Residential Weatherization Contractor
Infrastructure Assessment
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**Introduction**

Beginning in winter of 2020/2021, Bonneville Power Administration (BPA) aims to dramatically increase energy savings from residential insulation, windows, HVAC and high-efficiency water-heating measures. To achieve these significantly increased goals, BPA is initiating an effort to support contractors to expand their activities in BPA customer utility territories. The primary focus is the Comfort Ready Home Program (the Program), which will create a contractor network and provide trainings, program participation support, and lead generation. The Program will operate in tandem with BPA’s higher per-unit incentive rates for many residential measures, which were enacted to overcome a slowing in weatherization project savings due to past reductions in incentives. Weatherization programs, in particular, have historically seen a decrease in participation rates due to reduced incentives, along with a natural contraction in contractor program participation.

The Comfort Ready Home Program covers a broad territory and intends to greatly increase residential weatherization activity in partnership with customer utilities. As an initial step, the Program Team researched the strengths and weaknesses of the current weatherization contractor pool across sub-regions of the Northwest. When compared against past program activity, this research will identify strategic opportunities for increasing weatherization activity and guide Program strategies to address contractor shortcomings. These targeted recommendations will supplement the core functions of the Program: engaging with contractors, providing resources for program participation, and supporting the marketing of weatherization programs through the Comfort Ready Home brand.

**Weatherization Opportunity Assessment**

An assessment to determine the ability of a contractor pool to meet BPA’s increased weatherization goals must begin with an understanding of future insulation and window project opportunities. BPA has maintained a weatherization program since the late 1980’s, meaning that a significant portion of the low cost, high energy savings projects and motivated homeowners have already performed weatherization projects. The Team analyzed BPA’s past program activity to estimate remaining opportunities by housing type and building component. In the context of the remaining areas of opportunity, the Team then analyzed contractor data to make recommendations for building up a work force that can effectively address the opportunities identified.

To estimate the remaining weatherization opportunity, the Team evaluated weatherization program activity occurring between 2012 and 2018 as an indication of contractor activity in each sub-region. Program activity is compared to household data from the census to generate a rate of activity per thousand households sorted by housing type. This analysis identifies opportunities for increasing activity but does not create a numerical target value for weatherization by housing type (single family, multifamily, or manufactured home) or by building component (attic, floor, wall, window).¹

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¹ A numerical target would require data from pre-2012 utility program activity, weatherization occurring outside of utility programs, gas heating share, and as-built conditions of each home from date of construction and building code requirements. Such data is prohibitively difficult to acquire at the sub-regional level. Analysis at larger geographic scales – such as at the state or regional level – would not produce actionable information for the Comfort Ready Home Program.
Contractor Infrastructure Assessment

After conducting the weatherization opportunity assessment described above, the Program Team’s next step was to assess the capacity for contracting firms to take on a larger number of projects while maintaining high quality of work and meeting the requirements of utility programs. The team started by analyzing the pool of contractors currently providing weatherization services to determine their ability to meet these expanded targets. To do this, the Team first gathered data to estimate the number of contractors that perform weatherization services in each sub-region. To put the raw number of contractors in context, the contractor count was compared to household data from the census. This household-weighted count gives a metric to understand the number of firms performing weatherization work in comparison to the number of households that are potential customers. The Team then compared the average number of employees per firm, where that information was available, to determine the relative capability to meet the increased scale of operation expected from BPA. The Team assumes that contracting firms with more employees have the capability to serve a larger quantity of projects.

The Team gathered data to indicate contractor quality, knowledge of weatherization best practices, and customer satisfaction. The data gathered included the percentage of businesses represented on a utility program preferred contractor list and ratings left on customer review websites. While the customer review data was inconclusive as discussed in the Findings and Recommendations section, analysis of utility program lists was useful in creating recommendations for the Comfort Ready Home Program. Sub-regions with a higher percentage of contractors represented on utility program lists will have less need to train those contractors on utility weatherization project specifications or orient them to participate in utility program requirements. Conversely, sub-regions with low representation will need greater support in the basic understanding of utility weatherization programs.

Methodology

The Project Team gathered data from multiple sources to assess the remaining weatherization opportunity and analyze the capabilities of the existing contractor pool at the sub-regional level. The BPA region was divided into 16 sub-regions, defined in Appendix A. Dividing the six Northwest states into sub-regions supports implementation of the Comfort Ready Home Program by allowing the Team to understand the specific opportunities and needs of each geographic area. The Program can use this precise understanding to craft strategy to take advantage of those opportunities and right-size the program effort in each sub-region. Furthermore, the sub-regions reflect the fact that contractors will offer services between many utility territories.2

Reporting Metrics and Data Sources

The Team developed a set of research questions and reporting metrics that are intended to allow for apples-to-apples comparisons of past program activity and contractor strength, described in Table 1. These metrics provide answers to the research questions for each sub-region, resulting in targeted recommendations for Program strategy within each sub-region.

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2 Historical weatherization activity will differ significantly between utilities within each sub-region, and so the Program will collaborate with specific utilities on measures and housing types to pursue within each service territory.
<table>
<thead>
<tr>
<th>Research Question</th>
<th>Reporting Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remaining Weatherization</td>
<td>Utility projects per 1,000 BPA households (lower rates → greater remaining opportunity)</td>
</tr>
<tr>
<td>Opportunity</td>
<td></td>
</tr>
<tr>
<td>Services Offered</td>
<td>Project volume per thousand BPA households</td>
</tr>
<tr>
<td>Number of Contractors</td>
<td>Number of contractors per 1,000 BPA households Number of contractors per 1,000 total households</td>
</tr>
<tr>
<td>Weatherization Volume</td>
<td>Average number of weatherization employees</td>
</tr>
<tr>
<td>Contractor Quality</td>
<td>Percentage of contractors on a utility contractor list (^3) Star ratings on contractor review websites</td>
</tr>
</tbody>
</table>

The team compiled and analyzed data from the sources described in Table 2. In combination, these data informed the reporting metrics described above that serve as the basis for recommendations, which occur in the following section (Findings and Recommendations).

**Note:**

\(^3\) This metric indicates contractors that are familiar with utility program requirements and technical specifications. The Program will need to offer a greater level of training to sub-regions with a low percentage of contractors on utility lists.
Analysis
The Team analyzed data to generate the reporting metrics described above, then sorted the sub-regions into tiers based on trends of groupings that emerged in both the historical weatherization activity and contractor metrics. Rather than create specific numerical targets for each metric, the Team relied largely on relative comparisons between sub-regions as the basis for recommendations. The program will seek to expand upon strengths and address weaknesses in each sub-region, both in terms of weatherization program success and contractor capabilities.

Remaining Weatherization Opportunity
The Team estimated the remaining weatherization opportunity by ranking sub-regions with high, average, and low historical program activity, as defined in Table 3. Sub-regions with high program activity are expected to have less opportunity for scaling up the pace of weatherization projects due to a saturation of the marketplace, particularly with single family homes. However, these sub-regions are likely to have a higher starting point in terms of program awareness with contractors.

TABLE 3. TIERS OF HISTORICAL PROGRAM ACTIVITY

<table>
<thead>
<tr>
<th>Tier</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>More than 20 projects per thousand BPA households</td>
</tr>
<tr>
<td>Average</td>
<td>Between 8 and 19 projects per thousand BPA households</td>
</tr>
<tr>
<td>Low</td>
<td>Fewer than 8 projects per thousand BPA households</td>
</tr>
</tbody>
</table>

For all sub-regions, even those with high historical single family program activity, there is an opportunity to increase the pace of weatherization projects. Utility programs can reach these opportunities in collaboration with the Comfort Ready Home Program through increased incentives, contractor support, and homeowner marketing. For sub-regions with low historical activity, the Team recommends broad recruitment and training of contractors to meet the goals of the Program. For sub-regions with average to high rate, the Team analyzed data in greater detail to identify specific opportunities in building components or housing types, such as manufactured homes or multifamily properties.4

The Team used a combination of data analysis and professional judgement to determine specific housing and measure opportunities because they have additional economic or technical challenges. The Team, therefore, sought complementary evidence in the data that demonstrated the recommended measures would have receptive customers in the population of homeowners within the sub-region. For example, it is common for sub-regions to have experienced low uptake of manufactured home floor insulation due to low rates of investment in upgrading those building types. The Team recommends floor insulation measures for sub-regions that have had high rates of window projects in manufactured homes, indicating that there are homeowners willing to invest in energy upgrades. Furthermore, the success of window

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4 Multifamily low-rise properties are defined in BPA’s residential energy efficiency programs as buildings that contain five or more dwelling units within the same structure that is no more than three stories high. Multifamily mid/high-rise is defined as buildings that contain five or more dwelling units within the same structure that is more than three stories high.
projects in those homes creates a two-fold opportunity to reach customers with other proposed measures. The homeowners that opted to upgrade their windows may be receptive to other energy efficiency upgrades, such as floor insulation or air sealing. The success of the windows contractors operating in the sub-region can be supported and leveraged to both increase overall project rates and to promote other measures with prospective clients.

Contractor Infrastructure Assessment
The capability of the existing contractor pool to increase the pace of weatherization activity in each sub-region is indicated by total contractor counts, size of firms where possible, and indicators of contractor quality. Sub-regions were compared and sorted into tiers to determine relative strengths and shortcomings, which correlate to targeted recommendations for the Program strategy. Table 4 defines the tiers of contractor quantity, with the total number of contractors weighted by BPA households.\(^5\) Specific recommendations for program strategy also consider the total-household weighted contractor volume as described in Table 7 in the Findings and Recommendations section.

**TABLE 4. TIERS OF CONTRACTOR QUANTITY**

<table>
<thead>
<tr>
<th>Tier</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>More than 0.30 insulation contractors per thousand BPA households*</td>
</tr>
<tr>
<td>Average</td>
<td>Between 0.10 and 0.30 insulation contractors per thousand BPA households</td>
</tr>
<tr>
<td>Low</td>
<td>Fewer than 0.10 insulation contractors per thousand BPA households</td>
</tr>
</tbody>
</table>

*For consistency with project count metrics, the Team weighted contractor counts by thousand BPA household even though the resulting metrics are less than 1.

Additionally, the Team was able to identify the number of employees for 13% of contractors (112 of 852) in the contractor database. Sub-regions were sorted into tiers of employee count. This data, though not comprehensive, supplements our understanding of the contractor capability in each sub-region. Contractors with more employees will be able to sustain a larger project volume and have greater capabilities through greater knowledge of installation techniques and potentially higher quality equipment. They are more likely to scale rapidly to meet increased project volume as employees will have clearer, more delineated roles and responsibilities, and because these firms tend to have more capacity to hire and train new technicians.

**TABLE 5. TIERS OF CONTRACTOR EMPLOYEE COUNT**

<table>
<thead>
<tr>
<th>Tier</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>10 employees per firm</td>
</tr>
<tr>
<td>Average</td>
<td>Between 5 and 9 employees per firm</td>
</tr>
<tr>
<td>Low</td>
<td>Fewer than 5 employees per firm or no data available</td>
</tr>
</tbody>
</table>

As a measure of quality, the Team evaluated the star rating of firms on contractor review sites such as Google and Angie’s list. Although this data was expected to illuminate contractor quality and commitment to customer service, it was ultimately not useful in comparing between sub-regions as discussed in Findings and Recommendations. However, the Team was able to compare the number of contractors listed on utility weatherization program preferred contractor lists to the total population and sort sub-regions into tiers defined in Table 6. This is an important metric for determining Program strategy during the initial phase, where some sub-regions will have a significant head start with contractors that are familiar with technical specifications and program participation requirements.

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\(^5\) The Team chose to focus on insulation contractors because they are more likely to shift focus in response to economic conditions to other services like HVAC or drywall, while windows contractors generally only work on fenestration projects.
**Table 6. Tiers of Contractor Participation**

<table>
<thead>
<tr>
<th>Tier</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>More than 50% of contractors are on a utility program list</td>
</tr>
<tr>
<td>Average</td>
<td>Between 20% and 50% of contractors are on a utility program list</td>
</tr>
<tr>
<td>Low</td>
<td>Fewer than 20% of contractors are on a utility program list</td>
</tr>
</tbody>
</table>

**Findings and Recommendations**

The Comfort Ready Home Program represents an ambitious effort to increase the scale of weatherization energy savings in the Northwest. It will engage with utilities and contractors, providing technical training and education on program opportunities, and helping to reach homeowners with compelling messages of increased comfort and reduced energy bills. In the following section, the program has identified specific recommendations for targeted activities in each sub-region. These recommendations rely on the findings from the data analysis above. Specific sub-regional recommendations supplement the core activities necessary to broadly increase weatherization activity, such as establishing the contractor network or supporting contractors in scaling their businesses. The findings allow the Comfort Ready Home program to right-size the level of effort necessary in each sub-region and to strategically allocate resources, in order to meet the overall project goals.

**General Findings**

Findings will first be discussed generally, illustrating key learnings from the analysis of the data. Sub-regional profiles of findings and recommendations follow the general discussion.

**Regional Weatherization Opportunities**

Before evaluating BPA’s weatherization program data, the Team reviewed the number of households by housing types in each sub-region. Household-weighted program data illustrates the pace of weatherization activity for a given housing type but obscures the overall opportunity represented in the absolute number of units within a sub-region. Low pace in program activity for a given housing type must also have a substantial number of total units in order to represent a viable opportunity. Figure 1, Figure 2, and Figure 3 display the number of both BPA and total households for single family, multifamily, and manufactured homes by sub-region.
Single family homes comprise the largest quantity of homes and have generally been the main focus of weatherization programs. However, specific sub-regions have had a high level of success with manufactured homes and multifamily weatherization. Ultimately, the team decided to consider historical performance in all building types to estimate the remaining weatherization opportunities. While there are pockets of opportunity in multifamily buildings, many of those properties are found in urban regions covered by non-BPA electric utilities, with Northwest Washington as the main example.

Figure 4 displays the total number of weatherization measures for all building types by sub-region. Sub-regions with higher numbers have had more successful programs and are therefore assumed to have less remaining weatherization opportunity but a stronger starting point for initiating the Contractor Network. The Team then sorted sub-regions into tiers of past weatherization activity as illustrated in Figure 5 to inform specific recommendations.
Generally, the Team recommends that the Program scales the current efforts of utilities in sub-regions in the higher tier of historical performance, making sure to spread effort across all utilities – both high and low performing – within a sub-region. Conversely, the Program will engage in the foundational work of building relationships with contractors, developing their skills and experience, and generating demand with homeowners in low-volume sub-regions.

Most sub-regions have experienced uneven program activity, indicating additional opportunities to increase weatherization activity in specific building components or housing types. In these cases, either the homeowners have been unmotivated to upgrade these opportunities or contractors are not capable of providing those services. In single family homes, programs have typically been most successful with
windows and attic insulation, while air sealing, floor insulation, and wall insulation are generally less popular, as illustrated in Figure 6.

In virtually all sub-regions, windows projects outpace all other weatherization measures claimed. Windows have a different path to market than insulation and air sealing, often relying on marketing-heavy promotions, while insulation contractors typically experience smaller margins on their projects and therefore have lower marketing budgets. Windows are often what homeowners consider the most important variable for a home to be efficient and may even increase the value of a home or the rent that can be charged by a landlord. While the Program will seek to increase the pace of windows projects, the Team does not make recommendations to promote windows measures. This leads to two general, region-wide conclusions. First, homeowners that have received utility incentives for windows projects are an opportunity for marketing weatherization of other building components. Second, utilities can leverage windows contractors to generate new leads. The Team has explicitly made these recommendations where data show windows projects far outpacing other weatherization activity.

**Figure 6. Single Family Weatherization Projects Per Thousand Single Family BPA Households**

Comparison between sub-regions show differing levels of success insulating attics, floors, and walls. The variation in popularity between these building components indicates an opportunity for the Program to train contractors and promote those measures more aggressively in specific sub-regions. In Figure 6, wall insulation significantly lags attic measures in Central Oregon, Central Valley and Coast Oregon, Northeast Washington, the Olympic Peninsula and Coast of Washington, Southern Idaho, and the Southern Valley and Coast of Oregon. The implication is that there are contractors available to do those wall projects, successful programs reaching customers, and a base of houses that may require upgraded insulation. However, either the contractor base lacks the training and resources to confidently promote wall insulation or homeowners are unaware or unconvinced of the value. The contractor network can address both obstacles.

Floor insulation activity varies greatly between sub-regions as well. Many sub-regions have similar rates of single family attic and floor projects. The success of the utility program and contractors with promoting floor insulation can be leveraged and expanded to increase the rate of multiple-measure projects.

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6 While successful utility programs claimed equal volume of floor and attic insulation measures, there appears to be an upper limit of one wall insulation project per two attic insulation measures. This limit guided the Team’s recommendations on wall insulation.
However, many sub-regions show much slower floor insulation activity compared to attic insulation, including Northeast Washington, Northern and Southern Idaho, and the Tri-Cities and Yakima Valley sub-region of Washington. The Team recommends that contractors in these regions are trained in floor insulation techniques and supported with marketing efforts to homeowners.

Similarly, sub-regions varied greatly with success in multifamily buildings. Since this is by far the least common residential building type in the Northwest, the Team compared historical volume of projects to the total number of units. The Team verified that the opportunity was significant before recommending increased Program attention to multifamily properties. Additionally, multifamily homes typically suffer from the “principal-agent problem,” in which the owner of the asset (the building owner) does not pay for the cost of energy consumption (often paid by tenants). Weatherization upgrades are therefore harder to sell on economic terms. To account for this conundrum, the Program Team only recommends effort to reach multifamily buildings when there was evidence of interest from property owners, such as a history of successful window measure uptake. Sub-regions that fall into this category include Central Oregon, the Olympic Peninsula and Coast of Washington, and Tri-Cities and Yakima Region of Washington.

**Recommendation:** Promote multifamily attic insulation and manufactured home floor insulation in sub-regions with a strong history of windows or other measures in those building types

The Team also considered other factors in the data when making specific recommendations for measures or building types with remaining opportunity. For example, multifamily weatherization faces specific economic challenges with building managers, who generally approve and pay for any building upgrades but are often not responsible for energy bills. Manufactured homes deteriorate more quickly and have lower average values compared to single family homes, meaning that homeowners are less motivated to

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7 Multifamily households are represented by total number of units, while program data considers an entire building to be a single project. Program activity is therefore not comparable to single family and manufactured home program data, but the relative activity between sub-regions is useful for estimating opportunity.

8 Wyoming is an outlier due to a much smaller population of multifamily units. There were only 31 windows measures installed in this building type.
invest in energy upgrades. The Team sought evidence of past program success with a building type before recommending that building type as an opportunity. However, the success reaching these building types in some sub-regions indicates that there are strategies for success that the Program can replicate across the Northwest.

Manufactured homes represent a larger share of homes in the Northwest compared to multifamily and are therefore a significant opportunity for increased weatherization activity. However, this building type presents significant technical challenges with weatherization projects, particularly with attic and wall insulation. Floor insulation and window upgrades are therefore the primary opportunity, along with air sealing. Additionally, manufactured home weatherization faces obstacles with homeowners as those homes generally have lower value and shorter lifespans than single family homes. As with the multifamily category, the Team compared the pace of past program activity to the number of units before considering this as a significant opportunity and looked for evidence of homeowner interest before recommending Program attention to this building type. The evidence in this case is the ratio of floor insulation to window measures. Sub-regions with both a significant number of windows installations and a relatively low rate of floor insulation projects, may find a receptive audience for additional weatherization. The Team recommends training contractors in manufactured home weatherization and promoting the Program with homeowners in NE Washington, Nevada, Northwest Montana, Southern Idaho, Southern Valley and Coast of Oregon, Southwest Montana, and the Tri-Cities/Yakima region in Washington.9

**Figure 8. Manufactured Home Weatherization per Thousand Manufactured BPA Households**

<table>
<thead>
<tr>
<th>ID</th>
<th>Northern Idaho</th>
<th>Southern Idaho</th>
<th>SW Montana</th>
<th>NW Montana</th>
<th>Nevada</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NV</td>
<td>Central Oregon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>Central Valley/Coast Oregon</td>
<td>NE Oregon</td>
<td>NW Oregon</td>
<td>Southern Valley/Coast Oregon</td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td>NE Washington</td>
<td>NW Washington</td>
<td>Olympic Peninsula/Coastal Washington</td>
<td>SW Washington</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Tri-Cities/Yakima Washington</td>
<td></td>
<td></td>
<td>Wyoming</td>
<td></td>
</tr>
</tbody>
</table>

**Contractor Infrastructure Assessment**

In addition to past program data, the Program Team made targeted recommendations for each sub-region based on the number and quality of contractors offering weatherization services.

**Contractor Quantity**

Figure 9 displays the quantity of contractors found within each sub-region, weighted by the number of households located in BPA customer utility territory. The Team sorted sub-regions into tiers, shown in Figure 10, based on quantities defined in Table 4 above. In sub-regions in the low tier, the Program will recruit and train new contractors. The Program will support contractors to scale project volume by offering

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9 Although neither NW Montana nor Wyoming claimed any manufactured home measures, Wyoming contains significantly fewer units and therefore the Team does not consider this building type a worthwhile opportunity in that sub-region.
also relevant to this analysis is the disparity between the BPA household weighted contractor quantity and the total household weighted quantity. Table 7 describes recommendations associated with contractor quantity and the number of households, both within BPA customer utility territory and total. In sub-regions with a significant number of non-BPA households, a large number of contractors are available to perform weatherization work but, presumably, are partially occupied by work in homes outside of BPA customer utility territory. This situation results in a recommendation that the Program recruits these contractors to increase focus on BPA customer utility territories by making the business case describing increased incentives and resources. Otherwise, sub-regions with high contractor volumes receive no recommendation for addressing contractor volume due to past success of utility programs. The Team recommends strategies for adding capacity to meet increased project goals and generating additional demand with homeowners.

**Recommendation:** Recruit contractors by making the business case of greater incentives and resources in sub-regions where many contractors are available, but work outside of BPA customer utility territory.

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10 Sub-regions in this category include NW Oregon, Southern Idaho, and Olympic Peninsula/Coastal Washington.  
11 Because the BPA customer utilities make up a portion of the total household count, the total household weighted volume will always be lower than the BPA household weighted count as the denominator for this metric is higher.
Table 7. Contractor Quantity Recommendations

<table>
<thead>
<tr>
<th>BPA Household Weighted Volume</th>
<th>Total Household Weighted Volume</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Recruit new contractors</td>
</tr>
<tr>
<td>Average</td>
<td>Low</td>
<td>Support existing contractors and increase training; Recruit contractors working in non-BPA territories</td>
</tr>
<tr>
<td>Average</td>
<td>Average</td>
<td>Support existing contractors and increase training</td>
</tr>
<tr>
<td>High</td>
<td>Low or average</td>
<td>Recruit contractors working in non-BPA territories</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>No recommendation</td>
</tr>
</tbody>
</table>

Figure 10 displays tiers of contractor quantity by sub-region and includes a comparison between the different household weightings as defined in Table 4. Tiers of Contractor Quantity. Detailed recommendations for each sub-region can be found in the following section. Notice that the greatest disparity between BPA and total household weightings are in sub-regions with significant non-BPA customer utility territories, such as Northwest Oregon and Southern Idaho. The implication is that there are a significant number of contractors available to help BPA accomplish its goals.

Figure 10. Insulation Contractors per Thousand Households

The Team further refined sub-regional recommendations for recruiting and supporting contractors by the average number of staff for each insulation contracting firm. The Team acquired employee counts for 13% (112 of 852) of the contractors in the database, shown in tiers in Figure 11. Average Number of Employees per Insulation Contractor. While not comprehensive, the number of employees does indicate sub-regions with the ability to sustain higher project volume, even with a relatively low total quantity of firms. Furthermore, those firms are likely to be more capable of scaling up volume in the future. The Team adjusted recommendations for sub-regions with low or average contractor quantity when their contractors fell into low or average volume. Recommendation: Scale up capabilities in contractors with larger staff.
the high tier of employee count. In these cases, the Program will increase the capability of firms to increase project volume. Northwest Washington and Southwest Washington are notable sub-regions that fall into this category.

**FIGURE 11. AVERAGE NUMBER OF EMPLOYEES PER INSULATION CONTRACTOR**

![Bar chart showing average number of employees per insulation contractor across various regions.]

**Contractor Quality**

The final analysis performed by the Team to strategically target Program activities was an assessment of the quality of contractors. This activity is inherently uncertain without records of inspection results, but nevertheless provides a basis for actionable recommendations.

The Team acquired star ratings for a significant number of contractors in the database. However, the Team elected to omit analysis of this data for a number of reasons. First, the star ratings were very similar between sub-regions, leaving little room for comparison as shown in Figure 12. Second, sub-regions with lower ratings were dominated by a significant number of poor reviews for companies that offer services outside of insulation, such as drywall or HVAC equipment installations. The applicability of those ratings to the Comfort Ready Home Program is questionable. Finally, star ratings are a subjective measure not necessarily tied to the quality or level of customer service of a firm, but also including price and customer experience.

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12 No employee data was available for Northeast Oregon, Nevada, or Wyoming.
To generate an actionable assessment of contractor quality, the Team compared utility weatherization preferred contractor lists to the overall population of firms in the contractor database. Figure 13 displays the results, including four sub-regions that have no utility lists at all. This is an important metric for the operation of the Program during the startup phase, as there is a crucial difference in Program needs for contractors that are and are not familiar with the operation of utility weatherization programs. Contractors on utility lists are likely to be familiar with technical specifications and program participation requirements.

Figure 14 displays the sub-regions sorted into tiers of contractor representation on utility lists based on the percentage of contractors occurring on utility program lists. In sub-regions with low representation contractors, the Comfort Ready Home Program will focus on providing basic orientation to the Contractor Network participation requirements and training on installation technical specifications and best practices.

The analysis includes non-BPA customer utility lists. In the Northwest, most utility weatherization programs are substantially similar in technical specifications and programmatic requirements.
Conversely, in sub-regions with a high rate of representation, the Program can train contractors to expand their offerings in more difficult measures and supporting them with scaling project volume. Sub-regions with average contractor representation will need to provide specification training on a contractor-by-contractor basis but can focus the bulk of effort on scaling up capabilities and project volume.

**FIGURE 14. TIERS OF CONTRACTOR REPRESENTATION**

The Program Team has analyzed program and contractor data to identify specific opportunities for the Program to find success. Table 8 summarizes the situations and recommendations for program strategy explored in this Assessment.

**TABLE 8. SUMMARY OF RECOMMENDATIONS**

<table>
<thead>
<tr>
<th>Situation</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of high windows activity</td>
<td>Leverage contractors and past participants</td>
</tr>
<tr>
<td>Disproportionate measure activity</td>
<td>Promote multiple measures that have had slower volume, including single family wall insulation, multifamily attic insulation, and manufactured home floor insulation</td>
</tr>
<tr>
<td>Low quantity of contractors</td>
<td>Recruit contractors with business case of increased weatherization opportunity</td>
</tr>
<tr>
<td>High quantity of contractors working outside of BPA customer utility territory</td>
<td>Recruit contractors with business case of increased weatherization opportunity</td>
</tr>
<tr>
<td>Low rate of contractors represented on utility weatherization program lists</td>
<td>Train contractors on weatherization specifications and program participation requirements</td>
</tr>
</tbody>
</table>
Sub-Region Profiles

The profiles that follow describe the findings from the data analysis for each of the individual sub-regions and detail the recommendations informed by the data. For all sub-regions, even those with historically successful weatherization programs, achieving BPA’s goals for weatherization energy savings will require additional resources to generate leads with homeowners and provide incentives, along with a coordinated effort to recruit and train contractors. The analysis and recommendations that follow inform and right size the strategy for the general region-wide effort to increase weatherization activity. The recommendations identify specific opportunities to address specific housing types or building components that were not historically addressed. Additionally, the Team identifies strategic leverage points in historical and ongoing successes with specific weatherization activities that will offer greater levels of success with marketing and lead generation activities.
These recommendations are drawn from the analysis in the 2020 Residential Weatherization Contractor Infrastructure Assessment developed in partnership with BPA and Cadeo Group. That report looks historical weatherization activity and the number of existing insulation and windows contractors in geographical sub-regions. The purpose is to target activities for increasing weatherization and right-size program effort. In all sub-regions, the first step for broadly increasing the pace of weatherization activity will include recruiting contractors, offering training, and increasing incentives.
Sub-Region Profile

Northern Idaho

<table>
<thead>
<tr>
<th>Weatherization Opportunity</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures to Prioritize</td>
<td>Insulation</td>
</tr>
<tr>
<td>Priority Housing Type</td>
<td>Single Family Homes</td>
</tr>
<tr>
<td>Contractor Count</td>
<td>Low</td>
</tr>
<tr>
<td>Contractor Representation</td>
<td>Low</td>
</tr>
<tr>
<td>Priority Outreach Area</td>
<td>Windows Contractors</td>
</tr>
</tbody>
</table>

Weatherization Opportunity Assessment

Northern Idaho has a history of low program activity, but relatively strong performance in manufactured homes. There appears to be an opportunity to increase weatherization activity in single family homes, the dominant housing type in this sub-region. Additionally, Northern Idaho has seen greater success of windows contractors, who can be leveraged for leads in other weatherization measures.

Contractor Infrastructure Assessment

Northern Idaho has a low quantity of contractors compared to other sub-regions. Few contractors are currently listed on utility weatherization preferred contractor lists, meaning they will require training to understand program requirements and weatherization technical specifications.

Recommendations

- Recruit contractors and train on specifications
- Train contractors on single family homes
- Leverage windows contractors for leads

These recommendations are drawn from the analysis in the 2020 Residential Weatherization Contractor Infrastructure Assessment developed in partnership with BPA and Cadeo Group. That report looks historical weatherization activity and the number of existing insulation and windows contractors in geographical sub-regions. The purpose is to target activities for increasing weatherization and right-size program effort. In all sub-regions, the first step for broadly increasing the pace of weatherization activity will include recruiting contractors, offering training, and increasing incentives.
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**Sub-Region Profile**

**Southern Idaho**

<table>
<thead>
<tr>
<th>Weatherization Opportunity</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures to Prioritize</td>
<td>Single Family Wall Insulation</td>
</tr>
<tr>
<td>Priority Housing Type</td>
<td>N/A</td>
</tr>
<tr>
<td>Contractor Count</td>
<td>Average</td>
</tr>
<tr>
<td>Contractor Representation</td>
<td>Low</td>
</tr>
<tr>
<td>Priority Outreach Area</td>
<td>Homeowner Outreach</td>
</tr>
</tbody>
</table>

**Weatherization Opportunity Assessment**

Southern Idaho has a low history of program activity, indicating a large opportunity to increase weatherization volume. The significantly greater number of attic insulation projects compared to wall insulation shows an opportunity to direct contractor attention to wall insulation retrofits in single family homes.

**Contractor Infrastructure Assessment**

Southern Idaho has an average number of contractors compared to other sub-regions. However, few of these contractors are currently listed on utility weatherization preferred contractor lists, meaning they will need to receive training on technical specifications and program participation.

**Recommendations**

- **Recruit contractors and train on specifications**
- **Train contractors on single family wall insulation**
- **Generate leads with homeowner outreach**

These recommendations are drawn from the analysis in the 2020 Residential Weatherization Contractor Infrastructure Assessment developed in partnership with BPA and Cadeo Group. That report looks historical weatherization activity and the number of existing insulation and windows contractors in geographical sub-regions. The purpose is to target activities for increasing weatherization and right-size program effort. In all sub-regions, the first step for broadly increasing the pace of weatherization activity will include recruiting contractors, offering training, and increasing incentives.
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### Sub-Region Profile

**Northwest Montana**

<table>
<thead>
<tr>
<th>Weatherization Opportunity</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures to Prioritize</td>
<td>Single Family Wall Insulation</td>
</tr>
<tr>
<td>Priority Housing Type</td>
<td>Manufactured Homes</td>
</tr>
<tr>
<td>Contractor Count</td>
<td>High</td>
</tr>
<tr>
<td>Contractor Representation</td>
<td>Average</td>
</tr>
<tr>
<td>Priority Outreach Area</td>
<td>Windows Contractors</td>
</tr>
</tbody>
</table>

### Weatherization Opportunity Assessment

Northwest Montana has a moderate history of program activity in single family homes, but shows a significant opportunity for increased activity on wall insulation. The significantly larger number of attic insulation projects compared to wall insulation shows an opportunity to direct contractor attention to the wall insulation retrofits. Similarly, high windows activity in manufactured homes indicates an opportunity to promote floor insulation with customers who have had positive experiences with utility weatherization programs in the past.

### Contractor Infrastructure Assessment

NW Montana has a high quantity of contractors compared to other sub-regions, an average number of which are currently listed on utility weatherization preferred contractor lists. In addition to focusing on single family wall insulation and manufactured home floor insulation, the program will leverage the success of windows contractors in the sub-region to generate leads for other measures.

### Recommendations

- **Train contractors on MH floor insulation**
- **Train contractors on single family wall insulation**
- **Leverage windows contractors for leads**
These recommendations are drawn from the analysis in the 2020 Residential Weatherization Contractor Infrastructure Assessment developed in partnership with BPA and Cadeo Group. That report looks historical weatherization activity and the number of existing insulation and windows contractors in geographical sub-regions. The purpose is to target activities for increasing weatherization and right-size program effort. In all sub-regions, the first step for broadly increasing the pace of weatherization activity will include recruiting contractors, offering training, and increasing incentives.
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Sub-Region Profile

Nevada

<table>
<thead>
<tr>
<th>Weatherization Opportunity</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures to Prioritize</td>
<td>Insulation</td>
</tr>
<tr>
<td>Priority Housing Type</td>
<td>Single Family Homes, Manufactured Homes</td>
</tr>
<tr>
<td>Contractor Count</td>
<td>High</td>
</tr>
<tr>
<td>Contractor Representation</td>
<td>Low</td>
</tr>
<tr>
<td>Priority Outreach Area</td>
<td>Windows Contractors</td>
</tr>
</tbody>
</table>

Weatherization Opportunity Assessment

Nevada has a higher opportunity for increasing weatherization projects, although a relatively small number of households. Past program activity is in the bottom tier of the region, and significant opportunity remains in single family and manufactured homes. The significantly larger number of window projects compared to insulation shows an opportunity to leverage those projects for leads.

Contractor Infrastructure Assessment

Nevada has a large quantity of contractors compared to other sub-regions. However, few of those contractors are currently listed on utility weatherization preferred contractor lists, indicating a need for training and support for participating in programs.

Recommendations

- Train contractors on specifications
- Train contractors on manufactured homes
- Leverage windows contractors for leads

These recommendations are drawn from the analysis in the 2020 Residential Weatherization Contractor Infrastructure Assessment developed in partnership with BPA and Cadeo Group. That report looks historical weatherization activity and the number of existing insulation and windows contractors in geographical sub-regions. The purpose is to target activities for increasing weatherization and right-size program effort. In all sub-regions, the first step for broadly increasing the pace of weatherization activity will include recruiting contractors, offering training, and increasing incentives.
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**Sub-Region Profile**

**Central Oregon**

<table>
<thead>
<tr>
<th>Weatherization Opportunity</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures to Prioritize</td>
<td>Single Family Wall Insulation, Multifamily Attic Insulation</td>
</tr>
<tr>
<td>Priority Housing Type</td>
<td>Multifamily</td>
</tr>
<tr>
<td>Contractor Count</td>
<td>Medium</td>
</tr>
<tr>
<td>Contractor Representation</td>
<td>High</td>
</tr>
<tr>
<td>Priority Outreach Area</td>
<td>Homeowner Outreach</td>
</tr>
</tbody>
</table>

**Weatherization Opportunity Assessment**

Central Oregon has a moderate history of program activity and significant opportunity for continued weatherization remains, particularly with wall insulation. The significantly larger number of attic insulation projects compared to wall insulation shows an opportunity to direct contractor attention to wall insulation projects. Additionally, Central Oregon contains a significant share of low-rise multifamily homes that have not been addressed by weatherization programs.

**Contractor Infrastructure Assessment**

Central Oregon has an average number of contractors compared to other sub-regions, so more are needed to meet increased program goals. 80% of those contractors are currently represented on utility weatherization preferred contractor lists, indicating a high level of familiarity with program requirements and program technical specifications.

**Recommendations**

- Train contractors on single family wall insulation
- Generate leads with multifamily homes
- Recruit contractors and train on specifications

These recommendations are drawn from the analysis in the 2020 Residential Weatherization Contractor Infrastructure Assessment developed in partnership with BPA and Cadeo Group. That report looks historical weatherization activity and the number of existing insulation and windows contractors in geographical sub-regions. The purpose is to target activities for increasing weatherization and right-size program effort. In all sub-regions, the first step for broadly increasing the pace of weatherization activity will include recruiting contractors, offering training, and increasing incentives.
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---

### Sub-Region Profile
**Northwest Oregon**

<table>
<thead>
<tr>
<th>Weatherization Opportunity</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured to Prioritize</td>
<td>N/A</td>
</tr>
<tr>
<td>Priority Housing Type</td>
<td>N/A</td>
</tr>
<tr>
<td>Contractor Count</td>
<td>High</td>
</tr>
<tr>
<td>Contractor Representation</td>
<td>High</td>
</tr>
<tr>
<td>Priority Outreach Area</td>
<td>Homeowner Outreach</td>
</tr>
</tbody>
</table>

#### Weatherization Opportunity Assessment
Northwest Oregon has a moderate history of program activity in single family homes, which has been balanced across housing types and measures. There is no clear opportunity to make up for poor historical performance, but rather to scale up past success.

#### Contractor Infrastructure Assessment
Northwest Oregon has a high quantity of contractors compared to other sub-regions. Nearly all contractors are currently listed on utility weatherization preferred contractor lists, indicating a high level of familiarity with program requirements and weatherization. Many of these contractors are active in non-BPA customer utility territories, meaning there is an opportunity to recruit a highly trained base of contractors to increase work in BPA’s territory by making a strong business case based on increased weatherization incentives.

#### Recommendations
- Recruit contractors to work in BPA customer utility territory
- Generate leads with homeowner outreach

These recommendations are drawn from the analysis in the 2020 Residential Weatherization Contractor Infrastructure Assessment developed in partnership with BPA and Cadeo Group. That report looks historical weatherization activity and the number of existing insulation and windows contractors in geographical sub-regions. The purpose is to target activities for increasing weatherization and right-size program effort. In all sub-regions, the first step for broadly increasing the pace of weatherization activity will include recruiting contractors, offering training, and increasing incentives.
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---

**Sub-Region Profile**

**Northeast Washington**

<table>
<thead>
<tr>
<th>Weatherization Opportunity</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures to Prioritize</td>
<td>Single Family Wall Insulation</td>
</tr>
<tr>
<td>Priority Housing Type</td>
<td>Manufactured Homes</td>
</tr>
<tr>
<td>Contractor Count</td>
<td>Low</td>
</tr>
<tr>
<td>Contractor Representation</td>
<td>Low</td>
</tr>
<tr>
<td>Priority Outreach Area</td>
<td>Windows Contractors</td>
</tr>
</tbody>
</table>

---

**Weatherization Opportunity Assessment**

Northeast Washington has a moderate history of program activity in single family homes, but shows a significant opportunity for increased activity on wall insulation. The larger number of attic insulation projects compared to wall insulation shows an opportunity to direct contractor attention to the wall insulation opportunity.

---

**Contractor Infrastructure Assessment**

Northeast Washington has a low quantity of contractors compared to other sub-regions. Very few of these contractors are currently listed on utility weatherization preferred contractor lists, indicating a need for training and education. Additional opportunities for generating leads include leveraging windows contractors, which have been disproportionately successful in this sub-region.

---

**Recommendations**

- Train contractors on manufactured homes
- Recruit contractors and train on specifications
- Train contractors on single family wall insulation
- Leverage windows contractors for leads

These recommendations are drawn from the analysis in the 2020 Residential Weatherization Contractor Infrastructure Assessment developed in partnership with BPA and Cadeo Group. That report looks historical weatherization activity and the number of existing insulation and windows contractors in geographical sub-regions. The purpose is to target activities for increasing weatherization and right-size program effort. In all sub-regions, the first step for broadly increasing the pace of weatherization activity will include recruiting contractors, offering training, and increasing incentives.
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Sub-Region Profile
Southwest Washington

<table>
<thead>
<tr>
<th>Weatherization Opportunity</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures to Prioritize</td>
<td>Multifamily Attic Insulation</td>
</tr>
<tr>
<td>Priority Housing Type</td>
<td>N/A</td>
</tr>
<tr>
<td>Contractor Count</td>
<td>Average</td>
</tr>
<tr>
<td>Contractor Representation</td>
<td>Average</td>
</tr>
<tr>
<td>Priority Outreach Area</td>
<td>Past Participants</td>
</tr>
</tbody>
</table>

Weatherization Opportunity Assessment
Southwest Washington has a strong history of program activity, indicating a challenge to significantly scale up weatherization activity. The largest remaining opportunity is in multifamily, where a history of success with windows can be leveraged into other measures.

Contractor Infrastructure Assessment
Southwest Washington has an average number of contractors compared to other sub-regions. An average number of contractors are currently listed on utility weatherization preferred contractor lists, indicating a moderate need to train on program requirements and weatherization technical specifications.

Recommendations

- Generate multifamily leads from window participants
- Train contractors on technical specifications
- Generate leads with homeowner outreach

These recommendations are drawn from the analysis in the 2020 Residential Weatherization Contractor Infrastructure Assessment developed in partnership with BPA and Cadeo Group. That report looks historical weatherization activity and the number of existing insulation and windows contractors in geographical sub-regions. The purpose is to target activities for increasing weatherization and right-size program effort. In all sub-regions, the first step for broadly increasing the pace of weatherization activity will include recruiting contractors, offering training, and increasing incentives.
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**Sub-Region Profile**

**Tri-Cities and Yakima, Washington**

**Weatherization Opportunity**

The Tri-Cities and Yakima region of Washington has a moderate history of weatherization program activity. The strong performance of windows installations indicate a receptive customer base to other weatherization measures, and the strength of those contractors can be leveraged to generate leads for new weatherization measures in different building components.

**Contractor Infrastructure Assessment**

The Tri-Cities and Yakima region of Washington has an average number of contractors compared to other sub-regions. An average number of these contractors are currently listed on utility weatherization preferred contractor lists, indicating a limited need to train on technical specifications and program requirements. The focus in this sub-region will be scaling up the past success of utility programs.

**Recommendations**

- Leverage windows contractors for leads
- Generate leads in multifamily homes with past participants
- Train contractors on technical specification

These recommendations are drawn from the analysis in the 2020 Residential Weatherization Contractor Infrastructure Assessment developed in partnership with BPA and Cadeo Group. That report looks historical weatherization activity and the number of existing insulation and windows contractors in geographical sub-regions. The purpose is to target activities for increasing weatherization and right-size program effort. In all sub-regions, the first step for broadly increasing the pace of weatherization activity will include recruiting contractors, offering training, and increasing incentives.
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## Appendix A. Utilities by Sub-Region

<table>
<thead>
<tr>
<th>Sub-Region</th>
<th>Utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Oregon</td>
<td>Central Electric Cooperative</td>
</tr>
<tr>
<td></td>
<td>Harney Electric Coop.</td>
</tr>
<tr>
<td></td>
<td>Midstate Electric Cooperative</td>
</tr>
<tr>
<td>Central Valley and Coast Oregon</td>
<td>Blachly-Lane Electric Coop</td>
</tr>
<tr>
<td></td>
<td>Columbia Power Coop Association</td>
</tr>
<tr>
<td></td>
<td>Drain, City of</td>
</tr>
<tr>
<td></td>
<td>Emerald PUD</td>
</tr>
<tr>
<td></td>
<td>Eugene Water &amp; Electric Board</td>
</tr>
<tr>
<td></td>
<td>Lane Electric Coop.</td>
</tr>
<tr>
<td></td>
<td>Springfield Utility Board</td>
</tr>
<tr>
<td>NE Oregon</td>
<td>Hermiston Energy Services</td>
</tr>
<tr>
<td></td>
<td>Milton-Freewater, City of</td>
</tr>
<tr>
<td></td>
<td>Northern Wasco County PUD</td>
</tr>
<tr>
<td></td>
<td>Oregon Trail Electric Consumers Coop</td>
</tr>
<tr>
<td></td>
<td>Umatilla Electric Coop</td>
</tr>
<tr>
<td></td>
<td>Wasco Electric Coop</td>
</tr>
<tr>
<td>NE Washington</td>
<td>Cheney, City of</td>
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<td></td>
<td>Chewelah, City of</td>
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<td></td>
<td>Consolidated Irrigation District #19</td>
</tr>
<tr>
<td></td>
<td>Ferry County PUD</td>
</tr>
<tr>
<td></td>
<td>Inland Power &amp; Light</td>
</tr>
<tr>
<td></td>
<td>Kalispel Tribal Utilities</td>
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<tr>
<td></td>
<td>Modern Electric Water</td>
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<tr>
<td></td>
<td>Nespelem Valley Electric</td>
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<tr>
<td></td>
<td>Okanogan County PUD</td>
</tr>
<tr>
<td></td>
<td>Okanogan Electric Coop</td>
</tr>
<tr>
<td></td>
<td>Pend Oreille PUD</td>
</tr>
<tr>
<td></td>
<td>Vera Water &amp; Power</td>
</tr>
<tr>
<td>Nevada</td>
<td>Wells Rural Electric Coop</td>
</tr>
<tr>
<td>Northern Idaho</td>
<td>Bonners Ferry, City of</td>
</tr>
<tr>
<td></td>
<td>Clearwater Power Co.</td>
</tr>
<tr>
<td></td>
<td>Idaho County Light &amp; Power Coop.</td>
</tr>
<tr>
<td></td>
<td>Kootenai Electric Coop</td>
</tr>
<tr>
<td></td>
<td>Northern Lights</td>
</tr>
<tr>
<td></td>
<td>Plummer, City of</td>
</tr>
<tr>
<td>NW Montana</td>
<td>Flathead Electric</td>
</tr>
<tr>
<td></td>
<td>Glacier Electric Coop., Inc.</td>
</tr>
<tr>
<td></td>
<td>Lincoln Electric Cooperative, Inc.</td>
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<td></td>
<td>Mission Valley Power</td>
</tr>
<tr>
<td></td>
<td>Missoula Electric Cooperative</td>
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<tr>
<td></td>
<td>Troy, City of</td>
</tr>
<tr>
<td>NW Oregon</td>
<td>Canby Utility Board</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------</td>
</tr>
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