

Expressions, Musings and Ventures (EM&V) in the Real World

*Lori Hermanson, David Thompson and Bruce Folsom, Avista Corporation
Chris Ann Dickerson, CAD Consulting
Steven Schiller, Schiller Consulting,¹*

ABSTRACT

In 2010, Avista was asked by its regulators to develop evaluation, measurement and verification (EM&V) protocols. It convened a collaborative stakeholder group to assist in this process. The product of the working group is Avista's EM&V Framework.

The stakeholder group found it useful to consider EM&V protocols in the context of particular questions. The questions addressed in the Framework included:

- What are the evaluation objectives and metrics?
- What cost effectiveness tests will be used?
- What are the evaluation principles that drive the effort?
- What are the baselines against which savings are determined?
- Performance determined on basis of net or gross savings?
- What is included in net savings?
- What is the reporting "boundary" - are transmission and distribution considerations included and how 'granular' will the results be?
- How are savings estimates applied – retrospectively or prospectively?
- What impact evaluation approaches will be used and how will they be selected? What are the schedules for implementing EM&V and reporting?
- What are the data management strategies?
- What are expectations for savings determination certainty (confidence and precision)?
- How much money will be spent on evaluation?
- What is balance between or level of impact, market and process evaluations?
- Who will conduct the evaluations, how is independent evaluation defined, what are the roles between implementers, evaluators, and regulatory staff?

Avista completed its EM&V Framework document and has launched its revised EM&V approach. This paper describes the implementation of the EM&V Framework including lessons learned during the first EM&V cycle.

¹ The authors would like to acknowledge Tom Leinhard of Avista Corporation, Spokane WA, who provided helpful suggestions which were incorporated into the paper. Tom also played an instrumental role, along with the authors, in developing Avista's EM&V Framework.

Background on Avista Utilities

Avista is an investor-owned utility that serves approximately 357,000 electric customers and 316,000 natural gas customers in Washington, Idaho and Oregon. Avista has offered energy efficiency programs to residential and business customers since 1995.

Avista serves customers with broad and deep energy efficiency services and aspires to best practices in all aspects of program offerings, customer outreach, and evaluation. Avista provides a financial incentive to most kWh and/or therm saving measures that have a simple payback of over one year for commercial and industrial customers. Similar offerings, through standard offer programs, are available to residential customers. Approximately 70% of the demand-side management (DSM) budget is provided directly to customers through cash rebates and incentives. An additional portion of the budget provides technical assistance to customers in the form of engineering analyses. Customers use the rebates and incentives to purchase energy efficiency equipment and weatherization, often provided through an extensive network of trade allies. Over 300 measures and 35 energy efficiency programs are offered to Avista customers. Every Avista qualifying measure and program must have an objective analysis to describe how the kWh and therm savings are expected to be cost-effective, how they will be achieved, and how the expectations will be substantiated after installation.

Evolving Regulatory Environment Necessitates Improved EM&V

In 2010 several regulatory trends converged, resulting in requests from Avista's regulators for the utility to develop EM&V Protocols.

From the beginning, Avista had conducted most of its EM&V in-house, using the engineering staff. On occasion outside consultants were retained, but most of the work was done internally by Avista.

While this approach to EM&V had been acceptable previously, the methods were not fully documented. As a result, regulators found it difficult to evaluate the quality of program accomplishments reported by Avista.

The need for well-documented EM&V became more important due to 1) a Memorandum of Understanding with the Idaho Public Utilities Commission staff on reporting EM&V results, and due to the need for better, more transparent reporting for Washington's natural gas decoupling proceeding². However, Washington's *Energy Independence Act* was ultimately the driver for the regulators' request that Avista should develop and then implement EM&V Protocols. The *Energy Independence Act*, commonly referred to as *I-937*, requires that "each qualifying utility shall pursue all available conservation that is cost-effective, reliable, and feasible." It also requires penalties for not meeting biennial goals -- \$50 per megawatt hour of shortfall.

With such stiff penalties at stake, reliable, transparent EM&V became crucial for both regulators and Avista. In order to determine how well the Avista is meeting the *I-937* goals, and fulfilling its reporting requirements under the gas decoupling proceeding, regulators need to rely

² WUTC Docket UG060518, 2006-current. This docket began with a three-year decoupling pilot, following which the WUTC approved the decoupling structure, including reporting requirements.

upon EM&V data. They must be able to interpret and rely upon the results and understand the methods used to produce the information.

The Washington Utilities and Transportation Commission (WUTC) asked Avista to use its existing stakeholder group to facilitate development of EM&V protocols to improve reporting for natural gas decoupling, and for I-937. The stakeholder group includes Commission staff from Washington and Idaho, Public Counsel staff from Washington, representatives from large customer industry groups, representatives from low-income groups that implement Avista's programs targeted at low-income customers, representatives from the Regional Technical Forum the Pacific Northwest Power and Conservation Planning Council, a few academics and other interested parties.

In 2010, this group held a series of meetings aimed at developing EM&V protocols. The overarching goal of the meetings was to develop EM&V protocols for Avista. By mid-year, with the clock ticking for a fall deadline, the group had achieved something of an impasse. They were unsure what information should be included in EM&V protocols. Avista had developed some detailed documents to describe its existing EM&V methods, but these documents were lengthy and technical. They did not seem to be providing the information the regulators thought would be necessary to verify *I-937* compliance.

Solution: Three Levels of EM&V

The group decided that a useful approach would be to divide the EM&V protocols into three layers of documents. These are described below.

EM&V framework. A framework is a primary document that lays out EM&V principles, metrics, allowable approaches, net versus gross savings issues, reporting requirements, schedules, and the roles and responsibilities of various entities. An EM&V framework document tends to be “fixed” but can be updated periodically and often sets the expectations for the content and scope of other EM&V documents (e.g., annual portfolio and statewide evaluation reports produced by state agencies, utilities and/or independent evaluators charged with producing EM&V results). This is perhaps the principal document that all stakeholders can focus on and provide high level input – the ‘forest versus the trees’ of EM&V.

Annual portfolio EM&V plan. An annual plan that indicates the major evaluation activities that will be conducted during the evaluation cycle (typically one, two or three years), including budget and allocation between programs/measures/market sectors, as applicable.

Evaluation activity-specific detailed research plans. Research plans are created for the major EM&V activities or studies planned in a given cycle prior to the time each effort is launched.

In a recent paper Schiller and Goldman argue that national EM&V protocols would be helpful, and recommend the multi-level approach Avista used for its Framework (Schiller & Goldman 2011).

Avista's Evaluation, Measurement & Verification Framework

The Framework addresses DSM activities funded by Washington and Idaho Schedules 91 and 191 and/or the current cost-recovery mechanisms approved by the Washington Utilities and Transportation Commission and/or the Idaho Public Utilities Commission. Evaluations are performed by independent, external evaluators and Avista's internal evaluation team to determine energy and demand savings resulting from Avista's DSM portfolio. The EM&V Framework is intended to outline a comprehensive EM&V process that results in transparent and accessible documentation (reporting) of Avista's energy efficiency program activities. Thus, the Framework provides an overarching approach to EM&V; principles, objectives, metrics, methods and reporting activities. The Framework and related documents are structured in a modular fashion in order to allow flexibility for evolving EM&V needs and requirements over time, and to allow stakeholder review of overarching EM&V processes, annual EM&V plans, and specific EM&V activities at appropriate junctures. The Framework is very much a "living document" that may require modifications over time.

Questions addressed in the Framework include:

- What are the evaluation objectives and metrics?
- What cost effectiveness tests will be used?
- What are the evaluation principles that drive the effort?
- What are the baselines against which savings are determined?
- Performance determined on basis of net or gross savings?
- What is included in net savings?
- What is the reporting "boundary" - are T&D considerations included, how 'granular' will the results be?
- How are savings estimates applied – looking back/going forward?
- What impact evaluation approaches will be used and how will they be selected? What are the schedules for implementing EM&V and reporting?
- What are the data management strategies?
- What are expectations for savings determination certainty (confidence and precision)?
- How much money will be spent on evaluation?
- What is balance between or level of impact, market and process evaluations?
- Who will conduct the evaluations, how is independent evaluation defined, what are the roles between implementers, evaluators, and regulatory staff?

Other EM&V Documents

Annual EM&V plans are filed each fall with Avista's business plan. Research plans are developed for each major study conducted as part of annual EM&V. Finally, site-specific study plans are developed on an as needed basis, usually for large, custom sites.

As part of its new EM&V paradigm, Avista was required to develop a Technical Reference Manual (TRM). The TRM contains documentation and assumptions for all of the unit

energy savings estimates for the measures that comprise the Avista DSM programs and that are used in the planning of its savings claims.

Musings on the Process

Stakeholder process. Avista's energy efficiency programs have benefited by input from customer groups, external experts, and thought leaders. No utility has a longer-running, continuous stakeholder involvement effort than Avista's, which began in 1992. The stakeholder process can be somewhat challenging in that there are parties from many different organizations with varying goals which may not mesh at all times. During development of the EM&V Protocols, stakeholders benefitted from training on basic EM&V concepts in order to communicate more effectively during development of the EM&V protocols. Another issue that emerged for the group is the importance members placed on ensuring that their comments on documents were physically included in versions of the master document that the group was reviewing. This enabled members to see that the changes they requested were being incorporated. Overall, the development of the EM&V Protocols served to raise the quality of contributions from the stakeholder group, since the group had to work together to understand more about EM&V before moving forward..

Framework implementation. Avista developed a TRM, as required by the Framework. The savings values in the TRM have been reviewed by an external EM&V consultant and external evaluators to evaluate, verify and document the savings values from its energy efficiency programs together with the processes used to acquire those savings. The Framework guides the development of annual EM&V plans and the research plans for specific evaluation activities. Finally, it provides a mechanism for the Commissions and interested parties to understand and comment on Avista's overall evaluation approach and reported program accomplishments.

EM&V schedules. Each year, Avista develops an annual EM&V plan that contains evaluation schedules and budgets for the upcoming year. Originally, a three-year calendar was envisioned, in which several programs, approximately one third of the portfolio, would be evaluated every year. This plan would have resulted in the entire portfolio being evaluated by the end of the third year. However, during the development of Avista's first annual EM&V plan, review of the proposed schedule suggested that it would be productive to pursue a portfolio evaluation covering all programs in varying degrees. The level of analysis is based on size of acquisition from each program and level of risk in EM&V estimates. Using this approach, all programs are evaluated annually. In addition, certain activities are evaluated at a deeper level based on finding from previous evaluation periods. The Advisory Group and the Technical Committee are given opportunities to comment on the scope of each annual plan and are updated on findings throughout the evaluation process.

Requests for proposals (RFPs). RFPs are prepared if necessary for each major EM&V activity. The RFPs are presented to the Advisory Group for review. Beginning with the implementation of Avista's first annual EM&V plan, Avista decided to prepare a "mega-RFP" including all EM&V activities within one overarching project as opposed to an RFP for each major activity.

This provided an opportunity to attract more bidders. It also encouraged the teaming of bidders and enabled some of the daily project management to be shifted to the evaluation team.

This approach worked very well for Avista. Avista received a great deal of interest in its RFP and five bidders submitted proposals. The selected contractor was able to provide a high degree of engineering oversight, measurement and verification of programs, process oversight on program design and delivery as well as interaction with the Company and its Advisory Group and Technical Committee. Furthermore, Avista will follow this approach in the future.

Experiences with the Technical Reference Manual (TRM). The development of a comprehensive TRM was a primary requirement supporting the structure provided by the EM&V Framework. The TRM catalogs unit energy savings (UES) values and the associated assumptions or sources for each valuation. The UES values benefit from annual impact evaluations yielding the best science applicable to the Avista's measures, delivery methodology and service territory – this information is compiled in the TRM. As part of the TRM development, UES values are compared with similar values from programs across the country.

A benefit of having pre-approved UES information in the TRM is that regulators and Avista were able to have *ex ante* savings estimates be reviewed and by an independent evaluator since these values would serve as the basis for acquisition planning, including cost effectiveness evaluations. A requirement for a realization rate between existing UES information and the verified values supplied by the independent evaluator was included in the TRM evaluation as a method to simulate a first-year impact analysis. This process served to limit the uncertainty between the programs' planning targets and actual resource acquisition.

The TRM was initially envisioned as an opportunity to offer a linkage between a biennium's planning and reporting phases, where the UES values for identified measures would be "locked" over that time period. Subsequently, the emphasis was placed on continued impact analysis to inform the acquisition and cost effectiveness calculations. As a result, the TRM UES values are primarily used to make program planning decisions. The ability to compare Avista's program performance at the measure, program or portfolio level with similar programs has proven to be an unexpected benefit, and has enabled Avista to engage in more sophisticated portfolio optimization than had been possible prior to development of the TRM.

The Northwest Power and Conservation Council serves the northwest as a regional coordination body for energy efficiency. As part of its regional power planning process, the Regional Technical Forum (RTF) serves the Council as an advisory committee with a charter to develop standards for the verification and evaluation of energy efficiency and conservation savings. As a result of this group's effort, the northwest has a significant compendium of evaluation and verification work product that provides a relevant reference for measure UES values. Avista seeks to leverage the RTF's work, along with other pertinent verification work, in the ongoing process of maintain the TRM as the best science applicable for its DSM activities.

At present, Avista's TRM continues to be refined based on the evaluation effort being performed to evaluate the programs that operated during the 2010-2011 biennium. The TRM will be updated on an annual basis in to reflect the most recent impact evaluation results from Avista's own EM&V; other information, such as savings or hours of operation estimates. The first update will be completed beginning in July 2012. Since the second round of impact evaluation is due in June, 2012, this TRM update will be the first point in the cycle where all of

the savings estimates are based on fresh, Avista-specific impact evaluations – supplemented by current RTF and other values where appropriate.

Conclusions

Avista has been pleased with the new, improved EM&V structure. Better, more consistent and transparent EM&V has enabled Avista to improve both planning and reporting.

This has enhanced Avista's already excellent relationship with customer groups, because the improved EM&V has enabled Avista to design programs and portfolios that most effectively meet customer needs.

Having more complete and more transparent EM&V has improved Avista's relationship with regulators by providing regulators with information that meets needs by answering questions agreed upon in the Framework. Since the EM&V is conducted according to rules established in the Framework, the process used to generate savings estimates is more transparent and enables regulators to feel that they can interpret the savings estimates and additional EM&V information that is presented to them.

Finally, the enhanced EM&V information has allowed Avista to compare its performance with similar programs across the country – using estimates at the measure, program and portfolio level. Avista is able to use its EM&V information, including the comparative information, optimize programs even more effectively and in “real time” using the most recent year's results.

Development and implementation of the EM&V Framework has been a positive experience for Avista. Avista encourages other utilities and implementers that may be subject to enhanced reporting requirements to use the Framework approach, as it has suited Avista's needs.

References

Schiller, S., & C. Goldman, 2011. “Developing State and National Evaluation Infrastructures- Guidance for the Challenges and Opportunities of EM&V.” In *Proceedings of International Evaluation Program Evaluation Summer Study*, Belambra Presquille de Giens, France.