Energy Trust of Oregon

2018 Diversity, Equity and Inclusion Data and Baseline Analysis

Published December 26, 2018

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Executive Summary

Energy Trust conducted a geographic analysis, using data from the U.S. Census bureau to provide information about the extent to which Energy Trust has served diverse communities and where opportunities remain. We analyzed participation in Energy Trust programs at 1.4 million residential households in census tracts in Energy Trust's Oregon service territory and computed the participation rate and average savings per participant site for each census tract from 2013-2017.

We used U.S Census Bureau tracts as the unit of analysis because they contain 1,000-2,500 households and due to their size and use of major roads and geographic features as boundaries, are a good proxy for communities.

A notable limitation of geographic analysis is that we cannot make a direct link between community-level participation and the demographics of participants.

We created demographic indicators (indices) that describe census tracts on three dimensions: urban versus rural, household income, and racial and ethnic diversity. Each census tract was then assigned a 1-5 score for each of these three indices. The tracts with the most rural, most non-white and lowest-income residents were scored as 5. The tracts with the most urban, most white and highest-income residents were scored a 1. We compared those scores to participation rates to determine if communities with different demographic characteristics participate at different levels.

Energy Trust engaged representatives from community-based organizations at critical stages in the analysis and heard different perspectives, received feedback and established relationships.

Through this analysis, we identified opportunities to engage customers as well as opportunities to learn more. This analysis will inform program strategy and refinement of Energy Trust's 10 diversity, equity and inclusion goals.

We see opportunities to engage residents in communities of color, communities with low-income residents and rural communities in our programs and offerings.

We see opportunities to engage small and medium commercial businesses in all areas of the state and commercial businesses of all sizes in rural communities. There are also opportunities to increase service to small and medium production facilities, especially in rural areas.

We recognize the limitations of our analysis and have identified opportunities for continued learning. We plan to explore alternative data sources and perform additional analysis for residential communities of color, and we plan to seek input and feedback from communities. For business customers, we plan to explore how to connect income levels and race and ethnicity to businesses so that we can analyze participation from businesses serving or representing these communities.

1. Project Background

Energy Trust of Oregon is an independent nonprofit organization dedicated to helping customers of investor-owned utilities in Oregon and Southwest Washington benefit from saving energy and generating renewable power. Energy Trust funding comes exclusively from utility customers and is invested on their behalf in energy efficiency, clean, renewable energy and market transformation activities.

We serve 1.6 million commercial, residential and industrial customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista in Oregon, and 82,000 NW Natural customers in Washington.

In December 2017, Energy Trust's board adopted a diversity, equity and inclusion policy, which replaced the equity policy that had been in place since 2002. In 2018, Energy Trust created a diversity, equity and inclusion operations plan outlining 10 specific goals and identified three dimensions of diversity on which to focus: rural location, income and race/ethnicity. The 10 diversity, equity and inclusion goals include:

1. Increase customer participation in energy efficiency programs for all underserved populations by 20 percent by the end of 2020, with strategies and sub-goals for residential, commercial and industrial sectors.
2. Increase customer participation in renewable energy programs for all underserved populations by 20 percent by the end of 2020.
3. Increase participation in the Trade Ally Network by minority-owned and women-owned business by 50 percent each by the end of 2020.
4. Increase the number of projects completed by minority-owned and women-owned trade allies by 15 percent by the end of 2020.
5. Increase the number of contracts executed with minority-owned and women-owned businesses by 15 percent by the end of 2020.
6. Increase market awareness and understanding of underserved populations by developing and deepening of relationships with up to 50 organizations (e.g. community-based organizations, culturally specific/culturally responsive organizations, municipal agencies, membership organizations, etc.) by the end of 2020.
7. Increase the diversity in recruitment and hiring of employees by 25 percent by the end of 2020.
8. Develop systems and support needed to collect, track, analyze and report demographic information related to program participation, program delivery and trade ally network members by the end of 2018.
9. Increase organizational cultural responsiveness by the end of 2020.
10. Increase transparency and community engagement by publishing the diversity, equity and inclusion operations plan and progress towards its goals.

Goal eight states that Energy Trust will "develop systems and support needed to collect, track, analyze and report demographic information related to program participation, program delivery and trade ally network members by the end of 2018." The purpose of the analysis is to determine the extent to which Energy Trust has served diverse communities and where opportunities remain.

A cross-functional project team was assembled, including Dan Rubado, evaluation project manager; Andy Griguhn, planning and evaluation operations analyst; and Alex Novie, senior commercial project manager. Additional support and guidance was provided by Debbie Menashe, director of HR and legal services and diversity, equity and inclusion committee chair; Fred Gordon, director of planning and evaluation, and Dani Ledezma, diversity, equity and inclusion consultant and advisor.

This data and baseline analysis will support development of strategies to meet the other nine diversity, equity and inclusion goals.

1.1. Engagement with community-based organizations

Engagement with community-based organizations is critical to the success of diversity, equity and inclusion data and baseline analysis. Energy Trust engaged representatives from community-based organizations[1] at critical stages in this analysis and to hear different perspectives, receive feedback and establish relationships. Feedback from community-based organizations helped in interpreting the initial results from the geographic participation analysis.

In addition, Energy Trust met with other organizations conducting similar diversity, equity and inclusion data analysis to solicit feedback and input.

1.2. Internal Energy Trust Engagement

The project team met with staff from Energy Trust's residential, commercial, industrial and agricultural, and renewable energy program to discuss and provide feedback on methodology and results.

1.3. Overview of Program Sectors

Energy Trust analyzed program participation in four primary sectors:

- Residential (including multifamily)
- Commercial
- Industrial and agricultural
- Renewable energy (solar only)

The primary focus of analysis was on the residential programs since residential energy efficiency programs directly impact individual residents and ratepayers. As a result, the residential sector is perceived to have the largest impact on how equitably the benefits of Energy Trust programs are distributed to ratepayers.

The commercial and industrial programs deliver energy savings to businesses, organizations, government agencies and communities, and have indirect benefit for residential customers. These programs are important to acquiring cost-effective energy efficiency resources and keeping utility costs low for all ratepayers.

[1] Energy Trust met with community-based organizations over the course of two months in 2018, including on July 31 and October 9, 2018. Meetings with other organizations performing similar data analysis were held on June 15 and October 23, 2018.

To provide context and quantify the relative importance of the sectors in terms of total energy impact, we split out Energy Trust's total 2013-2017 savings and generation claims by sector. The results are presented in Figure 1, below.

Energy Trust's residential programs (including multifamily buildings) saved approximately 4 trillion BTUs of energy, about one-third of the total energy savings and generation claimed over that five-year period. The commercial sector accounted for another one-third and the industrial and agriculture sector accounted for about one-quarter of the total impact. Generation from the renewable energy sector was 4 percent of the total.

Energy savings acquired through Northwest Energy Efficiency Alliance's market transformation efforts, funded by Energy Trust, accounted for the remaining share of total savings and generation. Savings from Northwest Energy Efficiency Alliance's long-term market transformation activities were removed from analysis because they do not directly and immediately impact individual utility customers.

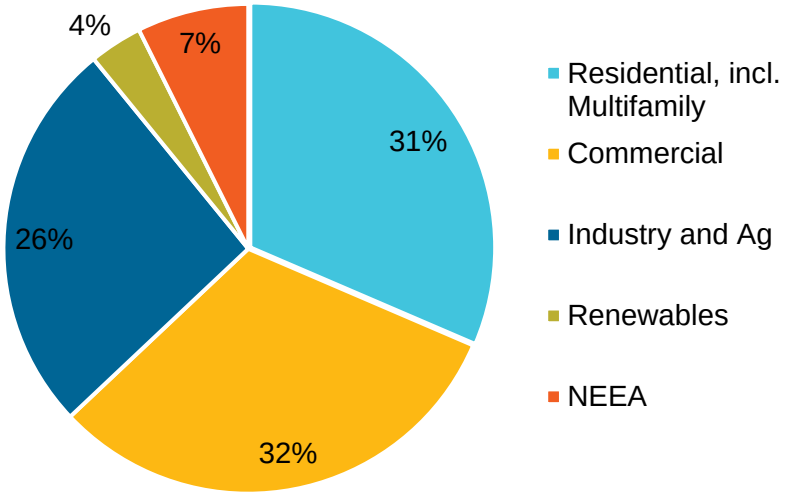


Figure 1: Energy Trust Savings and Generation by Program Sector (in MMBtu), 2013-2017

This report presents the results of our diversity, equity and inclusion participation analysis within each program sector.

1.4 Overview of Demographics for All Oregon Residents

Table 1 provides an overview of the demographics in Oregon. Residents of Oregon are predominantly white and have fairly modest median incomes. Oregon has relatively low population density compared to other states.

Table 1: Oregon Demographics[2]

White, not Hispanic/Latino	75.8%
Hispanic or Latino, all races	13.1%
Asian	4.7%
Two or more races	3.8%
Black or African American	2.2%
American Indian and Alaska Native	1.8%
Native Hawaiian or other Pacific Islander	0.4%
Median household income	$53,270
Persons in poverty	13.2%
Population per square mile	39.9

[2] Federal Statistical Agencies. (2018) U.S. Census Bureau QuickFacts: Oregon. Retrieved November 29, 2018, from https://www.census.gov/quickfacts/or. The data adds up to more than 100% because the census asks individuals to identify as both Hispanic or Latino ethnicity and, separately, as one or more of the race categories.

2. Methodology for diversity, equity and inclusion indices

2.1. Geographic analysis approach and limitations

We opted for a geographic analysis for several reasons. First, we did not have access to household-level demographic data. Energy Trust does not currently collect demographic information about participants because it could be perceived by customers as a barrier to participation.

Second, third-party household-level demographic data has significant limitations. Because third-party demographic data is a snapshot in time, it may not indicate the race/ethnicity or income of past participants since household and business ownership and occupancy change over time. Additionally, households with low-incomes may not use credit cards and therefore may not be represented in customer-level data sources, such as Experian data on household-level demographics derived from credit applications). Another consideration for third-party household level data is that assignments of race and ethnicity are largely unverified. A 2017 study found that only 29 percent of surveyed consumers found third-party data about them to be at least 50 percent accurate or better[3]. Similarly, a ChoiceStream study found that about one-third of the time, data vendors disagreed on assigning a specific gender to a person.[4]

Given these concerns about third-party household level demographic data, we selected geographic analysis based on census data. Census data is readily available and more accurately represents the income level and race and ethnicity of residents. Although there are well-documented issues with undercounting members of non-white race and ethnicity categories[5], census data are widely used for reporting on race and ethnicity, as it is collected through a direct survey of the entire population. Because census data is readily available, this analysis will be repeatable and useful for other researchers[6].

We used census tracts as the unit of analysis because they were the smallest geographic unit available from the Census Bureau's 2012-2016 American Community Survey[7] with reliable data. The American Community Survey is administered annually, and data are available as one-year and five-year estimates. We used the 2012-2016 American Community Survey dataset of combined five-year estimates. The five-year estimates (which represent 60 months of collected data) are the most reliable, are available for all areas and allow for the most precision in small

[3] Deloitte Insights. (2018) *Predictably inaccurate: The prevalence and perils of bad big data*. [online] Available at: https://www2.deloitte.com/insights/us/en/deloitte-review/issue-21/analytics-bad-data-quality.html [Accessed 4 Oct. 2018].
[4] Ross Benes. (2018) Why is third-party data still often wrong? Digiday. Retrieved October 15, 2018, from https://digiday.com/marketing/data-vendors-struggle-gender/
[5] US Census Bureau Public Information Office. (2018) Census Bureau Releases Estimates of Undercount and Overcount in the 2010 Census - 2010 Census - Newsroom - U.S. Census Bureau. Retrieved October 15, 2018, from https://www.census.gov/newsroom/releases/archives/2010_census/cb12-95.html
[6] A recent study from Coalition of Communities of Color, *Leading with Race: Research Justice in Washington County*, addresses the need to position communities in the center of discussions and analysis that uses quantitative data from the US Census. See Appendix __ for more information on the CCC research justice framework and CBO engagement.
[7] https://www.census.gov/programs-surveys/acs/

geographic areas. We analyzed census tracts within Energy Trust's electric and gas service territory[8].

Census tracts typically contain 1,000-2,500 households, have relatively homogeneous demographic compositions, and due to their size and use of major roads and geographic features as boundaries, are a good proxy for communities. To determine if a given census tract was urban or rural, we utilized the U.S. Department of Agriculture's Rural-Urban Commuting Area codes.

A notable limitation of geographic analysis is that we cannot make a direct link between community-level participation and the demographics of participants. We can only say that communities with certain demographic characteristics participated in Energy Trust programs at a particular rate. We cannot assume that Energy Trust participants are part of a demographic group or even that they are representative of the community they reside in.

2.2 Diversity Indices

The first step in performing geographic analysis was to create demographic indicators (indices) using data from the U.S. Census and from the U.S. Department of Agriculture that describe census tracts on three dimensions: urban versus rural, household income, and racial and ethnic diversity.

Each census tract was then assigned a 1-5 score for each of these three indices. The tracts with the most rural, most non-white and lowest-income residents were scored as 5. The tracts with the most urban, most white and highest-income residents were scored a 1. We compared those scores to participation rates to determine if communities with different demographic characteristics participate at different levels.

2.1.1. Income Diversity Index

The income diversity index is a measure of affluence calculated using data from the American Community Survey on adjusted median income[9] and average housing burden[10] for each census

[8] For a map of Energy Trust service territory see Appendix 1.2
[9] Based on the Pew Research Center methodology for adjusting income by household size. Appendix B: Adjusting Household Income for Household Size | Pew Research Center. http://www.pewsocialtrends.org/2011/10/03/appendix-b-adjusting-household-income-for-household-size/
[10] Total Housing Cost/(Adjusted Median Income/12) *100

tract in Energy Trust's service territory. The distribution of these variables across Oregon census tracts is shown below in Figure 2.

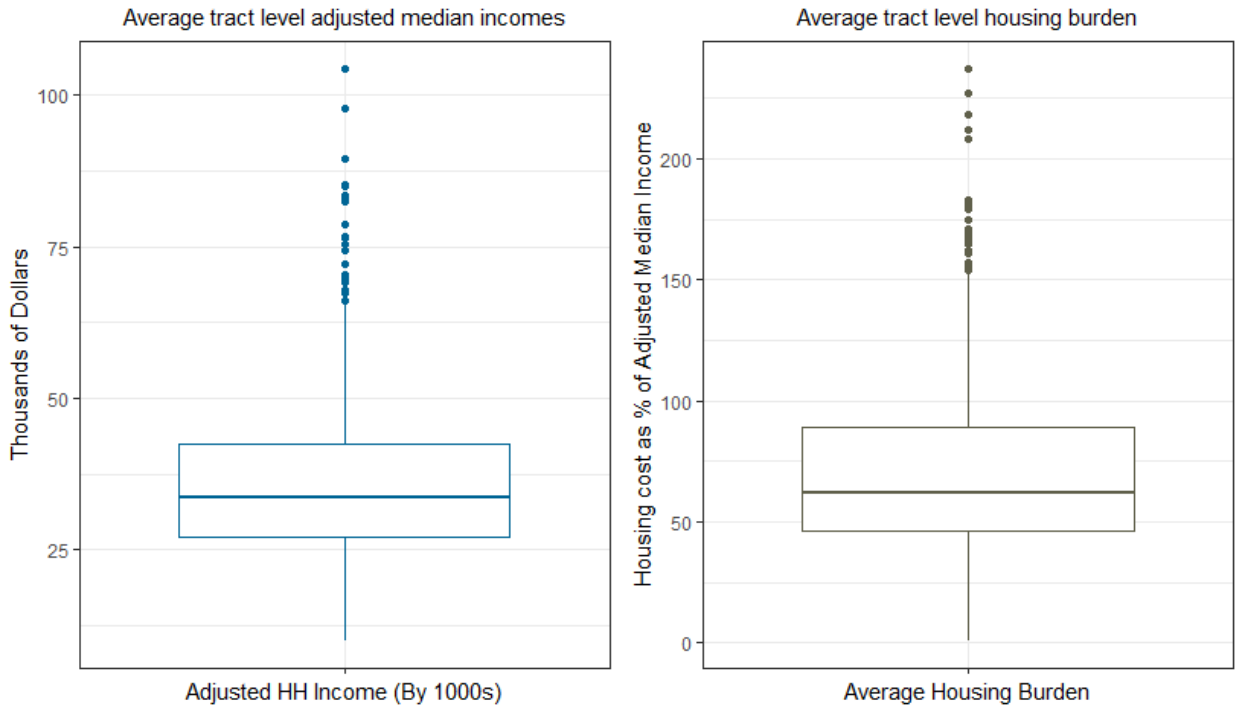


Figure 2: Distribution of Income Index variables

Those tracts were grouped into quintiles for each variable and assigned a 1-5 score corresponding to each quintile—that is, the highest 20 percent of census tracts by adjusted median income were assigned a score of one, the next 20 percent were assigned a score of two, and so on. For the average housing burden, the tracts with the lowest burdens were assigned a score of one and the highest were assigned a score of five.

Using both adjusted median income and housing burden, the most affluent tracts receive a score of one and the least receive a score of five. Finally, those variables were averaged and again assigned a final 1-5 income index score. The distribution of tracts by this index is found in Figure 3. while most tracts tend to be of average affluence (three), with the fewest tracts in the most affluent group. Figure 4 displays the geographic distribution of income index scores across the state, with the callout showing the Portland area in more detail.

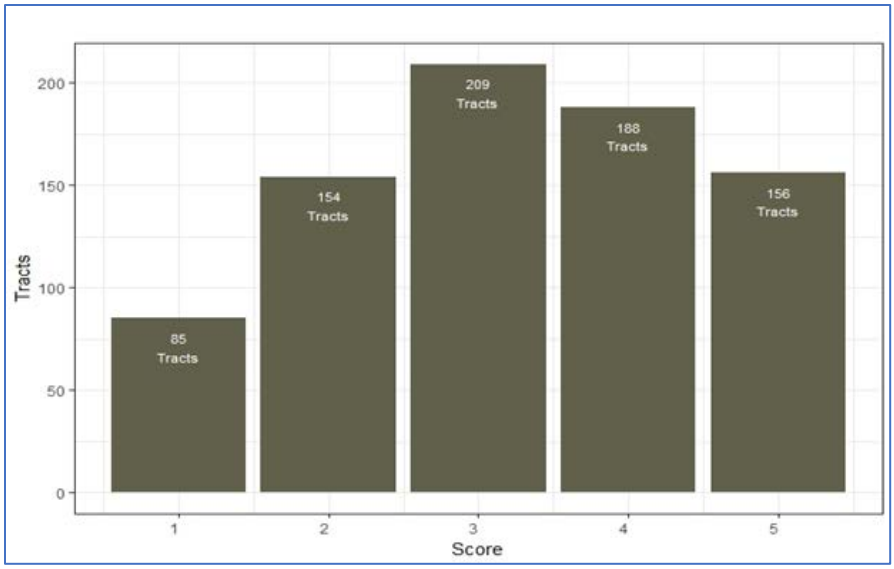


Figure 3: Distribution of Census Tracts by Income Index Score

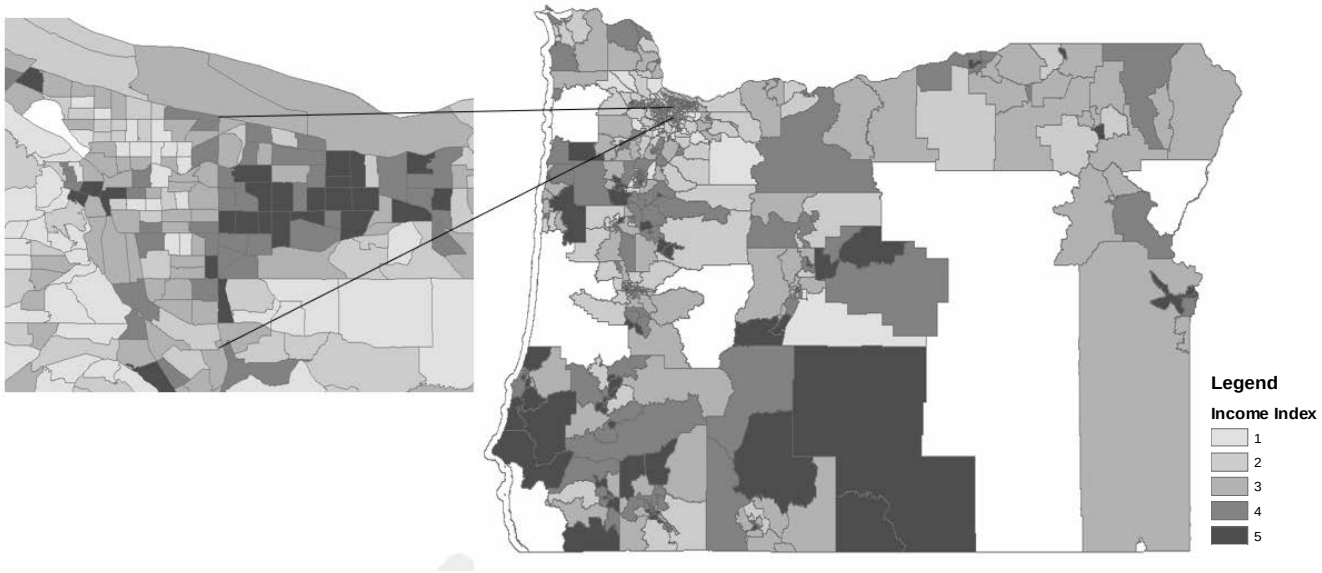


Figure 4: Income Index for All Energy Trust Census Tracts (Note: Areas in white are outside of Energy Trust's service territory)

Looking at the two income indices highlights some of the limitations with the methodology. For instance, housing burden is skewed by areas with high concentrations of college students and/or retirees without a verifiable income source, such as in the Eugene tract that encompasses the University of Oregon. These groups are categorized as lowest-income, which might not reflect the reality of the community.

2.1.2. Racial Diversity Index

The racial diversity index is a measure of prevalence of communities of color.

The racial diversity index was also constructed using variables from the Census Bureau's American Community Survey. The race and ethnicity variables included are listed in Table 2.

Table 2: ACS Race and Ethnicity variables

ACS Variable Code	Variable Description
B02001001	Total
B02001002	White Alone
B02001003	Black or African American Alone
B02001004	American Indian and Alaska Native Alone
B02001005	Asian Alone
B02001006	Native Hawaiian and Other Pacific Islander Alone
B02001007	Some Other Race Alone
B02001008	Two or More Races
B03003003	Hispanic or Latino

There are only a handful (7) of race categories represented in census data, and those categories don't fit everyone. Prominent examples are people from India, North Africa and the Middle East. Indians generally identify as Indian, but the Census Bureau doesn't provide that option and classifies them as Asian. When a race category that groups identify with isn't provided, they often select Other.[11]

To arrive at the racial diversity index, we first calculated individual race/ethnicity categories as a percentage of the total population in every census tract in Energy Trust's service territory. Next, we combined individual race/ethnicity categories to construct a single variable indicating the percent of people of non-Caucasian race, using the formula in Equation 1 below.

Equation 1: Calculating the Percent of People of Non-Caucasian Race

% Black or African American + % American Indian & Alaska Native + % Asian + % Native Hawaiian & Other Pacific Islander + % Some Other Race + % Two or More Races = % People of Non-Caucasian Race

Because the Census Bureau uses a separate ethnicity variable to identify Hispanic or Latino people, it is common for people to identify as both Hispanic/Latino and one or more of the race categories. To account for this, we kept Hispanic/Latino as a separate variable and used the higher value between the percent non-Caucasian race and percent Hispanic or Latino ethnicity as the final percent people of color for each tract. For instance, if a tract had a 25 percent non-Caucasian population and a 50 percent Hispanic or Latino population, the percent People of Color would be 50 percent. In another tract, with 30 percent non-Caucasian and 15 percent Hispanic or Latino populations, the percent people of color would be 30 percent.

Given that the census undercounts people of color and has limited race/ethnicity categories, our methodology aggregated race/ethnicity to create the index. We recommend disaggregating

[11] Despite a decade long push for the inclusion of a Middle East or North American (MENA) category, the Census announced in June 2018 that the 2020 Decennial Census will not include any new race categories. Us Census Bureau. (2018) Memorandum 2018.02: Using Two Separate Questions for Race & Ethnicity. Retrieved October 05, 2018, from https://www.census.gov/programs-surveys/decennial-census/2020-census/planning-management/memo-series/2020-memo-2018_02.html

race/ethnicity categories when possible to better identify gaps in Energy Trust's services to customers.

We calculated the quintiles for the tracts using the percent people of color and assigned each tract a 1 to 5 score corresponding to its quintile. Tracts with a score of one represent the least racially diverse tracts and tracts with a score of five represent the most racially diverse. The geographic distribution of tracts by the racial diversity index is found in Figure 5. The racial diversity index was created using quintiles of percent people of color and so the census tracts are evenly distributed among all five of the scores, as seen in Figure 6.

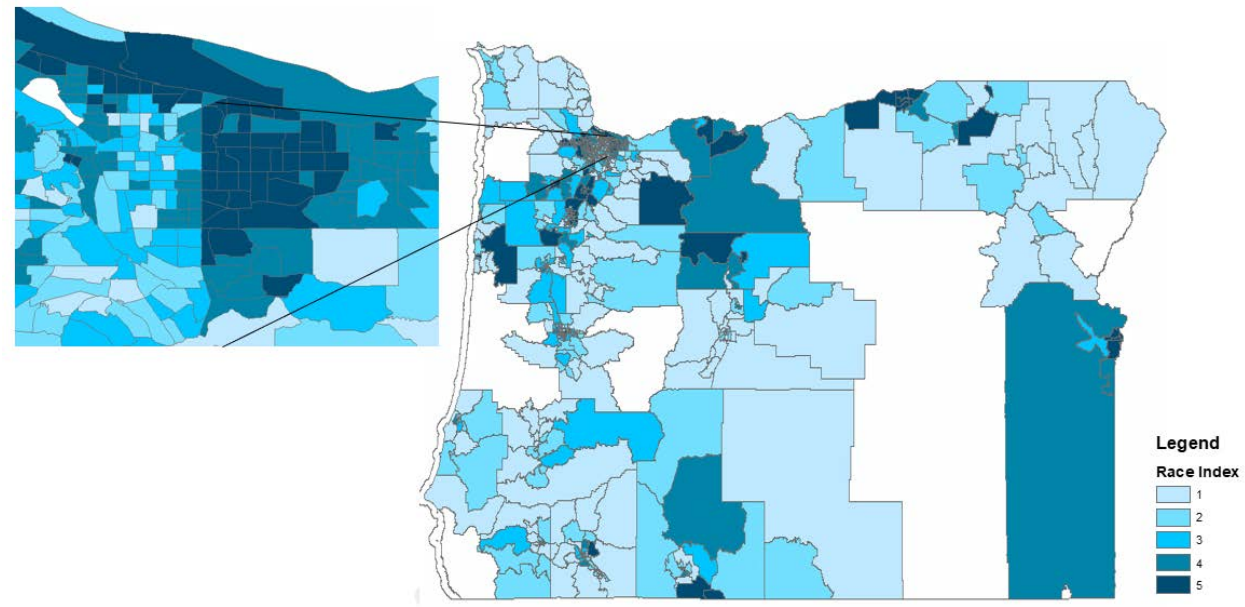


Figure 5: Racial Diversity Index for All Energy Trust Census Tracts (Note: Areas in white are outside of Energy Trust's service territory)

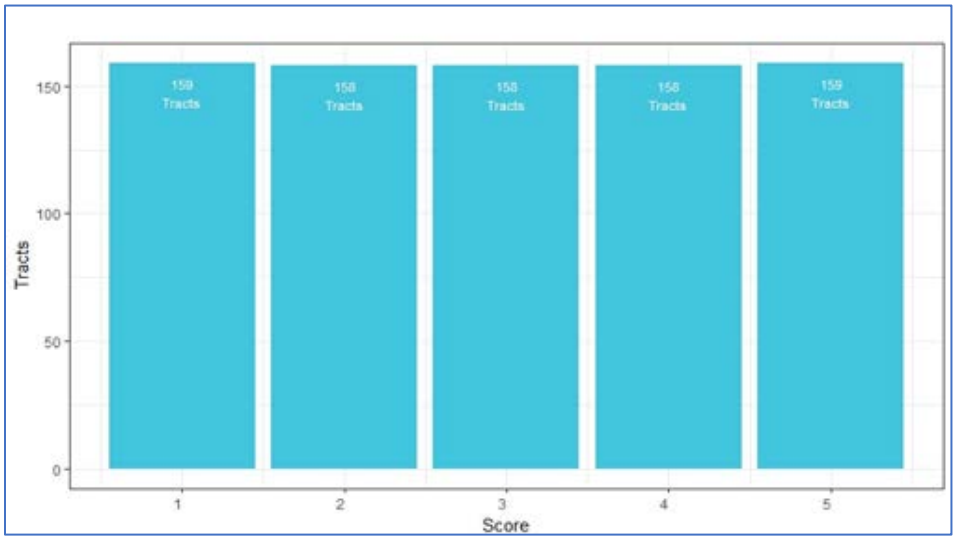


Figure 6: Distribution of Census Tracts in Energy Trust's Oregon service territory by Racial Diversity Index score

The most racially diverse tracts (scores of 5) have proportions of people of color ranging from 25 percent to 93 percent. Figure 6 shows a boxplot with the distributions of each variable. The box represents the middle 50 percent of census tracts based on the percent of people in each racial/ethnic group. Fifty percent of census tracts have populations of people of color between about 10 and 20 percent. The dots above the boxes are outliers. For instance, the dot at the top of the graph for percent people of color is a census tract that is nearly 100 percent Native American.

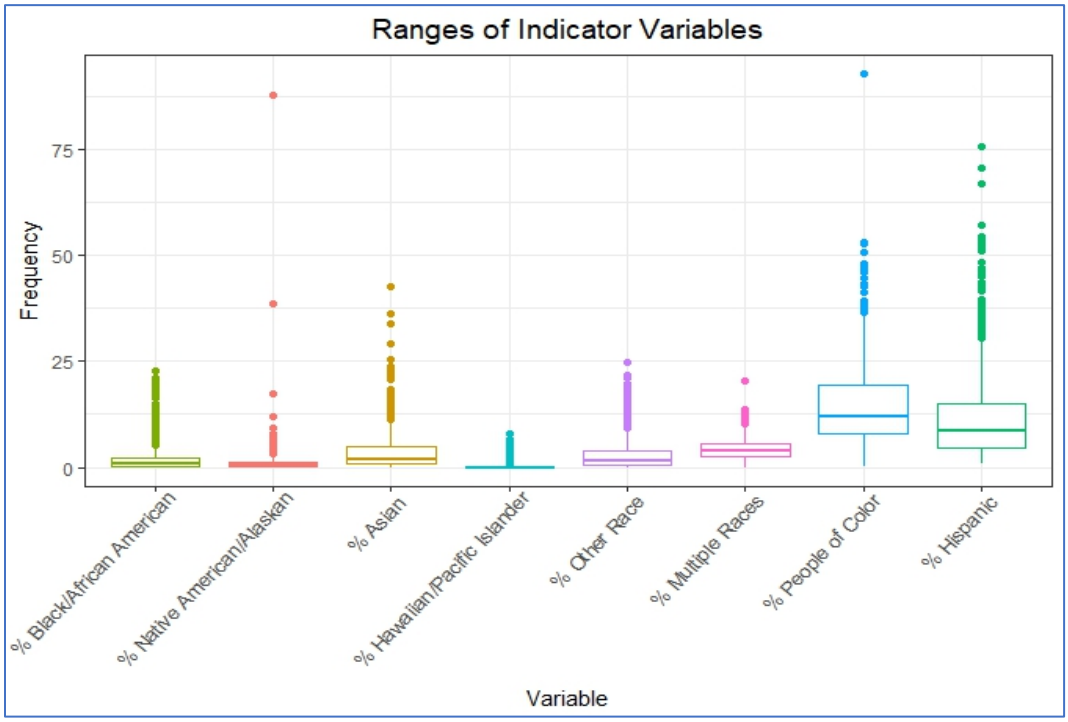


Figure 7: Distribution of Race/Ethnicity variables

While aggregation of races and ethnicities into a single variable is useful for determining overall diversity, understanding differences between individual race/ethnicity groups is essential for understanding why these communities may have been underserved by Energy Trust programs. This is explored further in Section 3 of this report.

2.1.3 Urban-Rural Index

The urban/rural index is a measure of population density and proximity to services and infrastructure.

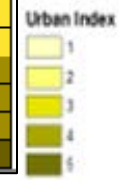
To calculate the urban/rural index, we used the U.S. Department of Agricultural Rural Urban Commuting Area codes. The Rural Urban Commuting Area codes are “measures of population density, urbanization and daily commuting to identify urban cores and adjacent territory that is economically integrated with those cores” [12] on a 1 to 10 scale. This scale allows for nuances between rural and urban areas, enabling us to categorize census tracts as somewhat rural or very rural. To make the Rural Urban Commuting Area scale consistent with the income and race/ethnicity indexes, we consolidated the 10 Rural Urban Commuting Area codes into 5

[12] https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/documentation/

groups. Table 3 shows the 10 Rural Urban Commuting Area codes shaded from light to dark to indicate the 1-5 score we assigned. Scores of 1 indicate the most urban areas and scores of 5 indicate the most rural areas.

Table 3: USDA RUCA Codes

1	Metropolitan area core: primary flow within an urbanized area of 50,000+ (UA)
2	Metropolitan area high commuting: primary flow 30% or more to a UA
3	Metropolitan area low commuting: primary flow 10% to 30% to a UA
4	Micropolitan area core: primary flow within an urban cluster of 10,000 to 49,999 (large UC)
5	Micropolitan high commuting: primary flow 30% or more to a large UC
6	Micropolitan low commuting: primary flow 10% to 30% to a large UC
7	Small town core: primary flow within an urban cluster of 2,500 to 9,999 (small UC)
8	Small town high commuting: primary flow 30% or more to a small UC
9	Small town low commuting: primary flow 10% to 30% to a small UC
10	Rural areas: primary flow to a tract outside a UA or UC



Because census tracts contain similar numbers of households, the tracts in densely populated urban areas (i.e. Rural Urban Commuting Area codes of 1) represent much smaller areas. As a result, most of Oregon census tracts are at the urban end of this scale (shown in Figure 8).

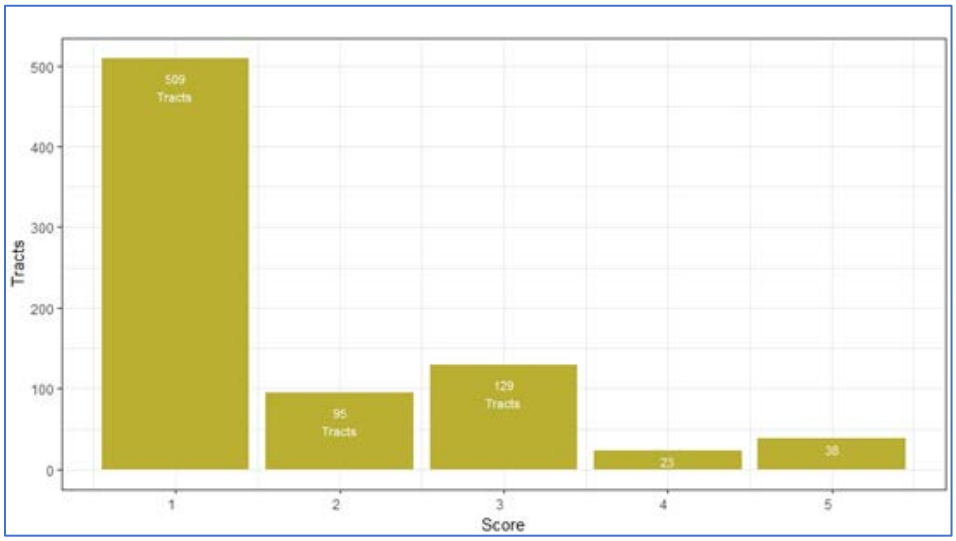


Figure 8: Distribution of Census Tracts in Energy Trust's Oregon service territory by Urban-Rural Index score

Though they make up a small portion of the total tracts, those assigned a score of five account for 50 percent (36,000 sq. miles) of the total land area within Energy Trust's Oregon service territory, compared to just 3 percent (2,300 sq. miles) for those assigned a score of one. The opposite is true when looking at the housing stock in the most rural and most urban areas. For example, 72 percent of all residential sites are in census tracts assigned a score of one (found mostly along the I-5 corridor as shown in Figure 9) and just two percent are in census tracts assigned a score of five, as seen in Table 4. Similarly, 70 percent of commercial sites and 53 percent of industrial sites are in the most urban areas compared to three and seven percent respectively in the most rural areas.

Table 4: Number and percent of residential sites, by urban-rural index

Urban-Rural Index Score	Residential Sites	Percent of Sites
1	1,026,000	72%
2	30,000	9%
3	205,000	14%
4	40,700	3%
5	29,000	2%

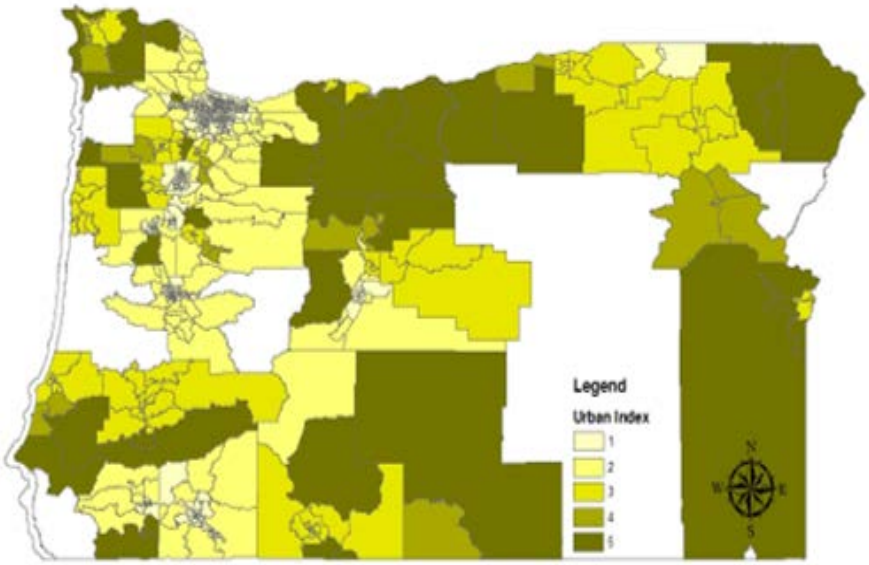


Figure 9: Urban-Rural Index for All Energy Trust Census Tracts (Note: Areas in white are outside of Energy Trust's service territory)

2.1.4 Composite Diversity Index

The composite diversity index is a combination of the income, racial diversity and urban/rural indices. The distributions of the three constituent indices can be seen in Figure 10.

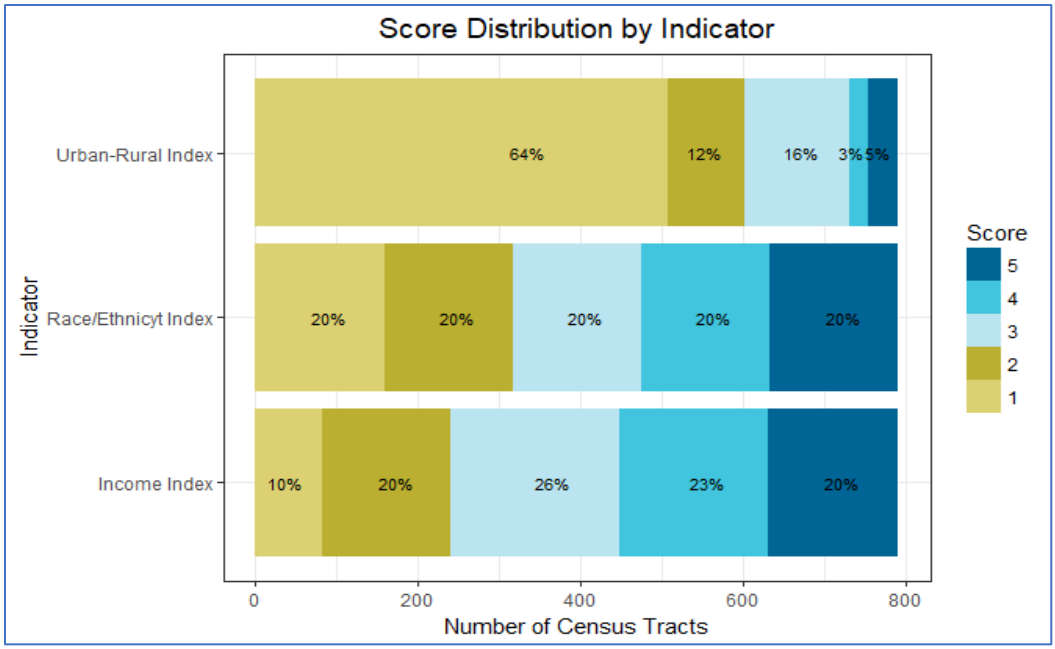


Figure 10: Distribution of Composite Index variables

We combined the three indices to create a composite diversity index to identify areas of the state that are both racially diverse and low income. Using the logic found in Equation 2, tracts were weighted by how rural they are so that census tracts with lower race/ethnicity and income index scores were included if they were sufficiently rural. The goal was to identify areas that represent an intersection of the focus areas called out in the diversity, equity and inclusion operations plan.

Equation 2: Calculating weighted Composite Index scores

If the Urban-Rural Index score is less than 4, then
Raw Composite Score = Average of the Racial Diversity and Income Indexes.
If the Urban-Rural Index score is >= 4, then
Raw Composite Score = Average of the Racial Diversity, Income, and Urban-Rural Indexes

The composite diversity index was constructed using the following logic: once the raw score was calculated, those scores were rounded and assigned a 1 to 5 composite score. Figure 11 shows that the composite index is relatively normally distributed with the majority of census tracts of relatively average affluence and racial/ethnic diversity. Five percent of tracts are the most affluent and least racially diverse, and eighteen percent of tracts are the least affluent and most racially diverse. Figure 12 shows the geographic distribution of tracts with composite scores of 5 across Energy Trust territory in Oregon. It shows that the census tracts assigned a composite index score of five are spread throughout the state, and some of the notable areas are described below.

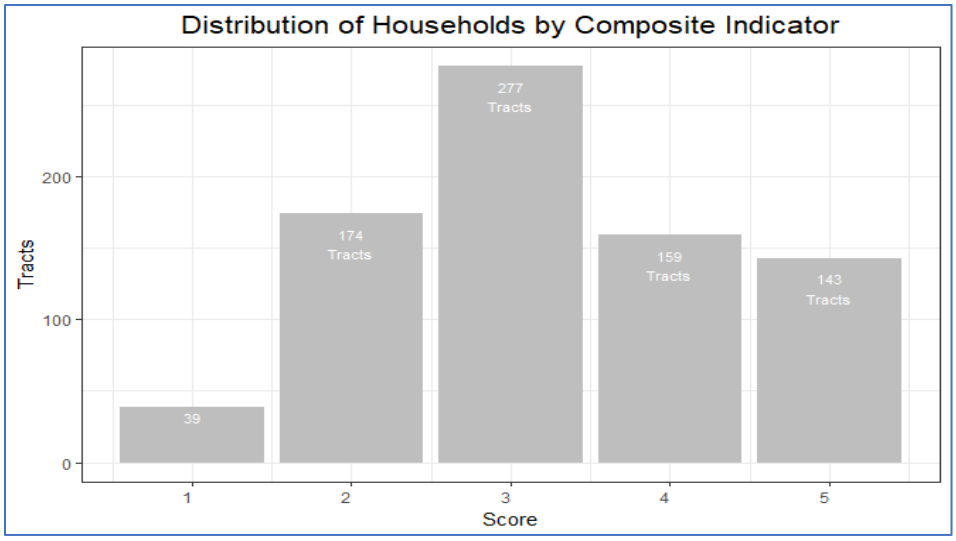


Figure 11: Distribution of Census Tracts in Energy Trust's Oregon service territory by Composite Index score

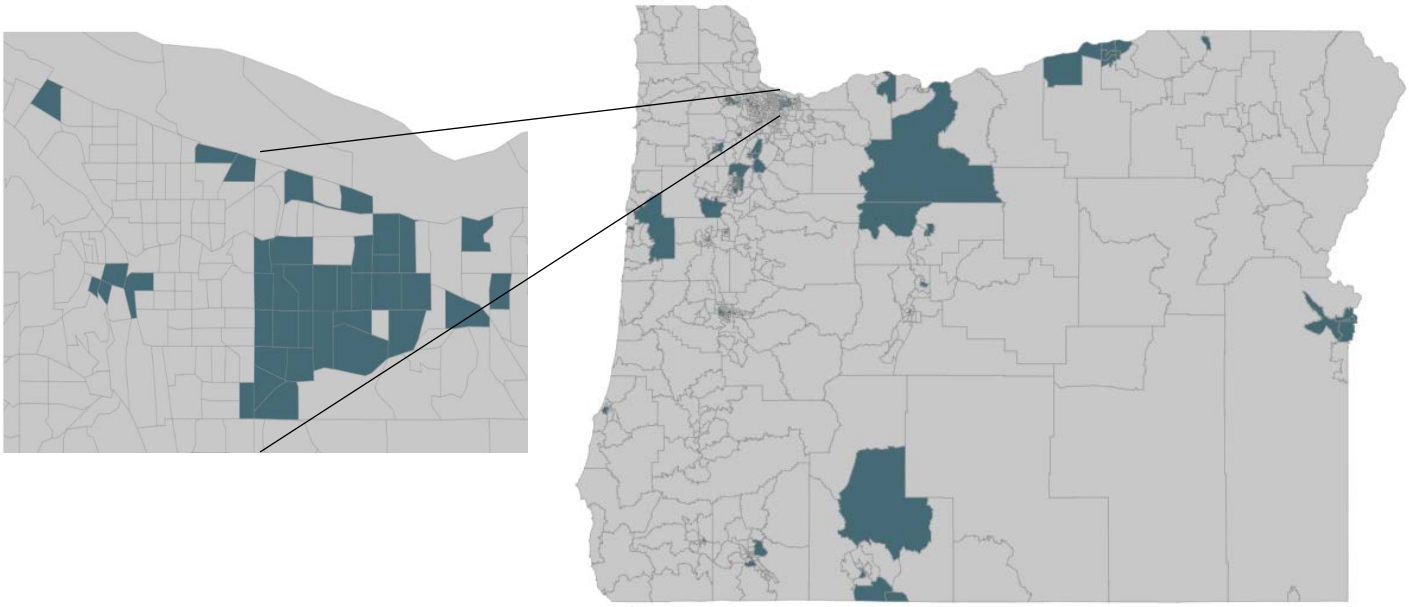


Figure 12: Energy Trust Census Tracts Assigned a Composite Index Score of 5

In Portland, the largest concentration of census tracts with a composite index score of five are in the area between SE 82nd avenue to the west, SE 223rd to the east, NE Sandy Blvd to the north, and SE Foster to the south; there are also areas west of I-205 along N Columbia Blvd. The neighborhoods that contain these diverse census tracts include Cully, Parkrose, Hazelwood, Montavilla, Powellhurst-Gilbert, Lents, Centennial and others. The Centennial, Lents, Powellhurst-Gilbert and Hazelwood neighborhoods were all designated as "poverty hotspots" by the Oregon Department of Human Services Office of Forecasting, Research and Analysis in 2015[13]. An area in downtown Portland also contains diverse tracts, but it is not clear if the

[13] https://www.oregon.gov/dhs/business-services/ofra/Documents/High%20Poverty%20Hotspots%20Multnomah%20Portland%20East.pdf

composite index score is influenced by part-time resident students who attend Portland State University. These areas can be seen in Figure 13.

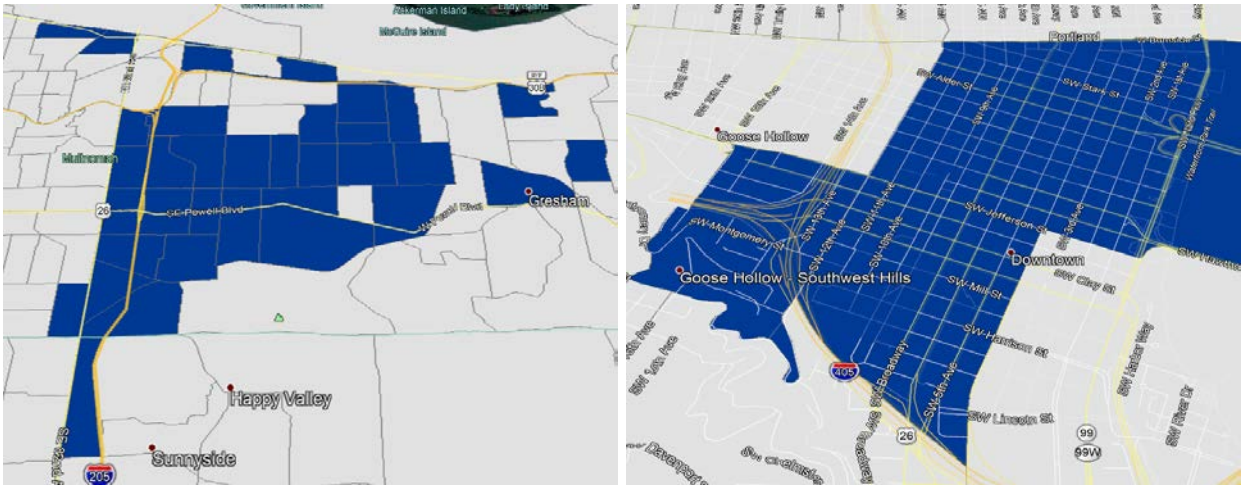


Figure 13: East Portland and Downtown Portland Areas

There are census tracts with a composite index score of five in and around Beaverton, Aloha, Cornelius and Hillsboro, as shown in Figure 14. The area around Cornelius and Hillsboro has a large Hispanic/Latino population with census tracts ranging from 30 to 70 percent Hispanic/Latino. These census tracts are also characterized by relatively low incomes ($17,000 to $33,000 adjusted median household income) and high percentages of renters. The Beaverton and Aloha area is comprised of several diverse race/ethnicities with more than one-in-four people identifying as Hispanic/Latino or some race other than white.

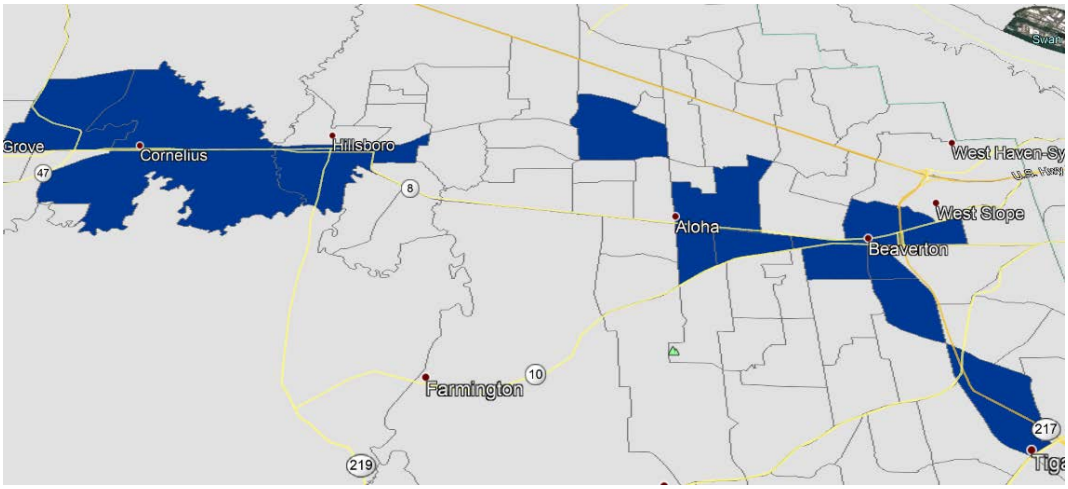


Figure 14: Beaverton and Hillsboro Areas

The areas around McMinnville, Woodburn and Mt. Angel (Figure 15) all have substantial populations of Hispanic/Latino people and people with relatively low incomes. Woodburn has the largest Hispanic population of any city in Oregon.

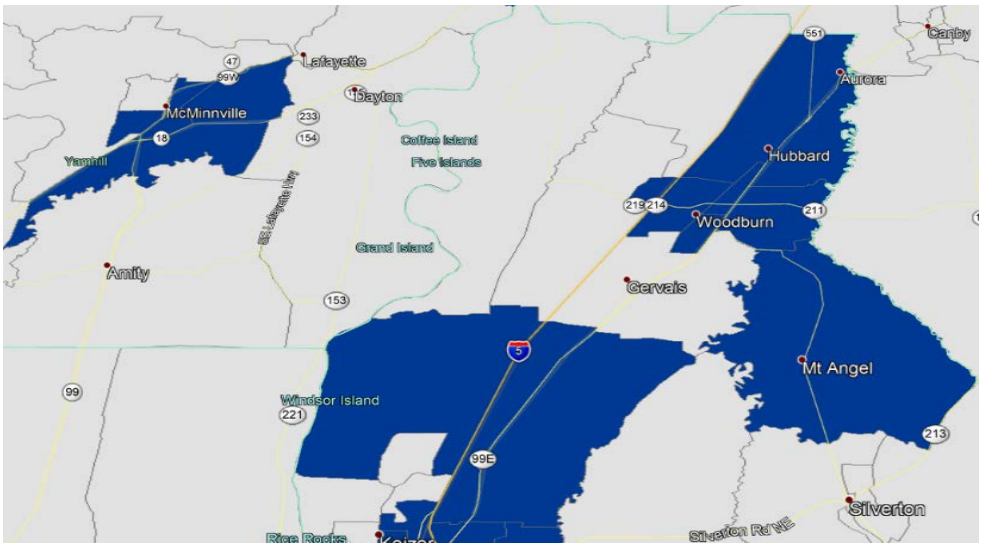


Figure 15: Woodburn Area

The census tracts with the highest proportions of people of color in Oregon are in and near the Warm Springs Indian Reservation (outlined in green Figure 16, left). One tract within the reservation is about ninety percent Native American. The adjusted median income is $20,500 annually. The area around the Siletz Reservation has a similar demographic make-up to the Warm Springs area, though the percent of people of color is lower, largely due to the reservation only accounting for a small portion of the total census tract land area. The Siletz area (outlined in green in Figure 16, right) has 30 percent people of color and has an adjusted median income of $23,000 annually. Both the Siletz and Warm Springs areas have median income levels below the 2018 Federal Poverty Level for households consisting of two people or more ($32,920).[14]

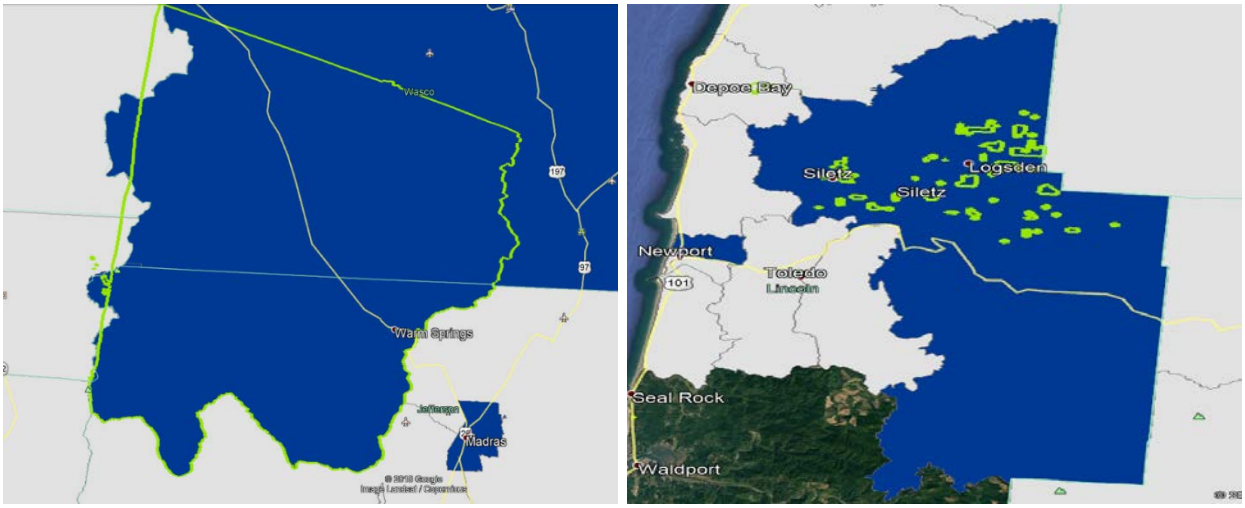


Figure 16: Warm Springs Indian Reservation (left, outlined in green) and Siletz Indian Reservation (right, outlined in green) and Surrounding Areas

[14] https://www.oregon.gov/ohcs/Pages/weatherization-oregon-income-guidelines.aspx

2.1.5 Relationship of Indices

The three dimensions of diversity are correlated in some instances, which impacts how we interpret the results of our analysis. We computed simple Pearson correlation coefficients, which measure the linear correlation between two variables, to better understand how the indexes were intertwined (Table 5).

None of the three primary indices were strongly correlated with one another. However, some weak correlations exist, which may have some impact on the interpretation of results. Tract-level income is weakly correlated with racial and ethnic diversity, meaning that more affluent areas of Oregon tend to be slightly less racially diverse than less affluent areas. The racial diversity index is also weakly inversely correlated with rural geography, meaning that urban areas in Oregon tend to be slightly more racially and ethnically diverse than rural areas.

Table 5: Pearson correlation coefficients between each of the three primary diversity indexes

	Income	Race/Ethnicity	Urban-Rural
Income	1		
Race/Ethnicity	0.21	1	
Urban-Rural	0.16	-0.24	1

2.2 Participation Dataset Site Definition and Attrition

The analysis of eligible sites[15] in Energy Trust's Oregon service territory was based on integrated dataset that combines site-level data from Energy Trust's systems of record (Customer Relationship Management, CRM, and Project Tracking, PT) databases with Utility Customer Information (UCI) data and various third-party data sets.

We removed approximately 73,000 inactive sites from this dataset (sites that have been demolished or are not in use for other reasons) to ensure that we were only looking at sites for which there may still be potential for energy efficiency.

We removed sites that are not connected to a utility account in UCI data *and whose top-level site and all child sites are also not connected to a utility account*[16]. There are a variety of reasons that a site might not be connected to UCI data. Or, put another way, there are a variety of reasons why a site might not appear in the UCI data that Energy Trust receives. This includes duplicate sites, sites outside of Energy Trust's service territory and agricultural sites without clear addresses.

We retained all agricultural sites regardless of whether they are tied to UCI data. Many agricultural sites do not have clear addresses and may not be directly metered. Ideally, these would be children sites of parents (e.g. the farm) that do have verified utility accounts. However, we know that there are a number of sites that are *orphaned,* meaning that there is not a connection between the site and a parent.

[15] A residential site is typically a single unit for single family homes. For multifamily it can be an individual unit, or structure, or group of structures. For Commercial and Industrial it can represent an individual business in a facility, an entire facility, or a group of facilities.
[16] Sites in Energy Trust's CRM system are part of hierarchies. For instance, a single unit in an apartment building is a site. The building itself is also a site and is a "parent" to the individual unit. The "top level site" is the site at the top of a hierarchy.

Table 6: Eligible Energy Trust Sites

Filter Type	Site Count	Attrition
All Sites	1,853,737	0
Active Sites	1,780,541	73,196
Sites with UCI	1,692,781	87,760
2017 Consumption	1,658,770	34,011

We removed sites that did not show energy consumption in 2017 (or whose top-level site did not) were removed. This was again done to remove sites for which there is not future potential. The final counts of eligible Energy Trust sites are found in Table 7.

Table 7: Eligible Energy Trust Sites by Sector

Sector	Count
Residential	1,432,492
Commercial	139,437
Industrial	24,244
Agriculture	12,363

3 Geographic Participation Analysis

This section describes the initial results from analyzing Energy Trust program participation by sector based on the census tract-level indicators described in Section 2 of this report.

- Section 3.1 describes the residential household participation analysis
- Section 3.2 describes the commercial sector participation analysis
- Section 3.3 describes the industrial and agricultural sector participation analysis

3.1 Residential Household Participation Analysis

3.1.1 Analysis Approach

We analyzed participation in Energy Trust programs at 1.4 million residential households in Energy Trust's Oregon service territory and computed the participation rate and average savings per participant site for each census tract. Sites were designated as participants if they received any Energy Trust service or efficiency measure that was completed and recognized in our system of record between 2013-2017.

Residential sites included all single-family homes, rowhomes, attached housing (duplexes, triplexes and fourplexes), manufactured homes and multifamily residences in Energy Trust's integrated dataset that used energy in 2017 and were eligible for Energy Trust services.

A multifamily unit was designated as a participant if the occupants directly participated and completed a measure or if an efficiency project was completed at the building. This meant that energy savings from efficiency projects completed by a multifamily building owner or manager accrued to all the units within the building. These projects include shell improvements, equipment upgrades, efficient appliances, lighting upgrades and other measures.

Including multifamily residences in residential participation analysis introduces some complexity. First, demographics of multifamily residents tend to differ from single-family residents, and multifamily buildings tend to be concentrated in different areas than single-family homes. Second, the measures and services that Energy Trust provides to multifamily buildings are significantly different than for single-family. Because multifamily units tend to be rented, not owned, multifamily building owners and managers handle building and efficiency upgrades as business decisions. However, multifamily residents typically pay the utility bills, not the building owners and managers. These factors impact how Energy Trust can serve multifamily buildings and residents and the strategies it employs to reach them.

Residential participation was broken into two categories: free measures and capital. Free measures required no investment from the customer and included services like appliance recycling and Energy Saver Kits, which include energy-efficient LEDs, showerheads and faucet aerators provided at no cost to the customers. Capital measures required some level of investment from the customer who received an incentive or rebate from Energy Trust. All efficiency measures supported by Energy Trust that could be tied to an individual residential site were included in the analysis.

Residential participation excluded market transformation savings, events, trainings and midstream measures with incentives paid to manufacturers, distributors and retailers, such as LEDs and showerheads purchased in stores. These measures are excluded because we do not have information to tie these measures to individual sites.

These excluded measures represent half of the savings claimed in Energy Trust's residential sector. Thus, our participation analysis only applies to 50 percent of the residential household program activity. Figure 17 shows the breakdown of residential sector savings by type.

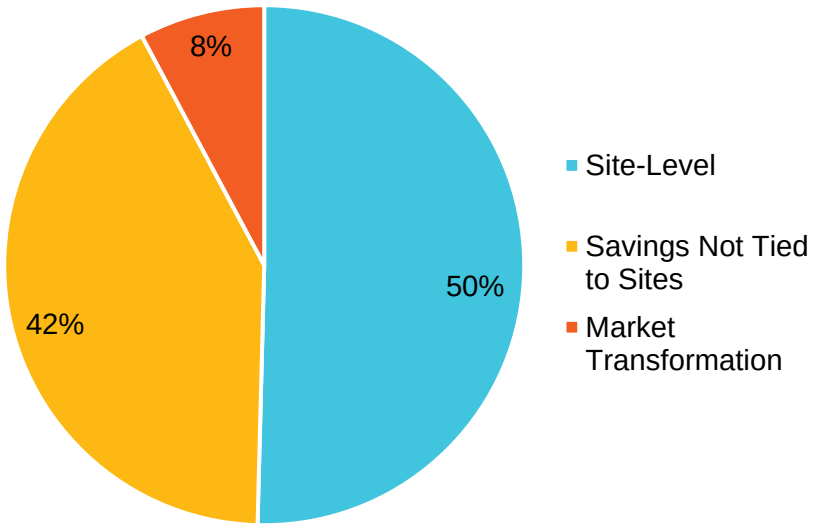


Figure 17: Residential Energy Savings, including Multifamily, by Type (in MMBtu), 2013-2017

The tract-level participation rate was calculated based on the number of residential sites that participated divided by the total number of residential sites in each tract. The average savings per participant site was calculated as the sum of electric and gas savings claimed at residential sites in million BTU (MMBtu) divided by the total number of residential participant sites in each tract. One MMBtu of energy savings is equivalent to 10 therms or 293 kilowatt hours.

We counted participation for the most recent five years of program activity, from 2013-2017. This five-year period aligns with the census data from 2012-2016. This alignment ensured that the number of residential sites did not change dramatically during the analysis period based on construction and demolition of homes. To better understand Energy Trust's cumulative impact on communities in Oregon, we also conducted a secondary analysis looking at program participation rates since Energy Trust's inception, from 2002-2017.

For context, we also computed the 2017 average annual energy consumption in MMBtu per residential site in each census tract. We used this to compare differences in residential energy use between areas with different diversity indicator values. Differences in residential energy use may drive differences in energy savings potential; for example, areas with lower average annual energy consumption may have fewer opportunities to save energy and less cost-effective options. This may in turn impact participation rates and depth of participation (i.e., energy savings per participating site).

A confounding factor in the program participation analysis is service territory type. Energy Trust serves customers of Oregon's five investor-owned utilities: PGE, Pacific Power, NW Natural, Cascade Natural Gas and Avista. Some residents in Energy Trust's service territory are also served by municipal or public utility districts, which are not eligible for Energy Trust services and incentives. We computed participation rates for tracts in each territory type to help understand the impact of this factor.

3.1.2 Five-Year Participation Rates and Energy Savings Per Participant Site (2013-2017)

3.1.2.1 Overall Results

We compared tract-level participation rates and savings per participant site against each diversity indicator to assess how well Energy Trust has served Oregon residents in communities based on race/ethnicity, income and urban-rural location. For each indicator, the participation rate and savings per participant site values were aggregated across tracts with the same indicator score and compared to the overall participation rate as a benchmark.

The overall five-year participation rate for all eligible residential sites in Energy Trust's Oregon service territory was 26 percent (Table 8). Tract-level participation rates ranged from zero to 81 percent. The distribution of participation rates across Energy Trust's Oregon service territory can be seen in Figure 18 below. The participation rate was 18 percent for capital measures and 12 percent for free measures. Table 9 displays the participation rates and counts for all capital and free measures. The overall average energy savings per participant site, for electric and gas saving measures combined, was 3.4 MMBtu for all measures, ranging from zero to over 20 MMBtu per participant site.

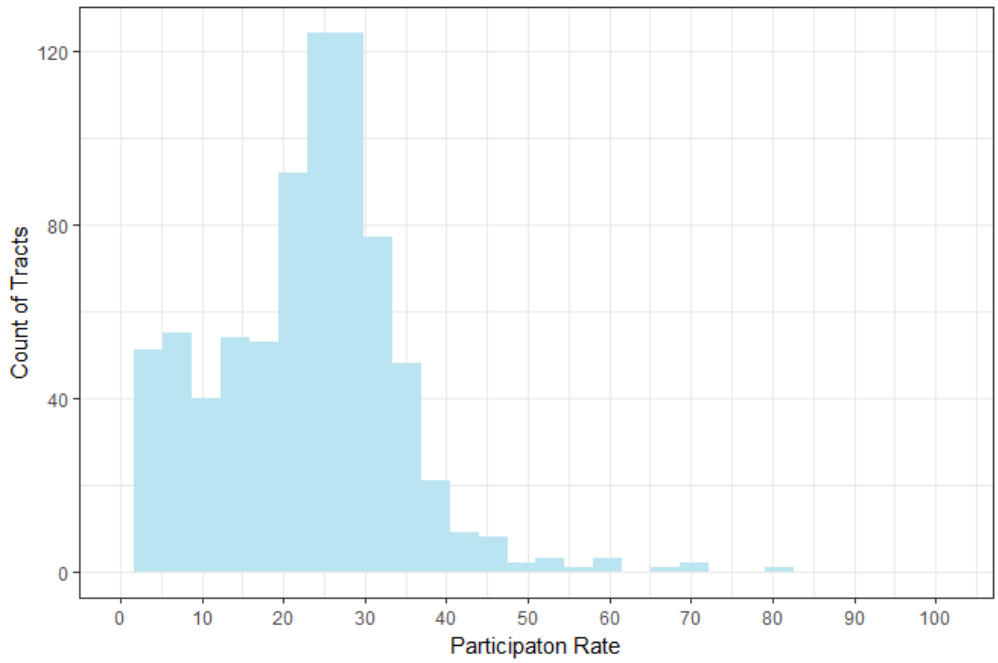


Figure 18: Distribution of five-year residential participation rates for all measures and all tracts in Energy Trust's Oregon service territory

Table 8: Overall five-year residential participation rates and counts for capital and free measures

Type	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
All	26%	369,155	1,060,902	1,430,057
Capital	18%	253,206	1,176,851	1,430,057
Free	12%	174,497	1,255,560	1,430,057

We analyzed the distribution of energy savings per site for all measures across Energy Trust's Oregon service territory, shown in Figure 19. Savings per site shows a much more skewed distribution across tracts. Most areas of the state have relatively low average energy savings per site, with a median of about 2MMBtu and a mean of about 3.5MMBtu, indicating that residents in these areas completed relatively fewer measures and measures that save less energy. In many areas of the state, savings per site is near zero. There are few tracts with higher than average energy savings per site, indicating that it is relatively rare for participants to complete multiple measures or high energy savings measures.

We analyzed the average 2017 annual energy consumption per residential site in MMBtu, including all gas and electric usage, for every tract. Figure 20 shows the distribution of average annual energy consumption per site across Energy Trust's Oregon service territory. Energy consumption is relatively normally distributed with a mean of about 60 MMBtu per residence.

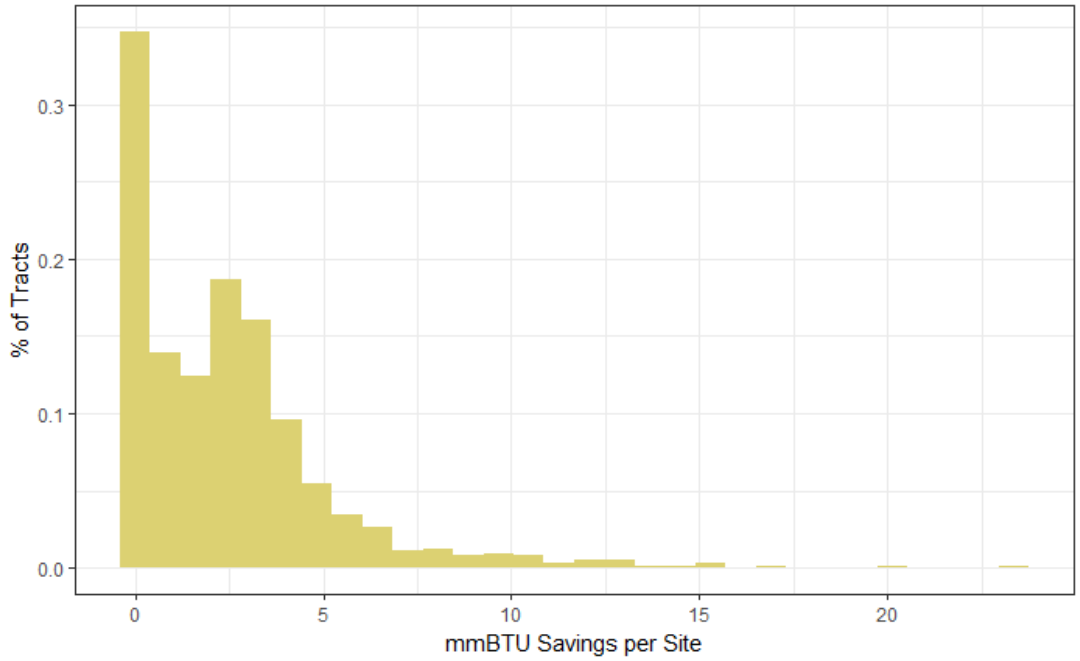


Figure 19: Distribution of five-year average energy savings per residential participant for all measures and all tracts in Energy Trust's Oregon service territory

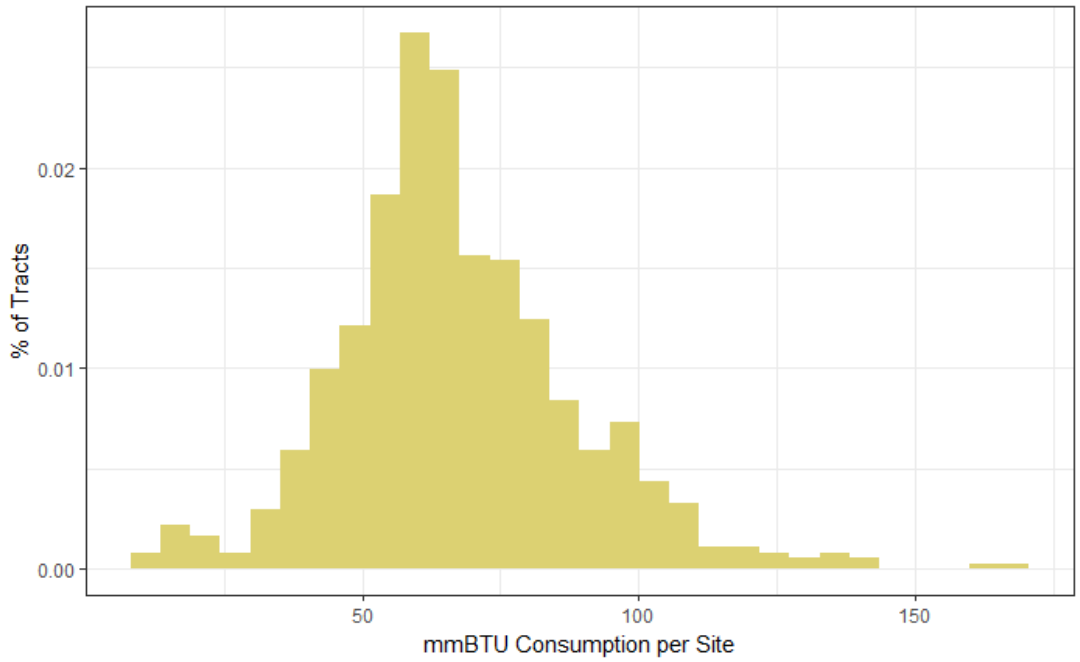


Figure 20: Distribution of average annual energy consumption per residence for all tracts in Energy Trust's Oregon service territory

Service territory type may be a confounding factor when analyzing the effect of the diversity indicators on participation rates and energy savings per site. To help understand the impact of service territory type on program participation, we looked at participation rates for tracts in Energy Trust's gas-only, electric-only and dual fuel territories. In gas-only and electric-only territories, residents are customers by electric or gas municipal or public utility districts, respectively. Customers in gas-only territory are only eligible for Energy Trust measures that save natural gas, and customers in electric-only territory are only eligible for Energy Trust measures that save electricity. In dual-fuel territories, customers are eligible for Energy Trust measures that save both gas and electricity. Energy Trust Figure 21 displays the participation rates by service territory type. Service territory type has a large impact on residential participation rates because customers in gas-only and electric-only territory have fewer energy saving opportunities.

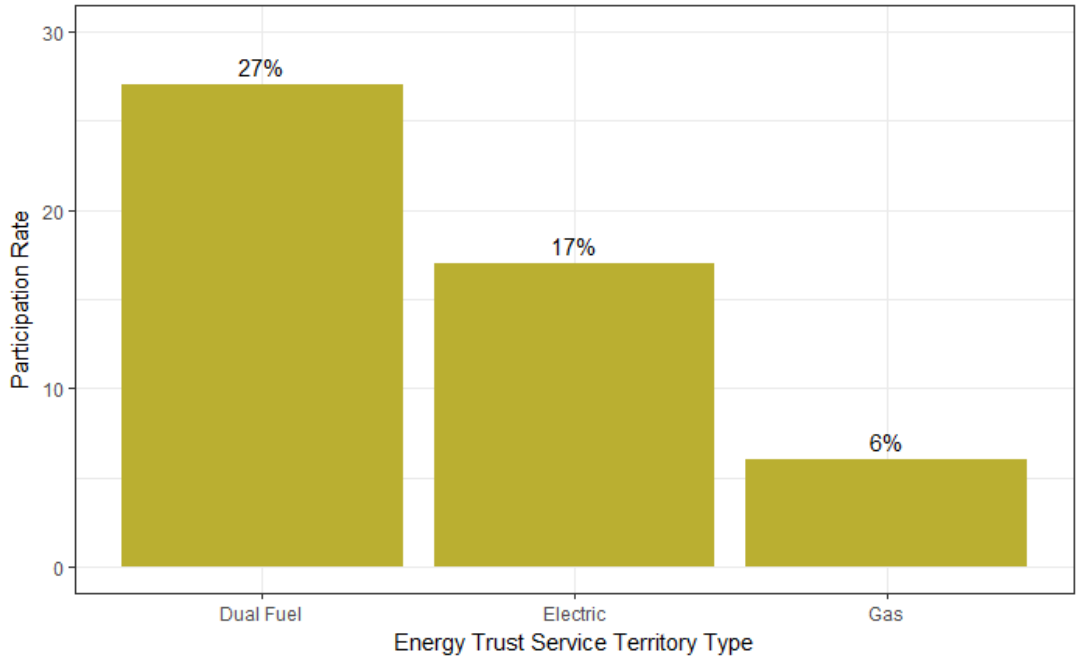


Figure 21: Five-year residential participation rates for all measures, by service territory type

3.1.2.2 Results by Composite Diversity Index

We use the composite diversity score to analyze participation in areas of the state with relatively high proportions of people of color and people with low incomes. Tracts were weighted by how rural they are so that census tracts with lower race/ethnicity and income index scores received a high composite index score if they were sufficiently rural. The goal was to identify areas that represent an intersection of the focus areas called out in the diversity, equity and inclusion operations plan.

In Figure 22, participation rates are broken out by categories of the composite diversity index, where scores of five indicate communities with a relatively high population of people of color and people with low incomes, designated as priority by Energy Trust. These results do not show substantial differences in participation rates between the priority communities and the rest of the state.

Tracts with composite diversity scores of 1, the most Caucasian and most affluent areas in Oregon, had slightly higher participation in free measures, but the difference from the overall rate was small: 14 percent versus 12 percent for the entire Oregon service territory. Overall, 28 percent of households participated in the most affluent and Caucasian areas, compared to 26 percent across the state. Table 9 through Table 11 display the residential participation rates and counts by composite diversity score for all measures, capital measures and free measures.

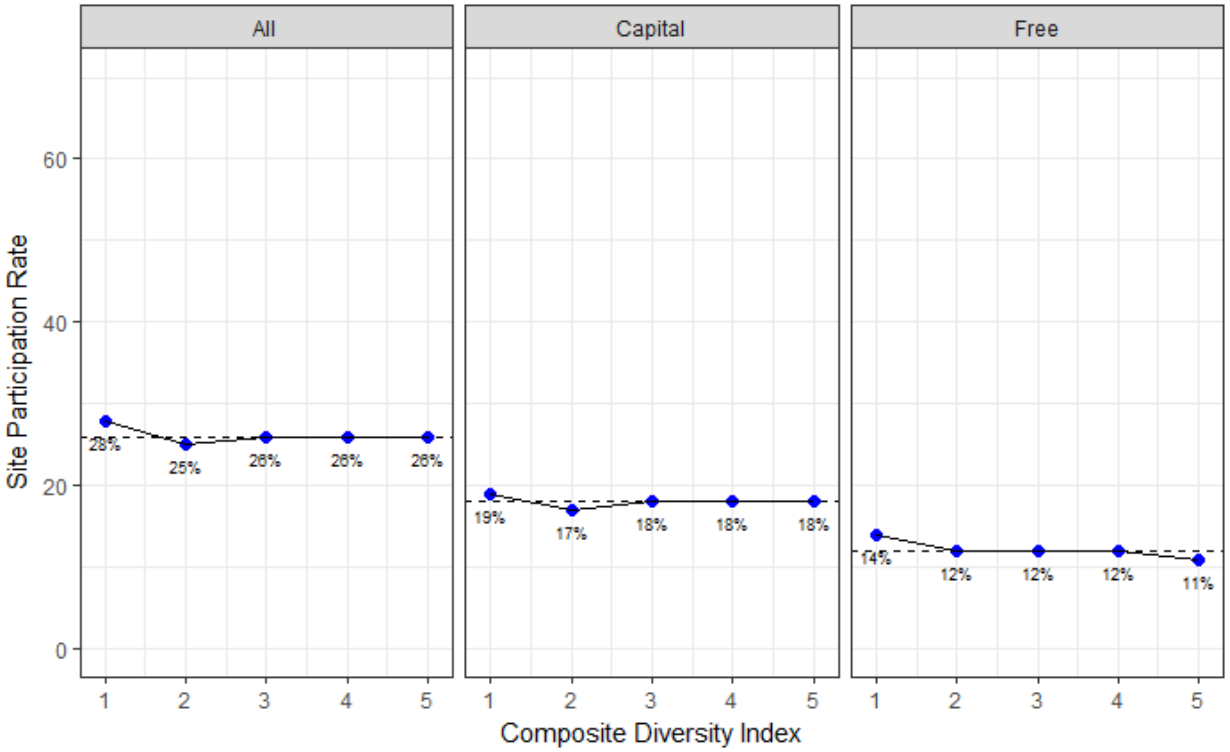


Figure 22: Five-year residential participation rates for all measures, capital measures and free measures, by composite diversity index. The dotted line is the average participation rate for that measure type.

Table 9: Five-year residential participation rates and counts for all measures, by composite diversity index

Composite Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	28%	14,980	39,438	54,418
2	25%	74,228	219,001	293,229
3	26%	129,505	374,572	504,077
4	26%	86,509	242,567	329,076
5	26%	63,933	185,324	249,257

Table 10: Five-year residential participation rates and counts for capital measures, by composite diversity index

Composite Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	19%	10,357	44,061	54,418
2	17%	51,076	242,153	293,229
3	18%	88,426	415,651	504,077
4	18%	59,282	269,794	329,076
5	18%	44,065	205,192	249,257

Table 11: Five-year residential participation rates and counts for free measures, by composite diversity index

Composite Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	14%	7,645	46,773	54,418
2	12%	35,972	257,257	293,229
3	12%	62,148	441,929	504,077
4	12%	40,321	288,755	329,076
5	11%	28,411	220,846	249,257

We also analyzed residential participation, excluding residents of large multifamily buildings (five or more units). Table 12 shows the overall participation rates for all residential sites, residential sites with large multifamily buildings removed, and residential sites in large multifamily buildings. Figure 23 shows these participation rates by the composite diversity index.

Energy Trust has served more households in large multifamily buildings than compared to single-family homes and residents of small multifamily buildings (four units or fewer), primarily through capital projects, some of which reduce energy consumption for all units in a building. When large multifamily buildings were removed from the analysis, the participation rates in more racially diverse, lower income tracts decreased—presumably locations where multifamily buildings are more prevalent.

We were not able to exclude small multifamily buildings because they are classified in Energy Trust's CRM system as single-family homes. We are actively working to improve the classification of multifamily units in our CRM system so that we can perform a separate, in-depth analysis of multifamily participation in 2019 or future years. Another caveat to this analysis is that we do not have any information on the demographic breakdown of residents in each tract between small residential and large multifamily buildings. Splitting apart the sites and participation rates by building type without separating out the demographic data for the residents may yield misleading results.

Table 12: Five-year residential participation rates for all residential sites, residential sites with large multifamily buildings removed, and residential sites in large multifamily buildings

Type	Large MF Only Participation Rate	Single Family and Small MF Participation Rate	All Residential Participation Rate
All	35%	23%	26%
Capital	31%	14%	18%
Free	7%	14%	12%

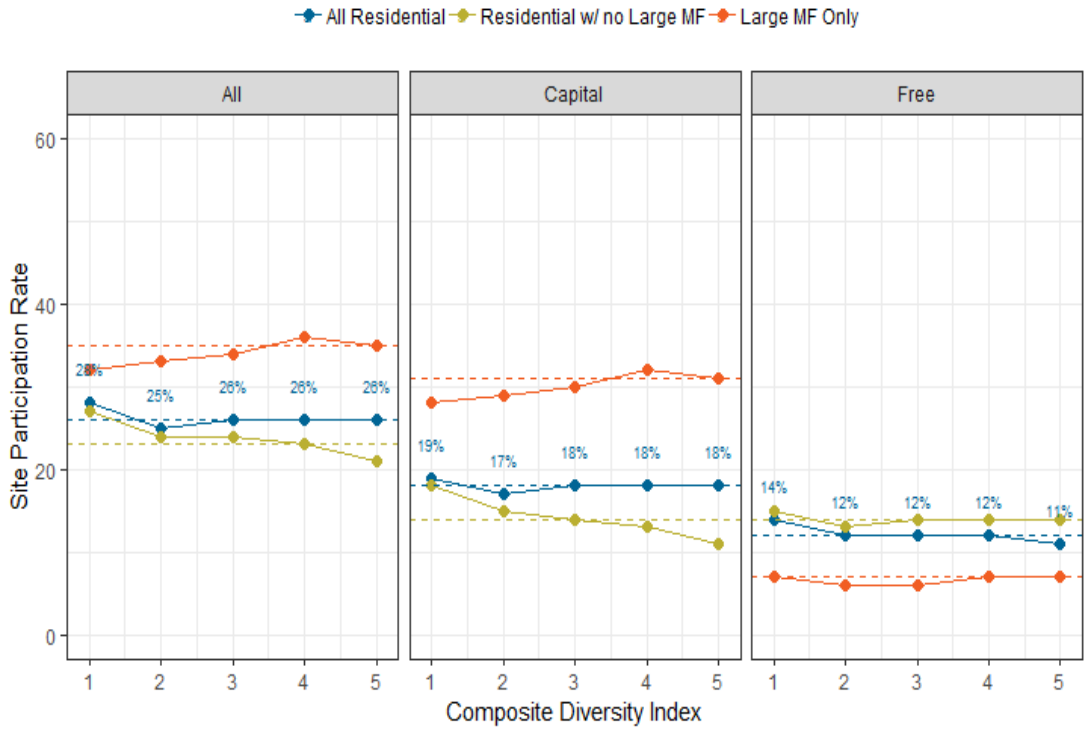


Figure 23: Five-year residential participation rates for all, capital, and free measures, by composite diversity index for all residential sites, residential sites with large multifamily buildings removed, and residential sites in large multifamily buildings

We conducted additional analysis to understand the distribution of participation rates for tracts within each category of the composite diversity index in Figure 24 below. Tracts with a score of one have the highest prevalence of participation rates above 25 percent and a lower prevalence of rates below 15 percent.

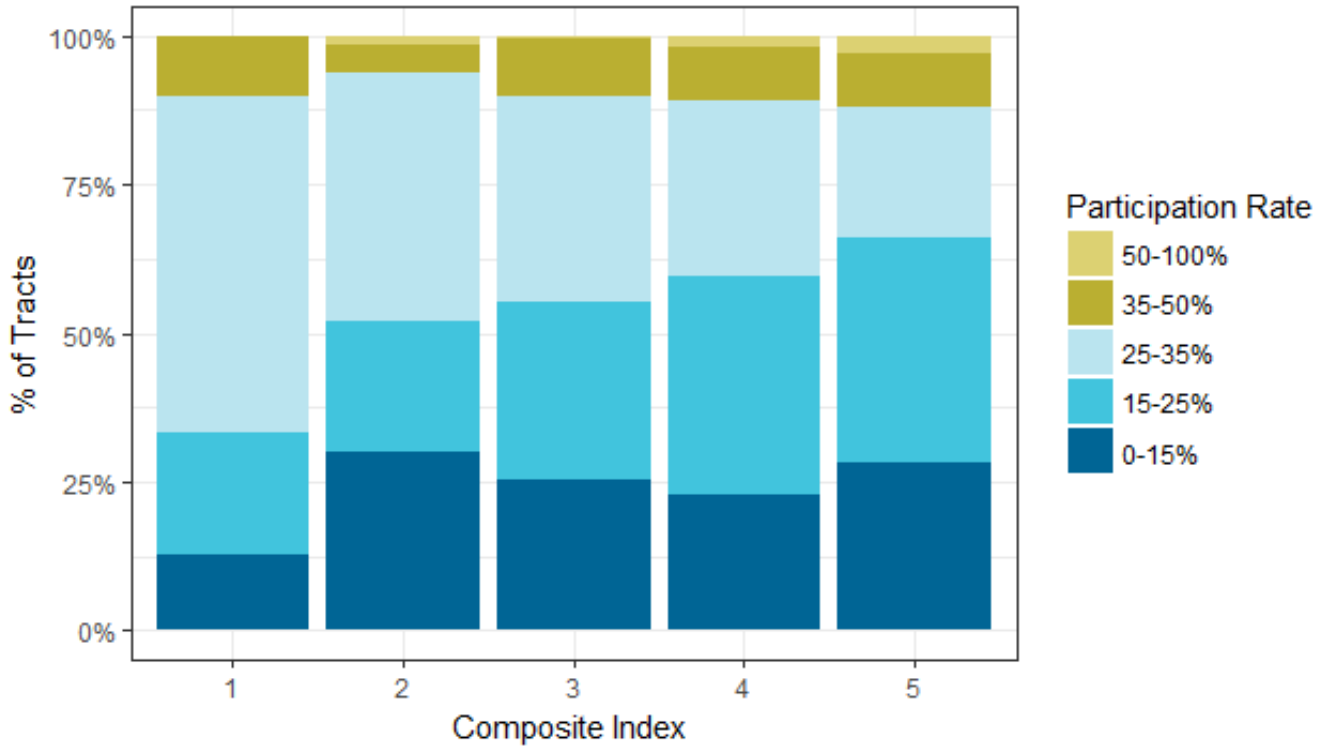


Figure 24: Distribution of five-year residential participation rates for all measures by composite diversity index

We looked at the average energy savings per site to understand how much energy participants saved. Figure 25 shows the average energy savings per site in MMBtu from all measures, broken out by the composite diversity index categories. The participation rate trend is included for comparison purposes. The trend in savings per site across the composite diversity index is relatively flat, but otherwise does not closely match the trend seen in participation rates. Tracts with a composite score of one had slightly higher participation rates than the state overall, however the savings per site were lower than other categories, at 2.9 MMBtu, indicating that participants in the least racially diverse, most affluent tracts installed fewer measures or installed measures that saved less energy. Tracts with a composite score of two and three had the highest savings per site, at 3.8 MMBtu, with similar participation rates to the state overall. Finally, tracts with a composite diversity score of five had the lowest savings per site, at 2.6 MMBtu, indicating that participants in the most racially diverse, least affluent areas completed fewer measures with lower savings.

Household energy consumption may be a confounding factor in the levels of participation. For context, Figure 25 also shows the average annual energy usage per residential site to better understand the savings opportunities. In contrast to the relatively flat trend in participation rates and savings per site for the composite index, we observed a strong linear relationship between energy consumption and the composite index. As the composite score increased, the average annual energy used by homes in those areas decreased. The differences were large, with homes in the least racially diverse, most affluent tracts using 54 percent more energy than homes in most racially diverse, least affluent tracts. This difference in energy consumption did not appear to drive participation rates or levels of program participation across levels of the composite index.

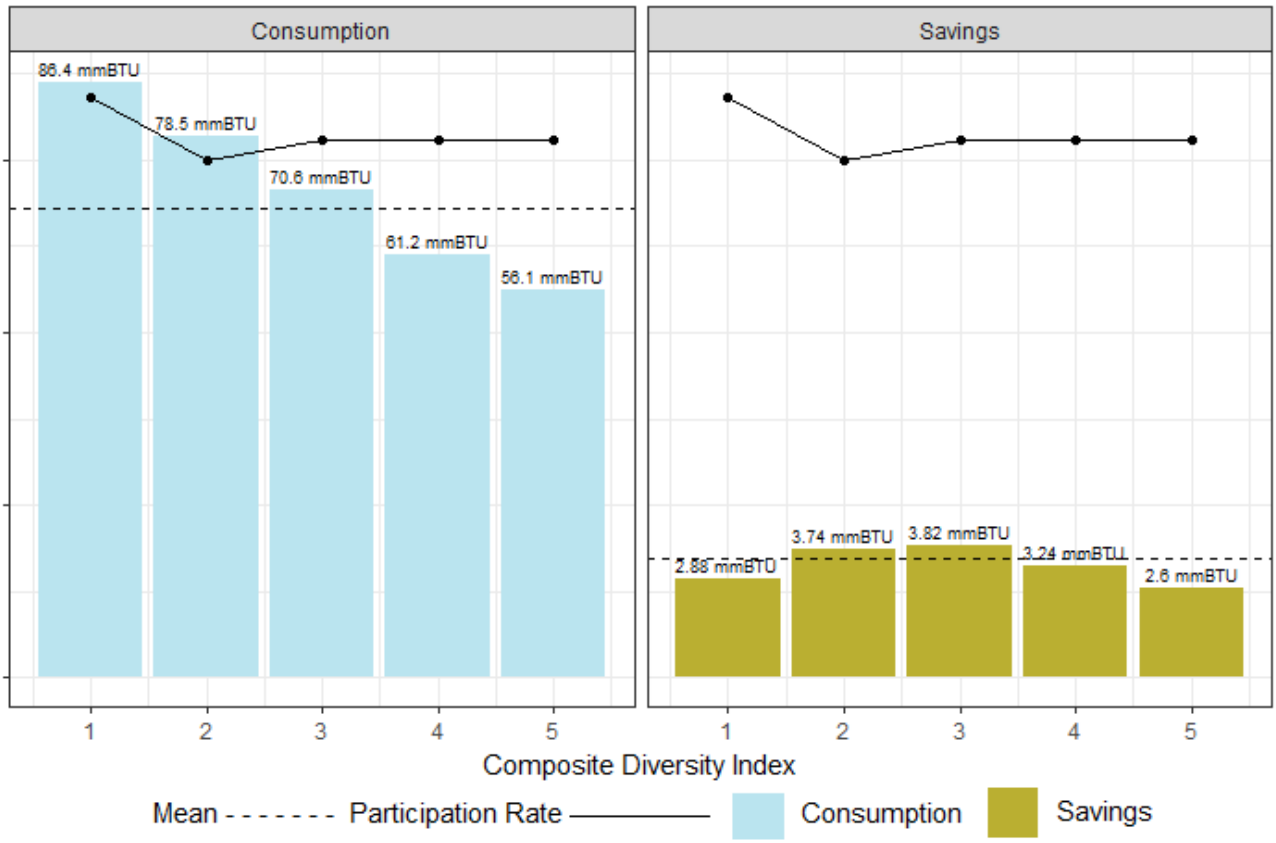


Figure 25: Five-year average energy savings per residential participant and average annual energy consumption per residence by composite diversity index, with the residential participation rate trend line for comparison

It is calculated as:

$$\frac{\textbf{\textit{Savings}}}{\textbf{\textit{Savings + Consumption}}}$$

Table 13 shows the values from Figure 25 and the average penetration rate for each composite diversity index score.

Table 13: Average Penetration Rates by composite diversity index

Composite Diversity Score	Average Energy Consumption (MMBtu)	Average Energy Savings (MMBtu)	Penetration Rate
1	86.4	2.88	3%
2	78.5	3.74	5%
3	70.6	3.82	5%
4	61.2	3.24	5%
5	56.1	2.60	4%

Figure 26 shows that savings per participant are similar between large multifamily and residential sites excluding large multfamily except for in the composite five category. In this category the savings per participant in large multifamily units is considerably lower.

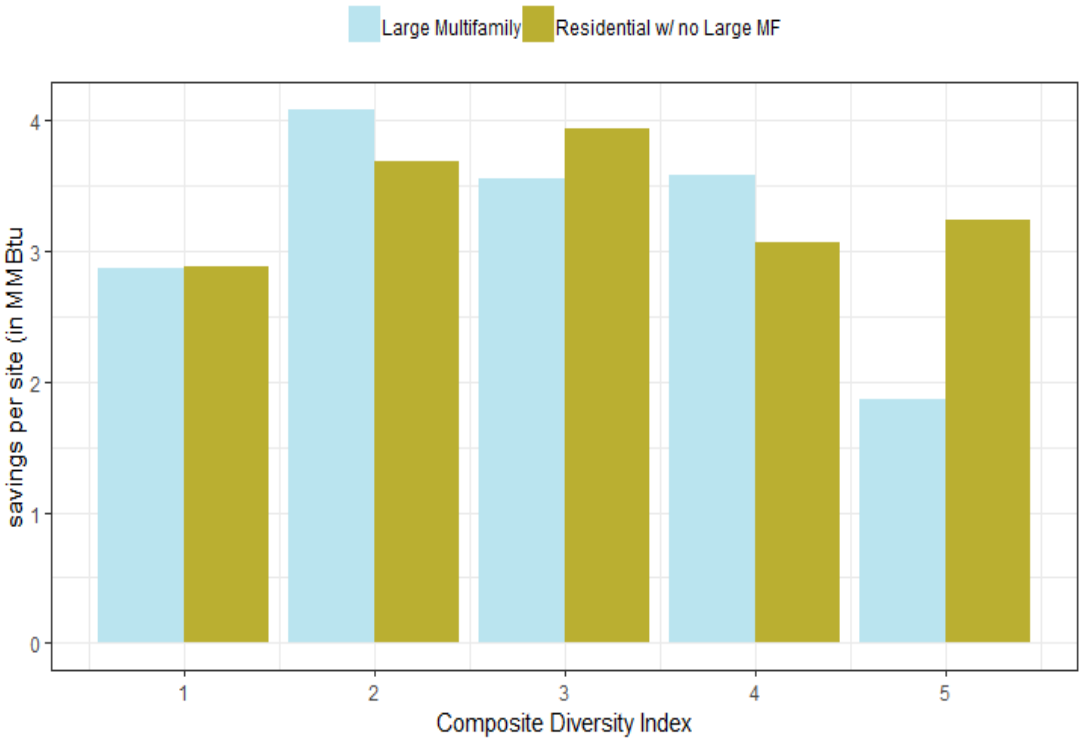


Figure 26: Five-year average energy savings per residential participant by composite diversity index, comparing large multifamily sites and residential sits without large multifamily.

3.1.2.3 Results by Income Index

Participation rates varied more significantly based on the income index, as shown in Figure 27 below. Tracts with an income score of one, the most affluent areas in Oregon, participated in both capital and free measures at slightly higher rates than the overall average. Overall, 30 percent of households participated in the most affluent areas, compared to 26 percent across the whole service territory. Tracts with income scores of four or five, representing the least affluent areas of Oregon, participated at a slightly lower rate than the overall average for capital measures but at a similar rate to the overall average for free measures. Table 15 through Table 16 show the participation rates and counts by income diversity score for capital and free measures.

Households in affluent communities participate with Energy Trust at higher rates than households in low income communities, although the differences are modest.

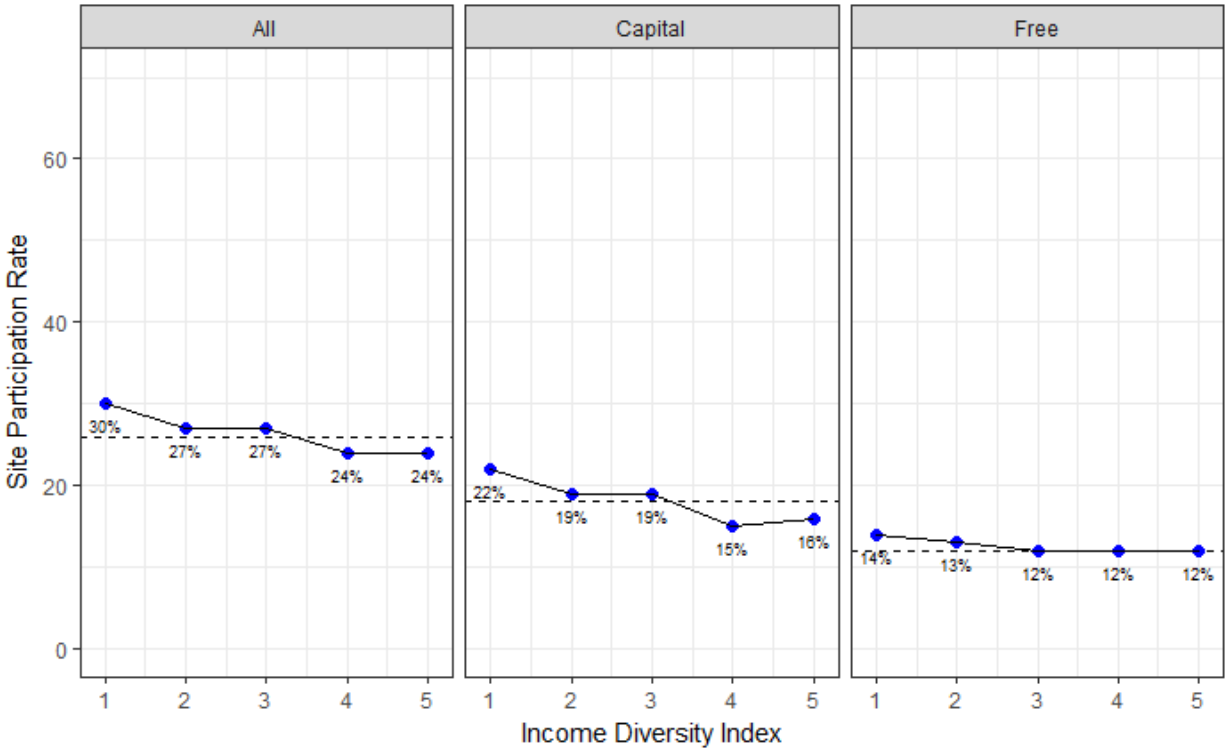


Figure 27: Five-year residential participation rates for capital and free measures, by income diversity index. The dotted line is the average participation rate for that measure type.

Table 14: Five-year residential participation rates and counts for all measures, by income diversity index

Income Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	30%	36,743	84,755	121,498
2	27%	74,525	199,149	273,674
3	27%	100,086	276,633	376,719
4	24%	83,180	268,943	352,123
5	24%	74,621	231,422	306,043

Table 15: Five-year residential participation rates and counts for capital measures, by income diversity index

Income Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	22%	27,152	94,346	121,498
2	19%	52,322	221,352	273,674
3	19%	70,399	306,320	376,719
4	15%	54,051	298,072	352,123
5	16%	49,282	256,761	306,043

Table 16: Five-year residential participation rates and counts for free measures, by income diversity index

Income Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	14%	16,498	105,000	121,498
2	13%	35,340	238,334	273,674
3	12%	45,301	331,418	376,719
4	12%	42,028	310,095	352,123
5	12%	35,330	270,713	306,043

We conducted additional analysis to understand the distribution of participation rates for tracts within each income diversity index category. These participation rate distributions for all measures are displayed in Figure 28, below. Tracts with a score of one have the highest prevalence of participation rates above 25 percent and a lower prevalence of rates below 15 percent.

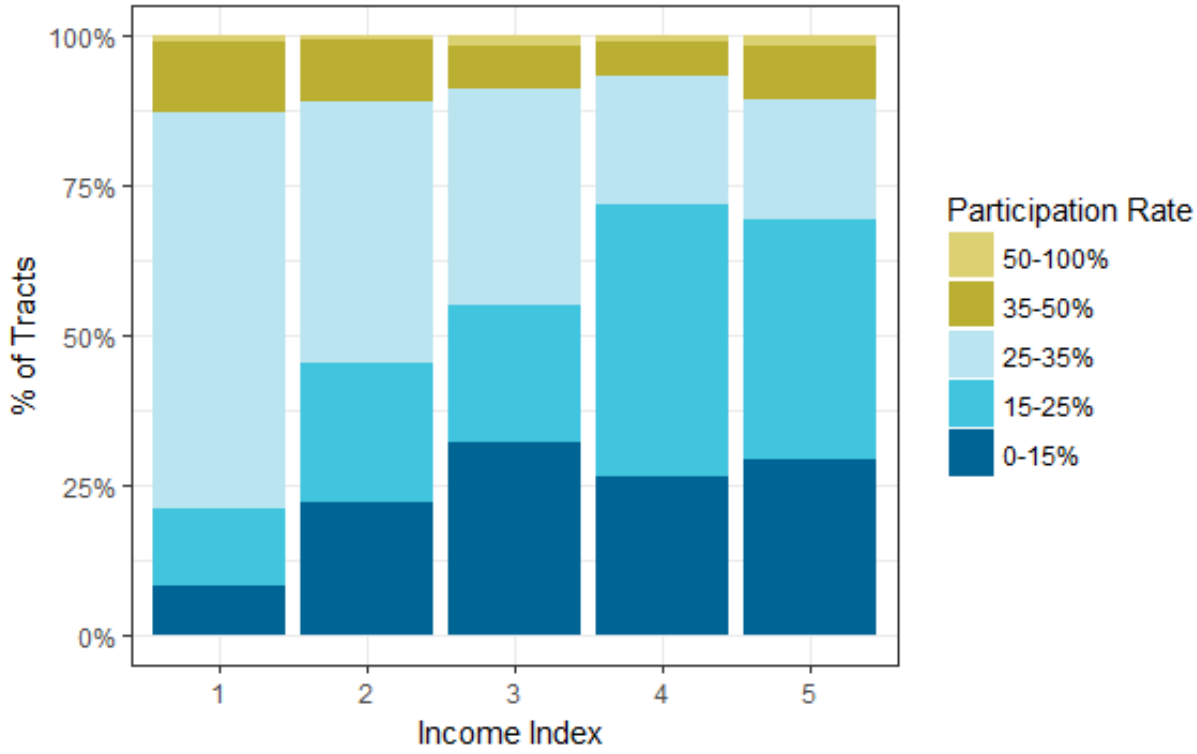


Figure 28: Distribution of five-year residential participation rates for all measures by income diversity index

Tracts with an income score of one saved the most energy per site, at 4.9 MMBtu, indicating that participants in affluent areas tended to complete more measures and measures with higher energy savings than their counterparts in the rest of the state. Figure 29 shows the average energy savings per site in MMBtu from all measures by income index. The participation rate trend is included for reference. Figure 29 shows the average annual energy usage per site as an indicator of potential energy savings. The trend in savings per site generally followed the trend in participation rates, except that the differences between income levels were more accentuated. In contrast, tracts with an income score of five had the least savings per site, at

just 2.1 MMBtu, indicating that participants in low income areas completed fewer measures and measures with lower energy savings.

The trend in annual energy consumption per site across the income index mirrored that of the participation rate and savings per site. As the income score increased and household incomes decreased, the average annual energy used by homes decreased substantially. The differences between categories were large, with homes in the most affluent areas using nearly 70 percent more energy than homes in the least affluent tracts. These differences in energy consumption could be a factor in the differential participation rates and savings per site because less affluent areas appear to have lower energy savings potential.

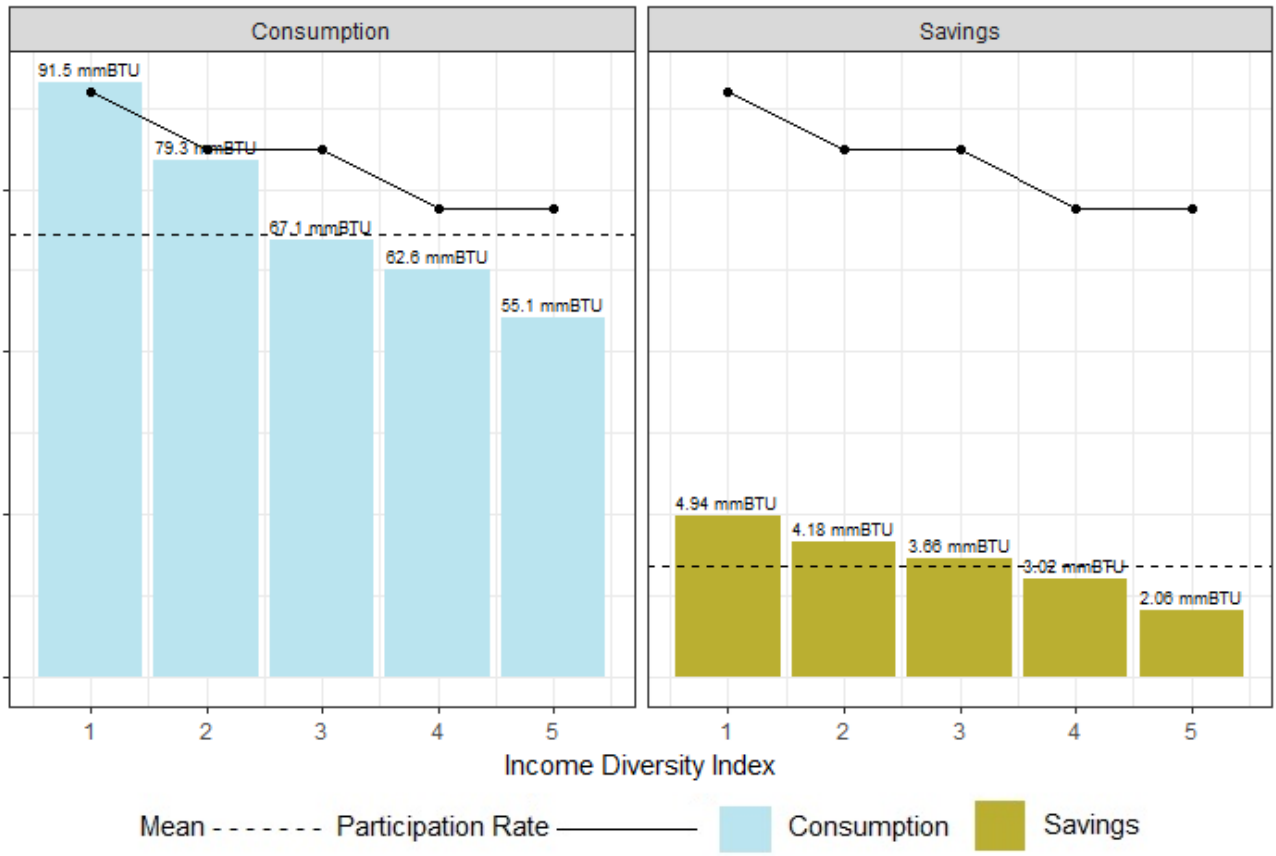


Figure 29: Five-year average energy savings per residential participant and average annual energy consumption per residence by income diversity index, with the residential participation rate trend line for comparison

Table 17: Average Penetration Rates by income diversity index

Income Diversity Score	Average Energy Consumption (MMBtu)	Average Energy Savings (MMBtu)	Penetration Rate
1	91.5	4.94	5%
2	79.3	4.18	5%
3	67.1	3.66	5%
4	62.6	3.02	5%
5	55.1	2.60	5%

3.1.2.4 Results by Racial Diversity Index

Residential participation rates varied significantly between communities based on the racial diversity index, with the lowest participation rates in most Caucasian areas and the highest participation rates in the most diverse areas, as shown in Figure 30 below. The highest participation rates were in moderately diverse areas with racial diversity scores of 4.

The differences between tracts for all measures were driven by differences in capital measure participation, with similar participation in free measures across tracts. Table 18 through Table 20 show the participation rates by racial diversity score for capital and free **measures.**

Higher participation in the most racially diverse communities may be partly due to the slight correlation between the urban-rural index and the racial diversity index. Urban areas are also slightly more likely to be racially diverse than rural areas, so the participation rates by racial diversity index may be a reflection of participation differences between rural and urban areas. Urban areas participate at higher rates, regardless of their racial diversity, compared with rural areas. This is because residents in urban areas have more access to trade allies, services and infrastructure, making them easier for Energy Trust to serve. Rural areas are also more likely to be gas-only or electric-only territories, reducing the available Energy Trust measures and savings opportunities.

We conducted additional analysis that revealed some of the underlying drivers of these results, presented below.

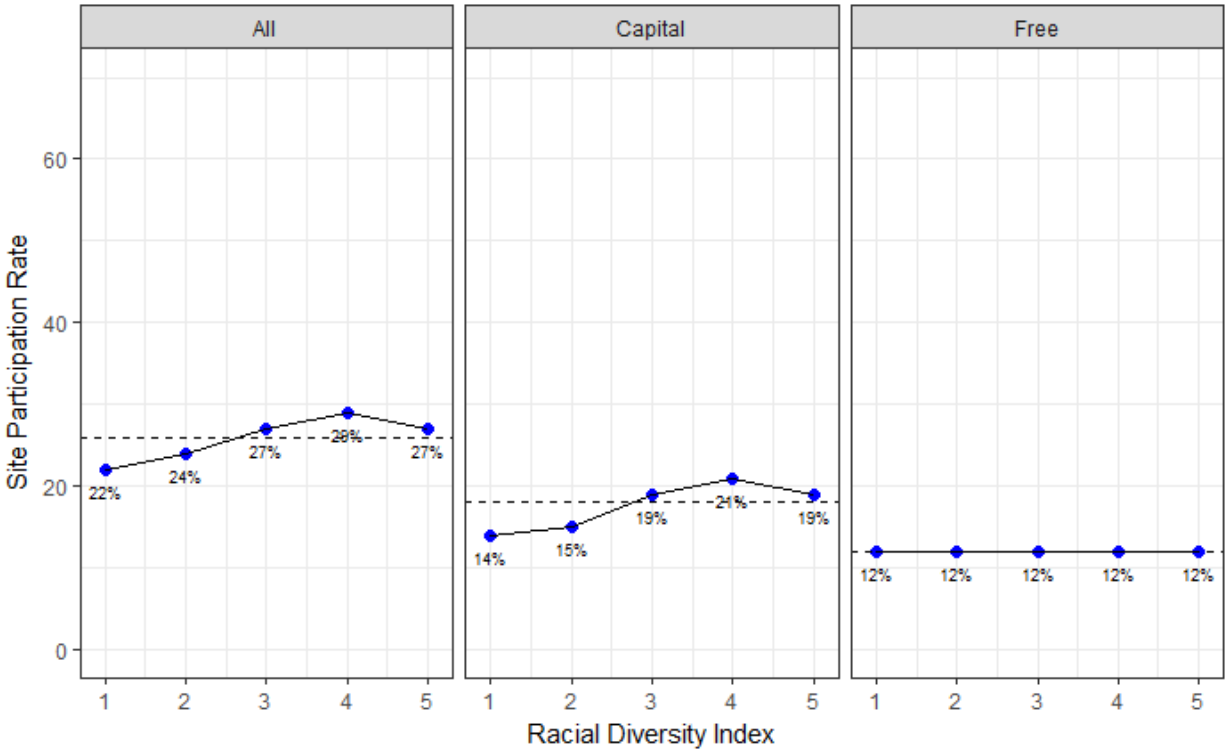


Figure 30: Five-year residential participation rates for all, capital, and free measures, by racial diversity index. The dotted line is the average participation rate for that measure type.

Table 18: Five-year residential participation rates and counts for all measures, by racial diversity index

Racial Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	22%	53,539	191,473	245,012
2	24%	70,872	228,237	299,109
3	27%	80,420	215,654	296,074
4	29%	82,968	202,887	285,855
5	27%	81,356	222,651	304,007

Table 19: Five-year residential participation rates and counts for capital measures, by racial diversity index

Racial Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	14%	33,624	211,388	245,012
2	15%	45,978	253,131	299,109
3	19%	57,079	238,995	296,074
4	21%	60,111	225,744	285,855
5	19%	56,414	247,593	304,007

Table 20: Five-year residential participation rates and counts for free measures, by racial diversity index

Racial Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	12%	29,271	215,741	245,012
2	12%	36,772	262,337	299,109
3	12%	35,945	260,129	296,074
4	12%	35,318	250,537	285,855
5	12%	37,191	266,816	304,007

We analyzed the distribution of participation rates for tracts within each category of the racial diversity index. These participation rate distributions for all measures are displayed in Figure 31, below. Tracts with scores of three and four had the highest prevalence of participation rates above 25 percent and a lower prevalence of rates below 15 percent.

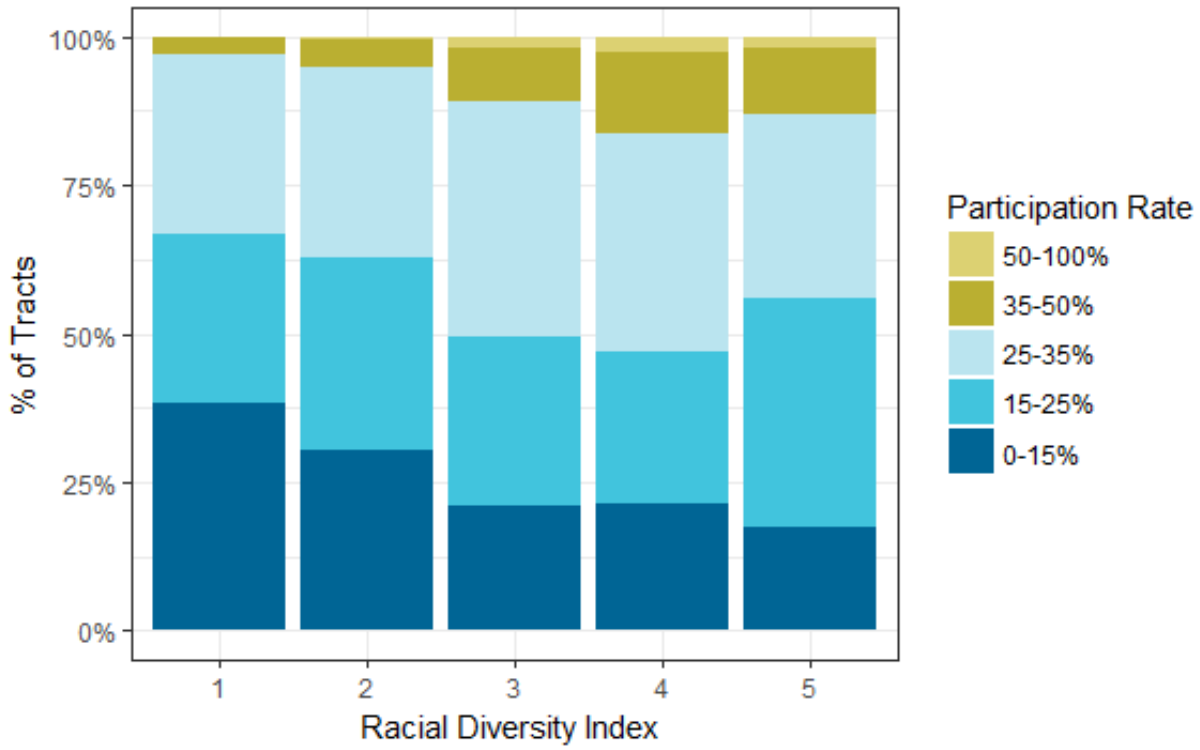


Figure 31: Distribution of five-year residential participation rates for all measures by racial diversity index

The trend in savings per site followed the trend in participation rates. Figure 32 shows the average energy savings per site in MMBtu from all measures by the racial diversity index. The participation rate trend is included for reference. This chart also shows the average annual energy usage per site to indicate potential savings opportunities. Tracts with a racial diversity score of one had the least savings per site, at 2.4 MMBtu, indicating that participants in the least racially diverse, most affluent areas completed fewer measures with lower energy savings than their counterparts in the rest of the state. Tracts with a racial diversity score of three and four had the highest savings per site, at 4.0 MMBtu, indicating that participants in moderately racially diverse areas completed more measures with higher energy savings. The most racially diverse areas had savings of 3.5 MMBtu per site, in the middle of the range.

Annual energy consumption per household was relatively flat across the racial diversity index and did not follow the trends in participation rate and savings per site. As racial diversity increased, the average annual energy used by homes decreased slightly. The differences between categories were relatively minor, with homes in the least racially diverse tracts using about 10 percent more energy, on average, than homes in the most racially diverse areas. The small differences in energy consumption are unlikely to be a major contributing factor to the trends observed in participation rates and savings per site.

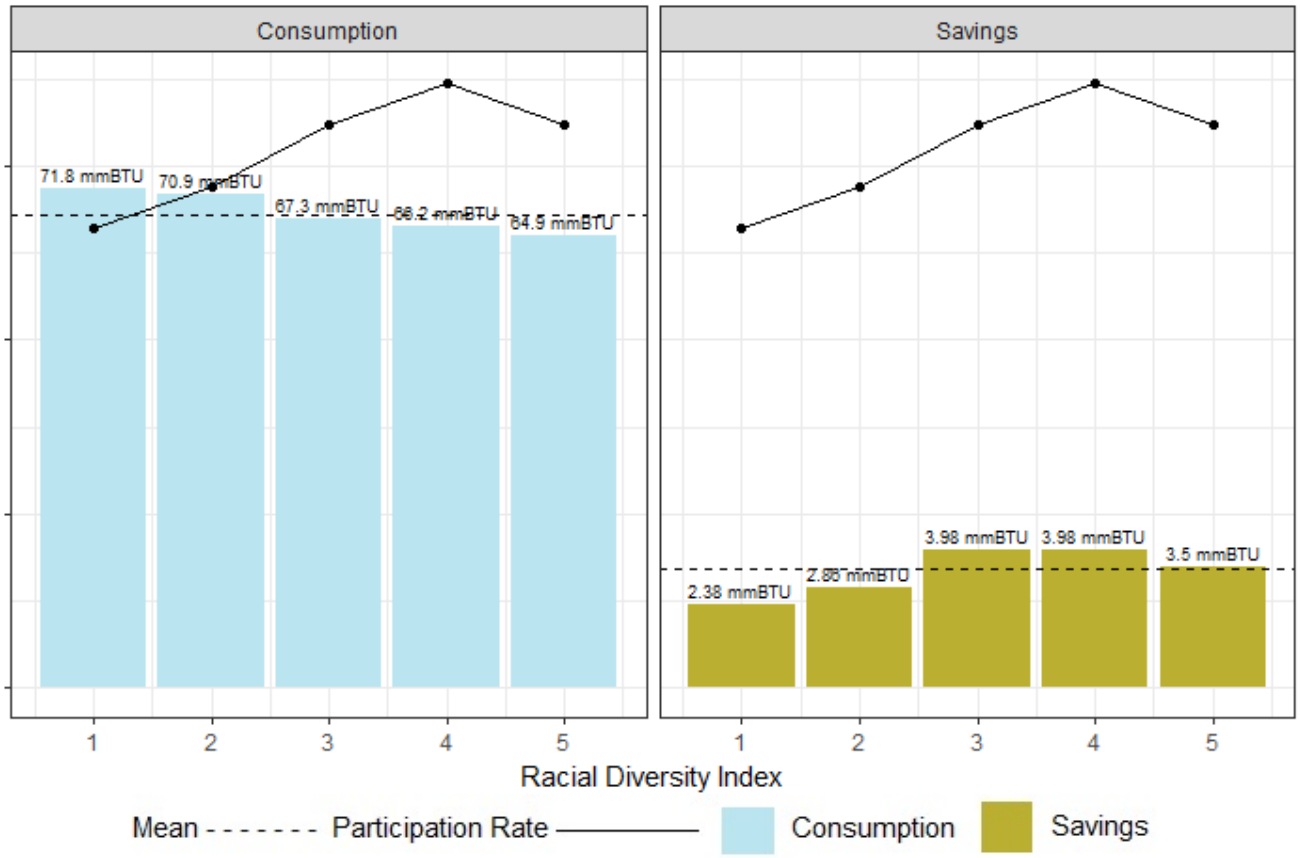


Figure 32: Five-year average energy savings per residential participant and average annual energy consumption per residence by racial diversity index, with the residential participation rate trend for comparison

Table 21: Average Penetration Rates by racial diversity index

Racial Diversity Score	Average Energy Consumption (MMBtu)	Average Energy Savings (MMBtu)	Penetration Rate
1	71.8	2.38	3%
2	70.9	2.88	4%
3	67.3	3.98	6%
4	66.2	3.98	6%
5	64.9	3.50	5%

3.1.2.5 Results for Communities with Prevalent Individual Racial and Ethnic Groups

We conducted additional analysis to understand what was driving the participation rate trends in the racial diversity index.

We attempted to disaggregate the effect of individual racial and ethnic groups on program participation. Racially diverse communities in Oregon are not monolithic, with residents from numerous racial and ethnic groups.

We identified tracts with relatively concentrated communities of color to observe the influence of individual racial groups on participation above or below the overall rate. For each diverse racial group that we analyzed, we categorized tracts as having either a low or high prevalence. Low prevalence tracts were defined as less than 30 percent of residents in the racial group of interest. High prevalence tracts were defined as 30 percent or more of residents in the racial group of interest. We then computed the participation rate for high and low prevalence tracts for each racial and ethnic group.

We were only able to complete this exercise for three groups—Asian, Hispanic/Latino, and Native American—because most Oregon's census tracts have 70 percent or more Caucasian residents. There are no reported tracts in Oregon where 30 percent or more of the residents are Black/African American, Hawaiian/Pacific Islander, Other Races or Multiple Races. We found tracts with much higher than 30 percent of the population for Native American and Hispanic groups. High concentrations of Native Americans were found in areas that are a part of the Indian reservations in Oregon. Even in communities where 30 percent or more of the population belongs to a particular race or ethnic group, participation rates could still be driven by the remaining portion of the population, which in many cases is the majority.

Figure 33 compares participation rates for all measures in tracts with a high versus low prevalence of Asian, Hispanic/Latino and Native American residents. The largest disparity was for high prevalence Native American communities, where the participation rate was much lower (10 percent) than the average participation rate. Tracts with a high prevalence of Asian residents had a participation rate of 30 percent, slightly higher than the 26 percent rate for communities with a low prevalence of Asian residents. Tracts with a high prevalence of Hispanic/Latino residents had a participation rate of 23 percent, slightly lower than the 26 percent rate for communities with a low prevalence of Hispanic residents.

These results indicate that countervailing trends exist between specific communities of color. The slightly higher participation rate in tracts with high racial diversity scores may be due to a high prevalence of Asian residents who tend to participate in Energy Trust programs more than their white, Hispanic and Native American counterparts. Or it may be due to the correlation between higher racial diversity and urban areas, which Energy Trust has been more successful in serving over the years (this is explored in more depth in the next section, with results for the urban-rural index).

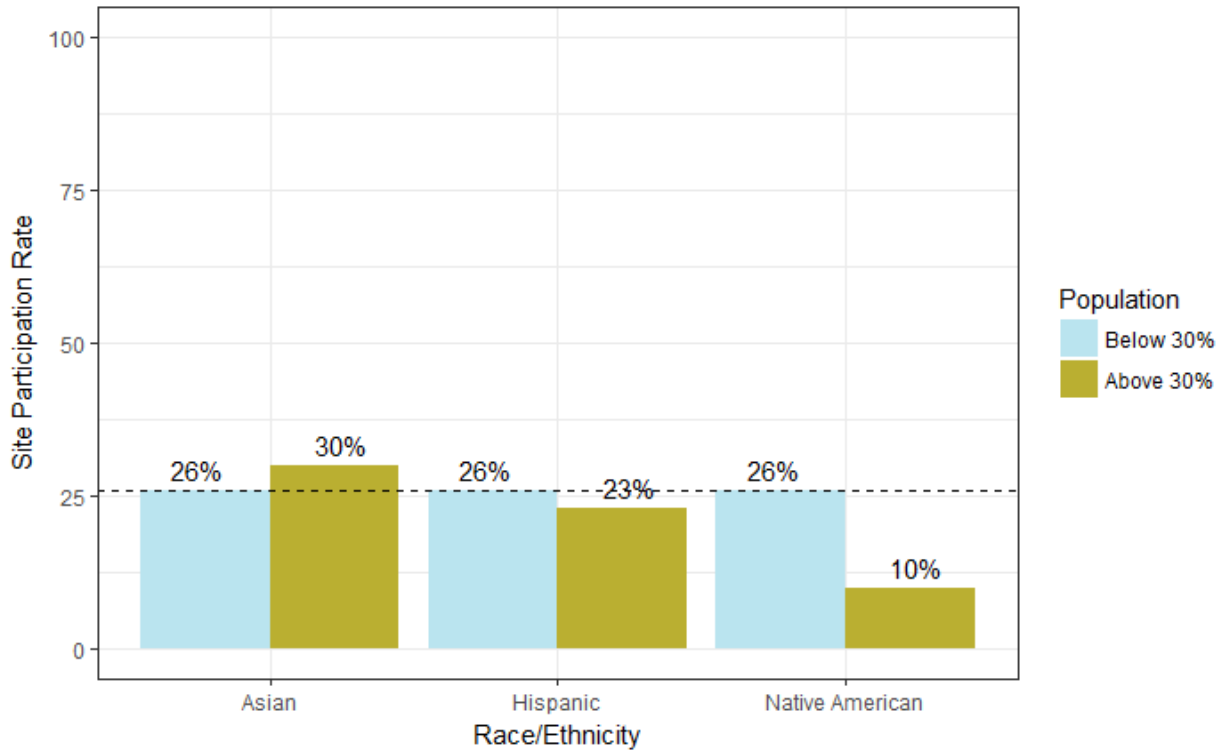


Figure 33: Five-year residential participation rates for all measures by high and low prevalence of Asian, Hispanic, and Native American residents

We analyzed the average energy savings per site for tracts with a high versus low prevalence of Asian, Hispanic/Latino and Native American residents. Figure 34 shows that a similar but more pronounced pattern to participation rates. Communities with a high prevalence of Asian residents had very high savings per site of 6.4 MMBtu, nearly twice that of the state overall. High prevalence Hispanic areas had lower energy savings per site than the state overall, at 2.3 MMBtu. The biggest difference was for high prevalence Native American areas, where there was an average of just 0.6 MMBtu savings per site, less than one-fifth of the overall state average. This indicates that participants in Native American communities installed fewer measures and measures that save less energy.

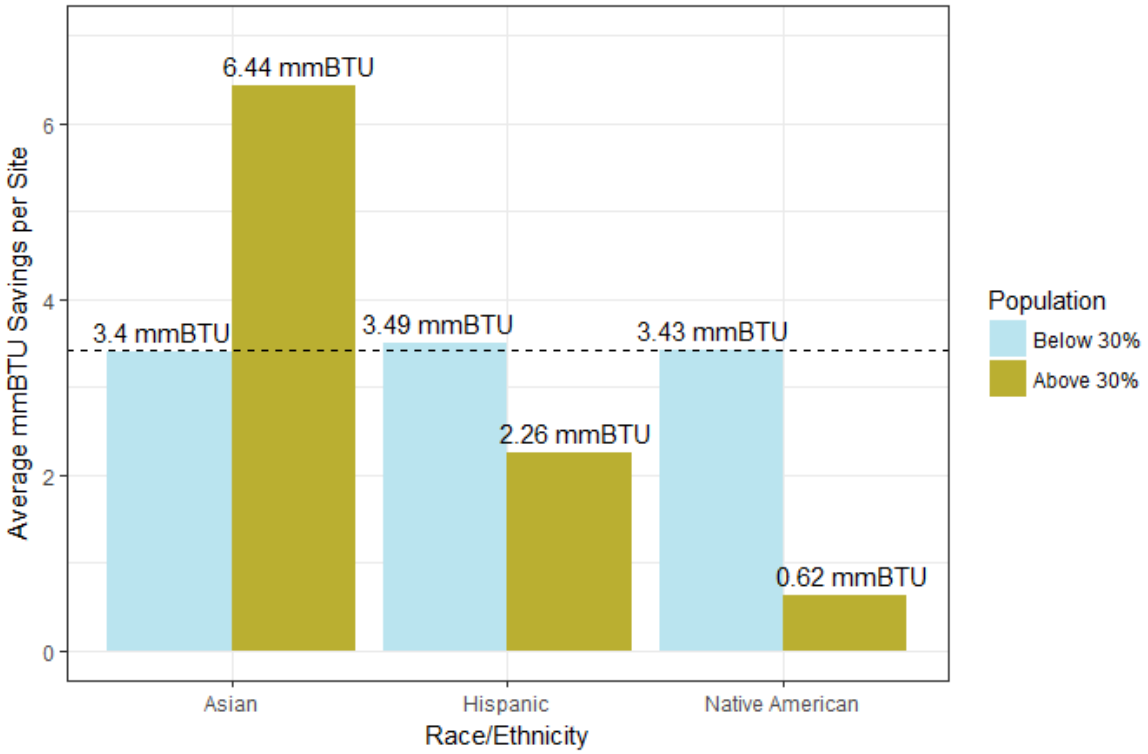


Figure 34: Five-year average energy savings per residential participant for all measures by high and low prevalence of Asian, Hispanic, and Native American residents

A limitation of this analysis is that these racial groups are a composite of many cultural and racial identities, such as Vietnamese, Korean and Chinese communities within the Asian group. As described in a 2010 report from the Coalition of Communities of Color:

> "In reality, the Asian community is composed of deeply varied groups—from Vietnamese, Chinese and Filipino to Hmong, Burmese and Bhutanese. Recent immigrants to this region likely account for a greater composition of the community. As well, one's country of origin and the recentness of one's landing will factor in the profile of the community"[17].

The same limitation holds true for all other racial groups. A newly published report on research justice in Washington County found that one in five people in the Latino community are of Puerto Rican, Salvadoran, Guatemalan, and Central and South American origins[18].

Notwithstanding the limitations on disaggregated data for these communities, we must account for information provided by communities who have consistently told us that they are not informed about Energy Trust and have been underserved by Energy Trust. This non-quantitative and non-traditional input provides important data points, and we must work with

[17] Curry-Stevens, A., Cross-Hemmer, A., & Coalition of Communities of Color (2010). *Communities of Color in Multnomah County: An Unsettling Profile.* Portland, OR: Portland State University.
[18] Coalition of Communities of Color: 2018. *Leading with Race: Research Justice in Washington County.* Portland, Oregon: Coalition of Communities of Color.

community-based organizations to learn more about communities who are not served and how to reach all eligible households in those communities.

3.1.2.6 Results by Urban-Rural Index

Urban communities participate at higher rates than rural communities. Figure 35 shows that the most urban tracts (score of one) had a participation rate of 29 percent for all measures, substantially higher than the 14 percent participation rate in the most rural tracts (score of five). This trend is roughly the same for capital measures, for which urban areas had a participation rate of 20 percent compared with seven percent for very rural tracts. Free measures appear to be more equitably distributed across urban and rural areas, with a smaller disparity in participation between very urban and very rural tracts. Table 22 through Table 24 list the participation rates and counts for capital and free measures for each level of the urban-rural index.

The trend may be partly due to the slight correlation between the urban-rural index and the income diversity index. Lower income areas participate at lower rates, regardless of whether they are urban or rural, compared with high income areas. Urban areas are slightly more likely to be higher income than rural areas.

Service territory type also impacts this trend. Urban areas tend to be in dual-fuel territory, where residents are eligible to all of Energy Trust's gas and electric measures.

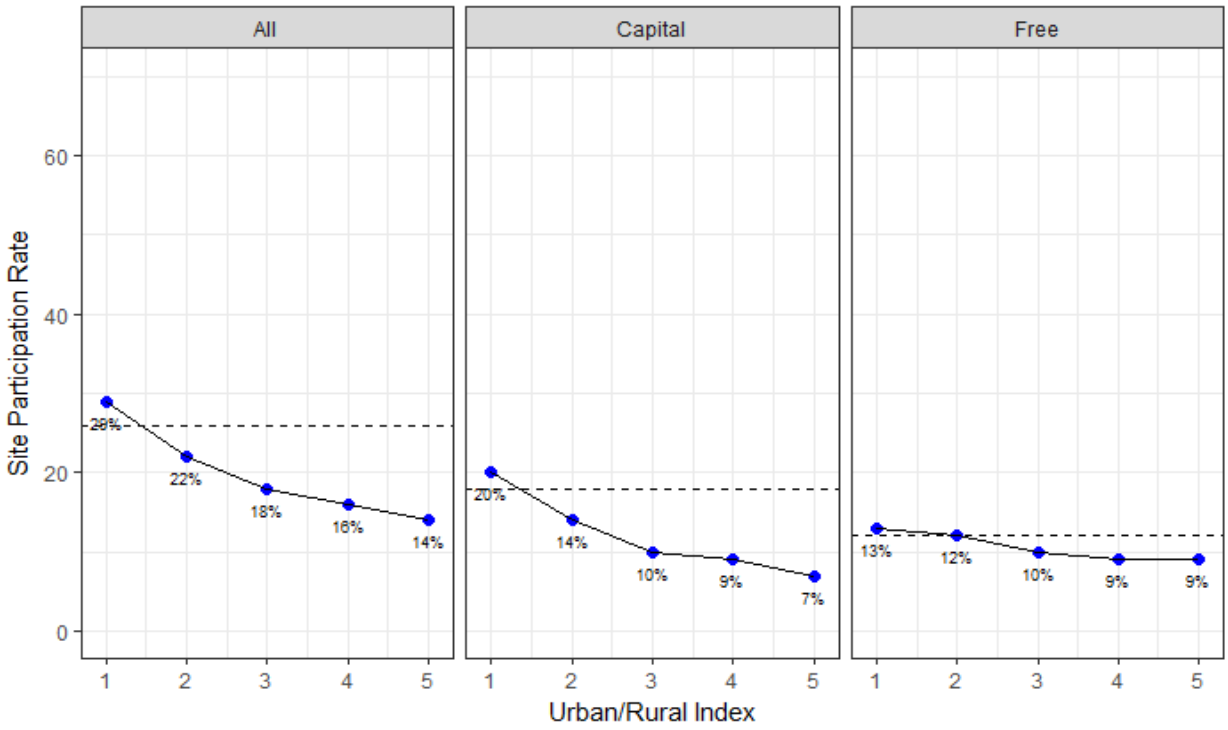


Figure 35: Five-year residential participation rates for all, capital, and free measures, by urban-rural index. The dotted line is the average participation rate for that measure type.

Table 22: Five-year residential participation rates and counts for all measures, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	29%	293,439	732,172	1,025,611
2	22%	28,538	100,763	129,301
3	18%	36,331	169,087	205,418
4	16%	6,645	34,049	40,694
5	14%	4,202	24,831	29,033

Table 23: Five-year residential participation rates and counts for capital measures, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	20%	208,745	816,866	1,025,611
2	14%	17,805	111,496	129,301
3	10%	20,661	184,757	205,418
4	9%	3,844	36,850	40,694
5	7%	2,151	26,882	29,033

Table 24: Five-year residential participation rates and counts for free measures, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	13%	131,295	894,316	1,025,611
2	12%	16,033	113,268	129,301
3	10%	20,676	184,742	205,418
4	9%	3,772	36,922	40,694
5	9%	2,721	26,312	29,033

We conducted additional analysis to understand the distribution of participation rates for tracts within each category of the urban-rural index. These participation rate distributions for all measures are displayed in Figure 36, below. Tracts with a score of one have the highest prevalence of participation rates above 25 percent and a lower prevalence of rates below 15 percent.

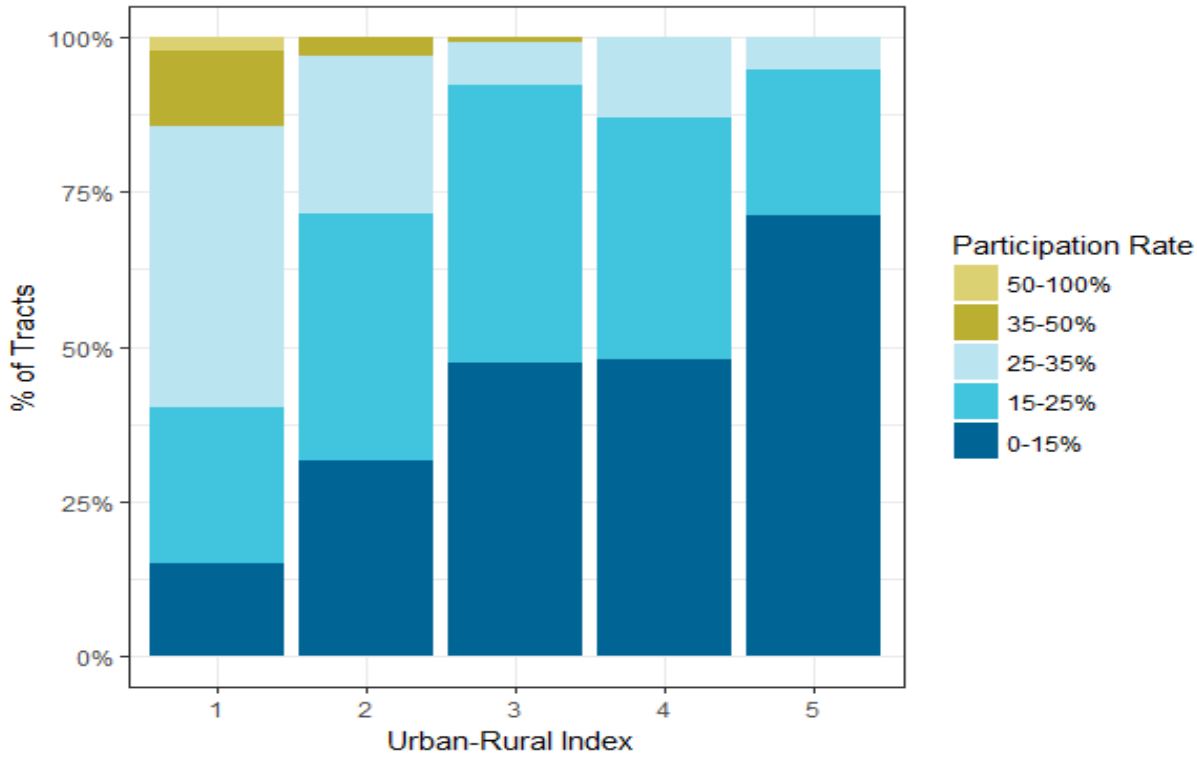


Figure 36: Distribution of five-year residential participation rates for all measures by rural-urban index

The trend in savings per site generally followed the trend in participation rates, with some slight variations. Figure 37 shows the average energy savings per site by the urban-rural index. The participation rate trend is included for reference. This chart also shows the average annual energy usage per residential site to indicates savings opportunity at each level of the urban-rural index. Very urban tracts had by far the highest savings per site, at 3.9 MMBtu, indicating that urban participants tended to complete more measures with higher energy savings than their counterparts in the rest of the state. In contrast, very rural tracts had by far the lowest savings per site, at just 0.4 MMBtu, indicating that rural participants were very lightly served.

Homes in more rural tracts appeared use less energy. However, this trend may be confounded by Energy Trust's gas-only territory, where we only have access to gas consumption data, which could make household energy consumption look artificially low. The trend in annual energy consumption per household closely followed the trend in participation rate but differed from the trend in savings per site. Homes in the most urban areas using 43 percent more energy, on average, than homes in the most rural areas. These differences may impact the disparate participation rates and savings per site because homes in more rural areas may have fewer energy savings opportunities.

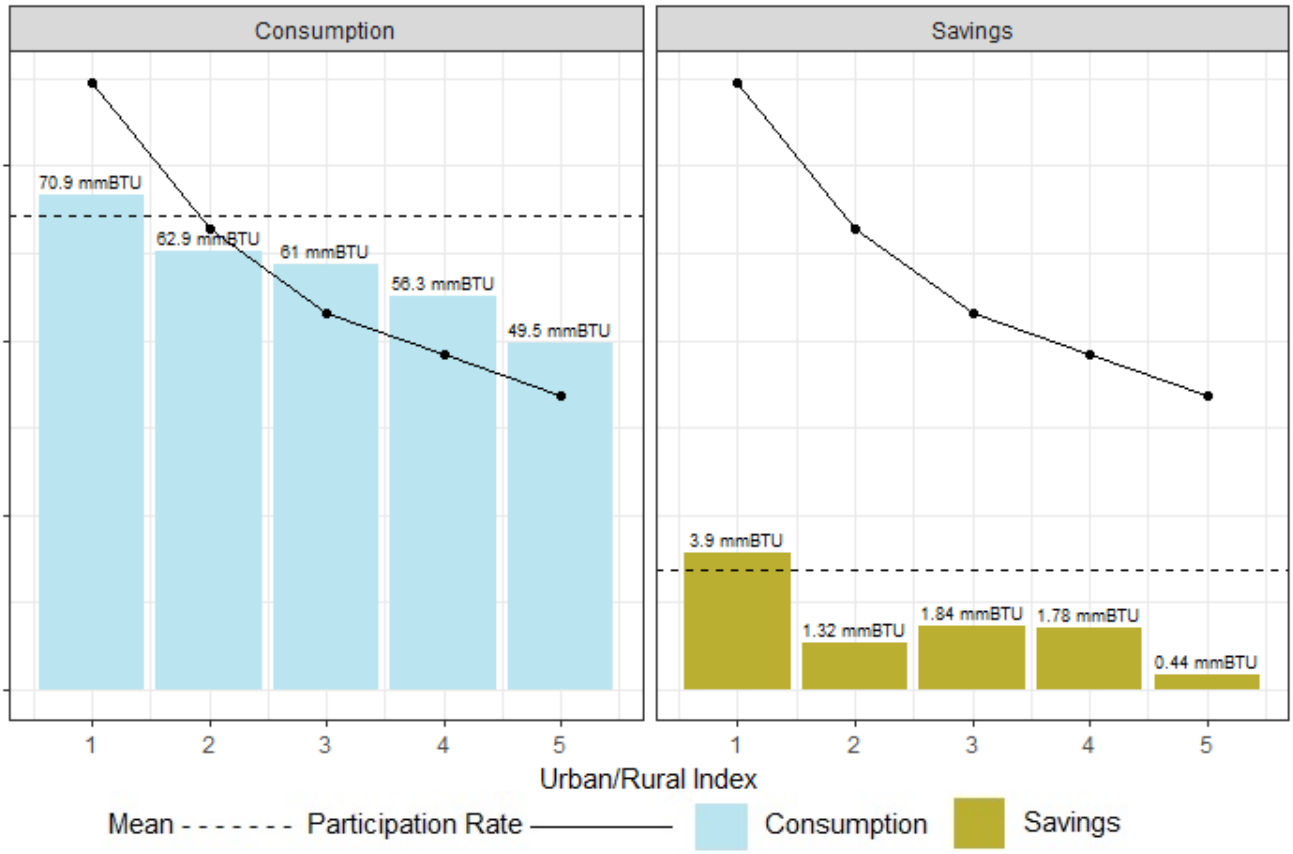


Figure 37: Five-year average energy savings per residential participant and average annual energy consumption per residence by urban-rural index, with the residential participation rate trend for comparison

Table 25: Average Penetration Rates by urban-rural diversity index

Urban-Rural Diversity Score	Average Energy Consumption (MMBtu)	Average Energy Savings (MMBtu)	Penetration Rate
1	70.9	3.90	5%
2	62.9	1.32	2%
3	61.0	1.84	3%
4	56.3	1.78	3%
5	49.5	0.44	1%

3.1.3 Cumulative Participation Rates Since Energy Trust Inception (2002-2017)

3.1.3.1 Overall Results

To understand Energy Trust's cumulative impact around the state, we looked at the cumulative participation rates of eligible residential sites served by Energy Trust since its inception in 2002 (Table 26).

The overall cumulative participation rate for all measures was 50 percent. Thirty-eight percent of households completed a capital measure while 28 percent received a free measure.

Table 26: Overall cumulative residential participation rates and counts for all, capital, and free measures

Type	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
All	50%	713,475	716,581	1,430,056
Capital	38%	541,032	889,024	1,430,056
Free	28%	393,791	1,036,265	1,430,056

3.1.3.2 Cumulative Results by Composite Diversity Index

Cumulative participation indicates a stronger relationship between composite diversity scores and participation rates, shown in Figure 38. The least racially diverse, most affluent areas had a 56 percent participation rate for all measures, substantially higher than the overall rate for the state. The most racially diverse and least affluent communities had a 47 percent participation rate, slightly below the overall rate. The trend was accentuated for capital measures where a more linear relationship emerged between participation and composite diversity score. This relationship existed for free measures as well, but to a lesser degree. Table 27 through Table 29 list the participation rates and counts for all, capital, and free measures for each level of the composite diversity index.

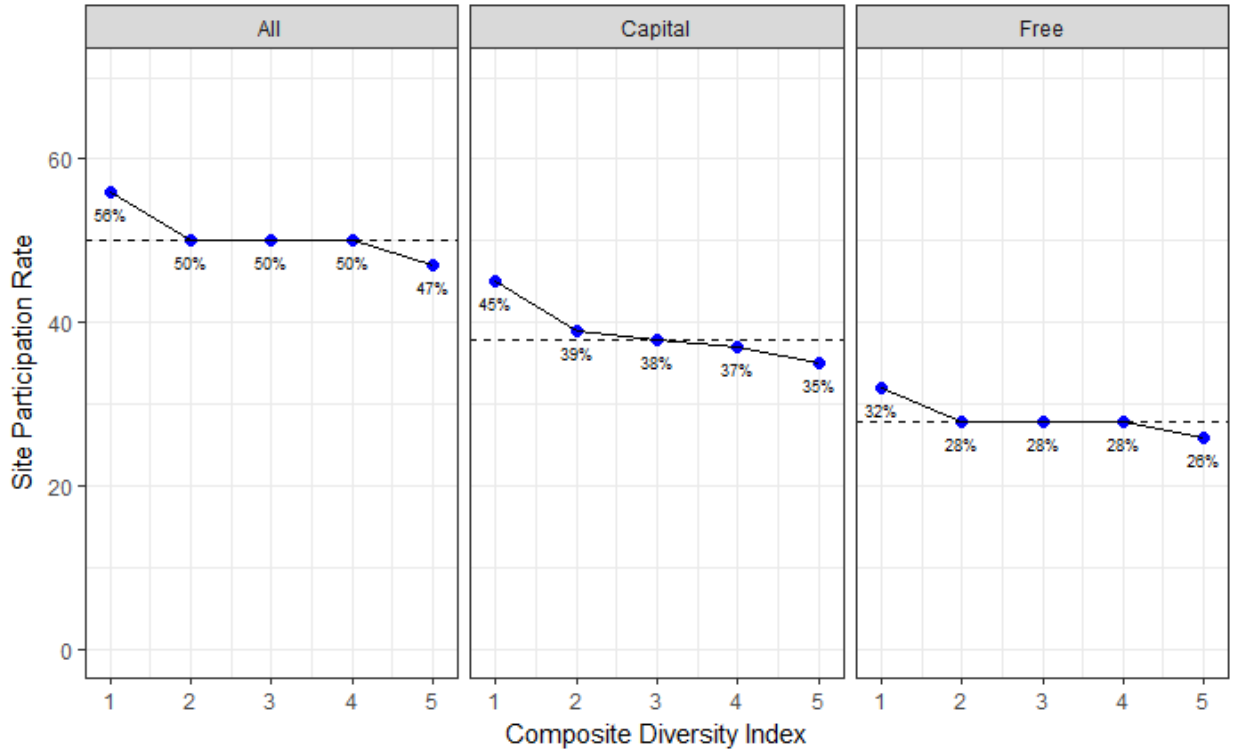


Figure 38: Cumulative residential participation rates for all, capital, and free measures, by composite diversity index.

Table 27: Cumulative residential participation rates and counts for all measures, by composite diversity index

Composite Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	56%	30,400	24,022	54,422
2	50%	147,736	145,487	293,223

3	50%	253,045	251,033	504,078
4	50%	163,970	165,106	329,076
5	47%	118,324	130,933	249,257

Table 28: Cumulative residential participation rates and counts for capital measures, by composite diversity index

Composite Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	45%	24,269	30,153	54,422
2	39%	115,439	177,784	293,223
3	38%	192,552	311,526	504,078
4	37%	122,202	206,874	329,076
5	35%	86,570	162,687	249,257

Table 29: Cumulative residential participation rates and counts for free measures, by composite diversity index

Composite Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	32%	17,206	37,216	54,422
2	28%	81,184	212,039	293,223
3	28%	140,079	363,999	504,078
4	28%	90,744	238,332	329,076
5	26%	64,578	184,679	249,257

3.1.3.3 Cumulative Results by Income Diversity Index

Participation rates varied more significantly by the income diversity index when looking at cumulative participation, as shown in Figure 39 below. The most affluent areas (score of one) participated in all measures at a much higher rate than the state overall—60 percent, compared to 50 percent overall. The least affluent areas (score of five) participated at a much lower rate than the state overall. The disparities in participation rates were more pronounced for capital measures than free measures. Table 30 through Table 32 list the participation rates and counts for all, capital, and free measures for each level of the income diversity index.

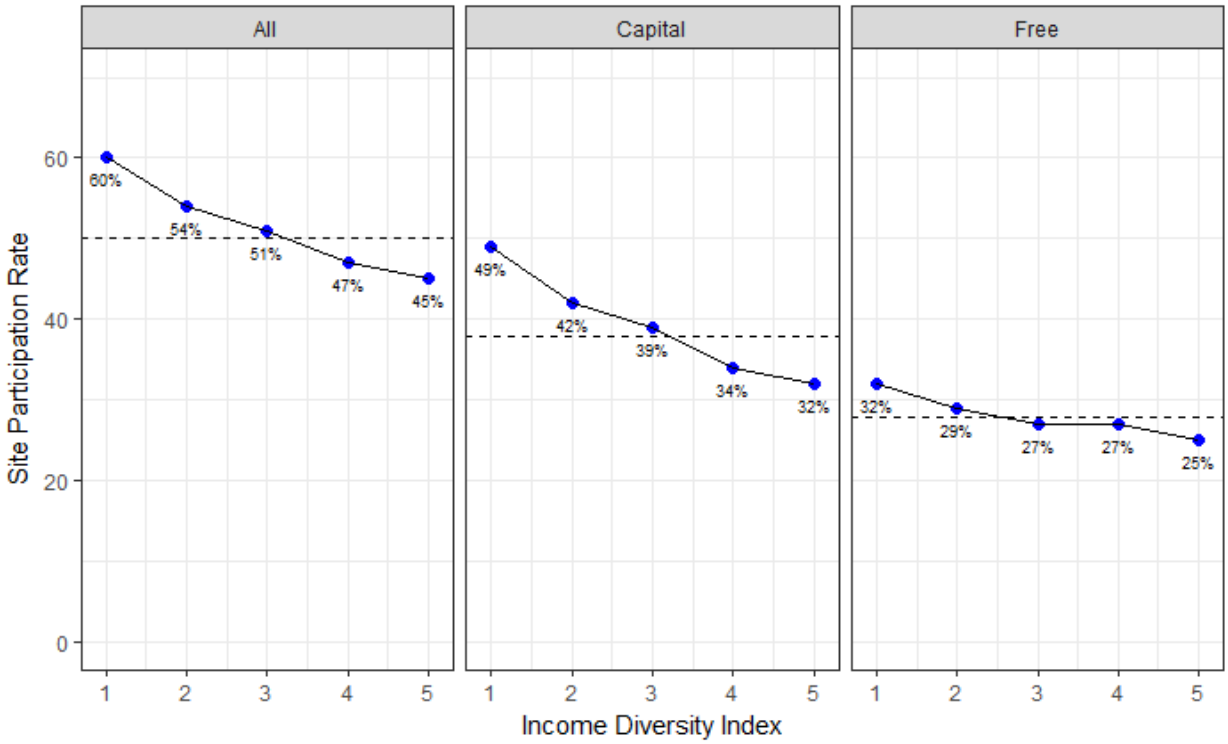


Figure 39: Cumulative residential participation rates for all, capital, and free measures, by income diversity index.

Table 30: Cumulative residential participation rates and counts for all measures, by income diversity index

Income Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	60%	72,680	48,822	121,502
2	54%	147,135	126,539	273,674
3	51%	190,701	186,012	376,713
4	47%	165,022	187,101	352,123
5	45%	137,937	168,107	306,044

Table 31: Cumulative residential participation rates and counts for capital measures, by income diversity index

Income Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	49%	60,066	61,436	121,502
2	42%	115,848	157,826	273,674
3	39%	146,820	229,893	376,713
4	34%	119,792	232,331	352,123
5	32%	98,506	207,538	306,044

Table 32: Cumulative residential participation rates and counts for free measures, by income diversity index

Income Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	32%	38,623	82,879	121,502
2	29%	80,298	193,376	273,674
3	27%	103,526	273,187	376,713
4	27%	94,522	257,601	352,123
5	25%	76,822	229,222	306,044

3.1.3.4 Cumulative Results by Racial Diversity Index

The relationship between participation rates and racial diversity was similar for the cumulative and five-year participation results. The cumulative participation rates for capital and free measures are shown by racial diversity score in Figure 40 below. The least racially diverse tracts (score of five) had the lowest participation rates for all measures and moderately racially diverse tracts (score of four) had the highest participation rates. The most racially diverse tracts (score of five) had similar participation rates to the state overall. This trend is primarily driven by the differences in capital measure participation. Cumulative participation rates for free measures were similar for tracts across the racial diversity index. Table 33 through Table 35 list the participation rates and counts for all, capital, and free measures for each level of the racial diversity index.

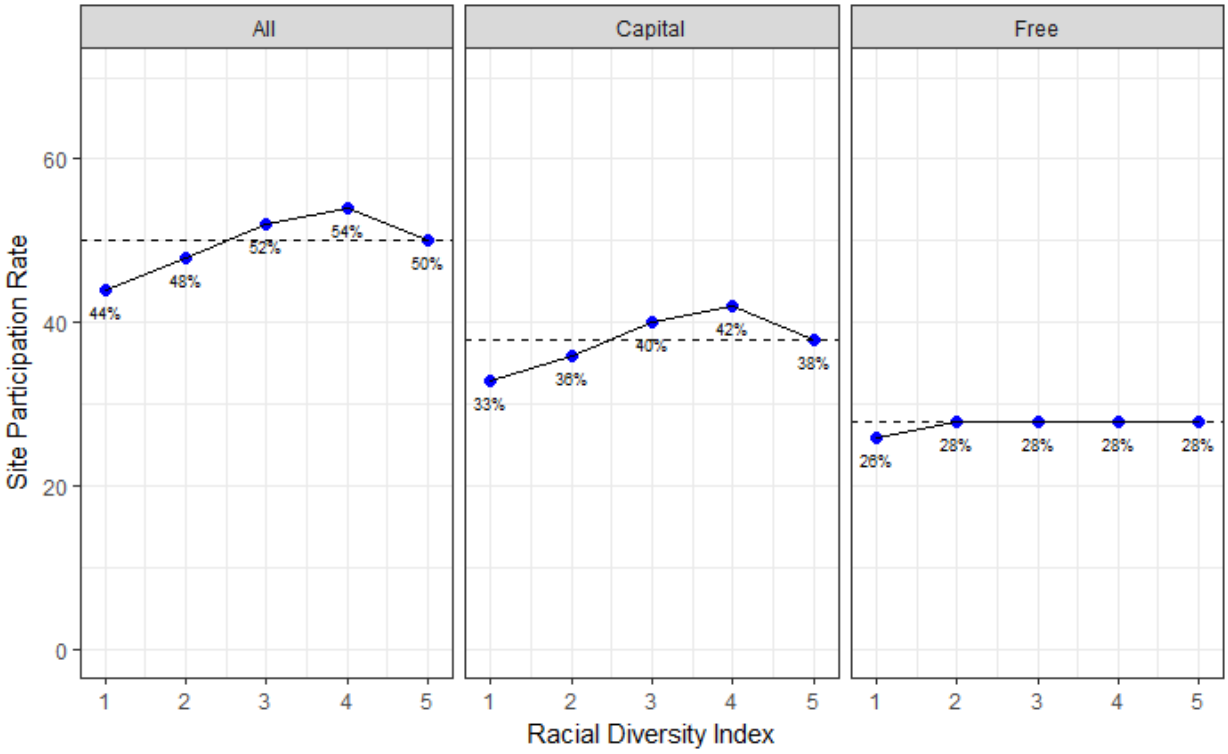


Figure 40: Cumulative residential participation rates for all, capital, and free measures, by racial diversity index.

Table 33: Cumulative residential participation rates and counts for all measures, by racial diversity index

Racial Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	44%	108,111	136,899	245,010
2	48%	143,872	155,238	299,110
3	52%	153,868	142,206	296,074
4	54%	154,106	131,749	285,855
5	50%	153,518	150,489	304,007

Table 34: Cumulative residential participation rates and counts for capital measures, by racial diversity index

Racial Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	33%	80,071	164,939	245,010
2	36%	106,277	192,833	299,110
3	40%	119,010	177,064	296,074
4	42%	119,987	165,868	285,855
5	38%	115,687	188,320	304,007

Table 35: Cumulative residential participation rates and counts for free measures, by racial diversity index

Racial Diversity Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	26%	62,783	182,227	245,010
2	28%	83,423	215,687	299,110
3	28%	82,692	213,382	296,074
4	28%	80,925	204,930	285,855
5	28%	83,968	220,039	304,007

3.1.3.5 Cumulative Results for Communities with Prevalent Individual Racial and Ethnic Groups

Cumulative participation trends for tracts with a high prevalence of Asian, Hispanic/Latino and Native American residents are similar to the five-year participation trends, as shown in Figure 41. Tracts with a high prevalence of Asian residents had slightly higher cumulative participation rates than the rest of the state, and tracts with a high prevalence of Hispanic/Latino residents had slightly lower cumulative participation rates than the sate overall. Tracts with a high prevalence of Native Americans had very low cumulative participation rates.

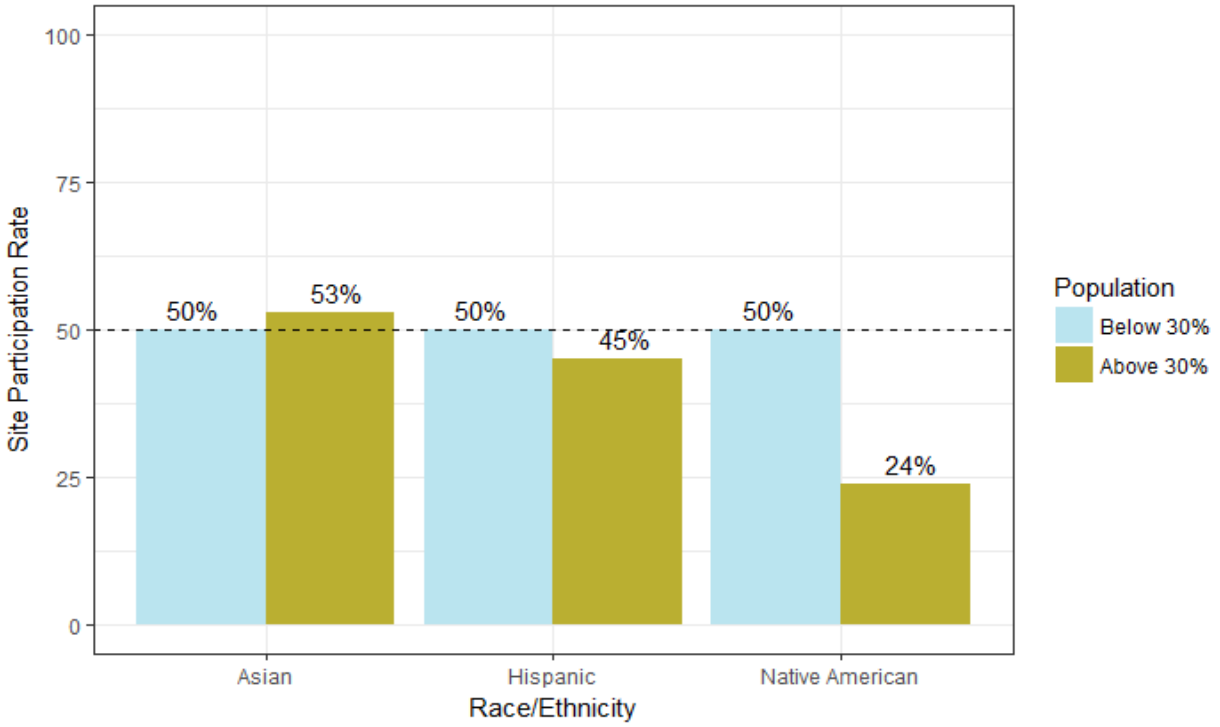


Figure 41: Cumulative residential participation rates for all measures by high and low prevalence of Asian, Hispanic, and Native American residents

3.1.3.6 Cumulative Results by Urban-Rural Index

The cumulative participation trend for the urban-rural index is similar to, and slightly more pronounced, than the five-year participation results. Figure 42 shows high cumulative participation for the most urban tracts (score of one) and low participation rates the most rural tracts (score of five). This is driven largely by capital measure participation, but also supported by participation in free measures. Table 36 through Table 38 list the participation rates and counts for all, capital, and free measures for each level of the urban-rural index.

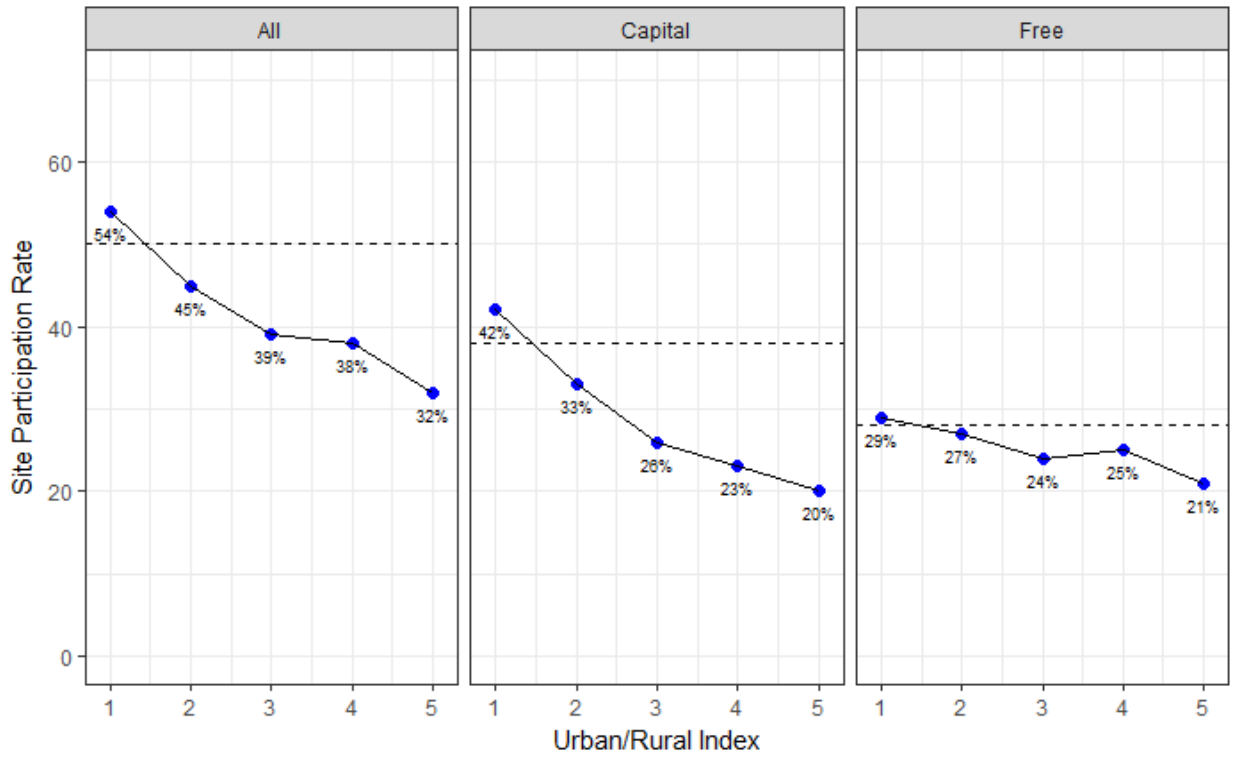


Figure 42: Cumulative residential participation rates for all, capital, and free measures, by urban-rural index

Table 36: Cumulative residential participation rates and counts for all measures, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	54%	549,793	475,813	1,025,606
2	45%	58,683	70,622	129,305
3	39%	79,999	125,419	205,418
4	38%	15,578	25,116	40,694
5	32%	9,422	19,611	29,033

Table 37: Cumulative residential participation rates and counts for capital measures, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	42%	429,526	596,080	1,025,606
2	33%	42,828	86,477	129,305
3	26%	53,206	152,212	205,418
4	23%	9,528	31,166	40,694
5	20%	5,944	23,089	29,033

Table 38: Cumulative residential participation rates and counts for free measures, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	29%	293,582	732,024	1,025,606
2	27%	34,313	94,992	129,305
4	25%	10,228	30,466	40,694
3	24%	49,564	155,854	205,418
5	21%	6,104	22,929	29,033

3.2 Commercial Participation Analysis

3.2.1 Analysis Approach

We analyzed participation in Energy Trust programs at all 139,437 commercial sites for all eligible Oregon businesses, and then computed the participation rate in each census tract in our service territory.

Commercial sites included all buildings within Energy Trust's integrated dataset containing a business or organization that used energy in 2017 and were not production facilities or agricultural sites. We identified individual businesses within each building by combining the building identifier and utility account number. In a building with multiple tenant businesses, each individual business with a separate utility account was counted as a separate commercial site.

Multifamily buildings were excluded from commercial participation and included in the residential analysis, summarized in section 3.1 of this report.

Commercial sites were designated as participants if they received any Energy Trust service or incentive from 2013-2017, and the measure was recognized in our system of record.

We divided commercial participation into large and small/medium sites based on energy consumption. Large commercial sites were defined as those having greater than 100,000 annual kilowatt-hour consumption or the equivalent therms (3,500). Commercial sites below this consumption threshold were classified as small/medium commercial sites.

Ninety-five percent of efficiency measures and services supported by Energy Trust that could be tied to an individual commercial site were included in the analysis. We excluded market transformation savings, events, trainings and midstream measures with incentives paid to a distributor to reduce the cost of a product. These missing measures had an insignificant impact on commercial participation rates because they represent a small fraction of commercial sector energy savings. Figure 43 shows the breakout of commercial sector savings by type.

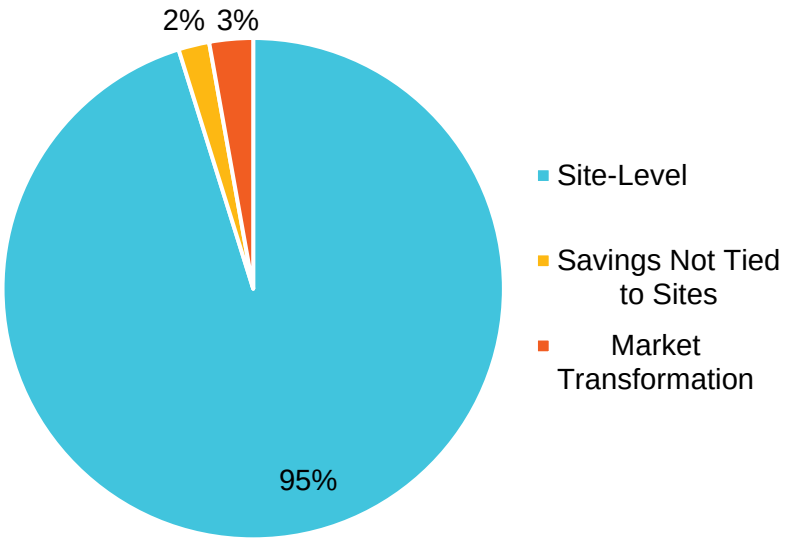


Figure 43: Commercial Energy Savings by Type (in MMBtu), 2013-2017

Tract-level participation rates were calculated as the number of commercial sites that participated in an Energy Trust measure, divided by the total number of commercial sites in each tract. In our primary analysis, we counted participation for the most recent five years of program activity, from 2013-2017. Restricting the analysis period to five years ensured that the population of commercial sites did not change dramatically during the analysis period, as businesses moved, old buildings were demolished and new ones were built.

To better understand Energy Trust's cumulative impact on Oregon businesses, we also conducted a secondary analysis looking at program participation rates since Energy Trust's inception, from 2002-2017.

3.2.1.1 Use of Diversity, Equity and Inclusion Indices for Commercial Program Analysis

We were not able to make a clear link between commercial businesses and the racial diversity index nor the income diversity index, as both indicators relate to household demographics. Energy Trust worked with community-based organizations and other stakeholders to learn how the three indices might apply to non-residential customers and Energy Trust program participation. The U.S. Small Business Association has researched the characteristics of businesses in low-income areas[19] and found that demographic characteristics of small business owners tend to mirror the demographics of the surrounding community. Communities have different views about the benefits and outcomes of diversity, equity and inclusion efforts with businesses. Some communities value the diversity of the owner and employees, while others value the populations served by businesses.

Given no clear way to tie businesses and racial or income characteristics, we analyzed only the urban-rural index for commercial business participation at this time.

[19] https://www.sba.gov/sites/default/files/437-Entrepreneurship-in-Low-income-Areas.pdf

3.2.2 Five-Year Participation Rates (2013-2017)

3.2.2.1 Overall Results

Results indicated that large commercial businesses participated at much higher rates than small/medium commercial businesses. The overall five-year participation rate for all eligible commercial sites in Energy Trust's Oregon service territory was 10 percent (Table 33). The overall participation rate for large commercial customers was 28 percent and the overall participation rate for small commercial customers was seven percent.

The distribution of participation rates across Energy Trust's Oregon service territory for large commercial sites can be seen in Figure 44 and participation rates for small/medium commercial sites can be seen in Figure 45. The participation rate was 18 percent for capital measures and 12 percent for free measures. Table 39 displays the overall participation rates and counts for all, large, and small commercial sites.

Table 39: Overall five-year commercial participation rates and counts for all, large, and small/medium commercial sites.

Type	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
All	10%	13,689	121,881	135,570
Large	28%	6,159	16,124	22,283
Small/Medium	7%	7,529	105,755	113,284

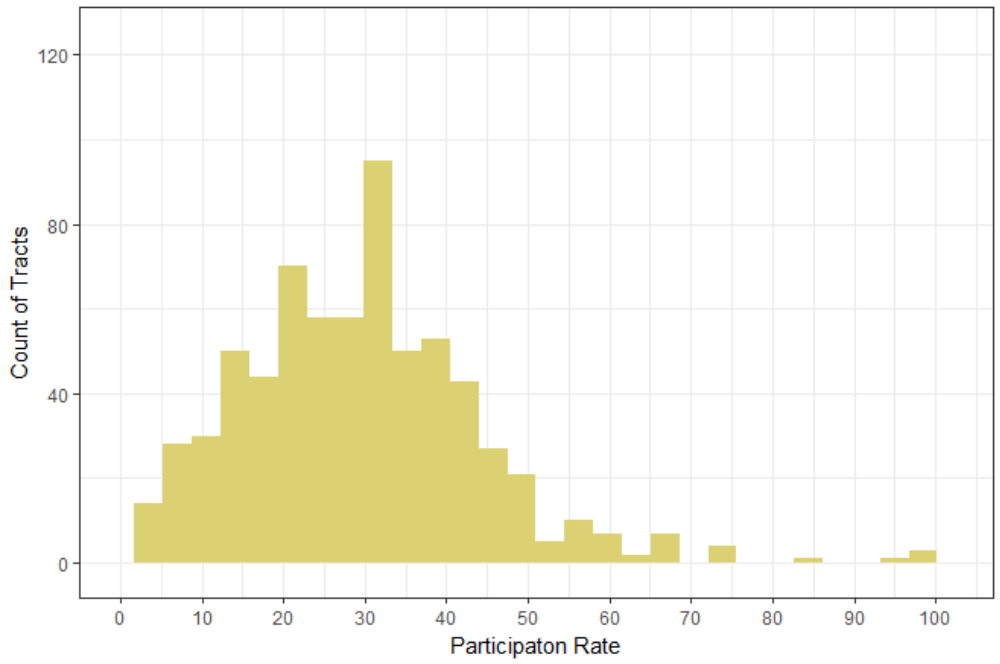


Figure 44: Distribution of 5-year participation rates for large commercial sites for all tracts in Energy Trust's Oregon service territory

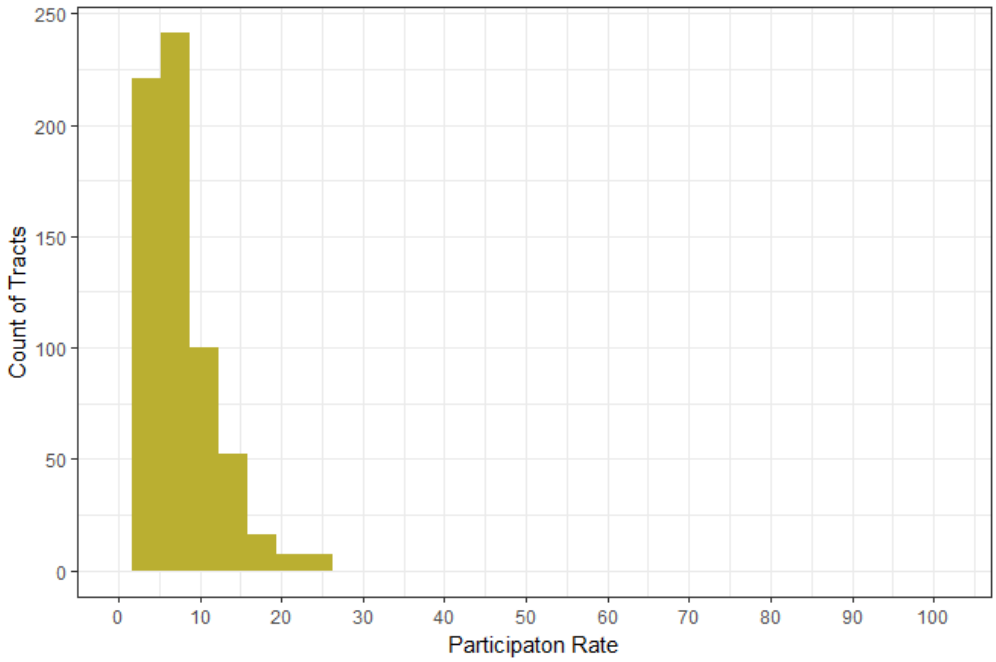


Figure 45: Distribution of 5-year participation rates for small/medium commercial sites for all tracts in Energy Trust's Oregon service territory

To understand the impact of service territory type on participation, we compared five-year participation rates for tracts in Energy Trust's gas-only, electric-only and dual fuel territories. Figure 46 displays the participation rates by service territory type. This factor may have a moderate impact on commercial site participation rates, primarily due to differences in energy saving opportunities and the incentives available for customers in single-fuel versus dual-fuel territories. It is a confounding factor when analyzing the effect of the urban-rural index on participation rates.

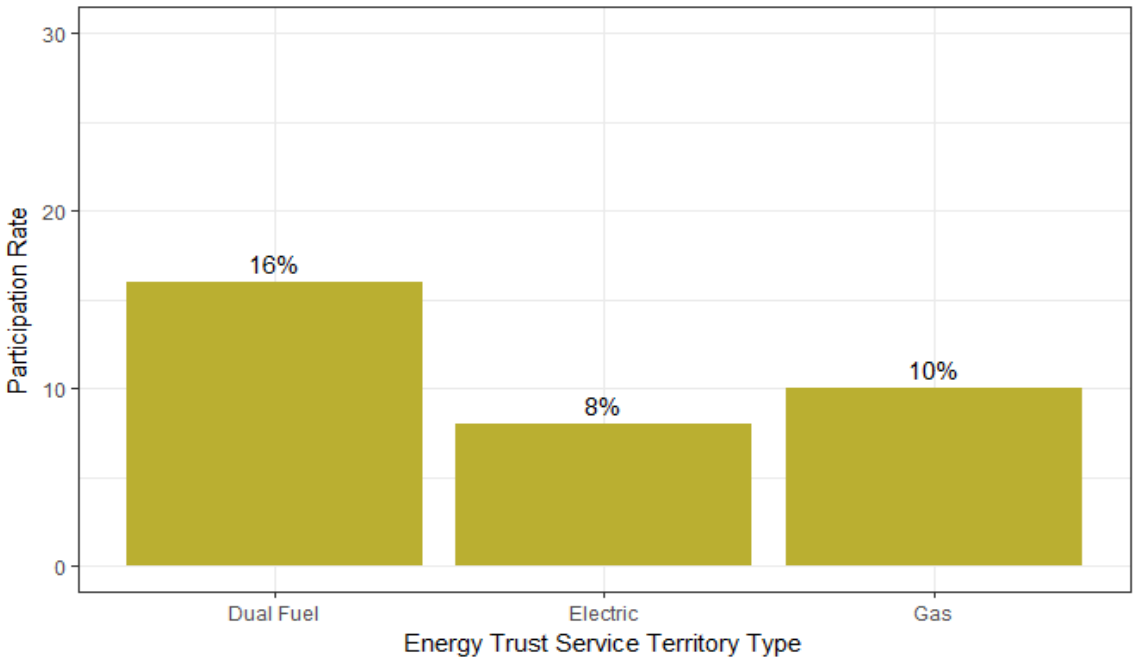


Figure 46: Five-year commercial participation rates for all commercial sites, by service territory type

3.2.2.2 Results by Urban-Rural Index

Large commercial customers in rural areas participated at lower rates than large commercial customers in rural areas. The participation rate for large commercial sites in very rural areas (score of five) was less than half of the participation in very urban areas (score of one).

Small/medium commercial sites had substantially lower participation rates than large commercial customers in urban and rural areas. Small/medium commercial sites in very rural areas participated at roughly half the rate of small businesses in all other areas of the state. Participation rates for large and small/medium commercial sites by urban-rural score are presented in Figure 47, Table 40 and Table 41 below.

There was more variation in commercial participation by the size of commercial sites than by their location in an urban or rural area.

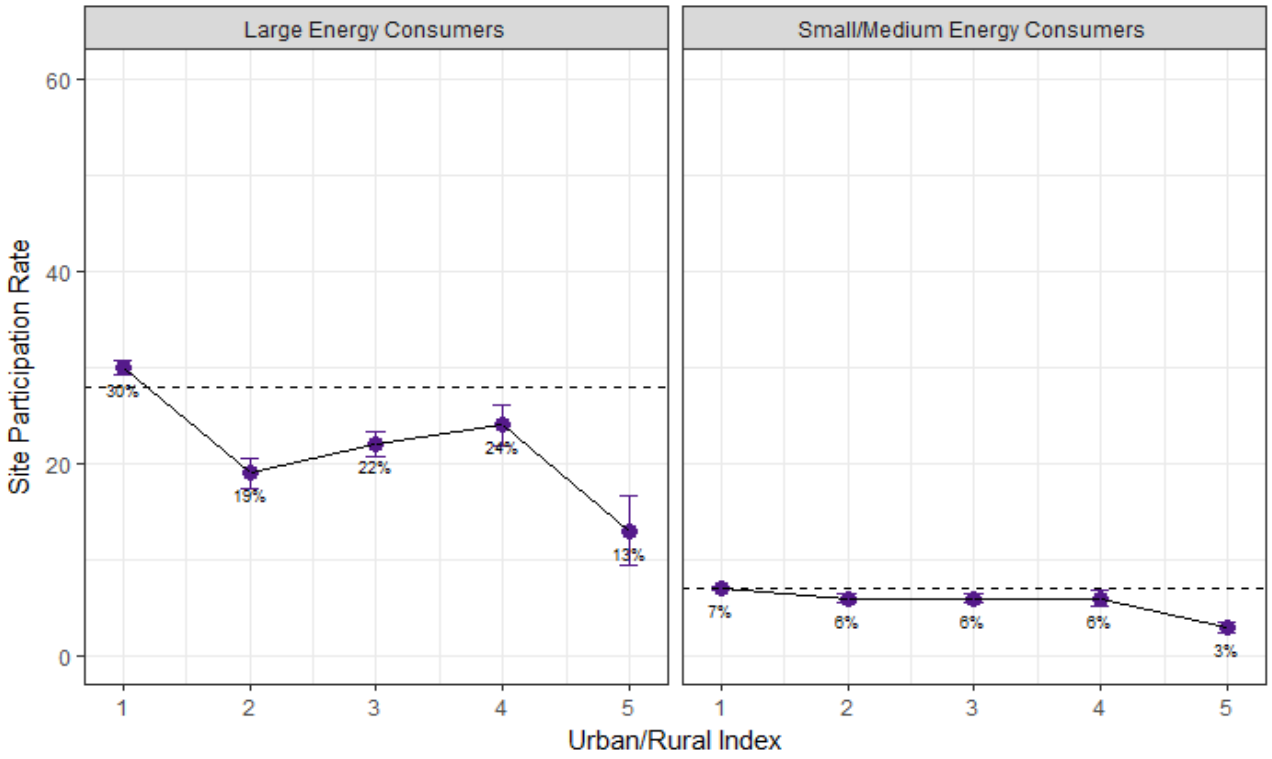


Figure 47: Five-year commercial participation rates for large and small/medium commercial sites, by urban-rural index. The dotted line is the average participation rate.

Table 40: Five-year commercial participation rates and counts for small/medium commercial sites, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	7%	5,536	71,928	77,464
2	6%	541	9,275	9,816
3	6%	1,142	18,073	19,215
4	6%	210	3,480	3,690
5	3%	101	3,001	3,102

Table 41: Five-year commercial participation rates and counts for large commercial sites, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	30%	4,946	11,541	16,487
2	19%	279	1,193	1,472
3	22%	745	2,613	3,358
4	24%	137	441	578
5	13%	52	336	388

Annual consumption threshold for small/medium businesses may vary by market segment, and more detail is needed to segment the small/medium commercial sites by their relevant market segment. For example, the annual energy usage of a small grocery store is typically higher than a small office building.

3.2.3 Cumulative Participation Rates Since Energy Trust Inception (2002-2017)

3.2.3.1 Overall Results

We compared the five-year commercial participation rates with the cumulative commercial participation rates since Energy Trust's inception in 2002.

The overall cumulative participation rate for all commercial sites was higher than the five-year participation rate. Most of this increase was in large commercial sites, where 42 percent of sites have participated since 2002.

The difference in participation rates between large and small/medium commercial sites was similar to, and more pronounced, in cumulative results than in five-year results. Table 42 shows the overall participation rates and counts for large and small/medium commercial sites.

Table 42: Overall cumulative commercial participation rates and counts for large and small/medium commercial sites

Type	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
All	16%	21,627	113,943	135,570
Large	42%	9,450	12,833	22,283
Small/Medium	11%	12,176	101,108	113,284

3.2.3.2 Results by Urban-Rural Index

Cumulative participation rates showed similar trends to the five-year participation results across the urban-rural index, as shown in Figure 48, Table 43 and Table 44.

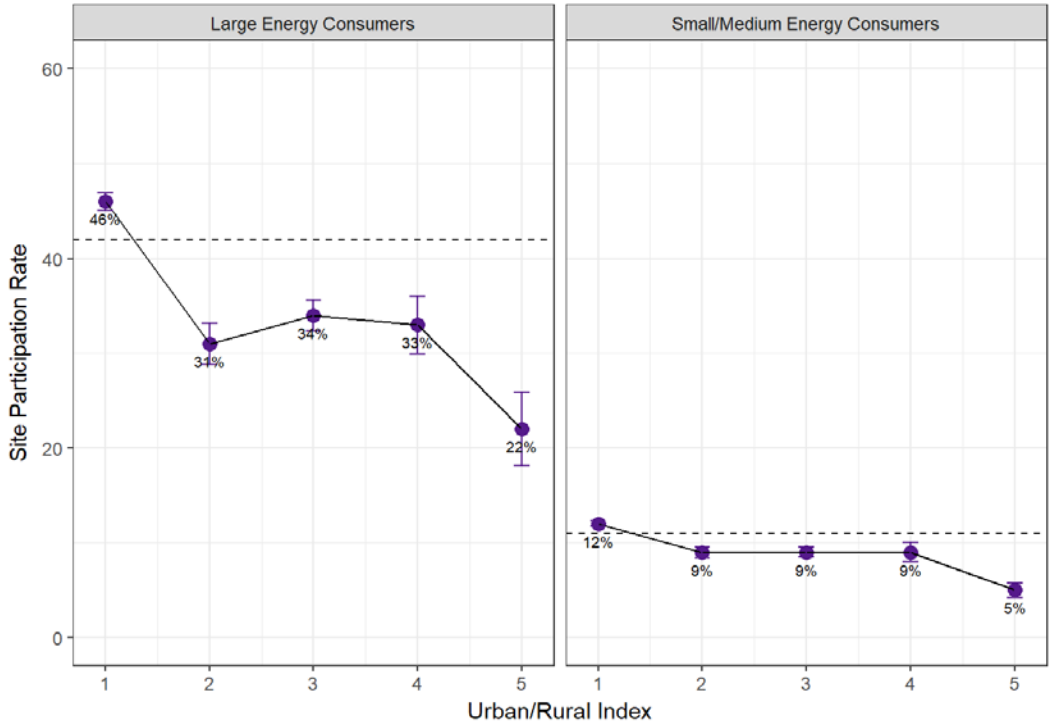


Figure 48: Cumulative commercial participation rates for large and small/medium commercial sites, by urban-rural index

Table 43: Cumulative commercial participation rates and counts for small/medium commercial sites, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	12%	9,151	68,313	77,464
2	9%	838	8,978	9,816
3	9%	1,678	17,537	19,215
4	9%	344	3,346	3,690
5	5%	166	2,936	3,102

Table 44: Cumulative commercial participation rates and counts for large commercial sites, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	46%	7,579	8,908	16,487
2	31%	458	1,014	1,472
3	34%	1,137	2,221	3,358
4	33%	191	387	578
5	22%	85	303	388

3.3 Industrial and Agriculture Participation Analysis

3.3.1 Analysis Approach

We analyzed participation in Energy Trust programs at all 24,244 eligible industrial sites and all 12,363 eligible agricultural sites, and then computed the participation rate in each census tract in our service territory.

Industrial sites included all facilities within Energy Trust's integrated dataset that produced goods or had an industrial process, used energy in 2017 and were eligible for Energy Trust services. Sites were considered agricultural if their addresses or meters that were flagged as having an agricultural use in the integrated dataset. We further combined individual, adjacent buildings into campus facilities, and rolled them up to the top-level site. Adjacent agricultural sites were also rolled up to the top-level site, if one existed.

Industrial and agricultural sites were designated as participants if they received any Energy Trust service or incentive from 2013-2017, and the measure was recognized in our system of record.

We divided industrial customers into two categories based on size. Large industrial facilities were defined as having greater than one average megawatt (8,760,000 kilowatt-hour) of annual electricity consumption or the equivalent in gas use (approximately 300,000 therms). Industrial facilities below this consumption threshold were classified as small/medium sites.

All efficiency measures and services supported by Energy Trust that could be tied to an individual industrial or agricultural site were included in the analysis, which is nearly all industrial and agricultural customer savings. Tract-level participation rates were calculated as the number

of industrial facilities or agricultural sites that participated in an Energy Trust measure divided by the total number of industrial facilities or agricultural sites in each tract.

We counted participation for the most recent five years of program activity, from 2013-2017. Restricting the analysis period to five years ensured that the population of industrial facilities and agricultural sites did not change during the analysis period, as businesses moved, old buildings were demolished, farmland was developed, and new facilities were constructed.

To better understand Energy Trust's cumulative impact on industrial and agricultural businesses, we also conducted a secondary analysis looking at program participation rates since Energy Trust's inception from 2002-2017.

3.3.1.1 Use of Diversity, Equity and Inclusion Indices for Industrial Program Analysis

Similar to the commercial sector analysis, there was no clear link between industrial and agricultural businesses and the income and racial diversity indices, as both relate to household demographics. Given no clear way to tie business characteristics to community racial and income characteristics, we analyzed only the urban-rural index for industrial and agricultural participation at this time. Improved firmographic data may allow us to conduct more in-depth analysis of business participation in the future.

3.3.2 Five-Year Participation Rates (2013-2017)

3.3.2.1 Overall Results

The overall five-year participation rates for industrial and agricultural sites are presented in Table 45, below. The participation rate for large industrial sites was 79 percent, ranging from zero to 100 percent. For small/medium industrial sites, the overall participation rate was 13 percent.

Small/medium industrial and agricultural sites had markedly lower participation rates than large commercial customers in urban and rural areas, with a greater difference than between small/medium and large commercial businesses. There are very few large industrial sites in Oregon, and Energy Trust has completed energy-saving projects with most of them through long-term engagements. For agricultural sites, the overall participation rate was 13 percent. Figure 49 and Figure 50 show the distributions of participation rates for large and small/medium industrial sites in census tracts across Oregon.

Table 45: Overall five-year industrial and agricultural participation rates and counts

Type	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
All Industrial	13%	2,510	16,239	18,749
Large Industrial	79%	195	52	247
Small/Medium Industrial	13%	2,315	16,187	18,502
Agricultural	13%	1,411	9,668	11,109

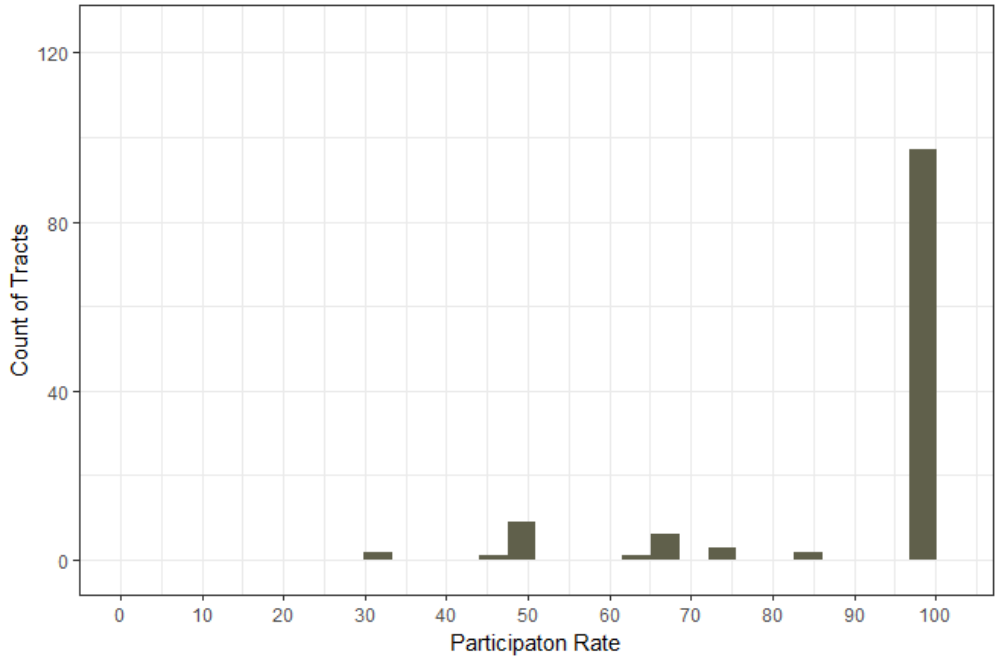


Figure 49: Distribution of 5-year participation rates for large industrial sites for all tracts in Energy Trust's Oregon service territory

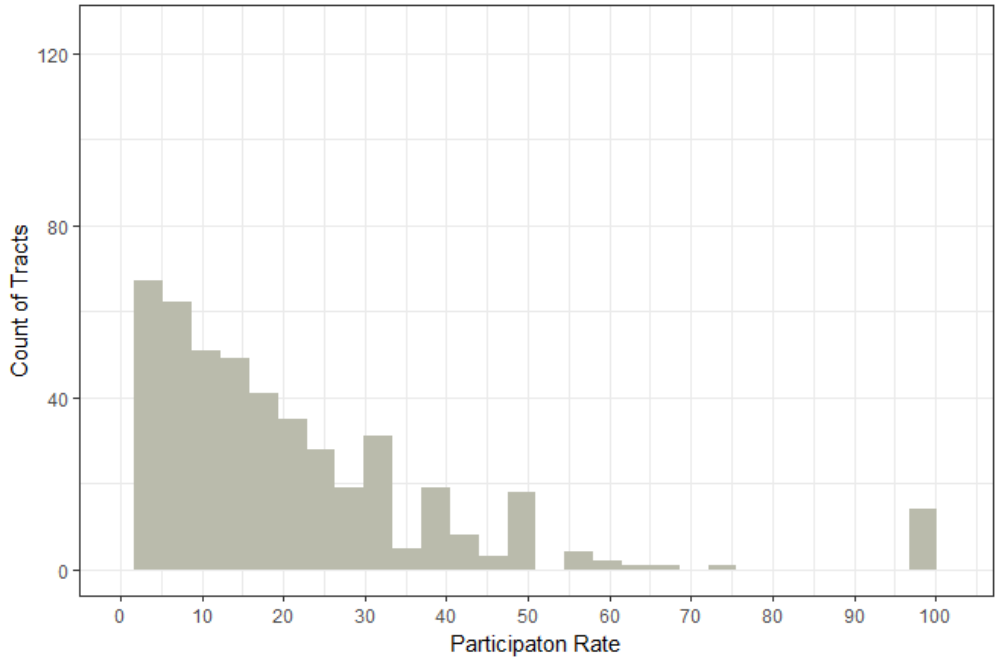


Figure 50: Distribution of 5-year participation rates for small/medium industrial sites for all tracts in Energy Trust's Oregon service territory

To understand the impact of service territory type on industrial and agricultural program participation, we compared five-year participation rates for tracts in Energy Trust's gas-only, electric-only and dual fuel territories. Figure 51 displays the participation rates for all industrial sites by service territory type.

The overall industrial participation rates appear to be much higher in dual fuel territory, compared with electric-only and gas-only areas. This factor may have a moderate impact on industrial and agricultural site participation rates, primarily due to differences in energy saving opportunities and the incentives available for customers in single-fuel versus dual-fuel territories.

It may be a confounding factor when analyzing the effect of the urban-rural index on industrial site participation rates, especially for small/medium industrial facilities. However, the total number of industrial sites in electric- and gas-only territories is smaller (N=744 and N=458, respectively), so these rates may be more volatile.

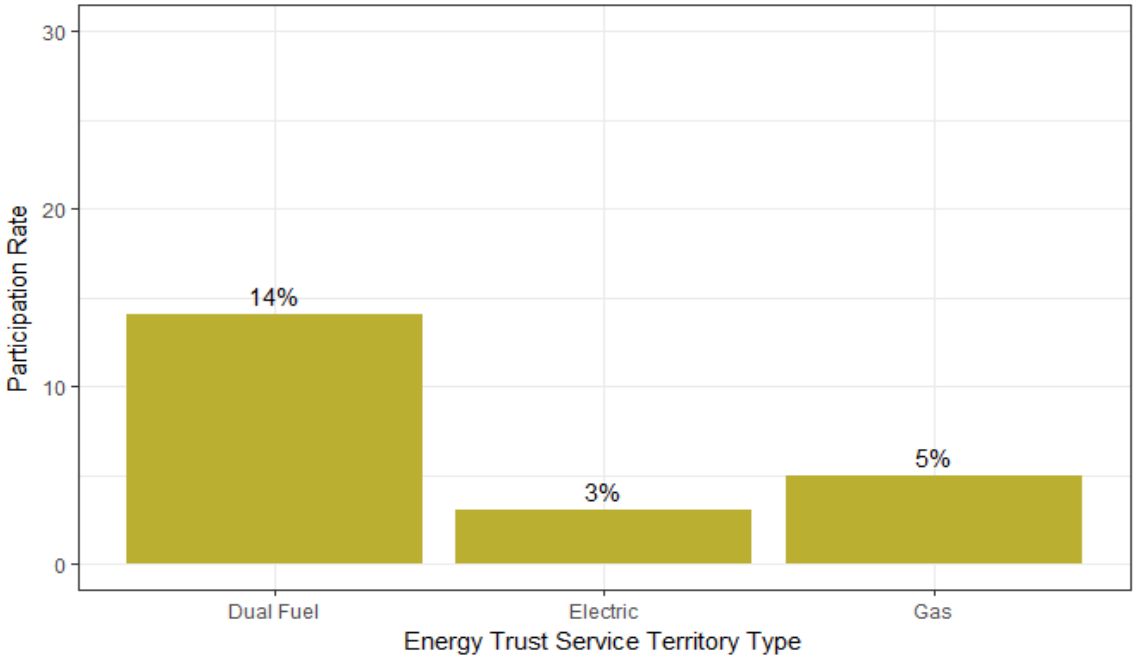


Figure 51: Five-year participation rates for all industrial sites, by service territory type

The overall agricultural participation rates are higher in dual fuel territory, compared with electric-only and gas-only areas. Agricultural site participation rates are broken out by service territory type in Figure 52.

There are very few agricultural sites eligible for Energy Trust services in gas-only territory. Most agriculture sites are primarily electric customers with end uses such as irrigation pumps. Although some sites, such as heated greenhouses, may use gas, most are not gas customers. Thus, most agricultural sites in gas-only territory are not customers of Energy Trust's partner utilities and therefore not eligible for services or incentives.

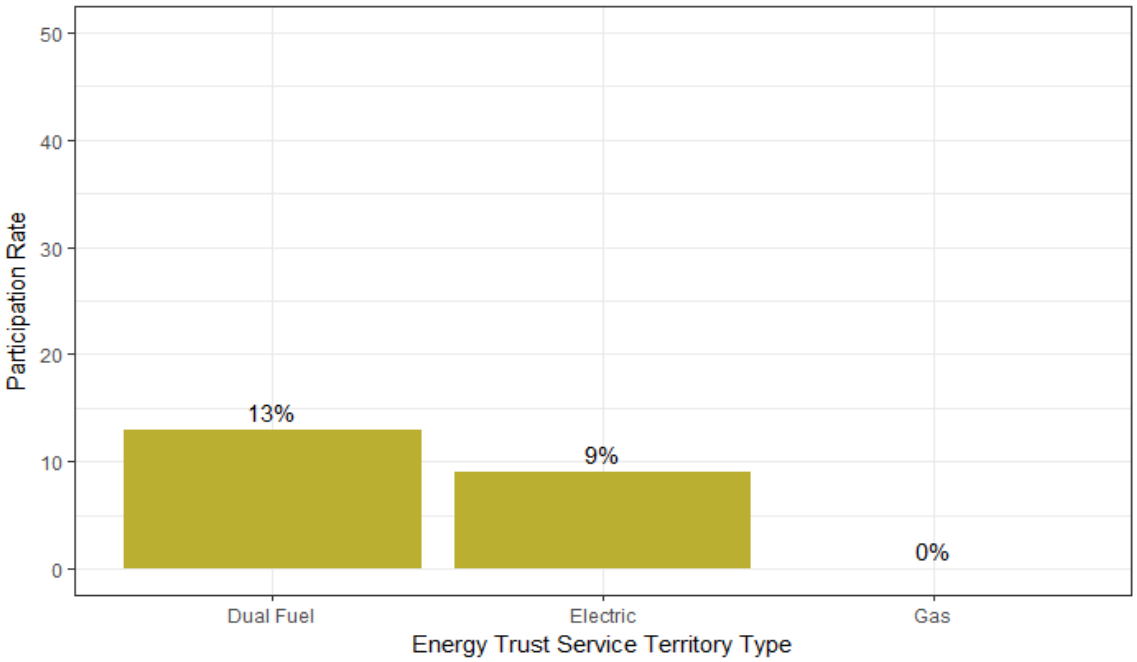


Figure 52: Five-year participation rates for all agricultural sites, by service territory type: Five-year participation rates for all agricultural sites, by service territory type
Note: Energy Trust gas-only service territory contains only 12 eligible agricultural sites

3.3.2.2 Results by Urban-Rural Index

Figure 53 shows the five-year industrial participation rate by the urban-rural index for large and small/medium industrial facilities. Table 46 and Table 47 show participation rate numbers and site counts for large and small/medium industrial facilities.

Customer size appears to have a bigger impact on industrial participation than urban/rural location. As noted above, large industrial customers participated at roughly six times the rate of small/medium industrial facilities. Although there appear to be fluctuations in large industrial participation rates by urban-rural index, these differences are not particularly meaningful, due to the small number of large industrial facilities, especially in more rural areas.

Small/medium industrial sites in very urban areas (one on the urban/rural index) participated at a much higher rate compared to rural and suburban areas. The 18 percent rate for small/medium industrial sites in very urban areas was over four times higher than the four percent participation rate in the most rural areas. There appear to be opportunities to serve small/medium industrial facilities in rural and suburban areas.

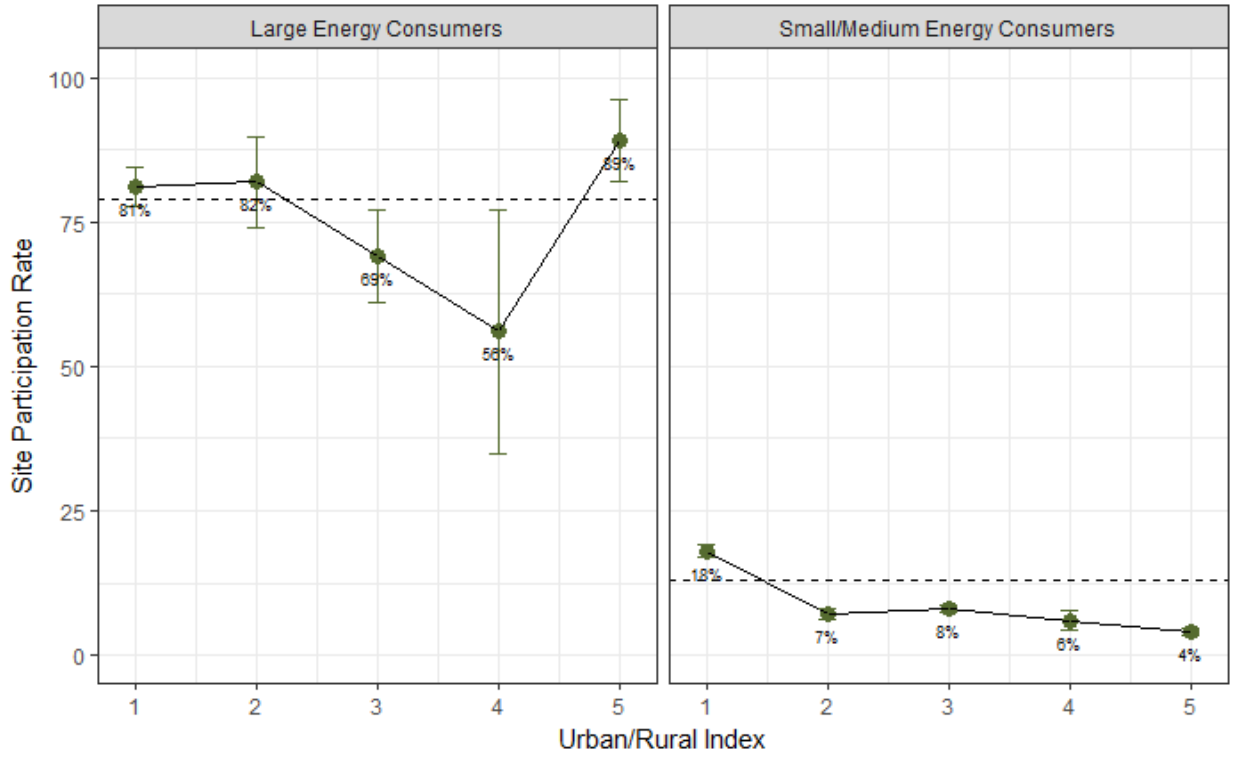


Figure 53: Five-year participation rates for large and small/medium industrial sites, by urban-rural index
Note: The number of eligible large industrial facilities is very small in tracts with urban-rural index scores of 4 and 5, with only nine total sites in each category. The dotted line is the average participation rate.

Table 46: Five-year industrial participation rates and counts for large industrial sites, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	81%	134	31	165
2	82%	23	5	28
3	69%	25	11	36
4	56%	5	4	9
5	89%	8	1	9

Table 47: Five-year participation rates and counts for small/medium industrial sites, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	18%	1,705	7,943	9,648
3	8%	324	3,797	4,121
2	7%	188	2,570	2,758
4	6%	44	679	723
5	4%	54	1,198	1,252

Agricultural participation did not appear to differ significantly between urban and rural areas, although there were some slight variations in participation rates across the state. Agricultural participation by urban-rural index is shown in Figure 54 and Table 48.

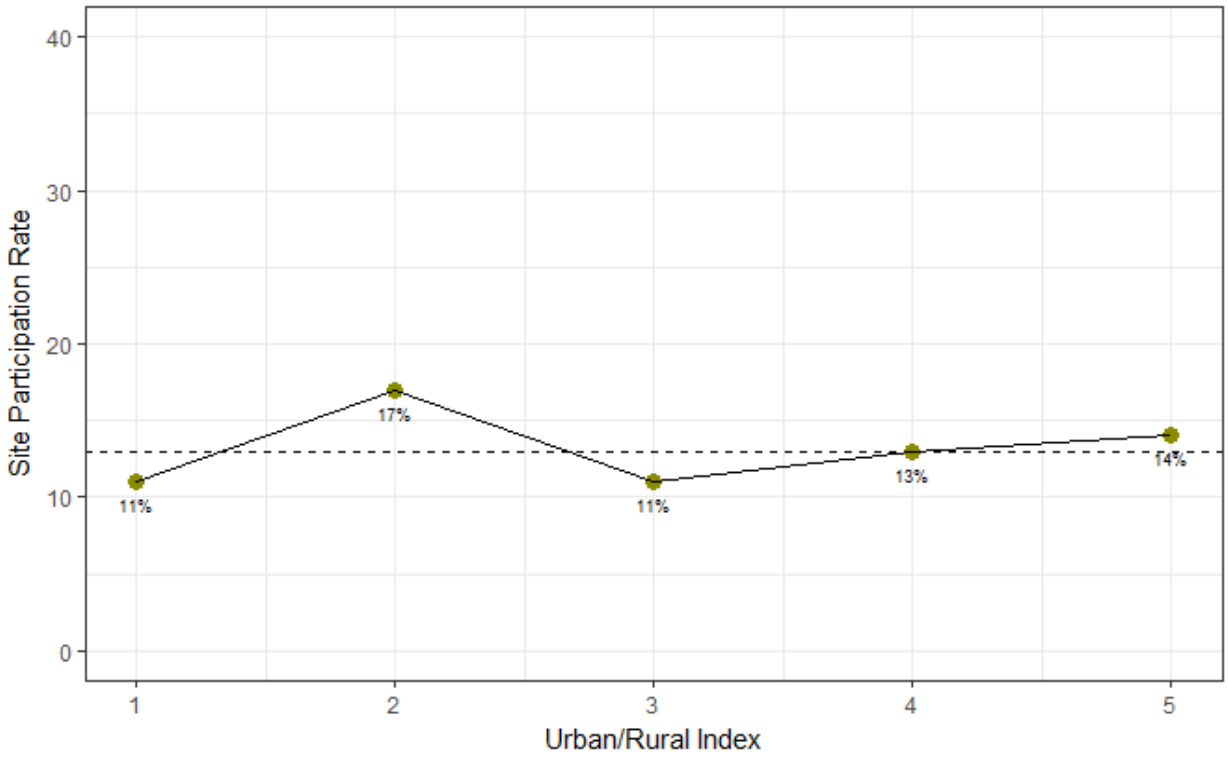


Figure 54: Five-year participation rates for agricultural sites, by urban-rural index. The dotted line is the average participation rate.

Table 48: Five-year participation rates and counts for agricultural sites, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	11%	294	2,377	2,671
2	17%	386	1,824	2,210
3	11%	372	2,993	3,365
4	13%	115	751	866
5	14%	274	1,723	1,997

3.3.3 Cumulative Participation Rates Since Energy Trust Inception (2002-2017)

3.3.3.1 Overall Results

We compared five-year industrial and agricultural participation rates with the cumulative participation rates since Energy Trust inception in 2002.

Overall cumulative participation rates were only slightly higher than the five-year results, indicating that many of the industrial and agricultural customers that have participated in multiple measures over time.

Energy Trust has reached almost all large industrial customers in our territory, indicated by the cumulative large industrial participation rate of nearly 90 percent. Table 49 displays the

cumulative industrial and agricultural participation rates and counts of participant and non-participant sites.

Table 49: Overall cumulative industrial and agricultural participation rates and counts

Type	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
All Industrial	19%	3,500	15,249	18,749
Large Industrial	87%	215	32	247
Small/Medium Industrial	18%	3,285	15,217	18,502
Agricultural	20%	2,274	8,835	11,109

3.3.3.2 Results by Urban-Rural Index

The variation of cumulative participation rates across the urban-rural index was consistent with the more recent five-year participation results. This was true for both large industrial and small/medium industrial facilities. The cumulative industrial participation rates by urban-rural index score can be seen in Figure 55, Table 50 and Table 51.

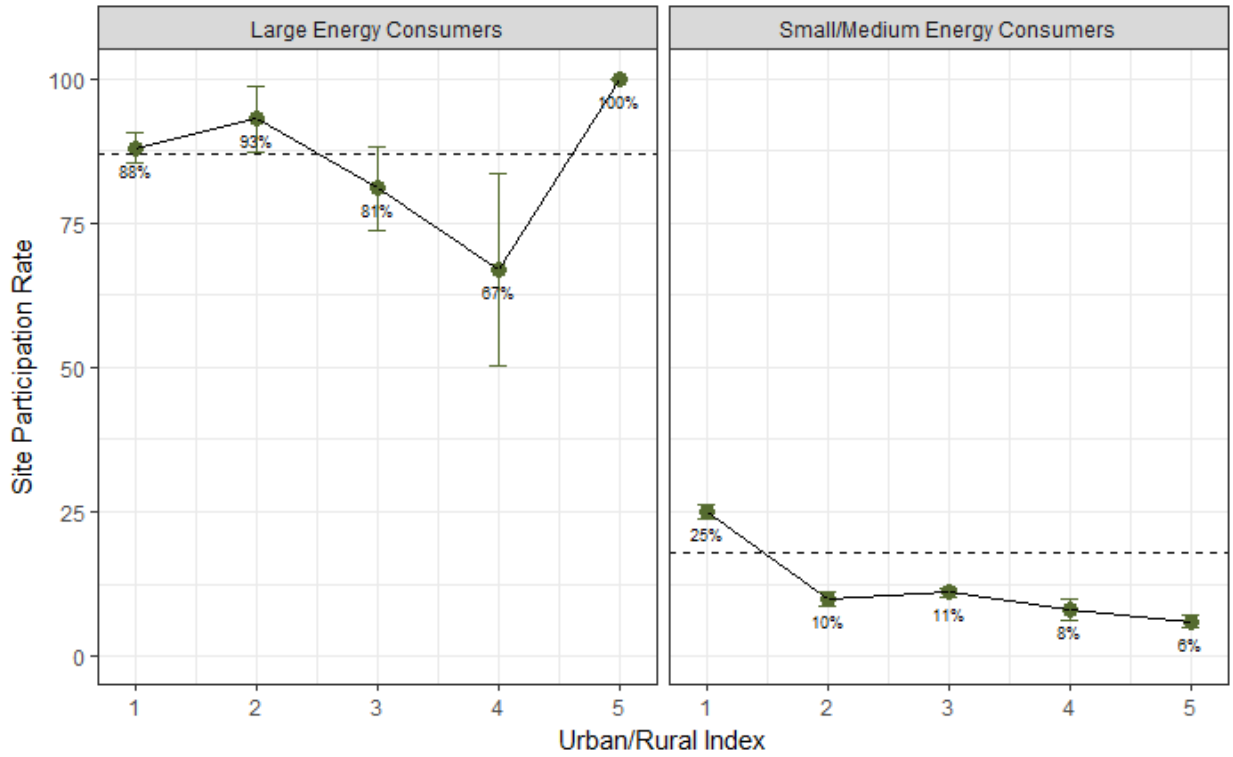


Figure 55: Cumulative industrial participation rates for large and small/medium industrial sites, by urban-rural index

Table 50: Cumulative industrial participation rates and counts for large industrial sites, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	88%	145	20	165
2	93%	26	2	28
3	81%	29	7	36
4	67%	6	3	9
5	100%	9	0	9

Table 51: Cumulative industrial participation rates and counts for small/medium industrial sites, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	25%	2,430	7,218	9,648
3	11%	452	3,669	4,121
2	10%	266	2,492	2,758
4	8%	61	662	723
5	6%	76	1,176	1,252

Overall cumulative participation rate for agricultural sites was somewhat higher than the five-year results, and the trend was similar across the urban-rural index. There were only slight differences in agricultural participation rates between categories. The agricultural participation rates for areas with each urban-rural index score can be seen in Figure 56 and Table 52, below.

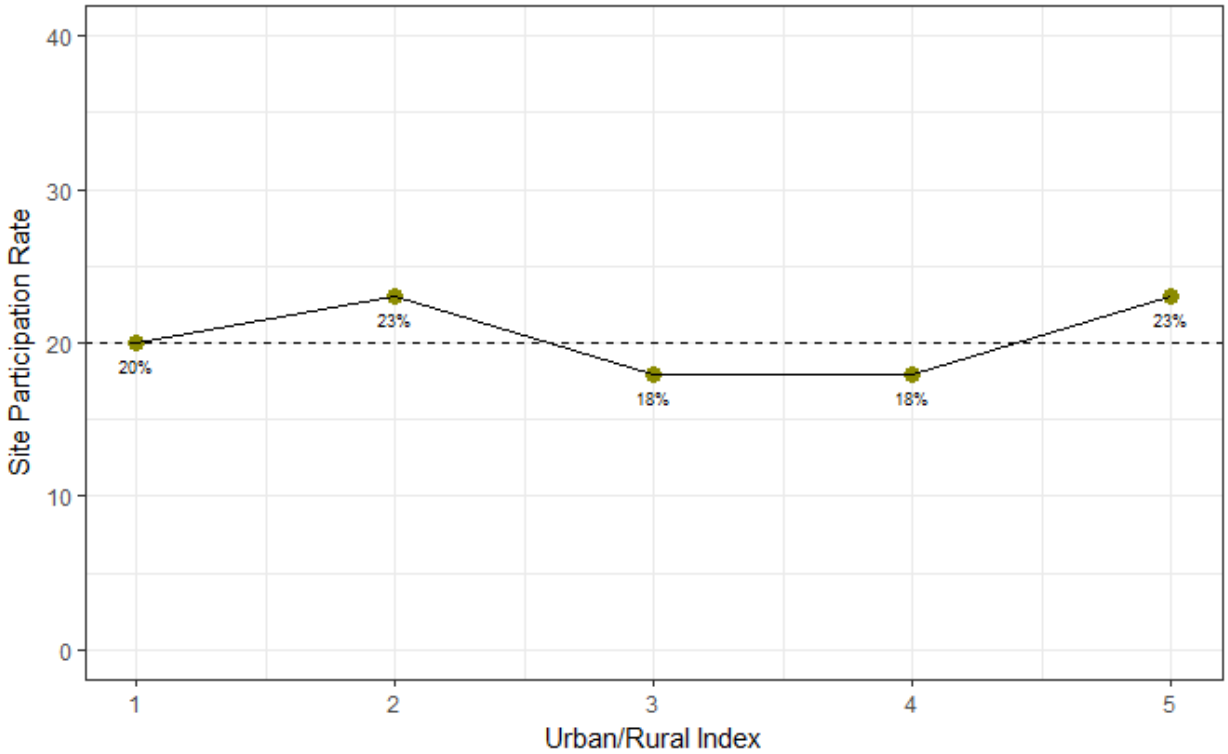


Figure 56: Cumulative participation rates for agricultural sites, by urban-rural index

Table 52: Cumulative participation rates and counts for agricultural sites, by urban-rural index

Urban-Rural Score	Participation Rate	Participant Sites	Non-Participant Sites	Total Sites
1	20%	531	2,140	2,671
2	23%	505	1,705	2,210
3	18%	613	2,752	3,365
4	18%	159	707	866
5	23%	466	1,705	1,997

3.4 Solar Participation Analysis

3.4.1 Analysis Approach

Energy Trust analyzed participation in renewable energy programs based on solar projects. Solar projects represented two-thirds of Energy Trust's generation from 2013-2017 and are all tied to a physical site. Other types of renewable energy projects—biopower, hydropower, geothermal and wind—are much lower volume and may have much more diffuse benefits that are not directly tied to a site.

We analyzed participation in solar projects at residential, commercial and industrial sites in the same ways we analyzed it for efficiency measures. We counted a site as participating if a system was installed at an eligible site in our integrated dataset. Residential sites were analyzed separately from commercial, industrial and agricultural sites. Multifamily buildings were included in the residential analysis; if a multifamily building installed a solar system, then all individual residences within that building were counted as participants.

Solar participation rates are lower than energy efficiency participation rates due to several factors. Energy Trust offers only one solar measure, compared to hundreds of efficiency measures. In addition, a much smaller portion of Energy Trust's budget is allocated to solar projects than compared to efficiency projects. Lastly, solar systems are large capital investments, and costs and demand for these projects are impacted by external policy and market changes. These include factors like tax credits, tariffs, contractor competition, bulk purchases and third-party ownership models.

We analyzed the distribution of projects completed within each category for each diversity indicator. This is because it is difficult to make meaningful comparisons between tracts in individual diversity indicator categories very few solar participants in each tract.

Results are presented as the percent of annual solar projects in each indicator category. For reference, these percentages were compared to the percent of all sites in each indicator category within Energy Trust's electric service territory.

For residential solar projects, we analyzed participation in this way across each of the diversity indicators.

For commercial and industrial solar, we only analyzed participation against the urban-rural index, similar to our analysis of commercial businesses and industrial and agricultural customers.

3.4.2 Solar Participation Results

3.4.2.1 Residential Results

Based on the composite diversity index, the distribution of residential solar projects across tracts has been relatively stable over time, with minor year-to-year fluctuations. Figure 57 shows the percent of residential solar projects completed at sites in each composite diversity index category for 2013-2017. Table 53 displays the percent of 2017 projects completed at sites in each composite diversity index category along with the percent of all residential sites in Energy Trust electric territory in each diversity index category.

Comparing the percent of 2017 projects completed at sites in each composite diversity index category with the percent of all residential sites in Energy Trust electric territory in each diversity index category provides a measure of how equitably solar projects were distributed to tracts in each index category in 2017.

Solar projects in the most affluent, least racially diverse areas of the state were distributed roughly in proportion to the population of households in those areas. Four percent of all eligible residential electric customer sites are in areas with a composite diversity score of one, while five percent of the 2017 residential solar projects were completed in those areas.

The least affluent, most racially diverse areas completed significantly fewer solar projects in 2017 than their share of eligible households. Eighteen percent of eligible residential sites are in areas with a composite diversity score of five, while only 12 percent of 2017 residential solar projects were completed in those areas.

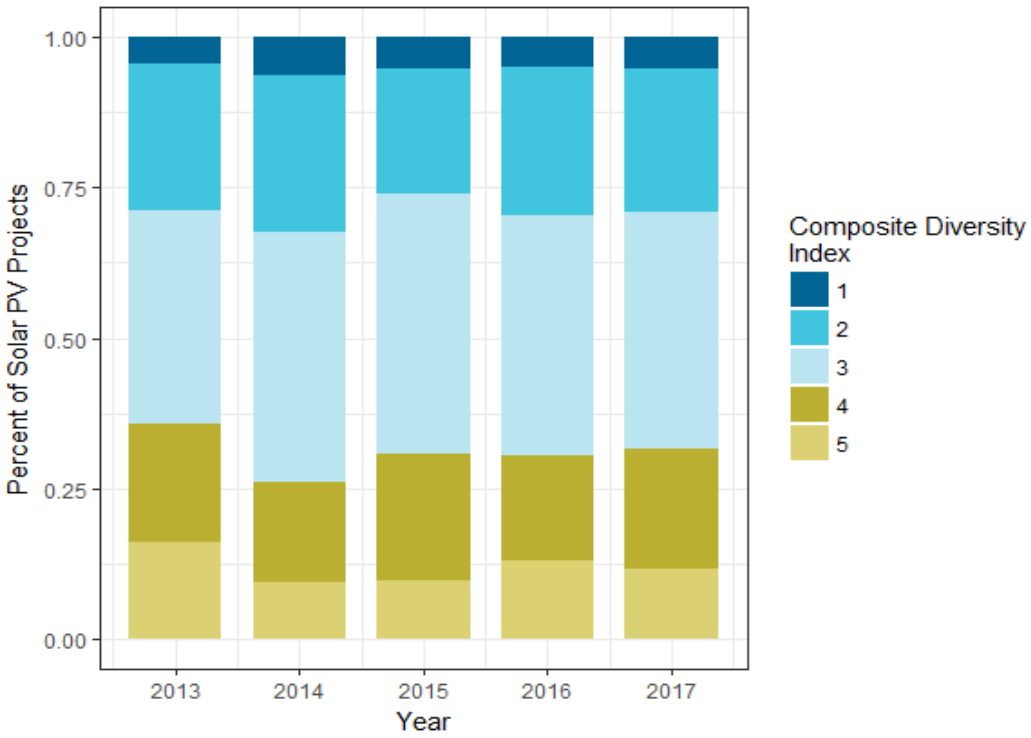


Figure 57: Percent of solar projects completed at residential sites in each composite diversity index category, by year, from 2013-2017

Table 53: Percent and count of 2017 solar projects completed at residential sites in each composite diversity index category

Composite Diversity Score	% of 2017 Solar Projects	% of All Sites in Category	Participant Sites	Total Electric Sites
1	5%	4%	93	50,298
2	24%	20%	420	248,884
3	39%	35%	691	443,000
4	20%	24%	351	299,321
5	12%	18%	207	222,774

The distribution of solar projects across areas with different income scores fluctuated substantially from year to year. Figure 58 shows the percent of residential solar projects completed at sites in each income diversity index category for program years 2013 to 2017. Table 54 displays the percent of 2017 projects completed at sites in each income diversity category along with the percent of all eligible residential sites in Energy Trust electric territory in each category.

Comparing the percent of 2017 projects completed at sites in each income diversity category with the percent of all eligible residential sites in Energy Trust electric territory in each category provides a measure of how equitably solar projects were distributed to tracts in each income category in 2017.

The most affluent areas of the state completed slightly more solar projects than their share of eligible households. For instance, nine percent of all eligible residential electric sites are in areas with an income diversity score of one, while 13 percent of the 2017 residential solar projects were completed in those areas.

The least affluent areas completed significantly fewer solar projects in 2017 than their share of eligible households. Twenty-two percent of eligible residential sites are in areas with an income diversity score of five, while only 12 percent of 2017 residential solar projects were completed in those areas.

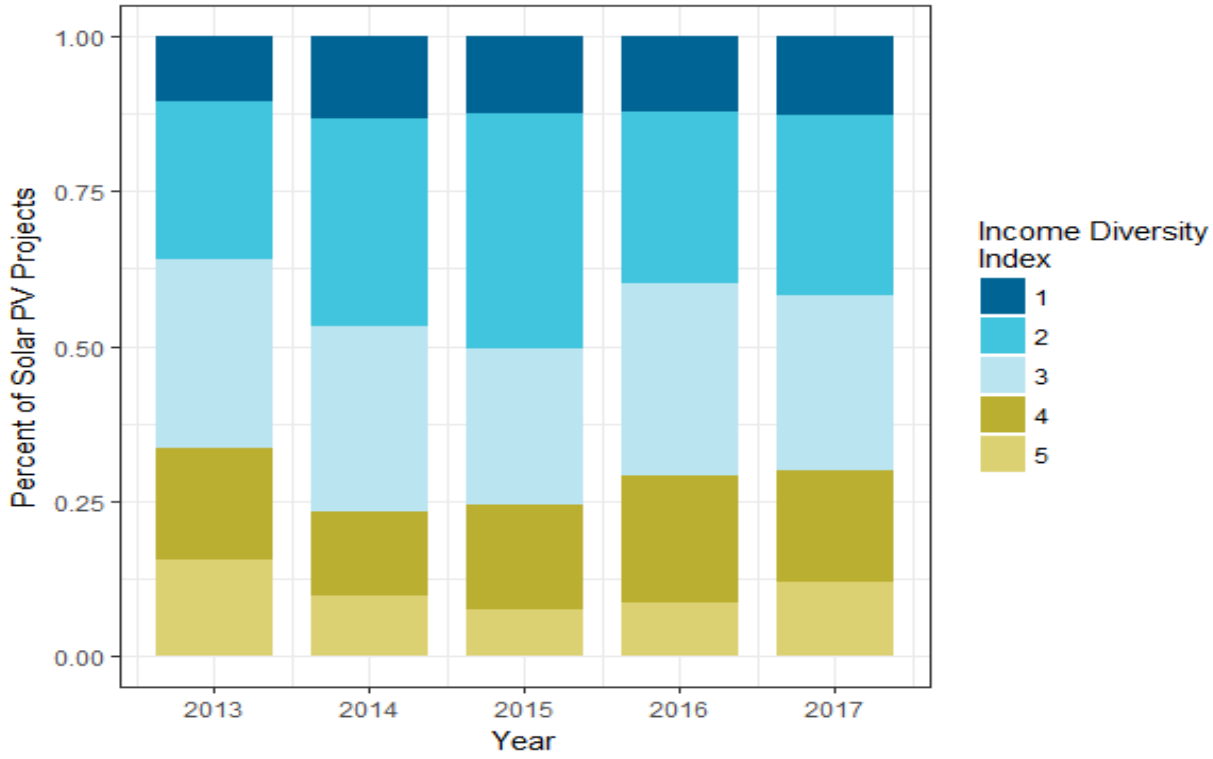


Figure 58: Percent of solar projects completed at residential sites in each income diversity index category, by year, from 2013-2017

Table 54: Percent and count of 2017 solar projects completed at residential sites in each income diversity index category

Income Diversity Score	% of 2017 Solar Projects	% of All Sites in Category	Participant Sites	Total Electric Sites
1	13%	9%	223	110,607
2	29%	20%	516	251,142
3	28%	26%	496	325,467
4	18%	24%	316	304,588
5	12%	22%	211	272,473

The distribution of projects across areas with different racial diversity scores was relatively consistent from year to year, except for an increase in the share of projects in areas with scores of four and five in 2015. Figure 59 shows the percent of residential solar projects completed at sites in each racial diversity index category for program years 2013 to 2017. Table 55 displays the percent of 2017 projects completed at sites in each racial diversity category along with the percent of all eligible residential sites in Energy Trust electric territory in each category.

Comparing these two numbers provides a measure of how equitably solar projects were distributed to tracts in each racial diversity category in 2017.

The least racially diverse areas of the state completed slightly more solar projects than their share of eligible households. Sixteen percent of all residential electric sites are in areas with a

racial diversity score of one, while 19 percent of the 2017 residential solar projects were completed in those areas.

The most racially diverse areas completed significantly more solar projects in 2017 than their share of eligible households. Twenty-two percent of eligible residential sites are in areas with a racial diversity score of five, while 27 percent of 2017 residential solar projects were completed in those areas.

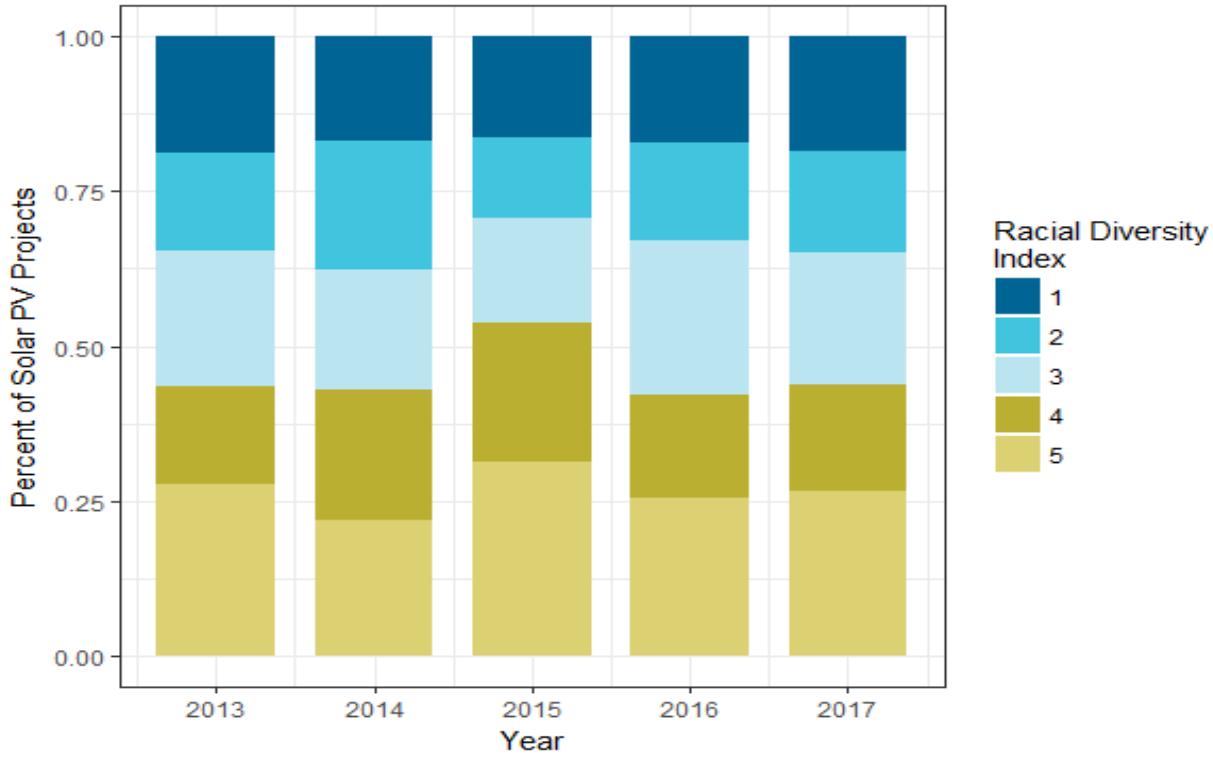


Figure 59: Percent of solar projects completed at residential sites in each racial diversity index category, by year, from 2013-2017

Table 55: Percent and count of 2017 solar projects completed at residential sites in each racial diversity index category

Racial Diversity Score	% of 2017 Solar Projects	% of All Sites in Category	Participant Sites	Total Electric Sites
1	19%	16%	329	204,162
2	16%	21%	287	263,304
3	21%	20%	373	254,302
4	17%	21%	305	262,554
5	27%	22%	468	279,955

The distribution of projects across urban and rural areas was relatively consistent from year to year. Figure 60 shows the percent of residential solar projects completed at sites in each urban-rural index category for program years 2013 to 2017.

Comparing the percent of 2017 projects completed at sites in each urban-rural category with the percent of all residential sites in Energy Trust electric territory in each category provides a measure of how equitably solar projects were distributed to tracts in each urban-rural category in 2017, as seen in Table 56.

The most urban areas of the state completed slightly more solar projects than their share of eligible households in the state. Urban areas with an urban-rural index score of one contain 73 percent of all eligible residential electric customer sites, while 76 percent of the 2017 residential solar projects were completed in those areas.

Results showed parity between rural solar projects and eligible rural households. The most rural areas of the state, those with an urban-rural score of five, contain only two percent of residential sites in Energy Trust electric territory, and two percent of 2017 residential solar projects were completed in those areas.

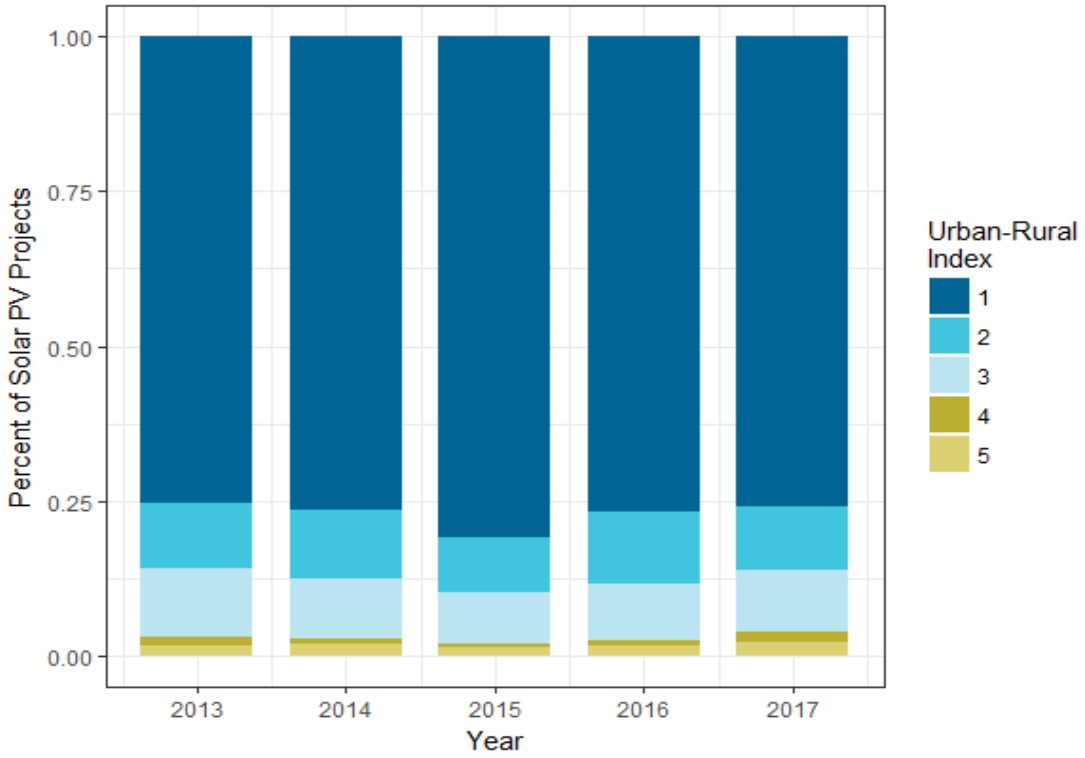


Figure 60: Percent of solar projects completed at residential sites in each urban-rural index category, by year, from 2013-2017

Table 56: Percent and count of 2017 solar projects completed at residential sites in each urban-rural index category

Urban-Rural Score	% of 2017 Solar Projects	% of All Sites in Category	Participant Sites	Total Electric Sites
1	76%	73%	1336	924,104
2	10%	9%	179	107,849
3	10%	13%	178	170,246
4	2%	3%	31	34,533
5	2%	2%	38	27,546

3.4.2.2 Commercial and Industrial Results

We analyzed Solar program activity at commercial and industrial sites similar to how we analyzed it for residential sites.

Consistent with our analysis of commercial customer participation in energy efficiency programs, we only present findings using the urban-rural index.

The distribution of commercial and industrial solar projects across urban and rural areas has varied significantly from year to year, as shown in Figure 61. This is in part due to the relatively small number of commercial and industrial solar projects funded by Energy Trust each year, which causes the numbers to be more volatile than the residential results.

Comparing the percent of 2017 solar projects completed at commercial and industrial sites in each urban-rural category with the percent of all sites in Energy Trust electric territory in each category provides a measure of how equitably commercial and industrial solar projects were distributed to tracts in each urban-rural category in 2017, as shown in Table 57.

Most urban areas of the state completed substantially fewer solar projects than their share of eligible commercial and industrial sites in the state. Sixty-two percent of all eligible commercial and industrial sites are in urban areas with an urban-rural score of one, while only 50 percent of the 2017 solar projects were completed in those areas.

Solar projects were distributed roughly in proportion to the population of commercial and industrial sites in rural areas. The most rural areas of the state, those with an urban-rural score of five, contain five percent of commercial and industrial sites in Energy Trust electric territory, and six percent of 2017 solar projects were completed in those areas.

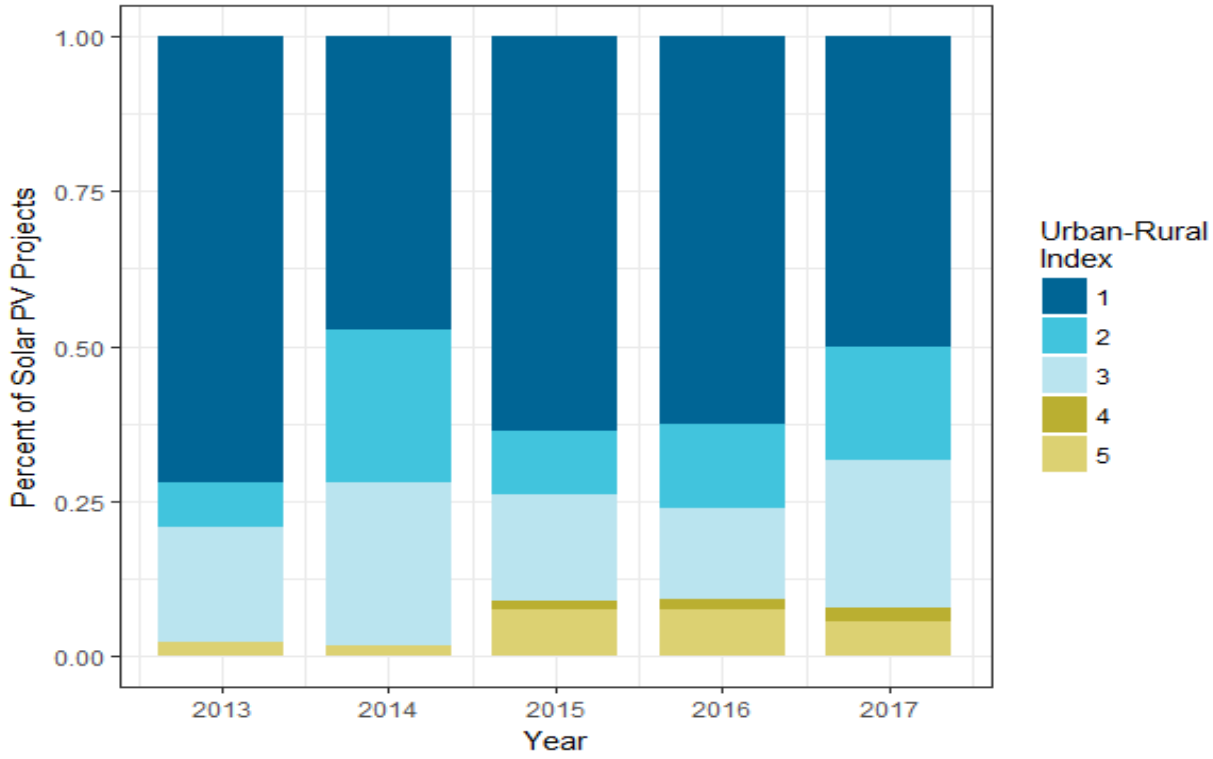


Figure 61: Percent of solar projects completed at commercial and industrial sites in each urban-rural category, by year, from 2013-2017
Note: The percentages in some categories are based on very small numbers of projects

Table 57: Percent and count of 2017 solar projects completed at commercial and industrial sites in each urban-rural category

Urban-Rural Score	% of 2017 Solar Projects	% of All Sites in Category	Participant Sites	Total Electric Sites
1	50%	62%	71	91,050
2	18%	11%	26	16,801
3	24%	18%	34	26,887
4	2%	4%	3	5,426
5	6%	5%	8	6,844

4 Conclusions and Recommendations

4.1 Conclusions

This analysis marks a significant step forward in Energy Trust's ability to reach more utility customers so that we provide energy savings and generate renewable power. With more information and clues to help set and monitor our progress against our diversity, equity and inclusion goals, we will continue to advance our mission. Energy Trust's past data collection model has inhibited our ability to get a clear understanding of our customers without access to household level data, while the need to develop a greater understanding of our diversity, equity and inclusion priority populations to develop effective strategies has become increasingly important. We recognize the limitations of this approach; however, we know that with this information we can jump-start the development of our diversity, equity and inclusion strategies in earnest. Through careful consideration of our internal analysis as well external feedback, we will focus on these areas of program opportunity in the near term, while also developing our internal capacity for increased diversity, equity and inclusion data systems and operations.

4.1.1 Areas of program opportunity identified in analysis

For residential programs, we see opportunities to focus strategies that engage areas where there are:

- High prevalence Native American communities
- High prevalence Hispanic/Latino communities
- Communities with low incomes
- Rural communities

For commercial programs, we see opportunities to focus strategies that engage areas where there are:

- Small and medium businesses across the Energy Trust service territory
- Businesses in rural communities

For industrial and agricultural programs, we see opportunities to focus strategies that engage areas where there are:

- Small and medium production facilities, especially in rural areas

For the commercial and residential solar program, we see opportunities to continue to focus strategies that engage areas where there are:

- High prevalence Native American communities
- High prevalence of communities of color
- Communities with low incomes
- Rural communities

4.2 Recommendations

As Energy Trust utilizes this data to inform and provide strategic direction for the development and implementation of its diversity, equity and inclusion goals, we intend to continue to

strengthen our data collection, analysis and dissemination so that customers, communities and decision makers have verified data and approaches to address underserved communities.

4.2.1 Utilization of Conclusions

We recognize the limitations of this analysis and do not intend to solely use composite information to develop detailed program strategies to address complex community needs and barriers.

The conclusions from this analysis should serve as a starting point for exploration and further development. This analysis has identified geographic areas of high opportunity to develop and refine Energy Trust's strategies to engage utility customers, potential program participants, businesses and communities. As Oregon's population continues to diversify racially, economically and geographically, Energy Trust plans to develop strategies to engage those groups that make up the priority diversity dimensions and gain a strategic advantage to achieving Energy Trust's mission.

As Energy Trust staff develop strategies and plans to achieve diversity, equity and inclusion goals, staff should utilize the information in this report as a broad guide. While participation varies across programs, there are several congruent opportunities where program teams can commence program development and collaboration to increase participation, remove barriers and engage with communities. These opportunities include:

- Communities with high prevalence of communities of color, including but not limited to Native American and Hispanic/Latino communities
- Communities with low incomes
- Rural communities
- Small/medium businesses and production facilities

The project team also recommends that as program teams utilize the DEI Data and Baseline Analysis, that teams document both their process and results so that Energy Trust can continue to analyze and improve efforts over time.

4.2.2 Race/Ethnicity, Income and Composite Indexes for Business Customers

The project team explored analyzing program participation for commercial, industrial, and agricultural business sites along the other indices besides the urban-rural index, such as racial, income and composite diversity indexes.

One area for further exploration is how community level demographics correlate to small business ownership demographics. A 2017 report from the U.S. Small Business Administration examined the characteristics of small business in low-income areas, including business size, payroll size and common industry types (i.e., construction, professional services, healthcare).[20] The study found that "in low-income areas, the vast majority of self-employed workers operate a business in their area of residence."

Further analysis is required to better understand demographic characteristics of business owners and employees and program participation rates. Energy Trust will also need to continue

[20] Kugler, M., Michaelides, M., Nanda, N., & Agbayani, C. (2017). Entrepreneurship in Low-Income Areas. https://www.sba.gov/sites/default/files/437-Entrepreneurship-in-Low-income-Areas.pdf

to work with community-based organizations to seek additional insight into needs and barriers of communities.

4.2.3 Cross-Sector Coordination on Goal Setting, Stakeholder Engagement and Delivery Tactics

There are opportunities for coordination across Energy Trust programs, especially Energy Trust's Residential, Multifamily, Existing Buildings and Solar programs.

For example, Energy Trust typically engages with large multifamily properties through property managers or owners through its Existing Buildings program. Smaller multifamily properties, however, do not necessarily have the same engagement opportunities through property management firms with large portfolios, and may be best served by direct engagement with owners and tenants through strategies more aligned with Energy Trust's Residential program.

As teams develop strategies for engagement, program design and implementation, the project team recommends utilizing these conclusions to ground the work in data and information while also seeking opportunities to utilize the talent, experience and expertise across the organization to achieve the organization's mission and diversity, equity and inclusion goals.

4.2.4 Approach for Data

This analysis highlighted areas for data exploration. Looking forward, the following activities and data system recommendations are suggested to complement this report and support goal 8:

4.2.4.1 Data Collection

- Develop strategies for community generated and verified information and data collection for all programs at Energy Trust.
- Develop strategies to collect household level demographic data for all program participants instead of utilizing large third-party data from vendors.
- Develop strategies to collect salient firmographic data for all business participants.
- Continue to work with community-based organizations to generate quantitative and qualitative data to inform goals and strategies.
- Work with community-based organizations such as the Coalition of Communities of Color and Research Justice Center to implement community verified guidelines for data collection of race and ethnicity on all data collection efforts.

4.2.4.2 Data Analysis

- Develop strategies for community-based analytics
- Build the analytic capacity of staff by recruiting diverse employees with diverse lived experiences of race/ethnicity, income and geography.
- Consider partnering with community-based researchers to design, collect, analyze and disseminate qualitative data to inform organizational evaluation and planning.
- Develop a plan and process to track diversity, equity and inclusion efforts, data and analysis over time.

4.2.4.3 Dissemination and Reporting

- Develop standard process and protocols to describe data limitations with regards to the priority populations.
- Collaborate with peers across the country who are conducting community-based research to inform data and evaluation and build a network of communities committed to increasing customer participation in energy savings and renewable power generation in priority communities.
- Collaborate with peers conducting community-based research to inform data and evaluation practices and build a network of communities with similar diversity, equity and inclusion goals.
- Develop and implement protocols to provide opportunities for community validation processes in diversity, equity and inclusion reporting.

5 Appendices

This section highlights additional resources relevant to this analysis.

5.1 Other Examples of Diversity, Equity and Inclusion Analysis and Frameworks

Los Angeles Department of Water and Power Equity Metrics Data Initiative

Perhaps the most similar effort in the energy industry to develop and track equity-related goals for energy program delivery and services is the Equity Data Metrics Initiative established by the Los Angeles Department of Water and Power in 2016 as part of a rate case.

Like Energy Trust, Los Angeles Department of Water and Power conducted a geographic analysis based on census tracts and data.

According to Los Angeles Department of Water and Power, the purpose of the Equity Data Metrics Initiative is to:

> "…track, measure, and report on how its programs are provided to all customers and residents of Los Angeles. The Equity Data Metrics Initiative establishes a data-driven framework that assesses how well programs, services, and resources are distributed and used throughout the city, both geographically and demographically, to see whether any disparities exist. Data collection and analysis through the Equity Data Metrics Initiative will provide important information about Los Angeles Department of Water and Power's services and operations, and help ensure that all customers are reached with fairness and equity."[21]

Citations and Links:

- Los Angeles Department of Water and Power "*Presentation on Equity Metrics Set for LADWP Board Meeting on September 19, 2017*." http://www.ladwpnews.com/presentation-on-equity-metrics-set-for-ladwp-board-meeting-on-september-19-2017/

California Energy Commission Energy Equity Report

Pursuant to California Senate Bills 350 and 355, along with ongoing research on tribal lands, disadvantaged and low-income communities, and energy use/energy burden through the Electric Program Investment Charge grant program, the California Energy Commission has developed energy equity indicators and an energy equity report "to help identify opportunities to improve access to clean energy technologies for low-income customers and disadvantaged communities; increase clean energy investment in those communities; and improve community resilience to grid outages and extreme events."[22]

These indicators for tribal areas and low-income communities are based upon census tracts, zip codes (or Zip Code Tabulated Areas) or counties, depending on data availability. The California Energy Commission's equity metrics use Census American Community Survey data (currently 2011-2015 five-year estimates) as one source (among others) for demographic data. In addition to income and population density, the California Energy Commission metrics also incorporate

[21] http://www.ladwp.com/equitymetrics
[22] http://www.energy.ca.gov/sb350/barriers_report/equity-indicators.html

health and community resilience data into their equity indicators with data on environmental health.

Citations and Links:

- California Energy Commission (2018). "*Energy Equity Indicators*." http://www.energy.ca.gov/sb350/barriers_report/equity-indicators.html
- California Energy Commission (2018). "*Energy Equity Opportunities in Low-Income Communities*." https://calenergycommission.blogspot.com/2018/08/energy-equity-opportunities-in-low.html
- California Energy Commission (2018). "*Funding opportunities for the Electric Program Investment Charge (EPIC) Program*." https://www.energy.ca.gov/contracts/epic.html

Coalition of Communities of Color Research Justice Framework

The Coalition of Communities of Color has done extensive work with the research justice framework to explicitly prioritize and center the historical and cultural knowledge of communities in research that uses quantitative demographic information from the U.S. Census Bureau. There are several examples of Communities of Color-led research engagements that focus on community verification of data. This is an excerpt from the recent report *Leading with Race: Research Justice in Washington County*:

> "Accurate data–using community verified, equitable practices—gives businesses, local governments, police, courts and schools effective information and tools for their decision-making, and their effective engagement with families, students and Washington county residents."

Citations and Links:

- Coalition of Communities of Color. 2018. *Leading with Race: Research Justice in Washington County*. Portland, Oregon: Coalition of Communities of Color. http://www.coalitioncommunitiescolor.org/leadingwithrace

Northwest Power and Conservation Council

Energy Trust participated in a recent regional study on "hard-to-reach markets" conducted by the Northwest Power and Conservation Council, working with other Pacific Northwest utilities, Bonneville Power Administration and Northwest Energy Efficiency Alliance.

Citations and Links:

- Northwest Power and Conservation Council (2018). "*Expanding Energy Efficiency Programs to Hard-to-Reach Markets*." https://www.nwcouncil.org/news/expanding-energy-efficiency-programs-hard-reach-markets

The project team communicated with Bonneville Power Administration's lead economist on the agency's approach to analyzing program delivery. Bonneville Power Administration's approach was to take the areas with the lowest participation and examine demographic factors. We repeated this type of analysis for Energy Trust's Oregon service territory, identifying the 20 tracts with the lowest participation rates in Oregon. In the end, we didn't find this method useful because there are too many non-demographic factors driving participation rates. For instance, many of the tracts that were identified are in Avista service territory (that Energy Trust has only

been serving since the beginning of 2017) and other parts of Energy Trust's gas-only service territory. As discussed earlier, gas-only territories tend to have lower participation rates regardless of the demographics of the area. Figure 62 shows that the lowest participating tracts are well distributed through the each of the indicators of diversity.

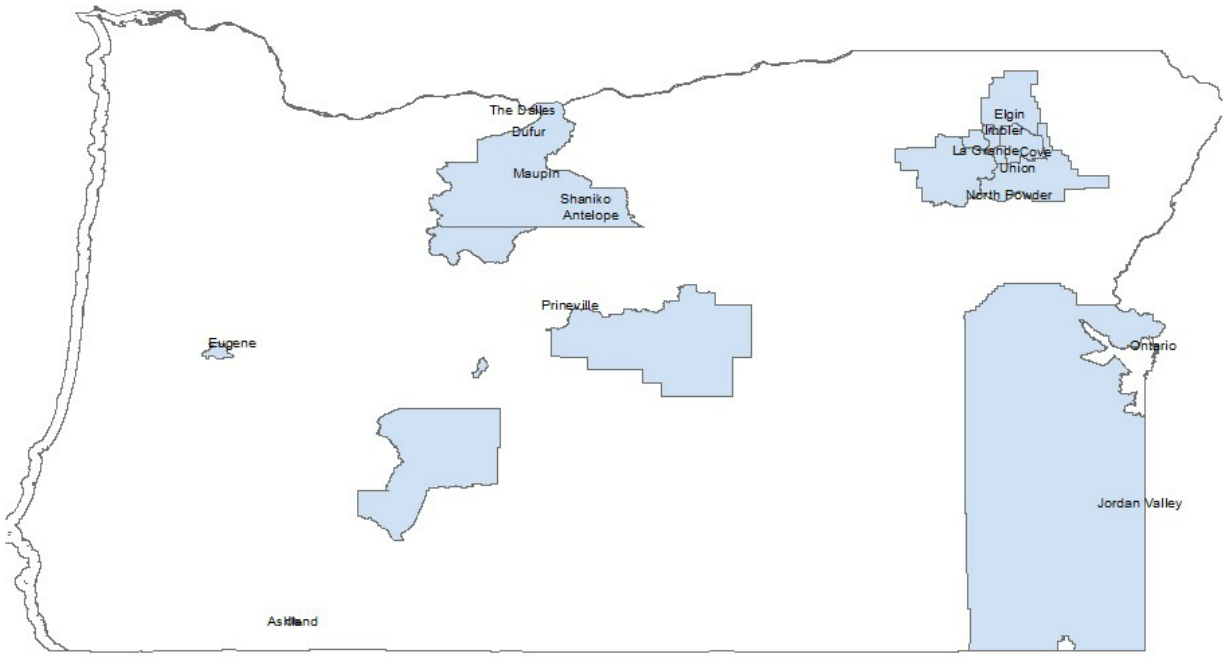


Figure 62: The 20 census tracts with the lowest residential rates of participation

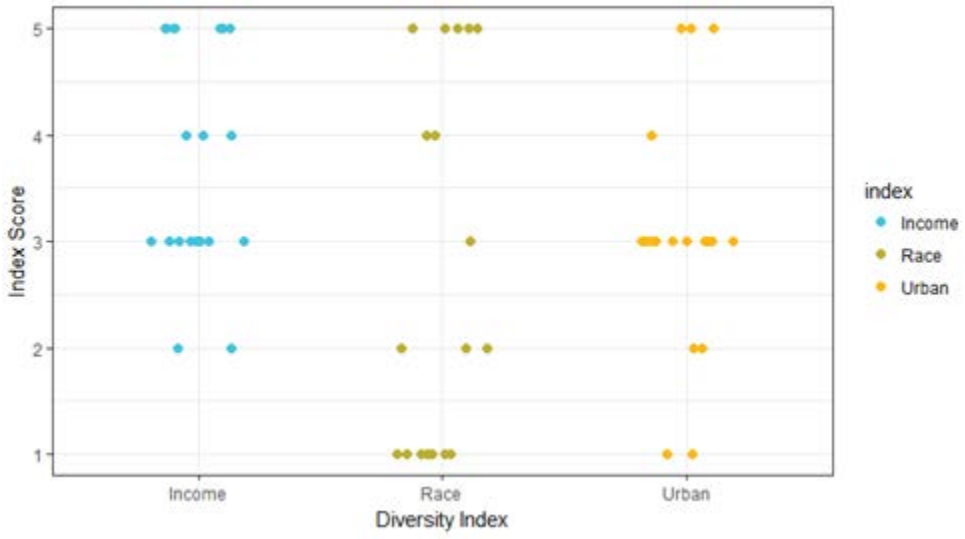


Figure 63: Composite Diversity Indicator scores for lowest participating census tracts (for tracts with > 100 households)

U.S. Small Business Administration

The U.S. Small Business Administration (SBA) published a report in 2017 examining the characteristics of businesses operating in low-income areas. A summary of characteristics from this report is as follows:

"Area Distribution and Incorporation of Businesses in Low-Income and Other Areas

- *There are proportionately fewer self-employed workers and employer businesses in*
- *low-income areas relative to other areas.*
- *The vast majority of self-employed workers in low-income areas operate a business in*
- *their area of residence.*
- *Businesses in low-income areas are less likely to incorporate than businesses in other areas.*

Characteristics of Businesses in Low-Income and Other Areas

- *A large majority of self-employed workers in low-income areas own businesses in five sectors – construction, professional services, other services, trade (includes wholesale and retail), and healthcare.*
- *In low-income areas, businesses in construction, professional services, administrative support, and agriculture are much less likely than average to be employer businesses (i.e., have at least one paid employee).*
- *In low-income areas, businesses in trade and healthcare are much more likely than average to be employer businesses.*
- *Employer businesses in low-income areas have fewer employees and lower average payrolls than businesses in other areas.*
- *Within low-income areas, employer businesses in education, manufacturing, mining, and healthcare tend to be larger and have higher-than-average payroll."*

Citations and Links

- Kugler, M., Michaelides, M., Nanda, N., & Agbayani, C. (2017). Entrepreneurship in Low-Income Areas. https://www.sba.gov/sites/default/files/437-Entrepreneurship-in-Low-income-Areas.pdf

U.S. Department of Treasury Opportunity Zones

The US Department of Treasury has developed Opportunity Zones as a local economic development tool. Within each US state, Opportunity Zones[23] are identified using census tracts —each zone consists of an entire tract.[24] The U.S. Department of Treasury defines an Opportunity Zone as follows:

> *"An Opportunity Zone is an economically-distressed community where new investments, under certain conditions, may be eligible for preferential tax treatment. Localities qualify as Opportunity Zones if they have been nominated for that designation by the state and*

[23] https://www.irs.gov/newsroom/opportunity-zones-frequently-asked-questions
[24] https://www.oregon4biz.com/Opportunity-Zones/

that nomination has been certified by the Secretary of the U.S. Treasury via his delegation authority to the Internal Revenue Service."

In Oregon, 86 census tracts were designed as "Opportunity Zones" in 2018.[25]

Citations and Links:

- Business Oregon (2018). *"Opportunity Zone Program."* https://www.oregon4biz.com/Opportunity-Zones/
- KGW (2018). *"Oregon picks prime Portland real estate for 'Opportunity Zone' program."* https://www.kgw.com/article/money/business/oregon-picks-prime-portland-real-estate-for-opportunity-zone-program/283-556720559
- Internal Revenue Service (IRS) (2018). *"Opportunity Zones Frequently Asked Questions."* https://www.irs.gov/newsroom/opportunity-zones-frequently-asked-questions

[25] https://www.kgw.com/article/money/business/oregon-picks-prime-portland-real-estate-for-opportunity-zone-program/283-556720559

5.2 Energy Trust service territory