

Energy Retrofit Project

Date: May 30, 2021

To: Board of Management of the Toronto Zoo

From: Director, Facilities & Infrastructure

Wards: All

SUMMARY

This report will recommend that the Toronto Zoo continue with the Energy Retrofit Project Phase II based on a modified scope of the project and increased initial costs. The Energy Retrofit Project will serve to reduce energy and water consumption, upgrade capital energy-related equipment, improve building operations and maintenance while saving costs. The project will coincide with the Toronto Zoo's environmental and natural resources conservation platform.

RECOMMENDATIONS

The Director, Facilities & Infrastructure recommends that:

1. The Board of Management of the Toronto Zoo approve phase two of the Energy Retrofit Project as presented by Ecosystem Energy Services Inc. Detailed Concept Design with a modified project cost.
2. The Board of Management of the Toronto Zoo approve the Zoo to enter into an Energy Retrofit Loan with the City of Toronto's Better Buildings Partnership to cover the Energy Retrofit Project costs if the Zoo's loan application is accepted and the financial terms offered in the loan are less than that offered by Ecosystems Energy Services Inc.

FINANCIAL IMPACT

The cost of the preferred proposed Detailed Concept Design is \$5,576,000 with an Enbridge incentive of \$21,290. The project is expected to produce annual utility savings of \$828,615. The payback period including the annual cost of predictive software and interest (at 6.25%) is 10 years.

Project Cost:	\$5,576,000
Predictive Software Cost:	\$ 210,000
Interest @ 6.25%:	\$2,489,886
Total Cost over 10 years:	\$8,275,886

All expenses are expected to be reimbursed by the utilities saving generated by the project over a 10-year period.

DECISION HISTORY

In April 2018, the Toronto Zoo released a Request for Proposals - RFP 18 (2018-03) to complete a site-wide Energy Retrofit Project that will target energy and water consumption.

At the 2019-02-15 meeting, the Board approved the Energy Retrofit Project to be awarded to Ecosystems Energy Services Inc. (ZB2.6) The project included the development of a Detailed Concept Design for the project, Engineering Design, Implementation, Commissioning, and Monitoring and Verification. At the time of approval, the proposal submitted by Ecosystem Energy Services Inc. had an estimated cost up to \$4.7 million with a simple payback period of less than 6 years, with the capital investment made by Ecosystem Energy Services Inc. and reimbursed by the Zoo with the utility savings generated by the project. The proposal was submitted based on the information provided by the Zoo during the RFP process about energy and water consumption, facility services, and infrastructure and maintenance requirements.

COMMENTS

During the site inspections and energy audit, Ecosystems Energy Services Inc. and Zoo staff investigated different environmental conservation measures such as peak shaving, heat pumps, steam to hot water conversion, controls optimization, electric boilers, water filtration systems, piping replacement, window repairs, ventilation optimization, grey water recovery, EV charging stations, HVAC retrofits, solar installations, intelligent fume hoods, and lighting redesign. Different factors influenced the final recommendations as presented in the Detailed Concept Report. At the request of Zoo staff, the heating system for the Americas Pavilion was prioritized as a project because it is failing. Some projects were removed from the design because they were projects already in progress by the Zoo. Others were not included because the scope of the project was far greater than estimated and would not have met the 6-year simple payback period.

The final Detailed Concept Design involves three project components:

1. Peak Shaving

To use the Zoo's backup generators to reduce energy costs by reducing the Zoo's Global Adjustment charges, through the management of the overall energy demand during the Province's top five coincident electrical peaks.

Ecosystems Energy Service's recommended a Split High-Voltage Network plan for the peak shaving measure as the project costs were low enough to fall within the 6-year simple payback period. The cost of the Split High-Voltage Network plan is \$2.6M. The Zoo receives the concept of peak shaving, however, after reviewing the three different peak shaving options possible for the Zoo, the Zoo Electrical Services prefers the Island Mode Peak Shaving option. This option does not restrict future development and electrical capacity on the Zoo's internal hydro grid. The Island Mode option is significantly more expensive at \$4.4M and will extend the simple payback period beyond the requested 6-years. This additional cost at this time can be justified as it increases the capacity of the Zoo's current backup generation system, upgrades transfer switches, permits electrical staff to transfer the electrical load to different sections of the internal hydro grid when completing repairs or other upgrade projects. Based on end-of-life terms for the generators and switches, these upgrades need to be completed within the next 10 years at the expense of the Zoo without the opportunity to offset the costs through energy savings.

The Island Mode Peak Shaving will generate the majority of the project savings. This measure is expected to realize an annual electricity consumption savings of 108,000 kWh and cost savings of \$715,274. This project will also upgrade transfer switches, install emissions scrubbing equipment to the existing site generators, install a new generator to increase emergency backup capacity, and increase redundancy to an aging generator system.

2. Water Conservation Measures

To install full recirculating filtration systems on the river and pygmy hippo habitats which are currently daily dump and fill. This measure is expected to realize an annual savings of 19,138 cubic meters of potable water, 11,215 cubic meters of natural gas, and \$85,532. Zoo staff receives and accepts this project design as presented in the Detailed Concept Design.

3. Steam-to-hot-water conversion in the Americas Pavilion

To replace the last remaining steam heating system at the Americas Pavilion which is at the end-of-life to a hot water network. This measure is expected to realize an annual savings of 16,584 cubic meters of natural gas and \$17,908. Zoo staff receives the design presented by Ecosystems Energy Services; however, we are working with the City of Toronto Energy & Environment Office to see if a modification to the recommended plan can realize more greenhouse gas emission reductions and improve energy efficiencies for greater savings through the inclusion of heat pumps at no additional cost to the project.

As per the RFP, the capital investment in the project will be funded by Ecosystem Energy Services Inc. The financial term for Ecosystems Energy Services to carry the capital investment is 6.25%, \$2.5M over a 10-year payback period. All capital and financing costs are covered by utility savings realized by the project.

For due diligence and to reduce the overall payback required, the Toronto Zoo has applied to the City of Toronto's Better Building Partnerships (BBP) Energy Retrofit Loan

Program to cover the cost of the project. Still in application review with the City, discussions with BBP staff, financing rate for the City's Energy Retrofit Loan average between 1.5 and 2.0%, a potential savings of \$1.9M in financing fees at a rate of 2.0%. All project costs and financing through the loan will also be reimbursed using the realized utility savings from the project. Ecosystem Energy Services will be required to monitor and verify the project savings until all project costs are paid in full. If the City of Toronto's Energy Retrofit Loan is approved the Zoo will realize significant savings in financing fees and reduce the payback period.

Additionally, the City of Toronto and Toronto Zoo are working together to review and apply for recently announced federal climate change action funding such as the Green and Inclusive Community Buildings Program to cover as much capital costs as possible for this project.

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SIGNATURE

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