Residential Electrification Economics After Elimination of Major Tax Credit In North Carolina

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Energy Affordability Is Top of Mind

Household energy bills strain many Americans. **34 million U.S. households** report trouble paying energy bills [EIA]. Energy efficient electric appliances can help reduce this strain.

Residential Electrification Policy Whiplash

The Inflation Reduction Act of 2022 introduced two incentive structures:

- **25C:** A tax credit with no income requirements that can cover 30% (up to $2K) for a heat pump technology
- **HEAR:** Home Electrification and Appliance Rebates funds distributed to North Carolina to create Area Median Income (AMI) gated rebates for home electrification up to $14K
  - <80%AMI; 100% project coverage (Tier 1)
  - 80-150%AMI; 50% project coverage (Tier 2)
  - >150%AMI; not eligible

The One Big Beautiful Bill Act prematurely ended 25C but HEAR is funded and operational.

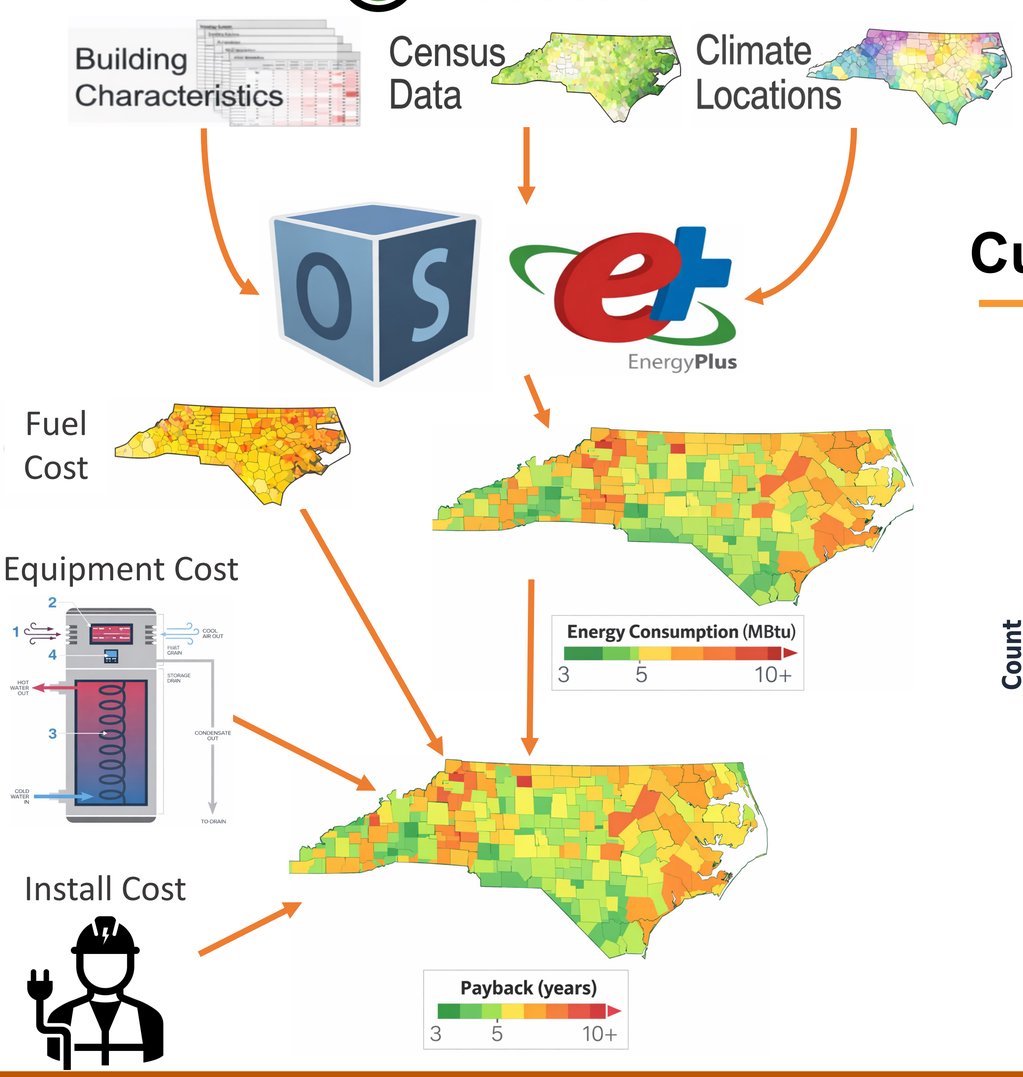
How do Heat Pump Water Heater economics change under varying policy environments?

Heat Pump Water Heaters (HPWH) can save Americans money. If a HPWH project's payback period – the time it takes for savings to pay for the upgrade – is less than the lifetime of the equipment, adoption should be seriously considered.

How do payback periods for HPWH upgrades change between no policy support, support available today (HEAR), and the IRA's intended support (HEAR + 25C)?

How to model Residential Electrification

A representative sample of North Carolinian housing is sampled, and pre- and –post-upgrade energy dynamics simulated using The National Lab of the Rockies' ResStock



Fuel Costs

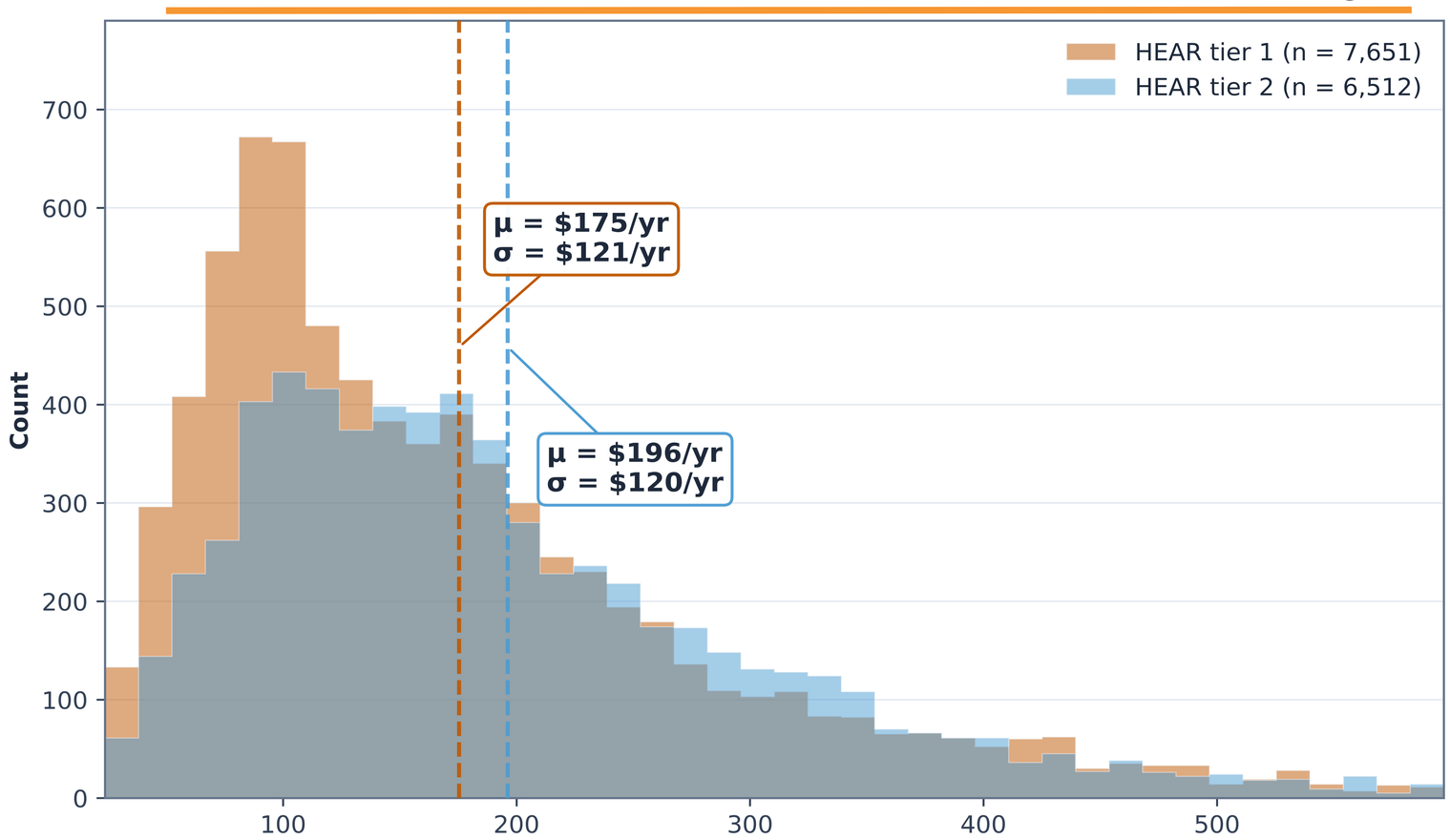
Fuel	$ (Retail)
Electricity	13 (¢/kWh)
Propane	37 ($/MMBtu)
Natural Gas	20 ($/MMBtu

Water Heater Characteristics and Costs

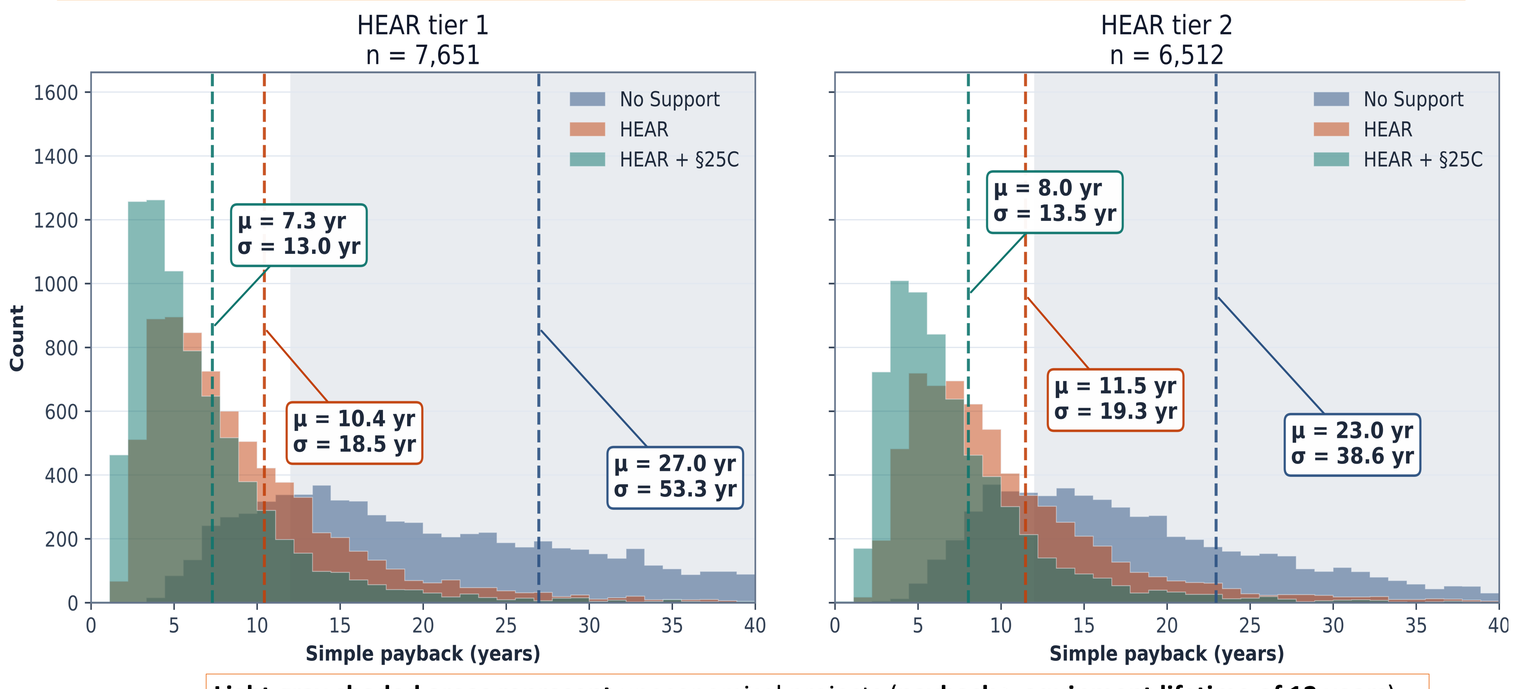
Size (Gallons)	Efficiency (UEF)	Project Cost ($)
50	3.75	2500
65	4.0	2900
80	4.0	3300

Uniform Energy Factor (UEF) is DOE standard for measuring WH energy efficiency. Fuel data from EIA. Project Cost inclusive of equipment and install cost, sourced from Home Depot. Install cost assumed to be $1K

HPWH Retrofits Save North Carolinians Money



Policy Support Greatly Improves Project Economics



Light gray shaded areas represent uneconomical projects (**payback > equipment lifetime of 12 years**)

Cutting 25C Cost 2,101 Sampled North Carolinians $430K

