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ENERGY BURDEN ASSESSMENT

ENERGY BURDEN REDUCTION STRATEGY

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SEPTEMBER 2021

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INTRODUCTION

This report presents a suggested strategy for Avista to meet its energy burden reduction goals. It begins with an overview of Avista's current customer energy burden, followed by a list of potential actions for reducing customer energy burden.

CONTENTS

1. METHODOLOGY

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1.1 GENERAL APPROACH

This energy burden assessment relies on collecting customer-level data, modeling missing attributes, then aggregating key metrics by geographic, demographic or building variables for analysis. The customer data comes from various sources as described in the rest of Section 1. Some demographic attributes were modeled or inferred using statistical techniques due to lack of primary data in CIS or other sources. American Community Survey data was mainly used to sanity check aggregate statistics of customer-level data at the census tract level.

Three types of metrics were calculated:

- Metrics related to energy burden based on demographic and geographic characteristics
- Participation and funding in Avista's Energy Assistance Programs
- Customer energy use characteristics

The final dataset and results will be packaged in a web dashboard for Avista staff and the final underlying dataset will also be provided in a later deliverable.

1.2 DATA SOURCES

The data sources leveraged for the analysis are described in this section.

DATA PROVIDED BY AVISTA

Customer Information System (CIS): This data included monthly electricity bills for 24 months in 2019-20, account numbers and service addresses. A separate data extract included the dates and customer accounts that received late payment notices, allowing us to calculate the on-time payment rate for different customer segments.

Direct Assistance Program Data: We received a list of participating accounts in six of Avista's direct assistance programs (LIHEAP, LIRAP, Senior/Disabled Rate, Project Share, Housing Assistance and other miscellaneous assistance) in 2019-20, along with discount amounts and dates. This allowed us to calculate the total assistance funding at the household level.

Energy Efficiency Program Data: We received a list of participating accounts in the Low Income Energy

Efficiency Program in 2019-20, along with installed measures, estimated kWh savings and rebate amounts. The rebate amounts were used to aggregate the "assistance funding" provided to the customer, while the deemed kWh savings were used to estimate the annual bill impact based on average bill savings of 9.4 cents/kWh. This rate is in the middle of Avista's tiered residential rate and we expected it be a good estimate of the true bill savings. Avista also provided participation data for the Multifamily Direct Install and residential energy efficiency measures – these will be used in later phases of the energy burden assessment to fully quantify the energy burden reduction of non-low-income programs.

2022-45 Conservation Potential Study: A copy of Avista's 2022-45 Conservation Potential Study was provided. This gave a big-picture view of anticipated conservation opportunities for the general population in Avista's service territory and helped frame some of the recommendations for energy burden reduction opportunities.

DATA OBTAINED FROM OTHER SOURCES

Geocoding: All customer addresses were geocoded to a latitude/longitude pair to facilitate geographic analysis. In addition, we mapped the latitude/longitude pairs to census tracts, block groups and blocks in order to pull additional aggregate statistics.

County Assessor Data: We obtained publicly available assessor data from the following counties: Spokane, Stevens, Whitman, Adams, Asotin, Lincoln, Ferry and Pend Oreille. A handful of customers in other counties were still included in the analysis but without assessor data. The assessor data included appraised values for homes, square footage, building year built, Washington state building use codes (residential, mobile homes, commercial and industrial), number of buildings on a land parcel, and other minor data points that were useful for performing general QA.

The addresses in this dataset were standardized to US Postal Service format, then matched with addresses in the CIS data. Some addresses existed in the CIS data but not in the assessor data (typically happens when multiple buildings occupy the same land parcel). For Spokane

county, we were able to match most of these addresses to the appropriate land parcel using a "point-in-polygon" algorithm. This algorithm detected whether a given latitude/longitude pair (obtained from geocoding) fell within a particular land parcel (the Spokane county assessor made available a GIS file of parcel boundaries).

Customer Demographics: Data was purchased from a third-party data compiler that aggregates data from public sources and credit bureaus. This data was mapped to the CIS dataset using customer addresses and included total household income, age of occupants, and homeownership status for a little over 60% of residential households. Demographic attributes for some customers were modeled due to lack of primary data in CIS or other sources. The modeling approaches are described in the next section.

American Community Survey (ACS): ACS data (2019 5 year estimates) was primarily used for QA to ensure that aggregate counts for various demographic attributes match the expected distributions from ACS.

1.3 FINAL ATTRIBUTES AND METRICS

The calculation methods for the metrics and attributes used in this report are described in this section. For all attributes, we also capture metadata related to the source of data and the confidence in the value (for example, data from primary sources has a high confidence, while modeled data has lower confidence). All of the data is robust for aggregate analysis, while high confidence data is better suited to customer-level marketing and program targeting.

Household Income: Income data was only available for 60% of households in Avista's service territory. To estimate the incomes for the remaining 40%, we used an iterative procedure.

Starting from the households for which we had income data, we applied an imputation model – this is a statistical method for filling in missing data by using the home's location, home value and building type. In other words, each household is assigned an income range based on the incomes of similar households in their area. This is the initial guess for that household's total annual income. Then, an iterative calibration procedure uses those initial guesses and adjusts them to ensure that the overall income distribution within a census tract is similar to the overall income distribution from the ACS. The calibration iteratively takes a small sample of households (under 10%) and bumps them up or down by one income level within certain bounds until the modeled income distribution resembles the ACS income distribution.

Validation: The modeling procedure yields fairly good results - it is able to reproduce the incomes accurately for a hold-out set of data from the original dataset, with errors under $5k/year in household income for 85% of the test set and errors under $20k/year in household income for the other 15%. Larger errors tend to happen for households with a larger income, which are not the focus of this study anyway. More importantly, the aggregate metrics related to energy burden (e.g. energy assistance need and overall burden) are very robust to errors in individual results because we are ensuring that overall distribution of income is as accurate as possible, while

the energy use does not change dramatically among similar households.

Poverty Status: The number of people living in a household cannot be easily obtained from any public data sources. This makes it difficult to identify a household's poverty status compared to the Federal Poverty Limit or the Area Median Income, both of which are defined by household size. The median household size in Avista's service territory is 2.4 and all figures that require poverty status in this report are given as ranges between a household size of 2 and 3. Household size for income thresholds is a configurable parameter in the data dashboard.

Validation: According to the US Census Bureau, approximately 14% of households in Avista's service territory would fall under 100% of the Federal Poverty Limit. In this analysis, the range is between 12 and 17%, depending if we assume all 2-person households or 3-person households, respectively.

Building type: Meters were classified into one of five building types: single family, mobile homes, multifamily apartments, commercial or master metered and

unoccupied. Commercial meters were those tagged with a specific commercial use by the county assessor or that were on a commercial rate class (unless they were clearly apartments). Additionally, we filtered out meters using in excess of 60,000 kWh per year as those are likely associated with commercial uses or are master metered. Meters that showed energy consumption less than 1200 kWh/year were flagged as potentially unoccupied.

Overall, the number of household meters excluding commercial and unoccupied meters was 224- 225,000. Addresses with multiple units or tagged as multifamily properties by the county assessor were flagged as apartments. Mobile homes were either labelled as such by the county assessor or were sited in a mobile home park. Non-multifamily homes with addresses but without an identified land parcel are usually accessory dwelling units, trailers or mobile homes – these were all included in the "mobile home" category.

Validation: The aggregate housing type counts (66% single family, 25% multifamily and 9% mobile/manufactured homes) agree well with data from the American Community Survey for the five main

counties in Avista's service territory (approx. 67% single family, 25% multifamily).

Homeownership Status: Homeownership status (rent vs. own) was determined using two methods. The demographic dataset included homeownership for approximately 60% of customers. For the other 40%, households in multifamily apartments were tagged as "Likely Renters", and households without any account changes during the two year analysis period were tagged as "Likely Homeowners". This can potentially undercount long-term renters and tag them as homeowners and it can undercount homeowners who have just purchased their home. We are also exploring whether we can incorporate home sales data – the intent is to tag households with an account change and an accompanying sales record as homeowners. However, the accuracy of the approach seems sufficient for the purposes of large-scale aggregate analysis as in this study.

Validation: The aggregate homeownership rate from this analysis (61%) is slightly lower than the owner-occupied housing rate from the American Community Survey (62%) for Avista's service territory.

Load Disaggregation and Heating Type: A simple load disaggregation was applied for all households using their monthly energy bills. This involved taking the tenth percentile of monthly energy use (normalized by the number of days in a billing period) as the assumed base load. Then, the energy use that exceeded the base load in the winter months (October through April) was designated as "heating-related energy use", while the energy use that exceeded the base load in the summer months (May through September) was designated as "cooling-related energy use".

Homes with a heating-related energy use that exceeded 10% were flagged as potentially utilizing electric heat, while homes with under 10% heating-related energy use were flagged as gas heated homes.

Validation: The approach has been previously tested by Empower Dataworks vs. a variable-base degree day regression and it yields similar results but at a much smaller computational cost. The penetration of electric heat using this approach (56%) is slightly lower than that in Avista's 2022-45 Conservation Potential Study (58.7%), but within the margin of error.

Energy Burden and Energy Efficiency Potential thresholds: These thresholds were set as follows:

- Electrically heated:
    - High-burden threshold: Greater than 6%
    - High efficiency potential threshold: Greater than 10 kWh/sq.ft.
- Gas heated:
    - High-burden threshold: Greater than 3% (this might change through future CETA rulemaking)
    - High efficiency potential threshold: Greater than 7 kWh/sq.ft.

Energy Burden: Energy burden for a household is calculated simply by dividing annual electricity expenses by gross household income.

$$Energy\ Burden = \frac{Annual\ Electricity\ Expenses}{Annual\ Household\ Income}$$

Excess Burden: Excess burden is the portion of a household's energy burden in excess of the 6%/3% threshold.

$$\begin{aligned}Excess\ Burden \\ = \max(0, Energy\ Burden \\ - High\ Burden\ Threshold) \\ \times Annual\ Household\ Income\end{aligned}$$

On-Time Payment Rate: This is the proportion of all energy bills that did not require a late payment or disconnect notice to be sent out.

Energy Assistance Funding: The dollar amount of funding flowing through energy assistance programs (including discount, donation and weatherization programs) through discounts or rebates.

Customer Bill Reductions (Avoided Burden): The total bill impact from energy assistance programs. This is the same as the assistance funding for direct assistance programs and is based on measure savings for energy efficiency programs as described in Section 1.2.

Avoided Need: The total bill impact specifically for customers flagged as "high-burden".

Census Tract Statistics: Since each customer has been mapped to a census tract and block group, we are also able to match customers to census tract average statistics (e.g. highly impacted communities, presence of children, non-English speakers, education level, environmental pollution etc.). These will be used in later stages of the analysis and for coordination with Avista's Clean Energy Implementation Plan.

Energy Assistance Need: This is the sum of excess burden across all customers.

Comparison to LEAD tool estimates: Energy assistance need was compared to estimates based on the Department of Energy's LEAD tool (currently the only other estimate for energy assistance need). For Stevens, Whitman, Adams and Asotin counties, the LEAD estimates are 51% higher on average than the actuals from this analysis. This is primarily driven by the customer electricity bills that are consistently higher in the LEAD dataset than actual customer bills from Avista's CIS system. The data used in the LEAD tool is sampled from a small portion of the population (under 10%) and extrapolated across a large area. The energy use data is self-reported and for a single month in the year, which is then extrapolated to a full year. This calls into question the reliability of energy burden estimates based on this data for Avista. Through previous assessments, Empower Dataworks has found that the tool can be accurate in some jurisdictions but inaccurate in others. For Spokane county, the LEAD estimates include the entire county (with areas outside Avista's service territory), whereas this analysis only includes Avista customers, so the difference is larger.

County	Average Annual Electricity Bill ($)		Total Assistance Need (million $)	
	Avista's CIS System	LEAD dataset	Current Analysis	LEAD dataset
Adams	1,322	1,616	1.0	1.3
Asotin	1,066	1,279	1.2	1.6
Spokane	1,018	1,215	16	29
Stevens	1,239	1,528	3.2	5.2
Whitman	941	1,213	2.0	3.1

2. AVISTA'S ENERGY BURDEN BASELINE

2.1 AVISTA RESIDENTIAL SECTOR PROFILE

Avista's service territory in Washington state was composed of approximately **235,000 residential meters, of which 225,000 were found to be occupied households** (with a detectable energy use and not designated as shops or garages).

Ethnicity: According to the U.S. Census Bureau, approximately 83% of residents in counties within Avista's service territory are non-Hispanic white. In particular, Stevens, Whitman and Adams counties have sizeable populations of Hispanic, American Indian and Asian customers.

Household Income: The median household income for residents in counties within Avista's service territory is approximately $55,000, well below the state average of $70,000. Approximately **11%** of households would fall under 100% of the federal poverty limit, **32%** would fall

under 200% of the federal poverty limit and **42%** of households would fall under 80% of the Area Median Income.

Employers: Data from the Employment Security Department of Washington state shows that other than Spokane County which has a very diversified economy, the other counties within Avista's service territory rely on jobs in agriculture, education and government and could be more susceptible to recessions and other macroeconomic trends[1].

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[1] Washington State Employment Security Department. https://esd.wa.gov. Retrieved August 2021.

Energy Bills: Avista's residential electricity rates are about average for the Northwest. This results in generally affordable annual energy bills for most (non-low-income) households (**approximately $1040/year with an average annual consumption of 10,800 kWh**), despite the high penetration of electric heating in the county (55-60%). Figure 1 shows that the distribution of annual energy bills has a long tail; a minority (~6%) of households pay more than double the overall average energy bill.

Home Vintage: Approximately 30% homes in Avista's service territory were built after 1980 and 45% were built between 1940 and 1980[2]. There are about 30,000 homes that are more than 100 years old. Generally, older homes have more opportunities for weatherization, while newer homes could benefit more from lighting, controls and efficient appliances.
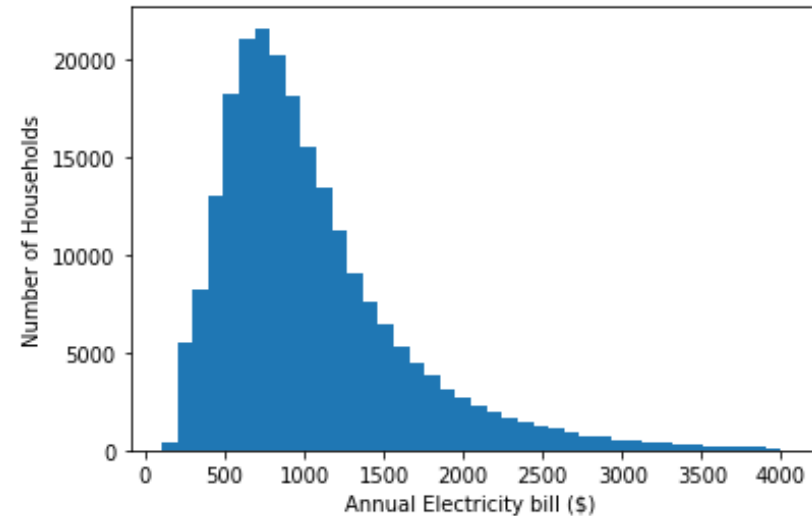
Figure 1. Household electricity bill distribution for Avista's residential customers

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[2] County Assessor Data for all Avista counties.

2.2 ENERGY BURDEN

Avista customers have an **average and median energy burden of 3.4% and 1.7%**, respectively. Figure 2 compares Avista's median energy burden to values published in other jurisdictions.

Avista's median energy burden is similar to that of the Seattle region. It is also lower (on average) than rural areas in the Pacific states.

The average household paid $1040/year in electricity bills in 2019-20. Of Avista's 225,000 identified households, **42,000 were deemed to have a high energy burden**, meaning that annual electricity bills exceeded 6% of their income for electrically-heated homes and exceeded 3% of their income for gas-heated homes. These high-burden customers paid an average of $1300 in annual electricity bills; the higher bill average reflects their higher likelihood to live in less efficient or older homes. The on-time bill payment rate is moderate for residential customers in general (87%) and much lower (79%) for high-burden customers. The **total energy assistance need for Avista is approximately $25M**—the total

reduction that would bring all customer electricity bills below the high burden threshold (6% of income for electric heat and 3% for gas heat).
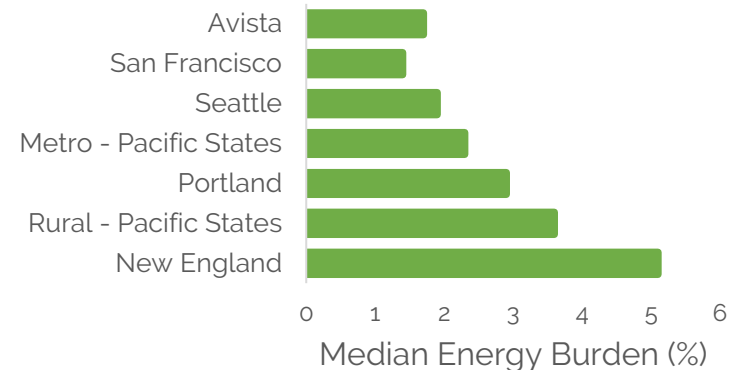
Figure 2. Energy burden benchmarking vs. other regions

Although averages and medians give a general indication of energy burden across a service territory, the reality is that **energy burden is a customer-level metric** and its distribution is a better indicator of the burden that customers experience. The distribution of energy burden among Avista customers is shown in Figure 3. The blue dashed line represents the 3% high burden threshold for gas heat and the green dashed line represents the 6% high burden threshold for electric heat.

Number of Households	
~225,000	

Low Income Households	
80% AMI: **~94-100k**	
200% FPL: **~72-82k**	

High Burden Households	
~42,000	

Energy Burden	
Median: **~1.7%**	
Average: **~3.4%**	

Electric Heat

Gas Heat

Bottom line: Our prime target is approximately 42,000 "high-burden customers"
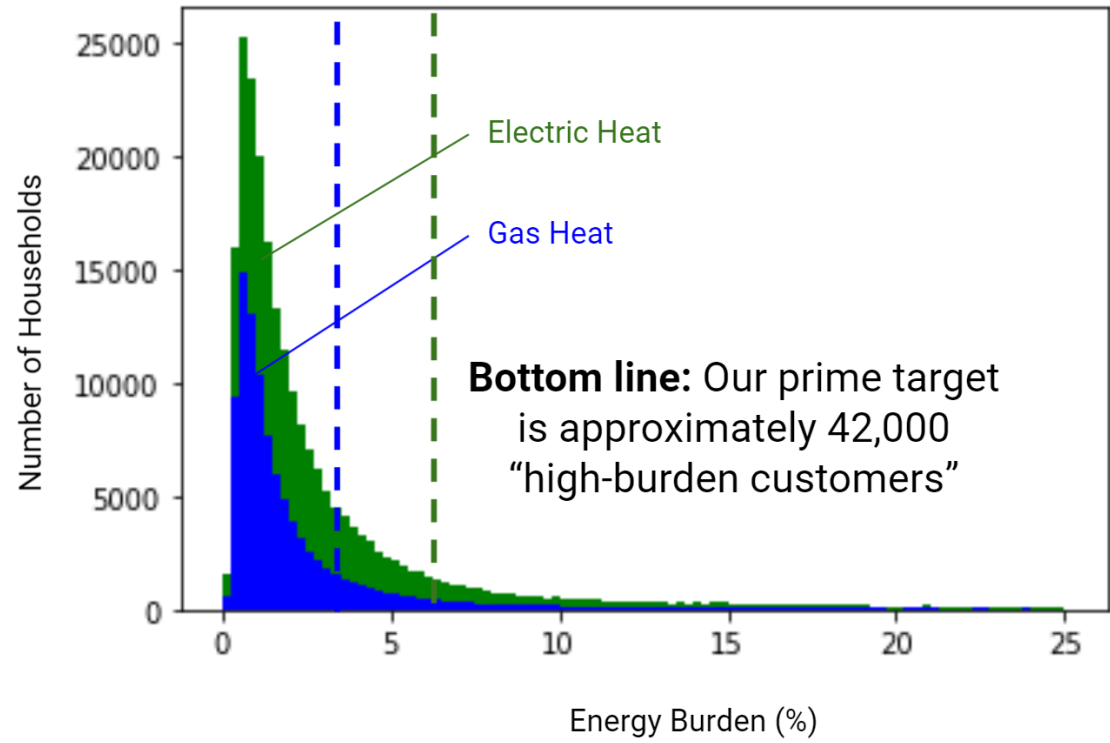
Figure 3. Distribution of energy burden among Avista customers.
Green line indicates 6% threshold of high energy burden for electric heat.
Blue line indicates 6% threshold of high energy burden for electric heat.

The goal of an effective energy assistance portfolio should be to prioritize the customers who most need the assistance, i.e. the customers to the right of the 6%/3% thresholds.

Approximately half of the energy assistance need is borne by single family households, with the other half distributed among multifamily and mobile home dwellers. The highest concentration of need is in mobile home dwellers, requiring more than $800/household in assistance on average, compared to $500/household for multifamily and $600 per household for single family households.

Approximately, 65-70% of the energy assistance need for Avista customers is among renters, indicating that conservation programs targeted at high-burden customers will need to grapple with the split incentive problem between landlords and tenants, but energy burden among homeowners should not be neglected. By sheer volume of need, senior (60+) homeowners in the Spokane area and renters in the Spokane area bear a large amount of energy burden. However, other rural areas have a much higher concentration of need (i.e. high-burden customers need more assistance on average).

Other customer segments will be investigated in more detail in later stages of this energy burden assessment.
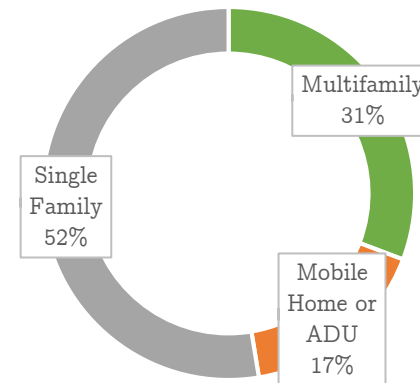
Figure 4. Distribution of energy assistance need by housing type.

2.3 LOW INCOME CUSTOMER SEGMENTS

Figure 6 shows the distribution of energy burden and energy efficiency potential (defined through Energy Use Intensity thresholds) across all low-income residential customers. In a perfect world, the energy assistance portfolio would match these customer segments. For example:

- Conservation programs should primarily serve **high burden**, **high potential** households
- Direct assistance programs should primarily serve **high burden**, **low potential** households
- Crisis/emergency programs should primarily serve **low burden**, **low potential** households
- Traditional conservation programs with financing should serve **low burden**, **high potential** households

Aligning targeted customers with program strengths results are the most cost-effective pathway to energy burden reduction.
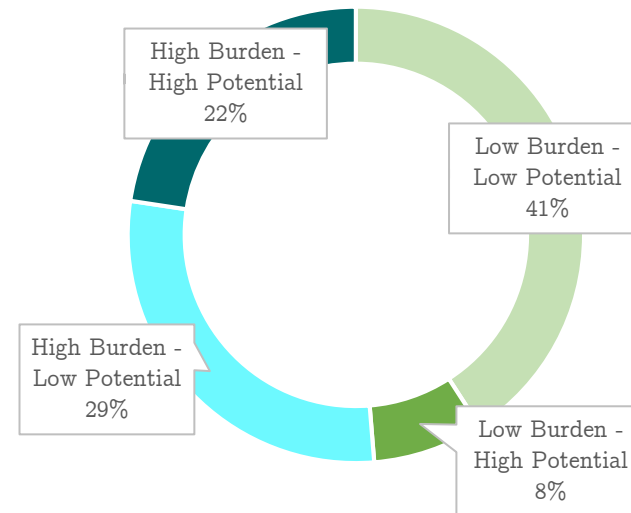
Figure 5. Avista's low-income customer segments by energy burden and energy efficiency potential.

Almost half of Avista's low-income customers are low-burden and low-efficiency potential. These customers' energy bills may not be a huge expense relative to housing, medical and education expenses, and they should not be prioritized in the more intensive programs, such as weatherization.

High burden customers are almost evenly split between high potential and low potential households. Since neither high or low potential customers dominate the high burden group, this indicates that a more holistic approach that combines conservation and direct assistance may be suitable for the first group, while direct assistance and lighter touch conservation is more suitable for the latter group.

In addition, as shown in the figure below, 55% of high-burden households require more than $400 in assistance to be brought under the high-burden threshold. These customers would likely benefit from "program stacking", i.e. being served by a combination of programs optimized to their need and the condition of their home.
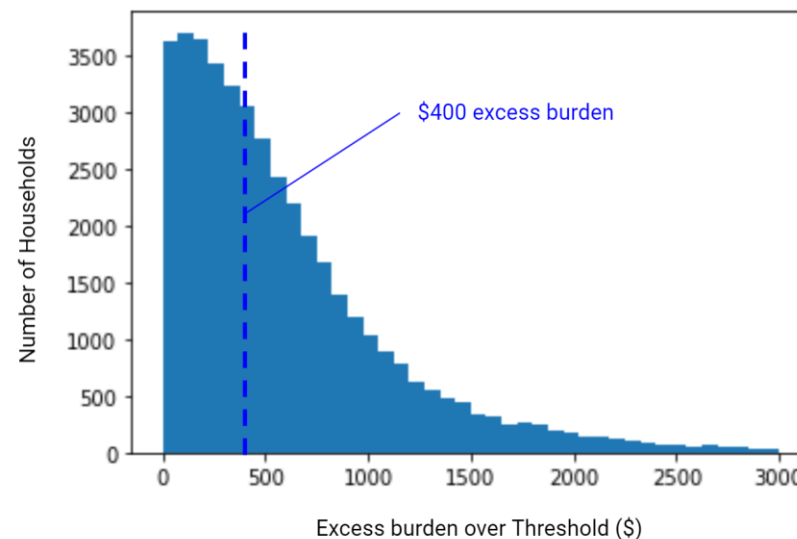
Figure 6. Distribution of Avista's high-burden customers' excess burden over the 6%/3% threshold.

2.4 ENERGY BURDEN PORTFOLIO EFFECTIVENESS

Washington State's Clean Energy Transformation Act (CETA) has set concrete goals for energy assistance funding by electric utilities. These goals are expressed as a percent of energy assistance need. Energy assistance need can fluctuate based on several factors:

- Household energy use and efficiency
- Household income levels and, by extension, unemployment rates
- Weather, especially the severity of cold winter weather

As shown in Figure 8, there are four program-related metrics that translate energy assistance program funding into actual avoided need.

- Energy assistance need is the total dollar amount required to bring all customer energy bills under a 6% electric heat/3% gas heat energy burden threshold

- Energy assistance funding is the total dollar amount that is made available to low-income customers through energy assistance programs. The ratio between energy assistance funding and energy assistance need is the *funding ratio*.

- Avoided burden is the actual dollar reduction in customer energy bills resulting from energy assistance programs. This is usually lower than the total energy assistance funding due to overhead expenses or non-cost-effective conservation measures. Efficiencies in program delivery and improvements in conservation program processes can help increase the avoided burden. The ratio between avoided burden and energy assistance funding is the *operational effectiveness.*

- Avoided need is the reduction in customer energy bills specifically for high-burden customers. This number is usually lower than avoided burden for programs that are not effective at reaching high-burden customers. Avoided need and avoided burden are close to each other in well-targeted programs. The ratio between the avoided burden and avoided need is the *targeting effectiveness.*

Energy Assistance Need
Total energy bills over 6% threshold

Gap between need and program funding

Energy Assistance Funding
Total funding earmarked for assistance programs

Overhead + inefficiencies in program delivery

Avoided Burden
Lifetime bill savings for all program participants

Bill savings below 6% energy burden threshold

Avoided Need
Bill savings for high-burden participants above 6% threshold

Figure 7. Energy assistance program effectiveness metrics

Effective energy assistance programs ensure that the difference between avoided need and energy assistance need is as small as possible. For the 2019-20 program years (Figure 9), Avista's energy assistance portfolio metrics were::

- **72% funding ratio:** Energy assistance need of $25M and energy assistance funding of $18M.

- **75% operational effectiveness:** 25% of energy assistance funding was used for overhead or the installation of non-cost-effective measures. The portfolio reduced the energy bills for approximately 25,000 households by $500 on average.

- **39% targeting effectiveness**: Primarily because some of the programs are not optimized for targeting high-burden customers (i.e. 61% of avoided burden was applied to customers *without* a high energy burden). The portfolio reduced the energy bills for 8,500 high-burden households by $500 on average. For 4,000 of these households, the assistance was sufficient to bring them below the high-burden threshold.

- So overall, the energy assistance portfolio is reducing the energy assistance need by approximately **22%**.

- **Funding levels appear to be generally sufficient at this time.** If energy burden reduction were to be pursued solely through increased funding, the assistance budget would have to be increased threefold to meet CETA's 2030 requirements and fivefold to completely eliminate the energy assistance need. Moreover, Avista's partner agencies are definitely not equipped to distribute that level of funding. Aside from standard annual budget adjustments or new budgets for pilots, we do not recommend significant budget changes in the near term, however, we recommend that the allocation of funds among programs be assessed through an energy burden potential forecast to ensure an optimal mix of short-term and long-term energy burden reduction.

- The most effective means to reduce Avista's customer energy burden over the next 5-10 years is to focus on better targeting of high-burden households through the existing programs.
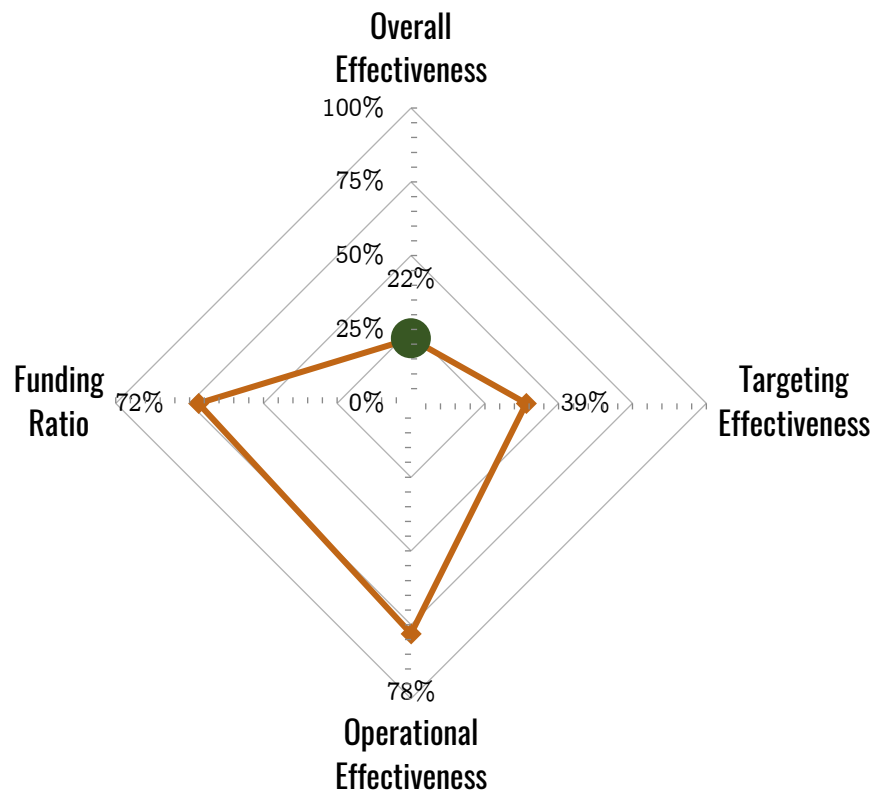
Figure 8. Performance metrics for Avista's energy assistance portfolio.

2.5 ADDITIONAL CONTEXT

➢ The top three measures in Avista's 2022-2045 Conservation Potential Assessment are:
  o Smart thermostats
  o Ductless mini-split heat pumps
  o Home energy management systems
  o Windows
  o Water heaters

  These measures account for almost 40% of Avista's residential potential but are highly inaccessible to low-income high-burden customers because of technical barriers or without incentives that cover 100% of cost.

➢ Aside from Avista's income-eligible conservation programs, the Multifamily Direct Install program will also be considered as part of Avista's energy assistance portfolio in the next phase of this assessment as it serves predominantly low-income renters (approximately 65-77% of program participants fall under 200% FPL).

➢ Avista's standard residential program (prescriptive measures and system conversions) has an approximate annual budget of $9M. Of all participants in this program, approximately 15% fall under 200% of the Federal Poverty Limit and half of those (approximately 8% of all participants) would be considered "high-burden". Low-income and high-burden customers are obviously under-represented in this program, but it is still contributing significantly to energy burden reduction.

3. ENERGY BURDEN REDUCTION STRATEGY

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2.1 POTENTIAL ACTIONS

The next 5-10 years will be a period of **diminishing conservation opportunities in the residential sector**. At the same time, equity requirements in CETA and Avista's BCP reinforce the need to prioritize energy burden reduction in high-burden households. To meet these challenges, Avista needs to pursue a holistic strategy that combines best practices in program marketing and delivery, combined with a full portfolio of interconnected program offerings.

Avista already has an impressive suite of energy efficiency and bill assistance program offerings that are well-designed and well-funded. Avista has also piloted or implemented numerous initiatives that are considered best practices. Empower Dataworks considers Avista's energy assistance program portfolio to be a gold standard, especially when it comes to funding levels and program design.

What comes next is the need to re-orient some of the programs to be able to achieve better energy burden reductions for high-burden customers.

To achieve this goal, we are presenting the following list of actions for Avista's consideration – these were selected to fit (i) Avista's current energy burden baseline, (ii) Avista's current robust program mix and (iii) best practices gleaned from conversations with peer utilities.

The actions fall in three categories:

i. *Research/Planning*: Actions needed to monitor and report energy burden reductions, and set realistic targets

ii. *Programs*: Actions related to tweaking current programs, or piloting new programs.

iii. *Funding*: Actions related to funding allocations.

The following parameters are given for each action:

- *Readiness level*: Has this action been widely deployed/researched in other jurisdictions?

- *Budget*: Expected budget range (outside of Avista staff time)

- *Avista staff time*: Time needed for project management or implementation

- *Energy burden impact:* The relative overall impact to Avista's customer energy burden. The actual impact will depend on the magnitude of investment in each action and its specific design.

	POTENTIAL ACTION	READINESS LEVEL	BUDGET	AVISTA STAFF TIME	ENERGY BURDEN IMPACT
RESEARCH/ PLANNING	Adopt energy burden reduction as a metric for all conservation programs	Intermediate	$	(2 clocks)	Foundational Action (No direct impact)
	Implement an energy equity monitoring plan	Intermediate	$ $	(2 clocks)	Foundational Action (No direct impact)
	Use Energy Burden in Program Design	Proven	$	(1 clock)	(2 people)
PROGRAMS	Implement a targeted marketing and outreach strategy	Proven	$ $	(2 clocks)	(3 people)
	Deploy a One Portfolio Model for energy assistance programs	Intermediate	$ $ $	(3 clocks)	(3 people)
	Community and small business energy efficiency in high-burden neighborhoods	Proven	$	(1 clock)	(1 person)
	Landlord-targeted energy efficiency	Pilot	$ $ $	(2 clocks)	(3 people)
	Energy Ambassador program	Pilot	$ $	(3 clocks)	(3 people)
	Democratizing the smart home	Pilot	$ $ $	(2 clocks)	(2 people)
	Income self-certification	Intermediate	$	(2 clocks)	(1 person)
FUNDING	Pre-weatherization incentives	Proven	$	(1 clock)	(1 person)
	Review regional and program-level funding allocations	Proven	$	(1 clock)	(1 person)

ADOPT ENERGY BURDEN REDUCTION AS A METRIC FOR ALL CONSERVATION PROGRAMS

Type: Research/Planning

Readiness level: Intermediate

Main Goal: Measure program progress towards energy equity and affordability

Target Customer Segment: All program participants

Budget: Internal Staff Only

Required Avista Staff time: *Moderate* (Conservation staff time to make internal business case)

Description:

"*You cannot manage what you cannot measure*"

If Avista's programs are meant to prioritize high-burden customers, then they need to excel at reaching high-burden customers and identifying high-burden customers among program participants. This is not an insurmountable task, particularly for the low-income energy efficiency program, where incomes are already collected as part of the intake process.

As a first step, the Avista Conservation team will need to get internal buy-in to adopt energy burden-related metrics as formal program metrics. This includes developing the internal business case and verifying the feasibility of doing this through data sharing, technical infrastructure and reporting tools. Ideally, this would happen in coordination with the Energy Assistance team so that energy burden can be used for reporting across Avista's energy assistance portfolio.

IMPLEMENT AN ENERGY EQUITY MONITORING PLAN

Type: Research/Planning

Readiness level: Intermediate

Main Goal: Evaluate the reduction in energy burden and access to programs for high-burden customers. Include metrics in annual conservation reports

Target Customer Segment: All program participants

Budget: *Moderate* (Planning studies and IT system setup)

Required Avista Staff time: *Moderate* (Conservation staff for project management, IT staff for 6-9 months to set up internal systems)

Description:

Following the adoption of energy burden as an internal program metric, the next step would be to build the infrastructure required to facilitate energy burden reporting. One potential option is for Avista to adopt the Energy Equity Monitoring Plan that was prepared as part of this Energy Burden Assessment. The plan details the methodology and types of studies/analysis that would be required on an ongoing basis, in order to plan, evaluate and design equitable programs.

Subtasks:

➢ Transfer income data from CAAs for all program applicants and program participants

➢ Set up internal database systems to facilitate energy burden calculations

➢ Develop 2-3 key metrics by program in order to assess energy burden reduction performance

➢ Integrate these metrics in standard program reporting

USE ENERGY BURDEN IN PROGRAM DESIGN

Type: Research/Planning

Readiness level: Proven

Main Goal: Align program rules with energy burden reduction

Target Customer Segment: Program participants

Budget: Internal Staff Only

Required Avista Staff time: *Minimal* (Conservation staff)

Energy Burden Impact: *High* (primarily improves the targeting effectiveness of programs by directing more funding/offerings to high-burden customers)

Description:

Avista has already piloted a Percentage of Income Payment Plan (called the Income Based Payment Program). These programs are extremely effective at reducing energy burden because they specifically target high-burden households.

A natural extension of this idea for conservation programs is to use energy burden either as a hard qualifying criterion or as a more gradual adjustment factor in a **tiered incentive model**. For example, customers who fall between 0-50% of the Federal Poverty Limit can be allowed to access higher incentives (up to 100%) for some of the measures in Avista's standard residential energy efficiency offerings that are not currently provided through the federal Weatherization Assistance Program or Avista's Low Income Conservation program. These would include smart thermostats, washer/dryers, water heaters and potentially HVAC tuneups, other appliances or smart devices. Or a small portion (20-40%) of the incentive cost for low-burden customers could be shifted to zero-interest on-bill loans to free up and prioritize funds for high-burden customers.

Another way to use energy burden within the current energy efficiency programs is to add high-burden applicants to a **priority queue** that bypasses the standard wait times for weatherization and audits (which can be up to 2 years).

IMPLEMENT A TARGETED MARKETING AND OUTREACH STRATEGY

Type: Programs - Operations

Readiness level: Proven

Main Goal: Improve participation of high-burden customers in current programs

Target Customer Segment: High-burden customers

Budget: $40-60k (strategy + marketing expenses)

Required Avista Staff time: *Moderate* (Communications + Energy Assistance + Conservation staff)

Energy Burden Impact: *High* (primarily improves the targeting effectiveness of programs, so more high burden customers participate)

Description:

Program targeting is a catch-all term and it could manifest as any of the following:

➢ Use a consistent, repeatable process for creating targeted marketing campaigns that are culturally and demographically relevant. One example is *Empower Dataworks Targeting Playbook*, but there are other frameworks that accomplish the same goal.

➢ Identify high-burden customers and neighborhoods using data from this Energy Burden Assessment and use these customer lists for targeted informational campaigns.

➢ Initiate a program of energy bill clinics in high-burden neighborhoods to raise awareness about energy efficiency and to provide an educational opportunity to customers about their bills.

➢ Build relationships with large property managers, trade allies and community organizations that serve high-burden neighborhoods.

➢ Test the *Whole Neighborhood Approach* to energy efficiency/weatherization, especially in concentrated pockets of energy burden in more rural areas. (https://www.osti.gov/biblio/1126788)

DEPLOY A ONE PORTFOLIO MODEL FOR ENERGY ASSISTANCE PROGRAMS

Type: Program - Operations

Readiness level: Intermediate

Main Goal: Integrate all of Avista's energy assistance programs into one optimized and customizable customer offering

Target Customer Segment: Program participants

Budget: Depends on the specific subtasks, but likely on the moderate to higher end.

Required Avista Staff Time: *High* (IT + Communications + Energy Assistance + Conservation staff + Community Action Agencies + Program Implementation Contractors)

Energy Burden Impact: *High* (Through stacking multiple programs to bring energy burden for all participants below the 6%/3% threshold)

Description:

Given the energy burden characteristics of Avista's high-burden customers, it is unlikely that participation in one isolated program at a time would completely eliminate high energy burden for the majority of customers. Instead, most customers would benefit from stacking the energy burden reduction from multiple relevant programs. This will necessarily involve closer integration and coordination between the energy assistance and conservation teams, the community action agencies and program implementation contractors, so that customers receive the assistance that is most impactful and cost-effective.

This coordination might include:
➤ A single, unified intake and application process for all low-income programs.
➤ A unified customer triage system to serve customers an optimized program mix based on their energy burden and energy efficiency potential.
➤ An energy education/conservation component in all energy assistance programs.
➤ Tiered incentives that encourage cross-program participation.
➤ Formal processes for cross-referrals between programs, customer follow-ups, tracking customer referrals and cross-program conversion rates.

COMMUNITY AND SMALL BUSINESS ENERGY EFFICIENCY IN HIGH-BURDEN NEIGHBORHOODS

Type: Program - Operations

Readiness level: Proven

Main Goal: Build rapport with trusted businesses and institutions in high-burden communities

Target Customer Segment: Businesses and community buildings in high-burden neighborhoods

Budget: Small increase in CEEP budget

Required Avista Staff Time: *Minimal* (Expansion of current program)

Energy Burden Impact: *Minimal* (Doesn't directly reduce energy burden but builds trust with potential participants)

Description:

Avista is successfully running a Business Partner program that targets outreach at rural small businesses and provides free energy assessments. This action would be a minor modification to the program to include community organizations (especially religious facilities and community centers) within the target customer segment. These organizations are great advocates for energy efficiency and can help Avista bridge the trust barrier with customers. In addition, we suggest that Avista expand outreach from just rural areas to any high-burden neighborhood, including within Spokane.

LANDLORD-TARGETED ENERGY EFFICIENCY

Type: Program

Readiness level: Pilot

Main Goal: Directly reach the energy efficiency decision makers in rental housing

Target Customer Segment: Landlords and property managers of single family and small multifamily rentals

Budget: *High.* Can use staff if done as separate initiative – or integrated in Multifamily Direct Install program

Required Avista Staff Time: *Moderate-High* (Conservation staff to design and implement program)

Energy Burden Impact: *High* (Reduces renter energy burden)

Description:

Since most of Avista's customer energy assistance need is among renters, conservation programs that prioritize high-burden customers cannot avoid the split incentive question. A pilot program could test the potential of offering energy efficiency incentives (with increased incentives up to 90-100% of measure cost), to landlords in high-burden areas. This would ensure that the homes that are likely to house high-burden customers are made more efficient.

One of the biggest challenges for smaller "mom and pop" landlords is unexpected expenses from having to replace broken appliances or HVAC equipment.

This is an extremely opportune moment to engage with landlords by offering them either low-cost on-bill loans or incentives for efficient replacements (provided they agree to an energy audit, for example).

Aside from financial incentives, targeted communication to landlords should always highlight their specific benefits of energy efficiency (not energy bill reductions). These include lower tenant turnover rate and increased property values. Outstanding questions that should be handled during the program design, include disclosure of on-bill loans or the potential for rent increases after participation in an energy efficiency program.

ENERGY AMBASSADOR PROGRAM

Type: Program

Readiness level: Pilot

Main Goal: Train community members in energy audits and the program application process

Target Customer Segment: 30-50 Energy Ambassadors + their communities

Budget: *Moderate* (Energy ambassador training/stipends)

Required Avista Staff Time: *High* (Conservation staff to design and implement program)

Energy Burden Impact: *High* for Energy Ambassadors, *Moderate* for their community members who enroll in programs.

Description:

A primary barrier to energy efficiency program participation by low-income customers is lack of trust. In many communities around Washington, there are regular customers who assist others in their communities explain the benefits. The Energy Ambassador program would formalize this process by paying a stipend to the "Energy Ambassadors" (usually low-income high-burden customers themselves) based on how many applications they bring in to the conservation programs.

As an extension to the referral portion of the program, the Energy Ambassadors could be trained to perform quick walkthrough energy audits and submit a simple audit form to Avista. These "citizen energy auditors" would be empowered through performance-based income while leveraging their trusted connections to encourage participation among their neighbors and families. The workforce development component would also serve Avista in the long run by reducing friction and expense in the intake/audit stage of energy efficiency programs.

DEMOCRATIZING THE SMART HOME

Type: Program

Readiness level: Pilot

Main Goals: Increase access of high-burden customers to smart devices. Evaluate savings for future smart device programs. Set up high-burden customers for future participation in demand response programs.

Target Customer Segment: High burden customers interested in smart devices

Budget: ~$500-800/participant

Required Avista Staff Time: *Moderate* (Conservation staff to project manage)

Energy Burden Impact: *Moderate* (expected savings of 800-1000 kWh/year)

Description:

Avista's conservation potential includes smart thermostats and Home Energy Management Systems as two of the top 3 measures in the next biennial cycle. Smart devices offer convenience to customers and they usually deliver a fair amount of energy savings when used correctly. However, low-income households have been unable to access them, because of a lack of internet connectivity or their renter status or technical incompatibility (most low-income homes use zonal heat). In addition, low income customers may not be able to afford the purchase cost of these smart devices.

Avista can potentially pilot approaches to democratize access to smart devices through a smart device pilot to deploy smart devices in low-income homes. This would include hardware, software, a financing model and a marketing plan to sell the benefits of these devices to landlords and tenants.

The packaged solution should include line voltage thermostats, plug load controllers, humidity and leak detectors, and indoor temperature sensors connected to a 4G cellular hub. The data from the smart devices would be used to develop personalized home energy efficiency diagnostic reports that offer personalized behavioral energy-savings tips and home upgrade recommendations.

INCOME SELF-CERTIFICATION

Type: Pilot

Readiness level: Intermediate

Main Goal: Reduce the paperwork required for customers to enroll and reduce the administrative burden of the Community Action Agencies

Target Customer Segment: High burden customers who are intimidated by documentation requirements

Budget: Internal Staff Only

Required Avista Staff Time: *Moderate* (mainly Conservation staff time for QA/QC or automated processes by IT)

Energy Burden Impact: *Low* (Encourages participation by high burden customers)

Description:

Income self-certification has proven to be an effective way to enroll customers in programs by reducing administrative hurdles. This potential action would test a sampling QA/QC approach, where income self-certification is accepted from all applicants to one of the conservation programs or pilots, with a small fraction of customers sampled for full income verification.

A proposed protocol for QA/QC is presented below:

1. For measures costing less than $500, sample 4-5% of program applicants at random. If their neighborhoods and home values do not align with expectations for a low-income household, request that they provide income documentation to the Community Action Agency before the application goes through.

2. If more than 10% of customers fail income verification or do not go through the process, increase the sampling rate in 5% increments

3. For measures costing over $500-$3000, use a 25% sampling rate to do internal data checks (using home values or income data) and forward another 5% to the relevant Community Action Agency for manual income verification.

4. Avista can also pilot an **opt-out program design**, where customers are automatically enrolled based on individual demographic data or by enrolling entire high-burden neighborhoods, with a similar audit protocol.

PRE-WEATHERIZATION INCENTIVES

Type: Funding

Readiness level: Proven

Main Goal: Assist customers who intend to participate in weatherization but whose applications were deferred for other issues

Target Customer Segment: High burden weatherization participants with deferral issues in home

Budget: Internal Staff Only

Required Avista Staff Time: *Low* (Conservation staff to set up process for CAAs)

Energy Burden Impact: *Low* (Removes a key barrier to participation for many high burden customers)

Description:

This action involves allocating a portion of the low-income energy efficiency program budget as grants towards fixing issues in customer homes that would lead to deferral of weatherization (e.g. structural and electrical issues, asbestos). Some experiments with similar initiatives in Massachusetts have shown promise in making sure that interested customers are still served by programs after these issues are mitigated. In Avista's case, it is recommended that only high-burden customers (or customers who fall under 50% of the Federal Poverty Limit) are given access to this pool of funds.

REVIEW REGIONAL AND PROGRAM-LEVEL FUNDING ALLOCATIONS

Type: Funding

Readiness level: Proven

Main Goal: Ensure that budgets are sufficient to meet current program needs across different community action agencies. Ensure that the current program mix will meet long term energy burden goals.

Target Customer Segment: Program participants

Budget: Internal Staff Only

Required Avista Staff Time: *Low*

Energy Burden Impact: *Low*

Description:
This energy burden assessment has found no need for additional program funding at this time, aside from potential new pilot budgets. However, it would be useful to regularly review budget utilization across the different community action agencies and identify any that might need additional funds or a funding reallocation.

Optionally, if Avista undertakes an *energy burden potential study*, it will be possible to review the allocation of funding among programs and to judge whether the current allocation serves Avista's long-term energy burden reduction goals under CETA.

2.2 NEXT STEPS

The actions proposed in this strategy document have different readiness levels and will require different levels of effort. Realistically, it is unlikely that everything can be tested in the coming biennium. Therefore, we suggest that Avista consider these actions and then prioritize the most impactful or compelling ones for actual implementation.

Our recommended workflow for implementing these actions is:

In the next 12-18 months (by the end of Q4 2022), we would recommend that Avista complete the two foundational planning actions (internal adoption of energy burden metrics and the energy equity monitoring plan). Another low hanging fruit that can be started in tandem is to begin identifying high-burden customers and neighborhoods and implementing a targeted marketing and outreach strategy. Strategic initiatives like the One Portfolio Model should be assessed for feasibility before implementation and this will take some time. Finally, depending on the Conservation and Energy Assistance team capacity, it is likely that between 1-3 pilot ideas can be tested annually. The activities that show potential can then be integrated into Avista's programs.

2.3 ADDITIONAL RESOURCES

POTENTIAL ACTION	RESOURCES
Adopt energy burden reduction as a metric for all conservation programs	Roger Colton, January 28, 2020. Presentation can be requested from WA Dept. of Commerce. Energy Trust of Oregon, Diversity, Equity and Inclusion Operations Plan. https://energytrust.org/about/explore-energy-trust/diversity-equity-and-inclusion/
Implement an energy equity monitoring plan	Refer to Energy Equity Monitoring Plan attachment in this energy burden assessment.
Implement a targeted marketing and outreach strategy	Empower Dataworks (hello@empowerdataworks.com) can share a Targeting Playbook and request a utility presenter to share their experiences.
Deploy a One Portfolio Model for energy assistance programs	D. Hernandez and S. Bird, Energy Burden and the Need for Integrated Low-Income Housing and Energy Policy, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4819257/
Landlord-targeted energy efficiency	Energy Trust of Oregon enhanced incentives for landlords: https://energytrust.org/incentives/landlords-property-managers-single-family-homes/
Energy Ambassador program	Can borrow some design elements from HVAC contractor training programs: https://www.aceee.org/files/proceedings/2012/data/papers/0193-000210.pdf
Democratizing the smart home	Empower Dataworks (hello@empowerdataworks.com) can share a concept paper upon request.
Income self-certification	Low-income/hard-to-reach energy efficiency programs in Texas use self-certification for income qualification – as an example: http://www.swepcogridsmart.com/texas/downloads/HTR%20Program%20Manual.pdf
Pre-weatherization incentives	Mass Save's Barrier incentive: https://www.masssave.com/save/barrier-incentive

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