



ELEVATE

Case Study: Verified Energy and Cost Savings from Whole Home Electrification

Electrifying residential buildings can decrease energy use, reduce carbon emissions, and lower utility costs. Elevate's analysis of a Chicago homeowner's energy bills shows full-building electrification upgrades and weatherization lowered annual energy costs by \$1,028 and reduced energy usage by 70%.

About the Property

The property featured in this case study is located in Humboldt Park, Chicago. It is a single-family, masonry-constructed house built in 1899. This housing type represents 19% of Chicago's residential building stock.¹ Previous research found that this housing type could see \$200-\$1,300 in utility bill savings after completing comprehensive energy efficiency upgrades and full electrification. This housing type is also estimated to see 57% - 77% in energy savings post full-electrification.

Project Details

Measures: Weatherization (Air Sealing and Insulation), Full Electrification

Partners: Chicago Bungalow Association

Funders: ComEd Energy Efficiency Program and Wells Fargo Foundation



Example of a single-family, pre-1942, brick/masonry construction home.

Work Completed

With funding from the ComEd Energy Efficiency Program and the Wells Fargo Foundation, and support from the Chicago Bungalow Association, Elevate worked with the homeowner, Teresa Zavala, to complete full electrification at her home. The following work was completed:

- Replaced gas water heater with a hybrid electric water heater
- Air sealing and insulation
- Replaced gas stove with induction stove
- Replaced gas clothes dryer with a heat pump clothes dryer
- Upgraded electric service panel
- Installed new thermostat

Energy Efficiency

Elevate implements strategies like air sealing and insulation in a building to make it as energy efficient as possible before moving forward with electrification. In this home, wall insulation was installed for the exterior front and side walls. The basement band joists, crawl space walls, and attic were also insulated.

Heating, Cooling, and appliances

This home was fully disconnected from gas as an energy source, so all fossil fuel appliances were removed from the home. The gas furnace was replaced with an air source heat pump. The home's gas water heater was replaced with a hybrid electric water heater. These heaters are a type of heat pump that improves energy efficiency by relying on heat from the air to heat water. The heat pump only switches to electric heating when the air is too cool, thereby increasing energy efficiency. The gas stove was replaced by an induction range, and the gas clothes dryer with a heat pump dryer.

Energy Bill Impacts Analysis

Energy Savings

After electrification and weatherization measures were completed, an analysis of Ms. Zavala’s energy bills show decreased energy usage and decreased costs. Table 1 shows the annual energy usage and cost comparisons for one year pre-electrification and one year post-electrification. Total energy usage decreased by 70% in the year post-electrification due to fully electrifying heating and cooling systems and installing efficiency measures.

Energy and Cost Savings

	Annual Electricity Use and Cost		Annual Natural Gas Use and Cost		Total Annual Energy (Electricity and Natural Gas) Use and Cost	
	Use*	Cost	Use*	Cost	Use*	Cost
Pre-Electrification	6,715 kWh	\$1,118	1,092 therms	\$1,500	132,260 kBtu	\$2,618
Post-Electrification	11,487 kWh	\$1,589	0 therms	\$0	31,192 kBtu	\$1,589
Total change	71% increase	42% increase	100% reduction	100% reduction	70% reduction	39% reduction

Pre-electrification period of analysis: Nov 1, 2022 - Oct 31, 2023 | Post-electrification period of analysis: Jan 1, 2024 - Dec 31, 2024
*Indicates weather-normalized values

Cost Savings

Along with energy savings, Ms. Zavala also saved on energy costs, seeing a 39% (\$1,028) reduction in total energy costs for the two years we compared. After completing a comprehensive electrification, gas use costs dropped significantly by 100% due to the elimination of gas use. While electricity use costs increased by 71%, this increase was offset by a much higher decrease in gas use costs.

Emissions Reduction

As a result of the whole home electrification and energy efficiency upgrades, Ms. Zavala’s home’s total greenhouse gas emissions decreased by 3.46 metric tons CO2e, a 41% reduction from the pre-electrification period.²

Personal Impact

Ms. Zavala spoke about the positive impacts she experienced after electrifying her home. She described how electrification “helped me a lot for my health, mainly. Because the house was cold [in the past], my health was deteriorating more. Now I feel more comfortable. I don’t put on a heavy coat like I did before. The heating works very well now.” Likewise, Ms. Zavala said the house is also more comfortable in the summer, “Everything works perfectly now. In the past, it was very hot [inside the house]. With the air conditioning that I had, it always had to be high, and it was very hot for me. Now, everything is normal.”

Overall, Ms. Zavala highly recommends the electrification program at Elevate, saying, “I am very happy with the service I was given and with the company that did the job. I tell others that they did a very good job. I have no complaints about the program. [...] My life has changed a lot with respect to the system in my home. I say to people who have low incomes, try to seek help to do this because in the future, that is what you are going to use, it is all electric.”

Learn More

Elevate works with owners to remove and replace on-site combustion of fossil fuels at their properties. Visit [ElevateNP.org/Building-Electrification](https://www.elevatenp.org/Building-Electrification) to learn more about our services.

¹ Elevate & NREL. 2022. “Achieving 50% Energy Savings in Chicago Homes: A Case Study for Advancing Equity and Climate Goals.” <https://www.elevatenp.org/publications/achieving-50-energy-savings-in-chicago-homes-a-case-study-for-advancing-equity-and-climate-goals/>
² GHG emissions were calculated through Energy Star Portfolio Manager (ESPM). For more information on how ESPM calculates GHG emissions, Energy Star provides a technical document on its methodology here: <https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf>