



ELEVATE

# Building Electrification Retrofits

*Jackie Montesdeoca, Elevate*

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# About Elevate

- Elevate seeks to create a world in which everyone has clean and affordable heat, power, and water in their homes and communities — no matter who they are or where they live



# Background on Elevate

Elevate has retrofitted over 100,000 units of affordable housing over the past 20 years

- Our programs span energy and health retrofits, solar, demand response and dynamic pricing, and contractor and workforce development
- We are developing an implementation model to electrify and decarbonize the affordable housing market as quickly and as equitably as possible



# Our Approach to Building Electrification

- We believe affordable housing should be high quality and low-carbon, and we need to move quickly to combat the climate crisis.
- Residents with lower wealth, renters, seniors, and other vulnerable groups are more likely to:
  - Live in older buildings,
  - Lack cooling,
  - Disproportionally experience the effects of climate change, and
  - Be left behind in climate mitigation efforts.
- Building electrification retrofits may shift energy costs, this can be done while still addressing energy burden.



# Strategies for Addressing Energy Burden

- Start with energy efficiency, and weatherize first
- Analyze current energy use using actual usage data
- Reduce fixed costs from multiple utility bills
- Switch customers to electric heat rate where/when available (and ensure tenants apply for electric space heat if receiving LIHEAP benefits).
- Explore potential to install solar to offset increased electric load
- Keep heating and cooling load on central account and install solar
- Provide education on operation and maintenance (including thermostat/controls)
- Monitor performance of equipment and energy usage, and follow up

# Single Family Electrification – Chicago, IL



## Electrification system scope

- Air source heat pump (ducted)
- Heat pump hot water heater
- Heat pump dryer
- Induction stove
- Electrical service upgrade
- Potential for solar
- Previously weatherized

## Benefits

- Added cooling
- Improved indoor air quality
- One less utility bill to manage

## Environmental Benefits:

- **75 tons** reduction in carbon emissions over 30-year lifetime.

## Costs and Savings

- \$41,800 total project cost
- Free to owner, leveraged two grants and income eligible utility program
- **\$970** annual cost savings



# Single Family: Electrification Project Scope

Electrification Measure	Average Cost per unit
Air source heat pump	\$23,000
Heat pump domestic water heater	\$3,800
Heat pump dryer and Induction Stove	\$3,000
Electrical service upgrade	\$12,000
<b>Total</b>	<b>\$41,800</b>



# Single Family: Electrification Costs + Savings

- \$970 annual cost savings
- Full electrification

Current Energy Profile	Building Total
Annual therms usage	1235
Annual Gas expense	\$1,944
Annual kWh usage	17,340
Annual Electrical expense	\$1,639
<b>Total current energy cost</b>	<b>\$3,583</b>

Post-Retrofit Energy Profile	Building Total
Annual therms usage	0
Post-retrofit Gas expense	0
Post-retrofit kWh usage	29,777
Annual Electrical expense	\$2,613
Estimated Savings	<b>\$970</b>



# Lac du Flambeau - Dual Fuel Electrification in Wisconsin



**Lac du Flambeau Tribe**

LAC DU FLAMBEAU BAND OF LAKE SUPERIOR CHIPPEWA INDIANS

## Electrification Project Scope

- 10-units
- Dual fuel system- propane will be used as back-up
- Ductless mini-splits
- Heat pump water heaters
- Updated air intake system to improve indoor air quality
- Designing for solar

## Resilience Benefits

- Cooling for each unit
- Improved indoor air quality

## Environmental Benefits:

- **17%** reduction in carbon emissions; **6 tons** annually, **90 tons** over 15-year lifetime.

## Costs and Savings

- Turnkey costs of ~\$630,000
- **\$8,267** estimated savings after solar

# Electrification + Solar Project Scope

Activity	Description	Cost
Air Source Heat Pumps	10- 20,000-24,000 btu heat pumps, 10- Thermostats	\$238,995
Remodeled Ventilation System	2- New Air Handlers	
Electrical Service Upgrade	200 Amp → 600 Amp Electrical Upgrade	\$60,924
Solar	36 kW; 132 kWh storage; Mechatron solar tracker	\$323,400
General Construction		\$7,500
<b>TOTAL</b>		<b>\$630,819</b>
<i>Grants</i>		<i>\$300,000</i>
<i>Rebates + Tax credits</i>		<i>TBD</i>

# Electrification + Solar Costs & Savings

- 73% Reduction in propane use
- \$8,200 annual cost savings after solar
- \$1,700 net savings without solar
  - \$2,130 increase from electric but \$3,800 savings in propane costs

Current Energy Profile	Building Total
Annual therms usage	3,498
Annual Propane expense	\$5,334
Annual kWh usage	67,000
Annual Electrical expense	\$6,500
<b>Total current energy cost</b>	<b>\$11,834</b>

Post-Retrofit Energy Profile	Building Total
Annual therms usage	200
Annual Propane expense	\$1,490.00
Final post-retrofit kWh	86,309
Final post-retrofit kWh after solar	21,419
Annual Electrical expense	\$2,077
<b>Total current energy cost</b>	<b>\$3,567</b>
Estimated Savings	<b>\$8,267</b>

# Program Implementation Costs

- Braiding funds for research, modeling, analysis, assessments and construction
- Funding retrofits with utility, federal and philanthropic dollars, as well as owner capital and financing
- Supporting workforce accelerator, contractors, engineering staff, construction staff, performance monitoring
- Sharing lessons learned



# Meeting People Where They Are

- Electrification must be integrated with the other pillars of building decarbonization, especially energy efficiency, and will often require braiding of funds and incentives.
- Regional differences are very real in terms of utility rates, economics, technology solutions, and contractor knowledge and availability.
- Investments in a diverse workforce are needed to help small and new businesses catch up.
- Policy is needed to fill gaps and address upfront costs, especially for electrical service upgrades and to address Weatherization Assistance Program funding and LIHEAP benefits.
- Adding cooling to improve resiliency and health benefits are of interest for owners and residents.
- Building owners need support to figure out the best solutions for their tenants and buildings.

# Thank you!

Jackie Montesdeoca

Director, Building Electrification

[Jackie.Montesdeoca@elevatenp.org](mailto:Jackie.Montesdeoca@elevatenp.org)



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