Renewable Energy Policy Mechanisms:
A comparative analysis of Feed-in Tariff Programs in Ontario and Germany

A thesis submitted to the Bucerius/WHU Master of Law and Business Program in partial fulfillment of the requirements for the award of the Master of Law and Business ("MLB") Degree

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List of abbreviations

AMO- Association of Municipalities Ontario
CEA- Canadian Environmental Assessment
CEAA- Canadian Environmental Assessment Agency
CEPP-Community Energy Partnership Program
CofAs- Certificate of Assessment
DSC- Distributor System Code
ECT-Economic Connection Test
EEG- German Renewable Energy Act (Erneuerbare-Energien-Gesetz)
ESA- Endangered Species Act
ESR- Environmental Screening Report
EU- European Union
FIT- Feed-in-Tariff
GEA- Green Energy and Economy Act 2009
HVDC- High Voltage Direct Current (cables)
IESO-Independent Electricity Service Operator
kW- Kilowatts
kWh- Kilowatt per hour
MNR- Ministry of Natural Resources
MOE- Ministry of Environment
MTCS- Ministry of Tourism, Culture and Sport
MW- Mega Watts
NIMBY- Not In My Backyard
OEB- Ontario Energy Board
OPA- Ontario Power Authority
OWA- Ontario Waterpower Association
PV- Photovoltaic (solar power)
REA- Renewable Energy Approval
REFO- The Renewable Energy Facilitation Office
RESPO- Renewable Standard Offer Program
RET- Renewable Energy Technologies (non-fossil fuel, non-nuclear)
TAT- Transmission Availability Test
1.0 Introduction

This paper intends to compare policy instruments established to support feed-in-tariffs in both Germany and Ontario. Germany maintains a mature set of policy tools to integrate renewable technology sources into its energy mix. Ontario has only recently brought about this change with legislation that has yet to fully settle into the energy structure and markets. As a result, no major comprehensive comparison of the two systems has been drafted despite the newer being modeled relatively after the older. Germany has many more years of experience implementing and designing subsidy systems to encourage growth in the renewable energy sector, whereas Ontario is still in the development and acceptance phase. Therefore the discussion will follow the challenges each jurisdiction continuously encounters, recent amendments and will examine how Germany’s advancements may be able to provide Ontario with further insight into a more effective system foregoing any hurdles Germany may have faced in the past.

This will require grasping the fundamentals of the political and legal landscape, including an overview of the electricity markets in each jurisdiction. Finally the analysis will narrow to explore the major elements of the solar PV subsidies in each jurisdiction. This focus is partially due to recent amendments made in both regions with regards to solar PV subsidies, which receive among the highest subsidies overall.

The aim of this paper is not to evaluate either feed-in tariff program, as each contains characteristics to the specific jurisdiction. Rather to provide a practical insight into the policy mechanisms used to support the programs in both jurisdictions and to highlight the major differences within each program in order to contribute to the public conversation.
1.2 Scope and Limitations

The scope of this paper will delve into the renewable energy law of the Province of Ontario, Canada and the country of Germany. Germany and Ontario share many characteristics. Geographically placed in the center of smaller working economies, operating autonomously but interconnected through trade and political ties with neighboring territories. Both Ontario and Germany have comparable economies where each region has established themselves as a manufacturing hub within their respective terrains. Both have been highly successful in the auto-manufacturing industry, and until the global economic down turn of 2008, Ontario was a North American leader. Both areas also have comparable landscapes with water access, highlands and plenty of open space for the installation of renewable energy technologies (RET) to source local communities, rural and urban.

Germany enjoys highly developed renewable energy sector and many of Ontario’s initiatives have been borrowed from the German strategy. Germany has purposefully become a European and world leader in developing the renewable energy industry in the effort to battle climate change and honestly modify the way electricity is consumed on a massive scale. Many countries have acknowledged the need for energy security, citing the instability of fossil fuels and the political and economic challenges of acquiring them. This paper may be perceived, as limited in scope, however will concentrate on Germany representing itself as a European leader and Ontario making a strong effort to guide the way on the North American front. This project certainly presents the possibility to extend further than the perimeters of this paper, but will not pursue any other national comparison within this analysis at this point in time.

Due to the time and quantity limitations of this project, only an assessment of German and Ontario policy mechanisms will be discussed. In Ontario the dialogue is limited due to that fact that Canada as a country has yet to enact similar laws pertaining to renewable energy generation. The topic of renewable energy policy continues to be a very political issue in both regions, and therefore carries potential to take many analytical directions, however the most prominent policy areas have been selected for thesis and this project will not expand in this area. Therefore it should be noted that this paper,
intends to delve into some political discussions but merely to set the contextual background for how the law operates.

Finally energy law in Ontario remains very young in development phase; in fact some of the most recent amendments were the first to be made. Therefore it is essential to take a more in depth a closer look at the path the GEA has taken over the last three years than to look at 20 years of German energy law for this would be beyond the scope of this paper, and the intended focus is to analyze the Ontarian perspective to drawing similarities to suggest where and how Ontario can learn from Germany in terms of renewable generation practices.

NB: Money- CAD≠EURO at the time of the paper’s completion is roughly 1.24:1
2. **Energy Policy in Ontario**

In 2003 North Eastern America suffered the second most widespread electricity black out ever recorded. Over 26,086 square kilometers were affected; 50,000,000 people in Northeastern America lost power and this all happened on a very hot day with temperatures soaring around 31C°/88F°.¹ A commissioned investigation² by both the American and Canadian Governments revealed that FirstEnergy Corp, an operator located in Ohio had serious defects in their transmission resulting in unreliable grid connections and a system overload. This prompted system modernization on both sides which cost between and estimated 50 and 100 billion dollars.³ The event served as a major wake up call for electricity providers to re-evaluate the current shape of their transmission systems, sending a clear message to Ontario indicating the necessity for a higher standard of care for distribution system operations.

2.1 **The Green Energy and Economy Act 2009**

The Green Energy and Economy Act (GEA) received royal assent on May 14th, 2009. It represents one of the most progressive legislative moves for renewable energy procurement taken on by any province in Canada and even represents one of the most advanced Acts in North America. Initially known as Bill 150, this movement was Ontario’s first real effort to consolidate and establish an operational law on harnessing renewable energy sources and developing the renewable energy industry. The Act repealed 15 former Acts, most notably the Energy Conservation Leadership Act (2006) and the Energy Efficiency Act (1990).⁴ The Act also modified the roles of particular bodies and stakeholders within the Ministries and Energy organizations in Ontario. Most notably, the GEA increases the power of the OEB who formerly filled an oversight role.

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These issues will be discussed further on, once a clear introduction has been given to understand the current roles within the energy sector in Ontario.

Ontario does not rely heavily on hydrocarbons, but the Provincial Government still recognized a need to re-vamp the industry and modernize the electrical infrastructure. This was partially due to aging nuclear plants, but in a progressive move the GEA calls for a phase out of coal by 2014, which will mean that other sources of energy must substitute this supply. There are few unexploited hydraulic sites in Ontario and the Province has set targets to reduce green house gas emissions; these combined factors have surged the Provincial Government’s movement to finally acknowledge the vast potential behind an eco-system that possesses the potential to deliver natural means of generation.\(^5\)

Prior to the Act, the province began a program in 2006 called the **Renewable Energy Standard Offer Program** (RESOP), which fell under the direction of Ontario Regulation 116/01.\(^6\) This program initiated the mechanism of Feed-in-tariffs for virtually the first time in Ontario. This was a result of a campaign launched by the **Ontario Sustainable Energy Association** (OSEA) who recognized the exclusion of small-scale and locally owned renewable energy generation and the need to enhance the system. The original tariffs offered 20-year contracts for bio-mass, wind and water energy generation at 11¢ per kWh and 42¢ for solar generated power (photovoltaic/PV). The program was limited to 10 MW sized project, within the region of Ontario and was available to applicants who were granted access to the grid through Hydro-One or a local distribution company. Although the program initiated the feed-in-tariff mechanism, it was not free of kinks and obstacles. First of all, providers were obliged to connect to the grid at their own expense and many of these projects faced the difficulty of integrating into the existing grid connections. This meant that any rural project, perhaps some distance from the grid was encumbered with connecting their device to the grid with no assistance (logistically or financially) from the government. Secondly, the program was arranged to attract small producers, this compelled some larger scale operations to separate and dismantle to fit the criteria. The introduction of the GEA allowed for major amendments to the feed-in-tariff


\(^6\) Ontario Regulation 116/01 made under the Envrionmental Assessment Act (2001).
process, incorporating mechanisms for larger scale projects. The Green Energy and Economy Act also sought to curb consumption through conservation measures such as creating energy efficient standards incorporated into building codes and household appliances; to work with utility companies to achieve targets and to ensure that conservation targets will not harm low income Ontarians.

2.2 Incentives and Goals of the GEA

The long title to the Green Energy and Economy Act (2009), clearly states what the laws intend to prescribe: ‘it is an act to build a green economy, to repeal the Energy Conservation Leadership Act 2006 and the Energy Efficiency Act among other statutes.’\(^7\) Although the scope of this paper intends to narrowly concentrate on the Feed-in-Tariff process development, we will see that particular conditions are interconnected to the program at large.

2.2.1 Job Creation

The promise of jobs during tough economic times is always welcome, the GEA promises job creation and this is hoped to coincide with the development of a stable renewable industry. Ontario has historically been the manufacturing hub of Canada, however a major shift of the national work force has brought many Canadians to the West where the Oil industry is thriving. It would not be misleading to say that Canada is currently suffering from ‘Dutch Disease’.\(^8\)

A surge in the Ontario manufacturing industry was anticipated with the introduction of investments to help develop the market not only for Ontario but also for all of North America. The energy industry already employs over 95,000 Ontarians. The GEA proposed the creation of 50,000 direct and indirect jobs as a result of the new legislation for the following three years (Long Term Plan, 2010). The FIT-review has

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\(^7\) Green Energy and Economy Act 2009 Long Title

\(^8\) Dutch Disease; an economic phenomenon which explains the correlation between a vast discovery of natural resources and the subsequent decline of the manufacturing industry. The concept was coined ‘Dutch Disease’ after major oil reserves were found off of the coast of the Netherlands in the 1960s.
claimed that the GEA is on track to meet its goal; already 20,000 new jobs have been created (FIT-review, 2012. pg. 7).

In conjunction with the release of the GEA, the provincial government supplemented the legislation with a Long Term Plan energy plan for Ontario stipulating that foreign investment would stimulate job growth. This was initiated though a ‘Green Energy Investment Agreement’ of $7 billion through a consortium of Samsung S & T and the Korean Electric Power Association (Long Term Plan, 2010. pg. 16).

2.2.2 Industry Development and Growth

This investment agreement included an announcement to build Ontario’s first wind-turbine manufacturing plant projecting the creation of nearly 900 jobs. The consortium will manage negotiations with other manufactures in the province to build another 3 plants, which are scheduled to be ready by 2013 (Long Term Plan, 2010. pg. 16).

Ontario’s current power source supply primarily comes from nuclear and large scale hydro electric facilities which are typically running 24 hours a day to generate the base load generation. Fossil fuels tend to run only during the day and renewable sources such as wind and solar run and capture when weather permits. However a supply mix capacity of RET by 2018 is set to reach 10,700 MW. This means that Ontario will have to rely less on fossil fuels and become more self sufficient at producing renewable supply.

2.2.3 Energy Savings and Security

The FIT program is intended for participants to eventually yield returns on their investments whilst reducing their own energy costs. The Home Energy and Savings Plan, is another instrument introduced to help homeowners realize energy savings by revealing where a house is losing energy through inefficiencies. The province vowed to reimburse participants (over 390,000) 50% for the cost of these home audits, which indicate what improvements can be made to the building to save energy. The program ended in March 2012, this demonstrates another example of energy savings ambitions.

9 IESO: http://www.ieso.ca/imoweb/siteShared/power_system.asp
10 An example of these inefficiencies include old insulation, old furnaces, dated appliances and poorly fitted doors and trimmings.
Transmission is key to ensure security and the GEA amends the Electricity Act to enhance the smart grid system to provide for improved ‘flexibility, security, reliability, efficiency and safety’ (GEA, 2009. sch. B (5.1)(3)) and particularly with regard to the following subsections (a-d) to increase, expand, accommodate and support renewable technologies to function within the smart grid system. Additionally, the OPA is forbidden from contracting with any project, which does not meet the specific criteria\(^{11}\) to ensure that transmission is not compromised. The crux of transmission connections is that the OEB still relies on the energy producer to cover the costs of connecting to the grid and reinforcing its network to ensure that transmission is fully supported and effective.\(^{12}\)

2.3 **Overview of Ontario Electricity Industry**

The Ontario energy Industry serves over 15 million people. The Province of Ontario alone is home to over 12 million people but the electricity industry has cultivated, expanding its network with an interconnection capacity of 5000 MW shared between Quebec, Manitoba, Minnesota and New York State. The Provincial capacity is 35,000 MW of electricity but at peak demand only requires 27,000MWs (Yetchew, A. & Baziliauskas, A. 2011).

As of 2011, generation in Ontario saw nuclear at the top with 55%, hydraulics 26%; coal 10%; oil and gas 10% and the remainder with RETs. Conventional Hydrocarbons combine to make up only 20% of electricity generation in Ontario. With such a low reliance on hydrocarbons, the culture of acceptance pertaining to renewable energy growth is often varied. But Ontario is one of the most nuclear dependant jurisdictions in the world (Adams, 2009). Many of these nuclear power stations require renovations or complete overhauls. For example, in the 1970s plans to refurbish the Darlington Nuclear generation site had initial estimated costs of $3.9 billion, however the process ran years over schedule and resulted in a $38 billion project deficit, which ultimately the Ontario taxpayers were forced to absorb. The repayment method of this can still be seen today on many Ontario hydro bills labeled ‘debt retirement’. Coinciding

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\(^{11}\) GEA, 2009. Schedule 5 s. 1 & 2, repealing s. 25.32 of the Electricity Act 1998.

\(^{12}\) As discussed above, the Ontario Energy Board Act s. 79.1 evaluates the position of the facility and therein has the discretion to reduce the rates otherwise applied for the connection to occur.
with a need to refurbish, the intermediary risk can be devastating and ultimately cost governments and taxpayers millions.\textsuperscript{13}

The late 1990s saw a complete overhaul of the electricity sector in Ontario. In 1998 the provincial government passed legislation authorizing the establishment of an electricity market in Ontario and in 1999 Ontario Hydro divided into five entities, separating generation and transmission. This reorganization, partially privatizing the sector, cost the province a hefty $20 billion.\textsuperscript{14} The \textbf{Ontario Power Generation} (OPG) acquired many of the generation assets and became the main overseer of the generation side. \textbf{Hydro-One} became the entity responsible for transmission and distribution. The \textbf{Ontario Energy Board} (OEB) was the main regulatory body whose role was to oversee the industry from a financial viewpoint. Prior to the reorganization of the sector, the OEB possessed a mere supervisory role, but the change transferred competence to work at arms length with the Provincial Government. The GEA has modified the role of the Board placing further responsibilities upon the OEB. This mainly included policy implementation activities, again, altering the role of the OEB (see further on).

In 1998, the \textbf{Independent Electricity Service Operator} (IESO) was established to operate and monitor the electricity market. Their role in and observatory one which is dedicated to the monitoring and reporting of daily supply and demand. This primarily is to anticipate and maintain reliability of the electricity system, ensuring stability in the Ontario market.

In 2004 The Electricity and Restructuring Act, created the \textbf{Ontario Power Authority} (OPA) to ensure long-term adequate supply of electricity in Ontario while working generally under the direction of the Ontario Ministry of Energy. One of the main responsibilities attached to this outfit was to establish a long-term energy strategy and in 2010 the OPA released a 67-page report outlining the action plan to achieve energy security in Ontario.\textsuperscript{15} The major short-term goals included transporting renewable energy sources to the grid (via feed-in-tariffs), to phase out energy produced by coal, to refurbish the nuclear facilities to ensure optimal use; this plan also included an ambitious energy

\begin{footnotesize}
\begin{enumerate}
\item Canadian Press. (1993). Darlington price tag rises to 14.4 billion. The Toronto Star.
\item \textit{Ibid.}
\end{enumerate}
\end{footnotesize}
savings target of 6300MW by 2025.\textsuperscript{16} The OPA is the organization assigned the responsibility to plan, develop and implement Ontario’s FIT program. This includes the administration of contracts and price setting for renewable energy projects (Wilke, M. 2011).

In March of 2012, the provincial government announced an amalgamation of the IESO and the OPA. The justification behind the merger is to save ratepayers millions of dollars and to meet, more efficiently, the electricity demands in Ontario. \textsuperscript{17} Furthermore, the merger would combine strategic knowledge from the OPA with technical and operational expertise from the IESO to create a more effective system to respond to consumer needs.

Finally the Ontario Global Adjustment Mechanism (GAM) was established to adjust the price of electricity supplied within the region, offsetting the difference between the market price of electricity and the FIT premium, the GAM is administered by the OPA (Wilke, M. 2011).

\subsection*{2.4 Power Shift: Changes to the Ontario Energy Board}

The OEB was established in the early 90s to oversee the energy industry in Ontario. The role of the board was fumbled around when the industry underwent an overhaul in the late 1990s and was left to work at arms length with the Provincial Government\textsuperscript{18} more-less as the financial watchdog, approving projects at the end of planning process. The GEA has since revised this role from sitting on the end of a project to that of a facilitator. The OEB before the GEA was the check on expansions, and now the Board becomes the catalyst for expansions (Vegh, 2009. Pg 10).

This ultimately changes the approach the Board must take when making decisions relating to power distribution and supply. No longer are they be able to take a pragmatic economic approach to lost cost efficiency, but were forced to become more integrated into the whole distribution process. This includes social and environmental

\footnotesize \textsuperscript{16} Ibid. p. 37
\textsuperscript{18} Adams, 2009.
considerations, which were not on the agenda before. The GEA takes a progressive step forward ensuring that all public bodies and stakeholders are engaged in the decision making processes and understand the extent of decisions on a much broader scale, rather than simply looking through an economic lens. The GEA and supplementary material have emphasized the importance of bringing fair value electricity to consumers. Although reforming the system, eliminating dated supply systems whilst ensuring customers can still afford to keep the lights on is one massive challenge, this cannot be achieved unless the underlying fundamentals of what is at stake are truly understood. This seemingly was the goal of the GEA when it came to the functioning of OEB.

2.5 Ontario’s Feed-In Tariff Program

Four months after the GEA was passed, by virtue of Electricity Act 1998 s. 25(30)2, the Minister of Energy and Infrastructure, George Smitherman directed the OPA to implement the FIT program.

The program intended to enhance the renewable energy sector through a specialized pricing structure to encourage civil participation and connect renewable energy producers as of right (Vegh, 2009, pg 6). The structure was based on what is called Levelized Unit Energy Cost (LEUC) and calculates the cost of a single unit of energy. Using a variety of models and assumptions to create, energy generation comparisons allowing for an analysis on the highest to lowest efficiency models. Some RETs require a high cost input for a low cost output and vice versa (i.e. solar PV systems). The LEUC is practical for measuring renewable energy generation because other supply sources cannot adequately take into account the external impacts the facility may have. Coal for example produces toxic dust, which is emitted into the atmosphere without consideration of its external effects on the environment and so forth. Because RETs are becoming increasingly environmentally favorable, this method creates a comparative system of renewable generation supply and produces a fair rate of return based on a per unit of production basis (¢ kW/h). In other words, a LEUC comparison allows for a fair value on the energy produced and from this governments can adjust process accordingly. When the OEB comes to deciding which generation facility will
yield the highest return it always looks to the LEUC, and the lowest LEUC usually wins (Vegh, 2009. Pg. 6).

This was a departure from the former approach where generators were constantly competing to provide the lowest cost supply. FITs offered stable prices under mid to long-term contracts for energy produced from renewable sources such as solar, wind, biomass, bio-fuel and hydropower. The main goals of the program were to assist the phase out of coal-fired generation in Ontario by 2014, to boost economic interest with investments and job creation and finally to develop renewable energy technology creating a more diverse market in Ontario. The government has arranged the program with an 11% internal rate of return expected. This is much higher than countries such as Germany and Spain who set the IRR on an average of 6-8%. Critics of the GEA often argue that the IRR is too high, therefore too ambitious risking financial losses in the long run (Yetchew, A. & Baziliauskas, A. 2011).

Although the feed-in-tariff mechanism represents the cornerstone of the GEA, it has also developed other areas within the energy sector. It established a priority right to connect to the grid for all renewable projects, which meet technical, economic and regulatory requirements. The Act established “one-stop” streamline approval processes to get RET projects up and running, however this process is still far from ideal.

2.6 Streamline process

The Renewable Energy (REA) Approval process aims to combine the requirements with the Ministry of Environment (MOE) and the Municipal Planning Act in an attempt to create a smooth streaming process for FIT applicants (Deveaux, 2010). This change intended to simplify the process, however with a variety of RETs the modifications in fact created a ‘mixed bag’ of requirements for the various projects which still remains despite recent proposals for change.\(^\text{19}\)

\(^{19}\) *Ontario’s Feed-in Tariff Program Two Year Report*, March 19 2012
2.6.1 Wind

Originally, any wind projects required an Environmental Screening Report (ESR) and the time of completion for these reports varied. Following the ESR a Certificate of Approval (CofAs) would be issued, but this too was a timely procedure. Generally, an ESR can take up to two years, followed by municipal planning. But often these CofAs could be applied and filed parallel to the municipal planning. This whole process then requires an oversight report from the Canadian Environmental Assessment Agency (CEAA) including construction and operation information, as well as grid access routes to determine if a Canadian Environmental Assessment is necessary (CEA). The CEA and the ESR can usually be combined but gathering the necessary information, and documents still required time.\(^{20}\)

The GEA has amended the process and classified wind power projects into size meaning that any projects smaller than 3kW will require no Renewable Energy Approval. Facilities with over 50kW have minimum requirements depending on the number of turbines and the sound meters. Wind projects are no longer required to fulfill municipal zoning requirements but municipal consultation is still required and the standard evaluation of bat and bird hazard assessment will still be required through the Natural and Cultural Heritage Ministry. The CofAs is also eliminated in order to achieve any FIT timeline goals, and the MOE has guaranteed a maximum six-month waiting period for review of the REA after submission.\(^{21}\) This somewhat reduces the wait time for wind projects; the project after all said and done will likely pass the approval completion stages within 15-24 months and then building can commence.

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\(^{20}\) Deveaux, 2011

2.6.2 Solar

Solar PV installations formerly had no REA requirements to satisfy, however municipal zoning requirements could not be avoided. These requirements became quite complex and burdensome and often mimicking an ESR and some large scale solar PV projects carried the potential for Federal assessments.

Similar to wind projects, solar projects are now classified according to size and location. Rooftop mounted PVs of any size are exempted from an REA but may still require a municipal building permit. PV ground-mounted installations over 10kW require an REA. Varied classes of PV installations will require also Aboriginal consultations, Natural and Cultural and Heritage Ministry evaluations, which may include a consultation with the Ministry of Natural Resources.

2.6.3 Water

Water has been among the more difficult RETs to customize due to the 40 year contract commitment on any FIT project. Before the GEA, water project evaluations were facilitated through the Ontario Waterpower Association (OWA). Large water projects required MOE and MNR technical regularities to be abided by, typically a REA and a CofAs is mandatory for noise and sewage works. The process of project completion is estimated from around 3-8 years.\(^{22}\)

The changes were based on the recognition that the old REA procedure for water projects required expedition. But little was done and the existing EA requirement under the Ontario Regulation 116/01\(^{23}\) still remains in effect for water projects. This regulation provided the former permission guidelines for RETs, but was later was replaced by Ontario Regulation 359/09 directed by the Environmental Protection Act\(^{24}\) concerning the renewable energy approvals process. Although the streamline process theoretically resigns to expedite project approval process, this had evidentially not been the case.

\(^{22}\) Ibid.
\(^{24}\) 2009
In March of 2012, the Provincial Government released the Two Year Feed-in-Tariff Review outlining six areas of improvement and made recommendations with regards to project streamline enhancement; upholding the exemption of micro-fit solar PVs from the REA process; a of a self-screening registry system (reducing turn around by 60-80%) and further amalgamation of ministries to accelerate and improve FIT projects.\textsuperscript{25}

\textbf{2.7 FIT and Micro-FIT programs}

The FIT program was developed for larger scale producers who could contribute an upwards of 10kW of power through RETs. As mentioned before, the former system only allowed contributions of 10MW or less, which resulted in the break up of many large-scale projects to fit the criteria for subsidies. This new mechanism allowed participants to engage at a higher level ultimately creating economies of scale for renewable power production. This was beneficial because landowners could amalgamate their investments off setting any large risks and reap the benefits of higher returns.

The contract period is 20 years for renewable generation from all RETs except for hydroelectric, which is 40 years due to longer amortization of such projects. Applicants are required to comply with certain regulations laid out by the OPA pertaining to the particular project. This includes purchasing of the facility equipment (i.e. solar panels or bio-gas converters) bearing the costs of connection and maintaining transmission lines. Furthermore, the contracts are subject to domestic content requirements according to the type of project. Applicants must also be aware of the consultation process involved in effective planning.\textsuperscript{26} The FIT program allows generation over 10 MW to connect to the grid, helping to generate power for other consumers. The Provincial Government compensates the supply with tariffs according to the energy production source. This process is mirrored with the micro-FIT program, and acts as an incentive for the set up of larger renewable energy projects, but of course, the larger the project the higher the return.


\textsuperscript{26} FIT rules 2.0., 2012.
The compensation plan for the **FIT** program can be viewed in the following table:

### FIT PRICING SCHEDULE 2012 (CAD$)

**Figure 1.0**

<table>
<thead>
<tr>
<th>Renewable Fuel</th>
<th>Size tranches</th>
<th>Contract Price ¢/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biomass</strong>(^1,2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 10 MW</td>
<td>13.8</td>
</tr>
<tr>
<td></td>
<td>&gt; 10 MW</td>
<td>13</td>
</tr>
<tr>
<td><strong>Biogas</strong>(^1,2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-Farm</td>
<td>≤ 100 kW</td>
<td>19.5</td>
</tr>
<tr>
<td>On-Farm</td>
<td>&gt; 100 kW ≤ 250 kW</td>
<td>18.5</td>
</tr>
<tr>
<td>Biogas</td>
<td>≤ 500 kW</td>
<td>16</td>
</tr>
<tr>
<td>Biogas</td>
<td>&gt; 500 kW ≤ 10 MW</td>
<td>14.7</td>
</tr>
<tr>
<td></td>
<td>&gt; 10 MW</td>
<td>10.4</td>
</tr>
<tr>
<td><strong>Waterpower</strong>(^1,2,3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 10 MW</td>
<td>13.1</td>
</tr>
<tr>
<td></td>
<td>&gt; 10 MW ≤ 50 MW</td>
<td>12.2</td>
</tr>
<tr>
<td><strong>Landfill gas</strong>(^1,2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 10 MW</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>&gt; 10 MW</td>
<td>10.3</td>
</tr>
<tr>
<td><strong>Solar PV</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rooftop</td>
<td>≤ 10 kW</td>
<td>54.9</td>
</tr>
<tr>
<td>Rooftop</td>
<td>&gt;10 ≤ 100 kW</td>
<td>54.8</td>
</tr>
<tr>
<td>Rooftop</td>
<td>&gt; 100 ≤ 500 kW</td>
<td>53.9</td>
</tr>
<tr>
<td>Rooftop</td>
<td>&gt; 500 kW</td>
<td>48.7</td>
</tr>
<tr>
<td>Ground Mounted(^2,4)</td>
<td>≤ 10 kW</td>
<td>44.5</td>
</tr>
<tr>
<td></td>
<td>&gt;10 ≤ 500 kW</td>
<td>38.8</td>
</tr>
<tr>
<td></td>
<td>&gt;500 kW ≤ 5 MW</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>&gt; 5 MW</td>
<td>34.7</td>
</tr>
<tr>
<td><strong>Wind</strong>(^2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onshore</td>
<td>Any size</td>
<td>11.5</td>
</tr>
</tbody>
</table>

*Source: Ontario Power Authority. (2012). FIT Price Schedule from Two-Year FIT review [sic].*
1. Peak performance factor applies.
2. Aboriginal price adder and community price adder eligible as discussed.
3. In the case of an incremental waterpower project, the incremental project together with the existing generation facility to which it is incremental cannot exceed 50 MW.
4. In the case of an incremental solar project, the incremental project together with the existing generation facility to which it is incremental cannot exceed 10MW

* Currently the province has a moratorium on any offshore wind farms in Ontario in early 2011. This has been a consequence of the growing public concern that wind farms have on human health. The Provincial government has said that it will review the situation, but up until now, no new offshore wind projects have been approved.

Excluded from the FIT tariff table above are waterpower projects over 50MW and solar PV installations above 10 MW per property, these projects are not eligible for the FIT program. The prices listed above were intended to provide a suitable rate of return as well as to supplement the development costs for energy generators in the long run. To reach these price estimations the OPA used a discounted cash flow method based on a 70:30 debt to equity ratio. Further OPA cost estimates based on professional consultant advice marked that contract price inflation will be upwards around 20% for RETs (except for solar PV) (Yetchew, A. & Baziliauskas, A. 2011).

These prices reflect the base prices for each specific RET, but it should be noted that biogas, biomass, waterpower and landfill receive a 35% premium during peak demand- Monday-Friday; 11:00-19:00- but a 10% reduction during off-peak times. Prices are also adjusted for categorical community projects. Community based projects will receive an additional €0.4-1.0/kWh depending on the technology and Aboriginal community based projects will receive up to €1.5/kWh depending on the technology. The additional return is typically highest for wind power and ground-mounted PVs. Aboriginal incentives will highly depend on the actual participation of the community members. These participation incentives are incorporated into the discussion further on.

The micro-FIT component to the GEA simulates the FIT process, but provides tariffs for smaller scale projects less than 10 kW. Unlike the FIT program these tariffs are not increased or decreased for peak demand times, nor are incentives for Aboriginal community participation added. These projects are typically intended for homeowners, schools or small businesses, which are not simply just a ‘split’ of an already larger, pre-

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existing, project. When the micro-fit tariff mechanisms were originally introduced, the province received over 22,000 applications with most of them for solar PV technologies. As we will see, the streamlining procedure now makes it easier to enter the system as long as the project is capable of connecting to the grid system.

Currently the province has opened capacity for 10,700 MW for FIT projects, and the future for the micro-fit program looks good because solar PV prices have dropped nearly 40-50% in cost\(^{28}\) making them more affordable for home-owners. This accelerates the IRR, which is falling now between 11-12%.

2.8 Conditions and Challenges

2.8.1 Location

First of all, any RET energy project must be within the boundaries of the Province of Ontario.\(^ {29}\) This condition does not create any disturbances within the project; the GEA is a provincial act and thus applies only to residents of Ontario. However each project is subject to a series of tests in order to determine the output before a contract is completed. First, a Transmission Availability Test (TAT)\(^ {30}\) is carried out to establish whether the transmission system can adequately accommodate the project. Based on certain conditions, the project may bypass the Economic Connection Test, or move on to the second test: the Distribution Availability Test (DAT)\(^ {31}\). The OPA will then consult with local distribution companies to determine whether the applicable distribution system carries enough connection resources to accommodate the project. Renewable energy projects will usually be subject to at least two tests. The third test is the Economic Connection Test (ECT).\(^ {32}\) The purpose of this test is to ensure project connection costs absorbed by the ratepayers are ‘reasonable on light of all information available regarding transmission developments and other proposed generation facilities’ (FIT rule 5.4(a)


\(^{29}\) FIT rules, S. 2 (2.1)(a)(ii), 2011

\(^{30}\) FIT rules 5.2(a), 2011.

\(^{31}\) FIT rules 5.3(a), 2011.

\(^{32}\) FIT rules 5.4(a), 2011.
2011). The OPA will then notify the applicant whether or not their project qualifies for a connection contract.

### 2.8.2 Domestic Content Requirement

Secondly, the GEA established domestic content requirements for the production and use of RETs. Essentially, the domestic content requirement (DCR) mechanism was installed to support the industry and help to promote and create jobs locally. The condition was introduced through a phase in process with the expectation that the GEA would surge renewable technology use. Naturally, this process eased the acquisition of renewable technologies and initially accommodated for any expensive purchases, which were preferable from foreign produced technologies (Chinese manufactured solar panels for example) allowing for the RET mechanisms under the FIT scheme to take off.\(^{33}\) It is also be presumed that with such modern legislation, the manufacturing industry needed time to research, realize and commence production if such technical products to meet new demands.

Wind projects generating over 10 kW of energy as well as all solar projects are subjected to these domestic content requirements; this will be set on the FIT cover-page of the issued contract\(^{34}\). The OPA has created a list of ‘designated activities’ under which the domestic content requirement will be prescribed (Timmons & Kirsh, 2012). These activities are categorized into five areas. Turbine (1), which includes the assembly of particular equipment for wind turbines that are required to be manufactured within the province; electrical (2) concerns the panels, converters and electronic, components to the project; construction activities (3) involves the consulting, construction and administrative costs, and are required to be commissioned by Ontario based companies and labourers. The driver-generator activities (4) covers gear boxes and drive shafts produced, assembled and tested in Ontario and finally the structural activities (5) that require the necessary raw materials to be produced inter-provincially (Timmons & Kirsh, 2012). From these areas specific activities, a ‘qualifying percentage’ is then calculated

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\(^{33}\) The Directive from the Minister of Energy and Infrastructure indicates that the domestic content requirements ‘provide an opportunity for Ontario manufacturers to participate in the economic benefits that will flow from the program.’

\(^{34}\) FIT rules, 6.4 (a), 2011.
based on input into the project, or onsite labour translating into the domestic content requirement percentage - determining how much of the project requires domestically manufactured products and how much of the project is permitted to be manufactured elsewhere (Yetchew, A. & Baziliauskas, A. 2011).

This domestic content requirement created an international stir when the European Union and the U.S. joined forces with Japan declaring that Ontario’s DCRs were a breach of international trade law, stating that the local procurement requirements were a ‘prohibited subsidy’ (MacCarthy, 2010). Under the WTO regulations, countries must engage in a consultation procedure to determine if any trade agreements have been breached before any legal action can commence. The grouping of countries contended that the content requirements were a threat to their export potential. The GEA mandated that content requirements increased overtime, allowing the market to develop incrementally. This meant that in 2009 when the FIT program was introduced the content requirement ranged between 25-40% depending on the RET; in 2012 the requirements jumped to between 50-60% (see Figure 2.0).

<table>
<thead>
<tr>
<th>Domestic Content requirements (%)</th>
<th>Oct 2009</th>
<th>Jan 2011</th>
<th>Jan 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind (&gt;10 kW)</td>
<td>25</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Solar (&gt;10 kW)</td>
<td>50</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Solar (&lt;10MW)</td>
<td>40</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

**Figure 2.0**

### 2.8.3 Aboriginal Consultation

Section 35 of the Constitution Act 1982 recognizes the rights and treaties of the Aboriginal peoples and commits to the principle commanding the government to consult with Aboriginal communities on issues affecting them. This law of course prevails within

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35 FIT rules 6.4, 2011.
the GEA but often the difficulty lies with motivating community members to participate let alone approve projects, which may impact the land and communities surrounding them.

In 2011 the Provincial Minister of the Environment established a tentative roadmap for the consultation and cooperation with Aboriginal communities on renewable energy projects. As was mentioned above, these communities have an enhanced monetary incentive to participate in local programs, which will also contribute towards autonomous energy security for their (rural) communities. The report delivered by the government included wind, water, solar, biomass and biogas. Titled the Renewable Energy Approval Aboriginal Consultation Guide aimed to coincide with a Provincial regulation under the Environmental Protection Act (1990) guiding consultation for any renewable energy project. According to regulation 359/09 an applicant wishing to submit a proposal for a renewable energy project, must provide a project description and request an Aboriginal consultation list, which the ministry shall provide. The list will contain the Aboriginal communities that have either (1) a constitutional right that may be compromised with the potential project, or (2) a community that may have an interest in any negative environmental impacts the project may have. The regulation however is vague and although requires Aboriginal consultation, it does not direct the project handler to act in response to any potential opposition (Abouchar et al., 2011).

The position of Aboriginal communities in Canada is a sensitive issue. Historically the tension between non-Aboriginal and Aboriginal Canadians has drawn on issues of land, nature and rights often debated on the federal level. Although the matter is one of significance, its discussion will be limited due to the context of this paper however; any dialogue on renewable technology infrastructure would be insufficient without considerations of Aboriginal rights. Although the GEA seeks to address this administratively, schedule B s. 25.35(2) (a) that the minister in conjunction with any potential FIT project must direct the Aboriginal consultation process but the legal framework thereafter does not provide what measures shall be taken to address any grievances.

36 Ontario Regulation 359/09 (2009)
2.8.4 Infrastructure: Connecting to the Grid and Transmission Capacity

Yet again, with mindfulness to the Aboriginal population, Ontario’s infrastructure and consequentially its capacity is notoriously old and in need of repair. Alongside this, a great deal of the land requiring necessary repairs and construction happens to run through protected Aboriginal land. Adequate supply is highly conditional on Aboriginal support, and tying into the discussion above.

Transmission lines have likely contributed to the greatest delay in most renewable energy projects across Ontario. The combination of land access and procedural checklists has hindered the growth of the renewable energy industry. It is quite clear with the number of applications the OPA received during the first round of the micro-FIT program that a large number of people are willing to invest and participate. But here we begin to see some of the shortfalls within the GEA.

As previously discussed, the OPA directed by the Ontario Energy Board, and by virtue of the Electricity Restructuring Act 2004, reports back to the Ministry of Energy branch of the Provincial Government. This tangled web of direction and management has the effect of evading direct accountability and becomes misleading for the small-scale producer simply trying to connect to the grid. This concept will be discussed shortly to consider the changes made to industry players such as the OEB and what impact this has on the sector. But one can easily recognize the confusion arising between industry actors and how this must appear from the outside looking in.

Connecting to the grid: One Farmer’s Story

Paul Klaesi, a farmer who came to Canada from Switzerland, harvested enough bio-fuel to provide energy for his home and up to 350 homes in his nearby community of Cobdon, Ontario. The rural farm owner invested and upward of one million dollars into an anaerobic digester which converts the manure into usable bio-fuel without odor or toxic emissions. After investing thousands into the proposal, Klaesi was told that he would be responsible for financing the one-mile transmission line, which would connect the project to the grid at a $160,000 price tag. After this was complete, he was forced into a contract with Hydro-One, which handed the ownership of the transmission line back to the company for one dollar. After more than a year, the farm is yet to be connected.

As of December 2010, any micro-FIT application was required to obtain what was called an “offer to connect” from their local distribution company before the OPA would issue a conditional offer on the micro-FIT project. The problem is that the Distributor System Code (DSC) was not amended when the micro-FIT program was established. Modified only recently, this was highly problematic because the DSC evaluates the minimum conditions a distributor must meet in order to obtain a license for supply and therein connect to the grid. No provisions were made for investments into the DSC to facilitate the connection of small-scale producers. Ultimately the DSC states that it may refuse a connection (DSC s. 6.2.6) because of its size and it delegates the right to allow a distributor to make a decision based on “safety, reliability and the efficiency of the system” (DSC s.6.2.25) (Abouchar et al., 2011). Although this may appear precautionary, the reality is that virtually any small-scale project could be denied access, without technical justification and this alludes to a big gap in the system for anyone wanting to invest, generate and share renewable energy generation.

In 2011, the OPA attempted to address some of the backlog issues by allowing relocation of the limited capacity to other, already approved properties. To achieve this the OPA would write a letter directing the already connected property to accommodate another strained applicant, so that their opportunity would not be missed to connect. The OPA also had the authority to direct strained applicants to either consolidate with other applicants in the same position where they could alternatively connect to an already existing grid connection (Abouchar et al., 2011). With this in mind, the GEA has committed to prioritizing the access of renewable generation facilities. Schedule B s. 10 of the GEA amends s. 26 of the Electricity Act (1999), committing to prioritizing access to renewable generation facilities. The connections will be satisfied if the license has been given and further if the connections meet the regulations found under the DSC (still bearing in mind the other prerequisite tests as well). Despite the prioritization mandate, the process still required improvement. Recognizing the need to improve the approvals process, the Ministry of Energy released a review on the FIT program to address a variety of reoccurring issues.
2.9 FIT review and micro-FIT Rules 2.0

In March of 2012, the Provincial Government issued a two-year review of the Feed-in Tariff program in Ontario. After consultations with nearly 3,000 individuals and organizations, the review revealed six core strategic areas to improve the system, alleviating the backlog and attempting to eliminate the political scrutiny the program had begun to face. In mid-July 2012 the OPA followed the commissioned report with amendments to the FIT rules. These changes will be briefly discussed as they offer some solutions to the problems previously discussed in relation GEA, but the tariffs listed above for Ontario include the most recent prices.

Still in line with a commitment to clean energy the goal is for Ontario to procure 10,700 MW of energy through renewable energy generation projects by 2015. This will be achieved through annual reviews of supply and demand of energy to evaluate whether or not a higher target for renewable generation is necessary (s. 1; FIT Review, 2012).

2.9.1 Streamline Processes

As development and planning has proven challenging, the review recommended to streamline FIT applications which would require changes to the Renewable Energy Approval regulations and enhanced cooperation of the ministries involved; the Ministry Of Energy, the Ministry of Natural Resources (MNR), and the Ministry of Tourism, Culture and Sport (MTCS). Specifically this includes (1) maintaining the exemptions of micro-FIT solar projects (too small to merit equal consideration) whilst expediting commercial operations for solar PV rooftop installations. (2) Expanding the self-screening mechanism to include projects generating less than 500kW; (3) improving the service standards of large projects, reduction of reviews on the Endangered Species Act (ESA) applications and an improvement on the streamline process to review archeological reports (s. 2.1 (c) i-iii; FIT review, 2012). The report also suggested aligning the land usage plans with the provincial energy plan, and to create a Renewable Energy Committee comprised of senior delegates from relevant ministries to steer and monitor the overall progress of these projects.

The new FIT rules are designed to be efficient for all parties involved (FIT rules 2.0 s. 1.1). The program is now aligned with the DSC unlike before-which created
inconsistencies as in the system. The evaluation process has been drafted into four steps. The first (1) an analysis of completeness, which must include proper documentation in preparation for a “LCD offer to connect”. This is followed by the (2) general requirement evaluation, which remains relatively unchanged from the original FIT rules except that incremental projects are no longer accepted and some applicants may have to submit official documentation that municipal and land use laws have been complied with. A points system (3) has been established in order to prioritize projects based on participation levels. No applicant will proceed if they have not received at least one point, but higher engagement will yield higher points helping the project skip ahead of the line. The details of the point qualifications are discussed in the following section.

**FIT Points Structure**

**Figure 3.0**

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Participation</td>
<td>3</td>
</tr>
<tr>
<td>Aboriginal Participation</td>
<td>3</td>
</tr>
<tr>
<td>Education or Health Participation</td>
<td>2</td>
</tr>
<tr>
<td>Municipal Council Support</td>
<td>2</td>
</tr>
<tr>
<td>Aboriginal Support</td>
<td>2</td>
</tr>
<tr>
<td>Project Readiness</td>
<td>2</td>
</tr>
<tr>
<td>Education or Health Host</td>
<td>2</td>
</tr>
<tr>
<td>System Benefit</td>
<td>1</td>
</tr>
</tbody>
</table>

The fourth (4) step includes the TAT and the DAT test. No mention of the ECT in the new rules was made, but the new rules allow the OPA to retain greater discretionary rights for contract termination. Once an applicant has complied and satisfied the above-mentioned criteria, they will be notified and offered a contract. This procedure does not amend any former eligibility requirements.

**2.9.2 Encouragement of Community and Aboriginal Participation**

Divided into two parts, this recommendation proposed to prioritize applications for communities through an incentivized points based system and to strengthen the

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37 FIT rules 2.0 s.7(b), 2012
38 Technical Recommendaton ‘C’, i-iii; also see appendix 3; FIT review, 2012
commitment to support programs within these communities. The first price incentive has been adopted into the new FIT rules 2.0 coinciding with a minimum of 10 percent of contract capacity for the local community with projects that carry higher than 50% community participation. The point system varies depending on the equity of the community and ties into the point system outlined above. Each 15% of equity will award the community 3 points. The points are structured to accelerate projects through a prioritization process and the price adders are to incentivize groups.

**FIT Price Adders**

<table>
<thead>
<tr>
<th>Participation Level (Equity)</th>
<th>Aboriginal Projects</th>
<th>Community Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 50%</td>
<td>1.5</td>
<td>&gt;15%≤ 50%</td>
</tr>
<tr>
<td>&gt;50%</td>
<td>1</td>
<td>&gt;15%≤ 50%</td>
</tr>
<tr>
<td>&gt;15%≤ 50%</td>
<td>0.75</td>
<td>0.5</td>
</tr>
</tbody>
</table>

*Source: FIT Rules 2.0. (2012). Appendix 5*

The second element of the process is a stronger commitment to support programs. This includes the refurbishing of the Community Energy Partnership Program (CEEP) and the Aboriginal Energy Partnership Program. This essentially entails a higher standard of accountability for project improvements, extending funding support, which would include also dedicating this support to projects already in the development phase to push completion. Aligning the participation requirements (i.e. the points system) would also fall within these support mechanisms.

The necessity to improve municipal engagement was recommended and may also benefit, as the points system will be open to communities and municipalities who satisfy equity participation. The introduction of this point system intends to increase community participation with micro-FIT and FIT projects. This will of course require municipal engagement to assemble stakeholders involved to share information and define expectations. If municipalities can also help to clarify project rules this will eliminate potential delays or false information acquisition, to ensure that procurement is carried out in a responsible diligent manner. Applicants are now required to have municipal

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39 To clarify, equity participation is not based on financial contributions but more so on the number of participants. 15% is roughly equal to 50 community members joining together to invest for a certain project with a minimum power generation output.

40 s. 4.2(a); FIT Review, 2012

41 s. 4.3(b); FIT Review, 2012
opinions in writing on the project proposal.\textsuperscript{42} This creates a natural engagement process, for municipalities, for they too must organize the project processing systems internally and with zoning and by-law regulations. Over time municipalities may want to start their own encouragement programs and with the help of the points and pricing structure, this will become increasingly easier.

\subsection*{2.9.3 Reducing Prices to Reflect Lower Costs}

The FIT programs were established to reflect the capital costs and provide the province with an IRR of around 11%. The province has now begun to develop a market that can benefit from economies of scale and yield lower prices. The international market has seen a price drop of solar PVs by 40-50\%\textsuperscript{43} and therefore, the FIT review recommended a price reduction for solar and wind, but maintain the current prices for hydro, biogas, biomass and landfill gas.\textsuperscript{44} The new rules are in line with this suggestion and price adjustments of 14.8\%-31.5\% were made reducing only solar PV and wind tariffs, the remaining facilities saw no price change.

Not all review recommendations transpired into the new rules. This includes addressing issues of transmission and distribution, which has to date, created the most obstacles. Some critics\textsuperscript{45} are disappointed that the Government did not revise plans on further transmission developments, which would allow the system to become more effective and accommodating for new renewable project integration. The rules also neglect to discuss energy storage measures; geo-thermal and solar thermal generation and finally no discussions were provided on the Municipal Renewable Energy Program\textsuperscript{46} or to the Clean Energy Task Force\textsuperscript{47} a planned committee to advise and guide the ministers of

\begin{footnotesize}
\textsuperscript{42}FIT rules 2.0 s.3.2(b)2(B), 2012
\textsuperscript{44}S. 5.1; FIT Review, 2012
\textsuperscript{46}Municipal Renewable Energy Program is a program established by the OPA to reimburse the extra costs associated with bringing renewable energy projects to municipalities. The program was never fully realized and until now is currently under development which is why the recommendation is to scrap it (Little information is available OPA website: http://powerauthority.on.ca/municipal-renewable-energy-program)
\textsuperscript{47}s.6.1(b); FIT Review, 2012
\end{footnotesize}
energy and economic development through strategy creation and delivery of renewable energy projects. The Ministry however, plans to release a comprehensive review of the energy sector in Ontario soon, which may address some areas, which may have been reserved for further research in the meantime.\textsuperscript{48}

**Sum up: Ontario energy policy**

The chapter was intended to provide an overview of the existing renewable energy policy mechanisms in Ontario with a specific focus on the feed-in tariff scheme. One can see the complexities arising from a wide variety of procedural instruments directed through a multi-level playing field of sector participants. There are a still a number of challenges facing this small but mighty Act. These include public acceptance around these modern energy sources, supply and demand in a staggering economy and cooperation between the government and it’s citizens; the ladder of the three likely the most important in moving forward to secure renewable energy supply for the future. However, much of the in depth discussion as to the overall effectiveness of the policy measures have been left until an examination of the German system has been made and a comparative analysis on similar features can be drawn.

3. **Energy Policy in Germany: Development and Practice**

Much of Germany’s renewable energy industry expansion can be traced back to one man: Hermann Scheer. Trained as economist, Scheer chose to devote his political life to making his country a world leader in renewable power. Herr Scheer was likely the most successful politician in the world when it came promoting renewable energy sources and a green economy (in Germany). He was a member of the German Bundestag; he was the President of the European Association for Renewable Energy (EUROSOLAR) and the Chairman for the World Council for Renewable Energy (WCRE) until his passing in

2010. During his time he co-authored the EEG along with six other members of parliament.\textsuperscript{49}

In 1998 he took to install PV on 100,000 houses by offering to pay a premium for the electricity to produced and despite the critics, he completed the project one year earlier than anticipated.\textsuperscript{50} He saw this as a kick-start to the PV industry, one that he viewed as the most ‘important energy technology for mankind.’\textsuperscript{51} His legacy has survived and Germany continues to blaze the trail for the global renewable energy industry.

\section{Overview of the German energy industry}

Currently, the German energy sector is ruled by the ‘big four’ utility companies: Eon AG, RWE (Rheinisch-Westfälisches Elektrizitätswerk), Vattenfall and EnBW (Energie Baden-Württemberg AG) and among them many mid-small scale producers all vying for their place to compete within the industry. However, the energy industry was traditionally shaped by a ‘co-existence of private and mixed economic enterprises’ (Brandt, T. pg 3). In 1996 directive 96/92/EC\textsuperscript{52} of the European Union provoked Germany to liberalize the electricity market, this meant opening the industry to allow competing providers in regardless of their ownership. Germany went beyond the directive to establish the National Energy Act, which, established ‘immediate and complete liberalization for industry and households in Germany’ (Brandt, T. pg 6). This kind of market liberalization drove electricity prices down in Germany due to increased competition in the market until about 2000-2002 when then again prices began to rise as a combined result of inflation, rising taxes and the EEG renewable surcharge, which will be discussed further on. By 2006, German electricity consumers were paying the 5\textsuperscript{th} highest prices in Europe (AT Kearney, 2007 pg. 13).

Between the years of 1995 and 2000, utility companies also began scaling back jobs to save on costs, they sought ways to increase productivity and at the same time

\textsuperscript{49} Among them, Prof. Dr. Klaus Töpfer, Dietmar Schütz, Hans-Josef Fell, Sigmar Gabriel, Josef Göppel, Jürgen Trittin
enhance economies of scale. Jobs of course are a major factor with regards to energy policy and this element has dramatically changed with the objectives set by the German Bundestag. The promise of new jobs brought with the development of the renewable energy sector also faced the downside of jobs losses on the nuclear generation front. This liberalization move was effectively made to develop the energy industry; it’s main drivers were primarily the reduction of electricity prices and compliance with European Union law. However, when the EEG was introduced, pushed by the same drivers as the liberalization, it charged the utility providers with the task to radically modernize their supply systems and invest in transmission expansion to meet the renewable generation targets. Unfortunately this transition results in a variety of unintended consequences.

3.2 Renewable Energy Sources Act (Erneuerbare Energien Gesetz-EEG)

The EEG was adopted in 2000 to succeed the Electricity Feed Act of 1991 (Stromeinspeisungsgesetz, StrEG). There were a number of reasons for updating the legislation; it was time to raise the previous 5% generation ceiling for green electricity; it addressed the need to extend distribution to rural regions through a national distribution system but in order for this to happen, a strategic plan facilitating expansion and securing investments for future growth was needed. Then, in 1997 the European Union (EU) released a white paper on the promotion of renewable energy sourced electricity, which became directive 2001/77/EC. The EEG fully complied with the new EU legislation by setting limits on compensation, establishing cost orientated rates and it differentiating those rates based on the generation supply, size and location. In conjunction with this, the EEG rolled out a degressive pricing system (currently, 8-10% p.a. for solar PV and 1-5% for other projects depending on their size) and with that insisted on regular reviews of each generation project.

53 European Union Directive which follows a 1997 white paper setting a target of 12% of renewable energy consumption for the EU-15 by 2010; this paper was set to bringthe EU up to date with measures implemented in the Kyoto Protocol.
The unchanged § 1 of the EEG states that ‘the purpose of this act is to facilitate a sustainable development of energy supply, particularly for the sake of protecting our climate nature and the environment [sic]’ and that this would include long-term effects to facilitate environmental protection alongside promoting further development in the area of green and renewable energy technology. This act was also designed to correspond to the German Constitution (Grundgesetz für die Bundesrepublik Deutschland) that mindful to future generations, natural resources must be protected because they represent the very basis for human survival.\footnote{\textsection 20a Grundgesetz für die Bundesrepublik Deutschland (Constitution of the German Empire) Federal Republic of Germany}

On replacing the Electricity Feed Act, the EEG ‘regulates the prioritization of grid-supplied electricity generated from renewables’ (Min. Jürgen Trittin, 2000) obligating the grid operators to connect new installations, purchase the energy from the renewable facility and to compensate suppliers. It specified the mechanisms for implementing grid access to coincide with EU directives\footnote{2001/77/EC and 96/92/EC}. The new EEG specified compensatory payments but differentiated these payments based on the size of the generation facility. In the case for photovoltaic and biomass, prices have been raised to reflect generation capacity, and the wind rates were to be set on a technology-neutral yield reference model. The pricing structure, as mentioned before, included degressive pricing steps to reflect the drop in facility manufacturing prices or economies of scale. The EEG also launched a nation-wide cost sharing arrangement which amounts to roughly €0.1P/kWh with an anticipated maximum in the coming years of €0.2P/kWh which in his introductory preamble to the unveiling of the EEG, Minister Trittin described as ‘a small price to pay to develop this industry in Germany.’

The act also facilitated the space for growing investments in the industry, eliminating the 5% generation cap; this meant that investments domestically and abroad would be encouraged and welcomed. By 2011 renewable energy in Germany had a 20% share in the electricity production. According to the most recent amendments\footnote{EEG, 2012; \textsection1 para. 2} to the
EEG (January 2012), the forecasted growth is expected to reach 35% by 2020, 50% by 2030, 65% by 2040 and 80% by 2050.\(^59\)

The EEG has also fostered the growth of employment in Germany with 20,000 jobs coming from within the wind industry alone. The growth of wind turbine generation in Germany has been so successful, and now the current legislation in place is to promote the same type of growth within the biomass industry, in the hopes that it will develop analogously to the former.

Amendments to the EEG were made in June 2011 and came into effect as of January 2012. These changes revise the feed-in tariff scheme paving the way for Germany to radically reduce its reliance on nuclear energy generation. The consequences of the Fukushima Daiichi nuclear disaster in March 2011 sent a clear message to Germany; transforming the energy supply was crucial and a phase out of nuclear supply, imperative. Germany has scheduled an accelerated phase out by 2022, which in encapsulates a reformation of the energy sector referred to as the “Energiewende” (energy transition).\(^60\) Not since World War II has Germany, currently Europe’s biggest economy, undergone such a reconstruction of its energy market (Bloomberg, March 2012).

3.2 Basic Principles of the EEG

Investment Security
This principle combines feed-in tariffs and the connection requirement to amounting to investment protection and security within the energy sector. This means that by directing the grid operators to connect, purchase and compensate the renewable energy facilities and that these contracts will run for a prescribed period of time depending on the project. This ensures that when a supplier invests with the purchase of a RET they will be guaranteed access to the grid and payment for their contribution. Not only does this create and element of certainty with facility operation, but ensures a most transparent relationship between the operator and supplier.

---


\(^60\) Renewables 2012 Global Status Report, pg 69.
Innovation
With a degressive price structure implemented, the rate of the tariffs will continue to fall and subsequently place pressure on manufactures to develop technologies in the most cost effective way for customers. This will also push manufactures to produce highly efficient equipment to keep up with the global market competition.

No burden on Public Purse
Germany’s progress is not enough for the promotion of renewable energy to cease; renewable energy technologies clearly illustrate the going rate of each electricity source as they are evaluated on their facility characteristics. But unlike fossil fuels, which carry the extra charges to the environment and the overall impacts on society, following the ‘user pays rule’ maintains an element of personal responsibility within the system. The production of renewable energy will always come at a cost, especially when the industry is still growing and developing, however the benefits to the environment and sustainability far outweigh the costs. This principle aims to persuade this philosophy.

3.3 Feed-in Tariff program

The EEG, with its origins in 2000 Germany had a nine-year head start over its featured counterpart, Ontario. Therefore despite a brief historical introduction to Ontario’s program, this paper will concentrate only on the most recent feed-in tariffs offered in Germany (i.e. those which are currently in place).

The EEG provides for the feed-in tariff program in Germany. Unlike the somewhat primitive Ontario scheme, Germany pricing structure is based on closer increments of energy supply; this is to ensure the most adequate and fair pricing. Germans are among the highest rate-payers in Europe, and these costs are only anticipated to increase in the next year. All of the contracts offered under the FIT programs in Germany are for 20 years with the exception of hydroelectric power, which is for 40 years.

The listed feed-in tariff rates are shown in the following and pursuant to § 23-31 of the EEG.

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61 User pays rule is abstracted from the ‘polluter pays principle’ coined by the OECD and most EC states.
### FIT Pricing Schedule (€)

#### Figure 5.0

<table>
<thead>
<tr>
<th>Source</th>
<th>Capacity</th>
<th>€/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landfill</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 500 kW</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td>≤ 5 MW</td>
<td>5.89</td>
</tr>
<tr>
<td><strong>Sewage gas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 500 kW</td>
<td>6.79</td>
</tr>
<tr>
<td></td>
<td>≤ 5 MW</td>
<td>5.89</td>
</tr>
<tr>
<td><strong>Mine gas</strong></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>≤ 1 MW</td>
<td>6.84</td>
</tr>
<tr>
<td></td>
<td>≤ 5 MW</td>
<td>4.93</td>
</tr>
<tr>
<td></td>
<td>≥ 5 MW</td>
<td>3.98</td>
</tr>
<tr>
<td><strong>Biomass</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 150 kW</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>≤ 500 kW</td>
<td>12.3</td>
</tr>
<tr>
<td></td>
<td>≤ 5 MW</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>≤ 20 MW</td>
<td>6</td>
</tr>
<tr>
<td><strong>Biowaste fermentation</strong></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>≤ 500 kWel *</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>≤ 500 kWel-20MWel**</td>
<td>14</td>
</tr>
<tr>
<td><strong>Manure biogas</strong></td>
<td>≤ 75 kWel</td>
<td>25</td>
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<tr>
<td><strong>Geothermal</strong></td>
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<td></td>
<td>w/ petrothermal tech.</td>
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<tr>
<td><strong>Onshore wind</strong></td>
<td>initial fee***</td>
<td>8.93</td>
</tr>
<tr>
<td></td>
<td>≤ 50 kW</td>
<td>8.93</td>
</tr>
<tr>
<td></td>
<td>base fee</td>
<td>3.87</td>
</tr>
<tr>
<td><strong>Bonuses</strong></td>
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</tr>
<tr>
<td></td>
<td>system service</td>
<td>0.48</td>
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<td></td>
<td>repowering</td>
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</tr>
<tr>
<td><strong>Degression rate</strong></td>
<td></td>
<td>1.50%</td>
</tr>
<tr>
<td>Facility Type</td>
<td>Description</td>
<td>Tarif Rate</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>Offshore wind</td>
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<tr>
<td></td>
<td>initial fee</td>
<td>15</td>
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<tr>
<td></td>
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<td>19</td>
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<tr>
<td></td>
<td>basic</td>
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</tr>
<tr>
<td>Degression rate</td>
<td>2017/2018</td>
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</tr>
<tr>
<td>Solar PV</td>
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<td></td>
</tr>
<tr>
<td>Mounted*</td>
<td>≤ 10 kW</td>
<td>18.92</td>
</tr>
<tr>
<td></td>
<td>≤ 40 kW</td>
<td>17.95</td>
</tr>
<tr>
<td></td>
<td>≤ 1 MW</td>
<td>16.01</td>
</tr>
<tr>
<td></td>
<td>≤ 10 MW</td>
<td>13.1</td>
</tr>
<tr>
<td>Ground mounted</td>
<td>≤ 10 MW</td>
<td>13.1</td>
</tr>
<tr>
<td>Degression rate</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Hydropower</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>≤500 kW</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>≤ 2 MW</td>
<td>8.8</td>
</tr>
<tr>
<td></td>
<td>≤ 5 MW</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>≤10 MW</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>≤ 20 MW</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td>≤ 50 MW</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>≥ 50 MW</td>
<td>3.4</td>
</tr>
<tr>
<td>Facilities ≤ 5 MW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 500 kW</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>≤ 2 MW</td>
<td>10.31</td>
</tr>
<tr>
<td></td>
<td>≤ 5 MW</td>
<td>8.47</td>
</tr>
<tr>
<td>Facilities ≥ 5 MW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 500 kW</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>≤ 10 MW</td>
<td>10.31</td>
</tr>
<tr>
<td></td>
<td>≤20 MW</td>
<td>8.47</td>
</tr>
<tr>
<td></td>
<td>≤ 50 MW</td>
<td>6.27</td>
</tr>
<tr>
<td></td>
<td>≥ 50 MW</td>
<td>5.29</td>
</tr>
<tr>
<td>Degression rate</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>

* kilo-watt electric
** mega-watt electric
*** The higher initial tariff is paid for 5 years for onshore and 12 years for offshore. This is extended pursuant to Section 29(2) and 31(3) of the EEG respectively. by two months /five months depending on certain characteristics under these subsections.

63 Tariffs, degression and sample calculations pursuant to the new Renewable Energy Sources Act (Erneuerbare-EnergienGesetz - EEG) of 4 August 2011 ('EEG 2012'). Available:
Close observation of Germany’s FIT program reveals the multifaceted and mature system in place. Nearly every year the EEG is reviewed and FIT prices are adjusted to their generation outputs. The EEG systematically integrates specific degression rates for particular RETs acknowledging the difference in amortization rates. These degression rates are based on the new capacity available each year, in other words the market volume in Germany. The degression rate will also depend on the capacity installed in the previous year and is calculated based on the tariff applicable for the RET as of Jan. 1 of each year.\(^{64}\) To finance the feed-in tariffs, electricity consumers across the country pay an EEG allocation fee\(^{65}\). This allocation fee is this difference between the amount of remuneration and the revenues from the sale of electricity coming from renewable sources.\(^{66}\) The resulting sum is then divided and allocated to consumers relative to their consumption.

Although Chancellor Angela Merkel promised to cap the fee at €3.5, the current surcharge is €3.59 p/kWh\(^{67}\) and it is only set to rise with the planned growth of the industry. The rise in this surcharge on top of rising electricity rates continues to be major point of contention in the German political sphere. Rising electricity rates affect countries worldwide, with growing populations and more dense urban populations, energy facilities struggle to keep up with the increasing demand and ratepayers will continue pay more. It then becomes a question of how these renewable energy targets will be achieved amidst the high implementation costs?

The German feed-in tariff has ripened gracefully; periodic changes will continue to ensure the system remains transparent, fair and that it continues to foster economic growth in Germany. The obligations placed on grid operators by virtue of § 5 of the EEG, makes is clear that any tampering on the operator side will not be tolerated. § 4 of the

\(^{64}\) Tariffs, degression and sample calculations (see footnote 44). (page 1)
\(^{65}\) § 37 EEG; whereby the term is actually named ‘surcharge’
\(^{67}\) German Transmission System Operators (TSOs) website. Retrieved from: http://www.eeg-kwk.net/de/EEG-Umlage.htm
EEG does not allow grid system operators to make their obligations arising from the act conditional; instead it is a statutory obligation. Furthermore, the EEG prescribes no necessary consultation process, nor does it incentivize the program with added bonuses based on heritage or community engagement. Germany has no domestic content requirements but as a member to the European Union, must adhere to union regulations prescribing member states to achieve renewable supply targets to be met within specific time periods, along with the measures to implement these targets.

With few conditions placed on FIT participants, the systematic approach to offering subsidies for wind, solar PV, biomass, biogas, hydropower, geothermal and landfill gasses appears fair and well formulated, but transmission, costs and the decline of the nuclear industry still brings about challenges within the system.

3.4 Challenges with Energy Transition in Germany

Prof. Dr. Georg Erdmann is a professor with the energy systems department at Berlin’s Technical University and President of the German Association of Energy Economics. In June 2012 he presented a study at the World OER Congress conference; he sought to outline some of the mistakes her believes Germany is making in the rapid development of the renewable energy sector. Erdmann was forced to diverge from his conventional position on the industry; his expertise landed him on an expert panel selected to monitor the transition to renewable energy in Germany. This study concerns the high rates electricity consumers in Germany will be faced with as investments continue to grow. He anticipates that by 2030, the subsidies will reach three times what Chancellor Merkel promised and will end up burdening customers with a $377 billion (€300 billion) price tag for renewable generation.

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69 Open Educational Resources
The study also discussed the fact that with a high reliance on renewable energy sources, the standard problem of storage and furthermore that RETs will always require a backup source incase the facility becomes unreliable or faces unfavorable circumstances. This ultimately results in a double infrastructure system. Erdmann’s study suggests that (1) investments be slowed until more effective methods of storage are improved, renewable technologies can satisfy grid requirements, (i.e. reducing costs) that (2) transmission grids can be improved (i.e. temperature control, installing HVDC cables\textsuperscript{72}); that (3) better planning processes are carried and finally (4) enhancing the electricity metering systems (i.e. smart meters) will create a more reliable distribution system. Recently, the RWE invested nearly €1 billion into the Nordsee Ost windfarm project, in the North Sea, and has been unable to realize the generation potential because the transport grid operator (Tennet- TSO) has yet to build the connector to the 48 mill, 295MW energy mine located 30 kilometers away from the shore. Perhaps, as Erdmann’s study suggests, that with more attention to planning and detail, problems such as this may be avoided in the future.

\textit{Energiewende} in many ways is challenging the whole electricity industry and the feed-in tariff scheme plays a big role in this. As previously mentioned, the energy transition in Germany, results in a major strain on the utility companies. The planned exit from nuclear energy means rapid grid expansion to new renewable energy projects such as the Nordsee Ost project, and high costs to install these grid systems. Recently however, the German Bundestag has announced that they will introduce new legislation to accelerate the offshore grid expansion to better coordinate the projects. Any delays will permit the facility to claim the loss profits of up to 90\% of their value among other provisions\textsuperscript{73} demonstrating the deep financial impact on the industry.

Take for example RWE a publicly listed German utility company who last year they saw their profits drop by 34\% complemented by share price dropped by 1.1\% when

\textsuperscript{72} High Voltage Direct Current cables which for long distance transmission prove to be more reliable and cost effective.

the company saw a change over of its CEO.\textsuperscript{74} Peter Terium who took office on July 1\textsuperscript{st} of this year, acknowledges that this transition will not be easy for the major utility companies to make in the coming years. Not only will profits be affected due to major costs necessary to spend on new power production facilities and but also connecting these and smaller projects to the grid. These costs ultimately mean that cut backs elsewhere will be necessary and in this sense it means jobs. Eon, another of the big four, is also facing similar difficulties as is planned to make an estimated 11,000 redundancies and de-leverage the company. Recently Eon sold its biggest gas distributor, Open Grid Europe, (McKillop, 2012).

3.5 \textbf{European Union Directive 2009/28}

As documented, European Union law plays a significant role in the development of renewable energy technologies and energy transition targets across Europe. Germany has proved to be among the most ambitious Member State, increasing their target mandate beyond what the European Commission fixes. Directive 2009/28 is the most recent installation in Europe\textsuperscript{75}. Amidst the Euro-zone crises, the directive ‘establishes a common framework for the use from renewable sources in order to limit greenhouse gas emissions and to promote cleaner transport’.\textsuperscript{76} The commission implemented an energy efficiency objective titled the ‘20-20-20’ goal setting targets aiming to reduce primary energy consumption by 20\% by 2020 within the Community. The 09/28 directive inclusive of this goal, instructs that the share of energy generated from renewable sources in the transport sector, \textit{[sic]} must amount to at least 10\% of the final energy consumption in the sector by 2020.\textsuperscript{77} Additionally, the directive instructs Member States to develop self-commissioned energy action plans taking into account consumption, sustainability and RET promotion. This may include cooperation between Member States, as long as

\textsuperscript{75} For readers unacquainted with European Union law, there are differences between a regulation and a directive. A regulation is a mandatory law which must be complied with at the date stated by the Union inclusive of measures to achieve this; directives set the goal but allow member states to orchestrate the measures required to meet the specific regulation.
\textsuperscript{77} \textit{Ibid}. 
the electricity is produced within the community. This must be proven with a guarantee of origin, access to grids; facilitated by the necessary infrastructure built by Member States.

Germany took the directions one step further and committed to 35% of energy generated from renewables by 2020. This includes Germany’s plan to phase out nuclear energy by 2022, but when renewable generators are not enough, Germany is actually importing nuclear power from its neighbors (France, Czech Republic and Austria) to make up for shortfalls. On one level this decreases the incentive of other Member States to phase out when they can realize capital by readily selling nuclear power, and it hollows out Germany's commitment to phase out, indicating that the country may be willing to eliminate generation but not consumption.

4. Analysis
4.1 Comparative Analysis of FIT schemes (solar PV subsidies)

The discussion to follow will examine the solar PV markets in each sector and outline some of the major similarities and differences; both jurisdictions have seen recent amendments with regards to PV tariffs with unparalleled effects. Then the analysis will shift to a more broad examination considering the degrees of difference each FIT scheme offers.

In late March 2012, the German Bundestag agreed to a reduction of solar PV tariffs. This was a result of public concern over the price of the current subsidies, with a warning that if PV rates did not reduce, the EEG surcharge would surge well over €10/kWh. Initially the Federal Council rejected proposals but it was in late June when it was agreed that reductions must occur. Solar PV rates are designated by virtue of §20a of the EEG and are developed by the Federal Network Agency (BNetzA) the German electricity grid regulator. These new reductions were based on new solar power facilities added to the grid between September 2011 and May 2012 and the Bundestag made an unprecedented move and applied the new tariff rates retrospectively as of April 1st, 2012, any new project would take on the rates as of July 1st. Germany carries a degressed pricing structure which allows for rates to be adjusted according to the market value of
the equipment. Since solar PVs are the fastest growing RET, this is driving prices down world-wide as the market becomes more competitive. Germany is a step ahead in this regard where as Ontario has committed to review prices on an annual basis\textsuperscript{78} adjusting to market demands. German consumers are charged an EEG surcharge to help fund the generation from renewables, Ontarians pay for the generation, but because generators themselves absorb the development costs, the province can ‘minimize’ costs. The pricing structures laid out for each jurisdiction contain their respective currencies. But upon closer examination of the PV tariffs offered in each region it is evident that Ontario offers a pricing structure much higher than that of Germany.

Comparative Pricing Structures*

<table>
<thead>
<tr>
<th></th>
<th>GERMAN</th>
<th>CAD ($)</th>
<th>EURO (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounted*</td>
<td>≤ 10 kW</td>
<td>18.92</td>
<td>23.47</td>
</tr>
<tr>
<td></td>
<td>≤ 40 kW</td>
<td>17.95</td>
<td>22.27</td>
</tr>
<tr>
<td></td>
<td>≤ 1 MW</td>
<td>16.01</td>
<td>19.86</td>
</tr>
<tr>
<td></td>
<td>≤ 10 MW</td>
<td>13.1</td>
<td>16.25</td>
</tr>
<tr>
<td>Ground Mounted</td>
<td>≤ 10 MW</td>
<td>13.1</td>
<td>16.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ONTARIO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rooftop</td>
<td>≤ 10 kW</td>
<td>54.9</td>
<td>44.24</td>
</tr>
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<td>Rooftop</td>
<td>&gt;10 ≤ 100 kW</td>
<td>54.8</td>
<td>41.9</td>
</tr>
<tr>
<td>Rooftop</td>
<td>&gt; 100 ≤ 500 kW</td>
<td>53.9</td>
<td>43.43</td>
</tr>
<tr>
<td>Rooftop</td>
<td>&gt; 500 kW</td>
<td>48.7</td>
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<td>Ground Mounted</td>
<td>≤ 10 kW</td>
<td>44.5</td>
<td>35.86</td>
</tr>
<tr>
<td></td>
<td>&gt;10 ≤ 500 kW</td>
<td>38.8</td>
<td>31.2</td>
</tr>
</tbody>
</table>

* EUR € ≠ CAD $ (1:1.24)

Ontario has specific conditions for micro-FIT solar PVs; any project less than 10 kW, 60% of the solar equipment is subject to domestic content requirements.\textsuperscript{79} However to ease the process of these DCRs the smaller solar projects do not require consultations. The OPA must be satisfied with the building choice for the solar PV installation and they must be built on permanent existing buildings.\textsuperscript{80}

Overall the conceptual design behind solar PV generation in Germany and Ontario is similar, and the price structure differences can be attributed to the fact that

\textsuperscript{78} FIT Rules 2.0 s.7(a), 2012.
\textsuperscript{79} FIT Rules, 2.0 s. 1.4, 2012
\textsuperscript{80} FIT Rules, 2.0 ‘Rooftop Solar Facility’ p.24
Germany has a much larger tariff scheme with many more participants; Ontario is still on the brink of establishing a working system.

Despite efforts to produce secure energy from solar PVs, the technology is highly climate dependent and faces the classic problems of storage and transmission. Until greater storage devices are developed and higher capturing models secured will the solar industry face criticism.

In conjunction with the solar PV announcement the German Environment Ministry recently added that it plans to cut the market premium allocated by virtue of the EEG. Market premiums are regulated by §33 g along with §35(1)(a) of the EEG and these premiums are a major contributor to the rising EEG surcharge. Estimates from the German Transmission System Operator show that operators have already paid over €9 billion for market premiums governed by the EEG.\textsuperscript{81} This reduction is in line with attempts to keep the EEG surcharge below the current kW/h price.

The details of calculating the premium can be found within Annex 4 of the EEG. It starts by subtracting a \textit{management fee} (which covers transactional costs; listing and trading on the stock market) from a \textit{monthly ex-post average} price (the monthly average of hour contracts on the spot of the SE energy exchange in Leipzig); both products are relative to the specific energy generation source. The sum of these two figures becomes the \textit{reference value}. This reference value is then subtracted from the \textit{EEG prescribed feed-in tariff} (which is not being paid as the electricity is directly marketed) and the premium value is achieved. The abbreviations in figure 6.0 have been modified for this discussion but remain relative in Annex 4 of the EEG.

\textbf{Market Premium Equation}

\begin{align*}
\text{MoXp} - \text{MF} &= \text{RV} \\
\text{EEGfit} - \text{RV} &= \text{Market}
\end{align*}

Premium

MoXp- monthly ex-post average price
MF- Management Fee
EEGfit – EEG feed-in tariff (specific to source)

These announcements illustrate the complex pricing system mechanisms in place in order to finance the development of renewable energy in Germany. Ontario’s system has public acceptance issues similar to Germany with rising electricity prices, but the costs of connecting the source to the grid are to be borne by the generator in Ontario resonating a shift in responsibilities from the state to the individual. Despite the early stages of the Ontario renewable energy industry, this aspect is concerning because even with small beginnings of developing this sector in Canada, many Ontarians and Canadians alike have taken to the NIMBY\(^82\) stance. Without enhanced policy support, the prospect of capitalizing on this market may result in marginalized efforts from both individuals and industry.

With little discussion required the first (1) major difference between the respective FIT schemes are of degression Germany hosts. But at the moment, Ontario is producing more energy then it currently needs (mostly due to a sluggish economy and a sharp decline in manufacturing). When this happens, the Province actually pays neighboring states and provinces to take surplus electricity.\(^83\) If this trend continues, Ontario may have to re-consider degression rates.

This brings us to the second (2) differential consideration between the two FIT programs, consultation obligations. Inclusive of Aboriginal and municipalities, the Ministry of Energy does not directly administer the process but rather directs the OPA to carry out the process, narrating measures in which the consultation should be carried out. This transfers the onus onto the OPA, drawing this branch of the government closer to the decision and facilitation process. The overall effect of a consultation agenda ensures that the procurement for new renewable generation facilities becomes a consorted effort among all stakeholders involved. This, in the view of the OPA\(^84\), creates a sense of solidarity through multi-channel engagement programs, from industry participants down to the individual consumer. This also precipitates community engagement on a new level

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\(^82\) NIMBY: Not In My Back Yard
aiming to achieve information symmetry between all stakeholders involved.

Arguably, the consultation process delays the development of new projects and may have the effect of burdening the process. Seemingly, the consultation process appearing to be somewhat of a social agenda, would not likely be possible in Germany due to the high renewable targets set within a limited time span. Whether the need for this component of the GEA will remain once the sector expands, is unclear. But for Ontario it is a crucial step in gaining community, municipality and Aboriginal support.

The third (3) difference, which merits analysis, are the domestic content requirements. Intrinsically, the DCRs in Ontario were established to help kick start the industry; by requiring that material production, construction and testing were all carried out inter-provincially. But as previously discussed this created a stir on the international front. In fact, the requirements are slightly complex. Domestic content levels for approved facilities are calculated as the sum of the ‘qualifying percentages’ assigned to the facility. In other words, to comply with such a contract, the facility must be constructed so that domestic content levels are equal or greater than the minimum amount required (Timmons and Kirsh, 2012). The calculation for solar PV technology becomes even more complex and categorizes the equipment based on material composition; crystalline silicon or thin-film technology each with their own qualifying percentages; on-and off-site labour services are also considered into qualifying percentages. If a FIT applicant is unable to show evidence of compliance with these designated activities, no qualifying percentage will be awarded, hence ruling out the possibility of a FIT contract. The compliance measures will also not be awarded for ‘half-way’ compliance, so essentially it comes down to an all or nothing situation.

The domestic content requirement places a huge amount of pressure on FIT applicants, and this is in conjunction with satisfying the series of tests to connect a project to the grid. Germany has refrained from introducing any DCRs in conjunction with the GATT; the German stance is that domestic content requirements inhibit international trade (McCarthy, 2010). This aspect leads to the final point of discussion in this analysis which concerns the cost bearing structures as delivered by particular public bodies and ultimately what overall impact this has on each respective electricity market.
The role of the German Bundestag has remained relatively legislative in its manner when it comes to directing the electricity sector towards renewable energy targets. Issuing purchase obligations based on specific technologies, which are designed to meet the underlying policy objectives. The ‘big four’ German utility companies, take it upon themselves to establish the appropriate FIT contracts. The process seems relatively unburdened by connection and transmission tests. Unlike the connection requirements Ontario prescribes, utility companies in Germany are forbidden from making their own conditions to the contract. The challenge with the ECT specifically, is that it may transpire into a default justification for not connecting a project to the grid. Now the OPA has been delegated more discretion on projects, producing a bit of an ambiguous landscape.  

This type of economic connection test would simply not suffice in a system as developed in Germany. As for Ontario, once the industry begins to build, these tests may slow projects down and hinder foreign investment. Additionally, the application for larger projects with guaranteed economic return, the OPA would be required to maintain consistency with the rules regardless, otherwise this could threaten the transparency and integrity of what the FIT program attempts to establish. Perhaps in time, the Ministry of Energy in coalition with the OPA will consider a threshold for the ETC test or consolidating the three-test phase to ease the administrative procedure and expedite the process.

Easing administrative and grid access procedures will likely require revision, or at least a more dogmatic approach. The Ontario practice sees a variety of public and private bodies participating in the organizational structure of the FIT program. This makes the grand picture appear chaotic and confusing not only for residents, consumers and providers, but even to the outside world. This does not mean to suggest that sector organizations be dismantled or eliminated, but perhaps consolidated. Again, one needs to bear in mind that the comparisons drawn in this paper are between a country and a province. Furthermore, Germany also receives top-down instructions from the European Union who are on a parallel path to explore and utilize natural resources to achieve a

more sustainable existence. Canada as a nation is also far behind in this regard, and fossil fuels have been at the forefront of the economy for years. Reductions of environmental impact assessments and the eradication of key environmental organizations are a hot topic during the writing of this paper, as a new bill was recently introduced into the Federal Parliament; the future remains unclear, but many fear for the worst.

4.2 Primary policy divergence between Germany and Ontario

Evidentially the fundamental distinction between the two FIT programs is the cost bearing structure.

The German side has crafted policy mechanisms to produce three outstanding effects. First, the environment is of high priority. We see this reflected in § 1 of the EEG and referred to in the German Constitution. As one of the first countries to openly announce the acceleration of Nuclear Phase out in response to the Fukishima disaster, illustrates the recognition of such danger and a subsequent action to address it. Second, the German FIT scheme’s obligation on utility providers to absorb transmission and connection costs on top of guaranteed purchase for the electricity supplied, constructs an equal opportunity for generators to invest in renewable technology and harvest the gains driving investment and participation. For as long energy costs continue to rise and climate change becomes more immediate, society will search for alternative, ecological energy sources.

Third, with reference to the second effect, perhaps unintended and seen as slightly controversial in this light, but the entire system essentially equalizes the industry to the extent that the utility companies are not set on a pedestal. In other words, because the Bundestag places obligations on the utility companies by virtue of law, they lose any chance to manipulate the system. When a society has equal access to electricity on fair and transparent means, the system will become a somewhat enduring and appreciated. Each party will feel more tied to the idea of generation resulting in commonly shared goals.

Other Canadian provinces; Nova Scotia and New Brunswick have implemented ‘light’ feed-in tariffs, but a problem, which will continue to plague growth in Canada, is
the vast amount of space. Peculiar as it seems, the reality is that Canada faces major transmission and distribution challenges. This is likely what Ontario had in mind when framing the cost bearing structure. In regards to pricing, the multileveled structure of the energy organizations in Ontario would need a remodeling if Ontario was to adopt a cost bearing structure such as Germany. Because most industry players act at arms length with the government, the Ministry of Energy would have to decide who bears the burden; the state or the companies. At this stage in the industry, it is not absolutely necessary to consider the consequences. It will remain essential to provide consultation and cooperate with Aboriginal communities for infrastructure repairs and grid expansion measures.

The final policy divergence between these two states, are the overarching laws and regulations orchestrating the transition to green from a higher legal source. For Germany this is the European Community and somewhat of a pioneer within the Union, it may gather a sense of solidarity from affiliated members who have been given the same direction to achieve similar goals. Ontario on the other hand has for the most part, has mapped a personalized route to develop green energy sources. The comparison on this level illustrates the differences of top down policy measures implemented in both Europe and Canada.

Ultimately, the over all comparison between the two political structures brings many political, legal, social and environmental considerations to the forefront. Policy measures within the energy sector will continue to become more intense and important as the global community recognizes the necessity to secure reliable energy. Technology and climate change together drive the need to find alternative sources of energy, sustainable enough to provide for the growing global population. These changes will certainly not occur overnight, but incremental policy implementation is a step in the right direction.

5. Conclusion
This paper has attempted to highlight some of the major policy measures in both Germany and Ontario that aid in the development of renewable energy generation, more specifically through the lens of the feed-in tariff schemes in both jurisdictions. I had hoped not to conclude by declaring one better than the other, because it is simply not
possible considering the maturation phases within each region, but to examine the mechanisms allowing the FIT systems to be successful.

I would like to close this paper by considering two theory based approaches that coincide with green policy development in relation to energy and environmental issues. Within the realm of environmental and resource economics is the economic efficiency theory. This theory is based on a low cost portfolio centered around the optimal allocation of (natural) resources to serve members of society in the most efficient way whilst minimizing waste. Although this theory is more subjective than not, it seeks to consider what is ‘best’ for society in the lowest cost sense. The Green economics approach integrates the concept of overall well-being and social equity through an environmental conservationist approach. It is based on the sustainability of earth’s natural resources, managing the economy for nature rather than wealth.\

The difference between these two theories is summed up nicely in Conservation and Environmentalism: An Encyclopedia:

“...gives no special emphasis to the conservation of natural resources or the environment. Indeed it is sometimes rational to deplete a resource fully, while the attainment of economic efficiency through the internalization of externalities does not imply the achievement of environmental sustainability – the ability of the natural environment to continue to support the human activities that impact on it. It has been perceived that a deeper, more integrated approach to environmental problems – one that transcends any single discipline – is required if these problems are to be solved. The development of green economics is a response to this problem.”

What these two theories do is direct us to think about the way policy has the impact to contribute to social and environmental outcomes. The way a government designs policy in any forum must always consider the subsequent consequences on society and community. But when it comes to deriving policy issues from important economic and environmental concerns, it becomes much more delicate of a task. Natural resources are not renewable; we as a society may be able to replenish tree stocks or stop chemical

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dumping to allow nature to reclaim the territory but we cannot turn back the clocks on the impact humans have already made on the environment. Once society begins to shift this focus can we then realize how nurturing and developing green policy can bring great benefits to our overall human capital and this process can only start with the citizen.
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