
Utility Scale Solar Power Plant

Recommendation

That the Standing Policy Committee on Environment, Utilities and Corporate Services recommend to City Council:

1. That Parcel M, Plan No. 102221525 (a 13 acre undeveloped parcel located along Circle Drive South near Montgomery Place) be set aside for a solar power plant; and
2. That Administration proceed with community engagement and report back to City Council with options to finance, build, and operate the solar power plant.

Topic and Purpose

The purpose of this report is to recommend that Parcel M be set aside to build a Solar Power Plant. Saskatoon Light & Power (SL&P) set a target to generate 10% of the utility's annual energy requirements from local, renewable resources. Development of solar power facilities will be key to meeting this target.

Report Highlights

1. SL&P is seeking approval to consider the development of a solar power development project on city-owned Parcel M.
2. SL&P could consider utilizing a mix of financial models to finance, build and operate the solar power plant.
3. SL&P currently has self-generation programs that it offers to its customers to facilitate small solar energy opportunities. While each program provides social and environmental benefits to the city, there are financial implications to the utility.
4. SL&P envisions adding more solar power generating stations in the future to help meet the City's Greenhouse Gas Emission targets.

Strategic Goal

This report supports the Strategic Goal of Environmental Leadership with a long-term strategy to create new sources of green energy where feasible and to increase self-reliance on green energy for city operations.

This report also supports the four-year priority to continue implementation of the Energy and Greenhouse Gas Management Plan, under the Strategic Goal of Environmental Leadership. The Energy and Greenhouse Gas Management Plan lays out many actions related to the development of renewable energy.

Background

City Council, at its meeting held on April 25, 2016, received the report Saskatchewan Polytechnic Solar Demonstration Partnership at the Landfill Gas Power Generation that

that provided a facility for construction of the Solar Power Demonstration Site, and on June 22, 2015, received the report Net Metering Program on providing customers with the ability to generate their own electricity.

In 2016, SL&P built the Saskatoon Solar Power Demonstration Site with its partners SES Solar Co-operative Ltd., Saskatchewan Polytechnic, and the Saskatchewan Environmental Society. The demonstration site was the first step for SL&P to prepare for a larger solar power plant.

The Solar Demonstration Site, located at the Landfill Gas Power Generation Facility is only 500 metres south of the proposed Parcel M location. From the demonstration site, SL&P is analyzing the performance of different solar arrays, comparing the capital cost against its generation, gaining operational and maintenance experience, and creating long-term energy production projections. Attachment 1 highlights early results from the solar demonstration project.

Report

SL&P has set a target to generate 10% of the utility's annual energy requirements from local, renewable resources. Solar power technology fits well within its franchise limits as it is easily deployable and can be sized to fit the available space.

SL&P envisions deploying solar technology within its boundary on undeveloped land that has little or no other above ground development opportunities, such as along rights-of-way.

Parcel M

Parcel M is approximately 13 acres in size and is located immediately south of 11th Street West between Circle Drive South and the CN rail lines. The parcel is a suitable location as it has excellent solar exposure, the location is near electrical distribution lines, and has little or no above-ground development opportunity. SL&P estimates that a one-megawatt solar power plant could be constructed on this site. A conceptual site layout is shown in Attachment 2.

Administration recommends that City Council set aside this parcel for a future solar power plant. This would not permit SL&P to start building the power plant, but would allow the utility to further analyze the site and begin developing a program to finance, build and operate a solar power facility on the land. A further report will be submitted to City Council providing a detailed project proposal before proceeding with the project.

Financial Models for Solar Power Development

There are several programs that SL&P could offer to finance, build and operate a solar power plant. Each program provides social and environmental benefits to the City, but may have varying adverse financial impacts on SL&P.

As a reseller of electricity, SL&P buys electrical energy in bulk from SaskPower. Roughly half the bulk cost is for electrical energy and the other half is for demand-

related charges. Solar generation on SL&P's distribution system would reduce the cost of electrical energy but may not reduce the demand charge. This is explained further in Attachment 3. Attachment 4 introduces the four possible financial models that could be used to finance this project:

1. SL&P could directly invest, construct, and operate the plant.
2. SL&P could contract an independent power producer to own and operate the plant, selling the power to SL&P.
3. SL&P could create a space for its customers to deploy solar power generation on their own to offset their existing power consumption (i.e. Virtual Net Metering).
4. SL&P could create a new Renewable Energy Tariffs Rate Class for its customers.

SL&P would prefer to consider offering multiple programs utilizing Parcel M. This would provide customers with choice on which program suits their needs best. Also, SL&P would be able to monitor the success of each program and expand the best programs in the future.

Facilitating Small Energy Opportunities

The use of Parcel M would be SL&P's first step to facilitate large solar energy opportunities. SL&P facilitates small solar energy opportunities through the customer self-generation programs. Currently, SL&P offers customers the same two programs SaskPower offers to its customers, the Small Power Producer Program and the Net Metering Program. Through the Net Metering Program, SL&P credits customers for electricity sent to the electrical grid at the retail rate. This is often visualized as the customer 'banking' their electricity in the distribution system when they are over-producing and 'withdrawing' that electricity at a later time. For this service, SL&P retains the emissions credits for the generation returning to the distribution system. SL&P is essentially buying greenhouse gas offsets at the purchase price of \$148 per tonne of carbon-dioxide equivalent.

The programs provide high customer satisfaction, but have a direct impact on SL&P's financial performance since the purchase price of electricity is purchased from customers at retail rates instead of the more economical bulk power rates that SL&P pays for electricity from SaskPower. The financial impact for each kilowatt of solar installed is estimated to be a reduction in revenue of \$185.25 per year. With these programs doubling in size every two years, the financial impact continues to grow proportionally. The loss of revenue opportunity from the existing programs in 2017 is estimated at \$92,625.

Future Solar Deployment and Use

To reach the City's new greenhouse gas emissions targets, both the electrification of end-use applications and the deployment of clean energy generation sources are required.

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As traditional fossil-fueled applications convert to electrified applications (such as stoves, water heaters, space heating, and electric buses and vehicles), SL&P envisions adding new clean energy generation in its franchise area to power these new loads. Several opportunities exist adjacent to Circle Drive around the city similar to this parcel east of Montgomery Place, on sound walls, and near SL&P substations. Multiple programs would be established.

Future opportunities are possible to invest in clean energy projects outside SL&P's franchise area. For example, SL&P could bid as an independent power producer on SaskPower procurement opportunities to add new clean energy to the provincial grid. This is in place in other jurisdictions such as Calgary who powers its light rail transit from wind farms outside of the city.

The following table illustrates a solar deployment strategy and timeline to meet the new demand to 2050.

Year	Net Metering	Community Co-op	Independent Power Producers	Direct Investment	Cumulative Total
Existing	0.5 MW				0.5 MW
2019	0.5 MW	0.2 MW	2 MW		3.2 MW
2021	1 MW		5 MW		9.2 MW
2023	2 MW	0.8 MW	5 MW		17 MW
2025	2 MW	1 MW	10 MW	20 MW	50 MW
By 2050	10 MW	10 MW		30 MW	100 MW
Total	16 MW	12 MW	22 MW	50 MW	100 MW

Options to the Recommendation

Administration could explore alternative sites such as using existing sound attenuation walls along Circle Drive South. This is a long-term vision for solar technology deployment but is not recommended by the Administration at this time as installations would be smaller and require more electrical distribution capital. Parcel M was deemed the most practical and cost effective with excellent exposure for this project.

Public and/or Stakeholder Involvement

Formal engagement with major stakeholder groups, community-based special interest groups, and adjacent residents will proceed in 2018. The City could also consider gathering public input via its Citizen Advisory Panel (CAP).

Communication Plan

Communication planning will be ongoing as the project progresses and will include website updates, media relations and advertising where required to promote accomplishments and provide opportunities for citizens to engage.

Financial Implications

Project investigation to date has been funded from Capital Project #1281 - Sustainable Power Generation Options.

Environmental Implications

A 1 MW solar power plant is estimated to save 15,893 tonnes of carbon dioxide equivalent (CO₂e) from being emitted over the 25-year term of the project, which is equivalent to removing 134 cars from the road.

Other Considerations/Implications

There are no policy, privacy, or CPTED implications or considerations.

Due Date for Follow-up and/or Project Completion

If City Council approves to set aside Parcel M for a potential solar power plant, the Administration would provide a further report identifying the proposed programs to be used to finance, build, and operate the plant.

Public Notice

Public Notice pursuant to Section 3 of Policy No. C01-021, Public Notice Policy, is not required.

Attachments

1. Solar Power Demonstration Site
2. Proposed 1 MW Solar Power Plant Design Circle Drive Parcel M
3. Reseller Rates and Local Solar Generation
4. Potential Utility Scale Solar Power Plant Financial Programs

Report Approval

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