GIBNEY FAMILY VISION CENTER

The Vermont Association for the Blind and Visually Impaired (VABVI), a non-profit organization founded in 1926, is the only private rehabilitation agency to offer free training, services and support to visually impaired Vermonters of all ages. VABVI offices are located in Brattleboro, Montpelier, Rutland and South Burlington.

In February 2009, VABVI moved into the organization’s new South Burlington headquarters, the Gibney Family Vision Center. Designers for the 12,000 square-foot building worked with Efficiency Vermont and followed the Advanced Buildings Core Performance Guide. It is handicap accessible and includes design features for VABVI’s blind and visually impaired clients.

The new space is double the size of VABVI’s old offices. Additions and improvements in the design include a library, an attached reading room, a Braille room, a state-of-the-art kitchen with brand-new appliances for training purposes, three classrooms for private instruction, an aids and appliances room large enough to keep inventory on hand, a sunny and spacious volunteer room, and an all-purpose space.

Key Objectives

- Create a high performance building meeting the requirements of the Advanced Buildings Core Performance program, with the goal of achieving 20% energy savings beyond the Vermont Energy Code.
- Low operation and maintenance costs were a priority for this nonprofit organization that depends on donations as its primary source of income.
Technologies and Design Strategies

Efficient HVAC Design
A key design element was to determine the appropriate cooling load for the building. By using a load analysis tool applied to the specific configuration of this project, versus a “rule of thumb” approach, the team was able to reduce the size of the system from 30 tons to 20 tons without impacting the comfort of the occupants and the functionality of the HVAC system.

The team opted to use four five-ton variable air volume rooftop units (RTUs) with minimum 14.8 SEER and dual enthalpy economizer controls. Through discussions with the design team and operations staff, it was determined that this option was the most efficient and appropriate for this facility. The rooftop units were zoned into 3-4 zones each to provide well-balanced air distribution. In addition, two 600 cfm heat recovery units were implemented to provide preconditioned ventilation air at the required levels. These units are programmed in concert with the lighting control system to operate only during working hours.

High Performance Envelope Design
Significant focus was put on building envelope performance. In addition to using tinted, triple-glazed fiberglass framed windows with an R8 rating and SHGC of 0.28, special care was taken to develop window details that ensured the building could be sealed properly. The exterior walls received 2” of continuous insulation in addition to standard interior insulation to achieve an R34 rating, and the roof achieved a rating of R37. The steel details at the perimeter roof/wall junction also were designed to ensure the integrity of the air barrier system.

Efficient Lighting and Control Strategies
While the lighting design achieved a reduced lighting power density of 0.93 watt/sq.ft. despite the challenge of having many small office spaces to consider, a significant savings resulted from reducing the use of artificial light by providing adequate daylight. Creative control strategies implemented in all perimeter offices included the use of manual bi-level controls with automatic override. This created a default state of having the lights off, even when occupied, if sufficient daylight was available. Additionally, the team was able to implement solar tubes in interior conference rooms by installing dimmers on the solar tubes to allow occupants to darken the conference rooms during presentations.

Measurement and Evaluation

Energy Performance
The performance baseline for this project was the Vermont Commercial Energy Code. By meeting the requirements of Efficiency Vermont’s Core Performance program, the building is expected to use just 70-80% of the energy typically used by a code-compliant building.
By the Numbers

- Total project cost: $2,100,000
- Energy efficiency upgrade costs: $16,800
- Energy efficiency investment payback (including incentives paid): 3.4 Years
- Internal rate of return on energy efficiency investment: 28%
- Estimated annual electricity savings: 2.3 Kwh/sq.ft.
- Estimated first year utility bill savings: $3,100
- Estimated lifetime customer savings: $25,400

Lessons Learned

By integrating energy conservation goals into the programmatic requirements of the building design, significant performance improvements were achieved. The design team and Efficiency Vermont worked cooperatively throughout the entire design-build process to ensure these goals were met in a cost-effective way.

From the preliminary site design and building footprint development, which included trees for shading and building offsets for additional daylighting opportunities, to the implementation of creative control strategies and energy conscientious construction techniques, the team was able to deliver significant performance on a tight construction budget.

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The design team’s projected annual energy usage was 21.50 kBtu/sq.ft. for heating (natural gas) and 23.56 kBtu/sq.ft. for electricity, totalling 45.06 kBtu/sq.ft. The most recent 12-month data for actual usage indicates even better performance, with total usage of 37.50 kBtu/sq.ft., or about 83% of projected levels.

Efficiency Vermont offers simple per-square-foot financial incentives for buildings that follow and meet the Core Performance criteria. Here, the $.50/sq.ft. incentive plus a bonus for achieving enhanced lighting criteria resulted in an overall $6,400 incentive for the project. Against the incremental costs of $16,800 identified for installing higher efficiency lighting, RTU’s and dual enthalpy economizer controls, the initial yearly savings was estimated to be $3,100.

About Advanced Buildings

Advanced Buildings offers a direct path to high energy performance in new commercial building projects. An Advanced Buildings designation represents a best-in-class building that adds value and stand out for their energy efficiency and healthy environments. In addition to the New Construction Guide, Advanced Buildings offers a suite of tools and resources that help design teams achieve superior energy efficiency.

Advanced Buildings is developed and managed by New Buildings Institute with support from utility and public benefits organizations as well as foundation funding.

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