Exhibit No. ___(HLR-1T)

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

DOCKET NO. UE-16______

DOCKET NO. UG-16______

DIRECT TESTIMONY OF

HEATHER L. ROSENTRATER

REPRESENTING AVISTA CORPORATION

I. INTRODUCTION

Q. Please state your name, employer and business address.

A. My name is Heather Rosentrater and I am employed as the Vice President of Energy Delivery and Customer Service for Avista Utilities, at 1411 East Mission Avenue, Spokane, Washington.

Q. Would you briefly describe your educational background and professional experience?

A. Yes. I received a Bachelor of Science degree in electrical engineering from Gonzaga University, and hold a Professional Engineer (PE) credential. I joined Avista in 1996, and worked initially as an electrical engineer at Avista's former subsidiary Avista Labs, where I developed electrical systems for fuel cells. I joined Avista Utilities in 2003, and have broad experience on both the electric and natural gas side of the business, having managed departments and projects in transmission, distribution, SCADA, asset management and supply chain, as well as business process improvement using LEAN and Six Sigma techniques. I was named to my current position in December 2015. In this role, I am responsible for electric and natural gas engineering, operations, customer service, including the contact center, and shared services – fleet, facilities and business process improvement.

I currently serve on the board of directors for the Vanessa Behan Crisis Nursery and the West Valley Education Foundation in Spokane. In addition, I am a member of the Washington State University School of Engineering and Computer Science Executive Council.

Q. What is the scope of your testimony?

A. I will provide an overview of the Company's electric and natural gas energy delivery facilities, our response to the November 17 Windstorm, the planned installation of Advanced Metering Infrastructure, our distribution capital investment as well as our Asset Management programs, and finally, I will summarize Avista's customer support programs in Washington.

A table of the contents for my testimony is as follows:

Q. Are you sponsoring any exhibits in this proceeding?

A. Yes. I am sponsoring Exhibit No.___(HLR-2) which shows the number of customers and customer energy usage for each customer class. Exhibit No.___(HLR-3) is Avista's Advanced Metering Infrastructure (AMI) Business Case and Exhibit No.___(HLR-4) is a regulatory resolution on advanced metering. Exhibit No.___(HLR-5) is a recent industry report on advanced meter deployments in the U.S., Exhibit No.___(HLR-6) is the Company's Electric Distribution System 2016 Asset Management Plan, Exhibit No.___(HLR-7) is the Company's Electric Transmission System 2016 Asset Management Plan, and finally Exhibit No.___(HLR-8) is the Company's Electric Substations 2016 System Review performed by Asset Management.

II. OVERVIEW OF AVISTA'S ENERGY DELIVERY SERVICE

Q. Please describe Avista Utilities' electric and natural gas utility operations.

A. Avista Utilities operates a vertically-integrated electric system in Washington and Idaho. In addition to the hydroelectric and thermal generating resources described by Company witness Mr. Kinney, the Company has approximately 18,300 miles of primary and secondary electric distribution lines. Avista has an electric transmission system of 685 miles of 230 kV lines and 1,534 miles of 115 kV lines.

Avista owns and maintains a total of 7,650 miles of natural gas distribution lines, and is served off of the Williams Northwest and Gas Transmission Northwest (GTN) pipelines. A map showing the Company's electric and natural gas service area in Washington, Idaho and Oregon is provided by Company witness Mr. Morris in Exhibit No. ___(SLM-3).

As detailed in the Company's 2015 Electric Integrated Resource Plan[1], Avista expects retail electric sales growth to average 0.6% annually for the next ten years in Avista's service territory, primarily due to increased population and business growth.

Also, based on Avista's 2014 Natural Gas Integrated Resource Plan[2], in Washington/Idaho the number of natural gas customers is projected to increase at an average annual rate of 1.6%, with demand growing at a compounded average annual rate of 1.3%.

Q. How many customers are served by Avista Utilities in Washington?

A. Of the Company's 374,962 electric and 334,732 natural gas customers (as of December 31, 2015), 246,435 and 155,972, respectively, were Washington customers.

[1] A copy of the Company's 2015 Electric IRP has been provided by Mr. Kinney as Exhibit No.__(SJK-2).
[2] A copy of the Company's 2014 Natural Gas IRP has been provided by Company witness Ms. Morehouse at Exhibit No.__(JM-2).

Q. Please describe the Company's operation centers that support electric and natural gas customers in Washington.

A. The Company has construction offices in Spokane, Colville, Othello, Pullman, Clarkston, Deer Park, and Davenport. Avista's three customer contact centers, located in Spokane, Washington, Coeur d'Alene and Lewiston, Idaho, are networked, allowing the full pool of regular and part-time employees to respond to customer calls in all jurisdictions.

III. RESPONSE TO NOVEMBER 17 WINDSTORM

Q. Can you please explain the severity of the November 17 Windstorm and its impact to Avista's electric system.

A. Yes. The severe windstorm that struck Avista's Eastern Washington service area caused more customer outages than at any time in the Company's 126 year history. The November 17, 2015 windstorm set a wind record for a cold front storm at 71 mph at the Spokane airport. The previous record wind was 67 mph on Jan. 1, 1972. The winds were so powerful they knocked out wind sensors at several locations, including the Spokane airport, which is the official measuring station for Spokane. The Storm remained in the area from approximately 2:00 PM, Tuesday, November 17, 2015 tapering down around 9:00 PM. At the peak of the outage Avista had approximately 180,000 of its total 372,000 electric customers out of service. The storm impacted 111 of the approximately 300 feeders in the Avista electric distribution system, 58 substations, twenty-five 115 kV lines and four 230 kV lines. The most extensive damage and customer outages were in Spokane County, and especially Spokane's South Hill area, and Northwest Spokane. Restoration of the last customer was accomplished at 3:45 AM on November 27, 2015. Thankfully, we were able to fully restore power without a single safety incident. The following photographs illustrate the impact to the Company's electric system.

<u>Illustration No. 1</u>

Q. Did the storm impact the Company's natural gas distribution system?

A. Yes. Natural Gas Operations were also impacted by the storm, primarily in Spokane and Coeur d'Alene on November 17th and the early morning of November 18th. The Company responded to 73 trouble orders in approximately a 12 hour period, sixty-three (63) of the orders were related to blowing natural gas or natural gas odor. Company servicemen responded to more blowing gas odors in this 12-hour period than the entire month of November in 2014.

Serviceman and crews found facility damage related to trees falling on natural gas meters, damage to natural gas service lines due to falling trees, and natural gas service lines that were damaged by the root ball of trees that had fallen over.

All Avista facility damage was related to service lines and meters. No known incidents were identified related to gas main damage due to the wind. The lack of damage to natural gas mains is most likely attributed to increased depth of cover for main pipes and

Avista's active vegetation management program. The photographs below show a natural gas pipe that was pulled out of the ground by the root ball of a tree and a natural gas meter that was torn away from a customer's house.

Illustration No. 2

Q. What did the Company do to prepare for the anticipated windstorm?

A. With weather forecasters indicating high confidence in the windstorm, prior to the storm hitting the Spokane area, Avista initiated its Emergency Operating Plan (EOP) at 9:00 AM on November 17th. Avista immediately called in all available line crews and contract crews from less-affected areas, and contacted other utilities in the Western Electricity Coordinating Council (WECC) requesting assistance through the Mutual Assistance Program. Avista normally has approximately 35 line crews throughout its entire Eastern Washington and North Idaho service area. At the height of the restoration effort, Avista had approximately 132 crews on 16-hour shifts working around the clock on a rotating basis. Avista contracted for several large generators and installed wiring to temporarily connect customers with the greatest need.[3]

Avista customers, with few exceptions, were supportive and understanding of the extended outage, recognizing the severity of the windstorm and the apparent, extensive damage to the distribution system. Avista employees partnered with members of the community to canvas certain neighborhoods with the most vulnerable customers, to ensure that basic needs were being met. Avista and the Spokane community witnessed hundreds of stories of family, friends and neighbors helping one another, which Governor Inslee recognized during his visit to the hardest hit areas of Spokane, and his reference to "Inland Strong." During the ten-day outage, there were five service-related complaints to the Washington Commission from Avista customers.

Q. How did the Company keep customers informed about its progress and estimated restoration times?

A. The Company's external communications staff members led the development of six coordinated news conferences involving city, county, emergency, and utility participants, through which vital information about all aspects of the storm, public safety, utility restoration activities and human care services was communicated.

Proactive communication to the news media was an important part of keeping customers and the community informed about restoration activities. The Media Team issued 15 Media Alerts over the 10-day event to media outlets in eastern Washington and northern Idaho. Alerts were also posted on Avista's online Media Room.

[3] Nursing homes and assisted living facilities (oxygen, temperature issues).

In addition, a two-hour briefing was offered to local media to help them understand the way power is distributed over the grid and how the storm restoration process was being managed. Representatives from the three local television stations and the local newspaper attended.

The Media Team managed 174 inquiries from local, regional and national media outlets, including NBC, CBS, ABC and Fox news channels, as well as the Associated Press (Washington D.C.) and the Seattle Times. Media requests included photo and video opportunities and interviews with Company subject matter experts.

The Social Media Team directly interacted with customers and the media 24-hours a day throughout the 10-day event.

Q. Is the Company asking to recover the costs associated with the Windstorm in this case?

A. The O&M costs associated with the windstorm in the 4th Quarter of 2015 have not been included in the Company's filing. However, capital investment to replace assets such as poles, transformers, etc. associated with the windstorm have been included in the Company's capital adjustments for 2015, and will be recovered over the life of those assets.

IV. ADVANCED METERING INFRASTRUCTURE (AMI) PLAN

Q. Please describe the Company's objectives and plans for implementing advanced metering infrastructure (AMI) in its Washington service territory?

A. Advanced metering systems are being deployed by utilities across the United States to optimize the value of other smart grid technologies and provide customer benefits ranging from lower operating costs and improved reliability, to providing them information and tools to better understand and derive greater value from their energy service. AMI also provides the platform required to implement such programs as time-of-use and demand-based pricing, demand response, and the integration of customer-owned distributed generation. The Company views advanced metering as an enabling technology key to achieving these customer benefits and our long-term customer service objectives.

The Washington Advanced Metering Project (Project) will deploy advanced metering to approximately 253,000 electric, and 155,000 natural gas customers encompassing all of Avista's Washington service area.[4] The Project builds on the Company's recent experience implementing a range of smart grid technologies, including advanced metering in Pullman, Washington, as well as our automated meter reading (AMR) systems in Idaho and Oregon.

The Washington Advanced Metering Project will support Avista's continuing effort to improve the quality and cost-effectiveness of the services we offer our customers.

Q. What is advanced metering infrastructure?

A. Advanced metering infrastructure is one element of a range of new smart grid technologies[5] that is rapidly becoming the metering standard for the utility industry. Advanced meters are capable of two-way communication and are equipped to measure the flow of energy in configurable intervals that range from 5 minutes to an hour. The advanced metering system can remotely transmit energy-use information to the utility and the

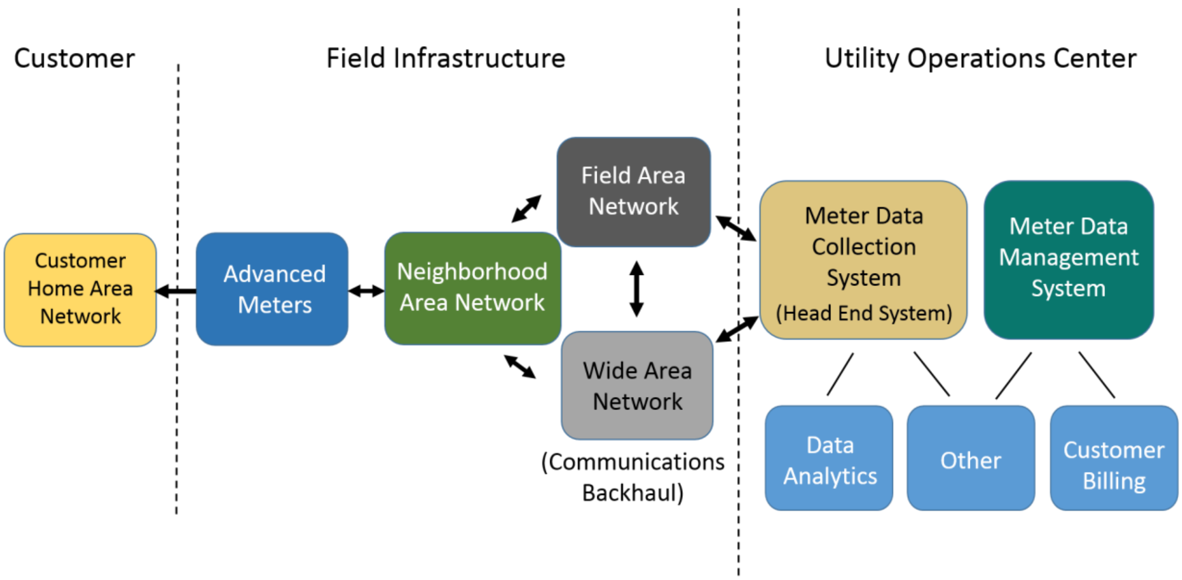
[4] These numbers reflect the estimated number of customers who will receive meters through the course of the deployment period.

[5] Smart grid technologies include a range of remote sensing and automation devices, and data analysis and two-way communications systems that are being deployed across the electric grid to improve operations and reliability, optimize energy supply and demand, and enable customers to better understand and capture greater value from the energy they use.

customer, and can also receive and respond operationally to signals sent from the utility to the meter.

Advanced meters themselves are only part of the integrated metering system that includes specialized communication networks and enabling information management systems, collectively referred to as advanced metering infrastructure. Elements of this system are depicted in Illustration No. 3, and are described below.

Illustration No. 3



Advanced Meters - Advanced meters[6] measure the incoming and outgoing[7] flow of energy from a customer's premises, which is transmitted to the utility in configurable intervals that range from 5 minutes to an hour. The meter can also provide energy consumption data directly to customers in real time through an interface to their <u>Home Area Network.</u> In addition to transmitting usage data the meter is able to receive and respond operationally to signals sent from the utility to the meter. When the interval data is provided to the customer directly or through a web portal it helps them better

[6] The advanced electric meter replaces conventional electro-mechanical, non-communicating digital, or AMR meters. Advanced metering for natural gas is accomplished by replacing the mechanical register on the existing natural gas meter with a new digital, communicating module. The natural gas meter itself is not replaced.

[7] Advanced meters measure the energy and demand used by the customer, and also measure the amount of energy being delivered from the customer's distributed generation onto the utility distribution system (known as 'net metering").

understand their energy consumption and provides the intelligence to support informed and timely actions to manage their energy use.

Metering Communications Network – A specialized and secure communication system is required to carry data and communications between the advanced meter and the utility. The design of this network is dependent on the characteristics of each utility's system, the geography of the service area, and the advanced metering solutions ultimately selected. While there are various options for supporting the overall communication network, it often consists of three integrated systems referred to as the Neighborhood Area Network, the Field Area Network and the Wide Area Network.

- The Neighborhood Area Network, also known as the "collection system" or "meter mesh network," consists of the wireless communication occurring between the individual advanced meters. Through this network of meter communication, information is transmitted from meter to meter and in the process is aggregated by a collection device and transmitted to the Field Area Network or the Wide Area Network, depending on the network design.[8]
- The Field Area Network is a broadband wireless system that may support only one function, such as advanced metering, but which may also support a full range of advanced grid-device communications. Avista's Field Area Network supports communication controls for substations and transmission facilities, and distribution system sensing, monitoring, and remote operation, as well as specialized applications like the Smart City Initiative.
- The Wide Area Network, also referred to as the "back-haul," is a separate computer or cellular based communication network that connects seamlessly with the Field Area Network. The Wide Area Network is responsible for transmitting communications and data collected by the Field Area Network or the Neighborhood Area Network to the utility operations center.

Meter Data Collection System (Head End System) - This computer hardware and software application controls and coordinates the meter communication networks. In addition to this function, the system aggregates the usage data from the advanced meters in the field and routes this data to the Meter Data Management system and other specialized software applications.[9] The meter data collection system software is designed and provided by the manufacturer of the advanced meters.

[8] This system works in reverse order to carry information transmitted from the utility to the meter.

[9] These specialized applications perform a range of business functions such as outage management integration, conservation voltage monitoring, and theft detection.

Meter Data Management System - This computer hardware and software application stores, validates, edits, and analyzes the interval consumption data, as well as coordinates specified metering commands. Meter data information from this system is also routed to other specialized software applications that perform a range of business functions such as customer billing, use of specialized rate options such as time-of-use, or the web presentment of customer usage data.

Data Analytics - This component of the AMI system includes multiple computer hardware and software applications used to provide deeper analysis of the advanced metering data. Meter data is compiled in these systems from both the Meter Data Management System as well as the Meter Data Collection System, and is used to derive customer benefits including theft detection, conservation voltage reduction, outage management, or utility engineering studies.

Q. Please contrast the major differences between automated meter reading and advanced metering systems?

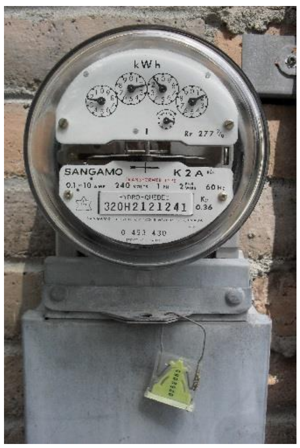
A. Compared with the two-way communications, near-real time interval energy data, and remote sensing and operations capabilities of advanced metering, automated meter reading systems typically provide only one-way communication (from the meter to the utility) and one monthly meter read for customer billing. Like advanced metering infrastructure, automated meter reading systems are generally connected with specialized communication networks. But since communication is only one way and is generally used to gather only one meter read per month, AMR data can also be captured by "mobile collection," which uses a data receiver either mounted in a vehicle or a handheld device. In short, advanced metering systems add value to a range of other smart grid technologies and systems and provide customer benefits that far exceed the monthly billing generally provided by automated meter reading.

Q. Will the Company replace all of its electric and natural gas meters as part of this plan?

A. All of the existing electric meters, the majority of which are conventional electro-mechanical meters, will be replaced under the Project with a new advanced digital meter, as shown in Illustration No. 4, below.

<u>Illustration No. 4</u>

Electro-Mechanical Meter *Advanced Digital Meter*



Existing natural gas meters will remain in service, but will be upgraded with a new digital communicating module, the “Encoder Receiver Transmitter” or “ERT”, as shown in Illustration No. 5.

<u>Illustration No. 5</u>

Retrofitting Natural Gas Meter Index with ERT

Q. Please describe why advanced metering is rapidly becoming the metering standard of the utility industry?

A. The focus of utilities to deliver cost effective benefits that improve customer experience and satisfaction, coupled with advances in metering technology, have helped propel the nation's transition to advanced metering. Penetration of advanced meters in the U.S. increased from just under 5% in 2008 to over 30% by 2013.[10] The Energy Information Administration[11] reported that in 2012, 533 U.S. utilities had installed over 43,000,000 advanced meters. According to the September 2014 report by the Edison Foundation

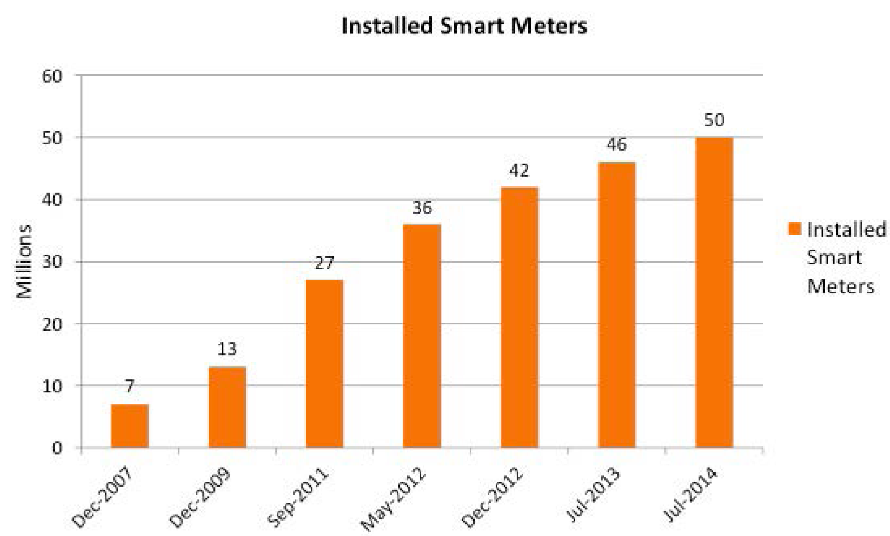
[10] Assessment of Demand Response and Advanced Metering. Federal Energy Regulatory Commission Staff Report, October 2013.
[11] Energy Information Administration. Frequently Asked Questions: How many smart meters are installed in the U.S. and who has them? http://www.eia.gov/tools/faqs/faq.cfm?id=108&t=3

Institute for Electric Innovation, "Utility-Scale Smart Meter Deployments", attached as Exhibit No.___(HLR-5), they state:[12]

> Smart meters are playing a critical role in shaping the electric grid of tomorrow and enabling the integration of new technologies and innovations across the grid. As the power grid evolves into a broad platform for integrating new energy services and technologies, the ability to connect legacy assets and systems and integrate new ones is critical; smart meters are supporting this evolution. In addition, the data collected by smart meters (or automated metering infrastructure (AMI)) opens the door for greater integration of new resources and new energy services for customers.

As shown in Illustration No. 6, the report documents the number of advanced electric meters installed in the United States as increasing markedly from only seven million in 2007, to a level of 50 million by July 2014.

<u>Illustration No. 6</u>



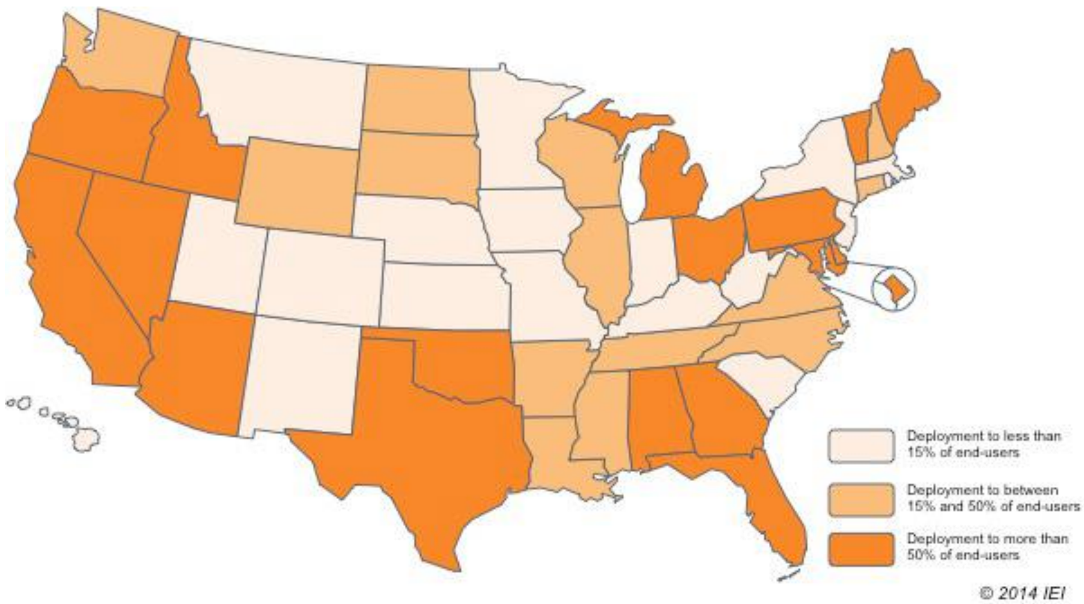
The report notes the rate of penetration of advanced electric meters at 43 percent for residential applications, and also depicts the degree of penetration expected for each state in

[12] The Edison Foundation report refers to AMI as "automated metering infrastructure" rather than "advanced metering infrastructure". In the context of their report, Edison's use of "automated" metering infrastructure refers to smart or two-way communication infrastructure, the same as the Company's proposed "advanced" metering infrastructure.

2015, as shown in Illustration No. 7, below. A copy of this report is attached as Exhibit No.___(HLR-5).

Illustration No. 7

Expected Smart Meter
Deployments by State by 2015



The number of AMI deployment projects in the U.S. is expected to reach 260 in 2016, double the number in 2009,[13] and the penetration of advanced meters is forecast to range from 50% to 70%[14] by year 2020. Closer to home, our largest neighboring cooperative utilities with adjacent service territories – Inland Power and Light and Kootenai Electric Cooperative – either have installed advanced metering or are in the process of doing so. Elsewhere in Washington State, Tacoma Public Utilities has deployed advanced metering and Seattle City Light and Puget Sound Energy are in the process of evaluating and selecting new advanced metering systems they intend to place into service.

[13] Leveraging Business Intelligence and Analytics to Improve Performance. Presentation by Gartner Research made to Avista, September 2014.
[14] From Pike Research in 2012, as cited from Elster presentation made to Avista in 2015.

Q. Have the policies of state and federal government and regulatory organizations contributed to this trend in the deployment of advanced meters?

A. Yes. The federal Energy Policy Act of 2005[15] required states to evaluate new electricity standards, which included "smart metering," and to evaluate whether these new standards should be adopted as requirements for state regulated electric utilities. In addition to federal policies, several states (e.g. California) have required utilities to implement advanced metering programs. Policies supporting the deployment of advanced metering have also been developed by organizations such as the National Association of Regulatory Utility Commissioners (NARUC). In 2007, NARUC passed a resolution to eliminate regulatory barriers to the broad implementation of advanced metering infrastructure.[16] The resolution identified the value of advanced metering in achieving significant utility operational cost savings in the areas of outage management, revenue protection and asset management. The resolution also called for advanced metering business case analyses to identify cost-effective deployment strategies, endorsed timely cost recovery for prudently incurred expenditures, and made additional recommendations on rate making and tax treatment of such investments. A copy of the resolution is attached as Exhibit No.___(HRL-4).

Q. Has the Company evaluated the costs and benefits of this project?

A. Yes. Avista recently updated its business case report summarizing the Washington Advanced Metering Project. The report provides an overview of advanced metering infrastructure, detailed estimates of the Project capital costs and lifecycle operating

[15] Energy Policy Act §§ 125(a); 1252(a); and 1254(a) all codified at 16 U.S.C 2621(d)(11-15).
[16] Resolution sponsored by the Committee on Energy Resources and Environment and Adopted by NARUC Board of Directors on February 21, 2007.

expenses, and the quantified and unquantified customer benefits to be delivered by the project. A copy of this report is provided as Exhibit No.___(HLR-3).

Q. In developing this program, has the Company addressed the range of factors to be considered by the Commission in evaluating advanced metering projects, as listed in the Commission's "Interpretive and Policy Statement" in Docket No. UE-060649?[17]

A. Yes, it has. For factors such as meter and installation costs, and administrative savings, Avista has prepared estimates of the costs and expected benefits associated with the advanced metering program. Avista has also specifically addressed among other issues, customer protection and privacy policies.

Q. Can you please briefly summarize the benefits of advanced metering, as detailed in the Company's report?

A. Yes. Customers will experience benefits that include improvements in service quality, customer experience and satisfaction, and a range of quantified financial benefits that more than offset the combined capital and operating expenses for the Project. A brief description of these customer benefits is provided below:

Improved Customer Service

- Increased customer privacy;
- Streamlined billing inquiries;
- More accurate billing;
- Customer text alerts based on parameters they select; and
- Detailed energy usage data, including the opportunity to capture real-time energy use, which allows customers to better understand and manage their energy consumption.

[17] In the Matter of the Commission's Investigation of Public Utility Regulatory Policies Act Standards Pertaining to Smart Metering and Time of Use Rates dated August 23, 2007.

<u>Platform for Future Service Options</u>

- Time-of-use and capacity-based pricing;
- Demand-Response programs;
- Real-time integration of customer-owned distributed generation at the distribution level;
- Supports micro-grid and Smart Cities initiatives; and
- Creates customer value through added data analytics.

<u>Quantified Financial Benefits</u>

- <u>Automation of manual meter reading</u> – provides savings by eliminating the costs of manual meter reading.
- <u>Remote service connectivity</u> – provides savings by eliminating field service trips for service disconnects and reconnects, and significantly shortens the time required to reconnect service.
- <u>Customer energy efficiency</u> – when coupled with energy conservation tips, having detailed use data enables the customer to implement cost effective efficiency measures.
- <u>Distribution system efficiency</u> – allows the utility to reduce the amount of electricity required to maintain the required line voltage along each feeder.
- <u>Reduced outage times</u> – integrates with the outage management system to provide earlier notification of outages and greater visibility of overall system outages that enables more efficient outage restoration and shorter outage duration.
- <u>Reduced energy theft and unbilled usage</u> – helps to identify cases of energy theft and reduce unbilled energy usage.
- <u>Billing accuracy</u> – provides greater accuracy than manual meter reading and eliminates the need to estimate bills.
- <u>More cost-effective utility system studies</u> – provides better data and lowers the cost of performing various system studies.

Q. What is the estimate of the overall project cost?

A. Avista has continued to update its estimates of the costs of deployment, which reflect up-to-date information on the capital and operating expenses required to support the system and to achieve the expected benefits for our Washington customers. Though Avista has not yet executed any primary vendor contracts for infrastructure or services required for the Project, we have received pricing for many components from vendors responding to the Company's formal Requests for Proposals ("RFP"). Better understanding the system specifications, initial vendor pricing, and Avista's labor requirements has allowed us estimate costs with increased confidence. The Company's current estimates of the total capital cost of Project and the total operating expense is $166.7 million and $123.4 million, respectively, both on a cash basis. Capital and operating costs for major components of the AMI system are provided in Table No. 1, below.

Table No. 1: Estimated Capital Investment and Operating Expense - Washington Advanced Metering Infrastructure Project. ($ millions)

Major Cost Components	**Total Capital Investment (Cash Value)**	**Total Operating Expense (Cash Value)**
Meter Data Management	$12.0	$18.0
Head End Systems	$12.8	$20.3
Collector Infrastructure	$31.7	$29.0
Data Analytics	$5.1	$19.1
Meter Deployment	$100.4	$12.0
Energy Efficiency	$4.7	$6.4
Regulatory Process	$0.0	$18.6
Totals	**$166.7**	**$123.4**

Detailed information on the activities comprising these cost categories, their expected duration, contract and labor requirements, and estimated costs are provided in Section VI and Appendix A of the Company's advanced metering business case, Exhibit No.___(HRL-3).

Q. Has the Company estimated the financial value of the customer benefits that have been quantified for its cost-benefit analysis?

A. Yes, it has. As briefly noted above, the Project will provide a range of benefits that will deliver financial value to our customers. These quantified benefits are grouped by category as listed in Table No. 2, below. The total cash value and the total present value of these benefits over the Project lifecycle is $510.7 million and $241.7 million, respectively. Additional detail on the descriptions, estimates of the value, and the timing of realizing these benefits, is provided in Section VII, and in Appendix B of the Project business case, Exhibit No.___(HRL-3).

Table No. 2: Estimated Benefits - Washington Advanced Metering Infrastructure Project. ($ millions)

Area of Benefit	Total Benefit Value (Cash Value)	Total Benefit Value (Present Value)
Meter Reading and Meter Salvage	$162.0	$75.9
Remote Service Connectivity	$45.7	$24.3
Outage Management	$86.4	$40.3
Energy Efficiency	$127.2	$59.4
Energy Theft and Unbilled Usage	$62.8	$28.9
Billing Accuracy	$22.2	$10.7
Utility Studies	$4.4	$2.2
Total	**$510.7**	**$241.7**

Q. Has the Company estimated the Project's lifecycle net benefits for its customers?

A. Yes, it has. Table No. 3, below, gives the present value of the lifecycle capital costs and operating expenses by major component, which together total $215.2 million.

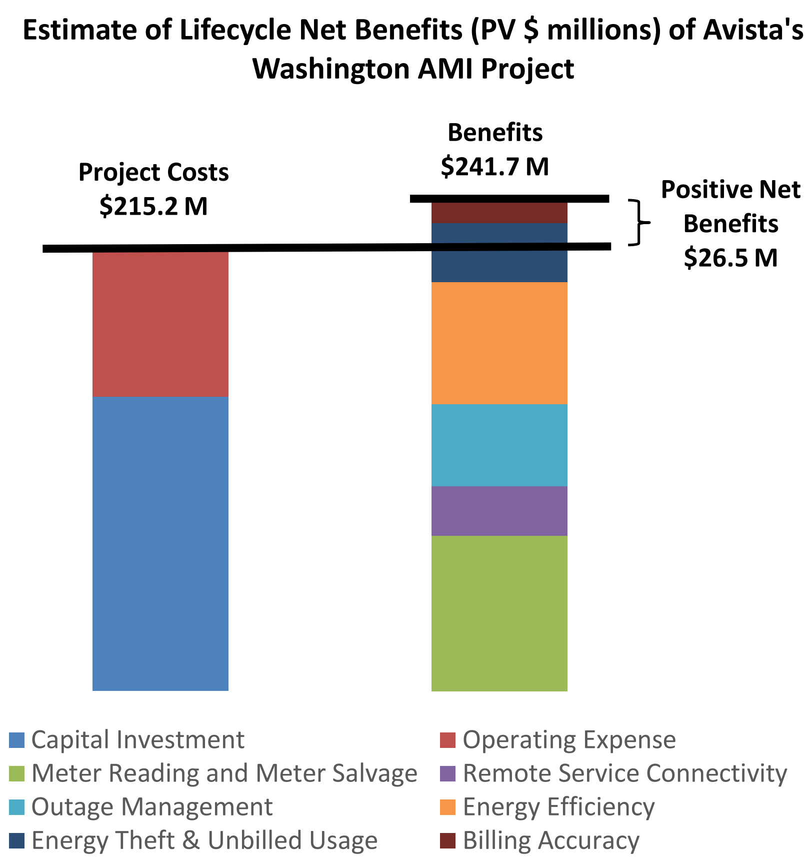
Table No. 3: Present Value of Capital Investment and Operating Expense - Washington Advanced Metering Infrastructure Project. ($ millions)

Major Cost Components	Total Capital Investment (Present Value)	Total Operating Expense (Present Value)
Meter Data Management	$11.5	$9.9
Head End Systems	$12.3	$11.3
Collector Infrastructure	$28.2	$16.4
Data Analytics	$4.9	$10.7
Meter Deployment	$84.6	$6.6
Energy Efficiency	$2.6	$4.6
Regulatory Process	$0.0	$11.6
Totals	**$144.1**	**$71.1**

Table No. 2, above, provides the present value[18] of the quantified customer benefits by area of benefit, which total $241.7 million. The net present value of the Project costs and benefits is $26.5 million, as shown in Illustration No. 8, below.

[18] The discount rate used is 6.58%, which is Avista's after tax cost of capital.

<u>Illustration No. 8</u>:



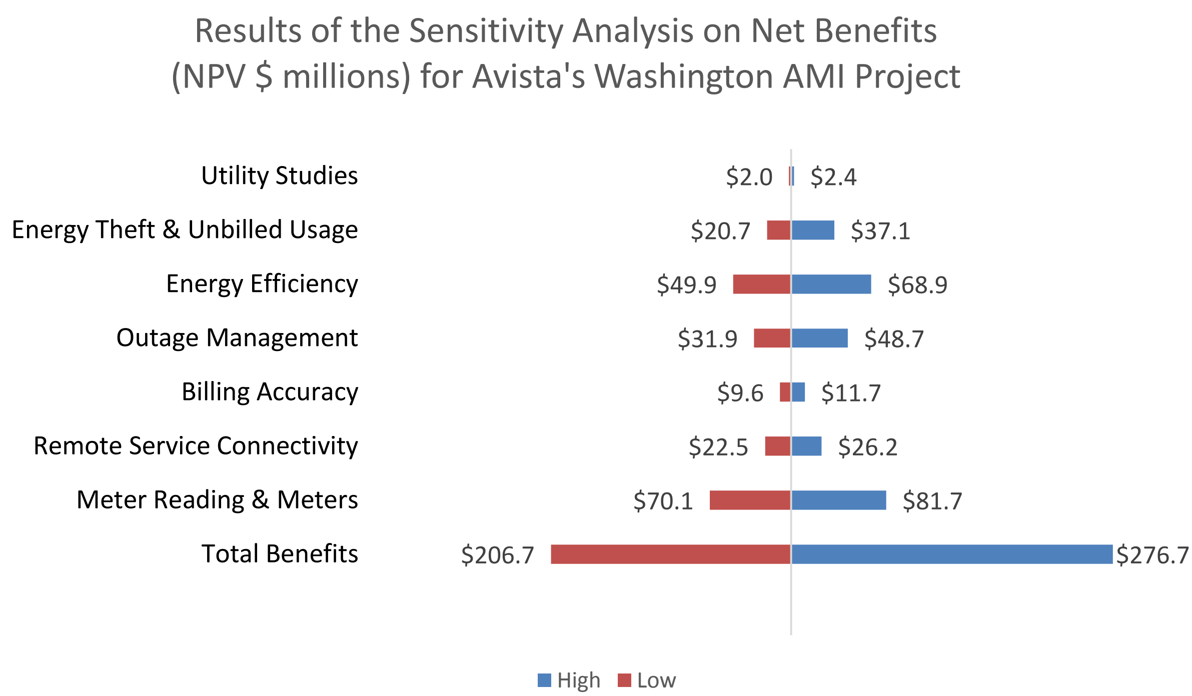
Q. Did Avista attempt to account for any uncertainties in the estimated Project costs and benefits?

A. Yes. The Company has included a contingency amount of approximately $20.8 million in its estimate of the capital cost to deploy the Washington Advanced Metering Project. This contingency amount represents 15.4% of the deployment costs[19] and is intended to provide a hedge against the remaining uncertainty associated with the final installation costs. For the estimated value of the quantified customer benefits, Avista

[19] Deployment costs include all of the capital costs required to fully deploy the AMI system by year 2021. The contingency is not applied to the cost for replacement meters, which could begin as early as year 2032.

conducted sensitivity analysis to evaluate the impact of uncertainties in benefit value on the overall net benefits of the Project. In the extreme case where all Project benefits were assumed to fall below our estimates of value, the overall net benefits would be a negative $8.5 million on a net present value basis. In the other extreme where the value of all quantified benefits was assumed to be greater than estimated, the project would produce a net benefit of $61.5 million on a net present value basis. The results of this analysis are shown in Illustration No. 9, below.

<u>Illustration No. 9</u>:



In both scenarios described above, the Company assumed the ultimate deployment cost equaled the currently-estimated Project costs (i.e. cost estimates + contingency amounts). The positive impact on the Project net benefits of the final capital costs potentially falling below the current estimates was not evaluated. Based on these analyses, the

Company believes it is likely that the Washington Advanced Metering Project will provide cost effective, meaningful, and sustainable benefits for our customers, and help advance the State of Washington toward achieving a cleaner energy future.

Q. Has NARUC recognized that deployment of advanced metering technology may require the removal and disposition of existing meters that are not fully depreciated?

A. Yes, it has. In the NARUC resolution of February 21, 2007, noted above, it was resolved that Commissions seeking to facilitate deployment of cost-effective advanced metering technologies should consider the regulatory option to, inter alia:

> . . . provide for timely cost recovery of prudently incurred AMI expenditures, including accelerated recovery of investment in existing metering infrastructure, in order to provide cash flow to help finance new AMI deployments;

Q. Does the $216.9 million present value of the Project total costs include the expense associated with retiring the Company's existing undepreciated electric meters?

A. Yes, it does.

Q. Are there other benefits associated with AMI that have not been quantified?

A. Yes. The present value of the benefits shown in Table No. 3 and in Illustration No. 9, above, reflect only those customer benefits that have been quantified, and does not reflect the value of the unquantified or "intangible" benefits associated with the Project. The NARUC Resolution cited earlier, recognizes this point and urges commissions to consider regulatory options for AMI "…that takes into account both tangible and intangible benefits." (See Exhibit No.___(HLR-3). The Washington Advanced Metering Project will deliver a range of legitimate customer benefits whose financial value Avista did not attempt to quantify, but that do, nonetheless, provide value to our customers. Some of these intangible benefits are noted earlier in my testimony, and are summarized in more detail on pages 48 - 50 of the business case report, Exhibit No.___(HLR-3). The value of some of these intangible benefits, such as the capability to implement demand response programs or time-of-use rates, would be easy to quantify, however, Avista is not currently proposing these mechanisms. Others, such as providing support for the customer home area network, may be quantified as well based on how our customers interact with this technology. Still other benefits, while contributing to our customers' overall satisfaction, are difficult to quantify financially. Examples are the customer value associated with the availability of interval usage data, or text alerts, or having additional bill payment options, or more accurate billing and streamlined resolution of billing issues. While we believe most would agree that these services have value to customers, it is difficult to assign them a financial value. In the final analysis, these customer benefits should be appropriately considered as additional weight supporting the prudence of the investment in advanced metering for our customers.

Q. Would you please describe the Company's plans for customer outreach to explain the benefits of AMI and make them aware of the pending deployment?

A. Yes. The widespread deployment of advanced metering across the country has demonstrated the potential for customers to be concerned with the new technology. Even though only a small percentage of customers may raise these concerns, the manner in which the utility addresses them can have a big impact on the success of the overall deployment. In other AMI projects, as well as in Avista's own experience, customer concerns are generally grouped in three areas, including:

Health - concerns related to the perceived safety of the wireless (radio) communication of the metering system.
Privacy - questions related to the kind of customer information being communicated by the meter and collected by the utility, and how that information might be used.
Accuracy - concerns about the perceived accuracy of digital meters compared with conventional metering.

In recognition of these concerns, Avista will be proactive in its communication and outreach to customers, community members, and our employees, and will respond quickly and effectively to any customer issues or concerns raised in connection with advanced metering.

The goal of Avista' communication and outreach plan, which is described on pages 23 – 26 of Exhibit No.___(HLR-3), is to build a broad awareness of the growing application of smart grid technologies being used to modernize the electric grid, and in particular, of advanced metering systems. The Company will focus on explaining the reasons for deploying this new technology, its expected customer benefits, and the cost effectiveness of the investment. The engagement and communications initiative will have the following key objectives:

- Educate and prepare our employees to provide accurate, balanced, and responsive information to questions raised by our customers and others in the community related to the deployment of the advanced meters.
- Engage customers, regulators, and other stakeholders to build a broad awareness and understanding of advanced metering and the deployment process, and to help surface and effectively respond to any new and emerging issues.
- Provide helpful information explaining the Project benefits to our customers.
- Proactively inform customers about the process and timing of meter installation in their locale so they know what to anticipate and have the opportunity to raise any issues or concerns.

- Provide energy expertise for our customers by equipping them with detailed energy-use information along with useful energy conservation advice and effective programs so they can implement cost-effective efficiency measures.

Avista will leverage its experience implementing smart grid, automated meter reading, and advanced metering systems using the communication and outreach approaches we have found to be effective for our customers. By informing and actively listening to our customers over the course of the Project, the Company will be able to adjust its communication and outreach efforts to ensure we are addressing the full range of issues important to all of our customers, audiences, and stakeholders.

Q. Notwithstanding the Company's communication and outreach plans, do you expect that some customers may still choose to "opt out" of the program?

A. As noted above, Avista's outreach and communication plan is designed to help our customers understand the advanced metering project, to be timely aware of pending deployment activities, and to surface issues of importance to our customers that we can actively address. The Company will continue its practice of responding directly to every customer who raises a concern with advanced metering. We have found this direct approach of providing accurate, understandable, and balanced information to be very helpful and effective to our customers. Even though no customers chose to opt out of Avista's advanced meter deployment in Pullman, we do anticipate that some will choose this option in the planned full deployment across our Washington service area. Accordingly, the Company is committed to providing metering options for our customers and will pursue the development of an opt-out program, working in concert with Commission Staff and other regulatory stakeholders.

Q. What cyber security safeguards will the Company put in place to ensure the privacy and protection of its customers' personal information?

A. The foundational value of an advanced metering system is its ability to capture, control, protect, and enable the customer and the utility to effectively use the energy consumption data. Avista understands that this increased flow of data raises the concern of customers and other stakeholders about what data is collected, how the data will be used, and how it will be protected. The Company is committed to protecting our customers' safety, security and privacy, and we have stringent procedures in place for the use and protection of customers' personal information. All Company employees as well as contractors acting on Avista's behalf, who have access to customer information, are required to comply with our privacy and security practices and policies. Avista treats all customer information as confidential, consistent with our policies and all legal and regulatory requirements, and will not sell or otherwise provide customer data to third parties without the customer's consent.[20] This includes any personally-identifying information we collect through the metering process.

Avista's cyber security practices are designed to enable the operational effectiveness of our systems and data while ensuring that their integrity is protected at every level from possible unintentional incidents and the full range of potential cyber security threats. Cyber security is a foundational part of every system, including advanced metering, and is designed to meet the Company's security and confidentiality standards, various regulatory requirements, and interoperability standards, among others. In every application, the goal of

[20] Exceptions include those instances where the Company may be legally required to provide information to law enforcement officers by warrant or subpoena, to governmental or regulatory agencies with jurisdiction over Avista when they require such information, or to credit reporting and collection agencies if an account is assigned for collection.

Avista's security processes is to ensure we have appropriate and cost-effective measures in place that provide comprehensive and seamless protection for our customers, employees, contractors, and work processes, across computer hardware and software systems, energy delivery and communications infrastructure, and myriad end-use devices.

The nature of cyber security applications and programs has changed in recent years from a system-by-system security application approach to an enterprise-wide security platform supported by centralized staff expertise, adaptive work processes, and constantly-evolving technology capabilities. Cyber security for the Washington Advanced Metering Project will an integrated part of this broad security platform. In addition to support from enterprise-wide security applications, many of the AMI components will be delivered with security applications and hardware already built into the product. Examples include cyber security systems embedded into meters, communication system components, and computer application systems, which are an integral part of the architecture of these systems. Avista will require its AMI product vendors to meet the Company's security thresholds, which will include the application or components' ability to be updated to meet future cyber security standards and requirements. A list of these cyber security criteria is provided on pages 28 – 31 of Exhibit No.___(HLR-3).

Through these processes and systems, Avista will ensure that all customer information is encrypted at the advanced meter, is transmitted over secure networks, and is safeguarded on secure systems that are protected by restricted, authorized, and authenticated access. An oversight committee will govern the development of the advanced metering security plan and an advanced meter security working group will be charged with implementing the plan and addressing new and emerging issues.

Q. What is the anticipated time frame for this project?

A. The Company initiated planning activities for the Project in mid-2015, which included the development of technical specifications, RFP's, and the evaluation and selection of vendor's proposals. Avista expects to execute vendor contracts and to begin the installation of supporting computer hardware and software systems in mid-2016. The installation of communications infrastructure and advanced meters will commence in 2017 and the Project is expected to be fully deployed by 2021. The Company's business case report provided in Exhibit No.___(HLR-3) provides substantial additional detail on Avista's planned deployment.

V. DISTRIBUTION CAPITAL INVESTMENT & ASSET MANAGEMENT

Q. Would you please describe the driving factors of Avista's investment in electric distribution capital assets?

A. Avista's investment in electric distribution capital assets is primarily driven by a combination of the following factors: (1) new customer connections and changing customer usage, (2) maintaining system reliability and safety, (3) realizing operational and electrical efficiencies, including compliance with the requirements of Washington Initiative No. 937,[21] and (4) minimizing life cycle costs of assets (e.g., Asset Management programs).

Q. What distribution plant investment is driven by the new customer connections and changing customer usage category?

[21] Initiative No. 937, the Washington Energy Independence Act, requires that "each qualifying utility shall pursue all available conservation that is cost-effective, reliable, and feasible." Chapter five of the 2015 Electric Integrated Resource Plan includes discussion of the inclusion of Washington feeder upgrades in meeting Avista's conservation targets under the requirements of initiative 937.

A. Distribution plant capital investment related to new customer connections and changing customer usage consists of the distribution plant assets required to serve new customers and includes the costs to construct new overhead and underground lines, as well as the costs for devices, such as transformers, meters, and network transformers and protectors. Additionally, as individual new customer connections aggregate over time, additional investment may be required for either new or upgraded feeders, transformers, substations, or other distribution assets. Finally, changing customer loads in a given area may require new or upgraded distribution plant equipment in order to continue to serve customers reliably. Given Avista's obligation to provide safe and reliable service to customers, responsible capital investment in response to customer connections and customer usage is imperative.

Q. Turning now to Asset Management, and its role in maintaining system reliability and safety, realizing operational and electrical efficiencies, and minimizing life cycle costs of assets, would you please describe the history of Avista's Asset Management function?

A. Yes. Avista's asset management approach began in 2003 with a report analyzing electric asset optimization. In 2005, the Asset Management group was formally established, focusing on Electric Distribution, Substations, and Transmission assets. In 2008, a number of organizations, led by the Institute of Asset Management, published PAS 55:2008[22], which provided a top down description of the goals and objectives of Asset Management programs. This specification was formalized in 2014 as an international

[22] PAS is an acronym for Publicly Available Specification.

standard, ISO 55000, by the International Organization for Standardization. Avista's Asset Management function is informed by this standard.

As discussed by the Institute of Asset Management,[23] ISO 55000 defines Asset Management as the "coordinated activity of an organization to realize value from assets." "Asset Management involves the balancing of costs, opportunities, and risks against the desired performance of assets, to achieve the organizational objectives." Summarized briefly, "Asset Management is the art and science of making the right decisions and optimizing the delivery of value. A common objective is to minimize the whole life cost of assets."

Q. What is the mission of Avista's Asset Management function?

A. The Asset Management group works to maximize the value of Avista's physical assets by applying a systematic evaluation and modeling approach which determines the optimum mix of cost and value. Asset Management strives to prioritize and plan work that results in maximizing the lifecycle values associated with maintenance and replacement of our assets by integrating information about repairing, maintaining, inspecting, monitoring, and replacing physical assets into a comprehensive analysis. This analysis encompasses strategic and tactical consideration of materials, labor, equipment, risk, safety, supply chain, training, system capacity and growth, energy efficiency, regulations, and other stakeholder issues.

Q. Would you briefly describe the Company's Asset Management approach to optimizing and managing the lifecycle costs of various assets in its system?

[23] "What is Asset Management," https://theiam.org/What-is-Asset-Management (accessed February 3, 2016).

A. Yes. The Company regularly reviews and assesses all elements of its Asset Management effort through program plans that document the management of its facilities, along with metrics of results and impacts associated with that investment. Through the active management of each individual asset type, and overall review of the entire Asset Management program, the Company is able to better-optimize its system investments. The Company looks at many factors when determining how it should manage a type of asset and the associated costs, such as safety, reliability, avoided costs, operational ability, capital offsets, code requirements, clearances, street relocations, and others. All planning and assessment is done for the benefit of our customers, and with the safety of our employees in mind.

Additionally, the Asset Management group evaluates assets for which Asset Management programs do not currently exist, to determine whether the implementation of a new asset management plan is necessary. This evaluation periodically results in new asset management programs. In other instances, the evaluation may determine that the economic benefit of a program would be insufficient, and no further action is taken at that time.

Q. Would you provide examples of the Company's electric distribution Asset Management programs?

A. Yes. The "Wood Pole Management" asset management program is one of Avista's most mature Asset Management programs. Wood poles and their accompanying fixtures are the backbone of Avista's electric distribution system (Avista's net distribution plant assets related to distribution poles, towers, and fixtures represent nearly 25% of the Company's net distribution plant assets), which made distribution wood poles prime candidates for an asset management program. The average age of a wood pole in Avista's electric distribution system is 28 years old. Additionally, nearly 20 per cent of Avista's wood poles are over 50 years old. Given the age profile of Avista's distribution poles, the Asset Management department determined that the inspection and maintenance of distribution wood poles on a 20 year cycle was the optimal asset management plan. That is to say, over a 20 year period, under this plan, each distribution wood pole in Avista's system will be inspected one time (along with the inspection of crossarms, distribution transformers, wildlife guards, and other components on the pole). Any poles or components that are identified for follow up through inspection are subsequently repaired or replaced. The implementation of this plan has enabled to Company to better maintain the distribution system by proactively performing maintenance and has resulted in the reduction of the number of outages due to wood pole-related issue.

In addition to the distribution wood pole program, the Company currently has active distribution plant asset management programs in the following areas, grid modernization, transformer change-out, segment reconductor and feeder tie switch installation, improving worst feeders, street light management, and underground residential district (URD) cable replacement. All of these proactive maintenance programs are driven by one or more factors, such as age of assets or feeder overloading, among other reasons. Each of these programs is described in further detail later in my testimony. The most recently completed Electric Distribution System 2016 Asset Management Plan report has been included as Exhibit No.___(HLR-6). Certain of Avista's substation capital maintenance activities are driven by asset management programs as well. The Electric Substations 2016 System Review reports has been included as Exhibit No.___(HLR-7). Additionally, the Electric Transmission System 2016 Asset Management Plan has been included as Exhibit No.___(HLR-8).

Q. Finally, please discuss the distribution plant investment and related drivers for the remaining investment not driven by new customers or changing customer usage or by Asset Management strategies.

A. These remaining investments generally address responding to distribution system issues that do not lend themselves to Asset Management-type maintenance. Examples of investments that fall under this group include storm damage repair, non-discretionary rebuild of structures due to an unplanned trouble or emergency event (e.g., replacing burned or damaged poles and equipment), overhead to underground line conversions or other service changes, and replacement or relocation of facilities due to franchise agreements, among other activities. The capital investment associated with these activities is the direct result of an external influence which must be addressed in order to maintain system reliability and safety.

Additionally, other electric distribution plant investment in this group is related to maintaining compliance with regulatory requirements or mandates, or to keep the Company's system up to code. For example, the standards and regulations associated with the distribution of electric power have evolved over time. Updating the Company's feeders to meet the current requirements is a comprehensive activity that requires substantial investment. While some of this investment is managed through Asset Management programs, compliance requirements must also be considered as end-of-life or damaged plant assets are replaced.

Q. Is the distribution plant investment presented in this case necessary in order to provide safe, reliable service to customers?

A. Yes. The factors driving Avista's electric distribution investment included in this case represent a prudent balance of maintaining the efficacy of the electric distribution system to enable the Company to continue to provide safe, reliable service to our customers, maintain a high level of customer service, and meet the current and future needs and expectations of our customers and other stakeholders, while at the same time being sensitive to the rate impacts to customers resulting from the investments. As Company witness Mark Thies states in his testimony:

> Although we could choose to put off for tomorrow what does not absolutely need to be done today, it would be imprudent to allow the system to deteriorate and begin to jeopardize reliability, as well as potentially create a "bow-wave" of investment that needs to be made in a relatively short period of time.[24]

Avista's approach to managing its electric distribution plant investment is no different from that of any other functional group, in that the focus is on the ability to continue to provide safe reliable service to our customers.

Q. Would you please provide a brief description of the electric distribution-related capital projects that are included in the Company's modified test year Pro Forma Study, and those included in the Company's Cross Check Studies for 2016 through the first half of 2018?

A. Yes. As shown in Table No. 4 below, for 2016 the Company has not included any electric distribution projects in the modified test year Pro Forma Study. The remaining electric distribution capital projects for the period January 2016 through the January through June 2018 time period (for the Cross Check Studies) total $54.5 million for

[24] Exhibit No.___(MTT-1T), page 10, lines 1-4.

2016, $88.8 million for 2017, and $41.1 million for January through June 2018, on a system basis. Details about these electric distribution-related capital projects are discussed below.

Table No. 4: Distribution-Related Capital Projects (System $)

Business Case Name	2016 $(000's)	2017 $(000's)	6 Mos. Ended June 2018 $ (000's)
Cross Check Projects:			
Meter Minor Blanket	$ 347	$ 347	$ 173
Elec Replacement/Relocation	2,750	1,670	830
Distribution Minor Rebuild	8,609	6,375	3,255
Storms	2,090	1,645	875
Primary URD Cable Replacement	200	231	190
Street Light Management	1,500	2,353	1,189
Substation - Asset Mgmt. Capital Maintenance	18	51	46
Worst Feeders	1,500	2,499	
Distribution Transformer Change-Out Program	7,654	7,354	2,603
Distribution Wood Pole Management	7,840	12,000	7,912
Substation - New Distribution Stations	2,794	275	
Washington AMI		34,420	17,025
Harrington Upgrades	2,150		
Spokane Electric Network	2,300	2,300	805
Transmission - Reconductors and Rebuilds	3,600	1,500	
Dist Grid Modernization	6,359	10,393	5,725
Segment Reconductor and FDR Tie Program	2,856	3,175	315
Distribution Line Protection	125	125	45
Environmental Compliance	350	350	150
Franchising for WSDOT	494	9	1
Hallett and White - Add Capacity*	1,000	1,725	
	$ 54,536	**$ 88,798**	**$ 41,140**

Meter Minor Blanket – 2016: $347,000; 2017: $347,000; 2018: $173,000 [System]
This project covers the replacement of failed, damaged, or otherwise improperly functioning electric meters at service locations where a meter has previously been installed. Meters are replaced in order to ensure accurate billing for electricity usage.

Electric Replacement/Relocation – 2016: $2,750,000; 2017: $1,670,000; 2018: $830,000 [System]
This annual program replaces sections of existing infrastructure that require replacement due to relocation or improvement of streets or highways. Requirements may come from our franchise agreements, permits, or Washington Department of Transportation (DOT). Avista installs many of its facilities in public right-of-way under established franchise agreements.

Avista is required under the franchise agreements, in most cases, to relocate its facilities when they are in conflict with road or highway improvements.

Distribution Minor Rebuild – 2016: $8,609,000; 2017: $6,375,000; 2018: $3,255,000 [System]

This program is for distribution minor rebuilds as requested by the customer or initiated by Avista. Examples of construction work includes replacing meters, services, transformers, primary overhead or underground lines, or devices. This also includes addressing trouble related jobs (i.e. replacing burnt or damaged poles).

Storms – 2016: $2,090,000; 2017: $1,645,000; 2018: $875,000 [System]

Weather events associated with wind, lightning, rain, and snow create a number of outage situations. Estimated capital spend is based on historical averages.

Primary URD Cable Replacement – 2016: $200,000; 2017: $231,000; 2018: $190,000 [System]

This program involves replacing the first generation of Underground Residential District (URD) cable. This project has been ongoing for the past several years and focuses on replacing a vintage and type of cable that has reached its end of life and contributes significantly to URD cable failures.

Street Light Management – 2016: $1,500,000; 2017: $2,353,000; 2018: $1,189,000 [System]

This program is a five year planned replacement of street light fixtures to LED, which includes replacement of photocells too. Currently, existing street lights are only being replaced with LED when they fail. Efficiencies result from converting 100 and 200 Watt street lights from High Pressure Sodium to LED. The savings come from eliminating the labor, equipment, material, and overhead costs associated with repairing older lights.

Substation Asset Management Capital Maintenance – 2016: $18,000; 2017: $51,000; 2018: $46,000 [System]

Avista has several different equipment replacement programs to improve reliability by replacing aged equipment that is beyond its useful life. These programs include transmission air switch upgrades, restoration of substation rock and fencing, recloser replacements, replacement of obsolete circuit switchers, substation battery replacement, meter replacements and upgrades, relay replacements, high voltage fuse upgrades, transformer replacements, breaker replacements, installation of diagnostic monitors, substation air switch replacements, and voltage regulator replacements. All of these individual projects improve system reliability and customer service. The equipment is replaced when its useful life has been exceeded. The System-Install Autotransformer Diagnostic Monitor program is one of the projects included in Substation Asset Management Capital Maintenance.

Worst Feeders – 2016: $1,500,000; 2017: $2,499,000; 2018: $0 [System]

In 2009, Avista initiated a program to target the reinforcement of the most underperforming electric circuits. This program is coordinated with regional engineers and focuses treatment on those feeders (FDRs) whose sustained outage statistics (SAIFI) and customer experiencing multiple interruptions (CEMI) are at the top of the 'worst performing FDR list'. Most of these circuits are located in rural areas and many involve significant exposure to tree related outages (national forests). In 2016, the circuits served from Gifford, Colville and Roxboro substations will be targeted for reliability projects. Project scope generally involves the addition of protection devices, circuit hardening, facility conversion from overhead to underground, and circuit rerouting.

Distribution Transformer Change Out Program - 2016: $7,634,000; 2016: $7,654,000; 2018: $2,603,000 [System]

The Distribution Transformer Change-Out Program has three main drivers. First, the pre-1981 distribution transformers that are targeted for replacement average 42 years of age and are a minimum of 30 years old. Their replacement will increase the reliability and availability of the system. Secondly, the transformers to be replaced are inefficient compared to current standards. Thirdly, pre-1981 transformers have the potential to have PCB containing oil. The transformers to be removed early in the programs are those that are most likely to have PCB containing oil and their replacement will reduce the risk of oil spills containing PCBs.

Distribution Wood Pole Management – 2016: $7,840,000; 2017: $12,000,000; 2018: $7,912,000 [System]

The distribution wood pole management program evaluates wood pole strength of a certain percentage of the wood pole population each year such that the entire system is inspected every 20 years. Avista has over 240,000 distribution wood poles and 33,000 transmission wood poles in its electric system. Depending on the test results for a given pole, the pole is either considered satisfactory, needing to be reinforced with a steel stub, or needing to be replaced. In addition to pole condition and strength, inspection crews inspect crossarms, insulators, transformers, guy wires, ground and bonding wires, and primary and secondary conductors. This project also funds the work required to resolve those issues (i.e., potentially leaking transformers, transformers containing more than or equal to 1 ppm polychlorinated biphenyls (PCBs), failed arresters, missing grounds, damaged cutouts, failed insulators and other visible issues). Transformers older than 1981 have the potential to have oil that contains PCBs. These older transformers present increased risk because of the potential to leak oil that contains PCBs. Poles installed during the pre-World War II buildup have reached the end of their useful life. Avista's Wood Pole Management program was put into place to prevent the Pole-Rotten events and Crossarm – Rotten events from increasing. The Company estimates the cost of an event associated with a bad wood pole based on crew response and labor is approximately $600. For 2017 we anticipate a reduction of 107 events.

Substation – New Distribution Stations – 2016: $2,794,000; 2017: $275,000; 2018: $0 [System]

This program adds new distribution substations to the system in order to serve new and growing load as well as for increased system reliability and operational flexibility. New substations under this program will require planning and operational studies, justifications, and approved project diagrams prior to funding. Planned new substation projects include Tamarack (NE Moscow), Greenacres and Irvin (Spokane Valley), and Lewiston Mill Road.

Washington Advanced Metering Infrastructure (AMI) Project – 2016: $0; 2017: $34,420,000; 2018: $17,025,000 [Washington]

This project has been discussed extensively earlier in this testimony, please see the Advanced Metering Infrastructure Plan section for further information about this project.

Harrington Upgrades – 2016: $2,150,000 [Washington]

The Harrington, WA area is the last area Avista serves at the legacy 4 kV voltage. This voltage is obsolete for serving utility distribution systems and we have very limited spare equipment to continue service at this voltage. The substation is very old and the transformer will be difficult and time consuming to replace if it fails. We do not have 4 kV on our mobile substations, so all the customers served by Harrington feeders will be out of service until the transformer is replaced. This could easily be up to 48 hours. This is a needed upgrade to our standard distribution class voltage and equipment that was delayed in 2014 due to resources, and was pushed into 2015 and 2016. Minor system efficiencies also result. In conjunction with the substation work, Avista crews will change out primary distribution lines from 4kV to 13.2 kV and replace several hundred line transformers principally in the town of Harrington.

Spokane Electric Network – 2016: $2,300,000; 2017: $2,300,000; 2018: $805,000 [Washington]

Avista operates and maintains an underground electric secondary network that serves the core business district of downtown Spokane. Network feeder lines are separated into four (4) sub-nets. Each is capable of sustaining the loss of one trunk line (N-1) without loss of any customer load. Secondary networks are a common feature in most mid to large size cities including Tacoma and Seattle. Avista's secondary network requires specialized material, equipment, tooling, and manpower to perform maintenance repairs, planned replacements, and capacity growth projects. The scope of annual capital replacements and additions includes: 7,500 feet of secondary cable (600V), 7,500 feet of primary cable (15kV), 6-8 manholes, 2-4 vaults/vault roofs and 10 street light replacements.

Transmission Reconductors and Rebuilds – 2016: $3,600,000; 2017: $1,500,000; 2018: $0 [System]

This program reconductors and/or rebuilds existing transmission lines as they reach the end of their useful lives, require increased capacity, or present a risk management issue. Projects include: ER 2423 – System Transmission: Rebuild Condition; ER 2457 – Benton Othello 115 kV Recondition; ER 2550 – Burke-Thompson A&B 115kV Transmission Rebuild Proj; ER 2556 – CDA-Pine Creek 115kV Transmission Line: Rebuild; ER 2557 – 9CE-Sunset 115kV Transmission Line: Rebuild; ER 2564 – Devils Gap-Lind 115kV Transmission Rebuild Proj; ER 2577 – Benewah-Moscow 230kV – Structure Replacement; ER 2576 –

Addy-Devils Gap 115kV – Rec/Rbld 266 & 397 Cond; ER 2582 – Beacon-Bell-Francis&Cdr-Waikiki 115kV – Reconfig; ER 2597 – Cabinet-Noxon 230kV Transm Line Rebuild Project.

Distribution Grid Modernization – 2016: $6,359,000; 2017: $10,393,000; 2018: $5,725,000 [System]

In 2012, Avista began a program to upgrade distribution feeders to reduce energy losses, increase efficiency, improve safety and operations, and to increase long-term reliability. The program includes the replacement of undersized and deteriorating conductors, replacement of failed and end-of-life infrastructure materials including wood poles, cross arms, fuses and insulators. Inaccessible pole alignment, right-of-away issues, undergrounding and clear zone compliance issues are addressed for each feeder section as well as regular maintenance work such as leaning poles, guy anchors, unauthorized attachments and joint-use management. Also being installed is distribution automation with elements of Avista's Smart Grid on select feeders where appropriate. Electric circuits are selected based on a selection criteria including: 1) reliability, 2) avoided costs, and 3) capital offset of future O&M. Once selected, circuits are analyzed by engineering staff to determine the scope of work including structure replacement, line reroutes, conversion from overhead to underground, automation scheme, transformer & equipment replacement, and reconductor segments. This program along with other asset maintenance programs uses the Distribution Feeder Management Plan to define the scope for the designers and construction personnel.

Segment Reconductor and Feeder Tie program – 2016: $2,856,000; 2017: $3,175,000; 2018: $315,000 [System]

This program improves the capacity and reliability of the Company's distribution grid through targeted reconductoring/rebuild and feeder tie projects. In Washington State there are thirty (30) segment reconductor projects scheduled between 2016 and 2018 (2016 – 11 projects). These projects are identified, prioritized, and coordinated through the combined effort of Avista's central system planning function together with the assistance of regional operating engineer analysis and study. This is an on-going effort to identify and mitigate the capacity constrained portions of Avista's 18,000 mile distribution grid. In addition to circuit capacity projects, Avista constructs several new feeder tie points annually in order to effect seasonal and or permanent load shifts from either heavily loaded circuits or to relieve substation transformer loading.

Distribution Line Protection – 2016: $125,000; 2017; $125,000; 2018: $45,000 [System]

Avista's Electric Distribution system is configured into a trunk and lateral system. Lateral circuits are protected via fuse-links and operate under fault conditions to isolate the lateral in order to minimize the number of affected customers in an outage. Engineering recommends treatment of the removal and replacement of Chance Cutouts, the removal and replacement of Durabute cutouts and the installation of cut-outs on un-fused lateral circuits. This is a targeted program to ensure adequate protection of lateral circuits and to replace known defective equipment.

Environmental Compliance – 2016: $350,000; 2017: $350,000; 2018: $150,000 [System]
This item includes implementation of Forest Service Special Use Permits, waste oil disposal, including PCBs, and environmental compliance requirements related to storm water management, water quality protection, property cleanup and related issues.

Franchising for Washington State Department of Transportation – 2016: $494,000; 2017: $9,000; 2018: $1 [System]
Avista is working closely with the Washington Department of Transportation to renew crossing and encroachment permits. As part of that process, we are realigning or modifying existing infrastructure to comply with state clear zone, conductor clearance, and other regulations regarding the location of poles, guy wires, pad mounted equipment, and overhead conductors.

Hallett and White – Add Capacity – 2016: $1,000,000; 2017: $1,725,000; 2018: $0 [System]
The substation needs to be expanded to accommodate a third feeder and a second power transformer to the station. Subsequent to the finalization of revenue requirement, this project was identified as being growth driven and should be excluded from the revenue requirement. This project will be removed from revenue requirement in a future update.

VI. CUSTOMER SUPPORT PROGRAMS

Q. What customer support programs does Avista provide for its customers in Washington?

A. Avista Utilities offers a number of programs for its Washington customers, such as the Low-Income Rate Assistance Program (LIRAP), energy efficiency programs, Project Share for emergency assistance to customers, a Customer Assistance Referral and Evaluation Service (CARES) program, senior programs, level pay plans, and payment arrangements. Through these programs, the Company works to build lasting ways to ease the burden of energy costs for customers that have the greatest need.

To assist our customers in their ability to pay, the Company focuses on actions and programs in four primary areas: 1) advocacy for, and support of, energy assistance programs providing direct financial assistance; 2) low income and senior outreach programs;

3) energy efficiency and energy conservation education; and 4) support of community programs that increase customers' ability to pay basic costs of living.

Q. What is the Company's Low Income Rate Assistance Program, or LIRAP?

A. The Company's LIRAP program approved by the Commission in 2001 collects funding through electric and natural gas tariff surcharges on Schedules 92 and 192. These funds are distributed by Community Action Agencies (CAA's) in a manner similar to the Federal and State-sponsored Low Income Home Energy Assistance Program (LIHEAP)[25]. LIRAP, like LIHEAP assistance, can help a household avoid having its utilities shut off or help reestablish service, and can also help pay ongoing heating costs.

During the 2014/2015 heating season (October 2014 – September 2015) just over 28,000 Washington customers received approximately $8.0 million in various forms of energy assistance (Federal LIHEAP program, LIRAP, Project Share, and local community funds). The following funds were <u>distributed</u> by Community Action Agencies (CAA's) during the 2014/2015 heating season:

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[25] The Low Income Home Energy Assistance Program (LIHEAP) is a federal program established in 1981 and funded annually by Congress. These federal dollars are released directly to states, territories, tribes and the District of Columbia who use the funds to provide energy assistance to low-income households. LIHEAP offers financial assistance to qualifying low-income households to help them pay their home heating or cooling bills. Under federal law, a household must have income below either 150 percent of the federal poverty level or 60 percent of state median income level, whichever is higher. However, states can set lower income thresholds if they choose to.

<u>Illustration No. 10</u> – Distribution of Energy Assistance Funding

Washington	**# of Grants**	**Amount**
LIHEAP	5,439	$2,425,578
Project Share	257	$66,695
Misc. Grants	9,826	$1,031,478
LIRAP	12,481	$4,516,983
Total	**28,003**	**$8,040,734**

Q. Please describe the recent results of Project Share.

A. Project Share is a community-funded program Avista sponsors to provide one-time emergency support to families where Avista provides service. Avista customers and shareholders help support the fund with voluntary contributions that are distributed through local community action agencies to customers in need. Grants are available to those in need without regard to their heating source. In 2015, Avista Utilities' customers donated $319,189 on a system-wide basis, of which $181,829 was distributed by Washington Community Action Agencies. In addition, the Company itself contributed $137,360 to Project Share for the benefit of Washington customers in 2015.

Q. What other bill-assistance programs does the Company offer?

A. In an effort to assist and educate customers about payment options such as Comfort Level Billing, flexible payment plans, and preferred due dates, we developed a campaign (Customer Bill Assistance Campaign) encouraging customers to learn about and enroll in the various bill assistance options available to them. This Campaign was launched in December 2013 in all of the Company's service areas. It briefly explains the payment options above and encourages the customer to contact Avista to enroll or find out more. The Comfort Level Billing program has been well-received by participating customers, with approximately 44,352 or 17%, of Washington electric and natural gas customers participating in Comfort Level Billing.

In addition, the Company's Contact Center Representatives work with customers to set up payment arrangements to pay energy bills, and choose a preferred due date. For the twelve month period ending December 31, 2015, 13,124 Washington customers were provided with over 63,176 such payment arrangements.

Q. Please summarize Avista's CARES program.

A. In Washington, Avista is currently working with over 1,799 special needs customers in the CARES program. Specially-trained representatives provide referrals to area agencies and churches for customers with special needs for help with housing, utilities, medical assistance, etc. One of the benefits we have in utilizing CARES representatives is the ability to evaluate each customer, based on their specific need, and to educate them on what assistance is available within the community. A goal of the program is to enable customers to manage not only their Avista bill, but other bills and needs as well.

Q. Does the Company perform any other outreach to its customers?

A. Yes. The following are examples of outreach programs that are available to customers:

1. **Senior and Low-Income Outreach:** Avista has developed specific strategic outreach efforts to reach our more vulnerable fixed and low-income customers (with special emphasis on seniors and disabled customers) with bill paying assistance and energy efficiency information that emphasizes comfort and safety. Avista accomplishes this outreach mainly through Energy Workshops. During the 2014/2015 heating season 18 workshops were conducted reaching nearly 621 seniors and low-income individuals. All workshop participants were given Home Energy Efficiency kits along with tips for low-cost/no-cost ways to manage energy use. Each kit contains energy-saving items such as compact fluorescent light bulbs, plastic window covering, draft stoppers for exterior light switches and outlets, v-seal for drafty doors and a polar fleece lap blanket. The

Company also conducts general outreach in partnership with organizations that are in contact with vulnerable individuals through resource fairs or in-home services. For example, home energy kits have been provided for distribution through senior meal delivery programs. Through all of these venues, individuals are provided with information to effectively manage their home energy use and the Company's bill assistance programs.

2. **Senior Publications:** Avista has created a one-page advertisement that has been placed in senior resource directories and targeted senior publications to reach seniors with information about energy efficiency, Comfort Level Billing, Avista CARES and energy assistance.

3. **Energy Fairs:** In 2015, Avista hosted two energy fairs, in which nearly 550 individuals were reached. These outreach events provided information and demonstrations on energy assistance, energy efficiency and home weatherization to limited income families and senior citizens as well as provided an environment for customers to learn about billing options and energy assistance, while offering them tips and tools to use to help manage their limited financial resources.

4. **Mobile Outreach Van:** Avista offers many opportunities throughout the year for customers to attend energy fairs or workshops to learn more about energy assistance, energy efficiency and the resources available to them. But some of our more vulnerable customers have a hard time getting to an event to access these resources. So to ensure that we're reaching as many customers who need our help as we can, Avista created the Energy Resource Team van. The van is fully loaded with energy efficiency items such as rope caulk, V-seals and coil cleaners, as well as informational materials about bill options, assistance and efficiency. A laptop resides with the van, so employees can demonstrate our many online tools in action. In 2015, the van expanded outreach efforts to 6,596 individuals through 69 events throughout our service territory, many of which were in conjunction with Second Harvest Food Bank mobile food pantry.

<u>Illustration No. 11</u> - Customers being assisted through the Mobile Outreach Van

Q. Please describe how the Company measures customer satisfaction, and how important it is to Avista.

A. Our customer satisfaction is very important to Avista. We measure satisfaction by conducting a quarterly survey we refer to as "Voice of the Customer" (VOC). The purpose of the VOC Survey is to measure and track customer satisfaction for Avista Utilities' "contact" customers – i.e., customers who have contact with Avista through the Call Center and/or work performed through an Avista construction office.

Customers are asked to rate the importance of several key service attributes. They are then asked to rate Avista's performance with respect to the same attributes (time for connection to a representative, representative being courteous and friendly, representative being knowledgeable, being informed of job status, leaving property in condition found, etc.). Customers are also asked to rate their satisfaction with the overall service received from Avista Utilities. Customer verbatim comments are also captured and recorded.

Our most recent 2015 year end results show an overall customer satisfaction rating of **96%** in our Washington, Idaho, and Oregon operating divisions. This rating reflects a positive experience for customers who have contacted Avista related to the customer service they received.

Q. Does this conclude your pre-filed direct testimony?

A. Yes.