

Avista’s Washington Advanced Metering Project

Description of Quantified Customer Benefits

Area of Benefit												
<p style="text-align: center; font-weight: bold;">Outage Management – Outage Restoration Efficiencies</p>												
Customer Value												
<p>Advanced metering will provide customer benefits by providing the Company better visibility of overall customer outages during large¹ outage events, which will make outage restoration more efficient and reduce the cost of providing service.</p>												
Background												
<p>For the five-year period 2010 through 2014, Avista’s average annual cost for storm damage restoration was \$4.17 million. Annual costs for this period are shown in the figure below. In 2014, Avista experienced two windstorm events that caused significant customer outages, which substantially boosted restoration costs for that year compared with the prior period. The Company experienced another major storm in November of 2015, which by itself caused more damage than <u>all of the storms combined</u> from the five-year period shown in the figure, and resulted in more customer outages than even the ice storm of 1996, which had been the largest event in the Company’s 126-year history. This trend toward increasing weather-related major outage events is not unique to Avista. A report² from the Lawrence Berkeley National Laboratory documents the increase in electric grid disturbances across the United States, representing an estimated annual economic impact of \$104-\$164 billion.</p>												
<h4 style="margin: 0;">Storm Related Costs By Year</h4> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <caption>Storm Related Costs By Year</caption> <thead> <tr> <th>Year</th> <th>Cost (\$)</th> </tr> </thead> <tbody> <tr> <td>2010</td> <td>\$4,001,075</td> </tr> <tr> <td>2011</td> <td>\$2,055,672</td> </tr> <tr> <td>2012</td> <td>\$2,521,824</td> </tr> <tr> <td>2013</td> <td>\$3,802,026</td> </tr> <tr> <td>2014</td> <td>\$8,471,556</td> </tr> </tbody> </table>	Year	Cost (\$)	2010	\$4,001,075	2011	\$2,055,672	2012	\$2,521,824	2013	\$3,802,026	2014	\$8,471,556
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<p>Avista’s restoration of customer outages from storm damage will benefit from advanced metering by integrating the AMI system with the Company’s outage management system. In short, when the new system is installed, any loss of service to a customer will be instantly posted on the geographic mapping system (GIS) that is integrated with the outage management application showing the exact location of the outage. Having this capability will benefit our customers in a number of ways as described in a report by the</p>												

¹ For this classification of events, Avista included costs for outages caused by weather-related events (Storms), but which also includes those caused by wildland fires.

² Electric Grid Disruptions and Extreme Weather. Lawrence Berkeley National Laboratory. U.S. Disaster Reanalysis Workshop, May 2012.

U.S. Department of Energy titled “Smart Grid Investments Improve Grid Reliability, Resilience, and Storm Responses.” Several utilities cited in that report³ were able to demonstrate that having advanced metering enabled them to reduce the time required to restore customers’ service after a storm event, thus reducing the overall duration of the outages. Two utility examples include the Electric Power Board of Chattanooga, Tennessee, which showed a 40% improvement in their system average incident duration index (SAIDI), and Florida Power and Light Company, which showed a 21% improvement in the same reliability statistic.

Restoration efficiencies are enabled by advanced metering through improved situational awareness of the overall outage event, enabling more efficient work processes that result in a reduction in the time required to fully restore grid integrity and customer service. Efficiencies are achieved in a variety of ways, some of which are noted in the following examples:

- More accurate and rapid identification of the exact locations of faults.
- Reduction in the time required to provide real-time updates of system status resulting from resolved, new, delayed, or cancelled incidents.
- Greater visibility provides detailed graphical information that can be used to prioritize and optimally-deploy resources.
- Reduction in administrative work processes required to update the outage management system and to aggregate sub-incidents⁴ into larger, more efficiently managed incidents.
- Improved predictive analysis will enable more accurate planning and dispatch of restoration crews helping to avoid rework and improve safety.
- More accurate prediction of outage causes at each incident ensuring that the right equipment and materials accompany the restoration crews and help avoid the need to make multiple supply trips.
- Greater situational awareness of the outage incidents will enable more efficient dispatching of restoration crews: crews will be more-efficiently dispatched to crew-related work, allowing servicemen to focus on areas of finish-up work that can be performed without a full crew.
- Knowing the exact locations of individual service outages will reduce the requirement to survey incident areas in the field to validate full restoration.

Calculating the Benefit Value

Though utilities have reported restoration efficiencies such as those cited above, ranging at and above 20%, Avista believes that for our practices and system an estimate of 10% improvement in storm restoration time is reasonable. Shorter storm restoration time will result cost savings that will be achieved through a reduction in employee and contractor labor hours, crew lodging, meals, and transportation and equipment costs.

Avista has estimated that a 10% reduction in restoration time will provide a corresponding reduction in storm related costs. The direct financial benefit to customers is included in the customer savings benefit “Customer Avoided Costs.” A review of Avista’s storm related costs shows that 59.5% of the costs are for employee and contractor labor, meals, lodging, and transportation and equipment costs. These costs will be directly reduced in proportion to the reduction in restoration time. Applying this cost percentage to a 10% reduction in restoration time (10% x .59) yields a reduction factor for overall storm restoration costs of 5.95 percent. Applying this cost reduction to the five-year average storm restoration cost of \$4.17 million, noted above, results in an estimated average annual savings of approximately \$248,000. Applying this percentage to the one storm event of 2015, which would be a very conservative savings factor for an event of that size, would result in a savings of approximately \$1.25 million.

³ Smart Grid Investments Improve Grid Reliability, Resilience, and Storm Responses. U.S. Department of Energy, Smart Grid Investment Grant Program. November 2014.

⁴ An storm or outage event is composed of outages that result from many individual points of damage on the system, which are referred to as “incidents.” These incident points of damage are aggregated during the management of a storm into units of work that are prioritized and optimized in order to minimize the overall cost and duration of the event.

Supporting Information

Information showing the ramp up in the level of this customer benefit, as well as its estimated annual value in each year of the Project lifecycle is provided in the attached electronic workbook titled "Avista AMI Customer Benefits" included on the Compact Disc provided at the end of Attachment B, Project Benefits.

1. Open the Benefits Workbook and select the tab "Summary Detail."
2. Select "Restoration Efficiencies" under the "Outage Management" area of benefit.
3. This tab contains the expected value for this customer benefit over the course of advanced metering Project lifecycle.

Functional Requirements

The advanced metering outage alarm data has to be effectively integrated with the Company's outage management system.

Additional Requirements

Costs - There are no additional cost requirements beyond those identified in the estimated Project costs.

Business Process – Though many work practices will be more effective and efficient as a result, there are no business process changes required to achieve this benefit.

Key Metrics

Measuring and tracking this benefit represents a challenge because after the system has been installed it will require a thoughtful methodology to objectively measure what the outage duration results would have been had the AMI system not been placed into operation. Avista is continuing to research the methods used by other utilities, as well as to develop its own methodologies to measure and track the value of this benefit.

Benefit Realization Schedule

The anticipated ramp up of this benefit is shown in the electronic workbook as described above.