

Affordable Housing

Electrification of affordable housing is a win-win

Affordable housing features many varieties, including rents that are subsidized or unsubsidized, residents who have mixed income limits with various rent structures, and utility bills that are paid by the tenants or by the project's owner. These variables complicate how operators of existing affordable housing approach an energy upgrade project and who will benefit from investing in modifications and equipment that is more energy efficient. This decision is further complicated by the need to electrify fossil fuel-powered heating and hot water equipment while considering the needs and sensitivity of the resident community. Disruptions caused by discomfort, noise, material abatement, chemical sensitivities and relocation options must be considered in the project plan when switching over to a new technology to heat and cool the building.

Many municipalities, including Denver and Boulder, have established limits on when buildings will be able to replace their gas appliances with another gas appliance. Local restrictions will mandate that this equipment is powered by electricity. Many of these same municipalities are enacting building performance requirements that go beyond the state's building performance standards that impact 50,000 square feet and larger buildings. Some are even considering outlawing the use of natural gas ranges.

Energy Outreach Colorado is a nationally and locally recognized nonprofit organized in 1989 to help Coloradans afford home energy.

What is building electrification? Electrification is the replacement of equipment powered by fos-



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sil fuels to cook, create heat and produce hot water with equipment that uses electricity. It's also known as beneficial electrification or building decarbonization, where high-efficiency electric heating and hot-water equipment is the priority over less-efficient and expensive-to-operate all-electric options in the past. Most buildings are powered by a combination of electricity and gas – electricity to power the lights, ventilation, refrigeration and electronic plug loads and natural gas (and sometimes propane) to power furnaces, boilers and water heaters. The goal of electrification is that one day all buildings will be powered with mostly zero carbon electricity provided by wind, solar and other cleaner electric generation options.

Another consideration of a building electrification project is whether the building needs energy-efficiency upgrades. Improving the insulation, air sealing and duct sealing of the building will ensure heat pump equipment can optimally condition the space and operate at the highest efficiencies. This can be very challenging and expensive with existing buildings and can add significant cost to the project if any remediation of hazardous materials or lead-based paint is required. Finally, electrification retrofits often require costly electrical capacity increases, and it's important to plan out what future electrical capacity the building might need by making these upgrades.

Partnering with a qualified contractor that has experience with affordable housing is the first place to start. This type of project will be disruptive to the community, and sourcing contractors who best understand how to navigate logistics with residents during this type of retrofit is important. Another key component is requiring contractors to correctly size heat pump equipment since stamped engineered drawings are not usually required for these types of retrofit projects.

What are the benefits of electrifying a building? The energy-efficiency improvements in the building's envelope can result in a more comfortable and stable living environment, lower utility bills, reduced noise pollution and pest intrusion. The elimination of combustion fuel appliances impacts the health of the residents and decreases the risk and liability of carbon monoxide poisoning or death occurring at the property. Installing a heat pump provides an efficient air-conditioning system, and these retrofits are especially critical for buildings without an existing cooling system.

The following describes current electrification projects:

■ **The Casey Apartments** is owned by Boulder Housing Partners in Boulder, and is comprised of six one-bedroom units in a single-story building.

- Existing system: 3-year-old central boiler for heating and hot water and no cooling.

- New system: Cold-climate Mitsubishi ductless mini-split heat pump with three heat registers per unit connected to one outdoor condenser unit. Heat is first provided by the heat pumps, and the existing boiler system was maintained

to provide heat when the temperature is 20 degrees Fahrenheit or lower outside.

- EOC will be performing a 12-month post installation utility bill analysis to inform the potential of further modifying the utility allowances for the building, and all of the residents will be offered free community solar garden subscriptions from EOC to offset the tenants' higher electric bills.

■ **Cottonwood Townhomes** in Windsor is a 37-unit mixed unit project in seven two-story buildings owned by Care Housing.

- Existing system: Apartments had old standard efficiency natural gas furnaces with electric resistance hot water heaters and no cooling.

- New system: Dual-fuel heat pump, a technology that uses both electric heat pump and a gas furnace for heating. These systems are programmed to depend on the heat pump for heating before needing to operate the furnace section of the equipment during colder days and nights.

- EOC will be performing a 12-month post-installation utility bill analysis to inform the potential of further modifying the utility allowances for the building, and all of the residents will be offered free community solar garden subscriptions from EOC to offset the tenant's higher electric bills.

If you are considering switching the heating and hot-water systems in your buildings or other projects, contact EOC at

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