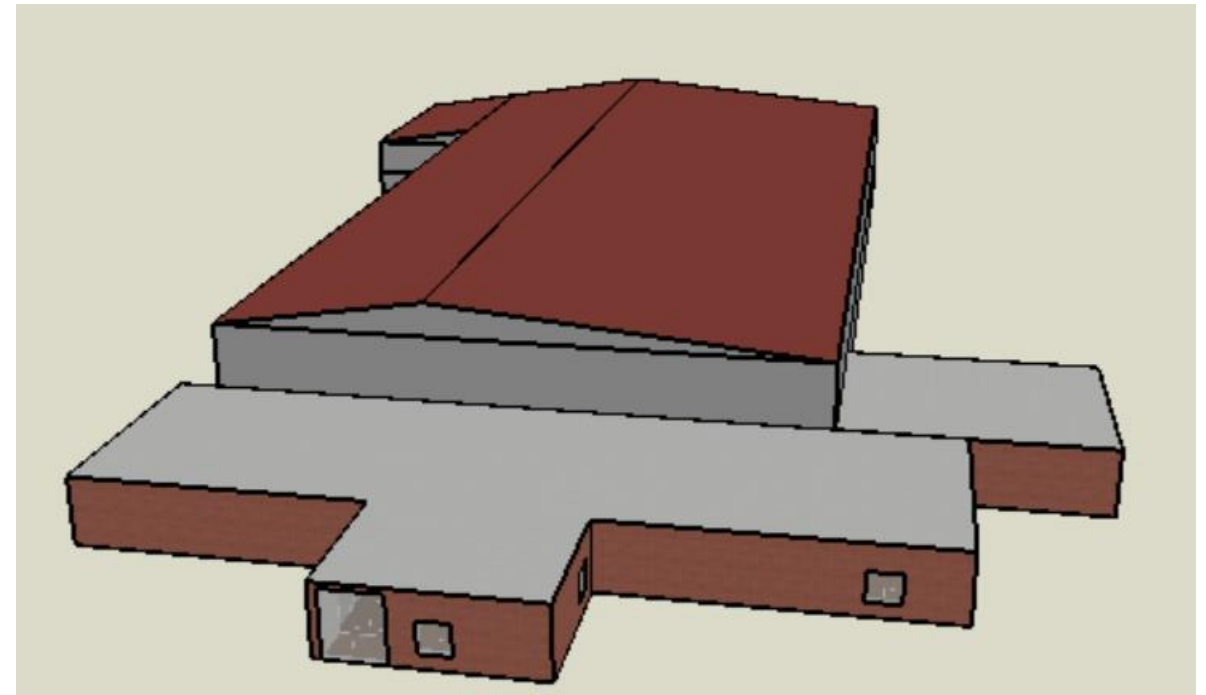
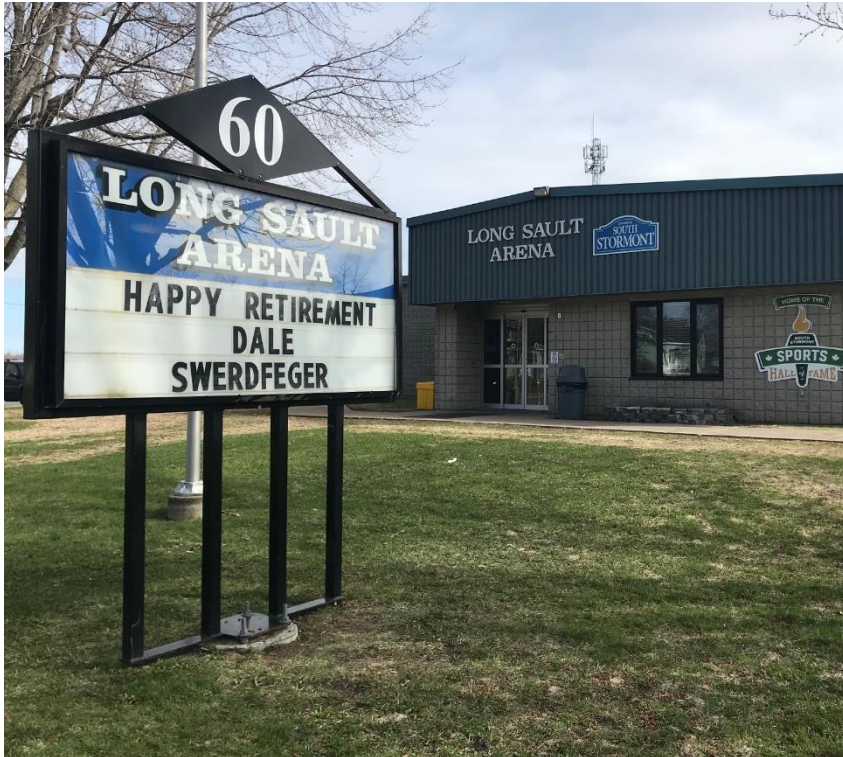


Long Sault Arena GHG Reduction Pathway Feasibility Study – Final Presentation

Created By:

Next Energy Development Group Inc.



Project Deliverables

- Energy Audit
 - Meeting standards of the ASHRAE 211 Standard for Commercial Building Energy Audits
- Whole Building Calibrated Energy Model
 - Calibrated in adherence with ASHRAE 14 Guideline on Measurement of Energy, Demand, and Water Savings
- Development of a 20-year forward projection of the facility
- Development of Four Pathways which would allow the Township to achieve an 80% reduction in Greenhouse Gas Emissions within 20-years, when compared to baseline consumption
 - Including relevant energy, financial, and emission analyses
- Final Report
 - Summarizing the results and methodologies used throughout the project
 - Consolidates knowledge that the Township may use as a reference for future deep energy retrofits

Project Deliverables

- Application into Infrastructure Canada's Green and Inclusive Community Buildings (GICB) program
 - Application submitted February 2023, currently in pending status
- Analysis and design of the incorporation of solar photovoltaic generation with on-site battery storage

Results – Pathway 1: Like-for Similar

- **Description:**
 - A 20-year baseline projection of the facility assuming no significant changes to operation and maintenance procedures
- **Advantages:**
 - Lowest implementation cost and complexity of installation
 - Minimal impact on facility operations
- **Disadvantages:**
 - Minimal energy conservation and/or GHG emission reduction
 - Negative Net Present Value indicates that the costs associated with the project exceed the savings found. This is expected as for this baseline projection the majority of the costs are spent on measures that do not provide energy savings, and thus do not provide a financial benefit.
 - Greatest amount of carbon offsets required for net-zero operation

Results – Pathway 2: GICB/Optimize Existing

- **Description:**
 - This pathway is meant to show the Township the impacts of all measures included in their GICB application, and the requirements to meet net-zero operations without radical change, but only an optimization of existing systems, beyond these measures
- **Advantages**
 - Most financially attractive Pathway
 - Significantly offsets fossil fuel consumption
 - Majority of construction is at the start of the study period, allowing for minimal intrusion on operations throughout the remainder of the project life
 - Ties in holistically with capital projects already planned, and pending funding applications
 - Allows for the incorporation of on-site renewable generation with on-site battery storage
- **Disadvantages**
 - Relies significantly on carbon offsets to reach net-zero operation

Results – Pathway 3: Full Electrification

- **Description:**
 - This pathway provides the Township with a pathway to transition fully to electricity, eliminating fossil fuel consumption at the Long Sault Arena
- **Advantages**
 - Maximum GHG Emission Reduction
 - Full Facility Electrification
 - Allows for net-zero carbon operation without purchasing carbon offsets
- **Disadvantages**
 - Requires ground mounted solar via a car canopy. The Township would like to avoid ground mounted arrays due to limited space and to allow flexibility for future development
 - Significant overhaul of existing HVAC Systems and electrical infrastructure
 - Potential replacement of condensing AHU prior to end-of-life
 - Increased operating costs over the project life cycle due to increased electrification

Results – Pathway 4: Full Electrification (Short Term Deep Retrofit)

- **Description:**
 - This Pathway includes all the same energy conservation and GHG reduction measures as Pathway 3 – Full Electrification, except that all measures are implemented in the first five years of the study period.
- **Advantages**
 - Maximum cumulative GHG emission reduction over the 20-year study period
 - Achieves full site electrification within 5-years
 - Allows for net-zero carbon operation without purchasing carbon offsets
- **Disadvantages**
 - Requires ground mounted solar via a car canopy. The Township would like to avoid ground mounted arrays due to limited space and to allow flexibility for future development
 - Significant overhaul of existing HVAC Systems and electrical infrastructure
 - Requires replacing some equipment prior to end-of-life
 - May cause issues with the ongoing GICB application by altering plans for a condensing AHU for an electric model in Year 0
 - Increased operating costs over the project life cycle due to increased electrification

Results - Summary

Pathway	Total Construction Costs	Incentives and Grants	Annual Energy Costs (Year 1)	Annual Cost Savings	Annual Energy Consumption [GJ]	Annual Energy Savings	Annual GHG Emissions	Annual GHG Emissions Reduction	NPV	IRR
P1 - Like-for-Similar	\$1,345,339.13	\$19,833.00	\$112,962.75	11.9%	3,196.56	8.00%	93,755.98	3.2%	-\$824,801.85	-4.0%
P2 - GICB / Optimize Existing	\$2,809,784.13	\$2,176,306.65	\$103,374.96	17.1%	2,594.80	25.30%	50,883.71	47.5%	\$1,513,290.25	17.8%
P3 -Full Electrification	\$3,842,407.81	\$2,362,427.75	\$144,631.11	-23.0%	2,660.56	23.40%	10,386.66	99.9%	\$1,072,432.85	11.8%
P4 - Full Electrification - Five Year Short Term Deep Retrofit	\$3,804,907.81	\$2,355,927.75	\$144,631.11	-23.0%	2,660.56	23.40%	10,386.66	99.9%	\$825,464.64	9.5%

Recommendation

- In-line with the Township’s established environmental goals, it is recommended that the Township continue to pursue measures that will allow the Long Sault Arena to operate as efficiently as possible, minimizing operating costs, consumption, and greenhouse gas emissions.
- Should funding become available, it is recommended that the Township pursue Pathway #2 – GICB / Optimize Existing.

Pathway	Total Construction Costs	Incentives and Grants	Annual Energy Costs (Year 1)	Annual Cost Savings	Annual Energy Consumption [GJ]	Annual Energy Savings	Annual GHG Emissions	Annual GHG Emissions Reduction	NPV	IRR
P2 - GICB / Optimize Existing	\$2,809,784.13	\$2,176,306.65	\$103,374.96	17.1%	2,594.80	25.30%	50,883.71	47.5%	\$1,513,290.25	17.8%

Recommendation – Pathway #2 – GICB / Optimize Existing

- If implemented, Pathway #2 would provide the Township with the plans to:
 - Achieve a substantial decrease in operating greenhouse gas emissions reductions (47.5%)
 - Achieve net-zero operation through the purchase of carbon offsets
 - Improve efficiencies and environmental stewardship
 - Provide energy security for the local community
 - Address the short- and long-term needs of the facility in a cost-effective manner

Recommendation – Pathway #2 – GICB / Optimize Existing

- Meeting the needs of the community:
 - Accurately forecast and efficiently address the financial requirements of the facility to provide cost savings
 - **This selected Pathway is the most cost-effective solution for the Township. By maximizing the financial benefits of this project, the Township would increase available funding as it continues to target ways to:**
 - Further reduce costs, consumption, and emissions across the entire municipal fleet
 - Identify and address the needs of the community, and distribute cost savings accordingly
 - **Capitalize on available funding to save costs while addressing the current- and future needs of the facility**
 - Improve quality of publicly available services offered at the facility
 - Keep costs down
- Increase community adaptability, resilience, and energy security
 - This Pathway includes the incorporation of a **rooftop solar photovoltaic array with on-site battery storage**, advancing the Township's capacity to **use the facility as a shelter during times of crisis**

Next Steps

- SaveOnEnergy / Enbridge Gas
 - Various rebates/incentives are available through local distribution companies for various energy conservation measures. The Township should continue to monitor these opportunities as equipment is replaced either with end-of-life or as part of energy retrofits

Next Steps

- Green and Inclusive Community Buildings (GICB) Application
 - Application is currently pending.
 - Requested Funding: \$2,380,263.39
 - Total Eligible Project Costs: \$2,975,329.23
 - Costs include a 15% contingency
 - **Municipal Contribution: \$595,065.84**
 - **Less than the cost of the required roof replacement alone**
 - Upon receipt of a funding decision the Township should begin discussion on planning the logistics of the implementation of identified retrofits

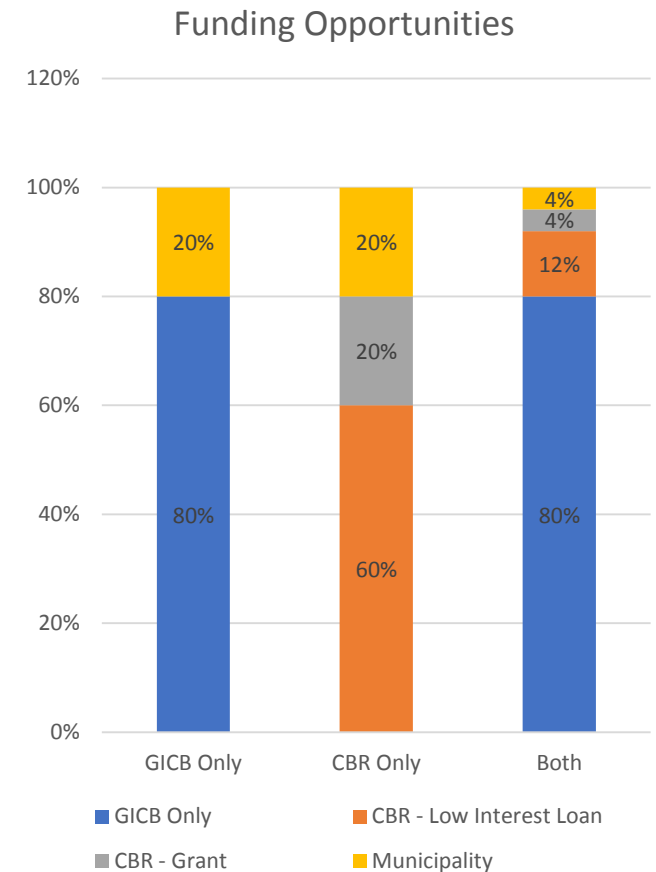
Next Steps

- **Community Buildings Retrofit – Monitoring and Analysis Grant**

- Grant available for up to the lesser of \$25,000 or 80% of eligible project costs to incorporate buildings with a monitoring and analysis system
- Generally, monitoring and analysis systems allow building operators to:
 - Monitor the energy performance of their buildings, allowing for weather normalization and year-over year comparisons.
 - Benchmark the energy performance of their buildings against similar buildings in other municipalities.
 - Identify and implement simple energy conservation measures.
 - Track, monitor and report energy performance after energy conservation measures are implemented.
 - Translate energy savings to GHG reductions.
- Capitalizing on this funding would allow the Township to translate the lessons learned through this project across the entire municipal fleet:
 - Maximize energy and cost savings for the entire municipal fleet
 - Accurately forecast and mitigate future operations and maintenance costs
 - Monitor and capitalize on future funding opportunities as they are introduced at the Federal and Provincial levels

Next Steps

- **Community Buildings Retrofit – Capital Projects**
 - It is recommended that the Township use this feasibility study to proceed with an application into the Federation of Canadian Municipalities' 'Community Buildings Retrofit – Capital Project' funding stream
 - This funding stream provides funding for up to 80% of eligible project costs
 - 20% as a grant
 - 60% as a low-interest loan
 - Allows for 'stacking' with other funding streams such as the GICB



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Thank you.