy offerings – a large-scale, competitive procurement, and a smaller-scale RESOP program. … The third thing that contributed to it, and I say was a decided accelerant, was the risk to the future of the Ontario economy found in the dramatic uncertainty at that time about the future of the automotive sector at that time. So we saw it as an opportunity to fulfill our objectives related to cleaner energy, we knew there was capital available to be able to implement more renewable projects, and we had a lot of risk in Ontario to the manufacturing base and we saw this as an opportunity, certainly not to replace the automotive sector – it's so big and important in Ontario – but at the same time renewable energy manufacturing relies upon many of the same skill sets that were found already in the Ontario economy. So I think it was a combination of those three things: we had the aspirational goal to do it, we had the demonstrated capacity to implement programs … and we saw the opportunity for some manufacturing response to the real risk and uncertainty that was being faced, especially in that time frame by the Ontario automotive sector. I think those three things combined created the environment for the Green Energy Act (interview 14).

A former cabinet minister argues that this connection between energy policy and economic growth has been a hallmark of the province's approach throughout its entire history:

> Energy policy is not just about creating energy; it's always been viewed in Ontario as an enabler, a critical enabler of the economy, and Ontario governments and political actors of all stripes have accepted the notion that, through energy policy, government is essentially providing a business subsidy, a prudent one, but a subsidy nonetheless (interview 13).

The GEGEA was an extension of that approach of using energy policy to subsidize business and encourage economic development, particularly with the introduction of the feed-in tariff (FIT) (interviews 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, and 13).

Ontario looked to Europe for inspiration on the FIT (interviews 13 and 14). An expert on the electricity industry said:

> Once the government was starting to move on the off-coal, there was a change in Energy Minister, George Smitherman spends a week in Germany and becomes an expert on renewable power, sees the feed-in tariff program, and from that trip he comes back and creates the Green Energy Act and implements a feed-in tariff program and talks about how we're going to be like Germany (interview 12).

In the Toronto Board of Trade speech in which he unveiled the details of the GEGEA, Smitherman said:

> The McGuinty government will create a best-in-class renewable energy feed-in tariff. A FIT that does not place artificial barriers on our ambitions. While the tariff is European-inspired, it's engineered for Ontario. In layman's terms, it means Ontario will offer an attractive price for renewable power, including wind – on-shore and off-shore – as well as solar, hydro biomass and biogas ... and we'll guarantee that price for decades. With this single bold move, we join global green-power leaders like Denmark, Germany and Spain (Ontario, 2009a).

In an interview for this dissertation, Smitherman, who waived anonymity, argued that Ontario's FIT program was an extension of its RESOP program:

> The RESOP program was a feed-in tariff by another name. So it was a standard offer, and standard offer is kind of similar, pretty much the same principle to a feed-in tariff. So we had already done it in Ontario, and really it was my view that the conditions that we needed to create were about certainty for investors. And the feed-in tariff offered that. I think we could have achieved success in a variety of different ways, but we were anxious to make Ontario a leader, not just a participant, and accordingly we felt that the feed-in tariff offered Ontario the attributes which would provide greater certainty for investors (interview 14).

Ontario's initial FIT price schedule ranged from 10.3 cent per kWh for landfill gas projects, 12.2 cents per kWh for hydro projects, and 13.5 cents per kWh for wind projects, all the way up to 64.2 cents per kWh for solar groundmounts and 80.2 cents per kWh for solar rooftop projects (Ontario, 2012b).

A number of other aspects of the GEGEA served to enhance the renewable electricity sector within the province: it established the *right* to connect to the electricity grid for all renewable power projects that were able to meet specified technical, economic and regulatory requirements; it established a 'one-stop' streamlined approvals process for small-scale projects; and it committed to implement a smart power grid to support the development of new renewable

power projects (Queen's Printer for Ontario, 2010). The legislation also ensured that developers of renewable power projects received the necessary construction permits within a six-month timeframe, to facilitate quicker completion of such projects (Hamilton, 2009). And the GEGEA dealt a blow to NIMBYism – the not-in-my-backyard phenomenon, which had plagued many renewable power projects throughout the province – by stripping municipalities of the ability to decide how close wind power projects can be to residential and environmentally sensitive areas (Hamilton, 2009).

Through the various elements of the GEGEA, and especially through the introduction of the FIT program, the government not only opened up space for new actors to participate in the electricity sector, but it also provided incentives for them to do so. The government asserts that, "the FIT program has helped create certainty in Ontario's economy, attract new investment, spur jobs and economic benefits for communities, and support a healthier future for all Ontarians" (Ontario, 2012, p. 2). As of March 31, 2014, the first two FIT windows had brought projects generating 1,447.6 MW into commercial operation, with FIT projects currently under development amounting to an additional 3,353.6 MW (Ontario 2014). The most recent FIT 3 application window saw 1,982 applications submitted, for a total of 493.71 MW of new renewable electricity generation capacity (OPA 2014).

Outside groups and renewable energy advocates influenced the government's direction in terms of the electricity sector. Rosenbloom and Meadowcroft (2014) note that:

> Renewable energy advocates organized around the electricity system and have been successful in lobbying for policy support. Starting in 2004, the Ontario Sustainable Energy Association and its membership emerged as important niche actors pressing for the development of a stable renewable energy policy. These actors launched several campaigns for a FIT. Campaigns gained traction with the Liberals, in part due to an ideological alignment and the promise of job creation, affording renewable energy advocates a central role in designing the RESOP, GEGEA and FIT (p. 675).

An expert in the electricity industry argues that the government:

> Listened to a number of special interest groups, such as the Ontario Clean Air Alliance, which had very simplistic modeling … and to some corporate people, those that stood to gain from new developments. … There were a lot of companies coming in and lobbying them on what they could do and they weren't always telling the whole story either. I mean Smitherman didn't always listen to what people who knew things told him, he could be selective at the same time, he had a lot of people coming in and telling stuff that only benefited them. ... You know, it is difficult when you're in government to understand who is telling you what for what reason, but certainly they found enough of a support group that supported what they wanted to do that they just went ahead and did it and tended to ignore balanced arguments and understanding (interview 12).

In response to landscape pressure and criticism from outside groups, the government reoriented the guiding principles of the electricity socio-technical regime and also reorganized the dominant actors, establishing the OPA as a powerful actor in the sector and giving its own Ministry of Energy and Infrastructure a much larger and more influential role than it had previously (Rosenbloom & Meadowcroft, 2014).

The government's discourse surrounding the changes to Ontario's electricity sector primarily focused on the benefits of shutting down coal power plants, especially in terms of population health, but also in terms of the economy. However, another key part of the government's discourse focused on how it was taking a "balanced approach" that moved beyond the various pitfalls created as a result of the approaches of past administrations (Ontario, 2004). The government argued that:

> For more than a decade, previous governments have been hamstrung by indecision and ideology. They've clung to the old Ontario Hydro model, and tried moving to a fully competitive market, and neither has worked. And they've done virtually nothing to come to grips with our long-term supply needs. … We've chosen what we strongly believe to be the best approach, a balanced approach. It represents a real, positive change from the past, and a bright, more prosperous future (Ontario, 2004).

The government also touted its leadership role within North America and proclaimed its approach to the electricity sector was 'bold' and 'aggressive.' For example, a 2005 news release entitled *McGuinty Government Unveils Bold Plan to Clean Up Ontario's Air* included this snippet:

> The McGuinty government's aggressive plan to replace coal-fired generation with cleaner sources of energy and conservation will clean up our air, improve the health of our citizens, and contribute to the sustainability of our environment while ensuring a reliable

> supply of electricity, … We are leading the way as the first jurisdiction in North America to put the environment and health of our citizens first by saying 'no' to coal (Ontario, 2005b).

While the environment was part of the discussion, as demonstrated in the previous quote from the news release, it was mostly a tangential piece of the discourse and climate change specifically was peripheral to the discussion, especially in the earlier years. That is not surprising, given that it was not until 2007 that the Ontario government released its first climate change action plan. Prior to that, Premier McGuinty had largely contended that climate change was a federal responsibility (Tabuns, 2006). But, in the lead up to the 2007 provincial election, the government released *Go Green: Ontario's Action Plan on Climate Change*, which included a focus on its plan to phase out coal-fired power plants and its target of doubling the amount of renewable power by 2025 to 10,700 MW. In the plan, the government committed to reduce Ontario's GHG emissions by six per cent below 1990 levels by 2014 and 15 per cent below 1990 levels by 2020 (Ontario, 2007). The government anticipated that nearly 30 per cent of its 2020 target would be achieved through phasing out coal, ramping up renewables, and "other electricity policies" (Ontario 2007: 8). While the government's electricity-sector reforms were crucial to its climate change strategy, climate change did not play a big part in the government's publicly communicated rationale for phasing out its coal power plants. That changed somewhat with the introduction of the GEGEA, when the government started to rely a bit more on the argument that its off-coal agenda was "the most ambitious climate change initiative in North America" (Ontario, 2009a), but the discourse was still primarily dominated by discussion about how getting rid of coal would clean up the air, improve the health of Ontarians, create good jobs, and grow the economy.

In many ways that dominant discourse has solidified into institutions and organizational practices, what Hajer calls *discourse institutionalization*. Through a variety of mechanisms, the province has set itself firmly on the path toward elimination of coal and increased reliance on

renewable sources of electricity, generated by IPPs. The OPA acknowledges the shift of the socio-technical regime to distributed generation:

> Ontario is … planning for future energy generation that will focus on efficient, localized generation from smaller, cleaner sources of electricity rather than exclusively from large, centralized power plants transmitting power over long distances. This strategy is known as 'distributed generation'. Distributed generation also opens up opportunities for smaller power producers, allowing individuals, Aboriginal communities and small co-operatives or partnerships to become generators (OPA, 2010).

In 2013, the government also introduced *The Ending Coal for Cleaner Air Act*, which explicitly prohibits new standalone coal-fired generating facilities (Ontario, 2014c).

In its 2014 progress report on health care initiatives, the government pointed to progress on its off-coal agenda as a health-related issue:

> As a result of Ontario's coal replacement strategy, in 2013 coal-fired electricity generation was down 91% from 2003 levels, with a corresponding reduction in greenhouse gas emissions from coal-fired electricity generation. By the end of 2014, Ontario will be the first jurisdiction in North America to eliminate coal as a source of electricity (Ontario, 2014c).

Environmentalist Tim Weis (2013) says:

> Coal-fired electricity is a thing of the past in Ontario. … The scale of this accomplishment bears repeating. In 2002, close to half of all the coal burned in Canada was burned in Ontario, and the province had a coal fleet comparable to Alberta's existing one. Those days are over. … Taken together, nearly half of Ontario's power is projected to come from renewables by 2025. That's up from 28 per cent today.

The dominant discourse of cleaning up the air, improving the health of Ontarians, creating good jobs, and growing the economy by phasing out coal and ramping up renewables has indeed become largely institutionalized in Ontario. The discourse coalition – the various actors that produced and used this storyline – included a loose blend of government, the Ontario Medical Association, cottagers' groups, the Ontario Clean Air Alliance, and the Ontario Sustainable Energy Association. The *coordinative*, behind-the-scenes discourse focused on a variety of factors, including: the need to find the most effective means to achieve the policy objective of phasing out coal; the need to create a more resilient electricity system; the need to challenge

NIMBYism, the not-in-my-backyard phenomena that often plagues renewable electricity developments; and the need to use energy policy to confront the economic downturn, subsidize businesses, create jobs, and get the economy growing again (interviews 1, 3, 6, 7, 13 and 14). The *communicative* discourse, which takes place in the public, focused primarily on how replacing dirty coal with renewable power would mean cleaner air, better health, more jobs and investments, and a more resilient and reliable system. This dominant discourse solidified into institutions and organizational practices and served to facilitate transformation of the socio-technical regime.

While several of the TIS functions – primarily *entrepreneurial experimentation*, *knowledge development*, and *knowledge diffusion* – are not relevant to this consideration of renewable power in Ontario, just as they were not relevant in the Nova Scotia case, because the technologies under consideration are already well-established and proven, the remaining TIS functions are relevant:

- *Guidance of the search* – the government provided positive signals, through initiatives like the RESOP and FIT, to support increased use of renewable electricity generation technologies; the government has also provided negative signals through policy directives, such as *The Ending Coal for Cleaner Air Act*, which prohibits ongoing use of coal-fired electricity generation;

- *Market formation* – with significant increases in the volume of renewable energy and the number of actors involved in the sector, Ontario has moved beyond a 'nursing market' and developed a 'bridging market;' it would not be accurate to represent Ontario as having a 'mature market' quite yet, but it is on its way;

- *Resource mobilization* – Ontario has made a rigorous effort to distribute needed financial, material and human capital to support the deployment of renewable electricity generation, through initiatives such as the RESOP, FIT, and a variety of Aboriginal-specific initiatives, including the Aboriginal Energy Partnerships Program, Aboriginal Renewable Energy Fund, Aboriginal Loan Guarantee Program, and Aboriginal Renewable Energy Network; and

- *Support from advocacy coalitions* – support from advocacy groups is increasingly less crucial because government policy is well entrenched, the key elements of which are largely supported by all three main political parties.

As a result of its fulfillment of those functions, Ontario appears to have developed several TIS motors, as specified in Suurs' (2009) typology of motors:

- *Entrepreneurial motor* – government responded to landscape pressures with project-specific subsidies, primarily in the form of the RESOP and then the FIT; government regulation guaranteed a sizeable commercial environment and enactor support for specific technologies;

- *System building motor* – government directives significantly increased the number of renewable electricity enactors and government also undertook a $2.3 billion makeover of the transmission grid, in significant part to be able to integrated more IPPs; and

- *A (promising) market motor* – support from advocacy coalitions is increasingly less crucial because, for the most part, the trajectory has been set and government policy is clearly entrenched within legislation and the key components are not disputed by other political parties.

This analysis, taking into account the perspective of TIS functions and motors, provides insight into the progress Ontario had made along the *transformation* pathway.

6.4 Involvement of First Nations in the Electricity Sector in Ontario

Ontario is home to 133 First Nations, the majority of which are Anishinaabek, Mushkegowuk, Onkwehonwe, and Lenape peoples (Chiefs of Ontario, 2014). There are roughly 243,000 First Nations individuals living in Ontario, almost half of whom live on reserve (AANDC, 2014). A series of treaties were signed between the newcomers and First Nations in what would become Ontario, with the Treaties of Fort Niagara and the Crawford Purchases, in southern Ontario, beginning in 1781; the Robinson Treaties followed in 1850 along the north shores of Lakes Huron and Superior; then Treaties 3, 5 and 9 between 1873 and 1930 in northern Ontario; and the Williams Treaties in 1923 with the Chippewas of Lake Simcoe, Lake Huron and the Mississaugas of Rice Lake, Curve Lake and Alderville (Ontario, 2014b).

Throughout most of Ontario's history, First Nations have been poorly treated when it comes to policies related to electricity development (interviews 1, 3, 6, 7, 8 and 13). A former

Ontario Hydro employee says First Nations began asserting demands for better treatment as early as the 1980s:

> The first build cycle that I was really part of was back in the 1980s. At that time we were looking at doing new developments and we went out and consulted with First Nations and we got a very clear message from them and it was this: if you think you're going to go out and do development in the way you did in the 40s, 50s and 60s, we're going to fight that all the way, we're going to object to it, and it's not going to happen. We need to be a part of the solution and we need to benefit from it (interview 1).

In 1991, Premier Bob Rae signed a Statement of Political Relationship, which recognized that First Nations "exist in Ontario as distinct nations, with their governments, culture, languages, traditions, customs and territories" (Hodgins et al., 1992, p. x). Hodgins et al. (1992) assert that:

> This recognition, the pledge of respectful, cooperative co-existence within a shared land and the province's apparent determination to push forward the First Nations' claim to self-government in the ongoing process of constitutional reform, may well represent a historic moment in Aboriginal-white relationship in the province of Ontario (p. x).

A former Ontario Hydro employee identifies this as a turning point in the Crown corporation's approach to dealing with First Nations people: "In the early 1990s, under the Rae government, we actually really started our conversation with Aboriginal communities and that conversation and attempt to reconcile was led and directed by government policy" (interview 1). Ontario Hydro started with a formal assessment of the impacts of its past actions on First Nations and found that the negative effects of its past actions had been an extensive: "We did an assessment in the early '90s and of the 133 First Nations we had directly impacted 99 of them. … So we initiated a program of trying to address those past grievances" (interview 1). But this type of activity was put on the back burner when the government changed a few years later:

> In 1996, the NDP government – for which First Nations were quite a big priority – lost the election and the Mike Harris government came in, really only focusing on fiscal elements and First Nations really weren't part of their agenda and there wasn't a lot done at that point in time with First Nations both at the political level with the government and even at the industry level. So the function really collapsed down to almost nothing within Ontario Hydro (interview 1).

The 2003 election included a focus on outstanding issues from the Ipperwash Crisis of 1995, in which the Ontario Provincial Police killed an unarmed First Nations protestor named Dudley George (interviews 1, 6, and 7). After winning the election, Premier Dalton McGuinty promptly announced an official inquiry into the events at Ipperwash. A former Ontario Hydro employee says that: "McGuinty put himself up as a defender of Aboriginal rights … So, you have the Conservatives leaving and the Liberals coming in. There was really a shift in philosophy and policy right at that point" (interview 1). A former cabinet minister from the McGuinty era agrees, asserting that the Liberals "had been elected to actually improve First Nations relations" (interview 6).

Not everything can be attributed to Liberal altruism, however. Decisions from the Supreme Court of Canada played a significant role in changing the nature of the relationship between governments, industry and First Nations:

> You have those seminal court cases that happened in 2004 and 2005, the Haida-Taku and Mikisew Cree decisions, those are key, those are game changers. Governments not being that nimble say, okay, really what we need to do is partnerships as one response to that. And I think this is another key piece here to why government responded the way they did (interview 1).

A former cabinet minister agrees with that, and adds in a few other key dynamics as well:

> So we not only have a very strong environmental movement, but we also have a new Aboriginal consciousness, we have all kinds of jurisprudence that says Aboriginal title matters and the reality is that you're not going to get any social licence north of much of southern Ontario now if you do not involve and seriously engage the Aboriginal communities, those things have all made governments and the political actors understand that it's not like it was in the 1950s or 1920s (interview 13).

A former OPG employee argues that ideology played an important role as well:

> A lot of it has to do with the minister and the government. I don't think that a Conservative government would care that much about First Nations involvement, but a Liberal or NDP or, as implausible as it may be, a Green government would tend to push those issues up the importance chain, so to speak. So why they did it, I think a lot of it has to do with ideology and political affiliation. I can't really think of another plausible explanation (interview 11).

While the specific causes of the increasing focus on partnering with First Nations on energy projects are a source of dispute, there can be little disagreement that there was indeed an increasing focus. An OPG employee says:

> It picked up in ’05-06. We needed new build stuff. And part of that stuff was looking at hydro-electric development in the north, so you have the Minister of Natural Resources issuing a site-release policy, with respect to new hydro sites, and as part of that criteria they had within that huge weightings with respect to Aboriginal partnerships, and that’s really the first time you start seeing that kind of approach, and I think it’s really a response to all the things like Ipperwash, Caledonia, days of action, blockades and especially the court cases (interview 1).

When the government launched its FIT program, it built in incentives for the participation of First Nations. In particular, it established price adders for Aboriginal participation, defined as equity. Between September 2009 and April 2012, the price adder amounted to 1.5 cents per kWh for wind and ground-mounted solar photovoltaic; 0.9 cents per kWh for water; and 0.6 cents per kWh for biogas, biomass, and landfill gas (OPA, 2009; OPA, 2010b). In April 2012, the price adder was refined as follows: if Aboriginal participation in any renewable project, with the exception of rooftop solar, exceeds 15 per cent, the project can qualify for 0.75 cents per kWh; if Aboriginal participation exceeds 50 per cent for any renewable project, except rooftop solar, the project can qualify for a price adder of 1.5 cents per kWh (OPA, 2012). An energy advisor for an Ontario First Nation points to the Aboriginal adder as the most significant contributing factor to Aboriginal success:

> I think the greatest role that it’s had is convincing proponents that want to develop these type of projects that it’s beneficial to have First Nation partners. So things like the FIT Aboriginal adder is a good example of that. Because of that, companies realize they can get just that much more for their power if they have a First Nation partner. … They’re incentivizing partnerships, which are so critical to the success of First Nations energy projects (interview 3).

The government also launched other programs to assist First Nations and Métis communities interested in participating in renewable energy projects. One such measure was the

Aboriginal Loan Guarantee Program (ALGP) that allows communities to take on equity participation in such projects. MacLaren (2013) asserts that:

> The Aboriginal Loan Guarantee Program is a phenomenal tool to allow Aboriginal communities to partner in project development within their traditional territories. For those communities interested in renewable energy, the ALGP has been a rare and welcome aligning of governmental policy and Aboriginal self-determination … The ALGP is such a welcome change because it signifies a committed policy of supported inclusion, and recognizes that Ontario's growth must not come at the expense of the livelihoods of its First Nations (para. 2).

The ALGP started in 2009 as a $250 million fund (Ontario, 2009b), but was increased to $650 million in the 2014 provincial budget (Ontario, 2014d).

Another important program launched by the government in 2009 was the Aboriginal Energy Partnerships Program, which includes:

- The Aboriginal Renewable Energy Network (AREN) – an online-based centre "for sharing of knowledge and best practices related to First Nation and Métis green energy projects" (Ontario, 2009c).
- The Aboriginal Renewable Energy Fund (AREF) – a fund established to assist with initial project development costs, including: 80 per cent of actual costs in the pre-feasibilty phase; 60 per cent of actual costs for the design and development phase; and 40 percent of actual costs for the regulatory approvals phase;
- Aboriginal Community Energy Plans (ACEP) – assistance with planning to help communities identify and benefit from their renewable power development opportunities; and
- The Aboriginal Advisory Committee – a group established to provide advice and guidance to First Nations and Métis communities interested in participating in the electricity sector (Ontario, 2012a).

Because of the breadth of this suite of programs, a former OPG employee argues that the government has clearly made First Nations participation in the electricity a significant priority:

> It's a pretty impressively big priority. You have to remember that First Nations constitute less than two per cent of the population in Ontario. Given the extremely limited voting sway they hold, I think governments to a large extent have done a really good job of recognizing that First Nations require special accommodation and consultation, they have a constitutionally protected duty to consult on new developments, so they recognize that First Nations are not just some other minority or stakeholder and I think Ontario has done a good job of involving First Nations and listening to their concerns and desires (interview 4).

An energy advisor with a First Nation largely agrees:

> I would say that the Ontario government has done a lot to help, but they have done stuff to frustrate, I mean I don't want to paint this rosy picture of everything being perfect, but on the balance of everything they're working on and the fact that Ontario has a very complex, large electricity system, I mean we're talking about an electricity system with large manufacturing load, albeit declining manufacturing load, a large residential and commercial bases, we have Canada's biggest economy, 13-14 million people, they've got a lot going on in Ontario and they're trying to balance a lot of factors and I think they've done a pretty good job of ensuring First Nations can participate in the electricity sector (interview 11).

But, according to Grant Taibossigai of M'Chigeeng First Nation, the government did not act without pressure:

> We urged the Ontario government to create programs specific to our needs. Finally, with the assistance of the Ontario Sustainable Energy Association and the First Nations Energy Alliance (FNEA), M'Chigeeng First Nation along with other Ontario First Nations convinced the Premier of Ontario and the Ministry of Energy to support the development of the Aboriginal Renewable Energy Fund, a fund that assists aboriginal proponents of generation projects, as well as the Aboriginal Loan Guarantee Program (AOPP, 2011).

By the end of the first quarter of 2014, First Nations were participating in 243 FIT program projects throughout Ontario. This included 534 MW of wind, 80 MW of hydroelectric, and 76 MW of solar projects (Ontario, 2014d). That amounts to 11 per cent of total FIT-related MW (Ontario, 2014a).

This research reveals that most of the key elements identified in the literature as necessary for successful First Nations participation in the electricity sector (Krupa, 2012; Henderson, 2013) were fulfilled in Ontario (interviews 2, 3, 4, 5, 9 and 10). Government embraced clean energy projects; chose to foster participation of new actors through mechanisms that facilitate the sale of electricity to the grid; and provided a degree of long-term clarity regarding the electricity sector. On a number of First Nations, there are also committed and capable local leaders serving as project champions, and strong governance to support the projects and ensure accountable and transparent financial management. Partnerships with private sector companies have been crucial to most of the renewable electricity projects, which have increased the capacity, capability and

confidence of First Nations. And, amongst those First Nation communities that have chosen to participate in the electricity sector, there has been a significant focus on delivering benefits to their entire community, which has increased the level of buy-in on the part of community members.

6.5 Conclusion

Ontario faced a variety of landscape-level dynamics, including pressure to respond to the impact of coal-related smog on population health; pressure to help mitigate climate change; pressure to create a more resilient electricity system in the wake of the August 2003 blackout; and pressure to use energy policy to help confront the economic downturn of 2008 and 2009 by subsidizing businesses, creating jobs and growing the province's economy. Ontario responded to these pressures by adjusting its regime rules, taking steps to incorporate proven niche technologies, and opening up space for new actors to participate in the system, without substantially disrupting the existing socio-technical regime. Ontario's progress along this *transformation* pathway is related to its fulfillment of various TIS functions, specifically: *guidance of the search*, with positive and negative signals through policy directives; *market formation*, with the creation of a 'bridging market' through increases in the volume of renewable electricity and in the number of actors involved in the sector; *resource mobilization*, through providing incentives for participation in the electricity sector and offering assistance with capacity enhancement and project planning; and *support from advocacy coalitions*, which was important but is increasingly less crucial because government policy is quite well-entrenched. As a result of the interplay of these TIS functions, Ontario has developed several TIS motors – an *entrepreneurial motor*, a *system building motor* and a promising *market motor* – all of which help to explain its progress along the *transformation* pathway.

Political dynamics have been crucial in the ongoing transition of Ontario's electricity sector. The government and a variety of influential groups produced and used the dominant storyline that focused on the following elements: phasing out dirty coal-fired power plants means cleaner air and better health for Ontarians; more renewable energy means new investments in the province's economy and more jobs for Ontarians; by doing this, Ontario is leading North America; and, Ontario is delivering a more reliable and resilient electricity system and more opportunities for smaller power producers by focusing on distributed generation using sources that are smaller and cleaner, instead of exclusively relying on large, centralized power plants. The discourse coalition – the various actors that produced and used this storyline – included a loose blend of government, the Ontario Medical Association, cottagers' groups, the Ontario Clean Air Alliance, and the Ontario Sustainable Energy Association. The *coordinative* discourse focused on the need to find the most effective means to achieve the policy objective of phasing out coal; the need to create a more resilient electricity system; the need to challenge NIMBYism; and the need to use energy policy to confront the economic downturn, subsidize businesses, create jobs, and get the economy growing again (interviews 1, 3, 6, 7, 13 and 14). The *communicative* discourse focused primarily on how replacing dirty coal with renewable power would mean cleaner air, better health, more jobs and investments, and a more resilient and reliable system. Clearly, this discourse has already solidified into institutions and organizational practices, by fueling the TIS motors and leading to adjustments in the socio-technical regime.

A crucial aspect of those adjustments in the socio-technical regime involved opening up space for First Nations to participate in the electricity sector. As a result of the FIT initiative, and the full suite of related government programs, 26 per cent of Ontario's First Nations are involved in renewable electricity generation projects. These 35 First Nations are not only benefiting from their participation in the renewable electricity sector, but are also helping Ontario move further along the *transformation* path, as it seeks to build an electricity sector that is more sustainable.

Table 6-2 outlines the operationalization of the analytical framework in Ontario.

Table 6-2. Operationalization of analytical framework in Ontario

Concept	Key dimensions	Ontario case
Socio-technical regime	Various components (policy, science, technology, industry, markets/user preferences and culture) that serve to stabilize and support the existing institutions	- Centralized power plants, utilizing mixed generation (primarily nuclear, hydro, coal and natural gas) and mixed ownership, in a market that has both competitive and regulated elements
Niche-level innovations	Different technologies, actors, networks and institutions than those stabilizing and supporting the existing institutions	- *Technologies:* Renewables (primarily wind and hydroelectric) - *Actors:* Ontario Power Authority, established in 2004 to oversee planning of the electricity system and procure private electricity generation; IPPs - *Networks:* Ontario Clean Air Alliance; Ontario Sustainable Electricity Association; Ontario Medical Association; cottagers associations; First Nations Energy Alliance - *Institutions:* Various renewable energy support mechanisms, including a standing-offer program and a feed-in tariff; new legislation and regulations setting renewable-portfolio standards and emission reductions, in 2004, 2009 and 2012
Landscape	Natural environment, macro-economy, political culture, demographic characteristics and worldviews	- Significant public pressure regarding population health concerns related to heavy smog, caused in part by coal-fired electricity generation - The worldwide financial crisis of 2008 and 2009 hit the province's economy particularly hard, and government saw this as an opportunity to promote renewable energy as a source of investment and jobs - The August 2003 blackout created significant pressure to make the system more resilient - Increasing calls to mitigate climate change

Concept	Key dimensions	Ontario case
TIS Functions	TIS functions: (1) entrepreneurial experimentation; (2) knowledge development; (3) knowledge diffusion; (4) guidance of the search; (5) market formation; (6) resource mobilization; and (7) support from advocacy coalitions TIS motors: (1) science and technology push (STP) motor; (2) entrepreneurial motor; (3) system building motor; and (4) market motor	- Entrepreneurial experimentation, knowledge development and knowledge diffusion not crucial. - Each of the following functions fulfilled: guidance of the search (with positive and negative signals established through policy directives); market formation (with a bridging market); resource mobilization, with incentives and support programs; and support from advocacy coalitions. - Ontario has developed several TIS motors: an entrepreneurial motor, a system building motor and a promising market motor.
Storyline	Narratives, structuring ideas and themes, problem framing, metaphors, analogies, historical references, appeals to fear or guilt, cognitive and normative ideas	- Phasing out dirty coal-fired power plants means cleaner air and better health for Ontarians - More renewable energy means new investments in our economy and more jobs for Ontarians - Ontario is leading North America - Focusing on distributed generation using sources that are smaller and cleaner, instead of exclusively relying on large, centralized power plants means a more reliable system and more opportunities for smaller power producers, communities, First Nations, and others to become generators
Coordinative discourse	Behind-the-scenes discussions and negotiations involving elected officials, civil servants, experts and interest groups	- Challenging NIMBYism - Creating a more resilient electricity system - Finding the most effective means to achieve the policy objective of phasing out coal
Communicative discourse	Public discussion of ideas and public announcements of decisions	- Replacing coal with renewable power will mean cleaner air, better health, and more jobs and investments

Concept	Key dimensions	Ontario case
Discourse coalitions	The coalition of actors producing and using a particular storyline	- Government - Ontario Medical Association - Cottagers' groups, including the Greater Bay Area Foundation and the Muskoka Lakes Association - Ontario Sustainable Energy Association - Ontario Clean Air Association - First Nations Energy Alliance
Effects of discourse	Key actors' use of ideas, concepts and categories	- General embrace of storyline by main political actors (with some disagreement over pace or relatively minor elements)
	Effects on government policy and organizational practice	- The FIT has brought 1,447.6 MW into commercial operation, with an additional 3,353.6 MW currently under development, and an additional 493.7 MW under review - First Nations are participating in 243 FIT program projects, including 534 MW of wind, 80 MW of hydroelectric, and 76 MW of solar projects, amounting to 11 per cent of total FIT-related MW - 26 per cent of First Nations involved in transition
Transition dynamics	Changes in the regime	- Coal has almost been eliminated from the electricity generation mix - Increased reliance on renewable power - Generation of electricity opened up to new actors

CHAPTER 7
SASKATCHEWAN

Two of the most significant challenges facing Saskatchewan's electricity socio-technical regime are aging infrastructure and demand growth. SaskPower (2014b) acknowledges that, "our generation, transmission, and distribution infrastructure is aging, and will require us to rebuild, replace, or renew it in its entirety over the next 40 years" (p. 19). In 2013, demand for power increased by 6.4 per cent, which was the highest annual growth in two decades (SaskPower, 2014b). SaskPower (2014b) anticipates that, by 2050, demand for electricity in the province will nearly double. But, according to SaskPower itself, the most significant landscape pressure it faces is the external climate change policy agenda. SaskPower (2014b) acknowledges that:

> Climate change continues to represent the single most influential factor associated with the future of electricity generation in Saskatchewan. New federal regulations concerning CO_2 have eliminated conventional coal-fired generation – SaskPower's primary baseload electricity source – as a generation option for the future (p. 43).

However, unlike in Nova Scotia and Ontario, where the socio-technical regime could not withstand the landscape pressure and outside criticism and responded to it by making significant adjustments to their electricity socio-technical regime, Saskatchewan's electricity socio-technical regime has largely been able to endure the landscape pressure and has faced minimal outside criticism.

Saskatchewan is an energy-producing province with an abundant supply of domestic coal that can be used for relatively cheap electricity generation. As a result, it would be expected that concerns about climate change and environmental sustainability would not be as pervasive in Saskatchewan as in other jurisdictions. This has resulted in minimal criticism of the existing

socio-technical regime. Disruption from exogenous pressures, such as the federal environmental policy agenda, is generally quite minor, with significant allowance for continued reliance on fossil fuel-based electricity generation. As a result, Saskatchewan has largely invested in technology that reinforces its existing regime. While there has been some investment in projects for wind power, geothermal and biomass, this has paled in comparison to the amount of funding the province has poured into carbon capture-and-sequestration (CCS) technology, a regime-reinforcing innovation.

Saskatchewan has primarily taken a *reproduction* pathway and, in the absence of significant new pressure, will likely pursue a path of very gradual *transformation* in which it adopts some symbiotic niche innovations and makes some minor adjustments to the regime rules while keeping the existing socio-technical regime mostly intact. The minimal progress Saskatchewan has made along the *transformation* pathway can be explained by the weak fulfillment of the TIS functions. *Entrepreneurial experimentation*, *knowledge development, knowledge diffusion*, *guidance of the search*, and *resource mobilization* are all heavily focused on regime-reinforcing CCS technology. *Market formation* is almost non-existent and *support from advocacy coalitions* is relatively weak and scattered. As a result, Saskatchewan has only developed the most immature TIS motor, the *science and technology push motor*.

Political dynamics have played a significant role in the trajectory of Saskatchewan's electricity system. In the late 1990s and early 2000s, Saskatchewan resisted and criticized the Kyoto protocol (Harding, 2002), but by 2007, the premier was saying that "climate change is a moral issue, not just a political issue" (Saskatchewan, 2007g) as he invited former American Vice President Al Gore to deliver a keynote address in the province, with SaskPower as the presenting sponsor. In the early 2000s, the government started off with relatively meager steps, mainly pilot and demonstration projects, as well as the Green Power program and Environmentally Preferred

Power program. But, in 2006 and 2007, the government laid out a more comprehensive climate change and energy strategy, including a commitment to significantly increase the province's reliance on renewable sources of electricity generation. The government also pursued regime-reinforcing CCS technology as a supply option, but not in the short-term, because of the immense costs associated with it. In late 2007 the government changed, with the election of the conservative-leaning Saskatchewan Party. The new government decided to invest heavily in CCS technology and worked with the federal government to minimize the effect that the federal policy agenda would have on Saskatchewan's electricity system.

For most of this time, the dominant storyline in Saskatchewan has focused on reinforcing the existing socio-technical regime. However, in 2006 and 2007, in the last two years of its mandate, the New Democrat government used a storyline that focused on making Saskatchewan a model of innovative and sustainable energy; living up to the responsibilities of being an energy powerhouse; addressing climate change; and securing benefits for Saskatchewan families well into the future. When the government changed at the end of 2007, the storyline reverted to a focus on reinforcing the existing regime: Saskatchewan has a 300-year supply of coal, which can be used to generate affordable electricity and fuel economic growth in the province, so it just makes good sense to continue relying on coal; by investing in CCS technology, Saskatchewan is leading the world and will be able to benefit from that by commercializing the technology and knowledge; SaskPower already has a diverse generation mix and it will continue to rely on a variety of sources, including affordable renewable options, well into the future. The Saskatchewan Party government briefly adjusted its electricity-generation storyline while it flirted with the notion of embracing nuclear power, but, when that proved publicly unpalatable, it quickly reverted to the long-standing dominant storyline that focused on reinforcing the existing socio-technical regime. Despite two relatively brief deviations from the dominant storyline –

first, to ramp up renewables, under the New Democrat government; second, to embrace nuclear power, under the Saskatchewan Party government – the dominant storyline remained deeply entrenched. This helps to explain why Saskatchewan's electricity socio-technical regime has largely taken a *reproduction* pathway.

This chapter delves into the dynamics at play in Saskatchewan's electricity system. It explores the broader context, including a brief overview of the history of electricity generation in Saskatchewan. It then outlines the province's initial exploration of various options for a more sustainable electricity system and its ultimate decision to try to clean up coal-fired electricity generation. This chapter also explores the steps taken to involve First Nations in the province's electricity sector.

7.1 History of Power Generation in Saskatchewan

Municipal power utilities initially dominated the electricity sector in Saskatchewan. When it achieved provincial status in 1905, the three central generating stations within Saskatchewan were municipally owned. Between 1906 and 1926, approximately 70 small, privately owned power systems were established in communities which could not afford to establish their own municipal utilities, or which chose to prioritize other municipal infrastructure projects (White, 1976). Both municipal utilities and private operators placed a high priority on generating revenues, so it made little difference to Saskatchewan residents whether the public or private sectors served them (White, 1976).

In 1927, the government established the Saskatchewan Power Resources Commission "to inquire into and report upon the economic practicability of generating power at central power plants and water power sites in the province and the distribution of same throughout the

province" (White, 1976, p. 32). A year later, the government created the Department of Railways, Labour and Industries, which it empowered to operate electrical utilities:

> By the terms of the Act, [the new department] could manufacture, distribute and supply electrical energy; acquire, lease, construct, maintain and operate works for generating electricity through the use of fuels or waterpower; obtain by purchase, lease, expropriation or otherwise land for power station or substation sites and for electrical transmission on distribution lines. It could also purchase, lease or expropriate plants, buildings and machinery used in the production, transmission, distribution and supply of power. By these clauses the Province might take over any electrical utility and incorporate it into any system it might see fit to establish (White, 1976, p. 34).

In 1929, the government created the Saskatchewan Power Commission, with the explicit purpose of coordinating the province's electrical systems and moving toward increased centralization and integration. However, it was not until 1949 that the centralization-and-integration project really gained steam. That year, the government turned the Saskatchewan Power Commission into a Crown corporation, the Saskatchewan Power Corporation (SaskPower), and tasked it with an ambitious expansion and rural electrification agenda (White, 1976). Around 1964, with the rural electrification project achieved, and with a new government in place, SaskPower's guiding principals shifted to serving its customers and generating revenues, a portion of which were frequently shared with the provincial government in the form of an annual dividend. Essentially, the utility has remained the same since then: focused on serving citizens and generating revenues; with centralized planning and system organization; with a general technological preference for coal-fired thermal electricity generation; and largely resistant to any significant change. A former senior manager with SaskPower says:

> You have to remember that in Saskatchewan here what do we have? We have a lot of lignite coal, in the south, and during the '60s, '70s and '80s, Saskatchewan exploited that, ultimately the last project for that was the Shand Power Station down in Estevan. So you come with a culture. A lot of electrical utilities in Canada have a culture. The culture here was build big coal. So very slow to change in that way (interview 1).

As a result of this resistance to change, a wind power proponent argues that, "the viewpoint about electricity in this province is still rooted firmly in the mid-20th century" (interview 3).

SaskPower remains the primary electricity provider in the province. The Crown corporation's available generating capacity is 4,291 MW. In 2013, the fuel sources of electricity supplied broke down as follows: coal – 47 per cent; gas – 28 per cent; hydro – 19 per cent; wind – 3 per cent; imports 2 per cent; and other sources – 1 per cent. 853 MW of SaskPower's generating capacity is accessed through long-term power purchase agreements (PPAs) with private companies, including four gas-fired generation projects, two wind power facilities, and four heat recovery facilities (SaskPower, 2014).

Table 7-1 outlines the history of electricity generation in Nova Scotia.

Table 7-1. History of electricity generation in Saskatchewan

	Pre-1949	1949-1964	1964-
Ownership	Municipally owned and private	Public	Public
Guiding principles	Revenue generation (municipal) and profit maximization (private)	Expansion, rural electrification and industrial development	Service to citizens and revenue generation
Planning	Market directed	Central command and control	Central command and control
Market	Free market	Non-market	Non-market
System organization	Decentralized, with fragmented grid	Centralized	Centralized
Technology preference	Coal-fired thermal and kerosene-burning engines	Coal-fired thermal	Coal-fired thermal

7.2 Exploring Options for a More Sustainable Electricity System in Saskatchewan

In the late 1990s and early 2000s, landscape-level pressure on Saskatchewan's electricity socio-technical regime, led the government to explore a variety of options to improve the sustainability of the province's electricity system. A former senior manager of SaskPower argues that:

> The culture of SaskPower really only started to break at basically the turn of the century in 2000. … At the turn of the century, there was a bit of a look-see, basically saying, look, Saskatchewan, we hear you about coal, but there is also this climate change issue, and we need to begin to change who we are, what we are, and begin to take a look at different forms of generation. … It was quite clear in the early 2000s that the federal government would at some point get around to saying, hey, no more coal, and they were looking at (a) limits on building new plants and (b) refurbishments not being allowed at a certain point in time. So we're sitting there at the time going, wait a second, if we're, into the future, not going to be allowed to develop coal, what else are we going to do, and what are the alternatives here in Saskatchewan to do that? (interview 1).

In response to this landscape-level pressure, the government supported pilot projects and took several small but important steps to embrace niche innovations:

- In 1998, the government announced a Small Power Producers Program, allowing customers who "wish to generate up to 100 kW of electricity for the purpose of offsetting power that would otherwise be purchased from SaskPower or for selling all of the power generated to SaskPower" (SaskPower, 2012);
- In 2001, the government announced a 5.3 MW wind power project (Saskatchewan, 2001a);
- Also in 2001, the government also announced that SaskPower and SaskEnergy would partner with Flatland Exploration Ltd. for a pilot project using flare gas – a byproduct from the process of extracting and processing oil that is normally wasted – to generate electricity (Saskatchewan, 2001b);
- In 2002, the government announced its Green Power program, which allowed customers to pay extra to buy blocks of wind-generated electricity (Saskatchewan, 2002a);
- In 2002, the government announced a natural gas co-generation pilot project at the Regina General Hospital (Saskatchewan, 2002b);
- In 2003, it announced 150 MW of wind power, which was a partnership between SaskPower and ATCO Power (Saskatchewan, 2003a);

- In 2003, the government announced a partnership with Clear-Green Environmental Inc. for a two-year demonstration project using animal manure to generate heat and electricity (Saskatchewan, 2003b);

- Also in 2003, the government announced a partnership between SaskPower, Saskatchewan Research Council and Ecology Energy for a two-year demonstration project using wood residue to generate electricity and heat (Saskatchewan, 2003c); and

- In 2004, SaskPower launched the Environmentally Preferred Power Program to "create the opportunity for SaskPower to partner with IPPs to build and operate small-scale generation projects, with up to 5 MW of capacity" (Saskatchewan 2004).

With regard to the 2002 Green Power program, a former Minister responsible for SaskPower says:

> The objective was to generate five per cent of SaskPower's electricity from renewable based sources – preferably wind. It was generally the view that the decision to move to emphasize renewables was a political, as opposed to commercial, venture. As such, there was a large amount of discussion about how to implement this policy. Ultimately, it was decided, through accommodation, as opposed to regulation or legislation, that the targets would remain soft, would be driven by consumer demand, and would be priced differently – at a two or two-and-a-half cents per kilowatt hour premium – from the base load that was fossil-fuel generated, and that consumers would be able to opt into the solution. This particular policy showed the desire of the government to drive policy changes at SaskPower, but to do so in a way that did not distort the commercial business of the company (interview 4).

The rationale for all of these moves was primarily to fulfill the demands of the federal government's climate change policy agenda, with an acknowledgement as well of the need to protect the environment. Premier Lorne Calvert said, "Our commitment to renewable resources will have a long-term benefit to Saskatchewan people, helping to reduce greenhouse gas emissions and improve our environment *as we work to meet the challenging targets that Canada has set out* [emphasis added]" (Saskatchewan, 2001). The impact of SaskPower's Environmentally Preferred Power Program was particularly notable. Then-SaskPower president Pat Youzwa publicly said:

> The EPP program is not only helping to fulfill our objective to meet projected load requirements in an environmentally responsible way without adding additional greenhouse gases, it is proving that we can diversify our generation mix, incorporating

> smaller and privately owned projects. The knowledge and experience gained through this program will benefit SaskPower greatly as we look to the future (Saskatchewan, 2005).

In its 2006 Speech from the Throne, the government committed to a "long-term goal of meeting one-third of our energy requirements through renewable resources" and it pledged to "work in partnership to research the feasibility of the world's first, Saskatchewan-designed, utility-scale clean coal generating facility" (Saskatchewan, 2006a, p. 7). With regard to clean coal, the government proclaimed:

> This project will enhance the quality of life for all Saskatchewan residents. The environmental and economic implications of the project extend beyond our borders, to the national and international stages. … This may be the world's first near-zero emissions pulverized coal unit. This unit would help meet emerging regulatory requirements while adding much needed baseload generating capacity while effectively using our 300-year supply of low-cost lignite coal (Saskatchewan, 2006b).

In 2007, the government significantly increased its focus on making the province's electricity system more sustainable. It did so in large part because of the increased awareness of the impacts of climate change. Premier Calvert proclaimed that "climate change is a moral issue, not just a political issue" (Saskatchewan, 2007g) and the government invited former American Vice President Al Gore to deliver a keynote address on climate change in the province, with SaskPower as the presenting sponsor. In 2007, the government released *Saskatchewan's Strategy for a Green and Prosperous Economy*, outlining the following goal: "to significantly reduce Saskatchewan's greenhouse gas emissions with specific and measurable targets demonstrating national and international leadership within a green and prosperous economy" (Saskatchewan, 2007a). The strategy included the following targets for reducing GHG emissions: stabilization of emissions by 2010; reducing emissions by 32 per cent below 2004 levels by 2020; and reducing emissions by 80 per cent below 2004 levels by 2050. The strategy also said the government would "ensure all of SaskPower's new and replacement electricity generation facilities are either emissions-free or fully offset by emissions credits" and that it would "develop a conservation

program to reduce SaskPower's electricity load by 300 megawatts by 2017" (Saskatchewan, 2007a). That same year, the government released *Saskatchewan's Energy and Climate Change Plan*, which built on the previously released Green Strategy, and outlined tangible actions based on five "emission reduction wedges," one of which focused on increased use of renewable energy (Saskatchewan, 2007c; 2007d). The government also unveiled a $320 million Green Future Fund, consisting of proceeds from the sale of the government's stake in a heavy oil upgrader in Regina (Saskatchewan, 2007b). And it established a Climate Change Secretariat to coordinate and oversee the province's climate change policy agenda (Saskatchewan, 2007b).

In 2007, the New Democrat government also announced a net metering program, which would allow customers that generate their own electricity to send any excess power back to the province's electricity grid for a credit on their SaskPower bills (Saskatchewan, 2007e). In order to "position the electrical grid for additional wind, biomass and other renewable generation projects," the government also announced that SaskPower would spend $525 million installing up to 400 MW of simple cycle natural gas turbines (Saskatchewan, 2007f). And the government announced that it would continue to pursue its clean coal project, but only through study at this point, and not yet through construction. SaskPower president Pat Youzwa was publicly quoted as saying:

> We remain fully committed to exploring clean coal as a supply option in the longer-term. Over the last year, our feasibility work has given us a great deal of confidence in clean coal from a technology perspective. But, given the need for new supply by 2010, and given the costs of clean coal at this early stage in its development, it would have been premature to proceed to the construction phase at this time (Saskatchewan, 2007f).

In 2007, the government's stated goal was to have 30 per cent of the province's electricity generated using renewable sources by 2020 (Saskatchewan, 2007e).

Just several years after it resisted and criticized the Kyoto protocol (Harding, 2002), and after taking rather meager steps in the first part of the decade, by 2006 and 2007, the government

had in place a comprehensive climate change and energy strategy, including a commitment to significantly increase the province's reliance on renewable sources of electricity generation. The government's discourse had noticeably shifted from earlier in the decade, when it talked about having to meet the "challenging targets that Canada has set out" (Saskatchewan, 2001). By 2006, the discourse focused on making Saskatchewan a model of innovative and sustainable energy, living up to the responsibilities of being an energy powerhouse, addressing climate change, and securing benefits for Saskatchewan families well into the future. Premier Calvert said:

> Our vision is of a province that is a model of innovative and sustainable energy. In realizing that vision, we recognize the current strengths we have as an energy powerhouse and the responsibilities that come with that strength. While contributing to our economic prosperity and quality of life, our energy industries also generate the majority of our greenhouse gas emissions. Change has to occur and this plan demonstrates our commitment to addressing climate change, and continuing to make Saskatchewan a great place for families today and building a stronger future here for our young people (Saskatchewan, 2007a).

However, this discourse did not have time to solidify into durable institutions – to achieve discursive hegemony, as Hajer (1993) would call it – and to move Saskatchewan's electricity socio-technical regime from a *reproduction* pathway to a *transformation* pathway, because the government changed near the end of 2007.

7.3 Focusing on Cleaning Up Coal in Saskatchewan

In November 2007, the conservative-leaning Saskatchewan Party was elected as the new government. In the lead-up to that election, the Saskatchewan Party pledged to uphold the New Democrat government's GHG reduction targets (Wood, 2008), but it scaled those targets back in 2009 to match the targets established by the federal government instead (Wood, 2009). While it watered down the previous government's GHG reduction targets, it ramped up the previous government's focus on cleaning up coal-fired electricity generation. CCS became the new

government's primary focus when it came to the province's electricity system. In 2008, the new government announced a partnership with the federal government to develop one of the world's first and largest commercial-scale CCS demonstration projects at the Boundary Dam Power Station, at an initially estimated cost of $1 billion (Canada, 2008). The Minister Responsible for SaskPower articulated the rationale:

> We have some two or 300 years of supply of coal here in Saskatchewan, and of course that why the public policy decision was made to look at carbon capture and sequestration at the Boundary Dam facility. … Now we have, I think, frankly, the world is beating a path to our doorstep to take a look at the project down there and see what's being done, see the very valuable work that is being done by the SaskPower folks with respect to it. And yes, there is a cost to it. There's no question about it. We have clearly indicated that there is a cost associated with it. But we have some two or 300 years of supply of coal that we are interested in continuing to use here in Saskatchewan to provide baseload power (Legislative Assembly of Saskatchewan, 2013, p. 382).

SaskPower (2014b) asserts that this "will be the world's first commercially viable large-scale carbon capture and storage project at a coal-fired power station. The project will produce 110 MW of baseload electricity and reduce greenhouse gas emissions by one million tonnes of CO_2 each year" (p. 43). SaskPower is also collaborating with Hitachi Ltd. to complete a carbon capture test facility, which "will offer a neutral platform for international vendors to verify and improve post-combustion technologies in a commercial setting" (SaskPower, 2014a, p. 44).

A former senior manager with SaskPower is highly critical of the province's heavy focus on CCS and lays responsibility at the feet of politicians:

> People are brain dead. … Now remember it's only a million people. SaskPower is relatively small by North American standards. Yet what they did is went ahead with a project for carbon capture-and-sequestration that they were going to be the leaders of the pack worldwide. Now, hold on, a million people will be the leaders of the pack worldwide, but we don't know if it will work. We put in $1.4 billion, they put it in, they think it's going to work. The ratepayers of this province have to pick up the tab. I'm not a fan of it. They should have walked away from it. But the problem is occasionally the politicians got a little too hyped on this thing and nobody really had the guts to tell them that this is a bad economic project for a million people (interview 1).

The province's political leaders made it a priority to preserve coal-fired electricity generation as part of Saskatchewan's electricity socio-technical regime. The rationale for continuing to prioritize coal-fired electricity generation is based on the province's 300-year supply of coal, which can be used to generate affordable electricity for Saskatchewan people. By investing heavily in unproven CCS technology, politicians sought to position Saskatchewan as an innovative world-leader (interviews 1, 3 and 6).

When the federal government began drafting new regulations with respect to GHG emissions from coal-fired power plants, SaskPower and the provincial government took a keen interest (interview 1). According to SaskPower's former CEO, the Crown corporation had discussions with the federal government about the new federal regulations for greenhouse gas emissions for coal-burning power plants throughout much of 2010 and 2011. Despite this dialogue, the former SaskPower CEO says the corporation was caught off guard when the initial draft of the federal regulations was released, because they were "considerably different than we thought the dialogue had carried on with. We heard that the regulation was coming out going for as low as 375 tonnes per gigawatt hour and a coal-burning plant would be 45 years end-of-life" (Legislative Assembly of Saskatchewan, 2013, p. 387). The former SaskPower CEO noted that such a standard would have gone even further than California and the United Kingdom. As a result, together with the CEOs of the other coal-burning power utilities in Canada – ATCO, TransAlta, New Brunswick Power, and Nova Scotia Power – SaskPower "put together a program, a commitment quite frankly, and went down to see the federal government, not only the Canadian Environment ministry, but also the Prime Minister's Office" (Legislative Assembly of Saskatchewan, 2013, p. 387):

> SaskPower of course, working very close with our provincial government and counterparts, worked on a joint recommendation and in fact a joint commitment that we would commit that once a coal-burning plant hit 50 years, then it would either have to

> convert to get CO_2 emissions to 420 tonnes per gigawatt hour or you'd have to shut it down. Generally, that's it. There's some other nuances built into it, but that's generally it. We concurred with that. … So as a result of that, SaskPower will be able to, quite frankly in our view for the long-term, keep the existing coal fleet in production: that's the four Boundary Dam units, 3, 4, 5, and 6; the unit at Shand; and then the two units at Poplar River (Legislative Assembly of Saskatchewan, 2013, p. 387).

Preserving coal-fired electricity generation as part of the province's electricity socio-technical regime was clearly a key priority for the government (interviews 1, 3 and 6).

The government also briefly flirted with nuclear power, but quickly moved away from that option (Hurlbert et al., 2010; McNutt et al., 2011). In 2008, it launched the Uranium Development Partnership (UDP), which was tasked with identifying, evaluating, and making specific recommendations concerning Saskatchewan-based value-added opportunities to further develop the province's uranium industry (Saskatchewan, 2008). Ontario-based Bruce Power even pitched a 1,000 MW nuclear power plant (Bruce Power, 2008). However, after the UDP consultation process, the government announced it would not endorse Bruce Power's proposal for a large-scale nuclear power plant in Saskatchewan and said that public consultations and additional information and consultation would be required before any future decision to pursue nuclear power in the province (Saskatchewan, 2009a).

The government has also taken relatively small steps to increase the province's reliance on renewable power. In 2009, it launched two new programs, the Green Options Plan and the Green Options Partners Program, which it said would enable SaskPower to "more than double wind power production in the province" (Saskatchewan, 2009b). Under the Green Options Plan, SaskPower undertook a competitive process to obtain up to 175 MW of wind power from IPPs; and, under the Green Options Partners Program, SaskPower introduced a Standing Offer Program to procure up to 50 MW of renewable power from IPPs (Saskatchewan, 2009b). The Green Options Partners Program focused on projects between 100 kW and 10 MW in size (SaskPower

2014a). Investments in renewable technologies paled in comparison to the resources devoted to CCS technology.

In 2009, the government tasked the Legislative Assembly's Standing Committee on Crown and Central Agencies with conducting public consultations on the future of the province's electricity sector. In particular, the committee focused on the following question:

> How should the government best meet the growing energy needs of the province, in a manner that is safe, reliable, and environmentally sustainable, while meeting any current and expected federal environmental standards and regulations, and maintaining a focus on affordability for Saskatchewan residents today and into the future? (Legislative Assembly of Saskatchewan, 2010, p. i).

The Standing Committee's final report summarized the themes that emerged during the public hearings:

> There were several themes that emerged from the presentations and written submissions during the public hearings. A prominent issue that became apparent was the cost and who was to bear the cost of upgrading, expanding and modernizing the electrical generation system. Many expressed a desire for conservation and efficiency measures because they are a means to mitigate growing energy needs and costs. A number of presenters and written submissions also detailed the desire for a decentralized mix of renewable energy sources to meet the expected growth and many wanted the ability to sell excess energy back to the grid for a profit. Some industry representatives noted the need for transitional sources of energy such as natural gas because it burns cleaner than other fossil fuels and is a flexible source of energy. Businesses, communities and representative organizations wanted to see an investment in baseload energy to ensure there is a reliable and stable energy supply for industry. Further, a number of presenters emphasized the need for reliable generation in the North which could be done in partnership with First Nation and Métis groups (Legislative Assembly of Saskatchewan, 2010, p. i).

The Standing Committee's final recommendations largely told SaskPower to carry on, with language like "continue to invest in generation, transmission and distribution infrastructure;" "continue to ensure that a consistent and reliable amount of baseload energy is made available;" "continue to evaluate carbon capture and sequestration options;" "continue to work with neighbouring provinces and states to establish and strengthen interties and connections;" and "continue to add renewable energy sources to the generation mix" (Legislative Assembly of

Saskatchewan, 2010, p. 35-6). The Opposition members on the Standing Committee on Crown and Central Agencies refused to fully endorse the report, providing a minority opinion that argued:

> As can be seen from the finished report, the recommendations call primarily for SaskPower to continue doing what it has been doing, and fails to provide significant direction to either the Crown corporation or the Government of Saskatchewan which we maintain must play a significant role in supporting and encouraging alternative practices in producing power and getting it to the consumer (Legislative Assembly of Saskatchewan, 2010, p. 53).

While SaskPower is working to somewhat increase its reliance on renewable sources of energy, it has every intention of continuing to rely heavily on coal and natural gas. During a legislative hearing, the Opposition's critic for SaskPower asked, "In terms of a mix that SaskPower thinks would be the best mix, using non-renewable and renewable energy sources, what is the mix, the optimal mix at this point in time?" Then-SaskPower CEO Robert Watson responded by saying:

> That's a fairly dynamic question and it probably changes every day and every year for sure. Certainly our recommendation is to keep the model de-risked. In other words, don't go too far dependent upon one technology in that gas-burning plants seem to be the flavour of the day because gas is so cheap today. We firmly believe that it's not going to be cheap for the long term but also we shouldn't depend on gas, you know. … Over the next 40 years, gas will go up to about 40 per cent of the total of the fleet. Coal will drop to about 30 per cent just by protecting the fleet, and then we'll make the rest up with, you know, arguably renewables" (Legislative Assembly of Saskatchewan, 2013p. 383).

SaskPower's 2013 Annual Report states that it has a target of having nearly 30 per cent of its overall generation capacity consist of non-thermal fuel sources by 2016 (SaskPower, 2014b). However, SaskPower insists that, "it's not practical for us to go, business-wise, for us to go [beyond 10 per cent wind power], now if somebody wants to tell us to do something different, that's fine. But practically, business-wise, it's not practical above 10 per cent" (Legislative Assembly of Saskatchewan, 2013p. 383).

About 80 per cent of SaskPower's current generation capacity is supplied by its own assets – three coal-fired stations, seven hydroelectric stations, six natural gas stations and two wind facilities (SaskPower 2014b). SaskPower also has long-term power purchase agreements (PPAs) with several IPPs amounting to an additional 840 MW of capacity:

- NRGreen Power Limited Partnership, for 20 MW from four heat recovery facilities;
- ATCO Power Canada Ltd., in a joint partnership for the 228 MW natural gas-fired Cory Cogeneration Station near Saskatoon;
- TransAlta and Husky Energy, for the 210 MW natural gas-fired Meridian Cogeneration Station near Lloydminster;
- Northland Power Inc., for an 86 MW natural gas peaking facility in Esterhazy and a 260 MW combined cycle natural gas facility in North Battleford;
- Concord Pacific Group, for the 26.4 MW Red Lily Wind Energy Facility near Moosomin; and
- Suncor Energy Inc. and Enbridge Inc., for the 11.2 MW SunBridge Wind Power Facility near Gull Lake.

The government has also approved twenty-six environmentally friendly power projects, amounting to about 83 MW of capacity, through SaskPower's Green Options Partners Program. The most recently available information regarding SaskPower's Small Power Producers Program shows that there are just 10 participants in the program operating 12 projects – nine wind, one waste heat, one solar photovoltaic, and one combined heat and power. These projects receive $0.09802 per kWh, escalating at two per cent per year over a 20-year contract (Kozoriz, 2012). SaskPower also operates a net metering program. In 2013, there were just 362 customers in the program. SaskPower's former CEO attributes the low uptake to the lack of subsidy:

> We don't subsidize it like other jurisdictions do. Like there's no feed-in tariff or anything like that. We don't subsidize that for net metering, but it is a benefit to people who have particularly varying loads and stuff like that. … We are particularly looking at what went wrong elsewhere, that certainly in our humble view there's other jurisdictions that put in a feed-in tariff that made the wrong people profit. … And what it did is concentrated the

> benefits to a select few, quite frankly, in other jurisdictions (Legislative Assembly of Saskatchewan, 2013, p. 380-1).

The government also established the SaskPower Self-Generated Electricity Demonstration Project for Rinks in 2011, installing wind turbines at municipal ice rinks in Central Butte, Eatonia, Shaunavon and Strasbourg. The government says that, "the data SaskPower obtains will help guide future programming decisions around customer self-generation and energy efficiency, for ice rinks and other commercial operations" (SaskPower, 2011). SaskPower's current 10-year plan includes adding 1,450 MW of new generation by 2023, 70 per cent of which will be owned by IPPs, including natural gas, coal with CCS technology, wind, hydro and biomass (SaskPower, 2014b).

Advocates for the protection of Crown corporations in Saskatchewan have fought against power-purchase agreements (PPAs). The advocacy group Save Our Saskatchewan Crowns (2012) says:

> Rather than encouraging investment in new power infrastructure and power generation, the government is looking to shift money and control of our electricity to private out-of-province companies. … As SaskPower customers, the owners and shareholders of the Crown Corporation, why are we on the hook for rate increases while private producers are reaping all the benefits? As the Saskatchewan government continues to sell off the province's power, one PPA at a time, we must ask ourselves what the future will hold 20 years from now. Will we be paying private out-of-province companies five times more than what it would cost to produce power ourselves and has that process already begun?

Save Our Saskatchewan Crowns (2013) also says:

> Nearly 20 per cent of the power produced in the province in the coming years has been privatized through Power Purchase Agreements that take money away from the Crown and into profits for non-Saskatchewan-based companies like Northland and Algonquin Power of Ontario. … The government is taking away precious resources from SaskPower and is making the ideological decision to divert revenue from power rates to pad private corporate profits instead of improving the public grid.

However, despite this relatively limited criticism, a renewable energy lawyer says the move toward increased use of PPAs and IPPs has been an evolution that has largely occurred without a lot of public attention or even interest:

> If we look at public policy 10 years ago, there was a lot of talk about the benefits and opportunities surrounding renewable energy, but nothing really happened. ... This all changed about maybe seven or eight years ago with SaskPower looking at different ways to procure power. And it was at that time, the monopoly utility in Saskatchewan said, look, what we're going to do is we're going to go out to the market, we're going to run RFPs, and we're actually going to let independent power producers design, build and operate generation facilities here in the province and we're just going to buy power from them at an agreed rate. ... So it's just been a rather slow evolution over the last few years where there's been more and more independent power producers doing more and different projects in the province (interview 8).

The discourse coalition challenging the increased reliance on PPAs and IPPs has failed to effectively advance their storyline, so the dominant storyline and the broad political approach has remained largely unchallenged.

The dominant storyline around the general policy direction with regard to the province's electricity sector has been as follows: Saskatchewan has a 300-year supply of coal, which can be used to generate affordable electricity and fuel economic growth in the province, so it just makes good sense to continue relying on coal; by investing in CCS technology, Saskatchewan is leading the world and will be able to benefit from that by selling our technology and knowledge; SaskPower already has a diverse generation mix and will continue to rely on a variety of sources, including affordable renewable options, well into the future. The discourse coalition – the various actors that produced and used this storyline – consisted of the government and SaskPower. The *coordinative*, behind-the-scenes discourse focused on a variety of factors, including: minimizing the impact of the federal government's new regulations respecting coal-fired power plants; delivering affordable power to Saskatchewan families and businesses; and using energy policy to achieve other policy objectives, such as increased investment (interviews 1, 4, 5 and 9). The

communicative discourse, which takes place in the public, focused primarily on delivering a high quality of life and a prosperous economy by providing reliable electricity at an affordable rate for Saskatchewan families and businesses. This dominant discourse served to restrict transformation of the socio-technical regime and led to $1.4 billion being poured into a single, regime-reinforcing CCS project.

Several of the early TIS functions are relevant to the Saskatchewan case:

- *Entrepreneurial experimentation* – the province is still heavily engaged in experiments and demonstrations to prove the usefulness of niche innovations, mainly CCS, but also wind power through projects like its ice-rink pilot project;
- *Knowledge development* – Saskatchewan is pouring a lot of resources into developing knowledge, primarily around CCS, with a small amount of resources going toward developing knowledge about other technologies;
- *Knowledge diffusion* – the majority of Saskatchewan's efforts on knowledge diffusion are focused on CCS; in 2012 alone, the VP of CCS spent $80,000 on out-of-province travel to workshops and conferences. SaskPower's former CEO said, "what we're really trying to do is monetize and materialize the lessons learned. So you have to go to conferences and you have to actually see suppliers" (Legislative Assembly of Saskatchewan, 2013, p. 395).

The remaining TIS functions are not particularly well fulfilled in the Saskatchewan context. *Guidance of the search* and *resource mobilization* are almost exclusively focused on CCS technology; *market formation* is extremely minimal; and *support from advocacy coalitions* is relatively weak and scattered (interview 6), with some advocacy groups focusing on protecting SaskPower from any perceived privatization, including any PPAs with private corporations, and other advocacy groups focused on ensuring SaskPower never pursues nuclear power generation. As a result, Saskatchewan appears to have developed only one of the TIS motors, as specified in Suurs' (2009) typology of motors, the *science and technology push motor*, which explains the very minimal progress it has made along the *transformation* pathway.

7.4 Involvement of First Nations in the Electricity Sector in Saskatchewan

Saskatchewan is home to 74 First Nations consisting of five groups: Nêhiyawak (Woodland Cree, Swampy Cree and Plains Cree peoples), Nahkawininiwak (Saulteaux or Anishnaabe peoples), Denesuline (Dene or Chipewyan peoples) and the Dakota, Lakota and Nakota (Sioux) peoples. There are roughly 110,000 First Nations individuals in the province (AANDC, 2013). Treaties 2, 4, 5, 6, 8, and 10 cover the province, and were signed between 1871 and 1907 (AANDC, 2010b).

The history of Saskatchewan's electricity development is marred by abuses of First Nations (Rude, 2013; interviews 1, 2, 5, 7, 9 and 10). For example, referring to the Island Falls hydroelectric development, which was discussed in the introductory chapter, Rude (2013) asserts that:

> They see this power plant as being their residential school. They see a lot of their challenges flowing from that, the loss of their status because of the construction of the plant, the marginalization by the company at the time, the marginalization by other First Nations as kind of secondary citizens, because though they reclaimed their status in 1985 under Bill C-31, but they're treated differently than other in Peter Ballantyne Cree Nation, so these are the things that they raise constantly with us.

However, the legacy of poor treatment has primarily been limited to a few First Nations in northern Saskatchewan, and mainly due to hydro development; unlike other provinces, there have not been significant, lasting conflicts over transmission projects (interview 9).

The Legislative Standing Committee on Crown and Central Agencies, as part of the recommendations coming out of its inquiry into the future of the province's electricity sector, specifically recommended that "the Government of Saskatchewan ensure First Nation and Métis peoples continue to be involve in evaluating and participating in future energy options" (Legislative Assembly of Saskatchewan, 2010, p. 37). During the committee's public hearings, several witnesses emphasized the need to open up space for First Nations to participate in the

province's electricity sector. Trent Blind, the CEO of George Gordon First Nation Holdings Inc. said, "First Nations want to be part of the solution as the sustainable nature of wind aligns with our beliefs about stewardship of the land and our relationship with Mother Nature" (Legislative Assembly of Saskatchewan, 2010, p. 11). Councilor Nataweyes of Peter Ballantyne Cree Nation said:

> We should be given priority status in becoming hydro development partners with SaskPower and Saskatchewan in the northeastern region. … We could provide the stimulus to move the projects forward and help meet the rural electrical demand in northeastern Saskatchewan and elsewhere. We are ready to enter a new era of co-operation and partnership with SaskPower and Saskatchewan to work towards a positive energy future (Legislative Assembly of Saskatchewan, 2010, p. 20).

The committee's final report recognized that, during public hearings, "First Nations and Métis involvement in power production was seen as a great opportunity for economic development in their communities and for a strong, provincial economy" (Legislative Assembly of Saskatchewan, 2010, p. 20).

Around this time, the Meadow Lake Tribal Council and the Black Lake First Nation managed to negotiate tentative long-term power purchase agreements with SaskPower, for a biomass project and a hydroelectric project, respectively (interviews 1, 2, 5, 7 and 10). Both projects are still in progress, however the initial success of these projects sparked an increased appetite amongst other First Nations in the province (interview 7). A former chief of the Federation of Saskatchewan Indian Nations (FSIN) says that, "probably 100 per cent or maybe 95 per cent of [First Nations in Saskatchewan] would want in on a power intiative" (interview 7). Because of this strong appetite to be involved in the electricity sector, the former FSIN chief also says:

> What we really wanted to do is to change the relationship with our stakeholders in government. Instead of continually kind of pointing the finger back at one another for not doing enough, we really had to take a look at what our strengths were. And some of those strengths were in collaboration, in a unified group of First Nations, and so we wanted to

> look and learn from some of the examples from around the province that we had already established, and building of institutions like the Saskatchewan Indian Federated College, back in the 1970s, the establishment of the Saskatchewan Indian Gaming Authority, back in the 1990s. We said we need another economic development opportunity similar to the Indian Gaming Authority, which was a big boost in terms of employment opportunities for First Nations in Saskatchewan. … One area that the government had identified, and we identified, at least in previous conversations I had had with former leaders, is what if First Nations were to establish a SIGA-like entity, except looking at opportunities in alternative energies and power generation. … We felt that this was a way to create wealth and opportunity, not only for contracting and construction of these things, but also for long-term, steady revenue streams besides gaming revenue streams. We were looking at the resource sector as the next great opportunity for us to benefit from. Unless there's a unified group similar to the gaming authority, with real human capacity at the helm of it, one-offing each project might have also been too costly and too time-consuming. And when you're getting behind something like this, you really have to hit the ground running and get out of the gates early. … So the province thought, okay, we need a partner that can help to deliver and bring these groups under an umbrella. That umbrella eventually became the First Nations Power Authority (interview 7).

In spring 2011, the provincial government, SaskPower, and the newly established First Nations Power Authority (FNPA) signed a memorandum of understanding intended to "help the province's First Nations advance their power generation projects" (Saskatchewan, 2011). The provincial government proclaimed:

> Many Saskatchewan First Nations are already pursuing economic development opportunities through potentially owning and operating power generation projects … This will result in a higher probability of viable, long-term sustainable First Nation economic development opportunities while helping SaskPower meet the province's electricity supply needs" (Saskatchewan, 2011).

Leah Nelson-Guay, FNPA CEO, says,

> We arose out of a need, of growing interest among First Nations and IPPs to work to develop power projects here for SaskPower, and our role here is to facilitate the development process. We're looking primarily to ensure full disclosure to First Nations on the project development process, the requirements, the timelines, the investments, to keep them in alignment with what the needs are (Nelson-Guay, 2013).

An FNPA representative says that:

> The biomass project at Meadow Lake was essentially the impetus for FNPA. As they began that development process, they recognized that, not only for First Nations, but for any new entrants into the power sector, it's a very difficult industry to enter. There's a steep learning curve, there's a lot of regulation, and there's a lot of expertise and

> knowledge that's needed to properly navigate that whole process. So it was recognized, as Meadow Lake was doing its work, that a provincial entity would be very useful (interview 10).

The provincial government saw an organization like the FNPA as an opportunity to better coordinate the potential First Nations electricity projects (interview 7).

> In 2009, the Honourable Bill Boyd, Minister of Energy and Resources, noticed a revolving door at his office, whereby many Aboriginal businesses were professing that their ideas for energy generation were not being addressed by SaskPower. Mr. Boyd had the idea to consolidate these ideas for energy generation by the First Nations businesses. At first, the Meadow Lake Tribal Council was put in place as this intermediary, and they immediately recognized the opportunity of this. This would be one place, a depot of sorts, where the First Nations businesses could bring their concepts and where they could be professionally addressed and, if feasible, brought forth to SaskPower. MLTC carried this responsibility for a while, yet since the MLTC had vested interests of their own, the formation of the First Nations Power Authority became the inevitable solution (EHRC, 2012).

According to Minister Boyd, a key motivating factor for the establishment of the FNPA was to spur increased First Nations investment and employment:

> Well, I think the economics drive the discussion [around planning for the electricity sector, but] I think there's also some public policy questions around that. I think that was part of the discussion around the First Nations Power Authority, was driven as not just about economics but about initiatives in terms of First Nations investment and employment. That was a part of the discussion. I don't think it's always just simply economics. I think there's a number of things that go into that discussion and then you sort of try and, you know, prioritize them from there (Legislative Assembly of Saskatchewan, 2013p. 385).

SaskPower says its relationship with the FNPA "is critical in aligning First Nations' interest in developing power generation projects with SaskPower's need to establish new generation supply" (SaskPower, 2013a, 26). SaskPower CEO Robert Watson says:

> We signed a memorandum of understanding with the First Nations Power Authority. This is a body that is now going out and with a standard to look for particular power opportunities throughout the First Nations in the province. We have allocated them an initial 10 megawatts that we will guarantee that we'll develop for them, if under the right economic terms, and then future considerations. So we actually at SaskPower have funded them for $100,000 a year for three years in order to get them going. They are to be consultation, administration, and support for First Nations across the province in order to

> identify and bring forward power opportunities. We think that's a significant step forward (Legislative Assembly of Saskatchewan, 2013p. 386).

An interview participant who wears several hats related to this research, and who brings a First Nations perspective to the discussion, says that:

> The province, through the FNPA and SaskPower, made a concerted effort to begin to work with First Nations in power generation and on a number of different fronts. … So what happened is that the province began to change policy, with respect to SaskPower, and engaging First Nations in power generation projects. Previously, decades ago, SaskPower was the only agency that developed power generation in this province. When the Sask. Party came in, they said, no, no, we want to be more industry friendly, so they mandated that, in the future, all new power generation projects would be done by the private sector. … And, you know, what SaskPower recognizes is the new reality of today concerning the Duty to Consult and Accommodate, it's highly unlikely that any major power generation project in this province would come about without impinging on some First Nation territories. … So realizing that they passed two policies – the Aboriginal procurement policy and the Aboriginal investment policy – which opened the door for them to begin to meaningfully engage First Nations in the development of power projects (interview 5).

There is not a significant degree of consensus about this approach and the efficacy of the FNPA is certainly under dispute. For example, a wind power proponent says, "I basically think the FNPA is a clever little rouse by SaskPower to stick all the First Nations in a box and manage them" (interview 3). On the other hand, a SaskPower employee disagrees: "No, I wouldn't say it's to put them into a box, I think what we're trying to do is build knowledge and capacity in First Nations communities about power generation projects" (interview 9).

In terms of the overlap of its own strategic interests and First Nations' ability to participate in the sector, SaskPower identifies that the main focus is on hydro, wind, forestry biomass, heat recovery, and natural gas (Rude, 2013) (Figure 7-1).

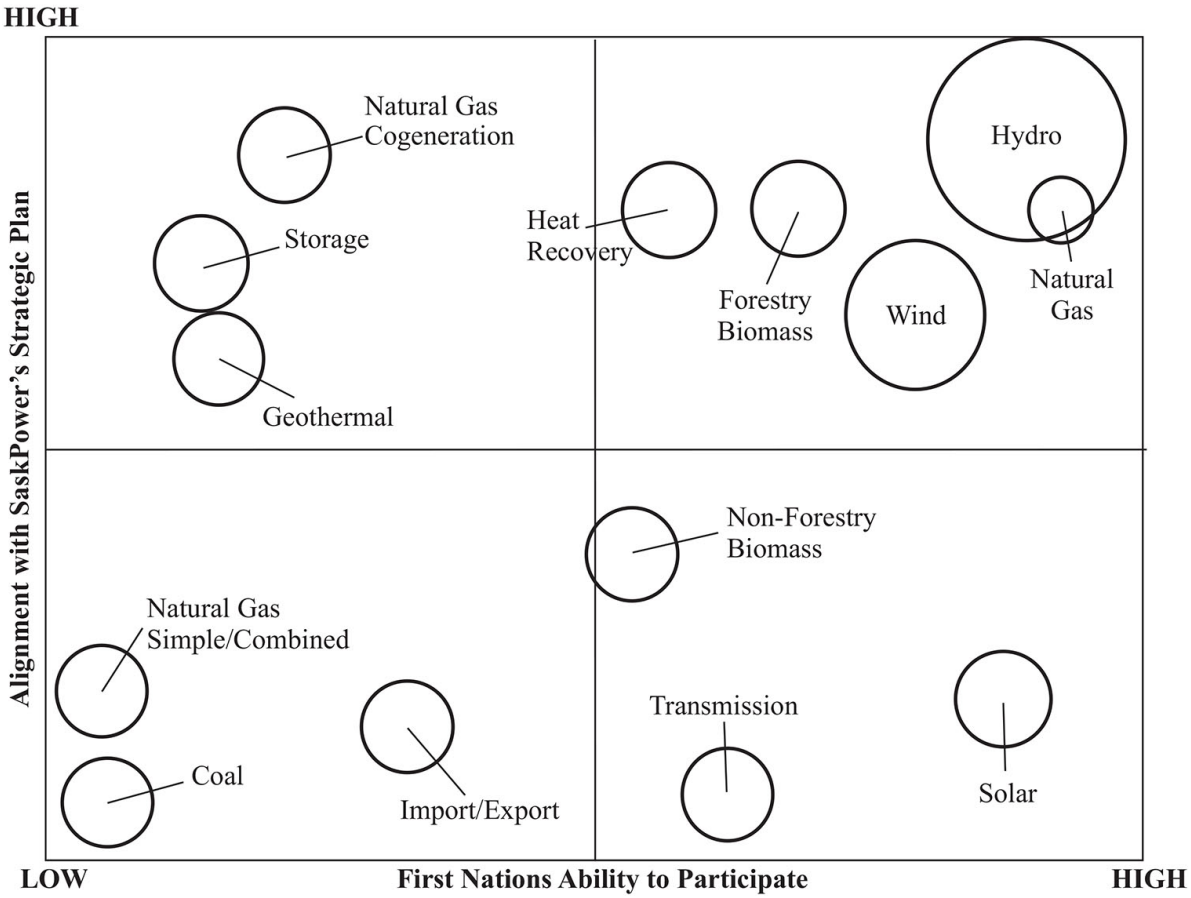

Figure 7-1. SaskPower's assessment of First Nations participation (Rude, 2013)

Currently, no First Nations are generating electricity in Saskatchewan. There is one 36-MW biomass project under development, which is owned by nine First Nations, through their tribal council. A 50-MW hydroelectric project, which would be a partnership between SaskPower and one First Nation, is in the final stages of approval. And one 800-kW energy storage demonstration project, which is a partnership between one First Nation and the Saskatchewan Research Council, is under development.

In October 2011, the provincial government and SaskPower announced approval of a 25-year PPA with the Meadow Lake Bioenergy Centre, a 36-MW biomass project led by the Meadow Lake Tribal Council (MLTC). The Minister Responsible for SaskPower said:

> This is the first project to come through the support of FNPA, which reflects the vision of the Government of Saskatchewan to actively engage First Nations in the province's growing economy. The project will have a direct and positive impact on the local community and surrounding area, while adding greener and cleaner energy to Saskatchewan's power grid (SaskPower, 2011).

In 2011, Black Lake First Nation in the far north of the province invited SaskPower to partner with it in the Tazi Twé Hydroelectric Project. In February 2013, SaskPower signed an agreement-in-principle to proceed with the project, which is expected to generate 50 MW of electricity beginning in December 2017. This would be the first power production facility built entirely on First Nations land within Saskatchewan (SaskPower, 2013b).

In 2012, SaskPower signed a 20-year PPA with Cowessess First Nation for the 800-kW wind storage demonstration project near Regina, on which it is partnering with the Saskatchewan Research Council (SRC) (SaskPower, 2013a). Cowessess First Nation (2013) says that this project is "North America's first wind turbine and lithium-ion battery system." The SRC says, "this project allows SRC and Cowessess the exciting and innovative opportunity to develop and evaluate a variety of strategies and to demonstrate the potential benefits of coupling energy storage with wind energy" (Cowessess First Nation, 2013).

This research reveals that many of the key elements identified in the literature as necessary for successful First Nations participation in the electricity sector (Krupa, 2012; Henderson, 2013) were not fulfilled in Saskatchewan to nearly the same extent as in Nova Scotia or Ontario (interviews 1, 2, 3, 5, 7, 9 and 10). The government's embrace of clean energy projects has been relatively minimal, with its main focus instead on regime-reinforcing CCS technology. The government has created the FNPA as an agency to help First Nations navigate the complicated process of seeking to enter the electricity sector, but the government has not created easy mechanisms that facilitate the sale of electricity to the grid, such as the COMFIT in Nova Scotia or the FIT in Ontario. On a number of First Nations, there are committed and capable local

leaders serving as project champions, and strong governance to support the projects and ensure accountable and transparent financial management (interviews 2, 5, 7, 9 and 10). However, partnerships with private sector companies that can help to increase the capacity, capability and confidence of First Nations are actually somewhat difficult to access (interviews 2, 5 and 7).

7.5 Conclusion

Saskatchewan's electricity socio-technical regime faced a variety of pressures, including aging infrastructure and rising demand. The most significant pressure was the external climate change policy agenda. However, none of these pressures have been significant enough to force meaningful change upon the province's electricity socio-technical regime. Saskatchewan has largely responded to these pressures by adopting CCS technology, which reinforces the existing system and ensures that coal-fired generation will remain a big part of the province's electricity generation mix well into the future. As a result, while Saskatchewan has taken very minimal steps along a *transformation* pathway, it has largely proceeded down a *reproduction* path.

The minimal progress Saskatchewan has made along the *transformation* pathway can be explained by the relatively weak fulfillment of the TIS functions. *Entrepreneurial experimentation*, *knowledge development, knowledge diffusion*, *guidance of the search*, and *resource mobilization* are all heavily focused on regime-reinforcing CCS technology. *Market formation* is almost non-existent and *support from advocacy coalitions* is comparatively weak and scattered. As a result, Saskatchewan has only developed the most immature TIS motor: the science and technology push motor.

Political dynamics have played a significant role in the trajectory of Saskatchewan's electricity system. The dominant storyline used by the government and SaskPower has focused on the fact that: Saskatchewan has a 300-year supply of coal, which can be used to generate

affordable electricity and fuel economic growth in the province, so it just makes good sense to continue relying on coal; by investing in CCS technology, Saskatchewan is leading the world and will be able to benefit from that by selling our technology and knowledge; SaskPower already has a diverse generation mix and it will continue to rely on a variety of sources, including affordable renewable options, well into the future. The discourse coalition – the various actors that produced and used this storyline – consisted of the government and SaskPower. The *coordinative* discourse focused on minimizing the impact of the federal government's new regulations respecting coal-fired power plants; delivering affordable power to Saskatchewan families and businesses; and using energy policy to achieve other policy objectives. The *communicative* discourse focused primarily on delivering a high quality of life and a prosperous economy by providing reliable electricity at affordable rates to Saskatchewan families and businesses. This dominant discourse served to restrict transformation of the socio-technical regime and led to $1.4 billion being poured into a single, regime-reinforcing CCS project.

Despite the heavy focus on CCS and minimal changes to the socio-technical regime, the government has opened up space for IPPs to participate in the electricity sector. Currently, a bit less than 20 per cent of SaskPower's electricity comes from IPPs. Over the next decade, SaskPower intends to add 1,450 MW of new, approximately 1,015 MW of which will be owned and operated by IPPs. The government also helped to establish the First Nations Power Authority, which is mandated to strengthen the capacity of First Nations to participate in and benefit from the electricity sector. While no First Nations are yet generating electricity in the province, projects amounting to about 87 MW, involving 11 First Nations, are currently in progress.

Table 7-2 outlines the operationalization of the analytical framework in Saskatchewan.

Table 7-2. Operationalization of analytical framework in Saskatchewan

Concept	Key dimensions	Saskatchewan case
Socio-technical regime	Various components (policy, science, technology, industry, markets/user preferences and culture) that serve to stabilize and support the existing institutions	- Centralized generation, primarily coal- and gas-fired, operated by a publicly owned monopoly
Niche-level innovations	Different technologies, actors, networks and institutions than those stabilizing and supporting the existing institutions	- *Technologies:* Main emphasis on CCS with peripheral focus on increasing reliance on IPPs - *Actors:* First Nations Power Authority, IPPs
Landscape	Natural environment, macro-economy, political culture, demographic characteristics and worldviews	- Minimal regime-destabilizing effects at the landscape level, including little pressure for action to mitigate climate change
TIS Functions	TIS functions: (1) entrepreneurial experimentation; (2) knowledge development; (3) knowledge diffusion; (4) guidance of the search; (5) market formation; (6) resource mobilization; and (7) support from advocacy coalitions TIS motors: (1) science and technology push (STP) motor; (2) entrepreneurial motor; (3) system building motor; and (4) market motor	- *Entrepreneurial experimentation*, *knowledge development, knowledge diffusion*, *guidance of the search*, and *resource mobilization* are all heavily focused on regime-reinforcing CCS technology - *Market formation* is almost non-existent and *support from advocacy coalitions* is relatively weak and scattered. - Saskatchewan has only developed the most immature TIS motor, the STP motor.

Concept	Key dimensions	Saskatchewan case
Storyline	Narratives, structuring ideas and themes, problem framing, metaphors, analogies, historical references, appeals to fear or guilt, cognitive and normative ideas	- Saskatchewan has a 300-year supply of coal, which can be used to generate affordable electricity and fuel economic growth in the province, so it just makes good sense to continue relying on coal - By investing in CCS technology, Saskatchewan is leading the world and will be able to benefit from that by selling our technology and knowledge - SaskPower already has a diverse generation mix and it will continue to rely on a variety of sources, including affordable renewable options, well into the future
Coordinative discourse	Behind-the-scenes discussions and negotiations involving elected officials, civil servants, experts and interest groups	- Minimizing the impact of the federal government's new regulations respecting coal-fired power plants - Delivering affordable power to Saskatchewan families and businesses - Using energy policy to achieve other policy objectives (i.e., increased investment and employment of First Nations)
Communicative discourse	Public discussion of ideas and public announcements of decisions	- Delivering a high-quality of life and a prosperous economy by providing reliable electricity at affordable rates to Saskatchewan families and businesses
Discourse coalitions	The coalition of actors producing and using a particular storyline	- Government and SaskPower using dominant storyline
Effects of discourse	Key actors' use of ideas, concepts and categories	- Minimal public debate over reliance on fossil fuel-based electricity generation
	Effects on government policy and organizational practice	- $1.4 billion investment in CCS project - Establishment of a variety of relatively small programs to support increased reliance on renewable power - Establishment of First Nations Power Authority

Concept	Key dimensions	Saskatchewan case
Transition dynamics	Changes in the regime	- Minimal changes in the regime - A niche innovation is being used to reinforce the regime - Regime rules are being slightly adjusted to allow for increased use of IPPs, including but not limited to those generating electricity using renewable sources

CHAPTER 8
CONCLUSION

This dissertation is aimed at answering two specific questions: (1) how can the various elements of sustainability transition studies be combined and augmented to develop an integrated sustainability transition framework that is relevant to the Canadian context? And (2) how can insights provided by an integrated sustainability transition framework help us understand the likelihood of First Nations participation in sustainable electricity transitions? The nature of these research questions requires that I first develop an integrated sustainability transition framework, drawing on the existing literature as well as this research, and then extend that framework to address the issue of First Nations participation in sustainable electricity transitions. In this chapter, I outline my answers to each of the research questions; unpack the conclusions at which I have arrived; discuss relevant insights and potential recommendations for policy makers and First Nations leaders; outline the contributions to knowledge achieved through this dissertation; and discuss possible avenues for further research.

Based on this research, I assert the following conclusions to answer the first question:

- The MLP provides a sound and adequate heuristic framework to outline and explain the various complex dynamics that are involved in sustainability transitions of electricity systems;
- In particular, the MLP framework provides useful insights into whether or not a window of opportunity will open that allows a sustainability transition to occur;
- The typology of transition pathways (Geels & Schot, 2007) provides valuable insights into the likely direction of the transition;
- The various TIS functions specified by Bergek et al. (2008), Suurs and Hekkert (2008) and Suurs (2009), combined with Suurs' (2009) typology of TIS motors, add an important

element of agency to the framework and provide beneficial insights into the rate of progress along the particular transition pathways;

- Hajer's (1993; 1995) discourse coalition theory adds depth, by inserting an even greater degree of agency into the framework, and by explaining the political dynamics involved; and

- By combining elements of the MLP and TIS frameworks, and supplementing them with elements of discourse coalition theory, I propose an integrated sustainability transition framework that is helpful, robust, and advances the field of sustainability transition studies.

In answer to the second research question, I assert the following conclusions:

- An integrated sustainability transition framework, which incorporates the relevant political dynamics and specific functions needed for successful First Nations involvement, can provide a helpful understanding of First Nations participation in sustainable electricity transitions;

- Successful First Nations participation is more likely to occur where governments are actively seeking to engage in reconciliation efforts and resurgence support, where governments have a strong focus on extending opportunity and prosperity to First Nations communities, and where governments are proud of such efforts and do not see them as a political liability;

- The type of political dynamics that are needed include an embrace of distributed, clean energy projects and a deliberate choice to open space for new actors to participate in the sector, including mechanisms that facilitate the sale of electricity to the provincial grid, and other government policies and programs that foster participation in the sector. Such dynamics create the opening for First Nations actors at the niche level to enter the socio-technical regime;

- In order to achieve the momentum needed to take advantage of the window of opportunity, First Nations actors need a project champion, stable governance, access to cash, partnerships with the private sector, and must ensure that the focus remains on sustainable development and delivery of benefits to the entire community. The fulfillment of these functions serves as a launching pad through the window of opportunity and into the socio-technical regime.

In the following sections, I unpack and explore these conclusions and present my integrated sustainability transition framework, with two versions: the first focusing on the specific functions related to technological innovations, which answers my first research question;

and the second focusing on the specific functions related to First Nations participation in electricity transitions, which answers my second research question.

8.1 An Integrated Sustainability Transition Framework

The electricity sector is highly complex, especially due to the layering of multiple generation technologies and the central role of electricity in both economic development and public welfare. This makes it difficult to cleanly apply sustainability transition theory to this particular sector (Rosenbloom and Meadowcroft, 2014). Nevertheless, the insights offered by the field of sustainability transition studies are highly useful for improving our understanding of the various dynamics involved in transitions of electricity sectors.

The MLP provides a sound and adequate heuristic framework to outline and explain the various complex dynamics that are involved in sustainability transitions of electricity systems. In particular, the MLP framework provides useful insights into whether or not a window of opportunity will open that allows a sustainability transition to occur within a particular electricity system. Each of the three provinces discussed in this dissertation experienced landscape-level pressure. Nova Scotia faced a decline in domestic coal supplies; the soaring costs of importing coal; public resentment toward the privatized electrical utility; the trend toward increased competition within electricity systems elsewhere; and the growing pressure for climate change mitigation. Ontario also experienced growing calls for climate change mitigation, but more importantly, it faced the impact of coal-fired electricity generation on population health; the blackout of August 2003 and subsequent demand for a more resilient electricity system; as well as the economic crisis of 2008 and 2009, and the resulting pressure to spur investment and create jobs. Saskatchewan faced aging infrastructure and demand growth, but the most significant landscape pressure it faced was the external climate change policy agenda, in particular the

federal government's new regulations for coal-fired power plants. The pressure on the existing socio-technical regime was especially strong in Nova Scotia and Ontario, and it was less strong in Saskatchewan, as is made clear by the fact that Saskatchewan successfully negotiated a reduction in the severity of the landscape pressure by partnering with other coal-based power utilities to get the federal government to pare back its regulations for coal-fired power plants.

Nova Scotia, Ontario and Saskatchewan responded differently to the pressures each of them faced. Nova Scotia brought in relatively aggressive targets for renewables and for GHG emission reductions, instituted hard caps on Nova Scotia Power's emissions, and established the COMFIT program to support distributed generation. As a result, Nova Scotia has implemented 89 COMFIT projects and, with other renewable projects added in, is well on its way to achieving 25 per cent renewables by 2015 and 40 per cent by 2020. Ontario chose to force coal-fired electricity generation out of its electricity regime and, through initiatives such as the FIT program, is ramping up its reliance on renewable energy and moderately increasing natural gas-fired generation to make up for the roughly 25 per cent of its generation mix previously supplied by coal. While Saskatchewan has undertaken some measures to increase reliance on renewable power, the vast majority of its resources have been devoted to CCS technology, which is serving to reinforce its coal-dominated electricity system. Clearly, the socio-technical regimes in Nova Scotia and Ontario were not able to withstand the landscape pressure and the criticism from outside voices that each of them faced and, as a result, a window of opportunity opened allowing a degree of change in their socio-technical regime. In Saskatchewan, the socio-technical regime has largely been able to withstand the landscape pressure and, as such, is currently being buttressed with regime-reinforcing niche innovations, rather than being significantly disrupted in any way.

The typology of transition pathways (Geels & Schot, 2007) provides valuable insights into the likely direction of the transition. While Saskatchewan has largely remained on a *reproduction* pathway, it is fair to say that all three provinces embarked on a *transformation* pathway, to varying degrees. This pathway tends to be followed when landscape-level pressure occurs at a time when fully developed niche innovations already exist. Regime actors respond to the landscape pressure by adjusting their development paths, including through the adoption of niche innovations that add to the regime without substantially altering its basic architecture. While Nova Scotia and Ontario exhibit some elements of *technological substitution*, it would be inaccurate to characterize those provinces as being on a *technological substitution* pathway, primarily because the niche innovations adopted have not been disruptive to the system. To be characterized as *reconfiguration*, the provinces would have had to adopt niche innovations as a result of problems within the regime, with the aim of improving the regime's performance; these component innovations would have then led to an overhaul of the basic architecture of the regime, or they would be well on their way to doing so. And to be characterized as *de-alignment and re-alignment*, significant landscape pressure would have led to regime actors losing faith and reducing investments in the existing technology, thereby opening up space for multiple niche innovations to co-exist and compete until one becomes dominant and stabilizes into a new regime. In each of the three provinces studied, the changes that occurred were a response to landscape-level pressure and outsider criticism; the niche innovations that were adopted were not disruptive to the existing socio-technical regime; the new actors that were invited to participate in the sector did not displace the incumbent actors; and the new knowledge involved was essentially added on to the existing knowledge. As such, each of these pathways is most appropriately characterized as *transformation*.

The various TIS functions specified by Bergek et al. (2008), Suurs and Hekkert (2008) and Suurs (2009), combined with Suurs' (2009) typology of TIS motors, add an important element of agency to the framework and provide beneficial insights into the rate of progress along the particular transition pathways. As noted in Chapter 4, I do not follow the traditional TIS approach, which focuses on the various dynamics at play in the emergence of new technologies and new products. I do not incorporate the TIS functions in a manner that is focused on moving a *new* technology from the concept phase to the commercialization phase. Rather, my analytical framework generally focuses on the deployment of technologies to new contexts.

In both Nova Scotia and Ontario*, entrepreneurial experimentation*, *knowledge development* and *knowledge diffusion* were not crucial, because the adopted niche innovations were already proven. However, in both of those provinces, the following TIS functions were well fulfilled: *guidance of the search*, with positive and negative signals established through policy directives; *market formation*, with a bridging market; *resource mobilization*, with an array of incentives and support programs; and *support from advocacy coalitions*. In Saskatchewan, *entrepreneurial experimentation*, *knowledge development*, *knowledge diffusion*, *guidance of the search*, and *resource mobilization* are all heavily focused on CCS technology, which reinforces the province's existing electricity socio-technical regime. *Market formation* is almost non-existent in Saskatchewan and *support from advocacy coalitions* is relatively weak and scattered. The fulfillment of these TIS functions help to explain how much progress these provinces have made: Nova Scotia and Ontario are further ahead in their transformation of their electricity systems, in significant part because they have adopted niche innovations that are already proven and stabilized; meanwhile Saskatchewan is heavily focused on proving CCS technology, and expending less resources on adopting proven renewable power innovations.

Hajer's (1993; 1995) discourse coalition theory adds depth, by inserting an even greater degree of agency into the framework, and by explaining the political dynamics involved. In Nova Scotia, the dominant discourse focused on the following storyline: bringing stability and affordability to electricity rates; unshackling from foreign coal; taking back control of the province's energy future; creating good jobs and boosting the economy; leading Canada, North America and the world; creating a cleaner, greener province; all, in significant part, by supporting local, community-based renewable power projects. The discourse coalition in Nova Scotia that produced and used that storyline is best described as a loose blend of government, political parties, First Nations actors, and advocacy groups. In Ontario, the dominant discourse focused on the following storyline: phasing out dirty coal-fired power plants means cleaner air and better health for Ontarians; more renewable energy means new investments in our economy and more jobs for Ontarians; Ontario is leading North America; focusing on distributed generation from smaller, cleaner sources rather than relying exclusively on large, centralized power plants means a more reliable system and more opportunities for smaller power producers, communities, First Nations, and others to become generators. The discourse coalition in Ontario that produced and used that storyline is also best described as a relatively loose coalition of government and political actors and advocacy groups. In Saskatchewan, the dominant discourse focused on the following storyline: Saskatchewan has a 300-year supply of coal, which can be used to generate affordable electricity and fuel economic growth in the province, so it just makes good sense to continue relying on coal; by investing in CCS technology, Saskatchewan is leading the world and will be able to benefit from that by selling technology and knowledge; and SaskPower already has a diverse generation mix and will continue to rely on a variety of sources, including affordable and reliable renewable options, well into the future. The discourse coalition that produced and used that storyline is really best described as government, including SaskPower,

which reflects the relative dominance of the government over the electricity sector in the province. In all three provinces, this discourse has solidified into institutions and organizational practices, thereby fueling TIS motors, and leading to varying degrees of transformation of the socio-technical regime.

By combining elements of the MLP and TIS frameworks, and supplementing them with elements of discourse coalition theory, I propose an integrated sustainability transition framework that is helpful, robust, and advances the field of sustainability transition studies. Chapter Two articulated some of the complementary strengths of the MLP and TIS frameworks, as identified in the literature. In particular, the MLP framework is better than the TIS framework at taking into account the system's broader environment, especially landscape-level dynamics. The TIS framework has a more analytical approach than the MLP framework, because of its elaborated functional analyses, and because of its more explicit incorporation of agency, which is important because the MLP framework is particularly lacking in the conceptual tools to adequately explore niche-level dynamics and it has little to offer with regard to agency.

The integrated sustainability transition framework that I propose (Figure 8-1) incorporates the TIS functions and motors within the MLP framework: (1) the s*cience and technology push motor*, which includes knowledge development, knowledge diffusion, guidance of the search, and resource mobilization; (2) the *entrepreneurial motor*, which adds entrepreneurial experimentation and support from advocacy coalitions; (3) the *system building motor*, which adds support from advocacy coalitions; and (4) the *market motor*, in which support from advocacy coalitions is no longer a crucial element. Fulfillment of the TIS functions serves as the primary explanation for the success of niche innovations at reaching and impacting the socio-technical regime. Put another way, fulfillment of the TIS functions serves as the primary explanation for progress made along a particular transition pathway.

Both the MLP and TIS approaches have largely ignored the role played by politics in sustainability transitions. The integrated sustainability transition framework that I propose explicitly incorporates politics into the framework (note the thick, dashed lines in Figure 8-1). It recognizes that political dynamics can support or hinder developments at the niche level; they can serve to blunt pressure from the landscape level; and they can respond to landscape-level pressure by opening a window of opportunity for change to occur and by creating space for niche-level actors and innovations within the socio-technical regime.

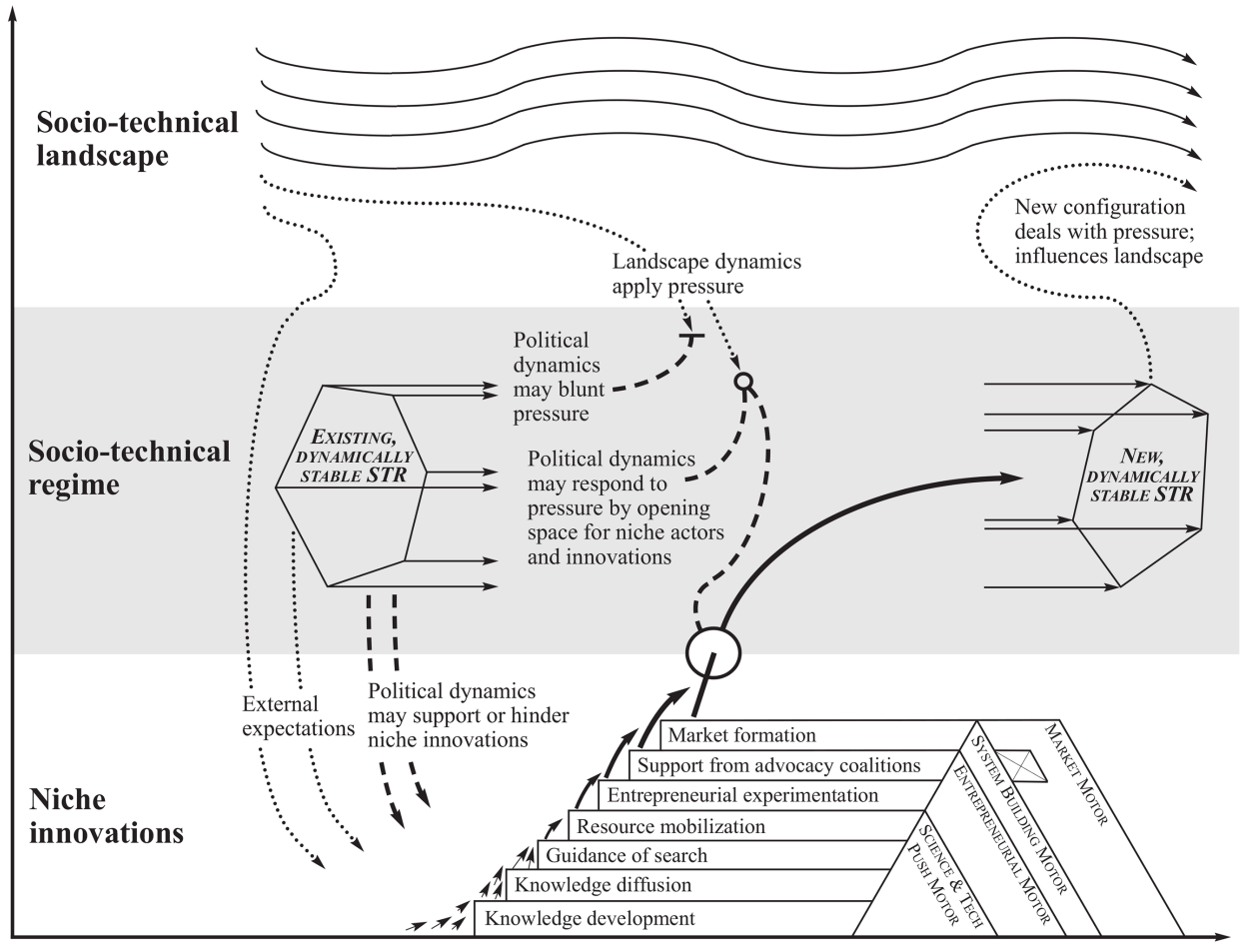

Figure 8-1. Integrated sustainability transition framework

This framework provides an answer to the first research question of this dissertation, which asked how the various elements of sustainability transition studies can be combined and augmented to develop an integrated sustainability transition framework. However, it does not go far enough to address the second research question: how can the insights provided by an integrated sustainability transition framework help us understand the likelihood of First Nations participation in sustainable electricity transitions? TIS functions are focused on specific niche technologies, rather than actor groups. The next section outlines what this research reveals about First Nations participation and presents alternative functions for the integrated framework.

8.2 The Likelihood of First Nations Participation in the Electricity Sector

There are various ways to evaluate the relative success of each of the three provinces covered in this dissertation. From a simple participation perspective, Nova Scotia is undoubtedly the most impressive, with 100 per cent of First Nations in the province participating in the electricity sector; followed by 28 per cent in Ontario; and 15 per cent in Saskatchewan. From a project-based perspective, Ontario leads the way, not surprisingly, with 243 projects; six projects in Nova Scotia; and three projects in Saskatchewan. From a wattage-based perspective, Ontario is far ahead of the pack, with First Nations in that province generating or soon to be generating 690 MW; followed by 87 MW in Saskatchewan; and 27 MW in Nova Scotia. From an average wattage perspective, Saskatchewan tops the list with an average of 43 MW per First Nation project – leaving out the very small demonstration project in the province – followed by a 4.5 MW average in Nova Scotia and a 2.8 MW average in Ontario. And from a relative grid-impact perspective, First Nations electricity generation projects amount to approximately two per cent of available generating capacity in Ontario and Saskatchewan and one per cent in Nova Scotia. While it could be argued that each of these measures is the most worthwhile measure upon which

to focus, I take the view that simple participation combined with average project size is the most useful indicator of relative success of First Nations participation in the electricity sector. Any other measure is too easily distorted by relative size of province or the relative number of First Nations located within the province. Therefore, using what I argue are the most accurate measures, Nova Scotia has clearly had the greatest success in terms of First Nations participation in the electricity sector, followed by Ontario, and then Saskatchewan.

A variety of factors contributed to this relative level of success. At its most basic level, Nova Scotia set out to achieve a significant reduction in coal-fired electricity generation and, as a result, a significant increase in renewable power. Ontario had a similar dynamic to Nova Scotia in that regard. On the other end of the spectrum, Saskatchewan set out to achieve the least in this regard, choosing instead to focus most of its resources on regime-reinforcing CCS technology. Therefore, even just based on the general policy direction in each province, it would be expected that Nova Scotia and Ontario would have a greater level of success than Saskatchewan in terms of First Nations participation.

At another fundamental level, what is undoubtedly a contributing factor to the varying degrees of success observed in this dissertation is the number of First Nations in each province. With just 13 First Nations in Nova Scotia, and with all of them Mi'kmaw, it was comparatively easy for Nova Scotia's First Nations to collaborate on a renewable energy strategy and jointly own renewable power projects. The situation is not so straightforward in Ontario, with 133 First Nations consisting of a variety of linguistic groups, or in Saskatchewan, with 74 First Nations, also consisting of several different linguistic groups. But there are deeper factors at play here then each of the province's general policy directions or the number of First Nations within each of the provinces.

In part to respond to specific landscape pressure, and in part to address particular political dynamics in the province, and in part to respond to lessons learned from FIT programs elsewhere, Nova Scotia specifically chose to introduce a *community-focused* FIT program. That made it relatively easy and straightforward for First Nations in Nova Scotia to participate in the program. Ontario chose to include an Aboriginal price-adder in its FIT program to incentivize partnerships with First Nations communities and businesses. While Ontario's approach has not achieved the same level of success as Nova Scotia, it's success is still quite considerable. Saskatchewan chose to establish the First Nations Power Authority to be a liaison between First Nations, SaskPower and the government and specifically to help negotiate 20-year PPAs. SaskPower does not provide any special financial incentive for First Nations power projects. So far, Saskatchewan has achieved the lowest level of success in terms of First Nations participation in the electricity sector.

What this research also reveals is that successful First Nations participation is more likely to occur where governments are actively seeking to engage in reconciliation efforts, resurgence support, and a strong focus on extending opportunity and prosperity to First Nations communities. And that is especially the case when governments are proud of such efforts and do not see them as a potential political liability. This is not to say that government's efforts in Nova Scotia and Ontario are entirely altruistic and that they did not have to be pushed to act. The case studies in this dissertation make it clear that a series of court cases and protests led governments in both Nova Scotia and Ontario to change their approach to First Nations within their respective provinces. But, despite the less than virtuous records that these provinces had and the need for court cases and protests to prompt action, their commitment to reconciliation and supporting First Nations resurgence is notable – this is especially so for the Nova Scotia government, but also the Ontario government. In Nova Scotia, Premier Darrell Dexter took on the portfolio of Aboriginal

Relations, and his successor, Premier Stephen McNeil, has retained that portfolio. The Dexter government made a concerted effort to work in partnership with First Nations in Nova Scotia, to achieve greater economic and social benefits. Part of that was supporting the development of a Mi'kmaq Renewable Energy Strategy, and collaborating with the Assembly of Nova Scotia Mi'kmaq Chiefs. Granted, a former politician in the Dexter government told me that very few Nova Scotians were paying attention to such matters, so the potential for political backlash was minimal (interview 4). However, that same politician stressed that racism, discrimination and misunderstanding are somewhat rampant in the province, so the government's stand is still notable for the courage and principle that was at its foundation. This almost certainly contributed to the level of success Nova Scotia has achieved in terms of First Nations participation in its electricity sector.

Ontario has had a somewhat similar dynamic to Nova Scotia. Certainly, Ontario was forced to confront some harsh realities because of court cases, various protests, the police shooting of an unarmed First Nations man, the subsequent inquiry into that shooting, and the additional protests that occurred as a result. But the McGuinty government clearly saw reconciliation and resurgence support as one of its priorities and it set out to achieve that in a variety of ways. McGuinty appointed the first Minister of Aboriginal Affairs. McGuinty's government also established Aboriginal set-asides in procurement projects and included an Aboriginal price adder in its FIT program. This was critical to the success of First Nations involvement in the electricity sector in Ontario.

The dynamic in Saskatchewan is a bit murkier. In Saskatchewan, the current government actually eliminated the standalone Ministry of First Nations and Métis Relations in late 2007 and made it a branch of the Ministry of Government Relations. The current government not only shies away from anything considered a 'special deal' for First Nations, but the governing party

has also run attack ads characterizing their opponents as being in favour of 'special deals' for First Nations people (Mandryk, 2013). That said, the current Saskatchewan government did support the creation of the FNPA and signed a long-term PPA with a First Nations-owned biomass plant. It is also pursuing a partnership with another First Nation for a hydroelectric project, and is partnering with another First Nation for a small wind energy storage demonstration project. Despite these few examples, the overall political dynamic in Saskatchewan – in which the current government is loathe to anything that might be deemed a 'special deal' for First Nations – is almost certainly a key contributing factor to the relatively low level of success the province has experienced when it comes to First Nations involvement in its electricity sector.

It is well beyond the scope of this particular dissertation to assess all 220 First Nations in Nova Scotia, Ontario and Saskatchewan, so it is not possible for me to properly factor in the relative capacity, capability and confidence of the First Nations in each province. However, while there is a wide spectrum of First Nations within each province, from quite poor to quite financially secure, I would not anticipate significant differences in the average First Nation profile between the three provinces and I would not anticipate that any such differences would be significant enough to account for differences in the relative level of success observed in this study. Nevertheless, it is noteworthy that the same factors for successful First Nations participation were identified in all three of the provincial case studies.

It is helpful to consider those factors for successful First Nations participation as important TIS functions. While this is a deviation from the TIS literature, I assert that it is a helpful addition to the sustainability transitions field. Drawing on the most relevant literature on First Nations involvement in the renewable electricity sector (Krupa 2012; Henderson 2013), and

drawing on my own research in Nova Scotia, Ontario and Saskatchewan, I propose the following list of factors that contribute to successful First Nations participation in the electricity sector:

1. An embrace of distributed, clean energy projects by governments, utilities and regulators, which provides project proponents with long-term clarity about the electricity sector;
2. Mechanisms that facilitate the sale of electricity to the provincial grid and other government policies and programs that foster participation in the sector;
3. A project champion on the First Nation, and strong, stable governance which ensures an appropriate degree of separation of political and business decisions;
4. Access to sufficient financial resources to enable revenue-generating activities;
5. Partnerships with experienced actors, which not only leverage additional capital, but also bring beneficial knowledge to the table, thereby enhancing the capacity, capability and confidence of the involved First Nations; and
6. A focus on sustainable development, ensuring the projects meets economic, environmental and social standards, and deliver real benefits to the whole community, which in turn leads to greater buy-in and a higher likelihood of long-term success.

In Figure 8-2, I present the same integrated sustainability transition framework that was presented in Figure 8-1, but with different functional analysis. As discussed previously, the TIS functions and motors outlined in the literature (Bergek et al., 2008; Suurs, 2009; Suurs & Hekkert, 2009a; Suurs & Hekkert, 2009b) focus on niche-level technological innovations, and fail to provide sufficient help in understanding the possibilities for non-traditional actors to participate in transitions of socio-technical regimes. As such, in Figure 8-2, I replace the TIS functions with the functions that are applicable to First Nations actors, according to my research. Admittedly, this is a deviation from the TIS literature, but I assert that it is necessary to better understand the potential for non-traditional actors to participate in transitions. In response to landscape pressure, political dynamics (which are noted with the thick, dashed lines in Figure 8-2) must include an embrace of distributed, clean energy projects and a deliberate choice to open up space for new actors to participate in the sector. That opening of space must include

mechanisms that facilitate the sale of electricity to the provincial grid and it must also include other government policies and programs that foster participation in the sector. Those dynamics create an opening for First Nations actors at the niche level to break through and become part of the socio-technical regime. But in order to achieve the momentum needed to take advantage of the window of opportunity, First Nations actors need a project champion, stable governance, access to cash, partnerships with the private sector, and they must also ensure that the focus remains on sustainable development and delivery of benefits to the entire community. The fulfillment of those functions – in a sense, climbing the successive steps – serves as a launching pad through the window of opportunity and into the socio-technical regime.

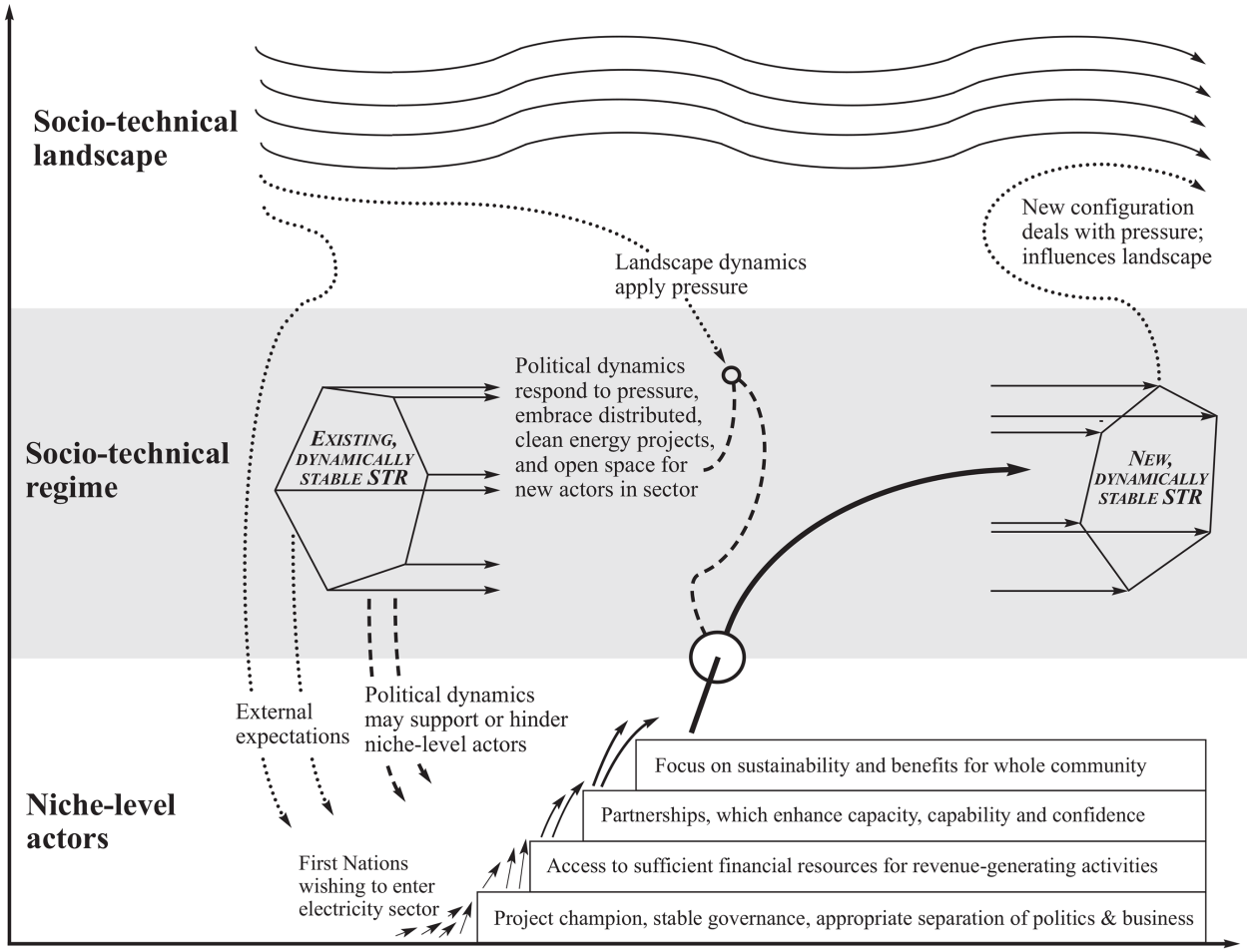

Figure 8-2. Integrated framework – key factors for First Nations participation

8.3 Recommendations for First Nations Leaders and Policymakers

This dissertation is appropriately aimed at *analyzing* policy making, rather than at *prescribing* specific policy approaches. Nevertheless, the insights offered through this dissertation should be informative and enlightening for policy makers, First Nations leaders and stakeholders concerned with sustainability transitions, particularly in electricity systems, as well stakeholders concerned with First Nations sustainable development and economic self-sufficiency more broadly. These insights also allow for reflection on possible policy recommendations.

For policymakers interested in facilitating the participation of First Nations in the electricity sector, the implications of this research are also clear: do not seek to blunt landscape pressure on the electricity socio-technical regime; rather, respond to landscape pressure by embracing distributed, clean energy projects; opening up space for new actors within the sector; establishing mechanisms that facilitate the sale of electricity to the provincial grid; and establishing other policies and programs that foster participation in the sector. As seen in the case studies within this dissertation, this can involve a variety of policy mechanisms, including: legislated targets for renewable energy, which are often associated with legislated targets for GHG emission reductions or mandates to phase out coal-based electricity generation; diversifying the actors involved in electricity generation, typically through FIT programs, but also through stand-alone power purchase agreements; and providing specific incentives for First Nations participation in the electricity generation sector.

To build broad consensus around the need to transform the electricity sector, the case studies in this dissertation demonstrate that it is not necessary to emphasize the mitigation of climate change. In fact, climate change was not a crucial part of the dominant discourse in either

Nova Scotia or Ontario. Rather, the emphasis of the dominant discourse is more wisely focused on how changes in the electricity sector will benefit people – whether that is through the stabilization of electricity rates, as was the case in Nova Scotia, or through improved health outcomes and improved economic opportunities, as was the case in Ontario.

In creating and implementing policy mechanisms, the role of policy learning is crucial, as demonstrated in the case studies. Ontario drew lessons from Germany's experience with its FIT program. Nova Scotia looked to Ontario's experience with its FIT program, and introduced an amended version of its own; in order to address the problems it saw in Ontario's case.

Finally, if provincial governments actively seek to engage in reconciliation efforts, to support First Nations resurgence, and to extend opportunity and prosperity to First Nations communities, the likelihood of successful participation of First Nations in the electricity sector will increase. In Nova Scotia and Ontario, the provincial governments more proudly engage in such efforts; whereas, in Saskatchewan, the provincial government is more timid in this regard, outwardly concerned with anything that may be seen to be a 'special deal' for First Nations people.

For First Nations leaders and community members, the implications of this research are also clear: if you want to be ready to take advantage of a window of opportunity to enter the electricity sector, there are several key things you need to do in order to increase your likelihood of success. The steps include: finding a project champion who will provide the committed leadership needed to get a project off the ground; ensuring your governance structures are sound and stable, and that you have an appropriate degree of separation between politics and business; ensuring that you have access to sufficient financial resources for revenue-generating activities; establishing secure partnerships with knowledgeable and experienced actors, which will enhance your own capacity, capability and confidence; and maintaining a strong focus on sustainable development and ensuring that benefits are delivered to the whole community, which in turn increases community buy-in and support.8.4 Contributions to Knowledge

This dissertation provides several important contributions to the field of sustainability transition studies. It presents an integrated sustainability transition framework, which has been called for by many prominent researchers within the field. The integrated framework is augmented by discourse coalitions theory in order to incorporate political dynamics, filling another significant gap that has been repeatedly identified within the field. This dissertation provides research from a non-European context, which continues to be quite rare in the sustainability transitions field. As well, as far as I am aware, the focus on the role of Indigenous groups is a first for the field. And, while sustainability transitions research has been conducted in both Ontario and Saskatchewan to limited degrees, to my knowledge such research has not previously been undertaken in the context of Nova Scotia.

8.5 Possible Avenues for Further Research

There are a number of potentially fruitful avenues for further research building on the findings of this dissertation. Several of the main possibilities are briefly discussed below.

This dissertation focused on three case studies. However, as the integrated framework developed through the analysis is intended to be broadly applicable, it would be interesting and useful to apply it to electricity systems in other Canadian provinces, and other jurisdictions around the world. Tapping into a wider empirical base would undoubtedly allow for the claims made in this dissertation to be strengthened, and likely modified. It would be especially interesting to explore the dynamics at play in cases in which transition pathways other than *transformation* are pursued.

This dissertation focused on electricity systems. But, again, since this integrated framework is intended to be broadly applicable, it would be helpful to apply the framework to a variety of other socio-technical systems. This would not only fortify the framework, but it would likely challenge several aspects and, therefore, yield certain adjustments.

This dissertation used discourse coalition theory to account for political dynamics. It could be a fruitful endeavour to apply other approaches to incorporating politics, including more traditional notions of politics, which have focused heavily on interests and power struggles. This would offer a new perspective to the field of sustainability transition studies, and it could produce intriguing challenges to the integrated framework presented in this dissertation.

Finally, the nature of this dissertation did not allow me to delve into the various interactions between the levels of the framework and add new details to our understanding of these important dynamics. I believe such a research endeavour would prove beneficial, because our current understanding of the various interactions between the regime, niche and landscape levels could use further elaboration.

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APPENDICES

Appendix A:

List of interviews conducted for the Nova Scotia case study

Position of interviewee	*Interview date*	*Interviewee code*
Former CEO, First Nation	June 23, 2014	1
Business manager, First Nation	June 25, 2014	2
Advisor, Kwilmu'kw Maw-klusuaqn Negotiation Office (Mi'kmaq Rights Initiative)	June 26, 2014	3
Former MLA, Government of Nova Scotia	June 27, 2014	4
Former researcher, Atlantic Policy Congress of First Nations Chiefs Secretariat	June 28, 2014	5
Staff member, Ecology Action Centre	Aug 6, 2014	6
Other (multiple roles in government and Nova Scotia Power)	Aug 11, 2014	7
Business advisor, First Nation	Aug 11, 2014	8
Staff member, Ecology Action Centre	Aug 11, 2014	9
Other (multiple roles in government and Nova Scotia Power)	Aug 19, 2014	10

List of interviews conducted for the Ontario case study

Position of interviewee	*Interview date*	*Interviewee code*
Staff member, Ontario Power Generation	May 21, 2014	1
Energy advisor, First Nation	May 27, 2014	2
Staff member, Hydro One	June 6, 2014	3
Energy advisor, First Nation	July 23, 2014	4

Business manager, First Nation energy company	July 28, 2014	5
Former cabinet minister, Government of Ontario	July 30, 2014	6
Staff member, Ontario Power Authority	Aug 11, 2014	7
Staff member, Ministry of Energy	Aug 18, 2014	8
Researcher, Canadian Council for Aboriginal Business	Aug 18, 2014	9
Researcher, Canadian Council for Aboriginal Business	Aug 18, 2014	10
Former staff member, Ontario Power Generation	Aug 20, 2014	11
Expert, electricity industry	Aug 21, 2014	12
Former cabinet minister, Government of Ontario	Aug 29, 2014	13
George Smitherman, former Minister of Health and Energy	Sept 8, 2014	14

List of interviews conducted for the Saskatchewan case study

Position of interviewee	*Interview date*	*Interviewee code*
Former staff member, SaskPower	Sept 5, 2014	1
Representative, Meadow Lake Tribal Council Biomass Project	Sept 5, 2014	2
Wind power proponent	Sept 8, 2014	3
Former Minister responsible for SaskPower	Sept 15, 2014	4
Other (multiple roles, First Nations perspective)	Sept 16, 2014	5
Board member, Saskatchewan Environmental Society	Sept 16, 2014	6
Former chief, Federation of Saskatchewan Indian Nations	Sept 18, 2014	7
Chad Eggerman, renewable energy lawyer	Sept 19, 2014	8
Staff member, SaskPower	Sept 19, 2014	9
Representative, First Nations Power Authority	Sept 22, 2014	10

Appendix B:

Semi-structured interview guide

Main questions	Additional questions	Clarifying questions
What role(s) have you had in the electricity sector?		Can you expand a little on this? Can you tell me anything else? Can you give me some examples?
What are your thoughts on how the electricity system in this jurisdiction has been changing?	What has changed? What do you think prompted that change? What has been the role of government policy?	
What do you think motivated government involvement in promoting or facilitating change in the electricity sector?	What policy problems do you think government was trying to address? Why do you think the status quo wasn't acceptable to the government?	
What do you think the role of different groups has been in terms of pushing for one thing or another?	What groups – formal or informal – have you seen pushing a particular agenda? What agenda have those groups been pushing? How effective do you think those groups have been?	
Have you seen new actors begin to participate in the electricity sector?	What kind of new actors? What facilitated their participation?	
How would you describe the opportunities for First Nations to participate in the electricity sector?	What have you heard about First Nations involvement in electricity generation? Do you think government has made it a public policy priority to increase First Nations' participation in electricity generation?	
What do you think would increase the likelihood of First Nations participation in sustainable electricity generation?		

Main questions	Additional questions	Clarifying questions
Is there anything else you would like to add on this topic?		