



Date: 2024-02-20

City of West Kelowna
2760 Cameron Rd.
West Kelowna, BC V1Z 2T6

File No.: P026.002.22
Email: erin.goodwin@westkelowna.ca
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Attention: Erin Goodwin

Re: Royal LePage Place Arena – Energy Retrofit Budget and Phasing Recommendations

Dear Erin:

Background

FirstLight completed a FortisBC CEP study that included investigation of nine (9) energy efficiency measures to reduce facility gas consumption, carbon emissions, and utility costs. Of these measures, five (5) are recommended for implementation.

Measures Recommended for Implementation

The following measures are recommended for implementation; refer to the energy study for more information on each measure.

- ECM-2: Controls Optimization
- ECM-4: Optimization of Dehumidifier Operation
- ECM-5A: Replace and Expand Existing Heat Recovery System
- ECM-5B: Install Heat Recovery System for Jim Lind
- ECM-7: Add a Desuperheater

Combined, these measures are anticipated to reduce the facility gas consumption by 54% (5,300 GJ/year) with a similar reduction in facility carbon emissions and annual cost savings of \$43,800 per year. The carbon emission reduction for the recommended measures is 293 t CO₂e per year.

In addition to the energy cost savings, the BC carbon tax is currently \$65/t CO₂e and will increase by \$15/t CO₂e until it reaches \$170/t CO₂e in 2030. The City of West Kelowna is currently charged carbon tax on top of the base natural gas rate. The table below shows the projected annual carbon tax year based on the carbon emission savings and the planned BC carbon tax increases.

Year	Carbon Tax (\$)	Carbon Tax Savings (\$)
2023	\$65	\$19,045
2024	\$80	\$23,440
2025	\$95	\$27,835
2026	\$110	\$32,230
2027	\$125	\$36,625
2028	\$140	\$41,020
2029	\$155	\$45,415
2030	\$170	\$49,810

Budget

Measure budgets included in the FortisBC report include hard construction costs only. For budgeting purposes, we recommend including the following multipliers to account for escalation, consulting fees, and contingency:

- 5% for annual escalation for all equipment costs from the date of the report.
- 10% for consulting fees
- 5% for construction management
- 20% for contingency based on the budgeting class presented in the report.

These budgets are summarized in the table below:

Measure ID	Measure Description	Construction Budget	Total Budget
ECM-2	Controls Optimization	\$15,625	\$20,000
ECM-4	Dehumidifier Optimization	\$6,250	\$8,500
ECM-5a	Heat Recovery System Retrofit	\$409,375	\$575,000
ECM-5b	Heat Recovery System Retrofit	\$323,750	\$455,000
ECM-7	Desuperheater Retrofit	\$68,750	\$95,000
Total	All measures	\$823,750	\$1,153,500
		Incentives	(\$480,240)
		Net-Cost	\$673,260

Note: The Total budget cost must be carried until completion of the project. FortisBC will pay the incentive amount upon completion of the project.

Implementation Incentives

FortisBC has completed their technical review and issued an Implementation incentive letter. The table below provides a summary on the capital incentive amounts offered for the recommended measures. In addition to these implementation incentives, the remainder of the energy study cost, \$9,174.45, will be provided if any measure is implemented.

FortisBC will provide these incentives upon completion of this work.

ECM	Description	Energy Savings		Cost Savings (\$/year)	Capital Cost (\$)		Simple Payback (years)	Estimated Incentive (\$)
		Natural Gas (GJ/year)	Electricity (kWh/year)		Base Cost	ECM Cost		
ECM-2	Building Controls Optimization	310	4,777	\$3,689	\$0	\$15,625	1.7 (4.2)	\$9,300
ECM-4	Dehumidifier Optimization	194	4,615	\$2,142	\$0	\$6,250	0.7 (2.9)	\$4,687
ECM-5a	Install 100 ton high temperature heat pump at Royal LePage Arena	3,445	-202,250	\$26,248	\$0	\$409,375	3.9 (15.6)	\$307,031
ECM-5b	Install 30 ton high temperature heat pump at Jim Lind Arena	784	-49,716	\$5,553	\$0	\$323,750	38.8 (58.3)	\$108,192
ECM-7	Desuperheater	567	0	\$6,207	\$0	\$68,750	2.9 (11.1)	\$51,030
Total		5,300	-242,574	\$43,839	-	\$823,750	7.8 (18.7)	\$480,240

Schedule and Phasing

We recommended phasing the implementation portion of the project to accommodate a number of factors including:

- Operational constraints, including refrigeration plant shut-down windows.
- Equipment lead times.
- Annual capital budget limitations.

Phase 0 – Hot Water Temperature Testing

This phase involves retaining FirstLight to work directly with the base building controls contractor to implement demand-based reset of the heating water temperatures to determine if the hot water temperature can be lowered without negative impact on the thermal comfort. The ability to operate at lower heating water temperature can reduce the cost of the heat pump equipment. It is recommended that this work proceed as soon as possible.

Phase 1 – Control Optimization & Replacement of Existing Heat Pump

This phase includes ECM-2, 4 & 5a which include control optimization and replacement of the existing heat pump located in the basement mechanical room. This work can be implemented without the need to shut-down the refrigeration plant and with minimal disruption to the existing hot water heating system.

Phase 2 – Retrofit of Heat Pump for Jim Lind and Desuperheater

This phase includes ECM-5b and 7 and should be implemented together with a period of refrigerant plant shut-down of 2-3 weeks to allow for integration of the desuperheater. Lead times on equipment will likely prevent this work from being accomplished during the 2024 shut-down period.

The table below provides a summary of total budget costs and incentive costs by phase.

Phase	Scope	Total Budget Cost	Eligible Incentive	Net Budget Cost
Phase 0	Low Temperature Testing	\$5,000	-	\$5,000
Phase 1	ECM-2, 4, 5A	\$603,750	\$321,018	\$282,732
Phase 2	ECM-5b, 7	\$549,500	\$159,222	\$390,278
Total		\$1,158,250	\$480,240	\$678,010



We recommend that the design for both Phase 1 and 2 be completed together. Construction of Phase 1 and 2 would preferably be completed by the same contractor under a phased construction project but could be completed as two separate projects, if required.

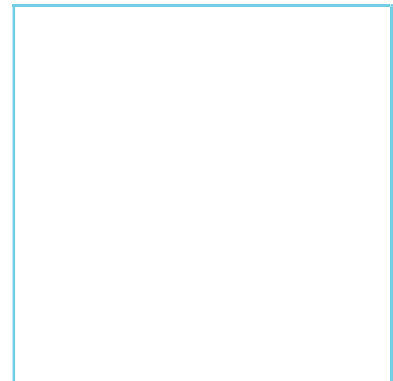
We trust the above information is clear and useful for project planning purposes. We are available to provide further clarification as requested and would be happy to assist the City of West Kelowna further by providing design and project management services for this project.

Yours very truly,
First Light Energy Solutions Ltd.

A handwritten signature in dark ink, appearing to read 'M. Reimer', with a long horizontal flourish extending to the right.

Mike Reimer, P.Eng., LEED AP
Principal

Attachment(s): N/A



**Professional Seal &
Signature**