Allentown Environmental Advisory Council

Energy Equity - An Analysis of the Issues and Recommend Solutions for Allentown

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Key Words

Energy Efficiency

Energy efficiency means using less input energy in an appliance to result in the same outcome. Ex. LEDs only use a few wavelengths of light (rather than the whole spectrum) and produce no heat, unlike incandescent light bulbs.

Energy Burdens

An energy burden is the percentage of household income that is spent on energy bills. Annual Utility Bills ÷ Annual Household Income = Energy Burden.

Energy Use Intensity

Energy Use Intensity (EUI) can be defined as the measurement of a building's annual energy consumption relative to its total square-footage.

Federal Poverty Level

The Federal Poverty Level (FPL) is a measure of income used by the U.S. government to determine who is eligible for subsidies, programs, and benefits.

Weatherization

Weatherization or weatherproofing is the practice of protecting a building and its interior from the elements, particularly from sunlight, precipitation, and wind, and of modifying a building to reduce energy consumption and optimize energy efficiency.

A study by the **American Council for an Energy-Efficient Economy** concluded that **“lowest-income brackets had the highest energy use intensity… caused by structural issues outside of their control"**

Who is Impacted the Most?

Energy Burden = Annual Utility Bills ÷ Annual Household Income

Compared to white non-hispanic households, the following groups spend more of their income on energy:

Native American households: 45% more

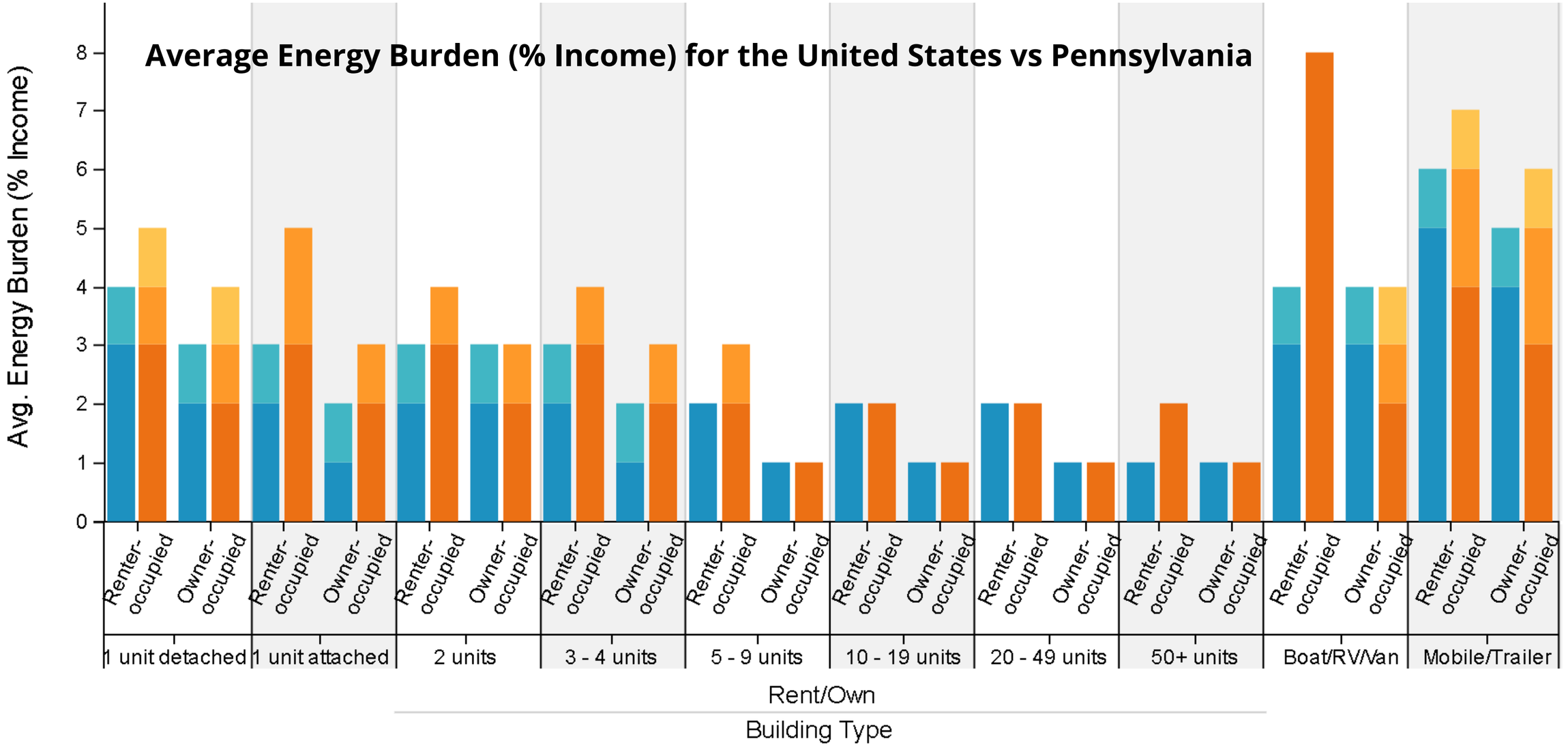
Black households: 43% more

Hispanic households: 20% more

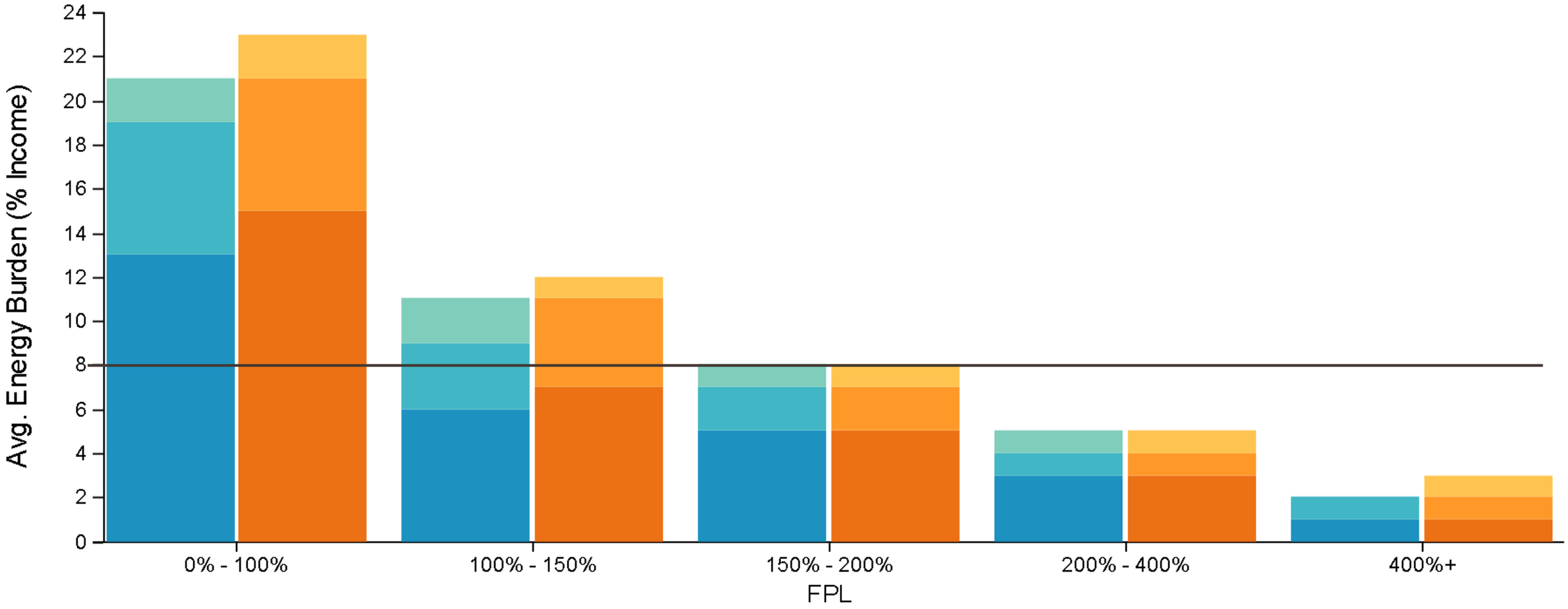
The United States Median energy burden is 3.1%, but the median energy burden of households below 200% of the federal poverty level is 8.1%

https://www.aceee.org/sites/default/files/pdfs/ACEEE-01%20Energy%20Burden%20-%20National.pdf

https://www.aceee.org/press-release/2020/09/report-low-income-households-communities-color-face-high-energy-burden


Average Energy Burden (% Income) for the United States vs Pennsylvania
Avg. Energy Burden (% Income)
0
1
2
3
4
5
6
7
8
Renter-occupied
Owner-occupied
1 unit detached
1 unit attached
2 units
3 - 4 units
5 - 9 units
10 - 19 units
20 - 49 units
50+ units
Boat/RV/Van
Mobile/Trailer
Rent/Own
Building Type
The United States
Electricity
Gas
Other
Pennsylvania
Electricity
Gas
Other

Avg. Energy Burden (% Income) for Pennsylvania vs Allentown

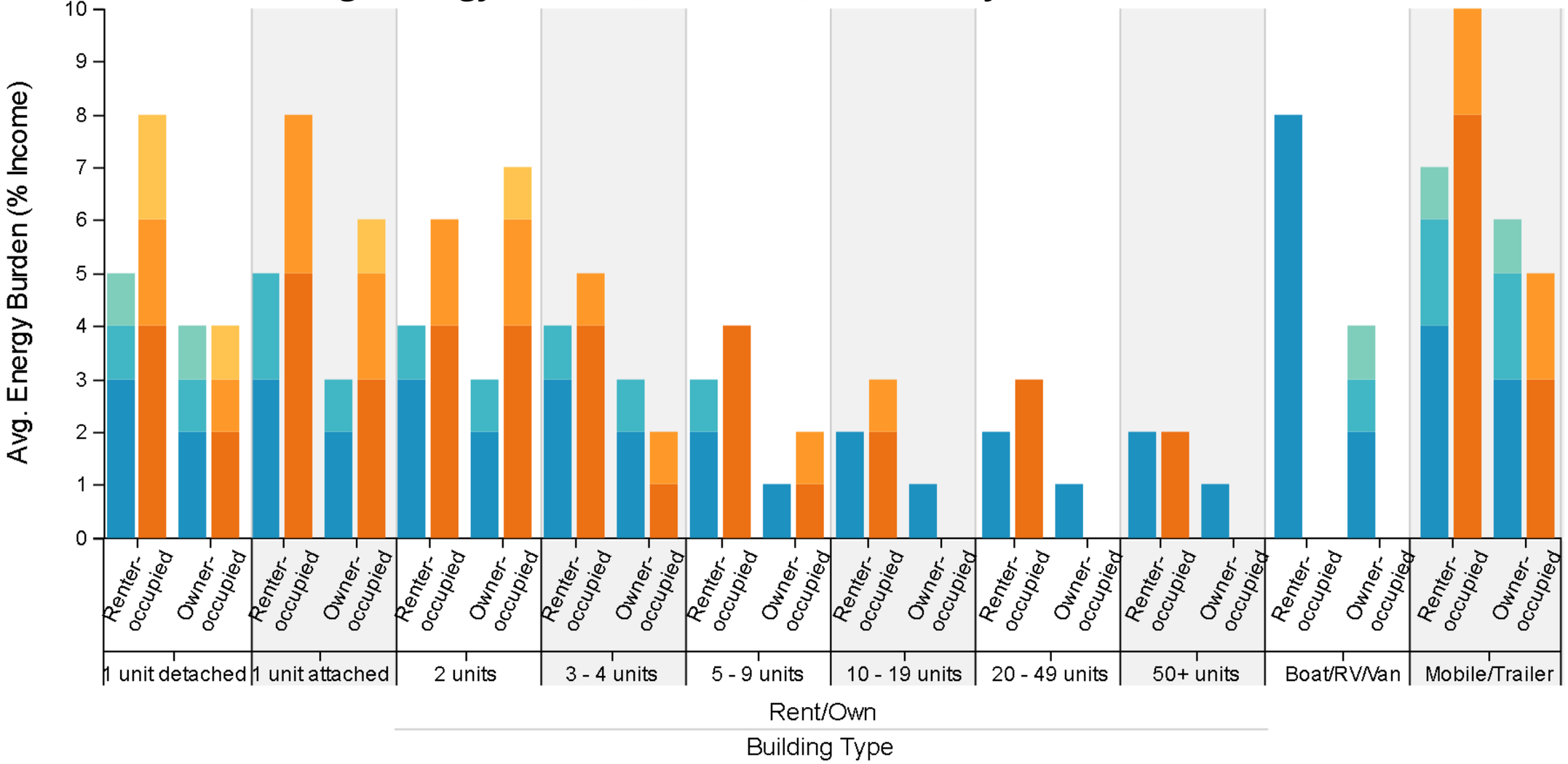


Pennsylvania
- Electricity
- Gas
- Other

Allentown
- Electricity
- Gas
- Other

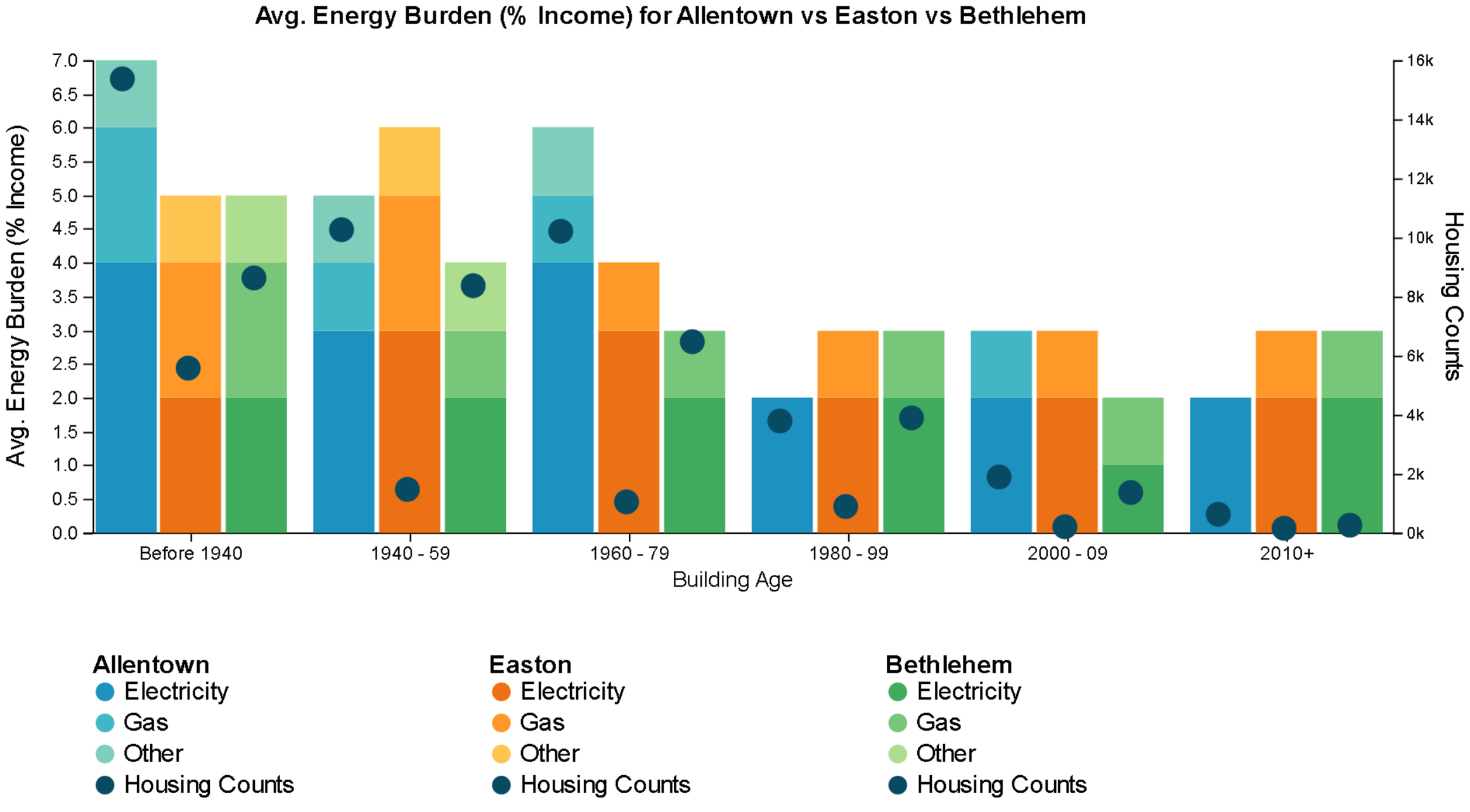
Note: 0%- 100% is at or below the poverty line 8% is the median U.S Averge

Average Energy Burden (% Income) for Pennsylvania v.s Allentown



Pennsylvania
- Electricity
- Gas
- Other

Allentown
- Electricity
- Gas
- Other


Avg. Energy Burden (% Income) for Allentown vs Easton vs Bethlehem
Avg. Energy Burden (% Income)
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
16k
14k
12k
10k
8k
6k
4k
2k
0k
Housing Counts
Before 1940
1940 - 59
1960 - 79
1980 - 99
2000 - 09
2010+
Building Age
Allentown
Electricity
Gas
Other
Housing Counts
Easton
Electricity
Gas
Other
Housing Counts
Bethlehem
Electricity
Gas
Other
Housing Counts

Allentown Compared to Sister Cities

Bethlehem

Average Energy Burden (% income Avg): 4%
Average Annual Energy Cost: $2,677

Easton

Average Energy Burden (% income): 5%
Average Annual Energy Cost: $2,902

Allentown

Average Energy Burden (% income): 5%
Average Annual Energy Cost: $2,788

The United States Median energy burden is 3.1%, and the median low-income energy burden is 8.1%

Note: 0%- 100% is at or below the poverty line

https://www.energy.gov/eere/slsc/low-income-energy-affordability-data-lead-tool

Energy Efficiency Impact of Old Housing Stock

Old homes have:

- Inefficient refrigerators and other appliances
- Poor heat, air conditioning, and ventilation systems
- Inadequate insulation

All of these can also affect health:

- Dampness and mold can increase asthma
- Heatstroke from high temperatures
- Cold and Flu from cold temperatures

https://www.aceee.org/sites/default/files/pdfs/u2006.pdf

Energy Efficiency Improvements Reduce Cost and Enhance Quality of Life While Reducing Carbon Footprint

Allentown's greenhouse gas inventory shows that in 2018 residential energy use accounted for

388,977 metric tons of emissions

Energy efficiency reduces energy burden while lowering carbon emissions

How can upgrades improve costs and quality of life?

A study by Columbia University called “Benefit or Burden? Perceptions of Energy Efficiency Efforts among Low-Income Housing Residents in New York City” **compared data from low-income apartment owners in the Bronx before and after energy efficiency changes to their living environment.**

"...improved thermal comfort was the most common improvement from the upgrades, followed by decreases in energy expense.” (Hernandez,Diana, Phillips, 2015, p.1) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4819256/.

Landlord A noted that before the conversion he paid between $20 and $30 thousand dollars per month for heating fuel in a large, multi-family building during the winter months, but with the new boiler, they were paying between $8 and 10 thousand dollars per month. Based on these savings, he would recover the 25% up-front cost of $250,000 ($62,500) within one heating season. (Hernandez,Diana, Phillips, 2015, p.1) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4819256/.

Existing Programs

The National Weatherization Assistance Program

PA Department of Community & Economic Development.

The W.A.P program focuses on the whole-house approach dividing projects into four subcategories of aspects, Mechanical (HVAC systems), Healthy and Safety (mold), Building shells,(replacing windows) Electric (adding LEDs). These homeowners (not renters) need to qualify below a certain level of poverty and must meet certain standards in order for weatherization to work. For example, Insulation will not work if there is a hole in the roof.

LIHEAP

Low Income Home Energy Assistance Program

This block grant distributed through the Department of Health and Human Services provides assistance paying for air conditioning and electric bills, and in some instances provides families with temporary housing and transportation until their home has proper heating and cooling.

H.E.E.L.P

The Homeowners Energy Efficiency Loan Program

Offers loans between $1,000 and $10,000 for specific energy efficiency repairs at a fixed rate of one percent (1%); (APR 1%) for ten years with no prepayment penalties. (For a representative $10,000 loan with a $0 financing charge.
This program also offers credits for Passive House which is the most efficient building you can build.

ppl wrap

Wrap Program by PPL

The Winter Relief Assistance Program PPL Electric Utilities customers (Renters need landlord permission.) If accepted,a contractor will visit the house and be able to educate the homeowner on how to save energy and in soem cases install new appliances.

All programs listed above require a certain level of poverty to receive services

HomeStyle® Renovation Program

PA Housing Finance Agency

This program allows eligible homebuyers purchasing a home or existing homeowners seeking a refinance mortgage to repair, remodel, renovate, or complete energy improvements. Qualified borrowers can fund up to 75% of the "as-completed" appraised value of the property. This allows buyers to make needed repairs right away, without having to take out another loan at a higher rate and with a shorter repayment period. All repairs must be completed by a qualified and licensed contractor.

The home improvement must be permanently affixed to the property and add value to the home.

Common repairs include:

- Roof repair/replacement installation or improvement of heating and/or air conditioning systems
- Upgrades to kitchen and/or bath areas
- Repairs/improvements to plumbing and/or electric systems
- Addition of living space

What is preventing residents with high energy burdens from taking advantage of existing programs?

1 Lack of Knowledge and Awarenss

A significant impediment to receiving aid is a lack of knowledge and awareness of existing programs or how to receive assistance under those programs. The procedures to apply for aid can be complicated and time-consuming. Some residents may face language barriers when applying.

2 Must Meet Defined Poverty Level

Some households may have a high energy burden but their income exceeds the criteria for receiving aid.

3 Renters Need Permission

If you are a renter, you must get permission from your landlord to upgrade any aspect of your living space. Landlords only have an incentive to upgrade appliances and improve energy efficiency is if they are paying the energy bill for the tenant under a gross lease.

4 Other Work May Be Required First

Existing programs are often only for energy efficiency which often excludes necessary preliminary work required in order for these upgrades to be effective. For example, Some homes have leaking roofs or mold or asbestos that must first be addressed before the home can be weatherized.

Easton's Plan for improving Energy Efficiency

From Easton's Climate Action Plan

Provide incentives for rental property owners to increase the energy efficiency of their properties. This should be tied to the renewal of rental license.

Encourage or consider requiring the use of net-zero emissions building standards or design standards like LEED (Leadership in Energy Sustainability buildings using Environmental Design) for new standards construction.

Providing free energy audit kits for lower-income communities. Consider partnering with Sustainability involved in the West Ward Community Initiative program

Partner with utilities to expand existing rebate options. Ensure that the program makes appliance upgrades possible for low- and middle-income households.

Educate homeowners, landlords and renter's about the health and cost-saving benefits of energy efficiency

Assist in evaluating homes for installation of solar panels and other non-GHG emitting energy sources.

Bethlehem's Plan for Improving Energy Efficiency

Bethlehem is mainly focused on reducing their greenhouse gas emissions, zero waste, and establishing more green spaces within their community by 2030 -2040

Create a “Bethlehem Climate Challenge” program to educate residents about climate change and its potential impacts and motivate and empower residents and businesses to reduce emissions and participate in creating a resilient community

Reduce GHG emissions from buildings by 30% by 2030

Adopt ambitious GHG reduction goals, accelerate, adoption of the CAP, and coordinate its implementation

From Bethlehem's Climate Action Plan

Solutions for Allentown

Lorem ipsum dolor sit amet

Allentown Environmental Advisory Council

Allentown E.A.C's Recommendation

By end of 2023 collect data on residential energy use at residences with high energy burden in order to establish targeted policies and programs.

By end of 2024 establish policies and programs to reduce energy use at residences with high energy burdens considering all grant opportunities and alternative financing mechanisms.

Some Ideas on How This Can be Done:

- **Collect and evaluate data (including data on grant availability) to inform targeted policies and programs including identifying appropriate residences for such programs.**

- **Partner with community-based organizations/businesses to educate residents about existing programs and energy efficiency's health and cost-saving benefits.**

- **As part of the City's efforts to promote home ownership, provide financial incentives to reduce energy use at owner-occupied homes with a high energy burden (see appendix for sources of funding for this).**

- **Encourage new multi-family homes to be built with renewable energy or passive solar energy in mind.**

- **Consider providing incentives for rental property owners to increase energy efficiency potentially tied to renewal of rental license**

APPENDIX

Weatherization

Weatherization is the practice of protecting a building and its interior from the elements. Including sunlight, precipitation, and wind, and modifying a building to reduce energy consumption and optimize energy efficiency.

This can include adding insulation, improving ventilation, moisture control replacing old appliances and new water heating systems

Keeping extra heat in during the summer and the cold out in the winter is efficient because renters and homeowners will use less energy to heat/cool their homes in the first place. Ultimately saving money and improved comfort. This has to be done in conjunction with other programs. Weatherization is futile if you have a hole in your roof.

“Based on … evidence of … weatherization reduces average customer bills, we estimate that it can reduce low-income household energy burden by 25%.”

(Drehobl, Ross, Ayala,2020, p.8) https://www.aceee.org/sites/default/files/pdfs/u2006.pdf

Resource and Funding Sources

This is a list of financial incentives resources for energy projects in Pennsylvania:

The Clean Energy Program (CEP) Plan summarizes Pennsylvanias Depatment of Environmental Protection's Energy Programs energy-related plans, supporting policies, and programs

The Green Energy Loan Fund (GELF) By leveraging US Department of Energy funds and through a collaborative contract, the DEP has been able to support low-interest loan financing for energy efficiency retrofits and the installation of energy conservation measures and high-performance energy systems in buildings throughout Pennsylvania

Clean Energy for Low-Income Communities Accelerator (CELICA) Toolkit,is a toolkit that provides an overview of tools, resources, and models for developing low-income energy efficiency and renewable energy programs

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