COMMUNITY ENERGY FINANCING

ASSESSING CHALLENGES AND OPPORTUNITIES IN ONTARIO

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ACKNOWLEDGEMENTS

My interest in the research area related to financing issues of renewable energy kindled with my research work as a student with Toronto Renewable Energy Co-operative (TREC). Right at the beginning of my graduate program I was fortunate to be selected to conduct research for the People-Power-Planet (PPP) project, jointly undertaken by TREC and York University. Therefore I would like to thank Dr. Judith Lipp (ex-Executive Director of TREC) for providing me with this exciting opportunity and for her guidance throughout. Many thanks to Dr. John-Justin McMurtry (of York University), also heading the PPP project, for encouraging, supporting and directing me in conducting further research in community power financing. Thanks are also due to Mumtaz Derya Tarhan of the PPP project who provided me with valuable guidance, feedback and encouragement during the project.

I have also been fortunate in having the best advisors in the faculty of environmental studies. I greatly appreciate Dr. Jose Etcheverry for his constant encouragement as well as being an inspiration for taking practical steps for climate change mitigation. I feel I have been especially fortunate to have been mentored by Dr. Mark Winfield throughout the program; he also constantly guided me in writing this paper and helped in contextualizing its various aspects. Therefore, I extend a special thanks to him. His ideas and perspectives related to sustainability continue to inspire and motivate me.

Thanks to the management of all the renewable energy co-operatives and financial institutions that I interviewed for this paper. I highly appreciate their taking out precious time to speak with me and providing valuable insights into the addressed issue.

I would also like to thank my parents and my brothers for always encouraging me to pursue further education. Their values and passion, along with my grandparents fuelled my interest in sustainability.

Finally, I would not have been able to have had such a rich experience in this program had it not been for my spouse, Omar Ansari. His unwavering support and confidence in me essentially propelled me to begin as well as complete this interesting and rewarding program, while we also welcomed our dear little daughter during the program.

ABSTRACT

A well-established financing regime is critical to the development and growth of Ontario's community energy sector. While a number of crucial policy initiatives have been undertaken at both the federal and provincial levels to spur the growth of the sector, these have not yet included any concrete policy steps to aid in accessing financing for the community energy projects. This paper investigates the challenges faced by community energy firms in Ontario in securing financing and seeks to present solutions through an assessment of successful approaches delineated in case studies and international benchmarks.

FOREWORD

This Major Research Paper (MRP) forms part of my graduation requirements for the Masters in Environmental Studies (MES) program at York University. This MRP focuses on the challenges and opportunities vis-a-vis community renewable energy (CRE) projects in Ontario and is based on a broad set of ideas and principles that have formed the basis of my studies in the MES program. My areas of concentration in the Plan of Study for MES include social finance for the development of successful CE projects and enabling policies for such projects. Therefore, during the MES program, my research interest revolved around studying the challenges for CRE projects, financing options and exploring how access to financing can be improved.

This MRP has enabled me to gain a comprehensive appreciation of the challenges faced by CRE projects in Ontario in gaining access to affordable financing and some of the solutions that have been employed. During the development of the MRP, I have also been exposed to some innovative solutions for financing of community renewable energy projects in international markets. In the MRP, I have also suggested ways in which lessons from these international benchmarks may be adopted for CRE projects in Ontario.

I have been fortunate that during the course of my MES program, I have had exposure to a number of courses directly relevant to my research. I have taken courses related to renewable energy, energy efficiency, Canadian environmental policy and Canadian environmental law that have provided me with background knowledge and insights on the overall business, policy and legal environment related to the community energy sector in Ontario specifically and in Canada more generally. In addition, my work with the Toronto Renewable Energy Cooperative (TREC) focused on researching the evolution of the community energy space in Canada and recent trends and opportunities in this sector. I have also developed a research paper on ‘Credit Unions and Financing

of Community Energy Projects - Trends, Opportunities & Challenges for Ontario' that was presented at Canadian Association for Studies in Co-operation (CASC) conference at Congress of the Humanities and Social Sciences in University of Ottawa in 2015. Working with TREC and conducting independent research on financing of CRE has enhanced my understanding of the subject while also making me realize how I can contribute further in this area.

Having said this, the views and analysis in this paper are mine alone and may not reflect the views of York University or TREC.

ACRONYMS

CAD	Canadian Dollar
CE	Community Energy
CEVB	Clean Energy Victory Bond
CRE	Community Renewable Energy
FCPC	Federation of Community Power Co-operatives
FiT	Feed-in Tariff
GEA	Green Energy Act
GEGEA	Green Energy and Green Economy Act
GHG	Greenhouse Gas
GW	Gigawatt
IESO	Independent Electricity System Operator
kW	Kilowatt
LTEP	Long-Term Energy Plan
MOECC	Ministry of the Environment and Climate Change
MW	Megawatt
PACE	Property Assessed Clean Energy
PV	Photovoltaic
RE	Renewable Energy
SME	Small and Medium Enterprises
SRI	Socially Responsible Investment
USD	United States Dollar

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1. INTRODUCTION

1.1. The Importance of Non-traditional Energy Sources

There is a significant need for changing the global mix of energy sources in order to reduce the adverse impact of fossil fuels on the Earth's climate. At current consumption levels, our traditional energy generation system, heavily reliant on fossil fuels, causes many harmful effects on human health and the environment through its release of carbon dioxide and other greenhouse gases (GHG).

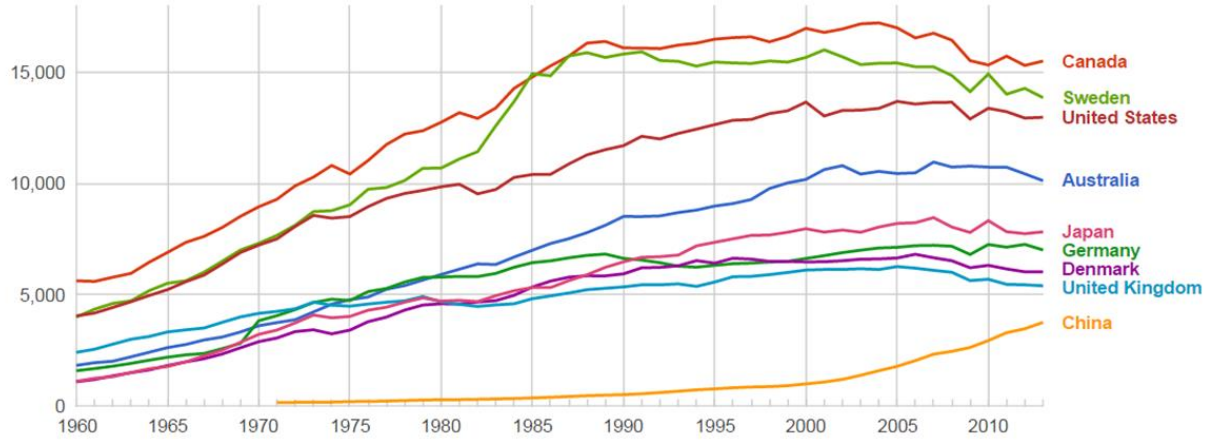
There is a consensus between ninety and hundred per cent of publishing climate scientists that human activities are responsible for climate change (Cook et al, 2016). Despite some fringe elements rejecting the adverse impact of GHG on the Earth's climate, it is generally accepted that these are the primary cause of global warming. The State of the Climate 2012 report concluded that rising carbon dioxide emissions from the burning of fossil fuels have affected global temperatures much more than natural climate variability during the past century (Byrnes, Brown, Foster and Wagner, 2013; Blunden, Arndt, Achberger, Ackerman et al, 2013).

This adverse effect on the Earth's climate from fossil fuel use is only going to get worse unless comprehensive changes are realized. It is estimated that by 2050 the world's population is likely to reach about nine billion people, therefore without major improvements in energy efficiency, undertaking additional initiatives for energy conservation and adoption of renewable energy (RE), it is expected that global primary energy demand will increase by more than fifty percent, thereby posing even more significant challenges to the planet's climate system (Boyle, 2012). As well, with 2016 being the warmest year on record, the move towards

a sustainable energy mix, from the current heavy reliance on fossil fuels, is essential for cities in particular in order to become resilient (Newman, Beatley and Boyer 2009).

In Canada, given the high degree of electricity consumption per capita there is a general recognition by the federal government and some provincial governments that suitable energy production and management initiatives are necessary to reduce GHG emissions. The country's per capita electricity consumption ranks amongst the highest in the world, standing at 16,473 kWh for year 2011 as illustrated in Figure 1.

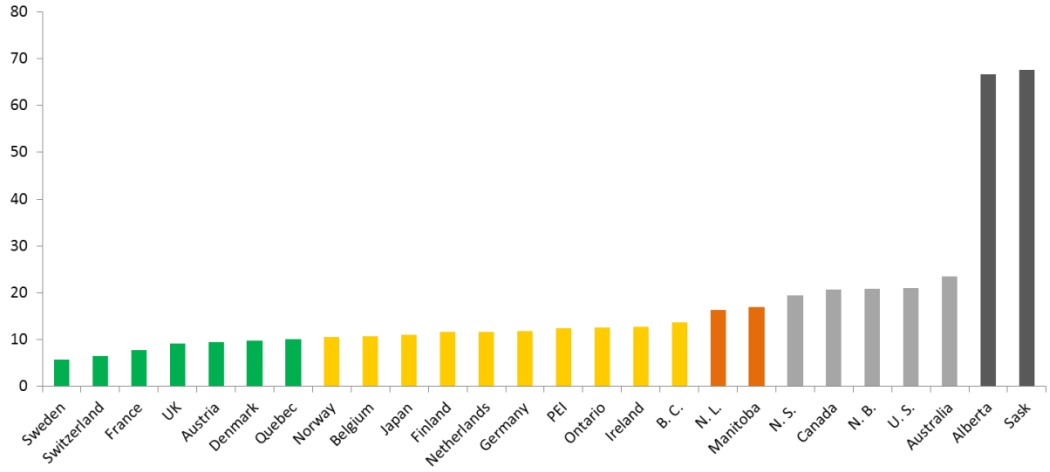
Figure 1: Electricity Consumption per Capita in the Developed World
(kilowatt hour per capita)



Source: Data from the World Bank (2013)

While Canada contributes a seemingly small figure of 1.6 per cent of the global GHG emissions (Environment and Climate Change Canada, 2016), it also ranks among the top ten GHG emitting countries especially where emissions per capita are concerned (The Conference Board of Canada, 2017). Figure 2 shows the GHG emissions of the Canadian provinces and international peers in tonnes of carbon dioxide equivalent per capita.

Figure 2: Greenhouse Gas Emissions of Provinces and International Peers
(tonnes of carbon dioxide equivalent per capita)

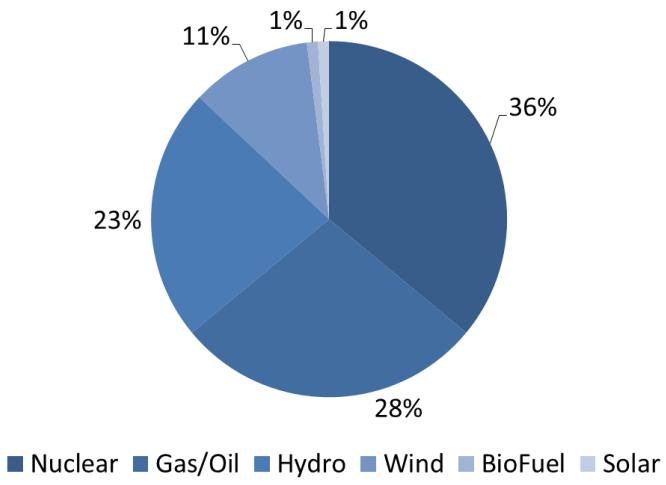


Source: The Conference Board of Canada (2013)

Although Ontario's GHG emissions have significantly reduced between 1990 and 2014, owing mainly to the closure of coal-fired electricity generation plants, it remains a main contributor of the emissions along with Alberta, both having a combined total of 61% out of which Ontario continues to contribute 23% to the national total for emissions (Environment and Climate Change Canada, 2016). As well, Canada's GHG emissions are growing faster than most other industrialised countries (Ahmed, 2016).

As far as the supply mix landscape for Ontario's electricity is concerned, it remains dominated by the traditional sources of energy; nuclear, gas and hydro contribute to 87% in the mix (see Figure 3), with wind, solar and biofuel contributing the remaining 13% (IESO, 2016).

Figure 3: Ontario's Electricity Supply Mix
(% of total generation capacity)



Source: Independent Electricity System Operator (2016)

Some work has already been conducted in Canada regarding a greater reliance on renewables for energy generation. Over the past five years, more than $45 billion has been spent to build new renewable energy projects across Canada. Most of this amount has been invested in wind ($19.4 billion), large hydro ($13.8 billion) and utility-scale solar projects ($8.4 billion). The mix of investors is diverse. It includes provincial crown corporations, Canadian businesses and multinational companies (Clean Energy Canada, 2016). The overall technological trends are also supportive of further penetration of renewables in Canada. As an example, electricity generated from wind turbines is fast becoming price competitive. The costs for wind turbines and their systems' maintenance continue to decrease worldwide while the costs for conventional energy generation increase steadily (OCEC Executive Summary, 2014).

In spite of these developments, Ontario's continued reliance on centralized sources of energy has a number of implications in terms of cost, technology deployment and customer access.

Firstly, according to recent estimates, roughly CAD 10.5 to 13.5 billion (USD 14 to $18 billion) of electricity sales revenue is lost annually due to transmission and distribution line losses worldwide in a centralized electricity network. Secondly, utility level inertia to the adoption of new technology severely limits the adoption of new distributed energy generation and transmission methods based on renewable energy. Finally, in a country as geographically widespread as Canada, customer's access to cheap electricity is curtailed due to a heavy reliance on centralized electricity generation (Mowat Energy, 2016).

Most importantly, however, the continued reliance on centralized electricity does pose a challenge to new and innovative methods of electricity generation such as distributed community energy generation. The existing industry structure along with a recent change in policy discontinuing the award of new FiT contracts will further challenge the growth of the community energy sector (Mowat Energy, 2016).

1.2. Research Thesis

Many scholars believe that if a sustainable energy future is to be realized, community renewable energy (CRE) must form an enduring part of it. In practical terms, the move from a centralized energy system to a decentralized one is essentially dependent on the adoption of community models (Kellet, 2007; Wirth, 2014). The concept of CRE has taken root firmly in some European countries. It has not witnessed a similar enthusiastic adoption in North America. For example, Denmark, Germany and Sweden have many successful CRE initiatives with an increasing number of communities and cities (in these countries) vying for 100% renewable energy goal. Some communities that have already achieved this goal include Thisted in Denmark, Dardesheim and Wolfhagen in Germany, Ostersund in Sweden, and Varese Ligure in Italy (Go100percent, 2017).

When it comes to raising seed capital for CRE projects, an interview conducted for this paper[1] indicate that the traditional sources of financing may fail to deliver, for a variety of reasons. High costs involved at the initial stage of project development and the fact that most 'traditional' financial institutions do not have the skill-set nor the human resources to assess the business models of firms that are revenue- and profit-driven instead of using hard assets as collateral are key issues. While this is a problem in a number of developed markets across the world, it is an especially acute issue in Canada where the traditional funding channels such as banks and credit unions continue to resist lending to the CRE sector[2]. In this context, the main research thesis of my paper revolves around investigating the gap in financing needs in Ontario and assessing how CRE initiatives in other developed markets have overcome this problem. This paper will also showcase four case studies of Ontario CRE projects where funding was raised using traditional as well as unconventional methods/sources. In addition, the research will seek to review and understand current banking sector credit assessment approaches in Ontario and will seek to identify gaps in order to understand why banks and other financial institutions have been hesitant to extend credit to community energy projects.

1.3. Methodology and Outline

The objective of this research was to understand the financing aspect of CRE projects especially in light of the fact that CRE projects have been unable to access adequate financing in a meaningful way. In order to gather information and insights on this, a three-stage process was adopted.

[1] Interview 3 revealed this information (identity of interviewee withheld).
[2] Interviews 3 and 4 revealed this information (identity of interviewees withheld).

In the first stage, government and industry documents were reviewed in order to make an assessment of the current CRE landscape in Ontario, in terms of growth, government support and financing options. The documents reviewed included government publications, industry reports and media reports relating to recent financing initiatives. This paper also analysed an important survey conducted by The Federation of Community Power Co-operatives (FCPC) in terms of assessing the current status of the CRE sector in Ontario, including size of projects and current funding sources and challenges.

In the second stage, key success stories in the financing of CRE projects in Ontario and the rest of Canada were studied through secondary research. The objective was to understand the drivers of success and how they can be applied to other CRE projects in Ontario.

Since information on this topic is not readily available in the public domain, key informant interviews were conducted to gather perspectives from industry experts, especially professionals in the CRE sector and financial institutions. These included experts and senior management professionals from prominent CRE co-operatives as well as some financial institutions of Ontario. These interviews were conducted in September and October 2016. The interviews were conducted using a semi-structured approach, where suggested questions were shared with the respondents before the interview. Other questions were also asked in response to the interviewees' answers.

This paper is organized as follows. Section 2 introduces the concept of CE and discusses the major developments that have occurred in this sector along with the benefits that it offers and the factors impeding its growth. Section 3 lays out the policy regime governing the CE sector including umbrella frameworks such as the Green Energy and Green Economy Act and

Ontario's Long-term Energy Plans, along with sector-specific initiatives such as feed-in tariffs and the newly introduced cap-and-trade program. Following this Section 4 delves into the specific financing challenges faced by CE co-operatives and describes a financing gap that exists for mid-sized CE firms. Section 5 showcases case studies of four CE firms which were able to raise financing along with implications for the broader sector. Section 6 provides examples of CE financing initiatives undertaken in other developed markets and their implications for Ontario. Finally, the last section provides conclusions and recommendations.

It is important to note that the analysis in this paper is focussed on RE cooperatives that currently hold FIT contracts. It now seems very likely that the province will not award more FIT contracts in the future.

Please note that the terms community energy (CE) and community renewable energy (CRE) are used interchangeably in this paper.

2. COMMUNITY ENERGY

2.1. The Need for Community Energy

Power generation figures prominently amongst the various sectors around the world that contribute to GHG emissions. The undesirable environmental effects of the traditional fossil-fuel driven power plants, which continue to constitute the majority of the power plants, are both well-established and well-documented (Michaelides, 2012). This heavy reliance of a vital sector on fossil fuels, coupled with the ever-increasing demand for electricity stemming from the expected increase in global population does not bode well for the planet's future. Sustainable energy is the way forward.

Renewable energy (RE) has witnessed increased generation capacity in the last few years, with a remarkable performance during 2015. The overall capacity additions for renewables totaled more than 152 gigawatts with a contribution of 63 gigawatts by solar and 47 gigawatts by wind (IRENA, 2016). This increase of 8.3 per cent, which is the highest growth rate ever recorded, has occurred in an era of falling oil prices and has been spurred by falling costs of technology with the result that at the end of 2015 the global renewable generation capacity stood at 1985 gigawatts (IRENA, 2016). The last five years have witnessed an overall capacity increase of roughly one-third (IRENA, 2016). However, although the renewables have globally accounted for more than fifty per cent of the power generation capacity additions each year since 2011, the rate falls short of achieving the goal of Sustainable Energy for All by 2030, which mandates RE's share in the global energy mix to be doubled. Therefore, to realize the potential of RE, a lot remains to be done (IRENA, 2017).

In addition to large scale projects, a key element of increasing the share of the RE in the total energy mix must come from smaller community-based RE projects. According to Kellet

(2007), if a sustainable energy future is to be realized, community energy (CE) must form an enduring part of it, as it is recognized as a necessary development for this goal. This notion is also echoed by Girardet and Mendonca (2009). Wirth (2014) also believes that, in practical terms, the move from a centralized energy system (fossil-fuel driven) to a decentralized one (RE-driven) is essentially dependent on the adoption of community models. Additionally, many authors recognize that in order for a healthy society to thrive in the twenty-first century, Social Economy must play a pivotal role (McMurtry, 2010; Bouchard, 2009; Borzaga and DeFourny, 2001). CE is a vital component of the social economy with its amalgamation of social and economic value in the form of innovative economic ventures.

The concept of CE has taken root firmly in some European countries. In some it is already out-producing power from centralized fossil fuel-based plants. In 2012 Germany's electricity generation from solar energy exceeded the amount of electricity produced from Darlington's reactors (Weis, Stensil and Harti, 2013). CRE has not witnessed a similar enthusiastic adoption in North America. However, in the recent past it has piqued the interest of quite a few environmentally-friendly minds in the region, notably in California, with arguably a general expectation now that the RE and CE sectors will grow at an accelerated pace in Canada as well.

Community energy refers to the direct community participation in, ownership of, and sharing the collective benefits from RE projects (Walker and Devine-Wright, 2008; McMurtry, 2014). Therefore, the CE approach essentially revolves around community ownership and engagement. The community members and organizations are significantly involved in the coordination, planning and/or financing of local RE projects (McMurtry, 2014). CE has many models with the common ones including the co-operative model (found mostly in RE sector), the subscription/virtual net metering model and the community benefit model. In the co-

operative model, the community members are responsible for the planning, coordinating and financing of projects. In the subscription model, the members receive credit on their power bill in proportion to the electricity generated by their respective share in a RE project, while members of a community benefit model provide financial support to non-profit and charity groups focussing on generation of green energy and heating systems (DTI Global Watch Mission, 2004; Lipp, 2008; Pahl, 2007; Walker, 2008).

2.2. The Nature of Community Energy Projects

The structure and nature of CE projects varies widely. When the basic variables involved in the structure of a community project, 'process' and 'outcome', are considered, it transpires that their different combinations can yield a wide variety of models of these community projects. Each model will have its own unique nature, characteristics and complexities, whereby the dimension of 'process' relates to who develops or is involved in the project, while the 'outcome' variable relates to who the project is for (Walker and Devine-Wright, 2008). By extension, this applies to the community projects in the energy sector as well, with the implication that the nature of each CE project can widely differ from the other, in terms of the stakeholders involved, type of technology used, size of the project, whether the project is for commercial or residential use etc. RE co-operatives can also differ in their type, scale and structure and can be owned by employees, consumers, producers, other businesses, communities and a combination of these (DTI Global Watch Mission, 2004).

2.3. Development of the Community Energy Sector in Major Global Markets

Community energy (CE) has been historically playing an important role in electricity

generation through renewable sources in the European market, especially Denmark, Germany, the Netherlands and the UK (Lipp, Lapierre-Fortin and McMurtry, 2012).

CE in Germany constitutes 34 per cent of the RE. Out of the almost 73000 megawatts of installed capacity of RE, more than 25,000 megawatts come from CE (Community Power, n.d.). Denmark has had a long history of community-owned energy supply, where most of the production was owned by municipalities and consumer co-operatives, based on a non-profit principle. However, with the liberalizing of the energy supply this has changed significantly. Nonetheless twenty per cent of the local windmills are still citizen-owned and the number of photovoltaic (PV) systems has increased from 4,100 in January 2012 to 89,500 in 2013 (Community Power, n.d.). As one of the earliest adopters of community-owned RE, Netherlands has witnessed a regeneration of interest in CE since 2007. There are now about three hundred CE projects in the country (in the initial stages), pertaining to solar, wind, biomass, hydro and geothermal technologies (Tarhan, 2013).

Lipp, Lapierre-Fortin and McMurtry (2012) believe that the business structure of co-operatives in the RE sector is also emerging in other European countries, the USA and some Canadian provinces, particularly Ontario.

2.4. Reasons for Adoption of Community Energy

As mentioned previously, the CRE model involves direct community ownership and engagement, which is precisely what distinguishes it from the large-scale centralized energy systems, where community involvement and community benefits are minimal and unsustainable consumption of power is found to be encouraged due to the remoteness of the energy systems (Rogers, Simmons, Convery & Weatherall, 2012). The CE model follows a

"more co-operative, multi-actor, and bottom up distributed" approach (Walker and Devine-Wright, 2010; McMurtry, 2014).

There is an increasing trend of communities being required to gain economic independence and self-reliance owing to non-availability of government funding (Kelly, 2012; Shuman, 2013), CE fills in the gap, especially in economically deprived areas, which also makes it an attractive albeit still unrecognized public policy benefit (McMurtry, 2014).

Apart from helping to reduce environmental impacts, some of the substantial benefits of CE include:

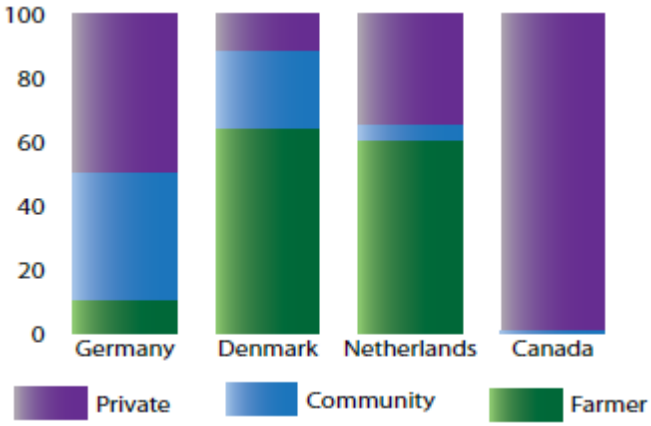
- Presenting new economic opportunities to communities and contributing to their income generation from local resources (Muhlenhoff, 2010; Walker, 2008; Kildegaard and Myers-Kuykindall, 2006),
- Contributing to both energy security and price stability by reducing dependence on imported fuel which can have fluctuating prices (Olz, Sims and Kirchner 2007),
- Contributing to capacity building and skill enhancement of the local communities (Walker et al, 2007) and
- Reducing friction that can manifest itself when new energy infrastructure is being developed, due to direct involvement of the local community members in decision-making (Walker and Devine-Wright, 2008; Juhl, 2008).

2.5. Community Energy: The Canadian Context

While Canada has fared somewhat better in terms of development of RE, community-owned RE projects in the country have not been as widespread as they are in Germany and Denmark. RE co-operatives are fairly recent phenomena in the country, with only 71 such entities

registered in 2011 (ILO, 2013); CRE projects account for less than two per cent of the total RE generation in Canada (The Pembina Institute, 2010). Figure 4 demonstrates Canada's performance in the CE sector compared with industry leaders such as Germany, Denmark and the Netherlands.

Figure 4: Constituent Actors of Renewable Energy in Developed Markets



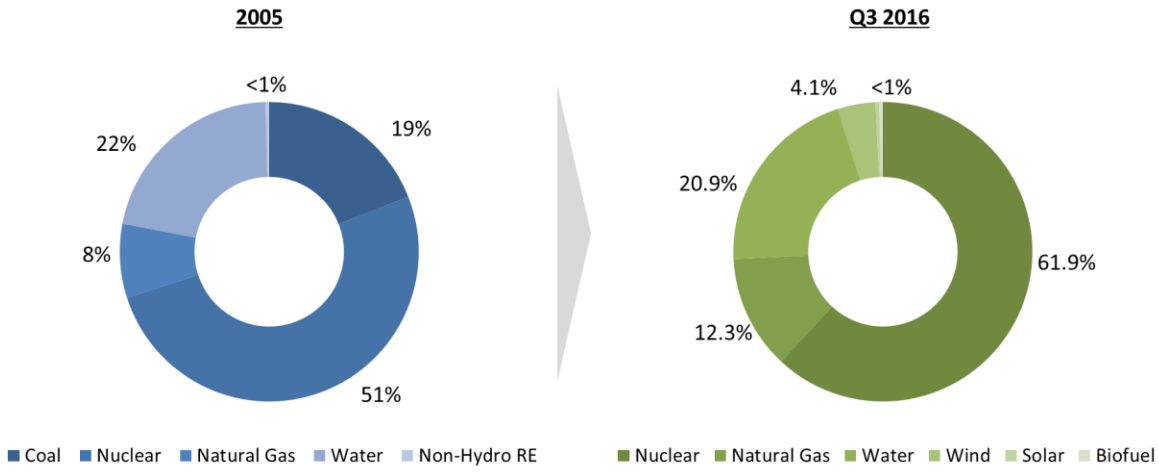
Source: The Pembina Institute, 2010

More recent data for Ontario indicates that CE in the province only accounts for about 1,000 MW (Lipp and Dolter, 2016) of generation capacity out of a total of 13,000 MW of RE (IESO, 2017). This represents about 7.6% of the province's RE generation capacity. While this is a good start, it pales in comparison with a developed country like Germany where almost 50% of the RE generation capacity is community-owned (Lipp and Dolter, 2016).

3. COMMUNITY ENERGY IN ONTARIO

Ontario's supply mix landscape for electricity has modified over the past years. Although nuclear energy continues to be heavily relied on, coal-fired generation has been phased out. See Figure 5 for a comparison between the supply mix in 2005 and 2016.

Figure 5: Ontario Electricity Supply Mix – Comparison between 2005 and 2016
(% of total)

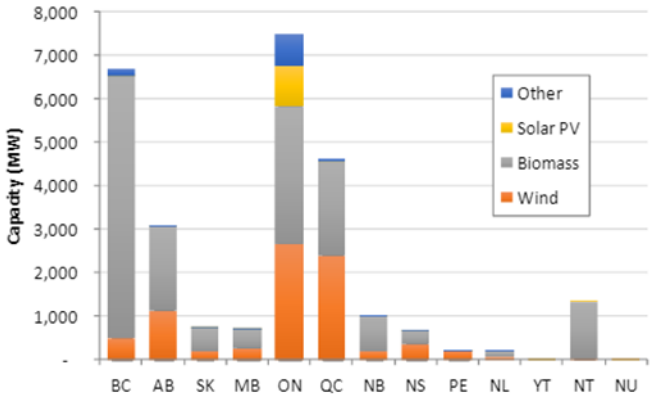


Source: Ministry of Energy (2016), Ontario Energy Report (2016)

As is evident from the figure the province has witnessed growth in power generation from renewable sources. The grid-connected generation capacity for wind energy has almost trebled. It grew from 1412 megawatts in 2011 to 3923 megawatts in the third quarter of 2016 (Ontario Energy Report, 2016). The target for generation from RE sources in the province's installed capacity by year 2025 is set at half (IESO, 2017).

Ontario has the greatest RE capacity in Canada when large hydroelectric resources are excluded (Nyboer and Melton, 2014). Figure 6 shows non-hydro RE capacity by province.

Figure 6: Non-hydro Renewable Energy Capacity by Province/Territory
(megawatts)



Source: Nyboer and Melton (2014)

As far as GHG emissions in the province are concerned, electricity generation contributes to nine per cent of the total emissions, which are estimated to be 5.4 million tonnes. Between 2000 and 2012 there have been significant reductions of emissions (of 66 per cent) from the sector in Ontario, owing mainly to the closure of coal-based power plants (MOECC, 2015).

3.1. Overview of the Community Energy Sector

A majority ownership of Ontario's CRE landscape is in the form of co-operatives. There are 62 such co-operatives operating in Ontario, with approximately 140 projects in various phases of development. These are heavily dominated by solar projects, followed by biogas and wind. More than fifty per cent of the co-operatives have a membership base exceeding 200, with approximately twenty per cent having more than 400 members. The average size of a co-operative's project is 247 kilowatts (FCPC Survey Report, 2014). In terms of policy support by the province, those RE co-operatives in the province that are grid-connected have also been recognized as a separate class of co-operatives under Ontario's Co-operatives Corporations Act

2009, providing them with unique considerations that only a few other jurisdictions have adopted (Lipp, Lapierre-Fortin and McMurtry, 2012).

3.2. The Province's Policy Support for Community Energy

3.2.1. Green Energy and Green Economy Act 2009

In order to spur investment in RE projects and to promote energy conservation, and encouraged by the USA's introduction of the *American Recovery and Reinvestment Act* (in 2009), the Government of Ontario passed the *Green Energy and Green Economy Act* (GEGEA) in May 2009. From the onset it has been hailed as unique, enabling and ambitious for North America. The legislation has formed a largely successful industrial policy vis-à-vis rapid promotion of new RE projects and related job creation (Rodger, 2014).

Ontario's initiatives in the clean energy sector since the introduction of the GEGEA (commonly called Green Energy Act) in 2009 have ushered in large amounts of investment in the private sector. According to Ontario's Long-Term Energy Plan 2013, it has also led to the production of over 31,000 jobs within the province. Its current 18,500 megawatts repertoire of RE (both operational and in the pipeline) includes over 9,000 megawatts of hydroelectric capacity and over 9,500 megawatts of solar, wind and bioenergy capacity. The government aims to increase the production to 20,000 megawatts from renewable sources by 2025; this would be 46 per cent of the province's energy generating capacity. (Ontario's Long-Term Energy Plan, 2013).

Most importantly, the GEA provided for the establishment of a new kind of co-operative for RE generation which was distinct from other co-operatives in the following ways:

a) The co-operatives would carry out the specific business of generating and selling RE;

b) A co-operative established under this framework would not be required to conduct fifty per cent of its business with members;

c) The members would be allowed to receive the surplus in accordance with the by-laws rather than in proportion to the business they conduct with the co-operative (Ontario Co-operative Association, 2013).

The GEA has also notably acknowledged the duty to consult aboriginal peoples and provided them opportunities to develop RE projects (CIELAP, 2009). Apart from various other features and incentives, the bill assists smaller community-owned generators as well and introduced a smart grid that has made it easier for renewables to get connected to the system (Runyon, 2009).

3.2.2. Feed-in Tariffs

A key feature of the GEA 2009 is the introduction of the feed-in tariff (FiT) program, a long-term secure pricing mechanism modeled after Germany's successful policy, aimed at providing assurance of profit to the projects' investors.

According to the FCPC Report (2014) a majority of the RE co-operatives of the province incorporated after the release of the FIT 2.1 rules in 2012. Therefore, the province's FIT program has proved to be a major supportive factor in the proliferation of CE. The program provides government's guarantees on stable prices for energy generated from RE sources under long-term contracts (FCPC Survey Report, 2014). This is supported by the findings of Alagappan, Orans and Woo (2011) according to which RE generation has the highest per

cent of total installed capacity in those markets that have a FIT regime in place (among other factors). They attribute this link to the certainty and 'generosity in price and non-price terms' brought about by the program, as opposed to the bidding process.

Developed by Ontario Power Authority and implemented by Independent Electricity System Operator, FIT is North America's first comprehensive pricing structure for the production of RE (IESO, 2016). The program allows individuals, communities, businesses, homeowners and private developers to generate electricity from RE sources and sell it to the provincial energy grid at a guaranteed price, as opposed to competitive bidding, for twenty years, with prices varying by technology (Marshall, 2011). The program covers RE projects with a rated electricity generating capacity in the range of 10-500 kilowatts (Ministry of Energy, 2015).

Benefits from the program have been reaped not only by project developers, which include Aboriginal groups, municipalities and communities, but also by equipment suppliers and installers. The guaranteed prices have been designed to cover the project costs as well as to provide a suitable rate of return on the investment over the contract period (IESO, 2016).

There have been various iterations of the FIT program with each version receiving a strong response. The first version (of 2009) attracted applications for a supply of over 15,000 megawatts of RE in its first year, which equals to about 43 per cent of the province's electricity generating capacity, as indicated by Figure 7 (Yatchew and Baziliauskas, 2011).

Figure 7: Ontario's Feed-In Tariff (FIT) Program
as of October 12, 2010

	Executed contracts		Offered contracts		Awaiting ECT		Applications	
	MW	%	MW	%	MW	%	MW	%
Wind	1469	60	1531	57	5953	88	10609	69
Solar-PV	732	30	909	34	610	9	4263	28
Water	188	8	192	7	143	2	355	2
Bioenergy	56	2	58	2	85	1	260	2
TOTAL	**2445**	**100**	**2690**	**100**	**6791**	**100**	**15487**	**100**

ECT: Economic Connection Test

Source: Yatchew and Baziliauskas (2011)

3.2.3. Long-Term Energy Plan (LTEP)

The Government of Ontario developed its first Long-Term Energy Plan (LTEP) in 2010. The plan broadly addressed seven areas: conservation, transmission, Aboriginal communities, capital investments, demand, supply and electricity prices (Ministry of Energy, 2010). The plan laid a greater emphasis on conservation. It also envisioned a greater role for natural gas and nuclear energy in the sector of power production which was reviewed and updated in the subsequent 2013 plan owing to a decrease in demand growth and strong conservation policy (Ministry of Energy, 2013).

The LTEP 2013 emphasized five key areas including cost-effectiveness, reliability, clean energy, community engagement and conservation/demand management. Within these the strongest focus was on conservation and RE through initiatives to develop state-of-the-art solutions, for instance, energy storage for RE (Ministry of Energy, 2013). Additionally, the feed-in tariff program was identified as a key focus area for the government of Ontario. (Ministry of Energy, 2013). The procurement targets for RE were enhanced in this plan and further innovation supporting the RE sector was also encouraged. Additionally, there was an

added emphasis on conservation and demand management leading to taxpayer savings (Walker, 2014). However, although the plan provides the energy outlook for the province till 2030, it implies that all addition in the RE capacity will be completed by 2018. RE does not figure at all in the LTEP beyond 2018 (Lipsig-Mummé and McBride, 2016) which is a cause for concern.

The third iteration of the LTEP is likely to be published in 2017 for which reviews and public consultations have already been undertaken. Given the reluctance of the Liberal government to add to the renewable power generation capacity, it is likely that RE will not find a mention in LTEP 2017.

3.2.4. Carbon Pricing Regime

In a bid to transition into a low-carbon society, the Government of Ontario introduced a cap-and-trade system on January 1, 2017. This climate change mitigation strategy will also help channel further interest in the uptake of RE as a source for electricity generation. Expected to generate between $1.8 and $1.9 billion annually, the revenues from the cap-and-trade system will be utilized to fund other climate change programs in the province (Government of Ontario, 2016).

The system will contribute to Ontario's plan of reducing GHG emissions to 15 per cent below 1990 level by 2020, 37 per cent by 2030 and 80 per cent by 2050. It covers organizations emitting more than 25,000 tonnes of GHG per year, including electricity importers, natural gas distributors and fuel suppliers (Government of Ontario, 2016). Currently the permits of the program are trading at approximately $18 per tonne of GHG emissions (Tombe and Rivers, 2017).

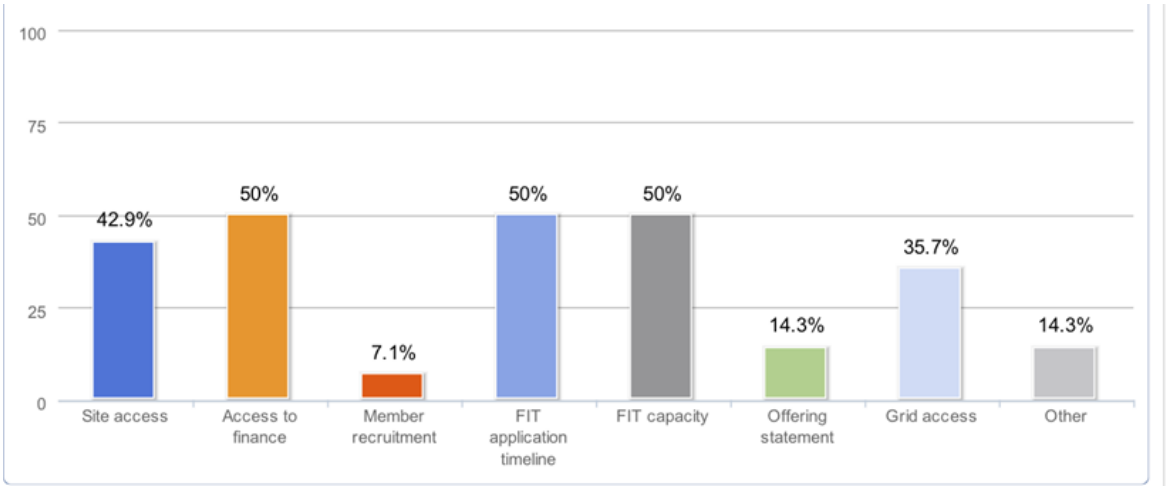
Although there have been concerns that the carbon pricing program will lead to a significant increase in the prices of household goods, these have been dismissed as 'misplaced' and 'misleading'. This has been corroborated by an in-depth analysis by Tombe and Rivers (2017) of the impact of carbon pricing on costs of goods and services. However, the newly introduced, ambitious program does appear to be vague and inconsistent vis-à-vis its action plan and complementary climate change policies (Cohn, 2016). It remains to be seen how the cap-and-trade regime evolves to affect Ontario's RE sector and the broader economy.

3.3. Access to Community Energy Financing Limited despite Policy Support

As the previous section illustrated, there is significant policy support from the government of Ontario for the development of CE initiatives. One area that seems to get less attention from the government relates to the financing of CE projects. While there are certain initiatives such as a grant/loan program called the Energy Partnerships Program that has been developed by the government to promote easier participation of indigenous communities, municipalities, public sector entities and co-operatives in the development of energy projects through provision of financial support (IESO, 2016), there seems to be limited coordination in policymaking in this regard.

This seems to have affected the ability of CE players in obtaining financing for their projects – especially from the conventional banking sector. The Federation of Community Power Cooperatives (FCPC) conducted a survey studying success and risk factors for CRE cooperatives (including access to financing for these players). According to the FCPC Survey Report (2014) fifty per cent Ontarian co-operatives consider early access to finance a top barrier to their project development (see Figure 8).

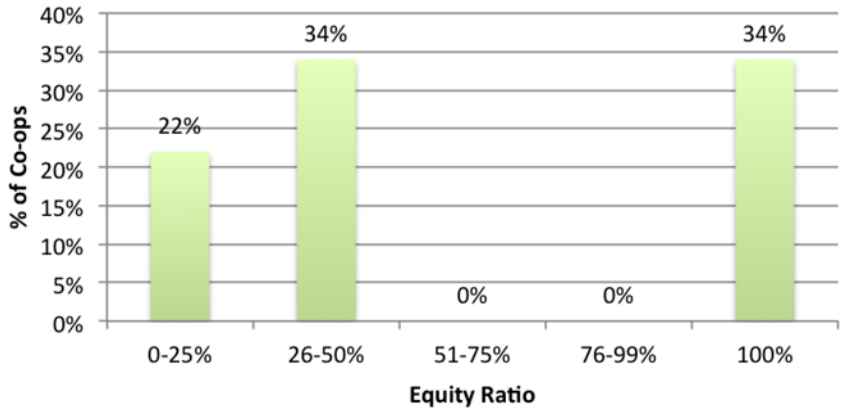
Figure 8: Most Significant Barriers to the Development of Community Energy Projects in Ontario



Source: Federation of Community Power Cooperative, 2014

Access to third-party financing sources has typically been difficult to obtain for CE projects. The FCPC Survey Report shows that 34 per cent of the surveyed RE co-operatives have financed their projects with 100 per cent equity (see Figure 9). This indicates a lack of available financing options from banks, credit unions etc. for CE projects (FCPC Survey Report, 2014).

Figure 9: Percentage of Equity in Community Energy Projects in Ontario



Source: Federation of Community Power Co-operative, 2014

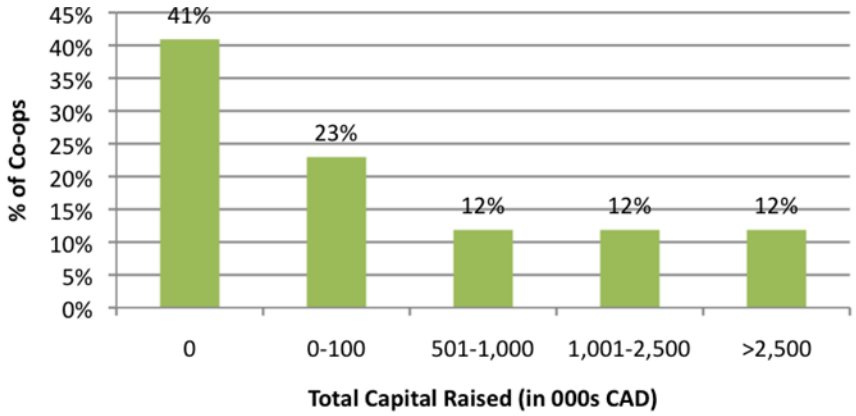
Furthermore, our interviews with professionals at RE co-operatives[3] indicate that where third-party financing for CE projects was obtained, these sources were predominantly non-banking channels. For instance, interest for CE projects came primarily from utilities, venture funds, insurance companies, developers' own resources and the co-operative members (typically co-operative members account for a relatively small percentage of the required financing, in the range of 20 to 30 per cent). In some cases European banks provided financing, but that was only because of existence of prior relationships with them. The interviews[4] also suggest that although these co-operatives have approached banks and credit unions in Ontario to obtain financing, these efforts have not been as successful as was anticipated.

Despite the above mentioned challenges, there have been a few examples of successfully securing debt financing. An example is that of Canadian Solar. The company was able to secure funding for two of its solar projects from Manulife, an insurance company. The amount of funding secured was $52.8 million for Aria solar plant located in Springwater, Ontario, and $51 million for RayLight solar plant located in Wyebridge, Ontario. This financing was raised through construction and term financing (Canadian Solar, 2014; 2015).

However, these success stories are few and far between and the general theme has been that of limited access to financing especially from traditional banking channels. Compounding this challenge is the fact that RE co-operatives are also finding it difficult to raise financing from their members. According to the FCPC Survey Report of 2014, 41 per cent of the participating co-operatives of the province were not able to raise any capital from their members (see Figure 10) as of March 2014 (FCPC Survey Report, 2014).

[3] Interviews 3 and 6 conducted for this paper (identity of interviewees withheld).
[4] Interviews 1, 3, 5 and 6 conducted for this paper (identity of interviewees withheld).

Figure 10: Community Energy Cooperatives in Ontario – Capital Raised from Members



Source: Federation of Community Power Cooperative, 2014

The results of this survey clearly indicate that a large proportion of RE co-operatives in Ontario are finding it difficult to raise finances from their members, thus exhibiting a need for financing from other sources.

4. ACCESSING FINANCING FOR COMMUNITY ENERGY – A MAJOR CHALLENGE IN ONTARIO

4.1. Introduction

Section 3 described the key policy drivers and initiatives adopted by the federal government and the government of Ontario to promote RE and their implications on the CE sector. These initiatives seek to assist individuals, entities and communities in the uptake of RE, revenue stability (through the FiT contract regime) and encouraging a shift towards RE generation (through the cap-and-trade initiative). While these initiatives address some of the areas of growth for CE projects, one key area that still constrains the growth of the sector is related to accessing financing for these projects. Promoters of early stage CE projects in Ontario typically face challenges in securing cheap finance, primarily due to an inability to provide adequate proof of concept and a dual focus on commercial as well as non-commercial objectives (Energy4all, n.d.).

This issue was briefly discussed in section 3.3 in terms of how lack of access to finance from traditional channels such as banks and credit unions poses a key challenge in the minds of CE project promoters. This section seeks to build a theoretical understanding of why banks and credit unions are hesitant in extending financing to the CE sector.

4.2. Typical Barriers in Lending to Community Energy Sector

There are a number of factors, some related to the structure of the banking sector in Canada and others related to the specific structure and nature of business of CE firms that are currently making it challenging for banks and other 'traditional' lenders in extending financing to the sector. A discussion of some of these factors follows.

4.2.1. Community Energy Business Model: Treatment of Community Energy Projects as Multi-Owner SMEs

Research and interviews[5] with key personnel in CE projects suggest that, because of their size and co-operative ownership structures, most banks and credit unions treat CE projects as small and medium enterprises (SMEs) with multiple owners. This poses a significant challenge in accessing financing from these sources as generally large banks and credit unions seem hesitant in lending to SMEs despite their substantial contribution to the economy. This sub-section explores this issue in more detail.

Typically in industrialized countries SMEs account for more than 90 percent of all firms, employ about two-thirds of the workforce and contribute to nearly 50 percent of the value added in non-agricultural production. They are often considered to play an important role in growth promotion and poverty reduction (Bank, 1994; 2002; 2004; Beck, Demirgüç-Kunt & Levine, 2005). Nevertheless, globally SMEs are confronted with relatively harsh credit constraints (Beck, Demirgüç-Kunt & Maksimovic, 2002; Beck & Demirgüç-Kunt, 2004; Baas & Schrooten, 2006).

According to the Organization for Economic Co-operation and Development (OECD), the outstanding debt of Canadian SMEs essentially has been unchanged since 2000. Lending to smaller companies decreased by 0.1 per cent in 2008, increased by 3.7 per cent in 2009 and decreased again by 0.9 per cent in 2010 (OECD, 2015). Canadian banks do not lend to SMEs in a substantial way and SME lending has been flat since 2000. In developing countries, SME lending has grown much faster. Even in a developed market such as the

[5] Interviews 5 and 6 conducted for this paper (identities of interviewees withheld).

USA, SME lending accounts for a higher percentage of total bank loans than in Canada (Carmichael, 2012). There are a number of reasons for this reluctance:

4.2.2. SMEs: Informationally Opaque

SME lending appears to be limited in Canada primarily because of the inherent structure of the banking system. Canada is dominated by a small number of large banks that have operations throughout the country. Research suggests that across North America the structure of large banks and financial institutions is such that it is difficult and expensive to assess risk in small business lending. Small business borrowers tend to be more "informationally opaque" than larger companies and therefore present greater challenges for banks and other lenders. For instance, small companies lack publicly available, transparent information for lenders to review. Moreover, in many cases in order to lend to small businesses, gathering information about the firm's owner is just as important as gathering information about the firm itself (Mills & McCarthy, 2014). Large banks also typically have more branches that are geographically dispersed. As a result explicit rules and underwriting guidelines are needed to avoid distortions and to help their credit analysis staff in standardized loan decision-making (Mills & McCarthy, 2014).

Due to the reasons mentioned above, a bulk of bank lending traditionally occurs under a transaction lending approach. Transaction lending is primarily based on "hard" quantitative data that can be analyzed and verified at the time of financing application. This data may include information on financial ratios calculated from audited financial statements, credit scores depending on payments histories of the SME and its shareholders obtained from credit bureaus, or other information obtained from an analysis of the financial statements of

the SME. This information may be relatively easily obtained, analyzed and verified by the bank and is thus the primary information used in bank lending decisions.

However, most SMEs including a number of community renewable energy players do not fall into this 'neat' transaction lending model. Because most SMEs are not required to prepare detailed financial information, the information typically required by banks to make an expeditious lending decision is not available. In order to mitigate this, a relationship lending methodology may be employed. Such a methodology, in contrast, is based significantly on "soft" qualitative information, gathered through contact with the SME, and often with its shareholders and management. The soft information may include the character of the SME's main shareholders and management, the payment and receipt history of the SME gathered from the past banking transactions, or the future prospects of the SME obtained from communications with SME's business partners among others.

However, this soft information is normally time consuming and expensive to obtain by banks and evidence suggests that large banking institutions appear to base their SME credit decisions more on strong financial ratios than on prior relationships (Cole, Goldberg & White, 2004).

4.2.3. Current Banking Structure Enhances Search Costs

Because of the current structure, it is difficult for even qualified CE firms to find willing lenders in the traditional banking system. This imposes significant costs in terms of time and effort to secure loans from the traditional banks. A senior manager[6] of a CE firm in

[6] Interview 2 conducted for this paper (identity of interviewee withheld).

Ontario has indicated to the author that the total time from initial financing application to funds disbursement has been as long as a year or sometimes even longer.

This time and effort spent is a real cost for the business as most of the CE firms are run by a small team. The search for funds takes away time from their project development work and other day-to-day tasks.

4.2.4. High Transaction Costs for SMEs

Since RE/CE are relatively new concepts for banks and credit unions, therefore, in order to effectively assess financing applications they require a detailed assessment of the technical, legal and financial/regulatory aspects of the project. In order to conduct this assessment, banks/credit unions typically require third-party due diligence. The costs of such an assessment can sometimes be prohibitive for smaller projects. An interview conducted for this paper[7] has indicated that in some cases the financing application has actually been withdrawn because of the high cost of this due diligence.

4.2.5. Lack of Interest in Non-recourse Financing:

Non-recourse lending refers to a situation where bank loans are secured by the assets of a particular project and the borrower is not liable for non-project related assets.[8] In Ontario, banks/credit unions have very limited appetite for non-recourse financing, especially for solar projects.[9]

[7] This information is from interview 4 conducted for this paper (identity of interviewee withheld).
[8] This information is from interview 9 conducted for this paper (identity of interviewee withheld).
[9] This information is from interview 9 conducted for this paper (identity of interviewee withheld).

4.2.6. Lack of Interest in Financing Projects of Long Tenures

CE projects by their nature are long gestation projects (of 15 to 20 years duration). Credit unions and banks typically are not willing to offer financing tenures of such duration. Typically credit unions extend financing for tenures up to 5 years while banks lend up to 7 years in Canada.

4.2.7. Lower Financing Ceiling of Banks/Credit Unions:

In certain cases the financing ceiling of banks and credit unions is lower than the requirement of the CE projects.

4.2.8. Competition from Other Commercial Projects:

Banks and Credit unions have a limit of how much they can lend to commercial projects. Therefore, when obtaining financing from credit unions, CE faces competition from other commercial projects that are more suited to the traditional lending models.

4.2.9. High Loan-to-value Ratios

In some cases, potential borrowers from the CE sector are looking for loan-to-value ratios higher than 70 per cent. In a large number of cases, this is a non-starter for credit unions.

4.2.10. Short-term Sources of Funds

Banks and credit unions are hesitant in lending to CE projects because typically the sources of their funds are short-term (including customers' deposits and other short-term funds).

4.2.11. Concerns about Inadequate Security

Many banks and credit unions are not convinced that the revenue contracts of CE projects provide adequate security because they are primarily asset-backed lenders; therefore their lending models do not allow for treating future contractual revenues as adequate security.[10]

4.2.12. The Shareholding Structure of Co-operatives:

As mentioned above, a reason why traditional lenders are hesitant to lend to RE co-operatives is the inherent shareholding structure of co-operatives. Since a co-operative is often made up of several hundred members, lenders believe that it would be difficult to execute a capital call to increase the equity in the RE project from all the members in case the project is unable to achieve its financing targets.

4.3. Financing Gap for Community Energy Projects

The factors mentioned above result in significantly constrained lending to small and mid-sized CRE projects in Ontario. On the other hand, the interviews[11] indicate that securing financing for larger projects in the RE sector (projects greater than $20 million value) is typically somewhat easier as there are larger institutions like insurance companies, pension funds etc. who are willing to support projects with solid business plans. Smaller projects (having $150,000 to $20 million value) typically find it more difficult to raise financing because the larger lenders do not want to commit resources where the consequent benefit from financing to a smaller project is not substantial. The following exhibit illustrates a summary of this market gap[12].

[10] Interviewee 3 revealed this information (identity of interviewee withheld).
[11] This information is from interviews 5 and 6 conducted for this paper (identities of interviewees withheld).
[12] This information is from interviews 5 and 6 conducted for this paper (identities of interviewees withheld).

Figure 11: Summary of Market Gap in Financing of Projects in Ontario

	Small Projects	Mid-Sized Projects	Large Scale Projects
Project Investment Size	Less than $150,000	$150,000 - $20,000,000	$20,000,000 and Above
Uses of Financing	Individual Households	Small to mid-sized CE projects	Large RE Projects
Financing Sources	Credit Unions and Banks	Market Gap	Large players like utilities, pension funds, insurance companies etc.

Significant market gap exists for mid-sized projects as they have difficulty in obtaining financing.

This is an important outcome for CE projects as most of the projects in Ontario fall into the category of $150,000 to $20,000,000 where there is a gap in funding support. In the next section, case studies of four RE co-operatives based in Ontario are presented. These co-operatives were successfully able to raise financing despite the challenges discussed in this section.

5. SUCCESSFUL EXAMPLES OF COMMUNITY ENERGY FINANCING SOLUTIONS

This section presents case studies of four CE firms of the province that were able to successfully secure financing for their projects. Each case study describes the background of the co-operative, the financing challenges it faced and the options considered before finally securing financing. The implications from each case study are also discussed. These case studies also highlight challenges faced by RE cooperatives particularly in the project development stage stemming from an inability to collateralize loans.

Most of the information for the case studies has been gathered through interviewing senior management of the RE co-operatives. In keeping with the standard research ethics protocol, their identities have been withheld for privacy purposes. Names of associated institutions have also been changed for the same purpose.

5.1. Case Studies of Successful Financing Solutions

5.1.1. Case Study 1

5.1.1.1. Description of Project

Renewable Energy Co-operative 1 (REC 1) was set up in 2013 as a 'for profit co-operative with share capital'. Headquartered in Ontario, the co-operative continues to increase its membership base from within Ontario.

For one of its major wind projects, Wind Farm, REC 1 has partnered with Wind Invest[13] (a Canadian corporation based in Ontario with a mandate to develop wind power generation) and North Frontier, where 49% of the equity is owned by REC 1.

[13] Names have been changed to protect privacy.

Holding a feed-in-tariff (FiT) 1.5 contract, the partnership includes the development as well as the operations of the wind farm. The wind farm will be completed in 2016. It will have ten wind turbines each having a capacity of 1.8 megawatts installed over an area of 7.5 kilometers. Since this farm will be connected to the local distribution lines, the produced electricity plans to be used to power about 6,250 homes in the neighbourhood. Other infrastructure planned for the wind farm includes access roads, a switching station, cabling and a facility for operations and maintenance.

REC 1, Wind Invest and North Frontier are limited partners in this community renewable energy (CRE) project. These partners have procured the project for about $73 million. In 2015, REC 1 successfully raised $9 million through the sale of community bonds and shares.

The investment structure of REC 1 is a simple one that includes one class of shares and one class of bonds. The shares are expected to earn dividends of about 10% annually while the bonds have a fixed interest rate of 5.5% and will mature in 10 years.

5.1.1.2. Financing Challenges and Options Considered

The total investment required for the acquisition and construction of the CE project (Wind Farm) was $73 million. The partners envisaged a 75%-25% debt-to-equity split with REC 1 planning to acquire 49% of the equity. The decision to inject a significant portion of the project cost as equity (i.e. 25%) was undertaken primarily to indicate to potential lenders that REC 1 and its partners were willing to share the risks of the investment with potential lenders. As mentioned previously, research suggests that

projects where significant owners' equity is involved are typically more favourably viewed by potential lenders[14].

In order to secure debt financing for the project the partners approached both Canadian and international banks. In the initial stages of the fundraising process the partners approached Canadian banks and credit unions (including Royal Bank of Canada and Meridian Credit Union) but their response was not favourable. In the opinion of the partners, Canadian banks are very conservative in their credit decisions especially those related to small and medium-sized enterprises (SMEs), including CRE projects.

In particular this reluctance to extend financing to this sector stems from a lack of prior engagement with the sector as well as deficiencies in 'business knowledge and acumen' of the co-operatives when it comes to developing robust proposals for obtaining financing from the financial institutions. Specifically, to facilitate the credit evaluation process at financial institutions there is a need for improvement in maintenance of comprehensive financial data and development of detailed financial statements.

Given the reluctance of the Canadian banks, a decision was made to approach international banks with which the partners had prior business relationships. Studies indicate that relationship lending is typically favoured by banks in order to lend to SMEs where detailed and comprehensive financial information is not available. According to Baas and Schrooten (2006), this is mainly because there are no stringent

[14] This information is from interview 4 conducted for this paper (identity of interviewee withheld).

legal requirements for SMEs to maintain and report detailed and standardized accounting information. Unfortunately, SMEs do not enjoy easy access to financing the world over for this lack of information. Therefore, this gap is filled by relationship banking as it allows financial institutions to obtain the required information about the enterprise over time (Baas and Schrooten, 2006). In fact the long-term, symbiotic relationship between the two ensures that the SME receives the required credit while the bank receives the information that it needs (Allen, Saunders & Udell, 1991; Berger et. Al, 1999; Boot, 2000). In fact the relationship proves so beneficial that over time the interest rate for the credit may even decline (Petersen and Rajan, 1994).

One of the partners of the project (Wind Invest) enjoyed excellent relationships with European banks, specifically banks in Germany[15]. Wind Invest had worked with German banks for a number of their previous projects and had an excellent track record with these banks. Wind Invest capitalised on these relationships by seeking debt financing from a consortium of international banks (two German banks and one US bank). A loan of $52 million was secured for 17 years at an interest rate of 4.8% with the project assets being used as collateral.[16]

5.1.1.3. Assessment of Outcome

REC 1 represents a rare success story in the CE space where such a project has been able to raise financing from the banking sector for a project in Ontario. There are a number of key lessons that can be learnt from the approach undertaken by REC 1.

[15] This information is from interview 1 conducted for this paper (identity of interviewee withheld).
[16] This information is from interview 1 conducted for this paper (identity of interviewee withheld).

(i) The critical importance of relationship management

Interviews with senior management of REC 1 suggest that the positive relationship between sponsors of the project (i.e. Wind Invest) and a number of international banks played a critical role in securing financing from these banks. Despite this long-term relationship the credit assessment and due diligence process was very extensive highlighting the reluctance of banks in extending financing to this sector in Ontario. However, according to REC 1's management 'having a strong prior relationship with banks is the only way of obtaining financing for such projects at this point in time.'

(ii) The significance of raising substantial equity prior to approaching financial institutions

According to REC 1's management another key reason for successfully acquiring bank finance was the fact that they had been able to raise substantial equity from their members prior to their approach to financial institutions. The co-operative had raised almost $9 million from its community members[17]. This helped in providing confidence to the international banks in terms of project viability and prospects of its future success. The banks recognized this as a key enabling factor in the decision to extend financing to the project.

(iii) International banks more receptive to CE projects than Canadian financial institutions

REC 1's experience highlights the significant disconnect between the credit assessment approaches of Canadian financial institutions versus those in some other

[17] This information is from interview 1 conducted for this paper (identity of interviewee withheld).

developed markets. According to REC 1's management, 'Canadian banks seem to be very conservative and cautious in their approach to financing projects from a relatively new sector such as CE'[18]. International banks, which in this case were banks in the USA and Germany, had more exposure to this sector and were more willing to invest in such projects. Canadian banks typically assess CE projects as part of their overall commercial lending framework which is more suitable for traditional commercial and industrial projects rather than CE projects. In order to create more awareness in Ontario about the specific characteristics of these projects, including project viability and profitability, there is a need for further engagement between the financial institutions and the CE sector, possibly through umbrella organizations of Ontario, such as Federation of Community Power Co-operatives (FCPC).

5.1.2. Case Study 2

5.1.2.1. Description of Project

Renewable Energy Co-operative 2 (REC 2) is one of the largest renewable energy co-operatives in Canada in terms of members and investors. Its product, Green Bond, features amongst the few retail products in the country that are available as an investment option for those inclined towards impact investment. The co-operative owns its projects directly as well as through two Special Purpose Vehicles. It has over 1200 members who have made an investment of over $21 million in its projects. The projects range in size from 10kW (rural systems) to 600kW (industrial rooftops) while the complete portfolio measures over 5 MW of installed capacity valued at over $30 million. REC 2's marketing initiatives include utilizing social media channels and

[18] This information is from interview 1 conducted for this paper (identity of interviewee withheld).

local media campaigns for specific projects. The co-operative also works on increasing awareness of renewable energy issues and opportunities by engaging with the education sector. It also works closely with institutions promoting impact investment.

All of REC 2's projects are based on setting up and operating solar photovoltaic facilities, allowing for a relatively simple business model for the co-operative. Revenues from the facilities are fairly predictable because FIT contract pay a fixed price per kWh for 20 years and the fact that ample sunlight is available year round for the projects. The administration, insurance and maintenance costs are also predictable. On the other hand, one of the major challenges for the co-operative remains the cost of financing. A key role in the co-operative's business model is played by Catalyst Capital, a financier to CE sector, which provides development capital to the co-operative.

5.1.2.2. Financing Challenges and Options Considered

According to interviews 3 and 4, REC 2 had a specific set of challenges in financing the various projects undertaken by the co-op. The projects varied in size, time of commencement, location etc. necessitating an umbrella financing structure rather than project financing for specific projects. In order to achieve this, REC 2 embarked on an innovative three-pronged approach for obtaining financing. First, REC 2 approached Catalyst Capital, a co-operative that provides bridge financing facilities to the community power sector in Ontario.[19]

[19] This information is from interviews 3 and 4 conducted for this paper (identities of interviewees withheld).

As mentioned earlier, financing from Catalyst Capital has been used as development capital for construction of projects. Funds typically lent by Catalyst Capital are at a higher rate than long-term loans because Catalyst Capital shares in the construction risk of the project. As of January 2016, Catalyst Capital has provided more than $13 million to finance the construction of various REC 2 projects. Once the projects are constructed and are in the revenue generating stage, REC 2 issues bonds that are marketed to retail as well as institutional investors. Proceeds from these bonds are used to repay the loans extended by Catalyst Capital. There are two types of bonds issued, a five-year bond and a fifteen-year bond. The terms of the bonds are highlighted in Figure 12.

Figure 12: Terms of Bonds Issued by Renewable Energy Co-operative 2

TERMS OF BONDS		
TYPE OF INVESTMENT	FIVE-YEAR BOND	FIFTEEN-YEAR BOND
Annual interest rate	5%	6%
Minimum investment	$1,000	$10,000
Repayment method	5th year	Amortized payments
RRSP/TFSA eligible	Yes	No

REC 2 bondholders are subsequently repaid from the revenue proceeds of the underlying projects (i.e. revenue from sale of electricity under FiT contracts).

As part of its strategy, REC 2 seeks to diversify its funding sources so as to reduce its dependence on any one particular source of funds. As a consequence, it has also sought financing through long-term loans to repay the financing of Catalyst Capital.

To date REC 2 has raised $4.3 million in long-term debt from an insurance company at reasonably favourable terms (interest rate of below five percent, tenure of sixteen years). REC 2 is also in the process of raising an additional $14 million as long-term debt.

Figure 13: Terms of Long-term Debt by Renewable Energy Co-operative (REC) 2

TERMS OF LONG-TERM DEBT	
Interest rate	Less than 5%
Tenure	16 years
Payment sculpting	Allowed
Placement fee	1%
Special condition	Reserve account maintaining six months of project revenue

While securing long-term debt from a financial institution is the preferable strategy for REC 2, interviews with the management suggest that securing such financing is an exceedingly difficult process. Some of the challenges faced by REC 2 in securing this type of financing are as follows:

(i) Low degree of receptiveness

REC 2 approached a large number of major banks and credit unions in Ontario in order to seek long-term financing for their projects. However, the overall degree of receptiveness for these institutions was low and REC 2 was not able to conclude a deal with any of the banks or credit unions. Eventually, the co-op was successful in raising

long-term financing from an insurance company. The primary reason for this success was the fact that the insurance company's long-term investment horizon was a match with the long-term (15 years +) loan requirements of REC 2.

(ii) Difficulty in raising financing less than $10 million

REC 2's approaches to banks and credit unions for obtaining long-term financing indicated that as a general rule these financial institutions were reluctant to extend loans of amounts less than $10 million. This seems to be the case because the credit assessment process for CE business models is reasonably complicated and banks/financial institutions are not willing to devote resources to conduct such assessments for loans of smaller denominations.

(iii) Extensive due diligence process

The due diligence process that financial institutions generally undertake for lending to CE projects is very extensive and costly for such projects. For instance, the loan application process for REC 2 took more than nine months and involved insurance review, legal due diligence and engineering assessment. The cost for administering this due diligence totalled significantly more than $100,000.

(iv) Special conditions by financial institution

In addition to the customary requirement for security, the financial institution attached additional security conditions to the financing primarily because it was unsure of the security of the underlying revenue contracts. One of these conditions was the establishment and funding of the 'reserve account' in the amount of six months of

project revenue. The financial institution stipulated that funds in this account may only be withdrawn with its consent and approval. Once a track record of success was established, the co-op was able to reduce the amount to be held in the reserve account to three months of revenue.

(v) Financial institutions reluctant to lend under a co-operative structure

Financial institutions are unsure how to lend substantial amounts under a co-operative ownership structure. The main issue in this respect is to structure a transaction where the financial institutions have step-in rights in case of default or delay in payment[20]. Getting an approval from all members of the co-operative for any financial institution action in such a scenario seems to be a challenge. To mitigate this risk, banks and other financial institutions typically ask for additional non-routine security as mentioned above.

(vi) Importance of an upfront contribution of equity

Similar to the experience of most CRE co-operatives it is essential for project sponsors to contribute significant equity to the project prior to applying for long-term financing. REC 2 was successful in this respect as it had accumulated a private capital pool of more than $5 million prior to approaching financial institutions. This was a key success factor that contributed to a successful long-term debt transaction that was needed for the projects.

5.1.2.3. Assessment of Outcome

REC 2 has adopted a unique method of raising financing for its projects. It employs a combination of equity from project sponsors, private sector loans, retail and

[20] This information is from interview 7 conducted for this paper (identity of interviewee withheld).

institutional bonds and long-term debt from financial institutions[21]. While this has been a successful approach for REC 2, other co-operatives seeking to follow this approach need to be aware of the following:

(i) Due diligence costs are prohibitively expensive for smaller co-operatives. The language of the FiT contract is very complex and it is very expensive and time consuming for the financial institutions to conduct an assessment of the legal framework and develop a full understanding of the various issues relating to the FiT contracts. The cost of such a legal assessment is invariably passed on to the co-operative and thus the cost of the transaction increases. Additionally there are other costs such as a placement fee of upwards of 1% of the transaction value that has to be borne by the co-operative. Engineering assessments and insurance review also must be conducted. Further to the monetary costs, there is also a significant time commitment that has to be undertaken by the co-operative's management in obtaining the relevant paperwork, supervising the due diligence etc. In the case of REC 2 the long-term financing took almost nine months of intense effort to be finally secured.

(ii) Since the financial institutions are not fully aware of the CRE business model, nor the security of the contracted revenue under FiT, they seek additional security from the co-operative that sometimes becomes onerous. For instance, the establishment and funding of the reserve account as a security mechanism is an inefficient way to allocate capital as it causes substantial amount of funds to remain unutilized for long periods of time. Another factor making such a security mechanism more difficult for the co-operative is that the co-operative typically has to seek approval from the

[21] This information is from interview 3 conducted for this paper (identity of interviewee withheld).

financial institutions to withdraw funds from the account. Such approvals can be time consuming to obtain, especially in a large institution such as a bank with a complex decision hierarchy.

(iii) Similar to REC 1's experience, REC 2 also found obtaining long-term debt to be easier once equity from project sponsors had been raised. As mentioned above, raising equity from project sponsors is a key success factor in demonstrating to financial institutions that project sponsors are sharing parts of the risks of the project.

5.1.3. Case Study 3

5.1.3.1. Description of Project

Renewable Energy Co-operative 3 (REC 3) is a non-profit renewable energy co-operative. Its membership exceeds 600 (as of 2016). The co-operative aims to develop a biogas plant at the local animal sanctuary, a first in North America, at a cost of $4.8 million in order to produce electricity, heat and fertilizer. The biogas plant is expected to begin operations in 2017. The fuel sources for the plant include the sanctuary's manure output and organic waste from restaurants of the city. Under the FiT program, the produced power (approximately 500 kW) will be sold to IESO. It is expected that the direct emission reductions from the project will be about 12,000 tonnes carbon dioxide equivalent annually[22].

The co-operative expects to raise revenue from three sources:

a) selling of electricity,

b) selling of solid digestate (to the public) and

[22] This information is from interview 5 conducted for this paper (identity of interviewee withheld).

c) earning tipping fee for accepting food waste

The co-operative's strategy is to finance its project entirely through debt. In order to do this the co-operative has issued various types of bonds including Founder's Club Bonds, Clean Energy Bonds, construction financing and long-term financing. As with other co-operatives, only its members and non-member corporations can purchase Clean Energy Bonds. Positive cash flows are expected by the co-operative over the life of its project.

Its longer term strategy includes plans to increase its electricity production from 500 kW to 1 MW. The surplus funds from the increased output will be employed to develop new community-owned biogas plants; other animal sanctuaries and zoos in the country can also be suitable locales for these plants.

5.1.3.2. Financing Challenges and Options Considered

The total investment required for setting up the biogas plant and associated infrastructure was $4.8 million. This investment is summarized in Figure 14.

Figure 14: Investment for Renewable Energy Co-operative 4

Item No.	Item Name	Amount
1	Biogas tanks, equipment, generators, engineering and contingency funds	$4.4 million
2	Grid Connection Equipment	$300,000
3	Road Improvements	$100,000
	Total Capital Cost	**$4.8 million**

The cooperative's strategy was to finance its project entirely through debt via a

number of sources. These included construction / vendor financing, Clean Energy bonds, and long-term debt from a commercial lender. The Clean Energy bonds were divided into three series (Series 1, Series 2 and Series 3) depending on the stage of the project that each source of funds would be deployed for. For instance, construction / vendor financing and proceeds from Series 1 and Series 2 bonds were allocated for development and construction of the biogas plant. Once construction is complete, Series 3 bonds and the long term debt will be used to repay the construction / vendor finance and the Series 1 and Series 2 bonds. Subsequently, Series 3 bonds and the long term debt will be repaid through the project's revenues.

The community bonds were issues to the public and REC 3 was successful in raising the following amounts:

- Clean Energy Bonds Series 1: $2.18 million.
- Clean Energy Bonds Series 2: $620,000
- Clean Energy Bonds Series 3: $ 1.15 million

In addition, the co-operative was also successful in raising $3.4 million from a commercial lender as long-term financing. The financing was raised at an interest rate of below 5% with a 16-year amortization term. Securing the long-term financing was the most challenging part of the fund raising process. In securing the long-term financing, the co-operative faced the following challenges:

a. **Lack of receptiveness from Banks and Credit Unions:** As with a number of other RE co-operatives, REC 3 also experienced significant difficulties in convincing conventional banks and credit unions of the business case and merits of providing financing for its projects. Despite approaching several banks and

credit unions, the cooperative was unable to secure financing from these sources. A key challenge in this respect was convincing these institutions of the business case and the certainty of revenue under the FiT contracts. In some respects, the complex language of the FiT contract also made the financial institutions less confident in proceeding with the loans. After making a number of unsuccessful approaches to banks and credit unions, the cooperative was finally able to secure long term financing from a non-bank commercial lender (project finance company).

b. **Small Size of the Loan:** To some extent, the small size of the financing required was also a factor in the lack of interest by larger banks and credit unions. The co-operative found that smaller financing institutions were more interested in lending in this segment ($3 to $4 million).

c. **Lack of Operating History:** As a start-up, the co-operative found it challenging to convince banks and credit unions of the merits of the business model. Banks and credit unions typically utilize a standard credit assessment framework that requires that the borrower provides at least a two year track record of performance. This requirement, of course, is difficult for a new renewable energy project to fulfill.

d. **Securing Certainty of Feedstock:** In contrast with solar power generating facilities where the feedstock (sunlight) is freely and generally abundantly available, a secure supply of feedstock for the biogas project was a critical precondition for securing long term financing. A key hurdle that was faced by the cooperative in raising long term finance was convincing financial institutions that

adequate amounts of feedstock will be consistently available for the biogas project. In order to achieve this, the cooperative entered into long term agreements with vendors such as grocery stores to collect their organic waste and use it as fuel for the project.

5.1.3.3. Assessment of Outcome

The case of REC 3 also highlights the significant difficulties faced by CE co-operatives in accessing financing through conventional banks and credit unions in Canada. Despite repeated approaches, the cooperative was unable to secure a loan through these sources. A lack of operating history was cited as a major obstacle. This is especially frustrating for RE projects since most of these, like REC 3, are new initiatives and do not meet the traditional requirement of at least 2 years of operational track record.

However, REC 3 was successful in obtaining financing from a commercial project finance lender on terms that were reasonably similar to those provided by banks. This provides a way forward for other CREs in terms of accessing financing from non-bank lenders for their projects. This is especially true for projects that require smaller financing amounts (typically less than $5 million).

5.1.4. Case Study 4

5.1.4.1. Description of Project

Renewable Energy Co-operative 4 (REC 4) has 27 solar projects all over Ontario, of various sizes ranging from eighty to five hundred kilowatts. Three of its biggest projects were completed in 2016 which generated over ten thousand kilowatt hours of

RE in only the first few months; till early 2016 REC 4 has generated over five million kilowatt hours of RE.

To finance its projects REC 4 has successfully raised more than $10 million from over 700 members through its first bond offering. In 2016 REC 4 issued a new five-year bond offering a rate of return of 6.13 %.

Membership is open to public for as little as ten dollars.

5.1.4.2. Financing Challenges and Options Considered

REC 4 sought to raise financing for its multiple projects from a number of sources. Since obtaining debt financing without significant equity already in place was a challenging proposition, the co-operative decided to focus initially on raising equity financing from its members. Following a successful fund raising campaign, REC 4 was able to raise almost $10 million from its 700+ members. According to management, this was crucial for the cooperative in approaching and successfully securing funds from financial institutions later.[23]

However, despite the successful equity raising, the co-operative was not able to successfully close financing from any of the local banks or credit unions in Ontario. This was despite approaching all the banks and a large number of credit unions in the province and possessing strong connectivity within these sectors. Eventually, the co-operative had to approach second tier lenders and equipment financing firms to secure funding. A financing of $20 million was secured from one of these lenders for the various projects under the umbrella of the cooperative. However, the interest rate

[23] This information is from interview 6 conducted for this paper (identity of interviewee withheld).

charged was somewhat higher that what could have been offered by banks or credit unions.[24]

The co-operative faced a number of challenges in securing debt financing for its projects. Firstly, there was reluctance by the banks and credit unions in providing debt financing because of the underlying co-operative structure and especially because the feed-in tariff (FiT) contract stipulated that the projects had to be undertaken under a cooperative structure. Defaults under a co-operative structure are hard to enforce (due to its intrinsic organizational structure of having a number of members), hence banks and credit unions did not view this structure as appropriate for lending. Additionally, the credit assessment models at most banks and credit unions are not geared to lend against the security of future revenue streams under the FiT contracts. In their credit assessment, they are still constrained by asset-based models where a project is viewed as a sum of its assets and in case of default the liquidation value is viewed as the disposal price of the assets. While such a model works well in the traditional industrial or commercial lending, for RE co-operatives, such a model invariably leads to a loan application being rejected.

5.1.4.3. Assessment of Outcome

REC 4 faced significant challenges in obtaining financing from financial institutions. The approach to banks and credit unions yielded no results. Second tier lenders were approached and one provided a debt facility on slightly less favourable terms than what would have been secured from a large bank or credit union. As with other case studies mentioned previously in this paper, key areas of focus for securing of

[24] This information is from interview 6 conducted for this paper (identity of interviewee withheld).

financing include raising significant equity before applying for debt financing, educating banks and credit unions about the nature and security of the FiT revenue streams and to seek financing from sources other than the large banks and credit unions for their projects, such as insurance companies, equipment financers and other investment companies.

5.2. Examples of Other Successful Community Energy Financing Initiatives

While the section above presents in detail specific financing initiatives that were undertaken by CE firms in Ontario to obtain financing for their ventures, this section describes more generally some of the other avenues that may be available for obtaining financing for CE projects. Specifically, this section describes briefly the role that some credit unions, both within and outside Ontario, have played for community development including CE initiatives, in the recent past.

In Jurisdictions Other Than Ontario

Vancity – British Columbia

Canada's largest credit union, Vancity has assets over $17 billion and serves 414,000 members across British Columbia. Its membership base comprises approximately 80% retail members and 20% community investment members. For the community investment members, Vancity focuses especially on developing of unique products to match their requirements (Global Alliance for Banking on Values, n.d.). It has provided grants, advice and workshops to 1,400 organizations in greening their businesses. As well, more than half of the $468 million it advanced as loans was aimed to support environmental sustainability initiatives (Vancity, 2014). It also supports small businesses with advice and collaborative opportunities as well as

access to capital, for example, grants and financing for companies both at the start-up and growth phases (Vancity, n.d.).

Its *Resilient Capital Program* provides a deposit-based product (term deposit) to fund social enterprises over terms of five, six or seven years to help build resilient communities. The program has provided financing to 11 enterprises, to the tune of $4 million, as of July 2013, and has been hailed as a pioneering approach with a strong potential of being replicated in other parts of Canada (Vancity, 2013).

Vancity's collaboration with *Greasecycle*, a small local company, is another example in which Vancity has attempted to impact community businesses. With facilitation in bridge financing, lines of credit, advisement and networking by Vancity, *Greasecycle* grew rapidly to meet growing demand of waste cooking oil to supply to the largely import-dependent biodiesel market of the province (Vancity, n.d.).

A start-up in the area of solar hot water systems' installation and energy audits, *Illuminate Solar*, was helped by Vancity in the form of business advice, micro loan for showroom renovation and line of credit for business growth (Vancity, n.d.).

Vancity also played an important role in the development of *Canoe Creek Hydro*, a hydro-powered electricity project for the Tla-o-qui-aht First Nation's community and surrounding areas. A first Aboriginal hydro-generated power facility, out of the required $13.5 million the project was able to secure a loan of $4.1 million from Vancity's Community Capital loan. It generates 16.8 GWh per annum, which is enough to power 1,700 homes. The First Nation owns 75% of the *Canoe Creek Hydro Company* (Vancity, n.d.).

Assiniboine Credit Union (ACU) - Manitoba

ACU provides financing opportunities through its *Community Financial Centre* (CFC) to non-profit organizations, co-operatives, social enterprises and micro-entrepreneurs that are unable to secure funding through traditional modes (Assiniboine Credit Union, n.d.).

ACU also helps finance community businesses, housing projects and other community social services through Jubilee Investment Certificates offered by Jubilee Fund Inc., a Winnipeg-based community investment fund (Assiniboine Credit Union, n.d.).

ii. Within Ontario

Kawartha Credit Union

Headquartered in Peterborough, Kawartha Credit Union has been active in financing the local RE industry. It has provided financing of approximately $20 million to date. These projects include solar, wind and small hydro-electric projects. Kawartha was also part of a syndication lender for another small hydro-electric project in eastern Ontario.[25]

Alterna Savings

This century-old credit union of Ontario is also highly supportive of local community projects. In 2013 it partnered with Ottawa Renewable Energy Co-operative Inc. (OREC), an organization that supports the growth of the local renewable energy sector, especially solar and environmental education. OREC provides long-term investments that finance such projects (Alterna Savings, 2014).

[25] This information is from interview 7 conducted for this paper (identity of interviewee withheld).

6. INTERNATIONAL BENCHMARKS FOR COMMUNITY ENERGY FINANCING IN OTHER DEVELOPED MARKETS

6.1. Introduction

The challenges faced by CE firms in Canada in financing their development and operations are not unique. Over the years, CE firms across the developed world have faced similar challenges in terms of accessing financing from the traditional banking sector.

6.2. Key Challenges Faced by Community Renewable Energy Projects outside Canada

There are numerous challenges faced by this relatively new sector. Because each CE project differs in its objective and outcome, so do the agendas of the involved stakeholders, which in turn makes this sector highly fragmented, resulting in difficulty in matching it with the appropriate financial products. Most importantly, there is a general lack of understanding about this sector, especially the opportunities that it does and can present in a number of developed countries other than Canada (Howard, 2012).

1. A low participation from individuals may be noted in certain regions of the world which could have a 'cultural' dimension to it – for example, Europeans seem to prefer security over rate of return for their investments. Therefore, this does not help the case of CE projects which are considered high risk. Additionally, such projects require financial investments over long term, which may not suit the needs of individuals who would prefer easy access to their capital (REScoop, 2014).
2. Lack of political support and a general lack of knowledge about the issues faced by renewable energy sectors are also seen as major barriers towards financing of renewable energy co-op projects (REScoop, 2014).

3. Another barrier that exists for adoption of all types of RE technologies is lack of awareness of the benefits that such technologies can manifest for communities. This barrier lists high in a report by European Commission conducted by Ecofys (de Jager et al, 2011). Because local and regional authorities pose as major stakeholders in this arena of CE, their positive outlook can prove to be a decisive factor for financing of such initiatives. Likewise, their lack of awareness can potentially translate into lack of support that is an essential requirement for the creation of such projects. The local authorities may be opposed to the idea as they do not appreciate having such installations close to their communities (REScoop, 2014).
4. The pre-planning stage of renewable energy co-ops is normally a capital-intensive one as it involves business plan modelling, technical assessment of the technology involved etc. The necessary involvement of professional organizations to perform these tasks so as to meet the requirements of financial operators further drives up the initial cost of such projects. 80% of these projects in France fail to survive beyond their first three years of creation due to these very high costs (REScoop, 2014).
5. The size of a RE co-op can also be a barrier in obtaining finances. In case it is too small, the return on investment it provides is also correspondingly small which may not interest the financial operator. If it is too big, the financing capacity of the banking sector can fall short. This can be solved through the creation of a pool of financial operators, but not all financial operators have the inclination to be a part of such a pool (REScoop, 2014).
6. Repeated modifications in the regulations relating to renewable energy co-ops can lead to an increased uncertainty for potential investors. Therefore, medium to long term stability in legal frameworks can help in building the trust of financial operators (REScoop, 2014).

7. In some countries, the supply of fossil fuels is subsidized so as to maintain their uninterrupted supply to the traditional energy systems. These subsidies in themselves strongly pose as a direct barrier to financing of renewable energy co-ops (REScoop, 2014).

6.3. Innovative Solutions Adopted to Support Financing of Community Energy Projects in Other Developed Markets and Implications for Ontario

As a result of the above challenges, a number of innovative CE solutions have been conceptualized and implemented in major developed markets – especially in Europe - that seek to mitigate the risks of financing CE projects and provide ways to assist companies in the CE sector in presenting themselves as viable candidates for financing from the institutional finance sector.

These solutions have been implemented in a number of areas – from purpose-specific investment vehicles such as co-operative banks, crowd-funding initiatives to market deepening measures such as loan securitization solutions with the common aim of making the financing environment less onerous for the CE sector as a whole.

This section briefly describes a number of initiatives where success has been achieved.

a. Co-operative banks

In contrast to commercial banks (whose focus is on purely commercial projects), co-op banks typically have an increased appetite for projects which have an environmental dimension as well. However, obtaining financing from co-op banks appears to be more expensive than commercial banks since co-op banks offer returns of 5% to 10% to their shareholders

(Energy4all, n.d.). While credit unions in Ontario fulfil the role of extending financing to the CE sector to an extent, there is a need to significantly expand this role[26].

b. Purpose-specific co-operatives

In the UK, CE projects are also financed through purpose-specific co-operatives that allow investors to own equity in CE projects (Energy4all, n.d.). For example, the average contribution by members of co-operatives in Germany can range from €1200 to €15625 which is the average taken from 15 Renewable Energy Cooperatives across Germany (Boontje, 2013). This provides an additional avenue for CE projects to raise finance. In addition to the return from equity investments, investors are further incentivized through tax relief on their capital gains (Drumlin Wind Energy Co-op, 2017).

In Ontario, purpose-specific co-operatives for CE projects are common. However, Ontario's RE co-operatives have generally not been successful in raising significant amounts of capital from their members (FCFP Survey 2014), as this is still considered to be a high risk - high return proposition for investors (as it involves equity investments).

c. Assistance in raising equity capital

Third-party specialist organizations have emerged to cater to the niche market of raising finance for CE projects, which are normally capital-intensive (Energy4all, n.d.). Such organizations provide a critical service to early stage CE initiatives especially in cases where project promoters do not have prior experience of conventional fundraising. These 'facilitators' typically charge a fee from either the project promoter or the investor for their services. There

[26] This information is from interview 5 conducted for this paper (identity of interviewee withheld).

are players like TREC in Ontario facilitating such investments for community renewable energy players to an extent but their role needs to be expanded significantly.

d. Indices

Indices are being developed that pool together the financial data of social investments and allow investors to invest in a multitude of project all at once instead of placing their funds in a specific project (Howard, 2012). For new investors such indices would inspire confidence and can even serve as an investment vehicle itself. This can be an area that financial institutions can explore for CE projects in Ontario.

f. Debentures

Third-party specialist organizations also assist in raising debt capital through a variety of products, including different types of debentures (Abundance Investment, 2017). Debentures provide a long-term, diversified investment (investing in more than one project at a time) so it can be used for long-term, stable financial planning. The investment amount can also be reinvested or withdrawn at any time. The fact that debentures are not listed on stock exchanges leads to a reduced investment risk (Abundance Investment, 2017). With regards to implications for Ontario, a formal debt market may be considered. However, economies of scale may be hard to achieve in this case for a small market like Ontario.

g. Crowdfunding

Smaller projects (for example, solar projects) that require limited funding may be financed through crowdfunding initiatives (Fox, 2014). This is especially relevant for projects that do

not have access to conventional financing either due to the scale, novelty of the idea or early stage of conception.

Like with any other equity investment, crowdfunding investments are not risk-free. There is always a possibility of insignificant or negative returns on investment. Additionally, this is still a new concept without a significant track record and creating investor awareness for such investment vehicle remains a challenge.

h. Property Assessed Clean Energy (PACE)

Property Assessed Clean Energy (PACE) financing is another new concept in the area of financing the development of RE solutions. This involves financing RE projects through property taxes over long term. This program is typically undertaken by city or town municipalities, pioneered in the state of California (Steller, 2014).

This allows homeowners or communities to develop/upgrade their energy systems without incurring substantial upfront capital cost. Payments for these initiatives are made through property taxes meaning that 'are tied to the property rather than the owner of the property, meaning they are transferable if the property is bought or sold'.

The onus of financing these initiatives falls on individual municipalities. These initiatives are relevant for individual homeowners but not for CE initiatives.

i. Investment funds

Major investment banks have created funds to finance solar projects in communities across the US, for example, Bank of America Merrill Lynch has invested more than $1 billion across the US in solar power projects in military housing communities (Bank of America, 2013). Morgan

Stanley created a $300 million fund in 2012 to finance clean energy for residences in California and Arizona (Woody, 2012).

An opportunity exists for setting up similar funds in Canada and some progress has been made by way of socially responsible funds but there are no funds specifically targeted towards the CE sector.

j. Impact investment

Impact investment industry has been slated by Monitor Group, in a 2009 research report, to grow from $50 billion in assets to $500 billion by year 2020 (Freireich and Fulton, 2009). This industry helps tap into substantial private sector funds to complement public and philanthropic funding in tackling the environmental challenges (GIIN, 2017). As far as implications for Ontario are concerned this is an up and coming sector and inclusion of CE projects in such funds can create additional financing avenues.

k. Securitization

Securitization is a mode of financing that has recently been adopted by owners of solar projects. Future revenue streams of solar projects (generated by leases and Power Purchase Agreements) are being used by project owners as a way of generating funding for new CE projects.

SolarCity turned to this mode of financing, already practised in sectors of life insurance, auto loans, mortgages etc., at end 2013 (Wang, 2013). It expects to raise $54 million at a rate of 4.8% by 2026. By 2016 it had completed fifth securitization of loans with a total of $185

million. The expected repayment date is 2022 with a blended yield rate of 5.81% (Johnston, 2016).

Funds received from the securitization process can be used by solar projects for further investment. Moreover, it can lead to an increased investor base in a low interest rate environment by providing returns on investments that are higher than traditional loan products.

SolarCity is a successful example of a solar company in the USA that has securitized its loans. Over the past four years the company has been able to secure loans worth about $185 million (Johnston, 2016). It allows individuals as well as institutions to invest in its portfolio of solar financial products (Solarcity, 2014). This can serve as a blueprint for Ontario's solar players once the securitization and debt market in the province has matured; however, this only seems likely in the long term.

l. Socially responsible asset management companies

Environmentally friendly investors are increasingly employing socially responsible asset management companies to manage their funds. Examples include New Island Capital and Green Alpha Advisors (Weil, 2016).

Such investment vehicles allow an appropriate allocation of the idle cash of individuals and organizations that want a good rate of return for their investments while simultaneously contributing to socially responsible investments (SRI).

Some Canadian asset management firms such as Ethical Funds, Wealthsimple and some traditional banks have introduced socially responsible funds. However, further development of

this sector is also required in order to include CRE projects as constituents of such funds in Ontario.

m. Clean Energy Victory Bonds (CEVBs)

A new source of federal government funding being considered in the USA is the Clean Energy Victory Bonds (CEVBs). These Treasury bonds, perceived as a highly safe investment, are expected to raise $50 billion in a short duration (Green America, 2016), and will create 1.7 million new jobs (Scientific American, 2016). CEVBs will be open to investments from individuals and institutions alike for an amount as low as USD 25 (Scientific American, 2016), effectively broadening the investor base for RE projects.

The project promoters can leverage the contribution made through CEVB by approaching other private sector investors. Evidence suggests that this can translate into tripling the capital initially raised through CEVBs (Francescato, 2013).

Such bonds may be introduced by Government Ontario or the federal government for investors throughout Canada as well as international investors to finance RE projects with possibly a certain allocation for CE projects.

n. Government-sponsored funds

Government-sponsored funds have been established in the UK to support CE projects. These funds provide support in the form of legal advice, grants and loans et al for community projects. Examples include Scotland's Community and Renewable Energy Scheme (Scottish Government, 2013), Wales's Ynni'r Fro (Welsh Government, 2014) and England's Rural Communities Energy Fund.

The financial support offered through such a fund is often not enough to fully cover the high upfront costs of CE projects. Moreover, bureaucratic red tape in obtaining such a fund could pose as an impediment (Roberts, Bodman and Rybski, 2014). Provided that these issues are addressed, such government-sponsored funds can be useful in Ontario in providing the much needed early stage support for CE projects.

The examples mentioned above provide a blueprint of the kinds of solutions that can be considered in Ontario for CE financing. While some of these initiatives such as ethical funds and other SRI can be implemented in the province in the short-term, other initiatives such as developing a securitization market or issuing purpose-specific government bonds are more structural in nature. Therefore, the implementation of these initiatives would require the interplay of a number of private and public sector entities over the medium to long-term.

7. CONCLUSIONS AND RECOMMENDATIONS

The social, economic and community benefits of providing RE through a CE model are clear. CE provides a democratized form of provision of a secure source of energy to a community and fosters inclusion and a collaborative approach to generating, distribution and maintaining energy production capacity. Furthermore, this 'inclusive' form of energy generation for communities also promotes the use of RE as both generators and users have the same objectives in building and operating the CE facility.

In recognition of these benefits, the government of Ontario has initiated a number of policy measures for the development of the CE sector in the province. These include the FiT regime, and an overall focus in favour of RE and away from 'dirty' energy generation methods such as coal-fired power plants. However, despite the obvious benefits of CE and the policy support, the sector has shown only limited growth in Ontario primarily due to lack of financing. This paper has sought to assess the reasons for the lack of involvement of the traditional banking sector in financing CE projects. The FCPC Survey (2014) indicates that a large proportion of CE projects are equity-funded. Equity capital is an expensive form of financing and impedes the long-term growth of CE projects. As the sector has grown over the past few years, RE co-operatives have made attempts to broaden their capital base by seeking financing from the traditional banking sector. Although there have been a few cases of successful collaboration, by and large these attempts have been unsuccessful.

Our research has also indicated that although financing is available for very small initiatives (i.e. less than $150,000) catering to individual rooftop solar systems as well as very large projects (i.e. more than $20 million), there exists a gap for projects requiring between $150,000 and $20 million (which is typically the investment range for CE projects).

Despite the fact that a gap exists in the financing of medium-sized CE projects, to date a suitable financing mechanism for such projects does not exist. One of the reasons for this is the conservative nature of banking sector lending in Canada whereby lending for projects that are not fully asset-backed and that require long-term financing (up to 20 years) is very limited. This underlines the need for educating the banking sector on the unique requirements of CE projects, specifically related to financing terms including tenure and security.

In light of this dearth of access to financing from traditional lending channels, some CE firms in Ontario have resorted to innovative financing channels such as the issuance of their own debt instruments. While such a move is likely to be successful in a few cases, the absence of a secondary market for these bonds means that the benefits from such issuance are likely to be limited. Access to the traditional banking sector, if it is widely available for CE projects, still remains the best avenue for financing for these firms till the time that an alternate market – either for bonds or for securitization – or other financing channels become available.

In order to improve access to financing for CRE firms in Ontario, there are a number of areas where improvements can be made. These fall into the following broad categories:

1. **Creating Awareness of the Community Energy Model in the Banking Sector**

   There is a need to create awareness so that the banking sector can play a more active role in financing CE projects. This is because the banking sector in general regards such investments as speculative, and therefore, banks and credit unions need to be made more aware of the merits and financial feasibilities of these projects. These awareness initiatives need to focus on the following areas:

Firstly, there is a divergence between the types of financing required by CE projects and the conventional lending models currently in practice at banks and credit unions across Ontario. There is a need to educate the banking sector about the unique nature and economic viability of CE projects. Preferably this should happen at the level of senior management to ensure that adequate and more permanent policies are in place at banks and credit unions. Specific areas of discussion should include longer tenures since a key objective of RE co-operatives in negotiating financing terms is to match the loan tenure to the revenue contract of the sale of power as closely as possible. Additionally, the banks and credit unions should also be educated about treating future government-guaranteed revenue streams as viable security.

Secondly, discussions should be held with banks and credit unions in order to convince them to create a separate category in their lending portfolio for CE projects given their unique nature and revenue profile. Currently the practice at most banks and credit unions is to lump these loans together with their commercial lending portfolio. This practice puts CE projects in direct competition with the traditional commercial projects, and given the lack of understanding of the CE model, their loan assessment officers are likely to prefer shorter-duration commercial loans over loans to the community energy sector.

Thirdly, other than lending, the CE co-operatives also need banks and credit unions to act as platforms for hosting and selling registered securities (RRSP/TFSA-eligible securities). This could be another area of collaboration between the banking sector and community energy firms.

2. Capacity Building at Individual Community Energy Firms

Fund raising needs to be a specialized function at CE firms, at least in the early stages. There needs to be significant capacity building at CE firms in terms of hiring or engaging resources

for areas such as developing relationships with the banking sector or other investors, creating business plans and other financing documents and most importantly, assisting in enhancing accounting systems in order to generate data and reports that the banking sector requires for effective credit analysis.

Additional capacity also needs to be built in the CE sector as a whole. The CE sector requires resources to build the financial, technical, social, legal, and organizational templates and practices associated with the facilitation and development of locally-owned community-based RE and conservation projects. There are several organizations that have developed resources and expertise in this regard, for example, Ontario Sustainable Energy Association, Green Communities Canada, the First Nations Energy Alliance, the Toronto Renewable Energy Co-operative, Our Power, Farmers for Economic Opportunity, Agri-Energy Producers of Ontario, the Ontario Federation of Agriculture, Ontario Co-operative Association etc. These organizations need to be sufficiently resourced to vastly expand their efforts (Green Energy Act Alliance, 2009).

3. Accessing New Financing Channels

While accessing the banking sector still remains the most inexpensive financing source for CE firms, there is a need to develop other financing channels as well in order to broaden the financing base for these firms. Following from successful examples from other developed markets, new areas such as future securitizations for revenue and other innovative financing structures should also be explored. In addition, CRE firms should also seek to partner with socially responsible mutual funds or other investment vehicles to access a potential pool of socially responsible investors.

4. Collaboration with all Levels of Government

There needs to be strong collaboration between the provincial government and the CE sector. The province should fund one or more entities to offer loans, capacity building and community support to the CE sector. Seed investments in CE projects by the government will go a long way in alleviating credit concerns at banks that can then proceed with the credit application as having an anchor sponsor.

The provincial government can provide funding and support in the following areas:

a) Soft loans and grants – CE projects require early stage funding to cover the soft cost of project development work.
b) Pre-feasibility grants
c) Capacity building grants
d) Project development loans as seed investments

Assistance in a) , b) and c) is highly important since the process of applying for bank credit is costly and lengthy for CE firms. Given that these firms are typically in early stages of their development, it is crucial to provide them financial support at this stage.

It is important for the government of Ontario to realize its role in assisting the CE sector grow and contribute to the overall RE landscape of the province. While programs such as FiT have been helpful, a stronger role of the government, especially in terms of assisting CE firms in obtaining financing is crucial in the further development of the sector. While direct lending by the government for entire projects is not envisaged for the CE sector, support in terms of providing seed capital and in providing loans/grants for pre-feasibility activities, and capacity building etc.

will be important for the development of the sector in terms of approaching banks and credit unions with a viable proposition.

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