AVISTA UTILITIES

SMART GRID TECHNOLOGY REPORT

In Compliance with WAC 480-100-505(3)(a)

09-01-2010

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Introduction

In response to the Washington Utilities and Transportation Commission's (UTC) General Order R-559 in Docket No. U-090222, and WAC 480-100-505 (Smart Grid Technology Report), Avista Corporation dba Avista Utilities ("Avista or the Company") submits its first compliance report that summarizes current and planned smart grid activities for the reporting period 2010. Avista is currently developing and/or implementing two new smart grid projects, one in Spokane, Washington and one in Pullman,Washington.

Avista considers the "Smart Grid" as a "system of systems" not as a separate definable "thing." Technologies that are typically labeled as Smart Grid may be new, but in many cases may be existing technologies applied in a different context.

The Company as part of its utility planning process evaluates new technologies and approaches to continuously improve energy efficiency, reliability, customer participation, education, capacity, operational efficiency and O&M expense reduction. This planning process evaluates the system as a whole and utilizes life cycle economics which includes all the key elements of the Smart Grid as typically defined. Smart Grid could be characterized as more of a strategy that is incorporated into the planning process. Technology should be deployed as required to meet strategic objectives and may be applied differently depending on circuit configuration, load profile, or customer interest to name just a few of the drivers.

Avista recognizes there is substantial interest and anticipation of benefits as well as concern about costs associated with Smart Grid concepts. The Company would like to make this reporting process more of an educational partnership, whereby together we learn by establishing a vision and subsequently generating action plans that support evaluation and implementation of solutions that can help meet the goals defined by the vision. Smart Grid deployments may take twenty or more years to implement across an entire electrical system, and as such, must be maintained on a road map that is continually updated to leverage the Smart Grid capabilities that can insure northwest residents and businesses have access to low cost, reliable energy that provides a competitive advantage as a region.

This report provides the establishment of the vision and focus on the goals and expected benefits the vision is desired to achieve. Follow-up reports will contain additional details regarding evaluations, selections, and implementation of Smart Grid solutions.

Therefore, the Company has focused on transformational Smart Grid capabilities that standout from the day-to-day capabilities that are currently deployed. Working together we can maximize our collective knowledge and usher in the "modern grid" that best fits the needs of our customers.

In October 2009 Avista was chosen to receive a matching grant in the range of $20 million from the U.S. Department of Energy (DOE) for a project to upgrade portions of its electric distribution system to smart grid standards. The Company will contribute approximately $22 million to the project cost. The upgrade will dramatically improve 58 electric distribution facilities known as "feeders" in the Spokane area. The Company refers to this project as the "Smart Grid Investment Grant" (SGIG). The project is intended to reduce energy losses from electric lines, improve reliability and increase efficiency in the feeder system. The result of this work will include a reduction in the need for new energy sources and will cut greenhouse gas emissions. Specifically, the project includes installation of modern equipment and software to enable Smart Grid capabilities and increase reliability and efficiency. The distribution feeder systems being upgraded are primarily in higher population density areas of south and north Spokane. The entire project is scheduled for completion in three years. The vast majority of this investment would have occurred, in any event, in the future. The ARRA funding provided the opportunity to so it sooner, and at lower cost to customers.

Avista will also lead a Smart Grid Demonstration Project (SGDP) that will create the first "smart community" in the Pacific Northwest. The matching funds for the $38 million project are part of a DOE grant for a for a larger $178 million regional project which is administered by Battelle[1]. Avista is teaming up with several regional entities for the Pullman, Washington project. Avista's portion of the matching funds will be approximately $13.1 million.

[1] Battelle is an international science and technology enterprise that explores emerging areas of science, develops and commercializes technology, and manages laboratories for customers. Battelle supports community and education programs to promote an enhanced quality of life for its community neighbors.

This demonstration project involves the automation of many parts of the electric distribution system using advanced metering, enhanced utility communication and other elements of smart grid technologies[2]. This project also includes some of the same technology as the Spokane project for example, the installation of a distribution management system (DMS) which controls smart switches, smart capacitor banks, smart fault indicators, and smart voltage regulators for fully automated restoration, fault identification, integrated volt/var compensation, conservation voltage reduction, and optimized switching. Smart transformers with internal and ambient temperature sensing as well as low side bushing measurement devices that will communicate loading and potential failure information routinely. These transformers will be high efficiency for loss reduction. Fiber communications to each of three substations will service an 802.11 wireless LAN covering the entire community. Once the work is completed, customers in the city of Pullman and nearby Town of Albion are expected to experience greater reliability, shorter outage times and access to their own energy use information, allowing them to better manage energy expenses. This project is also expected to help move the region and the nation closer to establishing a more efficient and effective electricity infrastructure that is intended to help contain costs, reduce emissions, incorporate more wind power and other types of renewable energy, increase power grid reliability and provide greater information and flexibility for consumers. The project should be completed in 2014.

Attached to this report are the following “Confidential” Appendices:

- Appendix A – A Historical Perspective of Grid Automation at Avista
- Appendix B – Smart Grid Investment Grant Business Case
- Appendix C – Smart Grid Investment Grant Application
- Appendix D – Smart Grid Demonstration Project Business Case
- Appendix E – Smart Grid Demonstration Project Statement of Work

[2] Smart grid technology includes everything from interactive appliances in homes to substation automation and sensors on transmission lines. It is a system that uses various technologies to enhance power delivery and use through intelligent two-way communication. Generators of electricity, suppliers and users are all part of the equation. With increased communication and information, smart grid implementations can monitor activities in real time, exchange data about supply and demand and adjust power use to changing load requirements.

Reporting

Smart Grid Technology Considered for Integration into Avista System:

There are many distribution technology solutions that are designed by vendors to be proprietary, locking the customer into a particular product line. This has been a reality for most of the utility industry history. Today efforts by the National Institute of Standards and Technology (NIST) are underway to provide interoperability standards. Will these efforts work? The jury is still out on that question. Accordingly, Avista first and foremost evaluates smart grid technologies that adhere to existing standards for interoperability.

Avista has made a number of technology decisions in the past that allow for centralized and/or distributed control based on an accurate digital model of the electric distribution system. The details regarding this model are included in the Appendix-"A Historical Perspective of Grid Automation at Avista". Without the existence of such an accurate electric model, a utility must create scenario based solutions. Vendors have focused much of their efforts on these type of solutions, often time using proprietary communications with only their devices, considered from a static configuration. Change the system configuration and the solution can no longer be used without changing the solution logic, inducing maintenance efforts by engineering staff. The presence of an accurate electric model allows for dynamic analysis of the system and appropriate control/response to a specific system state which takes into account current configuration.

As described above, Avista has focused smart grid efforts on sustainable solutions that reduce maintenance and operating expenses. A distribution management system (DMS) was considered a foundational requirement to provide an automation platform. This system was selected using a request for proposal (RFP) process. Automated switches, capacitor banks, and voltage regulators are considered key to distribution efficiency goals. Smart transformers and fault indicators are new technology options that we want to test. Battery storage was considered, but determined to be neither cost effective nor mature. Advanced Metering Infrastructure (AMI) is necessary to understand and test customer solutions. Many communication technologies were and are being considered. Wireless 802.11 will be used in a metro area network configuration. Line-of-site 900 Mhz radio was considered but ruled out after a one feeder pilot.

Many other technologies will be considered in future years. Some technologies may be used for a rural feeder configuration, but not for an urban. There are no "one size fits all" solutions.

Goal or purpose of the smart grid technologies described in this report:

The goals of Avista's smart grid projects are as follows:

(a) Increased Energy Delivery Information: System information will be available to better design system requirements using the detailed load information in order to optimize costs and efficiencies. Data that will be collected can be categorized into two areas, operational and customer information. Operational information includes data about feeder loads, power quality, and service reliability. Customer information provides interval consumption data that allows consumers and the utility to better understand when energy was used over the course of a month.

(b) Reducing Energy Losses: Typical distribution feeders that run from substations to customers are not optimally designed to minimize system losses. Because the existing field equipment was specified during a time when the cost of energy was low and the environmental impacts had a lower value, it has higher losses than modern equipment. Newer standards and increased energy resource costs have driven more efficient designs. Energy will always be lost as it makes its way through the feeders, however, utilities can install equipment that reduces those losses. In addition to loss reduction the capacity released will increase the useful life of existing equipment.

These problems can be reduced by adding available technology at each of the substations and feeders. New capacitors on the feeders will reduce energy losses, thereby delivering more power to customers from a given amount of electricity generated. A new centralized Distribution Management System (DMS) will measure the usage and performance of each feeder on a near real-time basis. Based on this information, the DMS will provide an optimized voltage control to minimize losses on each feeder. It could also use switching software to instantly adjust the feeder configuration in response to changes in customer usage, thereby conserving additional energy. The result will be a distribution system that responds in a dynamic fashion to customer needs as they vary throughout the day and throughout the year.

(c) Increasing Reliability: The Smart Grid Projects will increase reliability in several respects. The Distribution Management System mentioned above will automatically minimize the effect of an outage. By remotely monitoring the current flowing through each feeder, the location of an outage can be quickly identified. Once identified, the switches will isolate the area immediately around the outage, allowing restoration of service to customers outside of that area in a matter of seconds. This action reduces the number of customer experiencing a sustained outage and the duration of that outage.

The system will also reduce response time. Line patrol time is reduced due to improved fault location information. Also the faulted circuit indicators (FCI's), which will be used in the Pullman project, will further improve fault location information.

In addition, the Projects will include technology allowing Avista to remotely control the protection scheme on each feeder, in response to weather conditions. Currently, the protection schemes are set for non-storm situations. This "normal" setting allows fuses to blow first, isolating that portion of the feeder before causing a momentary outage on the entire feeder. This is done because anything that causes a fault during non-storm situation is likely to require repair, not something that will clear itself after a momentary outage. Under these circumstances a service truck is dispatched to fix the fault and replace the fuse.

During a storm, however, the strategy could be changed because faults are much more likely to clear themselves after a momentary outage. In these cases, the new technology will adjust the protection scheme to allow for temporary opening of protection devices. Consequently, all customers on that feeder will experience a momentary outage, but the fuse will not blow if the fault clears itself, a truck will not need to be dispatched, and no customers will needlessly experience an extended outage.

(d) The project in Pullman includes improved energy information: The Advanced Meter Infrastructure will provide data to customers in two ways. In–home displays, IHD's, will be used to provide near-real-time energy data to approximately 1500 residential customers. Web portals will be used to provide similar data to all customers, although after a processing delay. Avista will study the benefits of behavior changes that may result from this information. This portion of the project is still under development.

(e) The Voltage Optimization function of the Distribution Management System will reduce energy losses and power demand on the distribution system, and in homes and businesses: The reductions are due to the effects of conservation voltage reduction. The reductions on the distribution system result from lower equipment losses and customer power demand. The reduction in the average service voltage improves the energy efficiency and lowers power demand of customer appliances and equipment. Although the change is small at each meter, the reduction over large areas can be significant.

(f) Integrating Distributed Renewable Generation: Avista currently allows customers to interconnect their renewable generation resources to the distribution system, and credits them through the use of net-metering. However, Avista currently has limited ability to integrate that distributed generation into its system operations, thereby foregoing some of the benefit of distributed generation. For example, in the event of a major outage, it is important to know how much distributed generation is available to serve the load within the affected area. Technology to be installed as part of this project will enable the collection and use of that information.

(g) Extending the Life of Existing Infrastructure: The Project will include installation of substation and feeder measurement devices to monitor conductor and equipment loadings. This additional information will facilitate maximum utilization of equipment, thereby allowing equipment replacement to be deferred. Currently, planning for equipment replacement is based on simple models and single points of information. By using real-time data, Avista will be able to optimize utilization of the system over a broad range of operating conditions. Similarly, the DMS will allow loads to be transferred to nearby sources, thereby avoiding capacity constraints.

(h) Measure and Validate: A major objective of the two projects is to measure and validate smart grid costs and benefits for customers, utilities, regulators, and the nation, thereby laying the foundations for business cases for future smart grid investments.

Costs of deployment of the technology:

Table 1 below summarizes the estimated costs for the planned smart grid projects over the next five years. Both projects have cost share portions from the Department of Energy (DOE) or other cost share partners. Additional detail is available in Appendix B and Appendix C.

Table 1: Summary of Smart Grid costs for the next five years.

	DOE Grant	Avista Spend	Cost Share Partner	(Total)
Smart Grid Investment Grant	$20,000,000	$22,000,000	$ -	$42,000,000
Smart Grid Demonstration Project	$19,000,000	$13,000,000	$6,000,000	$38,000,000
Total	$39,000,000	$35,000,000	$6,000,000	$80,000,000

Overall cost-effectiveness of smart grid technologies that are planned to be implemented:

<u>Smart Grid Investment Grant (SGIG):</u>

With the approximate fifty percent matching grant from the Department of Energy, the SGIG project shows to be a cost effective deployment of the technology. Comparing the cost of the energy resource by reducing the system losses to long term energy availability, this project is a lower cost option than purchasing energy or developing generation plants.

Using the electric revenue requirement spreadsheet provided by the Company's finance department and assuming the grant will not be taxed, the projected internal rate of return for the project is 13.24%; present value of the savings is $55.48M. The calculated resource cost for this project is $56.78/MWh. Attached in Appendix B, is a copy of the business case information for this project.

<u>Smart Grid Demonstration Project Pullman (SGDP):</u>

The financial analysis for the Pullman project can be broken down into two groups of installed assets. The first group of assets includes distribution facility, communication and distribution automation capability which is nearly identical to that included for installation in the SGIG Spokane project. A similar IRR as detailed previously for Spokane is expected in Pullman.

The second group of assets focus on new technologies that enable further refinement and validation of distribution automation concepts. These assets also provide an opportunity to understand the value of engaging customers with educational opportunities and in-home technologies. A number of backend systems are required that are difficult to cost-effectively scale down to deployment for only one town of 14,000 residents. While a surface-level comparison of direct economic costs and direct economic benefits would show that costs exceed benefits for this portion of the project, it should be recognized that one of the primary purposes for doing the small-scale project is to learn about the new technology and the customer response to deploying the technology. These learning's will be very valuable to the Company, its customers, regulators, and other stakeholders in assessing the value of full-scale deployment of some of these technologies.

Attached in Appendix D, is a copy of the business case information for this project.

Operational savings associated with meter reading or other utility functions:

The SGIG Project will provide some operational cost reductions to the operations of the system, however until further analysis is completed the dollar or labor amounts is not quantified at this time.

The areas that the SGIG project expects to see reductions in operational costs are:

- Labor, travel time and vehicle usage to manually operate main line and tie point switching devices.
- Labor, travel time and vehicle usage in order to initiate a hot line hold.
- Labor associated with identifying and isolating faulted sections of the distribution system during an outage.

The SGDP Project will provide the offsets to future operation costs above in addition to those listed below:

- Meter Reading Costs
  For this project savings related to manual meter reading costs will be offset by increased costs for back office hardware, software and operating personnel costs. Meter reading costs are expected to provide positive benefits when back office fixed costs are spread to larger numbers of meters.

- Customer Service
  AMI will provide on-demand open and close reads and remote service disconnects. These features will reduce Customer Service expense in outside collections, inactive use, call reduction, and write offs.

- Customer Load Studies
  Customer energy data available from the new meter data base will provide an ongoing pool of data which can be used for analysis of time-of-use customer loads. Currently this data is provided by special metering installations and field data collections.

Effects on system capability to meet or modify energy peak loads:

The Distribution Management System (DMS) will manage power factor correction, voltage regulation, and voltage reduction to minimize system losses and reduce customer loads. This optimization occurs constantly providing benefits for all periods, not just peak, however load reduction and loss minimization will be maximized during peak load periods. Optional customer in-home devices (1500 in Pullman planned) will also allow for peak reduction of heating/cooling and water heat load.

Effects on service reliability including storm damage response and recovery, outage frequency and duration and voltage quality:

At this time, the Distribution Management System (DMS) proposal will automate the restoration of customers impacted by a feeder lock out. Within five minutes of a feeder breaker lockout, the DMS will identify and isolate faulted sections of the distribution feeder. Once the sections are identified the DMS will begin restoring power to sections of the distribution feeder that were not directly impacted by the fault. The distribution feeders in the projects will also receive midline reclosers that will detect faults on the second half of the distribution feeders, reducing the impacts of end of line faults to the customers on the first half of the feeder.

In addition to monitoring the distribution system for outage issues, the DMS will also monitor the distribution system for voltage and power flow characteristics in order to optimize efficiency. Active management of the system voltage and VAR flow will minimize voltage fluctuations throughout the normal course of the day.

Effects on integration of new utility loads, such as recharging batteries in electrically powered vehicles:

In April of 2010 Avista installed three level 1 electric vehicle public charging stations. These stations are not included in Avista's smart grid demonstration. The intent of these particular installations is to develop experience around installation variables and customer expectations. Information concerning system effects of electric vehicle and smart grid systems is currently being obtained through participation in various Electric Power Research Institute (EPRI) and Edison Electric Institute (EEI) electric and hybrid vehicle programs. The Company anticipates future additional installations of charging infrastructure that have intelligent controls and interfaces to smart grid communications as equipment becomes available and consumers begin adopting electric transportation within their normal routines.

Cyber and physical security of utility operational information:

Avista has developed a Smart Grid Cyber Security Plan which defines a structured and actionable plan for addressing cyber security issues through the life of the projects. The Plan provides a top-down evaluation of impacts, risks, threats, vulnerabilities, and controls.

The cyber security strategy uses the following six-step security life cycle approach:

Step 1 of the life cycle involves categorization of the various systems involved in the Smart Grid projects, and is presently being performed by Avista. This categorization step performs an inventory of all the various systems, existing and future, which are involved in the Smart Grid implementation. An assessment is made of each system's impact regarding confidentiality, integrity, and availability and what the loss of any of the attributes would have on operations, assets, and individuals.

Step 2 of the plan involves evaluation of the threats and vulnerabilities present in the various systems, analysis of controls to address the various threats and vulnerabilities, a numerical analysis of likelihood, impact and risk. Based on these evaluations and analysis, a set of recommended security controls is produced. The set of recommended controls is drawn from the NIST 800-53, and other security documents. The controls in the NIST document address a wide variety of security areas including, physical & electronic security, organizational accountability, training and awareness, vulnerability assessment, incident response, and many others.

Step 3, involves development of a control implementation plan. This plan will consider appropriateness and feasibility of the various recommended controls. This step analyzes the cost versus the benefit of the various controls in reducing risk and ensures that risk is reduced to an acceptable level, and with the application of cost effective controls.

At present, as of August 12, 2010, Avista is working on the completion of Step 1 of the plan for all of the various systems involved in the Smart Grid projects. Step 2 will involve the selection of control recommendations. And Step 3 we will perform the evaluation and consideration of technologies as discussed in WAC 480-100-505.

As stated in "The Smart Grid in 2010: Market Segments, Applications, and Industry Players" date July, 2009 by GTM Research:

> The promise of a smarter grid, as advocated by groups such as the Department of Energy (DOE), the National Energy Technology Laboratory (NETL) and the Electricity Advisory Committee (EAC), typically includes the following added security benefits:
>
> - Reduced system vulnerability to physical or cyber attack;
> - Minimal consequences of any disruption, including its duration and economic impact; and
> - Added security-related improvements related to the grid's ability to optimize reliability, communications, computing, self-adjustment and decision-making support.

Grid resiliency and security has come into the national spotlight in the past year, largely in response to a story that ran in the Wall Street Journal, regarding cyber grid hackers. While this unsourced story created quite a stir in Smart Grid circles, it did rightly call attention to the security issues involved in bringing two-way high-speed communications and controls to our electric grid, which in many ways is in the backbone of modern society.

The Company understands that the addition of millions of sensors and smart meters does dramatically increase the number of points that could be targeted and become potentially vulnerable to cyber attack. However, while these concerns have not obstructed the Company's implementation and the deployment of its Smart Grid technologies, we do need to adequately address government, utilities and companies providing grid hardware and software.

Avista's current communication network serves four primary business requirements:

1) System Operations
2) Customer Interface
3) Emergency Response
4) Business Enterprise

System Operations use is primarily for the management, control and operation of electric and gas infrastructure. Customer Interface networks provide communication paths into Avista via telephone and computer. Emergency Response systems use networks to provide critical communication for employee and public safety during gas and electric outages. Business Enterprise communication networks are required for efficient day-to-day business operations.

Avista networks are designed, provisioned, operated and maintained by the IT organization. Networks can be classified into two major types, carrier or private. Carrier networks are delivered to Avista as a service from companies like AT&T, Verizon, CenturyTel, Qwest, etc. Private networks are those that Avista constructs and maintains using technology such as microwave and fiber transports. Carrier solutions are generally used for Customer Interface and Business Enterprise. Private solutions are generally used for System Operations and Emergency Response.

Needs assessment for communication networks, carrier or private, follow a structured governance process. Typically a need will be identified by a line of business and that request will flow into the project management office. An established project methodology governs priority/value, scope, schedule, cost by placing the decision into a steering committee consisting of technology and line of business leadership.

Delivery of the network solution includes several cost areas. Each project usually consists of network hardware, software, labor and carrier services. A carrier solution generally consists of more services cost, a private solution generally has more hardware cost. Network hardware and software platforms are selected by using an RFP process. Once a technology platform is selected, expansion usually continues without RFP until a technology or cost signal triggers and a full platform replacement study is conducted. Selection of carrier service also follows an RFP process, with some exceptions. For example, carrier options may not always be available in all operating territories. Carrier services are often placed on multi-year contracts and rates often controlled by tariff. Expansion of service usually continues without RFP. Cost, quality and technology are considered during contract cycles and when prudent, a carrier replacement study is conducted.

Cyber and physical security of customer information and effects, if any, on existing consumer protection policies:

Avista takes cyber and physical security of our customers' information very seriously. The Company's current customer protection policy is as follows:

> It is the policy of Avista Utilities to protect the privacy of our customers and to safeguard any customer information we collect during the course of providing electric and natural gas energy services. Private customer information collected includes customer's name, service address, mailing address, telephone number, a personal identifier (such as, but not limited to, social security number) as well as information related to the type of service, the quantity of electricity or gas consumed and the customer's payment history.
> Only authorized and trained Avista employees or authorized representatives have access to or handle customer information. Customer information is stored and processed in secure computer facilities and is accessible by Avista employees or authorized representatives only on a need to know basis. Avista will not disclose or sell customer information to its affiliates, subsidiaries or third parties for the purposes of marketing services or product offerings to a customer, unless Avista obtains the customer's written permission. Avista may otherwise provide customer information to government agencies, and to collection agencies (in the event of non-payment of utility bills), but only after verifying the identity and affiliation of the receiving party.

Avista uses best practices for consumer protection. Access to information is protected by userID and password on the Avista utility web site; no customer data is contained on laptops deployed by field crews; and no customer data is stored on field installed devices such as meters. All data is stored within the confines of the Avista data center which is considered very secure.

Interoperability and upgradability of technology and compliance with applicable national standards:

Section 5.2 of Appendix B (Smart Grid Investment Grant), summarizes Avista's approach to interoperability for the project. Avista recognizes the communication and Cyber security requirements for Smart Grid implementations will be a dynamic space for the future. It is Avista's goal to be aware of the changes and best practices of Smart Grid implementers and when certain technology is selected and implemented that they are interoperable with existing infrastructure.

Customer acceptance and behavioral response:

In June 2010, Avista conducted two customer focus groups in Pullman, Washington, using a professional focus group facilitator to gather customer input on preliminary elements of a demand response pilot that is part of the Pullman Smart Grid Demonstration Project. The objectives and key findings of these two focus groups follow. A total of 16 Avista customers participated in the focus groups. Other aspects of customer acceptance and behavioral response as part of this project to this point have not yet been designed.

Focus Group Objectives:

- Assess general customer awareness of smart grid concepts
- Assess customer interest in participating in the Pullman demand response pilot
- Solicit customer likes/concerns about preliminary Pullman demand response pilot design
- Solicit customer input on possible pilot program incentives
- Solicit customer suggestions on approaches to recruit pilot participation

Key Findings

Awareness of Smart Grid/Smart Meter - Approximately one half of group participants reported having some awareness of Smart Grid/Smart Meter technology and were positive about the technology and it's potential to have a favorable impact on energy use and cost.

General interest in participating in the Pilot - The vast majority of participants reported being interested in participating in the pilot program as measured by their interest rating in participating on a 1 – 7 scale, with 7 meaning extremely interested in participating in the pilot. Nearly 90% of all participants reported an interest score of 6 or 7. Only one participant rated their interest level below 5.

Participant interest in being a part of the pilot program was primarily driven by their desire to lower the amount of money they spend on energy as well as helping to be good stewards of the country's energy resources.

<u>Likes about the Pilot and Smart Grid</u> - The majority of participants were very positive about the pilot and smart grid technology, and readily accepted both as being good for individuals and for Pullman. Several participants expressed a sense of pride in the fact that Pullman was selected to be a pilot city.

Participants liked several things about the pilot program and smart grid. Elements most liked included:

- It will allow individuals to make more informed energy consumption decisions
- It will allow for better integration of renewable energy resources
- The two way communication will help provide better quality power at reduced cost
- The web portal can help individuals better manage their energy use and help reduce their energy costs
- The program is partially funded through a federal grant

<u>Dislikes about the Pilot</u> - Participants reported very few dislikes about the pilot as presented to them. One person raised a concern that the program was funded through a federal grant and one person raised a concern about policy issues surrounding Smart Grid/Smart Meter.

Participants did express some concern over allowing Avista to turn down their appliances for a short period of time. This concern was <u>not</u> centered on the idea of allowing Avista to help manage in-home energy use at a high level. Instead, their concern focused on the timing and potential impact of the "turning down". For example, they wanted to make sure they had enough hot water when they needed it. All participants liked the idea that they could override the system when they wanted to as well as the fact that they could determine the level of severity of energy reduction they would allow.

<u>Program Incentives</u> - Most participants reported that getting all equipment installed for free and the fact that they would be able to keep their smart thermostats after the pilot program was enough incentive to participate in the pilot.

Several participants expressed the feeling that it would be "cool" to be one of the 1,500 homes participating in the pilot.

A few participants indicated that they would like some type of additional incentive to participate in the pilot. These people seemed to be satisfied with receiving an annual credit on their electric bill of between $50 and $100.

No participants expressed interest in receiving any type of gift certificate as an incentive to participate in the program.

Educate customers on what Smart Grid/Smart Meter is and the benefits that it delivers to individuals, communities and the country. Tariff and rate design changes necessary to implement the technology:

Securing customer acceptance of smart grid technologies and behavioral change designed to develop more conscious energy consumers in part will depend on education and outreach to Avista customers. Avista is committed to creating a coordinated, comprehensive education effort in easy-to-understand terms to help customers with the following:

- Understand the elements and benefits of the Smart Grid
- Understand how to take advantage of the new technology to manage energy use more efficiently
- Set expectations and provide advance notice of activities such as new meter change out and roll-out of energy.

As of August 2010, there has been a few news release announcements regarding Avista's participation in two smart grid projects—the Smart Grid Investment Grant and the Smart Grid Demonstration Project. Direct communication with Pullman customesr regarding the Smart Grid Demonstration Project will commence once all contracts have been secured and signed.

The Company is still in the beginning stages of the Smart Grid Demonstration Project implementation and intends to work with the Commission Staff and other interested parties as the design of the programs on the customer side of the meter become more defined. At this time, the Company does not anticipate offering any type of rate design as part of its SGDP.

Nonquantifiable societal benefits:

The implementation of smart grid technology, focused on the goals expressed in this report, provide a number of benefits that are difficult to quantify. The first benefit is the advancements that ultimately arise from the advancement of technology. Smart grid enablement will allow for new technological opportunities to be overlaid upon the smart grid to provide new capabilities and services. The advance of the cell phone is an interesting case study. Just a few short years ago, few people had a smart phone. Those that did own a smart phone had access to limited functionality. Fast forward to post iPhone introduction and it is hard to imagine any limitations in current smart phone offerings. The power grid may well follow a similar path. The intermingling of technologies with a smart grid opens limitless possibilities for people of all income levels.

Environmental impacts of energy usage can be positively affected with better energy management and optimized operation of grid assets. Diversification of energy resources will reduce reliance upon fossil fuels. National security may be enhanced as a result. Alternative energy resources, potentially located closer to loads, additionally reduce losses and may enhance reliability.

It is necessary to understand that these societal benefits will occur over a long period of time and only as economic opportunities appear to drive business to provide advances in technology.

Economic Considerations:

Avista Smart Grid efforts focus on increased reliability, operational and energy efficiency, and enhanced customer information, education, and satisfaction. When considering any specific solution for significant deployment, a business case is developed that quantifies energy savings in kWh translated to avoided cost dollars, labor savings for operational efficiency gains in dollars, and reduced outage minutes experienced by customers also translated to dollars. Customer information, education and satisfaction is a very important consideration, and product price is one of the drivers of customer satisfaction. Increased reliability will be measured with the standard IEEE indicies such as CAIDI and SAIFI, however the most important measure is those outage minutes that a customer does not experience. Each outage minute a customer experiences has a monetary value. That monetary value may be different for each customer but can be generalized by customer class. Avista has begun the process to determine the appropriate values.

Avista's distribution engineering staff have developed a process to evaluate the quantity and type of losses across its existing distribution infrastructure and with the recognition of the challenge in approximating energy savings for specific load varying feeders, the Avista distribution engineering staff developed a program to improve the measurement of power flow across the feeders using smart grid technology. Avista's incorporation of distribution efficiency upgrades using smart grid components is in accordance with the methodology established by the Northwest Energy Efficiency Alliance (NEEA) and published in the Distribution Efficiency Initiative Report (DEI 2008).

In addition to specific efficiency programs, Avista distribution standards are based on a life-cycle cost model. The life-cycle cost model takes into consideration the cost of energy loss over the life of the equipment. Distribution infrastructure which requires rebuilding or replacement as part of normal business practices takes advantage of higher efficient equipment which may directly involve smart grid technology.

Customer satisfaction is constantly measured by a third party for Avista. Product pricing is a customer concern. Avista's deployment of smart grid technology is driven by economic considerations with the goal to reduce the magnitude of future rate hikes by maximizing the utilization of transmission and distribution system assets that are already in service.

Any specific smart grid technology will be evaluated for desired functionality, security, interoperability, scalability, manageability, life-cycle costs and benefits. If considered for a sizable implementation, a business case is required.

Identification of any smart grid technologies that may be cost-effective and available for the utility and its customers during the subsequent ten-year period

The current smart grid projects funded by the American Reinvestment and Recovery Act of 2009 provide a foundation from which other emerging products can be leveraged. These projects include a comprehensive set of technologies. As such, there are only a few known technologies that can be supplied for this report.

Measurement of system "state" is the precursor for action to be taken on both the transmission and distribution systems. There is regional and national interest in phasor measurement units (PMU) that provide a benefit to understanding the state of the power system at the transmission level. Sensors that can be deployed at low cost can provide a great deal of value for optimizing the distribution system. Avista is interested in each of these technologies.

Two way communications is a critical component for smart grid deployment. Both private and public carrier options will continue to evolve. Avista will continue to evaluate these options.

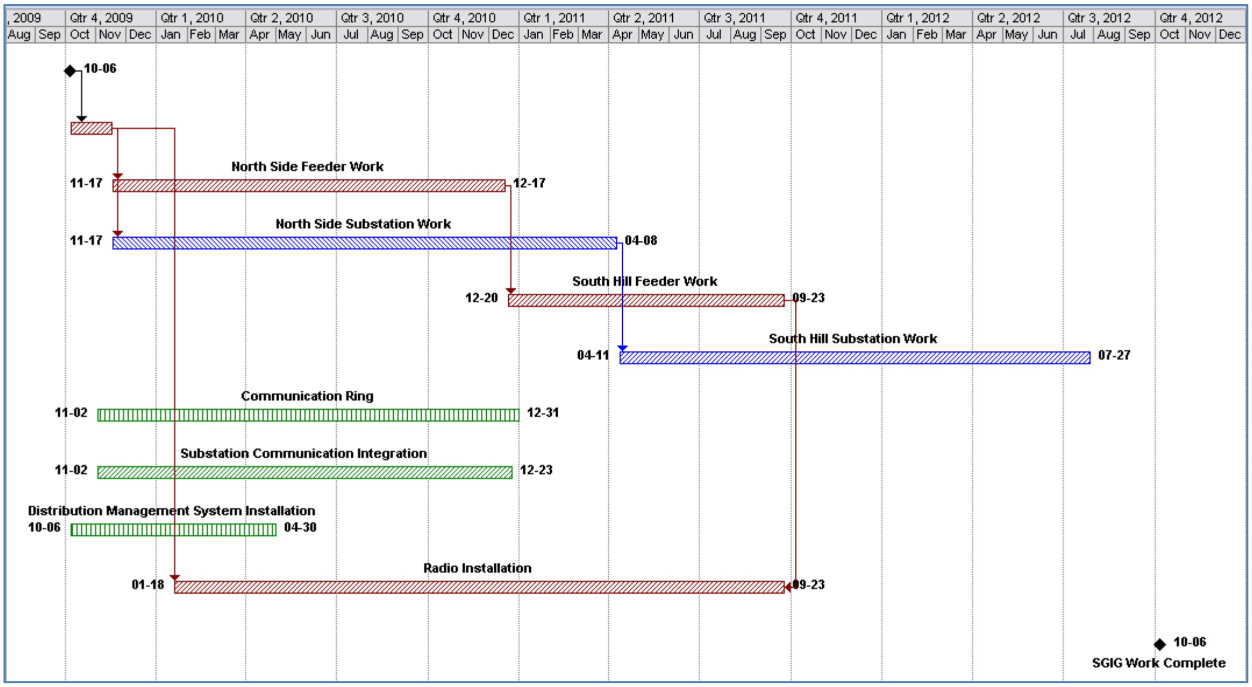
Distributed generation in the form of roof-top solar, small scale wind, micro turbines, or battery storage may become more prominent in future years. Avista will continue to monitor developments in these areas as well.

Additional technology interests will develop as a result of the experience with the current smart grid projects.

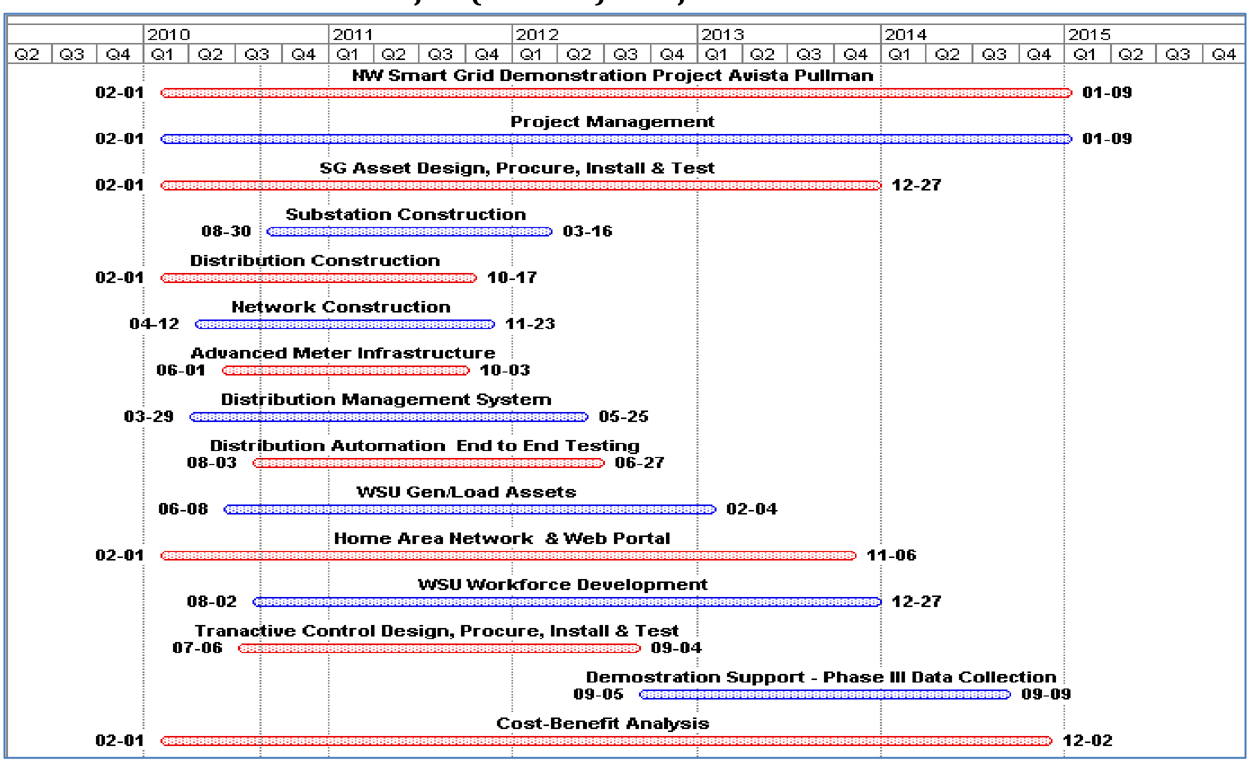
Avista's timeline for implementing smart grid technology over the next two years

Avista will focus efforts on the ARRA funded projects over the next two years. The timelines below provide the schedule for each of these projects which in the case of the Pullman project extends beyond the two year period. Evaluation of additional smart grid technologies may occur during this two year period as a part of, or in addition to these two projects.

Smart Grid Investment Grant (Spokane) - Project Timeline



Smart Grid Demonstration Project (Pullman) - Project Timeline



Conclusion

Avista intends this technology report to be informative, but also to be understood to represent a specific point in time. Avista continuously evaluates technology solutions, sometimes using limited-scope pilot deployments. Each evaluation may modify the smart grid road map. If the smart grid is considered as a "system of systems", the road map is truly dynamic as any system may become an extension to the smart grid. Avista believes smart grid technology can and will deliver benefits to Avista customers when appropriately applied.