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Northwest Market Characterization Study

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Executive Summary

Introduction

The Northwest Energy Efficiency Alliance (NEEA) is an alliance of over 140 utilities and energy organizations working across Idaho, Montana, Oregon, and Washington to advance energy-efficient products, services, and practices. Since its founding in 1996, NEEA has focused on market transformation (MT) to remove barriers to the sustained diffusion of energy efficiency (EE) products and practices in the market.[1] NEEA contracted with LD Consulting to explore the characteristics of rural, suburban, and urban residential markets to better understand how each area's characteristics potentially impact acceleration of benefits in MT transformation.

Research Objective

Contrast and compare characteristics of rural, suburban, and urban residential markets (such as consumer purchasing behaviors and spending patterns, energy burden,[2] supply chain access, building stock, and workforce features) to identify market transformation strategies that will accelerate the delivery of program benefits to rural markets. This research is intended to augment understanding of individuals and consumer markets across the Northwest regions.

Research Methods

This study used a mixed-methods approach, combining secondary research, data analysis, and primary research to address its objectives. The research was completed in two parts and four phases:

Part 1: Quantitative Analysis

- Phase 1: Defining rural, suburban, and urban areas and documenting known information by conducting staff interviews and completing a literature review.
- Phase 2: Quantitative analysis focused on contrasting and comparing four locales – Rural, Town, Suburban, and City areas – and on understanding what opportunities or disparities exist across these locales.

Part 2: Qualitative Research

- Phase 3: Participatory research with rural residential consumers, market actors (installers), and rural and statewide community groups (energy-focused).
- Phase 4: Data Party with participating community groups to validate findings and explore implications.

The purpose of **Part 1 (Phases 1-2)** was to establish a definition of rural, suburban, and urban, and to identify the opportunities and disparities that influence the adoption of energy-efficiency benefits. **Part 2 (Phases 3-4)** used participatory methods to gain deeper insights into the specific challenges affecting rural communities. Unlike the comparative analysis conducted in Part 1, the primary research in Part 2 was not designed to contrast locales but rather to explore how specific challenges and access limitations impact Town and Rural locales. The insights gained from this qualitative research are intended to inform targeted strategies that address the unique challenges of rural markets but may apply to other locales.

The strategies developed in the research used the framework of targeted universalism.[3] Targeted universalism involves establishing universal goals that address shared needs while implementing targeted strategies that consider the unique circumstances of these communities. This approach acknowledges that rural populations experience distinct structural, cultural, and geographic challenges that may require

[1] See https://neea.org/about-neea for more information about NEEA.
[2] Energy burden is defined as the percent of household income spent on energy. A household is considered "energy burdened" if their energy burden exceeds 6 percent.
[3] See https://belonging.berkeley.edu/targeted-universalism for more information on targeted universalism.

customized interventions to achieve the established universal goals. By aligning research findings with this framework, we look to identify opportunities for initiatives that offer adaptive solutions tailored to the specific realities of rural communities, while maintaining a commitment to broader, universal outcomes across all locales.

Findings

Data Analysis: Contrasting and Comparing Locales

There were many key findings from the data analysis, and there is a need for future analysis to dig deeper into the key data areas.[4] Below are a few highlights from the contrast and compare analysis.

- **Using the National Center for Education Statistics (NCES) Locale definitions to group communities (City, Suburb, Town, Rural) gave a clearer picture of locale differences.** It showed differences in areas like income and energy costs that could have been missed with a simple urban/rural dichotomy.
- **Towns and Rural areas tend to face more economic challenges and barriers[5] to energy efficiency adoption.** On average, people in Towns and Rural areas have more limited access to local contractors,[6] have higher energy burden, have more homes without internet and computers, and experience lower incomes. Rural areas also have the highest energy costs, the most homes heated with bottled gas (e.g., propane) and wood, and the most manufactured homes.[7]
- **In the state analysis, Montana stands out with the highest energy burden, the oldest homes, and the most manufactured homes** of the four states included in this study. People there also face higher energy costs and less access to computers and the internet.
- **Across all locales**, renters, manufactured home residents, and households using wood or propane for heating spend a larger share of their income on energy.

Synthesized Findings: Secondary and Primary Research

The team layered in the primary research with data analysis and literature review to propose potential MT strategies tailored for rural residential communities. Many of these barriers may also exist in other locales, and the proposed strategies could be applied more broadly across the region.

Table 1: Recommended Market Transformation strategies summary

MT Strategies	Market Barriers Addressed
Harness the shared values of health and safety to promote energy efficiency through community-centered strategies	Lower consumer awareness of energy efficiency technology, programs, and resources; distrust; limited multilingual resource availability
Facilitate DIY options for consumers	Limited contractor availability; limited product availability; upfront cost; installation cost; maintenance cost
Develop technologies that meet rural needs – and make available near those locations	Upfront cost; options incompatible with existing building infrastructure/stock; limited internet access
Create workforce development opportunities in rural communities	Limited contractor availability; distrust; installation cost; maintenance cost
Explore financing solutions for energy efficiency upgrades	Upfront cost; language differences

[4] More detailed data findings can be found in the Appendix A.

[5] For more information on these barriers and their influence on a household's ability to adopt energy efficiency, see Table 8.

[6] While there are similar numbers of contractors per capita between City/Suburb and Town/Rural, given the significantly different population densities, there are far fewer contractors near many Town and Rural communities.

[7] The data on manufactured homes in the data analysis section of this report is based on U.S. Census Bureau data. While the Census uses the term 'mobile home/trailer' in its data collection tool, we use 'manufactured homes' to align with NEEA's standard language.

Conclusions and Next Steps

The research highlights that challenges exist across all locales, with additional barriers arising for certain populations and communities due to characteristics such as household ownership type and building infrastructure. In both Town and Rural areas, the data identified obstacles, such as higher energy burdens and lower incomes. The primary research explored these challenges in depth and examined how rural insights could identify barriers within the rural perspective that could inform potential MT strategies.

Early in the process, the team acknowledged that the vast number and variety of communities across the Northwest made it impractical for the primary research to fully contrast and compare all locales within the scope of this effort. While the proposed MT strategies focus on rural communities, they should be expanded and further researched in other locales and areas. Based on the research, the team identified key areas for future exploration that NEEA could consider.

Future Research

- **Engaging Other Communities in Energy Research:** While this research provides valuable insights, it may not fully capture the experiences of all groups and locales across the region. Additional research directed towards other groups and locales could fill this gap, such as dedicated research in close collaboration with Tribal communities to better understand market characteristics, energy efficiency disparities, and culturally relevant strategies—while honoring Tribal sovereignty and fostering trust.
- **Key Contributors to Energy Burden:** Expand research into the complex factors influencing energy burden, including housing type, heating fuel, and income to inform market transformation efforts.
- **Urban & Suburban Locale Research:** Extend research efforts to urban and suburban communities to explore differences in market dynamics, energy burden, and access to energy efficiency programs.
- **Market Actor Research:** Investigate the supply chain structure including the role of manufacturers, distributors, and retailers in shaping energy efficiency markets in different locales, identifying opportunities for collaboration and intervention.
- **Additional Research Areas:** Explore opportunities such as rent-to-own markets, Rural and Town locale multifamily housing barriers, the used appliance market, rural code enforcement, manufacturer and distributor strategies, and contractor business models to strengthen the rural energy efficiency workforce.

I. Introduction

The Northwest Energy Efficiency Alliance (NEEA) is an alliance of over 140 utilities and energy organizations working across Idaho, Montana, Oregon, and Washington to advance energy-efficient products, services, and practices. Since its founding in 1996, NEEA has focused on market transformation (MT) to remove barriers to the sustained diffusion of energy efficiency (EE) products and practices in the market.[8] NEEA contracted with LD Consulting to explore the characteristics of rural, suburban, and urban markets to better understand if there were any potential differences and gaps in MT transformation.

I.1. Research Objective

The research objectives of this project were to contrast and compare characteristics of rural, suburban, and urban markets (such as consumer purchasing behaviors and spending patterns, energy burden,[9] supply chain access, building stock, and workforce features) to identify market transformation strategies that will accelerate the delivery of program benefits to rural markets. This research is intended to augment understanding of individuals and consumer markets across the Northwest regions.

II. Research Methods

This study utilized a mixed-methods approach, combining secondary research, data analysis, and primary research to address its objectives. The research was completed in two parts and four phases:

Part 1: Quantitative Analysis

- Phase 1: Defining rural, suburban, and urban areas and documenting known information by conducting staff interviews and completing a literature review.
- Phase 2: Discovery and Data analysis: Quantitative analysis focused on contrasting and comparing four locales – Rural, Town, Suburban, and City areas – and on understanding what opportunities or disparities exist across these locales.

Part 2: Qualitative Research

- Phase 3: Participatory research with rural residential consumers, market actors (installers), and rural and statewide community groups (energy-focused).
- Phase 4: Data Party with participating community groups to validate findings and explore implications.

The purpose of **Part 1 (Phases 1-2)** was to establish a definition of rural, suburban, and urban, and to identify the opportunities and disparities that influence the adoption of energy-efficiency benefits. **Part 2 (Phases 3-4)** used participatory methods to gain deeper insights into the specific challenges affecting rural communities. Unlike the comparative analysis conducted in Part 1, the primary research in Part 2 was not designed to contrast locales but rather to explore how specific challenges and access limitations impact Town and Rural locales. The insights gained from this qualitative research are intended to inform targeted strategies that address the unique challenges of rural markets.

Table 2: Research activities by phase

Phase	Activities
1	• Conducted ***staff interviews*** to understand NEEA's past efforts in all market areas.

[8] See https://neea.org/about-neea for more information about NEEA.
[9] Energy burden is defined as the percent of household income spent on energy. A household is considered "energy burdened" if their energy burden exceeds 6 percent.

	• ***Determined standardized definitions***. Adopted the National Center for Education Statistics (NCES) locale classification system, which categorizes areas as City, Suburban, Town, or Rural. • ***Performed a literature review*** to explore existing research on the market areas.
2	• ***Performed a comprehensive analysis*** by socioeconomic characteristics, housing characteristics, energy burden, purchasing and behavioral characteristics, community characteristics and market data to better understand potential gaps and barriers across all locales and the four states of Idaho, Montana, Oregon, and Washington. • ***Employed a cluster approach*** to identify two rural county clusters per state to recruit rural community groups, market actors (installers), and residential consumers for interviews and focus groups. The recommended clusters were chosen to ensure statewide demographic representation, considering factors such as locale population share, median income, and energy burden.
3	• ***Hosted interviews and focus groups*** with rural community groups, residential consumers, and market actors (installers) to explore experiences and perceptions in Rural and Town locales. Engaged directly with stakeholders to gather insights that inform future initiatives and align strategies with opportunities.
4	• ***Hosted a Data Party*** to engage stakeholders in validating findings and ensuring accuracy.[10] This process helped eliminate potential biases by allowing participants to confirm or challenge insights based on their lived experiences.

The strategies developed are lensed in the framework of targeted universalism. Targeted universalism involves establishing universal goals that address shared needs while implementing targeted strategies that consider the unique circumstances of these communities. This approach acknowledges that rural populations experience distinct structural, cultural, and geographic challenges that may require customized interventions to achieve the established universal goals. By aligning research findings with this framework, we look to identify opportunities for initiatives that offer adaptive solutions tailored to the specific realities of rural communities, while maintaining a commitment to broader, universal outcomes across all locales.

II.1. Part 1: Quantitative Analysis

In the first phase of the research, the team conducted staff interviews to explore NEEA's past efforts in rural, suburban, and urban markets. These interviews also aimed to understand how NEEA had previously defined these market categories. To establish a definition for rural, suburban, and urban areas for the research, the team collaborated with NEEA and reviewed multiple approaches. The team selected the NCES locales classification dataset[11] for market characterization analysis. The NCES system categorizes areas into four locales — City, Suburban, Town, and Rural — using TIGER 2021 shapefiles, Census Bureau urban area data, and Core Based Statistical Areas (CBSA) Principal Cities. This classification provides geographic relationship files by zip code, offering a structured way to define market boundaries. Additionally, the team conducted a literature review to examine existing research on rural, suburban, and urban areas. This review helped identify potential barriers to energy efficiency adoption across these regions.

II.1.1.Phase 1: Defining Locales

Deciding which data set to use to define locale

Before conducting data analysis, NEEA and LD Consulting examined different ways to define and segment data by locales. Various data sets were considered as options for defining rural, suburban, and urban areas, including:

[10] https://www.betterevaluation.org/methods-approaches/methods/data-party.
[11] See https://nces.ed.gov/programs/edge/Geographic/LocaleBoundaries for more information on the dataset.

- U.S. Department of Agriculture (USDA) Rural-Urban Commuting Areas (RUCA)
- USDA Rural-Urban Continuum Codes (RUCC)
- U.S. Census Urban Areas (UA) classifications
- U.S. Department of Housing and Urban Development (HUD) Urbanization Perceptions Small Area Index (UPSAI)
- Food and Nutrition Service (FNS) Rural Designation
- National Center for Education Statistics (NCES) Locale

The team researched how each data set was developed, how other entities have used these data sets, reviewed the frequency of update efforts for each data set, overlaid the various data sets with regional maps, experimented with combining data sets, and compared results to other regional data work. After review and discussion around the strengths and weaknesses of the data sets, the project team decided to use the NCES Locale classification[12] dataset to define the locales for our research.

The most significant strengths identified to support the use of the NCES Locale data set were:

- The decision to include four locale types, as opposed to the more common binary classification of rural and urban, may result in more distinct market transformation characteristics and outcomes.[13]
- The additional classification of locales by subtype, described below, could be leveraged to provide additional granular analysis if necessary.
- This data set leverages the commonly referenced U.S. Census UA data set, thereby enabling easy alignment with other future data efforts.

The most significant weaknesses of the NCES Locale data set identified were:

- At the time, the NCES Locale data set still referenced 2010 U.S. Census UA data, as several significant changes to the definitions used in the U.S. Census UA data set were updated in the 2020 release. However, comparing the 2010 and 2020 UA data set showed that very few areas in the region would be impacted by the update and it was decided that this would not significantly impact the results of the data analysis.
- The NCES Locale data is provided at the census block level, necessitating additional geographic relationship files and analysis to align with most data sets in this study, which are available at the census tract level. The team developed a rule to define Locale of each census tract in the region based on the Locale type with the largest population as calculated using NCES census block data.

Details on NCES Locales

The NCES locales classifies communities into four primary locales – City (Urban), Suburb, Town, and Rural.[14] NCES locales are defined using TIGER 2021 shapefiles (U.S Census, 2021), based on the 2010 Census Bureau's urban area definitions and the Office of Management and Budget's 2017 CBSA Principal Cities, and provide geographic relationship files by zip code (Geverdt and Maselli, 2024).

[12] *More information on locale types and subtypes can be found at the NCES Locale website, https://nces.ed.gov/programs/edge/Geographic/LocaleBoundaries.*
[13] Refer to Section III.1.1 to learn about how these extra Locales impacted the results of this data analysis.
[14] Locale designations will be capitalized in the report when referring to the NCES definition (e.g., Suburb, Rural) and not capitalized when used generally (e.g., suburb, rural).

Additionally, NCES further differentiates their primary locales into three subtypes:

- City and Suburb locales are classified as Small, Medium and Large.
- Town and Rural locales are further classified as Fringe, Distant or Remote, based on their proximity to higher population areas.

These categories are based on a rigorous, scientific methodology but are described here in more general terms for ease of understanding:

- **City (Urban)**: Large, densely populated areas, defined using the incorporated City's legally defined boundaries (e.g., Boise, ID; Billings, MT; Portland, OR; and Seattle, WA).
- **Suburb**: Residential areas situated adjacent to or very near a City, outside of the City's legally defined boundary, and tend to be less densely populated than a City (e.g., Meridian, ID; Lockwood, MT; Gresham, OR; and Woodinville, WA).
- **Town**: Small, densely populated communities independent from City or Suburb (e.g., Twin Falls, ID; Butte, MT; Baker City, OR; and Moses Lake, WA).
- **Rural**: Sparsely populated areas, defined as not being a City, Suburb or Town.

II.1.2.Phase 2: Quantitative Data Analysis

In Phase 2, the team used the new locale definitions (City, Suburban, Town, and Rural) and completed a comprehensive analysis by socioeconomic characteristics, housing characteristics, energy burden, purchasing and behavioral characteristics, community characteristics and market data to better understand potential gaps and barriers across all locales and the four states of Idaho, Montana, Oregon, and Washington.

By Locales

For the data analysis, the team focused the analysis on City, Suburb, Town, and Rural locales without subdifferentiation by size or proximity to higher population areas. The project team also analyzed some datasets separately for Remote Towns and Remote Rural locales, as it was hypothesized the remoteness of these locations could impact some market characteristics important in market transformation work. While this report does not include any results based on these subtypes, they are available in the supplemental slide deck accompanying this document at neea.org.

As a visual example of how the NCES Locales define specific areas,

Figure 1 shows the locale breakdown for part of Oregon's I-5 corridor and the Idaho Falls, Idaho area.

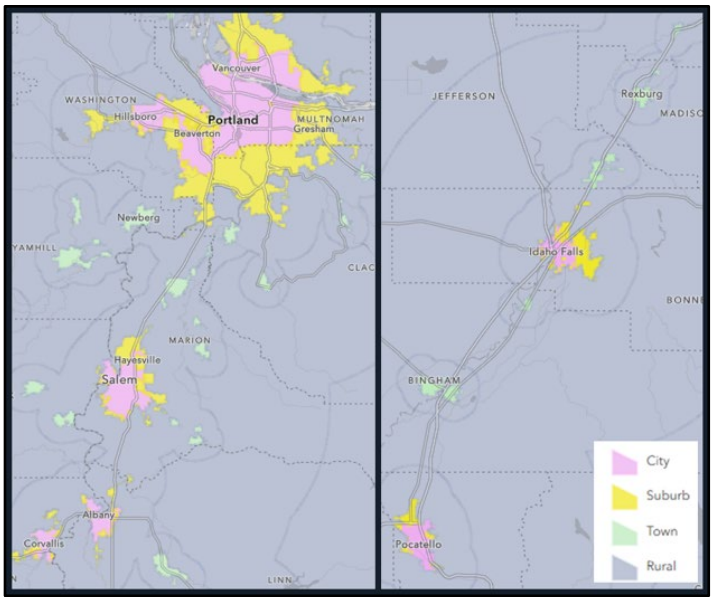


Figure 1. Locales designations of Oregon's I-5 Corridor and the Idaho Falls area

By States

In addition to collecting and analyzing data by locale, the team also looked at characteristics by states in NEEA's four-state region: Idaho, Montana, Oregon, and Washington.

II.1.3.Known Limitations of Data Sources Used

The data analysis work was performed using the best data available to the team at the time of analysis; however, the team acknowledges that there are limitations to these datasets. A few of the more impactful limitations are summarized below.

ESRI Data from ArcGIS Business Analyst

All the Purchasing and Behavioral Data cited, plus a few characteristics throughout the other categories of data, are based on data collected through NEEA's ArcGIS Business Analyst account. Most of the data used through this account included only vague documentation on their sources, and did not provide definitions of the terms used to truly understand the data provided (e.g., what work qualifies as "home improvement"). Additionally, when identifying different market actor segments using the Business Analysts' Point of Interest search, the tool was often unable to produce data sets for each locale individually. In these cases, the data was grouped into two categories: City/Suburb and Town/Rural.

U.S. Census Demographic Data

- The demographic data used in this project used the U.S. Census Bureau's 2020 Decennial Census of Population and Housing data. While the Census Bureau's data set is considered the authoritative source to analyze population level demographic data, they acknowledge limitations in their data. Specifically, the Census Bureau has documented (U.S. Census Bureau, 2022) that the 2020 Decennial Census undercounted certain populations.

II.1.4.Phase 2: County Clusters Approach

To recruit rural community groups, market actors (installers), and residential consumers for interviews and focus groups, the research team employed a cluster approach to identify two rural county clusters per state. Each cluster, consisting of 2-4 counties, was designed to represent at least 10% of the state's rural population and reflect key demographic and economic factors. This approach also allowed for potential comparisons across the state clusters. The team first selected four random "seed" counties per state from eligible Town and Rural counties using an Excel randomization function. Around each seed, 3-4 neighboring counties were identified based on community and economic interactions, including shared utility providers, commuting patterns, economic development ties, and regional planning organizations. After forming clusters, viable pairs were determined by ensuring they met the Rural population threshold and were within NEEA funders' service areas.

The final recommended clusters were chosen to ensure statewide demographic representation, considering factors such as Town vs. Rural population share, median income, and energy burden. The final clusters are outlined in Table 3, illustrated in Figure 2, and information about each chosen cluster is detailed in Appendix B.

Table 3: Counties within each cluster by state

State	Cluster #	Counties
Idaho	1	Benewah, Clearwater, Idaho, Lewis
	2	Fremont, Jefferson, Madison
Montana	3	Carbon, Park, Stillwater, Sweet Grass
	4	Glacier, Pondera, Teton, Toole
Oregon	5	Lincoln, Polk, Tillamook
	6	Baker, Union, Umatilla, Wallowa
Washington	7	Adams, Garfield, Grant, Whitman
	8	Grays Harbor, Lewis, Pacific, Wahkiakum

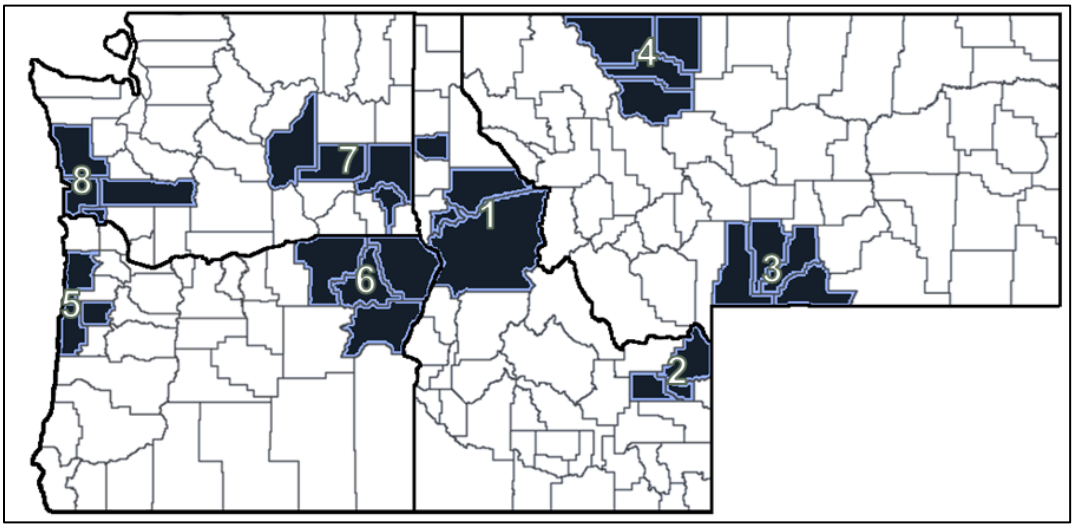


Figure 2. Map of county clusters

II.2. Part 2: Qualitative Research

II.2.1. Phase 3: Interviews and Focus Groups

A list of eligible community groups and market actors within chosen clusters was then compiled by online research. All interviews and focus groups were conducted virtually via Zoom and further details on the requirements, format, number of participants, and recruitment method for each target audience are listed in Table 4. The state distribution of participants recruited is listed in Table 5. Interview and focus group guides are available in the Appendix D, E, G, and I.

Table 4: Interviews and focus group details

Audience	Requirements	Format	# of participants	Recruitment Method
Community groups	State, regional, and local organizations active in the energy market ecosystem that live and serve rural communities	Interview (45 mins)	3	Direct outreach
		Focus group (90 mins)	16 individuals across 14 organizations	
Consumers	People living in rural areas who pay electric, gas or fuel bills	Interview (45 mins)	14	Respondent.io Userinterviews.com
Market Actors (Installers)	Businesses or employees providing energy efficient installation services	Interview (30 mins)	5	Direct outreach, Respondent.io, Userinterviews.com

Table 5: Sample representation by state

Audience	Idaho	Montana	Oregon	Washington	Northwest
Community groups	1	1	4	4	7
Consumers	4	3	4	3	N/A
Market Actors (Installers)	2	1	0	2	N/A

Methods Consideration

Several factors may limit the representativeness of the sample. Because interviews and focus groups were conducted virtually, all participants had access to and were familiar with navigating the internet. Thus, our sample excludes individuals without reliable internet access, which data highlights being more prominent in Town and Rural areas. Consumers and market actors (installers) were also recruited through online research platforms where participants self-enroll onto those platforms and regularly participate in research studies. Due to the time commitment required for participating in these research platforms, the sample may have skewed towards individuals with more free time. All participants spoke English, which restricts insights into the experiences of non-English-speaking residents. Lastly, while market actors provided insights based on their interactions with customers, they could not fully represent the experiences of rural customers, who may have limited awareness of or access to their services. This gap in representation may skew the findings towards people who are already engaged with and familiar with energy efficiency adoption. Due to these considerations along with the small sample size, the findings from the interviews and focus groups should be used as contextual insights rather than generalized insights across all rural populations.

II.2.2. Phase 4: Data Party

A data party is a facilitated session where participants involved with generating the research data are also involved in the synthesis of recommendations from the data. By involving community members

directly in the validation and strategy development process, data parties help ensure their voices are central to decision-making and implementation and that they have ownership over the results of the research. In this study, community groups were invited to participate in a data party after the conclusion of the focus groups to review and verify the primary research results, identify research gaps, and further develop possible market transformation strategies for rural communities. Data party facilitation materials are available in Appendix **Error! Reference source not found.**.

III. Research Findings

Our research findings start with a comparative analysis across different locales (Phase 2), identifying key similarities and differences. We then integrate primary research (Phase 3-4) by incorporating insights and lived experiences from rural community groups, consumers, and market actors (installers). The method ensures that their perspectives provide deeper context on what the team learned from the analysis. The cross-synthesized section further examines the findings, documents barriers from a rural lens, and explores potential MT strategies informed by data analysis and firsthand community input. This approach allows us to develop nuanced, locally relevant recommendations while identifying broader, scalable MT strategies.

III.1. Phase 2: Quantitative Data Analysis

The results presented in this report are samples of the data collected and analyzed for this study. More detailed data findings can be found in the supplemental presentation at neea.org.

III.1.1. NCES locale classifications led to richer data analysis

The decision to use the NCES Locale classifications to segment communities for data analysis in this project resulted in a richer and more nuanced understanding of these communities. The NCES Locales dataset classifies communities into four primary locales – City, Suburb, Town, and Rural – instead of the typical binary classification of rural and urban in datasets such as the U.S. Census Bureau's UA data. The results of this data analysis show that there are significant differences in some of the characteristics of City and Suburb areas, as well as in some of the characteristics of Town and Rural areas, which would have been missed if a different dataset were used.

To illustrate the impact of using the NCES data, the 2022 mean household income is shown in Figure 3 by NCES Locale, and in Figure 4 by U.S. Census Bureau's urban and rural definition. Using the binary urban/rural definition, the difference between urban and rural mean household incomes is $10,242; or the mean household income of urban areas is 10% higher than rural areas. But, using the NCES Locale definition, it is apparent that the actual disparities are much different and nuanced. The difference between City and Rural mean household incomes remains equivalent, only $10,724. However, the income disparities are much more significant when comparing mean household incomes of Suburb to Town – a difference of $41,388. When the Remote subtypes for Rural and Town are also included, it shows an even more significant disparity – $47,928 between Suburb and Remote Town locales. In other words, the mean household income in Suburb locales is *60% higher* than the mean household income in Remote Town locales.

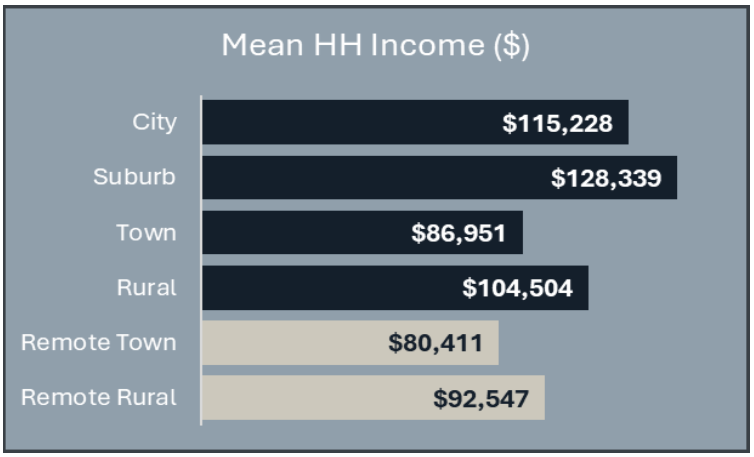


Figure 3. Mean household (HH) income using NCES Locale Classifications vs using U.S. Census Bureau's urban and rural definitions

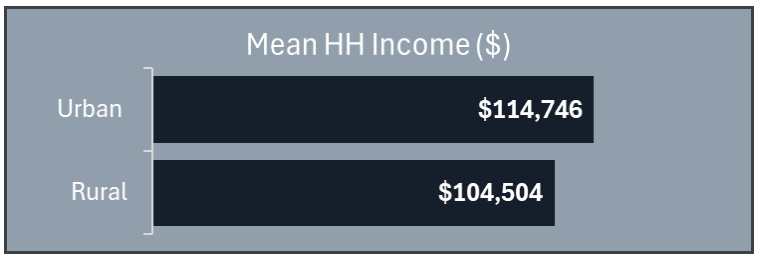


Figure 4: Mean household income using NCES Locale Classifications vs using U.S. Census Bureau's urban and rural definitions

If a different dataset had been used to compare communities in this data analysis study, the learnings would have been less robust than the ones provided in this report. Not all characteristics were as drastically impacted by using NCES Locales as the one illustrated here; but several, including income, demographics and energy burden, do provide a more robust understanding of communities due to the use of these classifications.

III.1.2. Data analysis highlighted a variety of commonalities and differences among locales and states. The following identifies some of the highlights from the quantitative analysis. More detailed findings can be found in the supplemental slides deck on neea.org.

This analysis includes data on key socioeconomic, housing, and market characteristics to provide a better understanding of the conditions that influence energy efficiency adoption and program effectiveness. Household economics—such as median income, energy burden, and energy costs—help identify financial constraints that may affect participation in efficiency programs. Information such as access to technology, environmental awareness, and language barriers represent informational and structural challenges that can limit engagement. Housing characteristics, including occupancy type, housing type, and primary heating fuel, shape the feasibility and decision-making process for efficiency upgrades.

The results from the data analysis are nuanced and highlight a variety of both commonalities and differences among the locales and the states. Town and Rural locales tend to have more economic challenges and barriers to energy efficiency adoption as outlined below in Figure 5 - Figure 76 and Table 6. The full data analysis can be found in the supplemental slide deck on neea.org and in Appendix A.

Table 6. Data for high-level takeaways

Characteristic	City	Suburb	Town	Rural
Energy Burden[15]	1.6%	1.6%	2.4%	2.8%
Energy Burdened Households[16]	10%	8%	16%	21%
Total Household Energy Costs	$1,640	$1,929	$1,953	$2,639
Median Household Income	$85,185	$101,224	$66,832	$82,703
Total Household Net Worth	$173,836	$354,646	$167,893	$284,759
Graduated College	43.2%	37.5%	26.2%	28.0%
Households without Computers	4.0%	3.1%	6.1%	5.6%
Households without Internet	8.2%	6.7%	12.0%	12.0%
Average Age of Home (years)	51	40	49	45
Knowledge about environmentally friendly products (compared to U.S. average)	+9%	+5%	-5%	-5%

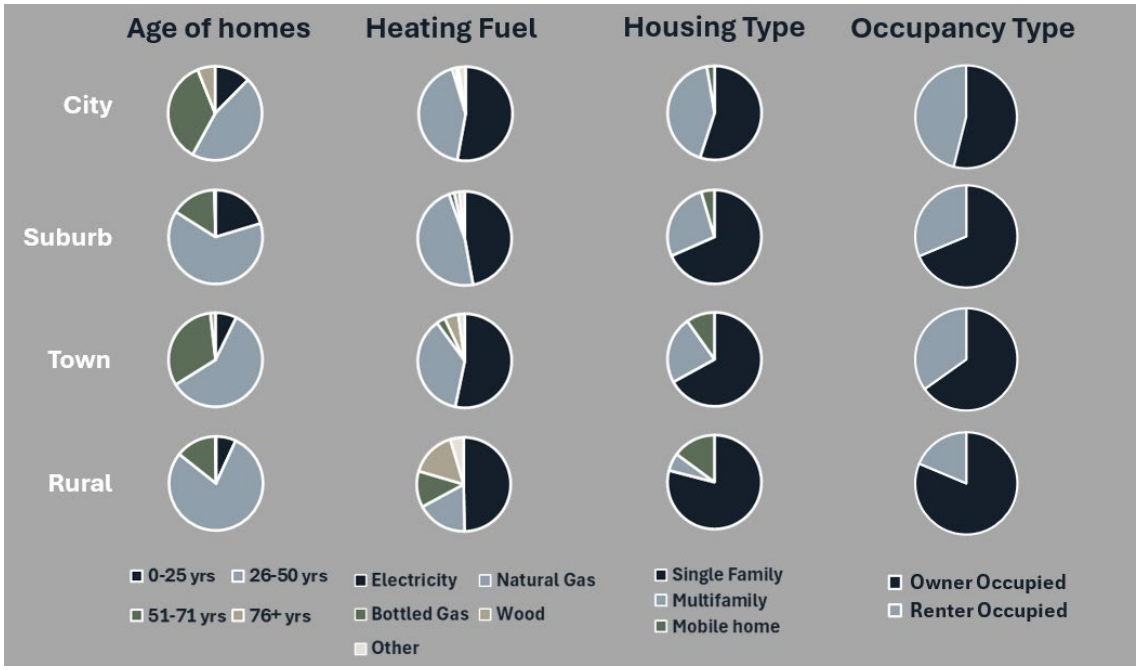


Figure 5. Infographic on housing characteristics for City, Suburb, Town and Rural locales
Notes: Ages of homes: City has the oldest housing stock, followed by Town, Suburb has the most new homes.
Heating fuel: Rural has many homes heated by wood & bottled gas and few heated by natural gas.
Housing type: City has of the most multifamily homes, Rural has the most manufactured homes.

[15] Energy burden is defined as the percent of household income spent on energy bills.
[16] Percent of households with 6% or higher energy burden.

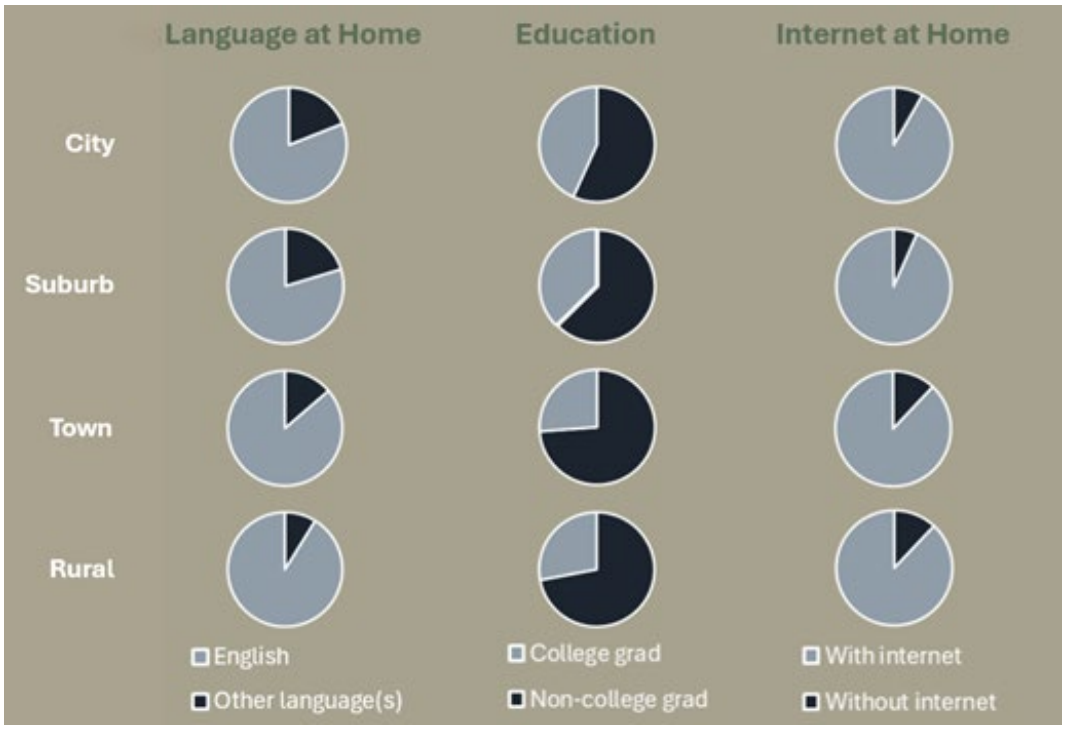


Figure 6. Infographics of socioeconomics for City, Suburb, Town and Rural locales
Notes: Language: City and Suburb have the most people who speak a language other than English at home. Education: City has the most college graduates, Town has the least. Internet: Town and Rural have the most households without internet access.

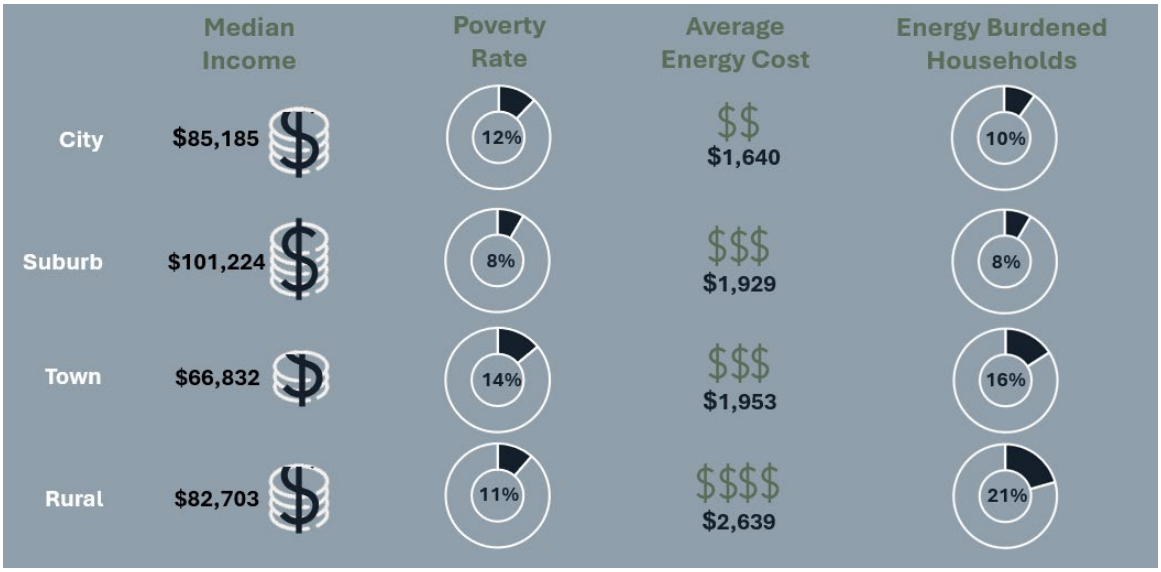


Figure 7. Infographics of energy burden for City, Suburb, Town and Rural locales
Notes: Median income: Suburb has the highest, Town has the lowest. Poverty rate: Town has the highest, Suburb has the lowest. Average energy bills: Rural has significantly higher average energy cost, City has the lowest. Energy burden: Rural has the most energy burdened households, followed by Town.

III.1.3. Contractor, distributor and retail store proximity

Another key difference among locales is the proximity of contractors, distributors and stores. While the data showed similar per capita measurements for these market actors, the heat maps shown below and

in the supplemental slide deck at neea.org illustrate how most of these market actors are in or near City and Suburb locales.

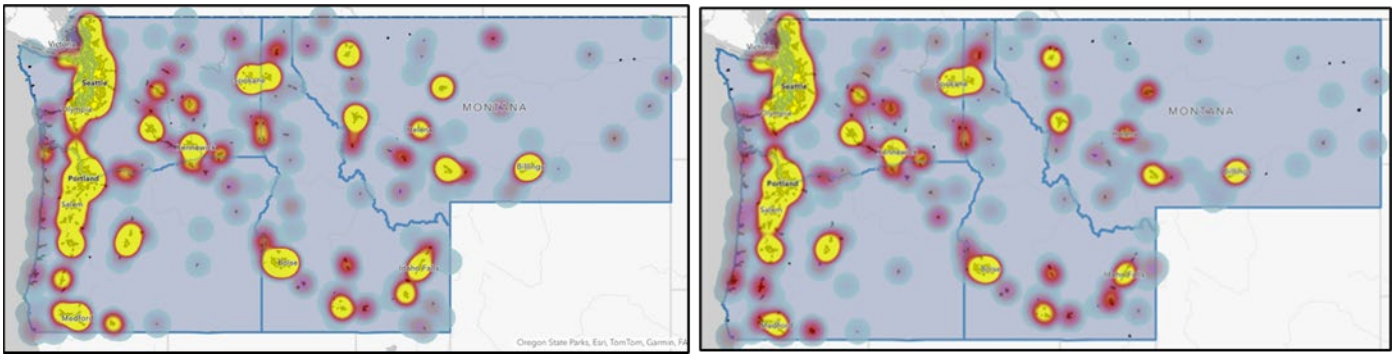


Figure 8. Heat map of HVAC contractors (left) and electrical contractors (right) illustrating the significantly higher concentration of contractors in and near City and Suburb locales

III.1.4. Rural locale, followed by Town, has fewest number of households. Montana has highest Rural household percentage.

The team started the analysis by looking at the four-state region by locale. The locale with the highest population and the highest number of households is the City locale, followed by Suburb, Rural and then Town, as shown in Figure 9 (left). The total distribution of households by locale is shown in Figure 9 (right). More than one-third of households in the region are situated in Town or Rural locales, highlighting the need to ensure these communities are considered in initiative design and delivery.

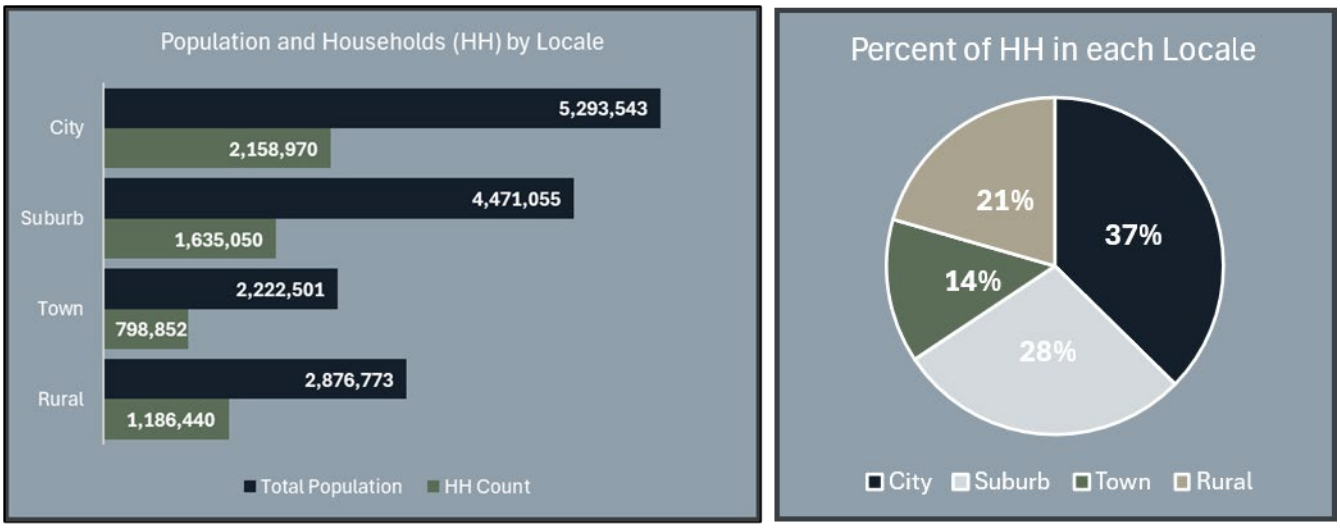


Figure 9. Population and number of households by locale across Idaho, Montana, Oregon and Washington (left) and percent of households in each locale across Idaho, Montana, Oregon and Washington (right)

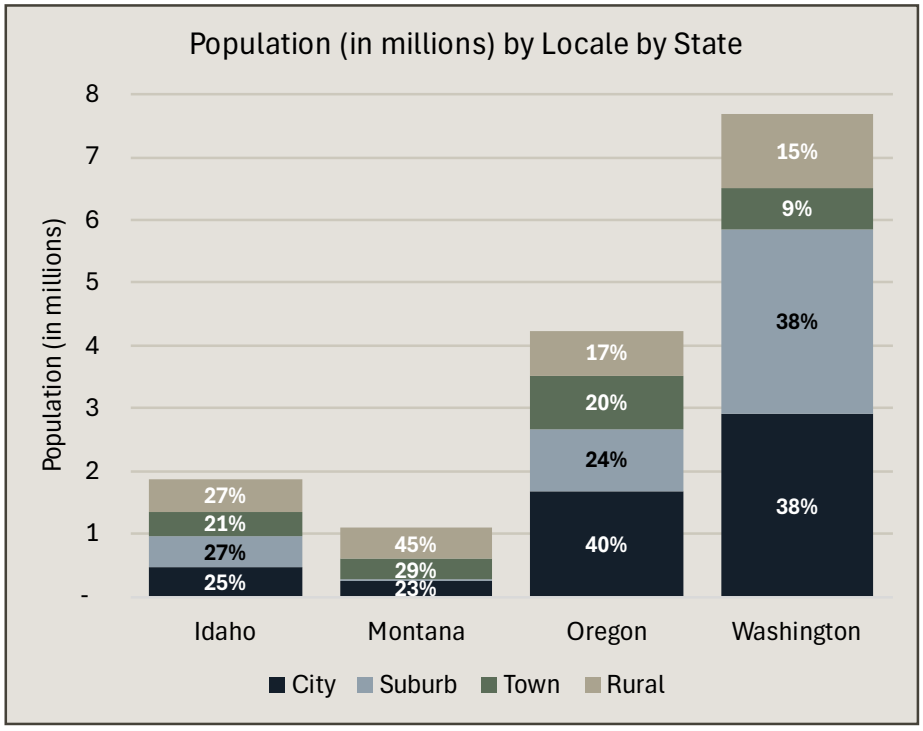
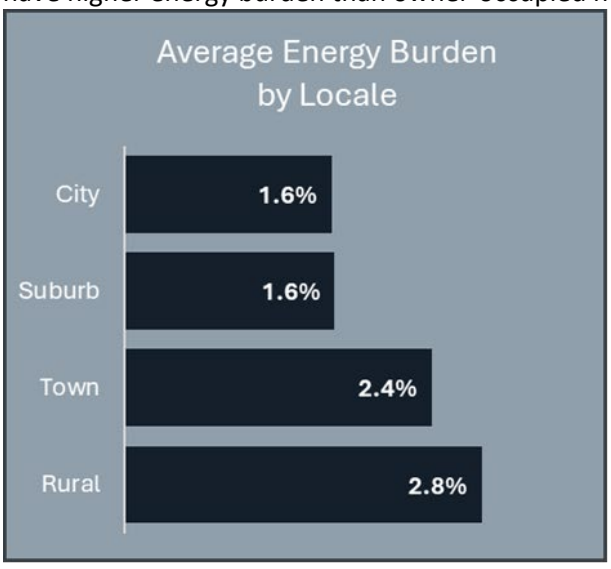


Figure 10. Population in millions of each locale across Idaho, Montana, Oregon and Washington

Additionally, the team analyzed how each of the four states were divided by locale, as seen in Figure 10. Montana has the highest percentage of population in Rural locale (45%), with Washington having the lowest (15%). However, Washington has the largest Rural population (1.17 million) of all four states, which is higher than the Rural population of Idaho (0.51 million) and Montana (0.50 million) combined.

III.1.5. Locales share similar energy burden patterns, concerns, and purchasing behaviors

In all locales, manufactured homes have significantly higher energy burden compared to single and multifamily homes; homes heated by wood, bottled gas (such as propane) and fuel oil have significantly higher energy burden than those heated by natural gas or electricity; and renter-occupied households have higher energy burden than owner-occupied homes. As shown in



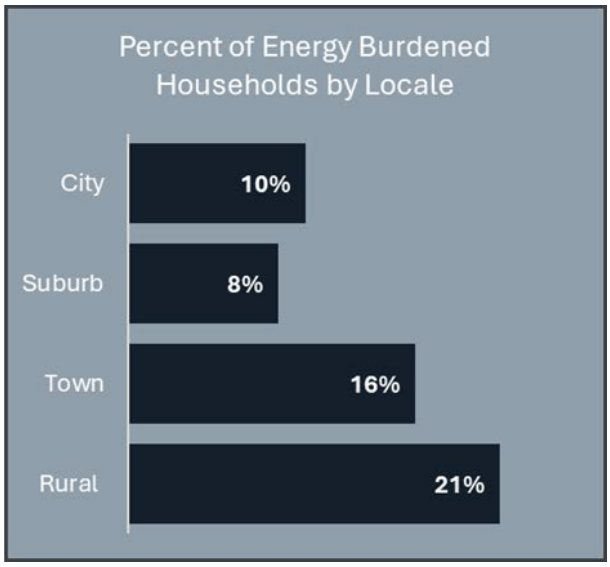


Figure 11 in all locales, the average household energy burden is less than 6%, the threshold used to identify energy burdened households; however, there are still a significant number of energy burdened households in all locales.

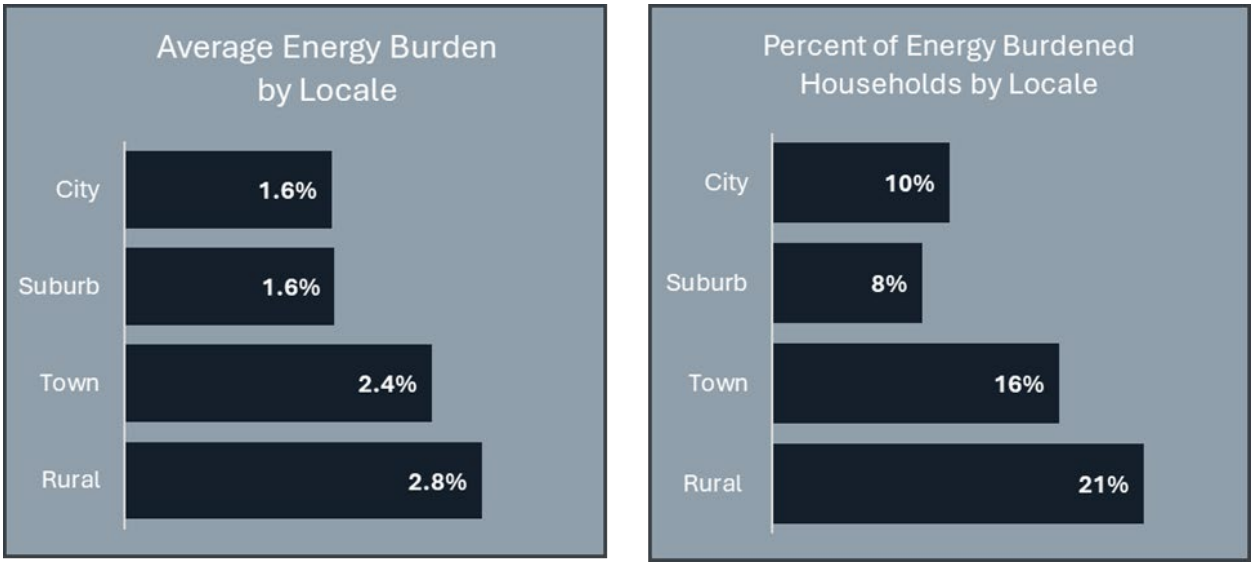


Figure 11. Average energy burden by locale and percentage of energy burdened households by locale

In all locales, people were more likely to have shopped at either Home Depot or Lowe's than any other hardware or appliance store in the last twelve months; though City and Suburb locales were more likely to shop at Home Depot or Best Buy than other locales, and people in Rural locales were more likely to shop at Lowe's, Ace Hardware, Harbor Freight, Tractor Supply Co, or True Value than other locales.

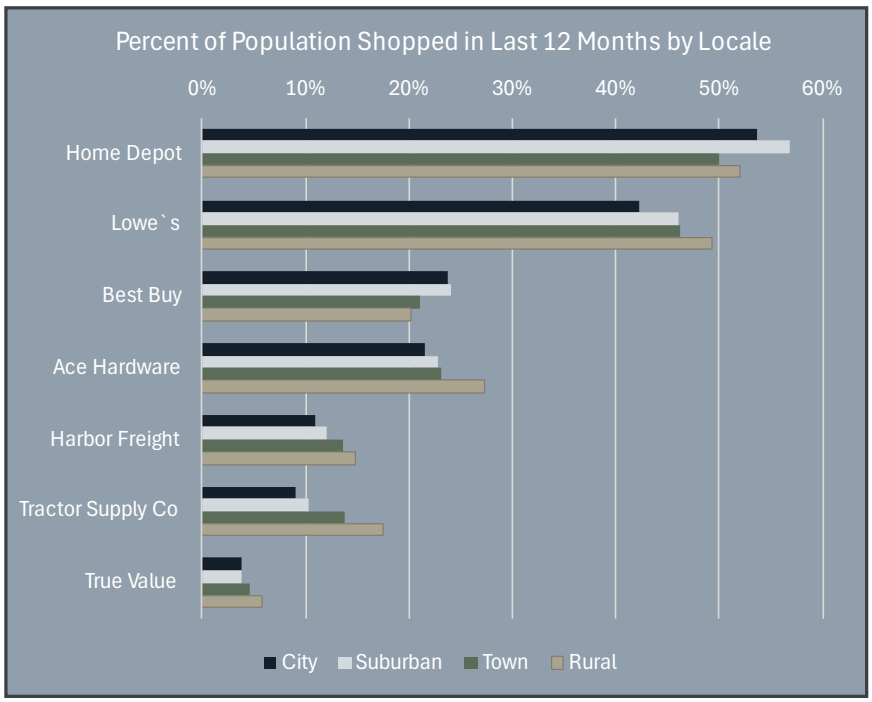


Figure 12. Percent of population who shopped at listed stores in the past 12 months, by locale

III.1.6. State-level analysis revealed that Montana has the highest prevalence of several housing and energy spending characteristics that may be related to barriers to the adoption of energy efficiency products and practices.

A few interesting findings surfaced when comparing states as well, particularly for Montana. Montana has the lowest income, the oldest housing stock, the highest percentage of households living in manufactured homes, the highest energy burden, the most energy burdened households and the highest energy costs. Montana also had the highest percentage of households without computers or internet at home. And the most prevalent household appliance store in Montana is Aaron's, a rent-to-own retailer.

III.1.7. Intersectional analysis showed high energy burden for renters on wood, propane, and fuel oil.

The data becomes even more nuanced once analyzed across datasets and layering locale information on top of other variables, such as household occupancy type, primary heating type, income level and housing type. For example, slides 117-122 on neea.org shows the results of a deeper dive into the energy burden of renter-occupied households by heating fuel type. It shows that even though the overall energy burden by locale is low (between 1.6 and 2.9%), there is significant energy burden in renter-occupied households that heat with wood, bottled fuel (such as propane) or fuel oil across all locales, and *especially* in Town and Rural locales. Those households, on average, have energy burdens between 5.9% and 8.6%, depending on the specific locale and heating fuel.

III.2. Phase 3: Participatory Research

The research took a deep dive into rural communities' challenges with energy efficiency adoption. Interviewing and hosting focus groups with community groups, residential consumers, and market actors (installers), the team heard themes of strong sense of self-reliance and local trust but also heard from all the groups there are significant hurdles in rural communities: high costs, older homes, and a lack of available contractors. Many residents talk about turning to DIY fixes to save money, which can lead to costly mistakes. Interviewees stated they trusted local recommendations (neighbors, trusted advisors, family members) over outside messaging, and installers stated they struggled with labor shortages and lack of interest from youth to enter in the industry. Table 7 lists the themes highlighted across the different focus groups and interviews.

Table 7: Primary research themes

Theme	Community Groups	Residential Consumers	Market Actors (Installers)
Self-reliance and strong community ties	Rural communities value independence, DIY approaches, and local networks.	Consumers rely on neighbors, online groups, and local recommendations for repairs and purchases.	Installers see DIY attempts leading to faulty installations and increased costs.
Economic and cost barriers	High upfront costs and income restrictions create a "benefits cliff"[17] where small income changes disqualify residents from assistance.	Cost is a top priority, and consumers often default to less expensive options from big-box stores rather than local retailers.	Installers shared that consumers navigating LMI struggle with initial costs despite potential long-term savings.
Technology and infrastructure	Older homes and limited internet access make	Consumers struggle with appliance size, electric panel	Installers hesitate to recommend newer

[17] Benefits cliff (the "cliff effect") refer to the sudden and often unexpected decrease in public benefits that can occur with a small increase in earnings. See https://www.ncsl.org/human-services/introduction-to-benefits-cliffs-and-public-assistance-programs for more information on the benefits cliff.

Theme	Community Groups	Residential Consumers	Market Actors (Installers)
	adopting modern energy-efficient solutions difficult.	capacity, and expensive fuel transitions.	technologies due to performance concerns, particularly in colder climates.
Contractor shortages and workforce gaps	Rural areas need local job creation in energy efficiency to build self-sufficiency.	Limited contractor availability leads to long wait times and high costs, pushing consumers toward DIY solutions.	Labor shortages, an aging workforce, and a lack of young workers entering the trade make it difficult to address contractor shortage.
Local and trusted communication channels	Outreach is more effective through local radio, community hubs, and trusted networks rather than external organizations.	Consumers trust recommendations from friends, family, and online reviews from "real people" over corporate messaging.	Installers note that customers prefer information from familiar, local sources.
Limited awareness of energy efficiency programs	Rural communities are sometimes skeptical of sustainability initiatives, especially if they appear top-down or financially inaccessible.	Consumers have varying levels of awareness about energy efficiency and often confuse different labels and incentives. People conflating the EnergyGuide sticker with the ENERGY STAR® label. [18]	Installers acknowledge that customers are unaware of the long-term benefits of energy-efficient technology.

Overall, cost and accessibility remain the biggest barriers to energy efficiency adoption in rural areas. Strong local trust networks play a key role in how people make decisions, highlighting the need for outreach through familiar and trusted channels. While the DIY approach is common, improper installations can lead to higher costs and performance issues. Additionally, contractor shortages and an aging workforce make it difficult for residents to access professional services, underscoring the need for more training programs. Finally, infrastructure challenges, such as older housing and limited internet access, call for energy solutions tailored to rural homes and climate conditions.

III.3. Phase 4: Data Party

Data parties give communities a voice in the research process. They help ensure that the findings reflect what organizations meant in focus groups and allow communities to confirm whether the results match their experiences.

At the data party, organizations clarified that rural solutions must be created by and for rural communities. They emphasized the importance of local empowerment, especially by training a local workforce for jobs in the energy sector. Participants stressed that energy efficiency programs should tap into trusted local networks to be effective. They also highlighted that community-driven approaches, where organizations ask open-ended questions and truly listen, lead to better outcomes.

"I think it's really, really important to have the folks on the ground who have standing, and trust be asking those questions, and that the questions be open ended and not prescriptive - you can say, what about this, or what about that? Or have you heard of this, or have you heard of that? But it isn't 'Here's this plan that you need to adopt'. That's disrespectful, and it will also backfire."

[18] For more information on the difference between EnergyGuide and Energy STAR, see https://www.energystar.gov/products/ask-the-experts/whats-difference-between-energy-guide-and-energy-star.

When engaging rural consumers, a mix of direct education and contractor involvement was seen as the best approach. Since contractors play a significant role in influencing consumer choices, working with them can often be more effective than reaching out to consumers directly.

"Engagement and contractors, in a lot of ways, go hand in hand … I think if the contractors are engaged, that's a huge thing. So, finding ways to not only have more contractors, but to engage the local contractors that are there would be really important for getting customers involved."

Participants also talked about the need for affordable, reliable energy technologies that work in rural areas. While the organizations thought energy-efficient solutions like heat pumps have potential, concerns about rising electricity costs and reliability in cold climates were mentioned as significant obstacles. Concerns were also raised about relying solely on electricity for heat and other essential needs, particularly in remote communities where resilience is critical. Participants emphasized the need to lower costs, and making technology more affordable. The increase in electricity rates was noted as a barrier, making it harder to justify the economic benefits of switching to electric heating.

Obstacles like rental housing, older homes, and lack of internet access can make it harder for some rural residents to benefit from energy efficiency programs. Participants also pointed out that workforce training is an issue for adoption, as many rural areas lack access to job training programs and skilled labor. They proposed strategies for more financial support and better incentives for consumer households navigating low-income.

The collaborative visual whiteboard from Mural is in the Appendix K.

III.4. Cross-Research Analysis

This section synthesizes findings across all research tasks to pull out similarities and differences and proposes MT strategies addressing barriers discovered in the data analysis, literature review and primary research.

Table 8 outlines MT barriers that were supported by both data analysis and primary research. These barriers are based on rural perspectives but are not solely unique to Rural and Town locales. Table 9 - Table 13 include possible MT strategies towards addressing barriers found throughout the research.

Table 8: Market Transformation barriers

Barrier	Influence on Energy Efficiency Adoption
Limited contractor availability	Consumers in areas with limited local contractor availability may face delays in obtaining service. This delay may lead them to pursue DIY options that are not energy-efficient or optimal or may lead them to purchase the first available piece of equipment from their contractor regardless of efficiency. Additionally, contractors may charge higher installation fees due to travel costs.
Options with existing building infrastructure/stock	Homes not supported by existing programs or technology (e.g., older homes, manufactured homes) due to building infrastructure condition, space or fuel limitations require additional costs for upgrade before energy-efficient equipment can be installed.
Lower consumer awareness of energy efficiency technology, programs, and resources	Awareness of the benefits and resources available for energy-efficient technology drives an increase in energy efficiency adoption. With a limited understanding of ways to mitigate cost or how energy efficiency can work for them, consumers may be deterred from adopting energy efficient technology.
Upfront cost	Upfront costs for energy-efficient equipment are typically higher than other products. Consumers experiencing low-income may prioritize their expenses towards items other than energy-efficiency.
Alternative fuels	Most existing programs do not have incentives for alternative fuel equipment nor support for changing from alternative fuels. Consumers with alternative fuel homes then may not be able to engage with energy-efficiency in a cost-effective manner or may suffer from increased energy bill.
Installation cost	Installation cost for energy-efficient technologies can be driven by complexity of the products, lack of contractor availability, and travel fees. Consumers experiencing low-income may prioritize their expenses towards other items.
Maintenance cost	Consumers experiencing low-income may prioritize other essential expenses which can result in delayed maintenance or decide not to purchase products that have higher maintenance cost.
Limited product availability	Limited product availability in stores and delays in receiving products due to remoteness make it more difficult to access new technologies and results in slower adoption rates.
Limited internet access	Internet availability impacts customers' ability to use DR capabilities to reduce utility cost. Without internet access, consumers also cannot view online energy efficiency resources (e.g., online information, applications, contractors).
Distrust	People in Towns and Rural communities may be less likely to accept information provided by government officials or individuals from outside their local area as accurate.
Limited multilingual resource availability	Energy efficiency resources and contractor services are often only available in English, which limits non-English speakers access to information about energy efficiency and ability to connect with contractor.

Notes: To see how these MT barriers relate to the rural experience, see Appendix J.

Table 9: Rural Market Transformation strategy 1

Harness the shared values of health and safety to promote energy efficiency through community-centered strategies			
MT Idea/Strategy 1	Increase consumer acceptance and adoption of energy-efficient technologies by focusing on the direct health, safety, comfort and resilience benefits they offer. By emphasizing these relatable outcomes and shared values rather than solely promoting energy efficiency the strategy increases the likelihood of greater resonance with a wide range of audiences, especially rural communities, leading to broader market penetration. To amplify this impact, partner with key community stakeholders serving rural communities such as social workers (via state boards), state agencies, public health systems, community action agencies, and other trusted local organizations, to craft messaging that will resonate with rural communities.		
Barriers	Lower consumer awareness of energy efficiency technology, programs, and resources; distrust; limited multilingual resource availability		
What we heard (primary research)	**Community Groups:** Rural communities often value self-reliance and local knowledge. Non-energy benefits like resilience, reliability, and healthier homes are especially appealing.	**Consumers:** Consumers' primary motivation for installing energy-efficient equipment is for potential utility bill savings. "...I think so the price definitely played a large role. You know, looking for a good balance of something that was gonna be affordable for us in the, at the time and, and that it wasn't going to be very expensive to run."	**Market Actors (installers):**
Data Analysis indicated (secondary research)	• Knowledge about environmentally friendly products (slide 63) • Use of environmentally friendly products (slightly lower in Town/Rural) (slide 64) • Ownership of hybrid vehicles (lowest in Towns, then Rural) (slide 65)		
Literature Review indicated (secondary research)	• Rural communities have less trust in existing programs • Outreach and advertising are often not targeted to rural communities		

Table 10: Rural Market Transformation strategy 2

Facilitate DIY Options for Consumers			
MT Idea/Strategy 2	Facilitate the adoption of Do-It-Yourself (DIY) energy efficiency solutions by collaborating with manufacturers and supply chain partners to develop and promote affordable technologies, that cater to a wide range of consumers. Ensure these products are stocked in stores accessible to rural communities, addressing geographic barriers to availability. Provide user-friendly DIY guides and videos for self-installation, readily available both online and at the point of sale, empowering consumers to confidently install and benefit from these energy-efficient solutions.		
Barriers	Limited contractor availability; limited product availability; upfront cost; installation cost; maintenance cost		
Other implications (opportunities, leverage points)	Leverage point: Many consumers and installers mentioned purchasing from Home Depot, Lowes, and other big box stores. Use box store retailer network to share DIY materials and train staff to be able to help customers answer questions		
What we heard (primary research)	**Community Groups:** Higher costs in rural areas, rural independence, and a lack of available contractors all lead to a "DIY" (do-it-yourself) approach to home improvements. "I DIY everything that I can, because it's cheaper if you need it done now, I'm here now, and I can't schedule three weeks out for a contractor that may or may not bail on me for a bigger job."	**Consumers:** People will fix or DIY before going to contractors. And the majority of those interviewed stated that there was someone in the household that had those skills. "If I can figure it out on my own. That's the way I'm gonna do it. And then if I can't, my next step is to talk to my neighbors and if I had to get a plumber or an electrician and my neighbors couldn't help me. I would get recommendations from them on who to call."	**Market Actors (installers):** Due to not enough installers to support the demand, leading people to do DIY, but incorrectly. It costs more for the consumer to get emergency support to help them correct the installation. "And it all goes south [DIY project], and then they call us [installer] because it's all messed up. And like my husband said, that that's the part where it bothers him when he can't get to them when they called the first time, and then they give up and they DIY because now they gotta pay him to go in. It's even more time and money and supplies to take out what they tried to put in and fix it."
Data Analysis indicated (secondary research)	• Heat maps of contractors show fewer local contractors in Town and Rural areas. (slides 143-150)		
Literature Review indicated (secondary research)	• Incomes are lower on average in rural communities • The poverty rate is highest in rural areas compared with urban or sub-urban • Product selection is limited and there is a lower concentration of contractors • Rural areas have a culture of self-reliance • Service costs are higher in lower population density areas		

Table 11: Rural Market Transformation strategy 3

Developing technologies that meet rural needs – and make available near those locations			
MT Idea/Strategy 3	Expand access to energy-efficient products that are able to meet the needs of rural communities ensuring they are affordable and readily available in local stores and big-box retailers where residents typically shop. Promote designs that are responsive to challenges such as limited stable internet access, which may restrict the use of connected devices for demand response, space constraints in manufactured homes, which often prohibit the installation of larger unitary heat pump water heaters, electric panel limitation, which may limit access to 220V supply, etc. Collaborate with manufacturers and supply chain partners to prioritize the development and stocking of products that meet the needs of rural customers.		
Barriers	Upfront cost, options incompatible with existing building infrastructure/stock, limited internet access		
Other implications (opportunities, leverage points)	Leverage point: Manufacturers, big-box retailers, regulators		
What we heard (primary research)	**Community Groups:** Rural areas face challenges with limited internet for smart technologies, challenges with switching fuels, and concerns about resilience. When projects succeed or fail, word travels fast in smaller communities. "If you can get a few successful projects on the ground, usually that news spreads pretty fast in the rural areas."	**Consumers:** Smaller stores in rural areas may not necessarily have a wide selection of products available, which may lead to longer delivery times and higher costs. Because consumers prioritize cost and quick turnarounds, especially for emergencies, they will purchase at larger retailers with equipment more readily available. "I know they [Home Depot] have lower prices…I kind of think of them as… the Walmart of hardware stores or like the McDonald's of hardware stores. It's just, they're so big, they've got the volume to be able to offer lower prices."	**Market Actors (installers):** Installers recognize that rural customers have unique structures like manufactured homes or older homes that may not have the best conditions to retrofit EE equipment. Also, equipment may not operate in the ideal conditions to get energy savings because of the climate conditions in the Northwest. "You know, because even in the fall, most of the time it's under 55 degrees and then even at 55 degrees, it's not functioning at peak performance. Right, it's just barely working. So, you know, they're great in warmer climates. I'm all for them in warmer climates, but here in the Northwest, we just can't."
Data Analysis (secondary research)	• Household without internet at home (higher in Towns and Rural) (slide 41) • Median income - lowest in Towns (slide 84) • Manufactured homes may have space issues - highest percent in Rural areas (slide 37) • Rural areas still shop at Home Depot the most (slide 55) • Age of housing - older homes, prevalent in Towns, may have electric panel limitations (slide 35) • Bottled gas heated homes, prevalent in rural homes may have electric panel limitations (slide 38)		
Literature Review (secondary research)	• Rural areas have more manufactured homes • Lower rates of internet access • Limited product selection in rural areas		

Table 12: Rural Market Transformation strategy 4

Workforce development opportunities in rural communities			
MT Idea/Strategy 4	Develop a capable energy efficiency workforce by establishing apprenticeship programs in energy efficiency technologies, with a strong emphasis on local training, to support local education, and to create local job opportunities. Collaborate with local schools, chambers of commerce, and community-based organizations to build accessible pathways for skill development, particularly in remote communities, ensuring that economic benefits remain within the community.		
Barriers	Limited contractor availability; distrust; installation cost; maintenance cost		
What we heard (primary research)	**Community Groups:** Rural residents often struggle to find qualified contractors. Contractors may avoid new technologies to reduce risk and avoid potential callbacks. Many rural workers are drawn to urban areas for better pay and training opportunities. “We heard these stories that were just so typical and so depressing, where you'd have a really talented young person … who really wants to go into HVAC [heating, ventilation, and air conditioning] installation or some kind of weatherization, and their option was to try and somehow get themselves three to four to five to six hours away to a union hall in South King County on their own.”	**Consumers:** Contractor availability is limited in rural areas which reduces the number of options that consumers can pick from and rely on for energy-efficient equipment installations. Consumers also notice that it is hard to schedule installers because they are often drawn to bigger projects. "...I would say, It's very hard to find skilled labor on the island. Most of the people who are worth paying for are very busy with very big jobs."	**Market Actors (installers):** Installers are very busy and are booked out sometimes months or have several people on a waiting list. One rural plumber stated they would not add services like furnace or heat pumps because they were already too busy with the current workload. “We're so busy with what we do that, with adding that service [furnace, heat pumps], we wouldn't be able to even fit it in a schedule. For like two years we've been behind by a month or two. Like 150 people on a list waiting to have their job done.”
Data Analysis (secondary research)	• Heat maps of contractors show much fewer contractors in Town and Rural areas. (slides 143-150)		
Literature Review (secondary research)	• Lower employment rates in rural areas • Lower education rates in rural areas • A loss of prime age workers in rural areas		

Table 13: Rural Market Transformation strategy 5

Financing solutions for energy efficiency upgrades			
MT Idea/Strategy 5	Ensure that rural communities have access to no- or low-interest financing solutions for energy efficiency upgrades, addressing the financial barriers that often prevent these households from adopting energy-efficient technologies. Many residents in rural areas may face challenges such as lower credit scores or lack of traditional credit history, which can make it difficult for them to qualify for conventional financing options. To overcome these barriers, partner with financial institutions, community lenders, and credit unions to offer no/low interest, low-risk financing programs specifically tailored for rural communities. Additionally, ensure that these financing options are well-promoted and easily understood by rural residents. Collaborate with local organizations, such as community action agencies, rural cooperatives, and housing non-profits, to raise awareness and provide guidance on how to access these programs.		
Barriers	Upfront cost; language differences		
What we heard (primary research)	**Community Groups:** Upfront costs are still a significant barrier. Financing options need to be low credit, and easy for contractors to promote. “Even if, in the long run, you know, people could potentially afford it, just the larger upfront costs makes it so people can't afford to do it.”	**Consumers:** While consumers are drawn to energy-efficient equipment for potential utility bill savings, they prioritize upfront costs first when deciding which equipment to purchase. "...so energy efficient is something I really notice/look for, but it really has to balance out. Dollar wise between what I want to spend immediately and how long am I gonna take to start saving any money."	**Market Actors (installers):** Installers mentioned the more expensive the less likely their customers would buy or even try a newer technology. Though installers did mention incentives, tax credits and other options they discuss with their customers, no installers knew of any accessible financing options, if a customer were looking for one. “I know the more expensive it gets, the less people are gonna lean toward buying it, so I haven't bought one”
Data Analysis (secondary research)	• Median income - lowest in Towns (slide 84)		
Literature Review (secondary research)	• Incomes are lower on average in rural communities • The poverty rate is highest in rural areas versus urban or sub-urban • Energy burdens are higher on average, and especially among low-income, elderly, renters, multifamily residents, and those living in manufactured homes • Aversion to debt in rural areas		

IV. Conclusions and Next Steps

IV.1. Conclusion

The research's first phase included NEEA staff interviews, a comprehensive data analysis and literature review that identified characteristics across the four locales. Rural communities often hold multiple intersecting characteristics, many of which face a high energy burden, and which are described inconsistently across existing literature and data. Conflicting evidence was found on issues like housing characteristics, workforce availability, and energy burden. The primary research provided further context into the experiences of rural consumers, community groups and market actors (installers) that guided possible ideas for market transformation strategies for rural communities. The recommended MT strategies focus on creating the faster adoption of EE technologies. Though these strategies were developed based on the rural prescriptive we gained from our primary research, they may be applicable to other locales as well.

By engaging and listening to rural community members (i.e., community organizers, consumers, installers), addressing their specific barriers, and using a flexible approach, this research provides strategies that can make energy efficiency adoption more accessible. These steps are an important part of achieving NEEA's goal of delivering energy efficiency benefits to all Northwest consumers.

IV.2. Limitations

A limitation of this research is the primary research conducting interviews exclusively with Rural and Town community groups, consumers, and market actors (installers), without extending the same approach to City and Suburban locales. While this provides valuable insights into the specific challenges and opportunities within rural markets, it prevents direct comparisons, limiting our ability to identify and contrast the factors driving disparities in EE adoption.

IV.3. Next Steps

Based on the limitations of this study, the research team has several recommendations for future research

IV.3.1. Perform deeper research into energy burden, energy insecurity and relationship with other characteristics

While the average household energy burden does not seem high when averaged across locales, once more nuanced data analysis was performed, disparities between different households came to light. Digging into energy burden by other factors including occupancy type, building type, primary heating fuel, highlighted specific household types within the region that do have significant energy burden, such as households living in manufactured homes and those heating with bottled gas. Digging even further into energy burden by the intersections of these factors (e.g., renter-occupied households by primary heating fuel) provided greater insight into what households are most impacted by energy burden. Other research has shown significant disparities in energy burden by household factors, such as the presence of disabled, ill or aging people in a household. We recommend further analysis into these socioeconomic and demographic attributes to better understand the factors that influence a household's energy burden in the region to inform future market transformation initiatives.

Energy burden is a metric that is determined by many disparate factors. One factor is household income, which is the primary factor that impacted the data highlighted in this project, where Suburbs and Towns

have very similar energy costs, but very different energy burdens.[19] The efficiency of a household is also a factor, which is impacted by several other factors including age of home, type of equipment, weatherization levels, and occupant behavior. A third major factor is the climate zone where the household is located. Other major factors include the use of on-site renewable energy, availability and needs around heating fuels (e.g., lack of gas lines in most rural areas) and energy rates. While market transformation may not be able to impact all of these factors, understanding the complexity of energy burden is necessary to determine if, and if so, how market transformation could potentially help reduce energy burden across the region.

Future research should explore not only energy burden but also energy insecurity—the ways households manage high energy costs through tradeoffs and adaptive strategies. Given the strong rural identity of self-sufficiency and problem-solving, understanding how people cope with high energy burdens is critical. This includes examining decisions such as cutting back on other essential expenses, adjusting energy use behaviors, or relying on alternative heating sources. Additionally, analyzing how energy burden varies based on housing type, homeownership status, primary heating fuel, and other household characteristics can help inform initiatives that address these challenges effectively.

IV.3.2. Consider these other future research ideas

In addition to the more detailed recommendations listed above, our team has identified several other recommendations on future research that NEEA could consider.

- Investigate the potential of working with rent-to-own stores, such as Aaron's Rent to Own and Rent-A-Center, which were found to be prevalent in Rural areas.
- Perform deeper research into multifamily homes in Towns, including their unique characteristics and barriers, which are likely different than those in larger multifamily homes found in City locales.
- Investigate the potential of influencing the used product market, including popular peer-to-peer marketplaces such as Facebook Marketplace and Craigslist, which were mentioned by many customers in our interviews as places where they purchase appliances.
- Assess code enforcement and housing characteristics in specific rural communities, to gain an in-depth understanding of housing characteristics, ages, and condition in specific areas. Compare this with existing region-wide data to verify and add depth
- Investigate how manufacturers and distributors perceive rural areas and how that shapes their go-to-market strategy.
- Examine how installers in large, dispersed territories adapt to limited supply access, influencing product choices, pricing, and consumer costs. Understanding these factors could shed light on supply chain challenges and potential solutions.
- Study successful contractor business models in rural NW and beyond to support the growth of a rural energy efficiency workforce.

[19] See slide 116 in the slide deck located at neea.org.

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III. Data and Sources Analyzed

A list of the characteristics analyzed, and the data source used for each, is provided in Table 14. The data referenced in this figure, as well as additional information, such as whether the data was analyzed by locale, by state, or both, and whether the data was analyzed based on population or household, plus definitions of terms, can be found in the supplemental slide deck on neea.org.

Table 14: Data analysis sources

Category	Characteristics	Data Source	Data Source Detail
Socio-demographic data	Age of residents - Median Age	ArcGIS Business Analyst	2024 ESRI Estimates
	Age of residents - Pct Over 65	ArcGIS Business Analyst	2024 ESRI Estimates
	Income levels - Median HH Income	ArcGIS Business Analyst	2024 ESRI Estimates
	Income levels - Mean HH Income	DOE LEAD Tool / ACS Data	2022 5-year ACS Data
	Housing poverty	Census Data	2024 Census National Survey
	Language spoken - Speaks English less than very well	Census Data	2022 5-year ACS Data Table DP02
	Language spoken at home - not English	Census Data	2022 5-year ACS Data Table DP02
	Level of education	Census Data	2022 5-year ACS Data Table DP02
Housing data	Home occupancy (Owner/Renter)	DOE LEAD Tool / ACS Data	2022 5-year ACS Data
	Household size - Avg HH size	Census Data	2022 5-year ACS Data Table DP02
	Age of housing - Median Age of House	Census Data	2022 5-year ACS Data Table B25035
	Age of housing - In 20-year buckets	ArcGIS Business Analyst	2024 ESRI Estimates
	New house starts	HUD database	SOCDS Building Permits Database
	Low-income HH - <200% and <100% Poverty Level	ArcGIS Business Analyst	ESRI ACS Population Summary Report
	Type of housing - Pct HH by SF, MF, MH	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Primary heating fuel - Pct HH by fuel	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Computer at home	Census Data	2022 5-year ACS Data Table DP02
	Internet at home	Census Data	2022 5-year ACS Data Table DP02
	Building systems	NEEA RBSA	2022 RBSA
	Equipment types	NEEA RBSA	2022 RBSA
Energy data	Energy burden	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Energy burden - in low-income HH	DOE LEAD Tool / ACS Data	2022 5-year ACS

Category	Characteristics	Data Source	Data Source Detail
	Energy burden - by building type (SF, MF, MH)	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Energy burden - by primary heating fuel	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Energy burden - by occupancy (owner/rent)	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Energy burden - by age of home	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Energy burden - in energy burdened HH	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Energy burden - Energy burdened HH by age of home	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Energy costs	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Energy costs - by building type (SF, MF, MH)	DOE LEAD Tool / ACS Data	2022 5-year ACS
	Energy costs - by age of home	NEEA RBSA	2022 RBSA
	Energy costs - by sq ft by age of home	NEEA RBSA	2022 RBSA
	Energy rates - annual avg gas and electric rate	U.S. EIA	Annual U.S. EIA Energy Rates
	Energy consumption	NEEA RBSA	2022 RBSA
	Home energy affordability gap	Fisher, Sheehan & Colton	2022 HEAG data
Purchasing and behavioral data	Purchasing behaviors - where people shop	ArcGIS Business Analyst	2024 ESRI Estimates
	Purchasing behaviors - online shopping	ArcGIS Business Analyst	2024 ESRI Estimates
	Purchasing behaviors - prefer local vs national stores	ArcGIS Business Analyst	2024 ESRI Estimates
	Disposable income (post-tax income)	ArcGIS Business Analyst	2024 ESRI Estimates
	Lifetime spending index - retail stores & home services	ArcGIS Business Analyst	2024 ESRI Estimates
	Home improvement model - DIY vs contractor	ArcGIS Business Analyst	2024 ESRI Estimates
	Environmental - environmentally friendly products	ArcGIS Business Analyst	2024 ESRI Estimates
	Environmental - climate change	ArcGIS Business Analyst	2024 ESRI Estimates
Community Characteristics	Cost of living	MERIC	C2ER survey
	Population growth rate - overall and by generation	ArcGIS Business Analyst	2024 ESRI Estimates
	Population density	Census Data	2022 5-year ACS
Market data	RPP Product availability	NEEA Interview	NEEA Interview
	RPP Participation data	NEEA	NEEA
	HP/HPWH Participation & installer data	NEEA	NEEA

Category	Characteristics	Data Source	Data Source Detail
	Trade Ally Network utility lists	Literature Review	Various websites
	Contractor/Distributor coverage	ArcGIS Business Analyst	2024 ESRI Estimates
	Retail stores - hardware, appliance and dollar stores	ArcGIS Business Analyst	2026 ESRI Estimates

Appendix

A. Data Findings Table

Table 15: Summary of data findings by locale

Characteristic	Urban	Suburban	Town	Rural
Population	5,239,543	4,471,955	2,222,501	2,876,773
Number of Households	2,158,970	1,635,050	798,852	1,186,440
Total Area (square mile)	1,300	1,934	1,111	390,656
Population Density (population per square mile)	4,071	2,312	2,001	7
Population Growth Rate (2010 – 2020)	1.26%	1.47%	0.99%	1.10%
Projected Population Growth Rate (2024 – 2029)	0.70%	0.71%	0.67%	0.81%
Gen X Projected Population Growth Rate (2024 – 2029)	-0.60%	-0.74%	0.05%	0.58%
Millennial Projected Population Growth Rate (2024 – 2029)	-0.74%	0.82%	0.06%	1.23%
Gen Z Projected Population Growth Rate (2024 – 2029)	2.65%	0.16%	0.63%	0.05%
Personal Crime Index (compared to U.S. average)	17%	-49%	-34%	-38%
Property Crime Index (compared to U.S. average)	93%	100%	0%	-30%
Average Age of Homes (year)	51%	40%	49%	45%
Homes Age 0-25 years	12%	20%	7%	7%
Homes Age 26-50 years	46%	64%	59%	79%
Homes Age 51-75 years	36%	16%	32%	14%
Homes Age 76+ years	6%	0%	2%	0%
Single-family Homes	55%	68%	67%	79%
Multifamily Homes	42%	27%	23%	6%
Mobile Homes	3%	5%	10%	15%
Households with Electricity as Primary Heating Fuel	53%	47%	53%	50%
Households with Natural Gas as Primary Heating Fuel	42%	47%	37%	17%
Households with Neither Electricity Nor Gas as Primary Heating Fuel	5%	6%	10%	33%
Owner-occupied Homes	54%	69%	65%	81%
Renter-occupied Homes	46%	31%	35%	19%
Households without Computers	4%	3.1%	6.1%	5.6%
Households without Internet	8.2%	6.7%	12%	12%
Average Annual Household Spend on Plumbing Labor	$235	$284	$186	$251
Annual Household Income After Taxes	$89,628	$100,497	$69,806	$84,635

Average Annual Household Spend on Retail Goods	$34,567	$38,750	$26,675	$34,041
Average Annual Household Spend on HVAC Work	$448	$552	$386	$499
Home Improvement Method – DIY only	21.8%	25%	25.8%	28.5%
Home Improvement Method – DIY + contractor	9.2%	10.5%	9.3%	10.3%
Home Improvement Method – contractor only	2.2%	3.1%	2.2%	2.9%
Top Household Supply Stores	1. Home Depot 2. Lowe's 3. Best Buy 4. Ace Hardware 5. Harbor Freight 6. Tractor Supply Co 7. True Value	1. Home Depot 2. Lowe's 3. Best Buy 4. Ace Hardware 5. Harbor Freight 6. Tractor Supply Co 7. True Value	1. Home Depot 2. Lowe's 3. Ace Hardware 4. Best Buy 5. Tractor Supply Co 6. Harbor Freight 7. True Value	1. Home Depot 2. Lowe's 3. Ace Hardwar 4. Best Buy 5. Tractor Supply Co 6. Harbor Freight 7. True Value
Shopped Online at Home Depot in Past 6 Months	14%	15%	13%	14%
Shopped Online at Lowe's in Past 6 Months	8%	10%	9%	10%
Shopped Online for Home Improvement Materials/Tools in Past 6 Months	19%	20%	18%	19%
Spent Over $500 Online in Past 6 Months	48.8%	50.5%	44%	46.4%
Average Credit Card Debt	$3,185	$3,512	$2,333	$2,891
Rather save than borrow to purchase	83%	83%	83%	83%
Careful with money	83%	84%	83%	85%
Willing to pay more for product from trusted company	78%	76%	78%	77%
Views climate change as a serious threat	74%	72%	69%	67%
Knowledge about environmentally friendly products (compared to U.S. average)	+9%	+5%	-5%	-5%
Used environmentally friendly lightbulb in last 6 months	18.8%	19.5%	18.1%	19.6%
Used environmentally friendly/green product in last 6 months	32.2%	32.2%	29.5%	30.4%
Owns or leases a hybrid vehicle (compared to U.S. average)	+15%	+25%	-7%	+6%
Median HH income	$85,185	$101,224	$66,832	$82,703
Mean HH income	$124,480	$138,475	$90,973	$113,895
Median net HH worth	$173,836	$354,646	$167,893	$284,759
Unemployment Rate	4.6%	4.1%	4.1%	3.6%

Poverty Rate[20]	12%	8%	14%	11%
Disadvantaged Community Population	24%	15%	37%	29%
Median age (years)	37.3	38.8	38	44.4
Over 65	16.1%	16.8%	19.4%	23.8%
Non-English Primary Language and speaks English "very well"	12%	13%	9%	6%
Non-English Primary Language and speaks English less than "very well"	7%	7%	5%	3%
Graduated High School	92.8%	92.5%	89.5%	91.9%
Attended Some College	73.5%	70.6%	61.7%	64.1%
Graduated College	43.2%	37.5%	26.2%	28%
Political Party – No affiliation	43%	42%	43%	40%
Political Party – Democratic Party	36%	31%	28%	24%
Political Party – Republican Party	21%	27%	29%	36%
Political Outlook – Middle of the road	36%	38%	39%	37%
Political Outlook – Very and somewhat liberal	36%	28%	25%	22%
Political Outlook – Very and somewhat conservative	28%	34%	35%	42%
Regularly Attend Religious Service	34%	34%	36%	37%
Energy Burden	1.6%	1.6%	2.4%	2.8%
Energy Burdened Households	10%	8%	16%	21%
Total Annual Household Energy Costs	$1,640	$1,929	$1,953	$2,639
Annual Household Electric Costs	$1,118	$1,284	$1,341	$1,558
Annual Household Gas Costs	$453	$565	$477	$703
Annual Household Non-Electric and Non-Gas Energy Costs	$69	$80	$135	$378

[20] Defined as percent of households below 100% federal poverty level.

B. County Cluster Data

Table 16: County cluster demographic data

Cluster	Population	Rurality (Rural/ Town + Rural)	Median income	Energy Burden	% over age 65
1	38,338	77.81%	$54,124	4.3%	27.0%
2	97,192	46.16%	$63,978	3.0%	14.8%
3	40,305	77.46%	$69,363	3.4%	24.7%
4	30,873	58.30%	$52,516	4.4%	17.1%
5	165,218	50.99%	$71,841	2.0%	20.9%
6	130,330	40.59%	$65,056	2.4%	19.2%
7	169,995	38.90%	$60,166	2.1%	14.0%
8	185,572	54.20%	$62,282	2.4%	23.3%

Notes: Cluster numbers align with counties shown in Table 3. All numbers are determined by totaling data across all counties within each cluster. Population is the total population across all counties within each cluster. Rurality is determined by taking the population residing in Rural areas within the cluster divided by the total number of residents in both Rural and Town areas within the cluster; the cluster is more Rural than Town if it has a rurality of over 50%.

C. Outreach Materials

C.I Initial Email from LD Consulting – Community Groups

Subject: Invitation to share insights on energy efficiency
Good morning/afternoon [Name],

I want to invite you to participate in a listening session [/research interview, LD team will select correct one]. I'm an independent researcher working on behalf of the Northwest Energy Efficiency Alliance (NEEA) to better understand how barriers and opportunities in energy efficiency might vary across rural/urban/suburban communities in the Northwest region. Our team is part of LD Consulting.

If you aren't able to join but know a colleague or another organization who may be interested, please share their contact information, and we will reach out to them.

Here's what you can expect:

- A 90-minute workshop/ A 45 minute 1:1 virtual interview [LD will update option depending on the org]. This will be virtual and will take place via Zoom
- Share ideas (and hear others' ideas) about challenges and opportunities around energy saving technology
- $150 compensation as a thank you for your time / $75 compensation as a thank you for your time [Select correct one depending on organization]
- You'll have the option to review the results and help develop the final recommendations

If you'd like to participate, you can sign up here [Link to form].

If you have any questions or want more information before deciding, I can answer your questions via email or we can set up a call.

Thank you,
[Researcher name]

NEEA is an alliance of partners that pools resources and shares risks to transform the market for energy efficiency to the benefit of all consumers in the Northwest. LD Consulting is leading this research on behalf of NEEA.

C.II Initial Email from LD Consulting – Market Actors

Subject: Energy efficient product trends in your area – Seeking your input
Good morning/afternoon [Name],

I'm an independent researcher working on behalf of the Northwest Energy Efficiency Alliance (NEEA) to better understand how barriers and opportunities for energy efficiency might vary across rural, suburban and urban communities. Our team is part of LD Consulting.

We are looking for HVAC, electrical, plumbing and appliance businesses to speak with us about trends in your area, challenges, and opportunities to increase energy-efficient technologies and practices.

There are two ways you can contribute:
(1) Small-group session with other HVAC, electrical, plumbing and appliance businesses, via Zoom: 60 minutes; receive a $100 gift card as a thank you for your time
(**2) One-on-one session** with a researcher, by Zoom or phone: 30 minutes; receive a $75 gift card as a thank you for your time

Please click here to see dates/times between November ##-## and sign up. We hope you can join a small-group session, and if those times don't work, please select a one-on-one time or email us!
If you aren't able to join but know a colleague or another business who may be interested, please feel free to forward this information.

The session will be recorded for accuracy, but all findings will be confidential.

If you have any questions, just let us know! You are among a small group of businesses we identified for this important research, and we hope you can join.

Thank you,
[Researcher name]

NEEA is an alliance of partners that pools resources and shares risks to transform the market for energy efficiency to the benefit of all consumers in the Northwest. LD Consulting is leading this research on behalf of NEEA.

C.III Email Template for NEEA Staff or Partners – Community Groups

Subject: Introduction to research team on energy efficiency project
Good morning,

I hope all is well with you! NEEA is working on a new research project with LD Consulting focused on rural energy efficiency and thought of you right away. Your experience in [specific field or work] would be really valuable for this study.
We're hoping you can contribute to a small group listening session or one-one interview to share your insights on how energy efficiency plays out in rural, suburban, and urban communities.

Here's a quick overview:

- [A 90-minute workshop/ A 45 minute 1:1 virtual interview]. This will be virtual and will take place via Microsoft Teams or Zoom
- [A $150 stipend as a thank you for your time / A $75 stipend as a thank you for your time]
- The session will be recorded for accuracy, but all findings will be confidential, and no quotes will be linked back to you or your organization
- You'll have the option to review the results and help develop the final recommendations

If this sounds good, you can sign up here [Link to form].

If you have any questions, please reply to [Researcher name] who I cc'd on the email.
We hope you are able to participate!

Warmly,
[Researcher name]

NEEA is an alliance of partners that pools resources and shares risks to transform the market for energy efficiency to the benefit of all consumers in the Northwest. LD Consulting is leading this research on behalf of NEEA.

C.IV Reminder Invitation Email from LD Consulting

Subject: Following up on invitation to research project on rural energy efficiency
Hi [Name],

I hope you're doing well! I wanted to follow up on my previous email about a paid research opportunity to inform a project by the Northwest Energy Efficiency Alliance (NEEA).

We're inviting organizations like yours to participate in either a ##-minute workshop or ##-minute interview.

If you're interested in participating, you can sign up here [Link to form].

We're offering a $##-$## gift card as a thank you for your time, and all feedback will remain confidential.

Once the session is scheduled, we will send you a confirmation email and a link to the virtual session. If you have any questions or want more information, please email or call me.

If there is anything we can do to make it easier to join, please let us know.

Looking forward to hearing from you!

Best,
[Researcher name]

NEEA is an alliance of partners that pools resources and shares risks to transform the market for energy efficiency to the benefit of all consumers in the Northwest. LD Consulting is leading this research on behalf of NEEA.

C.V Scheduling Confirmation Email

Subject: Confirmation for rural energy efficiency [listening session/interview] on [date]
Hi [Name],

Thank you for signing up to participate in NEEA's rural/suburban/urban energy efficiency research! We've confirmed your [listening session/interview] for [Date] at [Time].

Here's what you can expect:

- The [workshop/interview] will last about ## minutes.
- You'll receive a $## gift card as a thank you for your time.
- The session will be recorded, but your responses will be confidential.
- If you have any questions or need to reschedule, feel free to reach out.

Toward the end of the research project, you'll have an option to review the results and recommendations.

Looking forward to connecting with you!

Best,
[Researcher name]

NEEA is an alliance of partners that pools resources and shares risks to transform the market for energy efficiency to the benefit of all consumers in the Northwest. LD Consulting is leading this research on behalf of NEEA.

D. Community Group Interview Guide

Introduction – 15 mins

- Permission to record
  - "Before we get started, is it okay if I record this interview? The recording will not be shared anywhere, it's just for our team to reference as we summarize the results of the project."
- Introduce yourself and LD
  - "We are a team of researchers working together as LD Consulting. As a team, we have a lot of experience working in energy efficiency..." "
  - Introduce yourself
- Ask for their introduction
  - "Tell me a bit about yourself and your organization"
  - Prompts:
    - Which communities do you work with/where does your organization work?
    - How does your organization promote clean energy or energy conservation?
- Introduce NEEA
  - "We're conducting this research on behalf of the Northwest Energy Efficiency Alliance (NEEA). NEEA is an alliance of more than 140 partners and energy efficiency organizations working on behalf of more than 13 million energy consumers to increase the adoption of energy-saving products, services and practices."
- Introduce the project
  - "We're studying the differences between urban, suburban, and rural communities in Idaho, Montana, Washington, and Oregon. We want to understand if gaps exist in how these types of communities are buying and using energy saving technology. We also hope to develop some ideas about how NEEA can fill those gaps to make sure that their market transformation work is reaching everyone. We've looked at existing literature like research reports and data like census information, and now we're starting to talk to people like yourself who live and work in rural areas"
  - "Through interviews like this one, we're diving deeper into studying a few rural regions. We've chosen 8 rural cross-county communities to focus on through interviews and workshops with organizations, retailers, installers, contractors, and consumers. We're going to ask about some of the ideas we've come across in our research so far, but really, we're just hoping to learn about your experiences in these communities."
  - "No quotes or data will be attributed to you or your organization without your consent. However, we can acknowledge you as a contributor and participant in this study. Would you or your organization like to remain anonymous, or would you prefer to be acknowledged in the final report?"
- Introduce MT
  - "Are you familiar with market transformation, and the kinds of strategies that are used for it?"
  - "Market transformation is about creating the right conditions in the market to support lasting change. The goal is to make energy-efficient options a standard part of the market, making them more accessible and sustained over time. Instead of working directly with customers or offering rebates and installing products, market transformation focuses on removing barriers, leveraging market opportunities, and enabling the supply chain to drive the adoption of energy-efficient products and services. This includes tool and techniques like building awareness about products, collaborating with manufacturers and distributors

to ensure availability and accessibility, preparing the workforce to promote and install these products, and advocating for improved building codes and standards. For example, NEEA has encouraged more people in purchasing energy saving clothes dryers by working with retailers to prominently floor the more efficient models. NEEA has encouraged more people to purchase energy saving televisions by creating consumer marketing materials and offering incentives to retailers to promote TVs that use less energy."

- "Do you have any questions before we jump into our discussion?"

Questions – 25 mins

"We're doing 2 or 3 pre-interviews, like this one, to develop our understanding of your rural communities and to test our interview questions. We welcome your feedback to let us know if the questions make sense, if we're asking the right things, and if anything is missing."

"For these questions, we're focusing on rural areas and small towns, so this could mean areas as remote as (name a remote area in their region) or as big as (a small town) but not much larger than that."

"As you may know, state and local governments and utilities are promoting a variety of technologies that use less energy, such as energy saving appliances, higher-efficiency heating or cooling like heat pumps, and heat pump water heaters."

1. "What are some unique challenges that residents in rural areas face when considering home improvements and especially new technologies?"
    a. Prompts:
        i. Infrastructure, internet?
        ii. Contractors/workforce?
        iii. Product availability?
        iv. Higher costs?
        v. Priority communities – any unique or additional challenges for certain communities?
2. "What are people's attitudes towards these technologies in rural communities?"
    a. Prompts:
        i. Reaction to language like "energy efficiency"?
        ii. Other priorities – reliability?
        iii. Culture – self-reliance, aversion to debt, building permits?
3. "Where do people in rural communities get trusted information, especially about home appliances and upgrades?"
    a. Prompts:
        i. Utilities?
        ii. Rural marketing channels?
        iii. Internet access?
4. "In your experience, what strategies, programs, or outreach methods have worked well to reach rural communities?"
    a. Prompts:
        i. Programs?
        ii. Outreach?
        iii. Specific technologies or policies?
5. "Is there anything I didn't ask you about that you wish we had discussed?"
    a. Prompts:
        i. Do you have any other feedback about the interview questions?

Conclusion – 5 mins

- Thank attendee for joining
- Incentive
    - "We'll send a $75 gift card to the email used in the sign-up form."
- Share next steps
    - We are also talking to homeowners, renters, contractors, and others who install or sell residential equipment
    - To hear the homeowner and renter side of things, we're looking for 6-10 people for one-on-one Zoom interviews. Interviews are under 45 minutes and we're offering $75 gift cards. We're hoping to find people in rural areas and small towns like yours, and we'd love your help sharing the invitation**.** I'll send an invitation you can forward or post.
- Invite to data party
    - "You're invited to join us at another workshop, a data party. We'll look at all of the results together and then we can come up with ideas, strategies, and areas for further research. We want you to have a chance to see how the research is being used, and to be part of the process of interpreting the findings. Are you interested in participating? Just like with this interview, you will be compensated for your time."
- Say goodbye
    - "Thanks, and you'll hear from us about next steps!"

E. Community Group Workshop Guide

Introduction – 20 mins

- Share intro slides
- Introduce yourself and LD
- Invite attendees to introduce one another and ask any clarifying questions
- Introduce NEEA
- Introduce MT
- Introduce the project

Questions – 60 mins

Tips: Guide the attendees through these questions but be flexible and follow interesting ideas as they come up. Stand back and let folks speak.

"For these questions, we're focusing on rural areas and small towns, so this could mean anywhere in Wallowa County, areas as big as Pendleton in Oregon, Pullman or Dayton in Washington, or Laurel in Montana, but not much larger than that."

"No quotes or data will be attributed to you or your organization without your consent. However, we can acknowledge you as a contributor and participant in this study. Can each of you let me know in the chat if you would prefer to remain anonymous or have your organization named in the final report?"

"As you may know, state and local governments and utilities are promoting a variety of technologies that use less energy, such as energy saving appliances, higher-efficiency heating or cooling like heat pumps, and heat pump water heaters."

1. "What are some unique challenges that residents in rural areas face when considering home improvements, and especially new energy saving technologies?"
2. "What are people's attitudes towards energy saving technologies in rural communities?"
3. "Where do people in rural communities get trusted information, especially about home appliances and upgrades?"
4. "In your experience, what strategies, programs, or outreach methods have worked well to reach rural communities?"

Prompts:

- Infrastructure, internet?
- Contractors/workforce?
- Product availability?
- Higher costs in rural areas?
- Priority communities – any unique or additional challenges for certain communities?
- Reaction to language like "energy efficiency?"
- Other priorities over energy savings – reliability?
- Culture – self-reliance, aversion to debt, building permits?
- Outreach and trusted sources?
  - Utilities?
  - Rural marketing channels?
  - Programs?

- Specific technologies or policies?

Conclusion – 10 mins

- Thank attendees for joining
- Any feedback?
- Confirm that incentives will be shared via gift card at the email used in the sign-up form
- Share next steps
    - We are also talking to homeowners, renters, contractors, and others who install or sell residential equipment
    - We're hoping to find people in rural areas and small towns like yours, and we'd love your help sharing the invitation. I'll send details in the follow up email.
- Invite to data party
    - "You're invited to join us on at another workshop, a data party. We'll look at all of the results together and then we can come up with ideas, strategies, and areas for further research. We want you to have a chance to see how the research is being used, and to be part of the process of interpreting the findings. Are you interested in participating? Just like with this interview, you will be compensated for your time."
- Say goodbye

F. Consumer Interview Registration Screener

F.I. Homeowners

1. Do you own or rent your home? (Single Select)
    a. Own
    b. Rent [DISQUALIFY]
    c. Something else (specify)
2. Which of the following bills do you or someone in your household pay? Select all that apply. (Multi-select)
    a. Electricity
    b. Natural Gas
    c. Propane
    d. None of these – Utilities included in mortgage/rent [DISQUALIFY]
    e. Other
3. Who is your electric utility? (Single-line text box)
4. Please write the county and state where you live. (Single-line text box)
5. How would you describe the area where you live? (Single-select)
    a. Rural
    b. Small town
    c. Suburb
    d. Urban [DISQUALIFY]
    e. Other (specify)
6. What best describes your home? Select all that apply. (Multi-select)
    a. One-family house detached from any other house
    b. One-family house attached to one or more houses (e.g., townhouse, condo)
    c. Mobile home
    d. Manufactured home
    e. Apartment or condo in building with 2-4 units
    f. Apartment or condo in building with 5+ units
    g. Other (specify)
7. In the past 12 months, have you purchased or installed any of the following?
   (we have spots for people who have & haven't purchased recently - just let us know!) (Single-select)
    a. Heating equipment (e.g., furnace, boiler, heat pump)
    b. Air conditioning (e.g., central AC, window AC or heat pump)
    c. Water heater
    d. Laundry appliances (washer/dryer)
    e. Refrigerator or freezer
    f. Windows or doors
    g. None of these in last 12 months
    h. Other
8. When do you expect to purchase heating, cooling, water heating, or large appliances?
   (we have spots for people with and without purchase plans - just let us know!) (Single-select)
    a. Within next 6 months
    b. 6-12 months
    c. 12-24+ months
    d. 24+ months
9. How many people live in your home? (Single-select)

a. 1
b. 2
c. 3 +

10. What was the total gross income – for everyone in your home - in 2023? This may include wages, salary, cash or payment assistance, SSI/Social Security, unemployment insurance, and child support – before tax deductions. (we have spots for all income levels - please provide an approximate estimate.) (Single-select)
    a. Less than $30,000
    b. $30,000 – $49,999
    c. $50,000 – $69,999
    d. $70,000 – $99,999
    e. $100,000 – $149,999
    f. $150,000 or more
11. Does your household participate in any of the following programs? Select all that apply. (we are looking for people with and without experience in these programs - just let us know!) (Multi-response)
    a. Energy or Fuel Assistance (e.g., HEAP)
    b. Electric or gas utility bill discounts
    c. Supplemental Nutrition Assistance (SNAP)
    d. SSI (Social Security Income)
    e. TANF (Temporary Assistance for Needy Families)
    f. None of these
12. For this study, we will send a Zoom link for a video call that requires an internet connection through a smartphone, tablet or computer. Please indicate how you are able to participate. (Single-select)
    a. I have a device and internet access for a video call
    b. I am unable to participate with video, but can participate by phone
    c. Other (specify)

F.II. Landlords

1. Do you own or manage any of the following? (Multi-select)
    a. House or apartments for rent
    b. Commercial property for rent
    c. None of the above [DISQUALIFY]
    d. Other
2. How many residential rental units do you own or manage?
    a. 1-2
    b. 3-4
    c. 5+
    d. None
3. How would you describe the area? (Single-select)
    a. Rural
    b. Small town
    c. Suburb
    d. Urban [DISQUALIFY]
    e. Other (specify)
4. What is your role in selecting or purchasing equipment or appliances for rental housing? For example, heating, cooling, water heating, laundry or kitchen appliances. (Multi-select)

    a. I research equipment/appliances
    b. I purchase equipment/appliances
    c. I coordinate contractors/installers
    d. None of these [DISQUALIFY]
    e. Other
5. In the past 12 months, have you purchased or installed any of the following for rental housing you manage or own? (Multi-select)
    a. Heating equipment (e.g., furnace, boiler, heat pump)
    b. Cooling equipment (e.g., central AC, window AC or heat pump)
    c. Water heater(s)
    d. Laundry appliances (washer/dryer)
    e. Refrigerator or freezer
    f. Windows or doors
    g. None of these in last 12 months
    h. Other
6. When do you expect to purchase heating, cooling, water heating, or large appliances for rental units? (Single-select)
    a. Within next 6 months
    b. 6-12 months
    c. 12-24 months
    d. 24+ months
7. How do your tenants pay utility bills? (Multi-select)
    a. Heat is included in rent
    b. Electricity is included in rent
    c. Tenant pays heat
    d. Tenant pays electricity
    e. Other (specify)
8. For this study, we will send a Zoom link for a video call that requires an internet connection through a smartphone, tablet or computer. Please indicate how you are able to participate. (Single-select)
    a. I have a device and internet access for a video call
    b. I am unable to participate with video, but can participate by phone
    c. Other (specify)

G. Consumer Interview Guide

RESEARCHER INTRO
Hello, my name is Amanda and I'm an independent researcher working with LD Consulting.

Our client is a nonprofit in the Northwest who works in the energy sector to increase the availability and affordability of products that use less energy to operate. We are interested in people's experiences with equipment and appliances in your home, and how you shop for and install things when you need them.

Today I'm hoping to learn about your home and experience in a conversational way - there are absolutely no right or wrong answers or anything we expect people to say!

And I really appreciate you carving out this time today. We're actually just talking with a handful of people across the Northwest, so what you share will be really helpful to understand the range of experiences people have.

RECORDING CONSENT
1. [IF PHONE ONLY] Before we start, are you currently driving?
   a. [IF YES] Is there a better time to have this conversation? [Record preferred date and time for call back. Thank and terminate.]
2. In the application for this study, we asked if you might be comfortable if we record the conversation. That would help us with notes so that we can listen better. Nothing you say or share will be associated with your name or image, and we won't share the video or audio with anyone. Is it alright if I start recording?
   *** START RECORDING for consent capture ***
3. To have it on the record, do you consent to the research team recording this conversation for their notes and analysis, as long as all personally identifiable information like your name, image, voice, or video are not shared?

HOME, HOUSEHOLD AND COMMUNITY
Homeowner Introduction:
1. As an introduction, I'd like to hear a little about you and your home. Can you tell me where you live and what type of home you're in?
2. [If not mentioned] Who else lives with you?
3. [If not mentioned] …and what do you do for a living? *(listen/prompt for home-based business, farm or self-employment)*

Landlord Introduction:
1. As an introduction can you tell me a little bit about yourself? How long have you owned or managed rental properties?
2. And can you tell me a little bit about them – like how many, and what kind of buildings? *(listen/prompt for type: single-family, mobile home, duplex, triplex, 4-unit)*

Ask Everyone:
1. How do you describe the area [you live] [with your rental properties], in terms of how rural, urban or suburban it is? What makes you say that? *(listen or prompt for different words they may use – e.g., small town/city)*

2. Where are the nearest "Big Box" stores? *(what city/town; how far; how hard/easy to reach) (listen or prompt for: Wal-Mart, Home Depot, Lowe's)*
    a. [IF NEEDED] How easy/hard is it to get there?

EQUIPMENT AND APPLIANCES

1. How is [your home] [the house/property] heated? *(listen/prompt for: Type of heat, heating fuel)*
2. How do you keep cool in the summer? [Landlord: Is there air conditioning or cooling?] *(listen/prompt for CAC or room/window AC)*
3. Thinking about some of the equipment and appliances in [your home] [the house/property]...
    a. How well have they been working?
    b. What do you think might need replacement next? *(listen or prompt as needed for each product category)*
        i. Heating/Cooling
        ii. Water heater
        iii. Refrigerator
        iv. Washer/dryer

UTILITY COMPANIES AND BILLS

1. [LANDLORD] Do tenants pay all of the utility bills, or are there some that you pay?
    a. [IF LANDLORD: ask about utility company for the rental properties]
2. In the screener you named _____ as your electric company [and ____ for natural gas] Is that correct?
    a. If gas: What do you use gas for? (heating, water heating, cooking fuel?)
    b. If no gas: Does your home use propane or oil? If so, for what?
3. What do you think of [ELECTRIC CO] as a utility? How about [GAS CO]? *(listen for trust, interactions, or examples of actions taken to help customers)*
4. [IF COMPLAIN ABOUT HIGH BILLS] Have you looked into any programs or things you could do to bring bills down? *(listen for assistance programs, rebates/discounts, state or utility programs, etc.)*

RECENT PURCHASE PROCESS

1. Thinking about the equipment and appliances in [your home] [the rental property]— what's the most recent thing you purchased? When?
    a. [IF <1 year for a relevant category (HVAC, water heating, large appliances: **continue this section**; if >1 year or not a relevant category, **skip to next section** about upcoming purchases]

Motivation & Triggers:

1. Tell me a bit about the motivation for purchasing or replacing ____.
    a. [IF NOT CLEAR] …and what was your top motivation?
2. [IF NEEDED] How did you learn that _____ needed to be replaced? *(listen for sources – e.g., contractor, friend, social media, etc.)*

Shopping & Purchase Process:

1. Can you tell me about the process for finding a new _____? *(if needed prompt for if/when they visited a store)*
2. What resources were useful while shopping? *(listen/prompt for: websites, social media, retail stores, contractor, advisor, utility, state or local organization)*

    a. *(if social media, prompt for site and group etc. – e.g., Reddit, Facebook community group, Facebook marketplace, general Facebook search)*
3. Where did you buy ____ from? (this could include installers or retailers)
4. Why/How did you end up purchasing through _____?

Decision Criteria:
1. What _____ did you end up purchasing?
2. Is there a page online where you show me what you bought?
    a. (if yes) Can we switch to screenshare? [instructions]
3. What were some of the factors you considered? (What was important to you in selecting ____? Were you considering other types of [CATEGORY]?)

Installation:
1. Who installed ____?
2. [IF RETAILER] How did you decide to install through ____?
3. [IF INSTALLER] How did you find a contractor/installer?
    a. *(listen/prompt for online source including utility tool)*
    b. *(Clarify whether they had an existing contractor)* Was ____ someone you'd worked with before?
4. Thinking about the whole process for a new _____, what were some of the questions or hurdles that came up?

REPLACEMENT NEEDS/PLANS

[SKIP IF we went through full purchase process section]
1. Earlier you mentioned that ____ might need replacement soon. Is there any other equipment or appliances you're thinking of replacing [IF LANDLORD: in the rental property]?

[Identify and move forward with product most related to NEEA's residential portfolio]
2. Why do you think that [you might need to replace _____]? (listen/prompt for sources of information/advisors)
3. Where are you in the process of looking for a new _____? [IF NEEDED: What steps have you taken?]
    a. *(listen/prompt for reasons for not taking action, including other priorities or home repairs, barriers/questions)* What are some priorities before [relacing ____]?
    b. [IF NOT STARTED] How do you think you'll start?
4. [IF STARTED PROCESS] Can you show me online any of the ____ you are looking for or any sites you've visited?
    a. [Guide through screensharing so participant can share screen; if participant is uncomfortable screensharing, researcher will share screen.]
    b. [As the navigate, prompt if/as needed about how/why they chose the store/website, their product criteria, etc.]
5. What types of ____ are you considering? [ALT: Besides ____, are you considering any other types of ____?] *(listen/prompt for why, or who/what informed thinking)*
6. Are there any other people you've spoken with or sources you've used while shopping for [researching/shopping for]? *(listen open-ended; TIME-PERMITTING prompt for sources not mentioned above)*
    a. Retail Store – in-person (clarify: Big Box or local?)
    b. Online store (e.g., Home Depot, Amazon.com)
    c. A contractor, plumber, or electrician

d. Manufacturer website
e. Local group or organization
f. Social Media (prompt for which sites

COSTS, DISCOUNTS, FINANCING (if shopping or purchased recently)

1. What is the price range you are/were looking at?
2. [Past purchases] Were there any discounts, rebates or tax credits? [Upcoming] Are there any discounts or rebates for ____ right now?
    a. How did you learn that?
3. Have you heard of any financing for ____? *(listen for attitudes and interest in financing which people will likely offer unaided)*
    a. [IF NEEDED] What's your interest in financing or borrowing money?
4. [If cost seems like a barrier] Have you heard of any lease-to-own options for large appliances?
    a. [IF NEEDED] What's your interest?

PRODUCT AND PROGRAM AWARENESS AND SOURCES

The next section is about programs and services the state, local organizations and utilities have around energy and utility bills.

I am going to show a list of programs, products and discounts offered in some areas. Can you look and tell me which you've heard of?

1. High-efficiency furnaces 2. Heat Pump for heating/cooling 3. Heat Pump or Hybrid water heaters 4. Tankless (on-demand) water heaters 5. Rebate/discount for ENERGY STAR® Appliances	6. Home Energy Assessment 7. Fuel or Heating Assistance 8. Discounts on electric or natural gas bills 9. Tax credits for energy upgrades 10. Low-interest loan for energy upgrades

1. Have you ever looked into, purchased or used any of them? Why or why not? *(listen/prompt for: attitudes to early replacement; attitudes toward energy efficiency or government programs)*
2. In the past year, where have you seen or heard information about these programs or products? *(listen or prompt for organization as well as channel)*
    - Utility company (if so: online account, email, paper, call?)
    - Local organization (if so: what organization? What channels? Email, social media radio, etc.)
    - Local event (if so: what?)
    - Radio advertisement
    - Newspaper
    - Social media
    - Retail or big box store (if so: what store? Where in the store – or online?)
    - Contractor
    - Friends or family
3. What do you think of when you hear the term "energy efficient" or "energy efficiency?" What comes to mind?
4. I'm curious what you think about other phrases to get people's attention for energy programs or discounts. What do you think about the term...
    - "Lower your energy use" or "Reduce your energy bill"

- "ENERGY STAR"
- "Energy retrofit" or "energy upgrade"

DIY ORIENTATION

1. You touched on this a little earlier...I'm curious about what kind of projects you like to DIY. I'm going to pull up a few examples and for each one tell me if you think your household would DIY, ask friends/family, or pay someone

Replacing a washer/dryer	Troubleshooting a broken air conditioner
Replacing a door or window	Installing a new water heater

2. *(listen or prompt to why they DIY)*

RURAL EXPERIENCES

Our client – the Northwest nonprofit I mentioned – works across Idaho, Montana, Oregon and Washington.

Earlier you mentioned you live in a [their description of community], and I'm curious about what it's like to shop, purchase and install equipment and appliances in your area.

1. What do you think might be different about shopping, purchasing or installing _____ in your area, compared with more suburban or urban areas?
2. Is there anything you think is EASIER, or easier to find, in your area than other areas? What? Why?
3. Is there anything you think is HARDER, or harder to find? What? Why?
4. [IF NOT ADDRESSED] How about _____? (do you think it's easier/harder)
    a. Finding a contractor, electrician or plumber
    b. Driving distance (e.g., driving to stores)
    c. Product options in [locale description] area

THANK YOU AND CLOSING

That's all the questions I have for now.

Thank you very much for taking the time to speak with me.

Within a few hours I'll process the payment through Respondent.io and you should see information from them.

H. Market Actor Interview Registration Screener

1. What best describes your specialty or trade? (Multi-select)
    a. Electrical / Electrician
    b. HVAC installer
    c. HVAC sales and service
    d. Plumbing and mechanical
    e. Other
2. What types of equipment do you install (Multi-select)
    a. Heating systems – natural gas or propane
    b. Air conditioning
    c. Heat pumps
    d. Water heaters – natural gas or propane
    e. Water heaters – electric or heat pump
    f. Large appliances (refrigerator/freezer, washer/dryer)
    g. None of these [DISQUALIFY]
    h. Other
3. What is your role in your business? Select all that apply. (Multi-select)
    a. Installation
    b. Sales / Estimation
    c. Service
    d. None of these [DISQUALIFY]
4. Please list the county and state you serve most. If you serve multiple counties, list the top 2-3. (Single-line text box)
5. What percentage of your residential customers live in Rural areas? (your best guess is great!) (Number box}
6. We are using Zoom to hold virtual interviews, which requires an internet connection, smartphone, tablet or PC. If your internet isn't strong enough, we can send a dial-in phone number. Will you be able to participate by Zoom? (Single-select)
    a. Yes, I can participate by Zoom
    b. No, I cannot use Zoom but could call into a phone number

I. Market Actor Interview Guide

RESEARCHER INTRODUCTION
Hello, my name is [Researcher name] and I'm an independent researcher working with LD Consulting.

Our client is the Northwest Energy Efficiency Alliance (NEEA), a nonprofit who brings together more than 140 energy organizations including utilities and their partners to increase the adoption of energy-saving products, services and building practices across the Northwest. They work with a range of businesses including manufacturers, distributors, retailers, people who work on codes and standards, and contractors and installers, which is why we're here today!

1. [IF PHONE ONLY] Before I say too much, are you currently driving?
   a. [IF YES: Is there a better time to have this conversation?] [IF YES: Record preferred date and time for call back. Thank and end call.]
2. Before we get started, is it okay if I record this interview? The recording will not be shared anywhere, it's just for our team to reference as we pull together findings. Nothing you say or share will be associated with your name or organization.
   *** START RECORDING for consent capture ***

PARTICIPANT INTRODUCTION(S)
1. As an introduction I'd like to hear a little about you and your work.
   a. Your name and where you're located
   b. How do you typically describe what you do? *(if needed: contractor, electrician, plumber, HVAC business or installer; sales, installation or maintenance)*

That's so helpful, thank you. We'll get into _____ more in a minute.

For a little more background – we are interested in residential purchase and installation trends in different types of communities, particularly in rural areas, small and mid-sized towns. This will help the alliance of energy organizations I mentioned make sure their work serves all communities.

I really appreciate you carving out this time today – I can imagine your schedule is tight. We're only talking with a handful of [contractors/installers], so what you share will be really valuable.
The questions today are mainly about the residential market in your area – what customers are asking about and purchasing – and the supply chain in your area, like distributors and product availability. We don't have any questions about competitive business practices such as marketing or pricing.

PRODUCT TRENDS AND ENERGY EFFICIENCY
1. We're interested in residential heating, cooling, water heating, and large appliances. Of these, what makes up most of your work?
2. What types of [heating / cooling / water heating / appliances] **have been trending up** in your area? [clarify types and fuel: e.g., ducted/ductless HP; tankless gas/propane water heaters; HPWH]
   a. Is anyone else seeing [_____] trend? *(Prompt for key/products mentioned)*
   b. What do you think is driving [trend mentioned]? *clarify whether that's something they drive vs. customers ask for)*

CONSUMER PURCHASE PROCESS

1. Our team is curious about decision-making among residential customers, including when and why people call you. How are you typically involved in people's purchase process or decisions? Help me understand what that process looks like
    a. What portion of customers come to you knowing specifically what they want, versus looking for advice or guidance? Where are they getting that information?
2. What trends have you seen in **where** people are buying [CATEGORY]? For example, are they buying from you or buying elsewhere for you to install. *(listen or prompt for: how often people buy from elsewhere and contractor installs; DIY or self-install; where people are buying from)*
3. What do you [all] think of the term "energy efficient"? Is that a term that you use? That your customers use?
4. What trends if any have you noticed in who is more interested in [their term for higher efficiency] equipment or appliances? Tell me more…
   (moderator prompt group for whether others are seeing this, and in what parts of their territory)

REGION AND RURAL/TOWN CHALLENGES

I want to hear more about your regions.

1. How would you describe the **area you serve**, in terms of how rural, urban or suburban it is?
2. Have you noticed any differences in the **products people want or buy**, between rural areas and small/mid-sized towns vs. urban/suburban areas?
    a. [IF NEEDED] Is there any relationship between living in rural areas or smaller towns, and purchasing or installing [higher efficiency ____ or heat pumps/HPWH]?
    b. Why do you think that is? *(listen/prompt for consumer criteria (e.g., lower prices, lower cost to operate, performance, reliability) or constraints (e.g., income, propane)*
3. I'm curious what it's like working in [rural or small-town] areas – What do you see as differences or challenges of **working in** [rural / small town] areas? Anything harder or easier? *(allow group discussion; moderator test trends we hear among group) Listen and prompt if needed for:*
    - Workforce/labor availability
    - Training courses
    - Driving distance to customers
    - Driving distance to suppliers/distributors
    - Product availability
    - Visits from manufacturers reps
    - Supplies more expensive
4. Thinking about product availability – are there types of [CATEGORY] that aren't in-stock or harder to find in your area? *(listen for what types; prompt if needed)*
    a. Why do you think that is? *(if needed: is this related to how new it is, the efficiency level or something else?)*
    b. …And where do you purchase the equipment that you install?

INFORMATION AND TRAINING

1. You all hold a wealth of knowledge, and I'm curious how you stay up to speed. Where do you tend to see or hear information about [CATEGORY]? *(listen for sources and channels; we will dig into each)*

[Time-permitting: Show on-screen to prompt discussion after allowing open-ended responses – e.g., who has valuable information? What catches your attention?]

Potential Sources:	Potential Channels:

• Electric utilities • Gas utilities • Manufacturers • Suppliers/Distributors • Other Contractors/Installers/ Electricians/Plumbers • Big Box retailers • Local retailers or appliance stores • State or local government • Community organizations or nonprofits • Social media	• In-person interaction (e.g., at store) • Email newsletter • Personal email • Phone call (e.g., from rep, distributor) • Trade event or conference • Social media • Paper handout

Listen or prompt – time permitting - for specific group or site – e.g. specific manufacturer, supplier, retailer, Reddit thread – and/or what information is valuable (which they will probably mention unaided)

2. Thinking about training or refresher courses – what have you taken? *(listen/prompt for: source (distributors, manufacturers, utilities), preferred format, why they like it)*

BARRIERS SUMMARY AND IDEAS

As I mentioned earlier, our client NEEA is working to accelerate the adoption of energy-saving heating, cooling, water heating equipment, appliances, windows/doors, insulation and building practices across the Northwest. We've talked about [supply chain / workforce] challenges like _____ as well as the customer side like _____.

1. What do you see as the biggest challenges to people adopting [more energy efficient [CATEGORY] or heat pumps] in your area?
2. What ideas do you have for how to address _____? *(listen/prompt for ideas on MT-addressable barriers; listen/prompt for the "actors" to address them)*

3. I'm going to list the types of organizations NEEA works with, if it helps think about who could address the challenges you mentioned. [SHOW LIST ON-SCREEN]

• Electric utilities • Gas utilities • Manufacturers • Suppliers/Distributors • Social media	• Big Box retailers • Local retailers or appliance stores • State or local government • Community organizations or nonprofits

4. [OPTIONAL, time permitting] Earlier you mentioned [Workforce challenge] – can you think of any courses or training that could help?

THANK YOU AND CLOSING

That's all the questions I have for now. Thank you very much for taking this time today, we learned a lot that will help the project.

[SHOW SLIDE WITH FOLLOW-UP INFO on gift cards, residential interviews and data party]

We have your email address and will send the [describe gift card] within the next few days.
It will come from [EMAIL ADDRESS] and if you don't see anything, respond to the person who scheduled this call.

We're also looking for homeowners and small residential landlords for 30–45-minute interviews – for a $75 gift card. If you have any customers who may be interested, I can send an invite you could forward.

…And in a few weeks, we'll have findings from a range of interviews, and lots of data for rural areas and towns in the Northwest. We're holding a "data party" for everyone involved to look at the key findings and brainstorm ideas and strategies. I'll send you an invitation when we know the date/time if you're interested!

Thank you!

J. Barriers with Rural Impacts and Considerations

Table 17: Market Transformation barriers and their rural impacts and considerations

Barrier	Influence on Energy Efficiency Adoption	Rural Impacts and Considerations				
		Data Analysis	Literature Review	Community Group/ Data Party	Consumers	Market Actors (Installers)
Limited contractor availability	Consumers in areas with limited local contractor availability may face delays in obtaining service, leading them to pursue DIY options that are not energy efficient or optimal	Heat maps show fewer contractors in Town and Rural locales	Fewer contractors in rural areas	Rural contractors' high demand and limited resources slow energy-efficiency adoption	Consumers share that getting a contractor for their smaller residential project is hard when competing with large industry projects	Installers noted that there were not enough installers in the area and that there also was not a pipeline of youth joining the industry
Options incompatible with existing building infrastructure/ stock	Homes not supported by existing programs or technology (e.g., older homes, manufactured homes) due to building infrastructure condition, space or fuel limitations require additional costs for upgrade before energy-efficient equipment can be installed	Average age of homes in Town locale is 49; 45 in Rural 34% of homes in Town locale are over 50 years old; 14% in Rural 15% of households in Rural are manufactured homes; 10% in Town	Rural housing stock is geographically dispersed and primarily composed of larger, single-family homes as well as manufactured houses that predate 1980 building codes	Energy-efficient upgrades do not align with rural homes' existing space and infrastructure	One consumer mentioned panel capacity being an issue for energy upgrades	Installers mentioned manufactured homes in rural areas where there can be more issues getting to or replacing equipment causing higher costs and limited product options
Lower consumer awareness of energy efficiency technology, programs, and resources	Awareness of the benefits and resources available for energy efficient technology drives an increase in energy efficiency adoption. With a limited understanding of ways to mitigate cost	-5% knowledge about environmentally friendly products compared to the U.S. average (Town and Rural)	Lack of awareness of programs and resources	Rural-focused consumer awareness is needed	Consumers use inconsistent terminology to describe energy-efficiency and are unaware of the standards for what	Installers have hesitancy in sharing EE options with customers due to cost restrictions and potential increase future maintenance costs

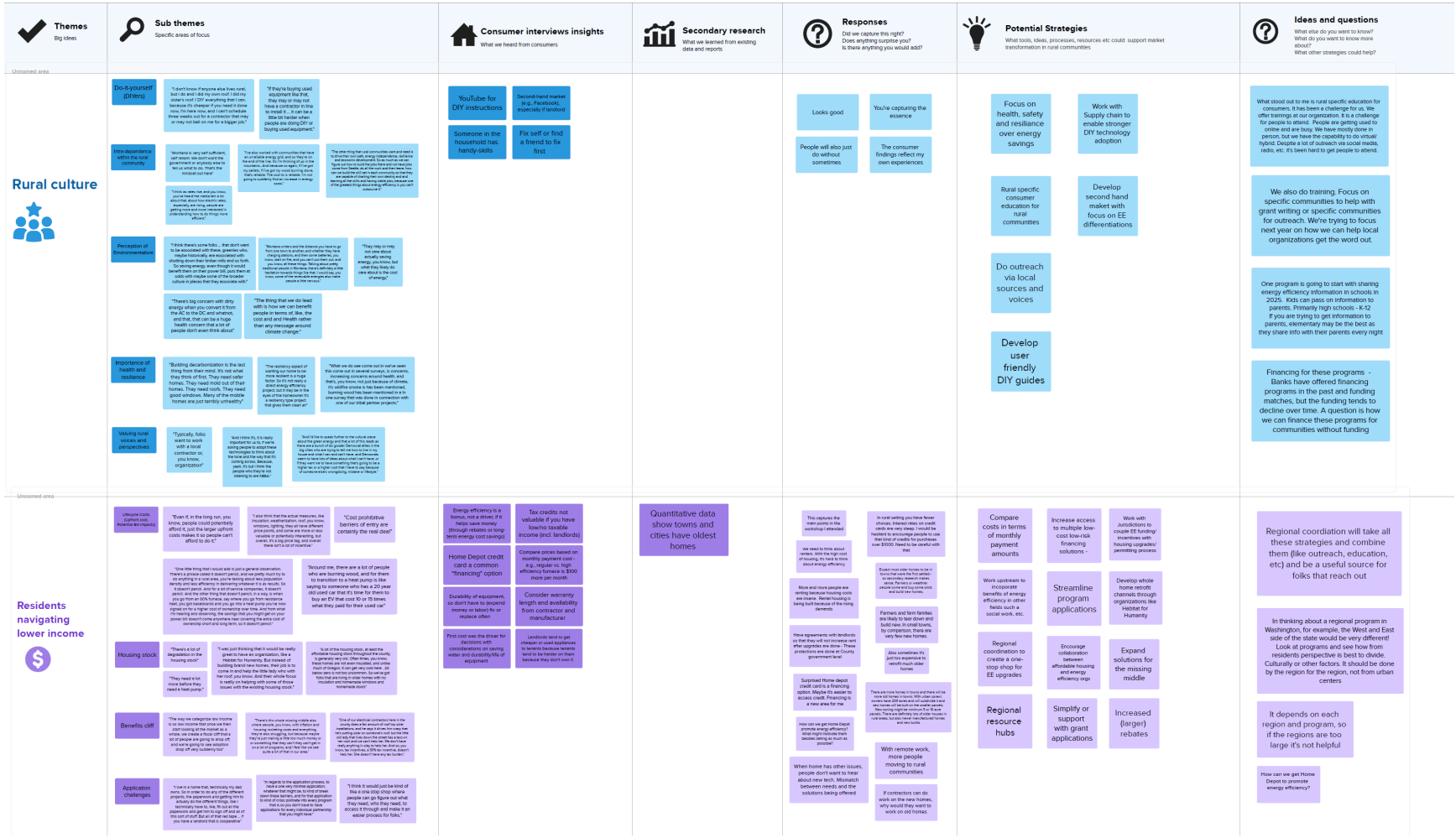
Barrier	Influence on Energy Efficiency Adoption	Rural Impacts and Considerations				
		Data Analysis	Literature Review	Community Group/ Data Party	Consumers	Market Actors (Installers)
	or how energy efficiency can work for them, consumers may be deterred from adopting energy efficient technology				qualifies as energy-efficient	
Upfront cost	Upfront costs for energy-efficient equipment are typically higher than other products. Consumers experiencing low-income may prioritize their expenses towards items other than energy-efficiency	Town has significantly lowest median income of all locales ($66,832); Rural has second lowest ($82,703)	Higher costs for service delivery in rural areas, lower median incomes Market transformation programs focus on higher price point products, while in common appliance categories (e.g., refrigerators, clothes washers, and room air conditioners), roughly 30% of sales are of the handful of models with the lowest price points	Even with existing supports and subsidies, if the upfront cost is higher for energy efficient options, consumers may not be able to afford the difference	Initial cost of the equipment is the most important consideration for consumers	Installer stated that costs were the most important factor decided on equipment
Alternative fuels	Most existing programs do not have incentives for alternative fuel equipment nor support for changing from alternative fuels Consumers with alternative fuel homes	16% of Rural households heat with wood; 12% with bottled gas; and 5% with fuel oil or other fuels	Homes in rural areas are much less likely to heat with a natural gas furnace (14.9%) than in urban areas (52.15)	Switching from delivered fuels to other options is cost-prohibitive, and homeowners feel the electrical grid is less resilient	Many consumers use alternative fuels in addition to electric and gas. One customer preferred to cut their own wood rather than paying	Installers mentioned that not every rural area has natural gas which can lead to more customers having propane Installers also mentioned that because of the lack of natural gas there was a

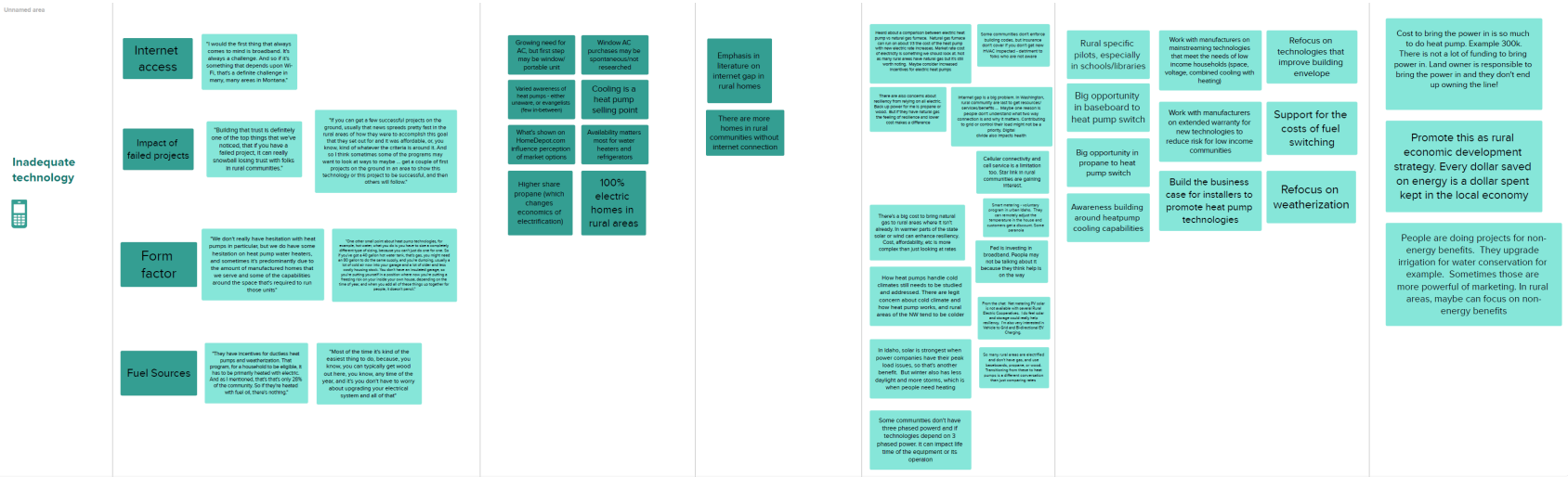
Barrier	Influence on Energy Efficiency Adoption	Rural Impacts and Considerations				
		Data Analysis	Literature Review	Community Group/ Data Party	Consumers	Market Actors (Installers)
	then may not be able to engage with energy-efficiency in a cost-effective manner or may suffer from increased energy bill.				utility for electricity to fuel their furnace.	tendency to use wood and have outside wood boilers/furnaces
Installation cost	Installation cost for energy-efficient technologies can be driven by complexity of the products, lack of contractor availability, and travel fees Consumers experiencing low-income may prioritize their expenses towards items	N/A	Higher costs for service delivery in rural areas, lower median incomes	Contractors may avoid installing complex or new technology because they are too busy and don't want to worry about callbacks, complaints, or maintenance issues	Installation costs may be higher due to travel fees for rural consumers	Installers noted that installation costs can be higher due to rural communities have more manufactured homes or structures that are more expensive to do an install
Maintenance cost	Consumers experiencing low-income may prioritize other essential expenses which can result in delayed maintenance or decide not to purchase products that have higher maintenance cost	Town has significantly lowest median income of all locales ($66,832); Rural has second lowest ($82,703)	Higher costs for service delivery in rural areas, lower median incomes	Rural households are not able to consider energy efficiency upgrades when other major repairs are needed first	Consumers consider the frequency of repairs and availability of warranty for equipment purchases	Installers noted that certain structures, like manufactured homes could have higher maintenance costs due to access They also mentioned that if equipment is not run correctly (HPWHs), that they have seen higher maintenance and repair costs
Limited product availability	Limited product availability in stores and delays in receiving products due to	Heat maps show fewer stores in Town and Rural locales	Lower levels of product availability	N/A	Rural consumers need to travel or order online for energy-efficient	Installers mentioned that their suppliers are sometimes 60 miles away, as well as delays in

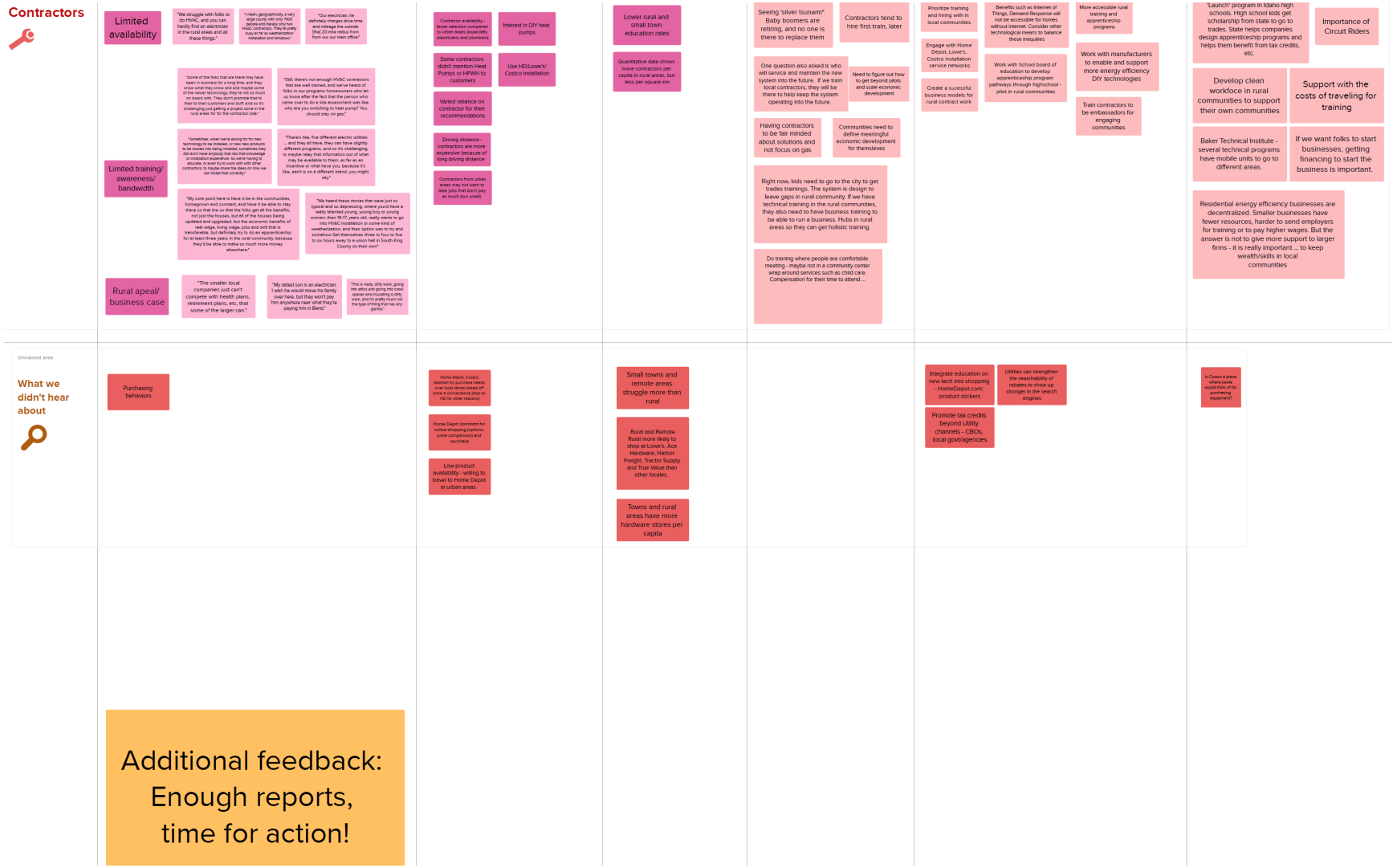
Barrier	Influence on Energy Efficiency Adoption	Rural Impacts and Considerations				
		Data Analysis	Literature Review	Community Group/ Data Party	Consumers	Market Actors (Installers)
	remoteness make it more difficult to access new technologies and results in slower adoption rates				equipment and prioritize what can be installed sooner when in emergencies	projects if they do not have what they need on hand
Limited internet access	Internet availability impacts customers' ability to use DR capabilities to reduce utility cost; without internet access, consumers also cannot view online energy efficiency resources (e.g., online information, applications, contractors)	12% of households do not have internet at home (Town and Rural)	Lower rates of internet access	Lack of reliable internet access and cell coverage continues to be a major challenge in rural areas	N/A	N/A
Distrust	People in Towns and Rural communities may be less likely to accept information provided by government officials or individuals from outside their local area as accurate	N/A	Perception that programs are unreliable or untrustworthy	Reaching rural audiences requires local voices for lasting impact	N/A	Installers noted that their customers wanted to work with local businesses and contractors
Cultural differences	Communities may be less likely to engage with outreach and education efforts that are not culturally relevant, as the messages may not resonate or feel accessible	N/A	Some energy efficiency organizations and programs lack rural cultural competency	Rural communities are less likely to trust or value information coming from urban organizations	N/A	N/A

Barrier	Influence on Energy Efficiency Adoption	Rural Impacts and Considerations				
		Data Analysis	Literature Review	Community Group/ Data Party	Consumers	Market Actors (Installers)
Limited multilingual resource availability	Energy efficiency resources and contractor services are often only available in English, which limits non-English speakers access to information about energy efficiency and ability to connect with contractor	14% of Town population speaks a language other than English at home; 9% in Rural	Spanish-speaking rural households can be missed if multilingual programming is not offered	Some rural communities are diverse, including many Spanish speakers, and existing outreach/ training is not reaching these communities	N/A	N/A

K. Data Party Materials







L. Terminology

L.I Definitions

Alternative Fuels: Energy sources other than electricity and natural gas (e.g., propane, wood).

Benefits Cliff: The sudden and often unexpected decrease in public benefits that can occur with a small increase in earnings. See https://www.ncsl.org/human-services/introduction-to-benefits-cliffs-and-public-assistance-programs for more information.

Bottled Gas: Gas stored in containers for heating (e.g., propane, butane, liquified petroleum gas).

City or Urban (as defined in Data Analysis): Large, densely populated areas, defined using the incorporated City's legally defined boundaries (e.g., Boise, ID; Billings, MT; Portland, OR; and Seattle, WA).

Community Groups: State, regional, and local groups active in the energy market ecosystem.

Consumers: Single-family homeowners or landlords who would purchase energy-affiliated equipment.

Cultural Differences: Variation in values, beliefs, and practices that distinguish one community from another. In this report, cultural differences include variation across locales, income, etc.

Data Party: Facilitated session based in procedural justice where participants involved with generating the research data are involved in the synthesis of recommendations from the data.

Energy Burden: Percent of household income spent on energy bills.

Energy Burdened Households: Households with energy bills that make up greater than 6% of their household income.

Heating, Ventilation, and Air Conditioning (HVAC): Technology related to controlling the temperature and humidity of a space.

Locale: The type of area someone lives in (e.g., urban, suburban, rural).

Manufactured Homes (as defined in Data Analysis): The data on manufactured homes in data analysis section of this report is based on U.S. Census Bureau data. While the Census uses the term 'mobile home/trailer' in its data collection tool, we use 'manufactured homes' to align with NEEA's standard language.

Market Actors (Installers): Contractors and businesses who work in installing HVAC, plumbing, and other energy-affiliated equipment.

Market Transformation (MT): The strategic process of intervening in a market to create lasting change in market behavior by removing identified barriers or exploiting opportunities to accelerate the adoption of all cost-effective energy efficiency as a matter of standard practice.

Mixed-Methods Approach: Research approach combining quantitative and qualitative data.

MT Barrier: Factors slowing or preventing increased market adoption. Examples of traditional barriers include lack of awareness, lack of availability, uncertainty in performance, lack of capability, and price.

MT Leverage Point: Markets that can be leveraged to accelerate adoption of energy efficient innovations for their own purposes.

MT Opportunity: Factors driving market adoption unrelated to the core efficiency innovation. Examples include: need for air-conditioning driving ductless heat pump sales, water resource efficiency driving sales of front-load clothes washers, and a change in federal standards driving a potential change in water heating efficiency.

Northwest (when describing NEEA's region): Includes 4 states: Idaho, Montana, Oregon, Washington. Primary Research: Analysis of data collected first-hand by this research team.

Rural (as defined in Data Analysis): Sparsely populated areas, defined as not being a City, Suburb or Town.

Rurality: Rurality is determined by taking the population residing in Rural areas within the cluster divided by the total number of residents in both Rural and Town areas within the cluster; the cluster is more Rural than Town if it has a rurality of over 50%.

Secondary Research: Analysis of existing data obtained by other teams.

Suburb (as defined in Data Analysis): Residential areas situated adjacent to or very near a City, outside of the City's legally defined boundary, and tend to be less densely populated than a City (e.g., Meridian, ID; Lockwood, MT; Gresham, OR; and Woodinville, WA).

Targeted Universalism: A framework that seeks to establish universal goals that address shared needs while implementing targeted strategies that consider the unique circumstances of specific communities. universal goals that address shared needs while implementing targeted strategies that consider the unique circumstances of specific communities.

Town (as defined in Data Analysis): Small, densely populated communities independent from City or Suburb (e.g., Twin Falls, ID; Butte, MT; Baker City, OR; and Moses Lake, WA).

Trade Ally: Energy equipment installers or contractors affiliated with utility or other energy efficiency programs.

L.II Acronyms and Abbreviations

Table 18: Acronyms and abbreviations used throughout the report and its associated terminology

Acronym	Term
CBSA	Core Based Statistical Areas
DIY	Do-it-yourself
DOE	Department of Energy
EE	Energy efficiency
FNS	Food and Nutrition Service
HH	Household
HP	Heat pump
HPWH	Heat pump water heaters
HUD	Housing and Urban Development
HVAC	Heating, Ventilation, and Air Conditioning
IOU	Investor-Owned Utility
LEAD	Low-Income Energy Affordability Data
MF	Multifamily
MH	Manufactured Home
MT	Market Transformation
NCES	National Center for Education Statistics
NEEA	Northwest Energy Efficiency Alliance
RUCA	Rural-Urban Commuting Areas
RUCC	Rural-Urban Continuum Codes
SF	Single-family
UA	Urban Areas
UPSAI	Perceptions Small Area Index
USDA	U.S. Department of Agriculture