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**TOWN OF CALEDON DEVELOPMENT APPROVAL & PLANNING POLICY
Energy & Environment**

Report DP-2011-009

To: Mayor and Members of Council
From: Mary Hall, Director of Development Approval & Planning Policy
Date: June 14, 2011
Subject: **Solar Photovoltaic Feasibility Results**

RECOMMENDATION

That Report DP-2011-009 regarding Solar Photovoltaic Feasibility Results, be received; and

That Council accept the results of the microFIT feasibility studies; and,

That Council enacts a by-law to amend By-law 2010-119 to authorize energy and system upgrades to include Caledon Village Fire Station #305, Mono Mills Fire Station #308, and Inglewood Community Centre; and,

That Council approves the continued use of the LAS Solar Photovoltaic Program for the single source procurement of a maximum of four turnkey 10 kW microFIT solar photovoltaic projects;

ORIGIN/BACKGROUND

The generation of renewable energy is of importance to the Town of Caledon. The promotion of alternative energy has been embedded into the Town's Community-Based Strategic Plan and Official Plan Amendment 226. The generation of renewable energy is an action highlighted in the Council endorsed Environmental Progress Action Plan and Corporate Energy Management Plan. The commissioning of such project will also assist the Town in reaching its Partner's for Climate Protection greenhouse gas reduction targets.

On May 14, 2009, the Ontario government passed the *Green Energy and Green Economy Act*. A primary component of this Act is the renewable electricity feed-in-tariff. This is a premium that the Province will pay generators for the production of renewable electricity. Systems with a generation capacity greater than 10 kW would be eligible for a Feed-in-Tariff (FIT) contract. Those systems that generate less than 10 kW of electricity would be eligible for a micro Feed-in-Tariff (microFIT). Due to the additional complexities associated with FIT projects these contract approvals take longer than microFIT contracts. Both contracts are 20 years in length and require the generator to make all generated electricity available to the electricity grid.

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Report PD-2010-055 recommended that Council explore the feasibility of having solar energy generation within Caledon. This was done to maintain the Town's progressive environmental reputation and to allow the Town to participate in the Ontario Power Authority's microFIT program.

This report will summarize the results of these feasibility studies and will provide options for further action.

DISCUSSION

Pre-feasibility Studies

Following Council Report PD-2010-055, through the Local Authority Service's Solar Photovoltaic Program, Essex Energy completed a series of pre-feasibility studies for rooftop solar projects at Council approved locations. These studies were completed to assess the viability of a project without proceeding with the more costly measure that a full feasibility study requires. The pre-feasibility studies considered the roof's age, size, type, and current load, the building's azimuth (angle to the sun), shading, connection and metering points. Upon completion of the studies the buildings were ranked based on the project's viability (see Table 1 for a summary of results). Projects that were not recommended were removed from the list. To limit costs only the top two projects were considered for feasibility studies. If these studies had positive results the next ranked facilities would be assessed.

Table 1: Pre-feasibility results

Sites	
1. Victoria Park Community Centre (Recommended for feasibility study)	<ul style="list-style-type: none"> ▪ few rooftop obstructions and there are minimal shading concerns. ▪ sufficient rooftop space to accommodate a full 10 kW microFIT project.
2. Margaret Dunn Library (Recommended for feasibility study)	<ul style="list-style-type: none"> ▪ building has minimal rooftop obstructions and shading concerns ▪ sufficient rooftop space to accommodate a full 10 kW microFIT project. ▪ will require a step-up transformer to accommodate the 600v, 3 phase system
3. Palgrave Community Centre (<i>Not recommended for feasibility study</i>)	<ul style="list-style-type: none"> ▪ peaked roof will cause shading on the northern portion of the flat roof ▪ appropriate roof space is not sufficient to hold a 10 kW system
4. Inglewood Fire Station (<i>Not recommended for feasibility study</i>)	<ul style="list-style-type: none"> ▪ trees providing shading to the southern side of the roof ▪ appropriate roof space is not sufficient to hold a 10 kW system
5. Palgrave Fire Station (<i>Not recommended for feasibility study</i>)	<ul style="list-style-type: none"> ▪ roof obstructions limit area available for solar ▪ current roof may not last the term of the contract ▪ appropriate roof space is not sufficient to hold a 10 kW system
6. Caledon Village Place	<ul style="list-style-type: none"> ▪ few rooftop obstructions and there are minimal

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(Not Recommended due to age and future function)	shading concerns. <ul style="list-style-type: none"> ▪ sufficient rooftop space to accommodate a full 10 kW microFIT project.
7. Lloyd Wilson Centennial Arena (Recommended for FIT Project)	<ul style="list-style-type: none"> ▪ building would be better suited for a larger FIT project which would exceed current project budget

As indicated in Table 1, the pre-feasibility studies found Victoria Parks Community Centre and Margaret Dunn Library to be the top ranked facilities and were therefore selected to have full feasibility studies. The remaining facilities were not suitable for a 10 kW solar microFIT project.

Feasibility Study

On May 9, 2011, Essex Energy completed the feasibility studies for the Victoria Parks Community Centre and the Margaret Dunn Library. These studies included assessments of the current condition of all proposed rooftops (including anticipated remaining roof life, suggested repairs, expected cost of repairs and/or replacement), an analysis of the facility's structural capacity and the proposed panel attachment method, a detailed shading analysis report, complete specifications and warranties of major system components, a roof layout for the proposed project, grid connection details, and a complete 20-year economic analysis.

Victoria Park Community Centre Feasibility Results

The Victoria Park Community Centre's feasibility results found that the structural stability of the building was not suitable for a 10 kW solar p.v. system. This is largely due to the wood tongue and groove deck, supported by wooden beams which were not designed to withstand the additional load of the panels and the ballast. In order to make this project feasible local reinforcement of the deck in areas of high loading would be required. The estimated cost of this remedial work would be \$40,000. This would be in addition to the downtime that the facility will experience during construction. This additional work would reduce the project's return on investment significantly. All other components of the feasibility study had positive results.

Margaret Dunn Library Feasibility Results

The Margaret Dunn Library's feasibility results found that the structural stability of the building was not suitable for a 10 kW solar p.v. system. The building was designed to the 1995 National Building Code which had a snow load 28.4 psf. The current snow load for Caledon is 30.1 psf which is slightly higher than the original design's load. The addition of the solar p.v. system would increase the dead load by 2.5 psf this would be 9% over the original design load. In this scenario the wooden trusses would be overstressed. Reinforcement to the top and bottom chords would be needed to provide additional capacity. Due to the confined work space this additional work would require the removal of the existing roof at an estimated cost of \$20,000. This is in addition to the downtime that the facility will experience during construction and the removal of a roof that has

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potentially another 20 years of service life. This additional work would reduce the project's return on investment significantly.

Alternative Solutions

Having exhausted the original list of building options for 10 kW rooftop solar p.v. projects staff has explored the remaining options that would allow for municipal solar projects within Caledon. There are two alternatives that could be pursued; i) assess larger facilities for solar feasibility, ii) pursue ground mounted solar projects.

Larger Buildings

The initial approach to selecting sites for 10 kW solar p.v. microFIT projects focused on the size of the building, with attention given to the 'smaller' Town facilities. This was done to prevent 'larger' facilities from becoming ineligible for future FIT contracts due to a pre-existing microFIT contract at a site. FIT projects were not considered because they exceeded the allocated budget. In addition to eliminating the site of future FIT projects, locating a microFIT project at larger facilities would require additional feasibility studies. With changes to the Feed-in-Tariff program likely coming this fall the Town may not have the time necessary to complete additional feasibility studies and obtain an Ontario Power Authority conditional offer. This approach is not recommended by staff.

Ground mount projects

The alternative to a rooftop solar p.v. system is a ground mounted solar p.v. system. The benefit of pursuing a ground mount option at this time is that it is a streamlined process that should allow the Town to obtain an Ontario Power Authority microFIT conditional offer in a timely manner. This would improve the likelihood of the Town obtaining an OPA microFIT contract prior to any changes in the program.

It should be noted that the tariff for a ground mount system is less than what is offered for a rooftop system; however the capital cost for a ground mounted system is less which makes the return on investment comparable.

Staff recognizes Council's concern with regard to vandalism of ground mounted systems and has investigated this matter. The results of this investigation found no Ontario reports on the vandalism of ground mounted solar p.v. systems. Inter-municipal communications found that vandalism has not been a problem. Deterring vandalism will remain a concern and staff will explore a range of preventative measures such as locating the project in proximity to police or fire stations, elevating the panels, or constructing fencing around the project. The sites that are being considered for ground mount systems are at the properties of following facilities: i) Victoria Park Community Centre; ii) Mono Mills Fire Hall; iii) Caledon Village Fire Hall; iv) Inglewood Community Centre. This approach is being recommended by staff.

LAS Solar Photovoltaic Program

Through the Local Authority Service's (LAS) Solar Photovoltaic Program, the Town single sourced Essex Energy Corporation to complete Caledon's feasibility studies. The LAS program was designed to simplify the FIT process for municipalities new to solar

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electricity generation. Participation in this program has allowed the Town to avoid the pursuit on undesirable rooftop solar p.v projects. With anticipated changes to the FIT and microFIT programs scheduled this fall it is recommended that the Town continues working through the LAS Solar Photovoltaic Program to complete the recommended solar p.v. ground mounted projects. This would give the Town the best chance to receive a conditional contract offer prior to any changes and/or cancellation of the current microFIT program.

FINANCIAL IMPLICATIONS

In the August 10, 2010 report, PD-2010-055 – Solar Photovoltaic microFIT Projects report, Council approved allocating \$300,000 from the remaining Ontario Rural Infrastructure Investment (RII) grant funds to a new community energy project, solar photovoltaic microFIT. The projects outlined in the 2010 report were roof-mounted installations that would contribute approximately \$135,000 per project to a Corporate Energy Reserve Fund over 20 years.

The Ground mounted projects proposed in this report have a similar initial capital cost (\$70,000 to \$77,000 per unit), however, the 20 year revenues are slightly lower due to the microFIT tariff to be received by the Town being \$0.642 per kWh generated (vs. the \$0.80 per kWh for the roof-mount projects). Accordingly, each ground mounted project is projected to contribute approximately \$100,000 to the Corporate Energy Reserve Fund over 20 years.

Based on 20-year financial projections, each ground-mounted microFIT installation is projected to recover the initial installation costs (\$70,000 to \$77,000) and approximately \$18,000 of interest over the 20-year period. Further, each installation is projected to earn additional positive cash flow of \$9,000 to \$18,000 after factoring costs such as maintenance, repairs, utility fee, and insurance. For the purposes of the financial analysis, the Ontario RII grant used to fund the project was considered similar to an external loan for the project. This means that “internal repayments” inclusive of principal and 2.5% interest were built into the cash outflows for the project to stress the importance of recovering the initial investment with interest. The \$100,000 contribution to the Corporate Energy Reserve Fund over 20 years is based upon the “internal repayments” of the initial cost with interest and the cumulative net positive cash flow for each installation.

LEGAL IMPLICATIONS

The Ontario Power Authority (OPA) has developed a set of standard contracts for the Feed-in Tariff Microfit programme. These contracts address the following issues:

1. the term of the contract—which is 20 years.
2. the price to be paid by the Ontario Power Authority for the generated electricity- which is 64.2 cents/kWh.
3. the requirement that the supplier of the electricity (Caledon) sell its power only to the Ontario Power Authority
4. the payments will be made to the supplier (Caledon) on a periodic basis based on the generational cycle

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5. the transfer to OPA by Caledon of the environmental attributes of the facility including any credits that may be available under any trading system for environmental attributes
6. completion by Caledon of the prerequisites to execution of a Feed-in Tariff Microfit contract by OPA such as Caledon's certification to OPA that (a) the solar photovoltaic facility has the required Domestic Content, (b) Caledon has entered into a Connection Agreement; (c) Caledon is an Eligible Participant, (d) that facility meets all Project Eligibility Requirements
7. the ownership of the meter by the supplier (Caledon) and the access to that meter and its data by OPA, and
8. the termination of the agreement by (a) Caledon on thirty days notice to OPA and (b) by OPA on ten days notice to Caledon if Caledon is in breach of the agreement.

The Town will be continuing the purchasing arrangement that was established through resolution 2010-479.

NEXT STEPS

- Submit microFIT applications to the Ontario Power Authority for 10 kW ground mounted solar p.v. projects located at Victoria Park Community Centre, Mono Mills Fire Station, Caledon Village Fire Station, and Inglewood Community Centre.
- Retain the service of Essex Energy Corporation, through the Local Authority Service's Solar Photovoltaic Program, for the construction and commissioning of the solar photovoltaic projects, in accordance with the microFIT program.
- Pending Ontario Power Authority and Hydro One's project approval, receive a conditional microFit contract offer.
- Mayor and Clerk to execute 20 year contracts with the Ontario Power Authority for the generation of solar electricity at the OPA approved sites.

COMMUNITY BASED STRATEGIC PLAN

Goal 1: Partner with land owner and community to preserve, protect, and enhance our environment, agricultural resources, and natural capital.

Strategic Objective 1B- Protect and enhance air quality and reduce impacts of climate change.

Strategic Objective 1C- Support green energy and energy reduction

POLICIES/LEGISLATION

Bill 150, the *Green Energy and Green Economy Act*, was created to facilitate the development of a sustainable energy economy that streamlines the approvals process, protects the environment, mitigates climate change, engages communities and builds a world-class green industrial sector.

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CONSULTATIONS

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ATTACHMENTS

No attachments.

CONCLUSION

Ground mounted solar photovoltaic projects will allow the Town to fulfill its desire to generate solar electricity, which in turn, will help the Town reduce greenhouse gas emissions, secure revenue for future energy conservation projects, and bring awareness to the positive attributes of renewable energy.

for

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