



2013 COMMUNITY EXCELLENCE AWARDS Category Worksheet

LEADERSHIP & INNOVATION

Climate Action

The Corporation of the Township of Esquimalt

Esquimalt Recreation Centre Aquatic Energy Retrofit Project

Project Summary

As part of its commitment to become a leader in sustainability and protecting the environment, the Township of Esquimalt recently completed a project that has reduced energy costs of its high profile facility, the Esquimalt Recreation Centre. The opportunity to implement energy saving measures arose when the natatorium's dehumidifier was decommissioned due to corrosion from the salt water disinfection system. This led to a major mechanical retrofit to the pool's heating and ventilation systems, as well as the conversion to an Ultraviolet filtration system and the installation of efficient lighting. The addition of heat recovery and an ambient solar system to the project significantly increased the overall energy reduction. Through this project the Township is proud to demonstrate the principles of sustainable design for both public and private developments through the use of green building technologies.

Project Analysis

In 2007, the Township of Esquimalt adopted a Sustainable Development Strategy which included directives related to climate change. In this case specifically, to;

"Retrofit existing municipal buildings to meet sustainability targets through various means, possibly including Energy audits and retrofits."

A green building standard for all civic facilities was set to stimulate learning in both the local government, as well as in the design and development community who builds civic facilities. Esquimalt now has a community wide target of reducing community greenhouse gas emissions by at least 38% by 2020 and 83% by 2050 compared to 2007 levels.

1. PROCESS

The Esquimalt Recreation Centre is located in the downtown core of Esquimalt. This 4,828 m² (52,000 ft²) sq.ft facility is a focal point and gathering place for the community with many users arriving at the facility by walking, cycling, or using public transportation. Esquimalt residents are proud of their recreation centre which contains an aquatic centre, gymnasium, weight room, youth centre, licensed out of school care, public meeting space and various multi-purpose rooms. Originally opened in 1974, the centre serves patrons throughout the Greater Victoria region and at peak times is often at capacity. In 2006 the building was expanded to add more meeting areas, a leisure pool, hot tub, steamroom, and additional weightroom space. The traditional chlorine system was also converted to a salt water filtration system. After 5 years in operation, it was discovered that a significant amount of corrosion had occurred due to the new salt system, and a major retrofit to mechanical portions of the building was needed.

In June of 2012 the Township of Esquimalt sought proposals for a retrofit of the Recreation Centre's HVAC and heating system that would result in significant reductions to energy

consumption and greenhouse gas emissions, and would obtain control of the facility's relative humidity. The project was to include an energy audit of the facility and the design and installation of the proposed solutions.

The Dehumidifier's refrigeration system had been decommissioned and the unit was performing as an air handler. The RFP asked consultants to identify potential efficiencies, showing detailed projected energy savings, and to realize a result of at least 25% annual reduction in energy consumption.

Energy efficiency retrofits were completed from August 2012 through to March 2013 with a budget of \$1.3 million and feature the following innovative design elements:

Dehumidification Reclaim System – extracts both sensible and latent heat from the pool return airstream, dehumidifying the air and using the extracted heat to heat the lap, leisure and tot's pool as well as preheat the domestic hot water for the facility.

Exhaust fan Reclaim System- extracts the heat from the air that needs to be exhausted from the facility and uses it to pre-heat the outdoor air that is introduced into the pool as ventilation air and chloramines dilution air.

Solar Ambient Heating System – the Solar Ambient Heating System is new to BC and is more efficient and cost effective. It sends cold fluid to the panels and can extract heat from the ambient environment including wind, rain and sun. Solar ambient is much more efficient and has an infrastructure payback of 10-14 years.

Pump and Boiler Room Air to Water, Heat Pump Air Systems- maintains cool temperature in both the boiler and pool filter rooms and uses the extracted heat to heat the hot tub.

2. RESULTS

Cost and energy savings are projected as follows:

Aquatic Centre Mechanical and Lighting Measure Summary						
Description	Years Payback	Annual Savings				
		\$	GJ	kWh	GHG	
Aquatic Centre Dehumidification Reclaim System	17.1	\$17,600	1880	-330697	88.6	
Aquatic Centre Solar Heating of DHW	13.3	\$5,380	425	-32900	21	
Aquatic Centre Exhaust air Reclaim	6.6	\$32,400	2220	-66692	112	
Dehumidification Reclaim DHW heating	4.2	\$22,400	1575	-6200	79	
Demand Ventilation for AHU-2,3,4	2.4	\$5,230	1575	-62000	13.7	
Pump Room A/C used to heat Swirl Pool	7.6	\$3,660	357	-24000	17.7	
Boiler room A/C used to pre-heat the DHW	5.4	\$4,950	362	-18900	18	
Energy Measurement EMIS				0	0	
UV Disinfectant system Liquid Chlorine		\$3,650		88600	1.9	
Lighting Retrofit		\$10,500		126000	2.8	

An overall reduction in GHG consumption is projected at approximately 354.7 tonnes

3. LEADERSHIP

Though heat reclaim retrofits using heat pumps and more efficient heat exchangers are occurring more frequently, the Township of Esquimalt is showing leadership through the addition of a Solar Ambient heating system which is new to BC. Solar Ambient is much more efficient than thermal solar panels and is widely used in parts of Europe.

4. ECONOMICS

Community works funding represents 80% of the total project budget and a Power Smart Incentive fund was acquired for the lighting portion. The use of these funds, coupled with the potentially significant annual savings made this project fiscally viable. As the project was completed three months ago, actual savings figures are not yet available, however the projected reduction of energy consumption of the building is approximately 6020Gj/yr with a savings of over \$100,000 annually.

5. ENGAGEMENT

Before the project began highlights of the complete retrofit were shared through public displays and user group information sessions. In September 2013, a permanent visual display of the cumulative energy savings will be mounted in the Recreation Centre's Atrium for continued public education on the Township's commitment to reducing energy consumption. This energy monitoring system receives signals from new pulse meters that are used to measure energy savings for both electrical and natural gas.

6. INNOVATION

Though the engineering is complicated, the installation of an innovative state of the art Diagnostic Digital Control system provides simplicity in programming for optimal energy savings. The DDC is programmed to modify settings based on varied needs placed on the Esquimalt Recreation Centre throughout the day and seasons, and allows staff to easily identify and solve problems.

7. TRANSFERABILITY

This new technology will be transferred and shared with other jurisdictions who manage and operate institutional buildings. There will be numerous opportunities to share and transfer this information through networking meetings, seminars, conferences and other hosted events to ensure that other Facility Managers are aware of this energy saving technology. Also, we will post this energy saving information on our local website and encourage others to contact us so that we may share our valuable expertise on these technologies. Our consultant has prepared design drawings that are easily read and interpreted by a layman making the methodology regarding the technology easily understood and shared.

8. KNOWLEDGE SHARING

The entire energy retrofit process presented numerous opportunities for stakeholders to share knowledge of the energy saving technologies. This continues with public tours of the facility and interdepartmental consultation in anticipation of future civic projects. The Esquimalt Recreation Centre is now being used as a demonstration facility to showcase the Township's commitment to climate action.