

## Efficiency Vermont Engages Key Stakeholders to Implement Award Winning High Efficiency Rooftop Units

Commercial building leases often involve several stakeholders making the process of executing energy-efficiency projects complex and challenging. However, the creative and determined leadership of Efficiency Vermont successfully completed a 66-rooftop unit (RTU) high-efficiency replacement project on a large 140,000 square foot office building in Vermont. Owned by Elman Investors, managed by Pizzagalli Properties, and leased by the U.S. General Services Administration. The local U.S. Department of Citizenship and Immigration Services is the tenant. [Efficiency Vermont](#) helps customers reduce their energy costs, decrease strain on the electric system, and protect the environment.

### Project Keys to Success

The building’s heating, ventilating, and air-conditioning (HVAC) needs were supplied by 66 aging RTUs that ranged in size from 1½ to 12½ tons of cooling with an original average energy efficiency ratio (EER) of 10. In addition, the state of Vermont wanted to reduce the load on the electricity grid in this region to avoid the need for new infrastructure, which made this building a good candidate for new RTUs. However, the complicated nature of the ownership, management, leasing arrangement, and occupancy of the building made the replacement challenging.

Investigation by the Efficiency Vermont program directors revealed several potential benefits for replacement beyond the energy and peak demand reductions. The RTUs were in a constant need of repair, which was becoming increasingly difficult



Photo courtesy of Pizzagalli Properties, LLC

because some parts were no longer available. The RTUs were controlled by 66 manually operated thermostats, which had to be manually reset after power outages and made consistent temperature control difficult. Finally, the old units struggled to maintain comfortable conditions during the hot and humid summers.

The team investigated several options and determined that the best solution was to replace all the old units with very high-efficiency RTUs (as high as 20.3 Integrated Energy Efficiency Ratio (IEER), which exceed the U.S. Department of Energy’s [RTU Challenge specification](#) of 18 IEER. Units built according to the RTU Challenge Specification are expected to reduce electricity use by 44% compared to the ASHRAE 90.1-2010 standard, depending on location and facility type.

ROOFTOP UNIT PROJECT HIGHLIGHTS	
Peak electricity demand reduction	163 kW
Annual electricity savings	575,000 kWh/year
Annual gas savings	940 MCF/year
Annual utility cost savings	\$93,000
Payback	4 years with incentives 6 years without incentives

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Efficiency Vermont and the property manager proposed the RTU replacement plan to the building owner, who worked with the lessee and the tenant to ensure that the project abided by federal guidelines, codes, standards, and specifications.

Because load reductions are of extreme importance in this area, the Efficiency Vermont team offered substantial financial incentives to support the project. At this juncture, the team had sufficient information to build a convincing case to replace aging RTU's and adhere to each stakeholders requirements.

Finally, the HVAC contractor and RTU supplier worked with all the involved parties to solve the practical challenges of making the project a reality and ensure that the high-efficiency RTUs were properly commissioned in order realize their full performance potential.

## Results

The units were installed in December 2014 with a centralized control system that allows for automated setback of temperatures and implementation of control strategies such as demand control ventilation and optimum start-stop for additional energy and demand savings. The project team estimated the annual savings for this project to be 289,000 kWh/year, 118 kW peak demand reduction, and \$41,200/year. However, after the first ten months of operation the facility was on track to nearly double these predictions. The high performance of the RTUs has led to an estimated net simple payback of 6 years without incentives and 4 years with incentives, and the internal rate of return is estimated to be 16% without incentives and 26% with incentives. The success of this project was recognized by the Advanced RTU Campaign with an award in 2015 for the highest number of high-efficiency RTU installations by a government organization.

"As the units neared end of life we knew we could not do better from an efficiency standpoint. There were a number of participants that helped reach this goal: **The Carrier Corporation** for its product, **Alliance Mechanical**, a capable contractor, a willing owner/investor **Elman Investors**, and a utility committed to improved performance, **Efficiency Vermont**. We, along with our client and occupant/tenant are very pleased with the final outcome."  
-Pizzagalli Properties