How can the high cost of heating electrification be mitigated for below median income households in Southeast Michigan?

Researchers from the University of Michigan examined the impact of air source heat pumps on utility bills in existing homes across income groups and assessed realistic upfront costs for energy efficiency retrofits that reduce utility bills.


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Why is this important?

- Studies[1] show that switching to a heat pump from natural gas heating increases utility bills for most existing single family homes, especially in the Upper Midwest.
- In new homes, heat pumps are the lowest cost option.[2]
- Low-income communities experience the highest energy burden nationwide; 30% of Detroit households spend more than 6% of their income on utilities.
- Low income households live in less efficient homes and consequently experience higher energy burden.
- Energy efficiency retrofits can lower energy bills and improve indoor comfort.

What is energy burden?

- Energy burden is the percentage of household income spend on home energy bills.
- In the US, about one in five households has to forego necessities like food or medicine to pay their energy bills.[3]

[1] Vaishnav & Fatimah. *Environ. Sci. Technol.* 54(16):9814−23 (2020)
[2] Rocky Mountain Institute, The New Economics of Electrifying Buildings, 2019.
[3] U.S. Energy Information Administration, Residential Energy Consumption Survey 2015

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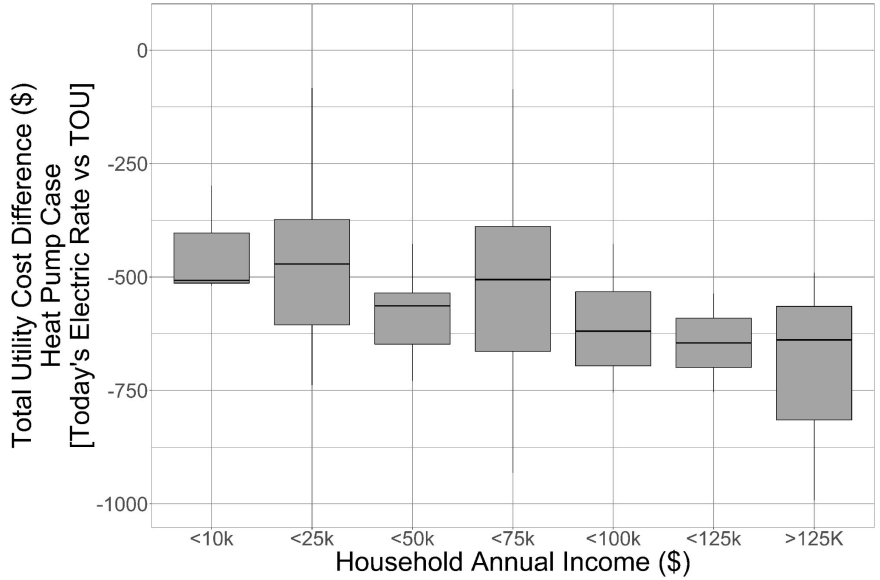
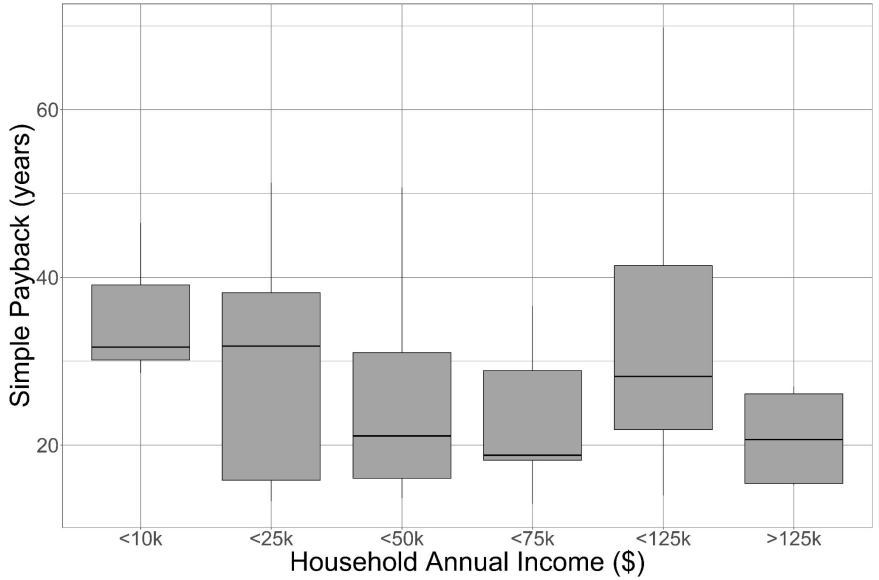
Switching to heat pumps without efficiency improvements raises utility bills

- Switching to time of use rates limited the increase in cost.
- Efficiency retrofits are currently expensive and can have long paybacks.
- Households below median income faced the longest payback for efficiency retrofits.
- Strong case for lowering the cost of efficiency upgrades though subsidies and increasing supply through workforce training.
- We observed that the effectiveness of efficiency upgrades was mixed: better quality control and consumer protection may be needed.

Time of use rate lowers electrification costs across all income categories



Payback periods can be long particularly for low income homes



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Funding for this research provided by
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