

# Illinois Heat Pump Affordability Assumptions

## System rated efficiency

- Gas or Propane Furnace: 85% AFUE
- Air Conditioner: 15.2 SEER2
- Air-source Heat Pump (ASHP): Ducted 16 SEER2, 9 HSPF2. Ductless 17 SEER2, 9.5 HSPF2. Part-load ASHP sized to cooling load with a 20F switchover temperature. Full-load ASHP sized to 95% of heating load with backup electric resistance.
- Gas or Propane Water Heater: 0.70 UEF
- Heat Pump Water Heater (HPWH): 3.45 UEF, 310% effective efficiency operating in efficiency mode

## Hourly loads and system efficiency

- Electric and gas utilities were assigned to each National Renewable Energy Laboratory's (NREL) ResStock home by combining: electric and gas utility territory shapefiles from S&P, block group shapefiles from the US Census, and geographic metadata for each home at the city- or county-level from ResStock.
- Baseline annual energy usage was determined using single-family detached, attached, and mobile homes in NREL ResStock.
- ASHP and HPWH energy usage was determined by applying hourly ASHP efficiency to hourly baseline energy usage.
- Hourly ASHP efficiencies were based on reported performance curves for the rated efficiencies above. Cold climate heat pump performance was based on an average subset of 100 common ASHPs listed in the Northeast Energy Efficiency Partnerships' Air Source Heat Pump (ASHP) database. The supplemental electric resistance heating element, for full-load heat pumps only, then covered any unmet heating load.
- Hourly HPWH efficiency was estimated based on reported data from two common electric HPWH manufacturers as found in HPWHSim; this data was also used in CBECC-Res. The electric resistance element then covered any unmet water-heating load based on the hourly water-heating load profile.

## Energy rates

The analysis used utility-specific electric rates sourced from Arcadia's Signal utility rate database, utility-specific gas rates sourced from rate schedules, and national-average propane rates.

- Propane

- \$1.89/gallon (Illinois state average April 2025 to March 2026)
- Natural gas
  - Space heating (2025/2026 winter months)
    - Peoples Gas: Gas heating \$1.33/therm and \$26.54/month, Non-gas heating \$1.98/therm and \$15.48/month
    - Nicor Gas: \$0.73/therm and \$21.31/month
    - North Shore Gas: Gas heating \$0.86/therm and \$22.29/month, Non-gas heating \$0.99/therm and \$14.47/month
  - Water heating (April 2025-March 2026)
    - Peoples Gas: Gas heating \$1.38/therm and \$26.54/month, Non-gas heating \$2.06/therm and \$15.48/month
    - Nicor Gas: \$0.81/therm and \$21.31/month
    - North Shore Gas: Gas heating \$0.83/therm and \$22.29/month, Non-gas heating \$0.96/therm and \$14.47/month
- Electricity
  - Electricity rates are shown here for illustrative purposes only assuming an average home electricity usage with an ASHP. Electricity bills in this analysis were calculated by sending hourly 8760 electricity usage profiles to Arcadia's Genability Rate Database, not using these displayed values.
  - Commonwealth Edison
    - Residential – Fixed charge of \$18.46/month, Volumetric charge \$0.186/kWh winter and \$0.167/kWh summer
    - Residential Electric Heat – Fixed charge of \$19.32/month, Volumetric charge \$0.112/kWh winter and \$0.143/kWh summer
  - Ameren
    - Residential – Fixed charge of \$13.95/month, Volumetric charge \$0.139/kWh winter and \$0.213/kWh summer
  - Cooperative and Municipal Utility
    - Residential – Fixed charge of \$30/month, \$0.102/kWh winter and \$0.136/kWh summer