



Great Lakes Indian Housing Association (GLIHA)

October 27, 2021



Who We Are

Founded in 2000, we are a nonprofit organization that 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.

We design and implement programs that make the benefits and services of the clean energy economy accessible to everyone to fight climate change while supporting equity.



What We Do

We support properties and portfolios at every stage to achieve a higher performance and generate operational savings by providing:

- Portfolio planning
- Energy and water use tracking and remote monitoring
- Energy, water, resiliency, and healthy homes property assessments
- Integrated design support and plan & specification reviews
- Energy modeling of existing and new developments
- Solar and net-zero energy feasibility evaluation
- Financing and incentive coordination
- Installation project management, quality inspections, testing, and verification
- Green certification

Our Partners

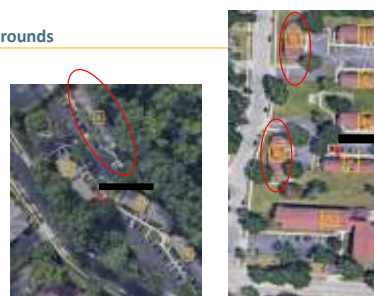
- Multifamily affordable housing owners and managers
- Homeowners and renters
- Nonprofits (community-based and direct services organizations)
- State and local government and public agencies
- Investor owned, municipal, and cooperative utilities
- Financial institutions

Four Pillars of Decarbonizing Buildings



Project Backgrounds

- The scope of this electrification project focuses on 14 townhomes at two locations
- Section 8 Affordable Housing
- Tenants pay for electric and natural gas bills (no common area bills)



LV Site

SR Site

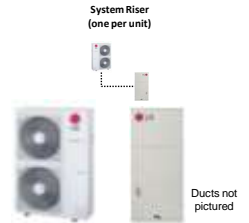
Electrification Strategies



- Upgrade all building equipment and systems that use natural gas:
 - Space Heating → heat pumps
 - Water Heating → heat pumps
- Upgrade electrical service to withstand new/added electrical loads, including additional cooling (if needed)
- Appliances can include stoves and clothes dryers (already electric at LV and SR)

Space Heating and Cooling

- High-efficiency individual air source heat pumps (ASHP) for each unit provide heating in winter and cooling in summer
- May trigger electrical upgrades
- LG technology shown, also available from Daikin, Mitsubishi and others
- Reduces total energy 50-60%



Water Heating Technology

- Simplified installation, no flues or additional roof/wall penetrations
- Typical life 5 years longer than traditional gas water heater
- Two Options:
 - 2.11 EF Heat Pump Water Heater (pictured) for SR
 - 0.95 EF Electric Water Heater for LV*



Storage Tank behind

*The closets where the DWHS are located at LV may be an issue for heat pump DHWs because they would pull heat from the rest of the unit in the winter months in order to operate effectively, resulting in the need to size a larger ASHP and potentially cause resident discomfort issues

Electrification Utility Bill Impacts

System Efficiencies	Current	SR	LV
Cooling	11.6 EER, 13 SEER	Air Source Heat Pump (14.7 EER, 18 SEER / 9.1 HSPP)	
Heating	96 AFUE	100 AFUE	
Electric Backup Heating	N/A	Heat Pump (2.11 EF)	Electric Water Heater (0.95 EF)
DHW	0.59 EF		
SR – 8 Residential Units	Current per Unit	Cost Increase per Unit	
Annual Energy Cost	\$1,650	\$180 - \$240	
Average Monthly Energy Cost	\$140	\$15 - 20	
LV – 6 Residential Units	Current per Unit	Cost Increase per Unit	
Annual Energy Cost	\$1,600	\$540 - \$720	
Average Monthly Energy Cost	\$130	\$45 - \$60	

Renewable Electric Supply – Rooftop Solar at SR



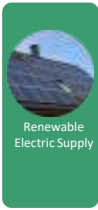
- Solar could defray up to 28,000 kWh or \$4,200 in annual energy costs at the two townhome buildings- Buildings A&B- (35% of current annual utility costs)
- Cost of installing a total of 27 kW is \$82,000
- \$25,000 in incentives include:
 - 26% Solar Federal Investment Tax Credit (ITC) is \$21,000
 - Focus on Energy Residential Customer Solar PV incentive is \$500 per system or \$4,000 for all 8 units
- Cost of installation after incentives is \$57,000 with an 12-year simple payback period

Renewable Electric Supply- Rooftop Solar at LV

- Solar could defray up 74,000 kWh or \$15,000 in annual energy costs at the LV townhome (75% of future annual utility costs, after electrification) using two configurations:
 - Rooftop solar on west half of 6205-17 (north-most building on the property)
 - Parking lot canopy
- Cost of installation is \$210,200 with \$57,652 in incentives
- Cost of installation after incentives is \$152,548 with a 14-year simple payback period



Renewable Electric Supply – Rooftop Solar at LV



- By cutting the tree on the southeast end of the building B (north-most building on the property), more solar can be added to the building, defraying 74,000 kWh or \$15,000 in annual energy costs at the LV townhome (74% of future annual utility costs, after electrification)
- Cutting the tree to the left of the visitor parking can also increase solar potential

Contractor Bid for 6 LV & 8 SR Townhomes

Scope	
Minisplit Heat Pumps for Heating & Cooling	36 MBH Mitsubishi, sized for heating when -5°F
Back-Up Electric Heating	8-10 KW
Distribution System	Use/Modify existing ductwork
Heat Pump Water Heater	Included, \$3,681 per Unit
Permit Fees*	Included
Electrical Service Upgrade	NOT Included- estimated to be \$21,000 to \$42,000
Total Heat Pumps ONLY	\$172,690, or \$12,335 per Unit
Total Heat Pumps + DHW	\$224,224, or \$16,016 per Unit
Total Heat Pumps + DHW+ Solar	\$433,724or \$30,980 per unit
Total Heat Pumps + Solar**	\$382,190 or \$27,300 per Unit
Tenant Utility Cost Increases without solar	\$15-20 for SR / \$45-60 for LV
Tenant Utility Cost Increases with solar	\$0 for SR / \$11-15 for LV
Elevate Funding	\$118,000, or \$8,500 per unit

*Scope falls under a replacement and just require individual permits to be pulled rather than engineering and plan reviews.
 ** Assuming \$209,500 for solar installs after incentives

Key Takeaways

- Heat pumps are a good solution in cold weather climates as they add air conditioning to the units; however, sometimes backup is warranted.
- Switching to heat pump technology will reduce overall carbon impact
- In the current energy cost climate, switching from natural gas to electric and adding electric load because of air conditioning will increase energy costs
- The addition of air conditioning load will increase resident utility bills. Adding solar to the project will mitigate those overall cost increases. Remetering the building to having one master electric meter will mitigate cost issues for residents (this is not an option under current rules).

Thank you!

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