Beneficial Electrification Case Study

Eagle River Water & Sanitation District

General Information

Building: Eagle River Water & Sanitation District Administrative Office

Location: Vail, CO

Type: Office

Size: 13,694 square feet

Year Built: 1980

Project Team:
Engineer- BG Building Works

Utility- Holy Cross Energy

Project Goals

The bottom level of the Eagle River Water & Sanitation District (ERWSD) building is a wastewater treatment facility, while the middle and top floors are office spaces that include a kitchen, kitchenettes, bathrooms, and a shower. The upper levels of this multi-use building have a new HVAC system for half the building, and an old boiler system for the other half. Transitioning into summer of 2019, staff noticed the old system was running continuously and spiking natural gas use. In preparation for a grid increasingly powered by renewables, a study was conducted to review the feasibility of transitioning from gas to electric powered equipment within this specific, high-energy-use building.

Study Overview

The study explored nine options for an HVAC system. It included a review of the existing HVAC and domestic water systems, which identified the four primary gas using systems/components that would need to be modified or replaced: the original boiler, the ERV gas furnace, the existing new-wing boiler system, and the existing domestic water heater. Lower- and higher-cost electric replacement options for those primary gas users were examined, and options to replace gas users individually or completely electrify were presented.

Results

The study compared energy use, cost, and carbon emissions associated with each option. The results found that today, the all-electric option would cost more to operate with greater carbon emissions, and no option resulted in total cost reduction from current operations.

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ERWSD upgraded its two constant-volume rooftop units with standard efficiency gas heating to two Variable Refrigerant Flow (VRF) heat pump systems with energy recovery so heating and cooling could be localized. The predicted energy reduction for the new system was calculated at 266,000 kBTu/sq.ft.yr. This system also significantly reduces gas usage, which enabled qualification for a Holy Cross Energy Rebate of $19,245.

Looking to an Electric Future

Actions being taken by ERWSD to prep for a grid powered by 100% renewable energy by 2030:

- offset all electricity use with wind power
- continual energy efficiency improvements to reduce overall energy use
- emissions reducing infrastructure upgrades as opportunities arise