

Indoor Climate Research & Training

Pilot Further Studies on All Electric Retrofits in Illinois Residences

Website:
icrt.appliedresearch.illinois.edu

Proposal Idea: Pilot a Study on All Electric Retrofits in Illinois Residences

- ▶ Partner with research organizations and contractors to implement incentivized whole-house all-electric retrofits in single-family homes.
 - Expand on Com-Ed multi-family studies
- ▶ Study and evaluate costs & benefits (energy savings, and GHG reductions) of whole-home all-electric retrofits including HVAC, water heating, air-sealing & insulation.
 - Potential target: propane based heated homes with lower efficiency furnaces?



Background

- ▶ 2018 ComEd pilot study on multi-family electric baseboard to ductless mini-splits.
 - 6 buildings, 87 installed units.
- ▶ 2019 follow-on study evaluated impact of air-sealing and attic insulation in a multi-family building:
 - Results showed savings from air-sealing and insulation.
- ▶ California and the Northeast pursuing electrification strategies.
 - Incentives included are for electric heat pump heating and water heating.
 - Reports show that heat pumps powered by low- or no-carbon electricity are needed to cut GHG emissions 80% or more by 2050.



California

- ▶ CA governor signed a bill for the utility commission to
 - *“by January 2, 2021, assess the potential for the state to reduce the emissions of greenhouse gases from the state’s residential and commercial building stock by at least 40% below 1990 levels by January 1, 2030.”*
- ▶ CA turning to carbon-free grids to decarbonize buildings.
- ▶ Findings from a Sacramento report show electrification reduces GHG emissions more than ee alone.
- ▶ Incentives for both existing and new home construction.



Northeast

- ▶ Residents see savings with rebates and switching from oil fuel to cold-climate electric heat pumps.
- ▶ Maine
 - 25,000 cold-clime heat pumps installed; up to \$750 incentives
- ▶ Massachusetts & Vermont programs
 - Mass Save and Mass Clean Energy Council
 - Electrification is a strategy to meet both grid modernization & grid flexibility goals

Illinois

- ▶ Key differences:
 - California is cooling dominated
 - Vermont homes tend to not have ducted forced air space conditioning – mini splits may be preferred over installing central air
 - Energy costs varies
- ▶ Evaluation needed in Illinois single-family context.
- ▶ Homes using propane could be a program target.
 - Propane costs fluctuate year-to-year and are higher in the wintertime than in shoulder season
 - Home expenses also related to furnace efficiency



Why study this?

- ▶ To understand in IL how electrification can help meet GHG emission reduction goals.
- ▶ To evaluate energy savings of whole-home retrofits.
- ▶ Study potential grid impacts in a wide-scale electrification scenario.
- ▶ Promote residential retrofit practices focused on treating the whole house as a system is an important factor.
 - Treating the whole home encompasses energy savings, health & safety, and comfort.



Small Pilot Study method & costs

Number of homes

- ▶ 10 homes over 2 years

Costs

- ▶ \$5,000 incentive per home x 10 homes = \$50,000
- ▶ Research modeling and analysis \$30,000
- ▶ Policy research, lit review, impact analysis, interviews leading to an understanding of electric heat pump adoption in IL = \$30,000

Total: \$110,000

Impact

- ▶ Target GHG reductions, grid modernization, grid flexibility goals for Illinois in the Midwest
- ▶ Be a Midwest leader on electrification
- ▶ Give customers more choice with regard to incentives on HVAC and water heating technology in the future

Resources

- ▶ [The Economics of Electrifying Buildings, Rocky Mountain Institute](#)
- ▶ [NREL Electrification Futures Study](#)
- ▶ [Electric Power Research Institute – Efficient Electrification](#)
- ▶ [Sacramento Municipal Utility District HVAC Incentives](#)
- ▶ [ACEEE programs nudge toward electrification](#)
- ▶ [EIA resources on propane costs](#)



Questions?

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