



Prism Engineering Helps BCIT Save Over **\$1.3 Million** in Energy Costs in Under 4 Years, Earning Them BC Hydro's Power Smart Excellence Award

The British Columbia Institute of Technology is BC's largest post-secondary institute with approximately 16,000 full time and 32,000 part-time students enrolled annually. BCIT lives up to its reputation as Canada's premier polytechnic institution with numerous innovative facilities including a new 300,000 square foot state-of-the-art Aerospace Technology Campus, featuring a fleet of 20 aircraft including a Boeing 737, and airport control tower simulation technology. BCIT's culture of innovation permeates all aspects of the over 40-year old institute, including energy management. In 2001, with the guidance and support of Prism Engineering, BCIT began an energy conservation initiative that would save them over \$1.3 Million dollars in utility costs in under 4 years, while significantly reducing their carbon footprint. In recognition of BCIT's leadership, it was presented with a Power Smart Excellence Award from BC Hydro in 2004 which cemented its status as the model to aspire to in energy management in the college sector.

Scope & Upgrades

In 2001, BCIT's Facilities Management Department embarked upon an ambitious energy management program. Their goal: improving energy efficiency and reducing greenhouse gases related to the operation of over 150,000 square meters of facilities contained in over 55 buildings on its Burnaby Campus. The enormous scale of the project, with an overall program budget of approximately 2.7 million dollars, required Prism's guidance and support from the outset.

Prism's first step was to carry out an extensive audit and review of energy savings potential at BCIT's Burnaby Campus. In 2003, once project funding from Natural Resources Canada was approved, the upgrades began with a campus-wide lighting system retrofit which included the installation of electronic ballasts, T8 Lighting, compact fluorescent lamps, LED exit signs and occupancy sensors to ensure that lights automatically turned off when facilities were unoccupied.



Jacque Champion, Manager of Project Services and Telecommunications at BCIT, has managed the energy projects at the institute since 2001, and had this to say about the lighting retrofit:

“I’ve always been particularly impressed by the way Prism handles the projects and manages their people and contractors on site. The first phase of the project was particularly tricky because we were replacing and installing a huge amount of lighting in 55 buildings on Burnaby Campus, all at night, from 10pm to 6am. Prism’s people were always readily available, taking action when necessary to make sure the entire process went smoothly.”

That same year, heating upgrades were completed for the North East campus and vending machine controls were installed to power off snack and beverage dispensing machines when cafeterias were vacant, saving 30-40% of the energy used. Also in 2003, Prism began to implement energy management controls upgrades to allow for campus-wide scheduling, holiday and optimum start operation, summer scheduling and exhaust fan control.

In 2004, the central heating plant was completely modernized with state-of-the-art combustion controls and a heat exchanger in the common boiler stack to recover waste heat before emission. Heating was converted to infrared for the shop buildings in the North East Campus, which saved energy by heating only the people and objects occupying the space as opposed to the entire air volume in the shops. Most recently, variable speed compressors were installed to significantly reduce compressed air use and its associated costs. As well, voltage levels were fine-tuned and optimized at over 20 transformers and automated controls were upgraded in the South Campus.



There were also some unplanned savings opportunities discovered by Prism along the way. When the central plant had to be shut down for three weeks in the summer to install a heat recovery coil, Prism discovered that the shutdown had no adverse effect on operations and was possible every summer. The central plant has been shut down for the past three summers, contributing unexpectedly to the savings achieved. Also, during Prism’s comprehensive audit process, over \$10,000 of over-billing by the gas utility was discovered, which was promptly refunded to the client.

Energy Conservation and Cost Savings Beyond Expectation

BCIT is enjoying savings in excess of even Prism's most ambitious projections. Using innovative monitoring and targeting models, some of which were designed in-house, Prism has kept a close eye on the results achieved, as well as on areas of potential improvement. Although the work is ongoing, as a direct result of the upgrades completed to date, last fiscal year 2006-2007 saw savings of over \$550,000 in utility costs once water savings were added. These measures are expected to result in a 22% decrease in electricity and natural gas consumption from year 2000 levels. It is anticipated that cost savings in the most recent fiscal year 2007-2008 will exceed \$650,000.

All told, in the last 3 ½ years, BCIT has saved over \$1.3 million dollars in utility costs. It is important to note that these figures do not account for the considerable load growth and extended hours implemented since the beginning of the project.

A summary of achieved energy, water and cost savings is presented in the following table:

Year	Electrical Savings (kWh)	Fuel Savings (GJ)	Water Savings (m ³)	Cost Savings (\$)
2004/05	2,008,605	9,030	-41,000	\$144,275
2005/06	1,997,807	17,439	29,600	\$288,056
2006/07	2,596,274	27,015	92,400	\$556,224
2007/08 (6 months)	1,978,793	13,527	79,500	\$326,034
Cumulative	8,581,479	67,011	160,500	\$1,314,589

Based on a net cost of \$2 Million for the project, the Return on Investment for the upgrades was approximately 4 years. This quick payback was due in part to the fact that the cost of the upgrades was partially offset by a combined contribution from BC Hydro and Natural Resources Canada of over \$600,000. These incentives were made possible by Prism's assistance in coordinating the extensive reporting of energy savings. In recognition of the impressive results achieved, BCIT was presented with a **PowerSmart Excellence Award** from BC Hydro in 2004.



Environmental Accountability to Future Generations

Despite the fact that electrical generation in BC is hydro-electric, which produces relatively little greenhouse gases (GHG), the energy reductions achieved by the upgrades will still drastically shrink BCIT's carbon footprint. The 2,282 tonnes of GHG emissions prevented in the latest fiscal year alone, are equivalent to the GHG reductions from the following:

- 494 Passenger cars kept off the road for a full year
- 768 Tonnes of waste recycled instead of sent to landfill
- 294 Households' annual electrical consumption eliminated
- 11.6 Railcars full of coal not burned

"Had we not started on this process with Prism we wouldn't have been on this stream of energy savings that we've been on for the last 5 years. We are now working on changing attitudes within our organization to identify further areas of savings and Prism has been helping us along and making sure that we stay on the forefront."

- Jacquie Champion, Manager, Project Services
Division Facilities Management, BCIT

An Ongoing Role in BCIT's Energy Management

Though the physical upgrades are nearing completion, Prism's role in this project is far from over. Through training and regular meetings, Prism is helping BCIT forge ahead towards further energy savings and environmental rewards. By monitoring and targeting energy use on a quarterly basis and holding monthly meetings with BCIT's energy team, Prism is helping to sustain the momentum that has been generated. New initiatives are being considered including satellite boiler plant upgrades, sub-metering, improved allocation of energy use to each building, outdoor lighting upgrades, and an energy awareness program targeted at the entire BCIT community.



Jacquie Champion explains why she would recommend Prism to any organization wanting to reduce their operating costs while lessening their impact on the environment:

"Prism has been instrumental in making sure that what the contractor has been specified to do gets done, that the savings are achieved, that the reports get submitted to BC Hydro so that we get the incentives, and that everything is in place so that we can get additional funding. They are really good at keeping us focused. They have also been great at getting us to look at where we can find additional savings going forward. We have definitely been recognized among colleges and universities as an environmental leader, but we are constantly trying to find new ways of reducing our energy consumption, working towards being carbon neutral by 2012, and Prism is helping us get there. We have dealt with pretty much every member of Prism's staff and they are without exception a great bunch to work with."