



Prism Engineering Helps GWL Realty Advisors Save **\$1 Million** In Under 5 Years, While “Greening” 650 West Georgia

When GWL Realty Advisors purchased the 34-storey office tower at 650 West Georgia Street in the heart of downtown Vancouver in 2001, this property manager recognized an opportunity to reduce operating costs by upgrading infrastructure. With a focus on improving energy efficiency in the 472,422 square foot facility, GWL Realty Advisors turned to Prism for support and guidance. GWL went ahead with innovative upgrades at the 25-year old complex, which resulted in savings of over \$1,000,000 in electricity and steam costs after only 4 ½ years! In addition to slashing operating costs, the retrofit was part of GWL Realty Advisors’ committed to the environment. During the process, a continuous improvement mindset was instilled in the building’s operating engineers, which is expected to generate additional efficiencies and savings for years to come.

Energy Audit & Upgrades

In 2002, Prism carried out a comprehensive energy audit of all systems in the building. Energy modelling was then used to determine the impact of various upgrade options and their inter-relationships.

Based on Prism’s findings, a complete upgrade of the chilled water system was completed in early 2003. The installation of two new high-efficiency chillers was accomplished by using a crane hoist set-up and a hole cut in the roof. The upgrade included a new cooling tower, condenser and chilled water pumps, and a variable speed chilled water system operating with two way valves (one of the first of its kind in Vancouver). Dedicated controls for the chilled water plant were utilized to optimize system performance.

A lighting retrofit was undertaken and completed in mid-2003 to upgrade the building’s lighting systems, including stairwell and storage room lighting, exit signs, incandescent down lights, and common area T12 lighting.

In late 2003, a network backbone was installed to allow high-speed network communication access between all floors and service areas. The backbone provided the opportunity for integration of building system controls and for additional automated control opportunities.



By spring of 2004, lighting controls for the majority of tenant areas were centralized, and nightly lighting off-sweeps were implemented. All previous generation DDC controls were updated to current technology and commissioned for improved performance. All floor fan flow control was converted to variable speed drive operation. Lighting and HVAC controls were then integrated into a common control system.

Finally, by mid-2004, heat recovery (“scavenger”) systems were installed to recapture heat from the condensate before sending it to drain, reducing both heating and water costs.

Saving Energy = Saving \$

650 West Georgia’s electrical and steam savings have been monitored on a monthly basis since 2004 by a monitoring and targeting tool developed by Prism using the CUSUM (Cumulative Sum of Savings) method.

The accurate tracking of electrical savings is critical, as BC Hydro incentives were made contingent upon the client achieving certain electrical savings targets. Current calculations show that the savings realized are ahead of those targets. Also, the monitoring allowed for investigation and corrective action when energy use appeared out of line.



The baseline for comparison purposes was calendar year 2002, prior to any retrofits taking place. By mid 2007, GWL had saved over 11 million kWh of electricity and almost 24 million pounds (36,000 GJ) of steam, for a total cost savings of \$1,008,402. They are currently benefiting from a 20% reduction in their electricity use and a 31% reduction in their steam use compared to the base period.

The savings achieved each year are summarized in the following chart:

Year	Electrical Savings (kWh)	Steam Savings (1,000 lbs)	Cost Savings
2003	1,572,000	4,280	\$159,600
2004	2,500,000	3,930	\$189,100
2005	2,707,000	6,080	\$246,400
2006	3,008,000	7,430	\$303,300
2007 (6 months)	1,356,000	2,150	\$110,000
Cumulative	11,143,000	23,870	\$1,008,400

In addition to the electrical and steam savings, substantial water savings were realized for the project due the fact that, once the scavenger heat recovery system was installed, less cold water was required to temper the condensate before it could be drained into the municipal sewage system. In 2006, over \$16,000 in water savings were realized and it is projected that annual savings of \$29,000 will be realized in 2007.

If one considers the incremental cost of approximately \$1,000,000 for the energy related projects, excluding the cost of replacing the chiller, the Return on Investment is over 20%, and the payback is approximately 4 years.

“Robert (Greenwald, President of Prism) has been instrumental in firing up our guys about energy reduction. He is probably the most passionate guy I know about energy management and reduction and it spills off of him. You put him in a room of 30 engineers and he gets pumped and they get pumped. And the engineering’s there, it’s not smoke and mirrors. Prism is by far the leading edge in energy reduction and, as a result, they are my “go to” guys for energy projects. They’ve called me in to talk to them about what was important to us and my answers filtered their way all the way down through their organization. You don’t get that kind of responsiveness from the bigger outfits, which are more accustomed to selling you what they have instead of working to figure out what the client needs. I think that differentiates Prism from the rest.”

- Peter Laforest – Manager of Technical Services, BC Region for GWL Realty Advisors

Note that the savings figures do not account for the increased load in the building since the 2002 baseline due to the arrival of several large, high-use tenants such as a London Drugs and a private ESL College. Further savings would be seen if this increased load was considered. Also, maintenance costs were significantly reduced with the replacement of the entire chilled water system. Further cost savings were realized in the construction process by eliminating general contracting and providing five separate contracts for chiller, network, DDC, variable speed drive supply only, and lighting retrofit. This allowed the installation to follow the two-year cash flow projection of the client.

Treading More Lightly on the Environment

One of GWL’s primary motivations for the project was the elimination of CFC refrigerant R11 which, due to its high chlorine content, has the highest ozone depletion potential of any refrigerant. The upgrades resulted in the complete elimination of CFCs in the building’s chilled water system.

In addition, the project reduced the building’s steam-related Greenhouse Gas (GHG) emissions by 31% (391 tonnes based on an industrial gas fired boiler). As for GHG emissions reduction due to electrical savings, emissions were reduced by only 92 tonnes per year, since electrical generation in BC is primarily through hydroelectric power which produces relatively little GHG¹. Annual GHG reduction is equivalent to saving over 20 acres of forest from clear-cut per year, planting 12,400 seedlings and letting them grow for 10 years, or taking 105 passenger cars off the road for a year.



¹ That figure soars to 2,513 tonnes of GHG per year based on the emissions from thermal sources such as coal, which is the primary source of electricity in many provinces.

In December 2004, GWL was awarded BOMA “Go Green” accreditation (a national environmental recognition and certification program for commercial buildings) for their leadership on environmental practices. In 2006, 650 West Georgia received ASHRAE’s BC Chapter Technology Award. The “greening” of the building has also improved GWL’s profile with prospective tenants and employees who are becoming increasingly interested in the ecological footprint of their landlords and employers.

Cooperation, Training and Continuous Improvement

The unmitigated success of the upgrades and the considerable efficiencies and savings achieved were due in large part to the cooperation of the building’s Operating Engineers and Prism Engineering, who worked closely with contractors and management to ensure well-executed installations and optimal project results. In order to prevent the erosion of savings by operator override of the system, dedicated training initiatives were held, including a full-day on “Spot the Energy Saving Opportunities” workshop in 2004 and a follow-up session in 2005. The Operating Engineers’ continued commitment to maintaining and improving on the savings achieved is bolstered by regular meetings held with Prism to review operations and to identify projects that could generate future efficiencies. For example, through the combined efforts of the building’s Operating Engineers and consultants, an additional 3% electrical and 11% steam savings, worth approximately \$60,000, were identified. It is expected that through the “continuous improvement” mindset that has been instilled throughout this process, additional savings and efficiencies will be realized.

“Part of what I like about Prism is that they customized the program for this building and they are still coming in on a quarterly basis to refocus the engineers . When the operators are motivated there are a lot of potential savings there because they are the first response. From the whole awareness point of view, having Prism, as a partner really, has created a model that we now use in other buildings. We’ll bring Prism in, develop some targets, go after them and report against them.”

- Peter J. Laforest is Manager of Technical Services, BC Region for GWL Realty Advisors

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