

Retrofit Program

Kwantlen University College

One of the Program's first unbundled projects; resulted in a 20% reduction in annual energy costs

Participants:

- Kwantlen University College (building owner and occupant)
- Third-party Owner's Representative
- Energy Service Company (ESCO)
- NRCan's Energy Innovators Initiative (25% funding for pilot phase)
- BC Hydro ("ePoints" awarded on value of electricity saved)

Kwantlen University College:

- Over 25,000 students; over 1,200 people in staff, faculty and administrative positions
- Four campuses encompassing 24 buildings; over 78,000 square metres of floor space (in 1999)
- Baseline unadjusted energy cost of \$958,979 in 1999

Building Improvements:

- Retrofits performed on 13 buildings
- Lighting retrofit and redesign
- Additions and upgrades to HVAC and building control systems
- Corrected power factor

Contract/Financing:

- Third-party energy savings insurance policy
- \$1.4 million project cost; construction financing provided internally
- Savings used for debt servicing
- Seven-year simple payback based on annual energy savings of \$200,000

Project Process:

- Utilized the unbundled approach; ESCO installed measures
- Contract signed in October 2001; retrofits installed November 2001 through February 2003
- Pilot project involved 25% of total building area
- Insurance provider reviewed proposed project work and energy savings calculations to verify savings potential
- Third-party Owner's Representative provided project management, pre- and post-implementation reviews, calculation and verification of savings achieved as well as value-added recommendations
- Facility managers and operators reviewed project work prior to implementation and provided input to energy use monitoring and calculations undertaken by contractors

Education and Training:

- Kwantlen staff worked closely with the contractor to develop and implement a tailored training program for operations staff
- ESCO implemented an Awareness Program targeted at staff, students and visitors, including emails to staff, promotion at student gatherings and product giveaways

Results:

- Total annual energy costs reduced by 20%
- \$100,000 per year avoided maintenance and capital costs over the life of the retrofits
- Overall electrical and natural gas consumption below 1994 levels despite: 10% increase in building area; a 20% increase in the number of students; significant increase in electrical loads due to additional computers
- Greater occupant control and comfort due to HVAC and control systems upgrades
- Greenhouse gas emissions reduced by an estimated 580 tonnes per year

| Annual Energy Use | Pre-retrofit | Post-retrofit | Saving |
|----------------------------|--------------|---------------|-----------------|
| Electricity kilowatt-hours | 12,501,024 | 8,629,510 | 3,871,514 (31%) |
| Electricity cost | \$652,362 | \$480,416 | \$171,946 (26%) |
| Natural gas gigajoules | 52,666 | 44,591 | 8,075 (15%) |
| Natural gas cost | \$322,111 | \$274,111 | \$480,000 (15%) |
| Total energy cost | \$974,473 | \$754,527 | \$219,946 (23%) |

Note: Pre-retrofit energy usage is an unadjusted baseline. Post-retrofit energy costs are estimates based on a 0% escalation in utility rates for the period Calendar 2000 to Calendar 2003.

Points of Interest:

- PROS AND CONS OF THE UNBUNDLED APPROACH** 1 “Lower overall cost and greater project control were the most significant factors that led the University College to choose the unbundled route” says Dan Brown, Kwantlen’s Physical Plant Manager. Brown admits that there can be some drawbacks to the unbundled approach, including a significant time commitment by staff to take care of project details and to provide the necessary information to the ESCO. As well, Brown indicated that the unbundled approach can result in greater complexities in completing the project and potentially greater risk if something is missed. However, the University College concluded that the positives of the unbundled route outweigh the negatives, and when asked Brown states that they would choose the unbundled approach again, likely unbundling the work to an even greater extent.
- UPFRONT AGREEMENTS ON CONTRACT COSTS A “GOOD IDEA”** 2 Kwantlen University College ensured an agreement was made up front with the ESCO regarding a total contract cost in order to avoid overruns. By the same token, a sharing arrangement was made with the contractor so that both parties could benefit should the total contract cost come in less than anticipated.
- INSURANCE PROVIDES SECONDARY SAVINGS REVIEW** 3 Kwantlen found the upfront engineering review performed by the insurer to be a benefit to the overall project. This review provided the university college with a second engineering opinion to ensure the project would have the anticipated energy savings.
- EFFECTIVE TRAINING PROGRAM TAKES TIME** 4 Kwantlen decided to spend considerable time ensuring the employee training program was tailor-made to suit the university college’s needs. A pilot training program was implemented with seven staff before full delivery at other sites. Documents developed focused on principles of operation for energy-saving measures, reasons for change, operating instructions, troubleshooting procedures, maintenance and warranty information. “The effort paid off,” says Dan Brown, Physical Plant Manager, “facilities employees now approach me with various issues affecting energy consumption, something that did not happen prior to the training program.”
- VALUE-ADDED ENHANCEMENTS THROUGH CAREFUL PLANNING** 5 As the project developed, opportunities arose for substantial improvements to some elements of the original project design, resulting in greater overall occupant comfort and energy savings. Examples of these value-added enhancements included: the repair of chronic heating problems at one campus, improved control over the conference room HVAC system, and the addition of isolation dampers to create zones for areas with shorter hours of operation and therefore reduce heating costs.
- KNOWLEDGEABLE AND EXPERIENCED OWNER’S REPRESENTATIVE KEY TO SUCCESS** 6 One of the success factors in the retrofit project, according Dan Brown, Physical Plant Manager, was working with an Owner’s Representative who was knowledgeable and experienced enough to identify key issues and provide guidance towards affordable solutions. “Having good consultants to work with who could extract viable project elements and discard ones that may not have been practical or affordable contributed greatly to the success of the project” says Brown.
- AWARENESS PROGRAM A NOTABLE FEATURE** 7 Recognizing that internal awareness would foster cooperation, interest and support, Kwantlen worked closely with the ESCO to implement an awareness program targeted at staff, students and visitors. Updates and information about the project were shared through various distribution methods including: the Kwantlen “Connection” newsletter, emails to staff, award programs, internal presentations to the University College board and submissions to trade magazines and community newspapers.

For questions or additional support, please contact:

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