

# Electrification Case Study

## Residence Near DU

Year Completed

**2023**

Average Monthly Utilities Bill

**\$16**

CO2 Emissions Saved

**54.8** metric tons\*

equivalent to 905 trees planted

## Background

This two-story single-family home features two air-source heat pumps, an electric water heater, and an induction cooktop. The home was also designed to lower energy usage and create a quiet living environment. The roof has solar panels to offset energy usage and lower utility costs. These features create a gas-free home that is healthier for the family. The homeowner, Rebecca, plans to install a battery backup system in the future as well.

**“I’ve been talking to a lot of people about it, and I think people are getting more interested and excited, especially as solar has become so much more common. The fact that people can be all electric and offset their costs is exciting.”**

**– Rebecca, Homeowner**

## Lessons Learned

While the process went smoothly, there were some minor challenges the design team had to work through since the house wasn’t originally planned to be all-electric. Space constraints within the original design limited their options to electric water heaters because there was not enough space for proper ventilation of a heat pump hot water heater. This is why Rebecca recommends homeowners involve experienced mechanical contractors early enough in the process to accommodate the preferred equipment.

*\*indicates cumulative carbon emissions saved through 2040*



## Key Takeaways

- Solar can reduce monthly utility bills.
- Account for space requirements when selecting equipment and get an experienced mechanical contractor on board early.
- When project teams inform the homeowner of equipment options, incentives and resources it helps in the electrification process.



## Features

### Heating/Cooling System

- Type: (2) Split Air Source Heat Pumps
- Outdoor Unit: Carrier 25VNA825A\*032\*
- Indoor Unit: Carrier FE4AN(B,F)003L+UI
- Ratings: 17 SEER2, 11 EER2, 8.1 HSPF2

### Water Heating System

- Type: Electric Water Heater
- Model #: State ProLine EN6-50-DORT; UEF 0.92

### Additional Electrification Features

- Electrical Service Size: 320 amps (for 3,069 gross sq. ft.)
- Solar Panels: 11.89 kW-DC, 10kW-AC
- Induction Cooktop

### Building Envelope (based on 2018 IECC)

- House tightness: 2.34 ACH50
- Wall Insulation: R-20 (cavity only)
- Attic Insulation: R-49
- Foundation Insulation: R-19
- Window U-value: 0.3

## Project Team

- **Architect:** Hacket Architecture & Design
- **General Contractor:** Consolidated Constructed Management
- **Mechanical Contractor:** Ultimate Heating and Cooling

## Cost Analysis

### Total Construction Costs

**Total Building Cost** ..... \$893,537  
**Cost/Square Foot** ..... \$355

### Upfront Cost Comparison

**Electrification System Cost**..... \$45,220  
**Savings from No Gas Line Extension**..... (\$8,000)  
**Mixed-Fuel System Cost** ..... \$40,495  
**Cost Difference for Electrification** ..... +\$4,725

*\*Costs include some electrical work for solar panels and a \$7,200 savings from equipment rebates.*

### Ongoing Utility Costs

**Total Utility Costs for 1 year**..... \$191.08  
**Average Monthly Utility Bill** ..... \$15.92

**Read More  
Electrification  
Case Studies**



<https://bit.ly/ElectricPilots>

