This project is funded by the U.S. Department of Energy Building Technologies Office

Home Energy Score Makes Energy Efficiency Visible, Valued, and Actionable at Scale

Home Energy Score

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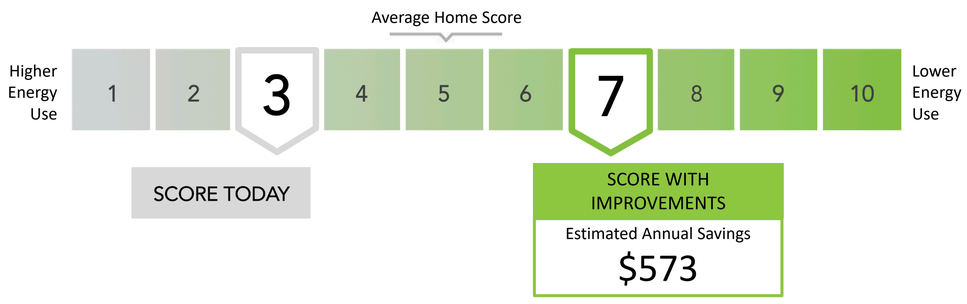
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BACKGROUND / INDUSTRY IMPACT

- The residential sector accounts for 20% of total U.S. energy consumption. 75% of homes were built before 2000.
- Energy efficiency is largely invisible in real estate decisions and not valued in the marketplace.
- Home Energy Score was piloted in 2011 and released in 2012 to give people a user-facing metric for home energy use for the retrofit market.

PROJECT OVERVIEW / OBJECTIVES

- "Miles per gallon" for a home that is visible and comprehensible to homeowners, renters, sellers, buyers at critical points in the decision-making process.
- Simple 1-10 score, relative to homes in the same climate.
- Low-cost assessment.
- Asset rating: assesses the home, not the occupants.
- Cost-effective upgrade recommendations.



APPROACH

- Create an easy-to-understand metric and report for broad consumer awareness and action.
- Develop easy-to-use software to make it more widely accessible to industry professionals.

FUTURE WORK

- IRA/HOMES Rebates qualification.
- Electrification upgrade recommendations.
- New and improved technology models.

Research Outcomes

2021: Modernize energy modeling

- Replace unmaintained DOE2.1e with EnergyPlus and OpenStudio.
- Align with open standards and rulesets to make the Score more comparable with other market metrics and tools.
- Make modeling improvements to heat pump water heaters, ducts, evaporative coolers, foundation heat transfer, infiltration, and more.

2022: Build on the improved modeling foundation

- New technology models: high efficiency and cold climate heat pumps, low-e storm windows, knee walls, more R-value options for walls and ceilings, other general modeling improvements.
- Better upgrade recommendations to identify more energy savings.

2023: Expand the reach, prepare to scale

- Expand to multifamily and manufactured homes.
- Modernize the software architecture at every layer of the application to enable more efficient and timely feature deployment and maintainability.

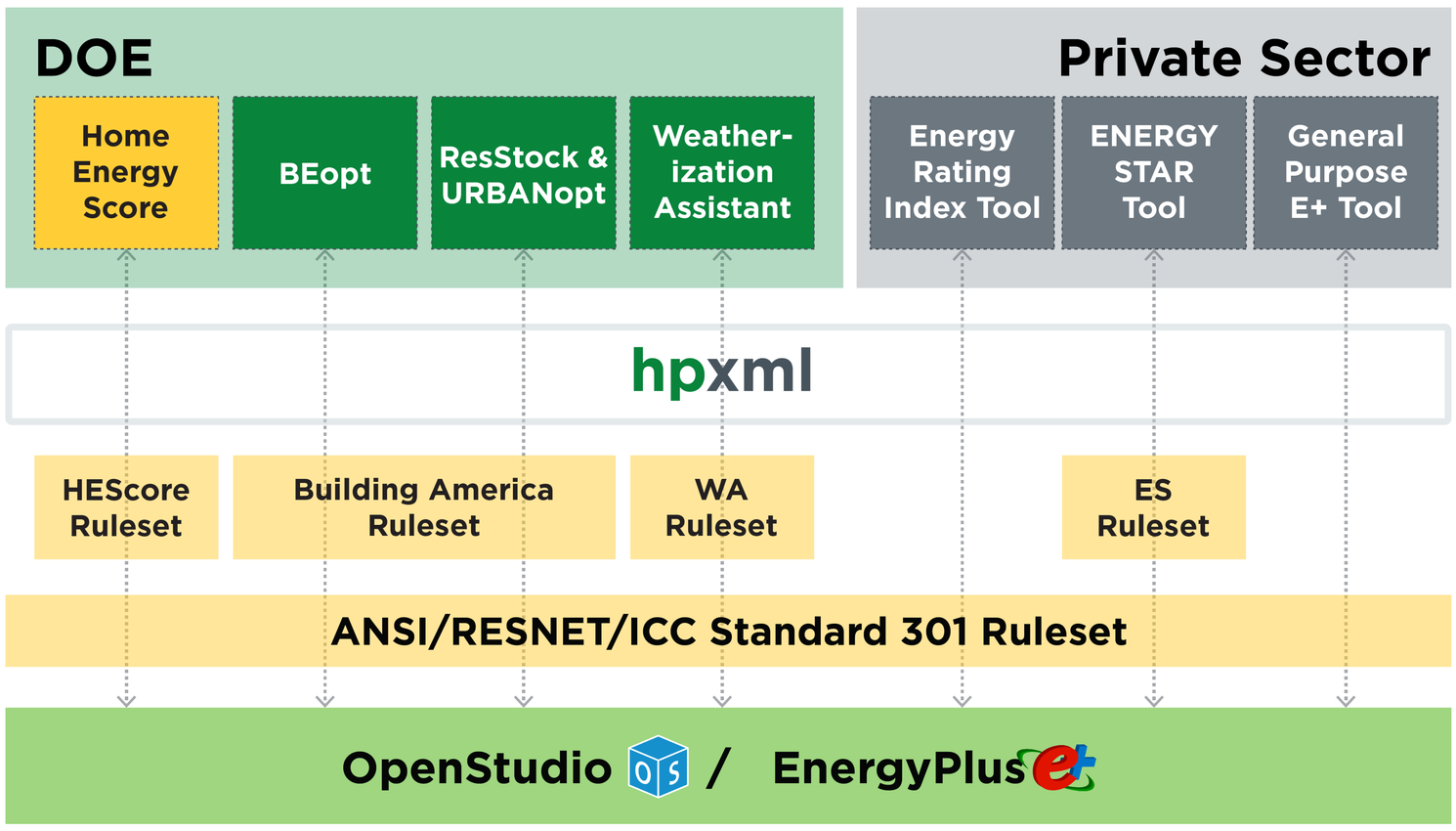
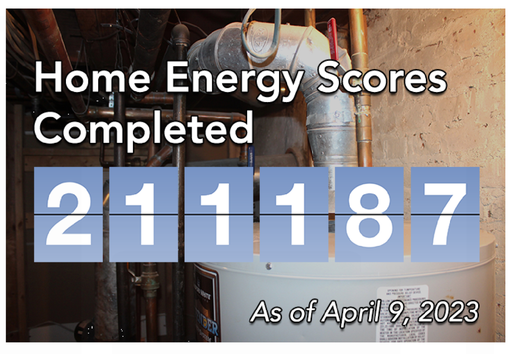


Diagram of Home Energy Score software architecture illustrating how common building blocks for energy modeling are utilized to meet the strategic needs of several DOE and industry programs while maintaining consistency across the portfolio and reducing duplication of effort.

Impact

- Utility Energy Efficiency Programs
- Real estate disclosure policies (Berkeley, CA; Portland, OR):
  - Score required at time of listing values EE in the market
  - A one point increase in Score associated with a 0.5% increase in sale price, and a 5.5% reduction in odds of a loan going delinquent[1]
- Rental ordinances (Gainesville, FL):
  - Transparency of costs benefits low-income households
  - Implemented minimum efficiency standards for rentals
  - Renters are willing to increase their monthly rent by 1.8% for a one-unit increase in Score[2]
- Energy Efficiency Financing:
  - Fannie Mae and Freddie Mac allow financing up to 15% of the "as-completed" home value for energy efficiency improvements.
  - FHA allows a 2% stretch on debt-to-income ratio for homes with a 6-10 score.
- Score is required for EE loans in the Revolving Loan Fund set up in the Bipartisan Infrastructure Law, which makes EE in reach for low-income households.



[1] https://eta-publications.lbl.gov/sites/default/files/pigman_aceee_summer_study_2022_preprint.pdf
[2] https://www.aceee.org/research-report/b2204

NREL is a national laboratory of the U. S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

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BTO Peer Review
Arlington, VA
April 24-27, 2023
NREL/PO-5500-85685