BEFORE THE WASHINGTON UTILITIES & TRANSPORTATION COMMISSION

WUTC V. AVISTA

DOCKETS UE-120436 AND UG-120437 *et. al*.

DIRECT TESTIMONY OF NANCY BROCKWAY (NB-1T)

ON BEHALF OF

PUBLIC COUNSEL

SEPTEMBER 19, 2012

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I. INTRODUCTION / SUMMARY

Q: Please state your name and business address.

A: Nancy Brockway, doing business as NBrockway & Associates, 10 Allen Street, Boston, MA 02131.

Q: By whom are you employed and in what capacity?

A: I am the proprietor of my consulting business.

Q: On whose behalf are you testifying?

A: I am testifying on behalf of the Public Counsel Section of the Washington Attorney General's Office (Public Counsel).

Q: Please describe your professional qualifications.

A: I have been involved in the regulation of public utilities since at least 1983, when I joined the staff of the Maine Public Utilities Commission. In 1986, I became a staff member of the Massachusetts Department of Public Utilities. I served as General Counsel to the Massachusetts Commission during the last two years of my tenure there. In 1991, I joined the National Consumer Law Center, and provided expert witness testimony on rate design and efficiency for low-income customers. In 1998, then-Governor Jeanne Shaheen appointed me to the New Hampshire Public Utilities Commission. Since leaving the New Hampshire Commission in 2003, I have run my own consulting business, NBrockway & Associates. I also worked briefly with the National Regulatory Research Institute, during which time I wrote a seminal paper on smart grid issues, *Advanced Metering Infrastructure: What Regulators Need to Know About its Value to Residential Customers,* NRRI Report 089-03, and performed the original research for a report later issued by NRRI on regulatory policy regarding pre-

approval of utility capital projects. In my consulting, I have presented testimony in 12 regulatory proceedings concerning smart grid investments, and am presently assisting the consumers' counsels in Maryland and Pennsylvania with the implementation of smart metering by utilities in those states. In July, 2012, I published an article on cyber-security for the smart grid in *Public Utilities Fortnightly*. My résumé and list of testimonies are attached as Exhibit No. NB-2.

Q: What is the purpose of your testimony?

A: In my testimony, I will review the decisions made by Avista to invest in the Smart Grid Demonstration Project (SGDP) in Pullman, and the Smart Grid Investment Grant (SGIG) in Spokane. I will assess the strength of the business cases for such investments. My testimony will also provide an overview of certain policy issues that are raised by proposals to deploy smart meters for electric utility customers. In particular I will explain the privacy, cyber-security and consumer protections that must be considered before implementing such technology. I will conclude with a recommendation for further action by the Commission with respect to these projects and for review of any future smart grid investments.

II. REVIEW OF AVISTA'S SMART GRID PROPOSALS

A. Pullman Smart Grid Demonstration Project.

Q. What information did you review in your assessment of Avista's decisions to go forward with the Pullman Smart Grid Demonstration Project?

A: Public Counsel asked the Company for "feasibility studies and other analyses/support" as well as "any presentations to upper management or officers

addressing the cost of, the need for, or expected benefits" of each of the projects.[1] Below, I will discuss the information provided in response to this discovery, and my analysis of the Company's decision to proceed with the Pullman Smart Grid Demonstration Project (SGDP).

Q: On what analysis or analyses did Avista base its decision to go forward with the SGDP?

A: In response to discovery, Avista provided two documents related to the Company's analysis of the SGDP: (1) a memorandum labeled "Business Case: NW Smart Grid Demonstration Project— Pullman, WA" dated September 1, 2010 (Business Case) and, (2) a deck of slides titled "Smart Grid Updates—July 20, 2009."[2] Because DOE came to terms with the primary grantee, Battelle, on the master grant on September 30, 2010, allowing the demonstration project to go forward, the later of the two analyses, the Business Case document, better represents the best available information the Company had at the final stage of the analysis when the Company might have withdrawn from the project.

Q: What did the Business Case for the SGDP predict?

A: The Business Case estimated the internal rate of return for the Avista share of the project to be 5.20%, assuming no federal income tax liability for the DOE grant, and only 3.99% if the DOE grant were taxable to Avista.[3]

Q: Please explain the significance of an internal rate of return.

[1] Avista Responses to Public Counsel Data Request Nos. 98, 99, and 100.
[2] Avista Response to Public Counsel Data Request No. 99, Attachments A and B.
[3] These estimates are consistent with the financial spreadsheet supplied in Avista Response to Staff Data Request No. 394, Attachment B.

A: The internal rate of return (IRR) is the rate of profit that is obtained from the investment. Typically, a firm will not invest in a project with an IRR less than the profit rate it can earn on its utility investments generally. The utility's weighted average cost of capital (WACC) is the general benchmark against which a proposed project's IRR is measured. The utility shareholders can reasonably anticipate earning the WACC, and a project returning less than the WACC represents a suboptimal application of capital. If the IRR is less than the WACC, customers and shareholders are, all else equal, incurring opportunity costs if they continue with the investment. In this example, such a project must be justified by non-dollar benefits in order to be a sensible investment.

Q: What was Avista's weighted average cost of capital at the time it made its decision to invest in the SGDP?

A: In 2009, Avista's allowed weighted average cost of capital was 8.22 percent.[4] For the period December 22, 2009, through November 19, 2010, the allowed WACC was revised to 8.25 percent[5].

Q: How does the internal rate of return for the SGDP project compare to the Company's WACC at the time?

A: The internal rate of return projected by Avista for the SGDP was much lower than the Company's WACC at the time. The SGDP was estimated to have an IRR no higher than 5.9% (assuming no tax liability to the Company for the grant income, a factor not known at the time the grant was accepted). If Avista had to pay tax on the grant

[4] *Washington Utilities & Transportation Commission v. Avista Utilities,* Dockets UE-080416/UG-080416, Order 08, ¶ 92.
[5] *Washington Utilities & Transportation Commission v. Avista Utilities,* Dockets UE-090134/UG-090135, Order 10, ¶¶ 24-26.

income, the IRR would have been even lower, as the Company acknowledged in its business case. On the assessment of the monetary benefits alone, the SGDP did not look like a profitable investment for shareholders or ratepayers.

Q: Do you have any concerns about the assumptions made in Avista's SGDP business case?

A: Yes. Based on information that was available at the time the Company made its decision to invest in these projects, it is likely that the both the long-term avoided costs of power, and the potential energy savings from the smart meters, were overstated. In addition, the Company failed to include estimates of the incremental costs it would incur to educate customers and respond to their queries and complaints about the smart meters. As discussed in further detail below, more reliable assumptions on these points would have further weakened the business case for making the investment.

Q: You stated that the Company may have overstated the value of the energy and capacity costs that could be avoided by investments like the SGDP. On what do you base this statement?

A: In its Business Case for the SGDP, the Company valued the energy and capacity savings anticipated from the investments at $100 per MWh, levelized over 40 years.[6] Two years later, the Company is using an assumed avoided cost for energy and capacity that is roughly one-third of the level assumed in the Business Case; in its recent calculations, the Company is valuing avoided energy and capacity over the

[6] *See, e.g.* Avista Response to Public Counsel Data Request No. 99, Attachment A, p. 13.

near term at only $31.50 per MWh.[7] At the least, a much lower value for levelized avoided costs should have been considered a possibility in 2010, and run as a sensitivity. In late 2009, Avista issued a request for proposals for renewable energy, and analyzed the resulting proposals using cost estimates that were updated from the 2009 IRP to reflect changes in the market prices that had resulted from a lower economic forecast. This translated to a levelized twenty-year avoided cost of $84.63.[8] Despite the difference in study periods (20 yrs. vs. 40 year), the $85 value should have been explored as a possible avoided cost for the analysis of the SGDP (and for the Spokane project). Had Avista run its financial spreadsheets of the SGDP at the $85 level, the internal rate of return would have dropped under the 5% mark (even if no taxes were due on the grant income) by virtue of the change in that assumption alone. A sensitivity using the $85 estimate would further show that the project was likely not cost-effective from a strictly monetary point of view, even assuming a DOE grant of roughly half the costs.

Q: Are there other questions regarding the assumed benefits of the SGDP?

A: Yes. Avista assumes that the impact of smart metering and distribution smart grid upgrades on its customer service expenses will be positive. Avista does not acknowledge or reflect the additional costs it will incur in educating customers about the new technologies, and responding to questions they will have about them. While the dollar amounts here are not the main drivers of cost-effectiveness, a sound benefit/cost analysis would have reflected these offsetting additional costs.

[7] *See* , *e.g*. Avista Response to Staff Data Request No.30, Eighth Supplement, Attachment ER 2530, SGDP, O&M offset calculation.
[8] Avista Response to Public Counsel Data Request No. 317.

Q: Why would Avista have to incur additional costs to educate its customers regarding smart metering and be prepared to answer their questions?

A: Smart metering introduces information and concepts with which electricity customers are not familiar, and it potentially raises concerns that customers will need the utility to address.

Q: Please discuss the need for customer education when smart meters are installed.

A: Smart metering takes a monthly statement of usage, with perhaps a list of monthly usage figures from the recent past, and expands it to a statement of household usage every 5 minutes of every day of the month. Policy wonks may be right at home with 8,640 data points (12/hour*24 hours/day*30 days/month) and multicolored graphs of usage, but the average customer will have to get used to this new level of detail and new way of presenting information. To make use of the information in a way that will eventually put less burden on the electric system (or perhaps, the environment), customers will have to learn to distinguish the concepts of demand and energy, time of use, energy intensity, and emissions, and then apply that knowledge to their own usage patterns and opportunities. It takes experts years to understand the interplay of the various aspects of electric generation, delivery and usage. It will not take households any less time, and they will need educational materials and access to sources of guidance to embrace this learning.

Q: Have other utilities with smart metering installations made customer education a priority?

A: Yes. For example, the Maryland Public Service Commission is facilitating a working group of utilities, consumer advocates and commission staff to develop customer

education tailored to the various phases of smart metering implementation, and that will remain in place for the long-term to assist customers with ongoing smart metering issues. Baltimore Gas and Electric (BGE) estimated its budget for education at $1.42 million to $2.45 million for its first year of system-wide deployment, increasing to the range of $3.77 million to $5 million in the second year, and continuing at $1.8 million to $2.6 million in year three.[9] However, it is clear that customer education will not end after year three. As new customers come on to the system, and early lessons for some fade with time, BGE will have ongoing education expenses, but so far has not released budget estimates for these long-term costs.

Q: BGE is introducing dynamic pricing, and Avista is not. Does that account for the extent of customer education BGE and other utilities plan to provide?

A: The customer education to be provided by utilities like BGE will differ from that provided by companies like Avista that do not plan to offer time-varying pricing.[10] But precisely because Avista is not going to offer time-varying pricing it will need to ensure that its customers understand the dynamic value of electricity based on feedback and education alone. The Company will avoid one education problem (explaining why dynamic pricing could be a good thing), but still takes on a heavy burden of educating customers regarding the drivers of electricity costs.[11]

[9] BGE Smart Meter Customer Education and Communication Plan, June 1, 2011, pp. 3-4. The plan was approved by the Maryland Public Service Commission. *In the Matter of Baltimore Gas and Electric Company for Authorization to Deploy a Smart Grid Initiative and to Establish a Surcharge Mechanism for the Recovery of Cost*, Case No. 9208, Letter Order, July 18, 2011.

[10] Avista Response to Public Counsel Data Request No. 264 (The response states: "The Company does not have plans to implement dynamic pricing in its Washington service territory" and "has not implemented dynamic pricing in any of its service territories.")

[11] Of course, if the Company later decides to pursue system-wide smart meter installation, then the customer education task is commensurately greater.

Q: Please discuss the need for additional resources and training of staff to respond to customer inquiries and complaints.

A: Utilities have recognized the need to add resources and train staff to be able to respond to customer inquiries and complaints. One of the primary reasons that the 2009 smart metering roll-out of Pacific Gas & Electric (PG&E) drew such heated customer resistance in some communities was due to PG&E's failure to recognize the types of questions and concerns customers would have. In their consideration and adoption of smart meters, the utility and the California PUC were far ahead of the public. PG&E's failure to respond nimbly and with sufficient respect for the customers' concerns set off a cascade of misunderstandings that delayed the implementation and made it more costly.[12] It is reasonable to expect that the public will put increased pressure on Avista consumer representatives and energy management staff for a significant time during and after roll-out of smart meters. It would have been unreasonable to ignore the need for customer education and customer service about this radically different form of metering, while at the same time anticipating or reflecting savings in customer service made possible by smart meters.

Q: Please turn to the Avista assumptions regarding the effect of the advanced metering component of the SGDP on future energy use. What did Avista assume?

[12] Note that the public uproar in 2009 in California was not triggered by the institution of dynamic pricing, but rather circumstances surrounding the meter installation itself.

A: Avista estimated a 2% savings for the 1,500 participants in the Pullman advanced metering initiative who will be supplied with a smart thermostat, capable of being programmed to respond by decreasing usage on the home's HVAC system in response to signals provided over the advanced metering system.[13] The energy savings estimated for the project are derived only from this subset of customers. Avista did not estimate any energy savings from the interaction with the customer web portal, accessible by all 14,000 participants, because the percentage was anticipated to be very small.[14]

Q: How did Avista derive this level of estimated energy savings for this subset of customers?

A: Avista states that "there have been numerous studies...attempting to understand the change in customer behavior when provided with their energy usage information. The studies have produced results which vary widely from as little as 0% to 25%."[15] In support of these assumptions, Avista refers to an executive briefing provided by a senior executive of the Electric Power Research Institute (EPRI) on November 9, 2009.[16] In short, considering the range of possible results referenced in the various studies the Company considered, Avista chose 2% "purely as a reasonable engineering expectation."[17] It also pointed to a widely circulated summary of studies of residential customer response to feedback issued by EPRI in February 2009, *Residential Electricity Use Feedback: A Research Synthesis and Economic*

[13] Avista Response to Public Counsel Data Request No. 370.
[14] *Id.*
[15] *Id*.
[16] *Id.*, Attachment A.
[17] Avista Response to Public Counsel Data Request No. 371.

Framework.[18] In this meta-study, EPRI collated what was known to the electric industry and researchers from feedback studies to that time.

Q: The 2% assumption in the SGDP Business Case is lower than many of the results examined by the Electric Power Research Institute (EPRI) in its February 2009 report on feedback. Would it have been defensible for Avista to rely upon any an estimate as high as or higher than 2%?

A: No. Indeed, EPRI pointed out that existing studies were not sufficient to persuade decision makers of the benefits of feedback on energy usage.[19] Ironically, the fact that the range of results included claimed reductions up to 25% percent should not be taken as evidence that a 2% estimate would be a safe and reasonable estimate. EPRI concluded that the reverse is true. EPRI summarized its findings as follows in its executive summary:

> EPRI reviewed several past studies and found overall conservation effects that ranged from being negative (in one case, although on-peak reduction did occur) to 18%. *This wide range suggests that there is more to be understood about feedback before its impacts are widely accepted.* [20]

As EPRI highlighted, there was a need for additional evaluation and assessment around the reliability of estimated savings in numerous areas. Additional research

[18] *Residential Electricity Use Feedback: A Research Synthesis and Economic Framework*., February 2009, EPRI, Palo Alto, CA: 2009. 1016844.(Hereafter, "EPRI Report"). Available at http://my.epri.com/portal/server.pt?Abstract_id=000000000001016844.
[19] EPRI Report, p. ix.
[20] *Id.* (emphasis added).

areas requiring additional focus included,

> study participation levels...the relative value of different types of feedback, dynamic pricing interactions, and distinguishing the effects of feedback among different demographic groups.[21]

In addition, Avista concedes that very few of these studies "can validate the reduction as sustainable."[22] In fact, I would argue that none of these studies achieve that goal. This means that even if the estimated savings, which are difficult to determine, are correct, there is no evidence that the savings continue over the resource planning period.

Q: Will the Pullman smart meter project give Avista the information it needs to determine whether to expand smart metering, in-home technologies and web feedback to all of its Washington customers?

A: No. First, even a 2-year pilot[23] does not provide reliable information on the sustainability of customer responses to feedback. For an investment of this nature, the Company would need to have more years of data and analysis to derive reliable results. Second, Avista does not know the extent to which its customer base has the kinds of loads that might be responsive to such information. Avista has not performed an appliance survey for over 20 years,[24] and does not know the extent to which its Washington customers have central air conditioning, electric water heating,

[21] *Id.*
[22] Avista Response to Public Counsel Data Request No. 370.
[23] In Avista Response to Public Counsel Data Request No. 257, Avista states, in part: "The Company did not do an electric smart meter pilot. It installed roughly 13,000 electric meters as part of the Pullman Smart Grid Demonstration Project." My testimony uses the term "pilot" because I believe the Pullman "demonstration project," incorporates the characteristics of a pilot program.
[24] Avista Response to Public Counsel Data Request No. 373.

pool pumps, electric pool water heating, or electric space heat.[25] Lacking this information, the Company could not apply lessons learned from this or other more recent feedback studies.

Q: Turning to the fact that this project was partly funded by DOE grants, how did the Company reflect this fact in its SGDP business case.

A: The Company based its business case for the SGDP on the assumption that it would bear only half the costs of the investment.

Q: Did this provide an adequate basis for evaluating the merits of the SGDP?

A: No. In addition to considering the costs and benefits of the SGDP itself, the Company should have looked forward to its likely menu of choices available for consideration after the pilot. Assuming, counterfactually, that the project was cost-effective at the level of investment the Company had to make in the pilot project, the Company would still need to understand the likely cost-effectiveness of expanding the project system-wide.

Q: Why should the Company have considered the cost-effectiveness of the project assuming ratepayers would have to pay 100% of the costs?

A: A cost-benefit analysis based on the total cost of the project would have provided an important insight into the likelihood that the project could be replicated across the entire system in a cost-effective manner. If the program cannot be expanded cost-effectively with ratepayers shouldering 100% of the costs, and that outcome could have been reasonably anticipated at the time of the SGDP investments, the pilot is useless to ratepayers as anything more than an interesting research project.

[25] Avista Response to Public Counsel Data Request No. 374.

Q: Does Avista have a plan for evaluating the results of its SGDP?

A: At this time, Avista only has a plan to make a plan to evaluate the results of its SGDP. Avista has agreed to estimate the energy savings from its distribution upgrades under its conditions associated with the Energy Independence Act.[26] Avista has also agreed to allow third-party evaluations of the voltage optimization component, but has not yet settled on an evaluation method.[27] Finally, according to Mr. Kopcynski, the project will enter a demonstration phase that will not begin until January 2013 and will only end in January 2015.[28] The reports from the project in the final six months of 2014 will help with program assessment in key areas of the project.[29] Given this timetable, we will not know the results of the project for two to three years.

Q: Could there be intangible benefits of the SGDP for other parts of the Avista distribution network, beyond Washington State?

A: Yes. The lessons learned from the Pullman distribution network smart grid investments will be useful to Avista in deciding whether and if so, when, to move forward with smart metering throughout its service territory.

Q: Did the Company have a sufficient business case to proceed with the SGDP?

A: The Company's analysis of the financial costs and benefits of the SGDP produced weak results, and likely overstated the benefits of the investments. Based on the economic analysis alone, it would have been imprudent for the Company to make the SGDP investments, taken as a package. It is possible that the smart metering part of

[26] Avista Response to Public Counsel Data Request No. 262. *See also, In the Matter of Avista Corporation's 2012-2021 Ten-Year Achievable Conservation Potential and 2012-2013 Biennial Conservation Target Under RCW 19.285.040 and WAC 480-109-010,* Docket UE-111882, Order 01, ¶ 28, Condition (6)(g).
[27] Avista Response to Public Counsel Data Request No. 262, p. 2.
[28] Exhibit No. DFK-1T (Kopczynski Direct), p. 24:10-12.
[29] *Id.*

the project was not cost-effective, but the distribution energy savings technologies could be shown to be cost-effective, as they appear to have been in the Spokane SGIG. However, I have not attempted to make those calculations. Nor have I tried to determine if the intangible benefits—particularly those associated with the skills acquired and lessons learned—are significant enough improve the poor outcome of the cost/benefit analyses done at the time. Based on a comparison to the Spokane project, I would expect that the distribution-grid aspects of the SGDP (voltage optimization, etc.) would have a stronger cost-benefit profile if analyzed standing alone, without the smart metering component.

Q: What would be the impact on Avista's costs of removing the smart metering component from the revenue requirement for the SGDP?

A: The revenue requirement would be reduced by over half. The smart meter project costs represent 60% of the costs of the SGDP.[30]

Q: What is your recommendation regarding the prudence of this investment?

A: Because this is a pilot project, heavily subsidized with federal grant money, and designed to provide data and other information that may be useful in the future, to be conservative, I am not recommending a disallowance. However, I believe the results of this pilot project should be looked at very closely in order to inform future smart grid investments, in particular smart metering expansion. The questions raised by the sub-par business case for the SGDP, together with other policy issues I discuss below, raise the bar for the circumstances under which continuation or expansion of the

[30] Avista Response to Public Counsel Data Request No. 321, p. 2.

project (particularly the smart metering component) would be reasonable and cost-effective.

Q: Should Washington State customers of Avista shoulder 100% of the responsibility for the SGDP?

A: No. If and to the extent the SGDP is accepted as having been prudent, the Commission should, at a minimum, consider that the project is designed to provide "system" rather than Washington-only jurisdictional benefits. Accordingly, both "costs" and "partially offsetting" benefits should be shared between Washington and Idaho. Therefore, only a portion of the costs should be allocated to Washington, as calculated by Mr. Dittmer in his revenue requirement testimony in this proceeding.[31]

B. Spokane Smart Grid Investment Grant.

Q: What analysis or analyses did Avista base its decision to go forward with the Smart Grid Investment Grant (SGIG)?

A: Avista provided two documents in response to discovery that included the Company's analysis of the SGIG, (1) a memo to the Avista Rates Department, dated January 15, 2009, with the subject "Spokane Smart Circuit Project Justification" and (2) a deck of slides entitled "Smart Grid Updates: June 20, 2009." [32]

Q: What information was included in the SGIG Project Justification memorandum?

[31] *See,* Direct Testimony of Jim Dittmer, Exhibit No. JRD-1T, pp. 36-38.
[32] Avista Response to Public Counsel Data Request No. 98.

A: The memorandum provided was labeled as a "DRAFT" and there is no indication that it was made final or revised at a later date.[33] The draft identifies and quantifies estimated costs for the SGIG project, and estimates benefits, and concluded with the following:

> Using the Electric Revenue Requirements spreadsheet provided by the finance department and assuming the grant will not be taxed, the projected IRR for the project is 13.24%; present value of the savings is $55.48 million. The calculated resource cost for this project is $56.78/MWh.
> The assumptions on the [finance department] sheet were:
> a) Average loss reduction; 42,000MWh
> b) O&M offsets: $0
> c) Avoided cost of energy: $100/MWh
> d) Construction Cost: $22M Avista Customer Cost, $20M DOE Grant.[34]

The SGIG Project Justification memorandum also claimed that there would be Operations and Maintenance (O&M) savings, but did not include them in its cost-benefit estimate.

Q: Why did Avista not include its estimates of the O&M value of the SGIG project in its cost-benefit analysis?

A: The cost justification memorandum for the Spokane SGIG project states, that the O&M values "were not included in this business case because they are very conservative, would be hard to validate over the life of the assets and the benefits may just be an offset for a resource."[35] In other words, the benefits were too uncertain to include, and might not have been net benefits at all, once associated resource cost increases were considered.

[33] *Id.*, Attachment A, p. 2.
[34] Avista Response to Public Counsel Data Request No. 98, Attachment A, p. 6.
[35] *Id.*, Attachment A, p. 5.

Q: Does the SGIG Project Justification memorandum provide an adequate justification for the SGIG project?

A: The SGIG Project Justification memorandum appears to support the Company's decision to invest in the Spokane SGIG project.

Q: Please describe the information related to the SGIG included in the "Smart Grid Updates: June 20, 2009."

A: This document, which is the same slide deck that was provided in additional support of the SGDP, summarizes the costs and benefits of the SGIG project.[36] Like the SGDP, the SGIG relied upon an assumed avoided cost of $100/MWh.[37] Avista estimated the benefits of SGIG at, $44.31 million and the costs (including the DOE grant portion) at $41.53 million.[38] To the extent these estimates are accepted as reasonably reliable, this would have produced an expected benefit/cost ratio of 1.07.

Further, in response to Staff Data Request No. 394, Avista provided a spreadsheet estimating the financial costs and benefits of the SGIG to its Washington customers. The internal rate of return for the Avista Washington consumer of the SGIG itself was calculated as 13.94%. As noted above, the IRR for an investment should be at least as high as the utility's opportunity cost, or weighted average cost of capital. This would have been be a good return for customers, all else equal, and supports the Company's claim that the SGIG investment, after the DOE grant, was cost-effective.

[36] Avista Response to Public Counsel Data Request No. 98, Attachment B.
[37] *Id.*, Attachment B, p. 7.
[38] *Id.*

Q: Does this mean that expanding the type of distribution investments made in Spokane to the rest of Avista's Washington service area would be prudent?

A: No. While it may be reasonable for Avista to consider system-wide application after the R&D project has been fully assessed and evaluated, and the results may in fact prove that the expanded investment would likely be cost-effective, it is clear that the calculus is quite different if DOE stimulus money is not available to offset the incremental costs at the time of implementation system-wide. Without the DOE grant, the cost for the same level of investment elsewhere in the Avista Washington distribution network would be roughly double the cost of the SGIG. So, for example, to provide a crude measure of the impact of the federal grant on the SGIG cost-benefit analysis, if one simply replaces the assumption of Avista costs of $22 million with the full cost of the SGIG investments, $42 million, the internal rate of return drops from 13 percent in the pilot to below 7 percent, which is lower than the Company's authorized WACC.

Q: Are there other reasons to question the prudence of replicating the SGIG investments system-wide, at least based on present knowledge?

A: Yes. As noted above in the discussion of the SGDP, the Company now values avoided energy and capacity at roughly one-third the level included in its justification for the project. Even if the Spokane investments in smart grid infrastructure appear cost-effective based on the earlier estimates of value, the decision to expand the investments should be based on the most recent available information as to costs and benefits.

Q: What do you conclude regarding the prudence of the Spokane SGIG investment?

A: Investing in the distribution-grid-facing technologies of the Spokane SGIG appear to have been a cost-effective choice, even if the Company later decides not to expand these technologies further. However, the Company should not rely on the estimated net benefits of the Spokane project as a justification for expanding these types of distribution investments system-wide. When determining when and whether to perform such work without grant support, the Company will have to weigh the entire cost of the project against its anticipated benefits.[39]

II. POLICY CONSIDERATIONS

Q: Are there policy considerations that the utility should address before deciding whether to recommend expansion of its smart grid investments, even if later evaluation shows them to have saved more money than they cost?

A: Yes. There are significant non-dollar effects from these investments. In the case of smart metering especially, there are numerous issues that have arisen in other states that have proceeded to smart metering, and these have not yet been fully addressed in any state.

Q: What are some important non-dollar negative effects the Company should have anticipated from the investments?

A: The primary non-dollar effects that a utility should reflect in its business cases for expanded smart grid investments include the impacts on customer privacy, on

[39] In addition to my recommendation, Mr. Dittmer has an accounting adjustment associated with the SGIG project. This adjustment incorporates known cost savings "offset" amounts to the Spokane Smart Circuit Project identified by Avista within its revised response to Public Counsel Data Request No. 241. *See,* Direct Testimony of Jim Dittmer, Exhibit No. JRD-1T, pp.38-39.

frequency of disconnection as a bill collection tool, and on cyber-security. If Avista were going to use the smart meters to support dynamic pricing, it would also have to consider the ability of customers to respond to time-varying price signals without compromising their health and safety. These issues would have to be raised before considering the further deployment of smart grid functions by Avista or any other Washington utility.

A. Privacy.

Q: Please briefly identify the privacy issues raised by smart metering.

A: Smart meters record usage at intervals as short as every 5 minutes, or 12 readings an hour, 24 hours each day, for the entire month. Today, customers get readings that cover intervals no more granular than one per month. Thus, switching to smart meters produces between 8,000 and 9,000 more data points each month. With this additional information, just from examining a customer's load patterns, it is possible to infer a great deal of detail about the usage of a household, such as whether family members are home, and what major appliances are in use. Thus, it is important that this personally-identifying information is kept safe, and not distributed without their express agreement in advance, pursuant to a strong privacy policy.

Q: Does Avista have a privacy policy?

A: Yes. In response to Public Counsel Data Request No. 362, Avista provided a copy of its privacy policy.

Q: What is your opinion of the Avista privacy policy?

A: At a very high level of abstraction, the Avista privacy policy captures the major concerns of customers regarding access to their private information. For example,

Avista requires that the consumer give express written consent to any non-government request for the release of customer information.[40] The insistence that the permission of the customer be in writing is a strong protection against inadvertent release of private information. Avista also includes customer usage data within the definition of personally-identifying information (PII).[41] This inclusion goes further than some utilities, who have not caught up with the importance of usage information in identifying customer characteristics, and who limit their definitions of PII to financial and address data, like account numbers, social security numbers, addresses and phone numbers, and the like. These two aspects of Avista's privacy policy deserve note.

Q: Do you have any concerns regarding Avista's privacy policy?

A: Yes. As privacy concerns move more into prominence in a utility's business, it will be helpful to flesh out the high-level description of Avista's privacy policy with more detail on some of the difficult or complicated situations affecting customer privacy. For example, it will be necessary to decide to what extent data, once given to a third party with authorization from customers, can be further transferred and used.

Q: Is the field of smart metering privacy mature? Are there industry best practices that Avista can follow?

A: Guidance on smart grid privacy policies is emerging. For example, the California Public Utilities Commission recently issued its final decision in its smart grid privacy

[40] Avista Response to Public Counsel Data Request No. 363.
[41] *Id.*

rulemaking.[42] But even such exhaustive treatments of the issue, such as that conducted by the CPUC, have not yet addressed a number of issues. Chief among these unaddressed issues is how to safeguard information that has been properly transmitted to a third party (such as a conservation services vendor authorized by the customer) without being further distributed, intentionally or unintentionally, to entities over whom the Commission and the utility have no effective control.

B. Remote Disconnection.

Q: Please briefly describe the disconnection issue.

A: Smart meters can be fitted with a module that allows the utility to connect or disconnect a customer remotely, with no premise visit. Avista notes this feature as a benefit in its business case for the SGDP where it states that remote connection and disconnection will "reduce Customer Service expense in outside collections, inactive use, call reduction, and write offs."[43]

Q: Does Avista state whether it intends to use remote disconnection in the case of bill non-payment?

A: Avista suggests that it will use remote disconnection in the case of non-payment, when it references "outside collections" and "write-offs" in its list of functions that will benefit from the technology.

Q: Is remote disconnection an unqualified benefit to Avista?

[42] *Order Instituting Rulemaking to Consider Smart Grid Technologies Pursuant to Federal Legislation And On The Commission's Own Motion To Actively Guide Policy in California's Development of A Smart Grid System,* Rulemaking 08-12-009, Decision 12-08-045 (August 23, 2012).
[43] Avista Response to Public Counsel Data Request No. 99, Attachment A, p. 8.

A: No. Disconnecting a customer remotely deprives the utility of a valuable opportunity to understand the circumstances of the particular customer, or even to arrange a repayment schedule during the premises visit. In addition, by rendering the incremental cost to the utility virtually zero, the ability to disconnect a customer remotely lowers the practical barriers to the use of disconnection as a tool for bill collection. Indeed, the business case of one utility in the Southwest claimed greater disconnections and lower bad debt as a benefit of its proposed smart metering initiative,[44] and disconnections by a major California utility increased significantly after smart meters were installed.[45] However, there is reason to believe that disconnection is, at best, a crude tool for bill collection, and should not be used except as a last resort in situations where the customer has sufficient funds to pay the entire bill but will not pay absent a credible threat of disconnection.

Q: What do you conclude about the use of smart meters to conduct involuntary disconnections without a premise visit?

A: I conclude that permitting remote disconnection in the case of non-payment disconnections will create adversarial relations with customers. Making disconnection simple and cheap will also reduce the utility's incentive to use more creative and effective means of increasing bill payments. The power to disconnect

[44] See, *Application of Nevada Power Company d/b/a NV Energy Seeking Acceptance of its Triennial Integrated Resource Plan Covering The Period 2010-2029, Including Authority To Proceed With The Permitting And Construction Of The ON Line Transmission Project*, Nevada Public Utilities Commission Docket No. 10-02009, Vol. 16 (DSM), DSM 29 (Operational Benefit Categories, Advanced Service Delivery).
[45] See, *Status of Energy Services Disconnections in California*, at 7, 15 (California Public Utilities Commission, Division of Ratepayer Advocates, November 2009). See also, *Decision On Phase II Issues: Adoption Of Practices To Reduce The Number Of Gas And Electric Service Disconnections*, CPUC Rulemaking Docket No. 10-02-005 (March 2012). http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/162973.htm#P67_1588.

customers remotely will tend to dilute the carefully-developed consumer protections in the area of disconnection and debt collection.

C. Cyber-Security.

Q: What is meant by a "cyber-security incident" or "cyber incident"?

A: The National Institute of Standards and Technology (NIST) defines a Cyber Incident as: "An occurrence that actually or potentially jeopardizes the confidentiality, integrity, or availability. . . of an information system *or the information the system processes,* stores, or transmits or that constitutes a violation or imminent threat of violation of security policies, security procedures, or acceptable use policies. *Incidents may be intentional or unintentional*." [46]

Q: Why do you say that these smart grid investments in the distribution network will increase the risk of cyber-security incidents?

A: Smart grid technology bumps up utility cyber risks significantly, by interconnecting previously stand-alone components of the grid, collecting unprecedented amounts of information, linking new and legacy systems that may not be compatible, and linking parts of the grid to accessible communications networks such as Wi-Fi and the Internet. The Cyber-Security Working Group (CSWG) of the Smart Grid Interoperability Panel (SGIP), set up under the Energy Independence and Security Act of 2007 (EISA) *(Public Law No: 110-140, Sec. 1305,)* identifies some of the increased risks posed by smart grid interconnectivity as follows:

[46] National Institute of Standards and Technology Federal Information Processing Standards Publication 200, *Minimum Security Requirements for Federal Information and Information Systems*, March 2006 (emphasis added). http://csrc.nist.gov/publications/fips/fips200/FIPS-200-final-march.pdf.

- Greater complexity increases exposure to potential attackers and unintentional errors;
- Networks that link more frequently to other networks introduce common vulnerabilities that may now span multiple Smart Grid domains...and increase the potential for cascading failures;
- More interconnections present increased opportunities for "denial of service" attacks, introduction of malicious code (in software/firmware) or compromised hardware, and related types of attacks and intrusions;
- As the number of network nodes increases, the number of entry points and paths that potential adversaries might exploit also increases; and
- Extensive data gathering and two-way information flows may broaden the potential for compromises of data confidentiality and breaches of customer privacy, and compromises of personal data and intrusions of customer privacy.[47]

Q: The National Institute of Technology and Standards (NIST) and the Smart Grid Interoperability Panel (SGIP) are producing guidelines for cyber-security, and other federal government and industry groups are working on this issue. Why should the Commission review the cyber-security approach of electric utilities in the state?

A: The Commission has responsibility to supervise utilities to ensure that the public receives safe and adequate service. For a variety of reasons, state commissions

[47] National Institute for Standards and Technology,, *Guidelines for Smart Grid Cyber Security,* page 7. NISTIR 7628. Available at http://csrc.nist.gov/publications/PubsNISTIRs.html#NIST-IR-7628.

cannot rely solely on the NIST, SGIP or other government or private initiatives to assure that the introduction of additional cyber risks into the distribution grid are prudently managed by utilities. For example, the interoperability standards being developed under the NIST-SGIP process do not protect an entire system. They are being designed and written to cover piece-parts of the smart grid—a meter, the information flowing out of a substation, the plug for an electric vehicle, pricing for demand response, and so forth. Some were drafted and adopted before there was a formal SGIP focus on the cyber security chain, as well as the performance chain, across the smart grid. So far, neither the federal government nor industry has promulgated standards that utilities must follow and that will be sufficient to protect utilities from cyber-incidents. A fully implemented smart grid will need literally hundreds of guidelines for interoperability, most of which are not yet drafted, and which will have to be reviewed for cyber-security implications. The introduction of additional computer intelligence into the distribution system is a new enough development that it should be considered immature from the perspective of cyber-security. And, of course, it is recognized among cyber-security experts that there is no formula for preventing 100% of cyber incidents, whether intentional or unintentional. The systems are too complex to be readily managed for safe coordination between legacy and smart grid systems. As for malicious attacks, again the systems and human behaviors are too complex and unforeseeable to prevent all "zero day attacks" (attacks that use methods not yet recognized by cyber security experts).

Q: Is it your testimony that Avista did not consider cyber-security in its planning for the smart grid projects?

A: No. I am saying that the business cases provided by Avista as the justifications for the investments did not mention cyber-security. This omission suggests a lack of strategic importance to Avista. Avista did include a section on cyber-security in its Smart Grid Technology Report to the Commission pursuant to WAC 480-100-505.[48] It is not clear why this issue was but not mentioned in any of the business case analyses Avista says it used to determine the prudence of moving forward with the smart grid projects. This omission is the more curious given that, in response to discovery, Avista stated that cyber security is a strategic initiative for the Company, and "is frequently a topic of discussion between Executive Management and the Board of Directors."[49]

Q: Do you have any concerns about the approach Avista has taken to cyber-security?

A: Yes. However, at the outset that Avista does display awareness of cyber-security and attention to cyber-security problems. Unlike too many utilities today, Avista does not treat cyber-security as a mere afterthought, or a damage control exercise. Having said that, the Company has chosen to organize its cyber-security efforts in a way that could diminish the effectiveness of its efforts, by subordinating the issues to the Manager level, under an Information Technology silo.

[48] Avista Response to Public Counsel Data Request No. 171, Attachment A, p. 13.
[49] Avista Response to Public Counsel Data Request No. 360.

IV. SUMMARY OF CONCLUSIONS

Q: Please summarize your conclusions with respect to the Pullman Smart Grid Demonstration Project.

A: With regard to the SGDP, there are a number of important points that cast doubt on the prudence of Avista's decision to pursue the project, and in particular the smart meter component. These include the following:

- The business case is weak, with a very low IRR.
- The business case/cost-benefit analysis, already weak, is weakened further if the grant benefit is removed.
- If the project has benefits, they would be system-wide, not just for WA.
- The avoided cost assumptions were questionable.
- Assumed energy savings of 2% (and for only 1,500 of the 14,000 participants) are very low, the jury is out on the value or sustainability of feedback provided by the meters, and the short term of the pilot is not adequate to determine sustainability of savings.
- The customer education aspect of the pilot, key to achieving savings, is not sufficiently developed or explained.
- Evaluations of results will not be performed or available for several years.
- There are unanswered questions regarding privacy, cyber-security, and preservation of customer protections re credit and disconnection.

From the perspective of these considerations, the decision to proceed with the SGDP was borderline at best. Given that this is a pilot proposal, partially grant-

funded, and that it may provide some information relevant to future smart meter decisions, I do not recommend full disallowance of SGDP costs. I have two specific recommendations, however: (1) because the SGDP is designed to have system-wide benefits, a portion of the costs allocable to Idaho should be disallowed (reflected in the testimony of Public Counsel Witness Mr. Jim Dittmer); and (2) importantly, the Commission should expressly find that this project does not establish the prudence of any future deployment of smart meters in Avista's service territory, or prudence of a continuation of the Pullman smart meter project.

Q: Please summarize your conclusions with respect to the Spokane Smart Grid Investment Grant program.

A. The Spokane SGIG project appears to be supported by a reasonable business case, within its existing parameters, although the case is weaker once the value of the grant is removed and if current avoided cost numbers are considered. In general, the purposes of these types of "grid modernization" investments can be beneficial for consumers by improving efficiency and reliability of the utility's delivery infrastructure, although they do add new cyber-security concerns that the industry and regulators will be trying to address for many years. While the Commission can make a prudence finding for this project, I recommend that the Commission expressly limit its ruling to this project and state that approval of this project does not constitute pre-approval or a prudence finding as to any future smart grid deployment of the same or similar nature system-wide. The cost-effectiveness of future project is significantly

affected by availability of grant funding, and by current avoided costs.

Q: Does this conclude your testimony?

A: Yes.