

Dundonald Avenue Solar Farm Project Options

ISSUE

This report seeks City Council direction for the project scope and/or budget for the design and construction of the Dundonald Avenue Solar Farm Project (Solar Farm).

BACKGROUND

History

City Council, at its Regular Business Meeting on May 25, 2020, resolved in part:

1. That the Administration be directed to submit the proposed projects listed in Table 1 of this report to the Green Infrastructure Stream for the Investing in Canada Infrastructure Program – Green Stream.

City Council, at its Regular Business Meeting on May 31, 2021, considered the Investing in Canada Infrastructure Program – Budget Adjustment report. At this time, Administration indicated they would bring back a future funding report for the Investing in Canada Infrastructure Program (ICIP) budget increase and identify the funding for the City of Saskatoon's (City) portion of costs.

The requested increase to Capital Project P.01955 – Utility Solar Scale Energy Implementation for the ICIP funding in the amount of \$2,566,550 remains outstanding; therefore, this report recommends an increase to the capital project funded through ICIP.

City Council, at its Regular Business Meeting held on November 22, 2021, considered various options for implementation of the Solar Farm, and resolved in part:

1. That Option 2, Implement Project with Naturalized Landscaping, be approved under Capital Project P.01955 - Utility Solar Scale Energy Implementation;

Option 2 was based on the results of a feasibility study and access to approximately \$2.57 million of Federal and Provincial Government funding, which resulted in the following outcomes:

- Installation of up to 2.2 megawatt (MW_{dc}) of solar power at an estimated cost of \$4.26 million, with a 30-year project life;
- Generation of over 2.7 million kilowatt-hours (kWh) of renewable electricity, which is enough to power over 330 homes;
- Savings of up to \$0.3 million each year from bulk energy purchase offsets, resulting in a simple payback period of 7 years;
- Lifetime Greenhouse Gas (GHG) reductions of approximately 13,500 tonnes of CO_{2e} over 30 years; and
- Utilization of approximately 14 acres of land from Parcel M, Plan No. 102221525, and an adjacent vacant right-of-way land located immediately south of the parcel.

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City Council, at its Regular Business Meeting held on April 26, 2023, considered receipt of \$0.12 million of Federal Government funding under the Natural Infrastructure Fund (NIF) for the establishment of naturalized landscaping at the Solar Farm site, and resolved in part:

1. That the Capital projects outlined in this report be increased to include funding from the Natural Infrastructure Fund

This additional funding brought the total estimated project costs to \$4.39 million and provides sufficient funds for a landscape contractor needed to effectively naturalize the Solar Farm site landscape and attain desired aesthetic benefits, improve biodiversity, and green infrastructure, while reducing site related operation and maintenance costs by an estimated \$0.12 million over the 30-year life of the project.

The Standing Policy Committee on Environment, Utilities and Corporate Services, at its meeting held on April 2, 2024, outlined the [current status](#) of the project and considered a scope adjustment of the Solar Farm to stay within budget constraints, and resolved:

That the Administration report back in May on options to pursue a second phase of the project at the original scope of power generation or full utilization of the site. That the report include full payback costing and explore reserve funding as well as internal loans.

OPTIONS

Three options have been evaluated for further consideration for construction of the Solar Farm:

- Option 1: Implement Phase 1
- Option 2: Implement Phases 1 and 2
- Option 3: Implement Phases 1, 2, and 3 (Full Scope)

Evaluation of the options included the following considerations:

- The desire to maximize solar development potential of sites, due to limited opportunities within city limits;
- The City has committed to carbon neutrality by 2050, and is determining the most effective ways to reduce GHG;
- The Solar Farm project achieves and exceeds the Low Emissions Community (LEC) Action No. 30, which calls for the implementation of 1 MW utility-scale solar system on municipal land, and informs LEC Plan Action No. 34, which calls for the implementation of 20 MW of utility-scale solar system on municipal land in Saskatoon and surrounding areas within the decade;
- This is the first utility-scale solar project in Saskatoon and will show environmental and financial stewardship; and
- Eligibility for \$2.56 million of Federal funding requires the completion of the project by the summer of 2025.

Option 1: Implement Phase 1

Under this option, the Solar Farm would be designed for its full scope and potential of 3.09 MW_{dc}, while limiting solar panel installation up to budget constraints of the previously approved project amount of \$4.39 million, inclusive of the ICIP and NIF funding (Phase 1). This option would allow for easy expansion of the project as part of a future phase should funds become available.

Phase 1 would result in a system designed for 3.09 MW_{dc}, while limiting the installed solar panel capacity to 1.06 MW_{dc} that generates approximately 1.3 million kWh's of annual renewable energy production over the 30-year project life (approximately 34% of Option 3).

This option provides estimated annual savings of \$0.15 million through bulk energy purchase offsets which would be used to replenish the Electrical Distribution Extension Reserve, and results in a simple payback period of 13 years.

Advantages

- Maintains the maximum development potential of the project site;
- Future expansion may be eligible for government funding; thereby, reducing any incremental costs due to duplication or inefficiencies arising from phased construction activities; and
- Ensures the future opportunity for realizing maximum reductions in GHG emissions from Parcel M, resulting in estimated lifetime emission reductions ranging from 7,300 tonnes to 20,900 tonnes of CO_{2e} with the phased implementation of the project over 30 years.
- Does not require additional funds at this time.

Disadvantages

- As this option does not meet the requirements under the ICIP Contribution Agreement, there is a risk of losing a portion or all of ICIP funding due to the reduction in the installed system size (i.e. a reduction from 2.2 MW_{dc} to 1.06 MW_{dc}). Discussions and approval from ICIP would be required if this option is chosen;
- Results in highest overall cost of the project after completion of all phases, due to duplication and inefficiencies with construction activities, which is estimated at \$0.32 million; and
- Is subject to further cost increases from inflation and technology advancements applicable at the time of expansion.

Option 2: Implement Phases 1 and 2

This option is similar to Option 1 with design completed for the full site, except that the construction of solar panels would be extended to the entirety of the north section of the project site (i.e. Parcel M, Plan No. 102221525), and would result in the completion of Phases 1 and 2 of the project. This option would result in total project costs of \$6.23 million, requiring additional funding of \$1.84 million, which would be sourced from the Electrical Distribution Extension Reserve.

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This would increase the installed solar capacity to 2.23 MW_{dc} that generates approximately 2.7 million kWh's of annual renewable energy production over the 30-year project life (approximately 71% of Option 3).

This option provides estimated annual savings of \$0.32 million through bulk energy purchase offsets which would be used to replenish the Electrical Distribution Extension Reserve, and results in a simple payback period of 13 years.

Advantages

- Ensures the minimum lifetime reductions in GHG emissions expected from the project are attained immediately, while allowing for future GHG reduction increases through a future expansion;
- Future expansion may be eligible for government funding; thereby, reducing any incremental costs due to duplication or inefficiencies with construction activities; and
- Strikes a good balance between environmental and financial stewardship.

Disadvantages

- Capital funding in the amount of \$1.84 million would be allocated to this project from Saskatoon Light & Power's (SL&P) capital reserves, reducing the funding available for asset management and maintenance of the electrical distribution system. Although this is a short-term disadvantage, the long-term financial gain from the project would benefit SL&P's finances;
- Results in overall incremental cost to expand later arising due to duplication and inefficiencies with construction activities, which is estimated at \$0.18 million; and
- Is subject to further cost increases from inflation and technology advancements applicable at the time of expansion.

Option 3: Implement Phases 1, 2, and 3 (Full Scope)

Under this option, the Solar Farm would be designed and constructed for its new full scope and potential of 3.09 MW_{dc}, resulting in total project costs of \$8.46 million, requiring additional funding of \$4.07 million, out of which \$1.84 million would be sourced from the Electrical Distribution Extension Reserve, and the remaining \$2.23 million would be funded through borrowing.

This option provides the maximum renewable energy production, resulting in a system size of 3.09 MW_{dc} that generates approximately 3.8 million kWh's of annual renewable energy production over the 30-year project life.

This option provides estimated annual savings of \$0.45 million through bulk energy purchase offsets that would be used to replenish the Electrical Distribution Extension Reserve as well as service the additional borrowing required. With cost of debt (assuming 4.39% interest rate) included, the payback period is estimated to be 16 years.

Advantages

- Ensures the maximum development potential of the project site is attained;

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- Results in highest estimated lifetime emission reductions of 20,900 tonnes of CO_{2e} over 30 years; and
- Results in maximum annual savings from bulk energy purchase offsets.

Disadvantages

- Capital funding in the amount of \$1.84 million would be allocated to this project from SL&P's capital reserves, reducing the funding available for asset management and maintenance of the electrical distribution system. Although this is a short-term disadvantage, the long-term financial gain from the project would benefit SL&P's finances;
- Borrowing in the amount of \$2.23 million would be needed, which would result in interest payments that reduce the financial benefits from the project; and
- Additional project scope is not eligible for government funding given the immediate need for spending.

Comparison of Options

The below table provides a summarized comparison of the proposed options.

Report Option	Plant Size (MW _{dc})	Energy Production* (Million kWh)	Equivalent Homes Energy*	Lifetime Emission Reductions* (Tonnes of CO _{2e})	Total Cost (Millions)	Funding Gap (Millions)	City Funds Payback Period (Years)*
1 – Phase 1	1.06	1.3	162	7,300	\$4.39	\$0	13
2 – Phases 1 & 2	2.23	2.7	337	15,000	\$6.23	\$1.84	13
3 – Phases 1, 2 & 3	3.09	3.8	475	20,900	\$8.46	\$4.07	16

* Denotes estimates

RECOMMENDATION

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

1. That Option 3, Implement Phases 1, 2, and 3 (Full Scope), be approved as the design and construction plan for Capital Project P.01955 – Utility Solar Scale Energy Implementation;
2. That a budget increase to Capital Project P.01955 – Utility Solar Scale Energy Implementation in the amount of \$4.07 million, funded by \$1.84 million from the Electrical Distribution Extension Reserve and \$2.23 million through borrowing, subject to a public hearing and intent to borrow report, be approved;
3. That a budget increase to Capital Project P.01955 – Utility Solar Scale Energy Implementation in the amount of \$2,566,550, funded by the Investing in Canada Infrastructure Program, be approved; and
4. That Capital Project P.01955 – Utility Solar Scale Energy Implementation be exempted from the 10% downpayment provision required for capital projects funded through borrowing as stated in Council Policy No. C03-027 – Borrowing for Capital Projects.

RATIONALE

Positive Impact on City Goals

The recommended Option 3 achieves and exceeds LEC Action No. 30, which calls for the implementation of a 1 MW_{dc} utility-scale solar system on municipally owned land within Saskatoon and would also inform LEC Plan Action No. 34 which requires the implementation of 20 MW_{dc} of utility-scale solar system on municipal land in Saskatoon and surrounding areas within the next decade.

Minimization of Construction Inefficiencies

Option 3 ensures the project is built together; thereby, minimizing the need for multiple construction activities, which eliminates corresponding inefficiencies and added costs.

Positive Long-Term Impact on the Utility

All options retain a long-term positive impact to the utility, with Phase 1 resulting in initial estimated annual savings of \$0.15 million through bulk energy purchase offsets, growing to \$0.32 million after completion of Phase 2, and \$0.45 million after completion of Phase 3. After completion of all phases, the project is estimated to generate an average of 3.8 million kWh's of clean electricity each year across its 30-year life. This is the equivalent energy needed to power 475 homes annually.

Optimal Utilization of Land

Option 3 ensures available land within the project site is developed to its maximum potential immediately. This is especially important as there are limited land availabilities within the city limits and especially within the Saskatoon Light & Power electrical franchise boundary.

ADDITIONAL IMPLICATIONS/CONSIDERATIONS

Triple Bottom Line Implications

A Triple Bottom Line review of this project was completed. A variety of environmental, social, and economic impacts and opportunities were identified. Key considerations include:

Environmental

- The solar farm is estimated to reduce GHG's ranging from 7,300 to 20,900 tonnes CO_{2e} over its lifetime; and
- The project supports sustainable land use by developing land that has a low potential for other developments, and through careful planning, maximizes the productivity of the space with minimal rework and ground disturbance.

Social

- The overall health and wellbeing of the citizens will be positively impacted through the project's direct mitigation of climate change; and
- While physical access will be restricted, virtual access to the site will be given through public websites, which will include project details, benefits to the community and environment, and near real-time energy production.

Economic

- Constructing the solar farm on budget or with additional funding ensures savings to be realized over its lifetime, and results in a payback period of up to 16 years.

Financial Implications

Additional funding is needed for Options 2 and 3.

With Option 2, an additional \$1.84 million would be required and sourced from the Electrical Distribution Extension Reserve, which would reduce the funding available for asset management and maintenance of the electrical distribution system.

With Option 3, an additional \$4.07 million would be required and sourced from the Electrical Distribution Extension Reserve and through borrowing which will be repaid via the estimated \$0.45 million bulk power purchase savings, subject to a public hearing and intent to borrow report.

COMMUNICATION ACTIVITIES

The following communication activities are planned following direction from City Council:

- A communication plan will be developed that will alert the public to the updated project status and keep the community informed regarding construction timelines and other pertinent details; special attention will be paid to keeping directly affected neighbourhoods informed.
- Administration will pursue a public hearing and intent to borrow report.

APPENDICES

1. Illustration of Solar Farm Implementation

Report Approval

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