

Electrification of Mobile and Manufactured Homes

CAPSLO, City of San Luis Obispo, Diversity Coalition of SLO County, and Artemisia Energy



Problem

Manufactured homes account for approx. 60% of owner-occupied low-income housing in SLO and are especially complicated to decarbonize.

- Higher energy burden
- Home enclosure issues
- No access to utility incentives
- Little research or program support



Home Upgrades Provided

- Weatherization
- Electrical upgrades as needed
- Heat pump (HP) water heaters
- HP HVAC or window units

Goals

- Study feasibility and cost-effectiveness of electrification strategies
- Serve residents with need
- Cover 100% of upgrade costs
- Offer technical support and energy coaching

Project Overview

Performed outreach to assess residents' needs and priorities with direct engagement

Home upgrades provided to residents at not upfront cost

Energy monitoring for one year using Emporia Vue 3 tools

Bill protection provided to protect against utility bill increases

Energy coaching to recommend strategies to reduce energy consumption

Home comfort check-ins held regularly with residents



Findings

Cost Effectiveness

- Total energy use decreased, utility bill increased
- Solar could offset bill increase

Occupant Experience

- Weeks following install were most critical for support
- Appreciated energy coaching

Common concerns: t-stat/equipment operation, utility bill increase

Positive feedback: Water heaters more reliable, access to space conditioning, improved indoor air quality

Heat Pump Water Heaters

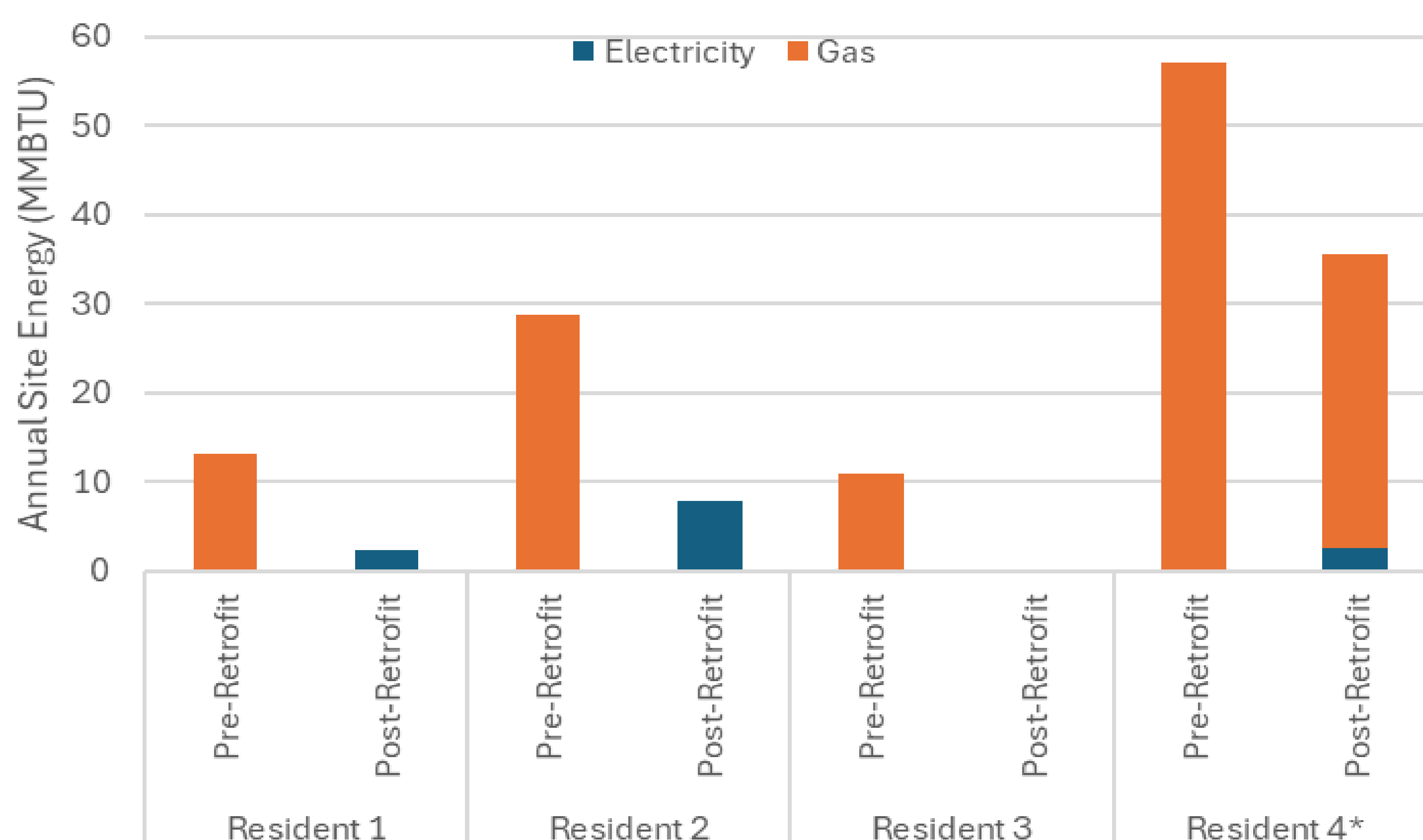
- Consistently good performers
- Mixing valve allows for tweaking
- Performed acceptably in winter
- Could align better with solar
- 120V dedicated circuit is ideal

Heat Pump Heating/Cooling

- Higher impact on utility bill
- Residents received access to space conditioning
- Preferred to old systems
- Window units required replacing windows

Recommendations

- Perform weatherization
- Upgrade to 100amp panels
- 120V dedicated circuit water heaters
- Energy program administrations extend incentives to manufactured homes, parks should enroll in utility conversion
- Offer education, understand resident concerns and priorities, access local resources whenever possible



Further Research Needed

Test feasibility of **full electrification**

Test **solar panels** to offset bill increase

Collect more data through more installations

Figure: Annual site energy impacts pre- and post- retrofit