ONTARIO FEED-IN TARIFF

2011 REVIEW

More jobs, affordable, clean energy, and a brighter future for Ontario

This joint submission is endorsed by the following companies and organizations:

ABOUT **GREEN ENERGY ACT ALLIANCE**

The GEAA is a broad coalition of leading policy research organizations, environment and community power advocates. The GEAA is focused on creating a sustainable energy industry in Ontario, reducing Ontario's dependence on fossil fuels, and creating opportunities for Ontario citizens to participate in clean energy development.

ABOUT **SHINE ONTARIO**

Shine Ontario Association (SOA) is an Ontario provincial solar industry and professional association. SOA brings together and represents the brightest and most dynamic group of independent professionals, leading utility-scale solar and commercial rooftop solar project developers, photovoltaic module manufacturers, engineering construction firms and leading environmental organizations throughout Ontario. SOA represents a diverse consensus-based membership of solar industries and environmentalists who are working hard to build a world-leading sustainable solar industry that will help protect the environment and create thousands of new jobs for the Province of Ontario. Shine Ontario Association was established in 2011 to be a strong dynamic voice for the solar sector in Ontario and help provide sound innovative solutions to ensure a brighter future for all of Ontario.

Photo Credit: SILFAB

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EXECUTIVE SUMMARY

When the Ontario Legislature approved the *Green Energy and Green Economy Act* (GEA) in 2009, Ontario established itself as the North American leader on job creation, and the fight to stop climate change. As other parts of the world experience losses in manufacturing sector jobs, Ontario can boast the development of thousands of green energy projects, and new investment resulting in thousands of jobs.

The Act has been applauded by energy policy groups, renewable industry players, farm organizations, and environmental groups for laying the ground for a thriving green economy in Ontario. A particular element of the GEEA's success is its world class feed-in tariff (FIT) program, which combines the benefits of price certainty, grid connection and regulatory simplicity to create the conditions for successful industrial development while limiting costs to ratepayers. The FIT has been credited as a critical part of Ontario's job creation strategy.

Our coalition members, who include leading energy policy groups, solar photovoltaic (PV) and other renewable industry players, farm organizations, and environmental groups, proclaimed that Ontario had raised the bar in North America in renewable energy development. Why? Because the government set in law the guiding principles necessary to develop a thriving green economy in Ontario. In so doing, it created a world class feed-in tariff (FIT) program, complete with its critical elements: uncapped renewable energy targets, clear, cost-based pricing, well-articulated tranches for differing renewable energy technologies, a reasonable return on investment, and additional provisions for community-owned and aboriginal-owned renewable projects.

But, while the FIT program has been central to Ontario's green economy leadership position, there is room for improvement. To meet the public policy, renewable energy development and job creation potential of the program, Ontario needs to move quickly on three critical items:

1. *Adopt aggressive targets for new renewable energy that will create a sustainable workforce while putting us on an equal footing with world leaders in renewable energy. This includes a specific set-aside for Community Power.*

2. *Keep the integrity and critical components of the FIT and microFIT programs, while introducing a transparent process to automatically reduce FIT prices.*

3. *Involve local communities in renewable energy projects.*

[1] See http://www.wind-works.org/FeedLaws/USA/Grading%20N.Am.%20FITs%20Report.pdf.

A World Class Act

Many have deemed the GEA a "world class Act," and for good reason. Here are some of the benefits that Ontario has already seen as a result of this policy:

- *Ontario's groundbreaking feed-in tariff program has enabled the province to leap to the front of North American jurisdictions in the development of a renewable energy manufacturing industry.*
- *According to the Ontario Federation of Agriculture, the microFIT and FIT program has produced the most rapid uptake of a technology by rural Ontario in the history of the province, with approximately one in seven farms now participating in the program.*
- *Ontario now rivals California, a one-time world leader, both in annual installations of solar photo-voltaic (PV) systems and in solar PV manufacturing.*
- *To date, applications have been received for 20,913 MW of new renewable energy, and 4,752 MW have already been contracted.*

The FIT program and the GEA have drawn significant praise:

- *Former U.S. Vice President Al Gore said that, "The Green Energy Act is widely recognized now as the single best green energy program on the North American continent."*
- *The World Future Council singled Ontario out in its report Grading North American Feed-in Tariffs by noting that the provincial program compares favourably to the best programs in Europe.*
- *Achim Steiner, Executive Director of the United Nations Environment Programme said that the Green Energy Act is shaping up as "one of the boldest moments in history."*
- *The late Hermann Scheer, former member of the German Parliament and co-author of Germany's Renewable Energy Sources Act said "Ontario's Green Energy Act represents North America's most ambitious and far-reaching enabling legislation and will place Ontario as a world leader in renewable energy development, industrial innovation and climate protection."*
- *"We believe Ontario is on the right track towards a green energy future that will wean us from dirty, old fuel sources and bring us closer to a brighter, cleaner, healthier future — and fuel Ontario's economic engine into the 21st century," reads, in part, a joint letter by David Suzuki and Mike Holmes.*

There is no doubt that the Green Energy Act, and its FIT program in particular, is working.

As we work together to develop the "FIT 2.0," we can take comfort in the fact that the province has accomplished much of what it set out to do when it passed the GEA—namely, to jump-start the development of a green energy economy here at home that bolsters the manufacturing sector, creating jobs while replacing polluting and dangerous sources of electricity with cleaner technologies.

Any bold government initiative will invariably draw criticism, and the Green Energy Act is no exception. Leadership in the coming years will be instrumental in ensuring Ontario's long-term success as a clean energy pioneer.

North America, with its enormous appetite for energy and substantial reliance on fossil fuels, is facing the need for a vast amount of renewal in its electricity sector in the coming decades. This makes it a huge emerging market for renewable energy. Ontario is well placed to take advantage of this opportunity if it continues to foster its domestic industry.

Recommendations

1. **Adopt aggressive targets for new renewable energy that will create a sustainable workforce while putting us on an equal footing with world leaders in renewable energy. This includes a specific set-aside for Community Power.**

Our joint submission makes a strong case that job creation and retention require market stability and a more ambitious renewable energy target.

Ontario's current medium-term targets do not match its ambition to create long-term jobs in the province. In order to create these jobs, renewable energy targets need to be increased from those outlined in the 2010 Long Term Energy Plan (LTEP). This is particularly true of the target set for solar and community-based renewable energy projects, both of which create significantly more jobs than traditional energy development.

Ontario currently has an extremely limited target for new renewables to represent only 13% of consumption by 2018, a target that is less ambitious than that of Nova Scotia or New Brunswick, and a level that was achieved in Denmark more than 10 years ago.

Few other jurisdictions where strong renewable energy procurement policies have been implemented have set such low medium-term targets. This is particularly true for jurisdictions that aim to develop renewable energy industries.

The target of 13% in the LTEP is insufficient to meet any of Ontario's objectives including manufacturing capacity, carbon emission reductions, or continually increasing the sustainability of the province's electrical system.

This limited medium-term market opportunity is a disincentive to mid- and long-term investment by the renewable sector in Ontario. It also falls well behind the mid-term planning targets and actual operating supply in other jurisdictions internationally.

Sustained and steady development of renewable energy will not only maintain the jobs created by the existing FIT program, but will also create new jobs as the new FIT program rolls out.

We propose a seven-year program that will add the equivalent of 26% of consumption from new renewables by 2018. This target is still less than international leaders in renewable energy and still less than many state targets in the U.S. Nevertheless, it puts Ontario's target on the North American and international map and places the province in a good position to go further, if desired. With this 2018 target, Ontario is well within striking distance of 30% of consumption by 2020.

We can create more jobs *and* an industrial export market.

Ontario's domestic market potential is sufficiently large to lay the foundation for local renewable energy manufacturing. However, in the long run, manufacturers of wind turbine and solar PV equipment and components will need to compete for interprovincial and international markets, much like Ontario's successful automobile industry. The government's approach to manufacturers therefore needs to ensure that manufacturing jobs are diversified beyond assembly to be sustained in the long term.

China provided foundational support to its domestic manufacturers, enabling them to rapidly develop into a world class manufacturing sector. In our submission, we provide detailed recommendations that will lead to a thriving export sector, including addressing such mechanisms as short-term financing and loan guarantee programs, continuing market research efforts, and assistance in developing "up-the-value chain" products.

Increasing Ontario's renewable energy targets will enable the government to deliver on its promise of 50,000 green energy jobs. Many of these jobs are created in the construction and manufacturing stages of development and thus longer-term targets are required to sustain these levels of employment.

Significant numbers of jobs are also created in long-term operations and maintenance, project management and component supply chains. However, extending Ontario's targets will enable its manufacturing base to establish export competitiveness to serve growing markets across the United States. These export markets are not only for the installation of new renewable generation, but also for replacing projects that have reached the end of their operating lives with new modern equipment.

In order to determine the economic impacts of expanding Ontario's renewable energy targets, we used the National Renewable Energy Laboratory's Jobs and Economic Development Impact tools that calculate the *annual* job impacts of developing, constructing and operating renewable energy power plants until 2018. The results of this modelling, listed below, illustrate that significant numbers of jobs can be created and maintained in Ontario.

TABLE 0-1: **EXPECTED ANNUAL JOB CREATION**

Annual Employment in the RE Sector							
	2012	2013	2014	2015	2016	2017	2018
Solar PV	16,268	20,451	27,373	27,566	27,758	27,950	28,142
Wind	7,404	8,581	9,776	10,987	12,216	13,462	14,725
Biomass, Biogas, Hydro	5,767	5,872	5,978	6,083	6,189	6,294	6,399
Total	29,439	34,904	43,127	44,636	46,162	47,706	49,267

Our modelling numbers were corroborated by a Navigant Consulting study completed for SkyPower in 2010. Navigant found that a proposed deployment of 900 MW of solar projects will produce approximately 53,000 person-years of employment, $1.6 billion of employment income and $8.0 billion of GDP impact.

2. Keep the integrity and critical components of the FIT and microFIT programs, while introducing a transparent process to automatically reduce FIT prices.

Feed-in tariffs have been demonstrated internationally to be the most effective and efficient mechanism of deploying renewable energy, and at the lowest cost to consumers. Ontario should not deviate from feed-in tariffs to procure renewable energy for fear of disrupting the market that is in the process of maturing in the province.

The feed-in tariff program, however, needs to be revised to ensure that Ontario's emerging clean energy industries continually improve their competitiveness and efficiency, while enabling renewable energy to act as a long-term price hedge for consumers.

Such changes must offer good value to Ontario ratepayers while creating long-term market stability for investors, manufacturers and developers in the province.

Our submission provides detailed analysis that supports the recommendation that Ontario set a targeted digression for the solar PV tariffs of 9% per year based on a sliding scale as a function of interest rates, the price of silicon, and the exchange rate. We propose developing an equitable formula in cooperation with OPA staff that provides ratepayers assurance that the industry is bringing costs down while at the same time maintaining a healthy manufacturing and installation industry.

3. Involve local communities in renewable energy projects.

In order to set Ontario's new industries on a trajectory of growth in the domestic market and to make sure they are ready to play a growing role in the export market, the province must move quickly to roll out a steady increase in the amount of new capacity installed over the next five years.

The technical, financial and regulatory innovation required to install large amounts of renewable energy in Ontario will require some significant system changes and will generate a huge number of jobs for Ontarians over the next decade.

Additionally, the public has become reasonably concerned about the cost of the rapidly growing renewable energy industry in the province. Our examination of the cost of an expanded FIT program found that the ten per cent rate rebate is adequate to cover the cost of new renewables to the system while creating nearly 50,000 new jobs, providing a hedge against future cost increases of non-renewable supplies. Still, it behoves all of us to better inform and engage the people of Ontario. To that end, we recommend that the government:

- ***Encourage meaningful engagement through community power projects***

  Ontarians need to move beyond general support to meaningful support and engagement. They need to know more about the benefits of renewable energy in terms of economic revitalization and sustainability. They need to know how they can engage directly in renewable energy through jobs, ownership, lease payments, and local improvement funds. We recommend that the province:

- ***Set up and seed a Green Energy Foundation (analogous to the Greenbelt Foundation) to support organizations that communicate benefits of renewable energy and engage citizens.***
    - *Support community power by: setting a target of community power 250 MW installed by 2018 (100 MW by 2015), and setting a target of 250 MW of aboriginal power by 2018.*

- ***Allow municipalities and municipally-owned LDCs to participate in generation projects.***

- ***Set up and seed a North American FIT Coalition (with Nova Scotia, Vermont, Rhode Island, Florida, and California) to promote the use and benefits of renewable energy, FITs, community power, distributed generation and smart grids, to further stimulate export opportunities.***

Summary

As our submission clearly outlines, merely implementing the contracted renewable energy projects already in the pipeline will not sustain targeted manufacturing and construction jobs over a reasonable period.

In addition to these high level and strategic recommendations, our submission includes analysis and modelling that supports our price and target recommendations, and contains 'drill down' recommendations that we feel will help adjust the FIT program so that the Ministry of Energy and the Ontario Power Authority can:

- ***Learn from the program's initial experience;***
- ***Correct weaknesses in the program;***
- ***Revise pricing to ensure tariffs are adjusted to reflect changing market conditions; and,***
- ***Ensure that the program will serve the needs of both today's ratepayers and those of tomorrow, as well as delivering on the program long-term promises of job creation.***

Key technical recommendations

- *Raise Ontario's sights: set annual targets of installations by technology*
- *Maintain the integrity of the program by keeping FITs in place for all technologies, all sizes*
- *Set solar PV target of 6350 MW by 2018*
- *Cut solar PV tariffs from 11% to 32% for new contracts*
- *Introduce annual tariff degression targets for solar PV*
- *Introduce a new solar PV "brownfield" tranche*
- *Add new technologies to the FIT program including solar hot water, ground-source heat pumps, small wind and remote community projects*
- *Make price-setting and grid connection more transparent*
- *Establish a carve-out for FIT contracts by community and aboriginal groups*
- *Reduce wind costs by introducing differentiated wind tariffs*
- *Revise future FIT reviews to allow more time for stakeholder engagement*
- *Run Economic Connection Test (ECT) immediately after FIT Program Review*

We look forward to working with the Ministry of Energy and the OPA to make a world class renewable energy policy even better.

INTRODUCTION

Intent of this joint submission

Ontario's groundbreaking Feed-in Tariff (FIT) program has, in just two years, enabled the province to leap to the front of North American jurisdictions in the development and job creation of new renewable energy.

According to the Ontario Federation of Agriculture, the microFIT and FIT program has produced the most rapid uptake of a technology by rural Ontario in the history of the province, with approximately one in seven farms in the province already participating in the program.

Ontario now rivals California, a one-time world leader, in annual installations of solar photovoltaic (PV) systems. Starting with virtually no manufacturing capacity in advance of the Green Energy Act, Ontario has already far overtaken California in solar photovoltaic manufacturing capacity, having enabled over 700 MW of annual capacity as a result of its domestic content requirements.

The FIT program has drawn significant praise; the World Future Council singled Ontario out in its report Grading North American Feed-in Tariffs by noting that the provincial program compares favorably to the best programs in Europe.[1]

While the province stands out in North America in its development of new renewable technologies, it is not alone on the world stage. More than 80 other jurisdictions use FIT programs similar to Ontario's, to build their green economies and to reduce their dependence on non-renewable generation. It is in part as a result of these policies that renewable energy has overtaken investment in conventional electricity generation globally every year since 2008.

Ontario's Green Energy Act (GEA) was a bold step that made major changes to the province's electricity. With any policy of this ambition there are inevitably shortcomings and areas for improvement that may be more apparent in retrospect than they were at the outset, or that arise as a result of changing global and domestic realities. Foreseeing this, the GEA itself requires a regular bi-annual review of the program and its tariff rates.

The FIT review that is underway in 2011 gives all stakeholders the opportunity to help the Ministry of Energy (MoE) and the Ontario Power Authority (OPA) learn from the program's initial experience, correct weaknesses in the program, and revise pricing to ensure tariffs are adjusted to reflect changing market conditions. This will ensure that the program will serve the needs of ratepayers both now and in the future, and will deliver on its long-term promises of job creation.

It is with the intent of making Ontario's exemplary FIT program even better that this joint submission of the Green Energy Act Alliance (GEAA) and Shine ONtario is made.

[1] See http://www.wind-works.org/FeedLaws/USA/Grading%20N.Am.%20FITs%20Report.pdf.

The GEAA is a coalition that includes policy research organizations, agricultural groups, clean energy developers and labour groups. The GEAA is broadly focused on creating a sustainable energy industry in Ontario, reducing Ontario's dependence on fossil fuels, and creating opportunities for Ontario citizens to participate in clean energy development. ShineONtario is an association of companies who are dedicated to all aspects of the solar industry in Ontario including manufacturers, installers and project developers. ShineONtario's contribution to this submission focused exclusively on solar development in Ontario.

Structure of this joint submission

The Ministry of Energy has asked eight questions as part of its FIT review. This submission is structured to directly answer these questions, although we have ordered them differently (see below) than they are listed on the OPA's webpage. Additional information that we feel is important is included in the appendix.

1. CREATING JOBS AND SUPPORTING MANUFACTURING

In 2009, the government introduced the groundbreaking Green Energy and Green Economy Act, 2009 (GEA). The GEA is sparking growth in clean and renewable sources of energy such as wind, solar, hydro and bioenergy. In its first three years, the GEA will help create 50,000 clean energy jobs across the province. A clean energy manufacturing base has been growing with over 30 domestic and international businesses announcing that they are setting up or expanding plants in Ontario to manufacture parts for the solar and wind industries.

In addition to FIT prices, should Ontario consider other mechanisms/tools to support clean energy manufacturers based in Ontario? For example, should Ontario consider a more robust strategy to support clean energy export opportunities?

2. PROTECTING RATE PAYERS AND ENCOURAGING INVESTMENT

Ontario's renewable energy Feed-in Tariff (FIT) program has been very successful. It has positioned Ontario as a leader in clean energy and has successfully attracted private sector investment to the province.

The FIT Program was launched in 2009 and has a built-in review every two years. The purpose of the Review is to ensure that the FIT Program continues to be stable and sustainable and reflects current market conditions. As part of the Review, FIT prices are being re-examined to account for market changes that have occurred both domestically and internationally, including economies of scale that have been achieved and capital cost reductions. The intention is to ensure a continued balance between the interests of ratepayers and the need to stimulate the economy by creating green jobs and attracting investment to Ontario.

Given declining costs, especially with respect to solar PV technology, and the development of new renewable energy technologies, should changes be made to the current FIT prices and price categories? If yes, please provide feedback on suggested changes to existing size tranches and contract prices.

3. PROCESS FOR CHANGING PRICES

As noted in the Long-Term Energy Plan, successful and sustainable FIT Programs in a number of other jurisdictions have reduced their FIT prices as technology advanced and economies of scale reduced the cost of production. This process is known as 'price degression.'

Some jurisdictions use a tiered pricing system known as 'dynamic degression' where a certain price is paid until a targeted amount of renewable energy is developed, and that price reduces by a certain percentage after that target is reached. This process is sometimes laid out in legislation, allowing developers to plan ahead.

To ensure program sustainability, what mechanism/process should the government of Ontario incorporate for future FIT price reductions?

4. CONSIDERATION OF NEW TECHNOLOGY

Ontario's FIT Program provides stable prices and long-term contracts for renewable energy produced through wind, water, solar PV, and bio-energy sources. Some citizens have proposed that Ontario include additional technologies.

Should the FIT Program consider new renewable energy technologies? Which new technologies should be considered and what requirements should apply to them?

5. ENGAGING MUNICIPALITIES

Municipal engagement and consultation is an important part of the renewable energy development process. The Renewable Energy Approval (REA) requires municipal consultation, including public consultations. The Ontario Government has also worked to ensure municipalities are aware of what their role is by creating a municipal consultation guide.

To complement REA, what other ways could citizens and municipalities be engaged and consulted about renewable energy projects being proposed in their communities?

6. EXPANDING RENEWABLE ENERGY PARTICIPATION

Ontario has been successful in attracting broad involvement in renewable energy projects. To date, over 100 FIT medium and large contracted and announced projects include Aboriginal or community ownership or partnerships. Ontario and the broader public sector have launched support programs to help the education sector, social housing, communities and Aboriginal groups develop and own renewable energy facilities.

These support programs include:

- *Aboriginal Energy Partnerships Program to provide funding for many of the key developmental stages of Aboriginal projects.*
- *Aboriginal Loan Guarantee Program to support Aboriginal participation in new renewable green energy infrastructure such as wind, solar and hydroelectric.*
- *Community Energy Partnerships Program to provide funding to assist community groups with the developmental costs associated with renewable energy projects.*

In addition, some jurisdictions, including Ontario, have 'price adders' on top of prevailing FIT rates, to help certain groups or communities overcome obstacles to renewable energy development. One obstacle, in particular, is securing project financing.

Are there more effective incentives, support programs, or mechanisms that could be provided to encourage more participation in renewable energy projects by community organizations, Aboriginal communities and the broader public sector such as municipalities and school boards? Do you support 'price adders' for specific groups?

7. SUPPORTING BROAD RENEWABLE ENERGY DEPLOYMENT

The FIT Program is a key component to supporting renewable energy in Ontario. However, not all renewable energy is developed through feed-in tariffs. For example, Ontario has a net metering program that enables Ontarians to create their own electricity to offset their electricity costs. Other Ontarians create electricity for their personal use without connecting to the grid, for example solar panels at cottages.

The Ontario government has demonstrated its commitment to renewable energy development. How should the Ontario government diversify renewable energy development beyond the FIT Program?

8. EFFECTIVE ENVIRONMENTAL OVERSIGHT

All renewable energy projects are subject to rigorous environmental approvals. In order to make it easier to develop renewable energy projects, the Ontario Government has streamlined many environmental approvals into the Renewable Energy Approval (REA) process. Ontario has recently made improvements to the Renewable Energy Approvals (REA) process that will provide greater certainty for developers, while continuing Ontario's rigorous protection of the environment and human health.

The Government has made recent improvements to streamline the provincial environmental approvals process. While the integrity of the process must be maintained, are there further efforts that could be considered?

1 / Creating Jobs and Supporting Manufacturing

It is well documented that Feed-in Tariffs have been the most effective mechanism globally to procure renewable energy and to create a stable domestic market to attract local manufacturing[2,3]. In developing its FIT, Ontario has set the short-term conditions for creating renewable energy jobs. However, jurisdictions that have successfully created long-term green energy employment have done so through initially fostering a robust domestic market, enabling industries to establish themselves for export. Ontario's medium-term renewable targets are modest by international standards and not aligned with its ambitious job creation goals. This submission outlines a path for renewable energy targets that will deliver the medium to long-term jobs promised by the government to Ontario's citizens and ratepayers.

1.1. Job creation and retention require market stability

In spite of its recent progress, in comparison to leading jurisdictions in Europe and even in North America, Ontario is still lagging with respect to its new renewable energy capacity. Denmark currently generates 34% of its consumption with new renewables and has set a target of delivering 100% of its consumption from new renewables by 2035;[4] Minnesota generates 20% of its annual electricity consumption from wind energy alone.

By comparison, Ontario has set an extremely limited target for all new renewables of only 13% of consumption by 2018, something Germany achieved nationally almost two decades ago. Few other jurisdictions where strong renewable energy procurement policies have been implemented have set such low medium-term targets, especially jurisdictions aiming to develop renewable energy industries. Table 1 illustrates some examples of jurisdictions with much higher renewable energy targets.

TABLE 1: **EXAMPLES OF GLOBAL RENEWABLE ENERGY TARGETS**

Renewable Energy Targets Comparison

New renewables unless noted.

	Current % Electricity	Target % Electricity	Year	Population Millions	Notes
Scotland	30%	100%	2020	5.2	Includes existing hydro.
Rheinland-Pfalz	30%	100%	2030	4	
Schleswig-Holstein	50%	100%	2020	2.8	Percent of interior consumption.
Denmark	34%	52%	2020	5.6	New policy: 100% by 2035.
Germany	20%	35%	2020	80	Includes existing hydro.
California	15%	33%	2020	37	
Minnesota	20%	30%	2020	5.3	
Ontario	3%	13%	2018	13.2	Excluding large hydro.

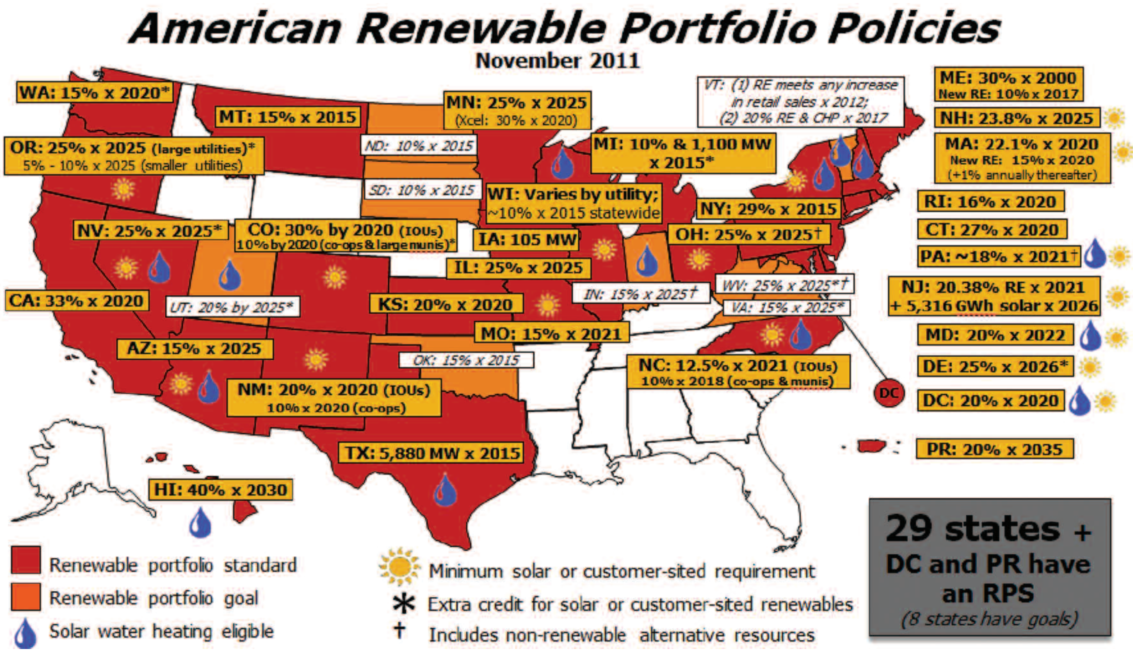
2 Stern, N. (2006). "Stern Review on The Economics of Climate Change" HM Treasury, London. Available online at http://www.hm-treasury.gov.uk/stern_review_report.htm

3 Intergovernmental Panel on Climate Change Working Group III, Special Report on Renewable Energy Sources and Climate Change Mitigation (2011) Available at: http://srren.ipcc-wg3.de/report

4 See http://www.ens.dk/da-DK/Politik/forhandlinger11/Documents/vores-energi-web.pdf

In North America, as can be seen in Figure 1, 29 American states have similar or higher renewable energy targets for the next decade; half of these have specific solar energy targets. Unfortunately, the OPA appears to be interpreting the relatively modest target of 13% new renewable energy by 2018 as a hard cap on renewable energy development in the province.

FIGURE 1: **AMERICAN RENEWABLE REQUIREMENT POLICIES**[5]



If Ontario wants to compete in renewable energy industrial development it must commit to a target comparable to other leading nations and jurisdictions—it must raise the bar on the pace and scale of new renewable development.

The current target of 13% in the Long Term Energy Plan (LTEP) is insufficient to meet any of Ontario's objectives including manufacturing capacity, carbon emission reductions, or continually increasing the sustainability of the province's electrical system.

This limited medium-term market opportunity is a disincentive to mid- and long-term investment by the renewable sector in Ontario. It also falls well behind the mid-term planning targets and actual operating supply in other jurisdictions internationally.

[5] Database of State Incentives for Renewables and Efficiency, www.dsireusa.org

1.2. Sustainable long-term new renewable energy plan

The Minister of Energy and the government must send a clear signal to OPA, OEB, and Hydro One that Ontario intends to become a worldwide leader in the development of new renewable energy. The Minister must direct them to find the means necessary to substantially increase the role of new renewables in Ontario's electricity system. To compete internationally, or even with North America, Ontario must strive for a targeted penetration of new renewables of 30% to 35% by 2020.

To create a sustainable manufacturing base for those firms that have located in the province, we propose annual targets by technology based on actual installed capacity—not contracted capacity.

Sustained and steady development of renewable energy will not only maintain the jobs created by the existing FIT program, but will also create new jobs as the new FIT program rolls out.

We propose a seven-year program that will add the equivalent of 26% of consumption from new renewables by 2018. This target is still less than international leaders in renewable energy and still less than many state targets in the USA. Nevertheless, it puts Ontario's target on the North American and international map and places the province in a good position to go further, if desired. With this 2018 target, Ontario is well within striking distance of 30% of consumption by 2020.

TABLE 2: **PROPOSED ANNUAL INSTALLATION TARGETS**

Ontario New Renewable Generation Capacity Targets Based on Installed Capacity (not Contracted): Seven Year Program

	Yield kWh/kW/yr	Year -2 2010 MW	Year-1 2011 MW	Year 1 2012 MW	Year 2 2013 MW	Year 3 2014 MW	Year 4 2015 MW	Year 5 2016 MW	Year 6 2017 MW	Year 7 2018 MW	Cumulative 2018 MW	2018 TWh/yr	Ontario Supply %
Solar PV	1,150	46	168	600	750	1,000	1,000	1,000	1,000	1,000	6,350	7	5%
Wind	2,200	250	250	700	850	1,000	1,000	1,100	1,200	1,250	7,100	16	10%
Biomass, Biogas, Hydro	7,000		8	250	250	250	250	250	250	250	1,750	12	8%
										Total	15,200	35	23%
Current New Renewables													3%
												Total	26%
Direct & Indirect Jobs				29,400	34,900	43,100	44,600	46,200	47,700	49,300			

For the FIT review, we have developed a spreadsheet model to estimate the cost of such a program. According to our model, taking Ontario to the next level of renewable energy development will cost ratepayers about 10% more than otherwise in 2018.[6] And beyond 2018, costs for the FIT program relative to the cost of conventional generation will likely be less.

1.3. Creating and sustaining jobs

Increasing Ontario's renewable energy targets will enable the government to deliver on its promise of 50,000 green energy jobs. Many of these jobs are created in the construction and manufacturing stages of development, and thus longer-term targets are required to sustain these levels of employment. There are also significant numbers of jobs created in long-term operations and maintenance, project management

[6] In the interest of full transparency, our model is available for download at http://www.wind-works.org/FeedLaws/Canada/OntarioRatepayerImpactofSustainableFITProgram.html.

and component supply chains. However, extending Ontario's targets will enable its manufacturing base to establish export competitiveness to serve growing markets across the United States. These export markets are not only for the installation of new renewable generation, but also for replacing projects that have reached the end of their operating lives with new modern equipment.

In order to illustrate the job impacts of expanding Ontario's renewable energy targets we used the National Renewable Energy Laboratory's *Jobs and Economic Development Impact* (JEDI)[7] tools that estimate the economic impacts of constructing and operating power generation plants.

Based on inputs derived from industry norms, JEDI estimates the number of jobs and economic impacts to a local area that could reasonably be supported by a power generation project. Models were created for solar and wind energy development specific to Ontario for this analysis.

1.3.1. JOB MODELLING RESULTS

Annual employment

Annual employment measures the number of full-time equivalent workers[8] employed in manufacturing, project development and construction as well as the on-going operations of renewable energy projects in that particular year. This projection includes development and construction jobs resulting from the projects built that year matching the proposed annual target, as well as cumulative operations and maintenance jobs from projects installed in previous years. Table 3 uses JEDI modelling results for wind and solar power development and data from Table 5 to determine jobs from biomass, biogas and hydro development. The methodology is explained in the following section.

TABLE 3: **PROPOSED ANNUAL INSTALLATION TARGETS**

Annual Employment in the RE Sector							
	2012	2013	2014	2015	2016	2017	2018
Solar PV	16,268	20,451	27,373	27,566	27,758	27,950	28,142
Wind	7,404	8,581	9,776	10,987	12,216	13,462	14,725
Biomass, Biogas, Hydro	5,767	5,872	5,978	6,083	6,189	6,294	6,399
Total	29,439	34,904	43,127	44,636	46,162	47,706	49,267

Total forecast jobs created for proposed Ontario targets

Including manufacturing, development and construction jobs as well as the 20-year operation phase, the proposed targets would be expected to create over 300,000 full-time person-years of employment. Table 4 uses JEDI modelling results for wind and solar power development. It uses data from Table 7 to determine jobs from biomass, biogas and hydro development.

7 http://www.nrel.gov/analysis/jedi/

8 Various terms are used by different tools to measure employment. Full-time equivalent (FTE) is the work done by one person in one year at a full-time job. Person-year employment (PYE) and job-years have the same meaning.

TABLE 4: **ANNUAL EMPLOYMENT IN THE RE SECTOR**

Job Creation (includes 20 year O&M jobs in the year they are created)								
	2012	2013	2014	2015	2016	2017	2018	Total
Solar PV	18,461	23,075	30,767	30,767	30,767	30,767	30,767	195,373
Wind	9,678	11,061	12,443	13,826	15,209	16,591	17,974	96,782
Biomass, Biogas, Hydro	7,770	7,770	7,770	7,770	7,770	7,770	7,770	54,390
Total	35,909	41,906	50,981	52,363	53,746	55,129	56,511	346,545

1.3.2. **METHODOLOGY**

Solar power job forecasts

To forecast the jobs created by the solar power sector we used National Renewable Energy Laboratory's (NREL) Jobs and Economic Development Impact (JEDI) model. This model takes in spending impacts for construction and operations and determines the number of jobs created across the economy. Some of the major inputs are noted below:

- *Installed cost of $4,300/kW*[9]
- *Annual maintenance cost of $17.67/kW*[10]
- *Mounting system and PV array manufactured locally. Electrical equipment and inverter manufactured outside of Ontario*
- *New York State economic multipliers used (Ontario multipliers were not available for this exercise)*

Our modelling suggested that 26.9 PYE/MW would be created during the construction phase, and 0.19 PYE/MW of annual employment during the O&M phase (3.8 PYE/MW total over 20 years).

We also measured job creation and employment based on results from ClearSky Advisors' 2011 report.[11] This report suggested 17.6 PYE/MW during the construction phase and 7.1 PYE/MW for the full 20-year O&M phase.

These numbers are further corroborated by a Navigant Consulting study completed for SkyPower in 2010[12]. Based on SkyPower's project portfolio, Navigant analyzed the gross direct, indirect, and induced employment; wage; and GDP impacts to Ontario of this proposed deployment. Navigant found that a proposed deployment of 900 MW of solar projects will produce approximately 53,000 person-years of employment, $1.6 billion of employment income and $8.0 billion of GDP impact.

9 Based on ClearSky Advisors (2011), Economic Impacts of the Solar PV Sector in Ontario 2008. ClearSky estimates a total private sector investment of $12.9 billion leading to 3000 MW installed.

10 Ibid. ClearSky suggests from 2018 onwards an annual maintenance cost of $53-million for 3000 MW installed.

11 Ibid.

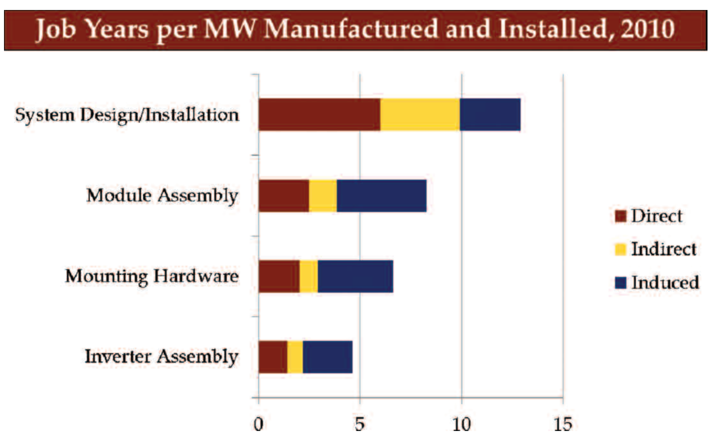
12 Navigant Consulting (2010) Economic Impact Analysis of SkyPower's Proposed PV Deployment, prepared for SkyPower Inc.

TABLE 5: **EXPECTED JOB CREATION RESULTING FROM 900 MW OF SOLAR DEVELOPMENT IN ONTARIO**

	Employment [Job-Years]	Wages ($MM)	GDP Impact ($MM)
Direct	16,835	$708	$3,992
Indirect	10,047	$357	$2,105
Induced	25,722	$551	$1,930
Total	52,604	$1,616	$8,027

Furthermore, Navigant found that a total of 32 Ontario job years are created to manufacture and install one MW of ground-mounted solar PV.

FIGURE 2: **JOB YEARS PER MW MANUFACTURED AND INSTALLED, 2010**



To determine these numbers, Navigant applied Statistics Canada's provincial input-output job multipliers to calculate indirect employment. Statistics Canada maintains an annually updated table of input-output multipliers by industry. In the case of jobs, these indicate the incremental full-time equivalents created directly and indirectly within the province for every $1 million exogenous output shock.

The table below shows how StatsCan industry categories were mapped to the job categories developed in Navigant's study. It also shows the indirect multipliers for job creation (indirect FTE/1,000 sqft for facility construction and FTE/MW for all others).

Induced multipliers are not currently available from StatsCan.

TABLE 6: **EXPECTED SOLAR PV JOB CREATION BREAKDOWN**

FTE/MW[1] (based on 2010 direct jobs) NCI Job Category	StatCan Industry	Indirect Jobs	Induced Jobs
Operations Jobs	Electric Power Generation, Transmission and Distribution	0.11	0.32
Module Assembly	Electrical Equipment and Component Manufacturing	1.37	4.40
Inverter Assembly	Electrical Equipment and Component Manufacturing	0.77	2.46
Mounting Hardware	Fabricated Metal Product Manufacturing	0.91	3.71
System Design and Installation	Electric Power Engineering Construction	3.90	3.00
Facility Construction	Non-residential Building Construction	0.33	0.60

1 Except for Non-residential Building/Facility construction, which is FTE/1,000 Sq

Wind power job forecasts

To forecast the jobs created by the wind power sector we also used the JEDI model. This model takes in spending impacts for construction and operations and determines the number of jobs created across the economy. Some of the major inputs are noted below:

- *Installed cost of $2,690/kW*[13]
- *Annual maintenance cost of $24.61/kW*[14]
- *~50% manufactured locally (everything but the turbine)*
- *New York State economic multipliers used (Ontario multipliers were not available for this exercise)*

Our modeling suggested that 10.4 PYE/MW would be created during the construction phase, and 0.17 PYE/MW of annual employment during the O&M phase (3.4 PYE/MW total over 20 years).

We also measured job creation and employment based on results from ClearSky Advisors' 2011 report.[15] This report suggested 10.5 PYE/MW during the construction phase and 3.6 PYE/MW for the full 20-year O&M phase.

13 Based on ClearSky Advisors (2011), The Economic Impacts of the Wind Energy Sector in Ontario 2011-2018.

11 Ibid.

15 Ibid.

Biogas/biomass/small hydro job forecasts:

Jobs for biogas/biomass and small hydro development were estimated using the following assumptions:

- *80% of power produced from biomass/biogas, 20% from small hydro;*
- *0.21 jobs/GWh from biomass/biogas, 0.27 jobs/GWh from small hydro;*[16]
- *27.1% of 20 year lifetime jobs are from the O&M phase (this is equal the average between wind and solar O&M job ratios).*

1.4. **Green energy creating jobs**

> ***"A key result emerges from our work: Across a broad range of scenarios, the renewable energy sector generates more jobs than the fossil-fuel based energy sector per unit of energy delivered…. The renewable energy sector generates more jobs per megawatt hour of power installed, per unit of energy produced, and per dollar of investment, than the fossil fuel sector."***
>
> — Daniel Kammen, Kamal Kapadia, Matthias Fripp
> *Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate? (Renewable and Appropriate Energy Laboratory, University of California, 2004)*

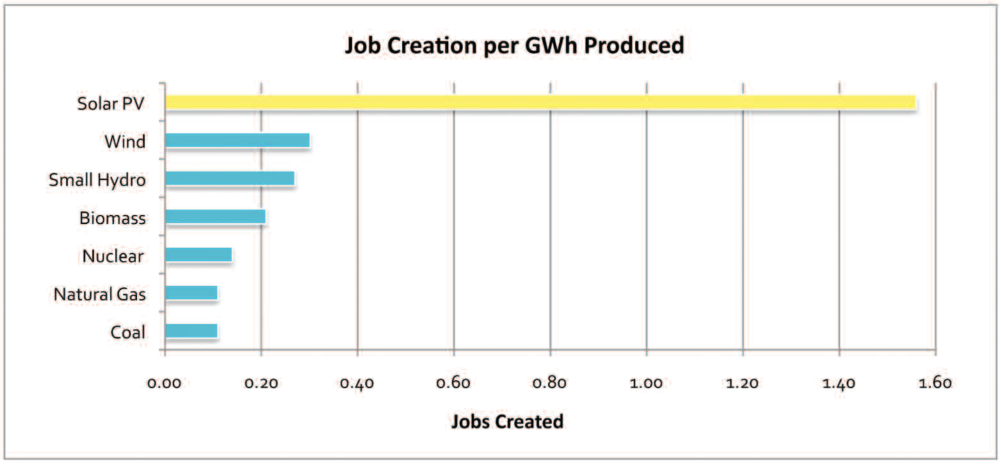
Numerous studies have shown that investments in renewable energy projects create more jobs than traditional energy investments. Some results of these studies include those by Wei et al (2010), as well as recent studies by ClearSky Advisors specific to Ontario's Feed-in Tariff.

TABLE 7: **JOBS CREATION PER UNIT OF ENERGY PRODUCTION**[17]

Energy technology	Total jobs-years per GWh	Job creation rank (where 1 is highest)
Solar photovoltaic	0.87	1
Landfill gas	0.72	2
Energy efficiency	0.38	3
Small hydro	0.27	4
Geothermal	0.25	5
Solar thermal	0.23	6
Biomass	0.21	7
Carbon capture and storage	0.18	8
Wind	0.17	9
Nuclear	0.14	10
Coal	0.11	11 (tied)
Natural gas	0.11	11 (tied)

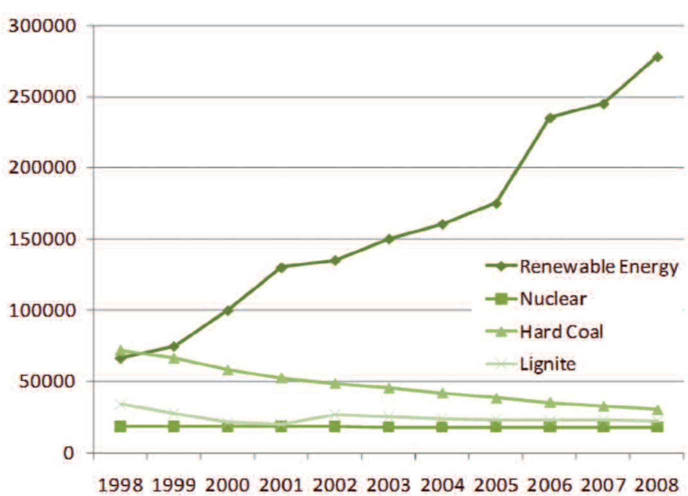
17 Max Wei, Shana Patadia, Daniel M. Kammen, "Putting Renewables and Efficiency to Work: How many jobs can the clean energy industry generate in the U.S.?" in Energy Policy 38 (2010), 922.

FIGURE 3: **CLEARSKY ADVISORS JOB CREATION PER UNIT OF ENERGY PRODUCTION**[18]



This type of job creation is playing out in Germany, one of the global renewable energy leaders, as illustrated below.

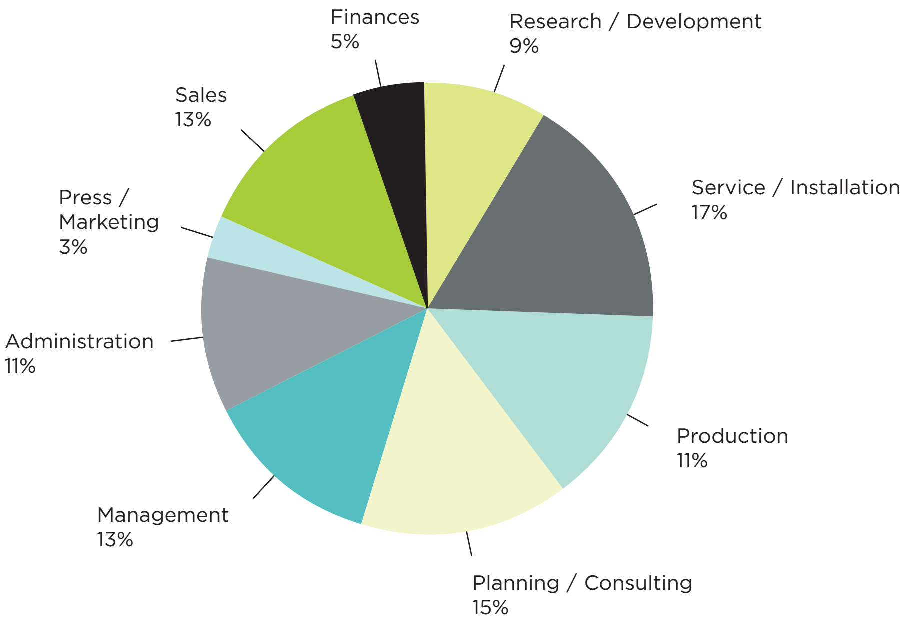
FIGURE 4: **ELECTRICITY JOBS IN GERMANY 1998-2008**[19]



[18] ClearSky Advisors (2011), The Economic Impacts of the Solar PV in Ontario 2008-2018.

[19] Source: BMU 2010, FH Wiesbaden 2008

FIGURE 5: **GERMAN RENEWABLE ENERGY JOB OFFERS BY FIELD OF BUSINESS TYPE IN 2009**[20]



This type of job creation is playing out in Germany, one of the global renewable energy leaders, as illustrated below.

1.5. Integrating higher targets

One reason that is often cited for limiting renewable energy targets in a jurisdiction is the difficulty in integrating variable output sources of electricity. Solar generation however is well-matched to daily peak loads, as well as the overall system peak, which for Ontario occurs in the summer months when the demand for air conditioning is greatest. As a result, solar power is typically easier to integrate into the grid then other variable output technologies, and can be relied on to offset the need for the two recently cancelled gas-fired power plants.[21]

> ***"Seven or eight years ago, we said that the electricity system could not function if wind power increased above 500 MW. Now we are handling almost five times as much. And I would like to tell the Government and the Parliament that we are ready to handle even more, but it requires that we are allowed to use the right tools to manage the system."***
>
> — Chairman of the Western Danish system operator ELTRA at the presentation of its 2003 annual report to the Danish government

[20] Arepo Consult, Berlin

[20] John Spears, "The power plant is dead but the need isn't, energy agency warns", The Toronto Star, November 24, 2011. http://www.thestar.com/business/article/1092074--the-power-plant-is-dead-but-the-need-isn-t-energy-agency-warns?bn=1

As illustrated in the quote above, it is common for systems operators to be conservative about their ability to integrate variable output renewable energy sources. For example, from April 2006 to September 2007, Alberta imposed of a 900 MW cap on wind power capacity, representing around 10% of total generating capacity. This cap was removed in 2007, and the Alberta Electric System Operator (AESO) is now forecasting up to 3,000 MW of wind in the southern part of the province. Studies of the capacity of electrical grids to absorb increasing percentages of new renewable generation have consistently found that more capacity is available than was once thought.

A recent publication of the International Energy Agency (IEA) suggests that that many regions have much higher technical potential to integrate and balance larger shares of variable renewable energy than traditionally thought. Using the systems and generation fleets that already exist, the potential to integrate variable output renewables (wind, solar, etc.), ranges from 19 per cent in areas such as Japan with less-flexible (often nuclear-heavy) grids, all the way up to 63 per cent in countries such as Denmark with well-connected grids and ready access to large hydro reservoirs.[22] Other results from the IEA are shown in Table 8.

TABLE 8: **POTENTIAL TO INTEGRATE VARIABLE RENEWABLE ENERGY INTO EXISTING ELECTRICAL SYSTEMS (SOURCE IEA[23])**

Region	*Integration Potential (%)*
British Isles	31
Mexico	29
Western Interconnection (U.S)	45
New Brunswick System Operator area	37
Denmark	63
Japan	19

In Ontario, a study completed by General Electric in 2006 found minimal system operation impacts for wind capacity of up to 5,000 MW; with some additional regulation that could be handled within the current system operation framework, Ontario could integrate up to 10,000 MW of wind energy.[24] Since that time, significant levels of natural gas have been added to the system, which would further increase Ontario's capacity to balance the output of wind generation. The 2010 Long-Term Energy Plan forecasts only 7,500 MW of wind, well below what was technically possible even in 2006 prior to the recent gas build.

[22] International Energy Agency, Harnessing Variable Renewables: A Guide to the Balancing Challenge (2011), http://www.iea.org/publications/free_new_Desc.asp?PUBS_ID=2403

[23] Ibid.

[24] GE Energy, Ontario Wind Integration Study (prepared for Ontario Power Authority, Independent Electricity System Operator and Canadian Wind Energy Association, 2006), http://www.ieso.ca/imoweb/pubs/marketreports/OPA-Report-200610-1.pdf.

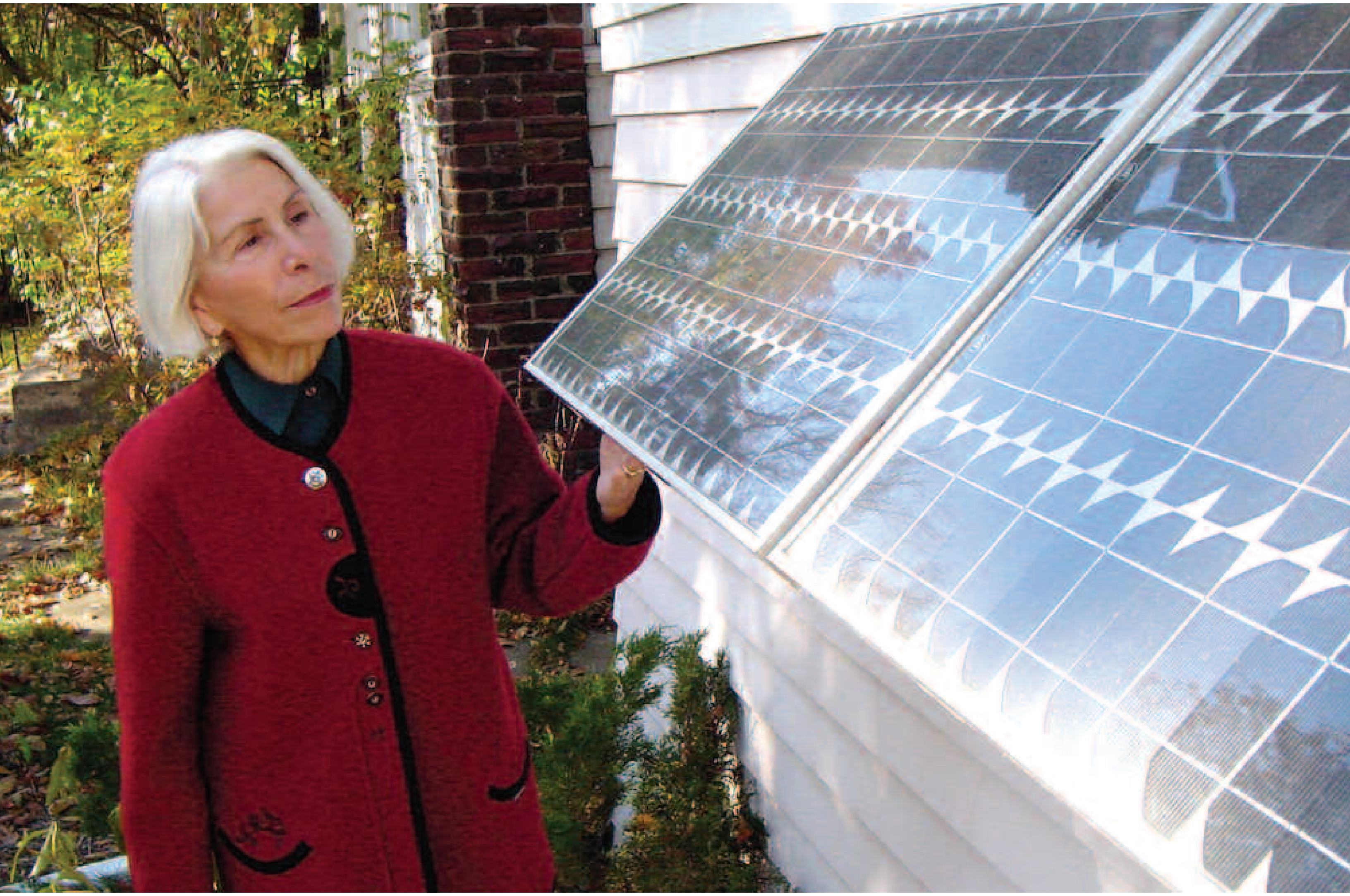
1.6. **Working towards manufacturing export**

Ontario's domestic market potential is sufficiently large to lay the foundation for local renewable energy manufacturing. However, in the long run, manufacturers of wind turbine and solar photovoltaic equipment and components will need to compete for interprovincial and international markets, much like Ontario's successful automobile industry does. To provide stable long-term employment the province must ensure that manufacturing jobs are diversified beyond assembly. China, for example, has provided foundational support to manufacturers to enable the rapid development of its world class manufacturing sector.

Such an approach in Ontario could include the following elements:

- *Short-term financing and loan guarantee programs to enable export manufacturers to invest in advanced tooling and automation equipment, which will help these companies to partner or participate in foreign projects as well as provide assurance to foreign buyers.*
- *Similar financing and loan support for project developers and EPC companies using Ontario-made renewable plant components such as solar panels and inverters.*
- *Dedicating resources toward researching potential foreign markets and sharing the information gained with manufacturers, as well as to facilitating relationships between Ontario-based companies and foreign government agencies responsible for procurement.*
- *Ensuring manufacturing activity in Ontario moves up the value chain to work that includes onsite deployment of research and development and knowledge-based labour by offering research and development tax credits as well as programs partnering with academic institutions on technology research.*
- *Government engagement with domestic banking institutions on the viability of financing large-scale renewable energy projects. The Ontario sector would be more viable, both domestically and in foreign markets, if local financial institutions were more open to offering competitive debt financing options, as their foreign counterparts do.*


MERIDIAN
MERIDIAN
MERIDIAN



2 / Protecting ratepayers and encouraging investment

2.1. Maintaining the integrity of the FIT program

"Feed-in mechanisms achieve larger deployment at lower costs" than other policy mechanisms such as quotas, direct incentives or voluntary goals, because "Uncertainty discourages investment and increases the cost of capital".[25]

Requests for Proposal (RFPs) or bidding systems rarely result in actually building the amount of capacity called for. Typically the failure rate is nearly 50%. Winning bidders frequently conclude that they can't or won't build a project for the price bid within the time allotted.

Bidding systems historically have never been able to support a stable manufacturing base. Great Britain is a prime example where the failure of the Non-Fossil-Fuel Obligation (NFFO) to bring on the amount of wind capacity bid also led to the destruction of a budding manufacturing industry.

The experience was similar in France with Project Eole. Few projects were built and most of the "winning" contractors eventually switched to France's feed-in tariff program. Most of the capacity bid under Project Eole was eventually built with feed-in tariffs.

The preparation of a proposal in response to an RFP process is an expensive and time-consuming task requiring a large dedicated team. The sunk costs associated with such an effort are those which only a well-capitalized company can incur over the long-term. Few of the smaller, more entrepreneurial developers even bother to submit proposals in response to RFPs. A review of results in the provinces that have used an RFP process for procurement shows that the preponderance of contracts have been awarded to established industry players, often multinationals, with strong balance sheets. That may, from some perspectives, be an appropriate outcome, but it is not an outcome which fosters a vibrant home-grown renewable energy industry that draws in new players, big and small, and has a meaningful impact on the broader provincial economy.

Ontario recognized the deficiency of green energy RFPs when it introduced the Renewal Energy Standard Offer Program (RESOP), and subsequently, the FIT program. The subcommittee report of the Standing Committee on General Government described a feed-in tariff procurement mechanism as a significant improvement over previous RFPs, as the latter effectively precluded community power groups from obtaining power purchase agreements due to prohibitive upfront costs and systemic prejudices. The sub-committee highlighted some of the objectives of the feed-in tariff approach as being:

[25] Stern, N. (2006). "Stern Review on The Economics of Climate Change" HM Treasury, London. Available online at http://www.hm-treasury.gov.uk/stern_review_report.htm

a) *to increase certainty in investor confidence;*

b) *to create jobs through new renewable energy projects;*

c) *to encourage community based projects, particularly those developed by rural Ontarians and First Nations communities; and*

d) *to generate broader private sector involvement in the development of renewal energy.*

In sum, the province took a hard look at RFPs relative to feed-in tariffs as a procurement mechanism and for still-valid reasons opted for the FIT program instead.

Moreover, bidding systems are exclusionary. Because RFP regimes are designed to ensure that bidders can actually build what they say they can build, only the largest players can participate, resulting in the further concentration of an already highly concentrated industry. Small and medium-size entrepreneurial companies, those most likely to create new jobs, can rarely compete in bidding programs.

For perspective, 20 of the European Union's 27 member countries use feed-in tariffs as the principal mechanism for meeting their renewable energy targets. An additional three countries use feed-in tariffs for selected technologies, often solar photovoltaics.

There is no convincing evidence that bidding systems lower the cost of renewable energy.[26]

2.2. **Contextualizing current and future electricity costs**

Recent studies have examined the impact of Ontario's renewable energy targets, and have found that prices to consumers are going to increase with or without renewable energy. While there is a premium to pay for new renewable energy in the short term, scaling back current programs would only have a marginal impact on overall price increases, and would lead to higher costs in the longer term when the prices of fossil fuels rise as they are projected to do. See for example a recent study by the Pembina Institute with whatIf? Technologies[27] and Navigant Consulting that examined the price impact of the renewable energy targets outlined in the Long-Term Energy Plan.[28]

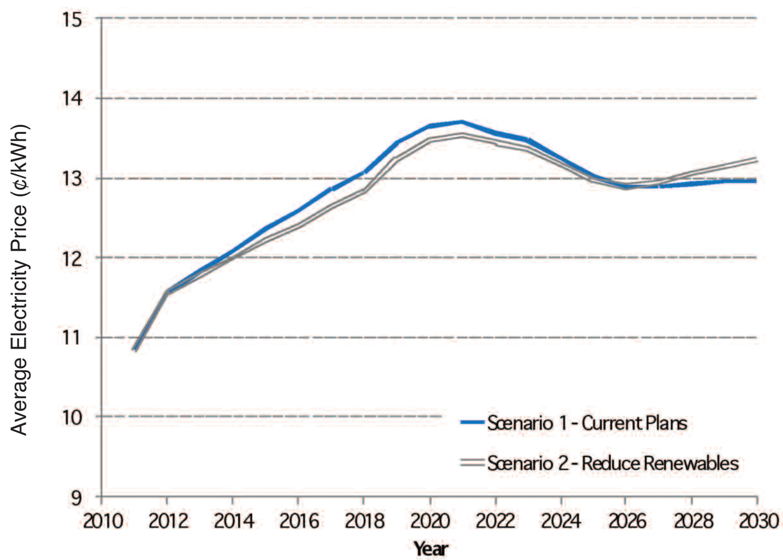
Simulation results in that study show that electricity prices in Ontario are set to continue to rise sharply in the future in both scenarios, peaking around 2022 when Ontario's nuclear fleet is in the midst of significant rebuilding. As can be seen in Figure 7, there would be virtually no change in electricity prices in the immediate future if future contracts for renewable energy were ended in 2011. Replacing the commitment to renewable energy largely with natural gas is likely to result in only a slightly slower increase in electricity rates from the years 2015-2025. However, within the next 15 years, as natural gas prices begin to rise and increased action (including some form of price on carbon emissions) is likely to be taken to combat climate change, the simulation found that investing in renewable generation today will keep consumer prices slightly lower in the long term.

[26] Comparison of Feed in Tariff, Quota and Auction Mechanisms to Support Wind Power Development by Lucy Butler and Karsten Neuhoff, University of Cambridge.

[27] Pembina releases CanESS-powered Ontario Electricity Pricing Report http://bit.ly/tuS7g5

[28] Weis, Tim and Partington, PJ (2011) Behind the Switch, Pricing Ontario Electricity Options, www.pembina.org/pub/2238.

FIGURE 6: **PEMBINA INSTITUTE SIMULATION RESULTS COMPARING AVERAGE ONTARIO ELECTRICITY PRICE SCENARIOS** (2010 CONSTANT DOLLARS)



If natural gas prices begin to rise faster than they are current forecast by the United States Department of Energy, or if more aggressive action is taken to combat climate change, these savings will be larger, and will begin to occur sooner in the future.

The FIT program provides ratepayers a long-term hedging advantage because the FIT contracts have fixed rates throughout the life of the 20-year contract. The contract tariff increases only 20% of inflation annually. And there is no inflation adjustment for generation from solar PV. Thus, FIT contract prices will increase much more slowly than the expected cost of generation from natural gas. Further, ratepayers only pay for actual generation delivered by FIT contracts. They do not pay for idle plants or those that perform poorly.

2.3. **Ratepayer impact of expanded program targets**

The Green Energy Act Alliance’s proposed long-term renewable energy supply plan adds approximately 15,000 MW of new renewable capacity in steady, sustainable, annual increments for seven years. We estimate that in 2018 total generation from our proposal would contribute about 32 terawatt-hours per year (TWh/yr) or nearly 21% of the province's electricity supply. Added to existing new renewable generation in the province, this target could bring total new renewable generation to 25% of consumption by 2018.

While this target is more conservative than that of California, which has a 33% target for new renewable energy by 2020, it is substantially greater than current Ontario policy which seeks only 15% of new renewable electricity supply through 2030.

The government and ratepayers are justifiably concerned about the cost of such plans to steadily expand the role of new renewables in Ontario's electricity mix.

We have commissioned Robert Freehling, an energy policy consultant from California, to prepare a financial analysis of our proposal. The Ontario Feed-in Tariff Costing Model that he produced is a spreadsheet examining the costs to ratepayers of a long-term plan for sustainable development of new renewable generation in Ontario.[29] The model shows that the net effect on ratepayers depends on several factors, described in detail below.

2.3.1. **MODEL ASSUMPTIONS**

Important factors affecting the cost to ratepayers are the pace of development per year and the mix of renewables added to the system, the tariff paid for each renewable technology, the annual generation from each technology, and—most significantly—the cost of energy that the new renewable generation would replace or offset. The last cost, known in the trade as the "avoided cost", varies widely, depending on a host of assumptions about the energy sources that would be used in the future.

Avoided cost

The avoided cost of generation in Ontario varies with the projected cost of natural gas-fired generation, the cost of out-of-province purchases, and the cost of generation from existing, refurbished, and new nuclear generation and is thus expressed as a range of possible future costs. The model represents this uncertainty as three different scenarios, where the feed-in tariff program is:

1. *Displacing relatively low-priced electricity from natural gas-fired generation purchased from short-term contracts and costing from 5.5 to 6.5 cents per kilowatt-hour;*
2. *Displacing mid-priced electricity from natural gas-fired generation purchased from long-term contracts at an average cost of about 10 cents per kilowatt-hour; or*
3. *Displacing new nuclear power at a cost of 16 cents per kilowatt-hour.*

Further, the model discounts the avoided cost of wind generation by 1 cent per kilowatt-hour below the cost of baseload power—effectively reducing the value of wind to the system—to account for the minor cost of providing backup generation for wind to improve reliability. Note, however, that this assumption has only a minor effect on the overall net cost of the program.

Generation from solar photovoltaic (PV) generation is assumed—in all but the nuclear case—to have a higher value, since unlike wind, it tends to be delivered predictably during the day when power demand is greatest and prices for conventional generation are higher.

[29] See http://www.wind-works.org/FeedLaws/Canada/OntarioRatepayerImpactofSustainableFITProgram.html.

Average annual yields

Annual average energy yields for each technology were based on experience in Ontario and elsewhere. These values should be treated as reasonable approximations, understanding that the performance of individual projects can vary significantly from fleet-wide averages.

Line losses

The spreadsheet calculates the percent penetration of new renewables from the proposed FIT program relative to retail sales. Much of the new renewable generation is delivered distant from the load and thus the loss of electricity in the lines must be accounted for when compared to retail consumption. The 6% loss assumed is slightly lower than the Ontario average to reflect that some of the solar PV generation will be on customer rooftops and the energy from these installations will be consumed on site, resulting in essentially no line losses.

Annual degradation

Annual degradation of the generation from solar PV of 0.5% per year is accounted in the spreadsheet. This is based on worldwide experience. Degradation of generation from the other technologies is derived from industry and public sources.

Degression rates

Degression is the annual reduction of the tariff paid for generation as a percent of the initial tariff. A range of values are selectable from a pull-down menu in the spreadsheet. The cost of generation from solar PV is dropping dramatically. Because the GEAA has proposed an annual degression of -9% per year for solar PV, the table uses this value as the default.

We are also recommending dramatic cuts in the solar PV tariff in the first year of the revised FIT program from 11% to more than 30%. These new tariffs coupled with our proposed annual degression rate offer substantial savings to Ontario ratepayers as the program progresses.

We have not seen dramatic drops in the cost of the other technologies used in this analysis. Thus, the default degression value for the other technologies is set to zero. However, these degression rates can be changed to model different scenarios.

Inflation adjustment

Tariffs are increased annually as in the current FIT program with the exception of solar PV, which is excluded.

2.3.2. **MODEL RESULTS**

The spreadsheet calculates the "gross cost" of total annual payments, as well as the "net cost" of the proposed FIT program. The net cost of the proposed FIT program depends primarily upon what specific generation sources the FIT program generation displaces or "avoids". The results for the different scenarios are outlined in Table 9 below.

TABLE 9: **ONTARIO FEED-IN TARIFF COSTING MODEL ESTIMATE OF RATE IMPACT FROM EXPANDED FIT PROGRAM**

Scenario	Net rate effect
Low-cost natural gas scenario	16.0%
Mid-cost natural gas scenario	10.4%
High-cost nuclear scenario	2.0%

In the case where electric generation from the feed-in tariff program displaces low-cost natural gas-fired generation, we estimate the net effect of a 16% percent increase in retail rates by 2018.

On the other hand, if the program displaces power from new nuclear plants that would have otherwise been built, then the estimated net effect is a 2% increase in the retail cost of electricity. This is well within the margin of error for an exercise such as this ,and it can reasonably be assumed that the costs of the expanded FIT program are equivalent to the development of new reactors through a provincially-owned enterprise with access to public financing.

However, if the roll-out of new renewables envisioned by the GEAA offsets generation from new nuclear plants built by the private sector with private financing, the renewable program might offer substantial savings. In 2010, the California Energy Commission estimated that a new nuclear plant built in 2018 would cost $0.167 USD/kWh if developed by a publicly-owned entity, but as much as $0.273 USD/kWh if built by an investor-owned utility.[30]

We have chosen the mid-cost case as the default. This case assumes construction of new natural gas power plants, either with the electricity purchased through long-term contracts, or where the plants are owned by the utility that has the full cost embedded into customer bills. Under these conditions, the proposed program may increase costs to ratepayers by approximately 10%. New conventional power plants have skyrocketed in cost over the past decade, in turn increasing the cost of the electricity they generate. This has significantly narrowed the gap in cost between conventional and renewable energy, a factor that is reflected in this scenario.

[30] See http://www.wind-works.org/FeedLaws/Canada/OntarioRatepayerImpactofSustainableFITProgram.html.

Further ratepayer savings

Our costing model does not take into account any monetary benefits to ratepayers from adding large amounts of renewables that arise from hedging natural gas prices or minimizing natural gas price volatility through 2018 and beyond. Both effects are substantial. Nor does the model account for any merit-order effects, where renewable energy reduces the demand—and thus the price—for conventional generation. This effect has been found to offer substantial savings to utility customers as renewables are brought on to the system.[31] In some cases, the merit-order effect alone pays for the apparent increase in costs due to the addition of new renewable generation.

[31] There is extensive literature on the merit order effect. See Merit Order Effect: Impact of Wind Generation on Wholesale Electricity Costs in 2011 in Ireland, and The Merit Order Effect: A detailed analysis of the price effect of renewable electricity generation on spot market prices in Germany by the Fraunhofer Institute (2007), and Arne Kildegaard on the Merit Order Effect (Univ. of MN).

3 / Process for changing prices

3.1. Information transparency

Pricing of electricity and the contracts for providing generation are not transparent in Ontario. This is a systemic problem that should be addressed outside the FIT review. The public cannot make informed choices about generating sources if facts about the cost of Ontario's electricity system remain obscure.

When compared to other technologies that are procured in Ontario, the final FIT prices are amongst the most transparent as the $/kWh price the OPA pays for power is publicly available. This is not the case for most other technologies in the Ontario electricity system such as natural gas plants or nuclear reactor costs.

Nonetheless, within the FIT program itself, details of OPA's tariff setting were not fully transparent, and it would benefit the industry to have full access to the modeling assumptions and pricing model in order to anticipate and plan for future prices changes.

3.1.2. TRANSPARENT ECONOMIC MODELING

In the interests of transparency and full disclosure, the GEAA had asked publicly that OPA release the model used to calculate tariffs and all its assumptions prior to the April 7, 2009 tariff workshop. The OPA indicated at the time that it would consider doing this. However, while the OPA's model (a discounted cash flow model) was described in general terms at the April 7, 2009 workshop and the assumptions used in several key parameters were discussed, the model itself was not released and some assumptions were not revealed. Thus, OPA's tariff setting was not fully transparent and remains so today, more than two years later.

The GEAA was fully supportive of OPA's effort to complete all discussions and establish a system of feed-in tariffs by June 2009. We believed that this could have been accomplished while at the same time ensuring that full transparency. We thus recommend again that OPA's model be released as a spreadsheet with all supporting documentation.

The GEAA suggests that using a discounted cash flow model may not be the best choice for tariff setting, especially in the use of after-tax cash flows. It appears that the OPA's consultant is familiar with tax-dependent transactions in the U.S. and has assumed that similar transactions are the rule in Canada. This is not the case. Few if any of the projects proposed by GEAA's members can use the Capital Cost Allowance (CCA, or depreciation deduction) that is such a large part of tax-advantaged investments in the U.S. If OPA wishes to construct a "made in Canada" program, it should not follow American practice.

We recommend, as we have since 2005, that the OPA use a simplified model that calculates tariffs before tax.

Concern has been expressed about overpaying for wind resources in situations where larger companies are more likely to be able to use CCA. Our preferred model allows the OPA to limit or regulate the profit of wind developers at high wind sites.

3.1.3. BRING BACK STAKEHOLDER ENGAGEMENT WORKSHOPS

We recommend that the OPA bring back the stakeholder engagement workshops that were used in developing the original FIT program. All parties felt these workshops aided transparency and communication around the development of FIT pricing and FIT rules and around the demands of stakeholders, including ratepayer advocates. The current mad scramble of private meetings, hurried discussions, and a rush to prepare written submissions will lead to a mass of documents that we fear few at the OPA and the Ministry of Energy will have the time to read.

3.1.4. FULL PROJECT COST DATA BY RENEWABLE INDUSTRY

As part of this transparency, the renewable energy industry should willingly provide, at a minimum, the cost of projects installed under the FIT program, and the amount of electricity produced by each project beyond a minimum threshold. This information should be posted publicly on the OPA web site in a fully searchable database. Such public records will enable all stakeholders as well as OPA to monitor and anticipate upcoming changes in posted tariffs as the cost of renewable energy changes.

3.1.5. FULL CONTRACT TRANSPARENCY FOR FOSSIL FUEL AND NUCLEAR INDUSTRY

Accordingly, the GEAA also demands that all future OPA contracts for all fossil-fired, new nuclear, and refurbishments be made fully public as well. Only then can stakeholders and the broader public begin to understand the tradeoffs in rebuilding Ontario's electricity infrastructure.

The OPA and OEB should be directed to ensure that, at a minimum, major nuclear projects undergo public reviews by the OEB for cost-effectiveness against alternatives, including additional conservation and renewables.

3.2. Technology-specific pricing charges: solar PV

Ontario's FIT program has been particularly successful in launching a vibrant solar PV industry. The program has attracted numerous manufacturers of solar PV to Ontario and the province has become the second-largest player in the North American solar market.

Nevertheless, the cost to ratepayers of developing solar PV must be controlled. More importantly, the cost to ratepayers must be made predictable. For this reason, we recommend the introduction of annual development targets and both a fixed as well as a variable tariff degression schedule.

As Ontario has seen, failure to adapt quickly and efficiently can also be costly. Political uncertainty can generate market uncertainty, leading to a prolonged dip in investment that jeopardizes thousands of jobs. This pattern can be seen in the different responses of Germany and Spain to the rapid growth of solar PV that occurred within their renewable energy sectors. Germany chose to stay the course and adapt its policy to changing circumstances, while Spain responded precipitously, clamping down on its burgeoning renewable energy industry, and triggering massive capital flight.

Today, Germany's renewable energy market has successfully weathered the financial crisis, job growth has continued apace, deployment in some technology classes is at record highs, and it boasts an export-oriented manufacturing complex that is second to none. It has secured this largely by improving and adapting its renewable energy policy to rapidly changing market circumstances. As a recent German government publication explains:

Our focus is on innovation and advanced technologies, on effective and cost-efficient measures, and on pursuing a policy that is environmentally sound, climate-friendly and in line with market and competition principles. This opens up technological and economic opportunities in terms of Germany's competitiveness as an exporter and location to do business.[32]

In contrast, Spain's response has led to the flight of several billion Euros in capital and triggered job losses as manufacturing plants are shuttered across the country. As an indicator of this, Spain has fallen from fourth to ninth in Ernst & Young's renewable energy country attractiveness index since 2008:Q2, just behind Canada, which currently sits in eighth place.[33]

In light of these contrasting results, Ontario has a fundamental policy choice to make: it can drastically scale back solar PV development, or it can seek to improve it by making strategic choices. This section provides a way forward that avoids Spain's disastrous path.

3.2.1. REDUCING THE COST OF SOLAR PV WITH DEGRESSION

One of the benefits of investing in renewable energy in Ontario is that prices have been steadily coming down as technologies improve and growing international demands have resulted in savings from economies of scale.

Currently there is no target or limit on the amount of solar PV that is contracted every year. To control the costs of solar PV to ratepayers, the revised FIT program must institute both a fixed and a variable mechanism for reducing solar PV tariffs annually at a minimum, or more often if necessary.

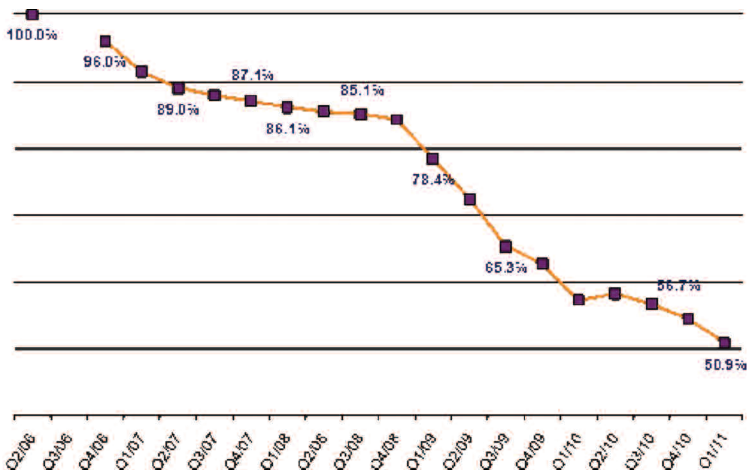
The current program has not reduced the prices paid for solar contracts since the program was launched in 2009 despite the fact that the cost of solar energy has been decreasing rapidly, as shown in Figure 6 below.

[32] The path to the energy of the future: reliable, affordable and environmentally sound," Germany, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, http://www.bmu.de/english/energy_efficiency/doc/47609.php.

[33] Renewable Energy Country Attractiveness Index",
http://www.ey.com/Publication/vwLUAssets/Renewable_energy_country_attractiveness_indices_-_Issue_30/$FILE/EY_RECAI_issue_30.pdf.

FIGURE 7: **NORMALIZED PRICE OF SOLAR PV MODULES**

SOURCE: RENEWABLE ENRGY POLICY NETWORK (REN21)



Germany, the world's leader in the development of solar energy, pays about one-half the price for solar PV that Ontario pays. Germany reduces the price it pays for solar energy at least once per year and up to twice per year when entrepreneurs exceed the country's targeted rate of development.

Germany uses a "growth corridor" to determine price degression, making their FIT program more market-oriented than a simple fixed degression would. This "responsive degression" varies the amount of degression by the amount of capacity installed that is above or below the desired target. This helps keep the prices paid for solar more closely linked to actual market prices, and avoids underpayment as well as overpayment.

We suggest that Ontario set a targeted degression of for the solar PV tariffs of -9% per year based on a sliding scale as a function of interest rates, the price of silicon, and the exchange rate. We propose developing an equitable formula in cooperation with the OPA staff that provides ratepayers assurance that the industry is bringing costs down while at the same time maintaining a healthy manufacturing and installation industry.

It is important to note that this targeted degression needs to recognize that the current Ontario market has significant differences to the global market. While global module prices have experienced significant drops in recent years, particularly since China's entrance onto the market, Ontario's domestic content rules disconnect the prices for solar PV systems in Ontario from those on the global market.

It is also important to note that equipment costs are only a part of the overall installed costs and other aspects of the system, such as labour, inverter and other component costs are not falling at the same rate, and in some cases (such as labour) may even increase.

Amongst the reasons that feed-in tariffs work so well for renewable energy is that most of the costs of renewable energy systems are at the front end of the project. This, along with no fuel costs (in the case of wind, solar and hydro) means that the long-term prices will be very stable. The front end loading of costs, however, means that those investing in these technologies generally require financing to complete installations. While many lending institutions internationally are familiar with renewable energy, very few in Canada are, and minimum rates of return are required in order for financing to be accessible to many developers.

Additionally, financers require utility-scale projects to use module manufacturers that have a long track record and belong to manufacturers with strong balance sheets who can support their performance warranties.

Once financing has been secured, the interest rates play a major role in any project's overall viability. Current rates are similar to what they were in 2009, although that could change significantly over the coming years depending on global and national economic trends. There are also fewer banks today financing solar projects than there were in 2009 because of the European debt crisis, as most banks who were lending to Ontario projects are European institutions that are more comfortable with renewable energy investments.

Solar PV price adjustments

Module prices, which make up a considerable portion of equipment costs for solar PV, generally reflect world market prices for polysilicon. Prices for the remaining components and labour required to develop solar PV systems are typically less reactive and more linear, and thus can be accounted for by adjusting prices based on other indices such as current interest rates and Canadian currency values.

Three significant indices — solar panel costs, interest rates and Canadian currency value — should thus be considered in adjusting FIT prices. Base line values should be established and FIT prices should be adjusted annually or semi-annually using a sliding scale method: the current measurement divided by the base line value will provide a simple multiplier.

Volumetric targeting should be adopted to capture other opportunities which may influence responsible FIT pricing but which many not be amenable to adjustment by the above sliding scale method.

Using these two methods, solar FIT pricing can and will continually fluctuate and adapt to pressures and targets. Investors will clearly understand the risks, developers can plan and become more efficient, and FIT prices will be more responsible.

[32] The path to the energy of the future: reliable, affordable and environmentally sound," Germany, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, http://www.bmu.de/english/energy_efficiency/doc/47609.php.

[33] Renewable Energy Country Attractiveness Index", http://www.ey.com/Publication/vwLUAssets/Renewable_energy_country_attractiveness_indices_-_Issue_30/$FILE/EY_RECAI_issue_30.pdf.

3.2.2. / COMMERCIAL ROOFTOP SOLAR

Commercial rooftop solar projects are marginally more expensive to build, operate and finance as compared ground mount projects. Generally the Solar PV equipment is the same for Commercial rooftops and Ground mounts however the conditions which are required in the leases are vastly different.

Building owners are asked to enter into a risk reward agreement which is not customary to the real-estate industry, they therefore do not easily agree to key requirements which are necessary for developers and financers. Building owners are generally not willing to compromise their core business without guarantees. These guarantees are in some cases incorporated into the lease price and in other cases are added in the form of significant liability borne by the financers.

The liabilities associated with occupying space above tenants and in some cases the public, account for higher operating costs for Solar PV on Commercial rooftops as compared to Ground mount.

Development costs of Commercial rooftop projects are slightly higher than ground mount projects.

Building owners are asked to enter into long term agreements requiring them to retain and not change or renovate their building due to the Solar PV systems. This adds significant risk to financers to maintain longstanding agreements with building owner.

3.2.3 / PROPOSED REVISED SOLAR PV FEED-IN TARIFFS

For 2012 we recommend a dramatic cut in the solar PV tariffs in response to the falling prices of modules during the past two years.

Using a simple economic model, we have calculated the tariffs needed for a reasonable profit.[34] The key assumptions used in the model are:

- *Installed cost*
- *Yield of the solar panels under typical Ontario conditions*
- *Term of the contract*
- *Annual reoccurring costs*
- *Desired return on equity*
- *Cost of debt*
- *Ratio of equity to debt*
- *Profitability index desired*

These are the same parameters used by the GEAA in its submission to OPA during the development of the original FIT program in 2009.

Resulting recommended tariffs are shown in the table opposite.

[34] Proposed revised solar PV feed-in tariffs for Ontario in 2012, http://www.wind-works.org/FeedLaws/Canada/Proposed%20revised%20solar%20PV%20feed-in%20tariffs%20for%20Ontario%20in%202012.html.

TABLE 10: **RECOMMENDED NEW SOLAR TARIFFS**

Proposed Revised Ontario Feed-in Tariffs and Key Assumptions 2012

Tranche	Installed Cost $/kW	Yield kWh/kW/yr	Contract Term Years	Annual Costs	Return on Equity	Debt	Percent Equity	Profitabiltiy Index	Tariff $/kWh
MicroFIT									
Rooftop <30 kW	5,800	1,150	25	1.5%	9%	0%	100%	0.1	0.55
Groundmounted <10 kW	?	?	25	1.5%	9%	0%	100%	?	0.44
FIT									
Rooftop >30 kW<250 kW	4,300	1,150	20	3.5%	11%	8%	40%	0.30	0.59
Rooftop >250 kW<500 kW	4,000	1,150	20	3.5%	11%	8%	40%	0.30	0.55
Rooftop >500 kW	3,500	1,150	20	3.5%	11%	8%	40%	0.30	0.48
Groundmounted <10 MW*	3,100	1,200	20	2.5%	11%	8%	40%	0.30	0.38
Groundmounted Brownfield Adder with community-municipal participation									0.05

1. ***As noted above, set a targeted degression of for the solar PV tariffs of -9% per year.***

2. ***Extend contract terms for rooftop microFIT to 25 years. Longer contract terms cut the initial price that must be paid for the same profitability by spreading revenue over a longer period.***

3. ***Extend the definition of microFIT to all rooftop projects less than 30 kW in size. This will enable farmers to use more of their barn roofs than under the present program.***

4. ***OPA should collect data on installed cost and the yield of projects along with data on annual reoccurring costs or total running costs.***

The installed costs and yields are based on extensive conversations with the industry.

With the exception of hydro, the term of all contracts under Ontario's FIT program is 20 years. Longer contract terms cut the initial price that must be paid for the same profitability by spreading revenue over a longer period. For instance, Spain offers fixed-price contracts with 25-year terms.

Solar PV systems have very long operating lives. There are modules that are still producing electricity after more than 30 years. Contract terms could be extended to 25 years and possibly up to 30 years for solar projects to reduce near-term costs to ratepayers. Longer-term contracts also help lock-in the fossil-fuel price hedging of solar PV for a longer duration, thus helping promote long-term electricity price stability in the province.

The highest tariff of Ontario's solar PV tariffs is the rooftop microFIT tranche. Even with today's cost of modules, the tariff necessary for a reasonable profit is still $0.59/kWh. However, extending the contract term to 25 years cuts the tariff needed by 7%, bringing the tariff down to $0.55/kWh.

TABLE 11: **SENSITIVITY ANALYSIS OF ROOFTOP MICROFIT CONTRACT TERMS**

	Sensitivity Analysis							
	Cost in $/kW$_{DC}$							
	0.546	$3,000	$3,500	$4,000	$4,500	$5,000	$5,500	$5,800
Term	20	0.31	0.36	0.41	0.46	0.51	0.56	0.59
	25	0.28	0.33	0.38	0.42	0.47	0.52	0.55
	30	0.27	0.31	0.36	0.40	0.45	0.49	0.52

We recommend extending the term of rooftop microFIT to 25 years.

We also recommend extending the definition of microFIT to all rooftop projects less than 30 kW in size. This will enable farmers to use more of their barn roofs than under the present program.

Because microFIT projects are smaller and, therefore, simpler, we've assumed that their annual operating costs are lower than those of commercial projects.

We've assumed that microFIT projects will require a 9% return while commercial projects will require an 11% return as in 2009.

To maintain a vigorous pace of industrial development of the solar PV industry in the province, we assumed a profitability index of 0.3 for commercial projects, which is typical for a rapidly expanding industry.

Two principle parameters in calculating solar PV tariffs are the installed cost and the yield of the projects. The following table presents the sensitivity of the tariffs to variations in these two parameters.

TABLE 12: **SENSITIVITY ANALYSIS OF INSTALLED COST AND ANNUAL YIELD**

	Sensitivity Analysis							
	Cost in $/kW$_{DC}$							
	0.55	$2,000	$2,500	$3,000	$3,500	$4,000	$4,500	$5,000
Solar Yield	900	0.35	0.44	0.53	0.62	0.70	0.79	0.88
kWh/kW$_{DC}$/yr	950	0.33	0.42	0.50	0.58	0.67	0.75	0.83
	1,000	0.32	0.40	0.47	0.55	0.63	0.71	0.79
	1,050	0.30	0.38	0.45	0.53	0.60	0.68	0.75
	1,100	0.29	0.36	0.43	0.50	0.58	0.65	0.72
	1,150	0.28	0.34	0.41	0.48	0.55	0.62	0.69
	1,200	0.26	0.33	0.40	0.46	0.53	0.59	0.66
	1,250	0.25	0.32	0.38	0.44	0.51	0.57	0.63

Because of the importance of these two factors in determining the price of solar-generated electricity, OPA should be collecting this data on a regular basis from participants in the FIT program.

We also recommend that the OPA begin collecting industry data on annual reccurring costs, sometimes known as total running costs. Annual costs for commercial rooftop systems in Ontario are higher than those in Europe. These costs can also have a significant effect on the tariffs.

TABLE 13: **SENSITIVITY ANALYSIS OF INSTALLED COST AND ANNUAL COSTS**

	Sensitivity Analysis Cost in $/kW$_{DC}$							
	0.55	$2,000	$2,500	$3,000	$3,500	$4,000	$4,500	$5,000
Annual Costs	1.0%	0.23	0.29	0.35	0.41	0.46	0.52	0.58
	1.5%	0.24	0.30	0.36	0.42	0.48	0.54	0.60
	2.0%	0.25	0.31	0.37	0.44	0.50	0.56	0.62
	2.5%	0.26	0.32	0.39	0.45	0.52	0.58	0.64
	3.0%	0.27	0.33	0.40	0.47	0.53	0.60	0.67
	3.5%	0.28	0.34	0.41	0.48	0.55	0.62	0.69

Adopting our recommended tariffs would cut solar PV tariffs from 14% for large ground mounted projects to as much as 32% for rooftop microFIT installations, as outlined in Table 14.

TABLE 14: **SAVINGS FROM PROPOSED SOLAR PV TARIFFS**

Proposed Solar PV Tariffs Offer Dramatic Savings			
	Current Tariff $/kWh	New Tariff $/kWh	Savings %
MicroFIT			
Rooftop <30 kW	0.802	0.55	32%
Groundmounted <10 kW	0.642	0.44	32%
FIT			
Rooftop >30 kW<100 kW	0.713	0.59	17%
Rooftop >100 kW<500 kW	0.635	0.55	13%
Rooftop >500 kW	0.539	0.48	11%
Groundmounted <10 MW	0.443	0.38	14%

With rapid degression of -9% per year, the tariffs for large groundmounted systems in 2018 would be about one-half what they were when the program was launched, and the tariffs for rooftop microFIT would be nearly one-third less.

Legacy rooftop FIT applications

The rooftop solar industry members of the joint submission propose a transitional tariff for legacy FIT applications for rooftop solar PV. They applied in good faith for rooftop FIT applications that were not processed by the OPA in a timely manner. The applications for the previous rooftop FIT rates were based on rooftop leases negotiated prior to their FIT application. While they acknowledge the need to reduce the solar PV tariffs for the new program, they feel justified in suggesting that the province offer a transitional tariff for legacy applications that is less than the previous rooftop FIT tariffs, but higher than the new FIT tariffs proposed in the joint submission, as noted in Table 15.

TABLE 15: **TRANSITIONAL TARIFFS FOR LEGACY SOLAR PV ROOFTOP FIT APPLICATIONS**

Transition Tariffs for Solar PV Legacy Applications			
	Tariff $/kWh	Current Tariff $/kWh	Reduction %
FIT			
Rooftop >30 kW<250 kW	0.64	0.713	10%
Rooftop >250 kW<500 kW	0.59	0.635	7%
Rooftop >500 kW	0.52	0.539	4%

These proposed transitional tariffs for legacy solar PV rooftop FIT applications are not incorporated in the joint submission's estimate of ratepayer impact from our proposed FIT program.

3.3. Suggested new tariffs

Ontario's FIT program has been particularly successful in launching a vibrant solar PV industry. The program has attracted numerous manufacturers of solar PV to Ontario and the province has become the second-largest player in the North American solar market.

3.3.1. / ADDING A NEW BROWNFIELD SOLAR TRANCHE

We propose creating a separate tariff for ground-mounted, central-station solar PV on permanent brownfield sites, for example landfills, and on non-agricultural land such as or mine tailings areas and degraded forest tracts.

Permanent brownfield sites are those lands where development is prohibited by real or perceived environmental contamination and will never again contribute to urban, agricultural, or forestry use. The Ontario Realty Corporation has many brownfield sites across the province that could be used productively for solar energy in this manner.

OPA should undertake the necessary calculations to create a separate program tranche for brownfield sites and consider not limiting projects to solely 10 MW in size.

We suggest using an adder for these projects. While we do not have a specific recommendation at this time, we would propose a range of $0.02-$0.05/kWh as a starting point for discussion.

3.3.2. / **ADDING ARCHITECTURAL SOLAR FEATURES**

The definitions of rooftops should be sufficiently flexible to allow architectural uses of solar PV under the rooftop tariffs, or the OPA should consider creating a separate architectural feature tariff. A shade structure over the sidewalk at the Great Lakes' Science Center in Cleveland is a good example of a purpose-built structure that should qualify for the rooftop tariffs.[35] In 2007 a similar structure was considered by the Toronto Renewable Energy Cooperative for Toronto's Exhibition Place. However, the project was not profitable under OPA's original RESOP solar tariff, but could be profitable under OPA's rooftop tariff for projects greater than 10 kW but less than 100 kW. Another increasingly popular example of a purpose-built structure that should qualify for the rooftop tariffs is solar above parking lots. One example of this is found Google headquarters in Mountain View, California.[36]

3.3.3. / **STABLE AND SUSTAINABLE SOLAR PV POLICY REQUIRED**

The IEA's recent solar energy roadmaps[37] estimate that by 2020 many solar systems will be competitive with grid electricity in many parts of the world, and solar photovoltaics, combined with solar concentrating systems could produce enough electricity to meet one-quarter of global demand by 2050 – up to 9,000 Terawatt-hours of energy annually – enough electricity to meet all of Canada's current electricity needs 16 times over.

"The combination of solar photovoltaics and concentrating solar power offers considerable prospects for enhancing energy security while reducing energy-related CO2 emissions by almost six billion tonnes[38] per year by 2050," said Nobuo Tanaka, Executive Director of the IEA.

However, the IEA also points out clearly that "This decade is crucial for effective policies to enable the development of solar electricity," Tanaka explained. "Long-term oriented, predictable solar-specific incentives are needed to sustain early deployment and bring both technologies to competitiveness in the most suitable locations and times."

In other words, governments need to support the development of the solar industry by establishing (or in some cases continuing) clear market incentives and enabling regulations to provide stability and direction for investments over the long term. The IEA cautions that incentives will need to evolve over time, both to encourage innovation and to support the refining of current technologies. No other policy does this better than Feed-In Tariffs.

[35] See the Cleveland Science Center Solar Portico.

[36] See http://www.wired.com/science/discoveries/news/2006/12/72292.

[37] http://iea.org/press/pressdetail.asp?PRESS_REL_ID=301

[38] Cutting six billion tonnes of CO2 emissions is roughly equivalent to taking two billion cars off the road.

4 / Consideration of new technology

4.1. Storage innovation bonus

The Ontario Power Authority's current program places unnecessary administrative roadblocks in the way of Ontario's innovators by prohibiting variable resources like wind and solar from using the province's bonus for providing firm power.

We believe that the time differentiated bonus should be extended to all technologies if they can guarantee firm power delivery during peak periods. There should be no blanket exclusion of wind and solar energy from this bonus because of their variability is relatively predictable.

If one of the policy objectives of the feed-in tariff program is to encourage technological innovation; including all technologies under the time differentiated bonus will spur innovation. While it is true today that wind and solar are variable resources, tomorrow there may be a technological or business innovation that will enable operators to firm up a portion of their generation. The feed-in tariff system should not only enable this, but encourage it.

4.2. Solar hot water tariffs

In 2007, OSEA proposed that the OPA introduce a feed-in tariff for solar domestic hot water (solar DHW). This was a novel concept at the time, but less so today following aggressive action by Great Britain.

The principles of setting a tariff for solar DHW remain the same as they do for solar-generated electricity. The difference is that the meter reads the flow of heat from the solar system instead of the flow of electricity. Such metering is widely used in district heating systems around the world. Similarly, the same pricing models used to estimate an equitable tariff for solar PV can be used for solar DHW.[39]

Great Britain introduced feed-in tariffs for commercial renewable heat, the Renewable Heat Incentive, on November 28, 2011.[40] Tariffs for the residential sector are planned for the fall of 2012.[41]

In Ontario, water is heated electrically or with natural gas. OPA is responsible for procuring electrical generation, but has also considered policies applying to district heating that may be used to offset the consumption of electricity. Solar DHW that offsets electrically heated water is also well within the purview of OPA.

[39] See the worksheets titled Chabot Profitability Index Method Simple Solar DHW Tariff at http://www.wind-works.org/PricingWorksheets/ARTsTariffsPricingWorksheets.html.

[40] See http://www.decc.gov.uk/en/content/cms/meeting_energy/renewable_ener/incentive/incentive.aspx.

[41] See http://www.decc.gov.uk/en/content/cms/news/PN2011_023/PN2011_023.aspx.

Residential and commercial solar hot water systems serve substantially different loads. Residential customers use solar hot water for characteristic domestic purposes. Commercial loads can have a far more consistent demand for hot water than residential users. Consequently, the tariffs necessarily vary by the type of load.

OSEA proposed a tariff tranche for residential and commercial solar hot water. We include the tariffs here as a placeholder until OPA and stakeholders can undertake a more thorough assessment.

TABLE 16: **OSEA PROPOSAL FOR SOLAR DHW TARIFF TRANCHE**

OSEA Proposed Solar DHW Tariffs	
	$/kWh
Commercial	0.10
Residential	0.20

4.3. Ground-source heat pump tariffs

Great Britain has also introduced tariffs for the heat provided by ground-source heat pumps, also known in Canada as geothermal heating, to the commercial sector. The government plans to introduce tariffs for this technology to the residential market in the fall of 2012.

TABLE 17: **RENEWABLE HEAT TARIFFS IN GREAT BRITAIN GROUNDSOURCE HEAT PUMPS**

Renewable Heat Tariffs in Great Britain Groundsource Heat Pumps						
			0.873	1.395	1.377	
	Years	£/kWh	€/kWh	CAD/kWh	USD/kWh	Metering
Groundsource heatpumps & geothermal	20					Metered
<100 kW		0.043	0.049	0.069	0.068	
>100 kW		0.030	0.034	0.048	0.047	

4.4. Tariffs for small wind turbines

More than a dozen jurisdictions offer feed-in tariffs for small wind turbines, including Nova Scotia in Canada, and Vermont in the U.S. The objectives, tariffs, and program features vary widely from one jurisdiction to another.

TABLE 18: **SMALL WIND TURBINE SAMPLE TARIFFS**

Price Summary for Small Wind Tariffs				
Selected programs with contract terms of 15 years or longer.				
Jurisdiction	Years	€/kWh	CAD/kWh	USD/kWh
Portugal <3.68 kW (Microgenerator)	15	0.432	0.602	0.595
Nova Scotia	20	0.358	0.499	0.493
Britain 1.5 kW-15 kW	20	0.321	0.447	0.441
Israel <50 kW	20	0.320	0.446	0.441
Britain >15 kW<100 kW	20	0.290	0.404	0.399
Israel <15 kW	20	0.250	0.349	0.344
Greece <50 kW	20	0.250	0.349	0.344
Switzerland <10 kW	20	0.244	0.341	0.336
Italy <1 MW	15	0.220	0.307	0.303
Vermont <15 kW	20	0.145	0.203	0.200
Hawaii <100 kW	20	0.100	0.140	0.138
Slovenia <50 kW	15	0.095	0.133	0.131
Denmark <25 kW Maximum	20	0.081	0.112	0.109

The most sophisticated as well as successful program is that in Great Britain where there are six tariff tranches, as outlined in Table 18. The program has resulted in the installation of some 16 MW of small wind turbines.

Note that in the British program "small" is defined as anything less than 5 MW. This liberal interpretation of "small" is an artifact of the British system. In North America, small wind tariffs are limited to wind turbines with less than 15 kW capacity in Vermont to less than 50 kW capacity in Nova Scotia.

The international definition of a small wind turbine is any wind turbine that intercepts less than 200 m^2 of the wind stream.

TABLE 19: **RENEWABLE ELECTRICITY TARIFFS FOR SMALL WIND TURBINES IN GREAT BRITAIN**

Renewable Electricity Tariffs in Great Britain for Small Wind Turbines					
			0.873	1.395	1.377
	Years	£/kWh	€/kWh	CAD/kWh	USD/kWh
Export Tariff*		0.031	0.027	0.038	0.037
Wind Energy	20				
<1.5 kW		0.362	0.415	0.578	0.571
>1.5 kW<15 kW		0.280	0.321	0.447	0.441
>15 kW<100 kW		0.253	0.290	0.404	0.399
>100 kW<500 kW		0.197	0.226	0.315	0.311
>500 kW<1.5 MW		0.099	0.113	0.158	0.156
>1.5 MW<5 MW		0.047	0.054	0.075	0.074
*Great Britain's micro FIT program is intended primarily for off-loading consumption. To encourage conservation, the program pays a bonus for electricity exported to the grid.					

The table below presents a first cut at tariffs for small wind turbines in four different size tranches. Note that the size tranches are based on rotor diameter, a surrogate for rotor swept area.

TABLE 20: **ONTARIO SUGGESTED SMALL WIND TARIFFS 2011**

Ontario Suggested Small Wind Tariffs 2011 & Key Assumptions									
		5.5 m/s							
	Relative								
	Cost	Yield	Term	Annual	Return		Percent	Profitabiltiy	Tariff
Size Tranche	$/m2	kWh/m2	Years	Costs	on Equity	Debt	Equity	Index	$/kWh
<5 m diameter (<3 kW)	$1,750	450	20	4%	9%	9%	n/a	0	$0.52
<10 m diameter (<10 kW)	$1,600	500	20	4%	9%	9%	n/a	0	$0.42
<15 m diameter (<50 kW)	$1,500	500	20	4%	9%	9%	n/a	0	$0.40
<20 m diameter (<100 kW)	$1,400	500	20	4%	9%	9%	n/a	0	$0.28

It is assumed that homeowners and farmers installing a small wind turbine will use the same desired rate of return on equity and the same interest rate on debt as in the 10 kW rooftop microFIT example used earlier.

Installed costs of small wind turbines vary widely by generator rating and swept area. Moreover, small wind turbines cost far more to operate, maintain, and insure than solar PV. Thus, the annual running costs of small wind are much higher than in the solar PV examples.

4.5. **Remote and off-grid communities**

Many remote communities as well as industrial facilities are found in northern Ontario. These areas are isolated from the national grid and typically draw their electricity from diesel generator sets that are expensive, cause a great deal of pollution (local air contaminants and greenhouse gases), and bring few economic or capacity-development benefits to the community. Medium-sized wind turbines and wind-diesel hybrid systems are proven cost-effective alternatives in many of these situations. Solar photovoltaic systems are also being deployed in several communities in the Yukon and Northwest Territories. Specific tariffs for projects in these communities should be developed.

Prices for such projects are very sensitive to community specifics including relative “remoteness”, community size and local renewable resource quality. Projects should be developed in partnership with remote communities and be reflective of the relative costs of importing diesel into each community.

4.6. **MicroFIT export bonus**

The Ontario Federation of Agriculture suggests that the microFIT program can be expanded to encourage conservation and improved energy efficiency. Currently microFIT pays for all generation delivered to the grid. This should not be changed. However, the program could be expanded to include a bonus payment or adder for all generation delivered to the grid that is in excess of the site's consumption.

Great Britain offers an "export bonus" in its FIT program for all generation in excess of domestic consumption. This payment is in addition to the base tariff. Thus, the "export bonus" encourages consumers to conserve electricity, that is, consume less on site so they can sell more electricity to the grid and increase their revenues accordingly. See Table 21 for details.

TABLE 21: **EXPORT BONUS IN GREAT BRITAIN**

Export Bonus Tariff in Great Britain					
			0.873	1.395	1.377
	Years	£/kWh	€/kWh	CAD/kWh	USD/kWh
Export Tariff*		0.031	0.027	0.038	0.037
*Great Britain's micro FIT program is intended primarily for off-loading consumption. To encourage conservation, the program pays a bonus for electricity exported to the grid.					

We have no specific recommendation on the amount of the tariff. We include the British tariff simply as a placeholder.

4.7. **Conservation tariff**

Similar to the export bonus to encourage conservation, the introduction of a tariff specifically for conservation can be a powerful new tool for the province. While frequently discussed, a tariff for electricity not used has yet to be implemented anywhere in the world. Ontario's exploration and implementation of a conservation tariff would be innovative and move the province to the forefront of jurisdictions worldwide experimenting with how best to create a "culture of conservation". Again, we have no specific recommendation except to note this is a novel concept that the province should explore.

5 / Engaging municipalities

Enabling adequate public consultation is important not only for any individual project, but for the long-term viability of the FIT program itself. At the same time, developers require some degree of time certainty to enable expedient project development and overall financial viability. To that end, a standard public consultation form (similar to the municipal consultation form) that can be made available at the PIC and the project's website should be developed and provided by the Ministry of Energy. Furthermore, the Ministry should develop checklists of criteria/features that must be considered for municipal consultations to be considered adequate and complete.

6 / Expanding renewable energy participation & supporting broad renewable energy deployment

6.1. Community & aboriginal power

Ontario's Community Power sector has the potential to engage up to half a million residents in the green energy economy. However, despite the success of Ontario's FIT program in attracting private investment in the province's power system, some segments of the population have not been able to fully participate. In addition, the newness of the technology, the rapidity with which renewable energy projects can be built, and the often absentee ownership of these projects has created social friction that, unless addressed, threatens the sustainability of the program.

By increasing the number of renewable energy projects that are financed using small investments from thousands of Ontario citizens, the program can reach far beyond the limited number of people participating through individual, private investment. Considering the potential for increased public engagement, jobs, and tax revenue, a goal should be adopted by the province to further develop community power in Ontario.

Co-operatives, non-profits and charities seeking broad public investment in their projects have faced significant barriers that have limited development of their projects. It is this sector that requires extra policy support justified on the basis that it has the greatest promise for engaging large numbers of Ontarians in renewable energy development.

The key barriers that remain are:

- ***Access to the grid and the FIT Program***
- ***A supporting financial framework***

6.1.1. LOCAL OWNERSHIP DECREASES SOCIAL FRICTION

Experience in jurisdictions where community ownership of renewable energy is more developed than in Ontario has shown that active public support for renewable energy comes from those who are able to directly experience the benefits through financial returns and through a sense of ownership.[43] In places where community-owned renewable energy has been broadly developed, the local sharing of development risk and expenses, and the sharing in the income from successful projects, has provided a high level of local acceptance.[44]

[43] Parsons, B., Cohen, J., and DeMeo E. (2000) Perspectives on an NWCC/NREL Assessment of Distributed Wind. National Renewable Energy Laboratory.

[44] Sorenson, H.C., Hansen L.K., Hammarlund, K., and Larsen J.H. (2003) Experience with and Strategies for Public Involvement in Offshore Wind Projects. National Planning Procedures for Offshore Wind Energy in the EU: Institute for Infrastructure, Environment and Innovation, Brussels-Belgium; Warren, C.R., and McFaydena, M. (2009) Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland. Land Use Policy, 27(2): 204-213.

Furthermore, the jurisdictions with the greatest public support for renewable energy (Denmark and Germany) are also the jurisdictions with the largest percentage of community ownership particularly with respect to participation by farmers and co-operatives.

Research shows that engagement and participation in project development by local residents not only reduces social friction but can also lead to social cohesion.[45] Thus, we envision improving the province's FIT program to enable half a million community power investors by 2018.

Public support for renewable energy in Ontario depends, in part, on the ability of citizens to participate directly in developing and owning renewable energy projects. In the past two years, the Green Energy & Economy Act has made Ontario a world leader in the transition to renewable energy. However, lessons learned during this time have shown us that in order to succeed in the long-term, we must overcome political and technical barriers to ensure broader public support for green energy. Securing support from communities across the province means providing more opportunities to take part.

Presently, the majority of FIT projects in Ontario are being built by a relatively small number of people and private companies who have ready access to capital. Typical rural and urban residents alike must be given more opportunities to benefit from projects in their communities to broaden support for renewable energy development in the province.

6.1.2. LOCAL OWNERSHIP INCREASES JOBS

Not only does community-owned renewable energy (or 'community power') support greater public acceptance of renewable energy development, it also increases job creation and tax revenue relative to other forms of development. Research in the USA has shown that community power projects can create up to 2.8 times as many jobs as non-community-owned projects.[46] This research suggests the key reason for the increase in jobs is that local ownership is likely to lead to an increase in spending and income directly in the community. A summary of impacts during the operations period is detailed in Table 22.

[45] http://www.reshare.nu/athena/site/file_database/Reshare_outlinenewFINAL.pdf REShare (2011). Benefit-Sharing Mechanisms in Renewable Energy.

[46] Lantz, E. and Tegen, S. (2009) Economic development impacts of community wind projects: a review and empirical evaluation. National Renewable Energy Laboratory. WINDPOWER 2009 conference and exhibition.

TABLE 22: **REVIEW OF OPERATIONS PHASE JOB IMPACTS**[47]

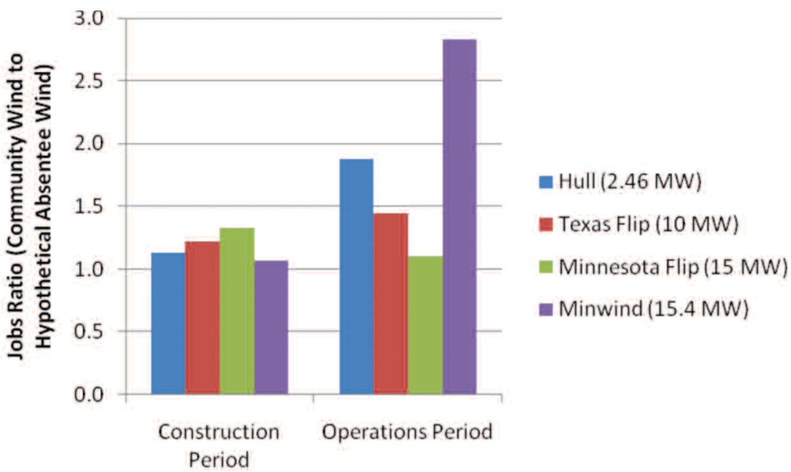
Study	Fold-increase in local economic activity with local ownership (wind projects)
DanMar & Associates (1996), *Economic Impact Analysis of Windpower Development in Southwest Minnesota*	2.4 – 6.8
Government Accountability Office (2004), *Wind Power's Contribution to Electric Power Generation and Impact on Farms and Rural Communities*	2.0 – 3.0
Kildegaard & Myers-Kuykindall (2006), *Community Versus Corporate Wind: Does it Matter Who Develops the Wind in Big Stone County, MN?*	1.9 – 3.4
Togerson, Sorte & Nam (2006), *Umatilla County's Economic Structure and the Economic Impacts of Wind Energy Development*	2.1
Lantz, E. (2008), *Economic Development Benefits from Wind Power in Nebraska: A Report for the Nebraska Energy Office .*	1.7 – 2.5
Lantz, E., & Tegen, S. (2008). *Variables Affecting Economic Development of Wind Energy.*	1.5 – 1.7

Studies have shown that projects with local ownership create more local jobs than projects with absentee owners. Based on information from operating projects in the U.S., employment impacts for community wind are 1.1 to 1.3 times higher during the construction phase and 1.1 to 2.8 times higher during the operation phase compared to absentee-owned projects.[48]

47 See table 7, Lantz, E, and S Tegen (2009), Economic Development Impacts of Community Wind Projects: A Review and Empirical Evaluation. National Renewable Energy Laboratory

48 Lantz, E. and Tegen, S. (2009) Economic development impacts of community wind projects: a review and empirical evaluation. National Renewable Energy Laboratory. WINDPOWER 2009 conference and exhibition.

FIGURE 8: **COMPARING THE RATIO OF ECONOMIC DEVELOPMENT IMPACTS BETWEEN COMMUNITY WIND AND HYPOTHETICAL ABSENTEE PROJECTS**[49]



In Ontario, the job creation has anecdotally followed a similar pattern to operating projects in the U.S. Projects pursuing community offerings (SolarShare, Pukwis, LIFE Co-op) are employing one or two people full-time in order to manage the development of the project. Projects owned by local individuals or corporations as well as those being developed by corporations removed from the community are simpler to manage and employ fewer people. Project managers can have responsibility for 20 projects of this variety.

A recent report completed by the Pembina Institute for the Community Power Fund[50] modeled community job impact for community energy projects. The findings of this study are congruent with existing literature which suggests that community-owned power projects lead to more local jobs than traditional development of similar projects. A literature review also suggested that additional benefits, such as increases in project participation and project acceptance and a decrease in project resistance, can also result from community power projects (CPP).

Community solar jobs

The JEDI model forecasts that community solar projects would lead to more jobs than traditional solar projects. To provide some differentiation of ownership structure between community projects and traditional projects, community projects were assumed to use local debt. Specifically, the modeling completed assumes that traditional projects are financed 80% with debt and 20% with equity; CPPs are financed 100% with debt, 30% of which is local. This is based on the non-profit co-op model, in which the 30% local debt is comparable to traditional equity, in that it represents bonds purchases by members of the co-op. The bonds pay a fixed interest rate and residual profits accrue to the non-profit co-op and are used for benevolent purposes. As such, the CPP model is less risky as it has less external debt.

[49] Figure 3 from Lantz, E, and S Tegen (2009), Economic Development Impacts of Community Wind Projects: A Review and Empirical Evaluation. National Renewable Energy Laboratory

[50] Haines, Graham, et al (2011) Analysis of Community Power Projects in Ontario

The model forecasted that the CPP would lead to approximately 50% more direct and indirect jobs than the traditional project over a 20-year period. This is largely a result of increased costs (both during the development period and commercial operation) and the use of local debt. However, even ignoring local debt, there would still be a 3.7-fold increase in O&M jobs.

TABLE 23: **TOTAL DIRECT AND INDIRECT JOBS CREATED FOR A SOLAR 10 MW PV PROJECT**

	Jobs (PYE)	
	CPP	Traditional
Development period	442	418
Commercial operation (20 years)	260	54
Total jobs	702	472

Community wind jobs

As with solar power, using the JEDI model it was found that wind CPPs could lead to 2.6 times as many direct and indirect jobs as traditional projects during the O&M phase of wind projects than traditional power projects. This is inline with research from the above section. This increase in job creation is largely a result of two factors:

- ***Local equity: Since more local equity is used in CPPs more money flows back to the province during the operations phase.***
- ***Increase in O&M costs from $24.61 to $65. Since O&M costs are higher, more jobs are created to service CPPs as opposed to traditional wind projects.***

20-year overall direct and indirect job creation is detailed in the table below and shows that, overall, CPPs will lead to about a 47% increase in job creation with the increase being predominantly in the O&M phase.

TABLE 24: **TOTAL DIRECT AND INDIRECT JOBS CREATED BY A 100 MW WIND POWER PROJECT**

	Jobs (PYE)	
	CPP	Traditional
Development period	1,044	1,041
O&M jobs (20-year total)	1,100	420
Total jobs	2,144	1,461

6.1.2. LOCAL OWNERSHIP INCREASES TAX REVENUES

Local ownership also increases tax revenue to both the provincial and federal government. The taxes generated from 100,000 investors in a 5-year renewable energy co-operative bond pay $31 million more in tax revenue than a 5-year GIC.

TABLE 25: **COMMUNITY INVESTMENT IN RENEWABLE ENERGY CO-OP VS GIC INVESTMENT: INCREMENTAL TAX REVENUE TO PROVINCIAL & FEDERAL GOVERNMENT FOR 100,000 INVESTORS**

Personal Taxable Income	Marginal Tax Rate	Tax Revenue from SolarShare @ 5% return	Tax Revenue from RBC GIC - 5 year @ 1.65% return	NET TAX BENEFIT (of SolarShare investment over GIC)	
$45,000	22%	$5,500,000	$1,815,000	$3,685,000	*Federal*
	9.15%	$2,287,500	$754,875	$1,532,625	*Ontario*
$70,000	22%	$5,500,000	$1,815,000	$3,685,000	*Federal*
	10.98%	$2,745,000	$905,850	$1,839,150	*Ontario*
$80,000	22%	$5,500,000	$1,815,000	$3,685,000	*Federal*
	17.41	$4,352,500	$1,436,356	$2,916,175	*Ontario*
$130,000	29%	$7,250,000	$2,392,500	$4,857,500	*Federal*
	17.41	$4,352,500	$1,436,352	$2,916,175	*Ontario*

ASSUMPTIONS:

1. *No co-op patronage dividend as per the current legislations; Assume co-op member invests $5,000 in 5 year SolarShare Bond at 5% per annum*
2. *Non-RRSP investment*
3. *$5,000 loan from 100,000 Ontarians ($500 million) to SolarShare Bonds @5% for a 5 year term generates $25 million in taxable revenue per year*

6.2. **Forms of community ownership**

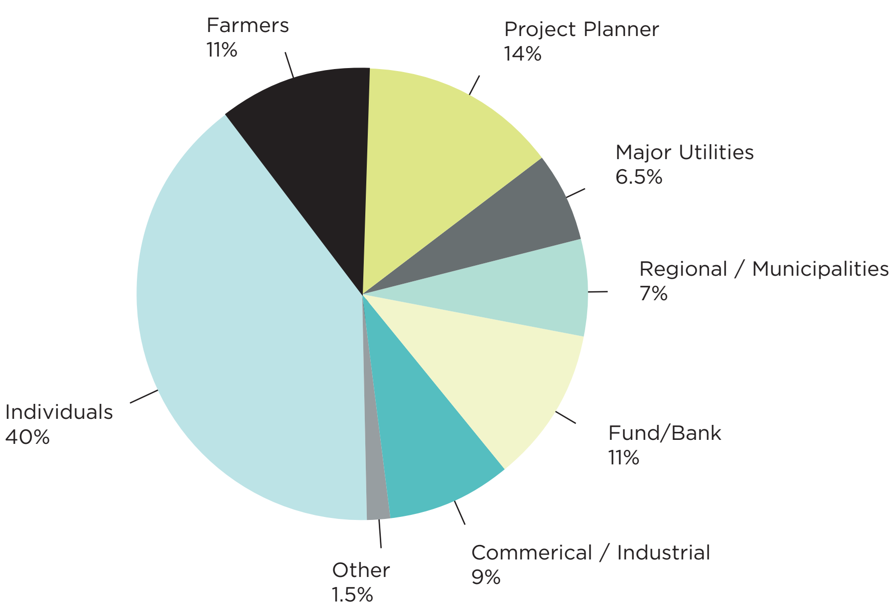
It is clear that the jurisdictions with the greatest public support for renewable energy (Denmark and Germany) are also the jurisdictions with the largest percentage of community ownership particularly with respect to participation by farmers and co-operatives.

TABLE 26: **COMMUNITY POWER INTERNATIONALLY**

	Farmer	Co-op	Corporate
The Netherlands	60%	5%	35%
Germany	10%	40%	50%
Denmark	64%	24%	12%
Great Britain	1%	1%	98%
Spain	0%	0%	100%

FIGURE 9: **GERMANY'S RENEWABLE ENERGY MARKET BY OWNER**

Share of Germany's 53,000 MW Renewable Energy Market



Ontario's definition of community ownership extends to all forms of financial structures (individuals, private companies, co-operatives etc.) whose participants are residents of Ontario and not in the commercial electricity generation business. Community ownership encompasses a broad spectrum of investment vehicles. They range from the individual homeowner using the microFIT program to install solar panels on their roof to a traditional co-operative building a commercial-scale renewable energy project.

In Ontario today, two years into the FIT Program, some forms of community ownership are progressing well, while other forms are lagging behind.

There are more than 17,000 MW of new renewable energy projects operating, under construction, or in the pipeline as a result of the FIT program, of which 4,630 MW have FIT contracts. Of this total, ~1500 MW can be attributed to projects with community ownership. Of these, 329 MW have been awarded FIT contracts and 555 MW are in the Economic Connection Test (ECT) category.[51] By contrast, there are ~20 Community Power Co-operative projects representing 50 MW of capacity; only about half of these projects have applied for a FIT contract.

TABLE 27: **RENEWABLE POWER OWNERSHIP IN ONTARIO FIT PROGRAM** (BASED ON APPLICATIONS)

Ontario	Community Farmer/Home Owner/ Small Business	Community Co-op	Corporate
microFIT	99.9%	.1%	0%
FIT	7.5%	.1%	92.4%

The community projects in this table are projects that are owned by Ontario residents not in the commercial power business. However, most of these are projects that will be owned by a private partnership or a few individuals – leaving only a small fraction of projects that have opened up their investment to the wider public. The FIT program is successful at reaching Ontario residents who have access to large amounts of capital and suitable sites for renewable energy development, but there are large segments of Ontario residents who are not able to participate in the FIT program as community investors since they do not have either of these advantages.

Ontario residents in towns and cities have limited access to suitable sites and rooftops for renewable energy projects and therefore are restricted from investing directly in a renewable energy system on their own land or building. Renters are likewise limited in how they can participate in Ontario's green energy economy. In addition, many people have homes or other buildings whose roofs are simply not suitable for a solar project.

Rural and northern communities are feeling disempowered since development is dominated by absentee owners from large companies. Furthermore, not all Ontarians are able to access the debt and equity necessary to finance a project on their own, especially in difficult economic times.

51 Bi-weekly FIT and microFIT report, October 28, 2011. Ontario Power Authority.

Community power projects with community investment offerings, such as renewable energy co-operatives, would allow Ontarians to make a smaller investment—from $500 to $20,000—in a project on a site separate from their place of residence. This enables significantly larger numbers of Ontario's citizens to be direct investors in renewable energy. It is this participation and a personal stake in Ontario's green energy economy that will lead Ontario residents to understand and appreciate the growing role renewable energy will play in the province.

Currently about 45,000 Ontarians have expressed an interest in investing in renewable energy project. That number can be substantially raised to over half a million Ontarians by enabling community energy projects with community investment offerings.

6.3. **Differentiated wind tariffs**

Since 2004 when the topic of feed-in tariffs was first broached in Ontario, the principal parties to the GEAA have recommended the use of differentiated tariffs for wind energy to facilitate community power development. Differentiated wind tariffs allow higher tariffs for less windy sites typical of community power projects, while at the same time offering much lower tariffs at windy sites, where the project does not need higher tariffs to earn a fair rate of return.

We recommended this policy in the development of Ontario's Renewable Energy Standard Offer Program and again during the development of the FIT program. Then Ontario Minister of Energy George Smitherman rejected the idea as too complex for the launch of the FIT program and suggested that the province would revisit the issue during the FIT review.

It is our belief that both the Ontario market and OPA have matured sufficiently that now is the time to implement this feature which is found in most successful feed-in tariff programs.

6.3.1. **WIND TARIFF DIFFERENTIATION BY RESOURCE INTENSITY**

- ***Limits unnecessary or excessive profits at the windiest sites, those most likely to be developed first,***
- ***Reduces development pressure on the windiest sites, and the "social friction" that results,***
- ***Provides program flexibility, especially in a province with brittle and limited grid capacity, and***
- ***Reduces risks to both banks and developers that revenues will cover debt repayment.***

The Green Energy Act and OPA's initial program looked to Europe for guidance on how best to create a "made in Ontario" feed-in tariff policy. Wind energy tariffs vary by resource intensity in four countries: Germany, France, Portugal, and now Switzerland. The tariffs vary by the productivity of the wind turbine. This is a surrogate for wind resource intensity.

Germany has made striking progress with their differentiated wind tariffs, and the rapid growth of wind energy in several diverse regions of France is also attributed to their use of differentiated tariffs.

Programs in both France and Germany have been successful in spreading or distributing development across the landscape in each country. While development still favors the windiest regions, development is not solely concentrated in the windiest regions. Nearly 60% of German wind development is in the interior of the country and has successfully moved away from the coastline as a result of the German policy.

Many of the issues confronting Ontario are similar to those once confronted by Germany. There is growing social friction over the concentration of wind turbines in certain windy parts of southern Ontario. Germany encountered the same opposition along the Baltic Coast, and the German system of differentiated tariffs was the result. Germany's intent was to spread development geographically as much as possible.

The use of a similar policy in Ontario would reduce the social friction (sometimes critically referred to as NIMBYism) associated with the concentration of development near the shores of Lake Huron and Lake Erie.

While the goal of the Green Energy Act is to rapidly develop significant amounts of wind energy, among other renewables, there is no need to overpay for that development. Our analysis indicates that even with ample margins sufficient to spur rapid development, OPA's proposed tariff will overpay at the province's windiest sites while underpaying at many other sites. Critics of wind energy, and especially those opposed to the Green Energy Act, will quickly seize on the possibility of overpaying for wind development in the windiest areas.

Differentiated tariffs would give OPA the flexibility needed to limit overpayment at the windiest sites, while ensuring payments sufficient for development at less windy sites.

Higher payments at less windy sites would enable development for the bulk of the wind potential in southern Ontario, which is far more geographically dispersed than that of the windiest sites. Further, there would be no need for a special tariff for community wind, if there was a sufficient tariff where most farms, First Nations, and community groups are located.

Germany and France each use a different mechanism for determining site productivity and, subsequently, the appropriate tariff. However, both use a trial period after which the productivity is determined. Until mid-2006, both countries used a five-year test period. (France extended its trial period from five to ten years.) During this period, all wind turbines are paid the same tariff. After five years, the average productivity is calculated and this value determines the tariff that will be paid during the years remaining under the contract.[52] Thus, the maximum tariff is fixed to provide a targeted profitability at the targeted sites, but the final tariff paid for more productive sites declines on a sliding scale as a function of productivity. Switzerland adopted the German differentiated wind tariff system in 2008. Portugal adopted the French system of differentiating wind tariffs by capacity factor in 2005.

[52] Relative productivity is calculated by discarding the highest and lowest annual production and averaging the remaining three years divided by the total wind turbine rotor swept area.

Portugal, while a small country geographically, has a population equivalent to that of Ontario. Portugal's differentiated wind tariffs have encouraged dynamic growth. The country has a total of 2,900 MW of wind capacity in operation, roughly similar to that in Great Britain and France, both much larger countries. The success of Portugal's wind industry is largely due to its system of differentiated tariffs.

Countries that have used differentiated wind tariffs have found implementation of such programs administratively straight-forward and have done so with minimal cost.

The GEAA's proposed wind tariffs are based on the French model. However, the French system has been adapted to the Ontario market by the use of average specific yield instead of the more error-prone measure, capacity factor. GEAA's proposal is for a truly "made in Ontario" system that not only would be the first of its kind in North America, but the first of its kind worldwide.

Our assumptions include:

- ***Return on Equity desired: 11%***
- ***Interest on Debt: 7%***
- ***Total installed cost: $750/m^2***
- ***Annual reoccurring cost: 4.0%***

To minimize cost to ratepayers, we have raised the lower tranche of wind resources from OSEA's original proposal in 2007 of 550 kWh/m^2/year to 650 kWh/m^2/year, or from average wind speeds of about 5 m/s to 5.5 m/s at hub height. We have also raised the targeted profitability index to 0.35 at annual specific yields of 900 kWh/m^2/year and up to 0.55 at yields of 1,100 kWh/m^2/year.[53]

TABLE 28: **PROPOSED ONTARIO WIND TARIFFS**

Proposed Ontario Wind Tariffs

Yield kWh/m2/yr	Hub Height ~m/s	T_{eq} $/kWh	T_2 $/kWh
	T_1	$0.136	
650	5.5	$0.136	$0.136
700	5.7	$0.132	$0.130
800	6.0	$0.126	$0.121
900	6.4	$0.121	$0.113
1,000	6.7	$0.115	$0.105
1,100	7.0	$0.110	$0.096
1,200	7.4	$0.100	$0.082

T_{eq} is the equivlanet annual tariff adjusted for inflation and the discount rate.
T_1 is the tariff in years 1 through 5.
T_2 is the tariff in years 6 through 20.

Current wind projects at Kingsbridge and Ripley are delivering 1,100 kWh/m^2/yr and this is representative of the best wind sites in Ontario. At these sites, our proposed average equivalent tariff is $0.11/kWh, nearly $0.025/kWh less than OPA's current tariffs. Very good sites in Ontario would receive about

53 For an explanation of the profitability index and the calculations used here, see OSEA's report Renewables without Limits: Moving Toward Advanced Renewable Tariffs by Updating Ontario's Groundbreaking Standard Offer Program

$0.12/kWh or equivalent to OPA's proposed tariff. Lower wind sites would receive no more than $0.136/kWh as today. The average tariff paid over 20 years to a project is designated in the above chart by T_{eq}.

All wind projects would be paid $0.136/kWh for the first 5 years. Subsequently, beginning in year six through year 20, all projects would be paid the tariff identified as T_2 in the chart depending upon their resource intensity.

The chart, for illustrative purposes only, shows discrete rows. Tariffs T_2 are on a continuum and not limited to the specific figures in the chart. Please consult the original spreadsheet for the calculations used.

6.4. Moving forward – community power under FIT 2.0

6.4.1. DEFINING COMMUNITY POWER

Though we do not recommend changing the current definition of community ownership in the Green Energy Act, we do recommend expanding the definition by including municipalities and municipally-owned entities, including LDCs, who are in 50/50 joint ventures with Class 3 community groups, as detailed below.

A project is defined as a community power project so long as community ownership is at least 50%. The balance can include commercial power developers. This will allow community groups to participate in the Fit program through joint ventures with commercial developers.

Furthermore, we recommend that the definition of community power be subdivided into four primary classes so that policies and programs to support community power can better target the needs of the different sub groups:

Class 1: *Individual community power*

- Ontario Residents owning MicroFITs contracts

Class 2: *Private community power*

- Ontario Residents owning FIT projects in traditional legal structures (private companies, limited partnerships, individual investments)

Class 3: *Public community power*

- Charities, co-ops and non-profits. For those who do public offerings, they must give priority to local residents
- Farmers, rural landowners, northern communities undertaking FIT projects using a collective land lease agreement with neighbouring property owners and/or involving a minimum of 25 local residents in the ownership structure

- Municipalities and municipally-owned LDCs or other municipally-owned entities in 50:50 joint ventures with a locally-based public community power organization

Class 4: *Aboriginal Power*

- Aboriginal groups in any corporate or governance structure wholly owned by Aboriginal People of Ontario.

6.5. Addressing barriers for community power

We propose a series of recommendations for supporting the continued development of all classes of community power; however, the majority of the recommendations focus on the need for additional policy support and programs for Class 3.

6.5.1. ESTABLISH COMMUNITY POWER TARGETS FOR 2018

To reduce social friction, and to increase the social equity of Ontario's FIT program, we recommend that the province adopt a target of offering more than half a million Ontarians the opportunity to install 5,000 MW of new renewable capacity by 2018.

To gauge progress and to be able to fine tune the program as it matures, we recommend targets for each class of community power.

TABLE 29: **ONTARIO COMMUNITY POWER TARGETS**

Ontario Community Power Targets								
Cumulative								
	2012 MW	2013 MW	2014 MW	2015 MW	2016 MW	2017 MW	2018 MW	Participants
Class 1							1,350	150,000
Class 2							2,000	1,100
Class 3				100			250	250,000
Class 4				100			250	250,000
						Total	3,850	651,100

Class 1: *MicroFIT*

- Target of 150,000 microFIT (~1,350 MW) projects by 2018
- This target represents about 150,000 citizens participating in the program

Class 2: *Private community power*

- Target of 2,000 MW of private community power by 2018
- This target represents about 1,100 citizens participating in the program

Class 3: *Public community power*

- Target of 250 MW of public community power by 2018
- This target represents about 250,000 citizens participating in the program

Class 4: *Aboriginal Power*

- Target of 250 MW of FN power (any corporate structure wholly owned by Aboriginal People of Ontario) by 2018, representing about 250,000 Aboriginal citizens of Ontario participating in the program

6.5.2. CLASS 1 AND CLASS 2 RECOMMENDATIONS

In the first two years of the FIT program, the first two classes of community power projects have been much more successful at getting their projects underway than Class 3 and Class 4. It is our belief that Class 1 and Class 2 community power are progressing well in Ontario.

In terms of Class 1 – MicroFIT, we believe the continuation of the MicroFIT Program is essential to maintaining the opportunity for farmers, rural landowners and homeowners to benefit directly from these projects. Currently 40,000 MicroFIT applications have been made to the OPA. We propose to allow the continuation of this program at the same rate over the years ahead. We do recommend, however, relieving congestion processing applications that for every 10 MicroFIT applications processed, a FIT application should also be processed. Further, we recommend that OPA create a standardized application, and an application process that can be used by all LDCs across the entire province.

In terms of Class 2 – Private Community Power, we believe this class to be progressing well also. We recommend that this group should continue to have access to the Community Adder and the CEPP. We also propose that Class 3 community aggregators of MicroFITs be eligible for the Community Adder and the CEPP.

6.5.3. **CLASS 3 AND CLASS 4 RECOMMENDATIONS**

There are currently several barriers limiting the development of Class 3 community-owned projects. We encourage the province to make a concerted effort to overcome these barriers in order to diversify renewable energy development. Issues with grid access and financing need to be overcome in order for community power to reach its full potential.

The original vision of the community power sector for Ontario was renewable energy developed by and owned by not-for-profits, co-operatives and charities that would seek broad public investment from the province's citizens. The Green Energy & Economy Act expanded the definition of community power to include all Ontario residents that are not in the commercial electricity generation business.

We applaud the intent of expanding the definition of community power. It is clear that Ontario residents want the opportunity to invest in renewable energy, and there are many ways this demand can be satisfied.

While there has been a huge influx of applications by individuals and private corporations for both microFIT and FIT projects, the original community power development structures (charities, not-for-profits and co-operatives) have continued to face barriers. This category of community power projects has fallen behind as the other sectors charge ahead.

In part, these projects have fallen behind because it takes time for these groups to form or to decide to move ahead with a project. So slower take-up is to be expected. However, with private investors and developers racing ahead to secure their FIT contract and access to the grid, this will squeeze out the public community power projects unless something is done to reserve space for them.

Recommendation 1

- ***We recommend setting aside 250 MW of FIT contracts for Class 3 Community Power projects and 250 MW of FIT contracts for Class 4 Community Power by 2018.***
- ***We also recommend setting an interim target of 100 MW by 2015 for each of these two classes.***

The set-aside for Class 3 community power should be restricted to projects with a minimum of 50% community ownership. Each sub category of Class 3 should not exceed 100 MW until a review of the targets in 2015. Class 3 includes the following as previously stated:

- ***Charities, Co-ops and non-profits whose public offerings give priority to local residents***
- ***Farmers, rural landowners, northern communities undertaking FIT projects using a collective land lease agreement with neighbouring property owners and/or involving a minimum of 25 local residents in the ownership structure.***
- ***Municipalities and municipally-owned LDCs or other municipally-owned entities in 50:50 joint ventures with a locally-based public community power organization***

Recommendation 2

Mechanisms for enabling Class 3 Community Power to reach these targets should address the 2 key barriers of grid access and the financing framework. For some projects that have been initiated by a community power proponent the issue of grid access is often the primary barrier. However, there are several community power proponents whose business model is to either acquire projects with FIT contracts and/or enter into joint ventures with commercial developers with FIT contracts. For these proponents, a supportive financial framework is necessary.

We believe that there are a number of creative ways to achieve these targets and that most fundamentally a working group needs to be established immediately that includes representatives from the Community Power sector, the Ministry of Energy, the Ministry of Finance, the OPA and Hydro One to develop a process and plan for meeting these targets. It is imperative that this plan be launched co-incident to the launch of FIT 2.0.

Some potential mechanisms for the group to consider are as follows:

GRID ACCESS:

i. ***THRESHOLDS:*** *Exempt CAR and CAE community projects from the connection thresholds for Scenarios 1-3.*

ii. ***COUNTER OFFER:*** *Where a project is over the remaining capacity of a transformer station, offer the community project the remaining capacity.*

iii. ***ASSIGNMENT:*** *Allow transfer of ownership from a commercial developer to a community developer or from one community develop to another any time in the FIT process.*

iv. ***SET ASIDE:*** *Where capacity remains at a transformer station and there is a Community Power project under development, capacity it reserved for up to 12 months or until their FIT application has been approved.*

v. ***DIRECT INCENTIVES:*** *Where the grid is constrained and no future capacity exists before 2015, offer direct financial incentives (increased adder) to commercial developers with FIT contracts will to enter into a 50:50 JV with a Class 3 Community Power organization.*

vi. ***PRIORITY ACCESS:*** *Assuming attrition of current FIT contracts before Oct. 31, 2011 will result in the ability of new FIT applications to proceed to commercial operation within a reasonable timeframe, priority access can be used on a going forward basis (i.e., apply only to new FIT applications as of Oct 31, 2011).*

  a. Where a Community Power Class 3 project has applied for a FIT contract they are given priority access to the grid.

  b. Any commercial project 20 MW and under connecting to the distribution network which offers a 50% ownership interest to a locally-based Class 3 a) community organization, are given priority access to the FIT process and grid capacity.

COMMUNITY ENERGY PARTNERSHIPS PROGRAM (CEPP):

i. ***AMEND THE CEPP AS NOTED IN SECTION 6.7.4 BELOW, INCLUDING:***

a. Remove the NTP cutoff point for Class 3 projects;

b. Increase project grant cap up to $500,000 for Class 3 projects;

c. Increase allocation for education & capacity building grants.

FINANCIAL FRAMEWORK:

ii. ***BRIDGE FINANCING:*** *Where a Community Power proponent is at the stage of requiring bridge financing or would like to purchase an existing project with a FIT contract or enter into a JV with a commercial developer with a FIT project, provide a Loan Guarantee on capital to Community Power Bridge lenders for the total community equity amount of the project.*

iii. ***ACCESS TO DEBT FINANCING:*** *For charities, non-profit organizations and non-profit co-ops, extend the mandate of the Infrastructure Ontario Loan Program to allow them to apply. Provide loan guarantees to for-profit co-ops.*

iv. ***REGULATORY:*** *Increase capacity and efficiency of Financial Services Commission of Ontario to process and receipt Offering Statements from the Community Power Co-operative sector.*

Recommendation 3

Connect the Lakewind Community Wind Project immediately. This 20 MW co-operative project is located in Kincardin Ontario and has the capacity to engage upwards of 7,000 local residents from the region in the governance and ownership of this project. (Co-operatives operate on the basis of one member/one vote, regardless of how many shares a member may own). This project is well advanced and can proceed to a membership drive immediately upon receiving a FIT contract. From both a communications standpoint and a replicable model standpoint, it is a critical project for meeting the proposed community power targets and building public support in rural Ontario for the Green Energy and Economy Act. This project requires that the remaining capacity at the Douglas Point transformer station be offered to LakeWind (as per recommendation #2).

6.6. **Community Energy Partnerships Program recommendations**

6.6.1. BACKGROUND

In May 2010, the Community Energy Partnerships Program (CEPP) was launched. CEPP is a grant program to support community power in Ontario. It assists community power projects through funding support of up to $200,000, or up to $500,000 for co-op projects over 10 MW. Many of these projects would not be able to move forward without this help. The CEPP also provides $500,000 per year in education grants.

This section provides an overview of the CEPP to date and makes recommendations re major changes to the program. A more detailed review of the CEPP Program Rules, Funding Agreement and other documents is still required. This more detailed review should take place following the FIT Review.

CEPP objectives

As per the Program Rules, the objectives of the CEPP are as follows:

- *To facilitate the participation of communities in the development of renewable energy generation facilities;*
- *To level the playing field for groups that may otherwise be excluded from developing renewable energy projects, due to financial barriers and higher project costs not encountered by commercial developers;*
- *To encourage local partnerships and to help community partners maximize their equity share;*
- *To encourage a high level of local community engagement, participation and investment in renewable energy projects; and*
- *To provide funding for a diversity of technology types, organizational and community types and geographic regions in Ontario.*

CEPP results

The CEPP has been very successful in facilitating the participation of communities in the development of renewable energy projects. In its first year, the CEPP received 142 applications and approved 84 of them, compared to a target of 83 approved applications. In the first 6 months of this year (April – October), the CEPP received 166 applications and has approved 87 of them, compared to an annual target of 100 approvals. Applications continue to pour in at an average rate of 31 applications per month.

TABLE 29: **PROJECT GRANT APPLICATIONS SUBMITTED TO CEPP TO OCTOBER 31, 2011 – BY TECHNOLOGY**

Technology	Applications	MW	Project Cost	Grants Requested
Solar rooftop	235	51.6	$300,503,879	$9,433,512
Solar ground	32	108.9	469,416,019	2,700,448
Wind	26	166.1	465,779,639	4,873,774
Hydro	7	8.7	33,582,761	1,302,765
Biomass	3	12.5	42,853,800	488,510
Biogas	5	1.3	10,694,000	601,150
Totals	308	349.1	$1,322,830,098	$19,400,159

Grants go through a rigorous review process that includes a review of applicant eligibility, project eligibility, site suitability, grid connection, economic viability and the reasonableness of the grant request, including comparisons of activity budgets against established benchmarks. CEPP program managers work with grant recipients to ensure the project plan is viable and to update the application as appropriate to incorporate appropriate changes and clarifications. Following initial screening by CP Fund, Deloitte performs an independent verification. The final decision to approve a grant is made by an independent Review Committee.

To date, 86% of applications processed have been approved. The main reasons for rejection are ineligibility of the applicant and lack of a grid connection.

Since program launch, 171 grants for 163 projects have been approved for grants totaling $8.1 million, based on total requests of $9.3 million. This translates into approved grants being on average 87% of the requested amount. The reduction represents mainly requests for ineligible activities and for activity budgets that exceed benchmarks. The following chart breaks down the project grants approved by technology.

TABLE 30: **PROJECT GRANTS APPROVED BY CEPP TO OCTOBER 31, 2011 – BY TECHNOLOGY**

Technology	Applications	MW	Project Cost	Grants Requested	Grants Approved
Solar rooftop	140	23,250	148,899,756	5,611,033	4,763,949
Solar ground	13	28,300	127,893,673	1,083,490	940,003
Wind	13	49,900	136,598,313	1,882,944	1,725,520
Hydro	2	1,556	7,544,302	400,000	344,900
Biomass	1	2,000	5,000,000	181,530	181,530
Biogas	2	599	6,000,000	153,000	140,226
Totals	171	105,605	431,936,044	9,311,997	8,096,128

Feedback from project grant recipients

A survey of grant recipients was conducted in November 2011. An overwhelming majority of recipients were happy with both the program and the way it is managed.

Regarding the application process, 78% of recipients had no difficulty finding information to complete their application. Only 4.8% of respondents considered the application "very" difficult. Comments regarding the application process were positive overall.

Regarding grant management, 95% of grant recipients had positive views of the responses received from CEPP staff in managing their grants, with 60% stating that they were very satisfied and 35% satisfied.

Many positive comments about the CEPP were submitted including:

- ***"Very, very positive, they have helped this and other community projects immensely."***
- ***"Thanks!!!! It would be nearly impossible to do this without the assistance provided but CEPP and the project management there is excellent."***
- ***"A good program. It has been instrumental in allowing us to move forward."***

Pre-feasibility work

One comment that accords very well with the view of CEPP's program managers was that "the application was a valuable exercise that forced us to think through various steps and issues well in advance of facing them. I think it was actually very helpful, though it was a challenge to complete."

CEPP does not fund pre-feasibility work. In fact, the CEPP application is designed to act as a pre-feasibility report. Some applicants find this to be a challenge, especially those who could not afford to hire a project manager to do the pre-feasibility work, typically Class 3 groups.

In some cases, neighbouring landowners will want to enter into a collective land lease agreement prior to developing the site or approaching a commercial developer. It may be that they will seek to simply lease the land to a commercial developer. The benefits of a collective land lease are so great that this should be encouraged and supported.

It is recommended that up to $5,000 in pre-feasibility funding be made available to Class 3 applicants generally, and up to $10,000 be made available if a community land lease is to be undertaken.

CEPP project grant eligibility

CEPP tracks applications by community type, in a way that is somewhat more detailed than the Class 2 / Class 3 distinction above. In terms of Class 3 projects, CEPP has only received applications from co-ops, non-profits and charities. It has not received applications from groups using a collective land lease or from municipal joint ventures. The municipal partner in municipal joint ventures is not currently eligible for CEPP funding. We recommend municipal partners be added to the list of eligible communities.

Some Class 3 proponents will seek to aggregate MicroFIT projects rather than undertake FIT projects. Provided they meet the minimum 10.1 kW threshold, we recommend that aggregated MicroFIT projects developed by Class 3 proponents be made eligible for CEPP.

Community type is an important determinant of the extent to which a project will further the objectives of the CEPP. As noted above, co-ops, not-for-profits and charities tend to have a larger impact because of the much larger number of Ontario residents engaged, either through investment in a co-op or membership in a charity or not-for-profit. As noted in the table below, co-ops, not-for-profits and charities together accounted for 15.5% of applications and 24.4% of MW applied for.

Farmers constituted 40.6% of applications and 22.9% of MW. These are all Class 2 projects.

Small and medium sized businesses are defined as projects that are ancillary to a business, for example where a furniture business is putting a solar PV project on the roof of its factory. These constituted 18.5% of applications and 7.6% of MW applied for.

The “Other” category includes mainly passive investors in a renewable energy project. This accounted for the remaining 25.3% of applications and 45% of MW.

TABLE 31: **PROJECT GRANT APPLICATIONS SUBMITTED TO CEPP TO OCTOBER 31, 2011 – BY COMMUNITY TYPE**

Community Type	Applications	MW	Project Cost	Grants Requested
Co-op	8.1%	20.6%	17.2%	15.0%
Not-for-profit	1.6%	1.3%	2.0%	2.8%
Charity	5.8%	2.5%	3.2%	5.2%
Farmer	40.6%	22.9%	22.4%	33.1%
Small / Medium Business	18.5%	7.6%	7.6%	14.1%
Other	25.3%	45.0%	47.5%	29.8%
Totals	100.0%	100.0%	100.0%	100.0%

6.6.2. SUMMARY OF CEPP RECOMMENDATIONS

The following recommendations are made regarding the CEPP:

Recommendation 1

The CEPP should provide up to $5,000 in pre-feasibility funding be made available to Class 3 applicants generally, and up to $10,000 be made available if a community land lease is to be undertaken.

Recommendation 2

Municipalities and municipally-owned LDCs or other municipally-owned entities in 50:50 joint ventures with Class 3 community power organizations should be added to the list of communities eligible for project grants.

Recommendation 3

Provided they meet the minimum 10.1 kW threshold, aggregated MicroFIT projects developed by Class 3 proponents should be eligible for project grants.

Recommendation 4

The funding period for Class 3 projects should be extended beyond NTP to at least one year following COD.

Recommendation 5

$5 million of the total $10 million CEPP budget should be set aside for Class 3 projects.

Recommendation 6

An additional $500,000 of the CEPP budget should be set aside for capacity building, including a financial capacity program to be offered by Community Power Fund.

Recommendation 7

A more detailed review of the CEPP Program Rules, Funding Agreement and other documents should take place following the FIT Review.

6.7. **Conclusion re community power**

The FIT is a sound program that offers great potential to engage Ontario citizens, but strong commitments need to be made in order to unlock the full potential of community power.

The figures for approved grants are below. Co-ops, not-for-profits and charities constituted 16.4% of approved projects, 14.4% of MW and 23% of approved project grant funding. This is the only group whose percentage of funding exceeded both the percentage of approved applications and MW. This is due to the added costs of raising community capital and governance. It is these added costs that make it more difficult for Class 3 projects to compete with commercial projects. Offsetting these added costs is an important way in which the CEPP is helping to level the playing field for these types of community groups.

TABLE 32: **PROJECT GRANTS APPROVED BY CEPP TO OCTOBER 31, 2011 – BY COMMUNITY TYPE**

Community Type	Approved Applications	MW	Project Cost	Grants Requested	Grants Approved
Co-op	7.6%	6.7%	6.8%	12.1%	12.1%
Not-for-profit	1.2%	0.3%	0.5%	1.0%	1.2%
Charity	7.6%	7.4%	8.3%	8.7%	9.7%
Farmer	46.2%	51.3%	43.3%	40.1%	39.9%
Small / Medium Business	17.0%	5.8%	8.0%	14.1%	13.2%
Other	20.5%	28.5%	33.0%	23.9%	23.8%
Totals	100.0%	100.0%	100.0%	100.0%	100.0%

Education grants

On November 24, 2010, the Minister directed that an Education Grant program be initiated to provide $500,000 per year in funding to co-ops, not-for-profits and charities to educate the public about the benefits of developing renewable energy projects.

This funding was quickly exhausted with the first call, for which CEPP received 43 applications with total grant requests of $3.1 million. Six grants totaling $483,000 were approved in June 2011.

The education grant program has been going very well, with much of the work by grant recipients completed already and with news of many new renewable energy groups being started. Monthly check-in meetings with all grant recipients have shown a great deal of enthusiasm and have helped to facilitate sharing of information and experience.

Although many new projects are being started as a result of the education grants, it is important that the groups initiating these projects improve their capacity to successfully develop them.

A key capacity to develop is financial literacy. Many project proponents do not understand the financial requirements of undertaking a FIT project, the importance of financial planning, the financial structuring options available to them, or even basic financial terms and concepts. Community Power Fund is both an expert in community power finance and the co-manager of the CEPP. It is uniquely positioned to held develop financial literacy.

It is therefore recommended that an additional $500,000 of the CEPP budget be set aside for capacity building, including a financial capacity program to be offered by Community Power Fund.

CEPP budget allocation

The CEPP currently has a $10 million total budget, including project grants, education grants and administration.

To date, CEPP project grants have not been competitive and have been provided to all applicants who meet the eligibility requirements. However, the CEPP is now at the point where its annual funding will not allow this to continue. At an average of 30 applications per month, this translates to roughly 26 approved per month based on historical rates. At the historical average grant approved of $47,000, expected funding is $1.2 million per month or $14.4 million per year, not including money for education grants or administration.

Class 3 projects are currently funded at a rate of roughly $2 million per year. This is a sector that is in its infancy and can expect to grow significantly. This growth will come about due to the impact of the education grants in animating groups to do projects, the example set by the pioneering projects currently completed or in development, and simply the passage of time as more people decide to undertake public community power projects. It will also grow due to the addition of municipal joint ventures. It is expected that in Year 3 of the CEPP, grant requests from these groups will be between $4 million - $5 million.

In order to maximize the impact of the CEPP project grants, it is recommended that $5 million be set aside for Class 3 projects.

Post-NTP funding for Class 3 projects

CEPP funding is currently not permitted for activities commenced after NTP. This creates problems for Class 3 projects, as prior to NTP is too early to raise community capital. The risk is too great at that point and there is not sufficient time to raise money without severely delaying the project. In fact, the ideal time to raise community capital is immediately following COD.

We expect that many public community power projects will be joint ventures with commercial developers. In many cases, the joint venture will not be created until after NTP. It is important that Class 3 proponents have access to CEPP funding to help them establish the joint venture.

It is recommended that the funding period for Class 3 projects be extended beyond NTP to at least one year following COD.

7 / Supporting broad renewable energy deployment

7.1. Complimentary support mechanisms

Feed-in Tariff programs have been successful at deploying renewable energy as well as bringing the costs of such technologies down, largely as a result of their ability to de-risk investments in project development, project financing and local technological manufacturing. If Ontario hopes to be successful, it is imperative that its feed-in tariff be given a long-term mandate.

However, as the cost of renewable generation falls, the Ontario government can make additional options available including:

- ***Providing incentivize for long-term power purchase agreements for the direct purchase of renewable generation to large scale electricity consumers if the consumers are interested in buying power at a rate lower than the existing FIT. Large electricity consumers who may be interested in hedging their long-term electricity costs or meeting Corporate Social Responsibility objectives, may be willing to sign a long-term power purchase agreement. The government should consider providing short term (less than 5 years) support to companies interested in procuring renewable energy to support their operations.***

- ***Provide tax credits or mandates to support integrated PV during the design and build stages of new buildings. Such an incentive would allow:***
    - *For costs of equipment to be amortized within the cost of the building and reduce the perceived cost.*
    - *Drive further penetration of renewable energy generation in Ontario above and beyond the current targets*
    - *Create synergies with the design, engineering and construction industry in Ontario and facilitate local companies building a knowledge based competency which they can export internationally.*

- ***Ontario needs to find ways to shift from a centralized electricity system to one that consists mainly of distributed generation. Higher levels of generation from intermittent resources such as solar and wind will necessitate development of energy storage, demand response, better forecasting, and greater levels of interconnection. Funding for research into effective electricity storage methods as well as a tariff paid to suppliers of stored electrical energy will promote a shift to distributed energy.***

- ***Municipalities, regional districts and other communities can benefit from reviewing current energy demand and supply systems and planning for change in the future. Future choices are based on estimates of economic costs and environmental implications of current and potential options. Creating these plans allows decision-makers to make choices that best meet the goals of their communities.[54] The***

[54] Bailie, A. et al.,Renewable Energy Policies for Remote and Rural Communities: Energy Policy Assessment, (Drayton Valley, AB: The Pembina Institute, 2009). http://www.rural.gc.ca/RURAL/display-afficher.do?id=1290792790023&lang=eng (accessed June 7, 2011).

provincial government can support Community Energy Planning by requiring local governments to complete Community Energy Plans; providing financial resources (grants) to communities to hire consultants; creating guidelines for completing the Energy Plans; and providing expert staff to help community staff to develop the plans.[55]

- *Support 100% renewable energy community planning. If municipalities want the surrounding farmers to supply power with biogas, wind, or solar, strategies need to be developed that include many stakeholders. These processes need resources. The provincial government can support these efforts through a program of "100% Renewable Communities" that matches efforts of municipalities to develop individualized strategies.*

- *Public education and outreach*

- *Data clearinghouse/Information Portal/Green Energy Foundation*

7.2. LDC connection assured cost recovery

Interconnection of renewable generators with Ontario's distribution network is the purview of the Local Distribution Companies (LDCs). Much of rural Ontario, where most wind generation, hydro, and on-farm biogas generation will be installed, is within the service area of Hydro One.

Despite nearly 30 years of worldwide experience of interconnected operation with renewable generators, and a similar amount of experience with on-farm backup generators in Ontario, Hydro One and some LDCs continue to place onerous and costly interconnection requirements on not only FIT projects but also on microFIT installations.

The Ontario Federation of Agriculture (OFA) has suggested that these interconnection requirements, especially for on-farm biogas generation, can be greatly simplified and still maintain the system's integrity and the safety of Hydro One's employees.

7.3. Distribution system investments

Ontario's distribution system has been under funded for decades. To fully gain access to Ontario's abundant and diverse renewable resources, the province must begin a comprehensive program of redevelopment of what is now called a "distribution" network. Because the system needs extensive reconstruction simply to continue functioning, Ontario is in the rare position in North America of being able to redesign the system for the 21st century by building a network of "collectors" of distributed generation rather than simply rebuild a 20th century distribution system.

[55] Bailie, A. et al.,Renewable Energy Policies for Remote and Rural Communities: Energy Policy Assessment, (Drayton Valley, AB: The Pembina Institute, 2009). http://www.rural.gc.ca/RURAL/display-afficher.do?id=1290792790023&lang=eng (accessed June 7, 2011).

Upgrades to the distribution system to take new renewable generation are in the public interest. Ontario needs a steady build-out of new clean generation as quickly as possible if the province plans to close its coal-fired power plants on schedule and it wants to spur new industrial development. Ontario policy is to encourage new generation from clean sources, including renewable energy. This is Ontario's formal public policy and as such is a statement of the public good.

In France, as in Germany, the wind developer pays for the local connection to the grid. However, any grid reinforcement--whether to the lines, to transformers, or to switching--necessary to fully use the renewable generation is the responsibility of the grid operator as the expansion of the grid is in the public interest. Costs of this expansion are subsequently borne by all ratepayers equally.

7.4. **Assured LDC full cost recovery**

Hydro One and some LDCs have not embraced Ontario's FIT program partly out of fear that the OEB will not allow full reimbursement for administrative and other costs due to the program. LDCs need to be reassured by the province and the OEB that they will recover all reasonable costs for the program.

The province, through the OEB, needs to remove any structural disincentives to LDCs and Hydro One from expanding distributed generation through the FIT program. The province and the OEB also need to take the steps necessary to assure LDCs and Hydro One that they will recover all costs associated with both transmission-connected and distribution-connected generation.

7.5. **Maintain and enhance OPA**

Nearly all participants of the Ontario FIT program stress that providing stability is essential to the success of the program in creating sustainable jobs. One unique feature of the Ontario program in comparison to many others is that the contract counter party is OPA on behalf of the province. Any effort to restructure OPA or to substantially reduce OPA's budget and staffing would create a nightmare of uncertainty for contract recipients, program applicants, and manufacturers who have relocated to the province in good faith.

OPA, Hydro One, and the LDCs need OEB support to hire and maintain the staff necessary to efficiently manage the FIT program and insure the program's stability.

8 / Effective environmental oversight

8.1. Strengthening the REFO

There is an apparent lack of power/authority given to the Renewable Energy Facilitation Office (REFO). The REFO was originally intended to coordinate approval the various ministries (Environment, Natural Resources, and Culture), in practice, the REFO is able to facilitate meetings with the various ministries but does not have the power to resolve issues that proponents may be encountering.

The Renewable Energy Facilitation Office (REFO) could provide a vital link for communities wanting to develop renewable energy projects. Because power development is not the main occupation for community members, additional advice is required to move community projects forward. The REFO could provide tailored advice and non-financial support to community developers. Additional services that the REFO could offer include access to experts and information required during the pre-feasibility, feasibility and contract stages, technical assistance and citizen and community group training.

8.2. Local municipal involvement

There is pressure for some amount of decision making authority to be returned to the municipalities. The current role of a municipality in the Renewable Energy Approval (REA) process is a vague instruction to "complete the consultation form". While the MOE is requiring municipal input prior to accepting REA applications, a developer has no ability to force a municipality to provide input. While we do not want to return to the previous process requiring zoning approvals, one solution to address public concerns would be to formalize or clarify the role of the municipality in the REA process. This could include the completion of a "site plan approval" process that is required under the Planning Act for other developments.

Furthermore, the regulations should recommend the need for a pre-consultation step with the municipality to introduce the project and to clarify the process to move forward. There should also be clarification on the costs that a municipality could request from a developer for their involvement in the process.

8.3. Project connection

The REA regulations are vague on how or even whether off-site connection lines to the grid lines are to be included in the submission. The province's response to date is that if the project developer is to construct or own the lines then the off-site lines need to be included in the project definition. If a LDC is to build or own the lines then the project does not need to be included in the REA application. There are no environmental approvals required for the construction of distribution scale lines within existing rights-of-way of Hydro One or a LDCs. But if a renewable energy developer chooses to build or own the project connection lines it must meet the strict environmental requirements of the REA process for these lines.

One particular example relates to wetlands. The regulations do not allow the overhead crossing of Provincially Significant Wetlands (PSWs) with overhead lines when a developer is installing the lines. Again, Hydro One and the LDC do not need to meet this requirement. Thus, the renewable energy developer is being held to a much higher level of environmental scrutiny than LDCs for the same facility are routine in this province. Distribution-scale power lines within existing rights-of-way should not be subject to REA approval and the setback requirements of the regulations. When located within existing RoWs, the effects of such facilities are minimal.

8.4. **Amendment provisions**

There needs to be clarification regarding how design changes to a project can be made. The Ministry of Environment has yet to identify the requirements for making a change to a project during either the approval process or after a project has received its approvals. Further, there needs to be clarification on what degree of project change will trigger a formal amendment process.

8.5. **Project description level of detail**

An REA requires an extensive amount of project details to be described in the application. Some of the information that is now required is only available once a contractor has been brought on board by a developer. As such, it may not be possible to accurately describe some of the project details at the time of the REA. Developers are therefore concerned that they cannot with certainty provide the required information. Detailing some of this information could restrict project design flexibility during the construction stage. It is typical to provide contractors some amount of flexibility in how they build a project. Some of the project design details that are expected by the Ministry are unnecessary for the purposes of describing the environmental effects of a project. The level of detail required for an REA application should be driven by what information is essential to adequately describe the environmental impacts of the project. And where project design details are not available, a developer should be allowed to use surrogate information to represent the project component for which design specifications are not available, for example, the type of transformer to be used in the noise assessment.

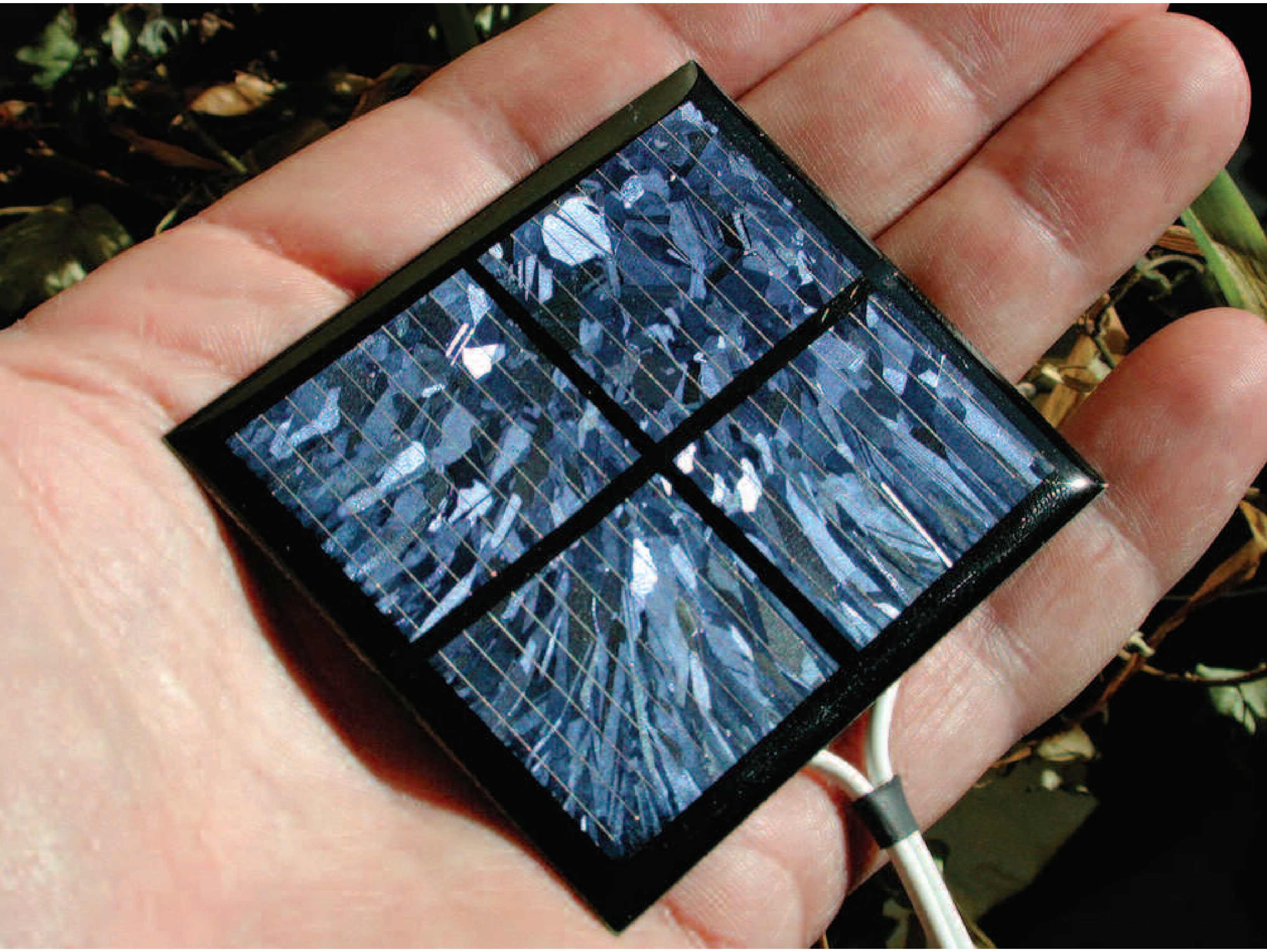
9 / Conclusion and summary of recommendations

Ontario has developed a world class system of feed-in tariffs that may well become a model for elsewhere in North America. The success of Ontario's feed-in tariff program has launched the province onto the world stage among jurisdictions rapidly expanding the role of renewable energy. In doing so, the province has attracted dozens of manufacturers to Ontario where they have established new plants and created new jobs for Ontarians.

Like all public policy, the feed-in tariff program can be improved, made stronger and better serve the needs of Ontario's citizens. Our joint submission is made with that intent in mind—to make a ground-breaking program better. We all want a program that works, adds value to Ontario's electricity system and protects ratepayers from the volatility in fossil-fuel prices and the risk from new nuclear construction.

Renewable tariffs are no panacea for the rapid and equitable development of renewable energy. Successful programs depend on several policies working in harmony. Most importantly, success depends upon political commitment. Without political commitment no program will succeed regardless of how well designed. With that commitment solutions will be found to the problems that inevitably arise.

What renewable energy policy in Ontario needs most of all is stability. Fortunately for Ontario, the province has made a strong commitment to renewable energy and to the feed-in tariff program. This strong support will ensure that the feed-in tariff program will grow in sophistication, become even more successful, and ultimately help the province build the "conservation culture" that we all desire.



10 / Appendix

10.1. Economic Connection Test

The following comments have been prepared by SkyPower as a brief background on connection capacity and suggestions on how to improve the connection process.

- OPA and Hydro One are still using 2008 TAT/DAT data which does not provide much help to developers and potential investors. These tables do not take into consideration many upgrade and improvement projects those happened since then. Over the last few years, Hydro One had improved and strengthened its Transmission Interties increasing the transfer capability. OPA should release new TAT data province wide immediately to reflect these changes.

- TAT data should reflect the rescission of all old projects that were not materialized, cancelled or were unable to achieve their commercial operation. Thus the capacity made available as a result so should be immediately allocated to projects as per their priority ranking list. A monthly or quarterly progress report should be published on the status of these projects. This quarterly or monthly report should also reflect the status of transmission and distribution system expansion. This will show continued commitment by the province to encourage investment and attendant job creation that the feed-in tariff program has initiated.

- Certain Transformer Stations are constrained by short circuit limitation or other minor issues that limit the integration and penetration of renewables into the grid. Hydro One and OPA should publish both short-term and long-term steps being taken to address these issues.

- Developers should be given opportunity for a conditional award “as per their priority ranking” with high-level cost overview of a particular upgrade and if developers are willing to take up that cost, this condition can be waived in their final contract awards. Developers may be able to assist in participating or conducting third party technical studies to get that particular upgrade done economically and in a viable fashion. This will help to modernize the current power system infrastructure cost effectively and more quickly than otherwise. An OEB mandated and legally binding mechanism already exists in the form of Connection Cost Agreement (CCA) with Hydro One to facilitate this process.

- The Economic Connection Test (ECT) process was envisaged as a clear mechanism to spur the growth of clean energy investment in the province, however, the process is taking much too long and is in fact discouraging this investment. The ECT process, if conducted in a timely manner, may direct development dollars toward the distribution system in local communities and by doing so modernize the province’s aged power system infrastructure. The ECT process should strictly adhere to the six month timelines in the regulations.

- The ECT process should also invite developers to cluster their projects near one another to facilitate economic expansion of system upgrades and to join in or co-share the cost of these upgrades in private-public partnerships. The Ministry of Energy should identify such clustered projects or zones and set a priority for system upgrade where developers have clustered their projects.

10.2. **Achieving Distributed Generation Targets**

The following was prepared by Joshua Wong, Opus One Solutions, on how Ontario can redress decades of underinvestment in the province's transmission and distribution system to meet targets for greater integration of new renewable generation.

SUMMARY OF RECOMMENDATIONS

In quantifying and measuring the progress of the Government of Ontario's focus on distributed renewable energy connection, it is recommended that the Minister of Energy adopt a similar approach of CDM and direct the OEB to take steps to establish mandatory distributed renewable generation targets, including renewable capacity (MW) and accumulated renewable energy (GWh) targets, as part of transmitters' and distributors' conditions of licences for the 2012-2015 period, in achieving green energy and job creation objectives for the province of Ontario. Renewable capacity and energy targets should further be specified for each transmitter and distributor, at a value greater than zero. Each distributor and transmitter must meet its renewable capacity and energy targets through Board approved GEA Plans involving generation connections, system expansion, and smart grid, in coordination with programs made available by the OPA (e.g. FIT and microFIT). Each transmitter and distributor should further specify in their GEA Plans a roadmap for smart grid development, with respect to the objective of distributed renewable generation connection.

In achieving such distributed renewable generation targets, Shine Ontario has the following core recommendations as realistic, implementable, and cost-effective means to remove existing limitations on renewable capacity based on antiquated grid technologies and to adopt best practices based on modern grid capabilities:

1. *Generators, transmitters, LDCs and the OPA to increase levels of coordination to lift current constraints on renewable generation connection, in particular through the use of smart grid technologies.*

2. *Transmitters and LDCs to report back to the OEB, as part of GEA Plans, on progress of distribution generation connections, any technical limitations being faced, and plans to achieve DG targets including through the use of smart grid technologies.*

3. *Generators, transmitters, LDCs and the OPA to pursue joint efforts with industry and academia to carry out research and development activities in core areas including generator model development, short circuit capacity controls and constraints, frequency response, ride-through requirements, dynamic performance testing, and integration and effects of smart grid technologies, for the objective of advancing Ontario's capacity to connect renewable generation.*

4. *Hydro One and OPA to provide justification and visibility into arriving at current generation connection limitations, and to develop a new set of generation connection guidelines based on the implementation of a smart grid.*

5. *Transmitters and LDCs to adopt the use of centralized and distributed energy storage devices along generator sites, transmission and distribution substations, distribution feeders, and end use to enable dispatchability, firming of capacity, buffering of intermittency, balancing of load and supply following schemes, reactive power injection, frequency response, and other services for grid and renewable generator support.*

6. *Transmitters and LDCs to allow and enforce exceeding of existing standards, if required, for power electronic conversion systems for grid interface, such as IEEE 1547, UL 1741 and CSA 22.2 107.1, to meet specific grid requirements. Examples include controllable reactive power, short circuit contribution, ridethrough capabilities, islanding, harmonics, and resonance effects.*

7. *Transmitters, LDCs, and the OPA to pursue firming of distributed renewable generation capacity to a level suitable to be used as provincial base generation through the use of advanced monitoring, controls, and storage technologies.*

8. *Transmitters and LDCs to require sufficient monitoring equipment with communication capabilities at generator sites and utility infrastructure to provide visibility in optimizing DG and grid performance, including meters, line sensors, substation monitoring, phasor measurement units, and establishment of an advanced monitoring infrastructure for grid situational awareness.*

9. *Transmitters and LDCs to implement automation to manage grid reliability and optimize performance under distributed generation connections. Such systems may include self-healing controls, energy storage systems, distributed intelligence controls, energy management systems, real time network modeling systems, adaptive protection schemes for dynamic feeder ratings and protection settings, microgrid controls, and enabling interoperable communications and enterprise systems.*

10. *Transmitters and LDCs to provide power quality controls in addition to standards for generator inter faces. This includes the use of filters and dynamic compensators for voltage support, reactive power injection, harmonic controls and resonance mitigation.*

11. *The OEB to provide guidelines and filing requirements in support of such recommendations, including transmission and distribution system codes and GEA plans as deemed condition of licence.*

DEFINITION AND OBJECTIVES FOR SMART GRID UNDER GREEN ENERGY ACT

Smart grid has been defined as a fundamental policy of the Province of Ontario regarding the modernization of the electric system. On May 14, 2009, the *Green Energy and Green Economy Act* ("GEA") was given Royal Assent. The legislation provides a definition of smart grid and reflected in *The Electricity Act:*

(1.3) For the purposes of this Act, the smart grid means the advanced information exchange systems and equipment that when utilized together improve the flexibility, security, reliability, efficiency and safety of the integrated power system and distribution systems, particularly for the purposes of,

a) *enabling the increased use of renewable energy sources and technology, including generation facilities connected to the distribution system;*

b) *expanding opportunities to provide demand response, price information and load control to electricity customers;*

c) *accommodating the use of emerging, innovative and energy-saving technologies and system control applications; or*

d) *supporting other objectives that may be prescribed by regulation.*

On November 23, 2010, the Minister of Energy provided a Directive to the Ontario Energy Board ("OEB" or "Board") to move forward with a plan to implement the smart grid. The Directive provides a list of ten overarching policy objectives, and further sets out a number of parameters under three major categories of objectives, including customer control, power system flexibility, and adaptive infrastructure. This Directive further requires the Board to consult for the purpose of developing a regional or otherwise coordinated approach to the planning and implementation of smart grid activities. The Directive is attached as Appendix…

Central the definition of smart grid as reflected in *The Electricity Act* (1.3a), as well as core to the objectives of all three policy objectives, is the increased participation, use, and ongoing innovation with renewable generation.

BARRIERS TO RENEWABLE GENERATION CONNECTION

Following the establishment of the GEA, the Ontario Energy Board developed filing requirements for distribution system plans under deemed conditions of licence (EB-2009-0397), which required transmitters and distributors to file GEA Plans as a part of their cost of service rate application for 2012 and subsequent rate years. The GEA Plan will include plans for: (1) Renewable Energy Generation Connection, and (2) Development of the Smart Grid. Each transmitter and distributor is further required to submit its GEA Plan to the Ontario Power Authority ("OPA") for comment prior to filing, for the purposes of coordination with other transmitters and distributors and whether projects and activities to accommodate renewable generation are consistent with any integrated plan for the region, or the province as a whole. The OPA has indicated that as a part of its Economic Connection Test for the Feed-in Tariff ("FIT") program, it will work with transmitters and distributors to integrate transmission and distribution system planning.

To date, there has not been a clear and well-defined integration between Renewable Energy Generation Connection and Development of the Smart Grid under the distributor's GEA Plans. Planned development of the system to accommodate renewable generation connection consists of connection assets, expansion of the system, and renewable enabling improvements, and disconnected with Smart Grid plans which are currently only restricted to demonstration projects, studies and planning exercises and education and training. With the definition of smart grid under the GEA as well as policy objectives under the November 23, 2010 Minister's Directive clearly stating the need for smart grid to increased participation, use, and ongoing innovation with renewable generation, there has not been a coordinated effort to consider the developments of smart grid when defining allowable connection capacities under the Long Term Energy Plan and under transmitter and distributor connection impact assessments. Under the Directive's objective of Visibility under Customer Control, participants in renewable generation further does not have sufficient visibility into the derivations of renewable energy capacity targets and limitations.

Beyond conservation and demand management and the Feed-in-Tariff programs, the OPA has little involvement in transmission and distribution smart grid planning. The requirement for the OPA to review and comment the GEA plan does not reflect a modernized smart grid approach to distributed renewable generation connection beyond system expansion, and further impedes the unhindered connection of renewable generation.

STRIVING FOR RENEWABLE GENERATION TARGETS

On March 31st, 2011, the Minister of Energy and Infrastructure provided a Directive to the OEB to take steps to promote energy conservation, energy efficiency, load management or the use of cleaner energy resources, including alternative and renewable resources. This includes having the Board to take steps to establish electricity conservation and demand management ("CDM") targets, consisting of 1330 MW of provincial peak demand reduction and 6000 GWh of accumulated reduced electricity consumption, to be met by licensed electricity distributors within the 2011-2014 timeframe.

In quantifying and measuring the progress of the Government of Ontario's focus on distributed renewable energy connection, it is recommended that the Minister of Energy adopt a similar approach of CDM and direct the OEB to take steps to establish mandatory distributed renewable generation targets, including renewable capacity (MW) and accumulated renewable energy (GWh) targets, as part of transmitters' and distributors' conditions of licences for the 2012-2015 period, in achieving green energy and job creation objectives for the province of Ontario. Renewable capacity and energy targets should further be specified for each transmitter and distributor, at a value greater than zero. Each distributor and transmitter must meet its renewable capacity and energy targets through Board approved GEA Plans involving generation connections, system expansion, and smart grid, in coordination with programs made available by the OPA (e.g. FIT and microFIT). Each transmitter and distributor should further specify in their GEA Plans a roadmap for smart grid development, with respect to the objective of distributed renewable generation connection.

ACHIEVING RENEWABLE GENERATION TARGETS

In response to the Minister's Directive on November 23rd, the Board convened a Smart Grid Working Group ("SGWG") and released a Staff Discussion Paper (EB-2011-0004) on November 8, 2011 in regard to the establishment, implementation and promotion of a smart grid in Ontario. The paper provides a discussion of each of the policy objectives, and the SGWG acknowledged, under Customer Control objectives, that technical constraints on the electricity system may result in customers in Ontario having different levels of access to be able to participate in distributed renewable generation. The paper further describes that SGWG members believed that investments in smart grid integration should be prioritized to maximize opportunities for participation, and promoted in high growth areas where future capital expenditures will be highest. Under Power System Flexibility objectives, the SGWG recommends the Board to investigate cost recovery guidelines on Distributed Generation on topics including connection, modeling and forecasting, monitoring, ancillary services and control (including dispatch capabilities). Storage was specifically mentioned as a key component of optimizing DG and the Board should provide guidelines in this area. Network visibility of grid conditions were discussed as important in promoting grid efficiency and optimizing DG. The "right" balance of control and automation were by definition of the policy objective needed to promote distributed renewable generation. Coordination among utilities is also emphasized and not limited to information sharing. In conclusion, it has been acknowledged that technical constraints exist in today's system, yet investments in smart grid integration have been defined as per policy objective and agreed by the SGWG as a central solution to the problem.

In achieving the set renewable generation targets, Shine Ontario has the following three areas of recommendations:

1. **Coordinated efforts in renewable generation connection planning and execution**

   Generators, distributions, transmitters, and the OPA should increase levels of coordination to lift constraints of the distribution and transmission systems for the unimpeded connection of renewable energy generation. There should be justification into arriving at existing connection limitations, and active pursuit of smart grid technologies in system modernization, along with traditional means of generator connection and system expansion with distribution and transmission system upgrades. Progress should be measured with performance standards to expedite the pace of connection.

2. **Modernization of the Electric System Infrastructure**

   Focused efforts should be made in modernizing the electric system for distributed renewable generation connection, beyond system expansion means with consideration for new technologies and standards. This can be described under the individual policy objectives under Power System Flexibility:

   - ***Distributed Renewable Generation –*** *move from a generation connection paradigm to holistic energy management paradigm with generation, demand, and storage management. This includes using centralized and distributed storage units along generator sites, transmission and distribution substations, distribution feeders (community level), and end use to enable dispatchability, firming of capacity (i.e. from installed capacity to green energy), buffering of intermittency, reactive power controls, frequency response, and other services for grid and renewable generator support. Existing technologies and standards for power electronic conversion systems for grid interface, such as IEEE 1547, UL 1741 and CSA 22.2 107.1, should be reviewed and allowed to exceed base standards to meet specific grid requirements, including controllable reactive power, short circuit contribution, ridethrough capabilities, islanding, harmonics, and resonance effects. The use of storage dispatch at supply, grid, and load locations, as well as various load control and demand response technologies should be explored to balance load following and supply following schemes. Communication and utility dispatchable capabilities for dynamic operations should be defined. Under advanced monitoring and controls, distributed renewable generation should be firmed to a level suitable to be used as provincial base generation.*

   - ***Visibility –*** *requirement for sufficient monitoring equipment with communication capabilities at generator sites and utility infrastructure to provide visibility in optimizing DG and grid performance, including meters, line sensors, substation monitoring, phasor measurement units, and establishment of an advanced monitoring infrastructure for grid situational awareness.*

   - ***Control and Automation –*** *generation, distribution, substation, and transmission automation systems should be encouraged to manage grid reliability and optimize performance under distributed generation connections. Such systems may include self-healing controls, energy storage systems, distributed intelligence controls, energy management systems, real time network modeling systems, adaptive protection schemes for dynamic feeder ratings and protection settings, microgrid controls, and enabling interoperable communications and enterprise systems.*

   - ***Quality –*** *power quality controls should be in place in addition to standards for generator interfaces. This includes the use of filters and dynamic compensators for voltage support, reactive power injection, harmonic controls and resonance mitigation.*

3. Studies and Planning in Overcoming Technical Barriers

To increase the overall knowledge and understanding about the behaviours of distributed generators on electrical grids and in response to the policy objective of Adaptive Infrastructure, joint efforts between utilities, generators, industry and academia should be encouraged. Increased visibility of the system should be promoted such as in advanced sensors, metering, communications, simulation software, and testing equipment for data collection, engineering simulations, and live field testing. Research and development should be performed in core areas including:

- *Generator model development and validation, including steady and dynamic models*
- *Short circuit capacity controls and constraints*
- *Frequency response, including harmonics and resonance effects*
- *Ride-through requirements*
- *Dynamic performance testing, including voltage setpoints, reactive capabilities, voltage change, and transient phenomenon*
- *Integration and effects of smart grid technologies*

The result of such efforts should result in a review and potential revision of Connection Impact Assessment ("CIA") requirements with the objective of advancing Ontario's capacity to connect renewable generation. Each transmitter and distributor should further lay out a strategy and plan to achieve renewable targets including the use of smart grid technologies, and filed to the Board as a part of their GEA Plan.

CREATION OF GREEN JOBS

Ontario's Green Energy and Green Economy Act ("GEA") has a defined target to create 50,000 clean energy jobs by the end of 2012. On July 25th, 2011, the Ontario Government announced the creation of 20,000 jobs to date[56]. Shine Ontario believes that the target can only be achieved if there is increased momentum on developing Ontario's smart grid infrastructure and in sustaining, if not increasing, the pace of renewable energy development projects.

The industry is in a very opportune time for job creation driven by an ageing workforce, ageing infrastructure, and a time of asset modernization and renewal. In its 2011 electricity distribution rate filing, Toronto Hydro Electric System Limited ("THESL") has indicated that it has "faced with a projected turnover of 45 percent of its current workforce over the next ten years. At the same time, THESL is executing a substantial modernization and renewal of its ageing distribution system"[57]. Based on a study by KEMA for the GridWise Alliance[58], released July 25th, 2011, a recent U.S. survey suggests that utilities will need to replace 46 percent of skilled technician positions by 2015 because of retirement or attribution. Approximately fifty percent of the engineering workforce will be eligible to retire by 2015.

[56] http://news.ontario.ca/mei/en/2011/07/green-energy-act-creates-20000-jobs.html

[57] EB-2011-0144, Exhibit C2 Tab 1 Schedule 2

[58] "The U.S. Smart Grid Revolution: Smart Grid Workforce Trends 2011", GridWise Alliance, July 25, 2011

Utilities will structure new hiring by using these legacy position openings only as a guidepost. New positions will need to address and adapt to the new realities and opportunities of the smart grid with a new set of workforce requirements. The GridWise Alliance believes that the future of smart grid continues to be very strong with investments flowing into businesses active in the smart grid sector, driving continued innovation and job creation. Such sustainable job creating power includes secondary and tertiary industries that will enable and assist utilities to deploy and maintain the smart grid. The smart grid will expand opportunities in the electric industry as a whole, and foster collaboration between industry, governments, utilities, and schools to prepare and create high-valued jobs.

The smart grid triggers a fundamental paradigm shift that will instill change and advancement in all parts of the electric industry. Established models, standards, methodologies and practices in power flow engineering, reliability, interconnection, planning, asset management and investment, design, system operations, and maintenance, that have sustained the grid infrastructure for decades, will now need to be developed and modernized with the new opportunities made available through the smart grid. This requires substantial efforts in research and developments, demonstrations, deployments, and adoption into sustaining practices, attracting new talent to be engaged, interested, and entering the clean energy space.

This effects tangible and significant job creation opportunities across academia, utilities, contractors, developers, suppliers, integrators, and manufacturers. Some of the major areas of job creation include:

- *Power system engineering, including power flow, short circuit, protection and control, power quality, and reliability*
- *Metering and sensing infrastructure*
- *Asset conditioning and operation monitoring*
- *Automation and self-healing systems*
- *Control systems with distributed intelligence and agents*
- *Energy storage, including electrochemical, thermal, and mechanical storage technologies*
- *Communications and computing technology, including information systems, software and hardware development, network architecture, and standards development and realization*
- *Data management, processing, analytics and optimization techniques*
- *Asset management and investment modelling and methodologies*
- *New customer service and participation models and operating systems*
- *Premise (e.g. in-home) energy management systems*
- *Electric vehicles and charging infrastructure*

Smart grid jobs are typically high quality, permanent jobs with ongoing high value propositions. The systemic and integrative nature of smart grid further brings together diverse industries for synergistic innovation and cross-optimization. This increasingly requires a workforce with broad analytical skills, solid technical fundamentals, and strong business acumen, along with a collaborative network involving industry, governments, utilities, and academia to develop talent and close training gaps.

In summary, a vibrant and dynamic smart grid economy catalytically fueling the continued growth of renewable energy developments will be answer to achieving Ontario's green job targets.

10.3. **Comment on the Feed-in Tariff Review by Goodmans LLP**

Stopping Ontario's FIT program before it can fully realize its potential, and instead switching to the previously tried and failed RFP model of green energy procurement, would be a great mistake. A primary objective of the FIT program is to attract green jobs to and investment in Ontario and to enhance the Province's reputation as a centre for innovation and capital formation. As a major Toronto law firm we have been able to observe and participate in the program's partial achievement of this objective. The FIT program, a visionary achievement of Ontario's current government, continues to be the best and fastest approach to creating a substantial green economy for Ontario.

GOODMANS LLP

Goodmans LLP is a firm of 200 lawyers having its main office in downtown Toronto. We are best known for our work in corporate finance and mergers and acquisitions, including billions of dollars of investments in Ontario's energy sector by Canadian and non-Canadian businesses.

We have been involved in Ontario's electricity sector since the early 1990s, when we began acting for the Electricity Distributors Association (then called the Municipal Electricity Association). We helped the EDA and a number of its member local distribution companies (LDCs) adapt to the changes in the regulatory environment introduced by the Electricity Act of 1998. We advised many of them in connection with merger and acquisition activity, and guided some of them in their first entry into the capital markets; in 2003 we acted for a number of large LDCs in connection with the first pooled bond financing transaction undertaken within Canada's electricity sector.

We have also for many years acted as counsel to the Canadian Electricity Association, representing Canada's largest electricity generators, transmitters and distributors, including certain members in Ontario.

In 2004, we began acting for clean and renewable energy developers and LDCs seeking power purchase agreements through RFP processes conducted in Ontario, Quebec, Manitoba, Nova Scotia, Newfoundland and New Brunswick.

FIT IS BETTER THAN RFP

Ontario's government recognized this deficiency with a green energy RFP approach when it introduced the Renewal Energy Standard Offer Program (RESOP) and subsequently the FIT program. The subcommittee report of the Standing Committee on General Government described a feed-in tariff approach as a significant improvement over previous RFP processes, as the latter effectively precluded community power groups from obtaining power purchase agreements due to prohibitive costs and systemic prejudices. The subcommittee highlighted some of the objectives of the feed-in tariff approach as being:

10.1. to increase certainty in investor confidence;

10.2. to create jobs through new renewable energy projects;

10.3. to encourage community based projects, particularly those developed by rural and First Nations communities; and

10.4. to generate broader private sector involvement in the development of renewal energy.

In sum, this Province took a hard look at RFP vs. FIT-based electricity procurement and for still-valid reasons opted for the FIT program.

THE FIT PROGRAM HAS BEEN GOOD FOR ONTARIO – INCLUDING ONTARIO'S LAWYERS

Our own experiences lend us to believe that the FIT Program's objectives, summarized above, are being achieved. With the introduction of a more standardized approach to the contract award process, first with the introduction of the RESOP in 2007 and subsequently with the rollout of the FIT in 2009, we began to see come into the Ontario renewable energy market a wider range of clients, from developers (large, mid-sized and small) to consultants to manufacturers, to property owners.

As our client base has broadened, so has the scope and depth of our renewable energy practice. Since 2007, we have assisted clients in raising over a billion dollars in capital for renewable energy activity. Thanks almost entirely to the RESOP and FIT programs, we now have two corporate/commercial lawyers, two real estate lawyers, two financing lawyers, and one environmental/urban planning lawyer who devote a substantial amount of their time to renewable energy projects. In addition, our energy regulatory practice has also grown.

This experience has been replicated across Toronto's other major law firms, such as Stikemans LLP, Bennett Jones LLP, Blakes LLP, and others. All of these firms have built significant renewal energy practices and by far the greatest period of growth in those practices has occurred since the introduction of the RESOP in Ontario.

The notion that a given program is to be applauded because it puts money into the hands of lawyers would no doubt be scoffed at by some. But if one believes, as do we, that building a vibrant renewable energy sector will make a lasting and an invaluable contribution to the enhancement of Ontario's status as a financial and industrial centre, then one cannot ignore the role that lawyers play in the development of that sector. Renewable energy development of necessity requires too sophisticated and specialized expertise in contracts, regulations, and real estate that only lawyers can provide. Just as one cannot have a world-class financial centre without world-class law firms, so are world-class law firms essential to the development of a world-class renewable energy sector.

Indeed, Ontario's law firms now can showcase their expertise in renewable energy to the rest of the world. We are already advising clients with respect to renewable energy projects in places such as Australia, South Africa, Israel and Chile. Extending the geographical range of our services creates a stronger firm which will hire more lawyers and staff in Ontario.

Moreover, fact that we following our clients to other jurisdictions demonstrates that those clients themselves have, thanks to the RESOP and FIT programs, built expertise which can be taken abroad.

CANCELLING THE FIT PROGRAM WOULD BE BAD FOR ONTARIO

If the FIT program is cancelled then its future benefits will be lost and many of the benefits already achieved will be nullified or diminished. We have already seen in the past the chilling effect on electricity sector investment when the government materially changes course. As counsel to the EDA and many LDCs, we saw how the former Conservative Government's many starts and stops on the way to the supposed opening up of the Ontario electricity market from 1998 to 2004 crushed investor confidence and interest in that sector for some time. We also had some smaller and mid-size renewable energy development clients who left the Ontario market for good when their projects lost value because of the shift from the RESOP to the FIT program. We do not mention this latter development because we believe the move from the RESOP to the FIT was unwise or unjustified; to the contrary, we believe the FIT is a significantly superior program from the perspectives of transparency, efficiency and fairness. We acknowledge that some change in programs is inevitable and that all change brings about some dislocation. But, if even an evolutionary change such as the RESOP to FIT transition caused significant disruption, then a radical move, such as the cancellation of the FIT program and the reversion to an RFP regime, would without doubt cause serious disruption and a chilling effect on investment.

Our clients and many others in the development, manufacturing and consulting sectors have spent millions upon millions of dollars on land option acquisitions, manufacturing facility set-up, wind and solar resource studies and consulting fees in reliance upon Ontario having a first-come first-served regime, subject to only to transmission capacity availability. Dashing these expectations after only two years will severely detract from Ontario's reputation as a leader in renewable energy.

Furthermore, there would be a cost to government stopping the FIT program in the form of an unknown quantum of compensation due to the program's participants. The many businesses that invested in Ontario in the green energy economy, relying on the government's representation that it would provide a long-term and stable FIT program, will suffer great damage if that program is eliminated. Many of these enterprises are not large businesses with deep pockets and would not be able to transition to an RFP environment. They would have to seek recourse for the legitimate expectations created by the government but later undermined. Moreover, many of these business have invested material dollars in hard assets in Ontario, such as in buildings, land and equipment, based on the promises made to them by government and the very rules of the FIT program. Killing the FIT program would effectively expropriate the value in their business – for which they would have to be compensated.

CONCLUSION

As advisors to many of the participants in Ontario's green energy section, we have been privileged to observe the benefits of the FIT program first-hand. We urge the government to continue the program so that the goals of a vibrant, broadly based green energy industry that attracts investment and opportunity to Ontario will be fully realized.