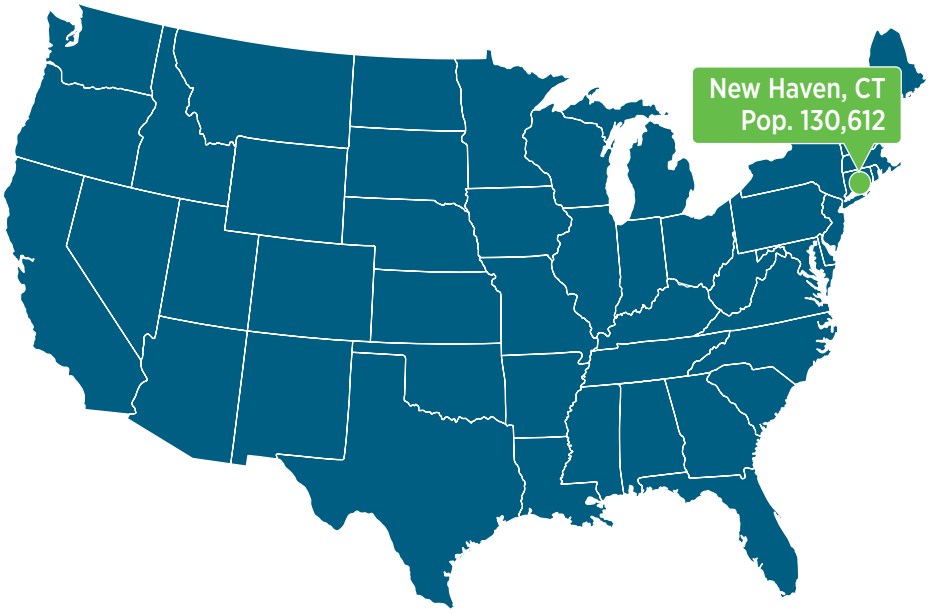
U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

New Haven, Connecticut: Targeting Low-Income Household Energy Savings



The City of New Haven partnered with the Energy Department and the National Renewable Energy Laboratory (NREL) to demonstrate how data and analysis can inform more strategic energy decisions. NREL based its analysis in-part on the City Energy Profiles on the State and Local Energy Data (SLED) website (*eere.energy.gov/sled*). The profiles contain data compiled by SLED and the Cities Leading through Energy Analysis and Planning (Cities-LEAP) program. Cities across the country can follow the same approach and use data-driven analysis in their own energy planning.

> "Energy use in buildings accounts for 54% of the city's greenhouse gas emissions. New Haven wants to prioritize actions that both reduce energy consumption and associated emissions and save money for residents, especially for low-income households. This [Cities-LEAP] analysis correlating building stock, ownership, and energy source provides insight and supporting documentation for those actions that will most benefit low-income communities."
>
> *– Dawn Henning, Engineering Department Project Manager, City of New Haven, Connecticut*

City Energy Goal

The City of New Haven, Connecticut, is in the process of updating its 2004 Climate Action Plan[1] and developing climate and sustainability goals. One of the city's goals is to expand energy programs to underserved populations, yet the city lacks the staffing capacity to focus analysis on this issue. To help prioritize actions to meet this goal and identify best practices and options, city officials asked for data and analysis to help target building energy actions and policies to benefit low-income households.

Data and Analysis

This analysis is based on estimated city energy data available on SLED and supplemental data inputs obtained directly from the City of New Haven.

Renters in New Haven are more likely to fall into lower-income brackets than their homeowner counterparts, according to Cities-LEAP analysis (Figure 1). Of the 49,771 occupied housing units in New Haven, 71% are renter-occupied, approximately double the average percentage of renter-occupied units in the state of Connecticut and the United States (see Table 1).

The U.S. Department of Housing and Urban Development (HUD) determines low-income status as a percentage of area median income (AMI) for a given location. HUD defines low-income as

Table 1. Renter- and Owner-Occupied Units in New Haven, Connecticut, Compared to State and U.S. Averages

	New Haven	Connecticut	United States
Percent renter-occupied	71.1%	33.0%	36.1%
Percent owner-occupied	28.9%	67.0%	63.9%

Source: U.S. Census Bureau, American Fact Finder: Selected Housing Characteristics, 2011–2015 American Community Survey 5-Year Estimates.

[1] New Haven Climate Change Action Plan: https://www.newhavenct.gov/civicax/filebank/blobdload.aspx?BlobID=26342.

households earning 80% or less of AMI.[2] Based on an analysis of HUD and U.S. Census data, 73% of renter-occupied units in New Haven are low-income households (see Figure 1).

Energy burden (the ratio of energy expenditures to household income) is a metric commonly used to evaluate the relative cost burden of energy expenditures. As shown in Figure 2, renters have a slightly lower energy burden than owners. This situation may be correlated with factors such as differences in unit area and household size, as well as shared walls and rental units that do not have separately metered utilities. Renters in New Haven are more likely to live in multifamily units; 72% of all renter-occupied units are in buildings with three or more units.

In New Haven, an estimated 27% of rental units are electrically heated compared to approximately 4.5% of owner-occupied units (see Figure 3). The lower energy burden among renters of electrically heated units may also be correlated with the increased likelihood that these rental units are smaller apartments with lower overall heating demands (see Figure 4). Nearly 32% of owned units in New Haven use fuel oil, which represents a high monthly energy expenditure in the city, compared to around 27% of rented units. More than half of both owned and rented units use utility gas (62% of owner-occupied units and 58% of renter-occupied units).

Approaches to Reducing Energy Burden

As shown by the analysis, in New Haven, programs that target energy efficiency upgrades in renter-occupied, multifamily buildings may best target benefits for low-income households. Converting rental units that use less-efficient electric resistance heating to higher-efficiency heat pumps may also reduce the energy burden among low-income renters.

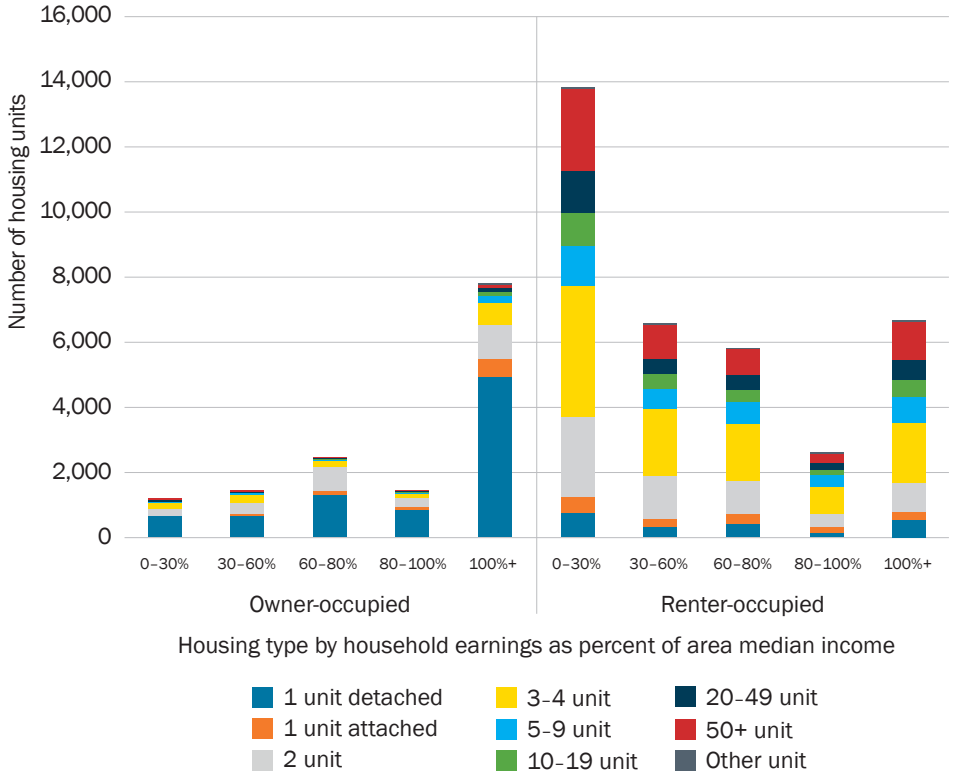


Figure 1. Number of housing units by housing type and area median income (2015) in New Haven, Connecticut (Source: U.S. Census, U.S. Housing and Urban Development, and Energy Information Administration data[3])

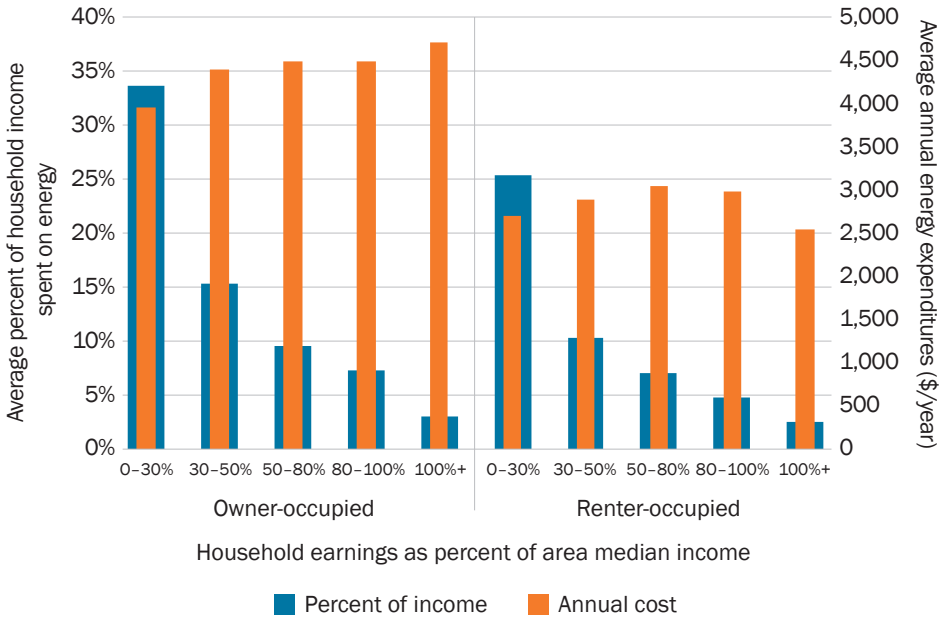


Figure 2. Average energy expenditures and energy burden for residential units (2015) in New Haven, Connecticut (Source: U.S. Census, U.S. Housing and Urban Development, and Energy Information Administration data[3])

[2] State and county-level income limits are updated every fiscal year and are based on the number of people per household. Income limit documentation is available at https://www.huduser.gov/portal/datasets/il.html.

[3] Figure based on a preliminary NREL residential household disaggregation and cross-tabulation of U.S. Census, U.S. Housing and Urban Development, and Energy Information Administration data. Similar data and the associated methodology will soon be available for all cities in SLED.

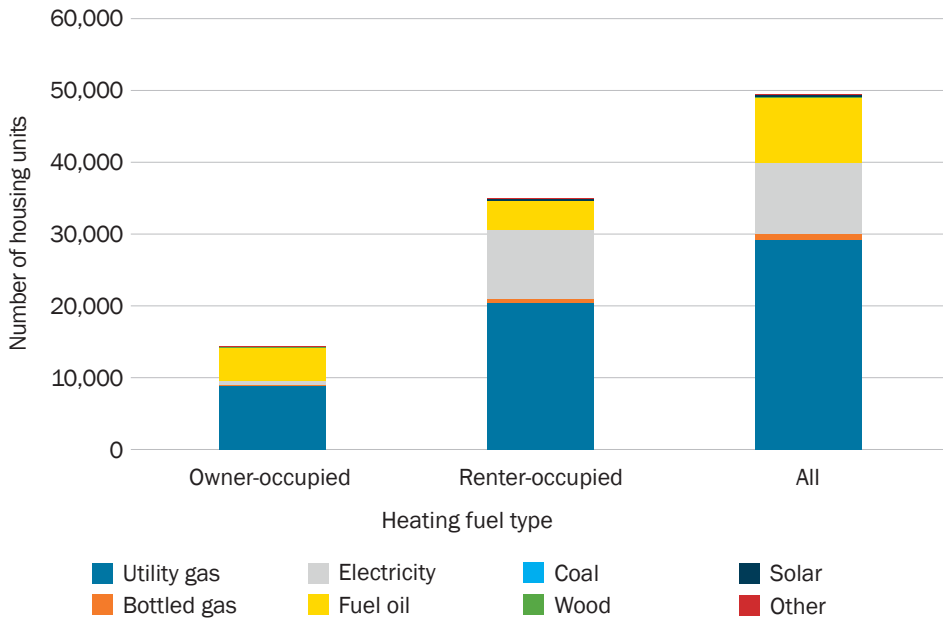


Figure 3. Number of housing units by heating fuel type and ownership status (2015) in New Haven, Connecticut (Source: U.S. Census, U.S. Housing and Urban Development, and Energy Information Administration data[4])

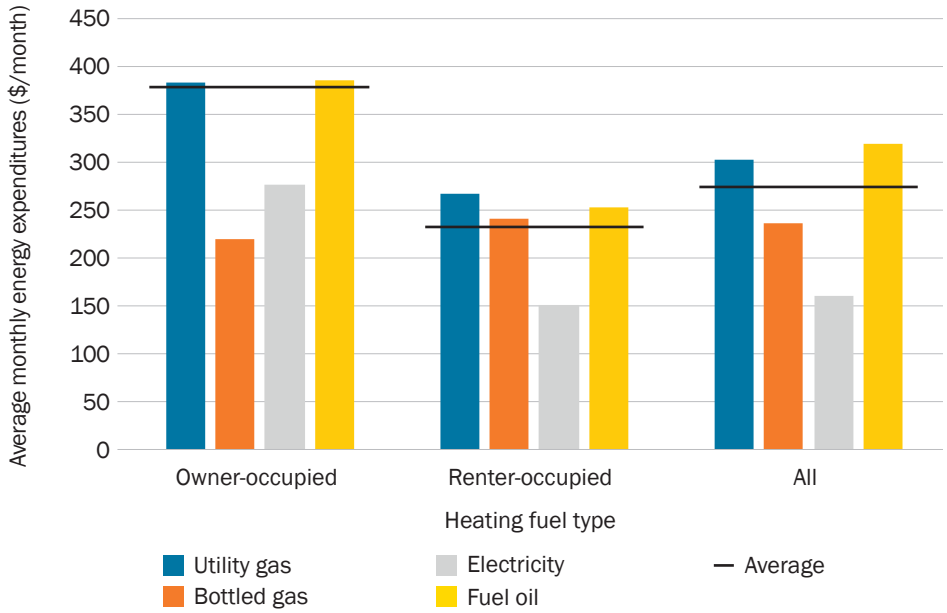


Figure 4. Average monthly expenditures by heating fuel type (2015) in New Haven, Connecticut (Source: U.S. Census, U.S. Housing and Urban Development, and Energy Information Administration data[4])

Additional measures to increase the efficiency of low-income and rental properties include the following:

- Time-of-sale efficiency requirements
- Rental and low-income weatherization programs
- Mechanisms to disclose anticipated utility bills to potential renters and buyers
- Requiring renovations to meet code
- Improving code compliance rates
- Adopting beyond-code measures (i.e., city policies that go beyond state-level or the latest vintage of building codes, such as the International Energy Conservation Code[5])
- Requiring new multifamily developments to meet efficiency standards in order to receive zoning and development approvals.

In addition, commercial building energy benchmarking or disclosure policies that include multifamily housing may lead to increased adoption of energy efficiency measures among these building types. Multifamily housing constitutes more than 30% of the commercial building area and more than 20% of the commercial buildings count in New Haven according to Cities-LEAP analysis of CoStar data (see Figure 5).

Weatherization Assistance Program

The U.S. Department of Energy Weatherization Assistance Program (WAP) provides weatherization services to low-income families to reduce their energy costs. Connecticut Department of Energy and Environmental Protection (DEEP) has administered the program since 2012 and weatherized 1,802 homes with WAP funding at an average cost per home of $4,950. New Haven represented almost 16% of the state-wide production with a total of 287 homes weatherized during the same period.

[4] Figure based on a preliminary NREL residential household disaggregation and cross-tabulation of U.S. Census, U.S. Housing and Urban Development, and Energy Information Administration data. Similar data and the associated methodology will soon be available for all cities in SLED.

[5] International Energy Conservation Code Resource Page, International Code Council, https://www.iccsafe.org/about-icc/government-relations/international-energy-conservation-code-resource-page.

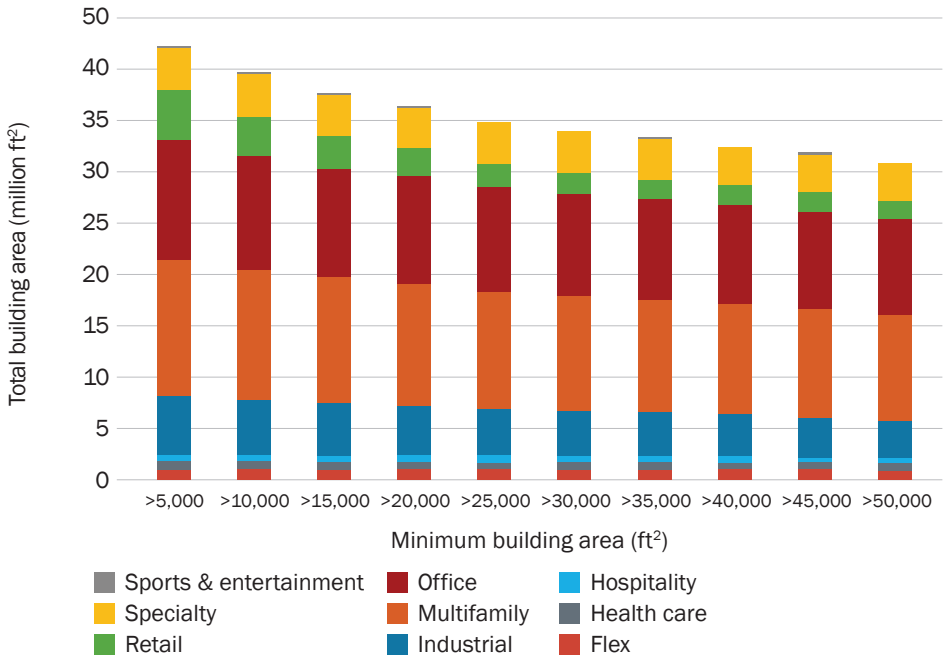


Figure 5. Commercial buildings in New Haven, Connecticut, by area and type (Source: Analysis of commercial properties data from CoStar Realty Information, Inc. [*costar.com*], on SLED)

Connecticut uses other resources to leverage WAP funding. A portion of the Low Income Home Energy Assistance Program (LIHEAP), funded by the U.S. Department of Health & Human Services, helps address health and safety barriers for WAP-funded homes. DEEP works to coordinate both state-administered federal programs in conjunction with utility-funded weatherization programs.

Resources

The following resources may be useful to guide further research and action steps for low-income household energy efficiency:

Rental Property Energy Efficiency Policy Case Studies

- **Vermont**: Burlington, Vermont's Time of Sale Energy Efficiency Ordinance requires certain energy efficiency upgrades at the time of property sale for rental properties where tenants are responsible for heating costs: *https://www.burlingtonelectric.com/time-sale-energy-efficiency-ordinance*
- **Maine:** Energy Efficiency Disclosure for Rental Units in Maine (landlords are required to disclose energy aspects of a property that may impact energy consumption at the location): *http://www.maine.gov/mpuc/online/forms/EnergyEfficiencyDisclosure.html*.
- **Wisconsin**: Rental Weatherization Program: *http://www.dsps.wi.gov/Programs/Industry-Services/Industry-Services-Programs/Rental-Weatherization and http://dsps.wi.gov/sb/docs/*

Low-Income Energy Efficiency

Residential

- Better Buildings Clean Energy for Low Income Communities Accelerator: *https://betterbuilding-sinitiative.energy.gov/accelerators/clean-energy-low-income-communities*
- Energy Efficiency in Affordable Housing, a U.S. Environmental Protection Agency guide for local governments: *https://19january2017snapshot.epa.gov/statelocalclimate/energy-efficiency-affordable-housing_.html*

Multifamily

- Energy Efficiency for All—Resources for multifamily efficiency program design: *http://energyefficiencyforall.org/issues/program-design-and-budgets*

Overcoming Renter-Owner Split Incentives (unwillingness of property owners to invest in upgrades that save tenants money)

- Policy Options for the Split Incentive: Increasing Energy Efficiency for Low-Income Renters: *http://www.sciencedirect.com/science/article/pii/S0301421512004661*
- Report from the Rental Housing Energy Efficiency Work Group in Minnesota: *http://www.cleanenergyresourceteams.org/files/RentalHousingEnergyEfficiencyWorkGroupDocument.pdf*
- Case study on rental housing policy in Boulder, Colorado: *http://aceee.org/files/proceedings/2012/data/papers/0193-000251.pdf*
- Renters guide for energy efficiency: *http://www.ct.gov/deep/lib/deep/energy/a_renters_guides_to_energy_efficiency.pdf.*

Find additional resources in the SLED Local Energy Action Toolbox: *http://apps1.eere.energy.gov/sled/cleap.html*.

Cities-LEAP is a project funded by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE). It is part of an effort by EERE's Strategic Priorities and Impact Analysis Team to empower state and local decision makers with data-driven analysis. ■

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For more information, visit:
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