



Northwest Market Characterization Study Quantitative Analysis

Prepared for NEEA by LD Consulting
September 10, 2025
Report #E25-501

The following slide deck supplements and should be used in conjunction with [NEEA's Northwest Market Characterization Study](#) written report. The report references this accompanying document in multiple places. Readers should refer also to the written report for a complete synthesis of the findings of this research.





Northwest Market Characterization Quantitative Analysis



Prepared for:
Nathan Martinez, Director of Market Analytics, Research & Evaluation, NEEA



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High Level Takeaways





High Level Takeaways: By Locale

- **Average age of home:**

- Suburb has the lowest average age
- Rural Town has the highest average age

- **Type of housing:**

- City has the highest number and percent of multifamily households
- Rural has the highest number and percent of mobile homes

- **Primary heating fuel:**

- Rural has the highest percent of households heated by bottled gas (e.g., propane) and wood.
- Rural has the lowest percent of households heated by natural gas.

- **Occupancy:**

- City has the highest percent of renter-occupied households.
- Rural has the lowest percent of renter-occupied households.



High Level Takeaways: By Locale

- **Without computer/internet:**

- Suburb has the lowest percent of households without computer or internet
- Town and Rural has the highest percent of households without computer or internet
- Remote Town and Remote Rural has higher percent than non-remote locales

- **Purchasing behavior:**

- City and Suburb are more likely to shop at Home Depot and Best Buy than other locales
- Rural and Remote Rural more likely to shop at Lowe's, Ace Hardware, Harbor Freight, Tractor Supply and True Value than other locales.
- Suburb has highest average credit card debt.



High Level Takeaways: By Locale

- **Income**

- Suburb locales have highest incomes and lowest energy burden*
- Towns, Remote Towns and Remote Rural locales have lowest incomes

- **Education**

- City and Suburb locales have higher education attainment
- Town locales have the lowest education attainment

- **Other Demographic Information**

- Caucasian people accounted for the largest share of the population in all locales
- City and Suburb locales have the highest percentage of Asian people, Black people, and Pacific Islander people, as well as immigrants
- The town locale has the highest percentage of Hispanic and Latino people
- Suburban population had the highest growth rate between 2010 and 2020
- Homeownership is most prevalent in rural areas
- Rural areas have the highest median age (44.4 years)
- Towns have the highest poverty rates

*Energy burden is the portion of a household's annual income spent on energy bills. See more in Energy Burden section.



High Level Takeaways: By Locale

- **Energy Burden:**
 - Towns and Rural locales have the highest average energy burden.
 - Though each locale has an average energy burden of less than 3%, there are still a significant number of energy burdened households.
 - Rural has the highest energy costs* of the locales.
- **Market Actors:**
 - Number of HVAC distributors per capita is higher in City and Suburb locales
 - Number of hardware stores per capita is higher in Town and Rural locales
- **RBSA Heat Pumps:**
 - Owner-occupied, electrically heated urban and rural households have similar rate of heat pumps, with urban having a slightly higher rate

**Energy cost is defined as the amount of household expenditures spent on electricity, gas (utility and bottled), and other fuels (including fuel oil, wood, etc.).*



High Level Takeaways: By State

- **Income**
 - Washington had the highest median income of the states
 - Montana had the lowest median income of the states
- **Energy Burden***
 - Montana has the highest energy burden of the states
 - Montana has the highest energy costs** of the states
- **Market Actors**
 - Most prevalent household appliance store in Montana is Aaron's, a rent-to-own retailer

**Energy burden is the portion of a household's annual income spent on energy bills. See more in Energy Burden section.*

***Energy cost is defined as the amount of household expenditures spent on electricity, gas (utility and bottled), and other fuels (including fuel oil, wood, etc.).*



High Level Takeaways

Opportunities to further investigate during primary research

- Dig deeper into other potential factors that impact affordability (not in order of importance)
 - Renter vs owner occupied
 - Race and ethnicity
 - Tribal communities
 - Income
 - Language
 - Primary heating fuel
 - Fuel access
 - Housing type (single family vs multifamily vs mobile homes)

What are Locales?

2021 NCES Locale Data





NCES Locale Data

- **NCES locale data is based on combining datasets**
 - 2010 Census UA
 - 2017 OMB Principal Cities
- **NCES has 4 basic types**
 - City – Urbanized area AND principal city
 - Suburb – Urbanized area NOT principal city
 - Town – Urban Cluster
 - Rural – Rural Area

<https://nces.ed.gov/programs/edge/Geographic/LocaleBoundaries>

Examples:

Portland Metro
and Idaho Falls
areas

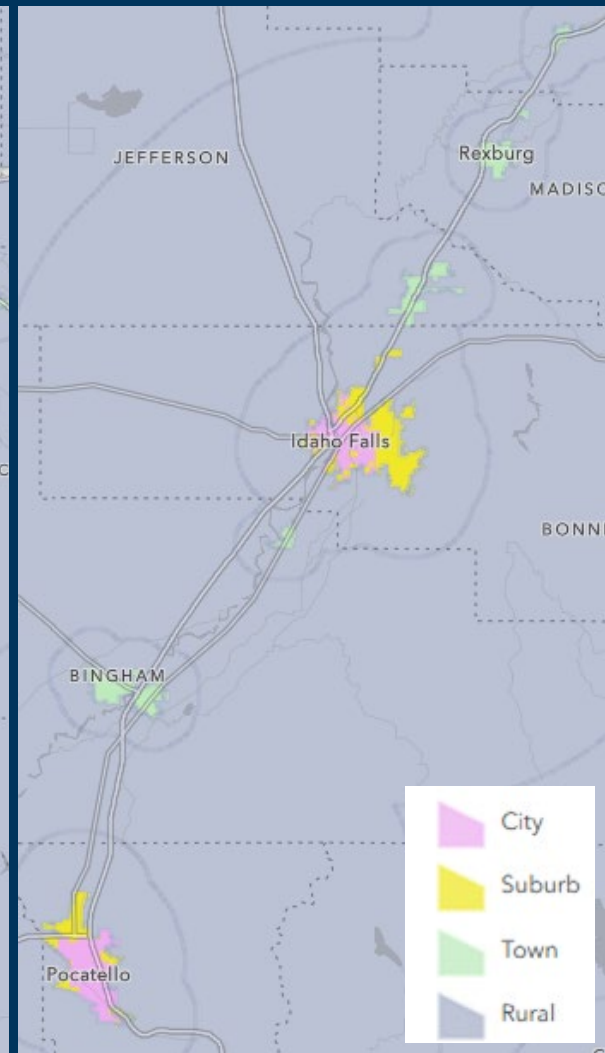
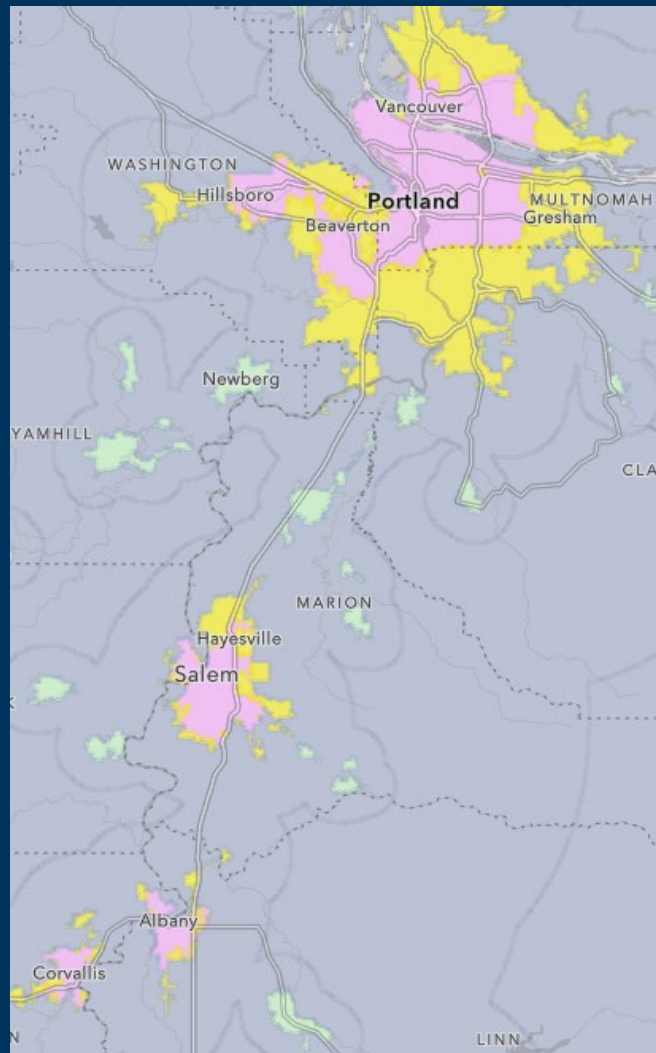
Non-technical description

City = core of the city

Suburb = rest of the city

Town = small town
(not associated with a city)

Rural = everything else





Remote Town and Remote Rural

- Each locale type has 3 subtypes:
 - City and Suburb types differentiated by size (small, midsize, large)
 - Town and Rural types differentiated by proximity to urban area (fringe, distant, remote)
- Given the factors that could impact market transformation, some of the data sets were investigated separately for Remote Towns and Remote Rural
- It is important to note that Rural includes Remote Rural areas; they have not been removed. Town also include Remote Town areas.

Regional Data

Locale and
State data





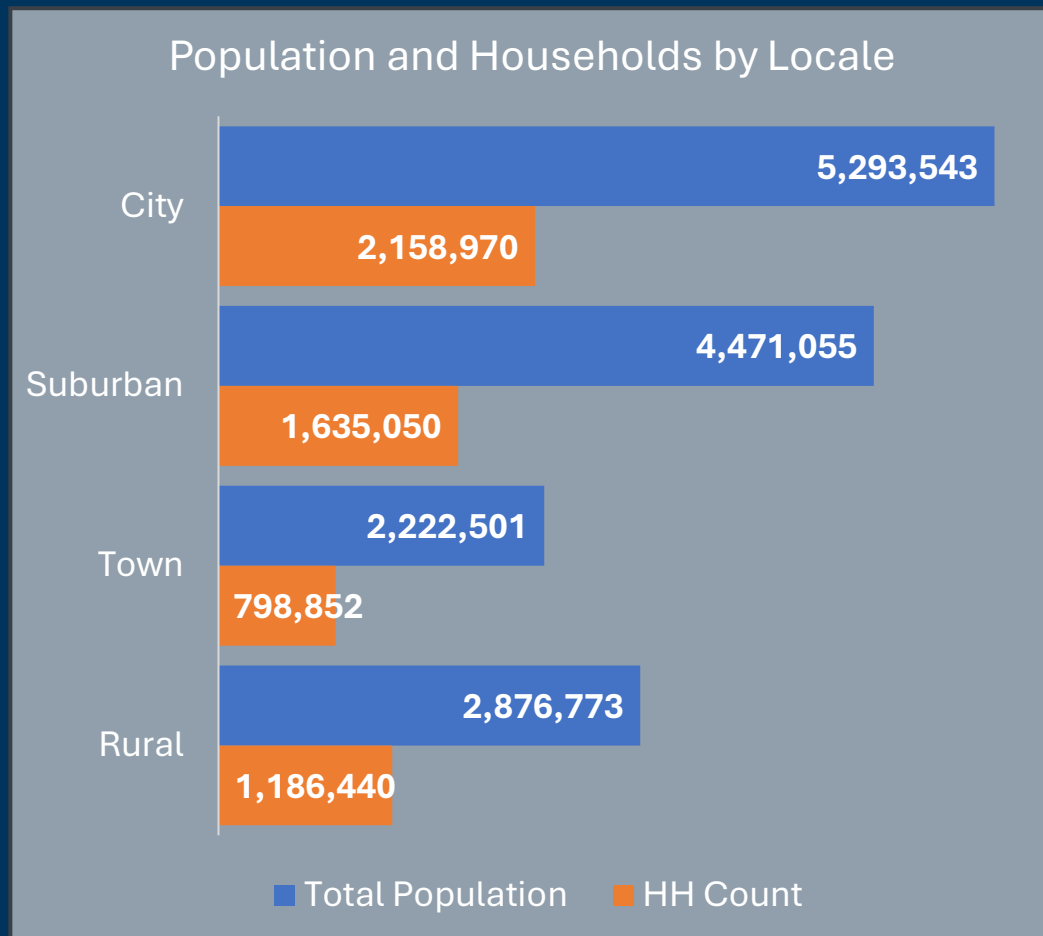
Locale Data

- Population (Pop) by locale
- Households (HH) by locale
- Area by locale
- Population density by locale
- Growth rate by locale
- Crime index

Total population and number of households

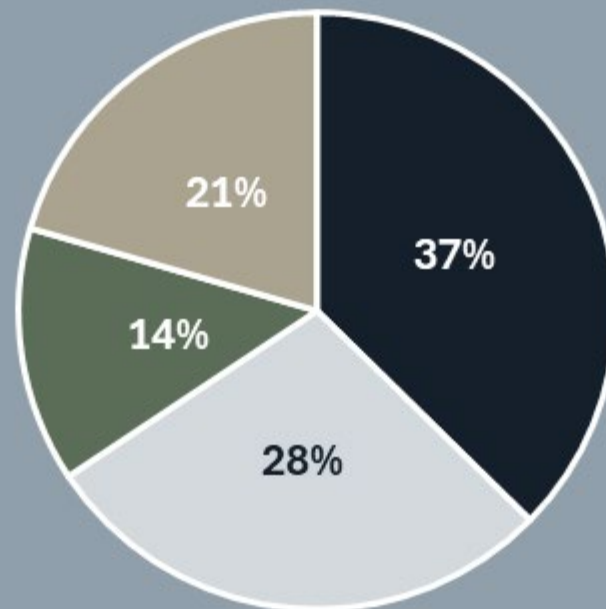
City has the highest population and highest households compared to other locales.

Town has significantly lower population and fewer households than other locales.



Percent of households by locale

Percent of HH in each Locale



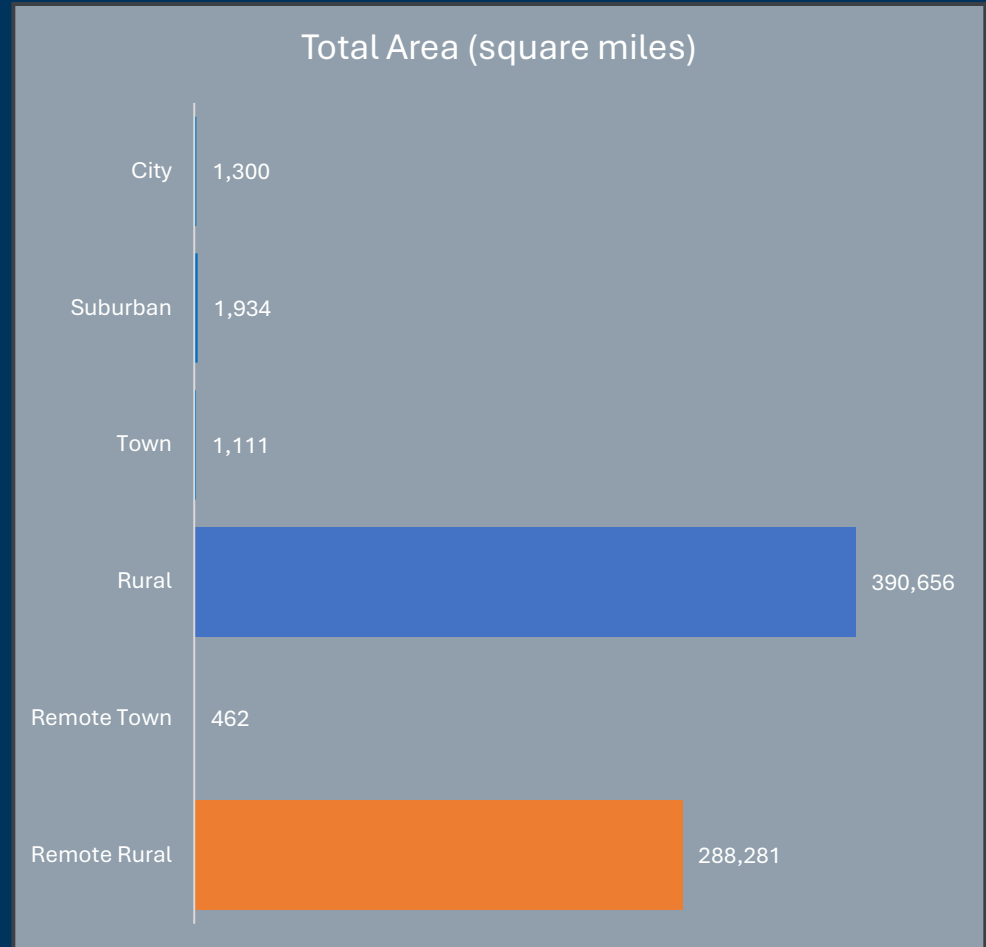
■ City ■ Suburb ■ Town ■ Rural

Total area

Total area of each locale
in square miles

Rural dwarfs all other locales in total area.

Remote rural is a significant portion of all rural in total area.

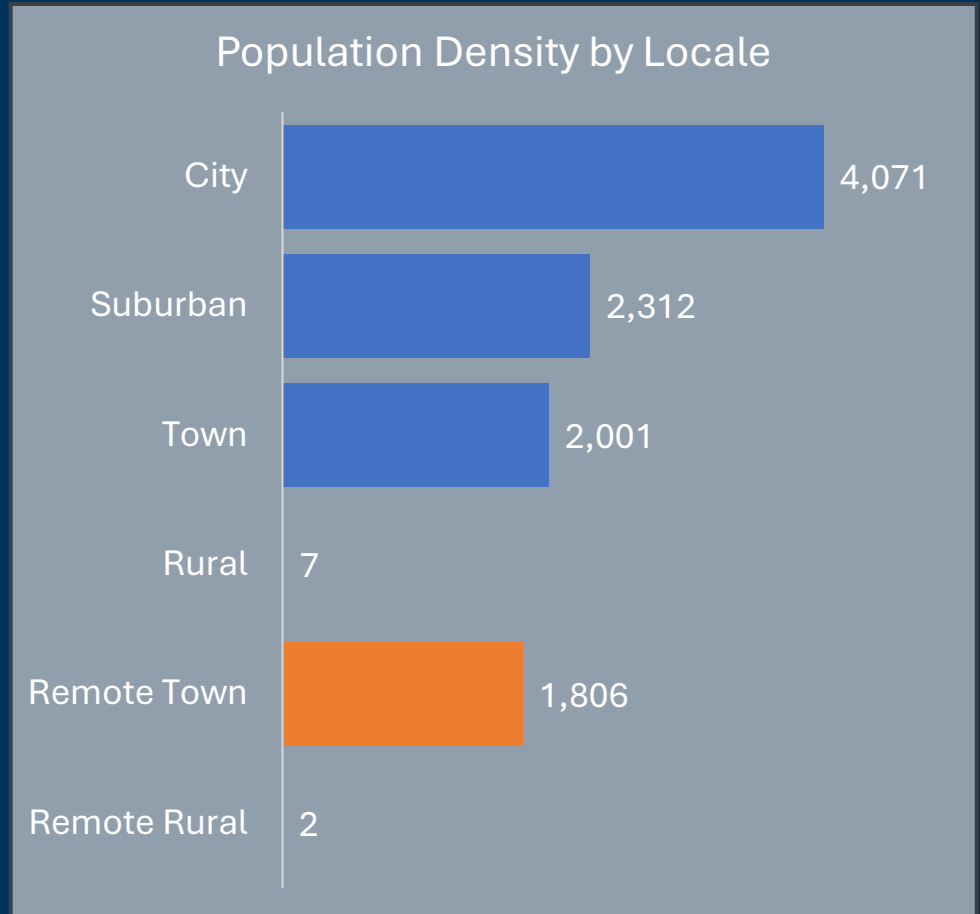


Population density

Total population per square mile for each locale

City population density is much higher than other locales.

Rural population density is tiny compared to other locales.

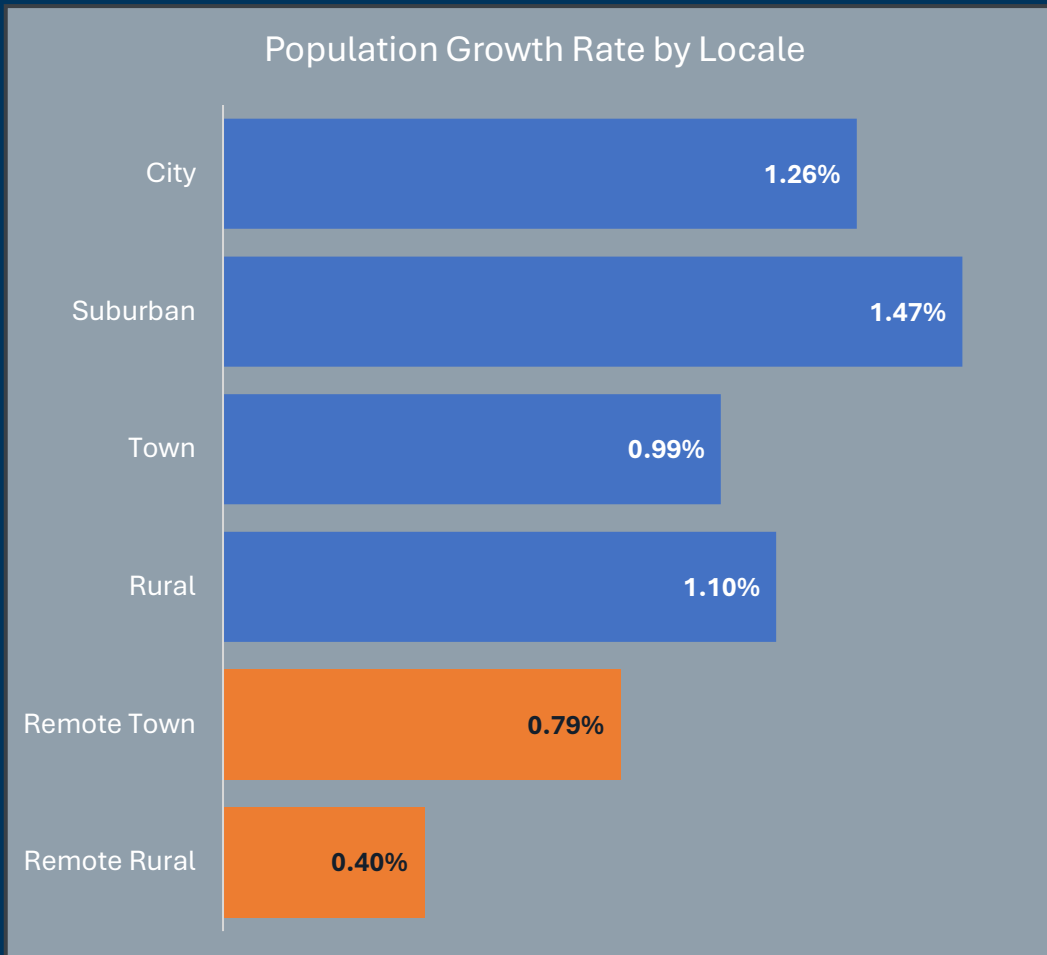


2010-2020 population growth rate

Population growth rate
by locale between 2010
and 2020 by locale

Suburb population had the
highest growth rate.

Remote populations had the
lowest growth rates.



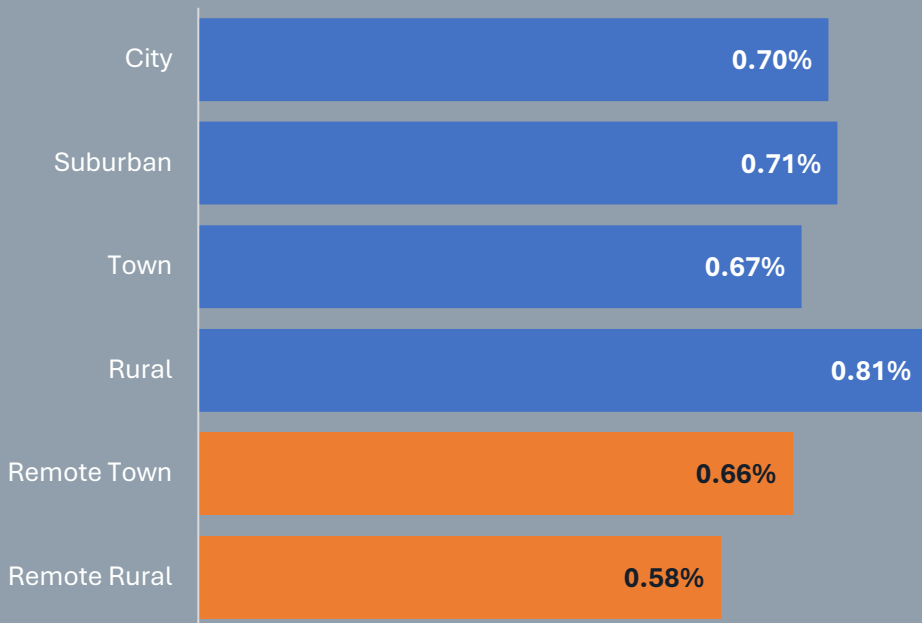
Projected population growth rate

Projected population growth rate by locale between 2024 and 2029

Rural population has the highest projected growth rate.

Remote Rural populations has the lowest projected growth rates.

Projected 5 Year Growth Rate for Total Population



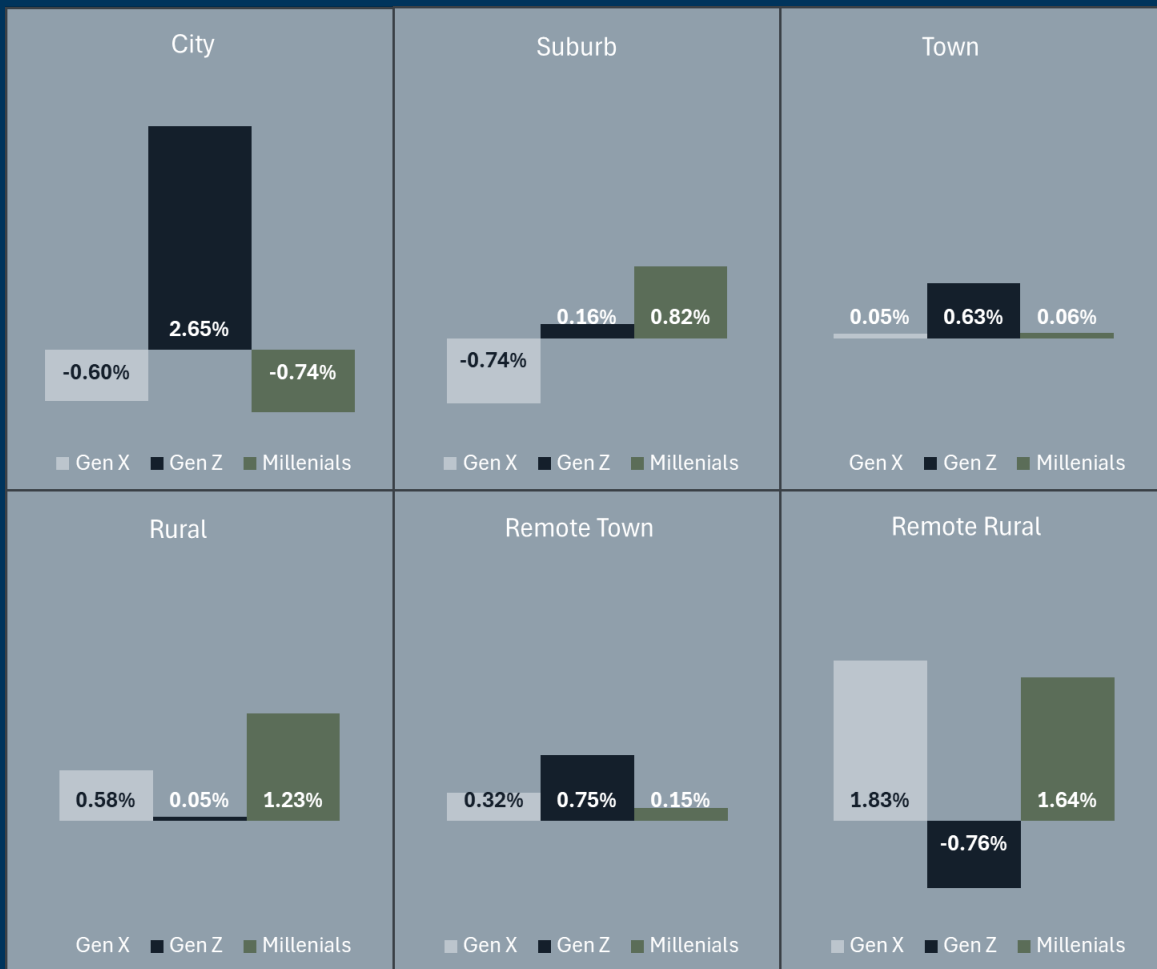
Projected population growth rate by generation

Projected population growth rate by locale between 2024 and 2029

Gen X populations are projected to decrease in **City** and **Suburb** and increase in **Rural** and **Remote Rural**.

Gen Z populations are projected to decrease in **Remote Rural** and increase in **City** and **Town** locales.

Millennial populations are projected to decrease in **City** and increase in **Suburb** and **Rural** locales.



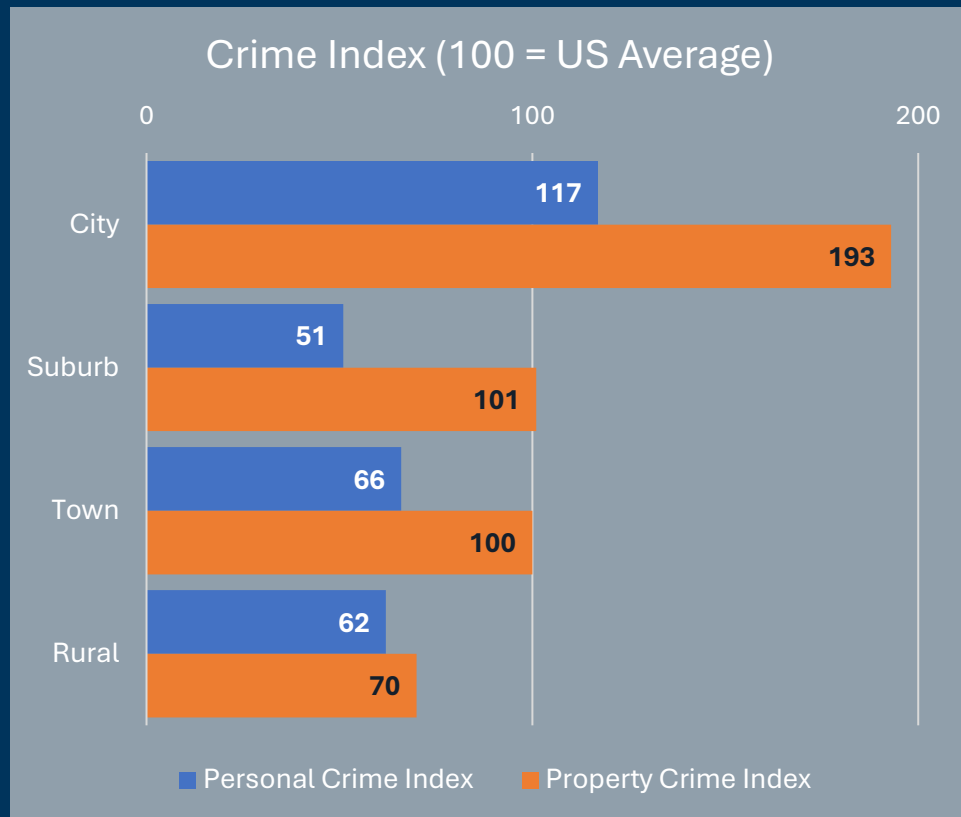
Crime index

Personal and property crime index compared to US average (100)

City locale has the highest crime index for both categories.

Suburb has the lowest personal crime index.

Rural has the lowest property crime index.





State data

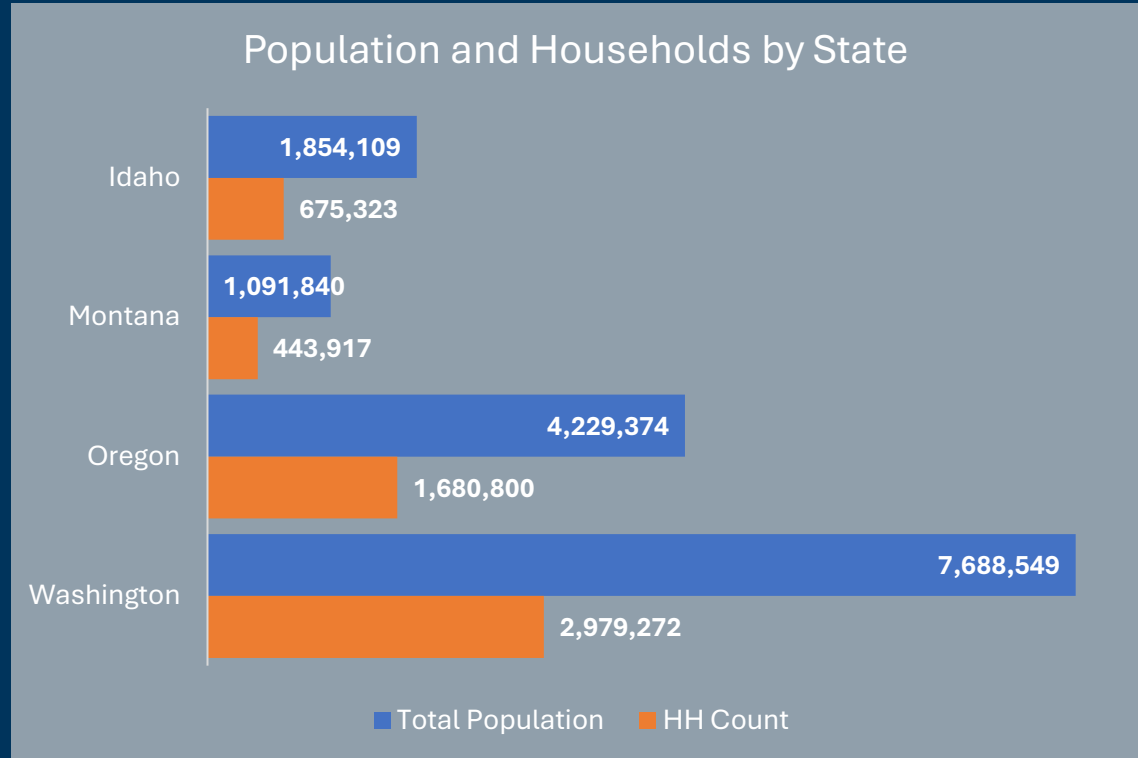
- Population (Pop) by state
- Households (HH) by state
- Area by state
- Population density by state
- Growth rate by state
- Crime index

Total population and number of households

By state

Washington has the highest
population (51% of total region).

Montana has the smallest
population (7% of total region).



Total area

Total area of each state
in square miles

Montana, which has the lowest
population, is the largest state.

Washington, which has the
highest population, is the
smallest state.

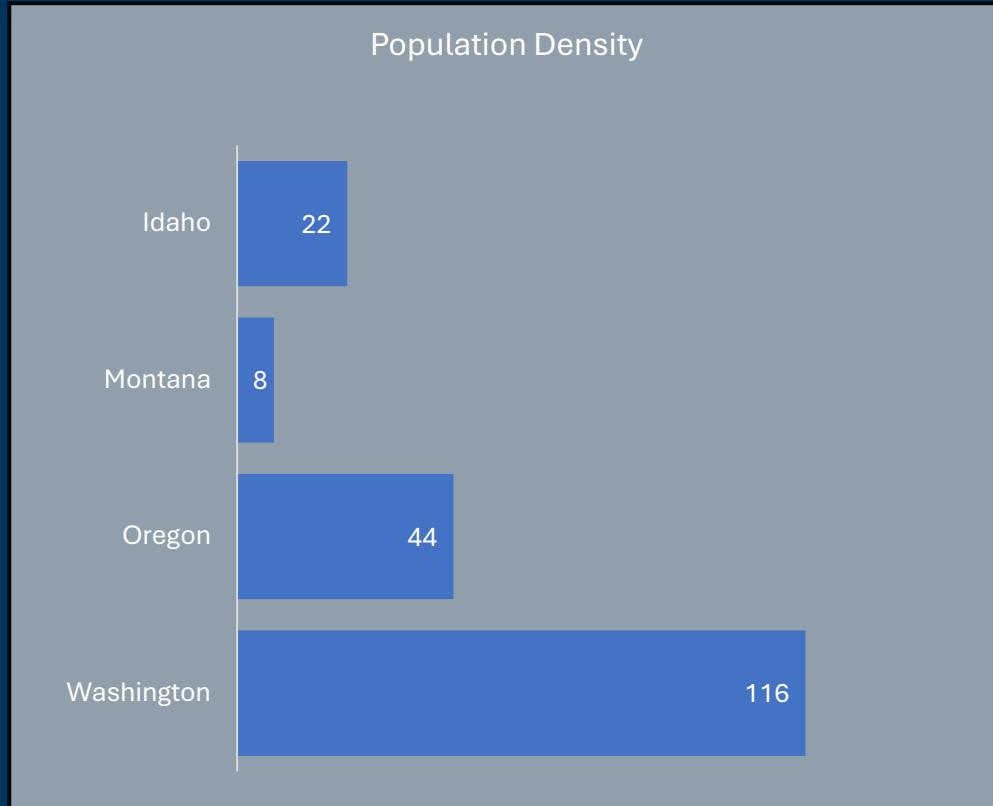


Population density

Total population per square mile for each state

Montana has the lowest population density.

Washington has the highest population density.

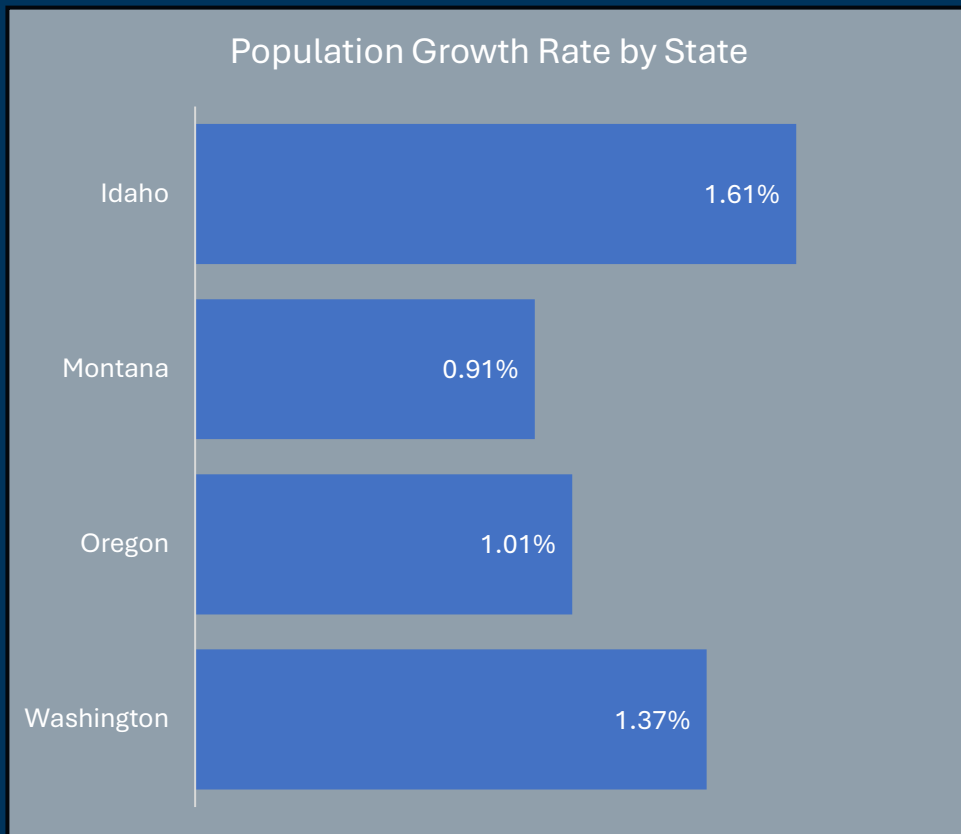


2010-2020 population growth rate

Population growth rate
between 2010 and 2020
by state

Idaho had the highest growth
rate.

Montana had the lowest growth
rate.

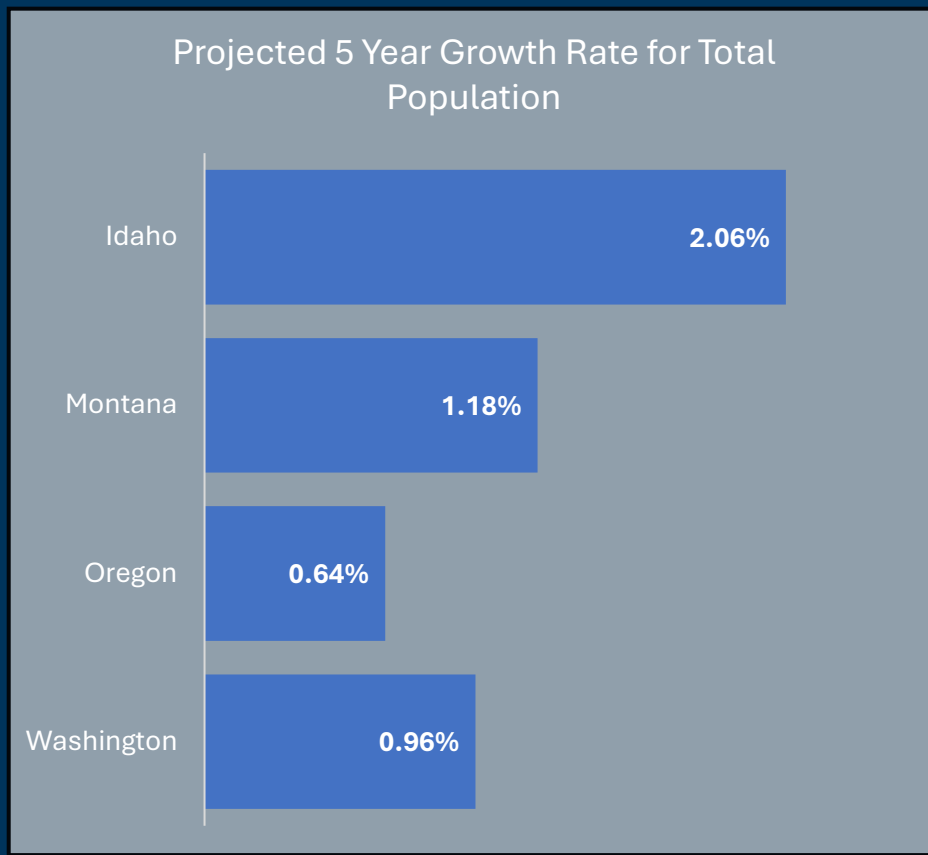


Projected population growth rate

Projected population
growth rate by state
between 2024 and 2029

Idaho population has the
highest projected growth rate.

Oregon population has the
lowest projected growth rates.



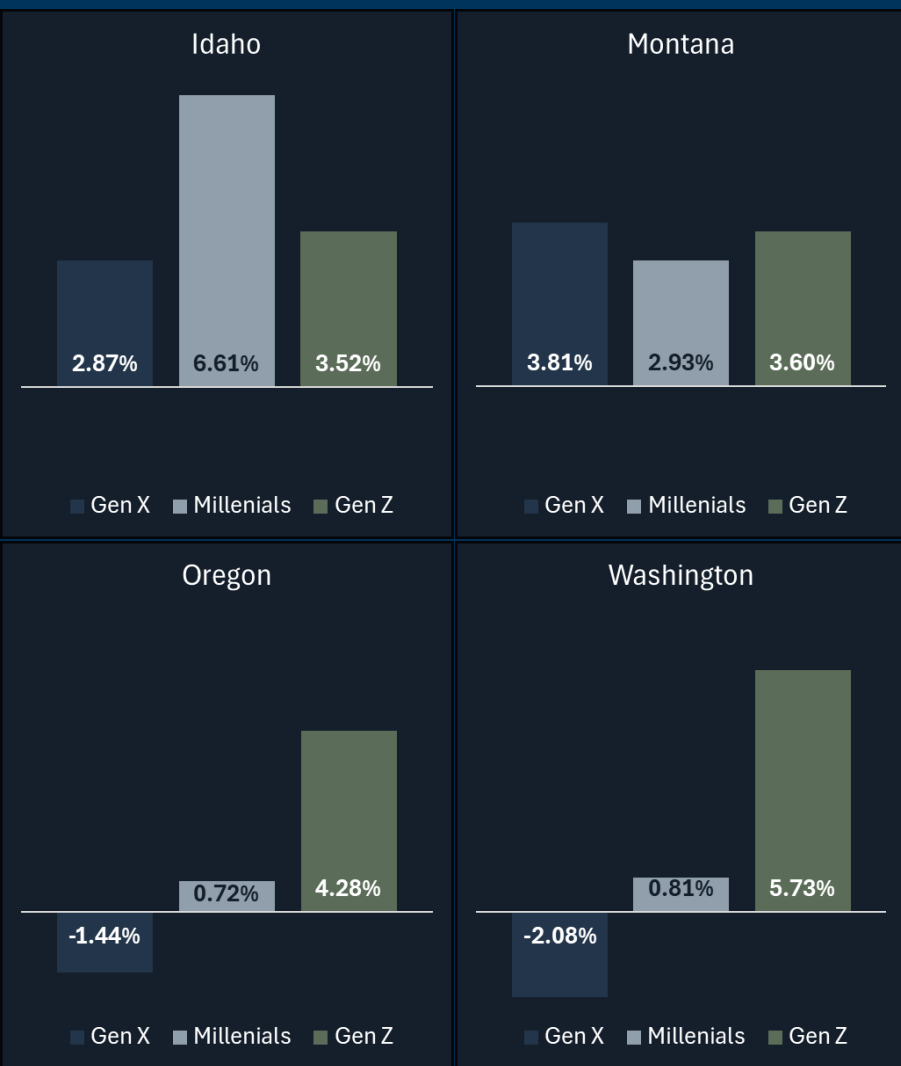
Projected population growth rate by generation

Projected population growth rate by state between 2024 and 2029

Gen X populations are projected to decrease in **Oregon** and **Washington** and increase in **Idaho** and **Montana**.

Gen Z populations are projected to increase in all states, but significantly more so in **Idaho**.

Millennial populations are projected to increase in all states.



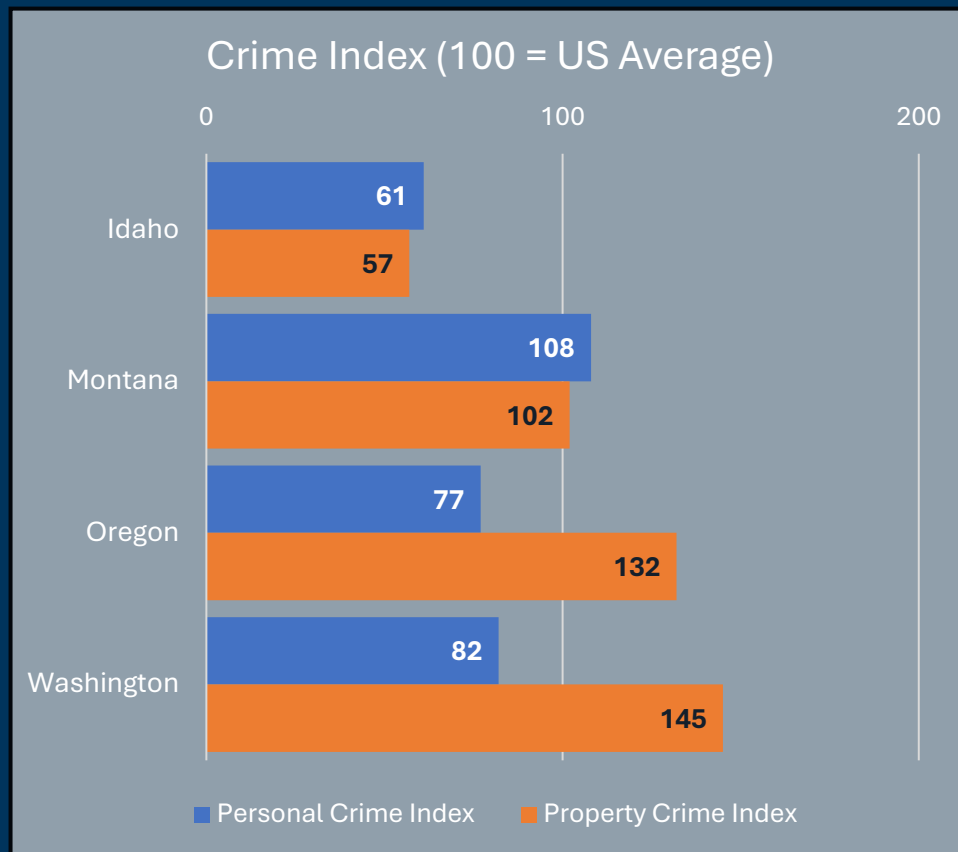
Crime index

Personal and property crime index compared to US average (100)

Washington has the highest property crime index.

Montana has the highest personal crime index.

Idaho has the lowest crime index for both categories.



Housing Stock





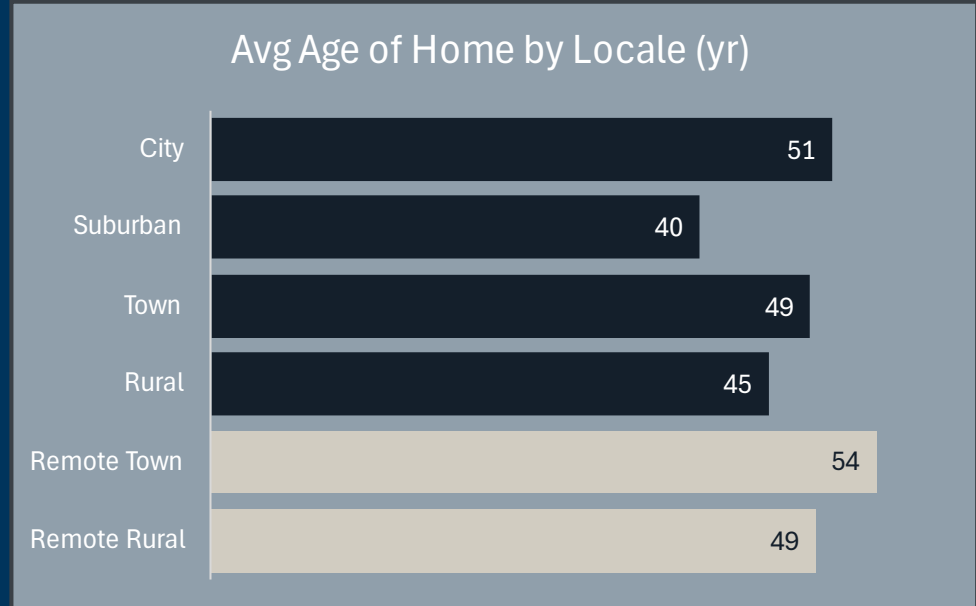
Housing Stock: By Locale

- Age of housing
- Type of housing
- Primary heating fuel
- Occupancy
- Technology at home

Age of Homes

Suburb has the lowest average age of homes compared to other locales.

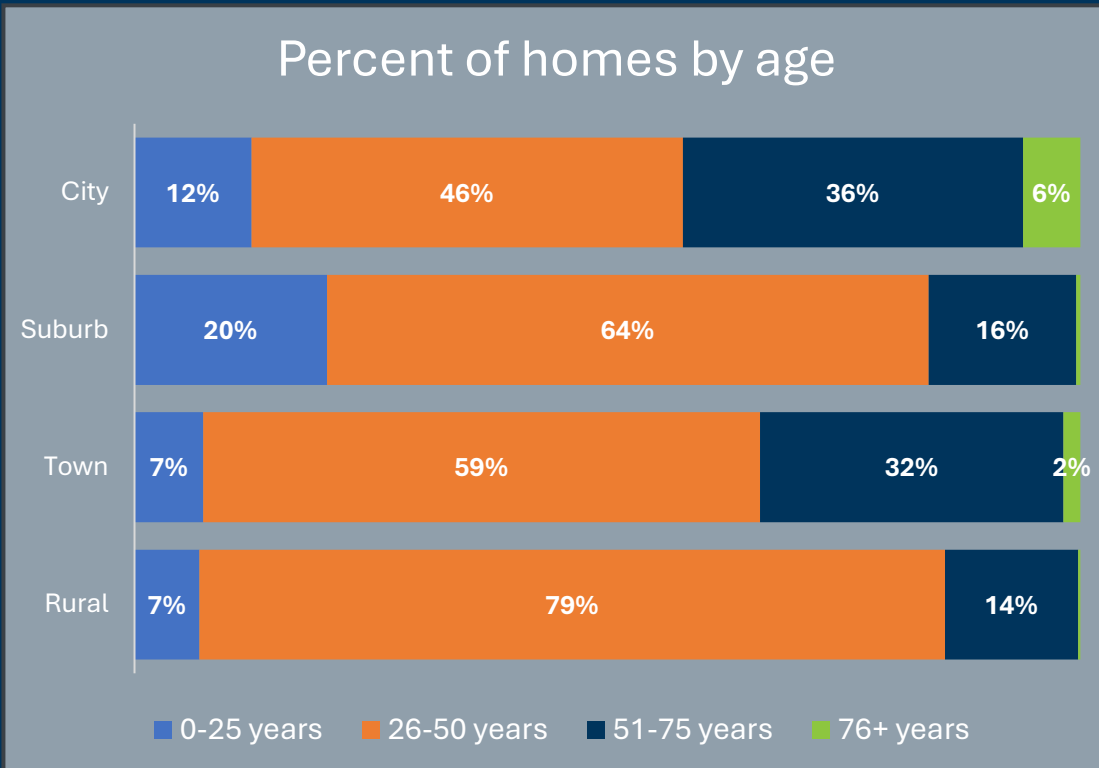
Remote towns have the highest average age of homes compared to other locales.



Percent of homes by age

Suburb has the highest percent of homes 25 years old or newer.
City has the second highest.

City has the highest percent of homes that are 51-75 years old and more than 76 years old.
Town has the second highest.



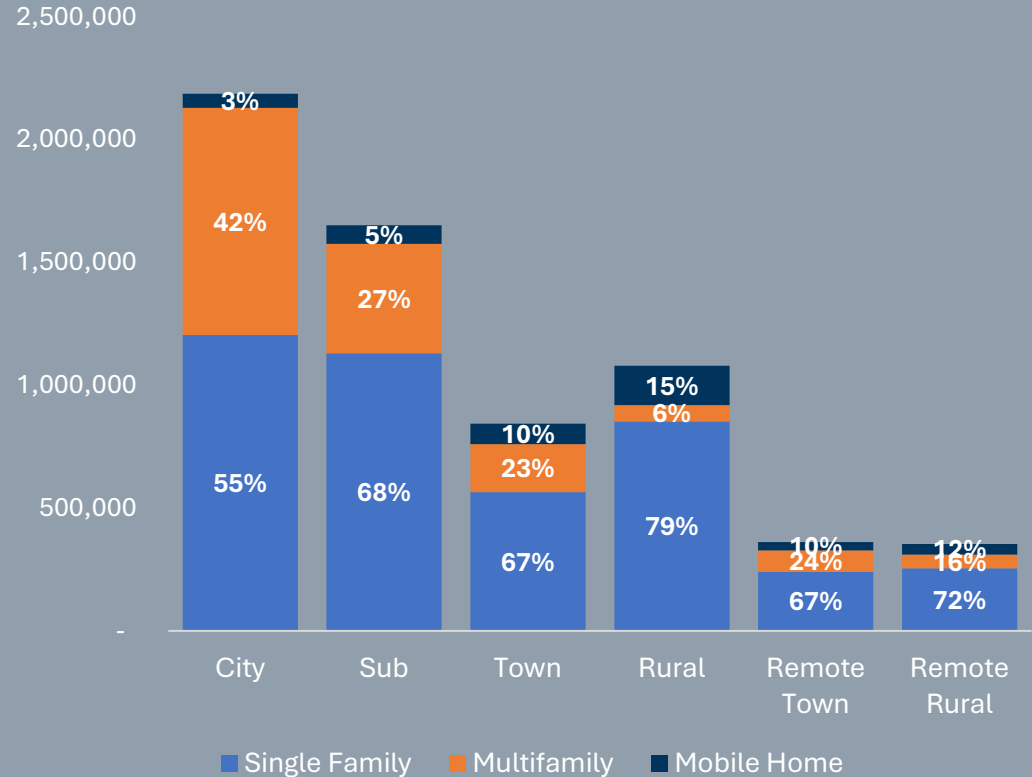
Type of Housing

Single family, multifamily
and mobile homes by locale

City has the highest number
and percent of multifamily
households.

Rural has the highest number
and percent of mobile homes.

Households by Bldg Type by Locale

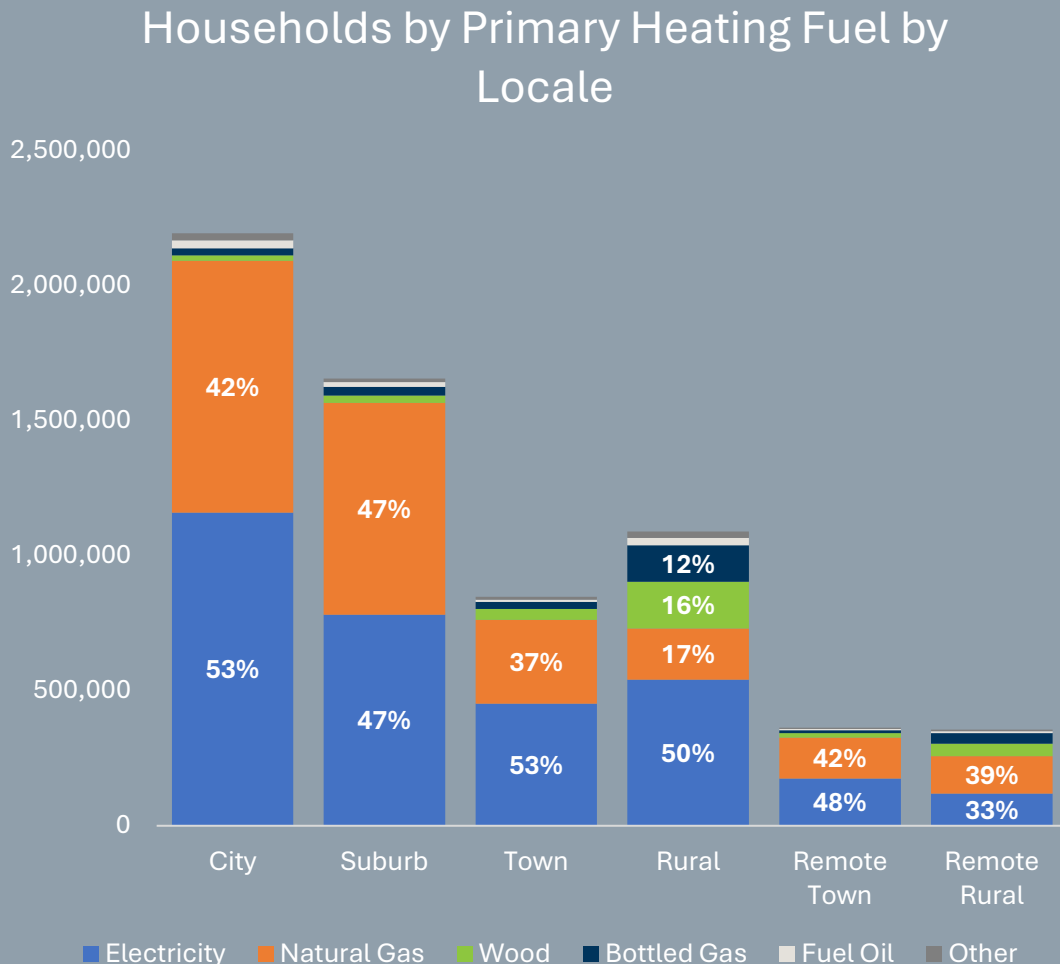


Primary Heating Fuel

Percent of households by primary heating fuel by locale

Rural has the highest percent of households heated by wood, bottled gas (e.g., propane) and fuel oil.

Rural has the lowest percent of households heated by natural gas.

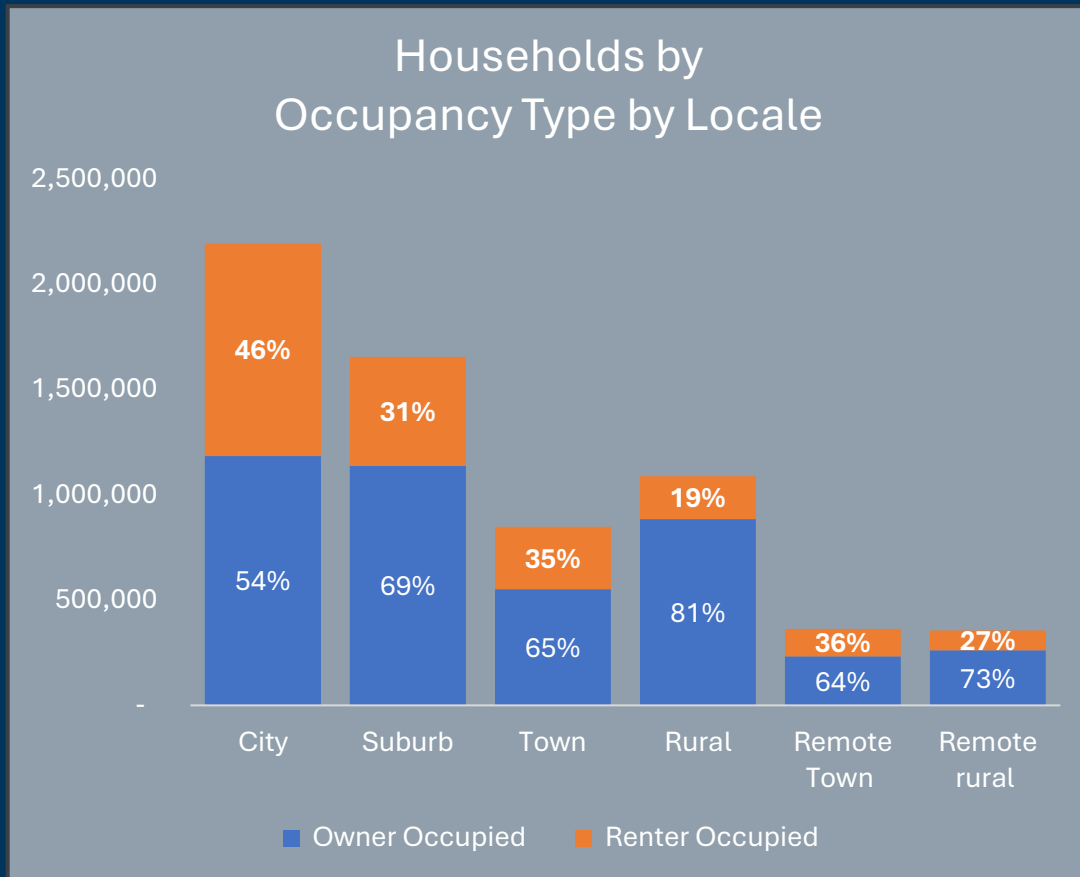


Occupancy

Owner occupied vs renter occupied by locale

City has the highest percent of renter-occupied households.

Rural has the lowest percent of renter-occupied households.

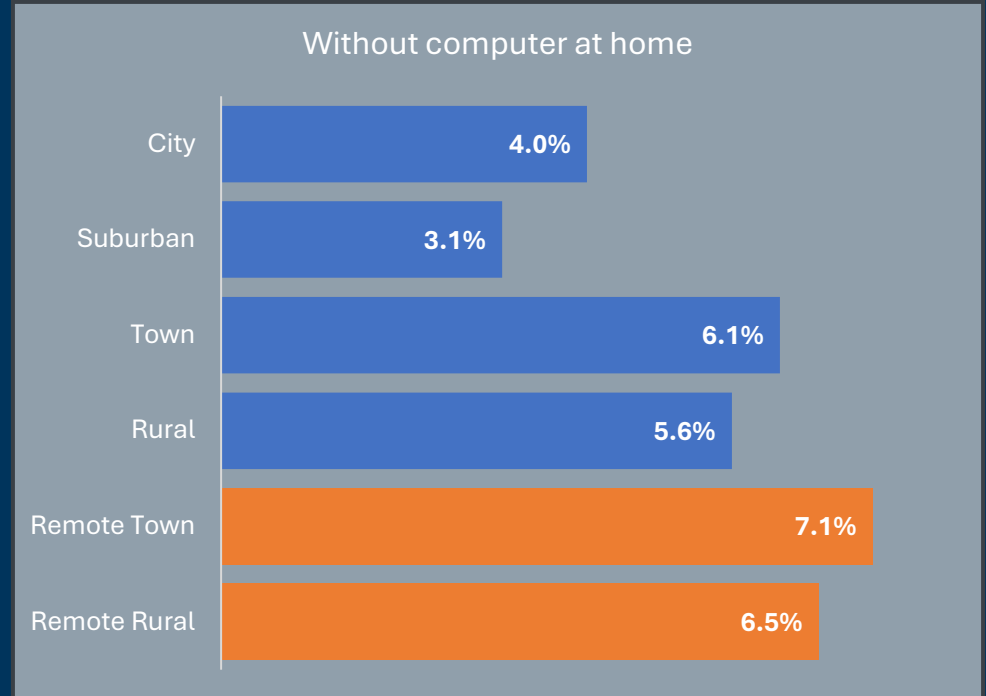


Computers at home

Percent of households that do not have a computer at home

Suburb has lowest percentage of households without a computer at home.

Remote Towns and Remote Rural have higher percentage without a computer than their non-remote locales.



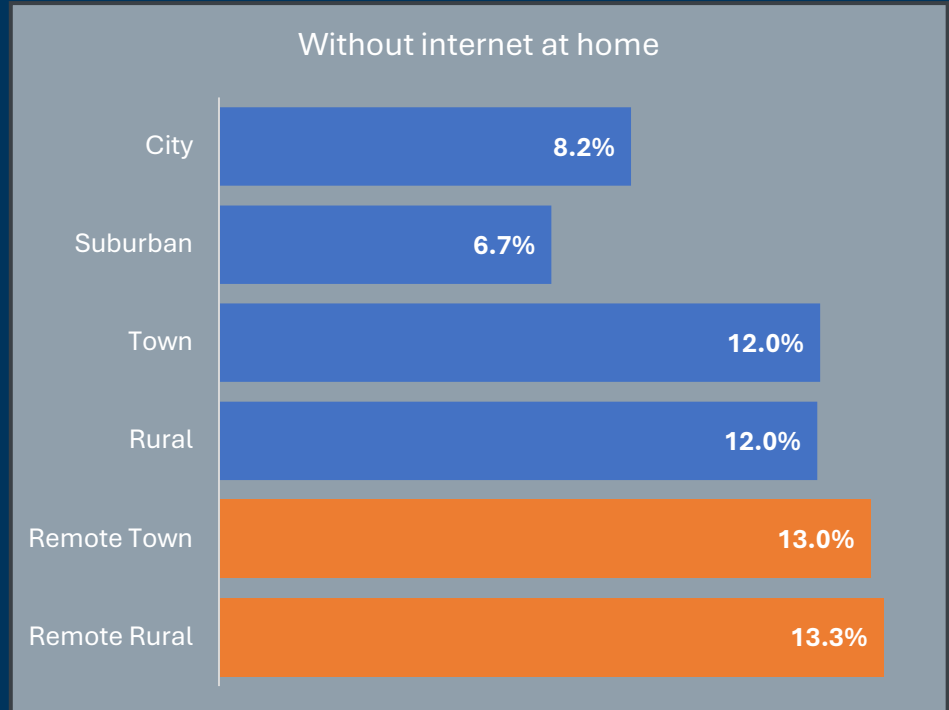
Internet at home

Percent of households that do not have an internet subscription at home

Suburb has lowest percentage of households without internet at home.

Remote Towns and Remote Rural have higher percentage without a computer than their non-remote locales.

All locales have about twice as many households without internet at home as without computers at home.





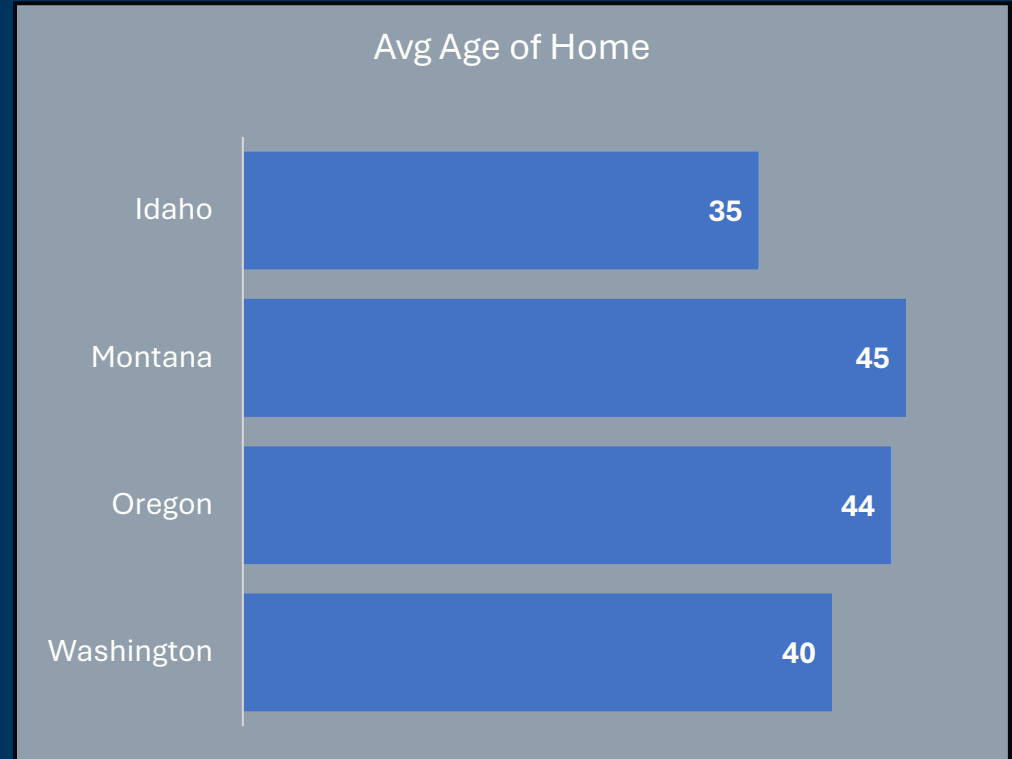
Housing Stock: By State

- Age of housing
- Type of housing
- Primary heating fuel
- Occupancy
- Technology at home

Age of Homes

Idaho has the lowest average age of homes compared to other states.

Montana and **Oregon** have the highest average age of homes.

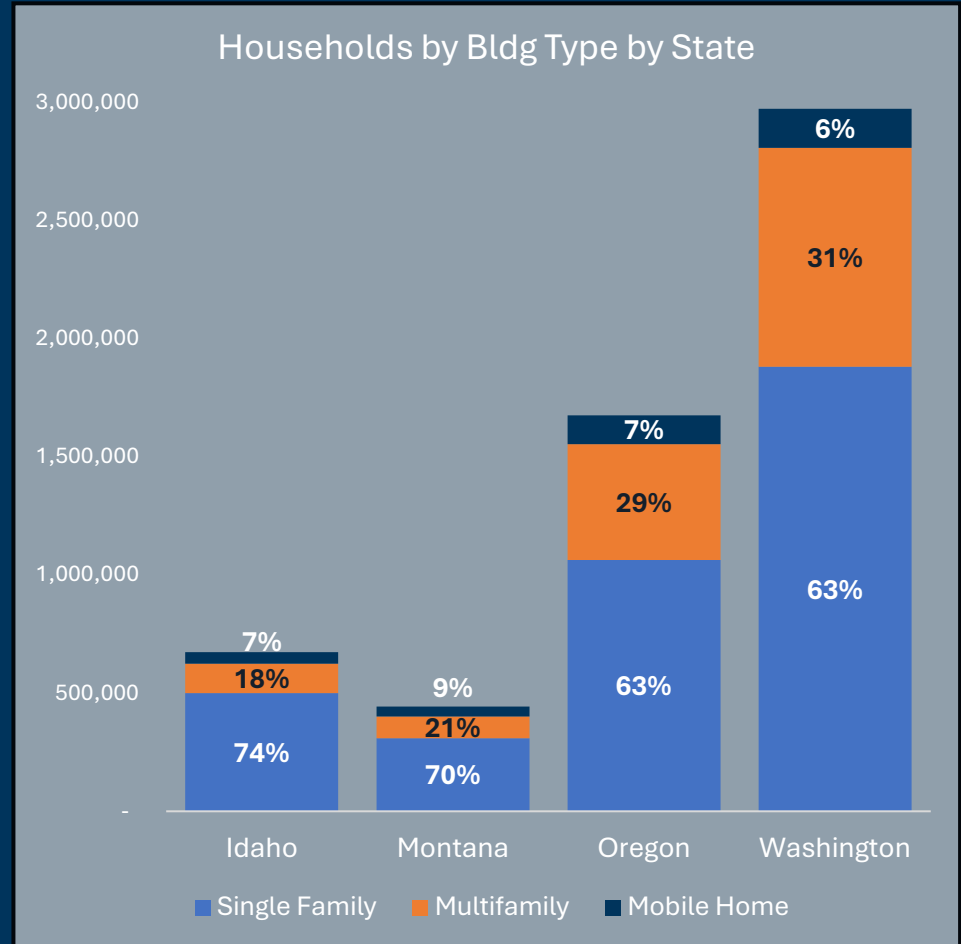


Type of Housing

Single family, multifamily
and mobile homes by state

Washington and **Oregon** have the highest number and percent of multifamily households.

Montana has a slightly higher percent of mobile homes than the other states.



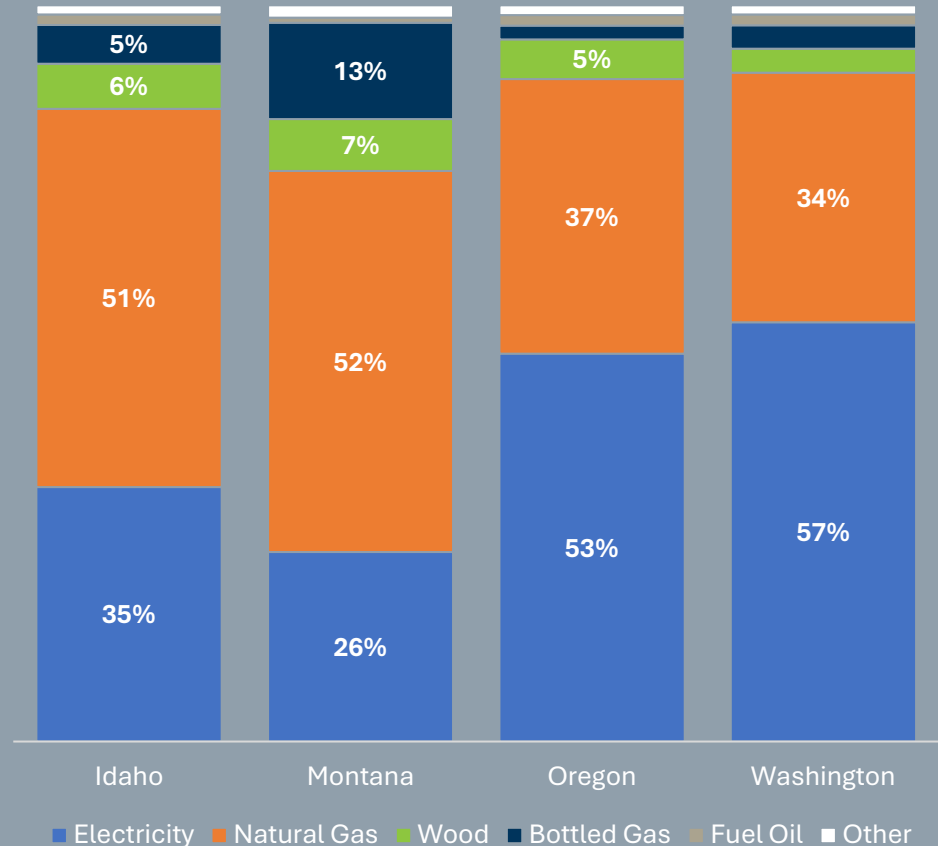
Primary heating fuel

Percent of household by primary heating fuel by state

Montana has a largest percent of households heating with bottled gas, followed by **Idaho**.

Montana has lowest percent of households heating with electricity.

Primary Heating Fuel by State

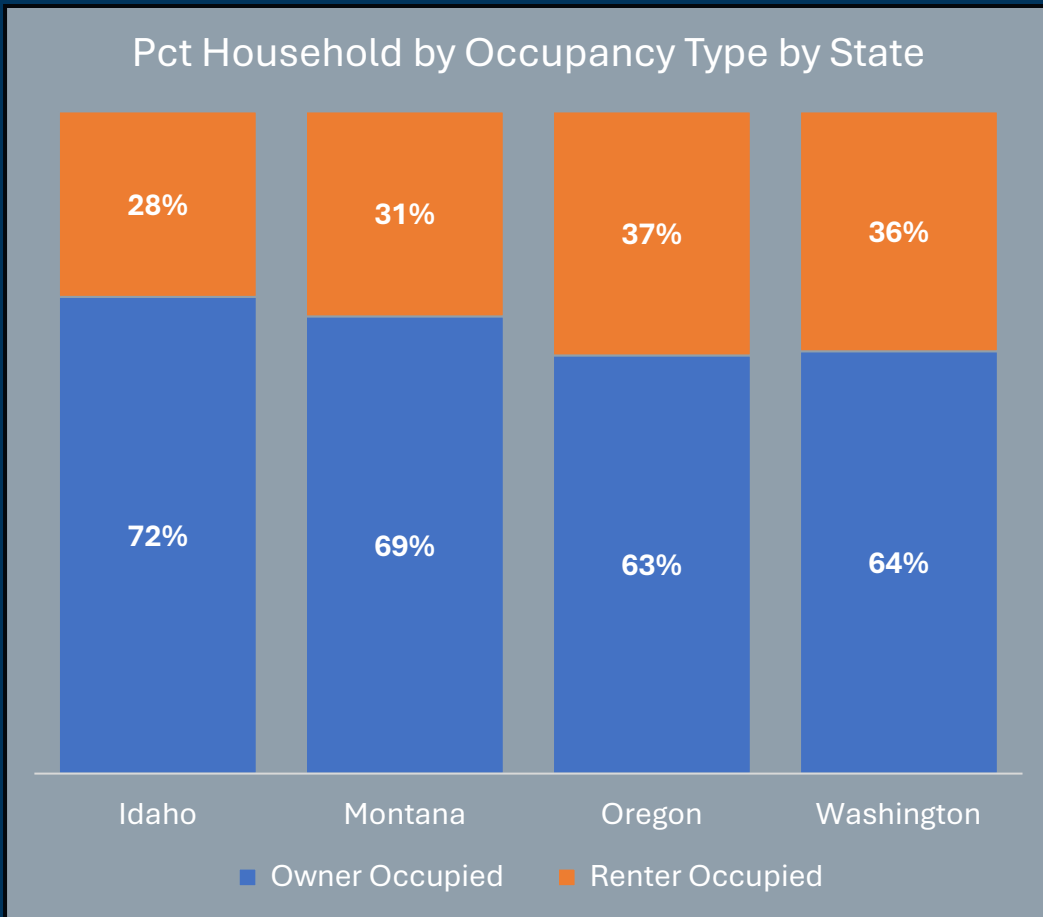


Occupancy

Owner occupied vs renter occupied by state

Washington and **Oregon** have the highest percents of renter-occupied households.

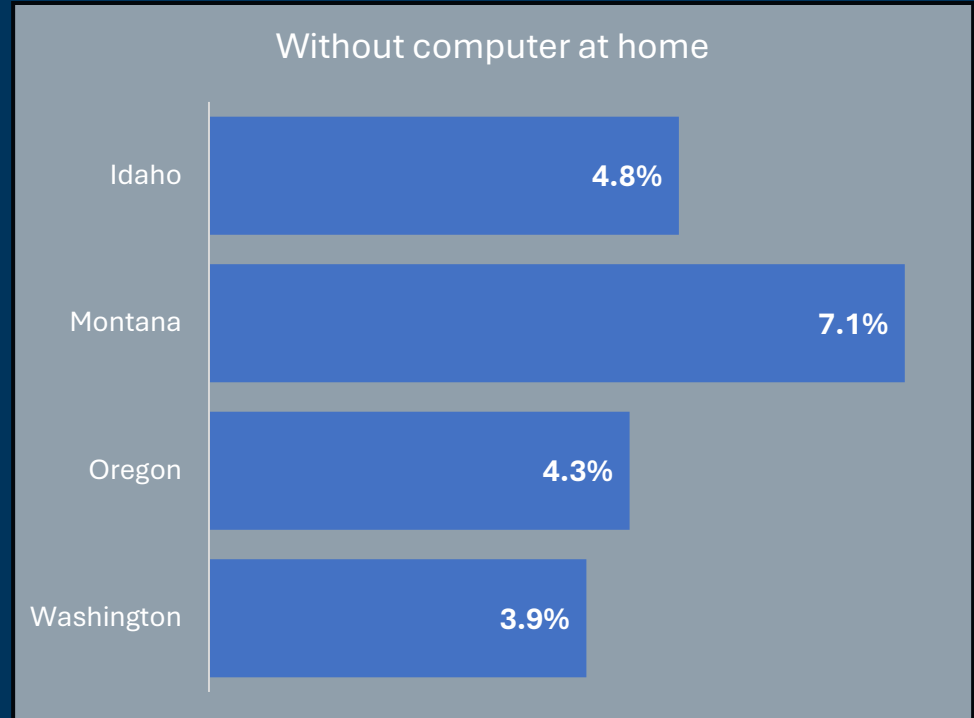
Idaho has the lowest percent of renter-owned households.



Computers at home

Percent of households that do not have a computer at home by state

Montana has the highest percentage of households without a computer.

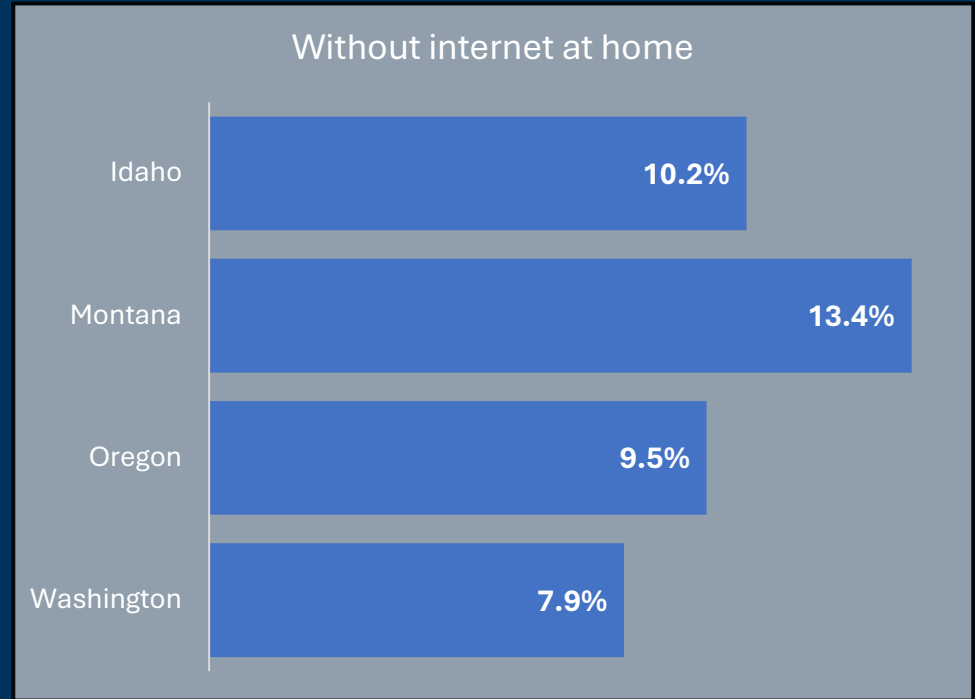


Internet at home

Percent of households that do not have an internet subscription at home by state

Montana has the highest percentage of households without a computer.

All states have about twice as many households without internet at home as without computers at home.



Purchasing Behaviors





Purchasing Behaviors: By Locale

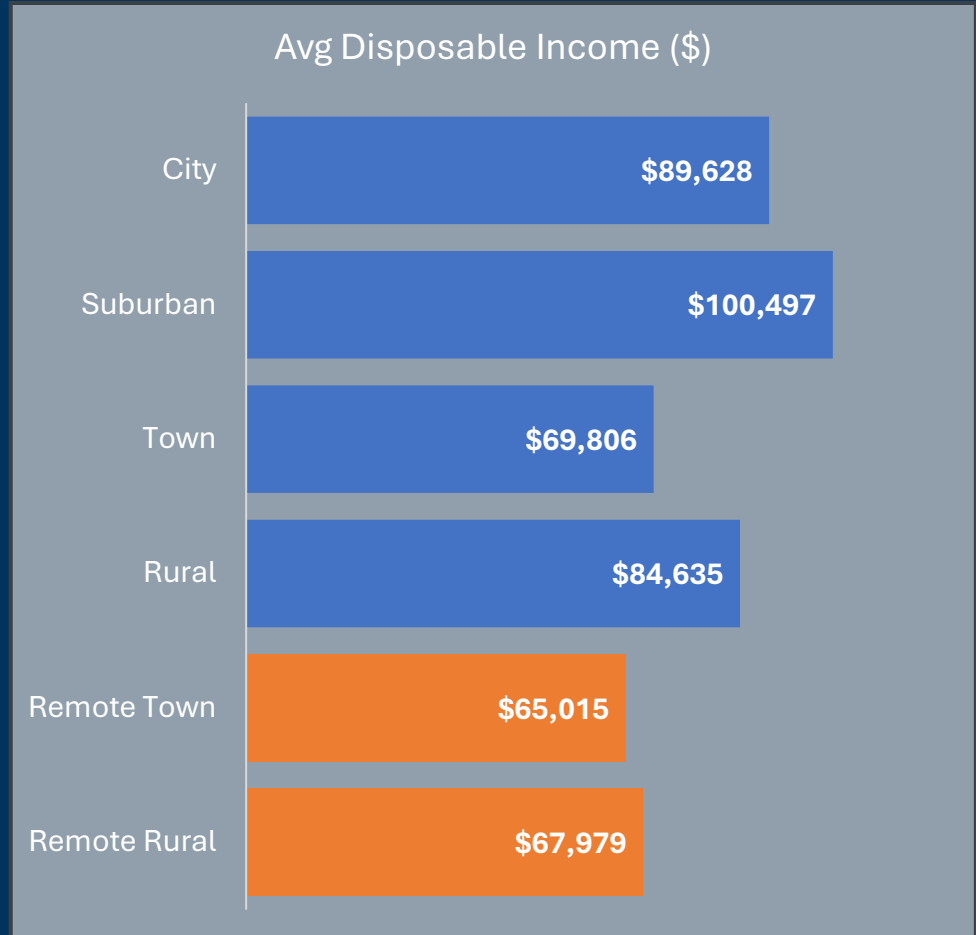
- Disposable income
- Household spend on retail goods / various services
- Home improvement model (DIY or hire a contractor)
- Where people shop (online and IRL)
- Credit card debt
- Rather save than borrow for purchase
- Careful with my money
- Will pay more for a product from trusted company
- Environmental inclination

Disposable income

Annual household income after taxes (per ESRI Business Analyst definition)

Suburb has higher disposable income than other locales.

Towns, Remote Towns and Remote Rural has significant lower disposable income.



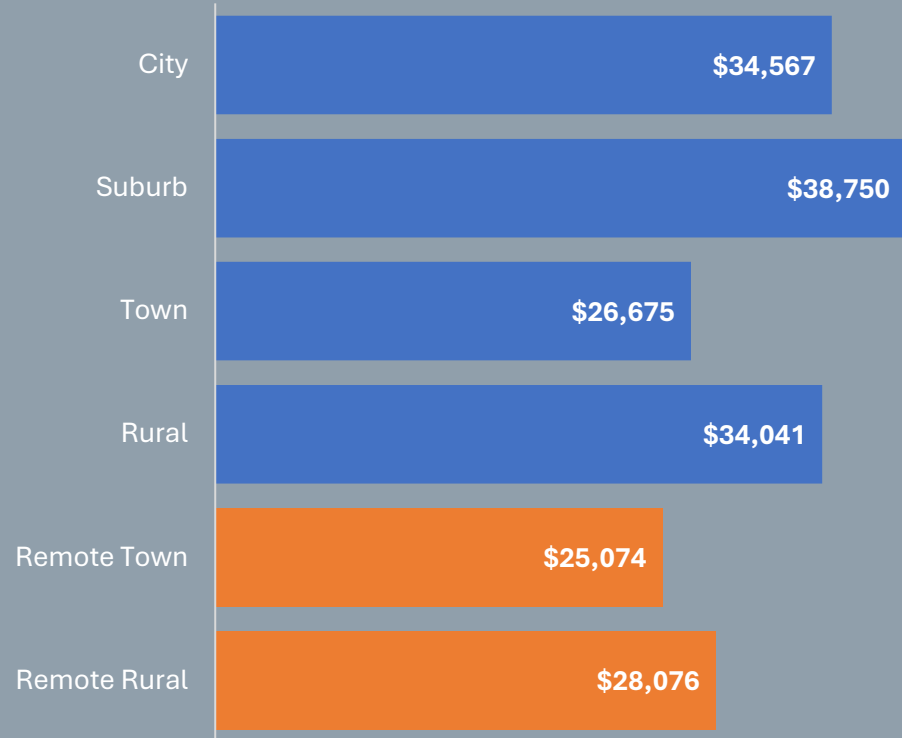
Spend on retail goods

Average annual household spend on retail goods in 2024 by locale

Suburb had the highest spend compared to other locales.

Towns, Remote Towns and Remote Rural has lower spends than other locales.

2024 Avg Household Amount Spent on Retail Goods by Locale



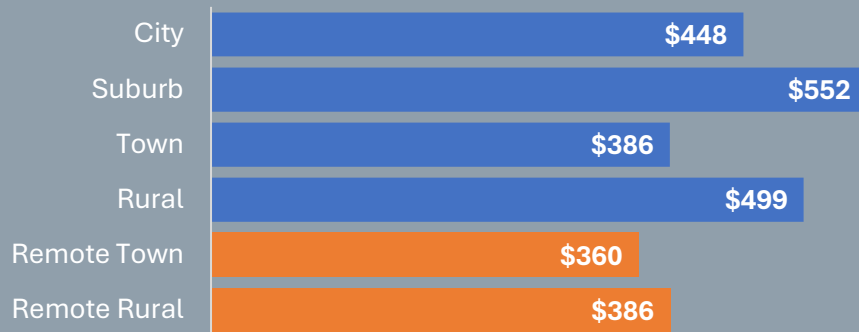
Spend on HVAC and plumbing work

Average annual household spend on HVAC work and plumbing / water heating labor in 2024 by locale

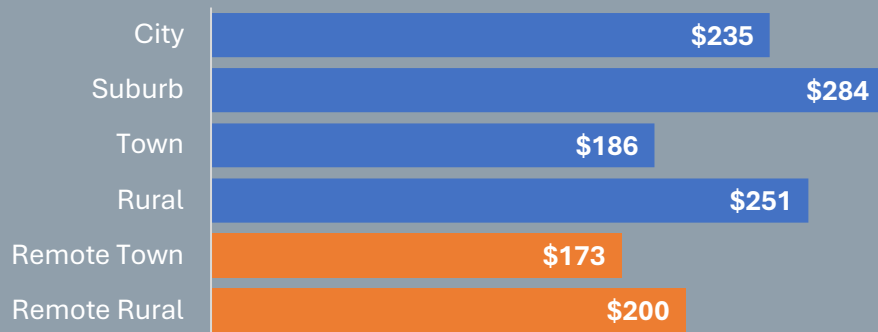
Suburb had the highest spend compared to other locales.

Towns, Remote Towns and Remote Rural has lower spends than other locales.

2024 Avg Household Amount Spent on HVAC Work by Locale



2024 Avg Household Amount Spent on Plumbing/Water Heating Labor by Locale



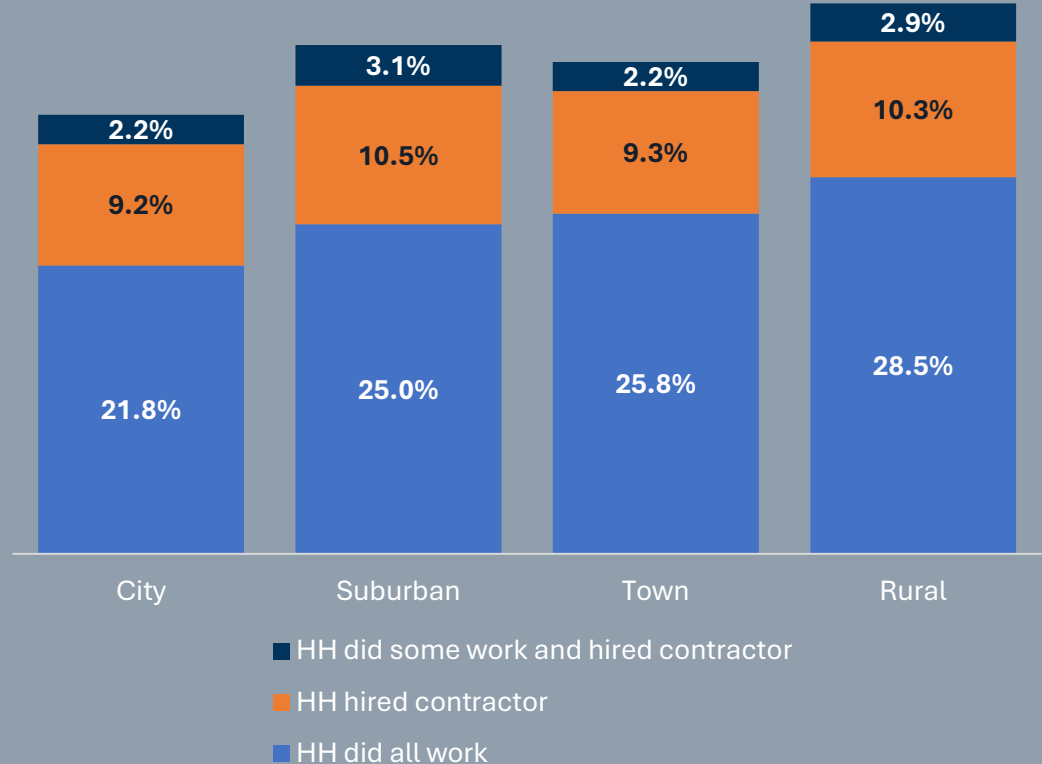
Home improvement model

Of households that had a home improvement project in 2024, how the work was performed by locale

In **all locales**, more households performed the work on their own.

Suburban and **Rural** locales had slightly higher rates of hiring a contractor than other locales.

Home Improvement Model (DIY or Contractor Hired or both) in Last 12 Months

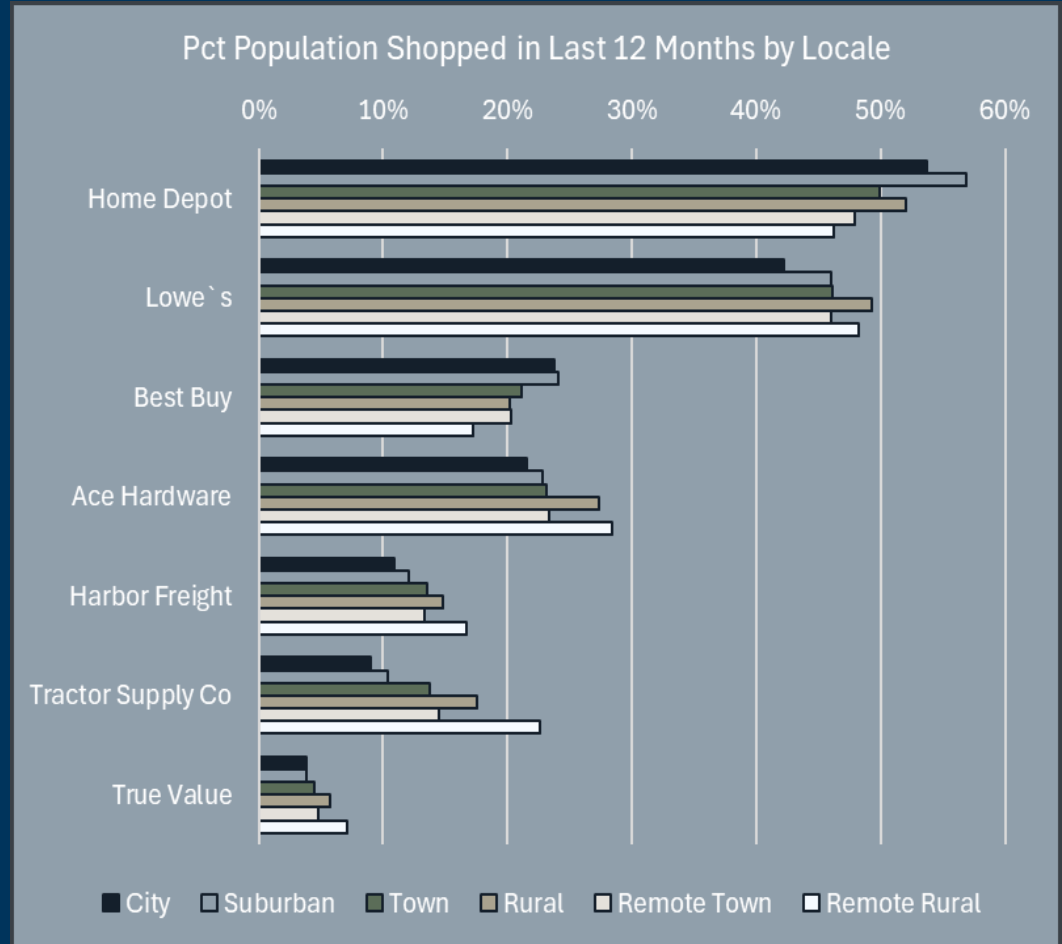


Where people shop

Hardware and Appliances

City and Suburb more likely to shop at Home Depot and Best Buy than other locales.

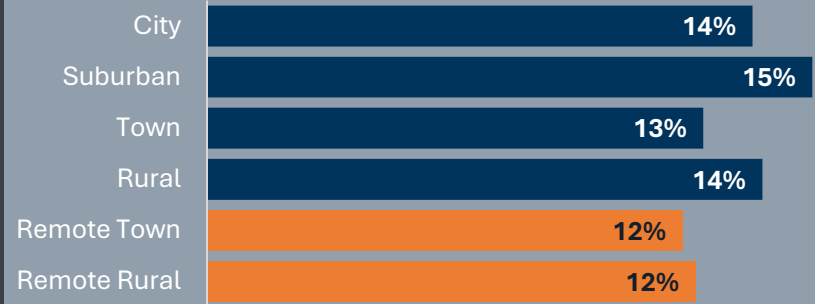
Rural and Remote Rural more likely to shop at Lowe's, Ace Hardware, Harbor Freight, Tractor Supply and True Value than other locales.



Where people shop

Online at Home Depot and Lowe's

Pct Population Purchased Online from Home Depot, Last 6 Months, by Locale

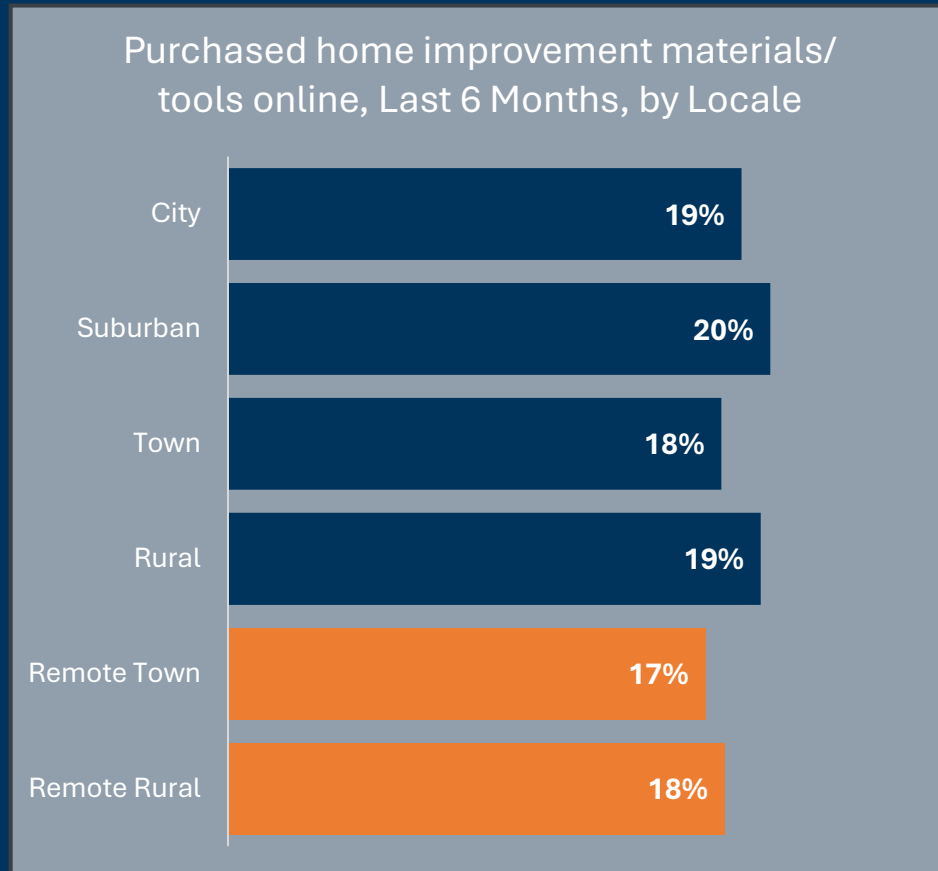


Pct Population Purchased Online from Lowe's, Last 6 Months, by Locale



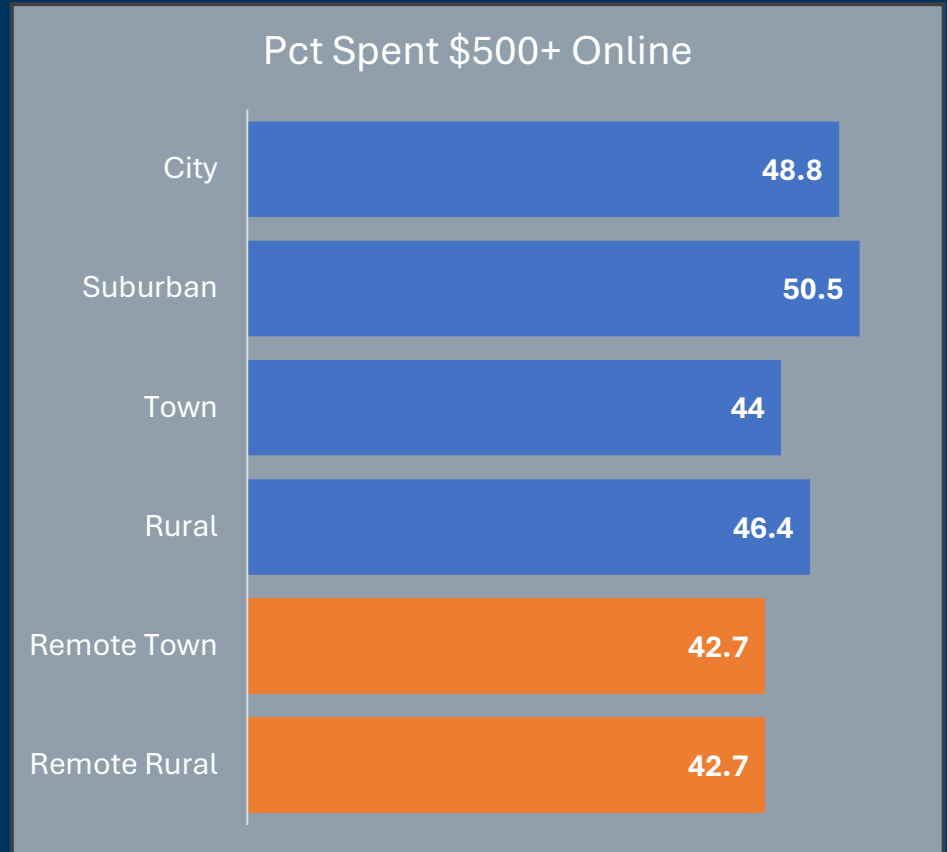
Where people shop

Percent of households who purchased home improvement materials or tools online in last 6 months



Online shopping

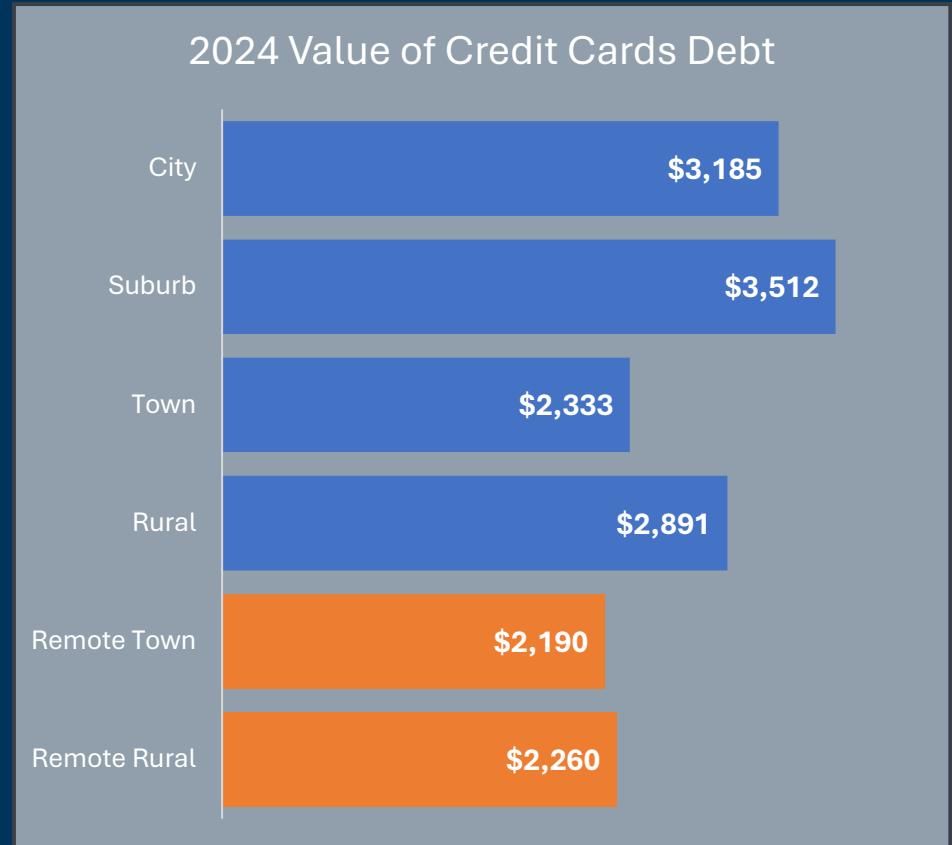
Percent of population who spent more than \$500 on online shopping in the past six months



Average credit card debt

Average credit card debt,
2024

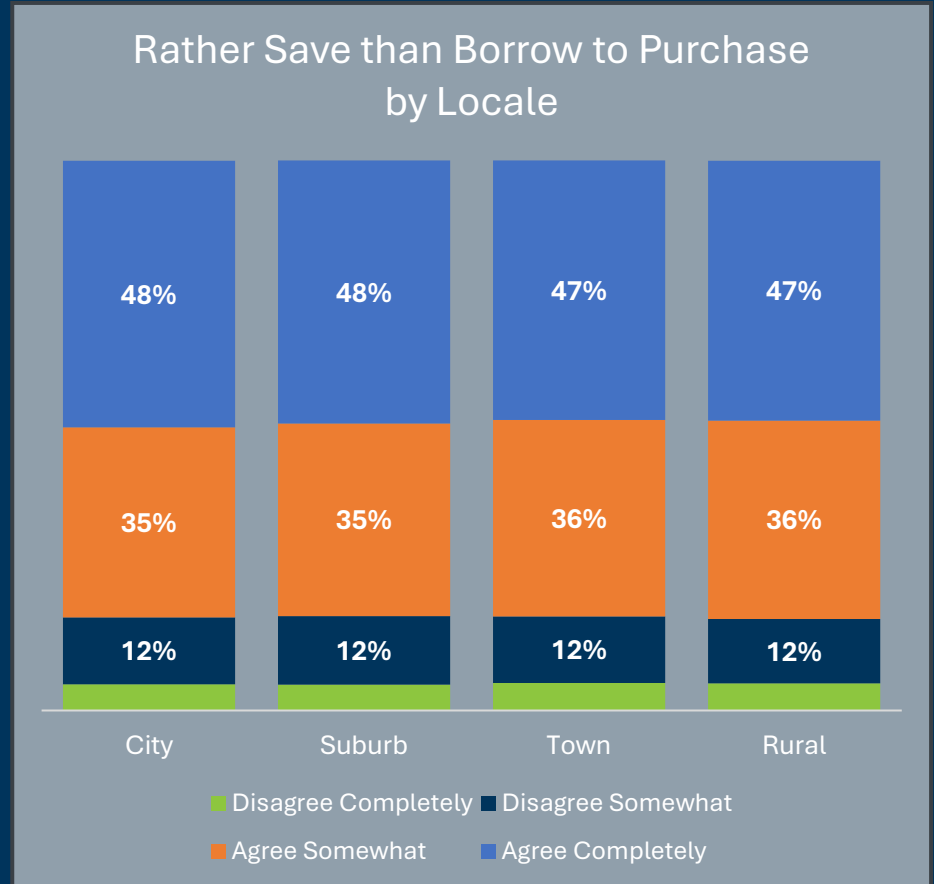
Suburb has highest average
credit card debt.



Rather save than borrow to purchase

Responses to “Rather save than borrow to purchase” by locale

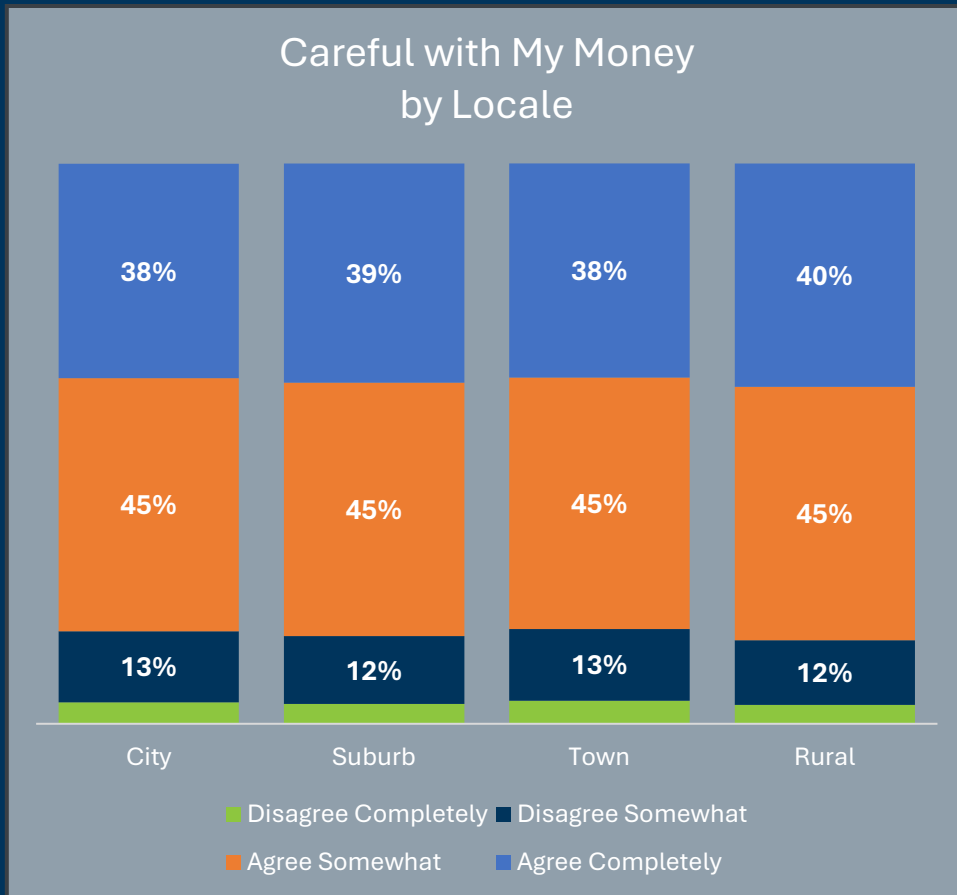
All locales have very similar responses indicating most of the population in all locales would rate save then borrow to purchase.



Careful with my money

Responses to “Careful with my money” by locale

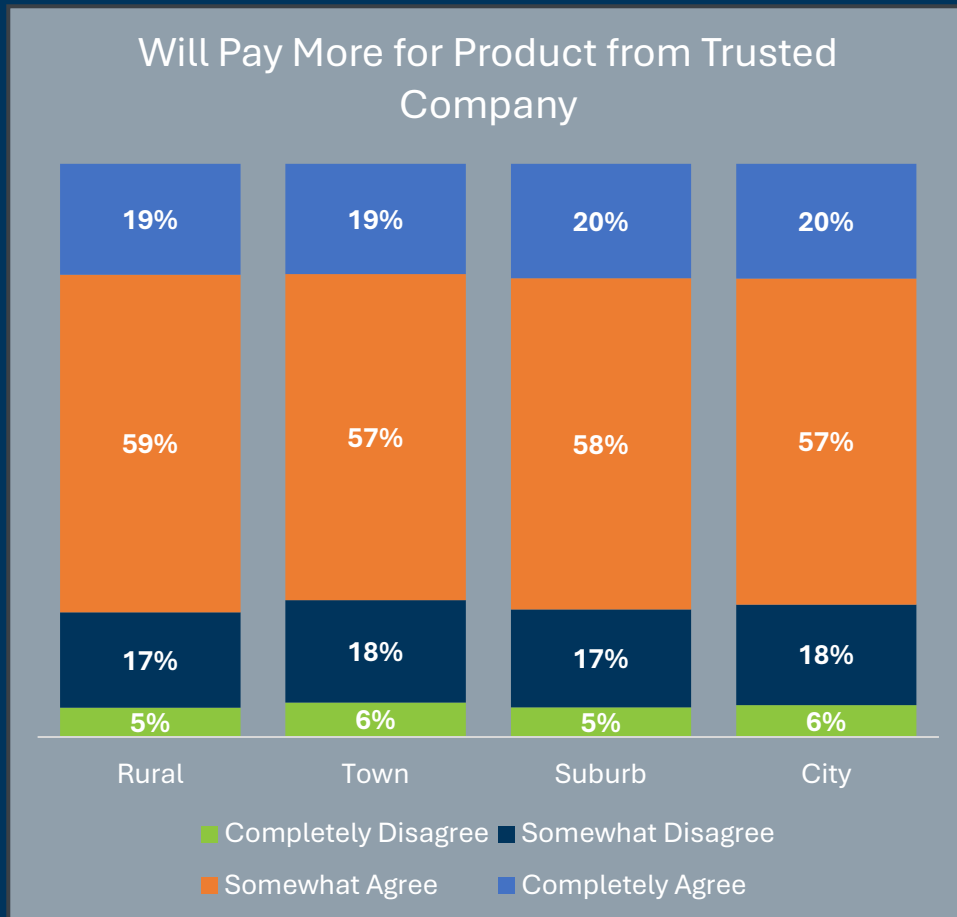
All locales have very similar responses indicating most of the population in all locales consider themselves careful with their money.



Will pay more for product from trusted company

Responses to “Will pay more for product from trusted company” by locale

All locales have very similar responses indicating most of the population in all locales will pay more for a product from a trusted company.

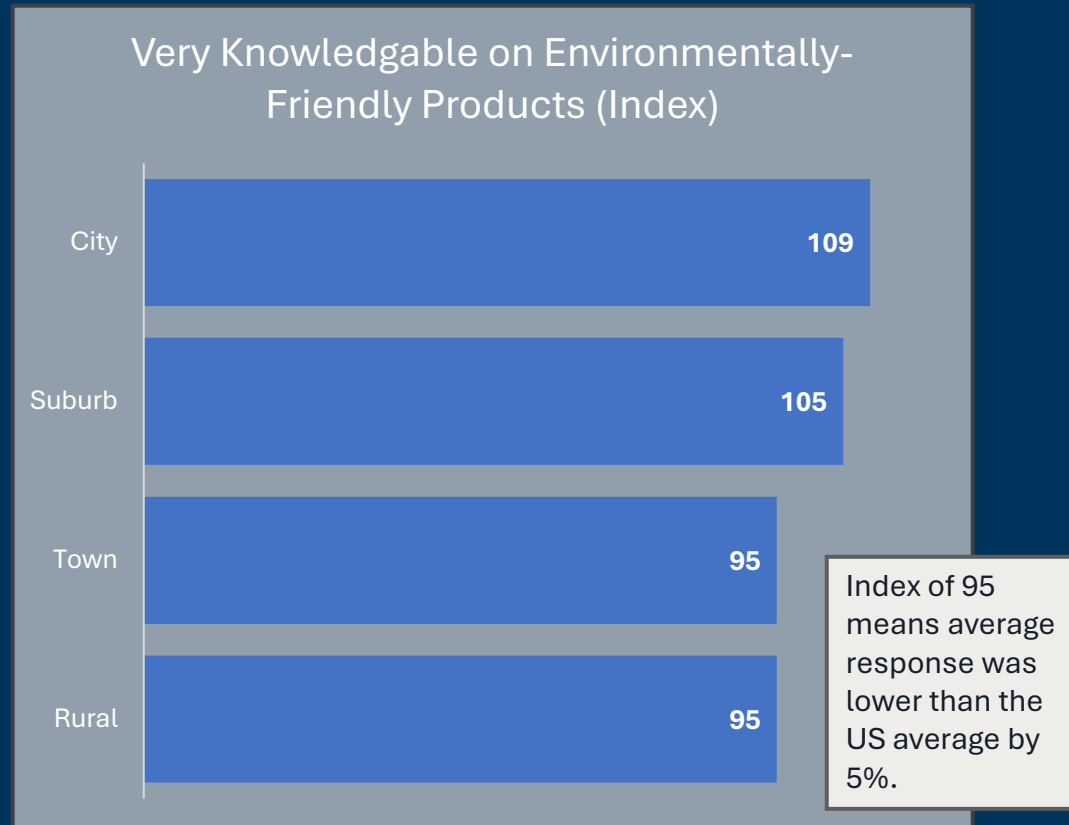


Knowledge of environmentally-friendly products

Responses to “Very knowledgeable on environmentally-friendly products” by locale, Index compared to US average response rate

City and **Suburb** have higher rate than US average index.

Town and **Rural** have lower rate than US average index.



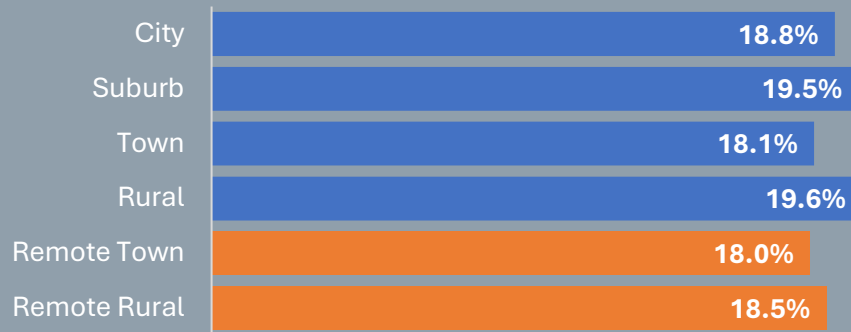
Used environmentally-friendly products

Percent of households that used environmentally-friendly lightbulbs and products in 2024 by locale

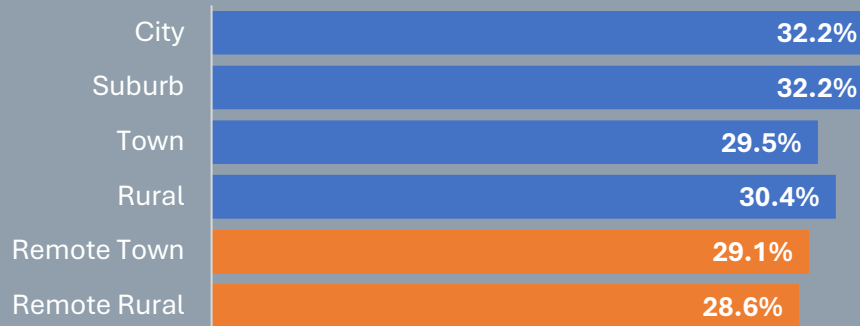
All locales had similar percent of households use these products.

Towns, Remote Towns and Remote Rural had slightly lower usage than other locales.

2024 HH Used Environmentally Friendly Lightbulb in Last 6 Months



2024 HH Used Environmentally Friendly / Green Product in Last 6 Months



Hybrid vehicles

Owens or leases a hybrid vehicle by locale, index compared to US average response rate

Suburb has the highest rate of owned/leased hybrids.

Town has the lowest rate of owned/leased hybrids and is the only locale to rate lower than US average.





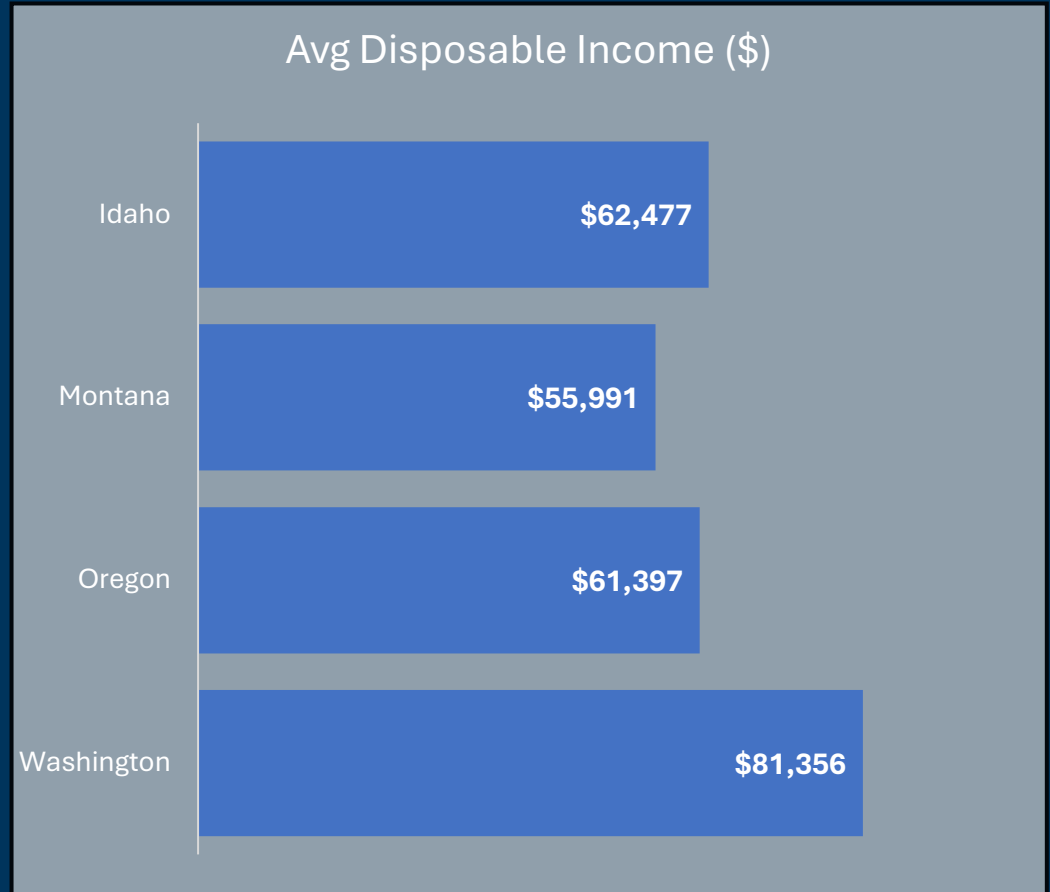
Purchasing Behaviors: By State

- Disposable income
- Household spend on retail goods / various services
- Home improvement model (DIY or hire a contractor)
- Where people shop (online and IRL)
- Credit card debt
- Rather save than borrow for purchase
- Careful with my money
- Will pay more for a product from trusted company
- Environmental inclination

Disposable Income

Annual household income after taxes (per ESRI Business Analyst definition)

Washington has highest average disposable income.



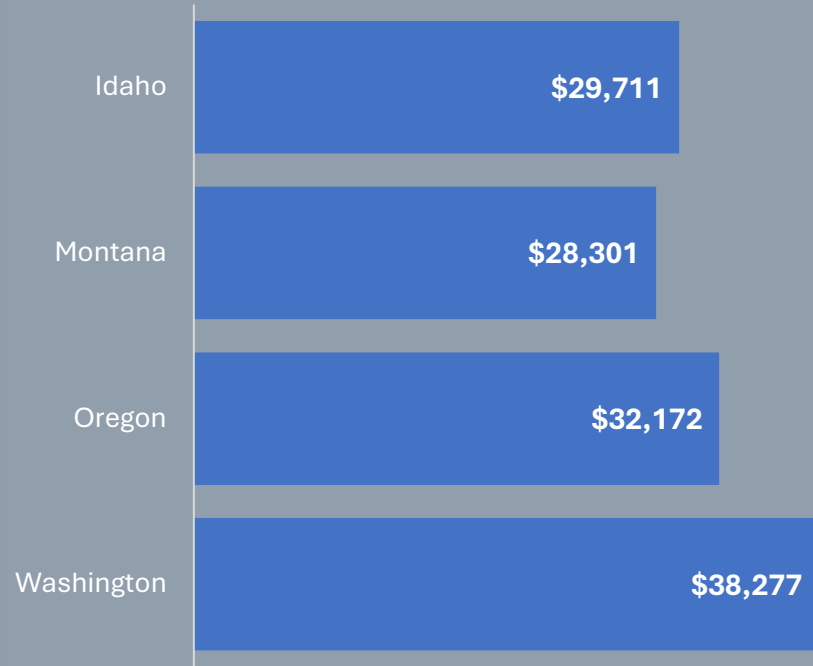
Spend on retail goods

Average annual household spend on retail goods in 2024 by state

Washington had the highest spend.

Montana has the lowest spend.

2024 Avg Household Amount Spent on Retail Goods by State



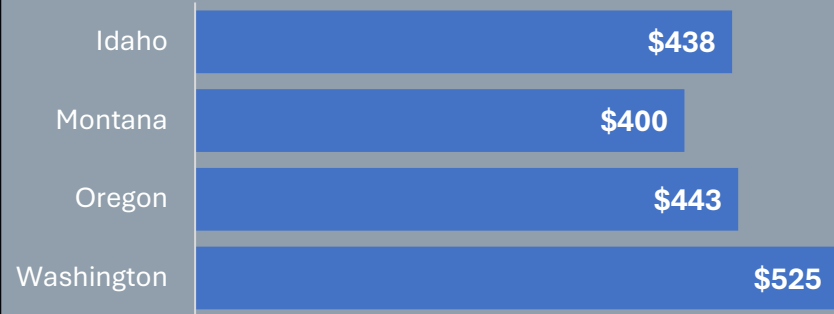
Spend on HVAC and plumbing work

Average annual household spend on HVAC work and plumbing / water heating labor in 2024 by state

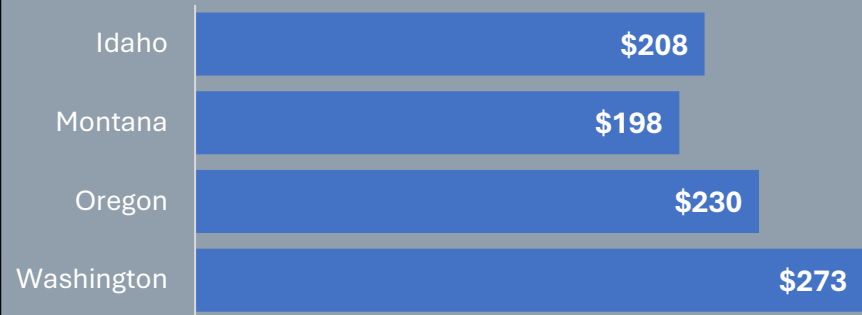
Washington had the highest spend.

Montana had the lowest spend.

2024 Avg Household Amount Spent on HVAC Work by State



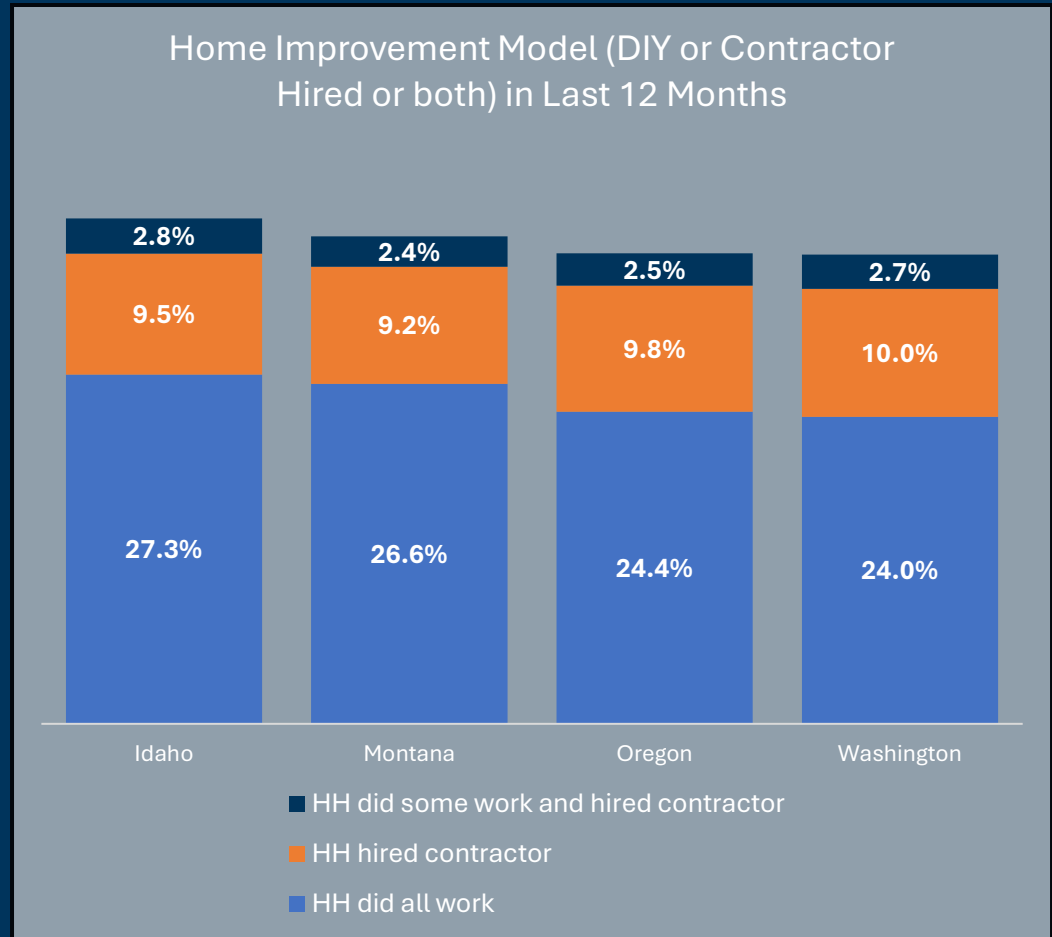
2024 Avg Household Amount Spent on Plumbing/Water Heating Labor by State



Home improvement model

Of households that had a home improvement project in 2024, how the work was performed by state

In **all states**, more households performed the work on their own.



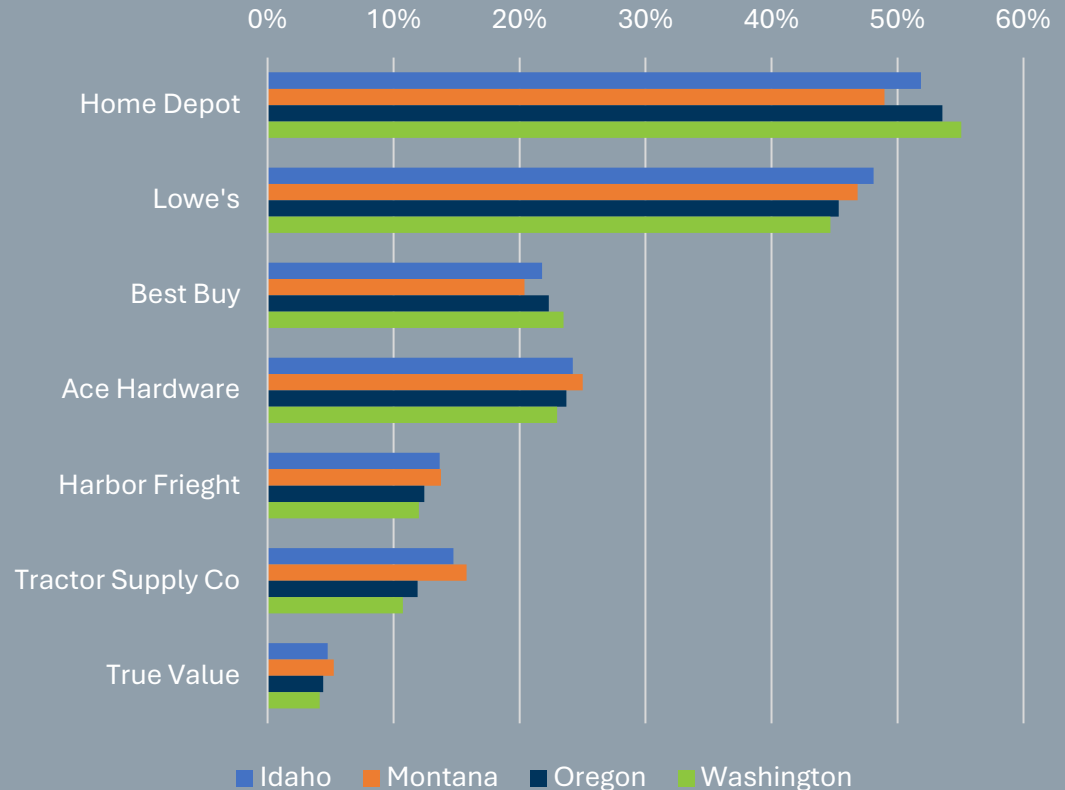
Where people shop

Hardware and Appliances

Montana residents least likely to shop at Home Depot and Best Buy than other states.

Idaho and **Montana** residents most likely to shop at Lowe's. Ace Hardware, Harbor Freight, Tractor Supply and True Value than other states.

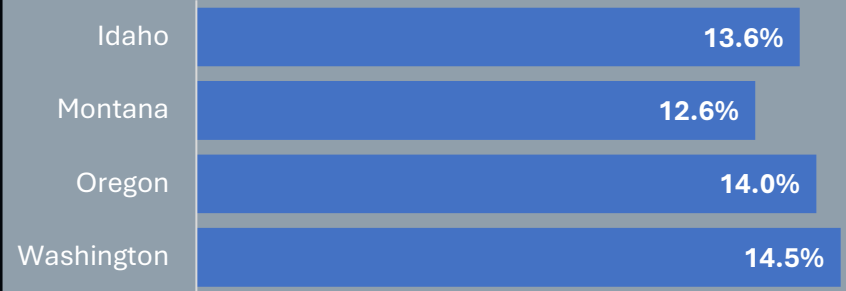
Pct Population Shopped in Last 12 Months by State



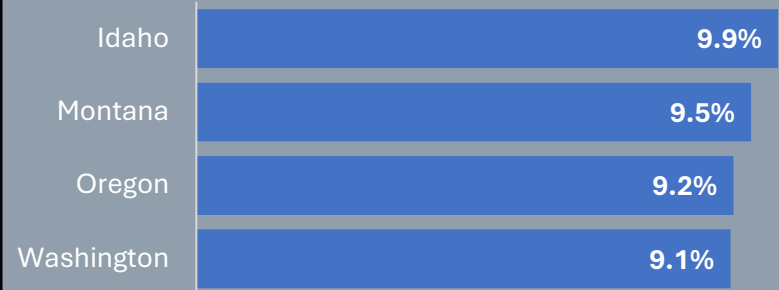
Where people shop

Online at Home Depot and Lowe's

Pct Population Purchased Online from Home Depot, Last 6 Month, by State

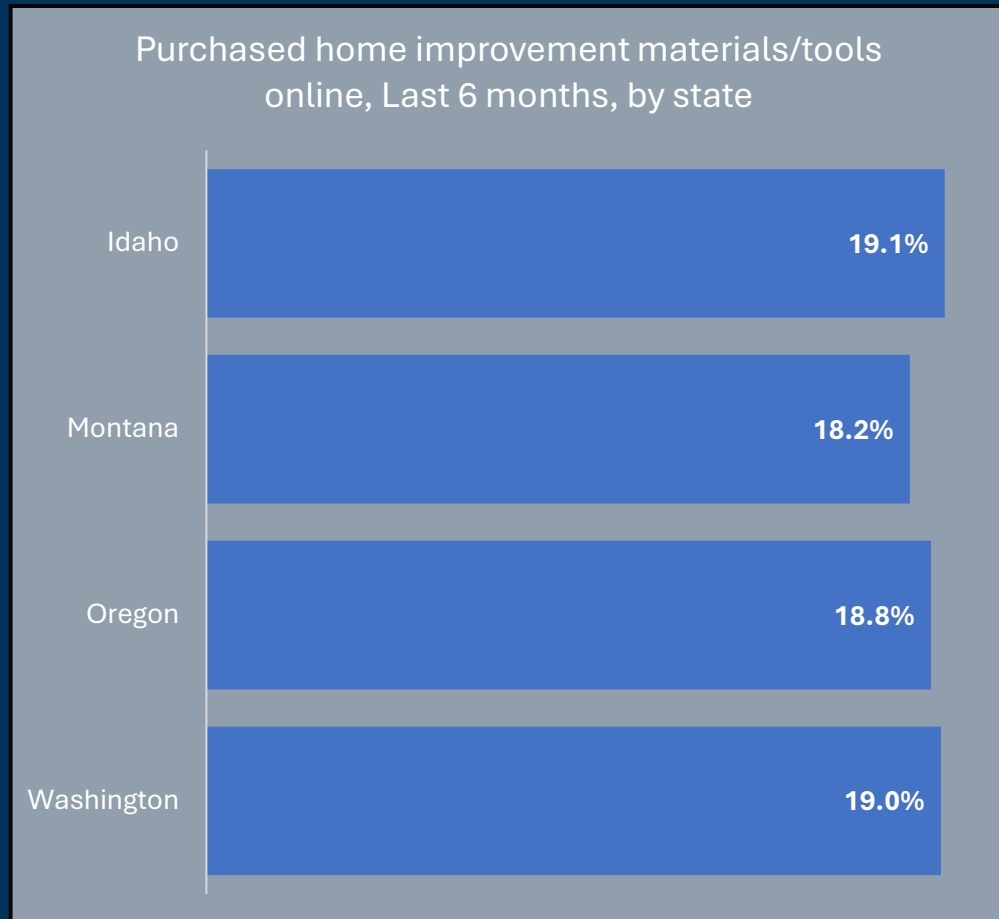


Pct Population Purchased Online from Lowe's, Last 6 Month, by State



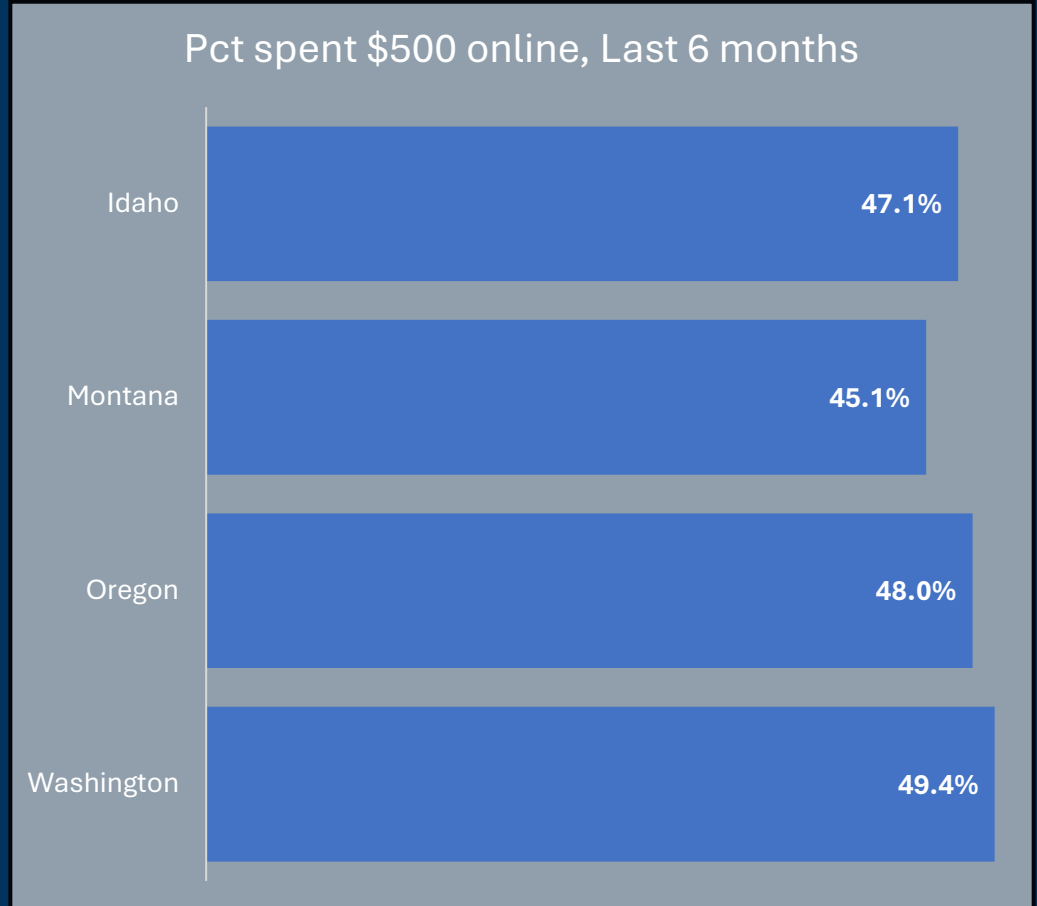
Where people shop

Percent of households who purchased home improvement materials or tools online in last 6 months



Online shopping

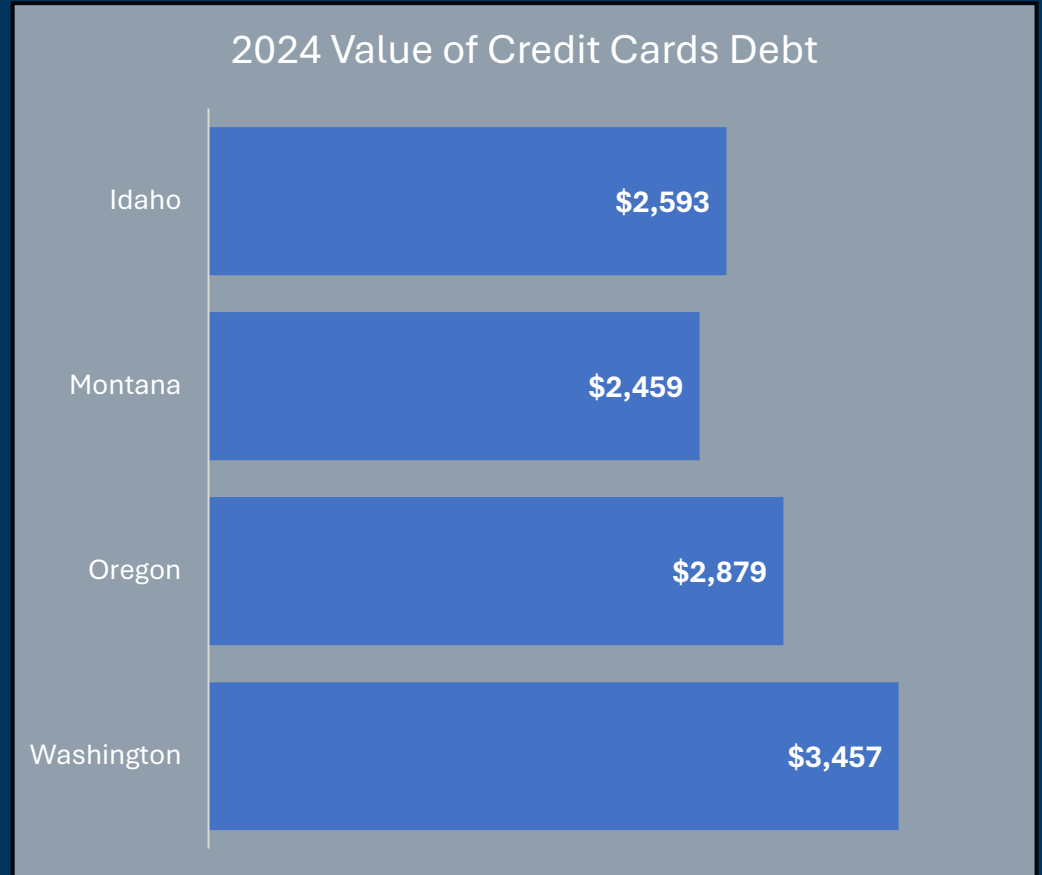
Percent of population who spent more than \$500 on online shopping in the past six months



Average Credit Card Debt

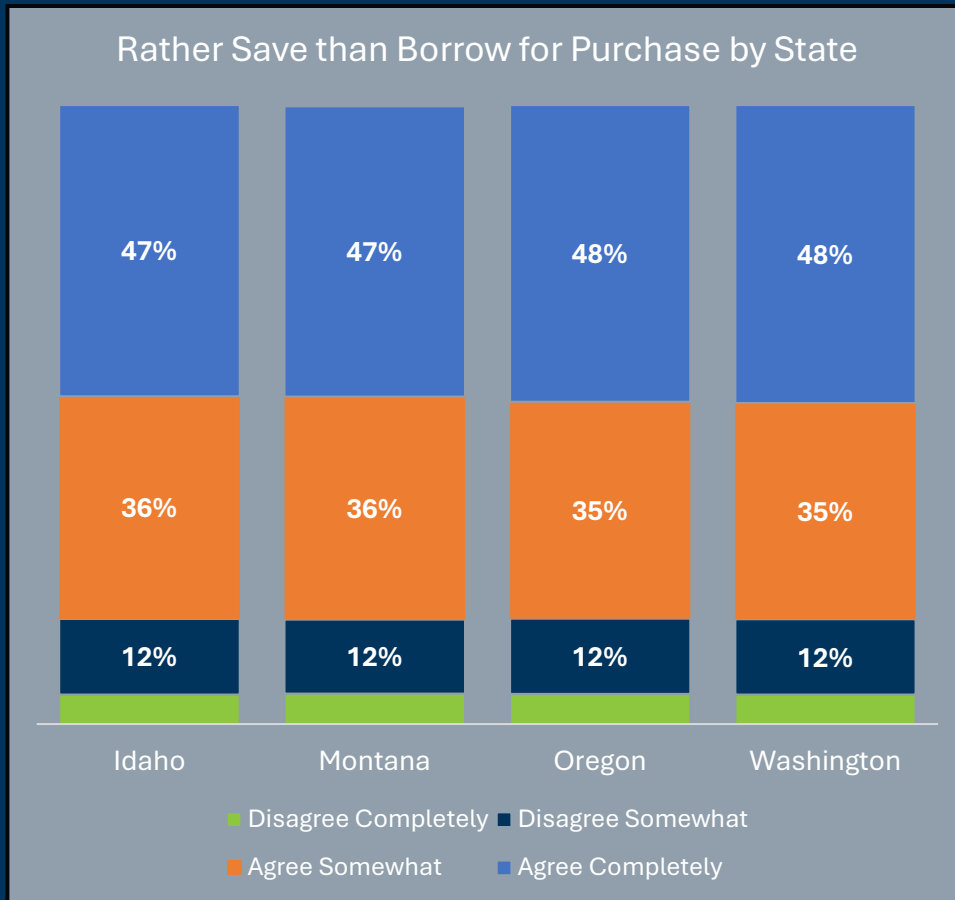
Average credit card debt,
2024

Washington has highest
average credit card debt.



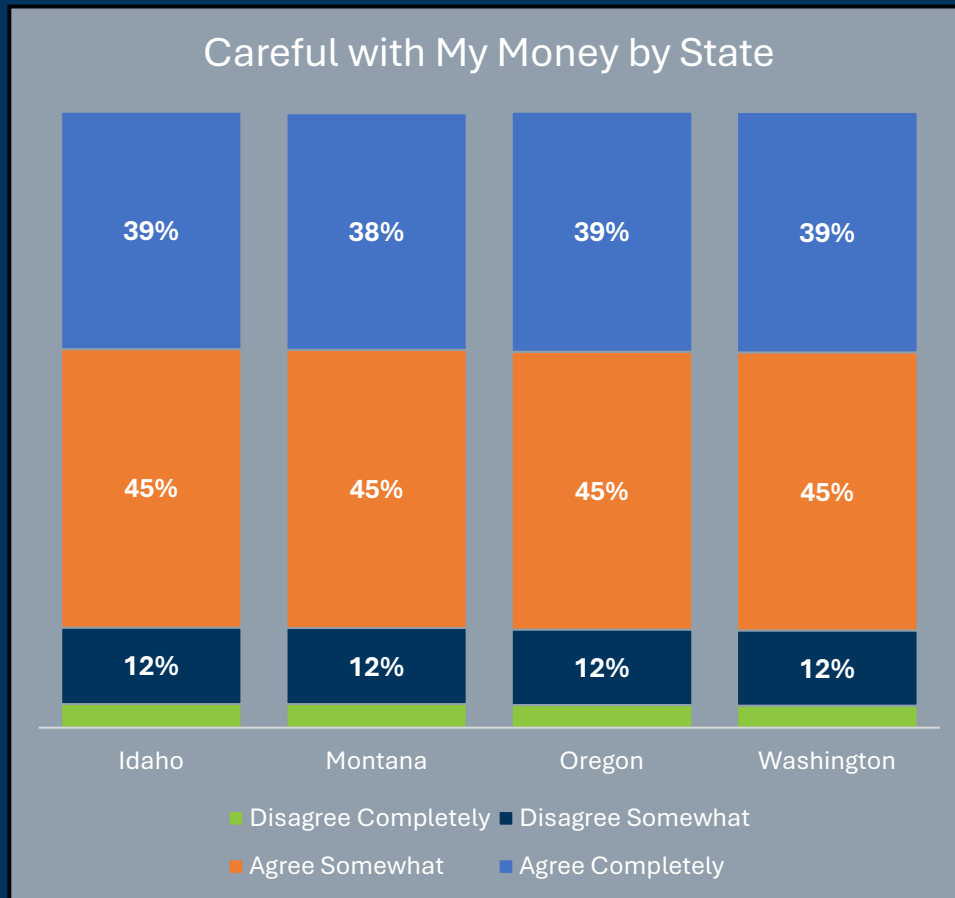
Rather Save then Borrow to Purchase

Responses to “Rather Save then Borrow to Purchase” by state



Careful with My Money

Responses to “Careful with my Money” by state

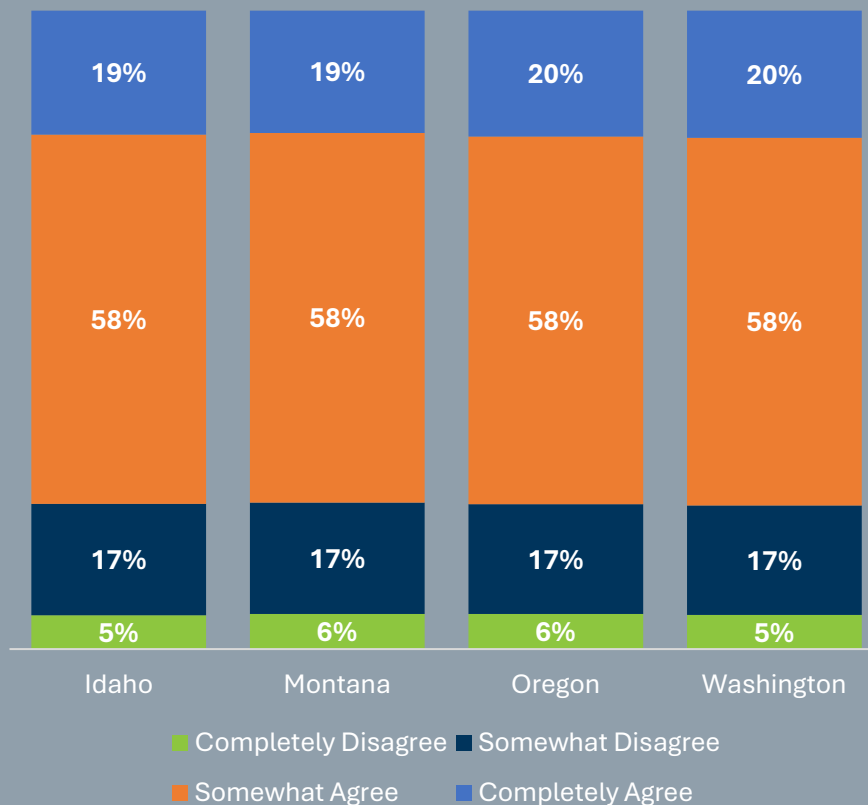


Will pay more for product from trusted company

Responses to “Will pay more for product from trusted company” by state

All states have very similar responses indicating most of the population in all states will pay more for a product from a trusted company.

Will Pay More for Product from Trusted Company

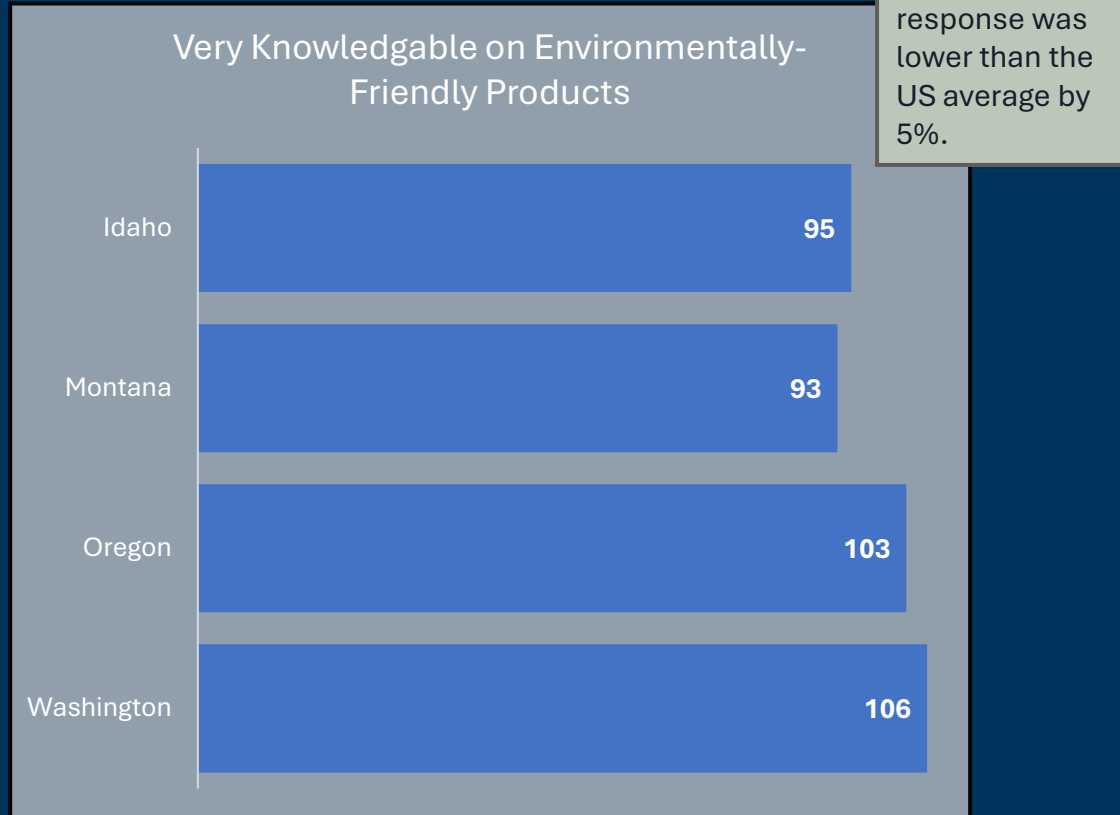


Environmentally-friendly products

Responses to “Very knowledgeable on environmentally-friendly products” by state, Index compared to US average response rate

Oregon and **Washington** have higher rate than US average index.

Idaho and **Montana** have lower rate than US average index.



Used environmentally-friendly products

Percent of households that used environmentally-friendly lightbulbs and products in 2024 by state

All states had similar percent of households use these products.

Idaho and **Montana** had slightly lower usage than other states.

2024 HH Used Environmentally Friendly Lightbulb in Last 6 Months



2024 HH Used Environmentally Friendly / Green Product in Last 6 Months



Hybrid vehicles

Owns or leases a hybrid vehicle by state, index compared to US average response rate

Oregon and Washington have the highest rate of owned/leased hybrids of the four states.

Idaho and **Montana** have the same rate of owned/leased hybrids as national average.



Index of 100 means average response was the same as the US average.



Sociodemographics: By Locale

- Income levels / net worth
- Unemployment rate
- Poverty rate
- Disadvantaged communities (DACs)
- Age of population
- Demographics of population
- Language spoken at home
- Level of education
- Political inclinations
- Religious service attendance

Median and mean income

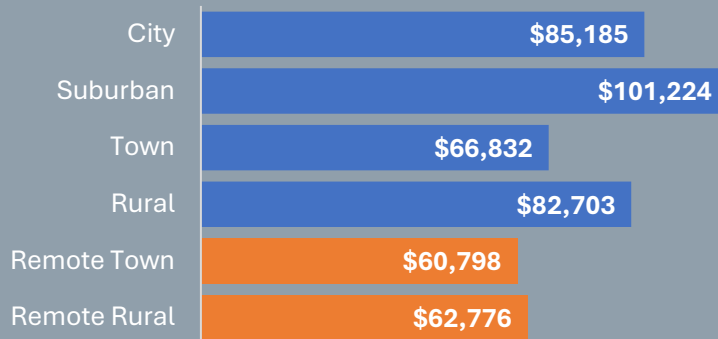
Median annual household income by locale

Mean annual household income by locale

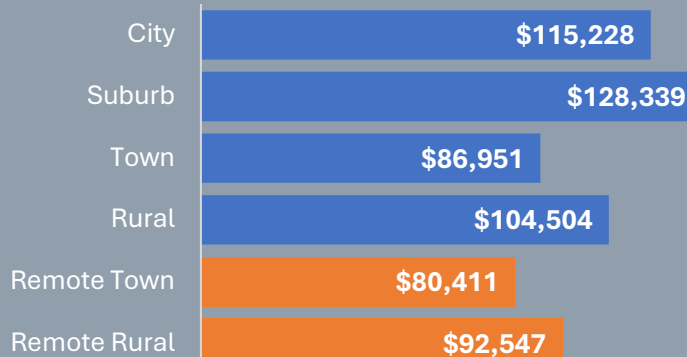
Suburb has a significant higher median and mean income than other locales.

Towns, Remote Towns and Remote Rural has significant lower median and mean incomes.

Median HH Income (\$)



Mean HH Income (\$)

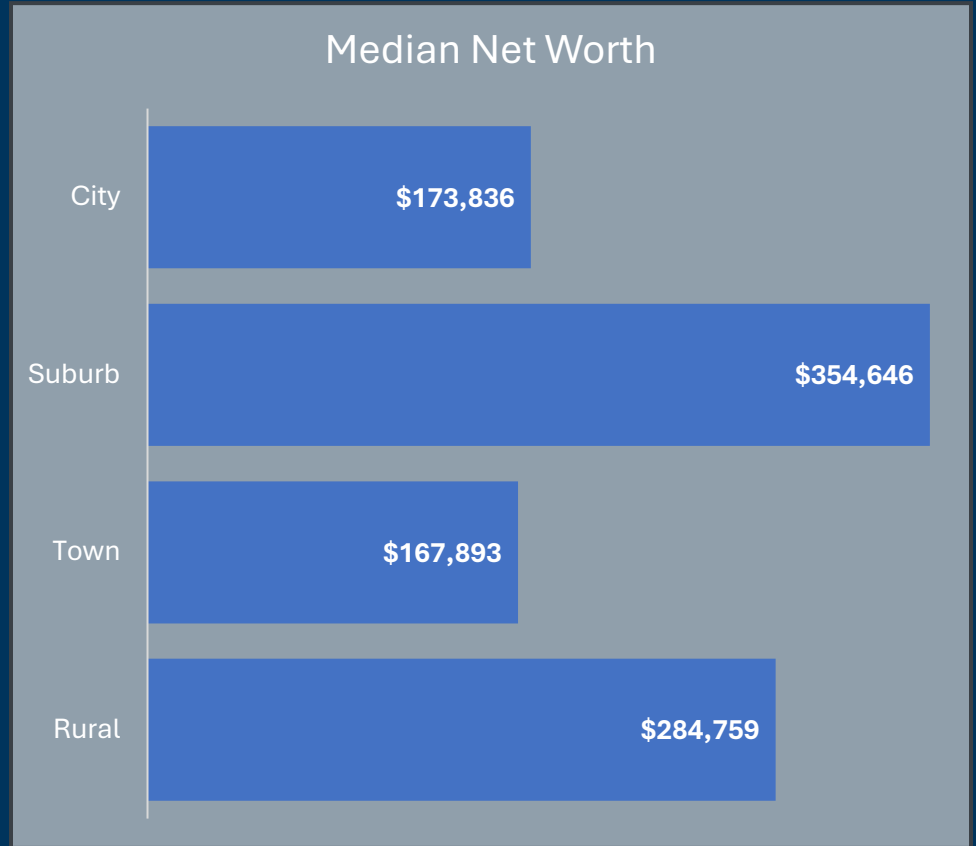


Median net worth

Median net household
worth by locale

Suburb has a significant higher median net worth than other locales.

Town and **City** households have significantly lower median net worth than **Suburb** or **Rural** locales.

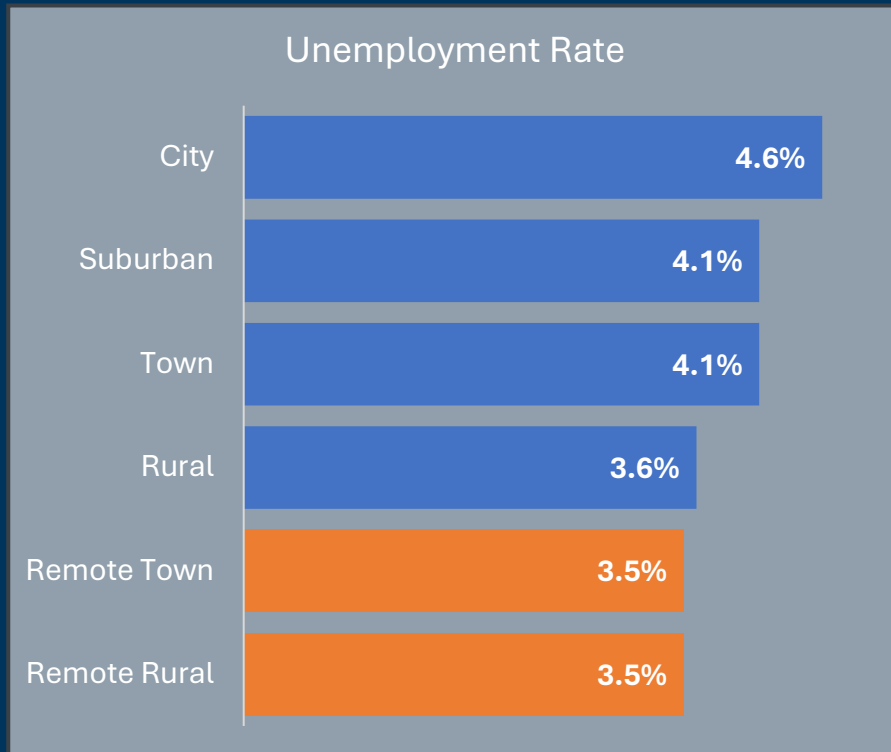


Unemployment rate

Unemployment rate by locale

City has the highest unemployment rate.

Rural has the lowest unemployment rate.



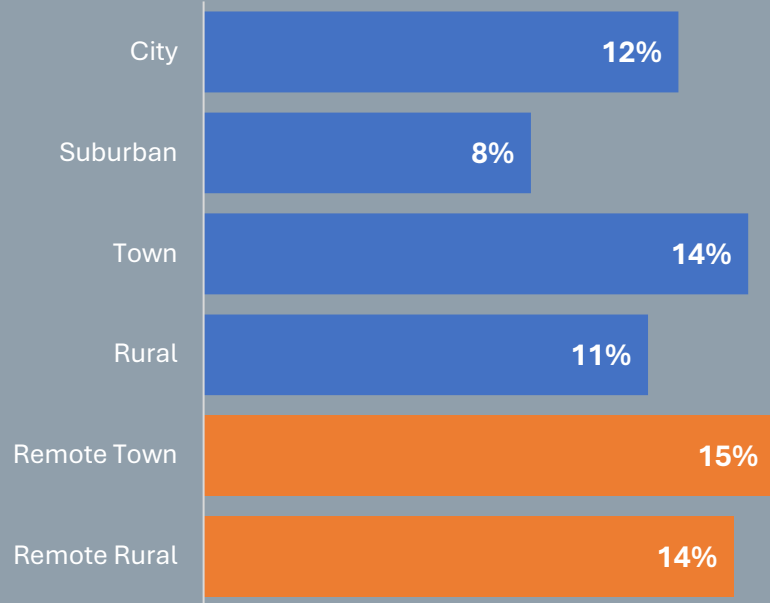
Poverty rate

Percent of households below 100% federal poverty level* by locale

Suburb has lowest percent of households below the poverty level.

Towns, Remote Towns and Remote Rural has highest percent of households below poverty level.

Pct HH below 100% Poverty Level



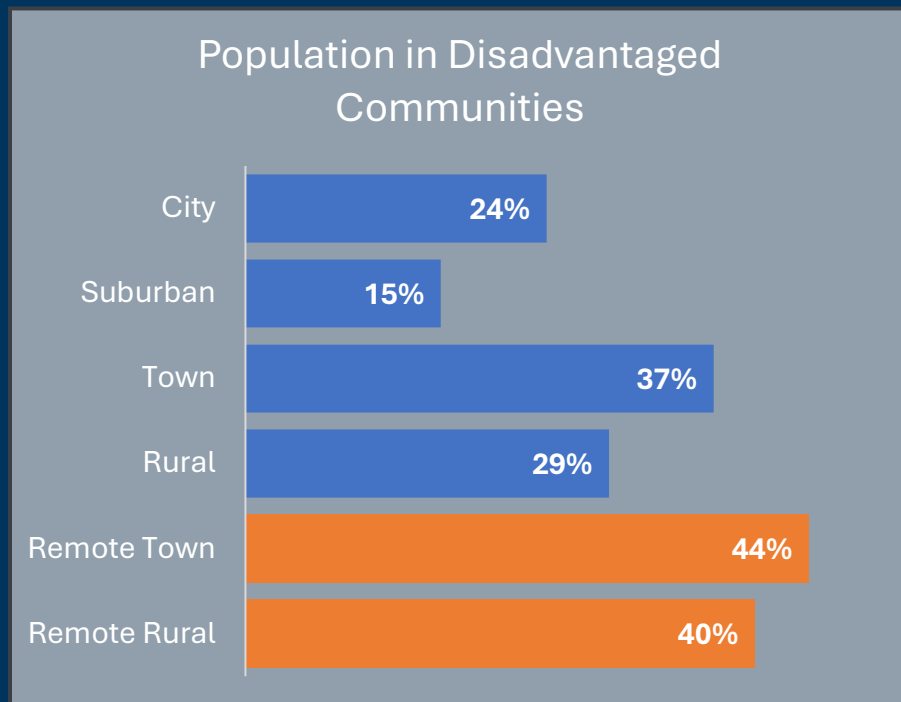
*Federal poverty level is the minimum income a family needs to cover basic necessities like food, shelter, clothing, and transportation, and varies by household size.

Population in disadvantaged communities

Percent of population in Disadvantaged Communities (DACs).

Suburb has lowest percent of population in DACs.

Towns, Remote Towns and Remote Rural has highest percent of population in DACs.



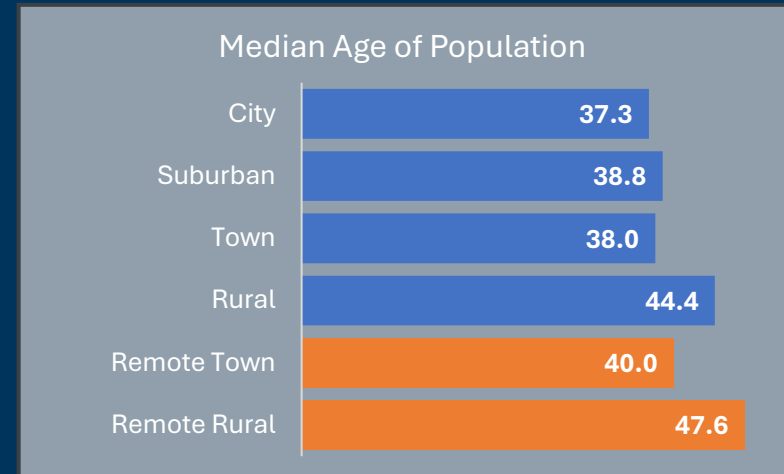
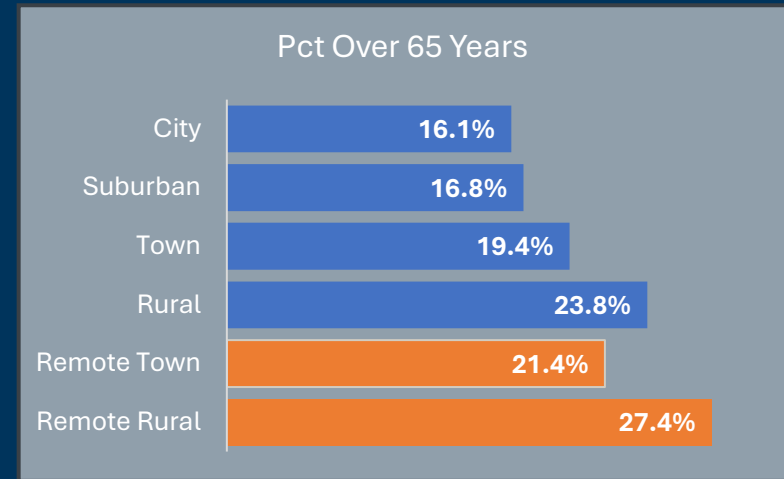
Age of population

Percent of population over 65 years of age by locale

Median age of population by locale

Rural and **Remote Rural** has oldest population.

Remote Town and **Remote Rural** have a population that is older than their non-remote locales.

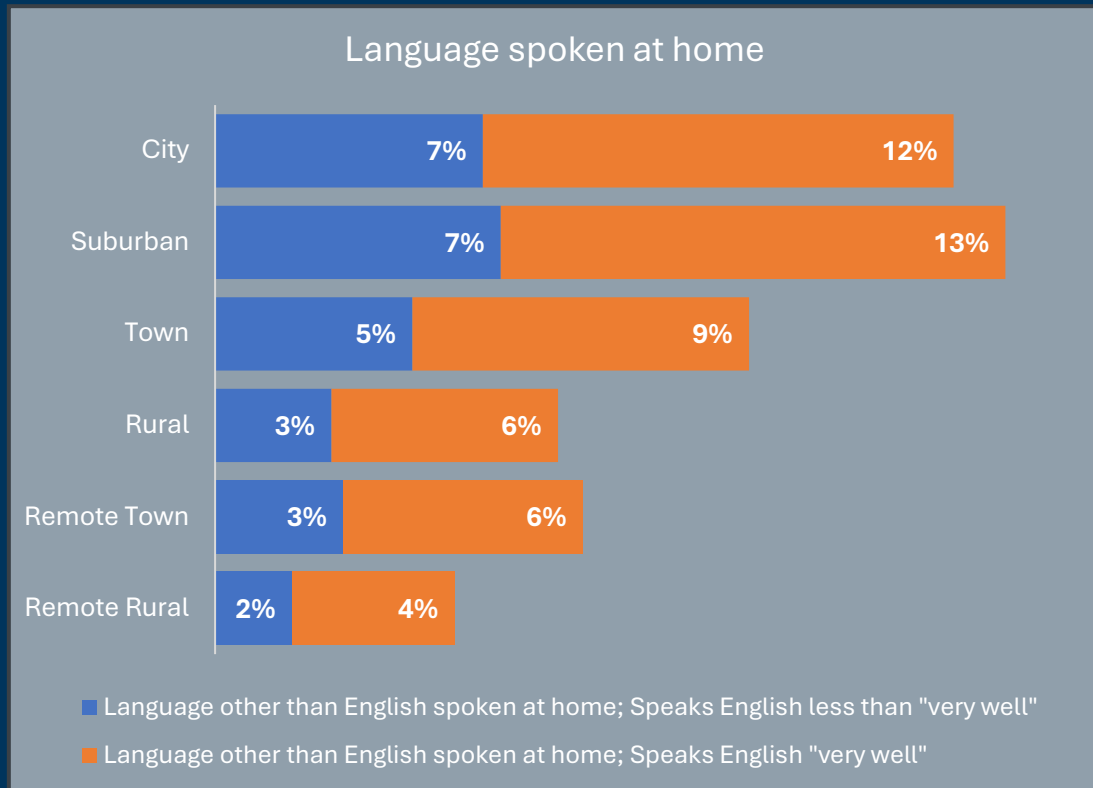


Language spoken at home

Percent of population who speak a language other than English at home; separate by does or does not speak English “very well” by locale

City and **Suburb** have significantly higher percent of people who speak another language at home.

Remote Town and **Remote Rural** have significantly lower percentages than their non-remote locales.

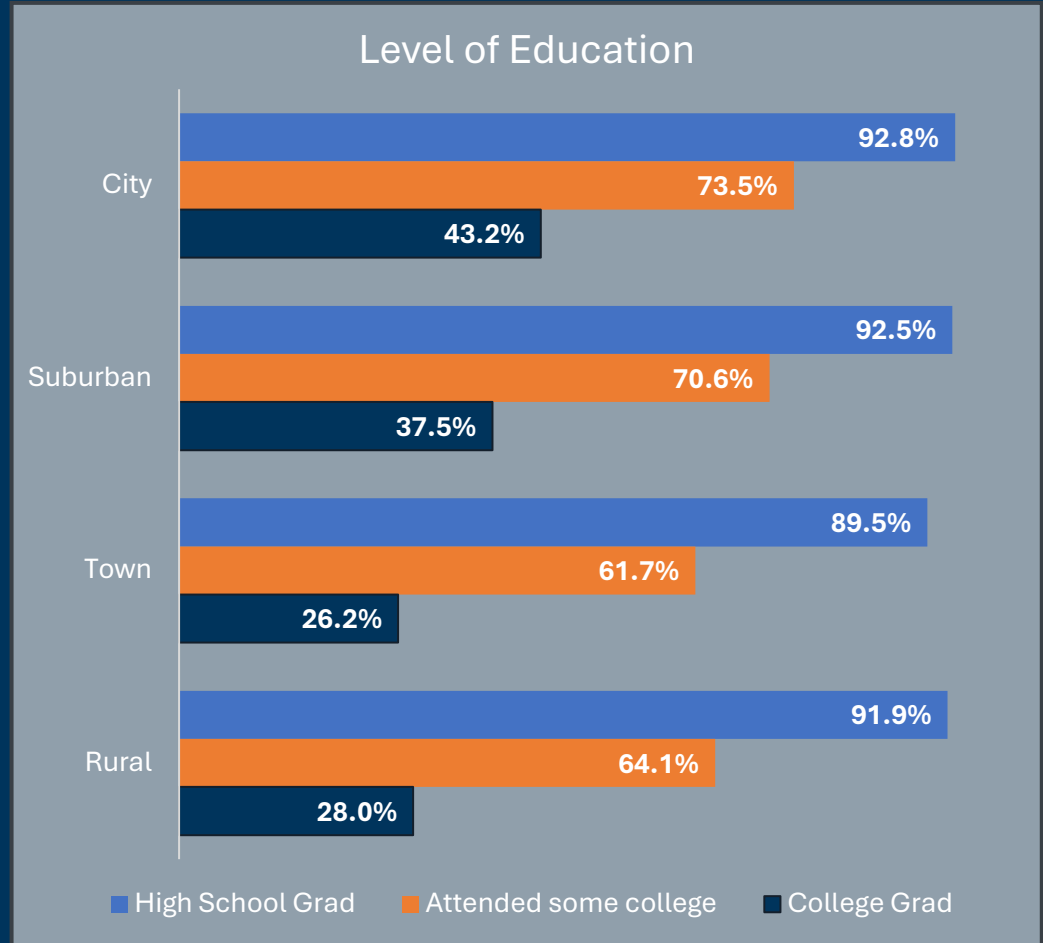


Level of education

Percent of population who attained specified level of education by locale

City and **Suburb** has highest percentage of population who attended some college and who graduated from college.

Town has lowest percentage of population for all categories.



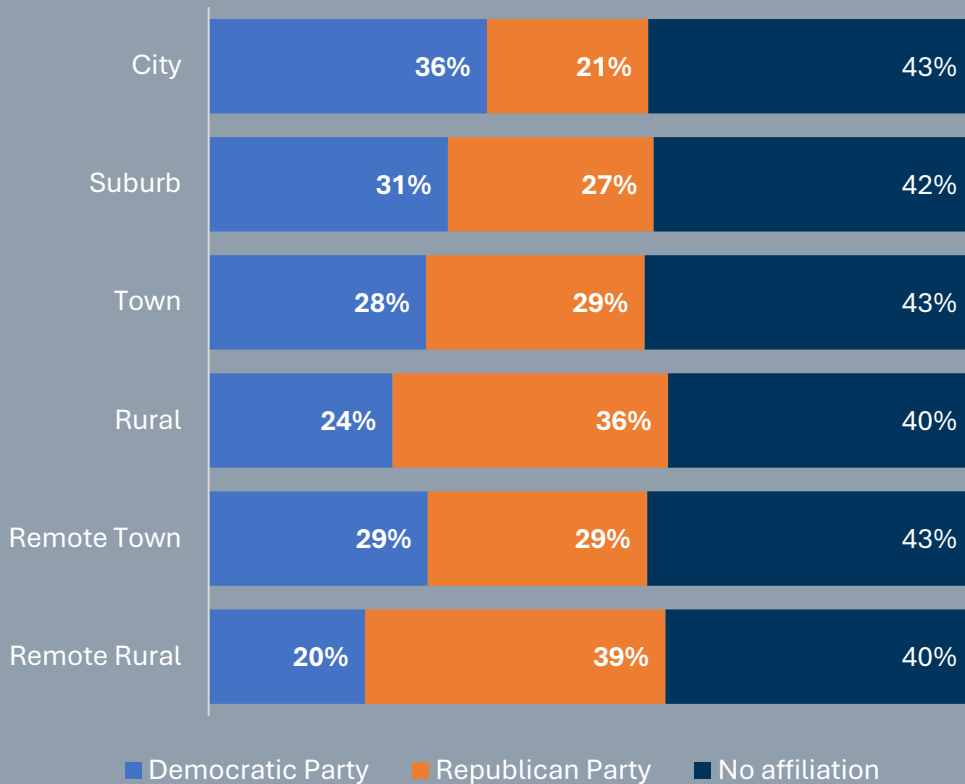
Political inclinations

Percent of population who are affiliated with a political party by locale

City has the highest percent of population who are affiliated with the Democratic Party.

Rural and **Remote Rural** have highest percent of population who are affiliated with the Republican Party.

Pct Population Affiliated with Political Party



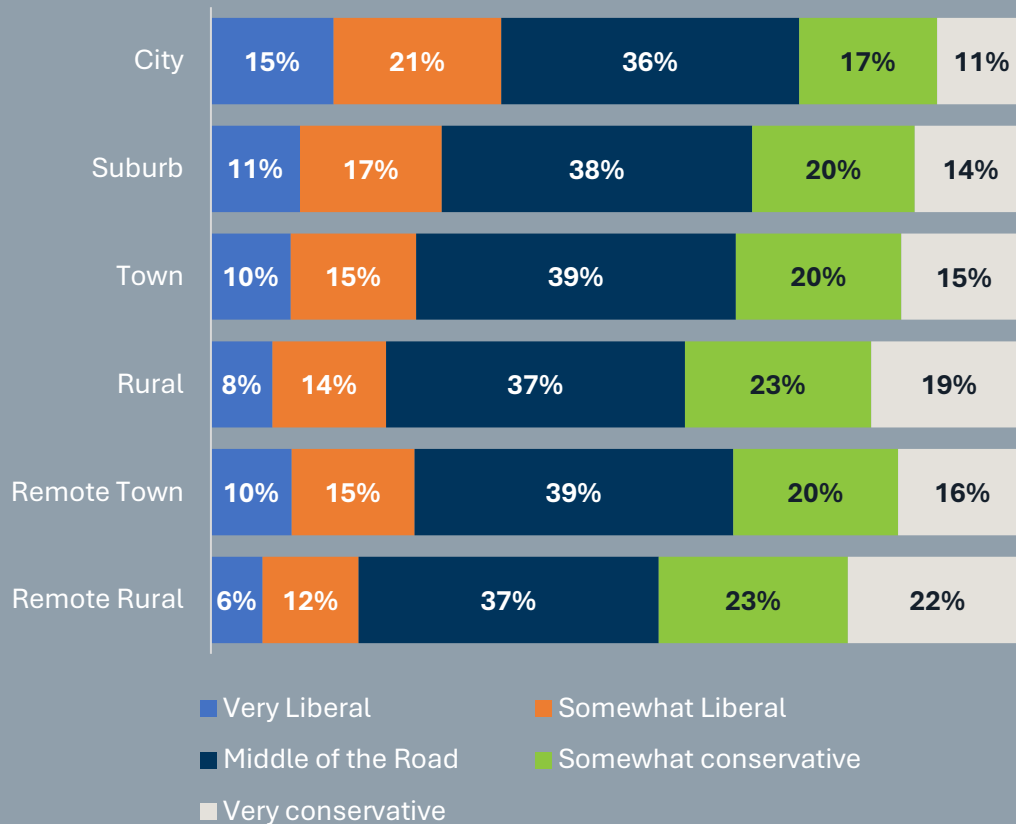
Political inclinations

Percent of population by political outlook by locale

All locales have a higher percent of “Middle of the Road” outlook than any other outlook.

City is the only locale with a higher percent of people with a liberal outlook than a conservative outlook.

Pct of Population by Political Outlook



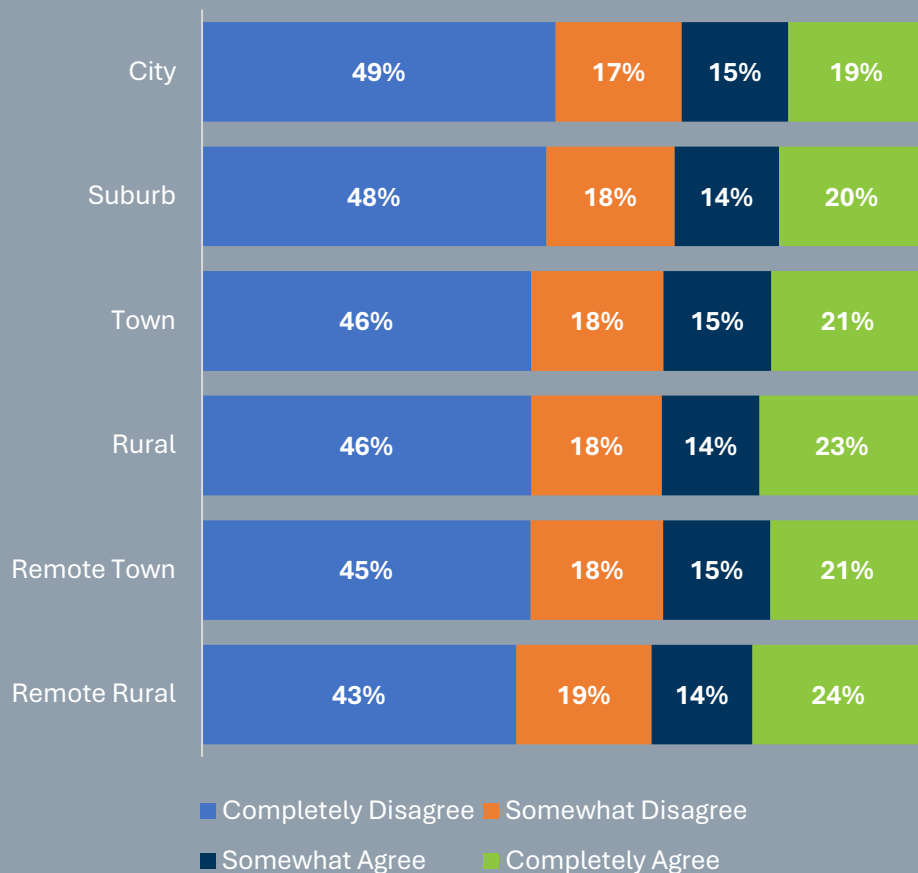
Religious service attendance

Responses to “Attend religious service regularly” by locale

All locales have a higher percent of disagree than agree responses.

Rural has a slightly higher percent of people who responded “Completely Agree” than other locales.

Attended Religious Services Regularly





Sociodemographics: By Locale

- Income levels / net worth
- Unemployment rate
- Poverty rate
- Energy poverty
- Disadvantaged communities (DACs)
- Age of population
- Demographics of population
- Language spoken at home
- Level of education
- Political inclinations
- Religious service attendance

Median and mean income

Median annual household income

Mean annual household income

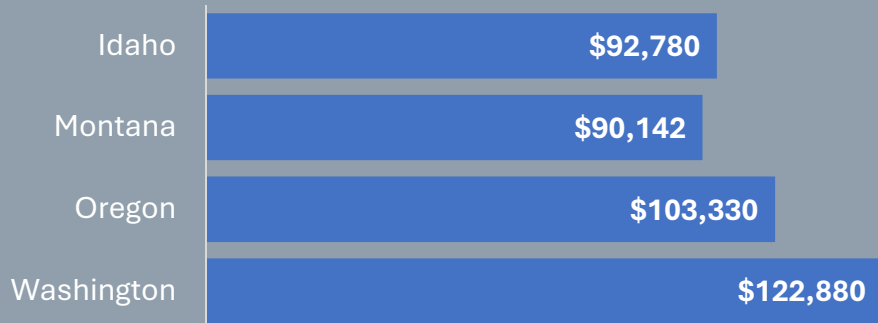
Washington has the highest median and mean income of the states.

Montana has the lowest median and mean income.

Median HH Income (\$)



Mean HH Income (\$)



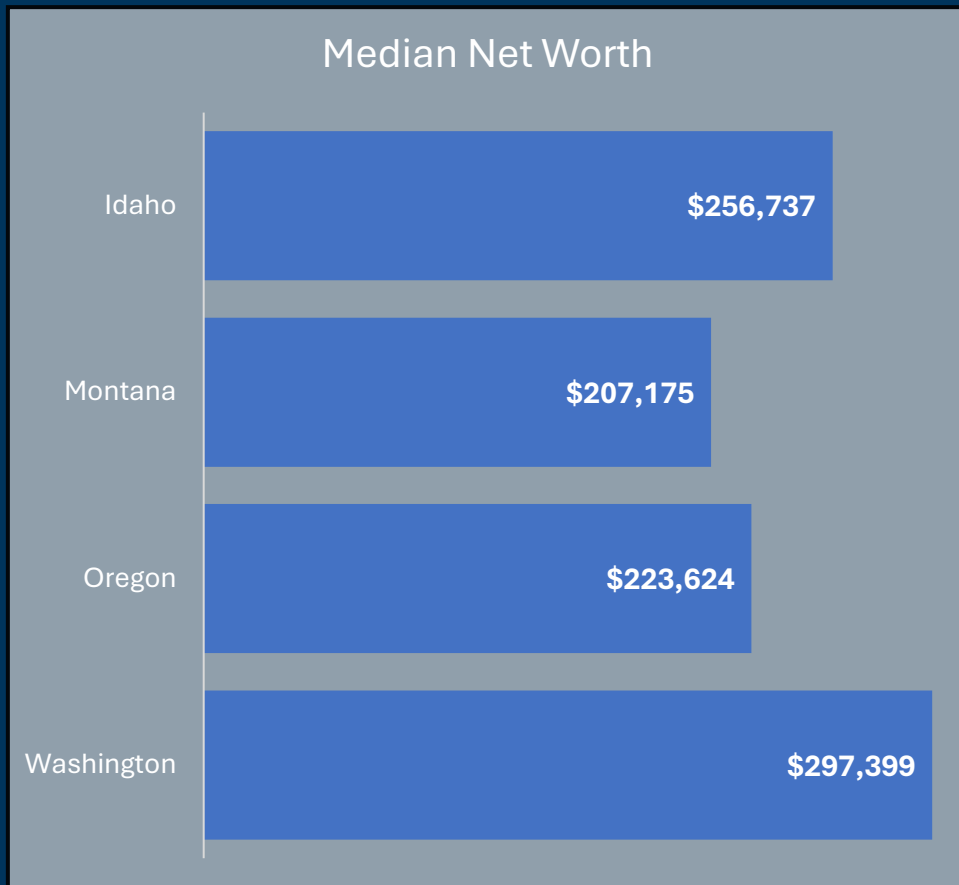
Median net worth

Median net household
worth by state

Washington households have the highest median net worth of the states.

Idaho households have a higher median net worth than **Oregon** households, which does not align with incomes.

Montana households have the lowest median net worth.

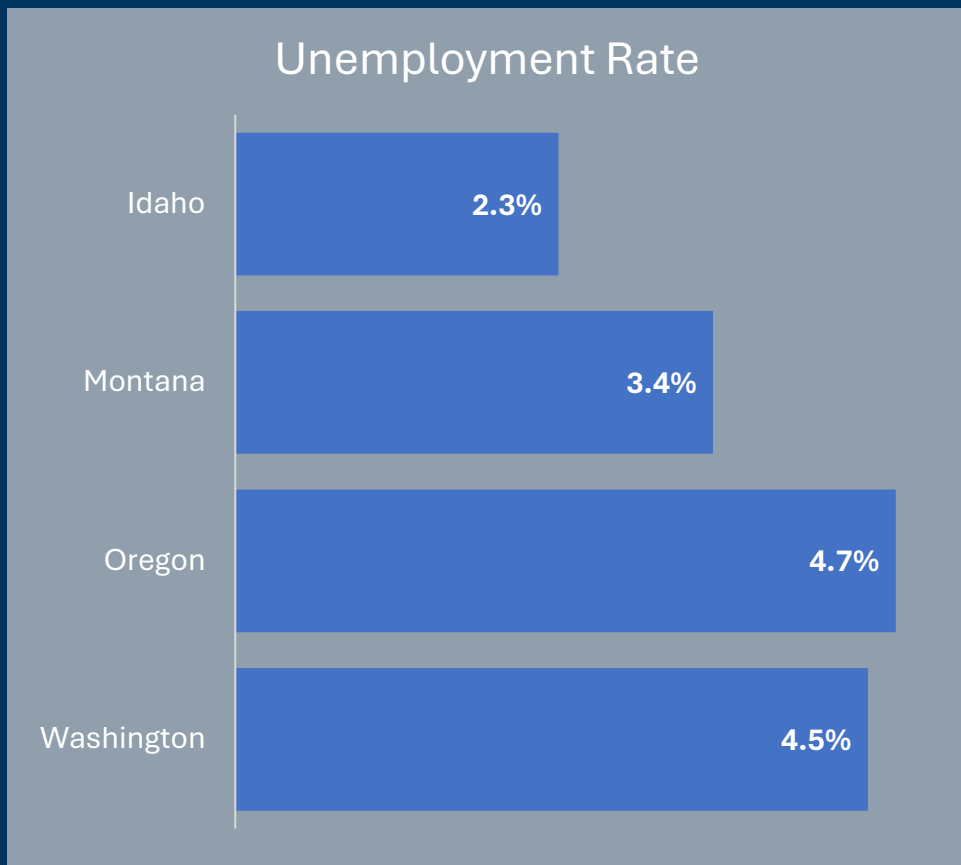


Unemployment rate

2024 Unemployment rate by state

Idaho has the lowest unemployment rate.

Oregon has the highest unemployment rate.



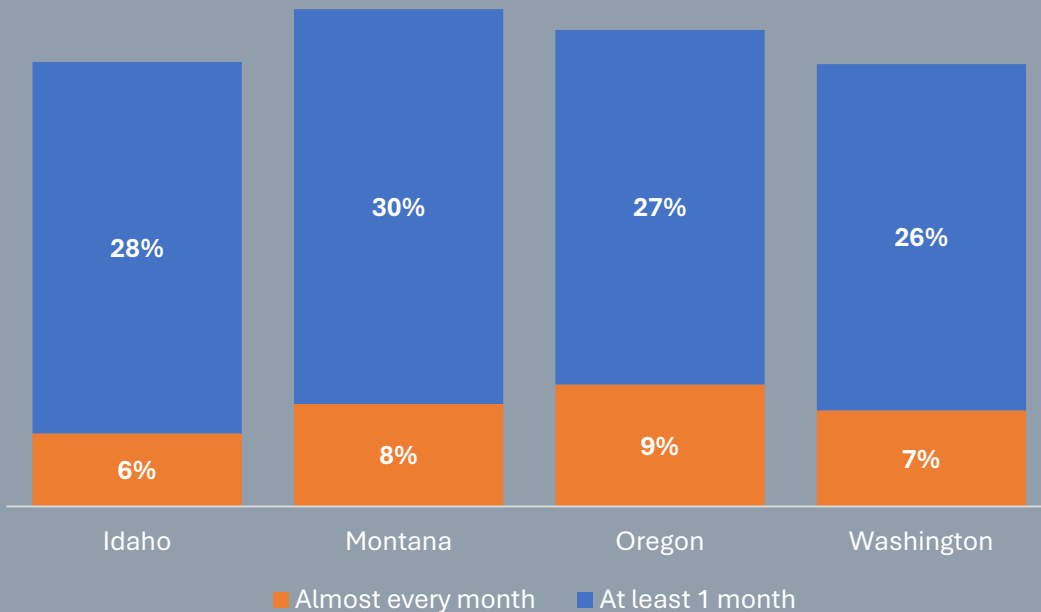
Energy poverty

Response to 2024 census survey on housing poverty

Montana has the highest percent of households that reduced or forewent basic HH needs to pay energy bills.

All states had more than 1 in 3 household respondents experience this for at least 1 month of last year.

Household reduced or forewent expenses for basic household necessities, such as medicine or food, in order to pay an energy bill, in last 12 months



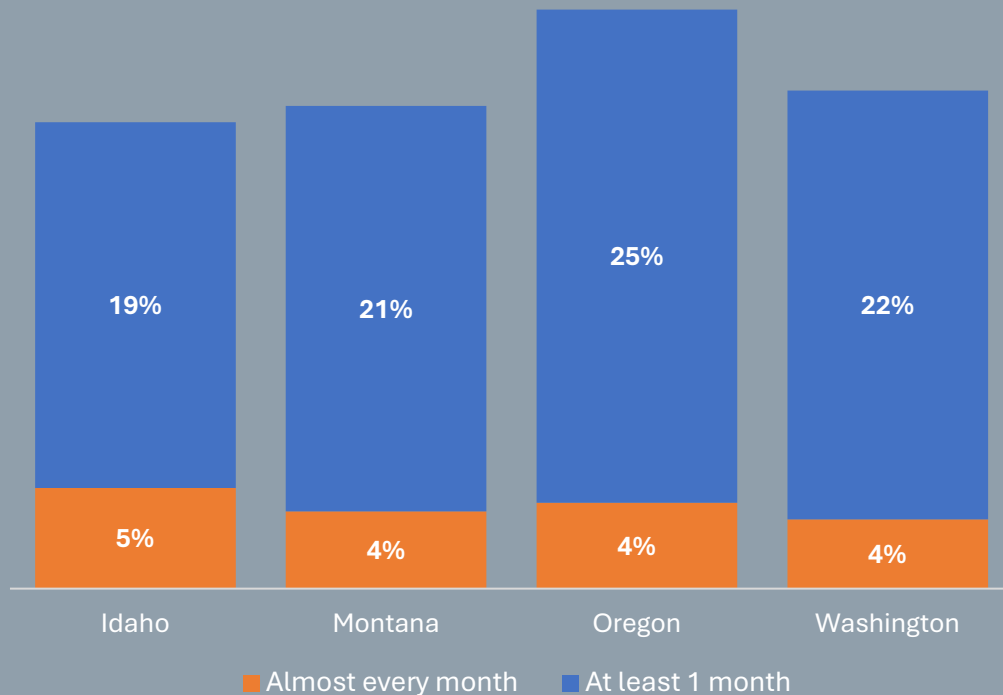
Energy poverty

Response to 2024 census survey on housing poverty

Oregon has the highest percent of households that kept their home at a temperature that felt unsafe or unhealthy.

All states had more than 1 in 4 household respondents experience this for at least 1 month of last year.

Household kept home at a temperature that felt unsafe or unhealthy, in last 12 months



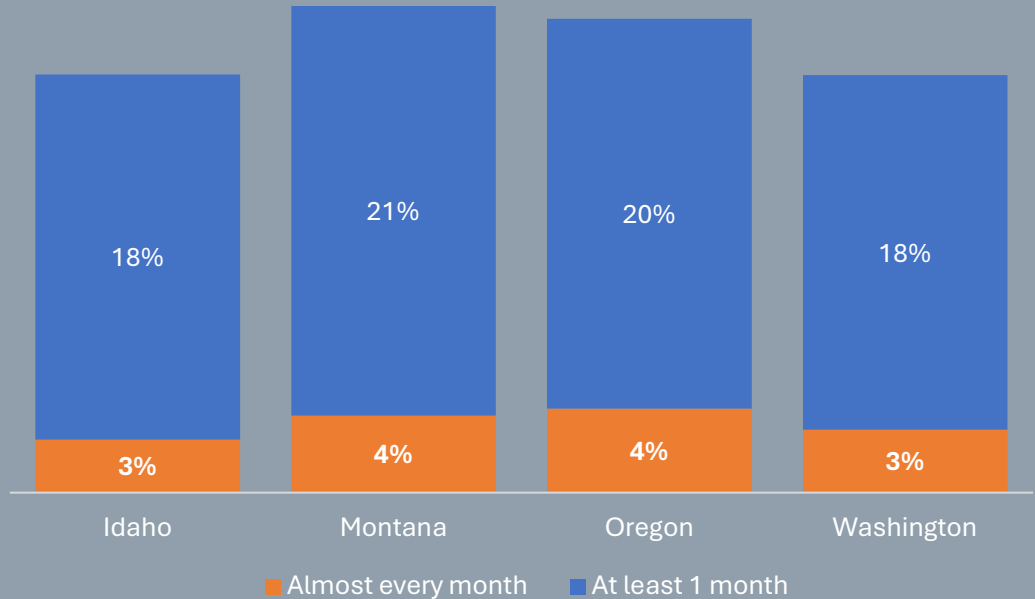
Energy poverty

Response to 2024 census survey on housing poverty

Montana and **Oregon** has the highest percent of households were unable to pay their energy bills.

All states had more than 1 in 5 household respondents experience this for at least 1 month of last year.

Household was unable to pay an energy bill or unable to pay the full bill amount, in last 12 months



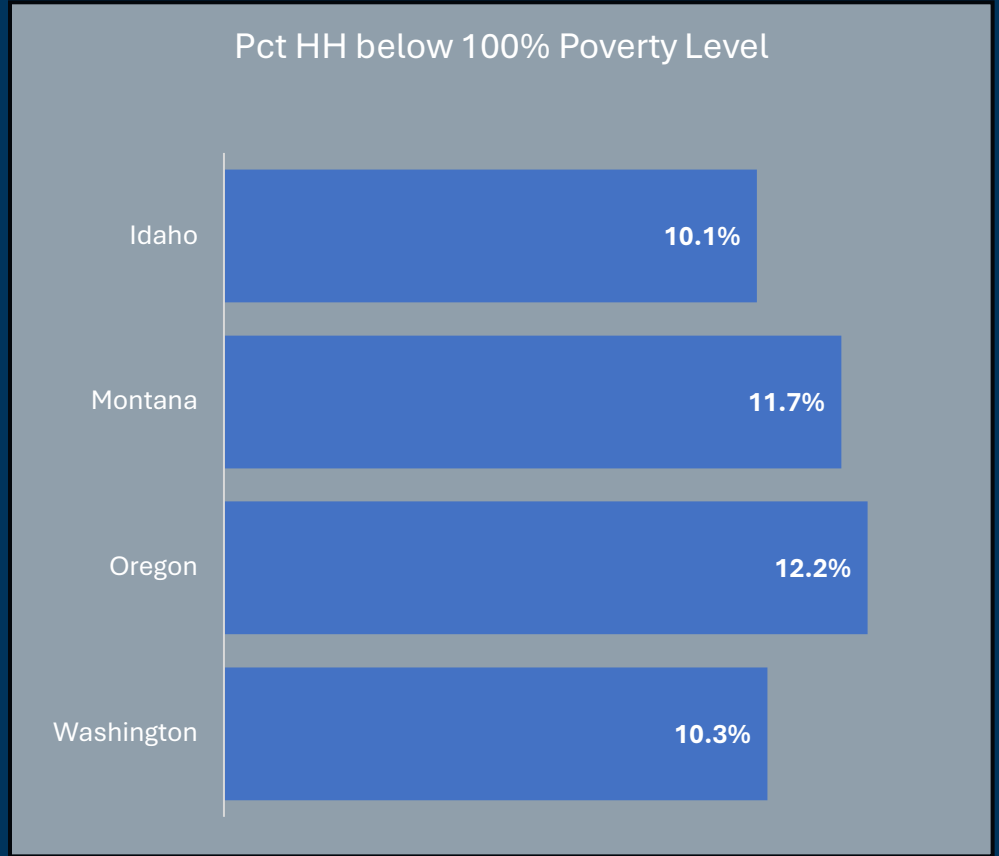
Poverty rate

Percent of households below 100% federal poverty level* by state

Idaho and **Washington** have lowest percent of households below the poverty level.

Montana and **Oregon** have highest percent of households below poverty level.

*Federal poverty level is the minimum income a family needs to cover basic necessities like food, shelter, clothing, and transportation, and varies by household size.

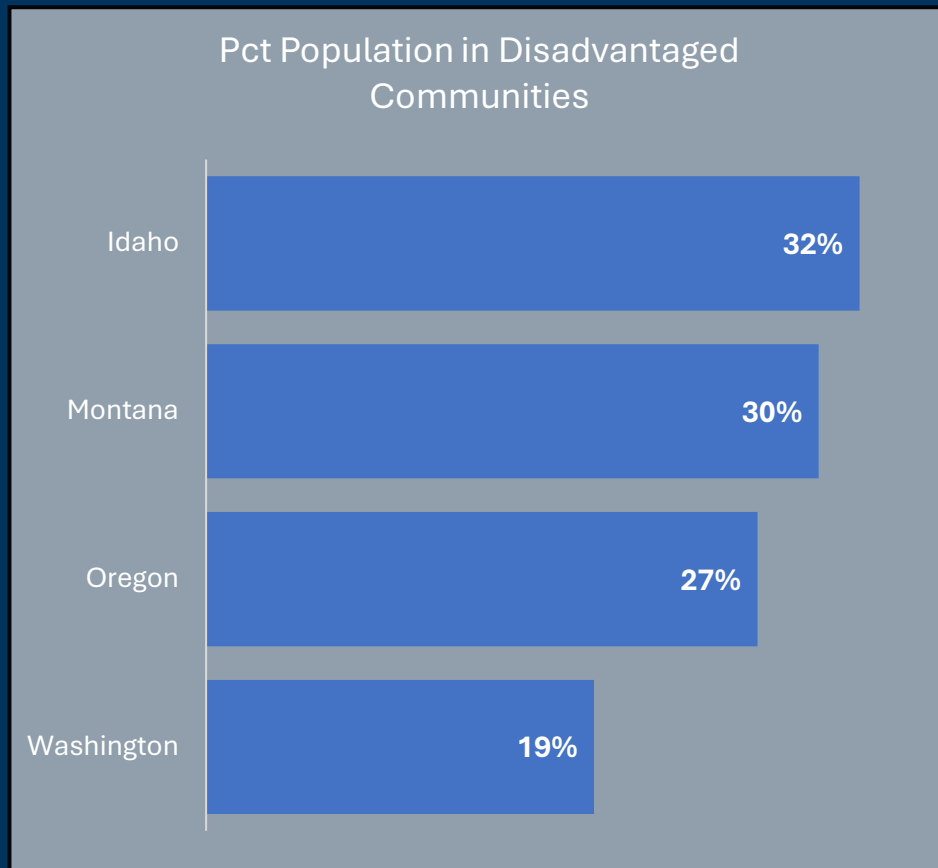


Population in disadvantaged communities

Percent of population in Disadvantaged Communities (DACs)

Washington has lowest percent of population in DACs.

Idaho has highest percent of population in DACs.



Age of population

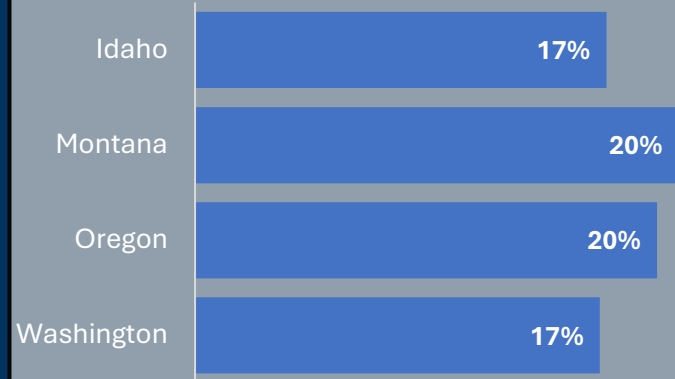
Percent of population over 65 years of age by state

Median age of population by state

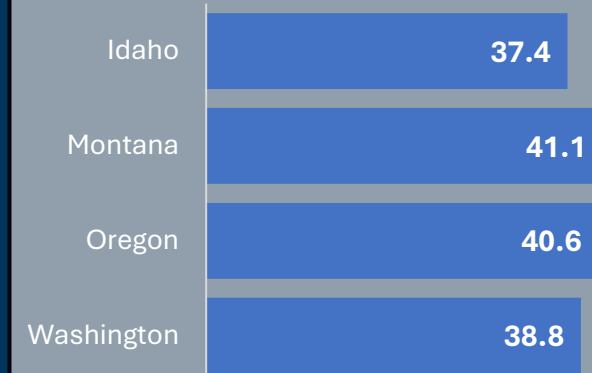
Montana has oldest population.

Idaho have a population that is older than their non-remote locales.

Pct over 65 Years



Median Age

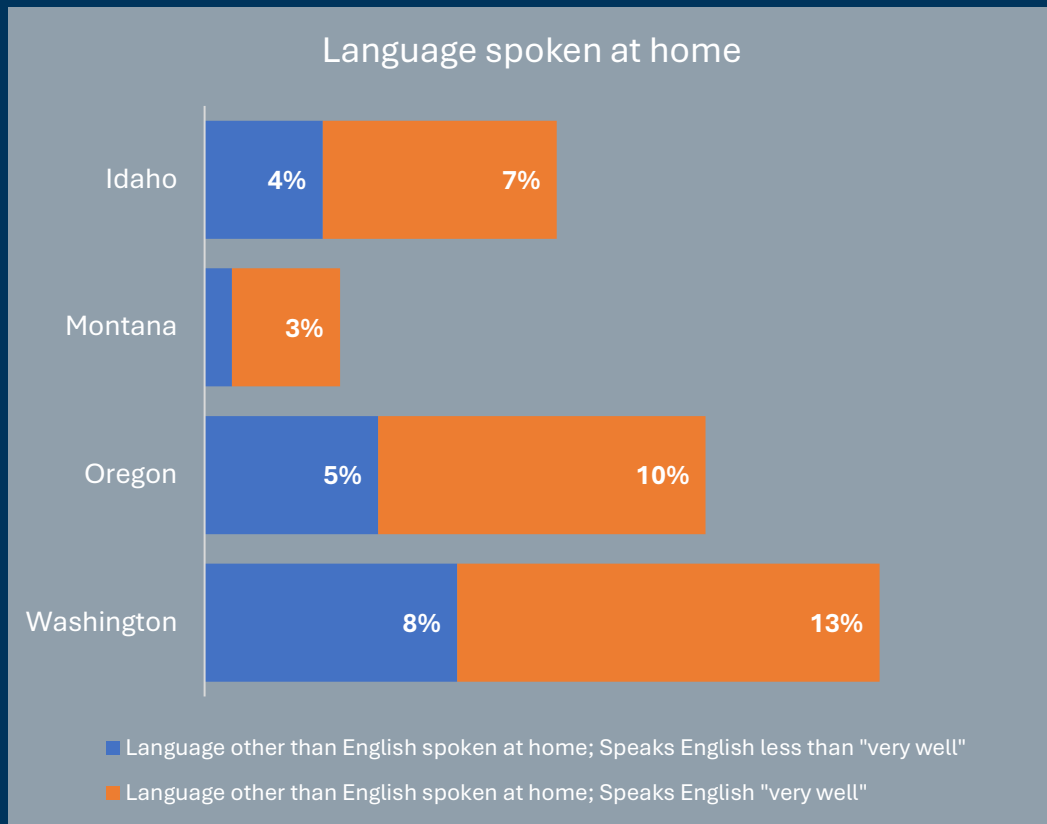


Language spoken at home

Percent of population who speak a language other than English at home; separate by does or does not speak English “very well” by state

Washington has significantly higher percent of people who speak another language at home.

Montana has the lowest percentage.

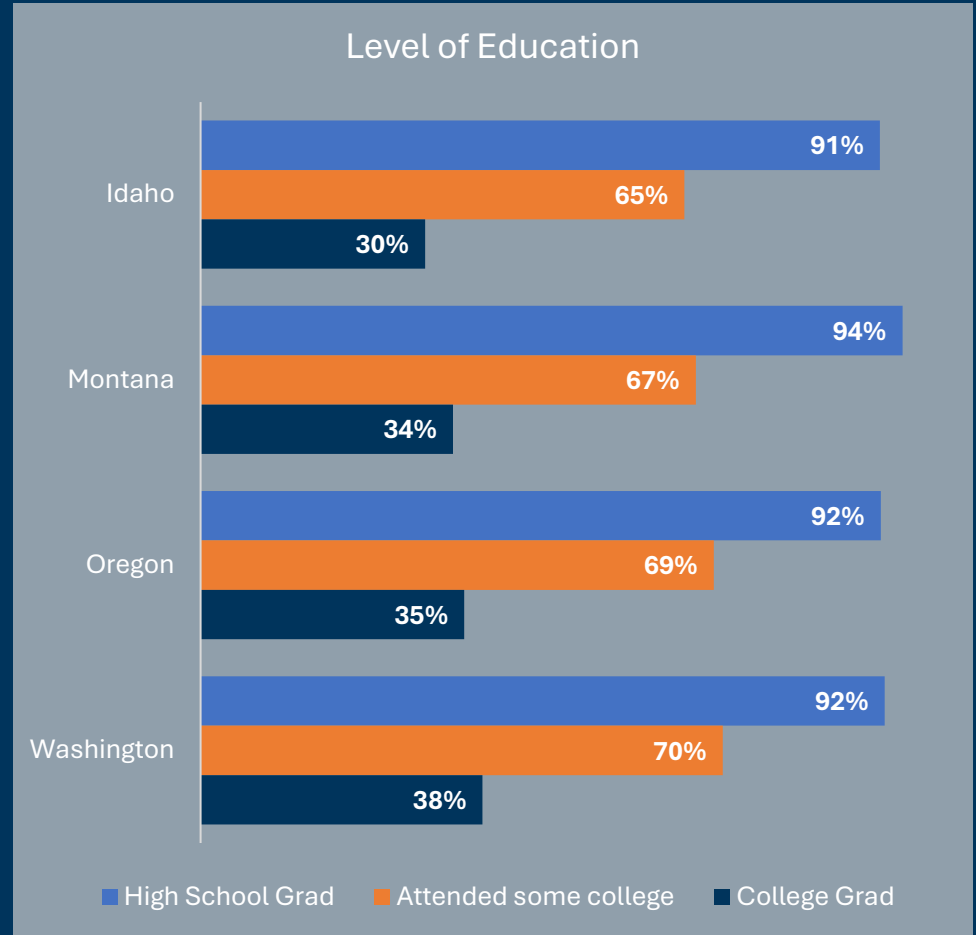


Level of education

Percent of population who attained specified level of education by state

Montana has highest percentage of population who graduated from high school.

Washington has highest percentage of population who graduated from college.



Political inclinations

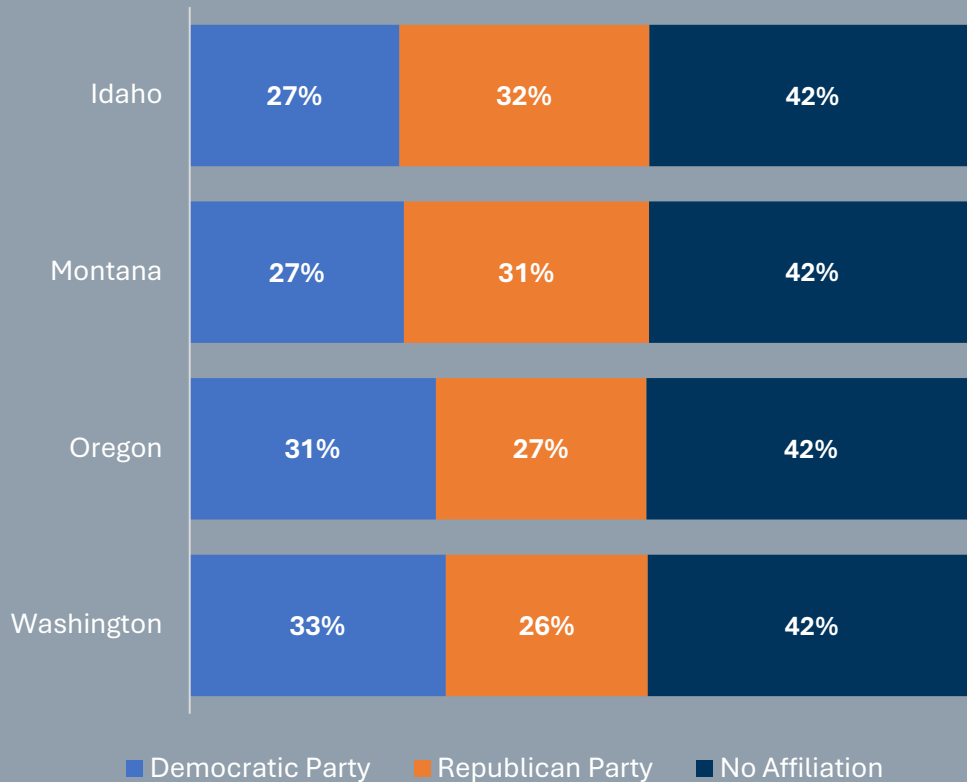
Percent of population who are affiliated with a political party by state

Idaho and Montana have a higher percent of people affiliated with the Republican Party.

Oregon and Washington have a higher percent of people affiliated with the Democratic Party.

All states have more people not affiliated with a party than affiliated with either party.

Pct Population Affiliated with Political Party

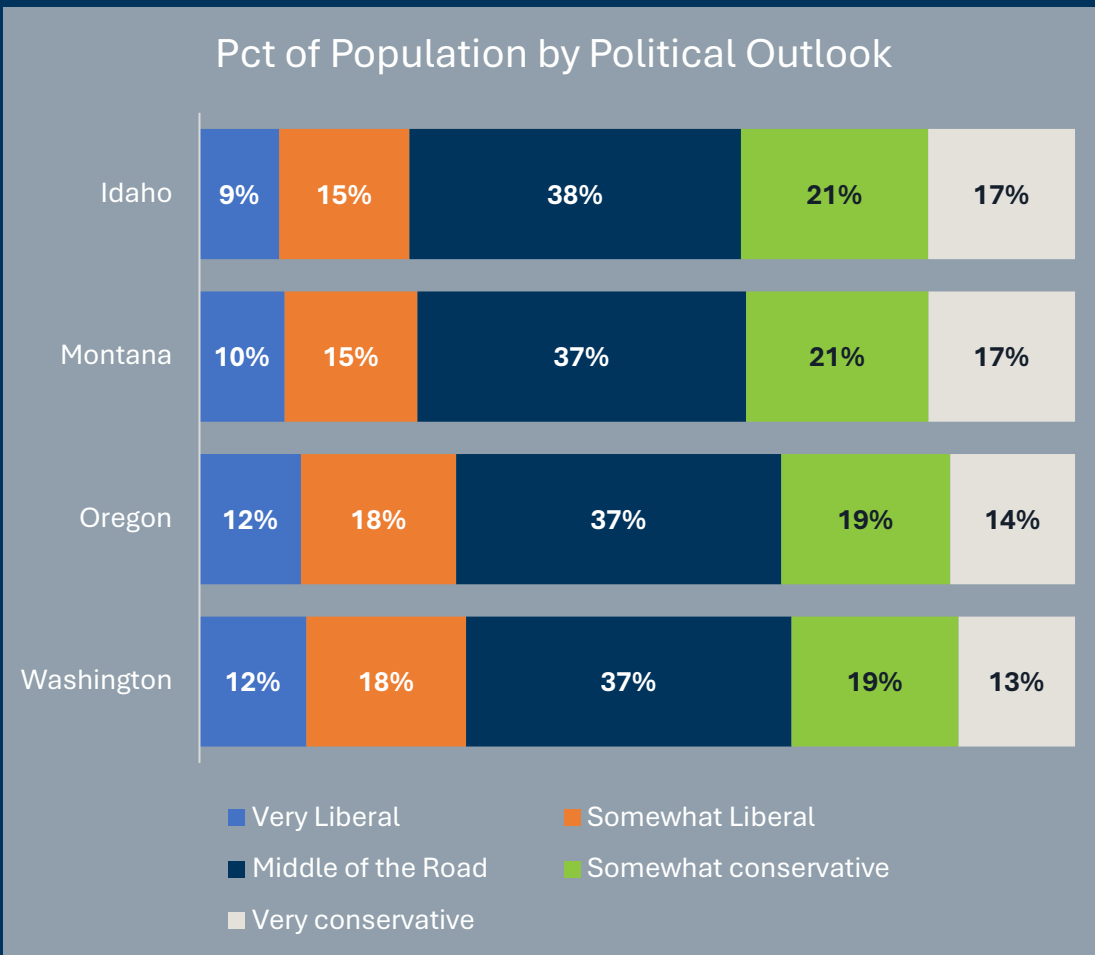


Political inclinations

Percent of population by political outlook by state

All states have a higher percent of “Middle of the Road” outlook than any other outlook.

All states have a higher percent of people with a conservative outlook than a liberal outlook.



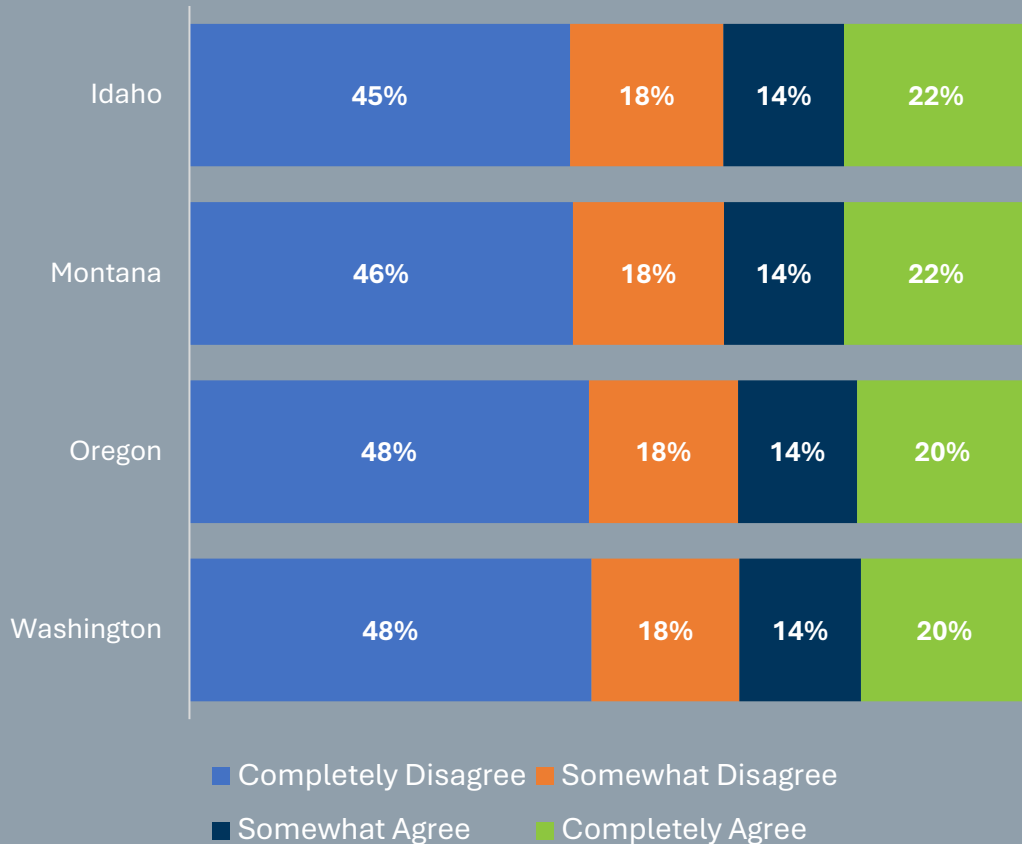
Religious service attendance

Responses to “Attend religious service regularly” by state

All locales have a higher percent of disagree than agree responses.

Idaho and **Montana** have a slightly higher percent of people who responded “Completely Agree” than other locales.

Attended religious services regularly



Energy Burden





Energy Burden: Definition

$$\text{Energy burden (\%)} = \frac{\text{Annual HH energy bills (\$)}}{\text{Annual HH income (\$)}}$$

- A household is considered “energy burdened” if their energy burden exceeds 6%
- Energy burden is impacted by
 - Energy consumption (and therefore: efficiency, size of home, weather, etc.)
 - Energy rates
 - Household income



Energy Burden: By Locale

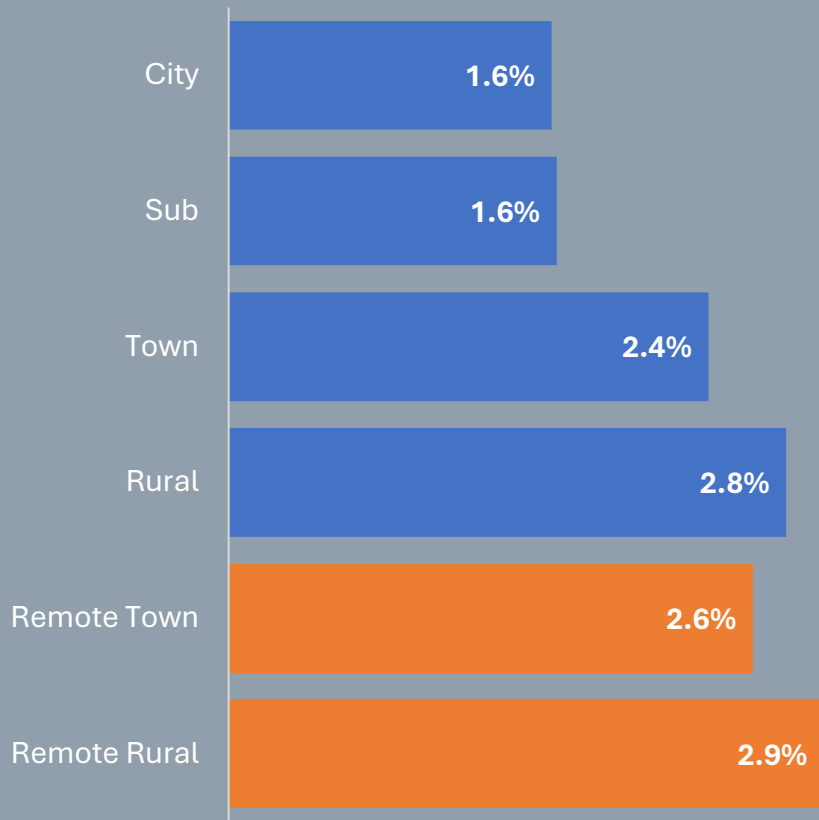
- Energy burden
- Energy burdened households
- Annual energy cost
- Compare town vs suburb energy burden
- Intersectionality of energy burden
- Energy burden by building type
- Energy burden by occupancy type
- Energy burden by primary heating fuel
- Energy burden in renter-occupied households by primary heating fuel
- Energy burdened renter-occupied households by primary heating fuel

Energy burden

Average percent of household energy burden

Towns and rural have the highest average energy burden compared to other locales, **Remote** locales having slightly higher energy burden than non-remote locales.

Avg Pct Energy Burden by Locale



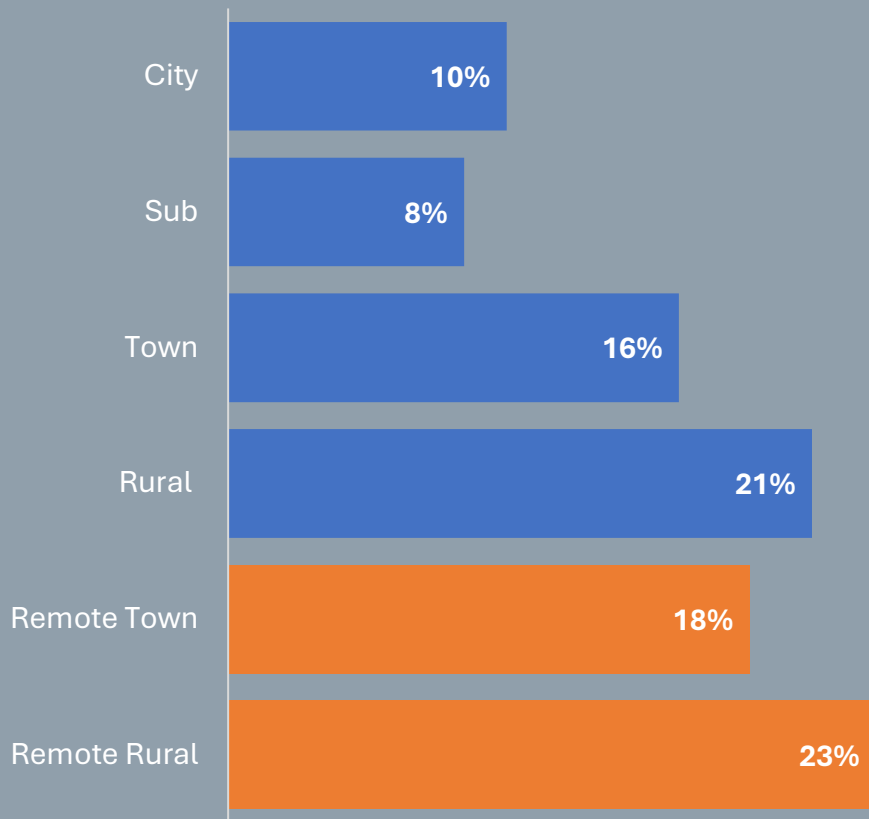
Energy burdened households

Percent of households that pay more than 6% of their income on energy costs

Though each locale has an average energy burden of less than 3%, there are still a significant number of energy burdened households.

Town and **Rural** have higher percent of energy burdened households than other locales.

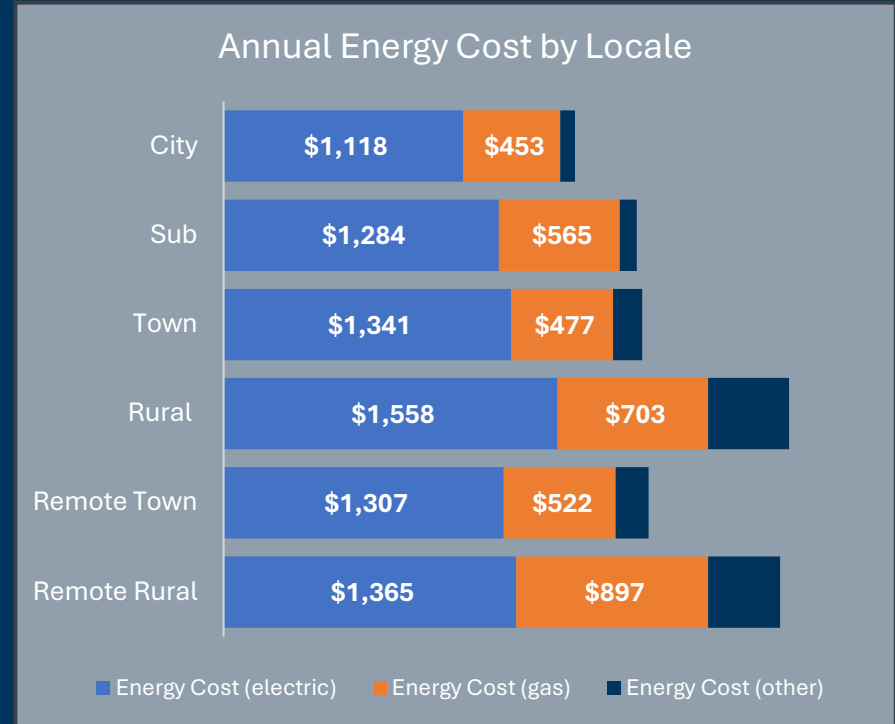
Pct Energy Burdened HH by Locale



Annual energy cost

Average annual energy cost, split between electric, gas, and other fuels

Rural has the highest energy costs of the locales.



	City	Sub	Town	Rural	Remote Town	Remote Rural
Total Energy Cost	\$1,640	\$1,929	\$1,953	\$2,639	\$1,984	\$2,597



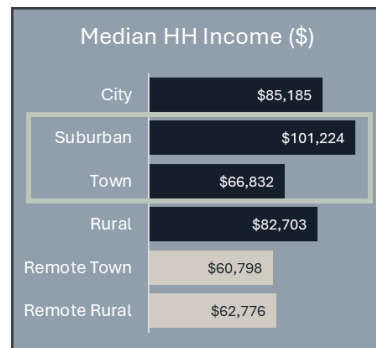
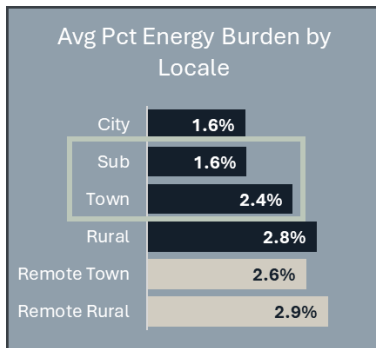
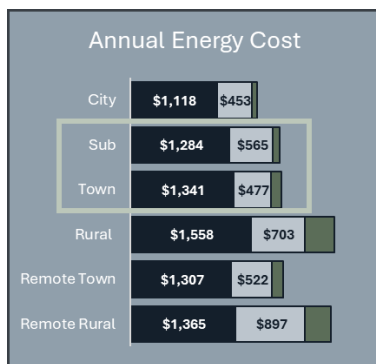
Town vs. suburb energy burden

- Annual energy cost of the two locales are about equal
- But town energy burden (2.4%) is 50% higher than suburb energy burden (1.6%)

WHY?

- Because median household income is significantly less in towns
- Holding energy bills constant while lowering income results in higher energy burden.

$$\text{Energy burden (\%)} = \frac{\text{Annual HH energy bills (\$)}}{\text{Annual HH income (\$)}}$$





Intersectionality of energy burden

- Energy burden does not seem to be very high when you look at all households across the region, even when you look by locale or state.
- Digging into energy burden by other factors (e.g., occupancy type, building type, primary heating fuel) starts to highlight specific groups within the region that do have significant energy burden.
- Digging even further into energy burden by the intersections of these factors (e.g., renter-occupied households by primary heating fuel) will provide greater insight into what households are most impacted by energy burden.
- The next few slides demonstrate this impact of intersectionality. The LD Consulting team recommends further analysis into these intersectionalities in the future.

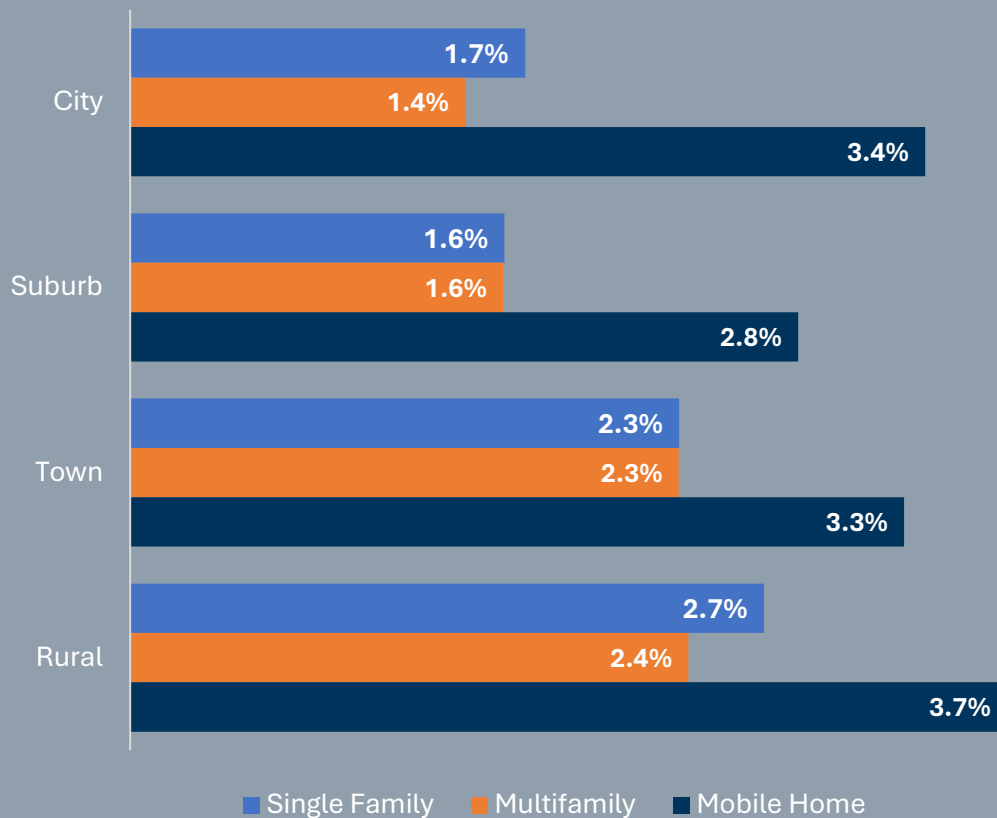
Energy burden by building type

Energy burden by building type by locale

Mobile Homes have the highest energy burden across all building types in every locale.

Town and **Rural** have higher energy burden in single family and multifamily households than **City** and **Suburb**.

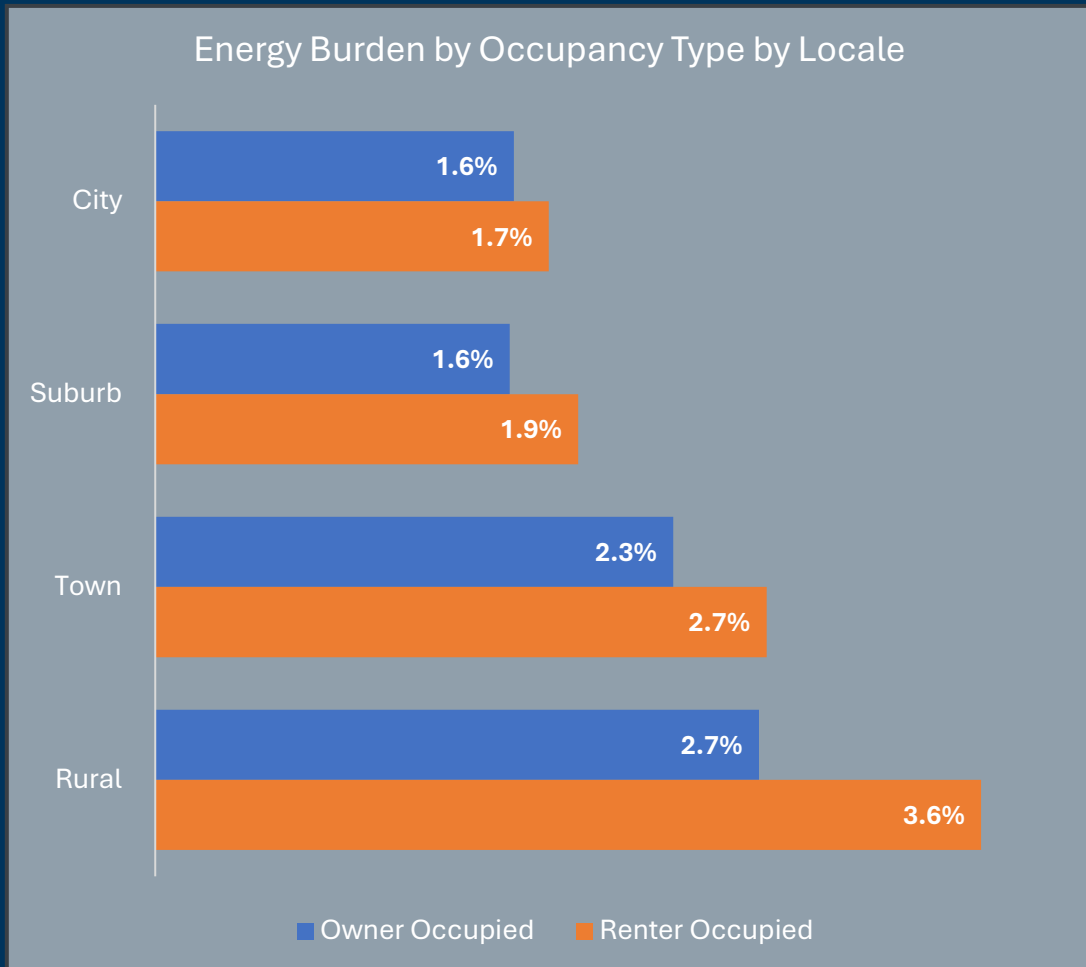
Energy Burden by Bldg Type by Locale



Energy burden by occupancy type

Energy burden by occupancy type by locale

Renter-occupied homes have higher energy burden in every locale.

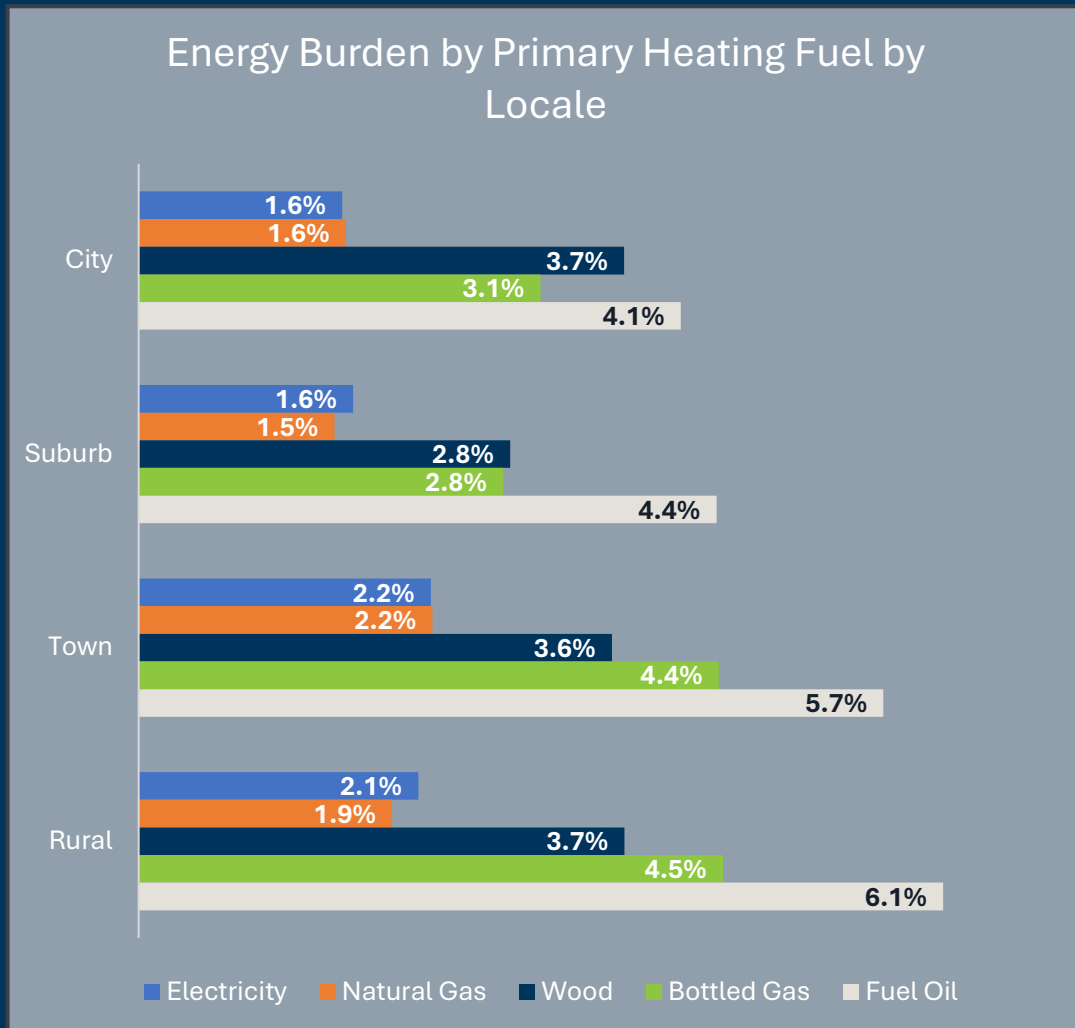


Energy burden by primary heating fuel

Energy burden by primary heating fuel by locale

Fuel oil heated homes have the highest energy burden across all locales.

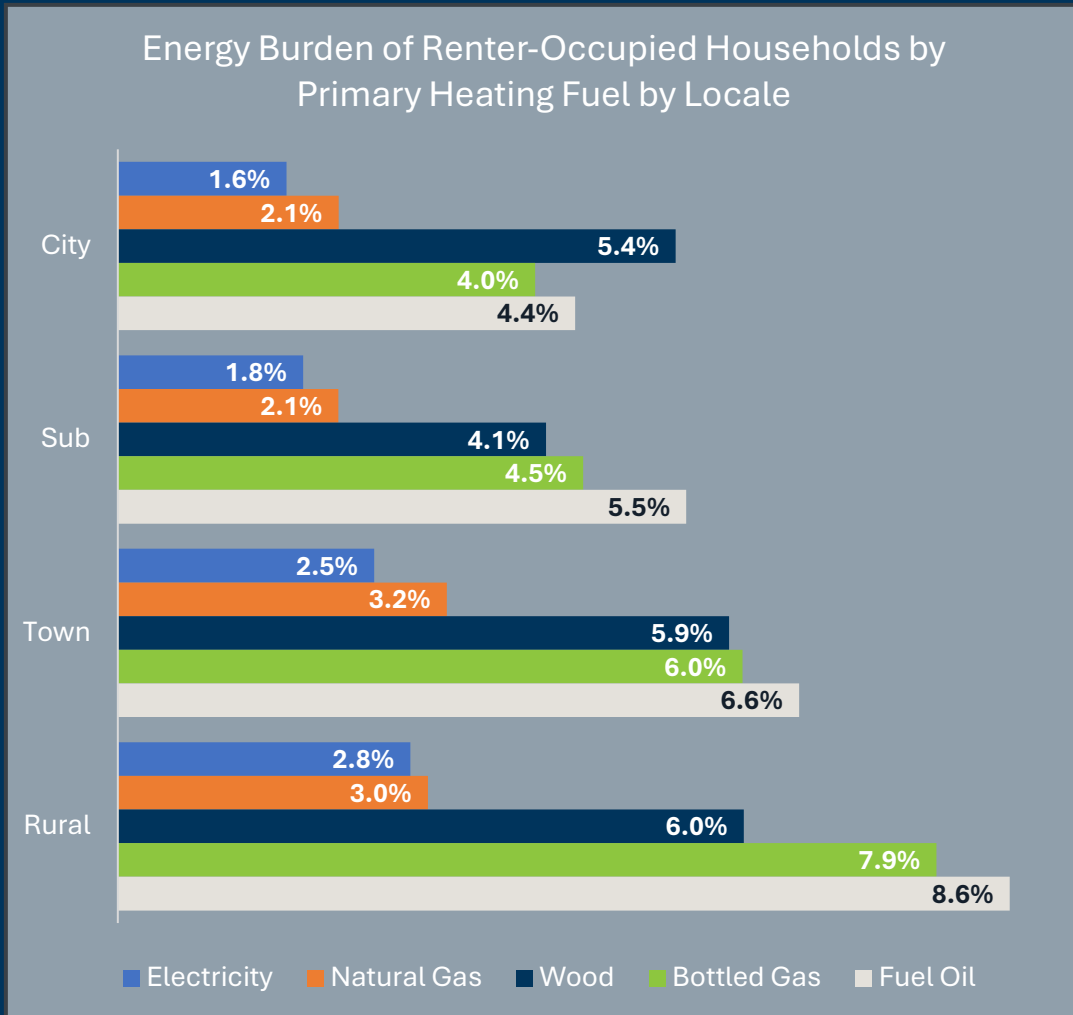
Bottled gas (e.g., propane) heated and **wood heated** homes also have significantly higher energy burden than electric or natural gas heated homes across all locales.



Energy burden in renter-occupied households by primary heating fuel

Energy burden by primary heating fuel in renter-occupied households by locale

The average energy burden in **Town** and **Rural** locales whose primary heating is wood, bottled gas or fuel oil is greater than 6%.

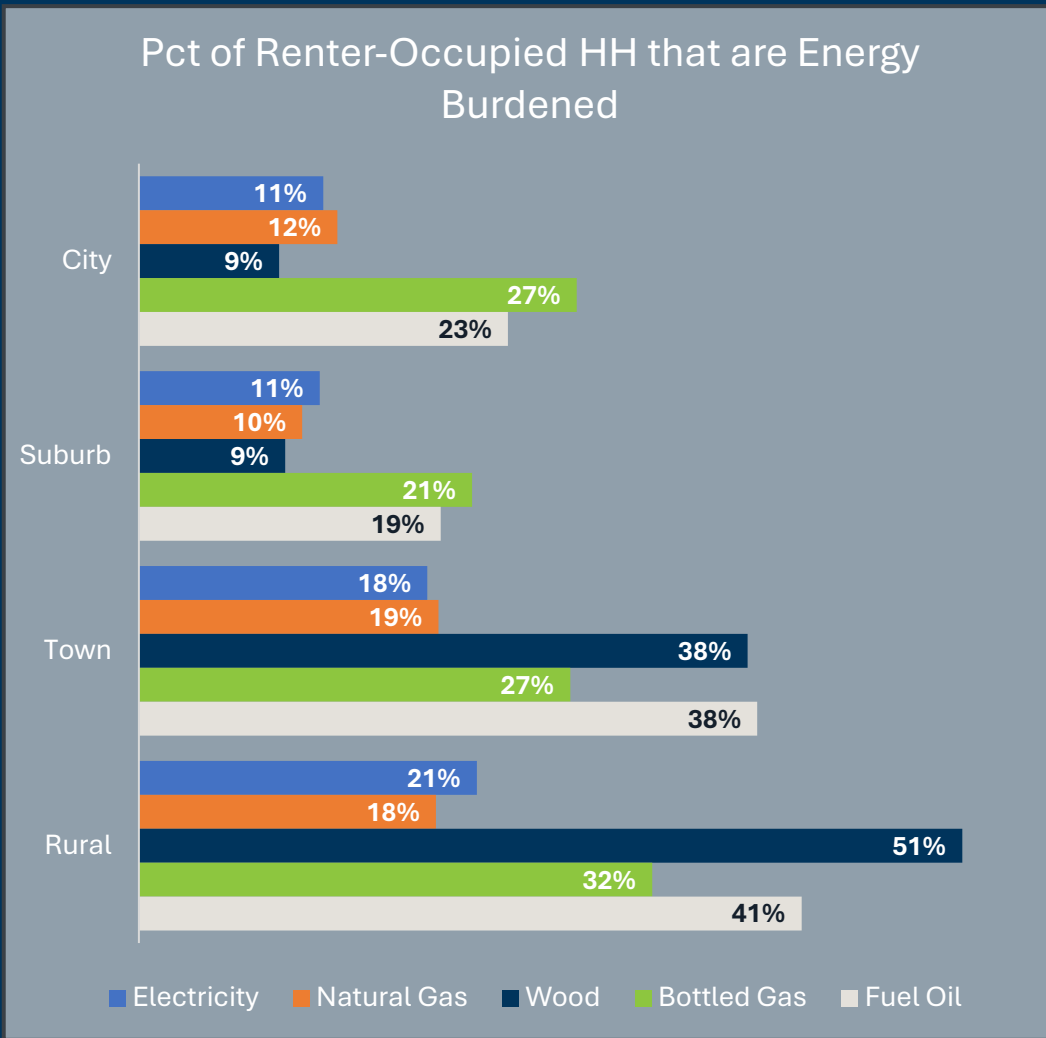


Energy burdened renter-occupied households by primary heating fuel

Percent of renter-occupied households that are energy burdened* by primary heating fuel

In **Town** and **Rural** locales, there are a large percentage of renter-occupied households that are energy burdened, especially those that heat with wood, bottled gas or fuel oil.

In all locales, a high percentage of renter-occupied households that heat with bottled gas or fuel oil are energy burdened.



*HHs that pay >6% of their income on energy costs



Energy Burdens: By State

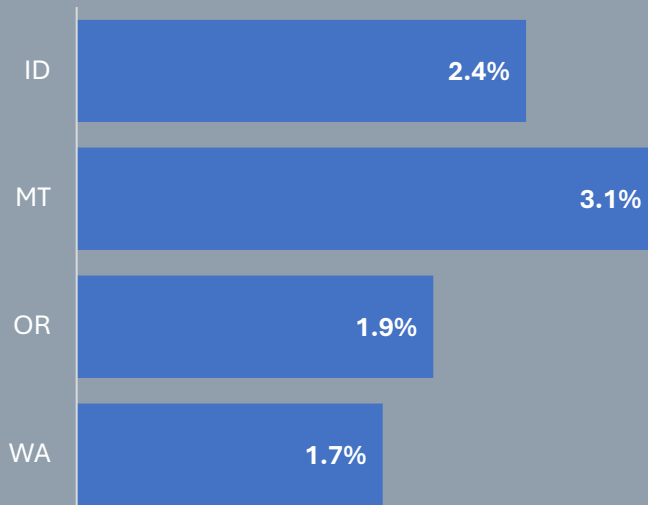
- Energy burden
- Energy burdened households
- Annual energy cost
- Average energy rates
- Annual HDD and CDD days
- Energy cost by conditioned area and year built
- Dive into Montana's energy burden
- Energy burden by building type
- Energy burden by occupancy type
- Energy burden by primary heating fuel
- Energy burden in renter-occupied households by primary heating fuel

Energy burden

Average percent of household energy burden

Montana has the highest average energy burden compared to other states.

Avg Pct Energy Burden
by State

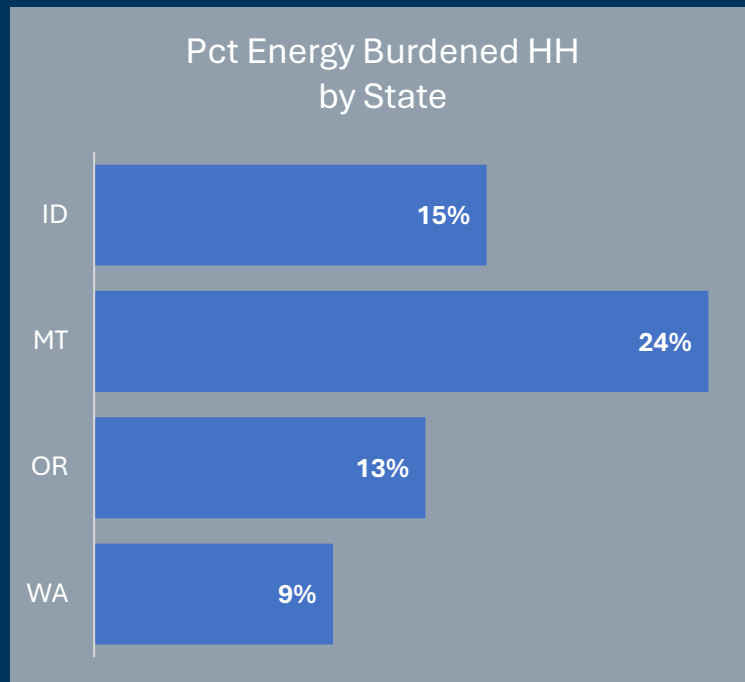


Energy burdened households

Percent of households that pay more than 6% of their income on energy costs

Montana has the highest percent of energy burdened households compared to other states.

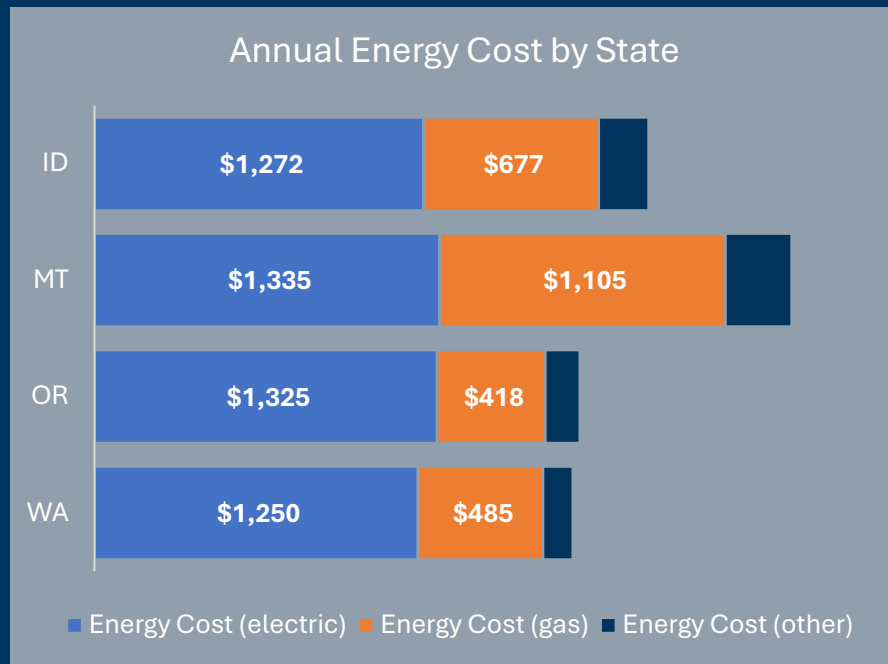
Though each state has an average energy burden of less than 4%, there are still a significant number of energy burdened households.



Annual energy cost

Average annual energy cost, split between electric, gas, and other fuels

Montana has the highest energy costs of the states, with average natural gas costs being the main contributor to the difference.



	ID	MT	OR	WA
Total Energy Cost	\$2,143	\$2,695	\$1,877	\$1,849

Average energy rates

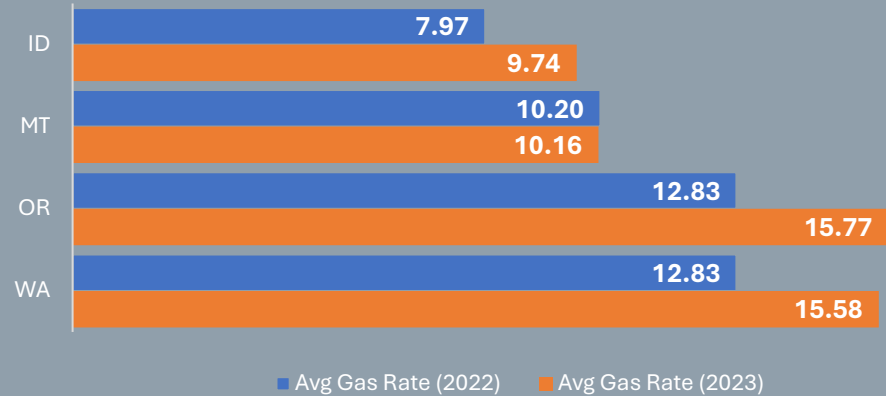
Average electric and natural gas costs by state, in 2022 vs recent

2022 data was included to align with the energy burden data, which is from 2022.

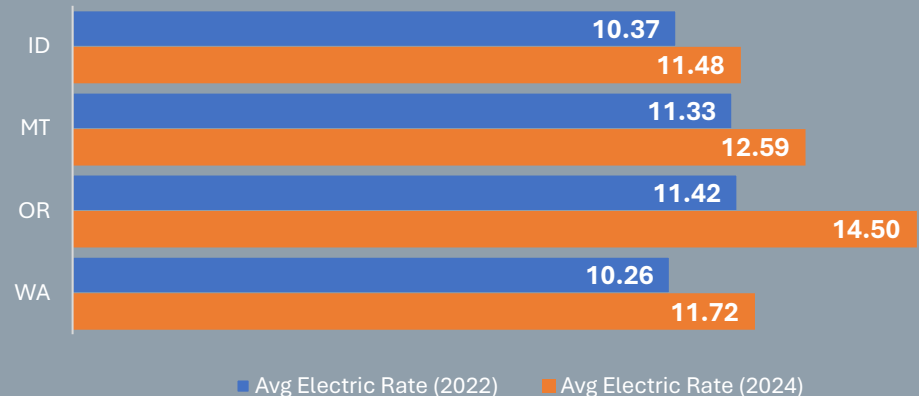
Idaho has the lowest energy costs of the states.

Oregon and **Washington** have significantly higher natural gas costs as compared to **Idaho** and **Montana**.

Avg Natural Gas Price by Year by State (\$/1000 CF)



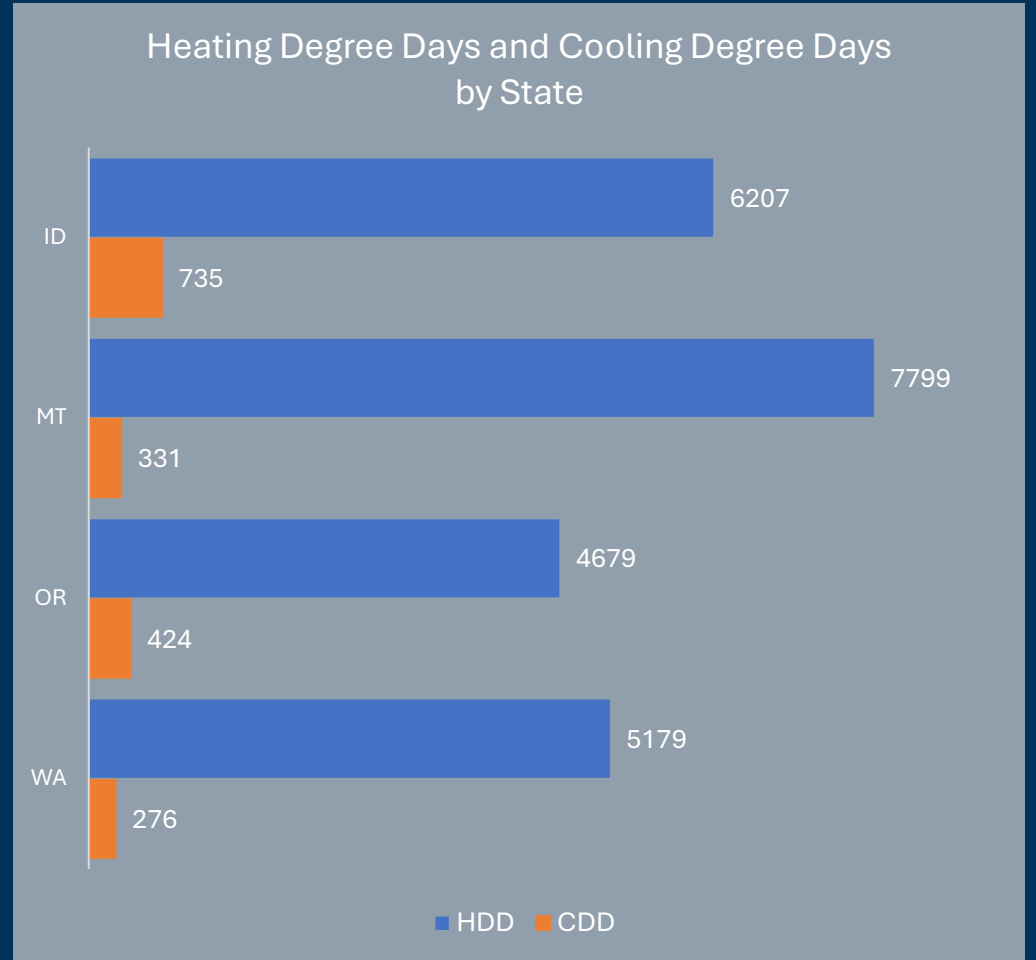
Avg Electricity Price by Year by State (cents/kWh)



Annual HDD and CDD by state

Average annual heating degree days (HDD) and cooling degree days (CDD) by state

Montana has significantly higher HDD than other states.





Montana Energy Burden

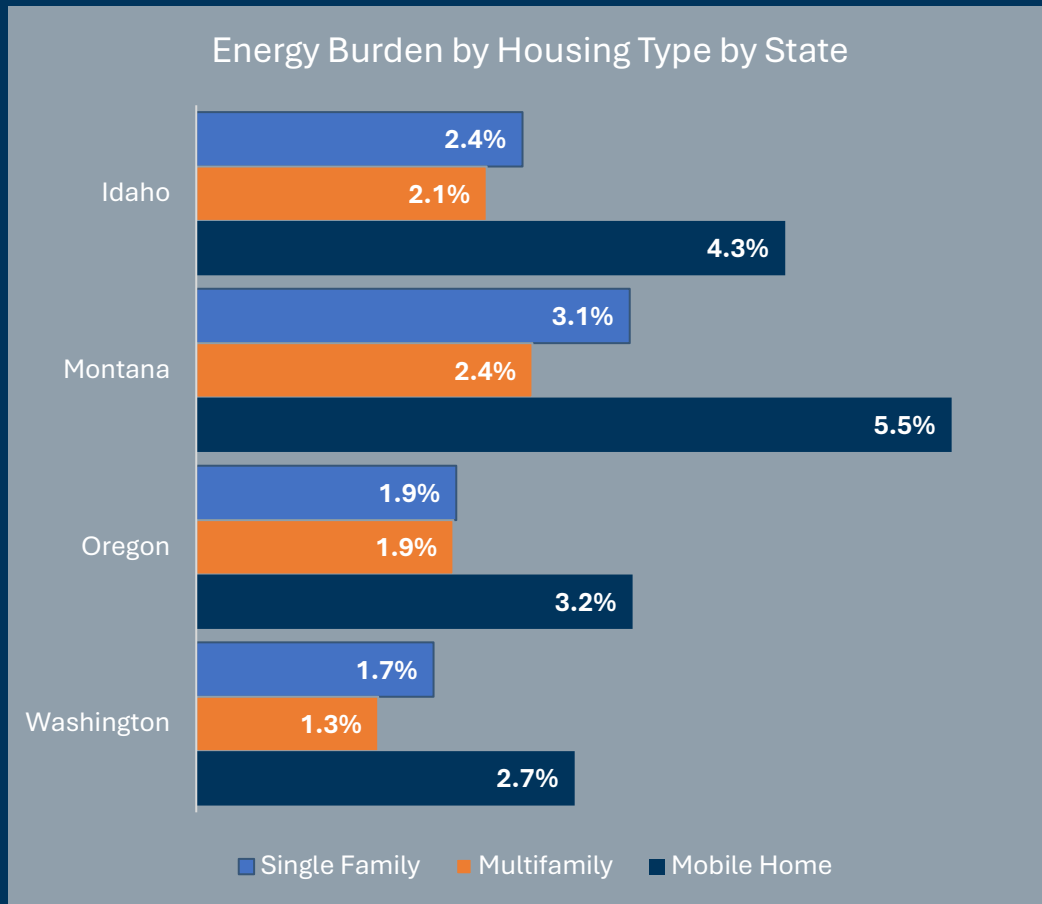
- Montana has compounding issues resulting in high energy burden, as presented in the previous slide.
 - Lowest median income
 - Colder weather than Oregon and Washington (a bit colder than Idaho)
 - Note: Energy rates in Montana are similar to or lower than other states

Energy burden by building type

Energy burden by building type by state

Mobile Homes have the highest energy burden across all building types in every state.

Montana has the highest energy burden across all building types.

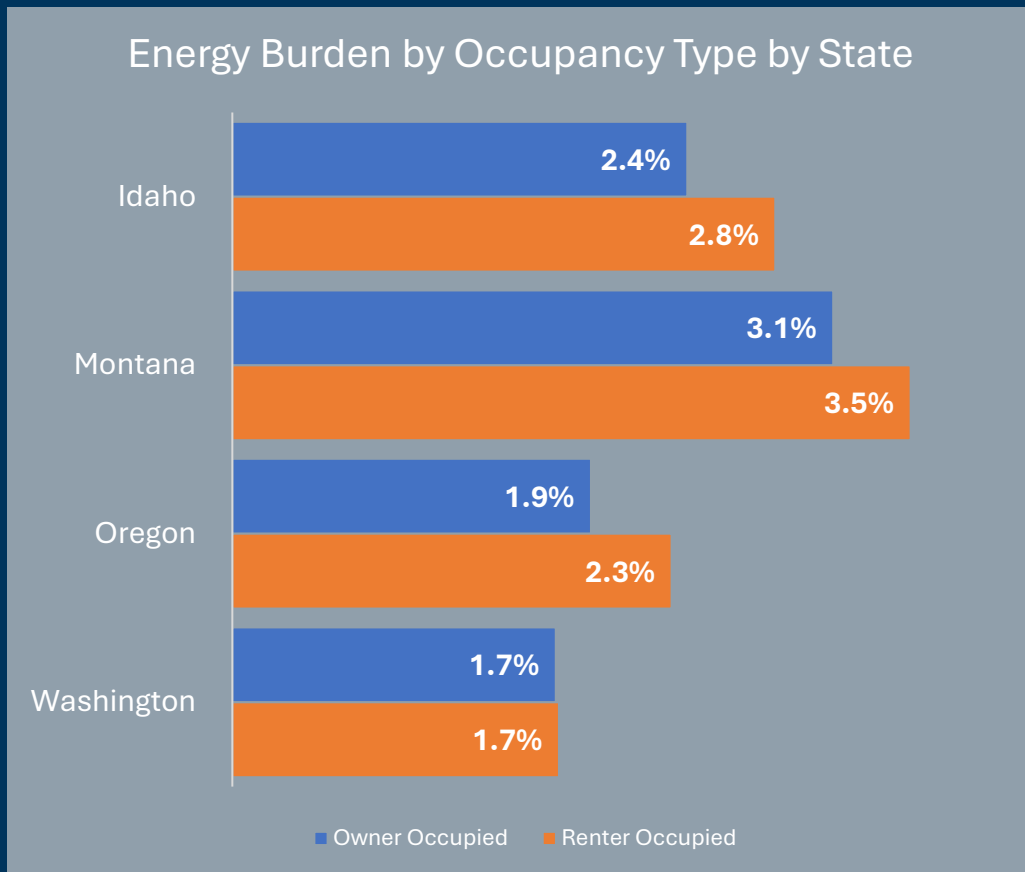


Energy burden by occupancy type

Energy burden by occupancy type by state

Renter-occupied homes have higher energy burden in every state except Washington.

Montana has the highest energy burden across both occupancy types.



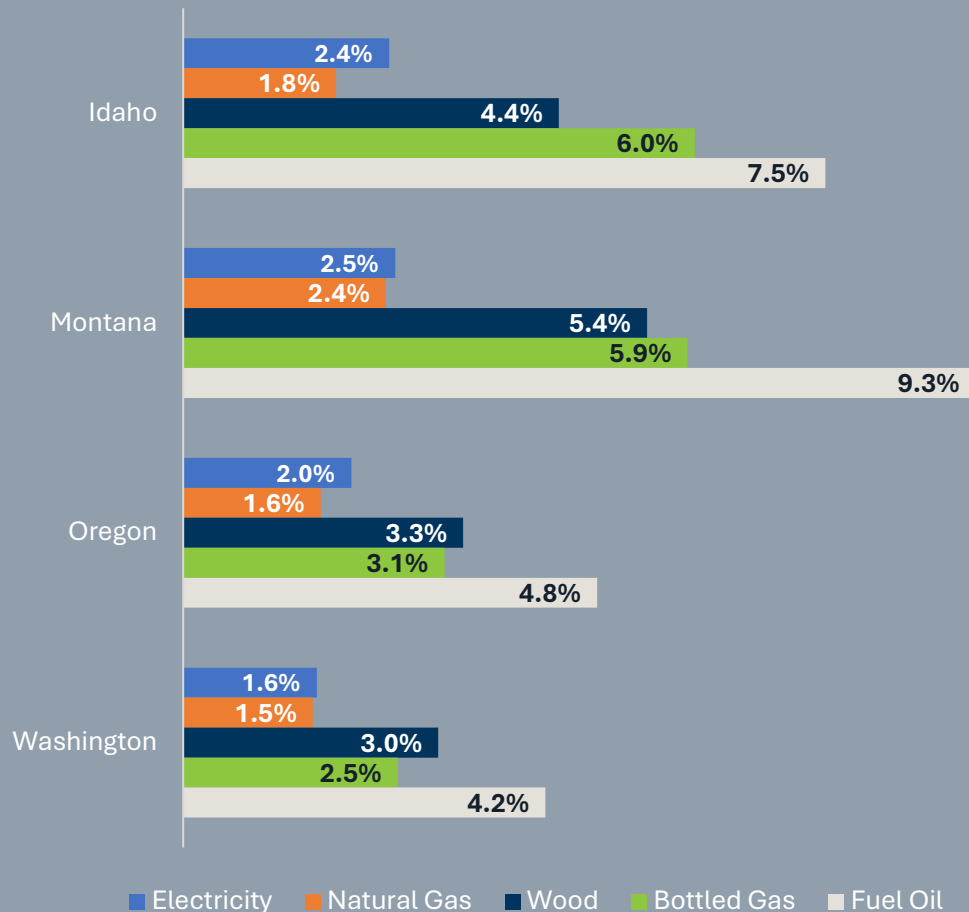
Energy burden by primary heating fuel

Energy burden by primary heating fuel by state

Fuel oil heated homes have the highest energy burden across all states.

Bottled gas (e.g., propane) heated and **wood heated** homes also have significantly higher energy burden than electric or natural gas heated homes across all states.

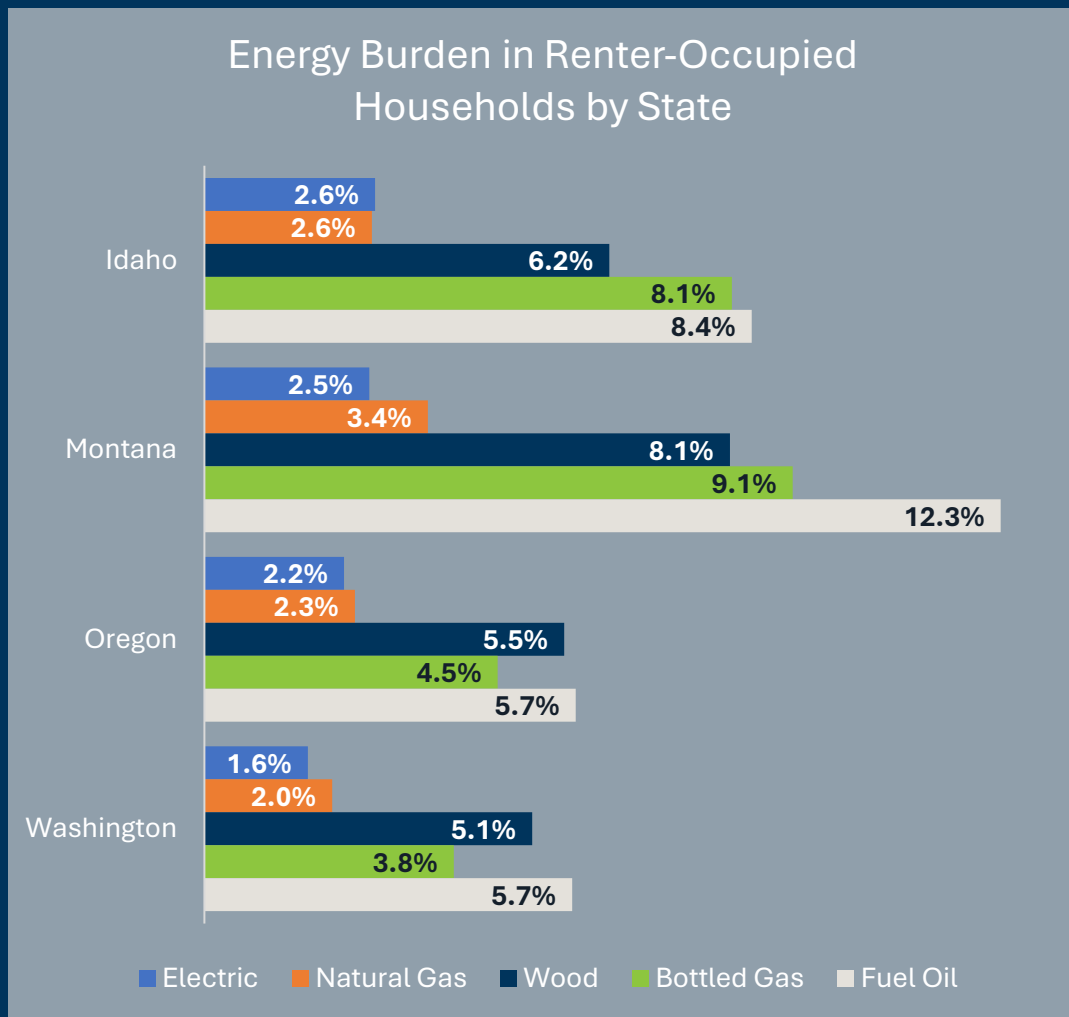
Energy Burden by Primary Heating Fuel by State



Energy burden in renter-occupied households by primary heating fuel

Energy burden by primary heating fuel in renter-occupied households by state

The average energy burden in renter-occupied households in **Idaho** and **Montana** whose primary heating is wood, bottled gas or fuel oil is greater than 6%.





Energy Burdens: By Locale and State

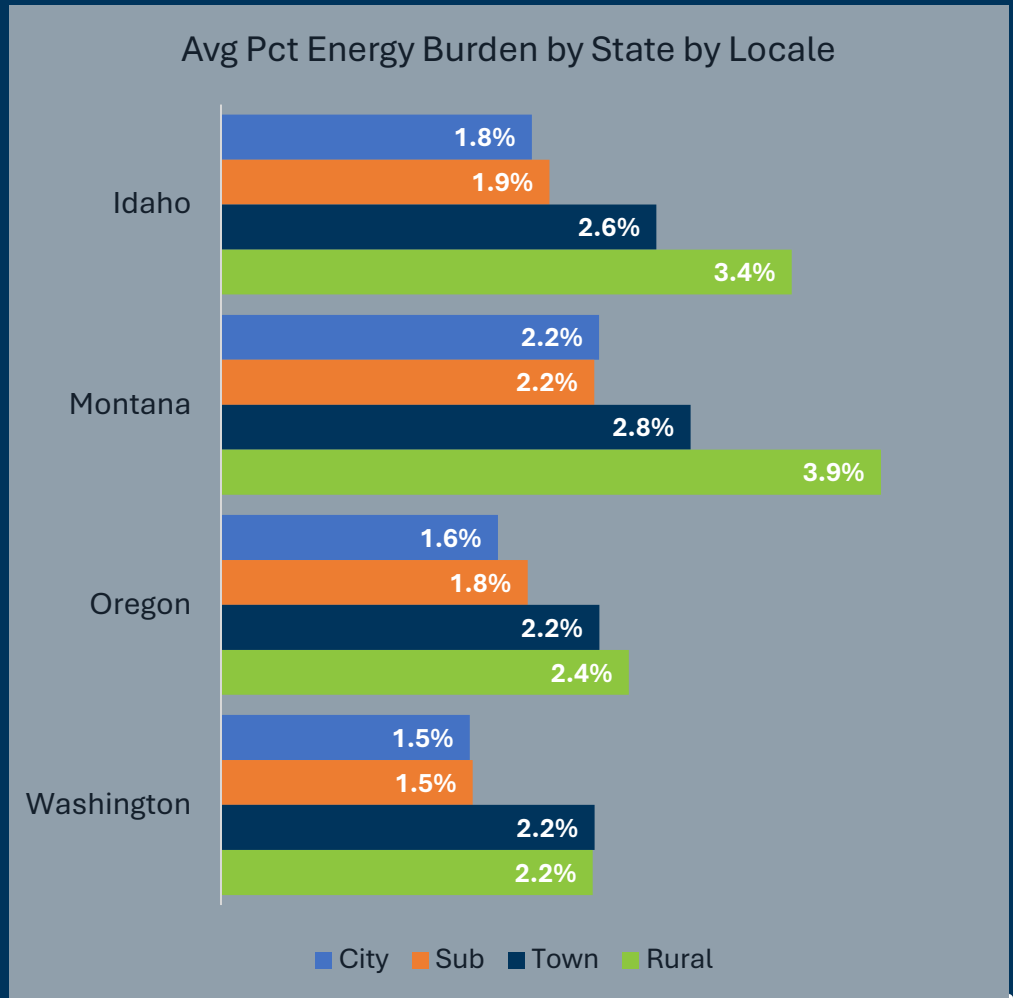
- Energy burden
- Energy burdened households
- Annual energy cost

Energy burden

Average percent of household energy burden by locale and state

Montana has the highest percent of energy burden compared to other states in every locale type.

Town and **Rural** has higher percent of energy burden across all states.

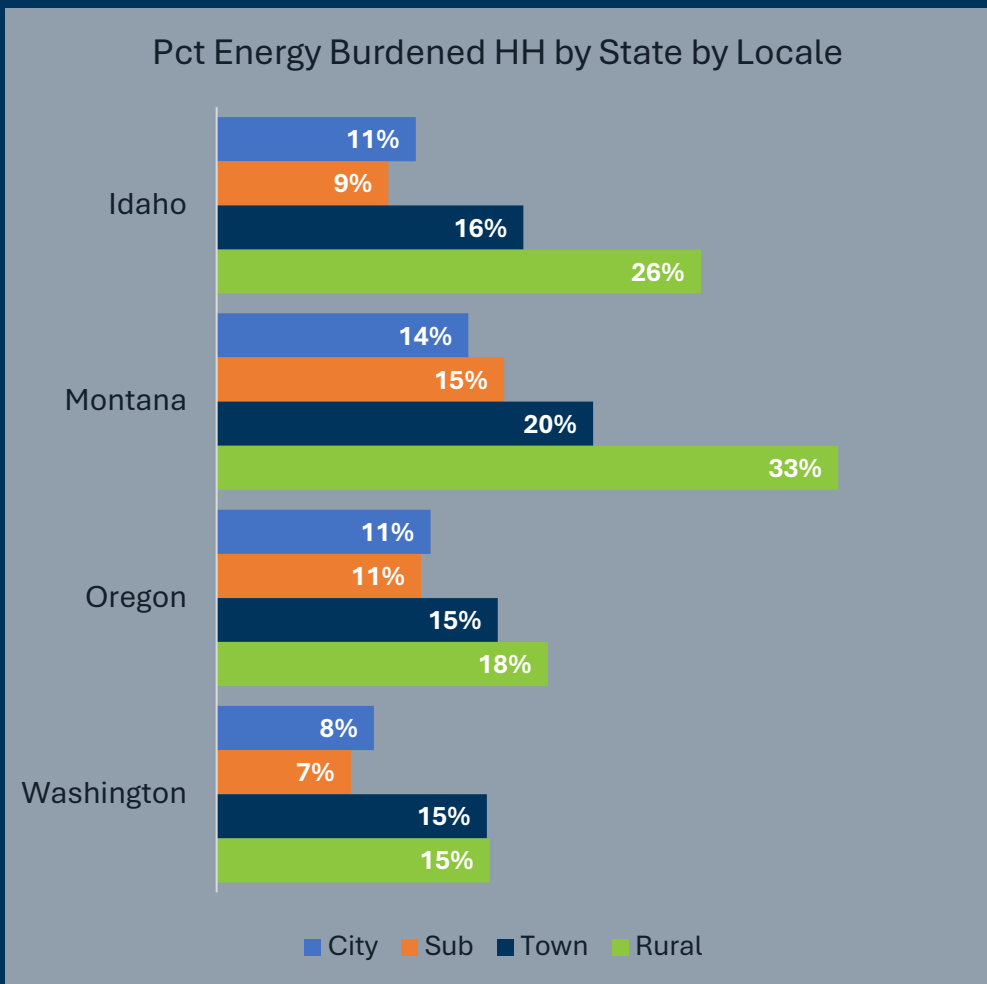


Energy burdened households

Percent of households that pay more than 6% of their income on energy costs by locale and state

Montana has the highest percent of energy burdened households compared to other states in every locale type.

Town and **Rural** has higher percent of energy burdened households across all states.



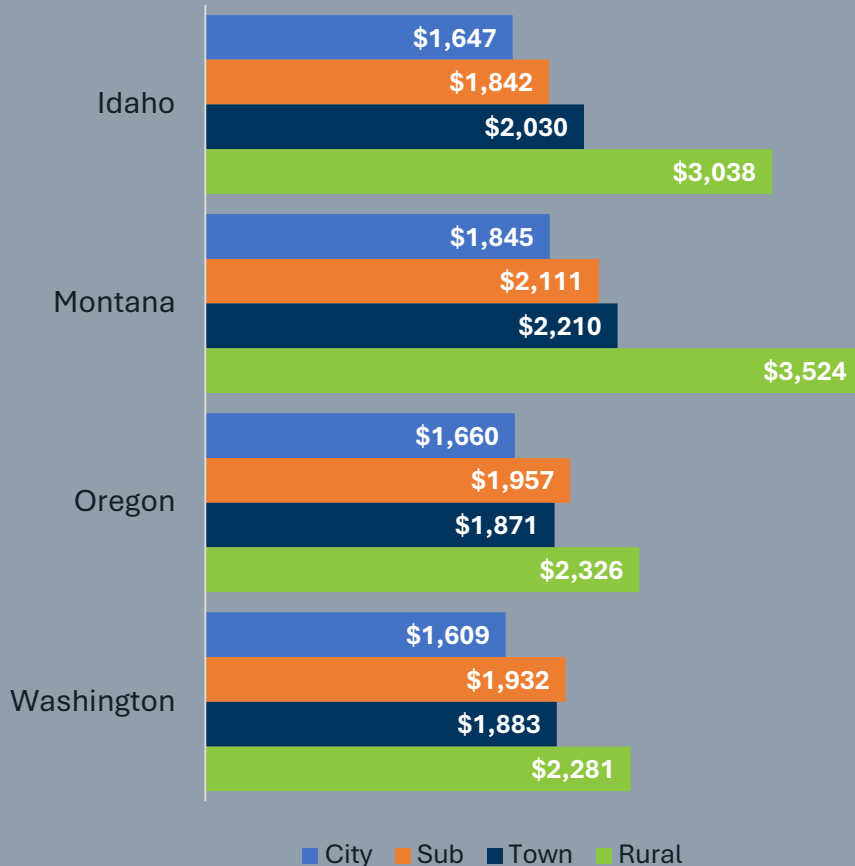
Energy cost

Average annual energy cost by locale and state

Montana has the highest energy costs in every locale type.

Rural has the highest energy costs across all states.

Energy Costs (\$) by State by Locale



Market Actors

*ArcGIS Business
Analyst, Points of
Interest*

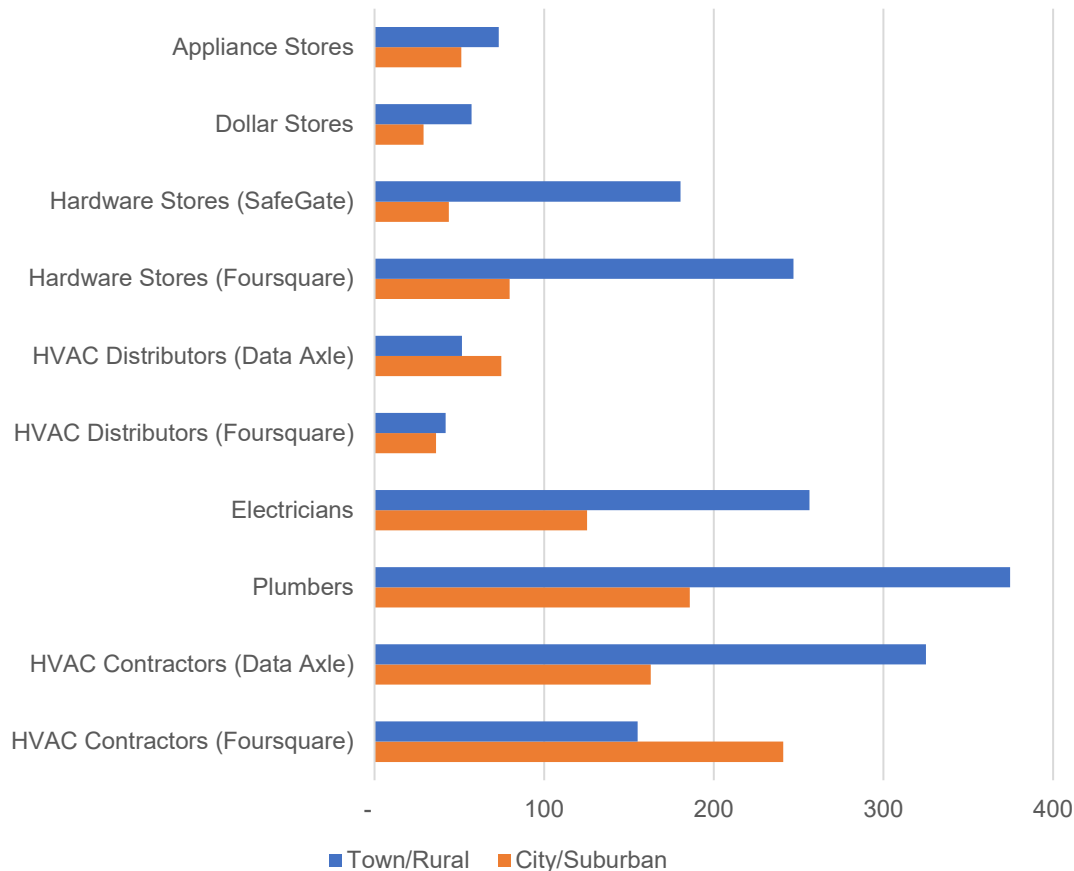


Market Actor Summary

By Locale, per capita

Note that the two data sources resulted in nearly opposite results in HVAC contractors

Stores/Market Actors per 1M people by locale



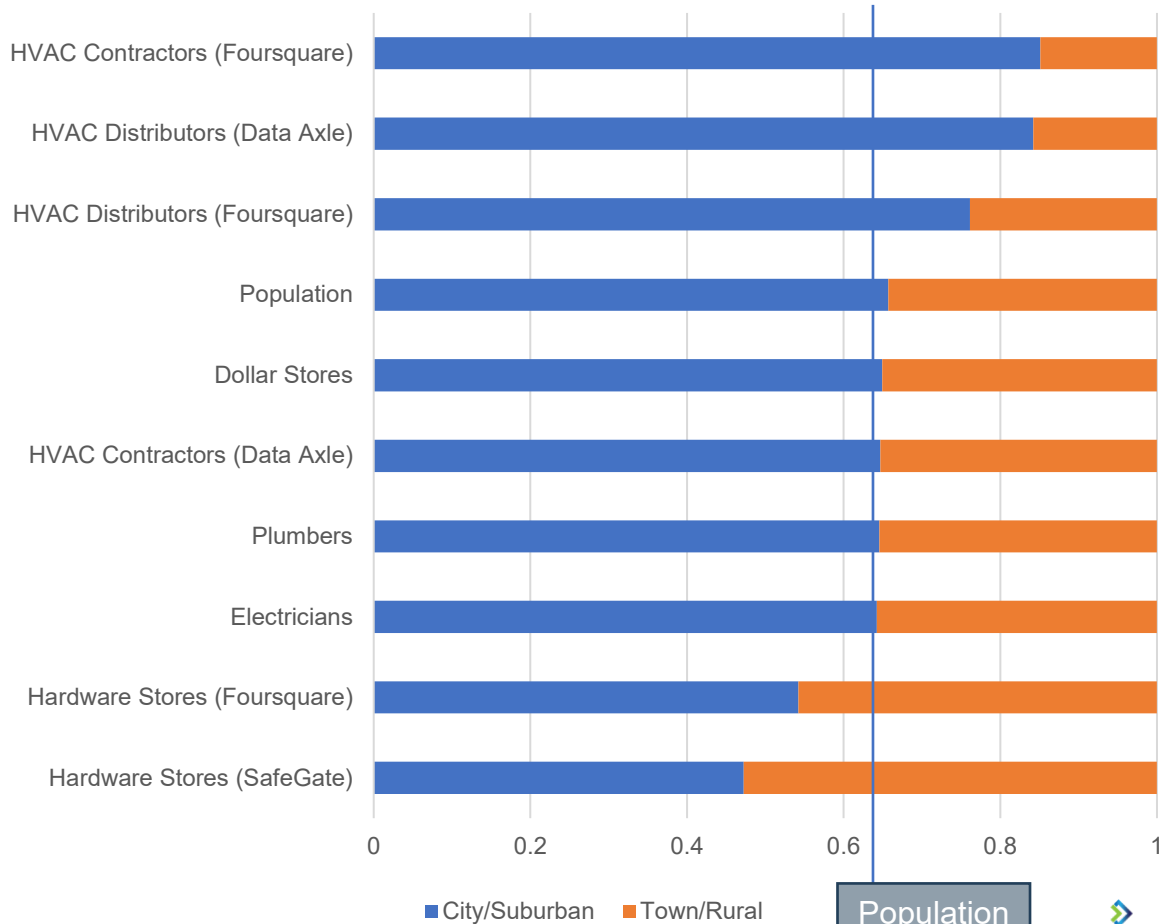
Market Actor Summary

By Locale

City/Suburb have more HVAC distributor and contractors (per Foursquare) per capita.

Town/Rural have more hardware stores per capita.

Pct of Market Actors in Locales





Apples to apples?

How to compare resource availability across locales

- While per capita metrics are one way to look at data, the heat maps on following pages show how more spread out these resources are in **Rural** and **Town** locales.
 - I.e., the much lower population density of Rural locales (500 times less than City locales) and Town locales (two times less than City locales) results in **Rural**, and to a lesser extent **Town**, residents having far fewer contractors located nearby.
- Households in **Rural** and **Town** locales have fewer local resources, which may present barriers, such as:
 - Fewer options in contractors and equipment
 - Higher costs
 - Longer wait times

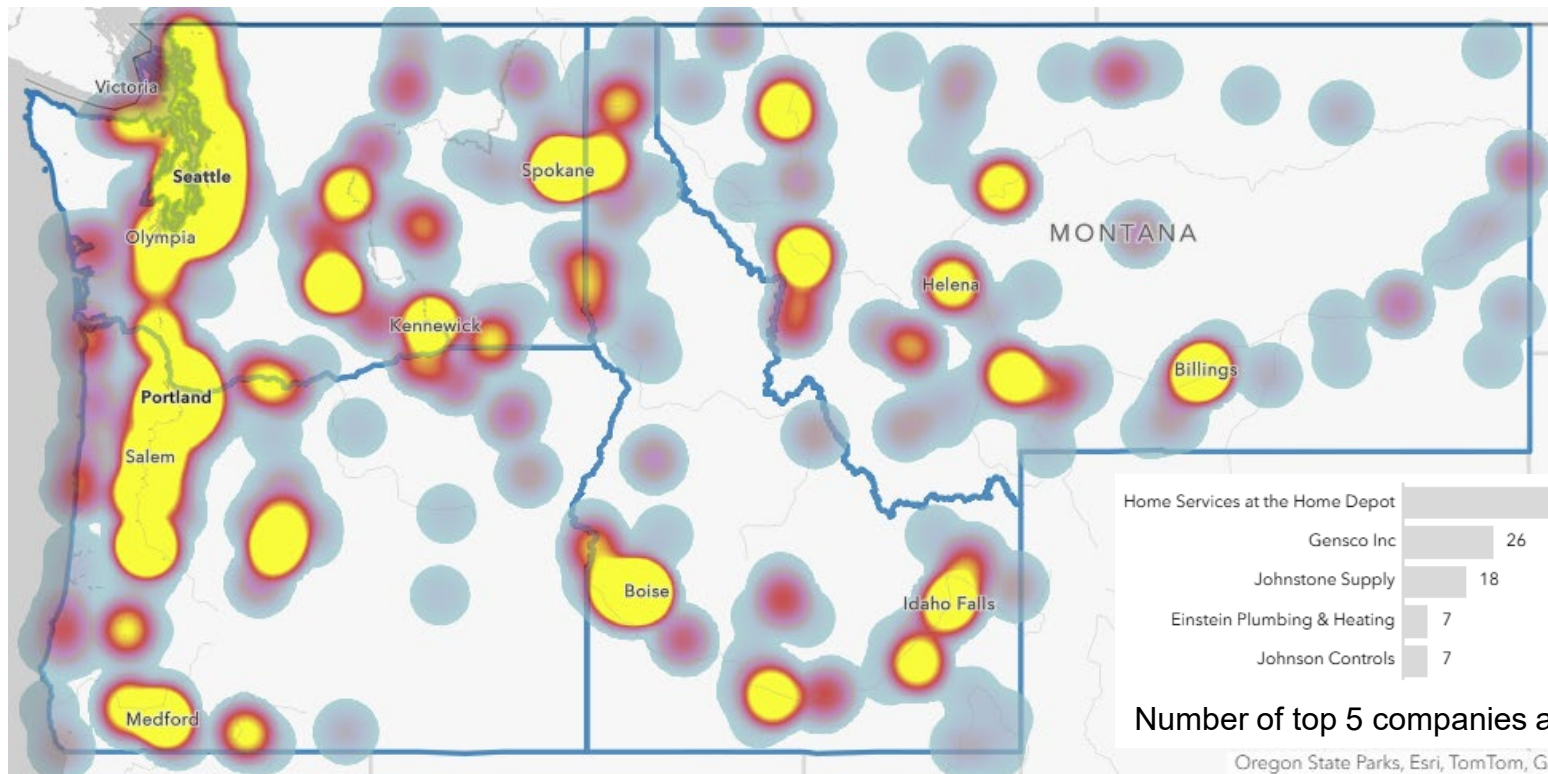


Contractors



HVAC Contractors (companies) – 2,937 locations

Data Source: Data Axle

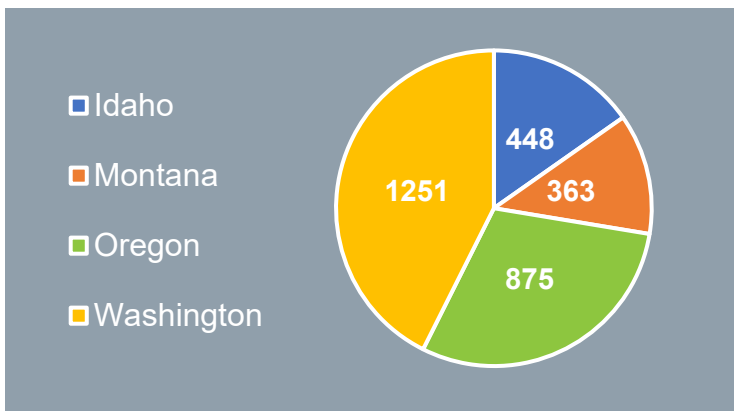




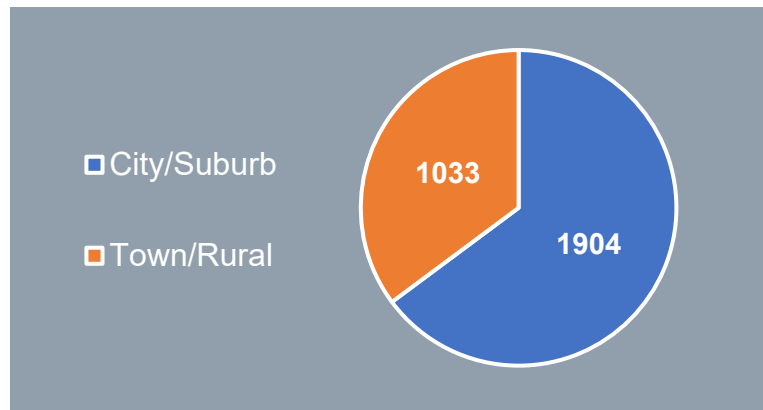
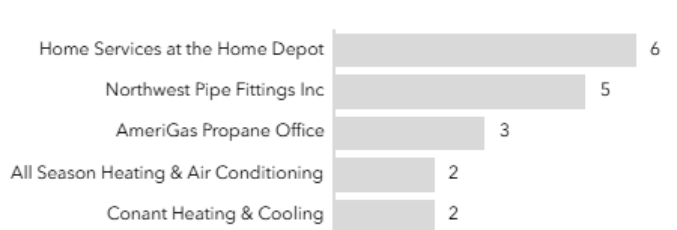
HVAC Contractors (companies)

Data Source: Data Axle

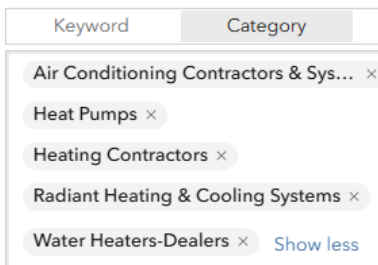
Number of contractors by state and locale



Number of top 5 companies in Montana



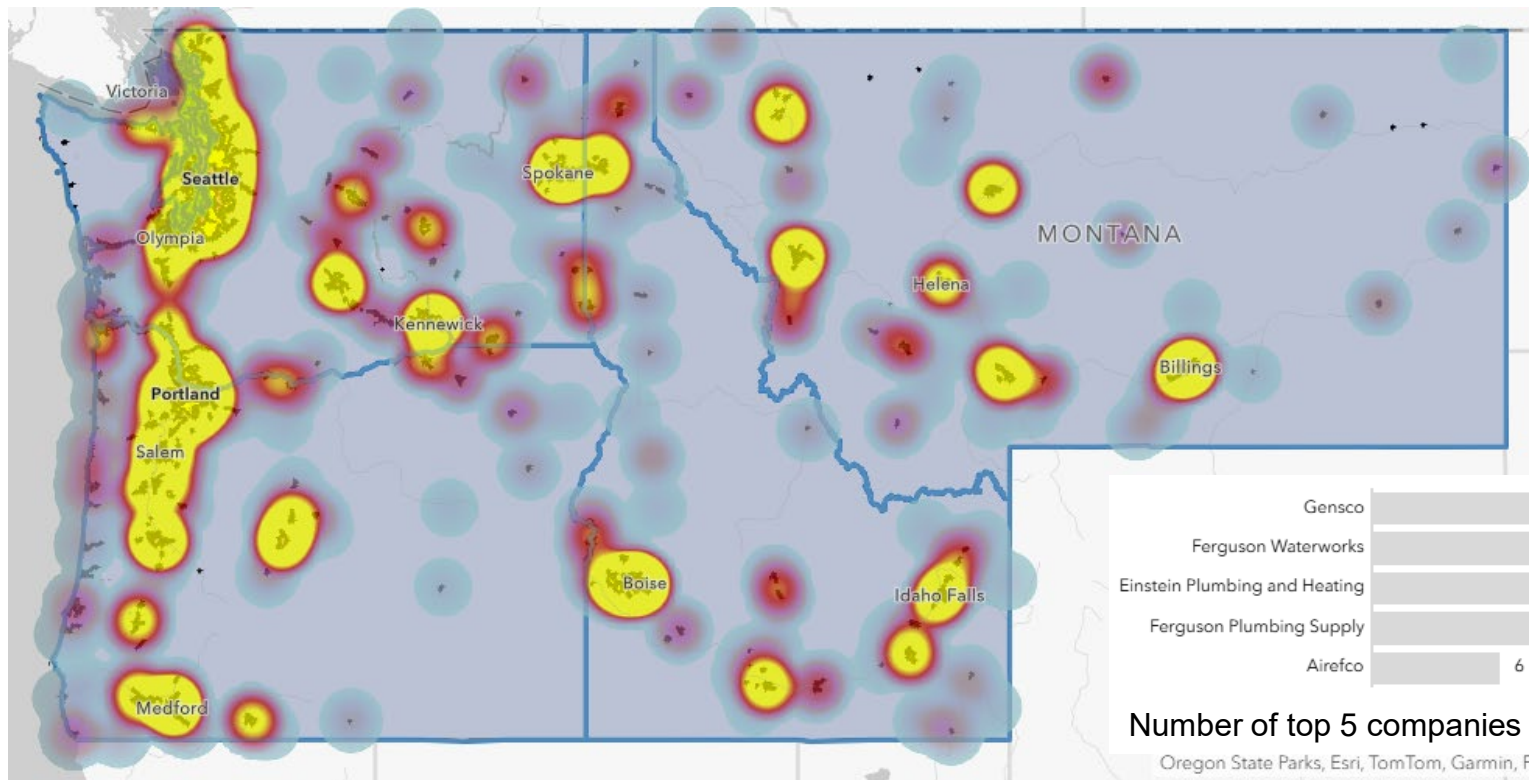
Categories used in search





HVAC Contractors (companies) – 3,308 locations

Data Source: Foursquare



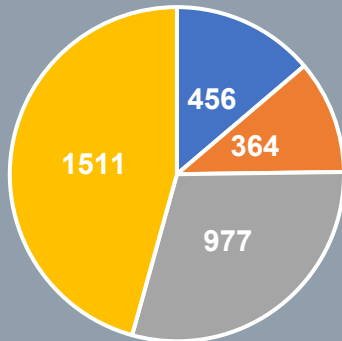


HVAC Contractors (companies)

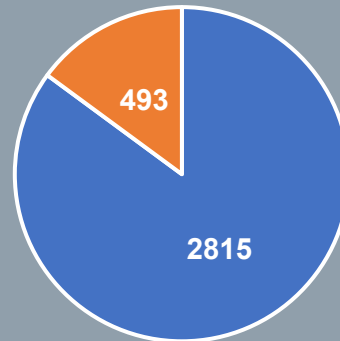
Data Source: Foursquare

Number of contractors by state and locale

- Idaho
- Montana
- Oregon
- Washington



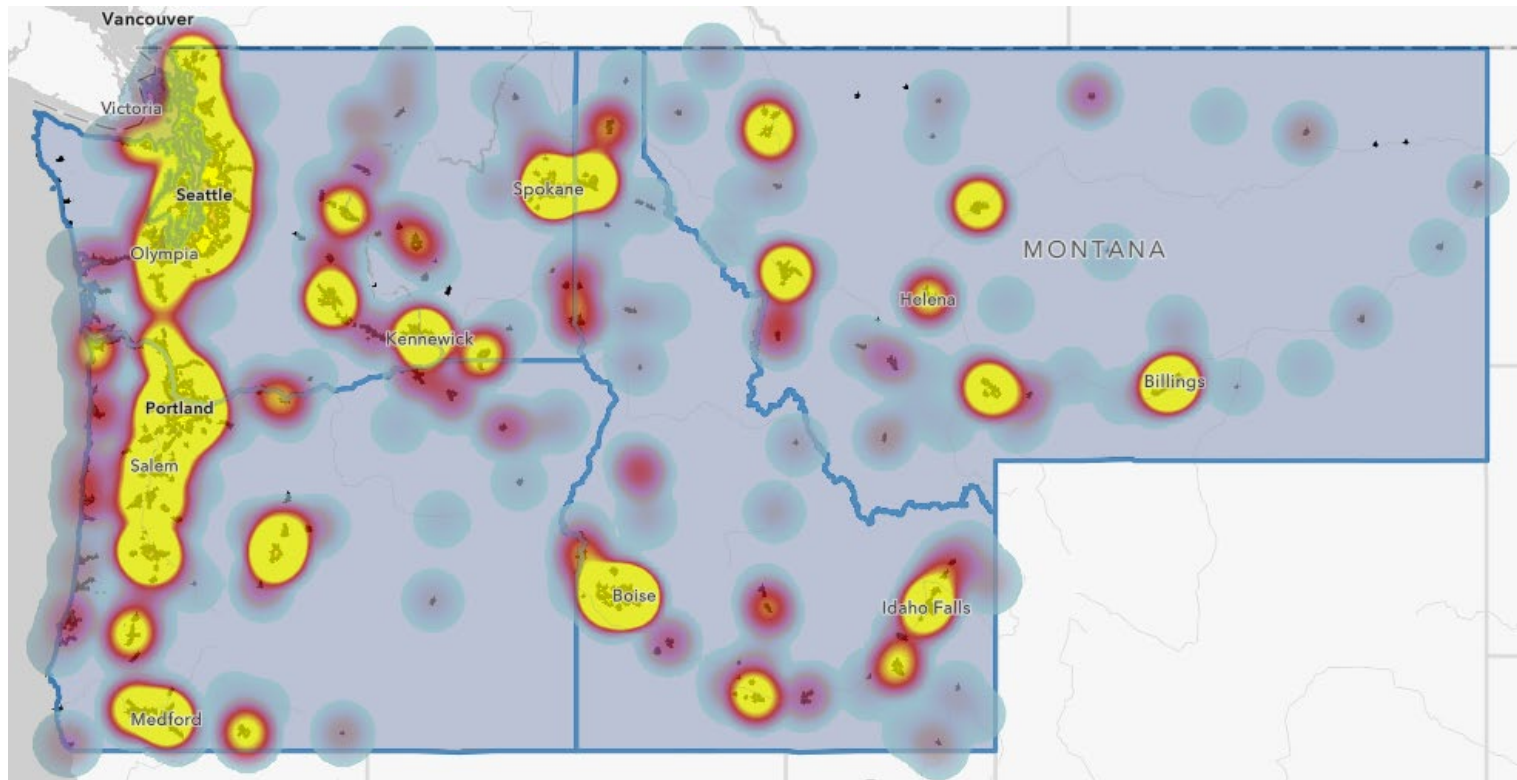
- City/Suburb
- Town/Rural





Plumbing Contractors (companies) – 3,363 locations

Data Source: Foursquare



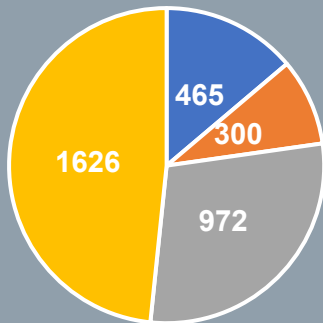


Plumbing Contractors (companies)

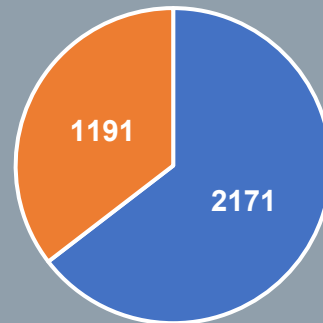
Data Source: Foursquare

Number of contractors by state and locale

- Idaho
- Montana
- Oregon
- Washington



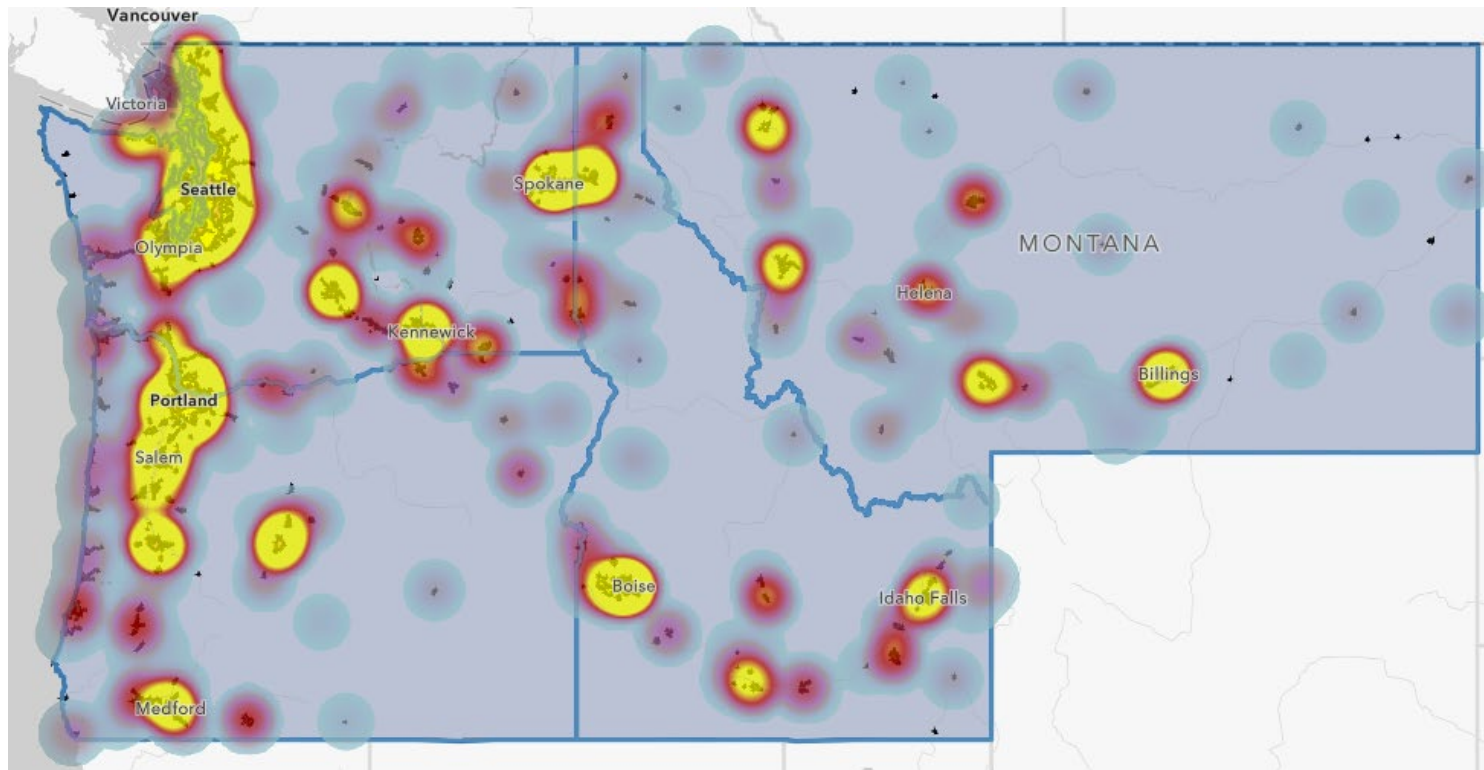
- City/Suburb
- Town/Rural





Electrical Contractors (companies) – 2,279 locations

Data Source: Foursquare

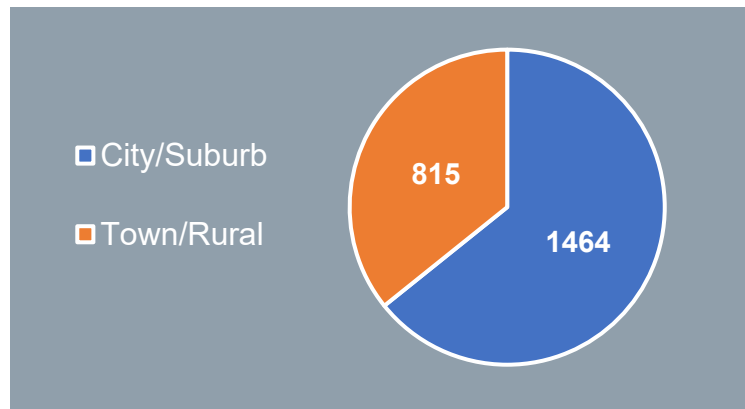
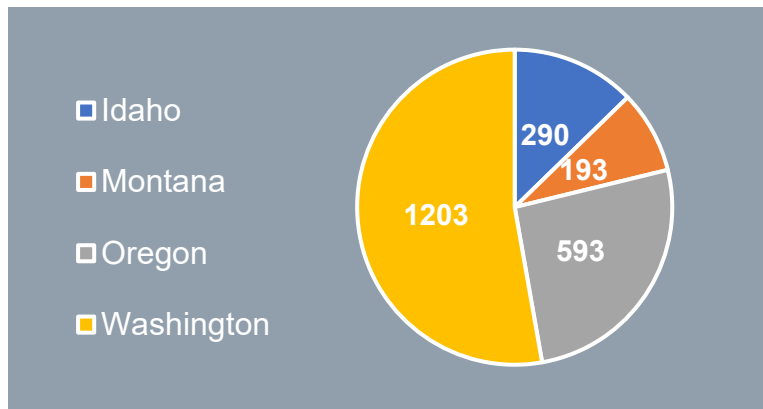




Electrical Contractors (companies)

Data Source: Foursquare

Number of contractors by state and locale



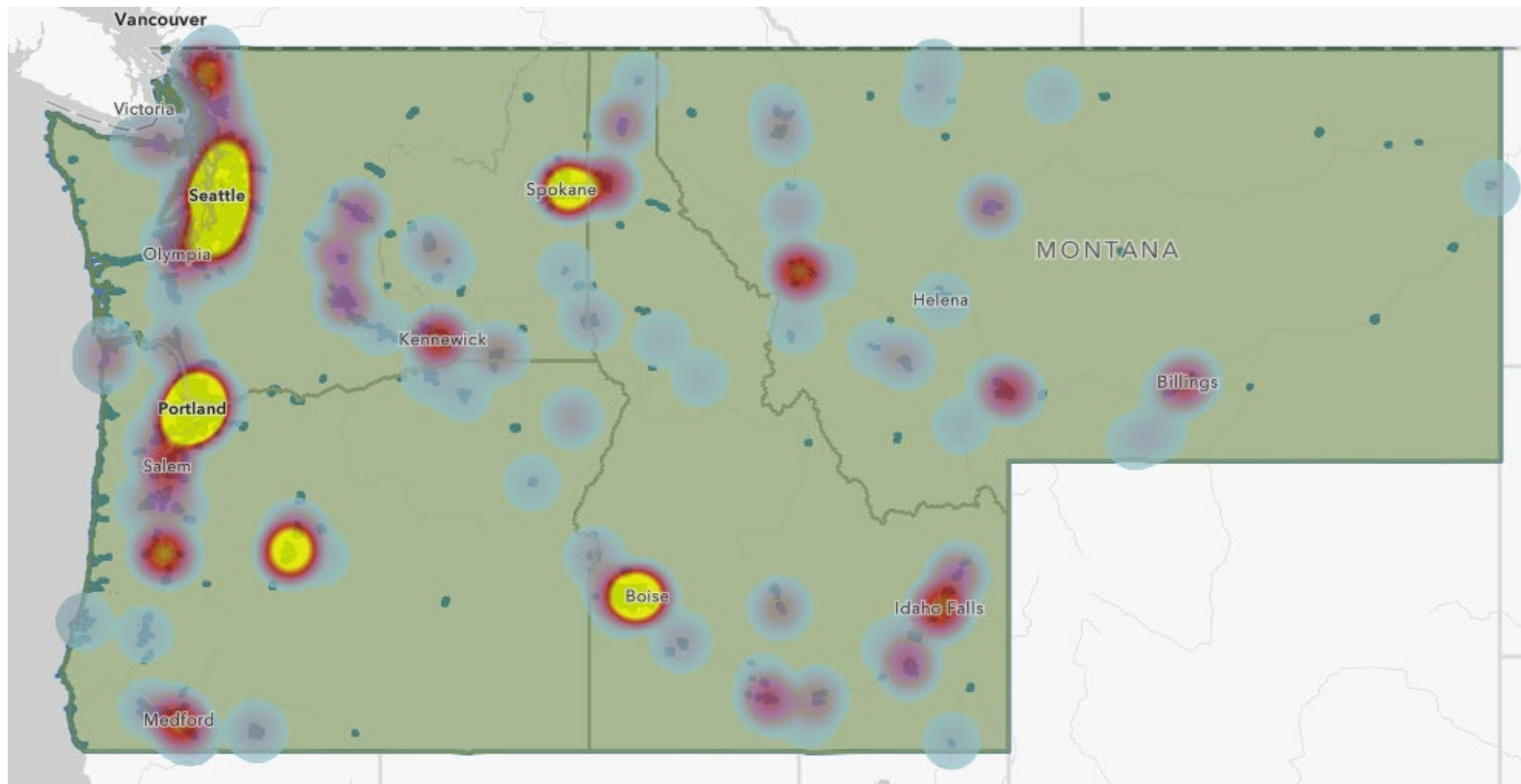


Distributors



HVAC Wholesalers – 557

Data Source: Foursquare

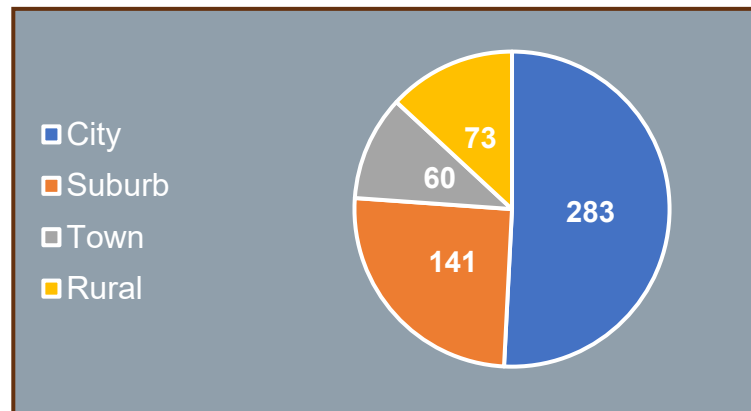
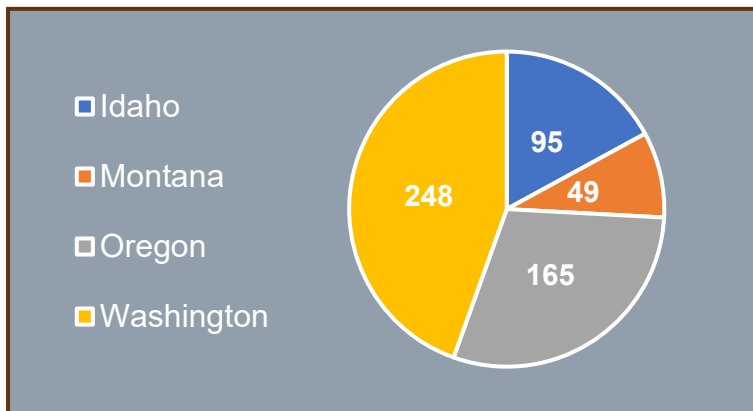




HVAC Wholesalers

Data Source: Foursquare

Number of wholesalers by state and locale

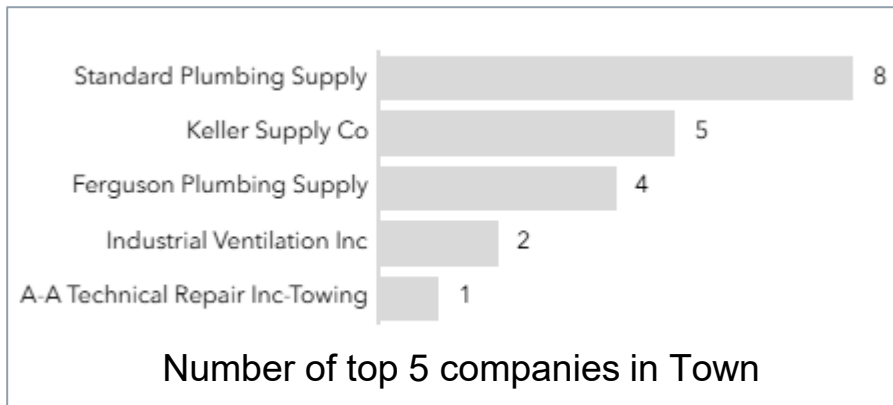


NAICS Codes Searched
423720 and 423730



HVAC Wholesalers

Data Source: Foursquare



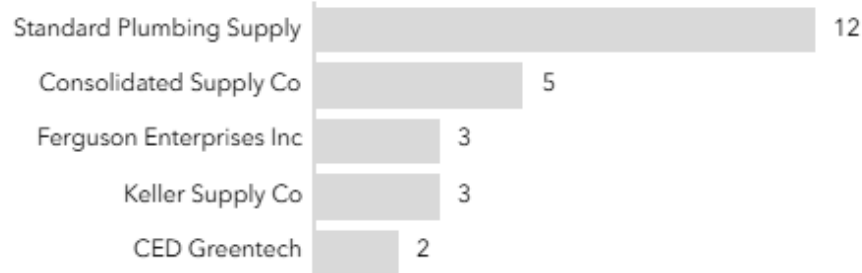


HVAC Wholesalers

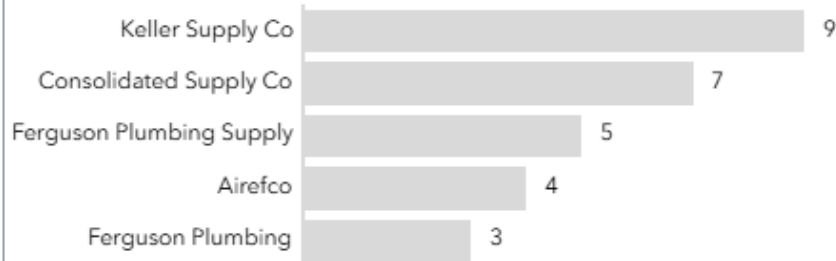
Data Source: Foursquare



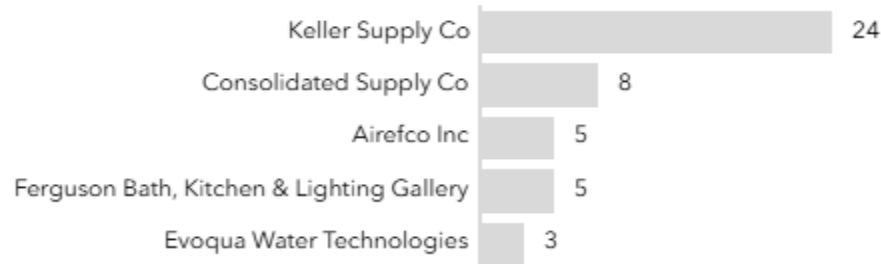
Number of top 5 companies in Montana



Number of top 5 companies in Idaho



Number of top 5 companies in Oregon

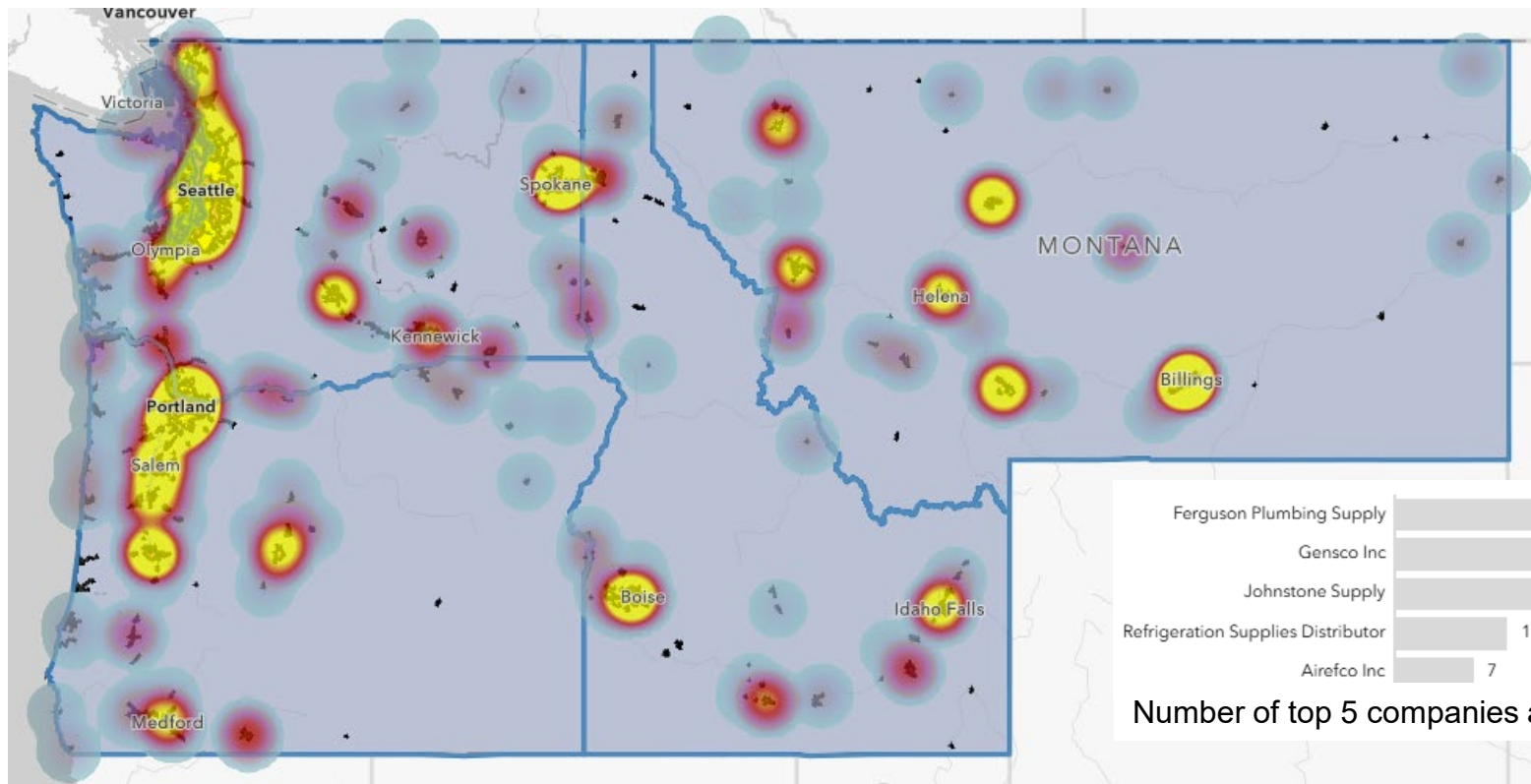


Number of top 5 companies in Washington



HVAC Wholesalers – 1,037

Data Source: Data Axle

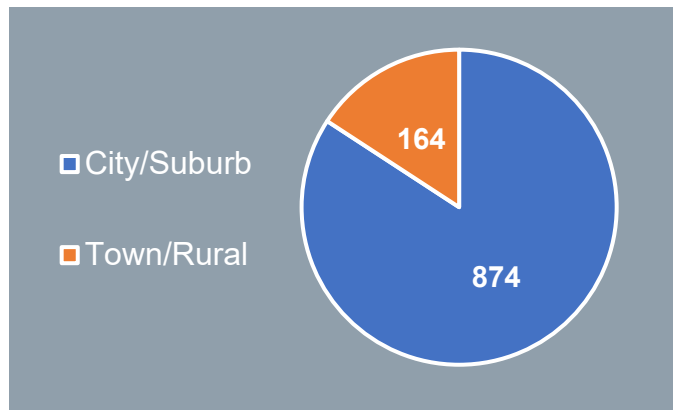
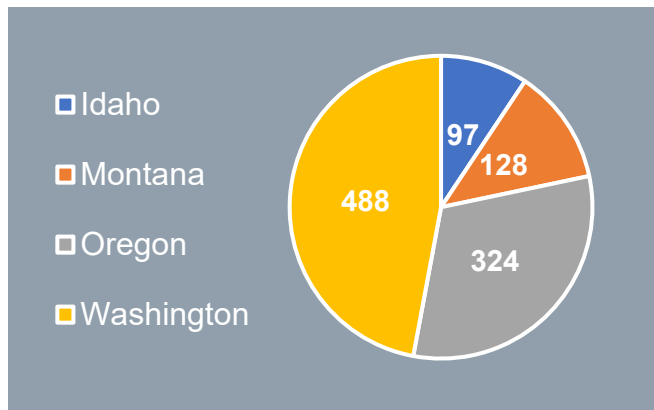




HVAC Wholesalers

Data Source: Data Axle

Number of wholesalers by state and



Categories used in search

Data source: [Data Axle](#)

Keyword	Category
Air Conditioning Equip-Room Unit...	
Plumbing & Heating Equipment & ...	
Air Conditioning Equipment & Syst...	
Air Conditioning Supplies & Parts (...)	
Furnaces-Heating (Whls)	
Heating & Air-Cond Eqpt & Suppli...	
Heating Equip & Systs-Supls/Parts (...)	
Heating Equipment & Systems (Whls)	

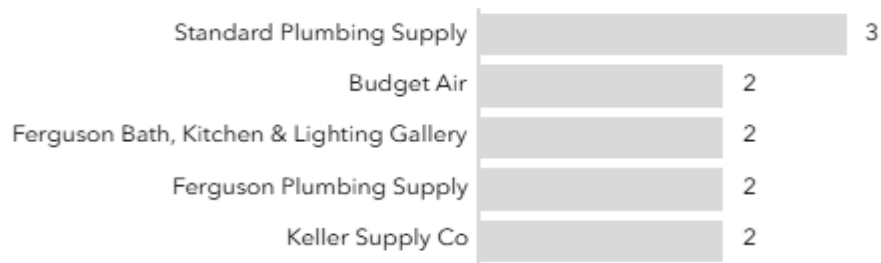


HVAC Wholesalers

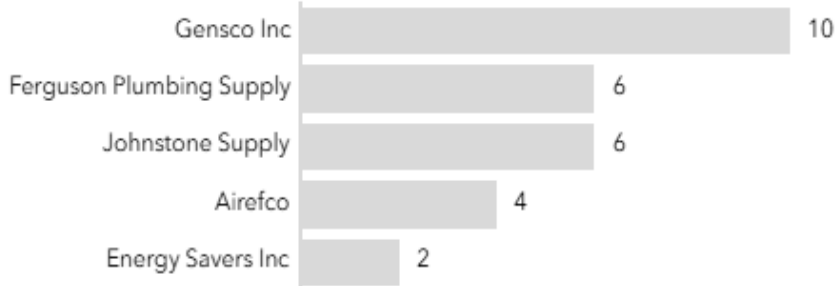
Data Source: Data Axle



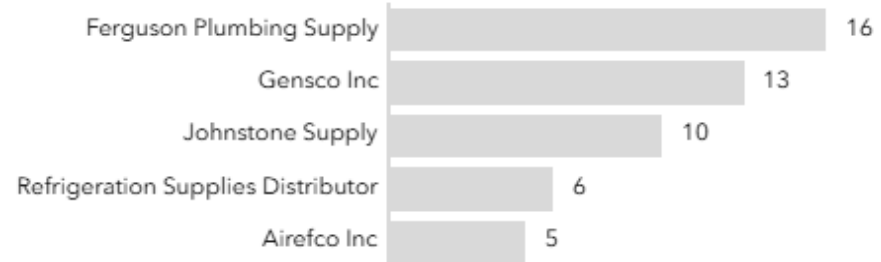
Number of top 5 companies in Montana



Number of top 5 companies in Idaho



Number of top 5 companies in Oregon



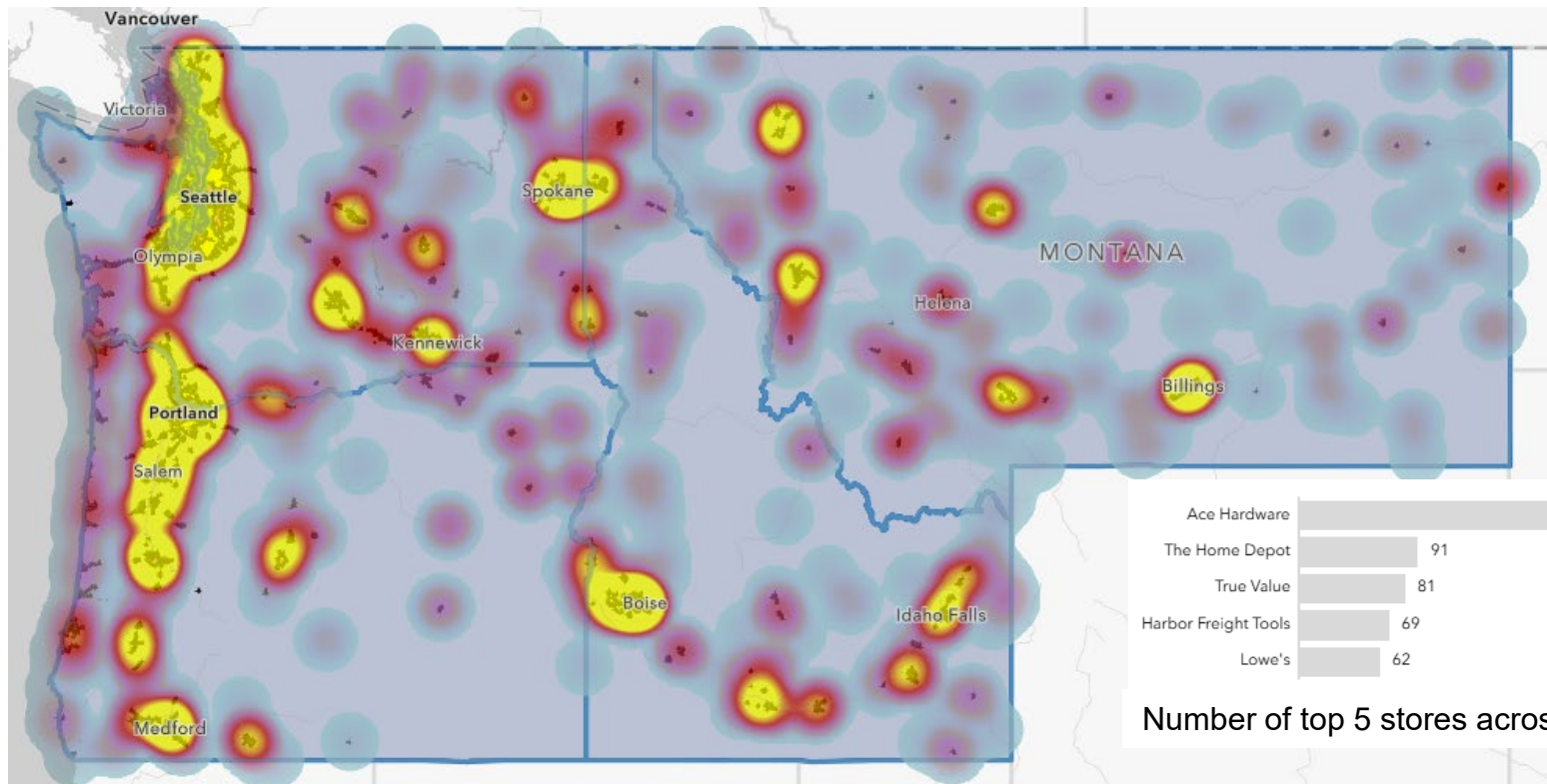
Number of top 5 companies in Washington

Retail Stores



Hardware Stores – 1,715 locations

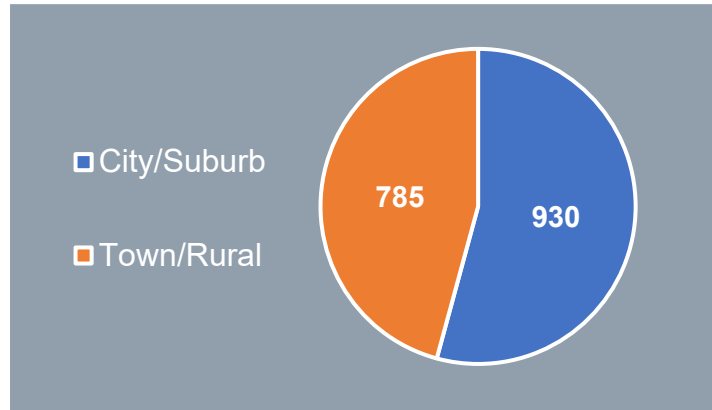
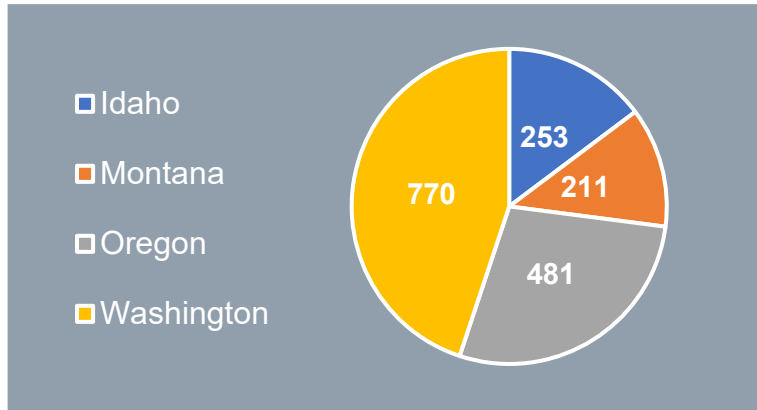
Data Source: Foursquare



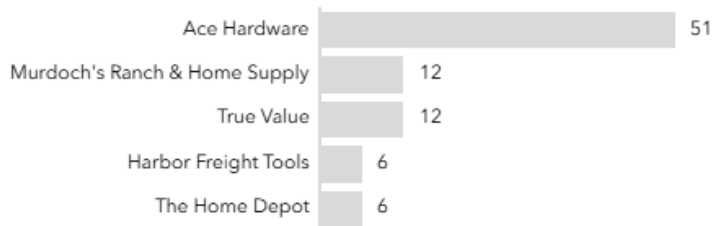


Hardware Stores

Number of stores by state and locale



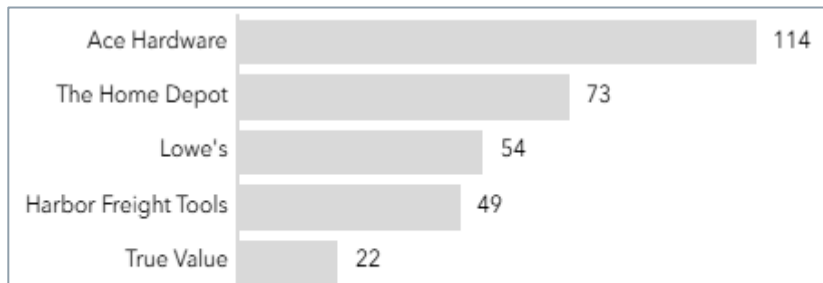
Number of top 5 stores in Montana



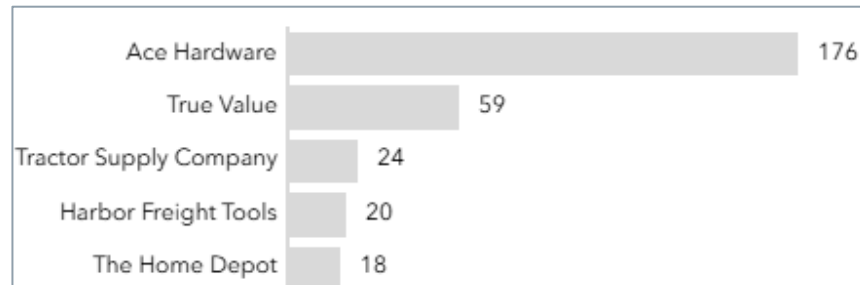


Hardware Stores – types by locale

Data Source: Foursquare



Number of top 5 stores in City / Suburb

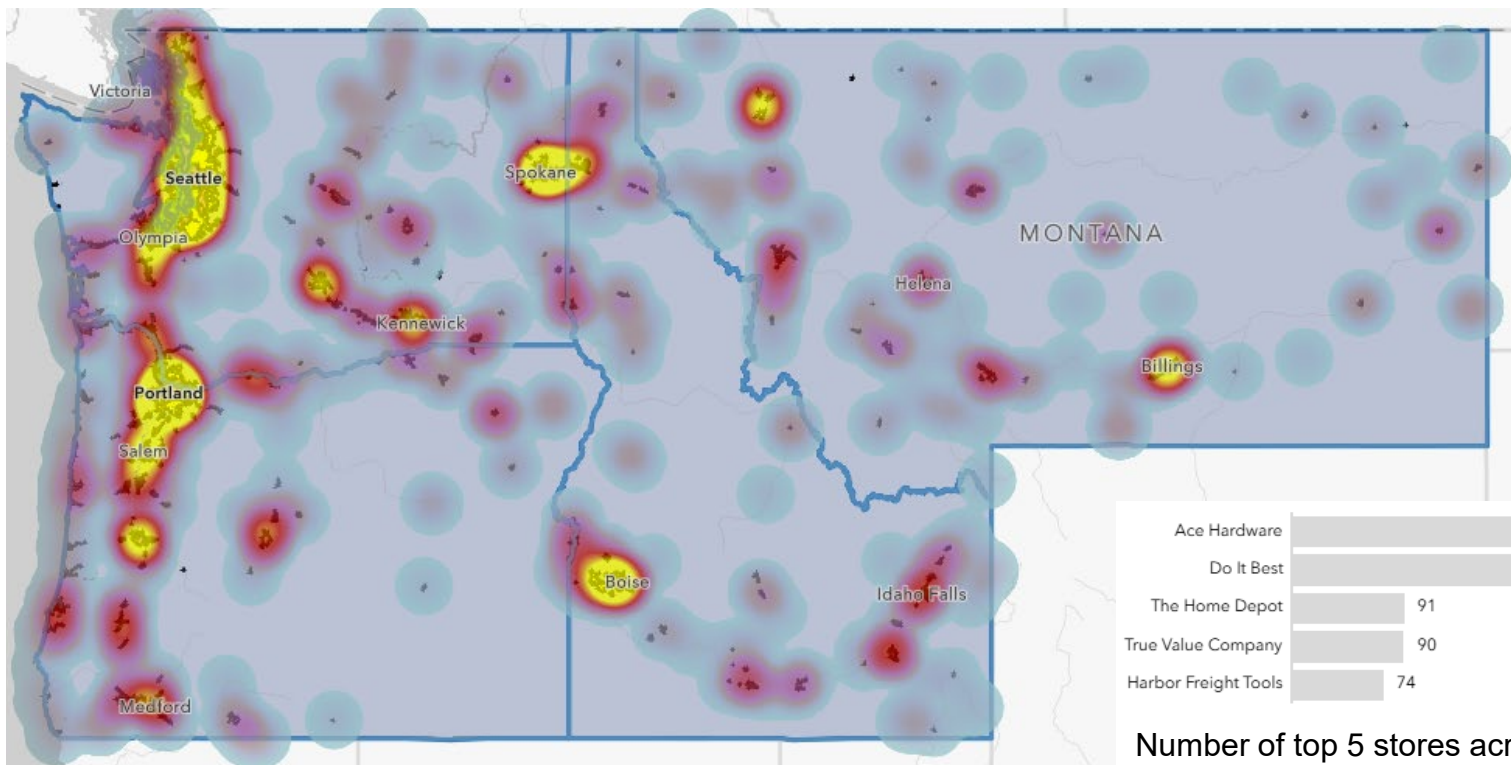


Number of top 5 stores in Town / Rural



Hardware Stores – 1,087 locations

Data Source: SafeGraph



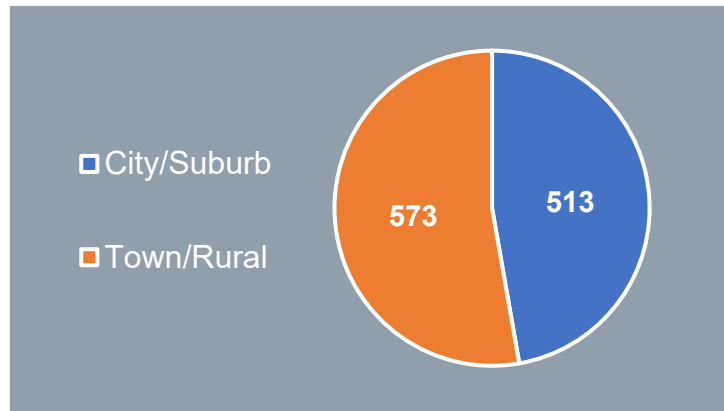
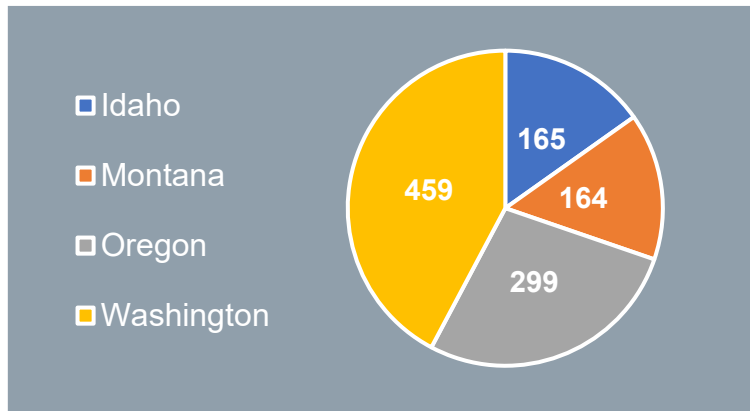
Number of top 5 stores across region



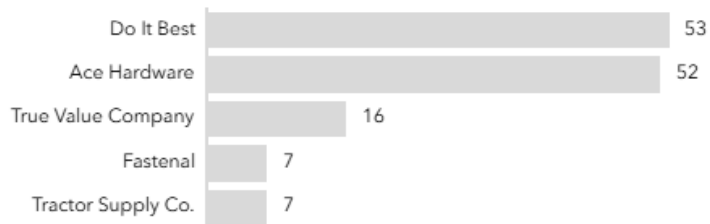
Hardware Stores

Data Source: SafeGraph

Number of stores by state and locale



Number of top 5 stores in Montana

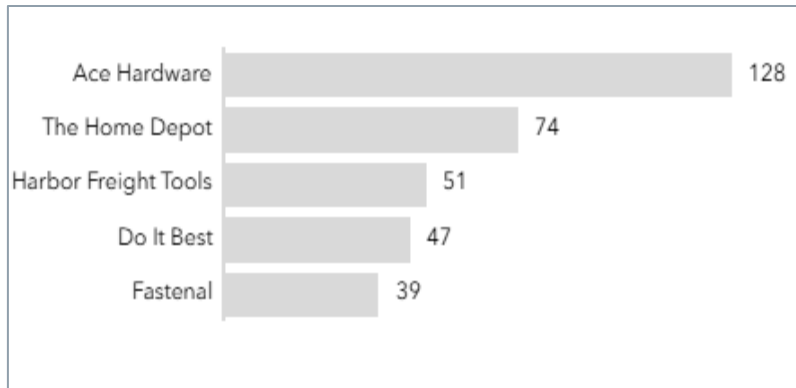




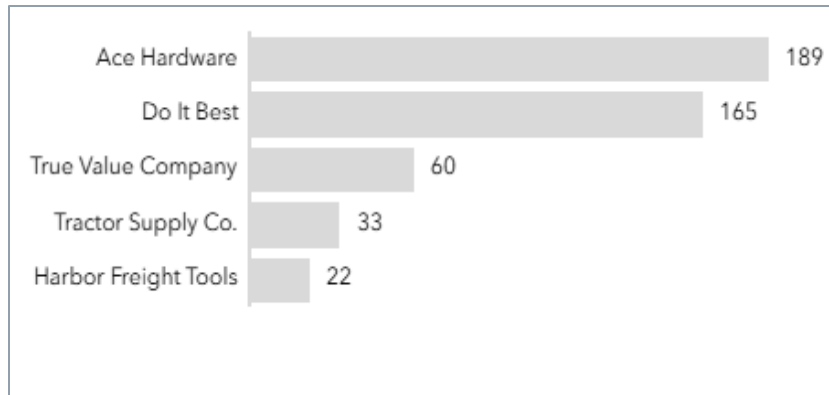
Hardware Stores – types by locale

Data Source: SafeGraph

Number of top 5 stores in City / Suburb



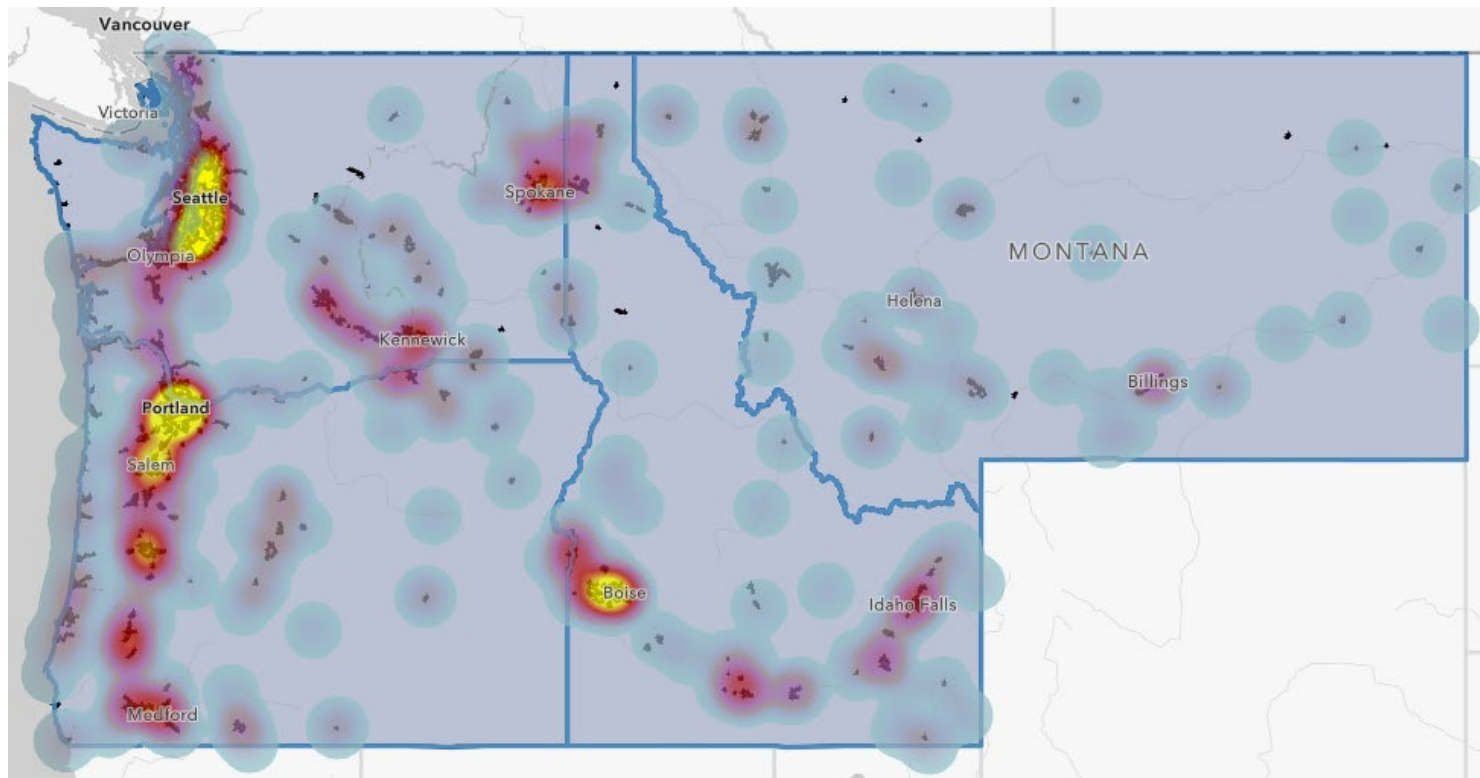
Number of top 5 stores in Town / Rural





Dollar Stores – 534 locations

Data Source: Foursquare

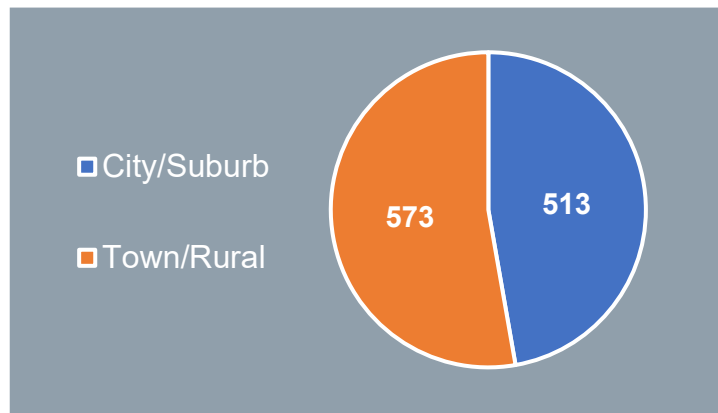
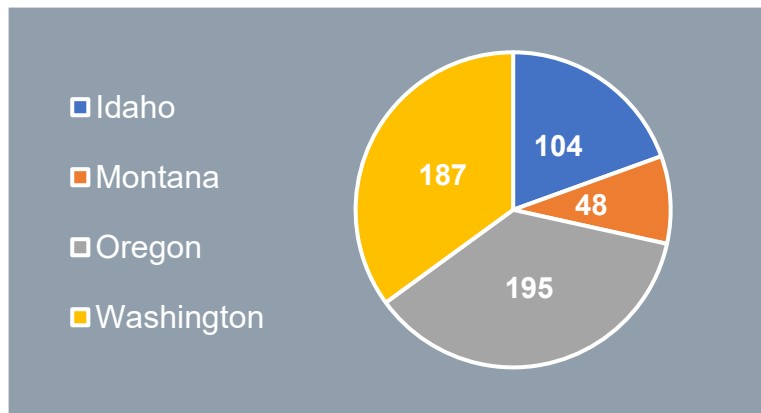




Dollar Stores

Data Source: Foursquare

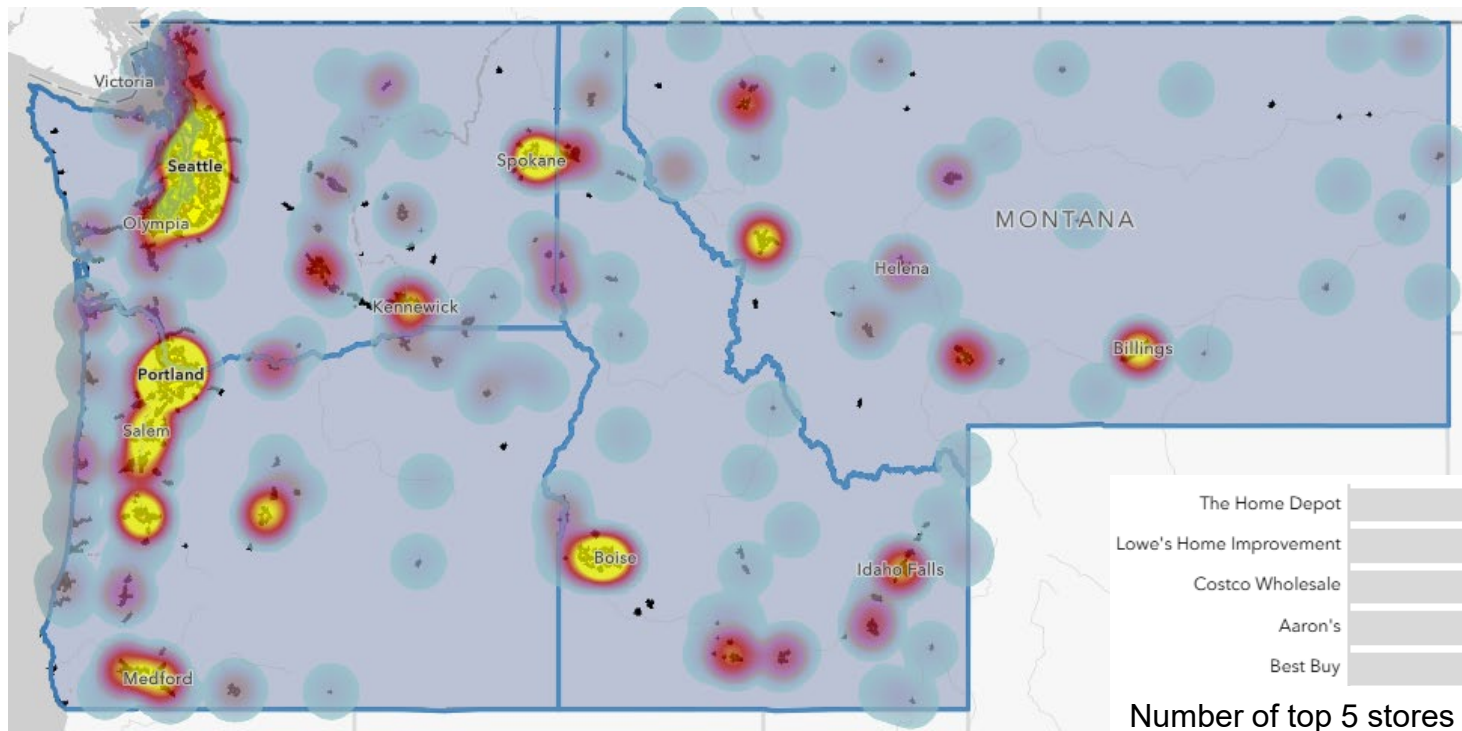
Number of stores by state and locale





Major Appliance Stores – 832 locations

Data Source: Data Axle

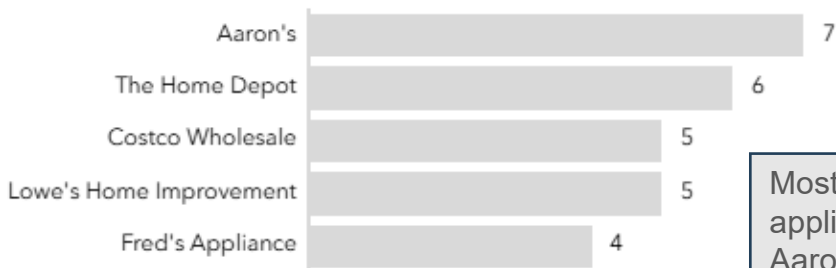
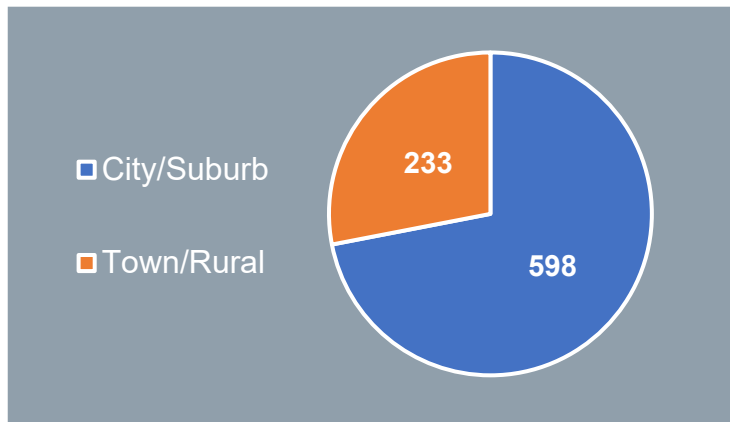
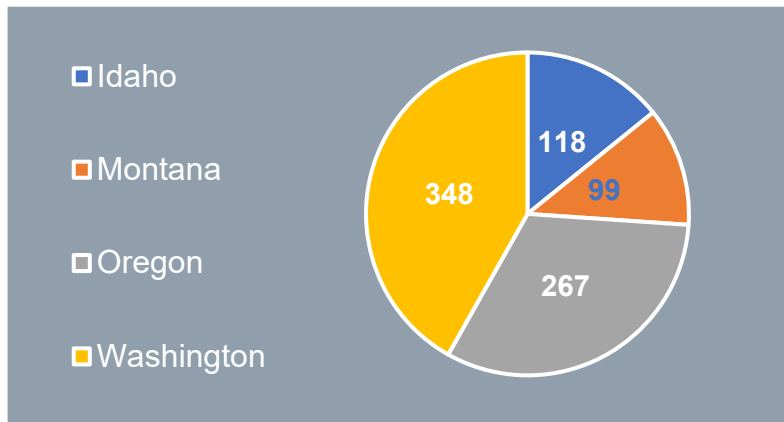




Household Appliance Stores

Data Source: Data Axle

Number of stores by state and locale



Most prevalent household appliance store in Montana is Aaron's, a rent-to-own retailer.

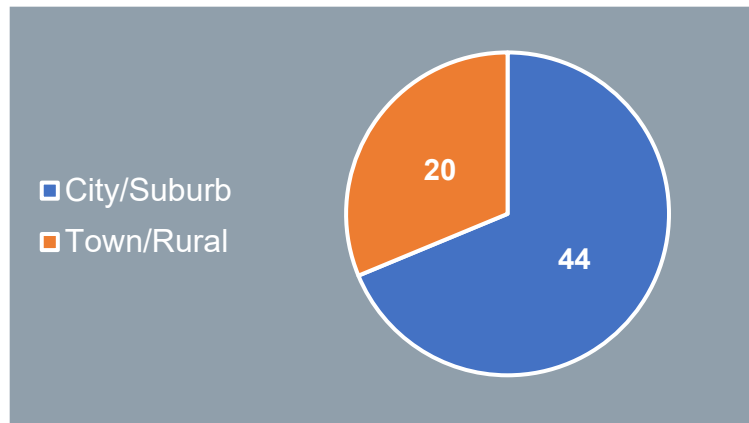
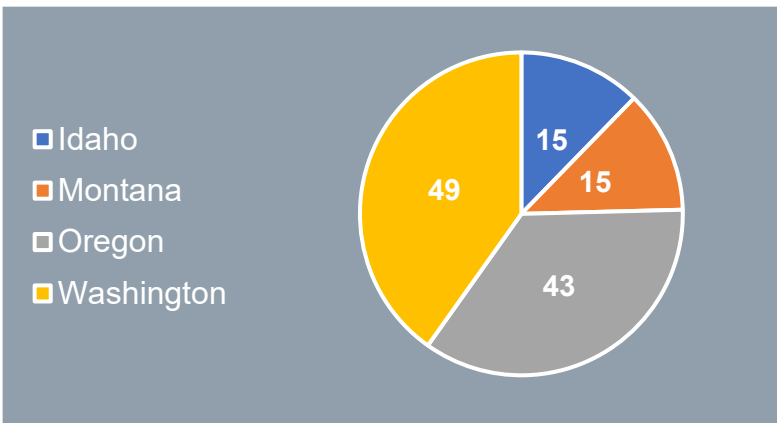
Number of top 5 stores in Montana



Aaron's + Rent-A-Center locations

Data Source: Foursquare

Number of stores by state and locale



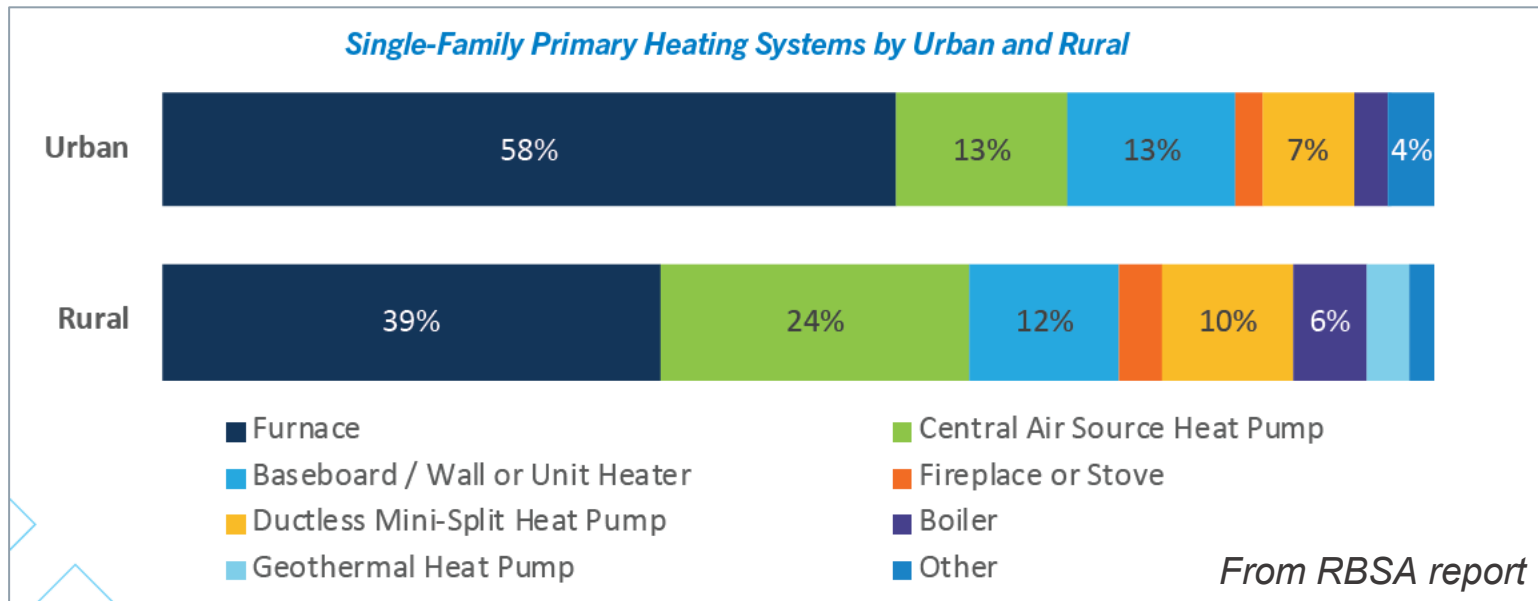
Aaron's and Rent-A-Center are the two most prevalent rent-to-own retailers in the 4 states that rent appliances.

Digging into RBSA heat pump data



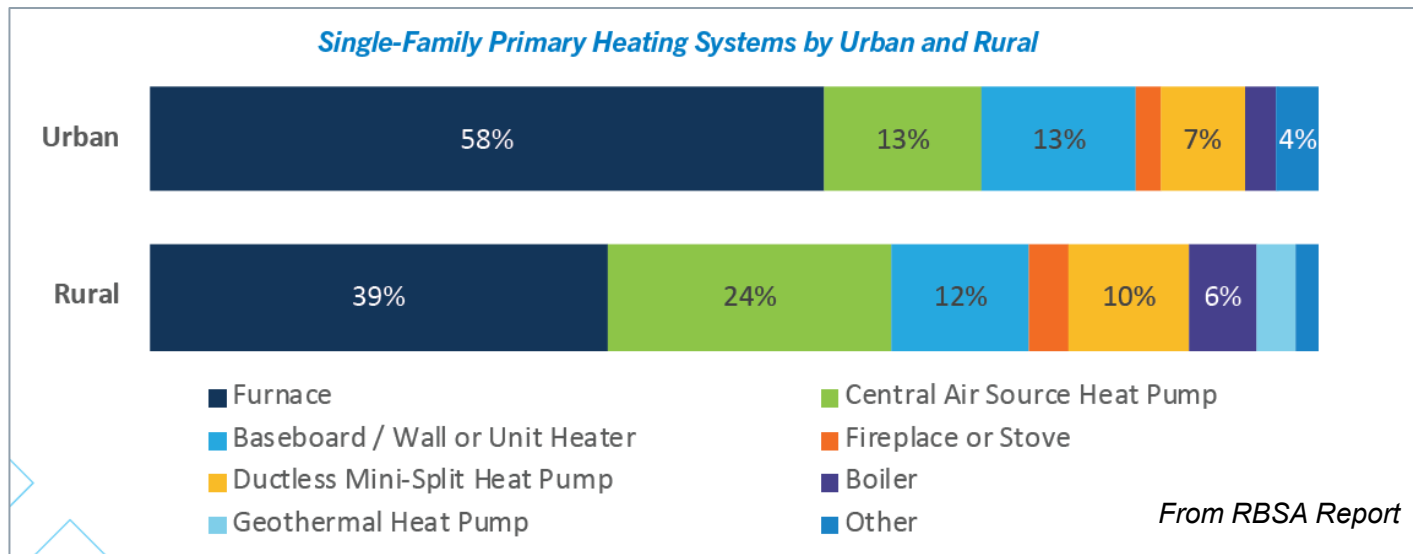


Investigating the higher uptake of heat pumps in rural areas vs urban areas





Investigating the higher uptake of heat pumps in rural areas vs urban areas



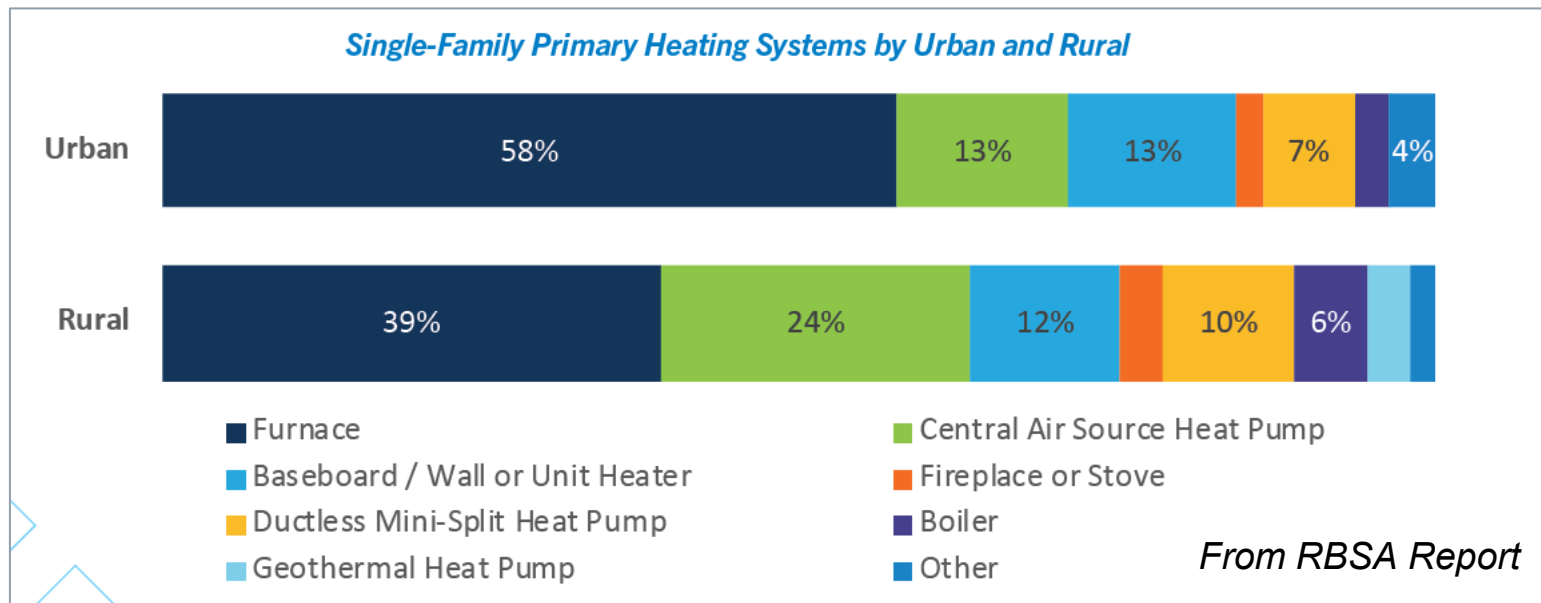
It was theorized that this was caused by a higher rate of renter-occupied household in urban areas, which often has lower-cost equipment, and higher rate of electrically heated households in rural areas.

This analysis looks at the impacts of those two factors – renter or owner occupied and electric vs gas heat.

This analysis uses the publicly available 2022 RBSA datasets and associated methodology.



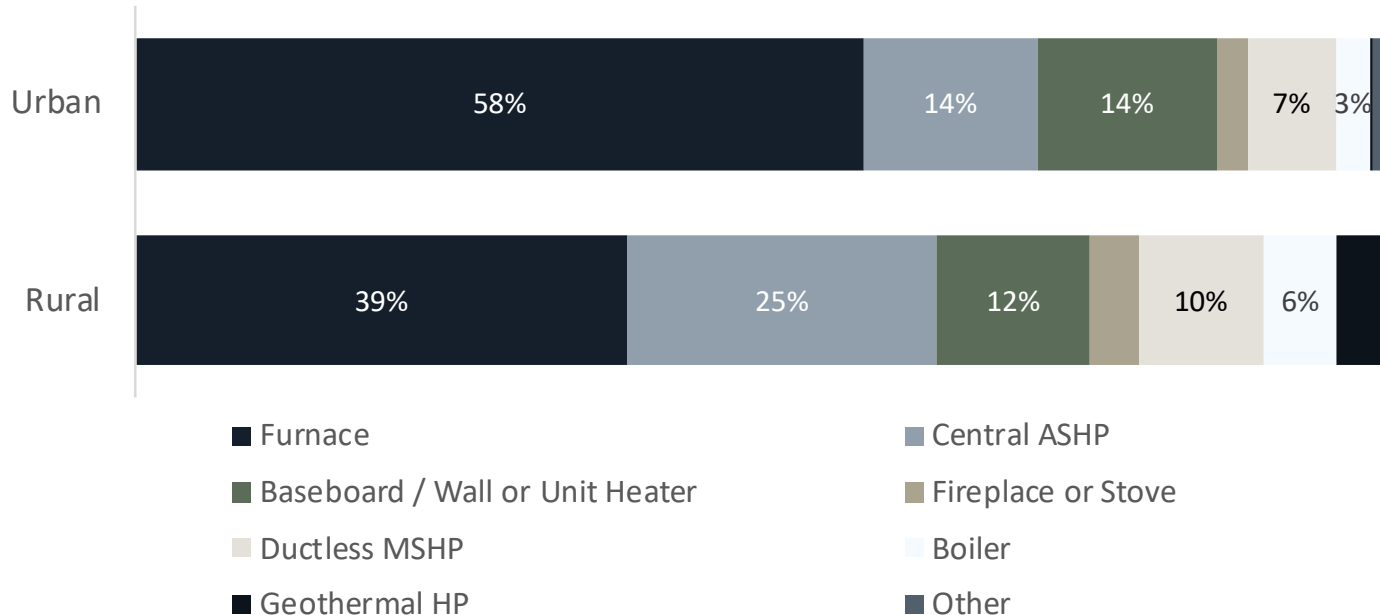
Caveat



The first step was to try to replicate the results of the RBSA data analysis, specific to this graphic.

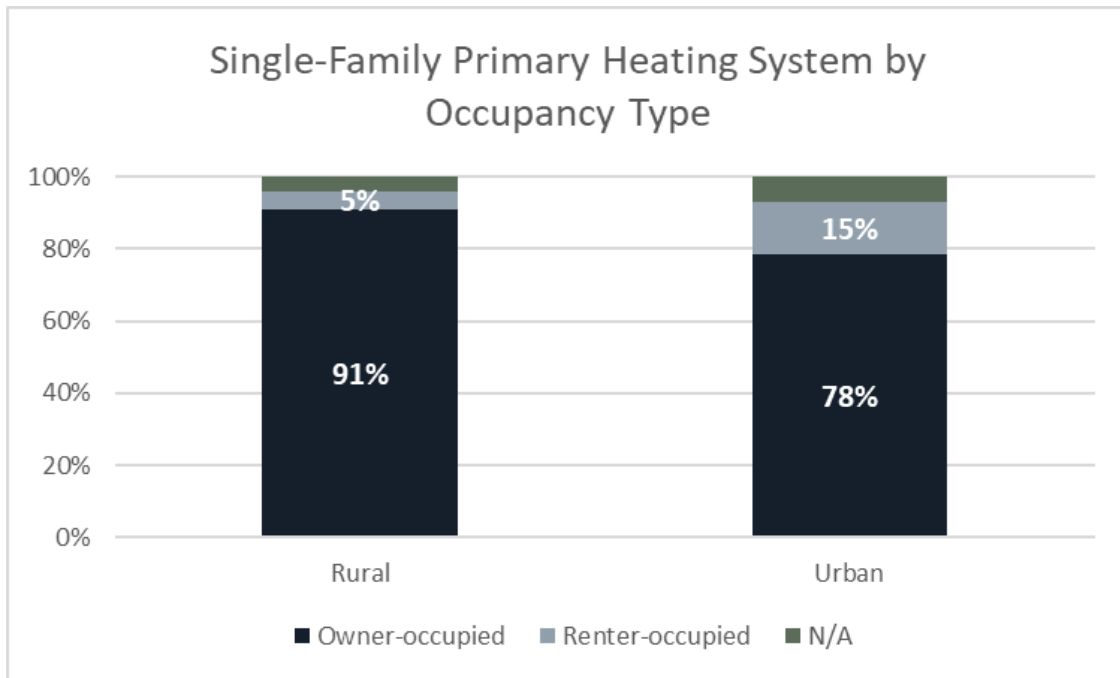


Single-Family Primary Heating System by Urban and Rural





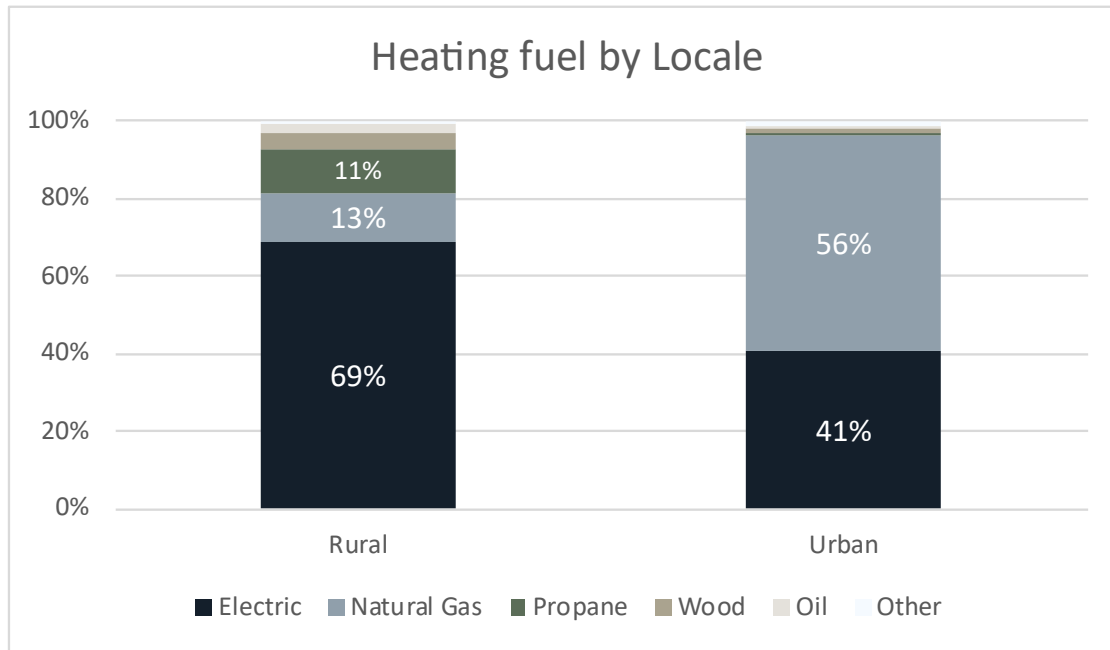
Households by occupancy type



Urban has three times higher rate of renter-occupied households than rural (15% vs 5%).



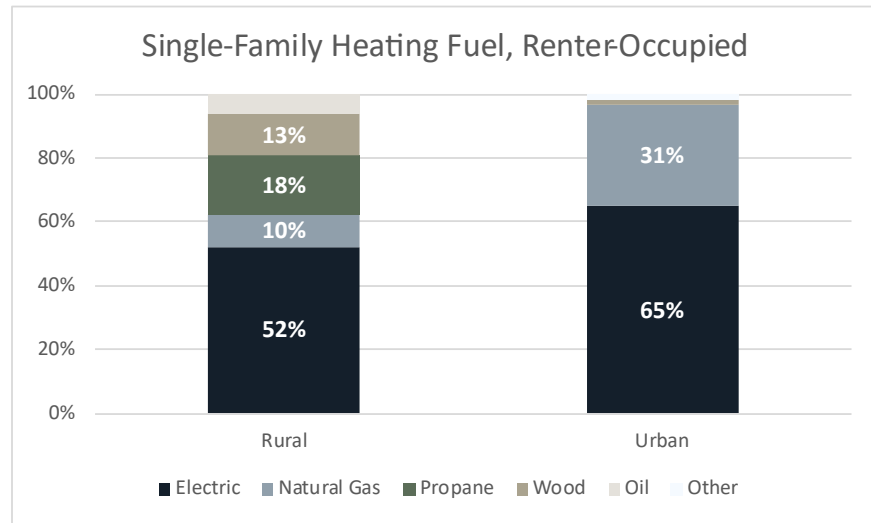
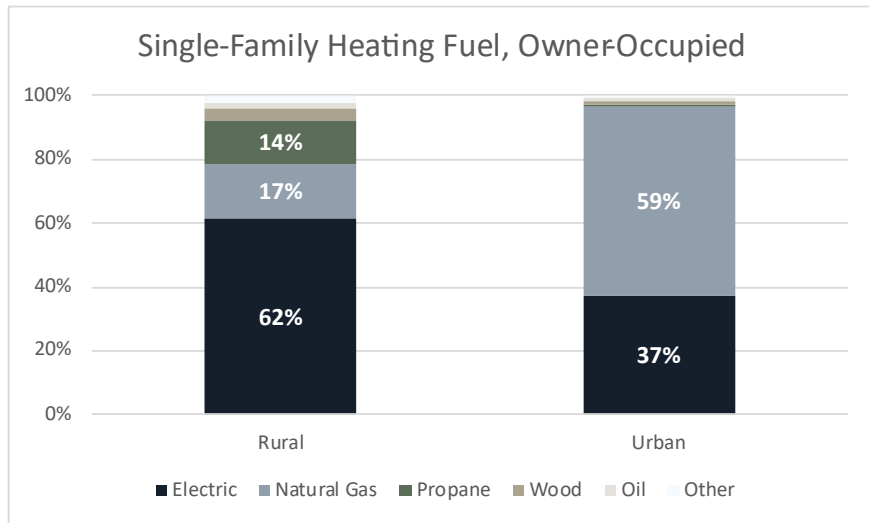
Households by heating fuel



Rural has a bit less than double the rate of electrically heated households than urban (69% vs 41%).
Urban has about four times the rate of natural gas heated households than rural (56% vs 13%).



Heating fuel – impact of renter-occupied



Renter-occupied houses have:

Rural:

- Lower rate of electric & NG
- Higher rate propane, wood & oil

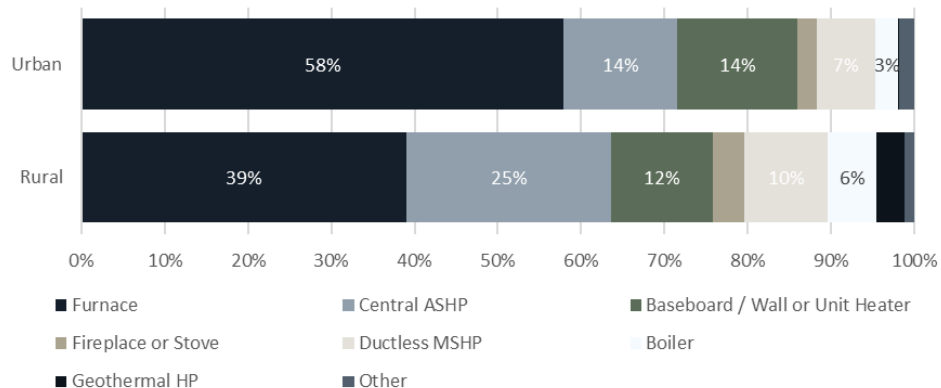
Urban:

- Lower rate of NG
- Higher rate electric

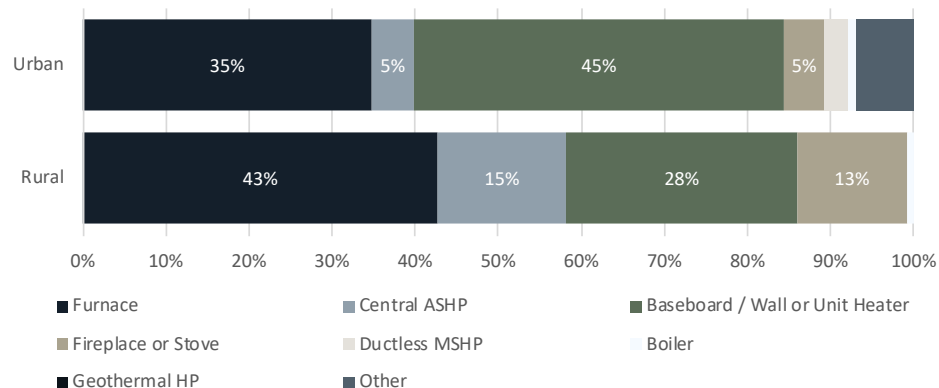


Primary heating system – renter-occupied

Single-Family Primary Heating System by Urban and Rural, All Ownership



Single-Family Primary Heating System by Urban and Rural, Renter-Occupied



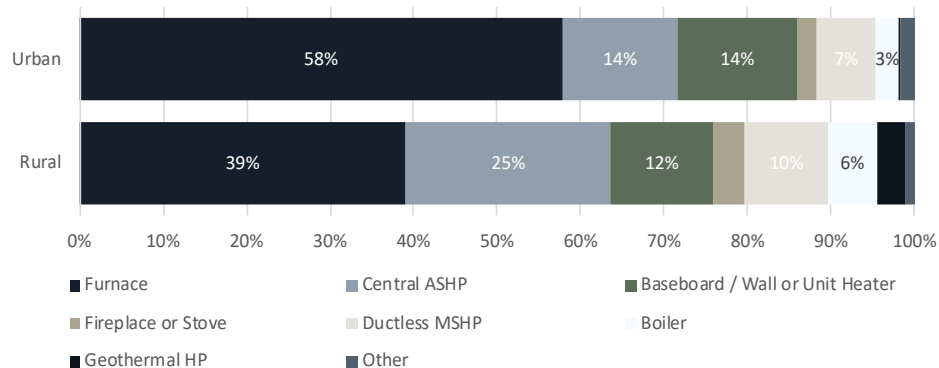
Renter-occupied houses have:

- Lower rate of furnaces (urban only)
- Lower rate of heat pumps
- Higher rate of baseboards / wall or unit heaters
- Higher rate of fireplace or stove

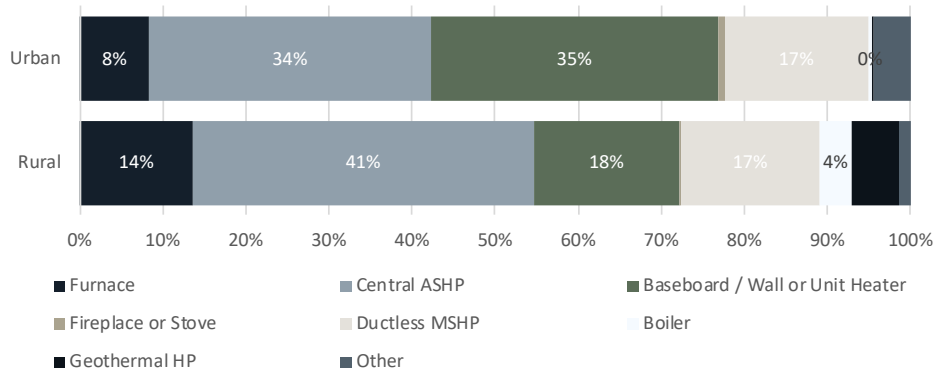


Primary heating system – electric heat only

Single-Family Primary Heating System by Urban and Rural, All Heating Fuels



Single-Family Primary Heating System by Urban and Rural, Electric Primary Heating



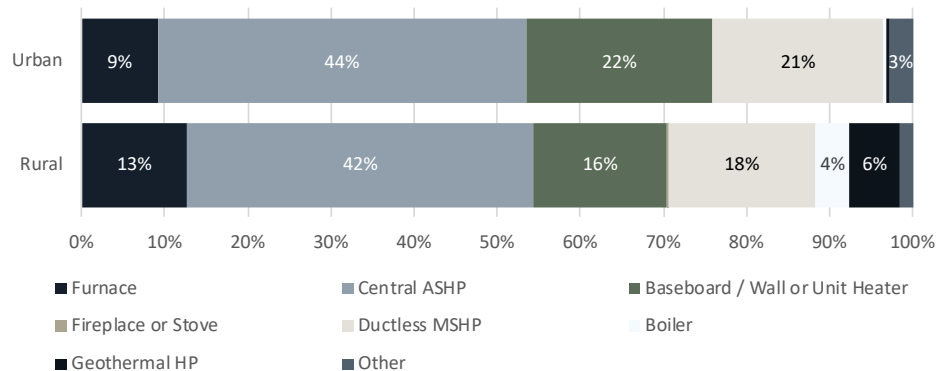
Electrically-heated houses have:

- Lower rate of furnaces
- Higher rate of heat pumps
- Higher rate of baseboards / wall or unit heaters

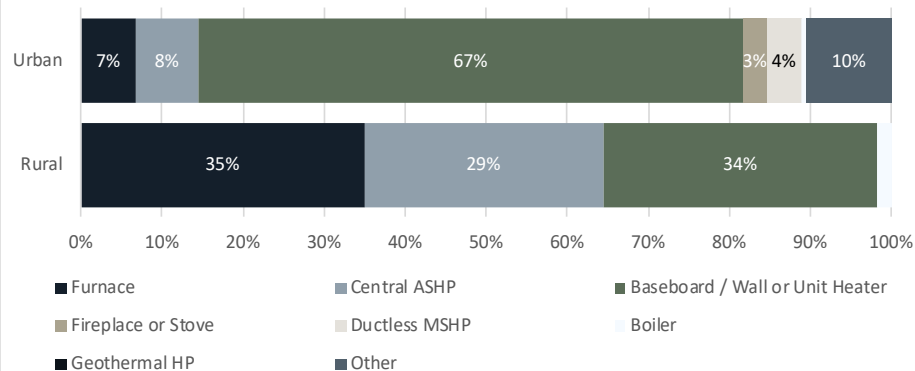


Primary heating system – Owner-occupied vs Renter-occupied with electric heat

Single-Family Primary Heating System by Urban and Rural, Electric Primary Heating, Owneroccupied



Single-Family Primary Heating System by Urban and Rural, Electric Primary Heating, Renteroccupied



Note: Owner-occupied, electrically heated urban and rural households have similar rate of heat pumps, with urban having a slightly higher rate.

Methodology and Limitations





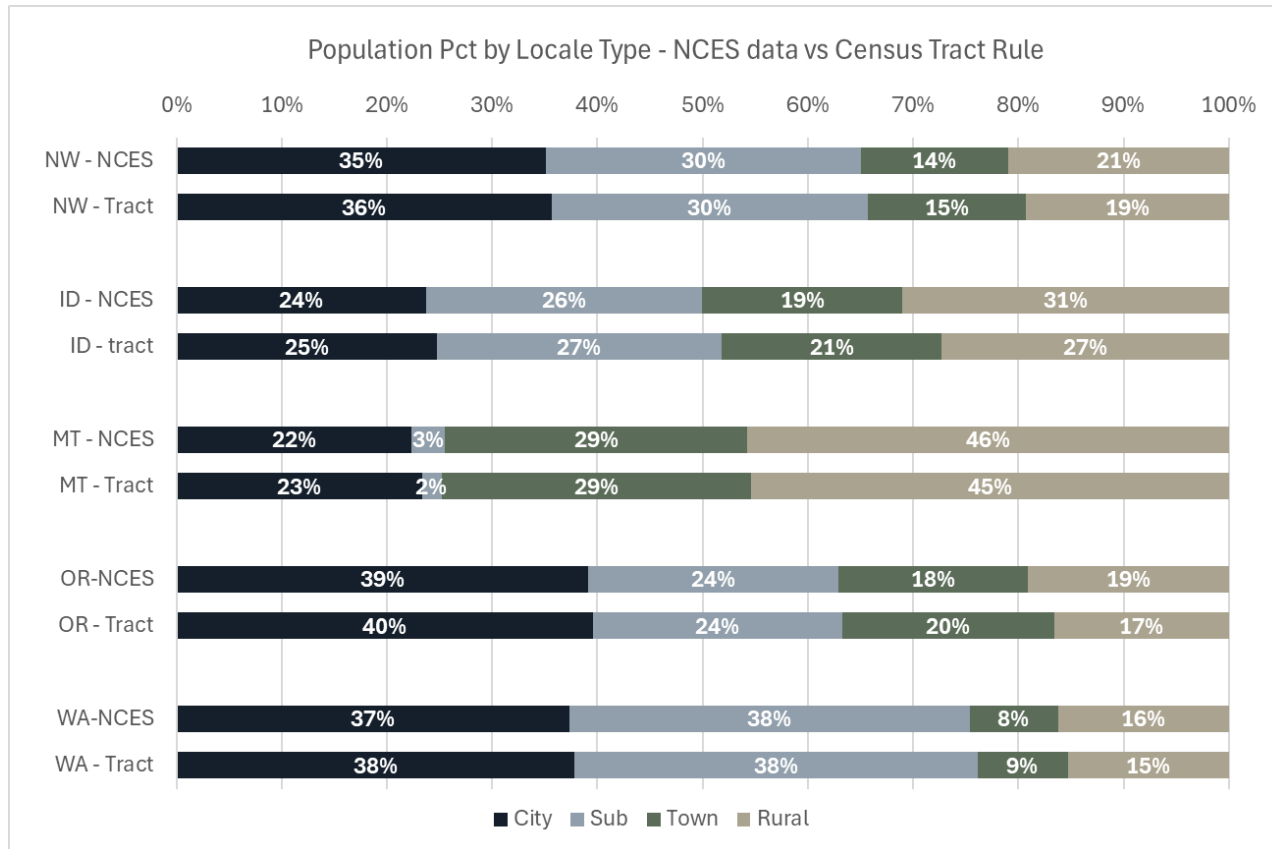
NCES Locale Data – Defining at Census Tract

- Original NCES Locale Data is defined at the census block level
- Majority of data sets are not available at census block level; most are available at census tract level, so census tract level locale data needed
 - Used ArcGIS to map NCES Locales to census blocks
 - Rolled up all census block locale data to census tract level
 - Assigned each census tract to locale by population distribution (e.g., a census tract with 75% rural and 25% town population would be assigned rural)

For the 4 states combined:	Census Blocks	Census Tracts
Total number of geographic units	459,196	3,539



Impact of census block to census tract roll up



Original NCES
Data versus Using
Census Tract Rule



Characteristics and Sources

Category	Characteristics	Data Source	Data Source Detail	By locale / state / intersection	By pop or HH?
Sociodemographic data	Age of residents - Median Age	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state	Pop
	Age of residents - Pct Over 65	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state	Pop
	Income levels - Median HH Income	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state	HH
	Income levels - Mean HH Income	DOE LEAD Tool / ACS Data	2022 5-year ACS Data	Locale and state	HH
	Median net worth	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state	HH
	Unemployment rate	ArcGIS Business Analyst	2025 ESRI Estimates	Locale and state	HH
	Disadvantaged communities	DOE LEAD Tool / ACS Data	Justice40 Data	Locale and state	Pop
	Low-income HH <100% Poverty Level	ArcGIS Business Analyst	ESRI ACS Population Summary Report	Locale and state	HH
	Race/ethnicity	Census Data	2020 Decennial Census, Table P9	Locale and state	Pop
	Immigrant population - Pct of Population	Census Data	2022 5-year ACS Data Table DP02	Locale and state	Pop
	Language spoken - Speaks English less than very well	Census Data	2022 5-year ACS Data Table DP02	Locale and state	Pop
	Language spoken at home - not English	Census Data	2022 5-year ACS Data Table DP02	Locale and state	Pop
	Level of education	Census Data	2022 5-year ACS Data Table DP02	Locale and state	Pop
	Political inclinations	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state	Pop
	Religious service attendance	ArcGIS Business Analyst	2025 ESRI Estimates	Locale and state	Pop
Housing data	Home occupancy (Owner/Renter)	DOE LEAD Tool / ACS Data	2022 5-year ACS Data	Locale and state	HH
	Age of housing - Median Age of House	Census Data	2022 5-year ACS Data Table B25035	Locale and state	HH
	Age of housing - by year	Census Data	2023 5-year ACS Data Table	Locale and state	HH
	Type of housing - Pct HH by SF, MF, MH	DOE LEAD Tool / ACS Data	2022 5-year ACS	Locale and state	HH
	Primary heating fuel - Pct HH by fuel	DOE LEAD Tool / ACS Data	2022 5-year ACS	Locale and state	HH
	Computer at home	Census Data	2022 5-year ACS Data Table DP02	Locale and state	HH
	Internet at home	Census Data	2022 5-year ACS Data Table DP02	Locale and state	HH
Community characteristics	Total population	Census Data	2022 5-year ACS Data Table DP02	Locale and state	Pop
	Total number of households	Census Data	2022 5-year ACS Data, Table S1902	Locale and state	HH
	Population growth rate - overall and by generation	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state	Pop
	Total Area (sq miles)	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state	N/A
	Crime Index	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state	N/A



Characteristics and Sources

Energy data	Energy burden	DOE LEAD Tool / ACS Data	2022 5-year ACS	All
	Energy burdened HH	DOE LEAD Tool / ACS Data	2022 5-year ACS	All
	Energy burden - by building type (SF, MF, MH)	DOE LEAD Tool / ACS Data	2022 5-year ACS	Locale and state
	Energy burden - by primary heating fuel	DOE LEAD Tool / ACS Data	2022 5-year ACS	Locale and state
	Energy burden - by occupancy (owner/rent)	DOE LEAD Tool / ACS Data	2022 5-year ACS	Locale and state
	Energy burden - by heating fuel in renter-occupied HH	DOE LEAD Tool / ACS Data	2022 5-year ACS	Locale and state
	Energy burdened HH by heating fuel in renter-occ HH	DOE LEAD Tool / ACS Data	2022 5-year ACS	Locale and state
	Energy costs	DOE LEAD Tool / ACS Data	2022 5-year ACS	All
	Energy costs - by sqft by age of home	NEEA RBSA	2022 RBSA	State
	Energy rates - annual avg gas and electric rate	US EIA	Annual US EIA Energy Rates	State
	Annual HDD and CDD by state	Regional Technical Form	RFT_ClimateZoneCalculation_v3_2	State
Purchase and Behavioral data	Purchasing behaviors - where people shop	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Purchasing behaviors - online shopping	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Purchasing behaviors - purchased home imp online	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Purchasing behaviors - spent \$500+ online	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Purchasing behaviors - spend on retail goods	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Disposable income (post-tax income)	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Spend on HVAC and plumbing work	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Home improvement model - DIY vs contractor	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Average credit card debt	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Rather save than borrow to purchase	ArcGIS Business Analyst	2025 ESRI Estimates	Locale and state
	Careful with my money	ArcGIS Business Analyst	2026 ESRI Estimates	Locale and state
	Will pay more for product from trusted company	ArcGIS Business Analyst	2027 ESRI Estimates	Locale and state
	Environmental - environmentally friendly products	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Environmental - climate change	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
Market Data	Contractor/Distributor coverage	ArcGIS Business Analyst	2024 ESRI Estimates	Locale and state
	Retail stores - hardware, appliance and dollar stores	ArcGIS Business Analyst	2026 ESRI Estimates	Locale and state



Data Limitations

- The team used the best data available at the time but wants to acknowledge some of the limitations of that data.
- ESRI Data from ArcGIS Business Analyst
 - Data sources are not well documented
 - Definitions of terms used are not well documented
 - When comparing points of interests across locales, the tool was unable to produce data sets for each locale individually, so grouped locales were used