



Household Energy Efficiency Analysis for Jackson County, Illinois

Many households in Jackson County, Illinois, could save hundreds of dollars annually on their energy bills and reduce carbon emissions with energy efficiency retrofits and upgrades in their homes and apartments. As part of the U.S. Department of Energy’s (DOE) Communities LEAP (Local Energy Action Program) pilot, the National Renewable Energy Laboratory (NREL) analyzed energy efficiency and electrification upgrades for about 27,900 housing units in Jackson County.

For more information about the Communities LEAP effort in Jackson County, visit: <https://www.energy.gov/communitiesLEAP/jackson-county-illinois>

Top End-Uses of Energy in Jackson County

Heating is the dominant end use for energy, and natural gas is the dominant fuel type.

Top 4 residential energy uses in Jackson County:

- 33% for space heating using natural gas
- 18% for heating using electricity
- 10% for cooling using electricity
- 7% for plug loads using electricity

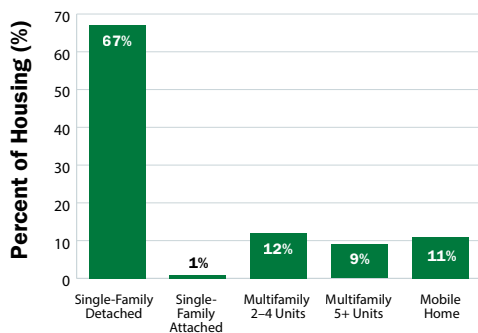
For more information on energy efficiency improvements, including smaller do-it-yourself projects, visit DOE’s Office of Energy Efficiency and Renewable Energy’s Energy Saver webpage: <https://www.energy.gov/energysaver/energy-saver>

Energy Challenges of Jackson County’s Housing Stock

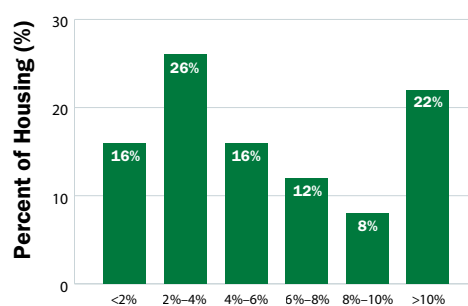
An estimated 60%–70% of the homes and apartments analyzed in Jackson County have poor building envelopes, meaning inadequate insulation and sealing allows air in and out of homes. Inadequate building envelopes increase the cost of heating and cooling homes, which requires residents to spend a higher share of their income on energy. Updating the building envelope could help lower the share of income residents must spend on energy, known as energy burden, and provide a more comfortable and safe indoor environment.

Jackson County, Illinois Residential Housing Stock Summary

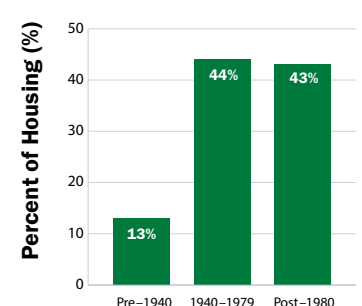
Building Type



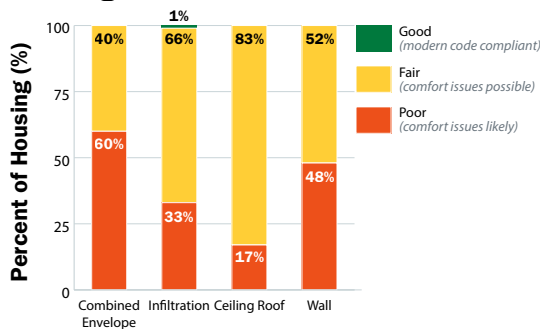
Energy Burden



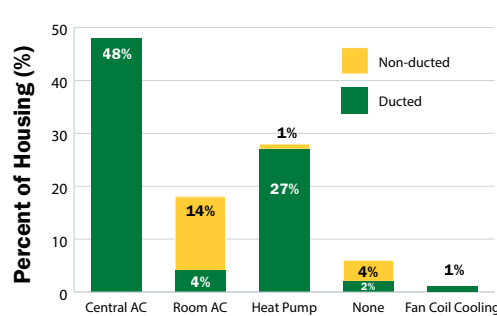
Construction Year



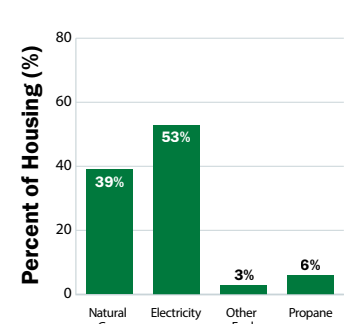
Envelope Status for Buildings with Frame Wall



Cooling Type



Space Heating Fuel Type



Annual Community-Wide Savings by Upgrade

The results below are the estimated average annual savings for all modeled household types located in Jackson County.



Energy Bill Reductions

Million \$



Emissions Reductions

Equivalent to number of cars taken off the road



Energy Savings

Equivalent number of homes



Upgrade Cost

\$-\$\$\$

Basic enclosure*

9

8,150

5,230

\$

Enhanced enclosure**

11

9,960

6,360

\$\$

Heat pump water heater

3

2,320

1,595

\$

Enhanced enclosure and high-efficiency whole home electrification***

29

27,600

18,170

\$\$\$

Minimum-efficiency heat pump with existing heat backup

7

8,400

5,540

\$\$

* Basic enclosure includes attic floor insulation, general air sealing, duct sealing, duct insulation, and wall insulation.

** Enhanced enclosure includes basic enclosure with insulating foundation walls and rim joists, sealing crawlspace vent, and insulating finished attics and cathedral ceilings.

*** Enhanced enclosure with high-efficiency whole home electrification includes an enhanced enclosure, high-efficiency heat pump, heat pump water heater, ventless heat pump dryer, electric oven, and induction range.

Average Annual Home Savings from Basic Enclosure Upgrade

Housing Type	Area Median Income	Estimated Energy Bill Reductions	Impact of Energy Bill Reductions on Energy Burden (pre -> post)	Site Energy Reduction (%)
Single-family detached homes built before 1940 with renters	All	\$441	11.3% → 9.3%	20%
	0%–80%	\$394	13.3% → 11.1%	21%
Multifamily buildings built before 1940 with renters	All	\$383	16.3% → 13.6%	20%
	0%–80%	\$393	16.3% → 13.6%	20%
All housing types with renters	All	\$244	11.6% → 10.4%	14%
	0%–80%	\$224	13.3% → 11.9%	13%

Actual site energy reductions, energy bill reductions, and changes to energy burden for any individual household will vary.

*Results are average annual savings per household (per unit for multifamily buildings); actual savings for any individual household may vary.

Basic Enclosure Upgrade

NREL’s analysis for Jackson County showed that on average, the most cost-effective option for upgrading energy efficiency is the basic enclosure upgrade, which includes adding insulation to exterior walls, the attic, and sealing openings around vents, doors, windows, and crawlspaces. Actual costs will vary depending on many factors, including the price of materials, contractor, size of the project, current incentive programs, and more.

Approach Details

Information on Upgrade Packages

NREL analyzed a total of 16 energy efficiency upgrades for Jackson County. The most cost-effective upgrade was defined as the energy efficiency and retrofit package that resulted in the most energy bill reductions per upgrade cost. All four housing types identified in this fact sheet had the same most cost-effective package.

Modeled energy burden and energy bill reductions vary by ownership (resident-owned or rented), housing type, and other factors. This analysis does not account for federal, state, and local rebates or programs that may further lower energy burden, upgrade costs, and payback periods.

Modeling Assumptions

- Vacant housing was not included as part of this analysis per the community’s request.
- Local equipment, labor costs, and utility costs were taken from a mixture of local and national data sources from 2023 or the most recently available data.
- The envelope status figure was based on 2023 International Energy Conservation Code (IECC) requirements for wall insulation, attic insulation, infiltration rates, and wall construction type.
- Upgrades did not consider new electric panel requirements.

To learn more about the modeled packages and upgrades in all building types, please visit <https://data.nrel.gov/submissions/224>.



This work presents energy efficiency and electrification modeling results for dwelling units using ResStock EUSS 2022.1, which is a statistical representation based on modeling predictions of energy use and savings, and actual results may vary. Scan the QR code to access the methodology document at <https://www.nrel.gov/docs/fy24osti/88058.pdf>.