ELEVATE

Case Study: Verified Energy and Cost Savings from 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 that full building electrification upgrades, weatherization, and solar reduced annual energy costs by $746 and lowered energy usage by 70%.

About the Property

The home featured in this case study is located in Chatham, a neighborhood in Chicago, IL. The house is a single-family, masonry-constructed house built in 1956 and represents 19% of Chicago's residential building stock.[1] Previous research found that this housing type could see 53%–72% in energy savings and $200-$1,300 in utility bill savings with comprehensive energy efficiency upgrades and full electrification upgrades.

Project Details

Measures: Weatherization (Air Sealing and Insulation), Full Electrification, Solar Panels (through IL Solar for All)
Partners: Chicago Bungalow Association
Funders: ComEd Energy Efficiency Program and Wells Fargo Foundation

Example of a single-family, 1942-1978, 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 to complete a full electrification project at their home which included removing all fossil fuel appliances and replacing them with electric appliances. The following work was completed at the home:

- Replaced gas furnace with electric air source heat pump
- Air sealing and insulation
- Replaced gas water heater with electric heat pump water heater
- Replaced gas stove with induction stove
- Replaced gas clothes dryer with a heat pump clothes dryer
- Electric service panel upgrade
- Installed new smart 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 walls, band joists, crawl space walls, and attic—this work was completed through the Chicago Bungalow Association. Additional upgrades included air sealing and weather stripping to further improve the efficiency of the home.

Heating, Cooling, and Appliances

In this home, the gas furnace was replaced by an air source heat pump. The gas water heater was replaced by a heat pump water heater which is a type of heat pump that improves energy efficiency by relying on heat from the air to heat water. The gas stove was replaced by an induction range, and the gas clothes dryer was replaced with a heat pump dryer.

This homeowner participated in Illinois Solar For All and had solar panels installed in the home in August 2024. By adding solar panels to the home, the homeowner is able to generate energy and reduce their electricity bills.

Energy Bill Impacts Analysis

Energy Savings
After electrification and weatherization measures were completed, an analysis of the homeowner's monthly energy bills shows decreased energy usage and decreased costs. Table 1 shows the annual energy usage and cost comparisons for one year pre-electrification to one year post-electrification. Total energy usage decreased by 70% between these two years due to fully electrifying the home and installing efficiency measures.

Table 1: 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	3,471 kWh	$676	966 therms	$1,388	108,396 kBtu	$2,064
Post-Electrification	9,410 kWh	$1,318	0 therms	$0	32,106 kBtu	$1,318
Total change	171% increase	95% increase	100% reduction	100% reduction	70% reduction	36% reduction

Pre-electrification period of analysis: Nov 1, 2022 - Oct 31, 2023, Post-electrification period of analysis: Apr 1, 2024 - Mar 31, 2025**
*Indicates weather-normalized values
**Time period was selected to include time after solar installation date (August 2024)

Cost Savings
Along with energy savings, the homeowner also saved on their bills, seeing a 36% reduction ($746) in total energy costs between the two years. After completing comprehensive electrification, gas use costs dropped by 100%. Although the electricity cost increased by 95%, the homeowner still saved several hundred dollars in the post-electrification time period.

Emissions Reduction
As a result of the home electrification and efficiency improvements, this home has lowered its total greenhouse gas emissions by 2.47 metric tons CO2e, a 38% reduction from the pre-electrification period.[2]

Personal Impact

This homeowner is a longtime resident of Chatham and spoke to their positive experiences with electrification, saying "I used to wear a sweatshirt in the house during the wintertime to save money because it cost too much to heat the house. With the insulation in the walls and attic, that really, really helped. It's much more comfortable now and the heating system is much better. It's more comfortable overall now."

The homeowner has also experienced positive impacts during the summer, saying, "I've always had air conditioning, but I don't mind using it now. Before, I didn't want to use it much because of the cost. So there were some sleepless nights and all that, mainly because of the cost. Now with the electrification and insulation in the house, I can actually use the air conditioner and feel better about it because it's not costing me so much. I don't even look at the thermostat anymore, its set and that's it. I don't worry about the cost as much now."

Learn More

Elevate works with owners to remove and replace on-site combustion of fossil fuels at their properties. Visit **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