

## Alta Verde Case Study | Breckenridge, Colorado



### Project Data

Project Location	Breckenridge, CO
Climate Zone	7
Placed in Service	2022
Size (sf)	81,358 sf
Floors (#)	2
Units (#)	80 (36 one-bedroom, 36 two-bedroom, and eight three-bedroom)
Buildings (#)	3
Construction Type	New
Fuel-Type	All-Electric
Green Building Certifications	Zero Energy Ready Homes (ZERH) Certification
Total Development Cost	\$32,337,000 (2022)

### Overview

Alta Verde is a net-zero apartment community located in Breckenridge, CO, intended to both meet the town's critical housing needs and advance ambitious sustainability goals. Featuring an all-electric design, the development integrates energy-efficient strategies and onsite solar designed to fully offset its energy consumption. Completed in late 2022, Alta Verde achieved the US Department of Energy's Zero Energy Ready Homes (ZERH) Certification and has also been recognized with the American Planning Association Colorado Chapter's 2022 Merit Award for Sustainability and Planning and ULI Colorado's 2023 Innovation Award.



## Electrification Strategies and Features

The design was guided by the Summit County Climate Action Plan and the Town of Breckenridge’s goals to reduce carbon emissions by 50% by 2030 and achieve net-zero by 2050. The all-electric design features individual cold climate split system heat pumps for space heating and cooling.

Roof	R-49 batt + 4” spray foam on underside of roof deck and perimeter walls (U-0.017)
Exterior Walls	R-20 batt in 2 x 6 wood studs + R-6 insulated panel (U-0.042)
Windows	Double pane, low-e glazing in fiberglass composite framing (COG: U-0.29, SHGC-0.40) Assembly: U-0.33, SHGC-0.32
Interior Lighting	0.30 W/sf (0.05 W/sf parking garage)
Exterior Lighting	1.5 kW
Appliances	Energy Star refrigerators, dishwashers, clothes washers and clothes dryer
HVAC	Split DX Heat Pumps with ERV (18.5 SEER, 9.6 HSPF with -4 deg F operation temperature)
DHW	Individual electric storage hot water heaters
Water Fixtures	1.5 gpm showers, 0.5 gpm lavatories, and 1.5 gpm sinks
PV System	650-kW

Unlike conventional heat pumps that rely on inefficient electric resistance heating in extreme cold, this project utilizes cold-climate heat pumps that maintain efficient operation down to -4 degrees Fahrenheit. Located in Climate Zone 7, Breckenridge experiences prolonged sub-freezing temperatures that makes reliable heat pump performance a priority.

The ventilation is provided by in-unit energy recovery ventilation (ERV). ERVs transfer heating/cooling energy, helping to reduce energy costs and improve indoor air quality. The project also utilizes individual electric resistance water heaters and electric resistance stoves. Alta Verde incorporates a 650-kilowatt (kW) photovoltaic (PV) solar array that generates enough onsite energy to fully offset the property’s energy consumption. Other key features of the building are highlighted in the table to the left.





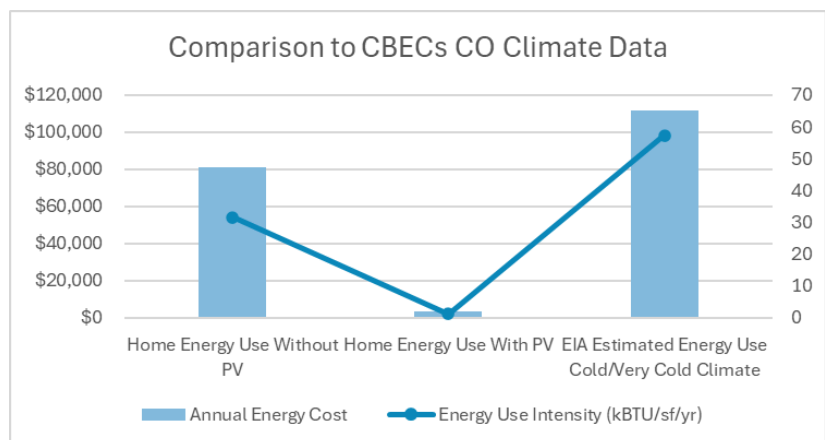
## Successes

Alta Verde has demonstrated that net-zero affordable workforce housing projects are possible even in the mountain towns of Colorado. Projects like Alta Verde are inspiring jurisdictions to introduce workforce housing scholarships, offering financial assistance to similar developments. These programs aim to tackle both the shortage of workforce housing and the worsening climate crisis by supporting sustainable projects in the future.

Alta Verde serves as a leading example of how developments can significantly reduce annual energy costs, consumption, and greenhouse gas emissions, as illustrated by the table on the right. The figures are compared to the median Colorado multifamily building<sup>1</sup>. The Social Cost of Carbon is the estimated future dollar cost of the economic and social damages caused by an additional ton of carbon dioxide emissions.

	Without PV	With PV
Total Annual Energy Use (kBTU)	2,566,984	106,147
Total GHG Emissions (lbs CO <sub>2</sub> )	690,648	28,559
Total GHG Intensity (lbsCO <sub>2</sub> /sf/yr)	8.5	0.4
Social Cost of Carbon (2025)	\$26,002	\$1,075
Social Cost of Carbon (2050)	\$36,340	\$1,503

The project has successfully addressed an urgent need for housing in the Town of Breckenridge through an all-electric design. Alta Verde is an excellent example of how to implement a net-zero design in Climate Zone 7 while prioritizing affordability.



<sup>1</sup><https://multifamily.fanniemae.com/financing-options/green-financing/2023-multifamily-energy-water-survey>