

Basalt Vista

A net zero affordable housing community



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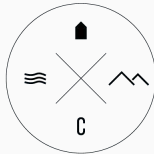
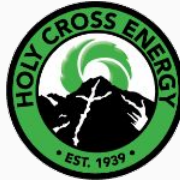
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Background

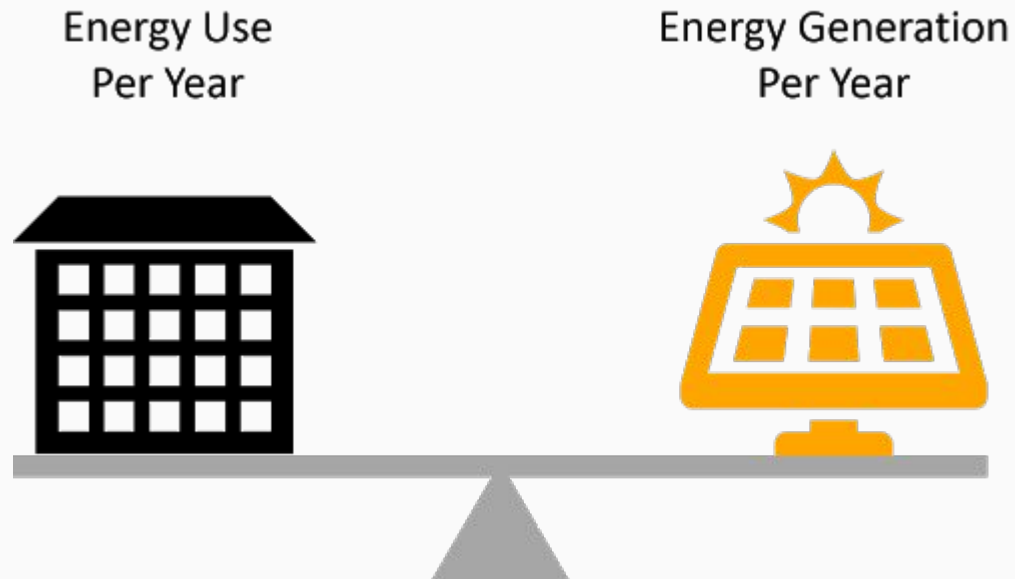
- 27 units total
- 2-, 3- and 4-bedroom floor plans
- 23 units complete

Partners



Factors to consider

- All electric
 - \$28,000 saved on infrastructure by not installing gas
- Building Envelope
- Appliances
- HVAC system
- Water heating
- Lighting
- Solar



Insulation



Ceiling

R-49 Loose Fill Fiberglass Insulation

- Rim Joists & Sills: R-29 Hybrid with R-10 foam
- Foam all penetrations, doors, windows
- Air seal and caulk all gaps and stud packs



Exterior Walls and Garage

- R-23 blown in blanket insulation
- R-5 exterior blue board

Midfloor Joists and Interior Walls

- R-19 batt insulation

Structural Insulated Panels (SIPs)

- Testing SIPs on 2 buildings to analyze:
 - Installation speed
 - Blower door test results
- Improves overall R value. Overall R=21.4
- Eliminates exterior blue board and interior blown-in insulation
- More volunteer friendly?



Windows

Shop for Performance		
For Windows Facing:	Cold Climate	Warmer Climate
North	Lowest U-factor you can afford	Low U-factor
South	Highest SHGC, Lowest U-factor you can afford	Low SHGC (and lots of shade), Low U-factor
East	Low SHGC (or shaded)	Low SHGC, Low U-factor
West	Low SHGC (or shaded)	Low SHGC, Low U-factor

Source: US Dept of Energy www.energy.gov

- Double pane, casement windows
- Weighted Average U-Factor = 0.29
- Solar Heat Gain Coefficient (SHGC) Weighted Average = 0.21

Low U-value = better insulated

Low SHGC = Low heat transfer (range 0-1)



Appliances



- All electric & energy star appliances
- Induction range
 - more efficient & superior heating performance
 - 1.5x the price of traditional electric ranges
 - 90% efficiency (standard electric ranges ~55%)

HVAC



- Mini Split System
- Carrier 38MGRQ48E-3 Heat Pump
- Ductless units in each room
- Move heat from one place to another using electricity
- Uses up to 50% less energy
- System cost ~\$25,000



Energy Recovery Ventilator (ERV)

- Model: RenewAire EV130
- Provides a controlled way of ventilating a home while minimizing energy loss
- Reduces energy costs by extracting warm air in the winter and cool air in the summer
- Cost included in total HVAC price



Heat Pump Water Heater

- Model: HPTU-50N-130
- 2x price of traditional electric water heater (without rebates)
- Holy Cross rebate \$450
- Total cost \$800 after rebate
- 2-3x more efficient
- Emits cold air



Solar



- 11.85 kW solar array
- 48 kWh battery backup total
- System size based on home's load calculations from electrician
- Holy Cross Energy donated monitoring and batteries
- System cost \$19,500 per home (2 bedroom)



EV Charging

- Homes are equipped with a Level-2 EV charger
- Charger provided by Holy Cross Energy at no charge
- Installation cost ~\$500



Outcomes

- Utility costs ~\$13/month collecting credits for 1 year
- HOA reserve - funding is set aside for long term maintenance
 - Warranties
 - HVAC: 10 yrs
 - Solar Panels: 25 yrs
 - Roof: 25 yrs
- NREL partnership to monitor homes for energy use at different times of the day

Lessons Learned

- Ductless HVAC system
 - Reduces material and labor costs
 - Eliminates duct blast testing
- Heat Pumps in Cold Environments
 - Need to be raised off the ground
 - Should be installed in direct sunlight
- Roof design to Maximize Solar Efficiency
 - Current system is oversized due to roof angles

Thank you!

Questions?



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"Today I got to see the future (and present!) of affordable housing at Basalt Vista. It was inspirational to see this amazing net-zero energy affordable housing. It's a true model for Colorado and our country." - Governor Jared Polis