ARTs Revision Report 04

Renewables without Limits

Moving Ontario to Advanced Renewable Tariffs
Updating Ontario's Groundbreaking Standard Offer Program

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Overview

This report examines the status of Ontario's groundbreaking Standard Offer Contract (SOC) program and proposes changes to the program as part of the program's first two-year review.

Renewables without Limits

To achieve OSEA's original objectives of developing as much renewable energy as quickly as possible through community participation, changes should be made in Ontario's SOC program. Some of these changes should be made immediately.

In light of experience with the program to date, Ontario should take immediate corrective action. The province should

- Raise solar PV tariffs and on-farm biogas tariffs markedly, and
- Apply the new tariffs retroactively.

To achieve the province's renewable energy targets as quickly as possible, all caps on the SOC program should be lifted. At the same time the province should ensure that there is ample capacity on the distribution system for all community power projects seeking connection.

Specifically, the province should

- Lift the program size cap,
- Lift the voltage cap, and
- Implement an anti-gaming provision for projects connected to the distribution system.

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To achieve OSEA's target of 500 MW of community-owned renewable resources by 2015, Ontario's SOC program must move quickly toward a modern system of Advanced Renewable Tariffs through a substantial revision of the program's objectives and the tariffs offered. Such a program would

- Grant renewable energy priority access to the grid, and would
- Grant renewable energy priority of purchase.

Further, Ontario's transmission and distribution system is a public resource. As such, OSEA recommends that renewable energy development by homeowners, farmers, First Nations, co-operatives, and municipalities receive

- Priority access to the grid where capacity is limited, and
- Priority access to any expanded grid capacity.

Regardless of the progress made in moving Ontario's SOC program toward a system of Advanced Renewable Tariffs, problems and conflicts will arise. For this reason, OSEA suggests that the Minister of Energy name a Chief Renewable Energy Officer responsible for assuring that renewable resources are added at a pace sufficient to meet the government's objectives and in a manner equitable to all Ontarians.

OSEA SOC Program Policy Proposal Summary		
Immediate Corrective Action Needed		
	Current	Action Needed
Tariffs		
Solar PV	Tariff $0.42/kWh	Raise base tariff to $0.80/kWh
	No inflation adjustment	Add infation adjustment
	Non-differentiated	Differentiate tariffs by size
		Grandfather existing contracts
On-farm Biogas	Tariff $0.11/kWh	Raise base tariff to $0.17/kWh
	Non-differentiated	Differentiate tariffs by size
		Grandfather existing contracts
Proposed Changes for Completion by March 20, 2008 Review		
Tariffs		
Wind onshore	Tariff $0.11/kWh	Raise tariff to $0.148/kWh
	Non-differentiated	Differentiate tariffs by resource intensity
	Inflation adjustment 20%	Increase inflation adjustment to 60%
Wind offshore	Not included	Add base tariff of $0.186/kWh
		Differentiate tariffs by resource intensity
Solar hot water	Not included	Add base tariff of $0.10-$0.20/kWh
		Differentiate tariffs by application
Geothermal	Not included	Add base tariff of $0.224/kWh
		Differentiate tariffs by size
Policies		
Renewables	Not preferred resources	Priority access, Priority purchase
Project cap	10 MW	Eliminate cap
Voltage cap	50 kV	Eliminate cap
Anti-Gaming	None	Add anti-gaming provisions
LDCs	Uncertain cost recovery	Assure full cost recovery
Community renewables	Not preferred resources	Priority access, Priority purchase
Responsibility	No one person responsible	Name a chief renewable energy officer

Table of Contents

OSEA & Community Power

OSEA promotes the development of community-owned renewable energy generation, that is, renewable energy projects developed, owned, and operated by homeowners, farmers, First Nations, and cooperatives.

The pattern of renewable energy development in northern Europe differs markedly from that in much of North America. In Denmark and Germany, much of the renewable energy generation is owned locally by people in the community or by those nearby. This is possible because homeowners, farmers, and investment groups can quickly, easily, and at little cost connect to the grid and sell their electricity for a profit through a system offering fixed prices for a fixed period of time. Such a system is variously called electricity feed laws, Renewable Energy Feed-in Tariffs (ReFITs), or Advanced Renewable Tariffs (ARTs).

OSEA sought to replicate European success with community power by adapting the European model of Advanced Renewable Tariffs to Ontario.

Advanced Renewable Tariffs bring more renewable energy capacity on line more quickly than any other policy mechanism. Moreover, this policy tool is more equitable than other mechanisms by allowing all parties to participate in the development of renewable energy, including homeowners, farmers, First Nations,

and community groups. In short, feed laws can be fair to all players when designed to do so.

Background[3]

OSEA launched a campaign to bring European electricity feed laws to Ontario in February 2004. In November 2004, Ontario's Liberal Party (the ruling party in Ontario's provincial parliament) endorsed the concept of Advanced Renewable Tariffs, as modern feed-in tariffs are sometimes called, at its fall policy conference.

In December 2004, OSEA was hired by the Ontario Ministry of Energy to prepare a report on the development of what the Ministry called "Standard Offer Contracts". OSEA immediately called upon ADEME's Bernard Chabot[4] to lead a stakeholders group to discuss pricing for each renewable technology under the proposed Standard Offer Program. The tariffs produced from the workshop were incorporated into OSEA's proposal. OSEA's report to the Ministry of Energy was released to the public in the spring of 2005.

The Minister of Energy subsequently directed the Ontario Power Authority (OPA) and the Ontario Energy Board (OEB) to determine how to implement OSEA's suggestions. OPA & OEB issued a draft report in early 2006 after further consultation with OSEA and other stakeholders.

After much discussion between OSEA, the Ministry of Energy, and the OPA, the OPA-OEB report was publicly released along with a directive from the Minister of Energy to implement the program in March 2006.

Premier Dalton McGuinty announced the program on March 21, 2006 and in November 2006 the program was formally launched. Through April 2007, the Standard Offer Program resulted in approximately 350 MW in contracts for new renewable generation. By May 2007, OPA was issuing about 100 MW of contracts per month. OSEA estimates that by year end 2007 some 50-75 MW of projects will be in operation due to the Standard Offer Program.

The SOC program calls for a review every two years. OSEA believes that the first review should begin in the first quarter of 2008 and be completed by March 21,

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[3] See also North America's First Electricity Feed Law: Standard Offer Contracts in Ontario Canada, Paul Gipe and Bernard Chabot, DEWI Magazin, Nr. 29, August 2006, http://www.dewi.de/dewi_neu/englisch/themen/magazin/29/04.pdf, visited May 12, 2007; and The Development of Renewable Electricity Policy in the Province of Ontario, Ian H. Rowlands, University of Waterloo, 29 August, 2006, http://www.fes.uwaterloo.ca/research/greenpower/Rowlands_OntarioRE_Policy.pdf, visited May 12, 2007.

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two years following Premier Dalton McGuinty's announcement of the program. Thus, OSEA has begun a review of the program and will discuss this review and the status of the SOC program with stakeholders during the summer of 2007.

Renewable Energy Policy Mechanisms

There is an extensive literature on the topic of renewable energy support mechanisms. There are several recent reports and several new books that examine renewable policy options in more detail than possible here. Links to these and other documents as well as commentary on feed laws and feed-in tariffs can be found at http://www.wind-works.org/articles/feed_laws.html.

In countries where Advanced Renewable Tariffs are successful, they are the principal, if not only, policy mechanism (Germany and Spain) used to develop renewable energy.

All support mechanisms for renewable generation of electricity must, at a minimum, include measures for:

- Access to the grid (interconnection), and
- A price for the electricity produced that contributes to profitability or at least the prospect of profitability.

These elements are the two essential parts of the development equation. One without the other will not lead to significant development. All successful policies, whether European feed laws or Renewable Obligations, include these two elements.

In the United States, for example, PURPA (the Public Utility Regulatory Policies Act of 1978), provided access to the electricity network and specifically prohibited discrimination against "qualifying facilities". PURPA also provided a mechanism for determining the price (avoided cost) that would be paid for generation, but it famously did not specify a price. At the time of PURPA there were also lucrative tax subsidies available. Nonetheless, there was little development. Independent power producers did not have sufficient countervailing power to negotiate successfully with the entrenched electric utilities that operated state-sanctioned monopoly franchises.

It wasn't until California forced the state's investor-owned electric utilities in the early 1980s to offer standardized contracts that development of wind energy and other renewable sources of energy began in earnest. And it wasn't until one contract, Standard Offer #4, provided specific prices (tariffs) for generation that development boomed.[5]

[5] For a discussion of this period, see Gipe, Paul, *Wind Energy Comes of Age*, (John Wiley & Sons: New York, 1995).

Germany's groundbreaking *Stromeinspeisungsgesetz* (StrEG, 1991) is an example of a policy that provides both elements: access and price. Literally, the law on "feeding-in" electricity provides for access. For this reason, the law and subsequent revisions are commonly referred to as Feed-In laws. The StrEG also specifies how much the renewable generator will be paid.

Germany's more recent *Erneuerbare Energien Gesetz* (EEG, 2000 and 2004), for example, clearly provides for access in its preamble by stating that its purpose is not only to permit but also to encourage interconnection with the network. Germany's EEG is formally known as the "Act on granting priority to renewable energy sources" of electricity from qualifying generators. The EEG, or Renewable Energy Sources Act as it is known in English, then goes on to specify in great detail the prices that will be paid for renewable sources of generation.

Corollaries to the elements of access and a means of payment are that access must be non-discriminatory, without resort to lengthy and costly regulatory proceedings, and that payment must be sufficient to drive development.

Revenues from tariffs, or from tariffs plus monetary support, must exceed the costs of generation by a sufficient margin for profitability, or development will not proceed, or will proceed at a tepid, insignificant pace. The degree to which revenues exceed generation costs determines the rate of deployment, everything else being equal.

Because renewable sources of generation are capital-intensive, they require long periods of time to return their investments and earn a profit.

Consequently, the prerequisites for policies that support renewable energy development must include:

- The political desire or demand for renewable sources of generation,
- The willingness to pay for renewable generation, and
- The stability of public policy to provide a return on investment.

Worldwatch Institute's Janet Sawin, an authority on national policy instruments for developing renewable energy, advises that any support mechanism must be:[6]

- Predictable, long-term, and consistent, with clear government intent. These characteristics are critical to providing certainty in the market, to drawing investors into the industry, and to providing enough lead-time to allow industries and markets to adjust to change.

[6] Sawin, Janet, National Policy Instruments: Policy Lessons for the Advancement & Diffusion of Renewable Energy Technologies Around the World, in D. Aßmann, U. Laumanns, D. Uh (ed.), *Renewable Energy. A Global Review of Technologies, Policies and Markets,* (Earthscan, London, 2006).

- Appropriate. The right types of support are needed—policies must match objectives and might vary by resource potentials, location, technology type, and timing. It is also important that the level of support not be too high or too low.

- Flexible. It is essential to design policies such that adjustments (fine-tuning, but not wholesale changes or elimination of policies) can be made on a regular, pre-determined time schedule if circumstances change. Governments must be able to address existing barriers as they become apparent, and new barriers as they arise. Policies also must be designed to allow developers/generators flexibility for meeting government mandates.

- Credible and enforceable. If policies are not credible, or are not enforceable (or enforced), there will be little incentive to abide by them.

- Clear and Simple. Policies must be easy to implement, understand, and comply with. Procedures of permission and administration, where necessary, must be as clear and simple as possible.

- Transparent. Transparency is important for suppliers and consumers of energy and is necessary to avoid abuse. It facilitates enforcement, maximises confidence in policies, and helps ensure that mechanisms are open and fair.

Ontario's SOC program is the first example of an electricity feed law in North America since that used in California in the early 1980s. However, the program implemented under the rubric of "Standard Offer" is not the full program of Advanced Renewable Tariffs that OSEA recommended. Several key elements were excluded.

In particular, OPA did not use the differentiated tariffs that OSEA recommended. This has resulted in much less renewable energy development than desired by OSEA and other stakeholders, few community renewable projects of any kind, and practically no community solar photovoltaics (solar PV).

Elements of Advanced Renewable Tariffs

Successful ARTs programs must

- Be simple, comprehensible, and transparent,
- Provide simplified interconnection,
- Provide sufficient price per kilowatt-hour to drive development,
- Provide contract length sufficient to reward investment, and
- Provide tariffs differentiated by technology, size, and resource intensity.

Most importantly, renewable tariffs must be sufficiently differentiated to deliver the kind of renewable development from the technology desired in the location

desired. Further, successful programs have either no cap on the program size (Germany), or the cap is so high (France and Spain) that there is no fear of reaching the cap in the early years of the program. This discourages gaming and hoarding.

In countries where Advanced Renewable Tariffs are successful, they are the principle, if not only, policy mechanism (Germany and Spain) used to develop renewable energy. Some countries (France) use both renewable tariffs and Requests for Proposals (RFPs) side by side. However, in France the principal program for meeting French renewable targets is Advanced Renewable Tariffs and RFPs (Call for Tenders) are only used for niche applications, for example France's first large offshore project.

SOC Program Summary

Like policies in Germany, France, and a total of 15 EU countries, the Ontario program will include wind, hydro, biomass, and solar photovoltaics.

- There are no limits or caps on the program.
- Prices or tariffs differ between Solar PV and other technologies.
- Contracts under the program will be for 20 years.
- Project size is limited to 10 MW to encourage distributed generation.
- The program provides for simplified interconnection with the grid.
- The program is reviewed every two years to monitor progress.

Though widely used in Europe, this is the first program of its kind in North America.[7] Interest has been shown in the Ontario program by other Canadian provinces of Canada and by some states in the USA.[8]

Goals of Standard Offer Program

It is useful to reiterate the goals of OSEA's proposal for a program providing Standard Offer Contracts as noted in its 2005 report to the Ministry of Energy.

- Encourage broad participation
- Eliminate barriers to distributed renewable generation
- Provide a stable market for renewable generation
- Stimulate new investment in renewable generation
- Provide a rigorous pricing model for setting the tariffs

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[7] PEI implemented a simple fixed tariff in 2005.

[8] SB 1223 was introduced in the Hawaii legislative assembly in early 2007. Michigan may introduce a bill modeled after Germany's Renewable Energy Sources Act. The California Energy Commission held a workshop in late May 2007 on feed-in tariffs. In his speech from the throne, the Premier of British Columbia, Gordon Campbell, announced that the province would launch a SOC program. Saskatchewan and Manitoba have also formally introduced the topic for discussion, though neither has taken any concrete action.

- Create a program applicable to all renewable technologies
- Provide a simple, streamlined, and cost-effective application process
- Provide a dispute resolution process

Encourage Broad Participation

Ontario's SOC program has resulted in participation by commercial developers, First Nations, some homeowners, and a few farmers. Effectively no renewable energy cooperatives have been able to take advantage of the program.[9]

Eliminate Barriers to Distributed Generation

The program has removed some barriers, but it has also erected new barriers, notably the Orange transmission constraint zone. Most importantly, the program has removed the single biggest barrier to small renewable generation: the right to sell electricity to the grid at a fixed price for a fixed number of years under predetermined conditions.

Proved a Stable Market

The program has provided a stable market for some technologies, however, the market for community solar is tepid at best due to the low price for solar electricity. For a similar reason, the market for biogas generation is similarly small. No on-farm biogas project is moving forward without provincial or federal government subsidies in addition to the federal EcoEnergy program.

Provide a Rigorous Pricing Model

OSEA proposed a pricing model created by ADEME's Bernard Chabot using the Profitability Index. OSEA and Chabot engaged stakeholders, OPA, and OEB in discussions about the model and the assumptions used for each technology. OSEA expected to debate the model and its assumptions. However, this never occurred.[10]

Chabot's model and OSEA's position was fundamentally based on the concept of "cost recovery" that had been used in utility rate regulation in North American for many years. What are the costs of generation from a technology and therefore what is the revenue required to earn a profit based on these costs.

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[9] As of June 2007, 70% of all wind contracts were by large commercial developers, and 99.7% of all solar PV contracts were to commercial developers for ground-mounted, central station plants. The remaining 0.3% of solar PV contracts were issued to homeowners, farmers, small businesses, and one co-operative. See http://www.wind-works.org/FeedLaws/Canada/OntarioStandardOfferContractsAwarded.html.

[10] Chabot and OSEA engaged stakeholders from the wind, solar PV, hydro, and biogas community at a pricing workshop in December 2004 where assumptions about each technology were discussed. Subsequently, OSEA and Chabot presented their model to representatives from OPA and OEB.

Using the cost recovery model, it is logically consistent to award different tariffs for different technologies, and in the case of wind energy, different tariffs for different resource intensities. In short, the concept of cost recovery enables higher prices for wind energy in areas of lower, less-energetic winds and lower prices in areas of higher, more-energetic winds.

OPA took a fundamentally different approach based on their perceived “value” to the ratepayer. OPA did the best they could in raising the resulting “value” price based on this philosophy, but they are ultimately limited in what they can accomplish when bound by the concept of “value”.

OPA began with a base price arrived at from the non-transparent bids in RFP II and then added a value representing transmission benefits from distributed generation. Using this philosophy, they awarded a price of $0.11 CAD/kWh to all technologies and dropped solar PV from the program.

OPA argues that they are bound by the Electricity Act to use value-based pricing. OSEA suggests they are not so bound and that the use of so-called valued-based pricing is ideologically driven.

Create a Program for All Renewable Technologies

OPA & OEB removed solar PV from the program. However, it was restored at the request of the Minister of Energy. The program currently includes all the technologies proposed by OSEA.

Provide a Simple Application Process

The program’s application process is far simpler and more streamlined than that in the province’s previous call for tenders (Request for Proposals). For solar PV, the application process and the interconnection agreements remain onerous for small solar PV installations by homeowners.

Provide a Dispute Resolution Process

OSEA proposed that the Ministry identify an ombudsperson within the OPA or clearly state who would be an arbiter of disputes over the interconnection between projects and local distribution companies or the grid operator. OSEA suggested that the ombudsperson could also act as a clearinghouse for information on the program.

These suggestions were not implemented and conflicts with Hydro One have stymied a number of projects. The only course for proponents who have conflicts with Hydro One or other LDCs is to contact the Minister of Energy directly.

OPA-OEB Program Goals

In their 2006 report to the Minister of Energy, OPA and OEB adopted some of OSEA's suggestions, but not all. OPA and OEB reported that their guiding principles in designing the program were that the program should

- Be simple,
- Remove barriers to renewable generation,
- Balance renewable generation targets with value to ratepayers, and
- Build on the efforts of OSEA.

The results to date are mixed.

However, it should be noted that the German program in one form or another has been in effect since 1991 and that the current form was not reached until after nearly nine years of experience. The Spanish program was introduced in the late 1990s, and the French program in 2001. Ontario's program is off to a good start, but is just that, a start.

Be Simple

Ontario's SOC program is indeed simpler than the province's call for tender or RFP (Request for Proposal) programs. However, the program's application, contracting, and interconnect remains more complex than the EEG in Germany especially in regards to small solar PV installations. While the OPA & OEB has greatly simplified the program for small solar PV installations relative to that of larger projects, small solar PV is still treated as though they are multi-megawatt generators.

Remove Barriers

The program has removed barriers, but OPA has replaced one set of barriers with another set, in particular the Orange exclusion zone. Further, the ability to game the program by commercial developers has led to long connection queues that has effectively barred some community power projects from the distribution system.

Balance Targets with Value to Ratepayers

This criterion is subject to interpretation internally by OPA & OEB as to the intent of Ontario's Electricity Act and was not part of OSEA's original proposal. Inclusion of this provision granted OPA & OEB carte blanche to determine the ratepayer interest and how best to meet it. None of the European policies use such politically charged terms as "value to ratepayers" in their programs. In OPA's & OEB's view "value to ratepayers" trumps all other considerations.

Build on the Efforts of OSEA

The program does build on OSEA's proposal to the Ministry of Energy. However, the program as currently constituted does not fulfill the Liberal Party's call for Advanced Renewable Tariffs. Nor does the program include key elements called for by OSEA. For example, the current program does not base tariffs on the cost of generation plus reasonable profit and does not provide sufficient tariff differentiation to achieve OSEA's objectives of distributed generation and distributed ownership.

The program does go beyond OSEA's proposal for a pilot program by making the program permanent, subject to the review of program details every two years.

Ontario's SOC Program Leads North America

While Ontario's SOC program is significantly less robust than those in Europe it was patterned after; it leads in North America. No other program to develop renewable energy in North America is as comprehensive as Ontario's SOC program. (The Ontario program includes solar, wind, hydro, and biomass.) No other program in North America pays as much as Ontario's program nor for as long (20 years). No other program is as open-ended. (There's no limit on the amount of renewables installed under the program. No other program is intended to provide opportunity to all willing participants, from homeowners to commercial renewable energy developers. (There no requirements that proponents prove financially capable of building a project, nor are there provisions for recapture if the project fails to deliver as promised).

While some programs, such as those in California and Washington State, provide a higher initial payment per kWh,[11] they do so for a limited number of years (5 years in California, 8 years in Washington State). Thus, the average payments over 20 years is substantially less in these programs than that in Ontario, even when accounting for the retail (net-metered) tariff in the California and Washington State programs.

Despite its position on the leading edge of renewable energy policy in North America, Ontario's SOC program falls far short of Advanced Renewable Tariff programs in Germany, France, and Spain.[12]

Status of ARTs in Germany

[11] Performance-Based Incentives. See http://www.wind-works.org/FeedLaws/USA/Performance-BasedIncentivesorRenewableTariffsforPhotovoltaicsintheUSA.html, visited May 17, 2007.
[12] For a table of renewable energy tariffs worldwide, see http://www.wind-works.org/FeedLaws/TableofRenewableTariffsorFeed-InTariffsWorldwide.html, visited May 17, 2007.

By the end of 2006 there were more than 20,000 MW of wind capacity, and more than 2,500 MW of solar photovoltaics (PV) operating in the country. Germany has become the world leader in both wind energy and solar PV technology.

Germany introduced its first feed law in 1991 and Advanced Renewable Tariffs in 2000 through the Renewable Energy Sources Act or EEG. Tariffs were revised in 2004 and will be revised again in 2007 as part of the program's periodic review.

Following the election in the fall of 2005, the Christian Democrats and the Social Democrats entered a formal agreement that created a Grand Coalition. This agreement specifically preserved the German renewables program.

Status of ARTs in France

France surpassed 1,000 MW of installed wind capacity in 2006, nearly all of which were installed under the country's system of Advanced Renewable Tariffs launched in 2001. The French National Assembly passed the new POPE law (Loi de Programme fixant les Orientations de la Politique Energétique) in 2005 and new tariffs were implemented in the summer of 2006. The law changed the requirements that wind projects must meet to qualify for renewable tariffs.

The new law asked the government to determine whether tariffs were fair or excessive. The government asked the Regie (the French equivalent of the OEB), stakeholders, and ADEME for their comments. The Regie said the tariffs were excessive and industry said they were insufficient. The elected government chose to modify the wind tariff, boost payments for other technologies, and significantly increase tariffs for solar PV.

While the new tariffs did not increase the base rate for wind energy on land in continental France, they doubled the amount of time that wind projects receive the premium payment from five to ten years. This significantly improves the profitability of wind turbines at moderately windy and windy sites.

The new policy also substantially raised the tariffs for offshore wind turbines to Euro 0.13/kWh ($0.20 CAD/kWh) and also extended the premium period from five to ten years.

Tariffs for biogas were more than doubled for plants less than 150 kW. There is also a substantial bonus for on-farm biogas.

France has a very ambitious target of 12,500 MW of wind energy installed on land by 2010. There are nearly 3,000 MW of wind projects in the queue for installation under the previous French wind tariffs.

Status of ARTs in Spain

At the end of 2006 Spain had installed more than 11,500 MW of wind generating capacity, making it second in the world behind Germany.

The Spanish program is substantially different from that in Germany, France, and most other countries using feed laws. Spain provides two options for renewable generators: a system of relatively fixed tariffs, and a system coupling the wholesale price with a bonus payment.

OSEA has emphasized Spain's relatively fixed tariffs in reporting on the program. In this system, the tariff is determined annually as a percentage of the Average Electricity Tariff. For example, generation from solar PV is paid 575% of the AET of Euro 0.0733/kWh ($0.113 CAD/kWh) in 2007. This is equivalent to Euro 0.421/kWh ($0.60 CAD/kWh) for electricity from solar PV.[13]

Most commercial wind developers have opted for the system of wholesale price and bonus payment. As a consequence, when the wholesale price increases, tariffs also increase. With the dramatic increase in the price of natural gas on the European continent in 2005 and 2006, wholesale electricity prices have spiked, tariffs have risen rapidly as a result, leading to political repercussions. This is a weakness of the Spanish system where renewable energy tariffs are coupled 100% to inflation in the average cost of energy.

Status of SOCs in Ontario

As of May 2007, OPA had granted about 400 MW of contracts, some of which included existing projects orphaned by previous policies.

Little of the contracted capacity has been built, excluding the orphan projects previously installed as well as some small solar PV systems.

OPA SOP Contracts Awarded Through May 2007		
	Contracts	MW
Wind	33	286
Solar	32	59
Hydro	6	24
Biomass	7	28
	78	396

Practically no community renewables have been contracted with the exception of the orphaned WindShare turbine on the Exhibition Place grounds, two hydro

[13] New Spanish tariffs were introduced May 25, 2007. Solar PV tariffs were increased slightly to Euro 0.44/kWh ($0.63 CAD/kWh). See http://www.wind-works.org/FeedLaws/Spain/SpanishList.html, visited July 19, 2007.

contracts by First Nations, and some small solar PV systems installed by homeowners.[14]

The program has failed to encourage significant new development of community renewables.

For Solar PV, the SOC program through May resulted in the contracts for only a handful of homeowner or farmer-owned systems. In addition, OPA has awarded contracts for nearly 60 MW of central-station, ground-mounted solar PV arrays.

Three new landfill gas projects were granted contracts, but no on-farm biogas projects had received contracts.

Less than one dozen of the total 33 wind contracts may be developed as locally-owned projects, but this can't be determined with any degree of certainty from the limited data in OPA's status reports.

Of the four hydro projects awarded contracts two are by one First Nations band.

ARTs are not SOCs

Ontario's SOC program provides "standardized contracts," it is not, nor was it ever intended to be a "Standard Offer" Program.

Language, as political consultants know, has a powerful influence on policy. The use of the term "Standard Offer Contracts" has, unfortunately, coloured the policy debate around the program.

In this respect, OSEA erred in adopting the language of its client, the Ministry of Energy staff, in writing its report Powering Ontario Communities. OSEA never intended that the program "standardize" the treatment of each technology. OSEA employed the term "Standard Offer Contract" as a surrogate for Advanced Renewable Tariffs.

OSEA had chosen its preferred description, Advanced Renewable Tariffs, with care. Renewable Tariffs are widely used in Europe and were commonly called feed laws or feed-in tariffs. Later, more sophisticated versions of feed laws were implemented in Germany, France, and Spain. These were no longer simple feed laws and were more accurately described as Advanced Renewable Tariffs. It was OSEA's intent to bring these "advanced" feed laws to Ontario.

The Ministry of energy's staff was not familiar with European renewable tariffs and resorted to terms they were familiar with from the 1980s: Standard Offer Contracts.

[14] Ag Energy Co-operative also has received a contract for its orphaned 10 kW solar PV array.

OSEA's campaign was built around the term "Advanced Renewable Tariffs". Farmers and NGOs wrote letters of support for Advanced Renewable Tariffs. Ontario's ruling party itself used the term "Advanced Renewable Tariff" in its endorsement of the policy concept.[15]

Ministry staff responded to OSEA's campaign by discussing Standard Offer Contracts in part because they objected to the term "tariff". To Canadian ears, they argued, "tariff" conjures images of trade battles with their big neighbor to the south.

OSEA countered that "tariff" is a commonly used term in electricity policy on both sides of the border and on both sides of the Atlantic. Nevertheless, in preparing its report for the Ministry of Energy, OSEA used the term demanded by its client. This was a mistake.

Use of the term "Standard Offer Contracts" conveyed two messages unintended by OSEA: that the contracts may include more than renewable energy, and that the contracts would be "standardized" across the differing technologies.

Initially, OPA wanted to include gas-fired cogeneration in the program. This was never OSEA's intent. OSEA sought a renewable energy policy, not a policy that included more efficient uses for natural gas.

Further, the literal interpretation of the term "standard" implied that all technologies would be treated identically. It was always OSEA's intent that each technology would be treated as unique and that prices and program elements would be determined by the nature of the technology, application, or the economies of scale appropriate to that technology.

For example, the price for solar energy would be significantly higher than that for wind energy. Prices for hydro and biomass would differ from each other as well. However, OSEA had little experience with hydro and biomass and simply proposed the same tariffs for these technologies as "placeholders". OSEA also proposed differentiated prices for wind energy to reflect differing wind resources across the province.

Unfortunately, OSEA did not carry the day, the difference in terminology and outlook resulted in a simpler, much less robust program than originally proposed. The tariff or price paid for each kilowatt-hour was "standardized" across all technologies with the exception of solar PV.

[15] See http://www.wind-works.org/FeedLaws/OntarioLiberalPartyEndorsesARTs.html, visited May 17, 2007.

OPA added a provision for paying a bonus to hydro and biomass for generation during peak periods, but this is unlikely to have any significant effect on renewable development and was not part of OSEA's original proposal.

Ontario's final policy more closely resembles an older feed law than it does the Advanced Renewable Tariffs used today in Germany, France, and Spain.

Measures of Success

OPA has expressed a willingness to modify the program within the two-year review period if growth isn't "robust" enough to meet the program's objectives.

Because of the high expectations of the SOC program, OPA-OEB should immediately convene an ad hoc or select committee to review the program. The committee should be composed of representatives from the Ministry of Energy, Ministry of Agriculture, OPA, OEB, and various stakeholders (OSEA, OFA, NFU, CanWEA, OWA, and so on). This committee should be charged with measuring the program's progress and determining what barriers continue to retard success of the program.

OSEA's 2005 report to the Ministry of Energy suggested monitoring the program at a minimum to determine if "growth in renewable generation is satisfactory to meet the government's targets. Further, the review should determine if development is being overly concentrated in certain areas to the exclusion of others. To gain the benefits of distributed generation, it must in fact be distributed geographically."

To gauge the success of the program, there are a number of measures that should be monitored.

- Number of operating installations of each technology
- Amount of wind capacity installed relative to applications for grid connection
- Growth in solar capacity installed
- Ultimately, the amount of renewable generation in kWh delivered
- Proportion of wind development owned by and for communities
- Proportion of solar development by homeowners
- Location of development (urban Toronto, rural, and so on)

Because of the long lead-time necessary to install wind, hydro, and biogas plants, few projects have been installed as yet under the SOC program. OSEA estimates that 50-75 MW of wind projects will be installed by year end 2007. This is not a significant amount of new generation.

In contrast to the other technologies, small solar PV installations can be quickly installed. Nevertheless, to date few have been installed under the SOC program. As of the end of April only 150 kW of community solar PV has even been

contracted. This is a paltry amount. California installed 65 MW of solar PV in 2006. On a proportional basis, Ontario should be installing more than 20 MW per year by residential and small commercial customers.

From all appearances to date, Ontario's SOC program will not appreciably contribute to the government's renewable energy targets. Nor has there been any significant development by farmers and homeowners.

Price (Tariff) Differentiation

One of the key features in all Advanced Renewable Tariff programs that is not found in Ontario's SOC program is tariff differentiation by technology, project size, application, or resource intensity. Currently, the only differentiation in the SOC program is the tariff for solar PV and the bonus payment for hydro and biogas if they can show delivery during peak periods.

The programs in Germany, France, and Spain differentiate price by technology and within each technology tariffs vary by project size, application, location, or resource intensity. For example, solar PV integrated into a building receives one tariff, panels installed on the roof receive another tariff, and those installed on the ground might receive a third tariff.

Tariff Differentiation by Application

Tariffs are thus used not only to reflect the costs of generation but also to fulfill other societal objectives. For example, German tariffs are higher for solar panels on the roof than those on the ground to encourage people to put the panels on the roof of their homes, barns, and factories rather than taking up valuable land in the densely populated country.

German solar PV tariffs are an example of tariffs differentiated by application.

German Solar Tariffs 2007			
			1.42803
Solar Photovoltaic	Years	€/kWh	CAD/kWh
Freestanding	20	0.380	0.542
<30 kW rooftop	20	0.492	0.703
<100 kW rooftop	20	0.468	0.668
>100 kW rooftop	20	0.463	0.661
Facade cladding <30 kW	20	0.535	0.764
Facade cladding <100 kW	20	0.511	0.730
Facade cladding >100 kW	20	0.506	0.722

Tariff Differentiation by Size

Likewise, tariffs often vary by project size to reflect expected economies of scale. In France, biogas generation receives a declining tariff as project size increases

above 150 kW. Biogas tariffs in Germany similarly decline with increasing project size.

German Biogas Prices 2007			
Biogas	Years	€/kWh	CAD/kWh
<150 kW	20	0.110	$0.17
<500 kW	20	0.095	$0.15
<5 MW	20	0.085	$0.13
<20 MW	20	0.080	$0.12

Tariff Differentiation by Location

Tariffs for wind energy in Germany and France, for example, also vary whether the wind turbines are installed on land or offshore. Likewise, French tariffs for all technologies differ by whether the project is located in continental France (Metropole), on Corsica, or in its former colonies (DOM-TOM). Greece similarly differentiates its tariffs by whether the project is located on the mainland or on the Greek islands.

Greek Solar Thermal Tariffs			
	Years	€/kWh	CAD/kWh
Solar Thermal	20		
<5 MW Mainland		0.25	0.385
<5 MW Islands		0.27	0.416
>5 MW Mainland		0.23	0.354
>5 MW Islands		0.25	0.385

Tariff Differentiation by Resource

In the case of wind energy, tariffs vary by resource intensity or location in Germany and France. In both countries, the tariffs for wind energy vary by the productivity of the wind turbine. This is a surrogate for wind resource intensity (power density). The objective is twofold: to lessen development pressure on the windiest sites by enabling development in other, less windy, sites; and to provide siting flexibility. Both programs have been successful in spreading or distributing development across the landscape of 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 now in the interior

of the country and has moved away from the coastline as a result of the German policy.

Germany and France each use a different mechanism for determining site productivity. However, both use a trial period after which the productivity and the subsequent tariff are determined. Until mid 2006, both countries used a five-year test period. (France recently 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. Thus, the maximum tariff is fixed to provide a targeted profitability at the targeted sites, but the final tariff paid for more productive sites decline on a sliding scale as a function of productivity

French Wind Energy Tariffs 2007

	Years	Full Load Hours	Capacity Factor	Tariff €/kWh	CAD/kWh
Wind Energy					
Continental	1-10			0.082	0.126
Low	11-15	2,400	0.27	0.082	0.126
		2,500	0.29	0.079	0.121
		2,600	0.30	0.075	0.115
		2,700	0.31	0.072	0.110
Medium	11-15	2,800	0.32	0.068	0.105
		2,900	0.33	0.063	0.097
		3,000	0.34	0.058	0.089
		3,100	0.35	0.053	0.082
		3,200	0.37	0.048	0.074
		3,300	0.38	0.043	0.066
		3,400	0.39	0.038	0.058
		3,500	0.40	0.033	0.051
High	11-15	3,600	0.41	0.028	0.043

Because this concept has yet to be used in an Anglophone country, there is no consensus on what to call this feature in English. OSEA has previously used the term “tiered” tariffs though “differentiated tariffs” may be more accurate.

While OSEA did describe this feature in its report to the Ministry of Energy, the novelty of it inadvertently led to some confusion. Most importantly, the final tariff (T2 in OSEA’s terminology) varied linearly between the prices for base, medium, and high wind intensity sites.[16] Regardless of any confusion in interpreting OSEA’s proposal, OPA rejected differentiated tariffs in their entirety, including that differentiating wind tariffs by resource intensity.

OSEA argues that differentiated tariffs for wind energy are essential to distribute wind development across the province. Differentiated tariffs

[16] Powering Ontario Communities: Proposed Policy for Projects up to 10 MW, http://www.wind-works.org/FeedLaws/Canada/PoweringOntarioCommunities.pdf, visited May 14, 2007, pages 36, 39-40.

- Increase distributed generation,
- Distribute wind development across the province,
- Reduce (but do not eliminate) development pressure on the windiest sites,
- Reduce (but do not eliminate) social friction[17] by spreading development among many sites,
- Increase program flexibility by lessening pressure to get prices exactly right the first time,
- Reduce development (wind & technology) risk by determining final (T2) tariff after 5 years of operation,
- Spread opportunity to all not just to those living near the lakes or in the highlands, and
- Enable fair profits at medium wind sites while limiting "excessive profits" at windy sites.

Tariffs differentiated by site productivity can be a powerful tool to encourage wind development where it is wanted or needed most. For example, generation is needed in the GTA or Golden Horseshoe but the winds are lower than elsewhere. With low productivity, a higher tariff is necessary to develop a profitable project in the GTA than along the windy eastern shores of Lake Huron.

Bonus Payments & Short-term Flexibility

"Bonus" payments, in the form of a tariff per kilowatt-hour, may provide Ontario's SOC program with some needed short-term flexibility without the need to revisit the base tariffs for a specific technology. Bonus payments for a particular attribute, for example urban rooftop solar in the case of PV, on-farm biogas generation from manure in the case of biogas, or a distributed benefit in the case of wind energy could enable OPA or the government the opportunity to take immediate corrective action before the two-year review is completed.

Bonus payments are used in France and Germany. France uses bonus payments to promote on-farm biogas generation and building integrated solar PV. Germany uses bonus payments to encourage "innovation" in the use of biogas and to encourage the use of biogas in district heating ($0.029 CAD/kWh).

For example, the Ministry of Agriculture concludes that the current tariffs for biogas are insufficient to drive development of on-farm biogas. As in France, it may be possible in the near term to stimulate on-farm biogas generation by providing "bonus" payments for the environmental benefits of reducing field application of animal wastes (manure). The bonus would apply, as in the French system, for generation produced by on-farm methane, or methane produced by farm wastes.

[17] More politically neutral than the term more commonly used: NIMBYism.

France Biogas Tariffs 2007			
Biogas	Years	€/kWh	CAD/kWh
<150 kW	15	0.09	0.139
>150 kW<2,000 kW	15	Linear interpolation	
>2,000 kW	15	0.086	0.132
Biogas Premium (on-farm methane)		0.02	0.031

The new French tariffs have doubled the payment for biogas generation from that previously. Further, the new tariffs pay an additional $0.031 CAD/kWh for generation from on-farm methane. As a consequence, the new French tariffs for on-farm biogas generation are the base tariff plus the on-farm methane bonus, for a total of $0.17 CAD/kWh. This is approximately the tariff that the Ministry of Agriculture estimates would be necessary in Ontario to drive development of on-farm biogas generation.

Similarly, the French wanted to stimulate greater solar PV development but they faced a political obstacle to raising the new “base” tariff of $0.46 CAD/kWh any higher. (This base solar PV tariff is similar to that of the “base” solar PV tariff in Ontario.) The French chose to use a “bonus” payment instead. By including a bonus payment for building integrated solar PV of Euro 0.25/kWh, they were able to raise total tariffs for solar PV to Euro 0.55/kWh ($0.85 CAD/kWh). Thus, the new French tariffs became competitive with those in Germany. Incidentally, the new French tariffs are also comparable to those suggested by OSEA in its original 2005 report.

French Solar PV Tariffs 2007			
Photovoltaics	Years	€/kWh	CAD/kWh
Continental (Metropolitan)			
Base (All)	20	0.300	0.462
Building Integrated	20	0.550	0.847

In the Ontario context, should few or no community wind projects move forward under the current tariffs, OPA could make a bonus payment to spur cooperative formation without modifying the base wind tariff of $0.11CAD/kWh. Perhaps a cooperative bonus of $0.01-0.02 CAD/kWh would be sufficient to push more cooperatives or community groups into developing projects.

Another possibility is to use “bonus” payments to lure development into areas where the grid needs strengthened or where generation is needed closer to the load, as in downtown Toronto. OPA could offer a “bonus” payment to solar PV in the GTA on the grounds of “emergency rooftop generation incentive” to spur development on rooftops in Toronto’s downtown core, where generation is desperately needed.

OSEA prefers that ultimately the base tariffs reflect the cost of generation for each desired technology in each location desired. This was the foundation for the rigorous pricing model that OSEA developed with the aid of France’s ADEME. However, the use of bonus payments may provide the political flexibility needed to meet the SOC program’s goals without revisiting the contentious issue of the base tariffs.

Renewable Tariffs & Retail Rates

OPA has taken the unusual position that tariffs under Ontario’s SOC program are equivalent to those in Europe and, therefore, there’s no reason to revisit the tariffs. OPA argues specifically that Ontario’s solar PV tariff is about four times the retail rate for electricity and that European tariffs for solar PV are also about four times European retail rates so, in OPA’s reasoning, they are “equivalent”. This argument is unique to OPA and has not been made elsewhere.

As OPA notes, the tariffs for solar PV in Germany and France are significantly greater than the retail rate for electricity. However, there is no policy connection between retail rates and the solar tariffs. There is no connection between retail rates and any of the tariffs for renewable energy in Germany, France, or Italy. This is understood by most in the energy policy community in each country.

OPA’s argument baffles European renewable energy policy experts as well as OSEA.

It is possible that OPA has misinterpreted Spanish tariffs. Spain’s solar tariffs are 575%, or about six times, that of the average electricity tariff. But this measure is only used to determine the actual price paid to the solar PV generator. The rate of 575% was determined in a manner quite similar to that in Germany, that is, what does it cost to generate electricity from solar cells. Then once that is determined, what rate in a percentage of the average electricity tariff is needed to generate that revenue. Once the tariff needed was determined, the price was coupled to the average electricity tariff and thus fully linked (100% indexing) to any increase in the price of electricity.

The final revenue requirement for solar PV will be lower in Spain than in Germany because Spain is further south, has more clear days and as a result has higher insolation than Germany. Spain’s solar PV tariff prior to 2007 was

$0.65 CAD/kWh, more than 50% greater than Ontario's solar tariff yet its average electricity tariff is only modestly greater than Ontario's.

To illustrate that Spanish tariffs are not determined by the average retail price, new tariffs eliminate any mention of the "average electricity tariff". New Spanish tariffs provide a fixed price of Euro 0.44/kWh or $0.59 CAD/kWh for solar electricity from systems less than 100 kW.[18] New Spanish tariffs are no longer linked to the average price of electricity.

Nor have renewable energy tariffs had any significant impact on electricity prices in either France or Germany. Even in Germany, the entire EEG has had little impact on electricity rates because the final cost to consumers is largely determined by the large amount of existing generation. The entire German program of renewable tariffs, and Germany now produces 10% of its supply from new renewables, adds only 3.6% to the cost of electricity for the final consumer.

Tariff Determination

In Germany, France, and Spain, tariffs are determined by an estimate of the cost of production and an allowance for a reasonable profit. Tariffs are ultimately determined by a political process.

In Germany, the government hires consultants to conduct cost studies. The studies are then presented to stakeholder groups. Ultimately, parliament (the Bundestag) makes a determination and the tariffs are written into revisions of the Renewable Energy Sources Act (EEG). The next revisions are scheduled for 2007.

In France, the process is similar. ADEME proposes revisions to the tariffs, as do stakeholders. The elected government seeks guidance from the Regie, then makes its determination.

In Spain, the process is similar to that in France for determining the base tariff, the multiplier, and any bonus payments that apply.

Inflation Indexing

OSEA's original economic model assumed 100% indexing for inflation. The final document suggested a 20% inflation adjustment, reflecting the client's wishes. Subsequently, OSEA urged OPA to adopt a value between 60% and 80%.

Few appreciate the powerful influence inflation has on eroding the profitability of investments in long-lived, capital-intensive technologies such as renewable generation. ADEME's Chabot has consistently emphasized this in his presentations in Ontario and in his published papers.

[18] See http://www.wind-works.org/FeedLaws/Spain/SpanishList.html, visited July 20, 2007.

Chabot notes that if productivity is determined by the resource, and all other factors remain the same, then profitability is determined by the tariff and the inflation adjustment. To improve profitability, the price can be increased, or the inflation adjustment can be increased, or some combination of the two can be used. In no case can the tariff be lowered and the inflation index lowered at the same time without hurting profitability. To maintain profitability when the tariff is lowered, the inflation index must be increased to compensate.

Conversely, if OPA wanted to boost returns to encourage development while maintaining the base tariff, they could raise the inflation adjustment from the current 20% (inexplicably, solar PV is excluded from the inflation adjustment).

Programs in Germany and Spain represent two extremes in how they respond to inflation. Germany's EEG does not account for inflation. For wind and solar PV there is an annual degression in the tariff for new projects. In Spain until recently, tariffs increase annually 100% with the inflation in electricity prices under the fixed-tariff option. This feature is built into the program because Spanish renewable tariffs are calculated as a fixed percentage of the "Average Electricity Tariff" determined annually.

France includes both an adjustment in the base tariff for inflation, and, within a contract, an adjustment of the contracted tariff. Most significantly, tariffs for each technology posted in 2006 increase with inflation. Thus, the biogas tariff of Euro 0.09/kWh in 2006 increases to Euro 0.0927/kWh in 2007 if inflation is 3%. That is, a biogas project built in 2007 will sell electricity for Euro 0.0927/kWh ($0.143 CAD/kWh) in year one of the contract. Once the contract has begun, the tariff paid increases with 70% of inflation.

After 2008, there is a degression in the French wind tariff of 2% annually, but this is on the inflated base tariff.

Within a contract for wind energy or solar PV, the French tariff is adjusted annually to 60% of inflation. For biogas, the adjustment within a contract is 70% of inflation.

Chabot warns that Ontario's 20% inflation indexing is not sufficient to protect renewable investments from the effects of inflation. In light of this, OPA's decision to eliminate any inflation indexing on solar PV is perplexing. It is as if, rather than removing barriers, OPA chose to penalize investors in solar PV for being "early adopters".

Further, it appears that OPA is discriminating against renewables in comparison to fossil and nuclear generation in their handling of inflation. OPA's proposed rules for the Clean Energy Standard Offer program provide a "hedging" option for

natural-gas fired cogeneration.[19] Under the hedging option, operators of cogeneration plants will be paid a portion of the increase in natural gas prices to protect generators from volatility in the natural gas market.

Indeed, there is volatility in the natural-gas market and there is every expectation that this volatility will only increase as North America passes its peak in extracting natural gas. Rather than reduce Ontario ratepayers to this exposure by encouraging the use of renewable energy, OPA encourages the use of natural gas by offering a hedging contract.

Through a complex formula, OPA offers natural-gas fired cogeneration that approximates 60% of any increase in the price of natural gas under the hedging option. Interestingly, this about the same as the inflation indexing that wind energy receives under French renewable tariffs. Unlike the hedging contract however, the French inflation indexing is based on a broader consumer index that is much less volatile than the price of natural gas. While energy is an important component of consumer price indexes, it is only one component. Thus, incorporating 60% inflation indexing into Ontario's SOC program will expose ratepayers to less volatility in rising energy prices than a hedging contract that results in a 60% indexing with the price of natural gas.

The Auditor General in his report to the Minister of Energy specifically notes that the inflation indexing in the agreement for the Bruce A refurbishment are significantly greater than those offered "non-nuclear suppliers", that is, renewable generation.[20] Under the agreement, the province's payment for generation increases with inflation (100% inflation indexing) up to a maximum of 2.5%. The Auditor General found that the Bruce A agreement assumed inflation of 3.5%. Thus the province assured Bruce A that it would receive 70% of increases in the consumer price index if inflation reached 3.5% per year. Again, this is substantially greater than that received by renewable sources of energy (20%) and notably that of solar PV (0%).

These examples of the Bruce A refurbishment and the proposed tariffs for natural-gas fired cogeneration suggest that the province provides preferential treatment of nuclear energy and natural gas generation over renewable sources of energy.

OSEA argues that for the province to meet its objectives of closing the coal plants on schedule Ontario must make a clear commitment to renewable energy

[19] See http://www.powerauthority.on.ca/sop/Page.asp?PageID=1224&SiteNodeID=245, visited July 21, 2007.
[20] The Bruce Power Refurbishment Agreement, Office of the Auditor General of Ontario, April 5, 2007, http://www.auditor.on.ca/en/reports_en/brucespecial_en.pdf, page 9, visited July 11, 2007. Increased costs for nuclear fuel are passed through directly, though these are a small portion of the costs of nuclear generation.

by giving it preferential treatment in pricing and contract terms over fossil and nuclear generation and not the other way around.

Only renewable sources of energy can meet the province's requirement for rapid development of new clean generation while minimizing exposing ratepayers to the expected increase in the price of natural gas.

OPA and OEB should re-examine inflation indexing in the SOC program and should offer an inflation index equivalent to that offered natural-gas fired cogeneration or nuclear power. OSEA suggests that Ontario match the inflation indexing used in the French program.

Grandfather Clause for Solar PV & Biogas

Numerous on-farm biogas projects are not moving forward because OPA's current tariff is marginal for profitability. Farmers are waiting in expectation that the tariff will be raised later to reflect reality. They are waiting because the current SOC program precludes anyone who signs a contract today from receiving a higher price later should the tariffs be increased. This provision is stalling on-farm biogas development.

There's no assurance that OPA will increase the biogas tariff. Nevertheless, there is a significant risk to early adopters that they will build projects that are marginally profitable or unprofitable only to find that later OPA realizes that the tariff must be increased and does so. One biogas developer has suggested that rather than penalize "early adopters", OPA should encourage innovation by removing this provision.

Small roof top solar PV installations are currently not profitable. The placeholder or "price discovery" tariff was intended by CanSIA to serve only the "early adopters"--those altruistic families and businesses that wanted to move Ontario toward a solar future.

Nevertheless, OPA may at some point increase the solar PV tariff to reflect the cost of generation. As with the early adopters of on-farm biogas, higher tariffs offered later in the program penalize those who took the risk to move the technology toward the mainstream. Neither should be penalized if a more attractive tariff is offered in subsequent years.

Tariff Degression

For technologies with rapidly falling costs, such as solar PV, tariff degression offers authorities a means for stimulating development while warding against potentially overpaying for the technology.

Though not a universal provision of all programs using renewable tariffs the French and German programs incorporate tariffs with price degression in each succeeding year of the program. That is, each project receives the same price from one year to the next after the project is connected, but each succeeding year new projects receive a lower price.

For example, solar tariffs in the German program starts with the highest price and degresses or decreases the most rapidly. Tariffs for solar PV decrease 5% per year in the German program. In 2004 Germany paid Euro 0.574/kWh for solar PV, in 2005 it paid Euro 0.545/kWh, and by 2007 was paying only Euro 0.492/kWh.

Similarly with wind energy, German tariffs decrease 2% annually as does those in France.

The revised French tariffs have eliminated the degression for technologies other than wind energy.

There is no need for a degression in Ontario's SOC program at this time. In general, the tariffs have been too low and there has been little risk of overpaying. Tariff degression may be a useful policy tool for Ontario in the future once tariffs have been raised sufficiently to stimulate rapid development.

Proposed New Tariffs by Technology

- Wind (on land and offshore)
- Hydro
- Biogas
- Solar PV
- Solar Hot Water
- Geothermal Electricity
- Biogas Pipeline Injection

Wind On Land

The cost of generation from wind energy is primarily a function of installed cost, average yield, and annual reoccurring costs.

In mid 2006, costs for small groups of wind turbines in Ontario averaged from about \$650 CAD/m^2 (\$2,100 CAD/kW) to nearly \$850 CAD/m^2 (\$2,500 CAD/kW).

Yields of operating wind turbines in Ontario vary from 500 kWh/m^2/yr for one wind turbine on the shore of Lake Ontario to 850 kWh/m^2/yr for a turbine at a good site near Lake Huron.

The turbine on Lake Ontario is on a 65-meter tower. An early turbine at the Bruce nuclear plant averaged 800 kWh/m^2/yr during a four-year period. This turbine is on a 50-meter tower.

Contemporary turbines will be installed on towers greater than 80 meters in height. Taller towers produce higher average yields. Even at modest wind sites along the northern shore of Lake Ontario and near Lake Simcoe, turbines on tall towers could potentially yield 550 kWh/m^2/yr.

For determining a base case, OSEA assumed that a large-diameter wind turbine could be installed for about $700 CAD/$m^2$ on a tall tower yielding 550 kWh/m^2/yr.

OSEA's uses estimates of annual reoccurring or annual running costs found in Europe.[21] Estimates of running costs in Germany are typically much higher than similar estimates in North America. Until publicly available data on total running costs are available, OSEA prefers to use European estimates, which are more transparent than those estimates used in Canada and the USA until such time as more Ontario-specific data becomes available.

While not as significant an influence as installed cost and yield, annual reoccurring costs do have a significant effect on the cost of energy. Reducing annual running costs from 4% of installed cost to 2% of installed cost cuts the base case tariff about $0.02 CAD/kWh.

The Chabot PIM model assumes that the tariffs increase fully with inflation.

Base Tariff

OSEA's original proposal to the Ministry of Energy suggested using a modified version of the French wind tariffs. In the French system, the base tariff is paid to all operators for the first five years. Subsequently, the average yield is calculated and the average yield is then used to determine the tariffs for years 6 through 20.

The average yield is calculated by removing the years of highest and lowest production and then averaging the generation over the three remaining years. The average generation is then divided by the swept area to produce an average yield representing the productivity or resource intensity of the site where the wind turbine or wind turbines are located.

[21] Deutsche Windguard assumes annual operating costs of from 4.8% to 6.8% of installed equipment cost. Deutsche Windguard provides detailed reports on wind energy costs to the German government for use in determining the wind tariffs under Germany's Renewable Energy Sources Act. Similarly, ADEME's Bernard Chabot typically assumes running costs of 4% of total installed cost.

The base case produces Tariff T1. As shown below for the assumptions described, the base tariff is $0.148 CAD/kWh.[22]

Tariff Calculation Using Chabot Profitability Index Method			
Adapted by Paul Gipe, pgipe@igc.org			
Enter Data in These Cells.			
Average Weighted Cost of Capital Before Tax			
Equity		20%	
Return on Equity	ROE	10.0%	
Debt		80%	
Interest on Debt		7.0%	
Nominal AWCC		7.6%	
Inflation		3.0%	
AWCC real	t	4.5%	
Rotor Diameter	82	5,281	m2
Rated Capacity		1,650	kW
Specific Installed Cost	Ius	$700	$/m2
Installed Cost	I	$3,696,712	
		$2,240	$/kW
Annual Expenses	Kom	4.0%	
Term	n	20	years
Discount Rate (AWCC)	t	4.5%	real
Specific Yield	Eas	550	kWh/m2/y
Capital Recovery Factor (n,t)	Kd	0.0766	
Profitability Index Target	PI	0	NPV/I
Cost of Energy	T1	$0.148	$/kWh
Simple Payback	SPBT	8.6	years
Note: Before tax, 100% Adjustment with Inflation.			

Tariff T2

Tariffs for year 6 through year 20 are described as Tariff T2. These tariffs decrease with increasing yield. Thus, for sites with yields greater than the base case, here 550 kWh/m^2, Tariff T2 decreases.

Most significantly, the average equivalent tariff (Teq) during the entire 20-year contract period also decreases with increasing yields. Restated, the average tariff decreases even after accounting for the effects from inflation as average wind turbine productivity increases.

For example, Ontario's current tariff of $0.11 CAD/kWh is equivalent to a site with a yield of 875 kWh/m2/yr. Windier or more energetic sites currently receive the full $0.11 CAD/kWh. However, under the proposed tariffs, windier sites would be paid less than under the current program. Under the proposed tariffs, wind turbines at such a site would be paid only $0.091 CAD/kWh in year 6 through year 20. This feature of the French system is intended to lessen the cost to ratepayers by minimizing what some may call unnecessary or excessive profits.

[22] See the worksheets titled * Chabot-Gipe PIM Ontario Wind 82m T1-T2 2007 Tariffs at http://www.wind-works.org/PricingWorksheets/ARTsTariffsPricingWorksheets.html, visited July 19, 2007.

Calculation of Constant Equivalent Tariff (Teq) and Tariff T2					
Term of Fixed Price, T1			j	5.00	years
CRF During Fixed Price Period, j			CRF(t,j)	0.228	
			1/CRF	8.652	
			CRF(t,j)	0.116	
			Years 1-j		Years j-n
		Eas	T1	Teq	T2
		Yield			
	PI	kWh/m2/y		$/kWh	$/kWh
Target	0.000	**550**	$0.148	$0.148	$0.148
	0.021	575	$0.148	$0.144	$0.142
	0.043	600	$0.148	$0.140	$0.136
	0.064	625	$0.148	$0.136	$0.130
	0.086	650	$0.148	$0.133	$0.125
	0.107	675	$0.148	$0.129	$0.120
	0.129	700	$0.148	$0.127	$0.115
	0.150	725	$0.148	$0.124	$0.111
	0.171	750	$0.148	$0.121	$0.107
	0.193	775	$0.148	$0.119	$0.104
	0.214	800	$0.148	$0.116	$0.100
	0.236	825	$0.148	$0.114	$0.097
	0.257	850	$0.148	$0.112	$0.094
	0.279	875	$0.148	$0.110	$0.091
Target	0.300	**900**	$0.148	$0.109	$0.088
	0.300	925	$0.148	$0.106	$0.084
	0.300	950	$0.148	$0.103	$0.080
	0.300	975	$0.148	$0.100	$0.076
	0.300	1000	$0.148	$0.098	$0.072
	0.300	1025	$0.148	$0.095	$0.068
	0.300	1050	$0.148	$0.093	$0.065
	0.300	1075	$0.148	$0.091	$0.062
	0.300	1100	$0.148	$0.089	$0.059
	0.300	1125	$0.148	$0.087	$0.056
	0.300	1150	$0.148	$0.085	$0.053
	0.300	1175	$0.148	$0.083	$0.050
	0.300	1200	$0.148	$0.081	$0.047

OSEA's proposed tariffs for wind energy should enable broader development across the province while minimizing the costs to Ontario ratepayers. Only with differentiated tariffs such as these will Ontario be able to move wind generation away from the shores of the Lake Huron and Lake Erie and distribute opportunity to Ontario's rural landowners throughout the province.

Wind Offshore

There is no experience with offshore wind projects in North America. Further, there are unique problems with freshwater lakes in northern climes that are not found in the waters off the coast of northern Europe. Wind turbines in the Great Lakes will have to be built to withstand the forces of wind-driven ice flows (ice jams). Thus, the costs associated with installing wind turbines in the Great Lakes could in fact be greater than those on the floor of the Baltic Sea or the English Channel. For this reason, OSEA suggests using the French offshore wind tariffs as a placeholder until more detailed cost data becomes available.

Advanced Renewable Tariffs in France					
		Full Load	Capacity	Tariff	1.42803
	Years	Hours	Factor	€/kWh	CAD/kWh
Offshore	1-10			0.130	0.186
Low	11-15	2,800	0.32	0.130	0.186
		2,900	0.33	0.130	0.186
		3,000	0.34	0.130	0.186
		3,100	0.35	0.130	0.186
Medium	11-15	3,200	0.37	0.090	0.129
		3,300	0.38	0.090	0.129
		3,400	0.39	0.090	0.129
		3,500	0.40	0.090	0.129
High	11-15	3,600	0.41	0.030	0.043

New German offshore tariffs that begin in 2009 are comparable to the current French offshore tariffs. For wind off shore, the program raises tariffs from Euro 0.0874/kWh ($0.12/kWh) in 2009 to Euro 0.11-0.14/kWh ($0.15-0.19/kWh).

Hydro

Some 20 MW of hydro projects have been contracted under Ontario's SOC program. OSEA has little experience with the technology and finds that OPA's tariff is probably sufficient at this stage of the program.

Biogas

OSEA proposed in its 2005 report to the Ministry of Energy that a placeholder of $0.13 CAD/kWh be used until more detailed studies could be conducted.

Ontario's Ministry of Agriculture and Food has examined the tariffs necessary to drive development of on-farm biogas generation. The ministry has yet to publish their findings. However, ministry staff has on several occasions publicly stated that OPA's tariff is insufficient.

In the absence of more detailed public discussion of the on-farm biogas tariff needed in Ontario, OSEA suggests using the German biogas tariffs. These tariffs have clearly worked in Germany and should work equally well in Ontario.

German Biogas Prices 2007			
Biogas	Years	€/kWh	CAD/kWh
<150 kW	20	0.110	$0.17
<500 kW	20	0.095	$0.15
<5 MW	20	0.085	$0.13
<20 MW	20	0.080	$0.12

Solar PV Tariffs

Using the principle established by first, the city of Aachen Germany, and subsequently that used in Germany's Renewable Energy Sources Act, OSEA held a pricing workshop with stakeholders in December 2004.

Using assumptions provided by members of the Canadian Solar Industries Association, CanSIA, OSEA estimated that a tariff of $0.83 CAD/kWh was necessary for minimal profitability under Canadian conditions in 2004. Subsequently, CanSIA suggested that such a tariff would indeed spur industrial growth, but that the Canadian market was too immature for the rapid growth anticipated. CanSIA instead suggested a tariff one-half that of OSEA's calculations and proposed $0.42 CAD/kWh as a "place holder" for solar PV in the SOC program.

CanSIA hoped that Ontario's solar tariff would lure "early adopters" to install solar PV and in doing so would enable provincial companies to gear up for greater growth when a subsequent tariff reflecting the true cost of generation was introduced.

Though Ontario's SOC program has generated tremendous public interest in solar PV and 50 MW of contracts for central station PV, there has been little residential or small commercial take up of the technology.

When announcing the Standard Offer Program, the Ontario Power Authority provided a simple RetScreen[23] spreadsheet to calculate simple payback on solar PV. OPA worried, unnecessarily as it turned out, that the solar PV tariff of $0.42/kWh would result in a rush of ill-considered small PV installations. OPA argued that they didn't want to "oversell" the program.

However, in trying to protect consumers from excess enthusiasm, OPA made a stronger case for solar PV than is justified by the Standard Offer Program.

[23] http://www.retscreen.net/.

For example, OPA's sample case used a specific installed cost for a 10 kW system of $9,000 CAD/kW. This is unrealistic in the Ontario market. Further, OPA assumed that the operating costs for a 10 kW system was only $224 CAD/yr or about 0.24% of installed cost. This too is unrealistic. The Bundesverband Solarwirtschaft (German Solar Industry Association) estimates that 1.5% of installed costs is needed to pay for land leases, operations and maintenance, and other expenses. Of course, no one has more experience operating solar PV systems than the Germans. They should know.

OSEA has consistently argued that the solar PV tariff, while the highest in North America, is too low for any rapid uptake of solar energy except by the very earliest of the "early adopters. OSEA did not publicly object to the OPA's spreadsheet at the time because an 18-year payback is so long that by our definition the investment is not economic.

Over the intervening months, we have noticed a worrisome trend that solar developers and consumers are arguing that solar PV is "economic" under the SOC program because the system will pay for itself in less than its lifetime. This is erroneous for two reasons. First because even if a system pays for itself in less than its lifetime, it can still be a poor investment, and second because the assumptions used by the OPA are too favorable.

Using an installed cost of $10,000 CAD/kW and operating costs of 1.5% of installed costs annually, OSEA estimates that a 10 kW solar PV system in Ontario will require 27 years to pay for itself and earns a negative rate of return. This is hardly economic.

Solar PV Key Factors Affecting Profitability

There are three principal factors that determine solar PV’s profitability: installed cost and annual reoccurring costs on the expense side of the ledger, and yield (productivity) and price per kWh on the revenue side of the ledge.

Average Installed Cost of Solar PV

Germany is the world’s largest market for PV. In 2006 Germans installed about 1,000 MW. Installed PV costs in Germany in 2006 averaged about $7,500 CAD/kW for large systems to about $8,500 CAD/kWh for small (residential) size systems.[24]

[24] http://www.wind-works.org/Solar/GermanSolarPVInstalledPrice2006.html.

German Solar PV Installed Price 2006							
					1.428		
	€/kW				$CAD/kW		
	Low	Avg	High		Low	Avg	High
Small	4,000	5,400	7,500		$5,700	$7,700	$10,700
Large	4,000	4,800	6,000		$5,700	$6,900	$8,600
Source: German Solar Energy Association.							

There is currently 200 MW of solar PV operating in California, the largest solar market in North America. The California market is an order of magnitude greater than any other state or provincial market and is the third largest worldwide after Germany and Japan.

California reports its data in AC kilowatts. That is, the representative capacity of the installation after the inverter. This is in part a response to the way the California subsidy (buy-down) program works and the desire by policymakers to pay as little as possible for each system. All others report installation data in DC kilowatts or the amount of capacity represented by the sum of the DC power produced by the modules. That is, before the inverters. Thus, it can be very confusing to compare data on installed costs in Germany to those in California without first taking this oddity of the California market into account.

The average installed cost of solar PV in California is about $8,000 CAD/kW of DC capacity. Systems greater than 100 kW cost about $7,500 CAD/kW (DC). Very large systems may be installed for as little as $7,100/kW (DC), costs similar to those in Germany.[25]

Annual Reoccurring Costs

These costs include lease payments, insurance, and costs for operations and maintenance. These costs are often underestimated for solar PV in North America because of limited operational experience. The Germany Solar Industry Association assumes 1.5% of installed costs reoccurring annually.[26] Commercial projects of 300 kW in Germany have budgeted about 1% for reoccurring costs.[27]

Annual Yield (Productivity)

[25] http://www.wind-works.org/Solar/SolarPVCurrentInstalledPricesperkWinCaliforniaElsewhere.html.
[26] http://www.wind-works.org/Solar/SolarCostCalculatorUsingChabot-BSi-RateMethods.html.
[27] See Fesa B31 Reoccurring Expenses, http://www.wind-works.org/Solar/FesaB31ReoccurringExpenses.html, visited July 19, 2007.

Though there is little actual performance data available in Toronto, solar PV systems are expected to yield from 1,000 kWh/kW/yr to 1,200 kWh/kW/yr.[28]

Price per kWh Needed for Profitability

There are several methods for calculating the tariff required per kWh to make a solar investment profitable before tax.[29] For systems costing $10,000/kW and yielding 1,200 kWh/kW/yr, a 20-year tariff in excess of $0.80/kWh is required for minimum profitability.

1. Simple payback. What is the tariff required for a 10-year payback, the minimum required for any reasonable rate of return. The tariff required for a simple payback of 10 years is $0.83/kWh.

Simple Payback of Solar PV in Toronto			
Rated Power		1	kW
Installed Cost	I	10,000	
Specific Installed Cost	Ius	10,000	$/kW
Specific Capacity	Eas	1,200	kWh/kW/yr
Generation		1,200	kWh/yr
Tariff		$0.83	$/kWh
Revenue		1,000	$/yr
Simple Payback of Solar PV		10	
Note: No reoccurring costs, no financing costs.			

2. Annuity Payment. What is the tariff required such that an annuity would pay for the investment over 20 years. Assuming annual reoccurring costs of 1.5%, the tariff required is more than $0.90/kWh paid for 20 years.

Rate of Return Calculation of Solar PV Using @IRATE Function		
by Paul Gipe		
Installed Cost	$10,000	$/kW Cost of solar system
Fv	$0	At end of period
Nper	20	years
Type	0	End of year
	1	Payment per year
Generation	1,200	kWh/kW/yr
O&M	1.50%	% of installed cost/yr
O&M Cost	$150	$/yr
Inflation	0.02	
Total O&M	$4,458	$ for 20 years, Note this value is higher than from cash flow.
Total PV Investment	$14,458	sum of Installed Cost and Total O&M costs
@Payment	$1,103	@PAYMT(Variables:C16,B5,-B13,B4,0)
COE	$0.92	
Note: No financing cost.		
Note: The @PAYMT function in Quattro Pro is equivalent to the =PMT function in Excel.		

[28] http://www.wind-works.org/Solar/SolarRadiationYieldsonTiltedSurface.html. Note that the performance of Toronto Hydro's 36 kW system is not publicly available despite its being in service for nearly three years.
[29] http://www.wind-works.org/Solar/SolarCostCalculatorUsingChabot-BSi-RateMethods.html.

3. Chabot Profitability Index Method. The Profitability Index Method used by ADEME's Bernard Chabot determines the cost of energy as a function of Net Present Value and installed cost. The Chabot PIM model yields a required tariff of $0.82/kWh for a 20-year period of payments.

Chabot-Gipe PIM Solar PV.wb3			
Note: Before tax, 100% Adjustment with Inflation.			
From Variables Page			
Average Weighted Cost of Capital Before Tax			
Equity		40%	
Return on Equity	ROE	6.5%	
Debt		60%	
Interest on Debt		6.50%	
Nominal AWCC		6.5%	
Inflation		2.0%	
AWCC real	t	4.4%	
Rated Power (kW)		1	
Installed Cost	I	$10,000	
Specific Installed Cost	Ius	$10,000	$/kW
Annual Expenses	Kom	1.5%	
Term	n	20	years
Discount Rate (AWCC)	t	4.4%	real
Specific Capacity	Eas	1,200	kWh/kW/y
Capital Recovery Factor (n,t)	Kd	0.0763	
Profitability Index Target	PI	0.1	NPV/I
Cost of Energy	T1	$0.824	$/kWh
Simple Payback		10.1	

4. Cash Flow. The simple, before-tax cash flow model used by the German Solar Industry Association yields a slightly higher tariff required to meet the profitability targets assumed of $0.88/kWh.

Revised Solar PV Tariffs

The current SOC program tariffs of 0.42 CAD/kWh for solar PV are significantly less than that needed for the rapid development of community-owned solar PV in the province. Ontario's present tariffs are out of line with those being paid in Europe. Since Ontario announced its program in early 2006, several countries have substantially boosted tariffs for solar PV to make their programs more robust.

Italy substantially revised its solar PV tariffs in 2007, moving to align its program with that in France and Germany. For small rooftop systems, the new Italian program pays $0.79 CAD/kWh. Italy will pay small building-integrated solar PV systems a total of $0.86 CAD/kWh.

Italian Solar PV Tariffs 2007				
		Base	Total*	1.42803
Photovoltaics	Years	€/kWh	€/kWh	CAD/kWh
Ground-Mounted				
1-3 kW		0.40	0.51	0.728
3-20 kW		0.38	0.49	0.700
>20 kW				
<500 MWh/yr		0.36	0.46	0.650
500-1,000 MWh/yr		0.36	0.44	0.628
>1,000 MWh/yr		0.36	0.43	0.614
Partial Building Integrated (rooftop)				
1-3 kW		0.44	0.55	0.785
3-20 kW		0.42	0.53	0.757
>20 kW				
<500 MWh/yr		0.40	0.50	0.707
500-1,000 MWh/yr		0.40	0.48	0.685
>1,000 MWh/yr		0.40	0.47	0.671
Building Integrated				
1-3 kW		0.49	0.60	0.857
3-20 kW		0.46	0.57	0.814
>20 kW				
<500 MWh/yr		0.44	0.54	0.764
500-1,000 MWh/yr		0.44	0.52	0.743
>1,000 MWh/yr		0.44	0.51	0.728
*Base plus net-metering bonus.				

Not only is Italian solar PV tariffs higher than those in Ontario, Italy also has greater insolation. Solar yields for central Italy are about 1,400 kWh/kW of installed capacity, or about 17% greater than those of Toronto, Ontario. Thus, Italian tariffs are nearly double those in Ontario and solar PV systems in Italy will produce one-sixth more electricity. Together, these factors greatly increase the profitability of Italian solar PV systems over those in Ontario.

France also significantly upgraded its solar PV tariffs in mid 2006 to rival those in Germany. France uses a mix of tariffs, national subsidies, and regional incentives to spur development of solar PV. The tariff for building-integrated solar PV systems is $0.79 CAD/kWh while a small rooftop solar PV system less than 2 kW in size in the region of Rhone-Alps would receive a total tariff of nearly Euro 1.0 ($1.43 CAD/kWh). Further, the small rooftop system could qualify for a national subsidy on the cost of the equipment installed.

French Solar PV Tariffs 2007			
			1.42803
Photovoltaics	Years	€/kWh	CAD/kWh
Continental (Metropolitan)			
Base (All)*	20	0.300	0.428
Building Integrated	20	0.550	0.785
Region Rhone-Alps Incentive**	6	0.400	0.571
*Plus 50% tax credit on hardware costs up to €8,000.			
**For systems <2 kW.			

Spain introduced new tariffs in mid 2007, including new fixed-tariffs for solar PV. Systems less than 100 kW will be paid Euro 0.44/kWh ($0.634 CAD/kWh) for a minimum of 25 years. Spain, like Italy, has much greater solar insolation than Ontario. Solar PV in central Spain can produce as much as 1,440 kWh/kW of

installed capacity or nearly 20% more than that in Ontario. Accounting for the greater insolation, new Spanish tariffs are equivalent to $0.75 CAD/kWh under Ontario conditions.

Yet Europeans no longer have a monopoly on high tariffs for solar PV. South Korea has launched a renewable energy program that includes the most aggressive solar PV tariff in Asia: 716 won/kWh ($0.81 CAD/kWh) for systems greater than 3 kW.

Summary of Solar PV Tariffs for Small Systems

			1.42803
	Years	€/kWh	CAD/kWh
Germany	20	0.492	0.703
France*	20(6)	1.000	1.428
Italy		0.550	0.785
South Korea	15	0.566	0.809
Spain	25	0.440	0.628
For small rooftop systems.			
*Rhone-Alps premium for 6 years only.			

Regardless of the cost estimates here, several commercial developers have signed 60 MW of contracts for ground-mounted, central-station solar PV at $0.42/kWh. These contracts suggest that the original tariff is sufficient for large, central-station solar PV “farms”. However, these contracts do not prove that the tariff is adequate for small or even large rooftop solar PV installations by homeowners, farmers, and small businesses.

From the foregoing, OSEA proposes that OPA revise Ontario’s solar PV tariff to reflect the realities of the global solar market and make Ontario’s program more robust. There are two approaches OPA could take. OPA could offer tariffs that are differentiated simply by project size or tariffs that are differentiated by size and application.

Differentiating tariffs by project size reflect expected gains from economies of scale. There’s little experience with in Canada with projects greater than 100 kW. However, the proposed tariffs below are comparable to those in other jurisdictions and take into account contracts awarded under the existing tariff of $0.42 CAD/kWh for multiple 10 MW projects.

Ontario Revised Solar Tariffs by Size

Size	Tariff
kW	$CAD/kWh
<10	$0.80
>10<100	$0.75
>100<1,000	$0.70
>1,000<2,500	$0.65
>2,500<10,000	$0.42

Another approach is to differentiate tariffs by size and application to better reflect the benefits to the transmission system of installing solar PV systems on rooftops, especially in urban areas such as Toronto.

Ontario Revised Solar Tariffs by Size and Application	
	Tariff
	$CAD/kWh
Ground-Mounted	$0.42
<10 kW Rooftop	$0.80
>10<100 kW Rooftop	$0.70
>100 kW Rooftop	$0.65

While these tariffs may seem high in comparison to wholesale costs from amortized existing fossil-fired plants in Ontario, they are in line with European tariffs. In light of experience, OSEA's proposed tariffs are a reasonable estimate of that needed to rapidly develop community solar in Ontario.

Solar Hot Water Tariffs

In late June the province proposed an incentive program for solar thermal systems to match that offered by the federal government. Rather than create a cumbersome new program to provide up-front subsidies for solar thermal (domestic hot water and commercial hot water), the current OPA program can be simply expanded to include solar thermal systems. To act quickly, the OPA can include solar thermal systems under the existing wind energy tariff of $0.11/kWh. In combination with the proposed provincial and federal subsidy, this should be sufficient to stimulate the rapid development of commercial solar hot water systems

Nevertheless, the same pricing models used to estimate an equitable tariff for solar PV could be used for solar DHW.[30]

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

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

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

Geothermal Tariffs

OSEA recommends expanding Ontario's program to include electricity generation from geothermal energy. Germany, France, and Spain all include specific tariffs for geothermal energy.

German Geothermal Tariffs 2007			
Geothermal	Years	€/kWh	CAD/kWh
<5 MW	20	0.146	0.224
<10 MW	20	0.136	0.209
<20 MW	20	0.087	0.134
>20 MW	20	0.069	0.107

Biogas Pipeline Injection

As with solar hot water, the technology exists for measuring the production of methane from a biogas digester. However, unlike generating electricity with the methane, the methane gas has value itself as a fuel. German biogas producers are now weighing whether to produce electricity with their biogas digesters or to feed the gas into the pipeline network. In many ways this is similar to injecting electricity into the grid from a network of small generators.

As with most renewable technologies, biogas digesters and associated gas cleaning equipment is capital intensive. To reduce the price risk when investing in such long-lived capital equipment as biogas digesters, Ontario can determine a fixed price or tariff for the methane generated that pays for the cost of gas generation plus a reasonable profit.

OSEA has no experience with this technology and does not propose a specific price. However, the province, possibly through OMAFRA, should explore the concept and propose a pilot tariff.

Interconnection

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 interconnection requirements for rural and on-farm renewable generators.[31]

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 Hydro One's employees safety. OFA further suggests that Hydro One's interconnection with on-farm generators for less than 500 kW should cost no more than $15,000 and should be completed as quickly and as simply as the addition of a 600-amp service for a new barn or other farm building.[32]

Though Hydro One remains the focus of attention, interconnection requirements with Ontario's other LDCs remains inconsistent. Some LDCs, such as Kingston Electricity Distribution, have made a concerted effort to prepare for the SOC program and to simplify the interconnection process and minimize the costs of doing so.[33] Others have simply placed new barriers in the way of small, locally owned renewables, notably that of rooftop solar PV.

In some cases, the LDCs have either made the application process so onerous or required such costly application fees and monthly service charges that purchasers of solar PV systems opt to connect through the net metering program.[34] Unlike the SOC program, net metering was never intended to spur

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[31] Hydro One has become notorious for its handling, some would say mishandling, of interconnection of new distributed generation. Hydro One currently has a seven-month backlog of interconnection applications, notwithstanding the long period of advance warning of the SOC program's implementation.

[32] Hydro One installs 600-amp farm service connections proficiently and in a timely manner.

[33] Kingston Electricity Distribution has made available its interconnection policy to its customers and other LDCs, including Hydro One at http://www.utilitieskingston.com/electric/generation/, visited July 20, 2007.

[34] Hydro One, a Crown (publicly-owned) corporation, charges ~$50 CAD/month for the privilege of connecting small renewable generators to its system. For comparison, WE Energies, an investor-owned (private) electric utility, charges $1-2 USD/month for small solar and wind systems in Wisconsin.

renewable energy development. Instead net metering simply "permits" a small power producer up to 500 kW to "bank" generation from its renewable system. That potential users of a program designed to encourage renewable energy development are forced to choose another program with less ambitious goals is an indication of how burdensome the requirements are by some LDCs.

The problems with integrating small generators with the grid are quite different from those with larger generators. Because small power producers, say those less than 2 MW in size, have little effect on the distribution system their interconnection should be fast tracked. Small renewable generators should receive priority and go to the head of the interconnection queue.

Ontario's distribution system has been under funded for decades as the province poured its resources into a massive nuclear construction program. This is apparent as one drives down the roads of rural Ontario.

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.

If the province undertakes to adapt the current distribution system to what Al Gore and others have called the "Electra Net" of the future, they will likely do so with public funds.[35] Just as the current system was built by Ontario Hydro, then a Crown corporation, was the property of the people, a newly expanded system of collectors built with public funds would also be the property of Ontarians.

Consequently, Ontario's existing system of transmission and distribution is a public resource, so to it is likely that the future system will remain a public resource. As such, OSEA recommends that renewable energy development by homeowners, farmers, First Nations, co-operatives, and municipalities receive priority access to the grid where capacity is limited. Further, when new collection capacity is added, community renewable energy projects should receive priority access to the expanded capacity.

In a related manner, improvements to the collection system to take new renewable generation is in the public interest to develop as much renewable energy as quickly as possible. Ontario needs new clean generation as quickly as possible if the province plans to close its coal-fired power plants on schedule. 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.

[35] See http://www.algore.org/node/58, visited July 21, 2007.

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.

Assured LDC Full Cost Recovery

Hydro One and some LDCs have not embraced Ontario's SOC program 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.

Further, there is a structural conflict of interest between LDCs and development of distributed generation. Hydro One profits on the amount of electricity they carry. If distributed generation delivers as promised and reduces demand in rural areas, Hydro One transmits less electricity, decreasing its earnings.

Similarly, LDCs may be committed to a certain amount of load growth. If an LDC expands its use of distributed generation through the SOC program, it may still be obligated for a certain amount of capacity it no longer needs.

The province, through the OEB, needs to remove any structural disincentives to LDCs and Hydro One from expanding distributed generation through the SOC program and the new Clean Energy Standard Offer 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 distributed generation.

OSEA suggested in its report to the Ministry of Energy the then Wind Power Production Incentive (WPPI) could be "clawed back" by the province from qualifying wind projects.[36] OSEA reasoned, since justified, that the federal government could remove WPPI without consulting the province and that the success of the SOC program should be independent of any federal action.

Privately, OSEA suggested to the Ministry of Energy that one-half of WPPI could be used to pay for OPA's administrative expenses and the other one-half of WPPI could be paid to LDCs for their administrative expenses.

The current SOC program splits the federal government's EcoEnergy subsidy between generators and the OPA. The province could direct OPA to relinquish its one-half of the EcoEnergy payment to LDCs in payment for their costs administering the program. LDCs bear most of the burden of implementing the

[36] Powering Ontario Communities, Pages 43-44. Of course, OSEA suggested "clawing back" WPPI only if projects were paid OSEA's full wind tariff. OPA chose not to pay OSEA's tariff, but still clawed back one-half of WPPI.

SOC program and it is only fair that OPA pass their portion of the federal government's EcoEnergy payment to the LDCs on the basis of the generation the LDCs absorb due to the program.

Moving Plants to the Transmission System

OSEA proposed Advanced Renewable Tariffs as an equitable and efficient means for encouraging community renewable energy development. In the interest of fairness, OSEA emphasized that the program should be open to all participants, including commercial developers.

However, commercial developers are able to act much more quickly and have more financial and technical resources at their disposal than community groups. In addition, there was a large inventory of potential wind projects waiting in the wings for the province to issue RFP III. These were projects that failed to win contracts under previous RFPs. Prior to the launch of the SOC program in March 2006, commercial developers were in frequent discussions with the Ministry of Energy on RFP III. It eventually became clear that the province would not issue a RFP anytime soon and has yet to do so. Commercial developers were left with few options and some chose to break up their large projects into a series of 10 MW projects and connect under the SOC program, thus gaming the program.

Anti-Gaming

Both OSEA and the Canadian Wind Energy Association (CanWEA) warned of the risk that gaming posed to the program. OSEA envisioned the SOC program as a vehicle for enabling the development of community renewables that otherwise would not be possible under the tendering system. Gaming by commercial developers threatened OSEA's principle objective by taking all the capacity available on the distribution system and leaving little or no capacity for community power.

OSEA suggested that one method for discouraging gaming could be to limit the total amount of contracts awarded in any one year, for example, to limit the amount of contracts to 20 MW per year for any one proponent. However, OSEA did not take a formal position and chose only to highlight the issue in its report to the Ministry of Energy and advised that anti-gaming provisions may be necessary.[37]

Nevertheless, OSEA and CanWEA privately suggested to the Ministry of Energy that an anti-gaming provision would be helpful in preserving a portion of

[37] Powering Ontario Communities: Proposed Policy for Projects up to 10 MW, http://www.wind-works.org/FeedLaws/Canada/PoweringOntarioCommunities.pdf, visited May 14, 2007, pages 44-45. "OSEA has no position on ownership restrictions so long as sufficient contracts are available for all farmers, First Nations, cooperatives and community groups who want them."

distribution capacity for community power. It was hoped that by discouraging gaming, community groups would find sufficient distribution capacity available for their projects.[38]

Unfortunately, the program was launched without any anti-gaming provision. As a consequence, there has been a flood of requests for interconnection from commercial developers that effectively occupied much of the available capacity on the distribution system in many parts of southern Ontario to the exclusion of community renewable energy developers such as farmers and cooperatives.

Remove Caps

Feed laws or ARTs are well adapted for the rapid development of renewable energy at all scales. Where they have been most successful, there are both no program caps and no project size caps.

OSEA proposed a program designed around 10 MW "with the last turbine in" as a stepping stone to a full-featured ARTs program with ultimately no project size cap. In the meantime, OSEA's intent was to develop a program designed for relatively small community renewable projects. The 10 MW cap was chosen to work within the existing OEB rules. There is nothing magical about the 10 MW number beyond that. Subsequently, connection requirements and application for a queue position have eliminated any benefit to limiting projects to 10 MW.

Ontario needs new renewable generation, and it needs it quickly if it is serious about meeting its renewable energy targets. There remains a large inventory of wind projects awaiting contracts, permits, and connection. Instead of effectively forcing them to chop their projects up into arbitrary 10 MW pieces, these projects should be accommodated immediately by lifting the voltage cap and the project size cap. They can then move to the transmission system where larger wind projects are better suited. By doing so, these large projects may open up distribution capacity for slower acting community renewable projects for which the SOC program was originally intended to serve.

In sum, OPA and OEB should immediately

- Lift the program size cap,
- Lift the voltage cap, and
- Implement an anti-gaming provision for projects connected to the distribution system.

This would effectively launch a SOC program at transmission voltages with projects sized appropriate to their interconnection and limited only by restrictions on land use.

[38] CanWEA suggested that developers be limited to five projects (50 MW). OSEA suggested a limit of three projects (30 MW) per developer.

Creation of a Low-Interest Loan Fund

Much of the rapid growth of renewable energy in Germany has been fueled by large low-interest loan fund. Money in this fund is distributed through private banks in a conventional manner, but the loans are held by the fund. This is a revolving fund, as loans are paid off with interest, the fund is regenerated.

Under the German program, local banks are obligated to provide loans from KfW (originally the Kreditanstalt für Wiederaufbau[39]), to applicants who meet the program's lending criteria. Loosely translated as the German Bank for Reconstruction and Development, KfW has a program specifically to promote renewable energy.[40] Loan terms can be up to 20 years for typically 1% below prime. Payments can be waived during the first three years of the loan.

The up front cost of solar PV and solar DHW systems remains prohibitive for many homeowners. Similarly, the costs of wind turbines are substantial and may exceed the mortgage value of the farms where the turbines could be used. An Ontario low-interest loan fund, patterned after the German program, could enable a much more rapid development of renewable energy than otherwise. Nevertheless, a low-interest loan fund is not a financial substitute for tariffs that offer the prospect of earning an attractive profit on a renewable energy investment. Loan funds are only an adjunct to a well-functioning system of Advanced Renewable Tariffs.

In Ontario, several private banks are exploring their potential role in providing financing to renewable energy development since the launch of the SOC program. Development may not be expanding rapidly enough to entice private banks into the market. This is certainly the case with on-farm biogas generation.

Strong & Stable Political Support Needed

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 in any program.

Ontario's government has remained committed to the SOC program. Both Premier Dalton McGuinty and Minster of Energy Dwight Duncan have repeatedly endorsed the program and cited it as a groundbreaking policy for North America.

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[39] See http://en.wikipedia.org/wiki/KfW, visited May 19, 2007.
[40] See http://www.kfw-foerderbank.de/EN_Home/Umweltschutz/RenewableE.jsp, visited May 19, 2007.

Premier McGuinty stated in a speech to the Ontario Energy Association his objective for the program ". . . we are encouraging homeowners, farmers, schools and community co-ops to set up renewable energy systems by letting them sell clean power to the grid. . . Over the long term, it could add thousands of megawatts of renewable power to our system."[41]

As recently as April 2007, Minister Duncan described his ministry's desire to modify Ontario's SOC program to "Find the right mechanism to spread the use of wind across the province." And to the many challenges facing the program he added ". . . We will bring the barriers down."[42]

Chief Renewable Energy Officer

Despite the continuing public statements of support for the program from the government, continuing questions of interpretation arise. In addition, many issues cross ministerial boundaries. For example, the development of on-farm biogas is the purview of both the Ministry of Energy and the Ministry of Agriculture and Food. Similarly, policies of the Ministry of Natural Resources may conflict with the objectives of the Ministry of Energy in the development of offshore wind resources.

For these reasons, OSEA suggests that the Minister of Energy name a Chief Renewable Energy Officer who will be responsible for assuring that renewable resources are added at a pace sufficient to meet the government's objectives and in a manner equitable to all Ontarians. The renewable energy officer can act as a liaison with all affected ministries, with the OPA and the OEB, and with stakeholders.

Course of Action

There are several mechanisms by which Ontario's SOC program can moved toward a full-featured program of renewable tariffs: amend the Electricity Act, introduce a new law (an Ontario Renewable Energy Sources Act), issue a Ministerial Directive, or issue a statement of intent.

Amending the Electricity Act by incorporating the objectives of the SOC program in the mission or purpose of the act may be the most direct approach short of passage of a separate bill delineating the program in detail. OPA and OEB have frequently cited the conflict between the SOC program and the purpose of the Electricity Act as reasons for not correcting deficiencies in the program.

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[41] Ontario Premier Dalton McGuinty, Ontario Energy Association annual meeting, September 14, 2005, http://www.wind-works.org/FeedLaws/Premier%20Dalton%20McGuinty%20Endorses%20SOCs.html.

[42] Minister of Energy Dwight Duncan, April 12, 2007, Growing the Margins, London, Ontario.

During public hearings on previous amendments to the Electricity Act (Bill 100), OSEA provided detailed suggestions for changes to the Act that would have mitigated many of the problems since encountered with the program. OSEA suggestions were not incorporated into the act.

Similarly, the program in its entirety could be introduced as a stand-alone bill. This was the course followed in Germany and France. In Germany, program details, such as specific tariffs for each technology, were included in the Renewable Energy Sources Act (Erneuerbare Energien Gesetz).[43]

Less desirable over the long term, but possibly easier to implement quickly, the Premier or Minister of Energy could clearly state their objectives for the program in a speech or other public address. This could be sufficient for the boards of and administrators within OPA and OEB to interpret the will of the government.

Amend the Electricity Act (Chapter 23 of the Statutes of Ontario, 2004)

Most importantly, the government should amend the Electricity Restructuring Act of 2004, also know as Bill 100, to include considerations for social and environmental costs of electricity generation and the seriousness of climate change.

In addition, OSEA suggests specific changes to the Act.

1. Purpose

Amend section g. “to promote economic efficiency in the generation, transmission, distribution and sale of electricity” by adding while reflecting the social and environmental values necessary for the longterm protection of the public's health and welfare.

Part II.1 Ontario Power Authority

25.2 (1)

This section should explicitly include Advanced Renewable Energy Tariffs as the preferred mechanism for the rapid deployment of renewable sources of electricity generation.

25.5

Section (a). “. . . act honestly and in good faith in the best interests of the OPA”

[43] Original (2000) version in English http://www.wind-works.org/FeedLaws/Germany/GermanEEG2000.pdf, visited January 7, 2006; current version (2004) http://www.wind-works.org/FeedLaws/Germany/EEG-New-English-final.pdf, visited January 7, 2006.

should be amended to act in the best interests and the sustainable health and welfare of the people of Ontario.

25.10 Conservation Bureau (Creates)

While very laudable and long overdue, the bureau has not performed as envisioned by the government. Amend the act to expand the role and function of the Conservation Bureau to include a renewable energy.

2. Change the name of the bureau to “Renewable Energy & Conservation Bureau.
3. Ensure that the Renewable Energy & Conservation Bureau is not subsumed with the OPA’s organizational bureaucracy.

Part II.2 Management of Electricity Supply, Capacity, and Demand

25.28

Minister's directives

(2) “The Minister may issue, and the OPA shall follow in preparing its integrated power system plans, directive that have been approved by the Lieutenant Governor in council that set out the goal to be achieved during the period to be covered by the integrated power system plan, including goals relating to,”

Amend this section to ensure that the Minister’s directive includes the broader goals of social, health and welfare benefits as well as the benefits from a sustainable electricity supply.

Publication

(4) “The Board shall review each integrated power system plan submitted by the OPA to ensure it complies with any directions issued by the Minister and is economically prudent and cost effective.”

Amend this provision to balance the phrase “economically prudent and cost effective” with considering all social and environmental costs and considering all benefits from distributed generation, and all social and environmental benefits from renewable sources of energy.
25.29 (1) “The OPA shall develop appropriate procurement processes for managing electricity supply, capacity and demand in accordance with its approved integrated power system plans.”

Amend this section to explicitly state appropriate procurement processes, including Advanced Renewable Tariffs or Minimum Price Standards . . .

(2) “The OPA's procurement processes must provide for simpler procurement processes for electricity supply or capacity to be generated using alternative energy sources or renewable energy sources, or both, where the supply or capacity for the generation facility or unit satisfies the prescribed conditions.”

Amend this paragraph to explicitly state that Advanced Renewable Tariffs or Minimum Price Standards” are not only acceptable but a preferred mechanism for “establishing the floor or minimum price" needed for developing different renewable sources of electricity.

Notice to Board

(6) “The IESO shall not make a rule under this section unless it first gives the Board an assessment of the impact of the rule on the interests of consumers with respect to prices and the reliability and quality of electricity service.”

Amend the phrase to include and to the safety, health, and welfare of Ontarians, and of the sustainability of the electricity supply, and addressing the seriousness of climate change.

Schedule B
Amendments to the Ontario Energy Board Act, 1998

“1. To protect the interests of consumers with respect to prices and the adequacy, reliability and quality of electricity service.”

Amend this phrase to include to protect the public’s health and welfare and address climate change.

2. “To promote economic efficiency and cost effectiveness in the generation, transmission, distribution, sale and demand management of electricity and to facilitate the maintenance of a financially viable electricity industry.”

Amend this phrase to include the words financially and environmentally sound electricity industry that serves the best interests of all Ontarians, those of today and those of tomorrow, while minimizing fuel-price risk and the impacts on public health and well being.

The Ontario Renewable Energy Sources Act

Rather than amend the Electricity Act, the Ontario’s Legislative Assembly can introduce a new law that specifically and clearly spells out the purpose and provisions of a program implementing Advanced Renewable Tariffs. Model statutes exist that can be modified to reflect Ontario’s regulatory and administrative context.

Early in 2007 Hawaii's state assembly briefly considered a renewable tariff specifically for solar PV patterned after that in Germany. Similarly, Michigan's state assembly is expect to introduce this year a more full-featured Renewable Energy Sources Act modeled after Germany's EEG.

Following the October election, the ruling party could introduce legislation adapting Germany's Renewable Energy Sources Act to Ontario conditions.

Issue New Ministerial Directives

Unique to parliamentary systems of government is the power vested in a member of cabinet to issue "directives" outlining or describing government policy to ministerial staff and agencies of the government. In Ontario this includes the OPA and OEB.

Most fundamentally, the government should clearly state that the program desired is not one of Standard Offer Contracts, but the implementation of the Ontario Advanced Renewable Tariff Program. While seemingly insignificant, the wording reflects a change in the way OPA and OEB approaches the development of renewable energy.

The government should create a large low-interest loan fund patterned after Germany's Bank for Reconstruction for the development of renewable energy.[44]

Direct the Ministry of Finance to create a large ($500 million) low-interest loan fund for the development of renewable energy in Ontario.

Direct OPA to open the current SOC program up to all renewable projects, that is, lift the 10 MW cap on project size and the limit to distribution voltage. To reiterate, direct the OPA to open the SOC program to all participants regardless of size and voltage.

Direct the OPA to determine renewables tariffs based on their estimated cost of generation with a reasonable profit as is done in Germany, France, and Spain.

Direct the OPA to increase price differentiation for the four renewable technologies in the current program and add solar hot water systems and geothermal energy to the program

Direct OPA to implement OSEA's original proposal for differentiated tariffs for wind energy.

Direct OPA to implement separate tariffs for projects of varying size for on-farm biogas, solar photovoltaics, hydro, and for solar hot water projects.

[44] KfW Bankengruppe, formerly DtA, Deutsches Ausgleichsbank, http://www.kfw-foerderbank.de/EN_Home/Umweltschutz/index.jsp, visited May 14, 2007.

Direct the OPA to raise the tariff of on-farm biogas, using that specific distinction.

Short of directing OPA to raise the base price of on-farm biogas, direct OMAFRA and the Ministry of Environment to implement a simple bonus payment scheme for on-farm biogas of $0.07/kWh in payment for their environmental attributes.

Direct OPA to include an inflation adjustment of 80% in the renewable energy tariffs.

Direct OPA to include inflation adjustments for solar PV and solar hot water systems.

It appears that the prices are not “robust” enough and that there remain too many barriers and indeed new ones have been added by the OPA that the rapid development of renewable energy in Ontario that was originally envisioned is not occurring.

Direct OPA to remove new barriers created by the OPA. Specifically, direct OPA to remove the “Orange exclusion” zone.

Direct OPA to substantially increase solar PV tariffs.

Direct OPA to raise prices for wind energy and on-farm biogas.

Direct OEB to further simplify interconnection requirements of microgeneration.

Direct OPA to remove the provision that precludes existing contracts from receiving a higher tariff later should the province raise the tariffs, notably for on-farm biogas and solar PV.

Direct the OPA to pass through to the LDCs any EcoEnergy payments it receives under the SOC program.

Direct OEB and Hydro One to implement simplified interconnection requirements for on-farm generators that are no more complex or costly than the typical rural service 600-amp connection.

Direct the OEB to ensure that Hydro One’s interconnection with on-farm generators less than 500 kW costs no more than $15,000.

Direct the OEB to ensure LDCs full cost recovery of any expenses related to implementing the SOC program

To ensure that the objectives of the government are met, it may be prudent to create a "secretariat" of renewable energy, or include renewable energy in the mandate of OPA's Conservation Bureau.

The Minister of Energy or the Premier should name a Chief Renewable Energy Officer who is responsible for seeing that the government's renewable energy objectives are met.

Statement of Intent

OSEA has compiled a summary of statements by Premier Dalton McGuinty and by Ministers of Energy Dwight Duncan and Donna Cansfield on their vision for Ontario's SOC program.[45] OSEA believes these statements, despite statements to the contrary by OPA staff, indicate that the government intended the program to provide opportunity to all Ontarians in the development of renewable energy, including homeowners, farmers, First Nations, cooperatives, and small businesses.

Though OSEA has always maintained that the program should be open to all participants, it has always been OSEA's intent--and we believe that of the government as well--that the program's primary focus was on support of community renewable energy development.

Because staff at the OPA and OEB challenge this conclusion based on the specific wording of the Ministerial Directive that established the program, it may be sufficient for the Minister of Energy to clearly and unequivocally state in a public forum, the government's intent for the program. While this may not be adequate to eliminate all problems with the program, it is an action that can be taken immediately at little cost to the government or ratepayers.

Conclusion

Ontario's SOC program is the most progressive renewable energy policy in North America in two decades. It has the potential to become a model for the rapid and equitable development of renewable energy not only for Canada but for the Unites States and Mexico as well. Yet this groundbreaking policy has several flaws, some of which require immediate correction.

Ontario, whether by independent action of the OPA and OEB, or by a Ministerial Directive, must quickly raise solar PV tariffs and tariffs for on-farm biogas generation. Early adopters that have pioneered these forms of energy in the province should not be penalized. Consequently, existing contracts for these technologies should be offered the new tariffs.

[45] See http://www.wind-works.org/FeedLaws/Canada/CommentsontheIntentofOntariosStandardOfferContractProgram.html, visited June 29, 2007.

OPA and the OEB should also immediately launch a review of the program so additional changes can be discussed publicly in the fall of 2007 with an eye toward presenting new draft rules in early 2008 and implementing the new program by mid March.

-End-