UCONS, L.L.C.
Utility Conservation Services

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January 19, 2017

Mr. Phil Bussey
Mr. Bob Stolarski
Puget Sound Energy
P.O. Box 97034, PSE 12
Bellevue, WA 98009

Dear Phil and Bob,

By cover of this letter, I am pleased to submit to you UCONS, LLC's proposal for an Innovative Pilot Program for providing a comprehensive level of electric energy conservation and efficiency services in 2017 to 1,800 Puget Sound Energy customers in Pierce and Thurston Counties who reside in manufactured homes (MH). A ProCost analysis demonstrates that the Pilot will provide PSE with a very cost effective new resource with a benefit/cost (TRC) above 2.0.

This Innovative Pilot Program has been prepared to address the barriers to equitably serving MH customers in 2017 while concurrently addressing the conservation goals of I-937 and the 7th Power Plan. The Pilot is recommended to be implemented in Thurston and Pierce Counties because MH park managers and customer groups there report very little conservation activity in 2016. UCONS plans to engage those contractors which PSE has qualified for selected measures in the MH sector. This will increase the opportunity for PSE-approved contractors.

PSE has been a leader for hard to reach customer programs for many years. In recent years, PSE MH customers have experienced a significant decline in the level of energy efficiency services provided to them. Although this customer class currently consumes over 6% of PSE's total electric load, it receives less than 1% of the utility's conservation budget, even though MH customers typically have the highest residential energy bills and the least ability to pay such high bills (Appendix IV, Pilot). Consequently, these mainly low and lower-income ratepayers receive a disproportionate low share of PSE's overall spending on conservation and efficiency measures, despite the fact that their homes represent a significant opportunity for regional power savings through cost-effective conservation. Ishbel Dickens, past Executive Director of the National Mobile Home Owners Association, has written of her concern "that manufactured home owners across the country are missing out on important conservation opportunities that ought to be as available to them as they are to other homeowners."

There are many reasons for this disparity and missed conservation opportunity which are identified in this Pilot Program. In brief, the MH customer is "hard to reach" with typical utility programs or with rebates. As a contractor that has supported over 130,000 MH customers on the West Coast and in Texas, UCONS has worked with the major customer groups to identify solutions to address these market barriers. In the past two years alone, the UCONS policy team has worked with groups representing MH customers, PSE, the staff and council members of the Northwest Power and Conservation Council (Council), staff and members of the Washington Utilities and Transportation Commission (UTC), Department of Commerce, the Public Counsel Section of the Washington Attorney General's Office (Public Counsel), the Northwest Energy Coalition (NWEC), and low income agencies.

Stakeholders representing this sector were greatly encouraged by the Council's language in its 7th Power Plan which recognizes that this customer class offers our region a significant opportunity for acquiring additional cost effective resources.

In brief, UCONS proposes this Innovative Pilot Program to promptly address the 7th Power Plan goal of addressing the MH sector's needs. This Pilot can be implemented on or before April 1, 2017, promptly bringing equity to the hard to reach MH customer while complementing the utilities' current conservation programs. In addition to addressing the needs of this customer in a timely manner, PSE will receive nine months of field and customer data prior to rolling out any new programs in 2018. The Innovative Pilot's focus is to address each of the primary barriers which have acted to make the customers in this class hard to reach, as the 7th Power Plan has correctly characterized them.

In the past, PSE has encouraged any and all innovative programs and opportunities to address the needs of their hard to reach customers. The UTC's rules recognize the importance of developing and implementing pilot programs and projects, stating that, in the "[p]rocess for pursuing all conservation," "[a] utility must implement pilot projects when they are appropriate and expected to produce cost-effective savings within the current or immediately subsequent biennium, as long as the overall portfolio remains cost-effective." WAC 480-109-100.

Our policy advisors have appreciated your time and our face to face discussions with you to review the challenges facing these customers. Per your recommendation, we were pleased to join other qualified PSE contractors to evaluate if a rebate program might address this market sector. The results are reflected in our proposed Pilot program, Appendix IV. To develop this proposal, several assumptions were necessary, both in modeling and analytics. This Pilot employed 7th Power Plan data and models employed by The Council and RTF staff who were very helpful in the attached cost effectiveness studies. We expect PSE may employ avoided costs, discount factors and administrative costs which are slightly different than those employed in the 7th Power Plan. We would be pleased to provide the ProCost model and data used for this Pilot so as to facilitate your review of how changing inputs may impact value to PSE. The Pilot has been prepared to complement the current PSE portfolio. Early implementation of the Pilot can support current IRP efforts while providing valuable input for future RFPs. We have been pleased to implement prior Pilot programs for PSE when such significant problems arise on reaching a customer.

I look forward to further discussions on this proposal. Please contact me should you have any questions.

Sincerely,

Tom Eckhart

Tom Eckhart, PE
CEO

Enclosure

Cc:

Customer Representatives: (Ishbel Dickens, Randy Chapman AMHO)

UTC (Deborah Reynolds; Jennifer Snyder)

Dept. of Commerce: (Emily Salzberg)

Public Counsel: (Lisa Gafken; Mary Kimball)

Power Planning Council: (Tom Karier)

Regional Technical Forum: (Jennifer Light; Charlie Grist)

Northwest Energy Coalition: (Nancy Hirsch; Wendy Gerlitz)

Manufactured Housing Innovative Pilot Conservation Program Addressing Barriers to Customer Participation

Submitted to Puget Sound Energy in Accordance with:
Puget Sound Energy's Conservation Goals; 7th Power Plan Hard to Reach Goals;
and I-937 Goals

Submitted by UCONS, LLC

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January 19, 2017

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Section I - Executive Summary

Brief Overview

Over the past six years, customers in manufactured homes (MH) have experienced a significant decline in the level of energy efficiency services provided. As an example, this customer class currently consumes over 6% of PSE's total electric load, but derives less than 0.5% of the utility's conservation budget (Appendix IV). They typically have the highest energy bills, while having the least ability to pay high bills. There are many reasons for this which are identified in this pilot program. In brief, the MH customer is "hard to reach" with typical utility or rebate programs. As a contractor who has supported over 130,000 MH customers on the west coast and in Texas, we have worked with the major customer groups to identify solutions to address these market barriers. In the past two years, policy team of Utility Conservation Services (UCONS) worked with customer groups representing the manufactured home customer, Puget Sound Energy (PSE), the Staff of the Northwest Power and Conservation Council (Council), the Utilities and Transportation Commission (UTC), the Public Counsel Section of the Washington Attorney General's Office (Public Counsel), the Northwest Energy Coalition (NWEC) and low income agencies. The customer groups representing this sector were encouraged by the language in the Council's 7th Power Plan approved in 2016 which recognized this customer class offers the region a significant opportunity for acquiring additional cost effective resources.

While this proposal has been prepared for consideration by PSE with reference to data from PSE's service territory, its framework would work for similar proposals for Washington's other investor-owned utilities.

Project Purpose

UCONS proposes this innovative Pilot to promptly address the 7th Power Plan goal to address the needs of this sector. Rather than defer or delay services another year, the Pilot would enable the utility to have important feedback this year on which measures (and which features) would work best. PSE would then have additional data and ability to build upon in their next round of bidding. This pilot can be implemented on or before March 1, and promptly bring equity to the hard to reach MH customer while complementing the utilities' current conservation programs. In addition to addressing the needs of this customer in a timely manner, PSE would have nine months of field and customer data prior to rolling out new programs in 2018. The focus of the innovative pilot is to address each of the primary barriers which have acted to make this customer class and identified in the 7th Power Plan as hard to reach.

Developer and Implementer Experience

UCONS has supported the development of new programs and new measures for the hard to reach customer class in the US since 1992. We have won competitive bids for this customer class (from PSE, Avista and Snohomish County PUD, all California IOUs and each Texas IOU). In order to provide the customer, the utility and the regulator assured and cost effective energy savings, UCONS has supported pre- and post- billing history studies for each of its programs. Perhaps most importantly from the customer perspective, we never offer a new measure which we have not separately field tested for its suitability for the MH sector.

Projected Savings
The Innovative Pilot has been developed to provide a comprehensive level of cost effective measures to 1800 MH customers of PSE in Thurston and Pierce Counties in 2017. With support from Council staff, ProCost analysis demonstrates that the pilot will provide PSE with a benefit/cost (TRC) above 2.0 and deliver over 6,000,000 kWh. The Pilot will substantially boost participation for this customer class in 2017. All energy savings and cost effectiveness results are provided herein for review. All costs are based upon use of the Incremental Measure Costs currently approved in the region.

Support of PSE Portfolio; Collaboration with PSE and Existing Contractors
PSE has encouraged any and all innovative programs and opportunities to address the needs of their hard to reach customers. This innovative program has been prepared to address the barriers to serving an equitable level of MH customers in 2017 (while concurrently addressing the goals of I-937 and the 7th Power Plan). The pilot is recommended to be run as a pilot in Thurston and Pierce Counties (where the MH park managers and customer groups report very little activity in 2016). UCONS plans to engage those contractors which PSE has qualified for selected measures in the manufactured home sector. This will increase the opportunity for PSE approved contractors. The customer is the priority.

Section 2: Proposal Summary Document

Project Name: Manufactured Housing Energy Retrofit Program

Bidder Organization: UCONS, LLC

Primary Contact Information

Name:	Thomas Eckhart	Shani Taha
Phone:	(425) 576-5409	(360) 466-2210
Address:	10612 NE 46th St Kirkland, WA 98033	

Proposed Start date: April 2017
Proposed End date: December 2017 (or later date should PSE wish to extend the Pilot program)

1) General Bidder Questions

a) What is the location of your office nearest to PSE service territory?
10612 NE 46th Street, Kirkland WA 98033
b) Number of years in business providing proposed service/product? 25
c) Is your product currently available to the market? Yes, each of these products have been evaluated and provided to PSE customers previously.
d) Have you provided this service or product to other utilities or government agencies? Yes
e) Do you have experience with measurement and verification of utility energy savings? Yes
UCONS is a contributing member of the RTF and a charter member of the Cal TF.

2) Program Information

a) Target Customer Segment(s): Residential Manufactured home customers in PSE service areas

b) Retrofit

c) Program end-use(s)
- Space Heating
- Water Heating
- Lighting
- Year round processes: heat pumps
- Seasonal Process: electric space and water heating

d) Type of energy efficiency measures to be installed:
All cost effective measures identified in 7th Power Plan for residential sectors (and identified by PSE customers in recent surveys: Lighting; low flow showerheads; ductless heat pumps; windows; heat pump water heaters; advanced power strips

e) Total participating customers:
An estimated 1800 customers are projected to participate in the Pilot phase

f) Total measures to be installed: an estimated 18,000 separate measures (See Proposal section (5.B and C).

g) Total annualized energy savings for all installed measures:
   a. 6,230,550 kWh (See Proposal section 5.C)
   b. Source of savings (RTF) and ProCost model simulation supported by Council staff.

h) Total proposal dollars: $3,717,390 (Proposal Cost Summary and Section 5.C). These costs are based on paying the full Council approved Incremental Measure Costs for most cost effective measures identified in the 7th Power Plan. Paying full Incremental Measure Costs (for the manufactured home hard to reach sector is both extremely cost effective (avoided costs lower than for other resources). This approach also addresses I-937 goals to acquire "all cost effective resources"

i) Benefit/Cost Ratio (ProCost results for each measure summarized in Section 4.C range from 0.9 (Heat pump water heaters) to 50.1 (low flow showerheads).
TRC for the recommended portfolio is >2.1 (see Section 5 and Appendix III)

3) Pilot Cost Exhibit

	Pilot # Measures	Council Measure Incremental Cost	PSE Cost	Customer Cost
Duct Sealing (both single and double wide)	600	$ 463	$ 277,800	See Pay for Savings Option
LED Lighting	1500	$ 72	$ 108,000	
(10 per home)				
LFSH & aerators	600	$ 22	$ 13,200	
Storm Windows	270	$ 1,181	$ 318,870	$ 318,870
(120 sq.ft.)				
Ductless heat pump (1 ton)	720	$ 4,024	$ 2,897,280	See Pay for Savings Option
Thermostats	450	$ 58	$ 26,100	$ 26,100
(line voltage)				
HPWH	90	$ 846	$ 76,140	$ 99,000
TOTAL Costs			$ 3,717,390	$ 443,970

NOTES:

1. Enables most cost effective measures to be provided at no cost to Customers; addresses current Lost Opportunities
2. Provides PSE a new program with a TRC > 2.0
3. Is responsive to 7th Power Plan goals for the hard to reach sector in a timely manner
4. Provides this customer class the opportunity to receive conservation benefits previously unavailable to them
5. Experience has shown PSE can leverage this customer class's participation through On Bill Financing. The utility has indicated it is looking at this option. Experience from other utilities shows that PSE could reduce its direct cost for the Pilot by nearly 50% by providing financing for higher-cost measures to its hard to reach customer class.
6. Additional non-Energy benefits from the Pilot accrue through water and sewer savings

Section 3 - Company Profile - Qualifications

UCONS, LLC
10612 NE 46th Street
Kirkland, WA. 98003

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Main office (Kirkland)

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UCONS is a sole member LLC. For the 2017 Manufactured Housing Innovative Pilot Program UCONS will be managed by Tom Eckhart, Shani Taha, Joe Wolery and Grace Garland. Our policy, DOE and evaluation support teams bring added depth in new products, technical training and specification preparation, financial reporting and independent quality control oversight. This management team has collaborated on multiple successful conservation programs targeting HTR customers in the Northwest. Groups representing HTR customers will play an active role with this pilot, bringing their perspective on how to best address those market barriers which have caused this customer group to remain underserved and hard to reach. As this program can include many PSE customers who qualify for low income assistance, we are working with the Department of Commerce and low income agencies to both leverage funds and enhance the value to manufactured home customers (some of whom qualify for low income assistance, and some of whom do not).

History & Overview of Products and Services
UCONS is a national leader in the development and implementation of residential conservation programs which focus on underserved sectors, especially manufactured home residents and multifamily customers. Under the leadership of Tom Eckhart, UCONS has provided direct install energy efficiency programs over the past 25 years in California, New York, Texas, Utah, Washington and Oregon. The level of service provided by UCONS to hard-to-reach markets is greater than that provided by any other contractor in the United States, and greater than most utilities' level of service as well.

Qualifications
UCONS has served as prime contractor to the following organizations, providing weatherization services to utility customers:

- **Puget Sound Energy, Bellevue, Washington**
  From 1990 to 1995, American Plumbing (our contracting arm) and UCONS provided space and water heating conservation services to over 20,000 multifamily and 11,000 manufactured homes in the Puget Power service territory. These were some of the first multifamily and manufactured home programs in the country that were provided on a turnkey basis. These programs provided low flow showerheads and aerators to the multifamily sector and comprehensive inspection and repair of manufactured home areas below the floor including:

cross-over duct repair and replacement; duct sealing; and rodent and vapor barrier repair and replacement. In addition, customers were provided new energy efficient set-back thermostats; low flow showerheads, faucet aerators; and pipe wraps.

In December 2009, UCONS completed a comprehensive multifamily Pilot program for PSE in Whatcom, Skagit and Island Counties, in which 8,215 multifamily customers of PSE had participated. The purpose of the Pilot program was to evaluate if a fully funded, direct install program could achieve the goal of reaching a more difficult to reach customer segment (compared to a partially funded program) --- while also remaining cost effective. The program was completed ahead of schedule, and under budget.

From January 2010 to the current time, UCONS has been delivering PSE's manufactured home programs. The program scope has been expanded by the addition of CEEP and ARRA grant awards over the past 5 years which has supplemented PSE funding. In the past 5½ years, UCONS has provided comprehensive services to nearly 25,000 PSE customers living in manufactured homes both in and out of MH parks, on budget and ahead of schedule.

In 2014, UCONS was awarded PSE's innovative manufactured home floor insulation program. The program utilized a CEEP grant award which supplemented PSE funding. Over an 18-month period, more than 700 MH customers participated in this program, saving over 1,300,000 kWh.

- **Snohomish County PUD, Everett, Washington**
  UCONS was selected in a competitive bidding solicitation in 2005 to provide a manufactured home weatherization program to about 1500 manufactured home customers of Snohomish PUD. The program provided a comprehensive set of measures including: duct test and sealing; furnace filters; water heating measures; and lighting measures. The program was launched in September 2005 and was completed in June 2006.

- **Avista Utilities, Spokane, Washington**
  UCONS was selected in a competitive bidding solicitation in 2007 to provide a comprehensive multifamily program in the utility's Washington and Idaho service areas. The program provided a comprehensive set of measures to 11,232 electric and gas tenant customers including: interior tenant and common area lighting; windows; floor and ceiling insulation; commercial washers in common area laundry rooms; low flow showerheads & aerators; and hot water pipe wrap. The program was completed in 2009 and provided Avista annual savings of 14,950,000 kWh and 95,900 therms.

  UCONS was selected in a competitive bid solicitation in 2012 to provide a comprehensive manufactured home prescriptive duct sealing program to an estimated 2000 homes in the Avista service area on or before July 2013. This program was co-funded by a state energy grant administered by Washington State University. The program closely resembled the UCONS program for Puget Sound Energy. UCONS was approached to continue the program through the end of 2014. The program finished on budget and ahead of schedule and provided Avista annual savings of 6,494,680 kWh and 91,951 therms.

UCONS has also worked with many other utilities in delivering similar program as proposed herein, including:

- **PacifiCorp,** Portland, Oregon
- **Portland General Electric,** Portland, Oregon
- **Pacific Gas & Electric,** San Francisco, California
- **San Diego Gas and Electric,** San Diego, California
- **Southern California Edison and Southern California Gas Companies,** Los Angeles, California
- **Texas utilities (SWPS, Reliant, TXU, AEP),** Texas

THOMAS G. ECKHART
January 1991 - Present
Chief Executive Officer
UCONS, LLC, Kirkland, Washington
As CEO, Tom positioned UCONS as a full-service energy services company (ESCO), providing residential and commercial energy services to utilities and public housing authorities. UCONS focuses on providing energy and water efficiency services to underserved sectors (apartments, small commercial properties, and manufactured home parks). Prior to joining UCONS, he managed Puget Sound Energy's award-winning residential conservation programs prior and coordinated the development and marketing of independent power projects for NEPCO in the United States and Canada. As chair of the National Association of Energy Service Companies residential committee since 1995, Tom has been instrumental in the development of cost effective and rigorous evaluation standards for residential programs. Tom holds a bachelor of science from The United State Merchant Marine Academy. He also holds a Masters in Nuclear Science from the University of Washington and an MBA in Finance from the University of Pittsburg. Mr. Eckhart is a Professional Engineer and is a licensed and bonded general contractor in Washington State.

SHANI TAHA
April 1995 – Present
Executive Vice President of Marketing and Operations
UCONS, LLC, Kirkland, Washington
Shani worked for two years as a marketing advisor to UCONS before joining our management team. A Smith College graduate, her professional credentials include service as Deputy Superintendent at Seattle City Light, Vice President with Bonneville Power Administration and CAO for King County. She also served on EPRI's Research Advisory Committee, and as an officer and Chair of the American Public Power Association's Customer and Energy Services Committee. Shani is recognized, both nationally and locally for her expertise in customer and service delivery planning. She has developed and coordinated marketing strategies for UCONS efforts with public and private utilities and has supported the UCONS marketing team in outreach to hard-to-reach customers.

JOE WOLERY
2010 – Present
Operations Manager
UCONS, LLC, Kirkland, Washington
Joe has over 12 years of experience in construction, with the last 6 years working for UCONS specializing in energy efficiency. Joe is our expert on Manufactured Home Duct Sealing and ductless heat pump installation; he also has experience working with multi-family and single family residences. Joe holds all necessary certifications for installation and servicing of ductless heat pumps. He has managed many different types of programs and has experience with production, construction, sub-contractors, purchasing and scheduling. Joe has excellent customer service skills and handles customer service calls.

GRACE GARLAND
2012 - Present
Financial and Office Manager
UCONS, LLC, Kirkland, Washington
Grace brings over 25 years of financial and database management and analysis to UCONS. She has managed several multi-million dollar projects for both public and private clients, including WSDOT, Cascade Water Alliance, Puget Sound Energy, and Microsoft. She specializes in enforcing state compliance and contractual obligations, human resources, financial reporting, and data management for the utility conservation programs conducted by UCONS.

Howard Reichmuth P.E., Senior Engineer at New Buildings Institute, coordinates early process evaluations and the design of IPMVP independent evaluations of UCONS' DSM programs. Mr. Reichmuth has published over 25 articles and papers on energy efficiency, passive solar and methods for predicting energy efficient uses in residential sectors, among other topics. His professional credentials are extensive and include service with the Oregon Department of Energy, Trisun Corporation, Ecotope, US Navy Astronautics Group and Montana MHD Energy Research and Development Institute.

Greg Sullivan, an MIT graduate with Battelle-Pacific Northwest National Laboratory, developed and managed a variety of programs and projects focused on energy and resource efficiency. Greg will support all early process and ex-poste evaluations on behalf of UCONS' DSM programs. All evaluations will be administered through protocols reviewed and approved by PSE.

Financial Qualification & Full Disclosure

- UCONS LLC is a limited liability company, chartered in Washington State.
- DUNS number: 80-951-1082
- UCONS Quick Ratio on January 1, 2017 was 10.
- UCONS' corporate web site is: www.UCONS.com
- UCONS is not currently nor has been involved in a lawsuit for the services proposed herein.

References

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Section 4: Barriers and Innovative Solutions Under I-937 and the 7th Power Plan

A. Events leading to the Northwest Power and Conservation Council addressing lack of manufactured home customer participation in regional conservation programs

The Northwest Power Act (1980) establishes, as one of the Council's purposes, "the development of regional plans and programs related to energy conservation, renewable resources, other resources, and protecting, mitigating, and enhancing fish and wildlife resources." The Council has fulfilled that purpose through its Northwest Conservation and Electric Power Plan and the periodic updates it makes to the Plan.

In its "action plan," the Council's 6th Power Plan describes energy efficiency as "the first priority resource in the Northwest Power Act." The 6th Plan's Overview Summary states:

> In each of its power plans, the Council has found substantial amounts of conservation to be cheaper and more sustainable than most other types of generation. In this Sixth Power Plan, because of the higher costs of alternative generation sources, rapidly developing technology, and heightened concerns about global climate change, conservation holds an even larger potential for the region. . . .
>
> Aggressive pursuit of this conservation is the primary focus of the power plan's actions for the next five years. Combined with investments in renewable generation as required by state renewable portfolio standards, improved efficiency will help delay investments in more expensive and less clean forms of electricity until the direction and form of future climate change legislation becomes clearer, and alternative low-carbon energy technologies become cost effective.

The Council takes seriously the Northwest Power Act's declaration that "conservation and efficiency in the use of electric power" is a central purpose of the Act. Based on that declaration, the Council has amplified that purpose in its past Power Plans and did so again in its 7th Power Plan.

Northwest utilities have recognized that manufactured homes are inherently inefficient; some utilities have expressed concern on the longevity of such homes for conservation investments. However, the Council has taken note that these homes "persevere" and typically are not removed or replaced, as the vast majority of their owners cannot afford to replace them and cannot afford to make improvements. In addition, low income programs generally focus on safety and comfort to the homeowner. Their improvements reach less than 1% of the manufactured homes in Washington, on average, and the improvements are not targeted to achieving the energy efficiency goals of either the 7th Power Plan or I-937. The 7th Power Plan recognized that other solutions are need to address this hard to reach customer class (See Appendix II)

B. Market Barriers

The primary barriers which have caused the MH customer sector to be underserved and labeled "hard to reach" are described in detail in Appendix I. Briefly, the barriers are:

1) Continued reliance on a single measure (duct sealing) to provide the majority of energy savings in manufactured homes.
2) Programs are not comprehensive (resulting in lost opportunities).
3) Programs no longer pay full incremental measure costs (for disadvantaged customers who cannot afford to pay upfront for cost effective measures).

Appendix II "Energy Efficiency in Manufactured Homes in Washington: The Path Forward" (July 2016), was prepared following the Council's adoption of its 7th Power Plan which addressed the region's need to address the barriers which have prevented this high-bill customer class from receiving the energy savings benefits provided to other residential ratepayers. That Path Forward document was prepared with feedback from: The Council staff and members; the UTC, Public Counsel, NWEC, and agencies serving low income ratepayers.

C. Innovative Solutions which can be implemented early in 2017 to address these barriers

Here is how the Pilot will address these barriers:

1) The Pilot will provide incentives to all customers in manufactured homes for those measures which have been identified in prior customer surveys as preferred.

2) The Pilot will limit incentives to those measures which are identified in the 7th Power Plan (Table G9) as cost effective in the residential sector.

3) The incentives shall be set at the full incremental measure cost approved by the Council for qualifying customers in manufactured homes, both those qualifying for low income assistance and those not qualifying for low income assistance. The 7th Power Plan identifies all customers in manufactured homes as "hard to reach." While it is critical to continue (and expand) support of low income programs for the MH sector, I-937 does not make a distinction based on income qualification but encourages the acquisition of all cost effective conservation.

By increasing financial incentives for MH customers, this solution will greatly expand their participation rate, up to the same level currently seen in other residential customer sectors, yet still provide a very cost effective program with a benefit/cost ratio above 2.0.

While on-bill financing is not yet available to MH customers served by PSE, it is possible that some of these customers would participate in a program even when asked to pay for a portion of the costs, if the utility offers on-bill financing. It has been demonstrated this customer class does not have the ability to pay upfront for even a portion of the cost for energy efficiency measures, and certainly not for the measures which have the greatest impact on their energy bills. If implemented, however, on-bill financing would also reduce the direct cost of the program to the utility, particularly if PSE were to offer the customer the option to finance up to 50% of the more costly measures (such as ductless heat pumps and low E storm windows). California has demonstrated that on-bill financing will reduce the direct utility cost of conservation by more

than half. There is a precedent for this approach at PSE, with its financing options for efficient electric water heaters. While our proposed Pilot does not include on-bill financing, it certainly could be adapted to accommodate that means to facilitate acquisition of conservation measures.

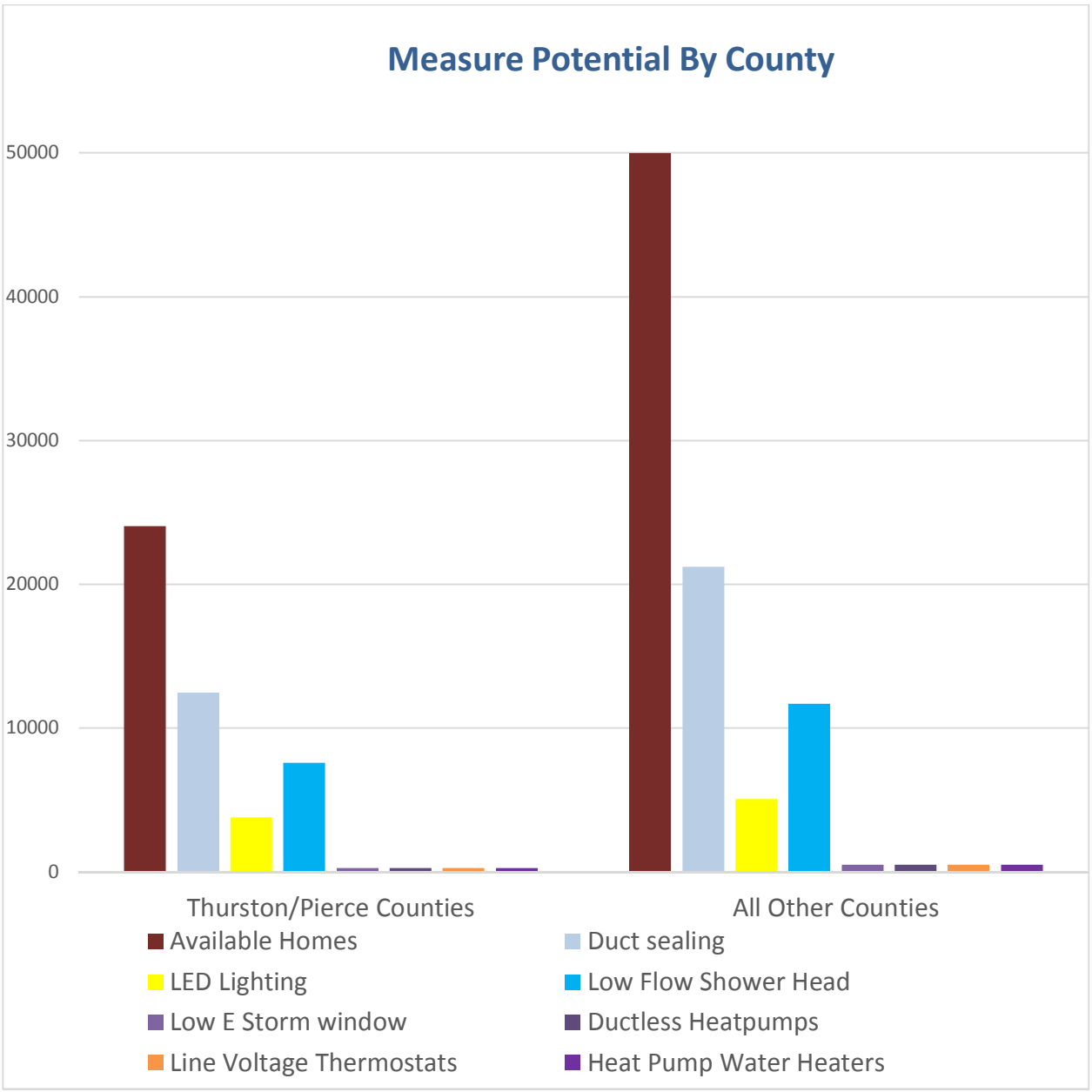
D. Complimenting Current PSE programs

The Pilot would expand upon the critical support provided by low income agencies. Utilities have noted that their funds (for qualifying low income ratepayers in manufactured homes customers) are provided to low income agencies. These funds, however, are for important repairs to address safety and building reliability (not energy consumption). We fully support increasing the funding to these agencies. In 2016, low income agency funds were limited to making improvements to fewer than 1000 manufactured homes (or less than 1% of the 204,000 manufactured homes in Washington). This data is reported by both the low income agencies and the Department of Commerce, and verified by the Association of Manufactured Home Owners in Washington State. Washington contractors are already assisting those low income agencies in Washington who have limited funds for energy improvement measures. We recommend that any energy conservation program which addresses the MH sector recognize that all customers in manufactured homes are "hard to reach and underserved." Accordingly, the same improvement in funding recommended herein for energy efficiency under I-937, should equally apply to funding for low income agencies. This would significantly enhance the level of energy efficiency services which can be overseen by community action agencies.

In addition, the Pilot would be facilitated by customer groups representing mobile home parks. Marketing to customers in parks has never been easy, as the function of park managers is often to "prevent soliciting or contact by any contractor, as there have been many instances of false representation to the elderly or disadvantaged customer, who often are in parks." A rebate program, which requires multiple customer visits in MH parks, simply does not work well. Yet multiple contractors can successfully collaborate and work within these limitations if they are overseen by a single company which works closely with both the park management associations and the customer groups who live in these parks. Utilities do many things well in providing conservation services, but typically do not work closely with this particular customer group. That has been a hindrance to getting word out to both the MH customer and their park managers. The Pilot addresses this current challenge (see Appendix I).

E. Cost Effective Measure Potential in PSE service area for Manufactured Home owners

The following chart is based on audits of over 50% of the 70,000 manufactured homes in PSE's service area. This data reflects all energy efficiency services performed in manufactured homes since passage of I-937 and reported to the UTC. Nearly one-half of these homes have participated in a program in which a single primary measure (duct sealing) was offered. For those homes in which duct sealing was provided, a small number of efficient lamps (typically five) and showerheads plus aerators were also provided. This low level of efficiency services resulted from the market barriers which have kept this customer sector from receiving the more comprehensive conservation benefits provided to other residential customers, even though there are many more cost effective measures available to this customer class which have been identified by the Council in the 7th Power Plan.



The PSE data used in estimating the remaining measure potential in manufactured homes demonstrates as follows:

- As reflected in program data required by PSE (and illustrated in the bar chart above), the duct seal measure has been employed in a large percent of the manufactured homes in PSE service area. While this measure is low cost, PSE has recently determined that energy savings from this measure may not be substantial. Moreover, we have demonstrated to the region that such repairs may not be cost effective as repairs cannot be long lasting due to the limitations imposed by the manufacturers when manufactured homes leave the factory.
- Low flow showerheads are also shown as frequently provided to customers in manufactured homes with electric water heating. This has been a reliable and low-cost source for achieving energy savings.

- Surprisingly, participating homes typically received only five energy efficiency lamps, leaving a very large remaining cost effective source of low cost energy efficiency in this sector. Due to the market barriers affecting this customer class as summarized above, less than 1% of PSE manufactured homes customers received energy efficiency benefits from the following cost effective measures identified in the 7th Power Plan:
    - Energy efficient (low E) storm windows: This is a relatively new measure which Pacific Northwest National Laboratory has recommended that UCONS field test in this sector, as they found this to be an ideal, low cost enhancement ideally suited to this customer class. Both the RTF and BPA recently concurred and have approved this measure for selected applications. Customer surveys have indicated this is a measure they would like to have provided in a utility conservation program. However, the MH customer cannot afford to participate under current rebate programs and currently does not have access to an on-bill financing program.
    - Ductless heat pumps: This single measure has been extensively tested and demonstrated to be the most effective solution to reducing high energy bills during the winter in manufactured homes. This technology bypasses the very inefficient ducts which manufacturers provide in most manufactured homes. In addition, the floor plans of most manufactured homes are ideally suited for the efficient distribution of air to the customers. Customer surveys also reflect that an improved heating system is a high priority in a utility conservation program. However, the MH customer cannot afford these pumps for the reasons reviewed above.
    - Heat Pump Water Heaters (HPWH): This measure has been found to be very cost effective in many residential buildings and has been identified as a popular improvement by some PSE customers. Like ductless heat pumps, however, this measure also has a high initial cost that generally puts it beyond the reach of most customers in a manufactured home. The RTF incremental measure (reported in Section 5) is $846. That is less than half the cost to install this measure in a manufactured home. This measure is worth evaluating in the pilot on a limited basis as more customers may participate (when on bill financing may be offered in the future).
    - Line voltage thermostats: This measure is appropriate for base board or zonal heating applications and has been found to be cost effective in specific residential applications. It is low cost, but has not been employed widely in prior conservation programs to this customer class.

In review, many of the solutions to current barriers to acquiring cost effective conservation in Washington manufactured homes can be implemented today. Longer term solutions (like on-bill financing) are prudent to better leverage ratepayer funding for a cost effective program. This pilot program can be implemented promptly; by doing so, PSE will learn how many measures can be added to its portfolio for this sector before implementing future system wide programs. Specifically, it will learn:

- Which measures prove most reliable and satisfying to this customer.
- Which measures provide the highest level of assured savings, since by employing pay-for-performance features (described below), PSE will have early feedback on the amount of those savings.
- How many additional contractors can support this customer sector.

Section 5: Innovative Pilot Program

A. Customers to be served

This Innovative Pilot Program will focus on the PSE customers that typically have the highest electric bills. These are customers in manufactured homes with electric forced air heating and electric water heating. We know these customers well and understand the limitations of their homes. In addition, audit data from prior programs will enable us to engage other qualified PSE contractors who would like to participate in a comprehensive program which promptly addresses PSE, 7th Power Plan, and I-937 goals to acquire all cost effective conservation. The Pilot Program should not affect PSE's current portfolio of rebate programs which it offers to its customers.

The Pilot Program is intended to enable PSE's MH customers to participate in a PSE conservation program at a level which other residential customers enjoy. However, it is not intended to be offered system-wide until the Program results are fully evaluated by the utility. PSE and UCONS have previously collaborated successfully on pilot programs on the same basis. Accordingly, the Pilot Program is designed to be implemented in Thurston and Pierce Counties in 2017. Customers groups indicate that very little conservation was offered in MH parks in Thurston and Pierce counties in 2016. In addition, the Pilot Program would not interfere with and would complement existing low income programs in those counties.

B. Measures to be provided, with schedule for delivery

The 7th Power Plan (Table G9 provided in Appendix II) identifies many cost effective measures for the residential sector for program years 2016-2021. Most of these measures have been found suitable for the manufactured home sector, but the Pilot focuses on those measures which not only have been found cost effective, but which have been repeatedly requested by customers in customer satisfaction surveys. The current PSE portfolio of low or no cost services (duct sealing, LED lamps and water conservation measures) will also be included in the Pilot. However, PSE properly notes that these measures have been offered for many years and there is limited future potential. The specific measures which are recommended for the Pilot include:

- 600 homes with the duct seal measure (employing the regional protocol for duct sealing)
- 1500 homes with 10 LED lamps each
- 600 homes with (2) low flow showerheads and aerators
- 270 homes with an average of 120 sq.ft. of low E storm windows
- 720 homes with ductless heat pumps
- 450 homes with live voltage thermostats
- 90 homes with HPWH

This represents an average of only 150 homes monthly, assuming the Pilot commence no later than April. This is a far more comprehensive set of measures than is currently provided. However, UCONS has successfully demonstrated to PSE the capacity to support an even larger number of homes.

C. Economic Justification

This analysis used the Northwest Power and Conservation Council's ProCost model to screen, analyze, and cost justify the proposed measures and measure package.

The ProCost model was developed to characterize the costs and benefits of conservation measures and programs so that they can be compared on an equal footing to other energy resource options including generation and other demand side resources. The model is intended to take a full "life-cycle" view of the program from a variety of perspectives. This requires that the model quantify all costs, including first costs, operating costs, and periodic maintenance and replacement costs. The model must also be able to incorporate all of the benefits that can be quantified including avoided energy and capacity resources, avoided losses and costs on the transmission and distribution system, and non-energy benefits such as environmental externalities, the regional conservation credit, risk-mitigation benefits of conservation and benefits, or costs, of non-electric fuels (RTF/NW Council 2016).

ProCost is used by the Northwest Power and Conservation Council (NW Council) to develop the conservation supply curves used in the Power Plan analysis. ProCost is also used by the Council's Regional Technical Forum (RTF) to evaluate the cost effectiveness of conservation measures using the assumptions of the NW Council's current Power Plan. For this analysis, the Total Resource Cost Benefit/Cost (TRC/BC) ratio and levelized cost of energy saved will be used to assess cost effectiveness.

D. ProCost Measure Results

The following Measure and Program Output summary presents the energy savings, incremental measure costs and cost effectiveness attributes of the Pilot program. Each measure was run through the ProCost model making use of the NW Council and RTF approved inputs. The model outputs match those generated and used by the RTF in their Measure Assessment Workbooks, which contain the analysis of savings, costs and benefits, and measure lifetime (RTF 2017).

For the purposed of this analysis, and as defined in the NW Council's Seventh Northwest Conservation and Electric Power Plan (7th Plan), the TRC B/C ratio is the metric of choice for determining cost effectiveness. From the 7th Plan (NW Council, 2016):

> *Conservation program managers, the Regional Technical Forum, and regulators should use the benefit/cost ratio method outlined to determine cost-effectiveness. This method assures that all the costs and benefits are captured, that the time-dependent shape of the savings are accounted for, and that the capacity contribution of the measures are fully taken into account. If a measure's benefit to cost ratio, from a total resource cost perspective, is greater than one, the measure is considered cost effective.*

As defined, a measure reporting a TRC B/C ratio greater than one is determined to be cost effective. As shown in the table, all measures except for the heat pump water heater (HPWH) measure report a TCR B/C ratio greater than one, and in some cases much greater than one. It should be noted that the specific HPWH measure chosen (Tier 1 HPWH, installed in "conditioned" electrically heated space) has the lowest TRC B/C ratio due to its installation location and interaction with the conditioned space.

PROCOST Measure and Program Package Output Summary: UCONS EM&V consultant Greg Sullivan worked with Northwest Council staff to evaluate the cost effectiveness of the proposed measures for the Pilot in PSE service area. The same ProCost model used by the Council in the 7th Plan was used for the evaluation. In addition, the RTF and Council's avoided costs, energy savings and incremental measure cost assumptions were applied to the analyses. Assumptions used in this analyses are provided in Appendix III.

Measure Outputs Heating Zone 1: Unit Outputs

Measure	Incremental Cost ($)	Measure life (years)	Annual Energy Savings (kWh/yr)	TRC B/C ratio
Duct sealing (per home)	$463	18	973	4
LED Lighting (per home with 10 lamps per home)	$72	12	596	4.1
LFSH By Request_MH_Any Electric_1_50 GPM (per home with 2 LFSHs per home)	$22	10	374	50.1
Low E Storm window on existing single-pane metal frame (per home with 120 ft^2)	$1,181	20	1,064	1.9
Ductless Heat Pumps (per home)	$4,024	15	5,736	2.1
Line Voltage Thermostats (per home)	$58	15	54	1.3
Heat Pump Water Heaters (per home)	$846	13	965	0.9

Measure Outputs Heating Zone 1: Program Package Outputs

Measure	Incremental Cost ($)	Measure life (years)	Annual Energy Savings (kWh/yr)	TRC B/C ratio
Duct sealing	$277,800	18	583,800	4.0
LED Lighting	$108,000	12	894,000	4.1
LFSH By Request_MH_Any Electric_1_50 GPM	$13,200	10	224,400	50.1
Low E Storm window on existing single-pane metal frame	$318,870	20	287,280	1.9
Ductless Heat Pumps	$2,897,280	15	4,129,920	2.1
Line Voltage Thermostats	$26,100	15	24,300	1.3
Heat Pump Water Heaters	$76,140	13	86,850	0.9
Total	**$3,717,390**		**6,230,550**	

References

RTF/NW Council 2016. User Guide to ProCost, Version 3.0.46 Draft. Regional Technical Forum/Northwest Power and Conservation Council, Portland OR. December, 2016.
RTF 2017. Regional Technical Forum (RTF), Measure Assessment Workbook. Northwest Power and Conservation Council, Regional Technical Forum, Portland OR, 2017. Available at: https://rtf.nwcouncil.org/measures.
NW Council 2016. Seventh Northwest Conservation and Electric Power Plan, Appendix G: Conservation Resources and Direct Application Renewables. Northwest Power and Conservation Council, Portland OR. May, 2016.

E. Marketing and Customer Service Plan

UCONS has successfully marketed to MH customers for PSE since 2009. We have built relationships directly with customers and park managers. However, many of the existing parks that we have worked within have a strict "no solicitation" rule. UCONS has gained the trust of the park managers for a "free program" with door-to-door solicitation, but anything that is at some cost, although reduced, is not welcomed for a door-to-door approach. Any future marketing effort in MH parks must address the problems seen in prior programs that were not comprehensive and persuade park managers (even for a "no cost" program) to allow yet another solicitation program in the parks.

Eligibility

PSE customers living in manufactured homes in Thurston and Pierce Counties (with forced air electric space heating) would qualify to participate in this Pilot Program. The Pilot will be available to previously treated customers as this is a far more comprehensive program which can significantly add to the acquisition of cost effective conservation in PSE service area. In addition, Customers who elect to participate will be required to:

- Be an electric space heated customer of PSE,
- Provide access to their homes for an independent audit of installed measures,
- Provide a billing history,
- Possibly finance a portion of measure costs (when wishing to acquire a measure whose incremental measure cost is below the total installed cost of a measure), and
- Participate in a customer survey

Defined marketing assistance the respondent expects PSE to provide

During the Pilot's startup phase, UCONS would request assistance from PSE in sending out mailers notifying customers about the Program. Customer lists, letters of introduction, and support from PSE's customer service representatives will facilitate participant recruitment. Co-branding of the Program, which includes badges, vehicle marking, apparel, and marketing materials, will be highly effective in "legitimizing" the program and increasing customer participation.

Addressing Park Manager "no soliciting" requirements, even for utility sponsored programs

Park managers and customers in manufactured homes have seen a significant curtailment in utility-sponsored conservation programs in the past two years. Of course, a contributing factor is the installation of certain measures (from earlier programs) and the additional barriers described

in Section 4. An additional reason for this decline in conservation programs is that the services which customers have requested have not been marketed through the customer groups representing the MH park residents or the park managers themselves, reducing their appeal. This Pilot's significant increase in available cost effective measures, with no upfront cost to the customer for most measures, will spur significant assistance from those who represent the MH customers (see Appendix I).

Customer Service Plan - Customer Obligations and Costs

How participant complaints and issues will be addressed: UCONS maintains an experienced customer service department which is able to respond to and resolve most customer issues within 12-24 hours. All complaints and issues received by our call center are tracked electronically, and are accessible to our customer service and operations staff. Complaints received by our call center, or through PSE, will be dispatched to our customer service team and the customer promptly contacted. A complaint file will be created and the date, time and issue recorded. The date and time of response to customer, action required and taken, and final resolution will be subsequently recorded and maintained on file. A report of all customer complaints will be transmitted to PSE monthly.

Process to track and report customer information: UCONS utilizes a data management system which tracks the services each customer receives and provides real-time information about program success. This system uses a customer master-record approach to manage data. Work orders are specific to each customer and individual services received by each customer are tracked in detail. UCONS will not only be able to provide PSE with summary information (e.g., number of LEDs installed) by day, week, month, etc., but will be able provide specific installation details down to the customer level. This level of detail and customization allows UCONS to provide real-time data and reporting, including invoices and regulatory data. Our system can be adjusted during implementation to rapidly respond to changes in data collection requirements by PSE.

Customer Feedback: UCONS has worked closely with PSE during the past 6 years to implement a Customer Survey to better understand what we have done well, and what we can do better. These surveys are tabulated and provided to PSE via SurveyMonkey and via monthly summaries. This customer interaction tool has been helpful in learning how the customer feels about the current program, and what other programs interest them. The response over the past 6 years has been a 97% satisfaction rate, with 96% "very likely to recommend the program to friends, neighbors or family."

Finally, UCONS works closely with PSE Energy Advisors to keep them informed of the program and the communities we are targeting. Customers are encouraged to contact the PSE Energy Advisors to confirm the authenticity of the program and its representatives. One customer's positive experience can lead to another customer having confidence in the program and our customer service.

Program Participation Data Reporting Requirements
UCONS has sufficient data and customer information to commence marketing and to qualify manufactured home customers upon notice to proceed. Updated data that may be useful includes: Customer name & address (service and mailing), property ID for linking back to PSE, energy usage information, and any additional data required to determine eligibility. All data will reside on a secure server and be transmitted via secure methods.

Customer Interactions Requirements
Customer interaction is critical to the success of any program. Customers requiring an appointment will be scheduled within the next two week period to make sure customer needs are addressed in a timely manner; we will work within customers' schedules as much as possible. Reminder calls will be provided for all appointments, typically two days in advance. UCONS will make appointments available a minimum of one Saturday per month to meet the needs of working families. If it becomes necessary to reschedule a customer, the customer will be contacted not less than 24 hours in advance of the original appointment.

F. Enhancing Current Program Portfolio

PSE recently addressed the issue of "direct benefit to customer" to the UTC noting that,

> "Hard-to-Reach market segments often require significantly more staff time, effort, and cost to have any kind of impact, and Marketplace circumstances: saturation of certain measures leave only higher-cost measures availability, increased or decreased customer demand may require less incentives to move the market, (artificially keeping incentive high is not a prudent use of ratepayer funding) market saturation may make some measures no longer desirable, building codes make some measure obsolete. Each of these has the potential to impact a program's cost-effectiveness. Every element is actively managed by program staff in order to continue offering cost-effective programs while demonstrating prudent use of customer funding."

These are indeed important considerations in the design and implementation of all conservation programs, particularly those focused on the HTR customer class. This Innovative Pilot Program addresses the following important issues identified above:

- No or little staff time or administrative support from PSE will be required. UCONS has previously provided similar programs for Washington utilities on a comprehensive, turnkey basis. PSE is aware of our experience and capability and our ongoing relationship with the MH customer.
- UCONS has been required to conduct all prior QA/QC by hiring independent contractors to inspect completed work, reducing the administrative burden on PSE.
- UCONS will be responsible for nearly all marketing and customer support (as described above).
- Administrative costs will often appear high in a very small-budget program. However, by expanding the manufactured home budget for 2017 via the $3.7 million Pilot Program outlined herein, the ratio of PSE administrative costs to total program costs will be much lower.

We have learned from regulatory and state Energy offices (and customer groups) that few manufactured homes were provided conservation services in 2016. This was reported for both low income and energy efficiency services in Thurston and Pierce Counties. For those contractors who PSE has qualified, this program will represent an increased level of work. We have successfully collaborated with PSE on prior pilot programs for hard to reach customers. This Pilot has been designed to support, and not disrupt current programs.

G. Measurement & Evaluation

As described above, all assumptions for this program are based on currently approved RTF values. In order to assure persistence of savings (and to keep all PSE administrative costs low), UCONS is prepared to fully fund an independent QA/QC inspection.

UCONS has always supported independent pre- and post-billing history studies of its PSE programs, especially when introducing a new measure or service. In this instance, all measures have been fully reviewed and approved by the RTF and are included in the 7th Power Plan (as Table G9). For this Pilot Program, UCONS is prepared to introduce an innovative EM&V component, Pay for Savings. PSE and UCONS participated in a Pay for Performance workshop hosted by the Northwest Energy Coalition last October. While pay for performance is standard for the non-residential sectors, it has not often been applied in the residential sector in Washington. UCONS has delivered prior performance based programs for other utilities. We believe this Pilot Program provides an excellent opportunity to implement elements of performance-based services to PSE and to its MH customers. As PSE is aware, all prior billing history studies for ductless heat pumps and for the duct sealing measure provide a wide range of measured savings values. However, the RTF values (and those used for Pilot cost effectiveness) are based on a single, or average weighted, value.

UCONS has demonstrated (and most RTF members concur) that the variable which provides the most reliable predictor of energy savings is *the level of Winter heating bills prior to providing the approved conservation measures.* This is because:

- High winter heating bills correlate closely with the greatest energy savings, while
- Low winter heating bills provide the lowest energy savings.

This has been noted in many studies presented to the RTF, but utilities have not yet incorporated this effect into their energy savings portfolio for good reason: *there is no wish to deny a program benefit to any customer class based on energy usage.*

We subscribe to this position, but believe the Pilot Program provides the opportunity to pay for a measure's cost based on anticipated and verified savings. Specifically, for low winter heating usage customers, we would not recommend an expensive measure (such as a ductless heat pump, DHP), or at least size it appropriately. If this customer still desired a DHP, then a co-payment might be appropriate (i.e., not at the full incremental measure cost). This becomes a more challenging marketing and customer support service, but the Pilot Program offers a unique opportunity to apply evaluation lessons learned from prior programs. If PSE elects, UCONS would include a budget for an evaluation of savings for the Pilot program so as to address regional goals for addressing Pay for Performance (into PSE RES programs).

Section 6 Environmental Attributes and Non-Energy Benefits

There are no identified environmental or hazardous wastes typically associated with this type of program. Most removed products (such as failed ducts, flanges, tape and most lighting measures) are not appropriate for recycling. However, we have recycled metals from showerheads and aerators in prior programs and would plan to do so here. All contractors and installers will adhere to PSE guidelines and government regulations dealing with handling and disposal of materials.

All environmental attributes and non-energy benefits associated with this proposal will accrue to the use of PSE.

Program Net Benefits

Program net benefit analyses often understate the overall energy and environmental benefits for a properly designed and implemented conservation program. Such non-quantified program benefits can accrue from enhanced savings persistence. On-going customer support programs will take full advantage of installed measures. With proper education and follow up, customers are more likely to properly use and maintain measures, such as cleaning or replacing furnace filters. UCONS makes a point of periodic follow up with customers to remind them of maintenance measures.

The non-energy benefits to these customers typically show up on their other utility bills and arise from the separate water and sewer savings achieved by the installation of high efficient showerheads and aerators. UCONS has quantified the water and sewer usage savings in prior studies.

APPENDIX I
CUSTOMER LETTERS

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Tom Eckhart
UCONS, LLC
10612 NE 46th Street
Kirkland, A 98033

January 10, 2017

Dear Tom

As the former Executive Director of the National Manufactured Home Owners Association (NMHOA) I am concerned that manufactured homeowners across the country ae missing out on important conservation opportunities that ought to be as available to them as they are to other homeowners.

NMHOA is a membership based national association with members in over 20 states, including Washington, where there is also a very strong statewide homeowners' association – the Association of Manufactured Home Owners (AMHO).

NMHOA advocates for stronger legal protections for homeowners at the local, regional and national levels and while I was the ED I was very involved in the Dept. of Energy's Working Group looking at making new manufactured homes as energy efficient as possible – indeed the D.of E's proposals have been posted for public comment on the Federal Register.

While it is great that new manufactured homes will be as energy efficient as possible, it is also vitally important that homeowners of existing manufactured homes be given the opportunity to make their homes as energy efficient as possible too.

I urge you to encourage the NW Power Planning Council to do everything it can to guarantee manufactured homeowners with the same access to free conservation services and appliances as are available to other homeowners. Manufactured homeowners tend to stay in their homes for long periods of time, and many spend thousands of dollars to upgrade their homes throughout the years. It simply does not make sense that they are not able to avail themselves of the same conservation products and services as other homeowners.

I understand that there is language in the 7th Power Plan which prioritizes addressing these inequities and emphasizes renewed efforts regionally to address these problems. On behalf of manufactured homeowners I very much appreciate this attention.

Please let me know if there is anything I can do to support efforts to bring expanded (no cost) conservation products and services to the hard to reach manufactured homeowner sector. Indeed, by partnering with AMHO and other statewide groups, the sector may not be that "hard-to-reach" after all!

Thank you again for your efforts on behalf of manufactured homeowners.

Best,

Ishbel Dickens

Ishbel Dickens,
Consultant.

AMHO
Association of Manufactured Home Owners

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Tom Eckhart
UCONS,LLC
10612 NE 46th Street
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January 11, 2017

Dear Tom,

I enjoyed meeting with you and Shani before the holidays and I wish to acknowledge the efforts of UCONS and NWEC to bring to the attention of the NW Power Planning Council the plight of customers who live in manufactured homes. As you are aware, we are ratepayers but do not receive the same level of conservation services provided to other residential customers. We also have the highest electric bills in the region but our residents include the elderly on fixed incomes, military veterans, the working poor and thus we are the least able to pay for a portion of these conservation costs when utilities do require a copayment and do not offer financing services.

We are grateful for the language in the 7th Power Plan which places a priority on addressing these inequities and emphasizing renewed efforts regionally to address these problems. We are also appreciative of the opportunity to meet directly with the UTC – to explain our needs for increased attention to reducing the high electric energy bills – by funding innovative and expanded utility services (which address the goals ofI-937) for Washington ratepayers.

In the past two years, our park residents (and park managers) have noted a significant decline in any contractor or utility conservation program being offered. The only low (or no cost) measures being offered today are a few lights and a showerhead. Duct sealing is often offered, but often only if the customers pay for a portion of the costs. This is a problem for the vast majority of residents in manufactured homes. We support any efforts to bring expanded (no cost) conservation services to the hard to reach manufactured homeowner sector. We understood that I-937 would encourage ALL cost effective conservation. Doesn't that mean a utility should be indifferent to paying for the full cost of a conservation program (at least up to the avoided cost for new resources)? Please bring this to the attention of the utilities, UTC and public interest groups.

We are aware of a few utilities who will finance or lease energy conservation products or services as a way to leverage their acquisition of all cost effective

conservation. Please let us know how we can support some form of utility bill financing to assist our manufactured home residents.

Thank you again for your efforts on our behalf,

Sincerely,

Randy Chapman, Co-President
Association of Manufactured Home Owners (AMHO)

APPENDIX II
ENERGY EFFICIENCY IN MANUFACTURED HOMES IN WASHINGTON: THE PATH FORWARD
July 5, 2016

I. INTRODUCTION AND SUMMARY

The recently adopted 7th Power Plan (Plan) of the Northwest Power and Conservation Council (Council) recognizes the potential for cost-effective energy efficiency to meet all of the region's load growth in the coming years. Motivated by the Plan emphasis on energy efficiency, and the strong conservation mandate by Initiative 937 (I-937) in Washington, this paper's purpose is to suggest a "path forward" for utilities and regulators to encourage and facilitate the acquisition of cost-effective conservation by Washington's regulated utilities.

To highlight the need for such a "path," this paper focuses on the Plan's priority to address hard to reach (HTR) customers who have not previously benefitted a great deal from regional programs and in whose homes there exists a significant level of additional cost-effective conservation potential. The Plan, for example, explicitly calls out the special potential for cost-effective energy efficiency in the manufactured home (MH) market and the "special challenges" that face utilities and regulators in fulfilling conservation mandates for that low income community.

II. THE FRAMEWORK FOR THE PATH FORWARD: THE 7TH POWER PLAN AND I-937

A. The Northwest Power Act and the 7th Power Plan

The Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act)[1] sets forth a comprehensive planning process for the development of a series of regional energy plans to ensure "an adequate, efficient, economical, and reliable power supply."[2] It requires the Council to incorporate into the plans "cost-effective" energy resources and energy efficiency measures, and to give first priority to conservation.[3]

In February 2016, the Council adopted the 7th Power Plan for our region.[4] The Plan emphasizes the continued key role of energy efficiency in meeting the region's energy needs:

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[1] Public Law 96-501 (Dec. 5, 1980), *codified at* 16 U.S.C. §839 *et seq*. (References to the Northwest Power Act in this paper will be to the section numbers). http://www.gpo.gov/fdsys/pkg/STATUTE-94/pdf/STATUTE-94-Pg2697.pdf

[2] Northwest Power Act, §2(2).

[3] Northwest Power Act, §4(e)(1).

[4] Northwest Power and Conservation Council, *Seventh Northwest Conservation and Electric Power Plan* (February 25, 2016) (7th Power Plan), available at http://www.nwcouncil.org/energy/powerplan/7/home/.

> *In more than 90 percent of the future conditions, cost-effective efficiency met all electricity load growth through 2030 and in more than half of the futures all load growth for the next 20 years. It's not only the single largest contributor to meeting the region's future electricity needs; it's also the single largest source of new peaking capacity.*

For the Council, acquiring this energy efficiency is the primary action for the next six years.[5] This focus on energy efficiency continues and extends the Council's emphasis on conservation and efficiency that it has maintained since it adopted its 1st Power Plan in 1983.

The 7th Power Plan calls out and emphasizes manufactured homes as an example for targeting conservation, not just because of their potential for saving energy but also because the population residing in such homes, in general, is greatly in need of energy efficiency services. In its Action Plan to support model conservation standards, the Plan states:

> *Manufactured Homes: The manufactured home segment may face special challenges related to income, ownership, building codes, and some difficult-to-implement conservation measures specific to manufactured housing and their heating systems. The assessment should determine whether the adoption of measures in the manufactured home segment is on pace to complete implementation of nearly all remaining cost-effective potential over the next 20 years. Where expected shortfalls appear, specific barriers to implementation should be identified and solutions targeted at those barriers. While this market segment has been successfully targeted with a limited set of conservation measures (e.g. duct sealing), a more comprehensive approach that identifies and implements an entire suite of cost-effective measures during a single visit may be more cost-efficient.*[6]

In sum, the Council in its Plan for our region recognizes the "special challenges" of achieving all cost-effective energy efficiency in the region's manufactured homes and advocates a "more comprehensive approach" to combine a number of cost-effective measures to better serve this community, and the region.

B. I-937

In Washington, the Energy Independence Act, enacted by the people as Initiative 937 in 2006, requires Washington utilities, both investor-owned (IOUs) and consumer-owned (COUs),[7] to pursue *all* conservation that is cost-effective, reliable, and feasible.[8] I-937 directs that utilities look to the regional Plan when identifying its "achievable cost-effective conservation potential" and requires utilities to develop and implement two-year conservation targets and develop programs to meet those targets.[9] For IOUs, the Washington Utilities and Transportation Commission (WUTC or Commission) has adopted rules for such plans[10] and

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[5] 7th Power Plan at 1-1.
[6] 7th Power Plan at 4-12 (recommendation MCS-1).
[7] Consumer-owned utilities include public utility districts and municipal utilities.
[8] RCW 19.285.040(1).
[9] RCW 19.285.040(1)(a)-(b).
[10] WAC 480-109-120.

must approve them.[11] For COUs, the Department of Commerce has adopted rules for conservation targets. However, there is no present requirement for approval.[12]

Commission rules require that each IOU file a biennial conservation plan by November 1 of every odd-numbered year[13] and an update to that plan by November 15 of each even-numbered year.[14] Commerce deadlines for filing of targets are slightly different, but all utilities, both IOUs and COUs are to be guided by the 7th Power Plan.[15] For IOUs, this means that the provisions of the 7th Plan should be implemented in the updates to utility plans to be filed by November 15, 2016, and for the next biennial plan to be filed by November 1, 2017. Further, given that utility integrated resource plans (IRPs) must contain the "mix of energy supply resources and conservation that will meet current and future needs at the lowest reasonable cost to the utility and its ratepayers,"[16] those cost-effective strategies for energy efficiency in the 7th Power Plan should also be incorporated into conservation potential assessments in utility IRPs.

III. ENERGY EFFICIENCY POTENTIAL IN MANUFACTURED HOMES AND HOW TO "ACQUIRE" SUCH ENERGY EFFICIENCY

A. The Energy Efficiency Potential in Manufactured Homes

The 7th Power Plan identifies 530 MW of cost-effective residential conservation potential in our region.[17] Table G-9 in Appendix G to the Plan (provided as Attachment 1 to this paper) provides a summary of residential conservation potential based on aggregated Regional Building Stock Assessment (RBSA) data collected across the region. To support segmentation of data (by customer class, utility and by state), the Northwest Energy Efficiency Alliance (NEAA) and Ecotope have published a report using the RBSA database. This data is further supported by the nearly 37,000 audits of manufactured homes filed with the WUTC for conservation programs provided by Puget Sound Energy (PSE), Avista Utilities, and Washington State University (WSU) under I-937.

The NEEA segmented data and the 37,000 audits of Washington manufactured homes confirm a realistic conservation potential of 10.6 aMW for this hard to reach customer (as shown in Attachment 2 to this paper). As demonstrated in Attachment 2, however, the 2016 combined budgets of PSE, Avista, and Pacific Power for their Washington investments in MH efficiency amount to less than $2 million, while the total five-year cost for achieving the 10.6 aMW in Washington MH is just under $57 million.

Census and audit data confirm there are over 95,000 manufactured homes in the service areas of Avista Utilities, Pacific Power, and Puget Sound Energy. Tapping this potential not only would further I-937's energy efficiency goals, it would advance state policies to serve low income communities.[18]

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[11] RCW 19.285.040(1)(f).
[12] *See* WAC 194-37-070.
[13] WAC 480-109-120(1)(a).
[14] WAC 480-109-120(3)(a).
[15] RCW 19.285.040(1)(a).
[16] WAC 480-100-238.
[17] http://www.nwcouncil.org/media/7149911/7thplanfinal_appdixg_consresources.pdf, at G-25.
[18] The Commission has been diligent in implementing its authority to benefit low income customers.

B. Models for Tapping Energy Efficiency in Manufactured Homes

In Washington, a number of utilities have approved programs for duct sealing and related measures under which the utility pays the entire cost of such measures. Other utilities provide rebates,[19] however the energy efficiency potential in the MH market remains largely unmet.

Other states have been more successful in meeting this need. In California, for example, the State's "Energy Action Plan" contains a special focus on energy efficiency programs for low- income and other "hard-to-reach" communities.[20] In California, the California Public Utilities Commission (CPUC) directs the energy efficiency programs for IOUs, setting goals for the utilities and using third parties to evaluate the programs' effectiveness.[21] The CPUC also takes the lead role in approving specific energy efficiency measures .[22] In Oregon, the energy efficiency programs for the utilities are run by a third party, the Energy Trust of Oregon (ETO).[23]

For manufactured homes, the ETO offers a number of free energy services, including LED lighting, duct sealing and repair, and high performance aerators and showerheads.[24]

Compared to Washington, both California and Oregon have been more aggressive in their pursuit, and more successful in their acquisition, of energy efficiency for hard-to-reach utility customers. This is substantially because of the institutional structures in place – a heavily- involved CPUC in California and a separate entity in Oregon – that are mission driven.

C. Barriers

As the Council notes in its 7th Power Plan, there exist barriers to effecting the acquisition of all cost-effective conservation for manufactured homes. Generally recognized barriers include:

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[19] Puget Sound Energy now provides a rebate program, shifting from a previous program that paid full cost of MH measures.

[20] California Energy Comm'n & California Public Utilities Comm'n, *Energy Action Plan II: Implementation Roadmap for Energy Policies* 3 (Sept. 21, 2005) (http://www.energy.ca.gov/energy_action_plan/2005-09-21_EAP2_FINAL.PDF).

[21] California Public Utilities Comm'n, *Regulating Energy Efficiency: A Primer on the CPUC's Energy Efficiency Programs* 3-4 (February 2016) (http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/Fact_Sheets/English/Regulating%20Energy%20Efficiency%200216.pdf).

[22] Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluations, and Related Issues, CPUC Dkt. No. 13-11-005 (Nov. 14, 2013) (http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M155/K634/155634404.PDF) OR Application of Southern California Edison Company (UY338E) for Approval of its 2009-2011 Energy Efficiency Program Plans and Associated Public Goods Charge (PGC) and Procurement Funding Requests, CPUC Dec. 09-09-047 (September 24, 2009) (http://www.calmac.org/events/107829.pdf).

[23] See www.energytrust.org.

[24] www.energytrust.org/Residential/manufactured-homes/existing-manufactured-homes/no-cost-improvements.aspx

- **Under-Funding:** To date in 2016, for example, less than 1% of the manufactured homes in the service areas of PSE, Avista, and Pacific Power have participated in a utility-sponsored manufactured home program.

- **Lost Opportunities:** Utility funded programs for this underserved sector have not been comprehensive. Not only are there fewer measures, but existing individual measures have been administered separately, which results in extra expense for repeated trips by the installer, one for each measure—an inefficient use of effort and money. There are, however, documented efficiencies in providing multiple measures "(comprehensiveness") for the typical manufactured home. Regulators and utilities should promote comprehensive EE programs in manufactured homes, thus avoiding the lost opportunities which have occurred in the past. This comprehensive approach sometimes is referred to as the "whole house" or "whole structure" approach. Overcoming these barriers would be facilitated by requiring utilities to provide data on a frequent basis that is disaggregated by customer class and measure.

- **Hard-to-Reach Targets:** Again as an example**,** the manufactured home sector is typically unable to obtain many EE measures because the customers there tend to be lower income, needing some financial help, but failing to qualify for low income assistance. Simply providing free LEDs or showerheads will not substantially reduce their high energy bills. Either a higher level of cost-effective rebates is needed for this customer sector, or easy access to on-bill financing service. For this reason, the 7th Power Plan recognized the need to address hard to reach sectors, especially customers in manufactured homes.

- **Lack of Innovation**: No new or innovative programs are currently available to the hard-to-reach customer in Washington, probably for the foregoing reasons. This problem is addressed in other states by requiring programs to be funded by utilities but administered by third-parties.

IV. CONCLUSION: THE PATH FORWARD

Given the emphasis in the 7th Power Plan on overcoming barriers to energy efficiency in the manufactured home market, the RTF's analysis of the great potential for energy efficiency in that market, and the mandate of I-937 to pursue "all cost-effective" energy efficiency, we urge the following actions:

- Washington State government generally, through its various agencies such as the WUTC and the State Energy Office, and all the governing bodies of publicly-owned utilities, should take all feasible actions to ensure that energy efficiency is the number-one priority for energy acquisition by all utilities, as directed by the 7th Power Plan and I-937.

- The WUTC, in implementing I-937's mandate that utilities acquire "all cost-effective" energy efficiency, should:

- Work with utilities more closely to assure all cost effective conservation measures are being installed today. Work with utilities as conservation targets and plans are being developed, and integrated resource plans being revised, to focus on the potential of cost-effective energy efficiency in manufactured homes and to overcome the barriers referenced by the Council. This should include the elimination of financial barriers and the authorization of contractors to install a "suite" of measures, to maximize installation efficiencies for the "whole house" or "whole structure."

- Review and revise its various rules to ensure that utilities are required to acquire all cost-effective conservation as required by I-937. Such rule review should ensure that utilities:

  - In developing their conservation target and plans, and in updating their integrated resource plans, including conservation potential assessments, carry out the directives and other provisions of the most recent version of the Power Plan adopted by the Council (including the provision regarding manufactured homes);

  - In developing such plans, implement a system by which public and private entities, including energy service companies, may "bid in" proposals for energy efficiency programs and measures that the utility would be required to accept if such programs are, pursuant to the terms of I-937, are "cost-effective, reliable, and feasible." This could be a process akin to the process by which independent power producers sell supply-side resources to utilities under the federal Public Utilities Regulatory Policies Act.

  - Include in such plans an evaluation of conservation potential for "whole house" or "whole structure" programs in developing and implementing conservation goals and targets, and

  - Submit data to the UTC on energy efficiency measures and programs that are disaggregated by customer class, on a monthly basis.

- Pending such rule review, the UTC should work with utilities to update their conservation plans and their IRPs to implement the directives of the 7th Power Plan regarding conservation potential in manufactured homes.

- The Department of Commerce and the governing bodies of COUs should implement similar measures as described above to ensure that such utilities also are acquiring all such cost-effective conservation.

Table G - 9: Estimated Cost-Effective Conservation Potential in Average Megawatts 2021 and 2035

Measure Bundle	aMW by 2021	aMW by 2026	aMW by 2035	Description of Bundle
Residential				
Heat Pump Water Heater	9	62	267	Efficiency factor of 2.0 or greater
Behavior	17	38	45	Reduction in home energy usage through improved controls
Computers and Monitors	32	33	36	Efficient Desktop PC and Efficient Monitor
Heat Pump Upgrades & Conversions	7	26	77	Space heating conversion from electric resistance to heat pump and to heat pumps above the federal standard
Duct Sealing	21	29	30	Sealing existing ducts to <10% leakage
Residential Appliances	11	32	68	Clothes Washer, Dishwasher, Microwave
Advanced Power Strips	29	117	185	Reduction in stand-by energy use of peripheral electronics equipment
Weatherization	121	169	180	High performance windows, insulation
Ductless Heat Pump	29	79	166	Converting zonal electric heating or electric forced air furnaces to ductless heat pumps
Lighting	174	372	463	LED lamps
Showerheads	67	100	121	2.0 gallons per minute or lower flow rate
Other Residential Measures	14	48	96	Includes aerators, WIFI thermostats, HVAC commissioning, heat recovery ventilation
All Residential Measures	**530**	**1,104**	**1,734**	

ATTACHMENT 1

APPENDIX III
RTF UNIT MEASURE ENERGY INFORMATION MEASURE DETAILS

Last update: **1/11/2017**

Measure	Measure Application	Technology, Measure or Practice	Building Type	Details of Implementation and Product Standards	Status	Measure Category
Duct sealing	Manufactured Home Prescriptive Duct Sealing - Electric FAF - Heating Zone 1	Prescriptive Duct Sealing	Manufactured Home	1. Ducts must not have been previously sealed with mastic. 2. Appropriate materials and duct sealing methods shall be used. A. UL-181 listed mastic is an appropriate material to seal non-flexible duct connections. Cloth-backed duct tape shall not be used to seal, secure, or fasten ducts. Loose tape shall be removed prior to sealing. Secured tape that remains must be completely covered with mastic. Where there are large gaps in sheet metal or duct connections, repairs shall be made using sheet metal, sheet metal screws, and/or mastic with mesh-reinforcing tape (for holes or gaps less than 1 inch). B. For flexible crossover ducts, both the inner and outer lining shall be tightly fastened using a compression strap tightened with a tool designed for that purpose. 3. End caps shall be made of either sheet metal or a UL-181 approved rigid product, and sealed. 4. Ducts shall be sealed from the interior at every supply register (boot-to-duct connections , floor-to-boot gaps, and any other duct connections within an arms reach). 5. Plenum connections shall be sealed (plenum-to-furnace connection and plenum-to-trunk duct connection). 6. Crossover duct connections shall be sealed (crossover duct takeoff-to-trunk and crossover duct-to-collar connections). 7. Inferior sections of crossover duct, such as rusted, crushed, disconnected, torn, or sections otherwise ineffective, shall be repaired or replaced. New crossover ducts shall be insulated to a minimum of R8. 8. Crossover duct shall be mechanically fastened and supported to avoid disconnection and airflow restrictions.	Active	Proven
LED Lighting	Direct install - High Use_LED_Decorative and Mini-Base_1490 to 2600 lumens	LED	Residential - Family room, Living room,	Decorative and mini-base. 1,490 to 2,600 lumens		
Low Flow Showerheads	By Request_MH_Any Electric_1_50 GPM	1.5 gpm or less rated flow rate	MH	By Request - Recipient must request the showerhead and must provide address and contact information.	Active	Planning
Low E Storm Windows	Electrical Resistance - Manufactured Home Weatherization - Add a Low-e Storm Window to an existing Single Pane Metal Framed Window - Heating Zone 1	LOW-E STORM WINDOW on existing Single Pane Metal Frame window	Manufactured Home	Storm windows must use glazing materials with an emissivity less than or equal to 0.22 and a solar transmittance greater than 0.55, as listed in the International Glazing Database (IGDB) managed by Lawrence Berkeley National Laboratory and measured in accordance with NFRC 300-14,NFRC 301-14 and NFRC 302-10. Storm windows must be of the same opening type as the existing prime window. Storm window shall be permanently installed. Exterior storm windows shall be oriented with the low-e coating facing toward the interior of the house. For installations with metal framed prime windows the storm window's frame shall not be in direct contact with the prime window frame.	Active	Proven
Ductless Heatpumps	Install Ductless Heat Pump in House with Existing FAF - Manufactured Home - HZ1	Install Ductless Heat Pump to displace electric forced air furnace heat	Manufactured Home	Install a 9.5 HSPF or better DHP, with nominal tonnage ≥ 3/4 ton in the main living area of a house with permanently installed electric forced air furnace space heat. Application: Manufactured Home with electric forced air furnace.	Active	Planning

Line Voltage Thermostats	Electronic Line Voltage Thermostat - Single Family · Zonal Electric Heating System - Heating Zone 1	Electronic Line Voltage Thermostat	Single Family	Measure applies to single family houses with zonal electric heat. Measure does not apply to houses with one or more ductless heat pumps. Thermostat shall be an electronic line-voltage type with a thermistor temperature sensing element and be UA or CSA listed for use with zonal electric heater applications including on ore more of the following: fan-forced, baseboard, wall or ceiling radiant. The following additional program specs are recommended by the RTF: - Thermostats should have current and voltage ratings sufficient for their application, according to national, state, and local codes - Thermostats should be installed in accordance with applicable State and local codes, Federal regulations, and the most recent version of the National Electric Code - All existing bi-metal thermostats in all rooms, except the bathrooms, should be replaced with electronic thermostats - Programmable electronic thermostats should maintain temperature and program settings during power failures, and have a temporary override feature	Active	Planning
Heat Pump Water Heaters	Complies with Tier 1 of NEEA's Northern Climate Specification HPWH shall replace existing electric storage water heater Installation is in conditioned space	Heat Pump Water Heater	Single Family / Manufactured Homes	Manufacturer, Dealer or Consumer Rebate and Direct Installations. Application: Unit installed in conditioned interior space with an electric furnace or electric zonal system.	Active	Provisional

APPENDIX IV
CURRENT FUNDING OF CONSERVATION TO CUSTOMERS IN MANUFACTURED HOMES

1) The documentation for the contribution of PSE total system electric load is straightforward: IRP. See Page 5-4 current IRP which demonstrates total PSE load as 20,966,000 MWh. PSE's own database of its MH customers shows they have 74,000 customers
From the Council report on "low income customers in the region; RBSA data for manufactured homes) the average kWh usage for a customer in a manufactured home is 18,000 kWh (per RBSA, RTF). This has been confirmed by PSE billing history data for this customer class.

   This yields the following algebra as:
   Total electric load of PSE MH customer = (74,000) x (18,000 kWh) x (1/1000kWh/MWh) = 1,332,000 MWh

   Leaving the ratio of MH load (to total load) = 1,332,000/20,966,000 (or 6.3%)

2) The actual level of conservation services delivered in PSE service area since 2016 has not yet been received (a request made August 2016 per recommendations of the UTC). The UTC reports the I-937 data received from the utility is bundled with commercial and industrial and other RES sectors. Segmentation in reporting data for each customer has been found important in other regions (to ensure adequate funding for hard to reach customer classes). While we have not yet received the requested data from PSE, we do have the following data:

   - 2010 and 2011: 354 homes monthly provided PSE EE services (~3% of total conservation budget, excluding low income)
   - 2012 and 2013: 412 homes monthly provided PSE EE services (~3% of total conservation budget, excluding low income)
   - 2014 and 2015: 228 homes monthly provided PSE EE services (~2% of total conservation budget, excluding low income)
   - 2016 and 2017: less than 40 homes treated monthly (< ½ % of total conservation budget, excluding low income)

   The number of homes treated monthly since 2016 has been reported by the Park Managers and customer groups serving the manufactured home sector. The approved PSE contractors serving this sector report a slightly lower level of service monthly since January 2016

3) Funding of Low income qualifying customers in manufactured homes: The low income agencies report less than 200 manufactured homes in PSE service areas were provided upgrades with utility funding. They further report that funds are not focused on I-937 conservation goals, but on addressing code and safety upgrades to manufactured homes. King County Housing Authority (KCHA) reports they have provided substantial energy efficiency upgrades to nearly 150 manufactured homes since January 2016.