

## LIQUID POOL COVERS

FACILITY SEES SIGNIFICANT ENERGY SAVINGS BY REDUCING EVAPORATION



The City of Thunder Bay selected the Volunteer Pool as the test facility for its liquid pool cover pilot project. Photos courtesy City of Thunder Bay

BY FRANCO MARCHESI

With both energy costs and global awareness towards environmental stewardship on the rise, the City of Thunder Bay, Ont., has made energy management a strategic priority. In doing so, the city set several objectives in its 2011-2014 strategic plan,<sup>1</sup> which includes a long term goal to reduce greenhouse gas emissions through the wise use of energy. One of the city's strategic directions is to reduce the total carbon-based energy consumption within the city below 2005 energy baseline levels.<sup>2</sup>

In working to achieve this goal, the city developed an energy plan called *The Strategic Approach to Corporate Energy Management*. Although the plan was only approved by council in December 2011, energy savings have already been realized. As part of the strategy to reduce corporate energy consumption, the city completed

several energy audits at key facilities, including three aquatic centres. Within the energy audits, strategies are provided that demonstrate simple procedures, which provide a significant cost savings at minimal expense.

The energy audits completed for aquatic facilities identified that significant energy savings were available by simply managing the pool's evaporation through temperature control and the use of a pool cover.

### TEST PILOT POOL

The City of Thunder Bay operates three indoor aquatic facilities. To pilot the pool cover savings opportunities identified in the energy audit, as well as decrease natural gas consumption and humidity levels, the Volunteer Pool was selected as a test facility due to its size, amount of use and the ability to implement projects within existing budgets. The pool is 25-m (82-ft) long and six



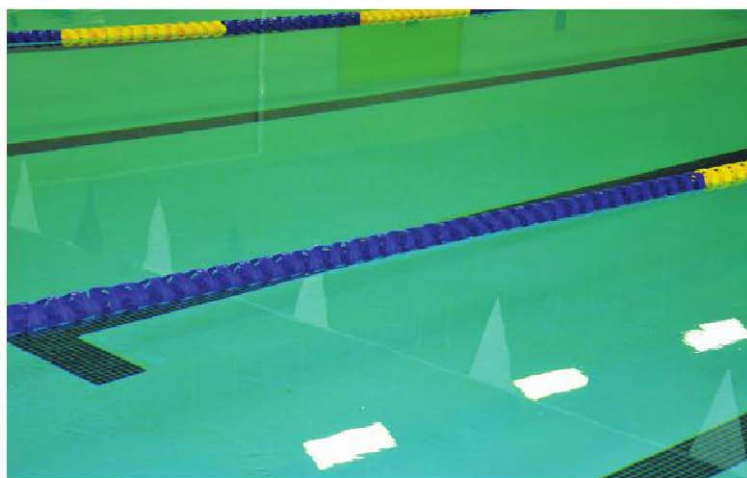
## CASE STUDY ■

lanes wide. A spa is also located in the pool area, along with exercise and spectator viewing areas within the natatorium.

Rather than using a standard swimming pool cover (i.e. plastic bubble cover), the city implemented the pilot project using a liquid solar cover, which once administered, quickly spreads over the surface of the water, creating an invisible monomolecular layer. This layer creates a barrier on the surface area of the pool, acting like a pool cover to reduce heat loss and energy consumption through evaporation. The self-spreading molecules are microscopic and safely travel through the pool's circulation system and filtration media.

### Observations

In August 2008 the city installed an automatic metering system (AMS), comprising a peristaltic pump and a seven-day programmable timer, at the Volunteer Pool facility to inject the liquid pool cover into the main pool, while 29.5 mm (1 oz) was added manually to the spa. The product was administered to each body of water on a routine basis at 11 p.m., after swimming hours were finished.



**After being administered into the water, the liquid pool cover forms a transparent, one-molecule thick layer on top of the water, which helps to reduce heat loss and energy consumption through evaporation.**

Within days after the application, maintenance personnel began to observe a substantial decrease in the humidity level and temperature inside the natatorium. No adverse effect to the pool's water balance and chemistry were noticed, and no complaints were recorded by facility staff or public users.

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**Left:** An automatic metering system (AMS), comprising a peristaltic pump and a seven-day programmable timer, is used at the Volunteer Pool facility to inject the liquid pool cover into the main pool.

**Right:** Facility staff manually add the liquid pool cover to the spa on a daily basis.



### Energy savings

The result of implementing the liquid pool cover at Volunteer Pool significantly decreased the facility's consumption of natural gas over the four-year average. Four years prior to this pilot project, the facility used an average of 136,200 m<sup>3</sup> (4,809,858 cf) of natural gas per year. In 2009, after a full year of using the liquid pool cover, natural gas consumption was reduced to 92,800 m<sup>3</sup> (3,277,201 cf), representing a 32 per cent decrease.

In terms of seasonal consumption, the facility was able to reduce its use of natural gas by 26.3 per cent during the winter, 27.6 per cent in the spring, 37 per cent in the summer and 42 per cent in the fall.

In October 2009, through the use of the liquid pool cover, and the resultant reduction of humidity in the natatorium, the facility was also able to add outside damper controls (*i.e.* a valve or plate, which stops or regulates the flow of air) to the air handling unit to decrease the amount of outside air required to maintain humidity and temperature levels inside the facility.

The following December (2010), operations staff also started using insulated tarps on the pool after hours and the natatorium lighting was retrofitted from 800-watt high-pressure sodium to 400-watt induction lighting. These operational changes, in addition to using the liquid solar blanket, further reduced the facility's natural gas consumption by almost half based on a comparison between the four-year average and 2010 (January to May).

For example, between January and May the facility used a four-year average of 89,100 m<sup>3</sup> (3,146,537 cf) of natural gas. In 2009, during this same period, natural gas consumption totaled 67,500 m<sup>3</sup> (2,383,740 cf). However, in 2010, consumption was reduced even further to 42,200 m<sup>3</sup>

(1,490,279 cf), representing a 52.6 per cent decrease over the four-year average and a 37.5 per cent decrease over 2009.

### CONCLUSION

During the pilot project the City of Thunder Bay's facilities and services division determined the energy savings combined with the reduction in humidity levels and space temperature created an approximate 40 per cent savings in natural gas consumption. Although the goal of the energy management strategic plan is to reduce consumption, the city also realized an approximate \$15,000 savings in natural gas costs. Based on these results, and the success of the Volunteer Pool pilot project, the city continues to use the liquid pool cover product at the facility, as well as at other indoor aquatic facilities in the city, including the Canada Games Complex. ♦

### NOTES

<sup>1</sup> For more information on the City of Thunder Bay's 2011-2014 strategic plan, visit <http://digital.turn-page.com/issue/40742>

<sup>2</sup> As part of the City of Thunder Bay's 2011-2014 strategic plans, Environmental Goal #9 and strategic direction 9.1



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