National Energy Affordability Tool (NEAT): From geographical averages to individual household data to inform climate, energy affordability and health policy decisions.

PSE Bringing science to energy policy

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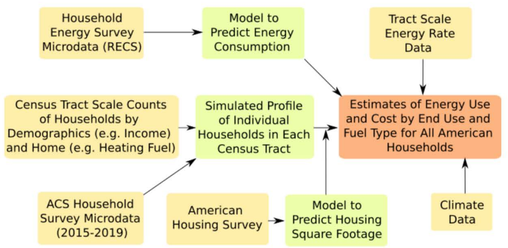
1 Methods

PSE's National Energy Affordability Tool (NEAT) simulates a synthetic dataset of all US household energy consumption and cost broken down by fuel and end use including demographics and building attributes. Allows for the calculation of metrics like energy affordability gap.



Energy Affordability Gap ($):

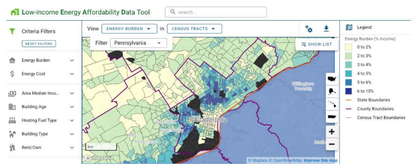
Definition: Sum of all household spending on energy beyond 6% of income.

Advantages:

- Accounts for prevalence, costs, and income simultaneously
- Summable, unlike cost burden style metrics
- Linked to bill assistance needs (e.g. PIPP) and can inform program cost effectiveness

2 Affordability Statistics

LEAD Tool

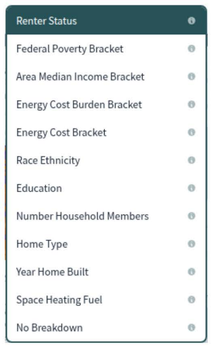


Previous tools (e.g. LEAD) and analyses capture energy cost burdens at geographies that group different types of households, making it difficult to identify which household segments are most burdened. Lack of energy use data makes it difficult to estimate intervention impacts.

NEAT uses simulated data to:

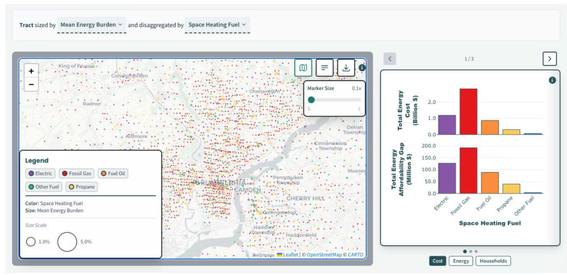
- Estimate energy costs and cost burdens, **bill assistance needs, energy consumption by end use and fuel type, and equivalent emissions**,
- Breakdown estimates by several demographics and home attributes such as home type,
- **Identify characteristic groups of households for program designs,**
- **Simulate the impact of changes and interventions on all of the above including:**

Home and Demographic Breakdowns



National Energy Affordability Tool (NEAT) [*Expected Launch April 2026*]

Detailed Maps at Sub-Tract Scale



Simultaneous and detailed grouping of demographic and home variables identifies strategies to both address equity (color) between customer subsets and also the magnitude of the affordability challenge in dollar value (size).

Energy Consumption by Fuel and End Use

Fuel and end use breakdowns highlight drivers of cost. Example: Renter occupied-homes built before 1970 have higher average annual costs than those built after 1970.

Detailed Breakdowns by Home and Demographic Variables

Treemap shows affordability statistics segmented according to multiple variables simultaneously. Sizes of rectangles represent gap while colors represent cost burden. For example, gas-heated, owner-occupied, single family homes have highest gap due to prevalence but lower mean cost burdens.

Correlations Between Demographic and Home Attributes

Network graph shows correlation between variables (distance and edge thickness). Size is gap and color is mean energy cost burden.

3 Example Use Cases

BUSINESS

DTE rate hike request would increase residential bills 11%

Breana Noble
The Detroit News
April 25, 2025, 5:19 p.m. ET

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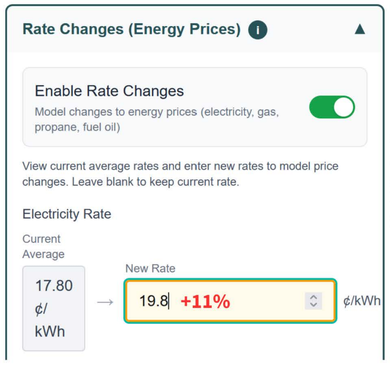
Residential DTE Energy Co. customers would see their rates increase 11.1% under a request filed with state regulators this week from the Detroit-based utility.

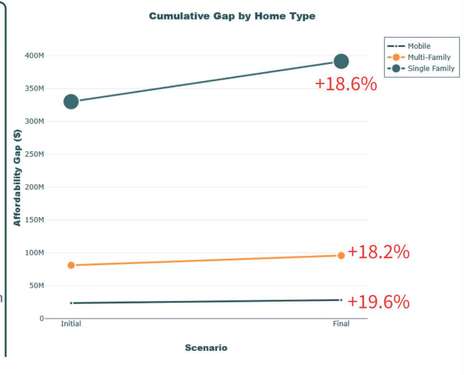
Example Input



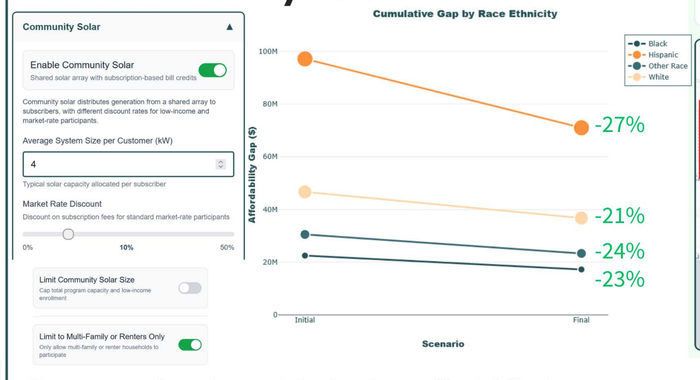
Rate Increases

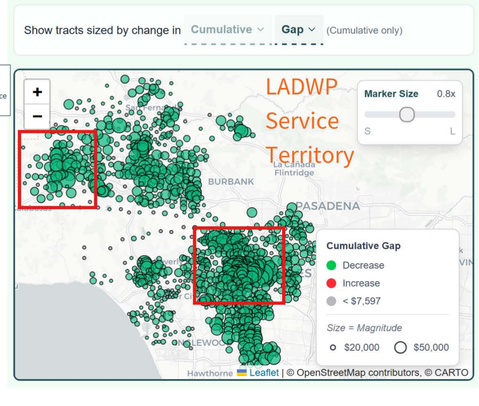
DTE Electric Company, based in Michigan, sought to increase electricity rates by 11%. If enacted, this would cause the affordability gap to disproportionately increase nearly 20% across all households, racial demographics, and renter status. Rural areas and dense urban areas alike face the brunt of the price increases.

Example Output



Community Solar





The community solar module simulates affordability impact across geography and demographics. Example: Inspired by California's Solar on Multifamily Homes program (SOMAH), this scenario considers universal adoption in LA of an average of 4 kW each to multifamily households or renters at a 10% discount over market rate (20% for households under 80% AMI)**. Example identifies areas that may see the largest cost benefit from a hypothetical community solar system (in this case – Downtown LA and the San Fernando Valley).

Additional Possible Scenarios

- Rate Changes (Energy Prices)
- Fuel Switching (Electrification)
- Bill Assistance Programs
- Grid Decarbonization (CO_2e)
- Heat Pump Replacement (Electric Systems)
- Behind-the-Meter Solar
- Energy Efficiency Improvements
- Demand Response Programs
- Community Solar
- Energy Storage (Battery)

4 Stay updated for the tool release!

Scan this QR code to get on the email list for the NEAT tool release!

The NEAT release is scheduled for April 2026.

Citations

Makhijani, A., Kinkhabwala, Y., Jaeger, J., Bilsback, K., Hill, L. A. L., Peltier, L., Lukanov, B., & Krieger, E. (2023). *Energy affordability in Maryland.* PSE Healthy Energy and Institute for Energy and Environmental Research.

U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. *Low-Income Energy Affordability Data (LEAD) Tool* [Data set]. (2022). Open Energy Data Initiative (OEDI).

Noble, B. (2025, April). *DTE rate hike request would increase residential bills 11%.* The Detroit News.

Verdant Associates and ILLUME Advising. (2023). *Solar on Multifamily Affordable Housing Second Triennial Report*. Submitted to California Public Utilities Commission.

***Bolded text** represent capabilities previously unavailable from existing tools.

**These are conservative estimates. Third party reporting indicates household bill savings from SOMAH approach 40-60%.

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