ATTACHMENT A

DOCKET NO. UE-100176

Gervais, Linda

From: Reynolds, Deborah (UTC) [DReynold@utc.wa.gov]
Sent: Tuesday, September 01, 2009 2:26 PM
To: Nightingale, David (UTC); Eckman, Tom; Allen, Cathie; Gervais, Linda; tom.deboer@pse.com; Hirsh, Nancy; Murray, Chuck (COM); Schooley, Thomas (UTC); Hopkins, William; Eberdt, Chuck; Kimball, Mary; Daeschel, Lea; Englert, Eric
Cc: Ehrbar, Pat; Goddard, Nancy; Hermanson, Lori; Folsom, Bruce; Gibson, John; Bumgarner, Jeff; Popoff, Phillip; Singh, Gurvinder
Subject: Conservation Potential Methodology Meeting
Attachments: CouncilMethodology_outline.doc

Greetings,

We have had some trouble with our e-mail, and I wanted to make sure everyone got this agenda and attachment. See you on Thursday!

Regards,

Deborah Reynolds, Regulatory Analyst
Utilities & Transportation Commission
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Conservation Potential Methodology Meeting Agenda

9:30 - Introductions

9:45 - Conservation Potential (Part 1 of 480-109-010)

9:50 - Conservation Potential Methodology

10:50 - Methodology Clarifying Questions

Lunch on your own 11:30

1:00 - Targets & Reports (Parts 2 & 3 of 480-109-010)

1:30 – Targets & Reports Questions and Answers

3:00 - Adjourn

The Northwest Power and Conservation Council's Methodology for Determining Achievable Conservation Potential - Outline of Major Elements

1) Resource Definitions

    i) Technical Potential

    ii) Economic Potential

    iii) Achievable Potential

        (1) Non-lost opportunity resources ("schedulable")

        (2) Lost opportunity resources

2) Technical Resource Potential Assessment

    a) Review wide array of energy efficiency technologies and practices across all sectors and major end uses

    b) Methodology

        i) Technically feasibility savings = Number of applicable units * incremental savings/applicable unit

        ii) "Applicable" Units accounts for

            (a) Fuel saturations (e.g. electric vs. gas DHW)

            (b) Building characteristics (single family vs. mobile homes, basement/non-basement, etc.)

            (c) System saturations, (e.g., heat pump vs. zonal, central AC vs. window AC)

            (d) Current measure saturations

            (e) New and existing units

            (f) Measure life (stock turnover cycle)

            (g) Measure substitutions (e.g., duct sealing of homes with forced-air resistance furnaces vs. conversion of homes to heat pumps with sealed ducts)

iii) "Incremental" Savings/applicable unit accounts for

(a) Expected kW and kWh savings shaped by time-of-day, day of week and month of year

(b) Savings over baseline efficiency

(i) Baseline set by codes/standards or current practices

(ii) Not always equivalent to savings over "current use" (e.g., new refrigerator savings are measured as "increment above current federal standards, not the refrigerator being replaced)

(c) Climate - heating, cooling degree days and solar availability

(d) Measure interactions (e.g. lighting and HVAC, duct sealing and heat pump performance, heat pump conversion and weatherization savings)

3) Economic Potential - Ranking Based on Resource Valuation

a) Total Resource Cost (TRC) is the criterion for economic screening - TRC includes all cost and benefits of measure, regardless of who pays for or receives them.

i) TRC B/C Ratio $\geq = 1.0$

ii) Levelized cost of conserved energy (CCE) $\leq$ levelized avoided cost for the load shape of the savings may substitute for TRC if "CCE" is adjusted to account for "non-kWh" benefits, including deferred T&D, non-energy benefits, environmental benefits and Act's 10% conservation credit

b) Methodology

i) Energy and capacity value (i.e., benefit) of savings based on avoided cost of future wholesale market purchases (forward price curves)

ii) Energy and capacity value accounts for shape of savings (i.e., uses time and seasonally differentiated avoided costs and measure savings)

iii) Uncertainties in future market prices are accounted for by performing valuation under wide range of future market price scenario during Integrated Resource Planning process (See 4.1)

c) Costs Inputs (Resource Cost Elements)

i) Full incremental measure costs (material and labor)

ii) Applicable on-going O&M expenses (plus or minus)

iii) Applicable periodic O&M expenses (plus or minus)

iv) Utility administrative costs (program planning, marketing, delivery, on-going administration, evaluation)

d) Benefit Inputs (Resource Value Elements)

i) Direct energy savings

ii) Direct capacity savings

iii) Avoided T&D losses

iv) Deferral value of transmission and distribution system expansion (if applicable)

v) Non-energy benefits (e.g. water savings)

vi) Environmental externalities

e) Discounted Presented Value Inputs

i) Rate = After-tax average cost of capital weighted for project participants (real or nominal)

ii) Term = Project life, generally equivalent to life of resources added during planning period

iii) Money is discounted, not energy savings

4) Achievable Potential

a) Annual acquisition targets established through Integrated Resource Acquisition Planning (IRP) process (i.e., portfolio modeling)

b) Conservation competes against all other resource options in portfolio analysis

i) Conservation resource supply curves separated into

(1) Discretionary (non-lost opportunity)

(2) Lost-opportunity

(3) Annual achievable potential constrained by historic "ramp rates" for discretionary and lost-opportunity resources

(a) Maximum ramp up/ramp down rate for discretionary is 3x prior year for discretionary, with upper limit of 85% over 20 year planning period

(b) Ramp rate for lost-opportunity is 15% in first year, growing to 85% in twelfth year

(c) Achievable potentials may vary by type of measure, customer sector, and program design (e.g., measures subject to federal standards can have 100% "achievable" potential)

c) Revise Technical, Economic and Achievable Potential based on changes in market conditions (e.g., revised codes or standards), program accomplishments, evaluations and experience

i) All programs should incorporate Measurement and Verification (M&V) plans that at a minimum track administrative and measure costs and savings.

ii) Use International Performance Measurement and Verification Protocols (IPMVP) as a guide

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Gervais, Linda

From: Reynolds, Deborah (UTC) [DReynold@utc.wa.gov]
Sent: Thursday, September 03, 2009 6:05 PM
To: Nightingale, David (UTC); Eckman, Tom; Allen, Cathie; Gervais, Linda; tom.deboer@pse.com; Hirsh, Nancy; Murray, Chuck (COM); Schooley, Thomas (UTC); Hopkins, William; Eberdt, Chuck; Johnson, Stefanie (ATG); Kimball, Mary; Daeschel, Lea; Englert, Eric
Cc: Ehrbar, Pat; Goddard, Nancy; Hermanson, Lori; Folsom, Bruce; Ringel, H Grant; Gibson, John; Bumgarner, Jeff; Popoff, Phillip; Singh, Gurvinder; Oshie, Patrick (UTC); Schwartz, Howard (COM); Murray, Chuck (COM)
Subject: Conservation Potential Methodology Meeting
Attachments: UtilityTargetCalc_v1_8_6thPlan.xls; CouncilMethodology_outline.doc; I_937 Conserv 10 Yr Potential and 2 Yr Targets.ppt; Council MethodologyExSum_update.ppt; AchievablePotentialResponse.pdf

Greetings,
Thanks to everyone for joining us today. Here are the handouts from today's meeting. I have included some that were sent out before the meeting so you have a complete set.

Best regards,

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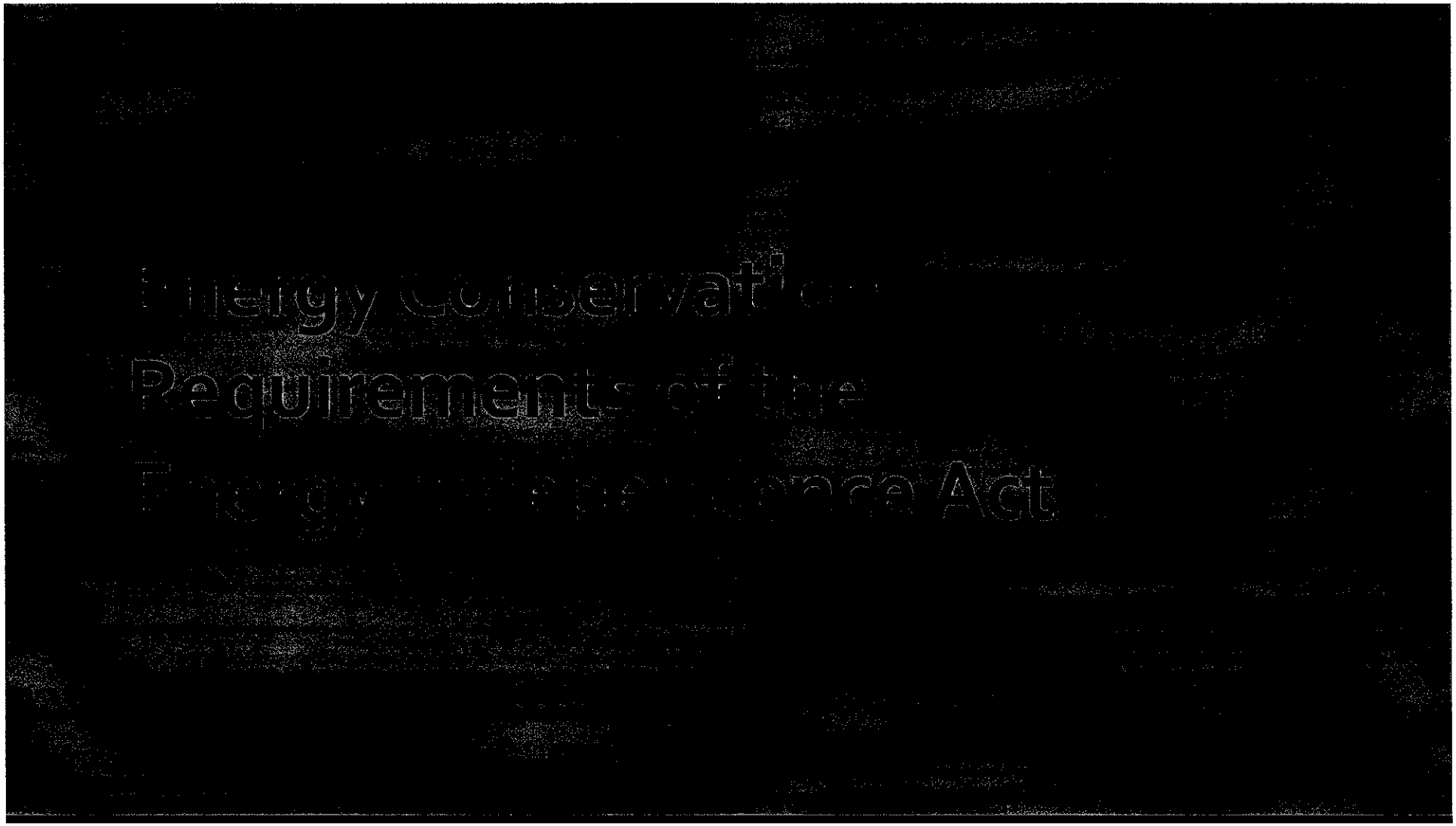


Facilitator, David Nightingale, WUTC staff
Guest Presenter, Tom Eckman, NW Power & Conserv. Council
WUTC Hearing Room, Sept. 3rd, 2009

Initiative 937 Approved in 2006

- Requires all large utilities (>25k customers in WA) to obtain renewable resources and undertake cost-effective conservation (RCW 19.285.010)

- This meeting will only address the second part, **cost-effective energy conservation**

RCW 19.285.040 (1) [I-937]

- Each utility "shall pursue all available conservation that is cost-effective, reliable and feasible."
- By 1/1/2010 each utility shall identify its achievable, cost-effective **conservation potential** through 2019 (ten years hence) and update the potential every 2 years.
- The projected conservation potential will be published along with biennial targets.

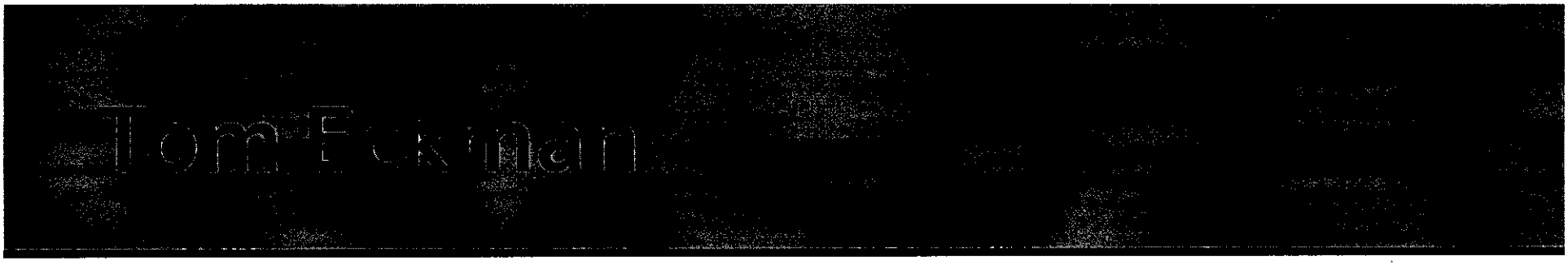
Conservation

- "Conservation" means any reduction in electric power consumption resulting from increases in the efficiency of energy use, production, or distribution.

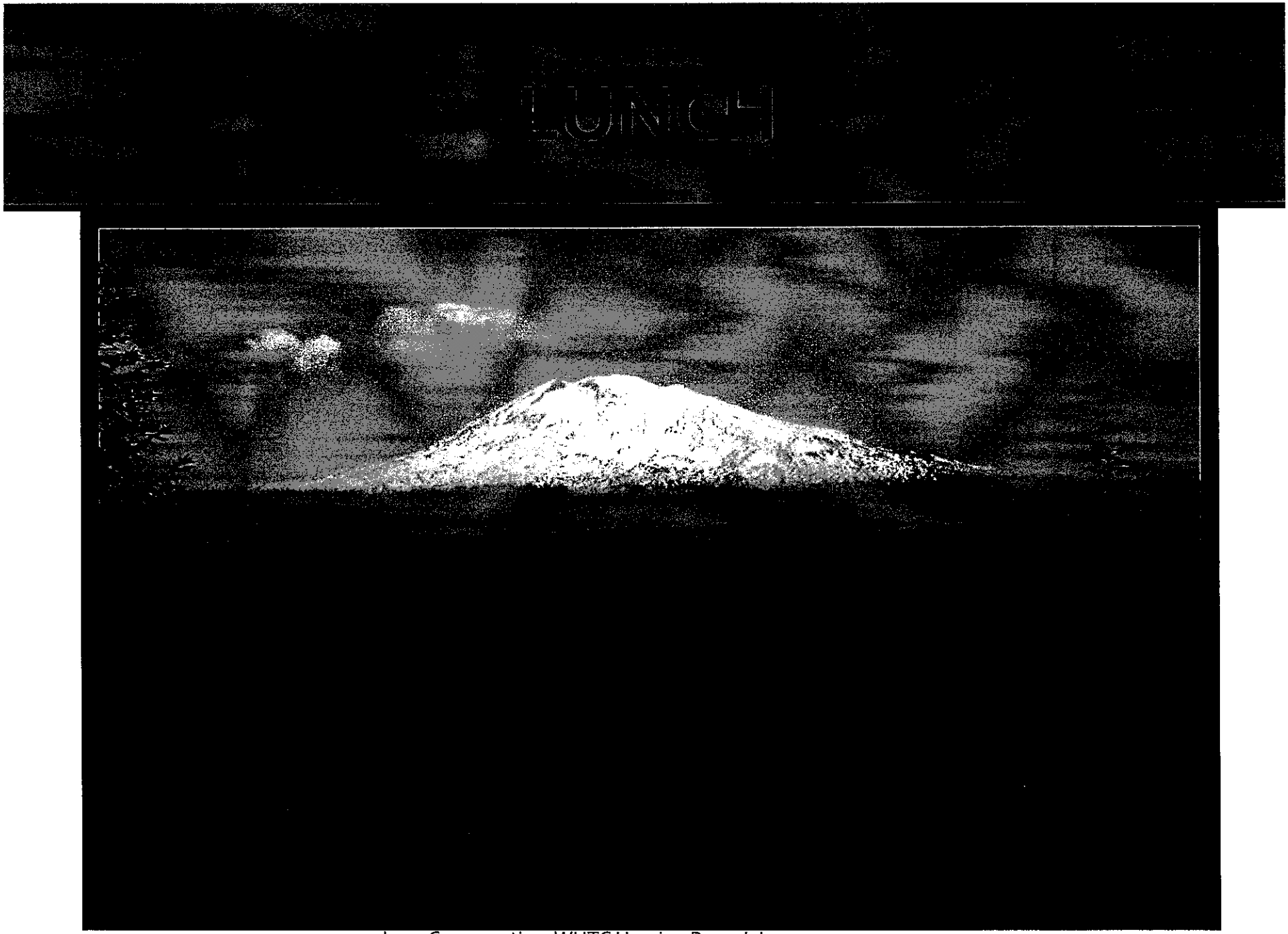
RCW 19.285.030(4) and WAC 480-109-007(3)

10-Year Conservation Potential

- Conservation potential projections must be <u>derived from</u> (additional analysis, not simply copy and paste from the last IRP) and <u>reasonably consistent with 1 of 2 sources</u>:
  - Your most recent IRP, including subsequent information learned, and the projection **<u>must</u>** use methodologies that are consistent with the NW Power & Conserv. Council, or ,with documented rationale, modify the Councils methodology.
  - The utility's proportionate share, based on retail sales, of the Council's current power plan targets for WA.



- NW Power and Conservation Council's Methodology
- Sixth Plan availability



Discussion of Utility Conservation Requirements

- Based on I-937, codified at RCW 19.285, and
- Commission Rules at WAC 480-109

RCW 19.285.040 (1) [I-937]

- Each utility "shall pursue all available conservation that is cost-effective, reliable and feasible."
- By 1/1/2010 each utility shall identify its achievable, cost-effective **conservation potential** through 2019 (ten years hence) and update the potential every 2 years.

Cost-Effectiveness

- Cost-effective defined at RCW 80.52.030(7)
  - Cost-effective means that a project or resource is **forecast**:

    (a) To be reliable and available within the time it is needed; and

    (b) To meet or reduce the electric power demand of the intended consumers at an estimated **incremental system cost** no greater than that of the least-cost similarly reliable and available alternative project or resource, or any combination thereof.

System Cost

- System Cost is defined at RCW 80.52.030(8)
  - System cost means an estimate of all direct costs of a project or resource over its effective life, including, if applicable, the costs of distribution to the consumer, and, among other factors, waste disposal costs, end-of-cycle costs, and fuel costs (including projected increases), and such quantifiable environmental costs and benefits as are directly attributable to the project or resource.

Prudent Acquisition of Conservation Resource Criteria Changes after 2010

- Through 2009 = IRP "Lowest Reasonable Cost"
- January 2010 = All Cost-Effective

Issue: "Lowest reasonable cost"

- Lowest reasonable cost (for all resource types, not just conservation - a portfolio mix), RCW 480-100-238(2)(b)
  - Means the lowest cost mix of resources determined through a detailed and consistent analysis of a wide range of commercially available sources.
  - Analysis must consider resource cost, market-volatility risks, demand-side resource uncertainties, dispatchability, resource effect on system operation, risks imposed on ratepayers, public policies and the cost of risks associated with environmental effects including emissions of carbon dioxide.

Lowest Reasonable vs. Cost Effective

IRP - LOWEST REASONABLE COST FOR ALL RESOURCES

- Mix of resources considering:
  - Commercially available resources
  - Resource cost
  - Market volatility
  - Demand-side uncertainty
  - Dispatchability
  - System operation impacts
  - Customer Rate impacts
  - Cost of Risk from Environmental effects, e.g. CO_2

CONSERVATION POTENTIAL- COST-EFFECTIVE

- Mix of resources based on:

A projection of all reliable, feasible and cost-effective resources and projects

Cost-effective includes :

- Available when needed and
- System costs including: direct cost over effective life, distribution costs, waste disposal, end of cycle, fuel (with projected increases), quantifiable environmental costs and benefits.

Commission Policy on Cost-Effectiveness

- RCW 19.285.040(d) states that the commission may determine if a conservation program implemented by an IOU is cost effective based on the commission's policies and practice.
- Historically the Commission has used the Total Resource Cost Test, TRC, to evaluate cost-effectiveness, after program implementation.

Conservation Potential and Targets

- "On or before January 31, 2010, and every two years thereafter, each utility must file with the commission a report identifying its ten-year achievable conservation potential and its biennial conservation target."

  WAC 480-109-010(3)

- The first report will be due January 29, 2010.

Stakeholder Participation in Developing Potential and Targets

- **"Participation** by the commission staff and the public **in the development of the** ten-year **conservation potential and** the two-year **conservation target is essential**.

  The **report must outline the extent of** public and commission staff **participation in the development of these conservation metrics**." WAC 480-109-010(3)(a)

Conservation Potential and Target Biennial Report Contents

- If the utility uses its IRP and related information to determine its 10 yr. conservation potential, the report must describe the
  - Technologies, data collection, processes, procedures and assumptions the utility used to develop these figures.
  - This report must describe and support any changes in assumptions or methodologies used in the utility's most recent IRP or the conservation council's power plan. WAC 480-109-010(3)(c)

Comments on Conservation Potential and Target

- Commission staff and other **interested persons may file written comments** regarding a utility's ten-year achievable conservation potential or its biennial conservation target **within thirty days of the utility's filing**. Comments will be due 3/1/2010.

(a) After reviewing any written comments, the commission will decide whether to hear oral comments regarding the utility's filing at a subsequent open public meeting.

WAC 480-109-010(4)

Commission Review and Decision

- The commission, considering any written or oral comments, may determine that additional scrutiny and review is warranted. If so, the commission will establish an adjudicative proceeding or other process to fully consider appropriate revisions.
- Upon conclusion of the commission review, the commission will determine whether to approve, approve with conditions, or reject the utility's ten-year achievable conservation potential and biennial conservation target. WAC 480-109-010(4)(b)&(c)

Conservation Reporting and Public Disclosure Requirements

- On or before June 1, 2012, and annually thereafter, each utility shall report to CTED and WUTC on its progress in the preceding year in meeting the targets, including:
  - expected electricity savings from the biennial conservation target,
  - expenditures on conservation,
  - actual electricity savings results,
  - the utility's annual load for the prior two years

excerpted conservation related parts of RCW 19.285.070(1)&(2)

Conservation programs should include (not an exhaustive list)

- Independent Measurement and Verification designed prior to program implementation
- Budget by year
- Analysis of ongoing projects and initiatives (e.g. documenting behavior change impact, persistence, billing analysis, surveys, widget counts, commercial/industrial post- measure results, etc.)
- Program development strategy
- Focused research and analysis efforts (e.g. smart grid pilots)
- Incentives to customers
- Limits on administrative cost burden
- Consistent input assumptions regarding savings and protocol to justify timing of any mid-course changes
- Criteria to evaluate emerging opportunities

(advisory only, not based on law)

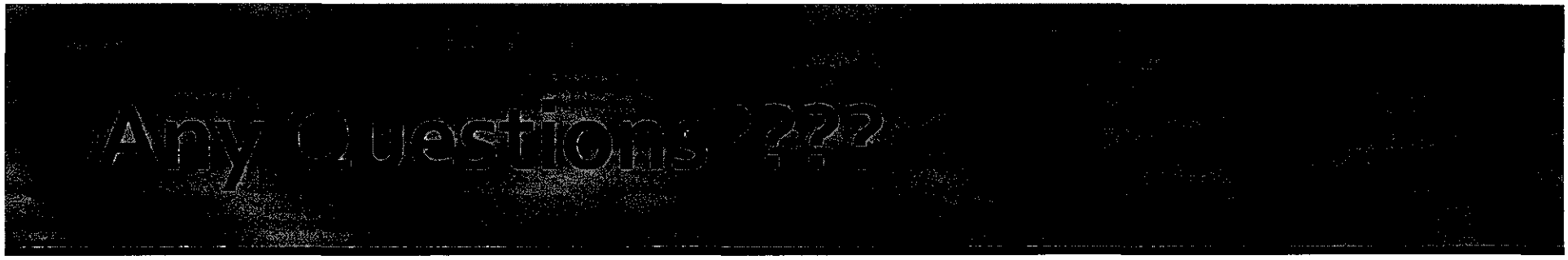
Incentives and Penalties (carrots and sticks) for Performance

- Failure to comply with energy conservation targets is determined by the Commission and = $50/MWh shortfall financial penalty. And utility must notify retail customers of the penalty amount and reason it was incurred.

- Commission may consider providing positive incentives for investor-owned utilities that exceed their targets. RCW 19.285.060

5 Months remain until new Conservation Resource Requirements

- WUTC Staff will be available to participate in the development of the Conservation Potential and 2-yr. Targets by Investor-Owned Utilities.
- IRPs submitted by all electric utilities in last 3 months should provide a good springboard for development of the new conservation metrics.



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Joan M. Dukes
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Melinda S. Eden
Oregon

Bruce A. Measure
Montana

Rhonda Whiting
Montana

August 1, 2007

MEMORANDUM

TO: Power Committee

FROM: Charlie Grist and Tom Eckman

SUBJECT: Comments on the achievable conservation savings report and proposed response

In May, the Council released for comment a paper entitled *Achievable Savings: A Retrospective Look at the Council's Conservation Planning Assumptions*. We received 38 comments on the paper. The full comments are viewable on the Council web site at http://www.nwcouncil.org/library/2007/2007-7.htm

The comments are summarized and proposed responses have been prepared in the attached document called *Achievable Potential Issues&Responses.doc*. Staff has also prepared a revised version of the paper based on the comments and proposed responses for review by the Power Committee. Both a redline and clean copy of the paper are attached.

At the August Power Committee meeting we will review the comments, the proposed responses and proposed changes to the paper. We will ask committee to make a recommendation to the Council to approve the revised paper.

Attachments

q:\tm\council mtgs\2007\aug 07\(p4-7) cover achievable.doc

Summary of Comments, Issues Raised, and Proposed Responses on the staff white paper ***Achievable Savings: A Retrospective Look at the Northwest Power and Conservation Council's Conservation Planning Assumptions***

Overview: Council staff has identified issues raised by comments on the draft paper. The major issues have been identified here and grouped under common headings. Each issue includes proposed responses. Staff's summary of the comments is attached after the issues and responses.

Issue: Many utilities view the maximum achievable penetration rates as targets for utility conservation programs. (Benton, Cowlitz, Inland, Tacoma) Several comments point out that conservation achievements outlined in the paper, which exceed 1983 plan expectations, result from better codes and standards, electric prices, and other factors that are not under direct control of utilities and may not be repeatable.

Response: The paper has been revised to clarify two things. First, the plan sets achievable penetration rates without respect to what fraction will be acquired by utility programs versus other mechanisms such as market transformation, codes, standards, electric price effects or goodwill. Targets developed in the power plan are for amounts of cost-effective conservation thought to be achievable by all means and mechanisms over a specific time frame. These are not targets for utility programs. They are targets for all programs, codes, standards, market factors and any other viable mechanism not yet discovered. Second, the paper clarifies that the Council uses the achievable rates as the maximum penetration rate for portfolio analysis. The operative rate is an annual upper limit on how fast conservation can be developed, by all mechanisms based on historic experience and consideration of the kinds of measures in the conservation assessment. The maximum penetration rates do not address what fraction is achievable by utility programs alone.

Issue: Achievable conservation rates will differ for the region and for individual utilities. (Cowlitz, Inland). This concern is driven primarily by issues surrounding Washington's I-937, the development of utility conservation targets under that law, and performance relative to those targets.

Response: As called for in the Northwest Power Act, the Council considers a regional perspective in developing its analysis, methodology and regional conservation targets. It must retain that perspective.

There are no doubt differences in measure applicability and cost-effectiveness among individual utilities compared to the region. For example, utilities with no irrigation loads will not have potential savings from this end use. Such differences should be reflected in a utility's assessment of cost-effective conservation potential in its service territory. The subject of this paper is how much of the cost-effective potential identified is achievable and over what time frame, given an all-out effort of all parties. The staff believes differences in the achievable penetration rate between the region and individual utilities are much smaller than differences in cost-effective conservation potential.

Issue: An achievable rate of 85 percent over twenty years for non-lost-opportunity conservation is too high and isn't supported by the evidence. Therefore, where definitive proof on maximum penetration rates does not exist for a measure, the Council should assume lower maximum penetration rates. (Benton, Tacoma) The argument takes several forms among the comments: 1) Forgotten details on Hood River Project call into serious question whether the 85 percent penetration rate was actually achieved, 2) Most evidence the Council cites is anecdotal, 3) A survey of national experts finds lower estimates of achievable conservation, 4) Some measures in the 1983 plan did not reach 85 percent penetration.

Response: Tacoma asserted that the Hood River project did not achieve an 85 percent market share because it was based on "installing at a minimum only one major measure in a dwelling." This is incorrect. Quoting directly from the Hood River Conservation Project's final report:

Only 261 of 3,249 homes had no major retrofit measures installed. A few of the four low-cost measures installed by auditors (outlet gaskets, water heater wraps, hot water pipe wraps and low-flow showerheads) were installed in these homes. On average, 1.9 measures/home were installed in these homes, compared with the 7.4 measures in the other 92% of the homes.[1]

Of the 26,354 measures recommended during the energy audit of the 2,988 homes that had major measures installed, 83% were actually installed. However, these installed measures accounted for 93% of the potential electricity savings for the measures recommended during the audit.[2]

The Council uses the "85 percent" as maximum realistically achievable potential after considering reductions for both physical and economic limits to a measure's applicability. Since one of the objectives of the Hood River project was to test the "upper bounds" of cost-effectiveness it did not restrict its recommendations to only cost-effective measures. Had the Hood River auditors recommended only cost-effective measures (consistent with the Council's methodology) then the penetration rate would have been still higher.

Tacoma Power also cited findings from a recent national survey it conducted on the question of achievable conservation as evidence that the Council's maximum achievable rates are too high. Survey respondents were asked about penetration rates at various levels of utility incentive payment. The following is from Tacoma's comments:

In general, findings from the survey of conservation experts indicate that a ten year-100 percent incentive would yield an expected 58 percent achievable factor. A 20 year-100 percent incentive would yield an expected 71 percent achievable factor.

Council staff has not reviewed the study or its methodology. It 'is not clear whether these estimates are for lost-opportunity measures, retrofit measures or both. Furthermore, it is not clear whether survey participants considered mechanisms other than utility incentives, such as codes and standards or market transformation, in estimating achievable penetration.

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1 Hirst, E. 1987. Cooperation and Community Conservation: The Hood River Conservation Project, ORNL/CON-235. p. 36.

2 Ibid, p.37.

Nevertheless, the Council's paper points out that the most important factor is the near-term annual penetration limit. By comparison, the Council's achievable targets over a 10-year period are about 43 percent of cost-effective potential. That includes 62 percent of 20-year cost-effective conservation potential achievable in ten years for non-lost-opportunity measures and about 21 percent for lost-opportunity measures. In light of I-937, which focuses on ten-year targets, the Council's paper has been revised to show the effective cumulative ten-year and twenty-year penetration rates assumed by the Council.

In an ideal world, it would be best to have data for all sectors and a wider array of measures from experiments like Hood River upon which to base long-term penetration estimates. Unfortunately, in the real world there are no data about the future, only a forecast of what might reasonably occur. Setting the standard of proof for all measures using Hood River-like experiments would not only be expensive, but more importantly, still not address the uncertainties faced during the development of a Council plan. Since the Council updates its plan every five years, near-term penetration rates for retrofit measures is far more important than long-term maximum penetration rates. In that regard, it is important to note that the 85 percent market penetration rate demonstrated in Hood River weatherization project was achieved within a *two year* period, not over 20 years. Similar rapid increases in short-term market penetration have also been achieved for residential shower heads, commercial lighting and industrial process changes.

The retrospective considers a large fraction of the measures included in the 1983 Plan's conservation potentials assessment. But it can not consider all measures as Tacoma suggests. Due to data limitations and other reasons already noted in the paper it is either impossible or inappropriate to compare the forecast and historical penetration rates for every measure identified in the 1983 plan. There can never be proof positive that a 25 year-old estimate of prospective measures would or would not have been achievable. The paper was revised to emphasize that the important assumptions are the near term maximum penetration rates and that there is a preponderance of evidence from actual experience that the Council's assumed rates are achievable through a variety of implementation mechanisms, technological progress and regulatory actions.

Tacoma suggests that technological improvement in measure effectiveness or cost should not be considered in the retrospective. The staff continues to believe that the retrospective should consider that technological improvements have helped many measures surpass achievable potential estimates. The Council considers only currently available conservation measures and current costs when doing its conservation assessments. Yet history has shown that, for many measures, more efficient technology, lower costs, or better conservation measures emerge quickly after the Council's assessment is complete. This technological progress contributes to the effective achievable penetration rate.

Issue: Regional assumptions of achievable penetration are not a reasonable benchmark for what an individual utility can achieve. For example, codes and standards provided much of the historic evidence of achievement but there is no guarantee utilities can either influence them or count on them in the future. The maximum retrofit rate should be set by individual measure and sector. (Inland, Benton, Tacoma)

Response: These issues spring primarily from the implementation of Washington's I-937, which requires utilities to develop and meet conservation targets based on the Council's methodology. First, the Council makes no claim that the maximum achievable penetration rates represent benchmarks for utility actions. They represent benchmarks for regional action. The Council recognizes that most conservation implementation requires the joint action of utilities and others. Appendix D of the Fifth Power Plan asserts that a mix of mechanisms and enhancements are needed and that for successful implementation many players are required. While the Fifth Plan described viable implementation approaches for many of the measures assessed, it does not prescribe the best acquisition strategy for each measure nor determine how much should be tackled by utilities programs versus other mechanisms. Such a recommendation would likely be too prescriptive given the opportunistic nature of conservation implementation.

Second, utility targets should be specific to what utilities can reasonably influence. While utilities do not have direct control over all mechanisms, they do have some influence in most realms. Utilities help determine the budgets and strategies for market transformation. Utility influence has been critical to the adoption of better codes and standards. Utility programs have demonstrated the viability of new measures beyond codes or common practice. It is true that past performance does not guarantee future success. But with respect to codes and standards the staff believes that the region's utilities are better positioned today to employ these mechanisms for future conservation acquisition than when the 1983 Plan was adopted.

When the first plan was adopted there were no federal appliance standards, state energy codes had only been in place for two years and there was no established process for code revision. All of these mechanisms are now in place. Indeed, codes and standards can even improve the market penetration for many retrofit measures by making high-efficiency equipment lower cost and more readily available. Utilities have had and continue to have great influence on the development, adoption and implementation of codes and standards. The Council encourages utilities to consider the broad reach of their influence when setting targets and claiming success. The Fifth Power Plan demonstrates that cost of falling short on conservation acquisition results in a higher cost and higher risk power system.

Issue: The Council should allocate its estimates of maximum achievable penetration rate by measure, sector or other factor. (Benton, Cowlitz, Inland, WISE) Maximum achievable penetration rates vary by many factors including: measure, sector, the possibility of code or standard and other factors. The Council should work with utilities and others to develop achievable penetration rates for each measure.

Response: This recommendation may be pursued during the development of the Sixth Power Plan. However, it would require significant effort and is likely more important on the lost-opportunity measures than non-lost opportunities.

Issue: The Council should adopt higher conservation targets for non-lost-opportunity measures based on performance over the last few years. (NWEC, Sierra Club, Sierra Club, SOWS, various private parties) This recommendation is based on review of conservation accomplishments in 2005 and 2006 and the finding that the region is meeting or exceeding the

targets set forth in the Fifth Power Plan. Further, proponents argue that an increase in the Council targets would generate more conservation activity from BPA and the region's utilities, which would reduce regional costs and risk. Energy costs have increased so more measures will be cost-effective. And finally, the plan understates the risk of climate change costs, which would also increase the amount of cost-effective conservation potential and the targets.

Response: Achieving conservation in excess of the Fifth Power Plan targets would reduce regional cost and risk if conservation costs were kept low. In fact, the Council's targets are for a minimum of 700 MWa over the five-year period from 2005-2009. The Council is already on record that achieving more conservation sooner would further reduce cost and risk provided the conservation costs remain low relative to generation.

However, the staff does not believe it is time to establish new conservation targets. First, the 2005 and 2006 data show that the region is almost meeting the Council's targets, not exceeding them.

Second, two years of performance is not enough to warrant revising the non lost-opportunity targets. History has proven that, for a variety of reasons, conservation acquisition is episodic. Review of the 2005 and 2006 reports shows varying annual conservation acquisitions for individual utilities, NEEA and the Energy Trust for a variety reasons specific to each situation. Annual acquisition rates for conservation vary depending on market conditions, budgets, the number of large industrial conservation projects completed and other factors.

Third, the staff believes increasing non-lost-opportunity targets may divert attention from lost-opportunity measures, which have a bigger risk reduction value.

Fourth, the Council's regional non-lost opportunity target of 600 MWa over five years is a high rate for a relatively long period of time compared to what the region has done in the past. The target is a challenge viewed over the five-year time frame and in combination with accelerated lost-opportunity targets.

Finally, revising conservation targets would require redoing most of the analysis in the power plan. Focusing instead on development of the Sixth Power Plan may be more productive.

Staff Summary of Comments on the staff white paper *Achievable Savings: A Retrospective Look at the Northwest Power and Conservation Council's Conservation Planning Assumptions*

Comments are summarized here by Council staff. Full comments are posted on the Council's web site at http://www.nwcouncil.org/library/2007/2007-7.htm

Benton PUD: It is not appropriate to use the Hood River Weatherization Project penetration rate to estimate maximum 20-year potential for retrofit measures other than weatherization. The Council should adopt lower penetration rates for other non-lost-opportunity measures until higher rates are demonstrated.

The Council should not use the same rates for all retrofit and lost-opportunity measures. The Council should work with regional utilities to develop and review rates for each sector and measure.

Successful regional performance has been "very dependent" on local, state and federal codes.

Cowlitz PUD: What is available locally will differ from what is available regionally. Differences include structure of utility load, rate of load growth, local program delivery infrastructure, and previous local conservation activities.

Utilities have little control over codes and standards, which are a large contributor to achievement.

Consider dividing the achievable conservation assessments into implementation segments that include utility, market transformation, codes, standards and other mechanisms.

Inland Power and Light: Fred Rettenmund, representing Inland Power & Light, cautioned that the estimate for achievability is a region-wide figure. What is achievable on the individual utility level depends on "what they can do in their part of the world in their circumstances," he said. The pace and volume that a utility can achieve depends on a mix of things, Rettenmund said. As you take action, we encourage you to make it clear that this is a regional assessment, not what is achievable by individual utilities, he urged. "It isn't a reasonable benchmark for what an individual utility can do," Rettenmund stated at the July, 2007, Council meeting held in Portland.

Northwest Energy Coalition (NEC): The Coalition believes the findings in the paper make a strong case for the Council to revise its annual non-lost-opportunity conservation target to at least 150 aMWs per year. The coalition suggested the Council provide the state-by-state and a utility-by-utility breakdown of recent conservation acquisition. This would shed light on the question of which utilities need to work harder, and to what extent measures not in the plan are contributing to achievement of the targets. Higher fuel prices than those used in the Fifth Plan

warrant increasing the conservation targets. A conservation assessment study by Tellus Institute also argues for higher targets.

The paper should explain the rationale for the near-term limits of 120 MWa per year of non-lost-opportunity conservation.

On page 3, clarify the 10 percent Act credit for conservation.

Clarify how much conservation is coming from market transformation through NEEA. If NEEA is responsible for a large fraction of the savings, the report should recommend that NEEA funding be increased.

Save Our Wild Salmon: The region is outpacing the Council's targets. The Council should revise its targets upwards to encourage BPA and others to increase their pace of conservation acquisition.

Sierra Club (Fred Heutte): The Sierra Club recommends that the Council set higher conservation targets. The Sierra Club believes that the barriers to higher achievable conservation rates are institutional, rather than technical or economic, and can be overcome. Sierra Club cites forecasts of decreasing Alberta gas production as evidence of increasing upward pressure on natural gas and electric prices.

The Sierra Club offered three reasons why the Council should set higher conservation targets. First, the Council should challenge to the region to invent ways to overcome institutional barriers. Second increased targets would be a way to hedge risks imposed by increasing energy prices. Third, more conservation would reduce emission of greenhouse gases as soon as possible.

Sierra Club (Cascade Chapter): A mid-cycle update of efficiency targets is not only necessary to reflect the current reality of the Northwest power market, but is the only way to ensure that conservation measures beyond the minimum requirements of the current plan will be achieved. An update of achievable targets should reflect both how changes in technology and standards are driving the slope of the conservation supply curve, and also how increased prices change our position on that curve. BPA and other utilities are not likely to respond in the absence of an increase in Council targets.

Tacoma Power: The basis for and use of an 85 percent achievability factor prospectively is not empirically supportable. 1) There is not enough empirical rigor. The paper should compare the same technologies as identified in the 1983 plan, without considering better technologies that supplanted what was available in 1983. 2) Codes and standards are responsible for a lot, but are not in control of the utilities. 3) Some measures did not hit 85 percent, so clearly we can not achieve 85 percent on average. 4) Hood River may not really demonstrate an 85% penetration

rate. 5) A consultant's survey of experts estimate achievable penetration rates lower than Council estimates.

Weatherization Industries Save Energy (WISE): The methodology for non-lost-opportunity savings is sound with regard to the fraction of 20-year cost-effective savings that is achievable in the near term. But the Council has underestimated the potential for cost-effective savings from residential weatherization. Technology improvements allow for deeper penetration. There is a need for previous weatherization to be redone.

A decrease in reported weatherization savings does not mean fewer savings are available. Excitement about utility programs has waned. But, new potential savings from new measures like duct and air sealing and better windows will supplant weatherization.

WISE suggested using utility cost test rather than total resource cost for cost-effectiveness screening.

Citizen Comments

The Council received 29 e-mail comments from individuals. The comments were very similar. All of them asked the Council to raise its Fifth Plan conservation targets. Here is a sample:

Dear Mr. Walker,

I am thrilled to learn that the region is greatly outpacing the conservation targets set in the 5th Northwest Power and Conservation Plan. According to your recent study, "A Retrospective Look at the Northwest Power and Conservation Council's Conservation Planning Assumptions," the region is acquiring conservation at a much faster pace than the Plan expected.

Apparently, these gains are being made with little assistance from the Bonneville Power Administration, which has not raised its conservation budget. If others can increase their pace of acquiring efficiency, BPA can too. Together we should be able to get 30-40% more cost-effective energy efficiency by 2023 than expected.

It is critical that we continue at or beyond the present pace and that Bonneville do its part. Unless the Council increases the 5th Plan's conservation target to reflect the real situation, BPA and other utilities might easily forego opportunities to save their customers money by acquiring all available, cost-effective conservation resources.

I urge the Council to revise the 5th Plan to increase the total 20-year "achievable" conservation target by at least 30 percent and to revise the interim targets accordingly.

Sincerely

Achievable Savings

A Retrospective Look at the Northwest Power and Conservation Council's Conservation Planning Assumptions

August 2007

Executive summary

The Northwest Power Act of 1980, the federal law that authorized the states of Idaho, Montana, Oregon, and Washington to form the Northwest Power and Conservation Council, directs the Council and the Bonneville Power Administration to treat energy conservation --improved efficiency of electricity use -- as a resource equal to electricity generation when planning to meet future demand for power. The Act requires Bonneville to acquire all cost-effective conservation first before acquiring new power from generating resources.

The Act also directs the Council to prepare, and to periodically review, a regional electric power plan to assure an adequate, efficient, economical, and reliable electricity supply in the Pacific Northwest. The administrator of Bonneville is required by the Act to make resource acquisition decisions that are consistent with the Council's power plan. Consistent with the Power Act, energy conservation is the highest-priority resource in the Council's power plan.

To assist the Council in determining the cost-effectiveness of generating and conservation resources that are included in the power plan, the Act establishes three criteria. A cost-effective resource or measure is one that is forecast by the Council to be 1) reliable, 2) available when it is needed, and 3) no more expensive than the least-cost alternative resource.

From this instruction, the Council developed a methodology to identify all of the technically feasible potential conservation measures in the region and any timing constraints to their implementation. With this methodology, the Council forecasts the rate of annual deployment of conservation measures and the maximum achievable potential of the measures over the 20-year horizon of the power plan (the Act requires the Council to plan 20 years into the future and to review the plan every five years).

The Council divides conservation measures into two categories: those that can be acquired at any time, such installing low-flow shower heads (these are called non-lost opportunity measures), and those that can only be acquired under specific conditions or at a specific time, such as wall insulation in buildings that are under construction (these are called lost-opportunity measures -- if they aren't implemented, the opportunity is lost). For planning purposes, the Council sets penetration limits, with respect to time, for both types of conservation.

In its planning, the Council assumes that the upper limit of conservation (this is called "penetration") that can reasonably be acquired by all mechanisms available. These mechanisms include more than utility programs alone. The mechanisms include incentive payments from utility and system benefit charge programs, improved state and local building codes, federal and

state appliance standards, market transformation programs, marketing efforts, voluntary programs, electricity pricing mechanisms and other tools. The Council's assumptions estimate achievable penetration rates without respect to what fraction will be acquired by utility programs versus other mechanisms such as market transformation, codes, standards, or electricity price effects.

Over the twenty-year planning horizon the long-term cumulative upper limit of market penetration in the region is 85 percent of the economically (i.e., cost-effective) and technically achievable potential for non-lost opportunity measures and about 65 percent for lost-opportunity measures over a 20 year period. In addition to long-term penetration limits, the Council sets annual near-term limits on how much conservation can reasonably be developed. These annual limits are a more critical assumption for regional planning and implementation than the long-term penetration limits.

The annual limit for non-lost-opportunity measures is 120 average megawatts per year. The annual limit for lost-opportunity measures gradually increase from 15 percent to 85 percent of annually available and cost-effective lost-opportunity measures over the first twelve years of plan implementation. These annual limits have the effect of reducing the near-term achievable potential significantly. For example, in the first ten years of plan implementation, the resultant cumulative limit of achievable potential is 62 percent of the 20-year economically and technically available potential for non-lost opportunities and 21 percent for lost-opportunity resources. In aggregate, across both non-lost opportunity and lost-opportunity resources, the Council's 5th Plan limits achievable potential to about 44 percent of the 20-year technical and economic potential over the first ten years.

There is ample historic evidence to support retaining these near-term and long-term planning assumptions, as both are supported by actual experience during the last 20 years. There are many examples of better than 85 percent penetration for lost-opportunity measures. For example, before the end of 1992 -- not quite 10 years after the Council issued its first power plan -- Washington and Oregon, the two most populous states in the region, already had met the energy-savings goals in the plan set forth for new residential and commercial construction. By 2002 all four Northwest states had met the goals of the plan for conservation in new residential construction and also exceeded the goals for conservation in new commercial buildings by at least 10 percent.

Examples of historic penetration rates for non-lost-opportunity measures are more difficult to analyze on a retrospective basis by measure because of data limitations and a lack of sustained efforts for many measures. The Hood River Weatherization Project demonstrated over 85 percent penetration in just two years with a 100 percent incentive and a large marketing effort. Recent data shows over 32 percent penetration in just six years for residential compact fluorescent lighting. Furthermore, there are two episodes of high region-wide acquisition rates in the early 1990s and 2000s that demonstrate the capability to acquire over 100 average megawatts per year through utility programs alone.

It is more relevant today to reliably predict the pace at which conservation programs can be "ramped up" and maintained over the near-term than it is to plan 20 years into the future. The

20-year timeframe stipulated in the Act for the Council's power and conservation planning is less important for conservation than the near-term acquisition rates for two reasons. In 1980, new generating plants took up to 15 years to site, license, and build. Today, new generating facilities and transmission system expansions can be brought on line in three to five years. Second, the Council develops a new power plan every five years or so. Conservation potential is reassessed in each plan which allows a fresh look at accomplishments as well as what exists for future potential.

Background

In 2007 there is a resurgent interest in the Council's approach to integrated resource planning in general, and its methodology for incorporating conservation in its Northwest power plans in particular. There are several reasons. For the region's public utilities, Bonneville's pending proposal to serve the load growth of its preference customers at "market-based" rates rather than embedded costs encourages them to consider their resource choices more systematically. In Washington State, the enactment of HB1010 and the passage of Initiative 937 (I-937) created additional impetus for the state's larger utilities, public and investor-owned. HB1010 requires utilities to prepare resource plans to demonstrate that they have adequate resources to meet their load-serving obligations.[1] I-937 requires utilities to develop all conservation that is cost-effective, reliable, and feasible using methodologies consistent with those used by the Council.[2] Because I-937 specifically references the Council's methodology there is heightened interest in understanding how the Council assesses achievable conservation potential. The purpose of this paper is to provide an overview of the Council's methodology and an assessment of whether its current planning assumptions regarding "achievable" savings are supported by evidence.

The Council's Conservation Planning Methodology

The Northwest Power Act establishes three criteria for resources included in the Council's power plans: resources must be 1) reliable; 2) available within the time they are needed, and 3) available at an estimated incremental system cost no greater than that of the least-cost similarly reliable and available alternative.[3] Beginning with its first power plan in 1983, the Council interpreted these requirements to mean that conservation resources included in the plans must be:

- technically feasible (reliable)
- economically feasible (lower cost)
- achievable (available)

The first step in the Council's methodology is to identify all of the technically feasible potential conservation savings in the region. This involves the review of a wide array of commercially available technologies and practices for which there is documented evidence of electricity

[1] http://www.cted.wa.gov/DesktopModules/CTEDPublications/CTEDPublicationsView.aspx?tabID=0&ItemID=4039&MId=863&wversion=Staging

[2] Energy Independence Act. RCW 19.285.040(1)(a) (http://apps.leg.wa.gov/RCW/default.aspx?cite=19.285.040)

[3] See Section 839a(4)(A)(i) and (ii) of the Northwest Power Planning and Conservation Act. (http://www.nwcouncil.org/library/poweract/3_definitions.htm or http://www.nwcouncil.org/LIBRARY/poweract/poweract.pdf)

savings. This step also involves determining the number of potential applications in the region for each of these technologies or practices. For example, electricity savings from higher efficiency water heaters are only "technically feasible" in homes that have, or are forecast to have, electric water heaters. Similarly, increasing attic insulation in homes can only produce electricity savings in electrically heated homes that do not already have fully insulated attics.

The second step in the Council's process is to determine the total resource cost of the energy savings from all of those measures that are technically feasible. This process requires the comparison of the all of the costs of a measure with all of its benefits, regardless of who pays those costs or receives the benefits. In the case of a more efficient clothes washer, cost includes the difference (if any) in retail price between the Energy Star model and the "standard efficiency" model, plus any utility program administrative and marketing cost. On the other side of the equation, benefits include the energy (kilowatt-hour) and capacity (kilowatt) savings, water and wastewater treatment savings, and savings on detergent costs.[4] While not all of these costs and benefits are either paid by or accrue to the region's power system, they are included in the evaluation because ultimately they are paid by or benefit the region's consumers.

Once the *net cost* (present value of all cost minus the present value of all benefits) of each of the conservation technologies or practices is determined, the technologies are ranked by cost in two "supply curves" that depict the amount of conservation resource potential available in the region. One "supply curve" represents all of the retrofit or "non-lost opportunity" resources. The other represents all of the "lost-opportunity" conservation resources.[5] The Council divides conservation resources into these two categories because their patterns of potential deployment are different. Non-lost opportunity conservation resources can be captured at any time. Lost-opportunity resources are only available during specific periods. For example, savings from improved wall insulation in new buildings are only available when the building is constructed. Savings from most appliances are available only as appliance stock turns over. If the savings from these lost-opportunity resources are not acquired within this limited window of opportunity, they are treated as lost and no longer available to be deployed.

The third step in the Council's process is to establish any timing constraints on the availability of the conservation contained in these supply curves. These constraints are needed in the Council's portfolio modeling process. The portfolio model selects the quantity and timing of all resource development. Because significant quantities of conservation are available at costs below most forecasts of future market prices, the portfolio model will "dispatch" all of the low-cost conservation immediately unless the pace of conservation deployment is constrained.

Thus the Council establishes two types of constraints on the amount of available conservation. The first is on the rate of annual deployment. This constraint represents the upper limit of annual conservation resource development. In the Council's Fifth Northwest Power Plan, non-lost opportunity resource development was limited to 120 average megawatts per year. On the other hand, lost-opportunity resources are more difficult to capture because of the limited window of

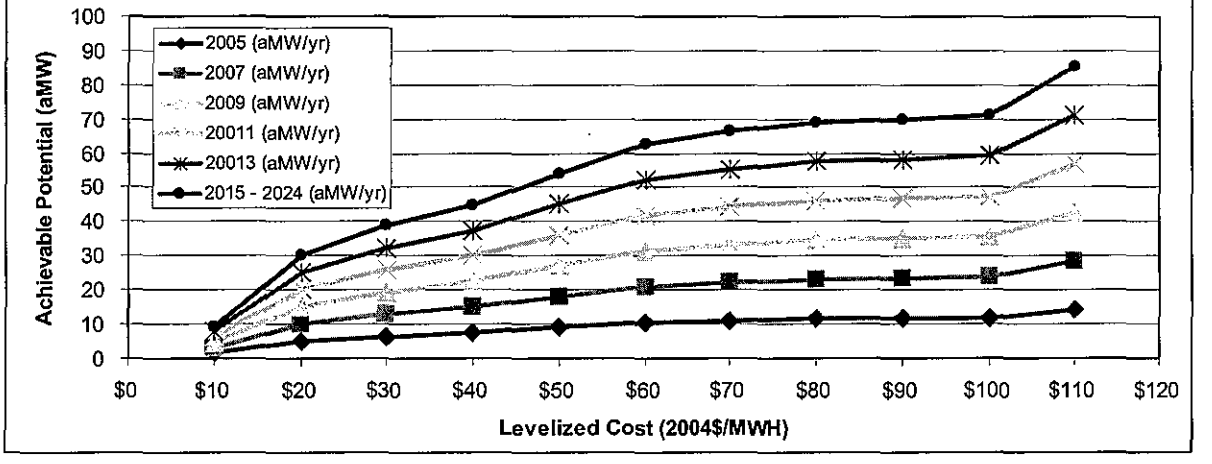
[4] More energy efficiency clothes washers use less water and hence require less detergent.
[5] Lost-opportunity resources are those that can only be technically or economically captured during a limited window of opportunity, such as when a building is built or industrial process is upgraded.

opportunity. So lost-opportunity deployment was based on penetration rates of 15 percent achievable in 2005 and increasing to 85 percent achievable over 12 years.

The second constraint is the maximum achievable potential over the 20-year period covered by the Council's power plans. In the case of non-lost opportunity resources, the Council set an upper limit of 85 percent of the technically feasible and cost-effective savings. Because lost-opportunity resources are phased in to an upper limit of 85 percent market penetration over 12 years, the cumulative 20-year penetration of lost-opportunity conservation equates to 65 percent of the technically feasible and cost-effective savings.

Figures 1 and 2 show the conservation supply curves for lost-opportunity and non-lost-opportunity resources used in the Council's Fifth Power Plan.

Figure 1 - Annual Lost-Opportunity Achievable Potential Supply Curve



As shown in Figure 1, the Council's planning methodology anticipates that the share of lost-opportunity resources that is achievable at a given cost increases over time. For example, at up to a levelized cost of $60 per megawatt-hour, only 10 average megawatts of the lost-opportunity resources are considered achievable in 2005. However, for the years 2015 and beyond, just over 60 average megawatts of savings are available each year at this same levelized cost.

Figure 2 shows the total achievable potential of non-lost opportunity resources.

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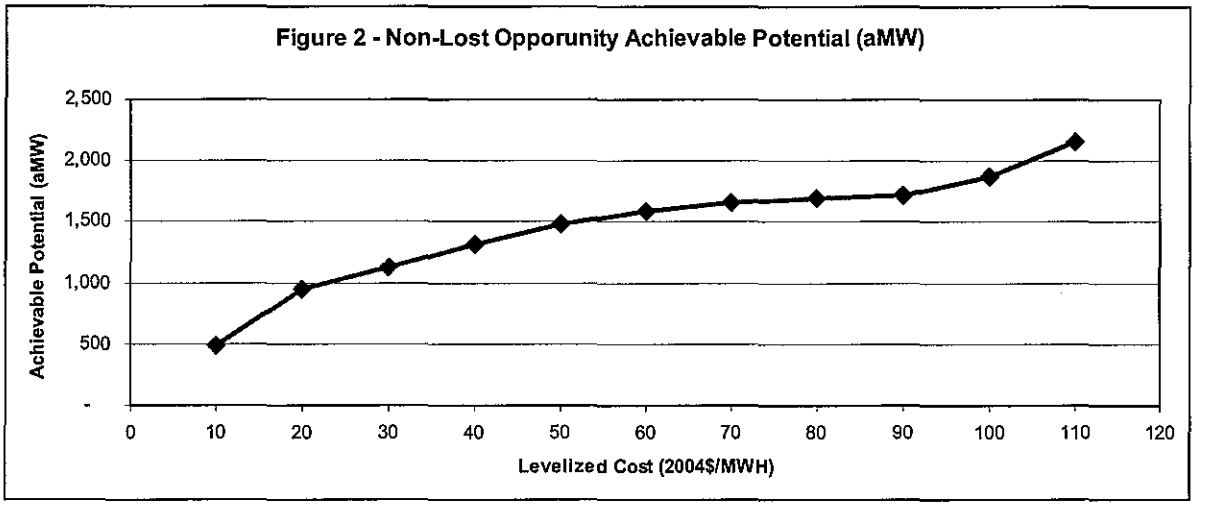


Figure 3 shows the expected value and annual deployment rate of those resources from 2005 through 2024 as well as the annual deployment rate of lost-opportunity resources over this same time period. As can be seen from Figure 3, the maximum amount of non-lost opportunity resource development remains constant at 120 average megawatts per year until 2015 and then declines significantly. This is a result of the fact that by 2015 all of the lower cost (<$50 /MWH) non-lost opportunity resources have been acquired and only in futures where prices are higher are the more costly conservation resources developed. A total of about 1,600 average megawatts of non-lost opportunity conservation resources are deployed over 20 years. But most of it, about 1,400 average megawatts, is deployed in the first 12 years. Figure 3 also shows that the amount of lost-opportunity resources developed annually increases over time until it reaches a "steady state" of around 70 average megawatts per year. That level represents 85 percent of the annual technical and cost-effective lost-opportunity potential. However, in the first 10 years, the Council assumes a gradual ramp up of achievable lost-opportunity conservation resources.

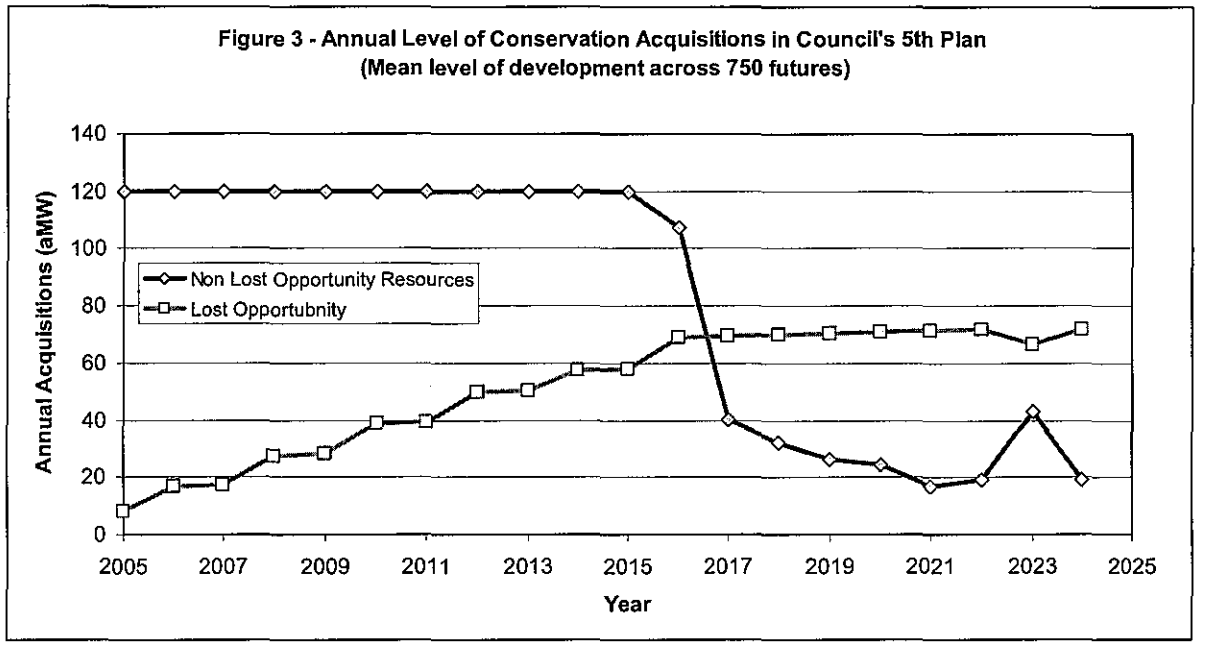


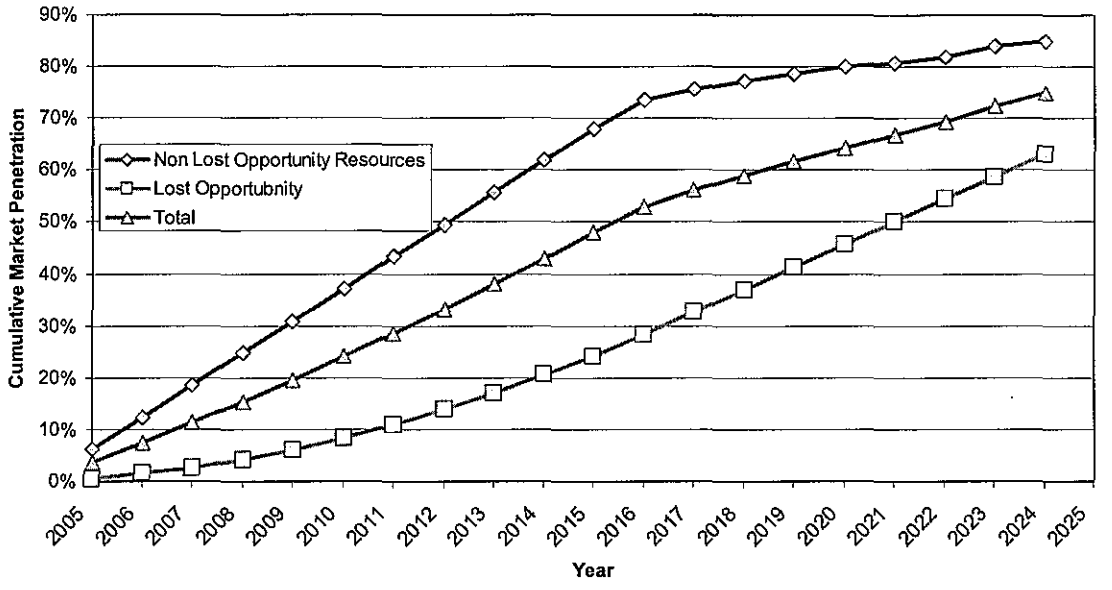
Figure 4 shows the cumulative maximum market penetration rate for lost-opportunity, non-lost opportunity and the total for conservation resources used in the Council's 5th Plan for each year covered by that plan. As can be seen from this figure, ten years into the plan (2014) the cumulative maximum market share of lost opportunity resources is 21 percent of their 20-year technical and economic potential. Also by this year, the cumulative maximum market penetration rate for non-lost opportunity resources is 62% of their of their 20-year technical and economic potential. In aggregate, across both non-lost opportunity and lost-opportunity resources the Council's 5th Plan limits cumulative achievable potential to about 43 percent of their 20-year technical and economic potential.

Basis of "Achievable Potential" Constraints

The first two filters in the Council's screening process, technical feasibility and cost, involve less "subjective" assessments than does the application of the "achievability" filter. Therefore, it is important to understand the basis of the Council's constraint on achievable conservation. The Council established the 85-percent upper limit in its first power plan in 1983 and has used this limit in all subsequent plans. The limit is based on the actual achievements in the Hood River Conservation Project sponsored by the Bonneville Power Administration and operated by PacifiCorp (then called Pacific Power and Light Company). The Hood River Conservation Project made weatherization measures available to all Hood River County residents with electric heat at no cost over a period of two years. In this project 83 percent of technically feasible (i.e. audit recommended) weatherization measures, representing 93% of the potential savings in the electrically heated residences were installed within a period of two years.[6]

[6] Hirst, E. 1987. Cooperation and Community Conservation: The Hood River Conservation Project, ORNL/CON-235, pp. 36-37.

Figure 4 - Cumulative Market Penetration in Council's 5th Plan (Mean level of development across 750 futures)



While the Hood River project set one mark for how much conservation is achievable, the Council also adopted the 85-percent value because, in its judgment, the region had access to multiple "tools" that could be used to achieve this goal. First, the region had *20 years* to achieve the 85 percent goal, even though it was accomplished in just two years in Hood River.[7] Second, Bonneville and utilities can offer significant financial incentives to encourage consumers to adopt energy-efficient technologies and practices called for in the Council's power plans. Indeed, by definition, Bonneville and utilities can offer to pay up to the full incremental cost of all cost-effective energy-efficient technologies or practices to encourage consumers to install them. In the Council's judgment, it seems realistic to assume that the combined ability to offer the more energy-efficient technologies and practices at no additional cost to consumers over a 20-year period would result in an 85-percent market penetration of those measures. Finally, in addition to offering financial incentives, that Bonneville and utilities had the ability to work at both the state and federal level to enact standards and improve codes that would require the use of more energy-efficient technologies and practices by law.

In addition to the Hood River project, the Council is aware of only one other empirical test of comparable scale that addresses the question of how much of the technically and economically feasible conservation potential in the region is actually "achievable."

[7] The Council also viewed its 85-percent goal as having limited risk because its power plans are updated every five years. If progress toward the goal is slow, then adjustments to the timing of the development of other resources can be made.

1983 Power Plan Achievable Conservation Potential: Goals and Actual Achievements

The 1983 Plan included a range of future load growth forecasts and resource scenarios to meet them. In the "high forecast" case, the 1983 Plan targeted over 4,900 average-megawatts of conservation savings by 2002. In the "low forecast" case, the plan's target was less than 700 average-megawatts. According the Council's recent analysis, by the end of 2002 the region had acquired just over 2,300 average-megawatts of savings. It is not possible to directly compare this value with the "achievable potential" in the 1983 Plan, for two reasons. First, the "actual" load growth experienced between 1983 and 2002 does not correspond with any of the 1983 Plan's four forecasts. Thus, the amount of potentially achievable "lost-opportunity" resources that could have been developed does not match the 1983 Plan's resource assessment. Second, Bonneville and utility conservation acquisition programs did not operate in a sustained manner over this period. In fact, during the mid 1980s and late 1990s Bonneville and utility conservation programs were significantly curtailed. Therefore, any comparison between the 1983 Plan's conservation goals, which were forecast to be achievable through stable and aggressive programs over 20 years, and the actual results would be misleading.

However, it is possible to compare many of the 1983 Plan's specific estimates of achievable potential with what actually occurred. In particular, the 1983 Plan contained a detailed forecast of achievable conservation potential for residential and commercial buildings, appliances, and equipment.[8]

Residential Sector

The 1983 Plan estimated achievable conservation potential for space heating in new and existing residences, appliances, lighting, and water heating. With respect to space heating new residences, the Plan called upon the region to adopt energy codes that were equivalent to the Council's Model Conservation Standards (MCS). The MCS represented a 40-percent savings over the construction practices and codes of 1983. Table 1 below compares the "prescriptive requirements" of 1983 Model Conservation Standards with the 1992 energy code requirements in Oregon and Washington. The table shows that by 1992 energy code requirements in Oregon and Washington were nearly identical to the Council's 1983 MCS. These energy code requirements were adopted in Oregon in 1992 and in Washington in 1991, less than 10 years after the Council established the MCS.

The Council's 1983 Plan anticipated that it would take until 2002 for the region to achieve 85 percent of MCS savings potential. Table 2 shows the estimated regional (all four states) average electric space heating requirements, normalized to kilowatt-hours per square foot, for new homes built under various "vintages" of energy codes. This table shows that by 1992 the entire region had already achieved that goal (85 percent of 40 percent is 34 percent) and that by 2006 the region had slightly exceeded the Council's original MCS efficiency levels.

[8] 1983 Northwest Power and Conservation and Electric Power Plan, Volume II, Appendix K. Northwest Power Planning Council. Portland, OR.

Table 1 1983 Plan Model Conservation Standards versus 1992 Oregon and Washington Energy Code Requirements						
Component	MCS - Zone 1	MCS - Zone 2	MCS - Zone 3	WA Code - Zone 1	WA Code - Zone 2	OR Code All Zones
Ceiling/Attic	R-38	R-38	R-38	R-38	R-38	R-38
Wall	R-19	R-25	R-25	R-19	R-19	R-21
Floor	R-30	R-30	R-30	R-30	R-30	R-25
Window	U-0.37	U-0.37	U-0.37	U-0.40	U-0.35	U-0.40
Door	R-5	R-5	R-5	R-5	R-5	R-5
Slab	R-10	R-12	R-15	R-10	R-10	R-15

Table 2 Regional Average Annual Space Heating Use of New Single Family Homes Constructed Between 1983 and 2006			
Vintage	Annual Use (kWh/SF/yr.)	Percent of 1983 Use	Improvement over 1983
1983	6.3	100%	0%
1986	5.5	88%	12%
1989	5.4	86%	14%
1992	4.0	64%	36%
Current Practice - 2006	3.7	59%	41%

Further evidence of the pace of efficiency improvement in new homes is shown in Table 3. This table shows the average heat loss rate derived from field audits of a random sample of homes across the region collected as part of a regional heat pump performance evaluation. As can be seen from Table 3, the average heat loss rate of the homes in the 2001 vintage is 35 percent lower than for the homes built in 1983, clearly reflecting the improvements in energy codes and construction practices across the region. For site-built homes, regulation via state energy codes was critical to achieving high rates of market penetration. Furthermore, improvements in the state's energy codes and federal standards remain an excellent tool for capturing further energy efficiency savings.

Manufactured housing provides an example of similar achievable penetration rates, but without reliance on the regulatory approach used to achieve the savings from site built housing. The 1983 Plan assumed that the MCS did not apply to new manufactured homes because federal law pre-empted the state regulation of energy efficiency aspects of these homes. Consequently, no savings from this market segment was included in that Plan's forecast of achievable potential. However, beginning in the mid-1980s the region's manufactured housing industry began working with Bonneville and the state energy offices to develop options for improving the efficiency of these homes -- over 80 percent of which use electric space heating. Early in 1992, just as the new "MCS equivalent" energy codes for site-built homes were adopted, all of the region's manufactured home builders agreed

Table 3 - Average Heat Loss Rate for New Single Family Homes Built Between 1980 - 2003		
Vintage	Heat Loss Rate (BTU/hr/sq.ft. floor area	Improvement over 1983 Code/Practice
1980-1984	0.260	0%
1985-1988	0.247	5%
1989-1991	0.194	25%
1992-1999	0.182	30%
2000-2003	0.170	35%

to build all of their new electrically heated homes to MCS levels. Since 1988 over half (54%) of new electrically heated manufactured homes generated savings that were not envisioned as "achievable" in the 1983 Plan.

Table 4 shows the annual penetration rate achieved for "MCS-level" efficiency manufactured homes between 1988 and 2005. Two periods shown in this table are noteworthy. The first period of interest is the period between 1988 and 1994, which indicates the rapid increase in market penetration of these more efficient homes. This period demonstrates that with a concerted effort and program design, the region achieved almost 90 percent of the technically feasible and cost-effective potential of this lost-opportunity resource without regulation. It is also worthy of note that this far exceeds the pace of market share increase assumed over 12 years as the upper limit of achievability for lost-opportunity resources used in the Council's Fifth Power Plan.

Table 4 - Model Conservation Standard Equivalent Manufactured Home Shipments and Market Share 1988 - 2006			
Year	SGC/NC Shipments	Total Shipments	SGC/NC Market Share
1988	29	9,049	0%
1989	135	9,967	1%
1990	684	11,875	6%
1991	2,081	11,815	18%
1992	11,000	13,784	80%
1993	15,094	17,535	86%
1994	18,356	20,512	89%
1995	15,710	19,641	80%
1996	11,503	17,125	67%
1997	9,231	17,301	53%
1998	7,677	17,996	43%
1999	5,366	14,620	37%
2000	3,475	9,564	36%
2001	3,828	7,437	51%
2002	4,887	8,029	61%
2003	4,669	7,384	63%
2004	4,654	7,601	61%
2005	4,754	7,834	61%
1988 - 2005	123,133	229,069	54%

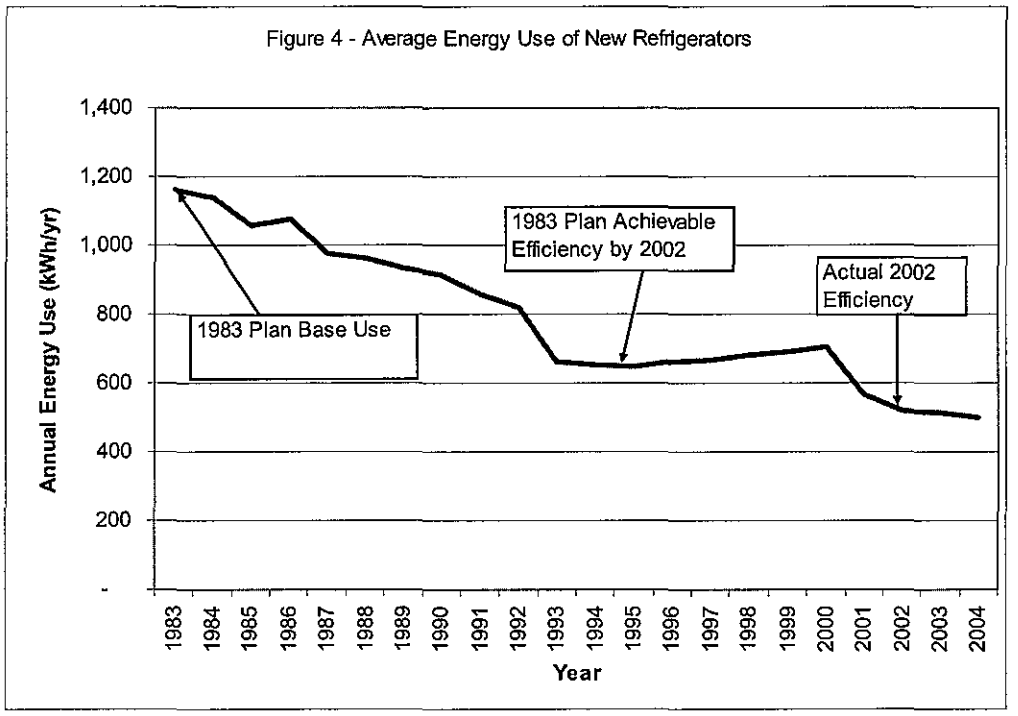
The second period of note is between 1996 and 2002 when the region's manufacturers first abandoned the production of energy-efficient homes and then returned to building these homes after discovering that the market did not want the less-efficient products they were trying to sell. While not specifically germane to the issue of "achievable potential," this market trend clearly demonstrates that even without regulation, higher levels of efficiency for manufactured housing sold in this region has become the market norm.

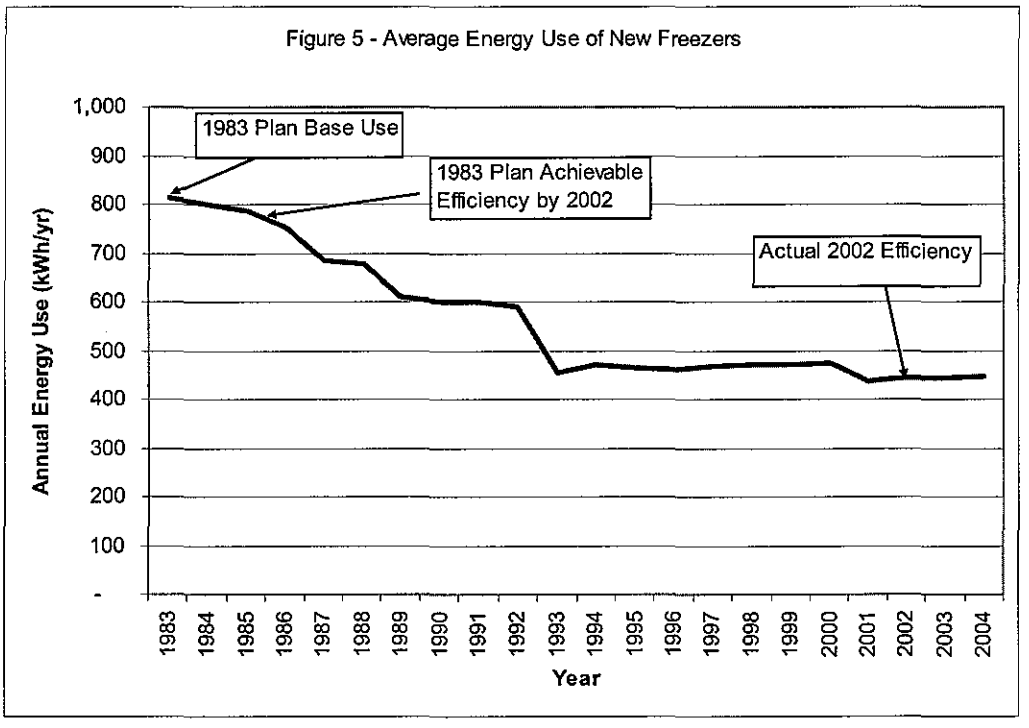
The 1983 Plan anticipated that by 2002 the region would have weatherized approximately 1.27 million existing electrically heated homes. Unfortunately, data collection processes that permit a direct comparison with this forecast were not in place during the period prior to 1991. However, current utility residential weatherization programs continue to produce savings, so it is clear that not all homes in the region have been fully weatherized. It is also clear that the pace of residential weatherization has slowed considerably since the early 1980's. For example, less than 7 average megawatts of residential weatherization savings were reported by the utilities participating in Bonneville's Conservation and Renewable Resources Rate Discount Program for the fiscal years 2001 through 2006. In comparison, Bonneville reported over 50 average megawatts of residential savings from 1991 through 1996, primarily from residential weatherization measures. While this may or may not be an indication of whether the 85 percent market saturation rate of technically and economically feasible measures has been reached, it does appear that this market is reaching saturation.

Residential appliances offer another window into the viability of achievable conservation assumptions. Data on the energy savings from major residential appliances, water heating and lighting are available. The 1983 Plan assumed that by 2003 average residential water heating use could be reduced by about 12 percent from roughly 5,150 kilowatt-hours per home per year to 4,530 kilowatt-hours per home per year. Three measures were identified to achieve this: 1) increased tank insulation; 2) lower-flow showerheads, and 3) lower the water tank temperature (from 140 degrees Fahrenheit to 130). As of 1991 the minimum federal standard for electric water heaters required that the average 50 gallon tank use less than 4,220 kilowatt-hours per year. This surpasses the Council's forecast of achievable potential with just one of these three measures (tank insulation) in less than ten years. In 1994 federal standards mandated that showerheads not exceed flow rates of 2.5 gallons per minute and that temperature on all water heaters be set at the factory at 120 degrees Fahrenheit for safety reasons. The 1994 federal standard was below the 2.75 gallons per minute showerhead flow rate assumed to be achievable in the 1983 Plan. In combination with the mandated lower water temperature, the achievable energy savings from residential water heating were nearly 50 percent higher than anticipated in the 1983 Plan.[9] Furthermore, the Council's 20-year target for improving water heating efficiency by 12 percent was exceeded in just ten years.

In 1983 the Council forecast that the achievable potential savings between the average electricity consumption of a new refrigerator and the most efficient model on the market would result in a savings of 515 kilowatt-hours per year. For freezers, the savings potential was just 35 kilowatt-hours per year. The Council did not break out its specific assumptions for clothes washers and dishwashers, but it did indicate that between these two appliances it anticipated that an annual savings of 340 kilowatt-hours should be achievable by 2002. Figures 4 and 5 show the "sales-weighted average" energy use of each of these appliances by year of purchase. As can be seen from these figures, the actual efficiency improvements for both refrigerators and freezers not only exceeded the forecast of achievable potential in the 1983 Plan, but they were achieved far early than forecast. Figures 4 and 5 are based on data reported by the Association of Home Appliance Manufacturers (AHAM), the appliance manufacturing industry trade association.

[9] In 2004, the federal minimum standard for a typical 50 gallon electric water heater resulted in electricity use of 4,060 kilowatt-hours per year.





Figures 6 and 7 show AHAM's sales-weighted average energy use for dishwashers and clothes washers for each year between 1983 and 2004. Also shown are the 1983 Plan's implied achievable potential savings for new dishwashers and clothes washers. As was the case with refrigerators and freezers, it appears that the 1983 Plan's forecast of achievable savings for dishwashers proved to be overly conservative. On the other hand, the Council's assessment of

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achievable efficiency improvements in clothes washer efficiency roughly correspond to the actual improvement in this appliance's energy use in 2002. However, it should be noted that by 2004, just two years later, the sales weighted average energy use of new clothes washers was *almost half* that anticipated in 1983 for machines sold in 2002.

Figure 6 - Average Energy Use of New Dishwashers

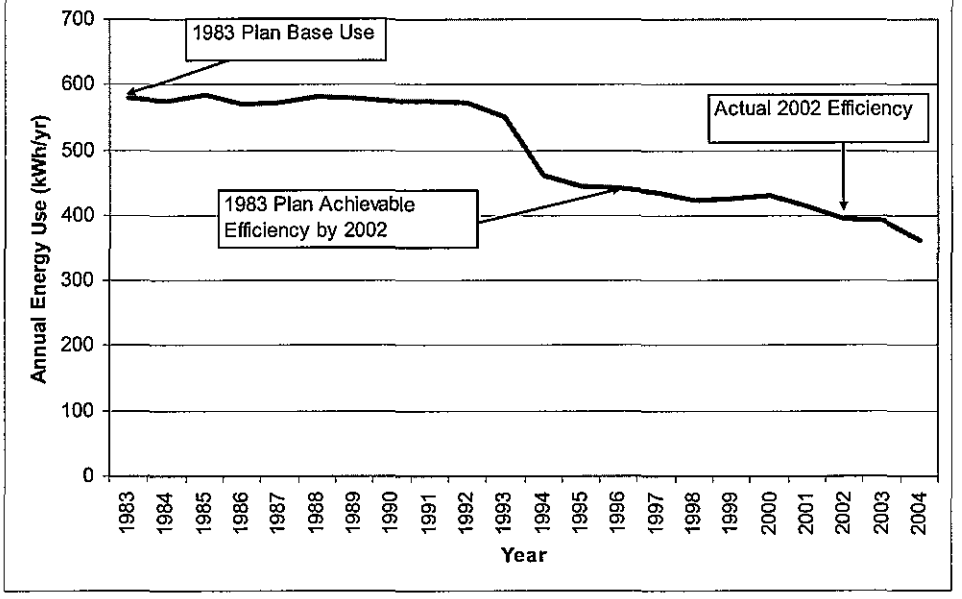
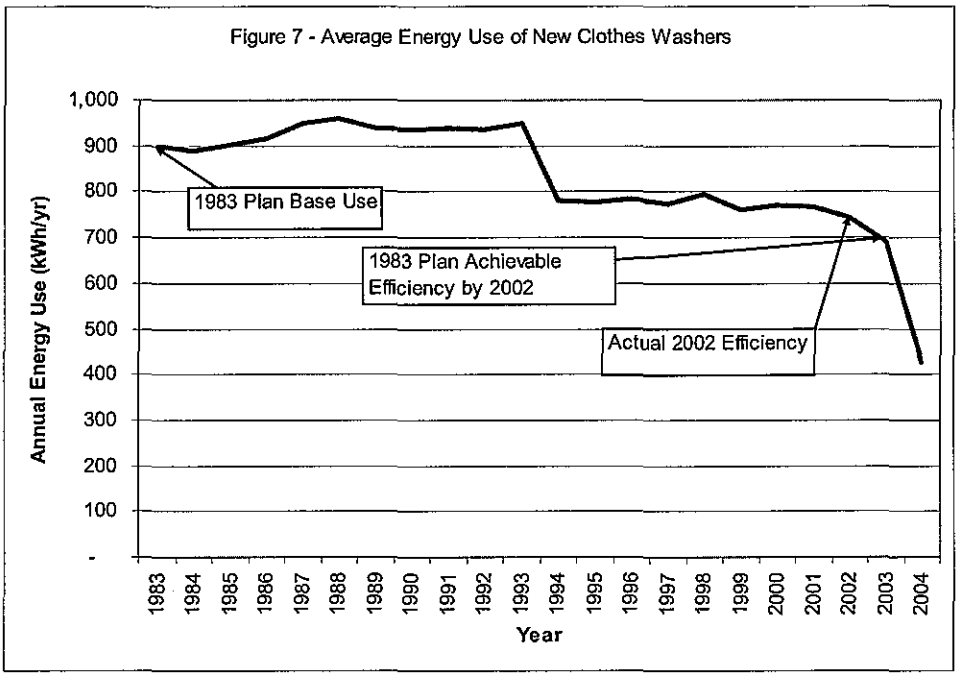


Figure 7 - Average Energy Use of New Clothes Washers



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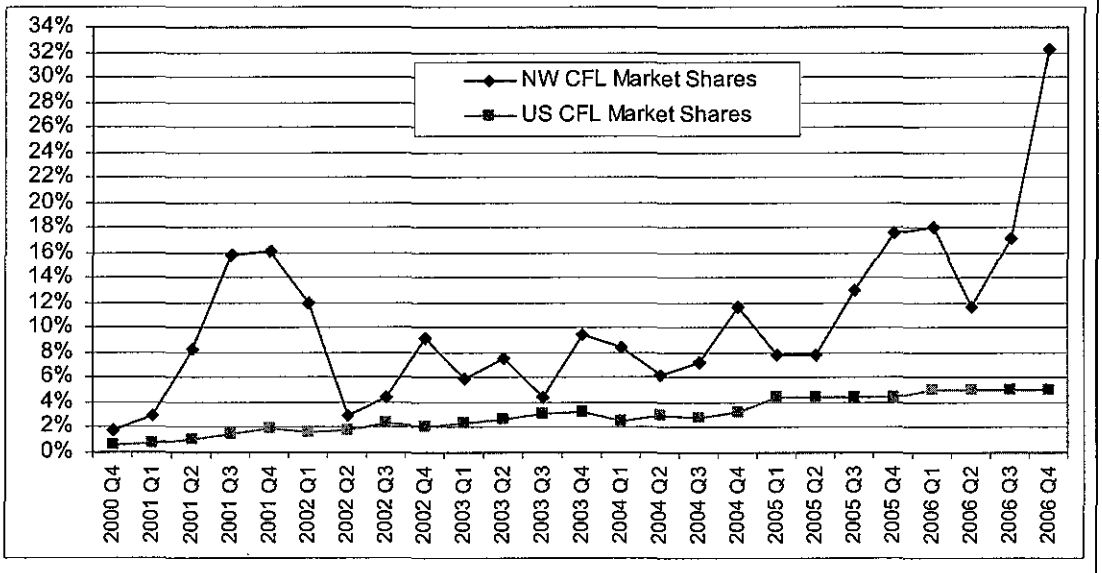
The 1983 Plan also anticipated efficiency improvements in residential lighting. That plan assumed that by 2002 the average home would use approximately 170 kilowatt-hours per year less for lighting than it did in 1983. While the 1983 Plan assumed that linear fluorescent lighting technologies could be employed to achieve these savings, it appears that compact fluorescent lamps (CFLs) are actually being used to achieve most of these savings. Based on surveys done for the Northwest Energy Efficiency Alliance, it appears that on average homes in the region had two to three CFLs installed by the end of 2002[10]. Based on the Council's current savings assumptions, this would translate into between 70 and 105 kilowatt-hours per home per year of savings. These savings are approximately half those anticipated as being achievable in 1983.

Since 2002, the penetration of CFLs in the residential sector has increased dramatically. Figure 8 shows that the regional market share of CFLs increased from 9 percent in the fourth quarter of 2002 to 32 percent in the fourth quarter of 2006. Such evidence does not prove the region can reach an 85 percent penetration rate in 20 years. But it is a strong indicator that high penetration rates for some non-lost opportunity measures are possible in a short time frame. The high market share for CFLs is due to a combination of mechanisms which rely heavily on federal and regional market transformation strategies, as well as utility incentives which have been a fraction of measure cost.

Figure 8 -Estimated ENERGY STAR CFL Market Share for the Northwest and U.S., 2000-2006



Sources: NW CFL sales 2000-2006: PECI and Fluid Market Strategies sales data reports; and NEEA estimate of an additional 1.5 million WAL-MART CFLs sold region-wide in 2006 (See Appendix A [Section 9.1.1] of MPER3 for more detail); U.S. and NW population estimates 2000-2006: U.S. Census 2004; U.S. market shares and non-CFL sales 2000-2005: Itron California Lamp Report (2006); U.S. market share 2006: D&R International (personal communication).

[10] ECONorthwest, Market Progress Evaluation Report, No. 1 (E02-101), prepared for NEEA June 20, 2002.

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Commercial Sector

The available data for commercial buildings tell a similar story; today's energy codes far exceed the achievable penetration rates identified by the Council twenty years ago. In the 1983 Plan (as is the case in the Fifth Power Plan) the largest portion of the commercial sector's achievable conservation potential was forecast to come from improvements in lighting. Lighting was estimated to make up about 45 percent of commercial sector electric use in 1983. Lighting power density, as measured by watts per square foot, is one metric that can be used to gauge the progress in lighting efficiency over time. Table 5 compares the lighting power densities for four major building types forecast to be achievable in the Council's 1983 Plan through adoption of its Model Conservation Standards for New Commercial Buildings with the current requirements of the commercial energy codes in the region. Table 5 shows that for office buildings and schools, current code requirements far exceed the levels of efficiency forecast to be achievable in 1983. For retail stores and warehouses, the 1983 Plan's assessment of achievable efficiency levels appears to be very near current code requirements. Offices, schools, retail stores, and warehouses make up about 60 percent of total commercial sector building floor space.

In addition to lower lighting power densities, the 1983 MCS also made recommendations on several lighting-control measures that have largely been adopted -- or exceeded in local codes throughout the region. The 1983 MCS included switchable lighting circuits that would allow manual or automatic control to turn off half the lighting circuits in spaces over 400 square feet. Current energy codes in all four states have adopted similar or superior provisions. The 1983 MCS called for automatic controls on outdoor lighting to turn lights off during daylight hours. That measure has been adopted in all local codes in the region. The 1983 MCS also required lighting circuits be designed to accept manual or automatic day lighting controls for areas within 12 feet of windows in office and school spaces. That measure is in code in Washington. In addition, current energy codes go much farther in lighting controls than was anticipated in the 1983 MCS. For example, occupancy sensors are required in Oregon and Washington on certain classroom, office and conference spaces. Automatic night-time control of interior lighting is required in all four states for all but the smallest buildings.

Table 5
Commercial Building Maximum Lighting Power Densities in 1983 Commercial Model Conservation Standards and Current Regional Energy Code Requirements

	Lighting Power Density (watts/sq.ft.)				
Building Type	1983 Commercial MCS	OR 2004	WA 2004	ID & MT	Seattle 2004
Office buildings	1.5	1.0	1.0	1.0	1.0
Retail Stores	1.5	Varies 1.5+	Varies 1.5+	Varies 1.5+	Varies 1.5+
Schools	2.0	1.1	1.35	1.2	1.2
Warehouses	0.7	0.5	0.8	0.8	0.5

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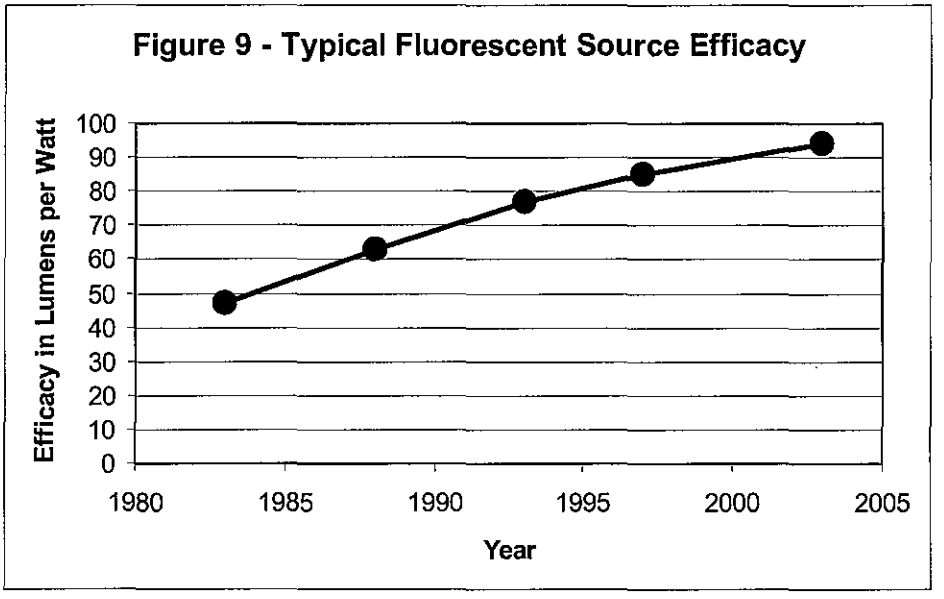
Lighting improvements for existing commercial buildings show similar trends of exceeding 1983 estimates of conservation potential. Two extensive surveys have been conducted to assess the energy-related characteristics of existing commercial buildings in the region. The first was carried out in 1987, about five years after the 1983 Plan was adopted. The second was completed in 2002. Table 6 shows the average lighting power density of the sample of existing buildings in 1987 and these same buildings in 2001. During this time period lighting power density was reduced by 20 percent across all buildings and from 13 to 21 percent in office and retail buildings. The 1983 Plan did not estimate lighting conservation potential specifically for existing commercial buildings. But overall electric conservation potential was identified as about 28 percent of electric use in 1982. By 1987, utility programs had already started to take a bite out of the conservation potential identified in 1983. Lighting represented about 45 percent of electricity use in commercial buildings in 1983. So a 20-percent reduction in existing lighting power density in the 14 years between 1987 and 2001 represents at least a 10-percent reduction in overall electric use for older buildings. Because lighting represents 45 percent of all commercial uses of electricity, the 25-percent reduction in lighting power density shown in Table 6 for existing buildings translates into 11 - 12 percent overall building efficiency improvement.

Table 6 - Change in Lighting Power Density for Existing (Pre-1987) Buildings Between 1987 and 2001

	Lighting Power Density (watts/sq.ft.)			Reduction in Lighting Power Density (%)		
Audit/Survey Date	All Buildings	Offices	Retail	All Buildings	Offices	Retail
As found in 1987	1.5	1.6	1.9			
As found in 2001	1.2	1.4	1.5	20%	13%	21%

Another gauge of lighting improvement is to look at the huge technological improvement in lighting efficacy, particularly fluorescent lighting, which accounts for about two thirds of commercial lighting. At the time of the 1983 Plan, improvements in lighting were available through improved fixture design, reduced lighting levels, and conversion from incandescent lighting to fluorescent or other high-efficiency lighting. Only modest improvements, on the order of 10 percent, were available in the efficacy of fluorescent light sources themselves -- the lamps and ballasts. But since 1983, improvement in the efficacy of fluorescent light sources has doubled. Figure 8 shows fluorescent source efficacy, as measured by lumens of light output per watt of electric input. Source efficacy for fluorescent lighting, the ability to turn electricity into light, increased from 47 to 94 lumens per watt over the twenty years from 1982 to 2002. In 1987, typical office lighting power density was about 2.0 watts per square foot[11]. By combining the 50-percent improvement in fluorescent source efficacy with additional improvements in fixture design, reduced lighting levels, and conversion from incandescent lighting to fluorescent lighting and other high-efficacy sources, it is clear why new office lighting designs can get to 0.7 watts per square foot, about one-third of what they were in 1983 and well below what was thought possible at the time.

[11] PNNonRes Phase II Results, Table 10c



In addition to improvements in lighting efficiency, the 1983 Plan forecast achievable savings from increases in the efficiency of heating, ventilating and air conditioning (HVAC) equipment. Table 7 compares the 1983 Plan's expected minimum efficiency requirements for cooling equipment efficiency levels with the minimums have been required by code in all states in the region since 2001. What is clear is that current minimum efficiency requirements far exceed those envisioned as achievable in 1983. The minimum efficiency requirements (SEER) for cooling equipment under 65,000 Btu/hr in all Northwest states is 66 percent above that expected in the 1983. Similarly, for larger equipment the minimum efficiency requirement is 22 percent above that anticipated for 2002 in the 1983 commercial MCS.

Table 7 - Commercial HVAC Equipment Efficiency Specifications

System Type	Capacity Under 65,000 Btu/hr		Capacity 65,000 Btu/hr and Larger	
	1983 Achievable SEER[12]	Current Code Minimum SEER	1983 Achievable EER[13]	Current Code Minimum EER
Air Cooled	7.8	13.0	8.2	11.0

Irrigation Sector

In 1982 total irrigated acreage in the region was roughly 8.9 million acres and irrigation electricity use that year was 695 average megawatts or 655 kilowatt-hours per acre per year. In 2002 the irrigated acreage in the region was virtually unchanged from 1982 while electricity used for irrigation had dropped to 595 average megawatts or 579 kilowatt-hours per acre per year.

[12] SEER = Seasonal Energy Efficiency Ratio. This is the annual ratio of electricity used per unit of cooling energy provided. A SEER of 6.826 equals an annual coefficient of performance of 2.0 (6,826 Btu of cooling for each kilowatt-hour -- 3413 Btu -- of electricity use)

[13] EER = Energy Efficiency Ratio. This is the instantaneous ratio of electricity used per unit of cooling energy provided.

The 1983 Plan assumed that if all achievable efficiency measures (e.g., reduced pressure, center pivot sprinkler systems) and practices (e.g., irrigation water scheduling) were implemented by 2002, electricity use for irrigation would drop to 596 kilowatt-hours per acre per year. Actual irrigation efficiency gains, therefore, slightly exceeded those forecast in the 1983 Plan.

Industrial Sector

Energy efficiency progress is difficult to measure on a broad scale in the industrial sector. Confounding issues include the changing mix of industries, products, and feedstocks, the general lack of applicable codes and standards, and the ability to substitute fuel and electricity in some processes. In 1983 the Council's forecast of achievable conservation potential was equivalent to about 6 percent of non-DSI industrial electric loads. Incremental improvements in minimum efficiency levels for electric motors alone have yielded a good share of that potential over the last twenty years. Motors comprise something on the order of 60 percent of industrial energy use. Minimum efficiency standards now in place are a 3 to 10 percent improvement over 1983 efficiency levels for motor sizes covered by federal standards.

Further, motor efficiency is a small part of what has been accomplished in the industrial sector. There are many industrial plants and processes that have far exceeded a 6-percent efficiency improvement by improving their processes and facilities. These include documented improvements of 20 to 30 percent in cold-storage facilities, savings of 15 to 30 percent in compressed air systems for many plants across different industries, lighting improvements of about 50 percent in manufacturing spaces with high ceilings, and many industry-specific process changes in the range of 20-percent improvement. In addition, NEEA has operated several successful industrial market transformation projects. For example, the NEEA and Siemens project on silicon crystal-growing facilities reduced electric power consumption for producing silicon crystals by 50 percent[14]. Savings from this project occurred in an industry that barely existed in 1983.

Summary and Conclusions

There is ample empirical evidence to support retaining the Council's assumptions for the upper limit on achievable conservation potential. Both the 85-percent upper bound on the achievable potential for non-lost opportunity resources and the approximately 65-percent cumulative upper bound on the achievable potential for lost-opportunity resources over a 20-year period are supported by experience of the last 20 years. Further, the Council's assumed maximum near-term achievable acquisition rates, which are the critical limiting factor, are well-supported and may be conservative when compared to what has occurred in practice.

In its 1983 Plan the Council forecast that significant improvements in the energy efficiency of a wide array of residential and commercial appliances, equipment and buildings could achieve an 85-percent market share by 2002. With some exceptions, nearly all of the actual improvements in residential appliances and water heating have far exceeded the 1983 Plan's expectations. In its

[14] Market Progress Evaluation Report, Silicon Crystal Growing Facilities, No. 2, Report #E01-090, prepared by Research Into Action, Inc., for NEEA, November 2001.

6D

1983 Plan the Council called upon the states in the region to improve residential energy codes by approximately 40 percent and commercial energy codes by 10 percent. Before the end of 1992 the two most populous states in the region, representing over 80 percent of new home construction and nearly 85 percent of new commercial floor space, had met the savings goals. By 2002 all of the states in the region had met the Council's original residential MCS and exceeded its original commercial MCS by at least 10 percent.

The 1983 Plan forecast that a 43-percent efficiency improvement in new residential refrigerators was achievable by 2002. This level of efficiency gain was not only achieved 10 years early (1992), but by 2002 new refrigerators used only 55 percent of the energy they did in 1983, even though they were both larger and more of them were frost-free. Freezer and dishwasher efficiency improvements also far exceed the 1983 Plan's assessment of achievable potential. Freezers met the first Plan's efficiency target in 1984, and by 2002 these appliances were using 45 percent less energy that was viewed as "achievable" in 1983. Dishwashers in 2002 used 32 percent less energy than they did in 1983, far exceeding the first Plan's goal of a 24-percent savings.

It is important to recognize that energy codes for buildings and appliance efficiency standards have contributed greatly to the acquisition of conservation over the last twenty years. Many of the conservation accomplishments outlined in this retrospective rely in part on codes and standards to achieve high penetration rates. Utility influence has been critical to the adoption of better codes and standards. Utility programs have demonstrated that new measures beyond codes are viable and that some can eventually be codified. Past performance does not guarantee future success. But with respect to codes and standards, the region is better positioned today to employ these mechanisms for future conservation acquisition than when the 1983 plan was adopted. When the first plan was adopted there were no federal appliance standards, state energy codes had only been in place for two years and there was no established process for code revision. All of these mechanisms are now in place.

A few conservation measures included in the 1983 Plan, such as residential heat pump water heaters, have not yet realized the anticipated penetration. However, savings from measures not envisioned in the 1983 Plan, such as those from low-flow showerheads and energy-efficient new manufactured housing, more than offset the unrealized savings. The fact that the first plan did not perfectly forecast these outcomes should not alter the overall finding with regard to "achievability." The Council updates its plan's every five years. Adjustments both upward and downward to its assessment of what is technically and economically achievable can be made on the basis of actual program experience and technological changes. Since each planning cycle offers the Council the opportunity to reassess the risk of relying on conservation to defer or reduce the scale of other resource additions near-term experience will always trump long-term forecast.

While the Council staff believes there is ample empirical evidence to support existing assumptions of 20-year achievable penetration rates, it is important to note that the 20-year forecast window for achievable conservation is less important today than it was in 1983 when

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generating resource lead times were long[15]. New generating facilities and transmission system expansions now can be brought on line in three to five years. Therefore, the need to accurately predict the achievable market penetration rate of an energy efficiency measure 20 years into the future is greatly reduced. Much more relevant to present-day resource planning decisions is what is achievable in the near term. The pace at which conservation programs can be "ramped up" and maintained over the near-term period is critical and of more practical importance than 20-year forecasts. There is solid evidence, presented here, that near-term achievable conservation rates have been higher than the Council's planning assumptions for both lost-opportunity and non-lost opportunity measures.

The historic effect of codes and standards in comparison to the Council's 1983 Model Conservation Standards reveals that in most cases, Council forecasts of 20-year achievable potential for lost-opportunity measures were met or exceeded in 10 years or less. In fact, several exceed 100-percent penetration in ten years, far exceeding the Council's near-term assumption of approximately 20-percent penetration in 10 years for lost-opportunity measures.

There is also ample evidence from utility programs that indicate conservation acquisition programs for non-lost opportunity measures can be scaled up rapidly. Figure 9 shows annual regional utility program conservation savings from 1980 through 2005. There are three periods, in the early part of each decade, where program savings have more than doubled in just one or two years. These increases were driven almost entirely by acceleration of programs for non-lost opportunity measures. In the last five years the region has maintained acquisition levels of 130-150 average megawatts per year. Retrofit conservation comprises 110-120 average megawatts per year of that total. If that pace were maintained, it would take 12 to 14 years, not 20, to reach the 85-percent penetration rate for the 1,500 average megawatts of cost-effective non-lost opportunity conservation identified in the Fifth Power Plan.

[15] The rationale for selecting a 20-year perspective for realistically achievable conservation in the 1983 Plan stemmed from the fact that at that time it took as much as 15 years to construct major central-station generating facilities. Therefore, both load forecasts and resources plans had to predict when construction should start far in advance of actual need.

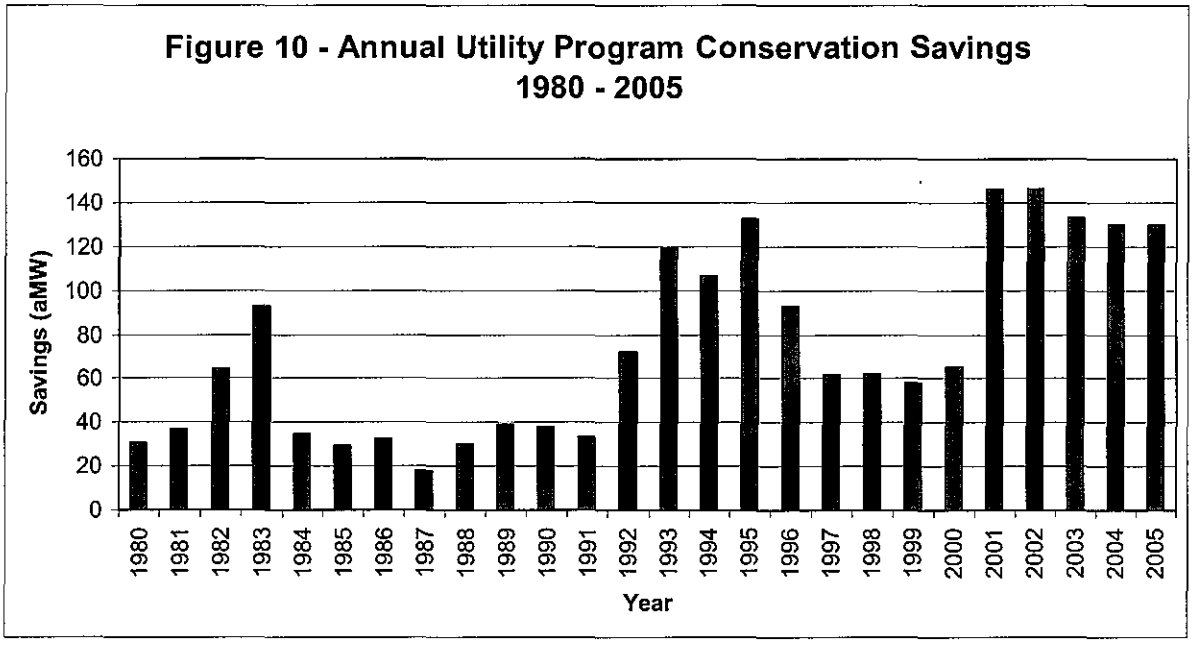
Figure 10 - Annual Utility Program Conservation Savings
1980 - 2005
Savings (aMW)
160
140
120
100
80
60
40
20
0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year

Gervais, Linda

From: Eckman, Tom [teckman@nwcouncil.org]
Sent: Tuesday, September 08, 2009 11:41 AM
To: Reynolds, Deborah; Nightingale, David (UTC); Allen, Cathie; Gervais, Linda; tom.deboer@pse.com; Hirsh, Nancy; Murray, Chuck (COM); Schooley, Thomas (UTC); Hopkins, William; Eberdt, Chuck; Johnson, Stefanie (ATG); Kimball, Mary; Daeschel, Lea; Englert, Eric
Cc: Ehrbar, Pat; Goddard, Nancy; Hermanson, Lori; Folsom, Bruce; Ringel, H Grant; Gibson, John; Bumgarner, Jeff; Popoff, Phillip; Singh, Gurvinder; Oshie, Patrick (UTC); Schwartz, Howard (COM); Murray, Chuck (COM)
Subject: RE: Conservation Potential Methodology Meeting
Attachments: UtilityTargetCalc_v1_9_6thPlan.xls

Deborah,

Attached is a slightly revised conservation target calculator based on the draft 6th Plan. This version has some minor bug fixes and we have added some error checking as well as an updated "Budget Estimation" tab. Please consider this the "current version" until we issue an update.

Tom

From: Reynolds, Deborah (UTC) [mailto:DReynold@utc.wa.gov]
Sent: Thursday, September 03, 2009 6:05 PM
To: Nightingale, David (UTC); Eckman, Tom; Allen, Cathie; Gervais, Linda; tom.deboer@pse.com; Hirsh, Nancy; Murray, Chuck (COM); Schooley, Thomas (UTC); Hopkins, William; Chuck Eberdt; Johnson, Stefanie (ATG); Kimball, Mary (ATG); Daeschel, Lea (ATG); Englert, Eric
Cc: Ehrbar, Pat; Goddard, Nancy; Hermanson, Lori; Folsom, Bruce; Ringel, H Grant; Gibson, John; Bumgarner, Jeff; Popoff, Phillip; Singh, Gurvinder; Oshie, Patrick (UTC); Schwartz, Howard (COM); Murray, Chuck (COM)
Subject: Conservation Potential Methodology Meeting

Greetings,
Thanks to everyone for joining us today. Here are the handouts from today's meeting. I have included some that were sent out before the meeting so you have a complete set.

Best regards,

Deborah Reynolds, Regulatory Analyst
Utilities & Transportation Commission
1300 S. Evergreen Park Dr. SW
Olympia, WA 98504-7250
360-664-1255
dreynold@utc.wa.gov

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Gervais, Linda

From: Coelho, Renee
Sent: Monday, September 14, 2009 3:47 PM
To: BeameN@dshs.wa.gov; Carrie Dolwick (carrie@nwenergy.org); cdavis@snapwa.org; Chuck Murray (ChuckM@CTED.WA.GOV); chuck_eberdt@opportunitycouncil.org; Claire Fulenwider (cfulenwider@nwalliance.org); Dan Baumgarten (DanB@community-minded.org); danielle@nwenergy.org; David Nightingale (dnightin@utc.wa.gov); Deborah Reynolds (dreynolds@utc.wa.gov); Donn English (donn.english@puc.idaho.gov); Jeff Harris; Jennifer Gross (jennifer.gross@nwnatural.com); John Kaufman (john.kaufmann@state.or.us); kerchep@shmc.org; Lea Daeschel (LeaD@atg.wa.gov); Lisa Labolle (lisa.labolle@oer.idaho.gov); lynn.anderson@puc.idaho.gov; lynn.kittilson@state.or.us; maryk2@atg.wa.gov; Matt Elam (matt.elam@puc.idaho.gov); mearly@icnu.org; michael_shepard@esource.com; Mike Parvinen (mparvine@utc.wa.gov); Moshrek Sobhy (moshrek.sobhy@state.or.us); Paul Kjellander (paul.kjellander@oer.idaho.gov); ppyron@nwigu.org; Ron Oscarson (roscarson@spokanecounty.org); Sarah Smith (sarah.smith2@terasengas.com); scarter@nrdc.org; Scott Davidson (sdavidson@nwalliance.org); stefaniej@atg.wa.gov; stuckart@snapwa.org; teckman@nwcouncil.org
Cc: Folsom, Bruce; Gervais, Linda
Subject: Avista's Fall Triple E Meeting - 9/30 and 10/1

Importance: High

Dear Triple E Participants,

Please find attached a draft agenda for our upcoming meeting in Spokane.

Here are the particulars once again:

Avista's Fall Triple E Meeting
September 30 and October 1, 2009
Spokane, Washington
Location: Avista's Jack Stewart Training Facility
8307 North Regal Street, Spokane

Times: Wednesday September 30 - 9 a.m. to 5pm
Thursday, October 1 - 7:30 a.m. to 5pm

Please note on the agenda that on Wednesday September 30 from 9 to Noon the topic will be on Washington's initiative 937. This requires the state's major utilities to increase the amount of new renewable resources in their electricity supply to 15% by 2020 and to acquire all cost effective energy conservation beginning in 2010. Avista will present the energy efficiency targets and plans for acquiring these additional resources in this session. Attached is a summary sheet that highlights the I-937 goals.

A teleconference bridge will be available for one or both days as necessary.

Directions to the Jack Stewart Center are attached for your reference. Please be advised however that Freya and Market Street is under construction. Alternative directions are on the bottom of the page of the directions for your reference.

If you have not already RSVP'd your availability to attend either in person or via phone, please do so by Friday, September 25th.

Thank you.
Renee Coelho

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Fall 09 Agenda Draft.doc

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Directions to Jack Stewart Tra...

External Energy Efficiency Board
(Triple E) Fall Meeting
Avista's Jack Stewart Training Center
September 30 and October 1, 2009

Agenda – Wednesday, September 30

9:00 a.m. – 12 Noon
2010 and 2011 Targets – per Avista's IRP and Washington's I-937

Presentation, discussion and comments about Avista's DSM targets and plans for the implementation of Washington's initiative 937 that requires the state's major utilities to gradually increase the amount of new renewable resources in their electricity supply to 15% by 2020 and to acquire all cost effective energy conservation resources in their service territories beginning in 2010. Presenters will include: Linda Gervais, Rates; John Lyons, Power Supply; Greg Rahn, Gas Supply; Jon Powell and Bruce Folsom, Energy Solutions

[This meeting complies with the Washington Commission's rule (WAC 480-109) requiring that utilities hold public meetings in advance of filing compliance plans.]

12:15 p.m. to 1:15 p.m. ***Lunch to be provided***

1:30 p.m. – 3:00 p.m.
Avista's Measurement, Evaluation and Verification Strategy

Presentation, discussion and comments about Avista's proposal for existing and future measurement, evaluation and verification for DSM programs. Presenters include: Damon Fisher and Tom Lienhard, Energy Solutions.

3:00 p.m. – 3:15 p.m. ***Break***

3:15 p.m. – 5:00 p.m.
Tariff Rider Update

Presentation of tariff rider balance status, updates to Schedules 91 and 191 in Washington and Idaho and Energy Savings results through August 2009. Presenters include: Lori Hermanson and Jon Powell, Energy Solutions

5:30 p.m. Evening Social @ Stix Bar and Grill, 9820 North Nevada

External Energy Efficiency Board Meeting
(Triple E) Fall Meeting
Avista's Jack Stewart Training Center

Agenda – Thursday October 1

Continental Breakfast beginning at 7:30 a.m.

8:15 a.m. – 12:00 Noon   ***Program Operations***

Panel presentation of outreach efforts, program enhancements and other DSM activities implemented by the Energy Solutions Group.

Residential/Limited Income/Renewable: ***Presenters: Chris Drake, Greta Zink, Kerry Shroy, Leona Doege, Bruce Folsom and Renee Coelho, Energy Solutions***

10:00 a.m. ***Break***

Commercial: ***Presenters: Catherine Bryan, Kerry Shroy, Ann Carey and Ed Arnhold, Energy Solutions; Kelly Conley, Service Development***

Noon ***Lunch to be provided***

1:00 p.m.	***Limited Income Rate Assistance Report (LIRAP) 2008-09 Presenter: Christine McCabe, Community Development***

1:30 p.m. – 2:30 p.m.
Continue panel discussions if necessary

2:30 p.m. ***Break***

3:00 p.m.   ***Regional and National DSM Effort***

Updates regarding Avista's involvement with NEEA, NEEC, AEE, CEE and others. Presenters: Bruce Folsom and Jon Powell

4:00 p.m.	***Wrap Up/Questions and Answers/Other Topics***

I-937: The Clean Energy Initiative

Washington's Initiative 937, passed by voters in November 2006, requires the state's major utilities to gradually increase the amount of new renewable resources in their electricity supply to 15 percent by 2020. Electric utilities also must acquire all cost-effective energy conservation resources in their service territories beginning in 2010.[1]

The 2009 Legislature will be the first to consider revisions to I-937 that don't require a 2/3-majority vote. The primary proponents will engage with other key stakeholders during the interim to prioritize any proposed amendments.

> *Any modifications should adhere to the following key principles, be narrow in scope, and address actual implementation barriers. The law's overall impact must be at least maintained and should be strengthened.*

Key Principles to Guide Any Modifications of I-937 (RCW 19.285)

- **Preserve voters' intent to increase development of clean and affordable energy.** Washington is relying on the provisions of I-937 to meet the state's critical climate action targets.
- **Do not weaken the law before utilities have even had to comply.** Most states that have modified their renewable energy standards have strengthened the laws. In 2007 alone, six states *increased* their renewable energy targets. That same year, Oregon passed a 25% by 2025 standard.
- **Modifications should be narrow in scope to maintain the integrity of the Act.**
- **Beware of unintended consequences.** RCW 19.285 has many interlinked components. Legislative proposals to change one small element could create unintended ripples throughout the law.
- **Keep the conservation and renewable energy standards separate.** Each is independently important.

Highlights of I-937

- Applies to the 17 largest electric utilities. Includes special provision for those with no load growth. Utilities will not need to sell any existing resources to comply with the law because they can use renewable energy credits to meet the standard.
- Designed to build on the renewable hydropower tradition in Washington and further develop the state's other abundant renewable resources - solar, tidal, ocean wave, geothermal, bioenergy, and wind.
- Directs utilities to pursue only the conservation that costs less than new power generation.
- Includes a cost cap on renewable energy purchases: In any given year, a utility is required to invest at most 4% of that year's revenue to meet the renewable energy standard – most will spend less.
- Ensures some consistency in determining conservation potential, while allowing utilities to focus on the needs and issues specific to their service territories.

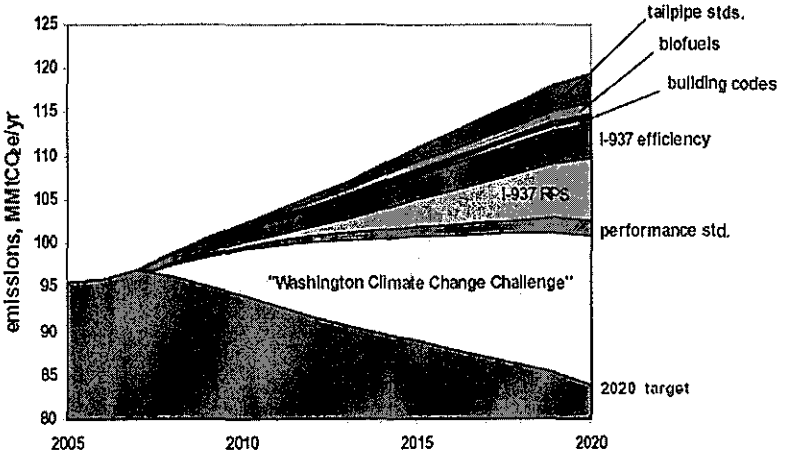
Importance of I-937

Energy conservation is the lowest cost resource available to meet future energy needs and new renewable resources, such as wind power, are consistently cost-competitive with other new resources. Increasing reliance on clean energy will:

- Stimulate rural economic development;
- Create jobs;
- Protect against future price shocks due to rising fuel, infrastructure, and carbon costs; and
- Save money for consumers.

Recent Actions in Washington[2]

As part of the state's Climate Change Challenge, Washington's Climate Action Team is counting the greenhouse gas emissions reductions from I-937 implementation toward the total needed to meet the state's targets established by Executive Order 07-02 and RCW 80.80.020. As the graph shows, I-937's efficiency standard and renewable energy standard (RPS) will do more to reduce emissions than all other existing policies combined.



Implementation

- The state's Utilities and Transportation Commission (UTC) adopted rules in November 2007 (WAC 480-109), establishing the processes and reports necessary for investor-owned utilities to demonstrate compliance with the Act. Rules rely heavily on existing regulations and practices to guide utility implementation, and on case-by-case Commission assessments.
- CTED's more detailed rules, adopted in March 2008 (WAC 194-37), relate to process, timelines and documentation and are designed to provide guidance for auditors[3] and public utilities in determining compliance.
- While all parties have some concerns about the rules implementing Initiative 937, the rules contain no fatal flaws. Utilities have sufficient guidance to begin planning to meet their 2010 conservation requirement and the 2012 renewables target.

For More Information, Contact:
Carrie Dolwick, NW Energy Coalition, 206-621-0094
Clifford Traisman, Renewable Northwest Project, 206-369-2235
Stan Price, Northwest Energy Efficiency Council, 206-292-5592

[1] The law applies to 17 of the state's 63 electric utilities, comprising approximately 91% of Washington retail electricity consumers and 88% of electricity consumed. Qualifying utilities currently include three investor-owned utilities, 10 public utility districts, two municipalities and two electric cooperatives, each with more than 25,000 customers.

[2] From August 7, 2007, presentation to Washington Climate Advisory Team. Department of Ecology, CTED, Center for Climate Strategies and Ross & Associates, page 11. ($MMtCO_2e$ means million metric tons of CO_2 equivalent)

[3] The State Auditor audits public utility compliance, with the Attorney General providing enforcement. Independent auditors will audit compliance by electric cooperatives.

Triple E Discussion Outline
Avista I-937 Conservation Compliance and Planning
September 30, 2009

Overview of Discussion:
How Avista will establish a conservation target for purposes of I-937 compliance, what measures will qualify towards that target, how acquisition will be measured and how Avista will work with stakeholders during the initial (2010-2011) compliance period as well as our expectations for future compliance periods.

Establishing the Conservation Target:

- Conservation target determination—Northwest Power and Conservation Council's 6th Power Plan *vis a vis* Avista's Integrated Resource Plan
- Modifications
- Future compliance periods and cumulative performance
- Range, point estimates, cumulative targets and acquisition over time and other issues.

Qualifying Conservation Measures:

- Acquisition from all conservation measures qualifying under the Northwest Power Planning Act plus electric to natural gas conversion acquisition will qualify.
- Non-specialty compact fluorescent lamps will not be a qualifying measure under this plan unless distributed as part of a limited income program.
- Avista will claim a share of acquisition resulting from our investment and involvement in the Northwest Energy Efficiency Alliance based upon the best available disaggregation of savings for Avista's Washington jurisdiction.
- Treatment of energy codes or federal manufacturing standards revisions.

Planning for Meeting the Target:

- Annual DSM business planning process to guide the business operations during the following year.
- Avista will augment the DSM Business Plan with an assessment of distribution efficiency improvements planned or contemplated in the following year(s).

Measurement of Acquisition:

- Measurement of the energy savings resulting from DSM measures will be based upon the DSM Evaluation, Measurement and Verification Plan circulated for review to the Triple-E Board.

Reporting and Procedural Issues:

- Avista will provide updates to the Triple-E Board regarding progress towards meeting the I-937 conservation goal and any significant issues arising regarding qualifying acquisition, acquisition measurement or planning that may affect compliance.
- The Triple-E Board will be the primary means of obtaining stakeholder input on I-937 conservation compliance.
- Avista's filing will be responsive to the specific requirements of WAC 480-109.

Gervais, Linda

From: Gervais, Linda
Sent: Wednesday, November 11, 2009 3:43 PM
To: BeameN@dshs.wa.gov; Carrie Dolwick (carrie@nwenergy.org); cdavis@snapwa.org; Chuck Murray (ChuckM@CTED.WA.GOV); chuck_eberdt@opportunitycouncil.org; Claire Fulenwider (cfulenwider@nwalliance.org); Dan Baumgarten (DanB@community-minded.org); danielle@nwenergy.org; David Nightingale (dnightin@utc.wa.gov); Deborah Reynolds (dreynolds@utc.wa.gov); Donn English (donn.english@puc.idaho.gov); Jeff Harris; Jennifer Gross (jennifer.gross@nwnatural.com); John Kaufman (john.kaufmann@state.or.us); kerchep@shmc.org; Lea Daeschel (LeaD@atg.wa.gov); Lisa Labolle (lisa.labolle@oer.idaho.gov); lynn.anderson@puc.idaho.gov; maryk2@atg.wa.gov; Matt Elam (matt.elam@puc.idaho.gov); mearly@icnu.org; michael_shepard@esource.com; Mike Parvinen (mparvine@utc.wa.gov); Moshrek Sobhy (moshrek.sobhy@state.or.us); Paul Kjellander (paul.kjellander@oer.idaho.gov); ppyron@nwigu.org; Ron Oscarson (roscarson@spokanecounty.org); Sarah Smith (sarah.smith2@terasengas.com); scarter@nrdc.org; Scott Davidson (sdavidson@nwalliance.org); stefaniej@atg.wa.gov; stuckart@snapwa.org; teckman@nwcouncil.org; 'kterpak@spokanecity.org'; 'dacquisto@gem.gonzaga.edu'; 'tomnoll@idahopower.com'; 'mike_kersh@iepco.com'; 'rick.sterling@puc.idaho.gov'; 'carrie@nwenergy.org'; 'elizabeth.hossner@pse.com'; 'villamor.gamponia@pse.com'; 'davev@nwenergy.com'; 'kwilson@ga.wa.gov'; 'forda@mail.wsu.edu'; Kalich, Clint; 'SJohnson@utc.wa.gov'; 'vnovak@utc.wa.gov'; 'Reynolds, Deborah (UTC)'; 'ChuckM@CTED.WA.GOV'; 'tmorlan@nwcouncil.org'; Barcus, Randy; 'anderson.arielle@gmail.com'; 'matto@McKinstry.com'; 'phillip.popoff@pse.com'; 'mschilmoeller@nwcouncil.org'; 'achang@nrdc.org'; Christie, Kevin; 'rtoth@greaterspokane.org'; 'MStokes@idahopower.com'; 'jeffmorris@energyhorizonllc.com'; 'Greg.Duvall@PacifiCorp.com'; 'AshA@McKinstry.com'; 'jking@nwcouncil.org'; 'KKNITTE@gcpud.org'; Hirsh, Nancy; 'danielle@nwenergy.org'; 'teckman@nwcouncil.org'; 'mearly@icnu.org'; 'randy.lobb@puc.Idaho.gov'; Waples, Scott; 'PHutton@kleinfelder.com'; 'Daeschel, Lea (ATG)'; 'Lisa.LaBolle@oer.idaho.gov'; 'MikeC@BennettForest.Com'; 'mike.k.schneider@us.abb.com'; 'Howard.Ray@clearwaterpaper.com'; 'joe_ross@transcanada.com'; 'baz@pivotal-investments.com'; 'dnightin@utc.wa.gov'; 'bart_jones@transcanada.com'; Shane, Xin; Rolstad, Tracy; Englert, Eric; Allen, Cathie
Cc: Folsom, Bruce; Powell, Jon; Ehrbar, Pat; Gibson, John; Weiss, Mark; Wood, Patty; Kirkeby, Curt; Coelho, Renee; Gervais, Linda
Subject: Avista I-937 Compliance

Avista Triple E, TAC members and interested parties:

Avista Utilities is in the beginning process of drafting its compliance filing with the Washington Utilities and Transportation Commission (UTC) specifying its plans for meeting the requirements of Initiative 937 (I-937). By January 1, 2010, and every two years thereafter, utilities must project their cumulative ten-year conservation potential and establish a biennial conservation goal.

Public involvement is essential to this process. Consequently, we are seeking your input as an interested stakeholder.

The attached is a summary outline of the approach that Avista plans to take in the upcoming compliance filing due by January 29, 2010. Additionally, we have provided some insights into our planning process for meeting the I-937 requirements.

Much of this was discussed at our September 30, 2009 public meeting at Avista's Jack Stewart Training Facility that many of you attended. This is an additional opportunity to comment on these or other issues related to Avista's I-937 compliance.

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To file by the required date, we will need to receive this first round of comments no later than November 30th, 2009. Preferably we would receive comments by e-mail to expedite the process of incorporating them into our planning process as quickly as possible.

Comments should be sent to me at: (linda.gervais@avistacorp.com or 509-495-4975). Thank you for taking the time to review and comment on this important issue.

Sincerely,

Linda Gervais
Manager, Regulatory Policy
State and Federal Regulation
Avista Utilities
509-495-4975 (W)
509-953-8057 (C)

I-937
-11.11.09.docx

6th Power Plan
Targets for I93...

linda.gervais@avistacorp.com

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Overview of Initiative 937

The initiative requires Washington utilities with over 25,000 customers to achieve minimum levels of conservation acquisition or pay a $50 per megawatt hour penalty on any shortfall. Utilities have the discretion to use the Northwest Power and Conservation Council's (NPCC) most recent Power Plan or the utilities Integrated Resource Plan (IRP), if that Plan is consistent with the methodology of the Power Plan, to establish this minimum acquisition level.

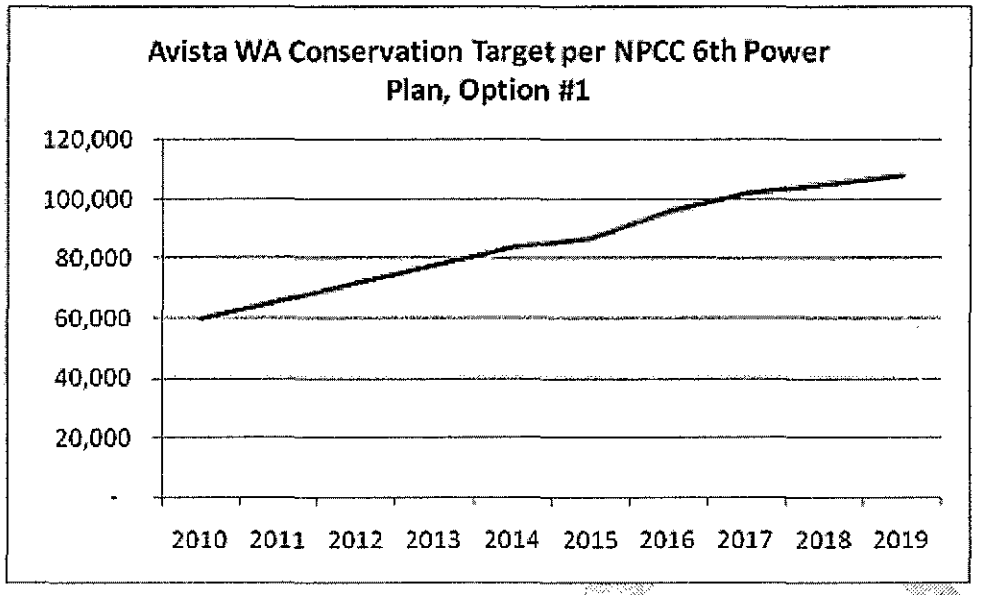
Avista's Proposal for Establishing the Target

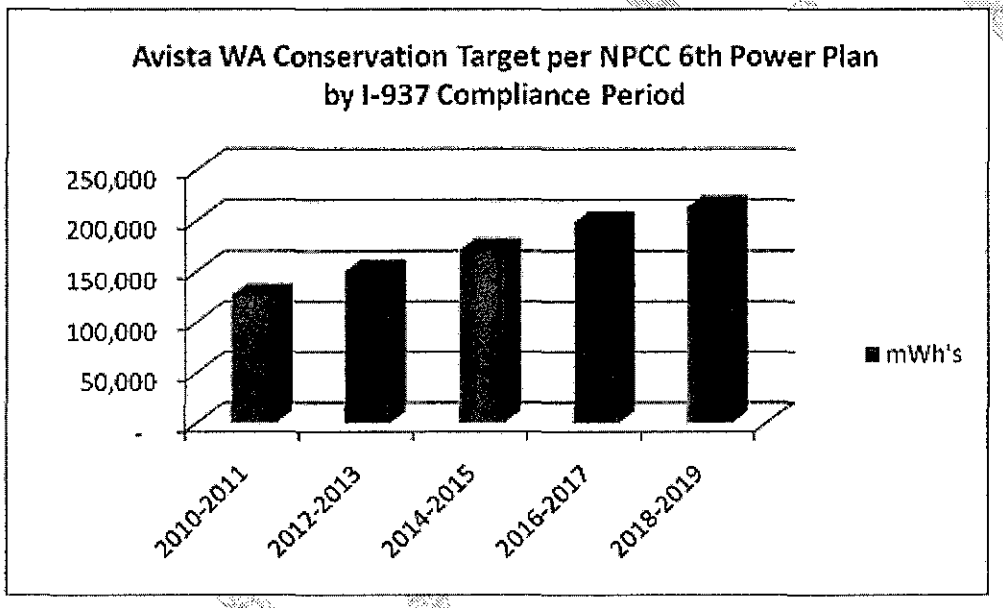
The Company proposes to Utilize Option #1 of the NPCC's 6th Power Plan (currently in draft form) for Avista's Washington jurisdiction to establish the 2010-2011 conservation target. Option #1 is not disaggregated by customer segment (e.g. residential, commercial etc). The NPCC offers two other options with progressively higher levels of disaggregation.

Avista is pursuing this approach to allow us the maximum flexibility to acquire conservation resources where they are most available and most cost-effective into the future. Recent history has demonstrated that there are unanticipated 'windows of opportunity' for utilities to ramp-up DSM acquisition. Applying NPCC options that include segment-level disaggregation could be erroneously construed as committing to segment-level targets and could restrict us from making the best use of these opportunities in the future.

Avista believes that we have the flexibility to select the NPCC's Power Plan, or the most recent Avista IRP for each of the two-year compliance periods. We believe this is important given the two-year IRP cycle vs. the five-year NPCC Power Plan cycle and how those times correspond to the two-year I-937 compliance periods and ten-year I-937 objectives. There may well be times when one or the other of these options are out of date or otherwise unsuitable for purposes of establishing the conservation target. Thus, Avista does not believe that our selection of the NPCC Power Plan for 2010-2011 necessarily precludes us from selecting the IRP in the future.

Avista's Washington conservation targets based upon Option #1 of the NPCC Power Plan is illustrated below:





Acquisition Qualifying Towards the Conservation Target

It is Avista's belief that the key issues regarding what resource acquisition qualifies towards achieving the conservation target are based upon (1) the language of the law itself, (2) achieving the intended public policy objectives and (3) the need for symmetry in the establishment of the target and the acquisition qualifying towards that target.

All references provided relate to conservation targets and qualifying conservation acquisition for Avista's Washington jurisdiction only.

Starting with the last of these criteria, symmetry between qualifying acquisition and the target, and given that Avista plans on utilizing the 6th Power Plan as a basis for the target, it is our intent to include the following acquisition in our claim at the end of the compliance period:

- Direct-use program acquisition
  - The NPCC, by law, cannot include these electric-to-natural gas programs within their definition of conservation regardless of the system BTU efficiencies. However, this has been a core element of Avista's electric DSM portfolio for over 15 years. Consequently, Avista plans on adding our best estimate of cost-effective electric acquisition through direct-use to the 6th Power Plan conservation target, and then considering acquisition through these programs as a qualifying measure.
- Improvements to the efficiency of the distribution system
  - Distribution efficiency improvements are a significant component of the current 6th Power Plan. These improvements include, but are not necessarily limited to, efficiencies resulting from voltage control, high-efficiency transformers and other measures.
  - Savings from both the customer and utility side of the meter will be considered as qualifying acquisition.
  - The baseline for the calculation of the efficiency savings will be based upon the pre-existing equipment in the case of retrofit installations and industry-standard equipment in the case of new construction.
- High-efficiency cogeneration at the site of our retail customer.
  - Avista does not expect any such new installations in the foreseeable future.
- Avista's Washington share of energy savings resulting from cooperative ventures
  - At the moment, this is limited to the Northwest Energy Efficiency Alliance (NEEA). Avista would apply the best estimate of the savings that has accrued to our Washington jurisdiction. Historically, Avista has used funding shares as the best proxy for this purpose.
- Avista will include any quantifiable savings from behavioral measures within our conservation acquisition. This will most likely result from Resource Conservation Management programs or behavioral programs linked to in-home displays or communications to individual customers regarding efficiency options based upon their individual billing or other customer characteristics.
- Avista will quantify and include in our conservation acquisition any savings resulting from local market transformation programs within our service territory, including the impact of the market transformation upon the non-programmatic customer population. At the moment the only such program is our Multifamily Direct-Use program.
  - Since these direct-use programs are not incorporated within the NPCC Power Plan, it will be necessary to modify (increase) the conservation target based upon our best estimate of the expected results of this program.
- The NPCC Power Plan seeks to measure the cost-effective and achievable market transformation potential within the region. This is not necessarily limited to measures for which there are utility DSM programs or to participants in those programs. To the extent that Avista can quantify the adoption by Avista customers of efficiency measures incorporated within the NPCC Power Plan, whether those customers participated in the

program or not, Avista will include the energy savings from those adoptions within our conservation achievement.

Measurement of the Acquired Resource

Avista's claimed conservation acquisition will be substantiated by an evaluation, measurement and verification (E, M & V effort customized to the measures implemented). The forthcoming 2010 Avista DSM Business Plan will have additional detail on this topic. It is also anticipated that Avista will be convening an E, M & V summit during 2010 to allow for further discussion of these requirements.

Claims of distribution efficiency savings will similarly be based upon a sound foundation. Due to the nature of these measures, and their interactivity, it is not possible to provide great detail on the best approach to these measurements at this time. Avista will provide periodic updates to the DSM Triple-E board and any other interested parties regarding the progress in designing both the projects and the measurement plans as this effort progresses.

Business Planning

It is Avista's intent to meet the 2010-2011 I-937 conservation target. We do not anticipate any additional measures or programs to be required beyond what would be incorporated into our DSM portfolio and distribution engineering efforts in the absence of this legislation. However, we do have plans to track our progress over the course of the two year period and make adjustments as necessary to achieve this goal.

Should it be necessary to further ramp-up Washington electric DSM efforts, we presume that there will be support for any tariff rider surcharge revisions required to fund these efforts.

DRAFT

Gervais, Linda

From: Scot Davidson [SDavidson@nwalliance.org]
Sent: Friday, November 20, 2009 5:19 PM
To: Gervais, Linda
Subject: Comments on Avista I-937 Compliance

Dear Linda,

NEEA has reviewed Avista's proposed compliance filing and finds it complete and well considered. We have no further comments. Thank you for soliciting our input.

Regards,

Scot Davidson

NORTHWEST ENERGY EFFICIENCY ALLIANCE

Scot Davidson
Director, Market Planning and Operations
Northwest Energy Efficiency Alliance
529 SW Third Avenue, Suite 600, Portland, OR 97204
(503)827-8416 ext. 249 http://nwalliance.org

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Gervais, Linda

From: Daeschel, Lea (ATG) [LeaD@ATG.WA.GOV]
Sent: Monday, November 30, 2009 3:20 PM
To: Gervais, Linda; Beamer, Nick; carrie@nwenergy.org; cdavis@snapwa.org; Murray, Chuck (COM); chuck_eberdt@opportunitycouncil.org; cfulenwider@nwalliance.org; DanB@community-minded.org; danielle@nwenergy.org; Nightingale, David (UTC); Reynolds, Deborah (UTC); donn.english@puc.idaho.gov; Jeff Harris; jennifer.gross@nwnatural.com; john.kaufmann@state.or.us; kerchep@shmc.org; lisa.labolle@oer.idaho.gov; lynn.anderson@puc.idaho.gov; Kimball, Mary (ATG); matt.elam@puc.idaho.gov; mearly@icnu.org; michael_shepard@esource.com; Parvinen, Mike (UTC); moshrek.sobhy@state.or.us; paul.kjellander@oer.idaho.gov; ppyron@nwigu.org; roscarson@spokanecounty.org; sarah.smith2@terasengas.com; scarter@nrdc.org; sdavidson@nwalliance.org; Johnson, Stefanie (ATG); stuckart@snapwa.org; teckman@nwcouncil.org; kterpak@spokanecity.org; dacquisto@gem.gonzaga.edu; tomnoll@idahopower.com; mike_kersh@iepco.com; rick.sterling@puc.idaho.gov; carrie@nwenergy.org; elizabeth.hossner@pse.com; villamor.gamponia@pse.com; davev@nwenergy.com; Wilson, Kirsten G. (GA); forda@mail.wsu.edu; Kalich, Clint; Johnson, Steven (UTC); Novak, Vanda (UTC); Reynolds, Deborah (UTC); Murray, Chuck (COM); tmorlan@nwcouncil.org; Barcus, Randy; anderson.arielle@gmail.com; matto@McKinstry.com; phillip.popoff@pse.com; mschilmoeller@nwcouncil.org; achang@nrdc.org; Christie, Kevin; rtoth@greaterspokane.org; MStokes@idahopower.com; jeffmorris@energyhorizonllc.com; Greg.Duvall@PacifiCorp.com; AshA@McKinstry.com; jking@nwcouncil.org; KKNITTE@gcpud.org; Hirsh, Nancy; danielle@nwenergy.org; teckman@nwcouncil.org; mearly@icnu.org; randy.lobb@puc.idaho.gov; Waples, Scott; PHutton@kleinfelder.com; Lisa.LaBolle@oer.idaho.gov; MikeC@BennettForest.Com; mike.k.schneider@us.abb.com; Howard.Ray@clearwaterpaper.com; joe_ross@transcanada.com; baz@pivotal-investments.com; Nightingale, David (UTC); bart_jones@transcanada.com; Shane, Xin; Rolstad, Tracy; Englert, Eric; Allen, Cathie
Cc: Folsom, Bruce; Powell, Jon; Ehrbar, Pat; Gibson, John; Weiss, Mark; Wood, Patty; Kirkeby, Curt; Coelho, Renee
Subject: RE: Avista I-937 Compliance
Attachments: FINAL PC 11.30.09 Comments on Avista's I-937 Acquistion Plan.docx

Hi Linda,

Attached please find Public Counsel's comments.

Regards,

Lea

From: Gervais, Linda [mailto:Linda.Gervais@avistacorp.com]
Sent: Wednesday, November 11, 2009 3:43 PM
To: Beamer, Nick; carrie@nwenergy.org; cdavis@snapwa.org; Murray, Chuck (COM); chuck_eberdt@opportunitycouncil.org; cfulenwider@nwalliance.org; DanB@community-minded.org; danielle@nwenergy.org; Nightingale, David (UTC); Reynolds, Deborah (UTC); donn.english@puc.idaho.gov; Jeff Harris; jennifer.gross@nwnatural.com; john.kaufmann@state.or.us; kerchep@shmc.org; Daeschel, Lea (ATG); lisa.labolle@oer.idaho.gov; lynn.anderson@puc.idaho.gov; Kimball, Mary (ATG); matt.elam@puc.idaho.gov; mearly@icnu.org; michael_shepard@esource.com; Parvinen, Mike (UTC); moshrek.sobhy@state.or.us; paul.kjellander@oer.idaho.gov; ppyron@nwigu.org; roscarson@spokanecounty.org; sarah.smith2@terasengas.com; scarter@nrdc.org; sdavidson@nwalliance.org; Johnson, Stefanie (ATG); stuckart@snapwa.org; teckman@nwcouncil.org; kterpak@spokanecity.org; dacquisto@gem.gonzaga.edu; tomnoll@idahopower.com; mike_kersh@iepco.com; rick.sterling@puc.idaho.gov; carrie@nwenergy.org; elizabeth.hossner@pse.com; villamor.gamponia@pse.com; davev@nwenergy.com; Wilson, Kirsten G. (GA); forda@mail.wsu.edu; Kalich, Clint; Johnson, Steven (UTC); Novak, Vanda (UTC); Reynolds, Deborah (UTC); Murray, Chuck (COM); tmorlan@nwcouncil.org; Barcus, Randy; anderson.arielle@gmail.com; matto@McKinstry.com; phillip.popoff@pse.com; mschilmoeller@nwcouncil.org; achang@nrdc.org; Christie, Kevin; rtoth@greaterspokane.org; MStokes@idahopower.com;

29

jeffmorris@energyhorizonllc.com; Greg.Duvall@PacifiCorp.com; AshA@McKinstry.com; jking@nwcouncil.org; KKNITTE@gcpud.org; Hirsh, Nancy; danielle@nwenergy.org; teckman@nwcouncil.org; mearly@icnu.org; randy.lobb@puc.Idaho.gov; Waples, Scott; PHutton@kleinfelder.com; Daeschel, Lea (ATG); Lisa.LaBolle@oer.idaho.gov; MikeC@BennettForest.Com; mike.k.schneider@us.abb.com; Howard.Ray@clearwaterpaper.com; joe_ross@transcanada.com; baz@pivotal-investments.com; Nightingale, David (UTC); bart_jones@transcanada.com; Shane, Xin; Rolstad, Tracy; Englert, Eric; Allen, Cathie
Cc: Folsom, Bruce; Powell, Jon; Ehrbar, Pat; Gibson, John; Weiss, Mark; Wood, Patty; Kirkeby, Curt; Coelho, Renee; Gervais, Linda
Subject: Avista I-937 Compliance

Avista Triple E, TAC members and interested parties:

Avista Utilities is in the beginning process of drafting its compliance filing with the Washington Utilities and Transportation Commission (UTC) specifying its plans for meeting the requirements of Initiative 937 (I-937). By January 1, 2010, and every two years thereafter, utilities must project their cumulative ten-year conservation potential and establish a biennial conservation goal.

Public involvement is essential to this process. Consequently, we are seeking your input as an interested stakeholder.

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Comments should be sent to me at: (linda.gervais@avistacorp.com or 509-495-4975). Thank you for taking the time to review and comment on this important issue.

Sincerely,

Linda Gervais

Manager, Regulatory Policy
State and Federal Regulation
Avista Utilities
509-495-4975 (W)

509-953-8057 (C)
linda.gervais@avistacorp.com *<<I-937 -11.11.09.docx>>* *<<6th Power Plan Targets for I937 (2).xlsx>>*

November 30, 2009

Public Counsel's Comments on Avista's Summary Outline for a Compliance Filing

Given the summary nature of the planning document provided by Avista, Public Counsel's initial comments on this matter should be considered preliminary in nature. We reserve the right to provide further comments upon reviewing the Company's final compliance filing with the Commission.

Acquisition Qualifying Towards the Conservation Target

- **Improvements to the efficiency of the distribution program:** Avista states that savings from both the customer and utility side of the meter will be considered as qualifying acquisition. More detail is needed on what actions will be taken on the "utility side" of the meter, as well as an explanation of how the Company will measure and verify any such savings.

- **Avista will include any quantifiable savings from behavioral measures within our conservation acquisition.** The question of whether savings from behavioral measures or programs are quantifiable is currently a controversial issue. At this time it is premature and not appropriate for Avista to include savings from such measures or programs toward their I-937 acquisition target. The Company should focus on EM&V of those programs (prescriptive and non-prescriptive) with the largest portion of claimed savings in the electric and gas DSM portfolios.

- **Avista will quantify and include in our conservation acquisition any savings resulting form local market transformation programs within our service territory, including the impact of the market transformation upon the non-programmatic customer population.** Public Counsel does not believe it appropriate for Avista to claim savings from local market transformation efforts, nor to include non-programmatic savings from local market transformation programs in their acquisition target. The ability of the utility to accurately quantify such savings is a matter of current debate. We are not aware of any methodology Avista has developed with the Triple E to calculate savings from local market transformation efforts. As we stated above, the Company would be well served to focus its efforts on EM&V of those programs that represent the largest portion of claimed savings from the electric and gas portfolios.

- **Measurement of the Acquired Resource.** Avista states that their claimed acquisition will be substantiated by an evaluation, measurement and verification. As the Company indicates, any Company EM&V plans are currently in developmental stages and therefore the Company's claim that their 1-937 acquisition target will be substantiated by this is premature.

Business Planning.

- **Should it be necessary to further ramp-up Washington electric DSM efforts, we presume that there will be support for any tariff rider surcharge revisions required to support these efforts.** Public Counsel does not believe it is appropriate for Avista to presume support for tariff rider surcharge revisions for DSM ramp-up related to meeting the Company's I-937 target. Any review and determination regarding revisions to Avista's DSM tariff rider revisions should be developed with consultation of the Triple E. Ultimately, the Triple E is a non-binding advisory group, and thus any stakeholder, including Public Counsel, may wish to comment on a tariff rider filing with the Commission. The company should not presume support for any such filing before it has even been developed.

Avista Annual Conservation Target Options Taken From the 6th Plan Conservation Target Calculator.

- **The 5th footnote in this spreadsheet states: "The Company would like to propose incentives and/or a cost recovery mechanism for exceeding the conservation target proposed above."** Public Counsel is not sure why the Company has included this comment or why the Company believes an incentive or cost recovery mechanism for exceeding the conservation target is appropriate especially given that the Company states in the Business Planning section of this summary that they do not anticipate any additional measures or programs to be required beyond what would be incorporated into their DSM portfolio and distribution engineering efforts in the absence of this legislation. Any incentives or cost-recovery mechanisms proposed by the Company would be reviewed in the appropriate proceeding before the Commission.

Gervais, Linda

From: Reynolds, Deborah (UTC) [DReynold@utc.wa.gov]
Sent: Friday, December 04, 2009 6:00 PM
To: Gervais, Linda; Beamer, Nick; carrie@nwenergy.org; cdavis@snapwa.org; Murray, Chuck (COM); chuck_eberdt@opportunitycouncil.org; cfulenwider@nwalliance.org; DanB@community-minded.org; danielle@nwenergy.org; Nightingale, David (UTC); donn.english@puc.idaho.gov; Jeff Harris; jennifer.gross@nwnatural.com; john.kaufmann@state.or.us; kerchep@shmc.org; Daeschel, Lea (ATG); lisa.labolle@oer.idaho.gov; lynn.anderson@puc.idaho.gov; Kimball, Mary (ATG); matt.elam@puc.idaho.gov; mearly@icnu.org; michael_shepard@esource.com; Parvinen, Mike (UTC); moshrek.sobhy@state.or.us; paul.kjellander@oer.idaho.gov; ppyron@nwigu.org; roscarson@spokanecounty.org; sarah.smith2@terasengas.com; scarter@nrdc.org; sdavidson@nwalliance.org; Johnson, Stefanie (ATG); stuckart@snapwa.org; teckman@nwcouncil.org; kterpak@spokanecity.org; dacquisto@gem.gonzaga.edu; tomnoll@idahopower.com; mike_kersh@iepco.com; rick.sterling@puc.idaho.gov; carrie@nwenergy.org; elizabeth.hossner@pse.com; villamor.gamponia@pse.com; davev@nwenergy.com; Wilson, Kirsten G. (GA); forda@mail.wsu.edu; Kalich, Clint; Johnson, Steven (UTC); Novak, Vanda (UTC); Murray, Chuck (COM); tmorlan@nwcouncil.org; Barcus, Randy; anderson.arielle@gmail.com; matto@McKinstry.com; phillip.popoff@pse.com; mschilmoeller@nwcouncil.org; achang@nrdc.org; Christie, Kevin; rtoth@greaterspokane.org; MStokes@idahopower.com; jeffmorris@energyhorizonllc.com; Greg.Duvall@PacifiCorp.com; AshA@McKinstry.com; jking@nwcouncil.org; KKNITTE@gcpud.org; Hirsh, Nancy; danielle@nwenergy.org; teckman@nwcouncil.org; mearly@icnu.org; randy.lobb@puc.idaho.gov; Waples, Scott; PHutton@kleinfelder.com; Daeschel, Lea (ATG); Lisa.LaBolle@oer.idaho.gov; MikeC@BennettForest.Com; mike.k.schneider@us.abb.com; Howard.Ray@clearwaterpaper.com; joe_ross@transcanada.com; baz@pivotal-investments.com; Nightingale, David (UTC); bart_jones@transcanada.com; Shane, Xin; Rolstad, Tracy; Englert, Eric; Allen, Cathie
Cc: Folsom, Bruce; Powell, Jon; Ehrbar, Pat; Gibson, John; Weiss, Mark; Wood, Patty; Kirkeby, Curt; Coelho, Renee; Parvinen, Mike (UTC)
Subject: RE: Avista I-937 Compliance

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Linda,
Thank you for providing this information. Due to workload issues, we have been unable to respond. However, we do have some general concerns.

First, the approach you have chosen does not allow for dialog among your stakeholders about the targets you are proposing. Staff would have preferred a meeting with the group.

Second, the targets you have proposed are based on the NWPCC calculator. Council staff have stated that large utilities should not need to use the calculator, because their IRPs will probably provide better, more tailored analysis. Staff looked at Avista's 2009 IRP, and notes that the estimates of cost-effective conservation in the IRP are higher than those provided by the calculator. Staff is concerned about this difference.

Third, the description of the conservation is lacking. Staff would expect to see detail such as that provided in the company's business plan.

Fourth, the company's evaluation, measurement and verification plans should have been presented and discussed in a public forum before inclusion in the forthcoming compliance filing. Proving that conservation has been achieved will be a key part of the 2012 report, and the company should be proposing standards in the 2010 filing.

Thank you,

93

Gervais, Linda

From: Gervais, Linda
Sent: Friday, December 11, 2009 3:14 PM
To: Reynolds, Deborah (UTC); Beamer, Nick; carrie@nwenergy.org; cdavis@snapwa.org; Murray, Chuck (COM); chuck_eberdt@opportunitycouncil.org; cfulenwider@nwalliance.org; DanB@community-minded.org; danielle@nwenergy.org; Nightingale, David (UTC); donn.english@puc.idaho.gov; Jeff Harris; jennifer.gross@nwnatural.com; john.kaufmann@state.or.us; kerchep@shmc.org; Daeschel, Lea (ATG); lisa.labolle@oer.idaho.gov; lynn.anderson@puc.idaho.gov; Kimball, Mary (ATG); matt.elam@puc.idaho.gov; mearly@icnu.org; michael_shepard@esource.com; Parvinen, Mike (UTC); moshrek.sobhy@state.or.us; paul.kjellander@oer.idaho.gov; ppyron@nwigu.org; roscarson@spokanecounty.org; sarah.smith2@terasengas.com; scarter@nrdc.org; sdavidson@nwalliance.org; Johnson, Stefanie (ATG); stuckart@snapwa.org; teckman@nwcouncil.org; kterpak@spokanecity.org; dacquisto@gem.gonzaga.edu; tomnoll@idahopower.com; mike_kersh@iepco.com; rick.sterling@puc.idaho.gov; carrie@nwenergy.org; elizabeth.hossner@pse.com; villamor.gamponia@pse.com; davev@nwenergy.com; Wilson, Kirsten G. (GA); forda@mail.wsu.edu; Kalich, Clint; Johnson, Steven (UTC); Novak, Vanda (UTC); Murray, Chuck (COM); tmorlan@nwcouncil.org; Barcus, Randy; anderson.arielle@gmail.com; matto@McKinstry.com; phillip.popoff@pse.com; mschilmoeller@nwcouncil.org; achang@nrdc.org; Christie, Kevin; rtoth@greaterspokane.org; MStokes@idahopower.com; jeffmorris@energyhorizonllc.com; Greg.Duvall@PacifiCorp.com; AshA@McKinstry.com; jking@nwcouncil.org; KKNITTE@gcpud.org; Hirsh, Nancy; danielle@nwenergy.org; teckman@nwcouncil.org; mearly@icnu.org; randy.lobb@puc.Idaho.gov; Waples, Scott; PHutton@kleinfelder.com; Daeschel, Lea (ATG); Lisa.LaBolle@oer.idaho.gov; MikeC@BennettForest.Com; mike.k.schneider@us.abb.com; Howard.Ray@clearwaterpaper.com; joe_ross@transcanada.com; baz@pivotal-investments.com; Nightingale, David (UTC); bart_jones@transcanada.com; Shane, Xin; Rolstad, Tracy; Englert, Eric; Allen, Cathie
Cc: Folsom, Bruce; Powell, Jon; Ehrbar, Pat; Gibson, John; Weiss, Mark; Wood, Patty; Kirkeby, Curt; Coelho, Renee; Parvinen, Mike (UTC)
Subject: RE: Avista I-937 Compliance

Deborah,

I appreciated the opportunity to talk through some of these concerns with you on Wednesday morning. The following is Avista's response to points raised in your e-mail last Friday.

First, we were surprised to recently learn that the process we are following is not fully acceptable to Staff. In July, we discussed with Staff the public involvement components of WAC 480-109. We inquired if moving up our External Energy Efficiency Board (Triple E) meeting from November to September, solely for the purpose of getting a jump on our Compliance Plan, would make sense and if that would meet the "public" requirement. Staff concurred and suggested broadening the notification list to include our Integrated Resource Planning Technical Advisory Committees (TAC) and others, which we did. We consulted with Staff regarding the type of notification (e.g., newspaper notice, etc.) and followed Staff suggestions regarding e-mail notification to specific interested party lists and posting the meeting notice to the Company's website. Staff participated in our September 30th I-937 Compliance Plan meeting. Next steps were itemized as part of this meeting. Presentations from this meeting will be provided as appendices to the Compliance Plan.

Staff states: "The approach you have chosen does not allow for dialog among your stakeholders about the targets you are proposing." We asked Staff if more meetings should be scheduled. Staff suggested that we follow the process we are now implementing, specifically to request e-mail responses to a filed draft Compliance Plan with the e-mail responses appended to our WUTC filing in January. It is not our intent to minimize dialogue. We would be happy to convene future meetings.

Regarding the use of the Northwest Power and Conservation Council's targets, the Council Staff stated at the WUTC's September 3rd workshop that the Calculator can be used. This was a point of discussion without disagreement by Staff or other parties. We are unaware of Council Staff suggesting that large utilities not use

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this calculator. Tom Eckman showed utilities (and only large utilities were present) at the WUTC September 3rd workshop how to access and use this calculator.

Regarding more detail of our plan, we will be submitting our 2010 DSM Business Plan in the coming weeks. Further, the detail supporting the 6th Power Plan targets is voluminous. This was the subject of multiple meetings of the Conservation Resources Advisory Committee (CRAC). Significant public information is available.

Regarding evaluation, measurement and verification (EM&V), we agree that evaluation is integral to claimed conservation savings. Avista currently has EM&V procedures in place. In the time since our current programs have been authorized by the Commission in 1995, we have had 13 years of prudence findings based on our established protocols. We understand that there is a desire for increased EM&V. We have provided our new EM&V plan to the External Energy Efficiency Board. We will provide this as an addendum to our Compliance Plan. The Company Brief in Dockets UE 090134, UG 090135 and UG 060518 (consolidated) states that we will have new EM&V in place by September, 2010.

It is the Company's plan to share via email to its Triple E, TAC and interested parties, prior to January 1, 2010 a revised draft with our projected cumulative ten-year conservation potential and a table of contents.

We have set up a conference bridge for Wednesday, December 16th at 2:00 pm and look forward to discussing these issues further with any and all interested parties. An e-mail will follow shortly with the details for this call. In the meantime, if you have any questions or concerns, please feel free to contact me at 509-495-4975 or Bruce Folsom at 509-495-8706.

Thanks!
Linda

Linda Gervais
Manager, Regulatory Policy
State and Federal Regulation
Avista Utilities
509-495-4975
linda.gervais@avistacorp.com

From: Reynolds, Deborah (UTC) [mailto:DReynold@utc.wa.gov]
Sent: Friday, December 04, 2009 6:00 PM
To: Gervais, Linda; Beamer, Nick; carrie@nwenergy.org; cdavis@snapwa.org; Murray, Chuck (COM); chuck_eberdt@opportunitycouncil.org; cfulenwider@nwalliance.org; DanB@community-minded.org; danielle@nwenergy.org; Nightingale, David (UTC); donn.english@puc.idaho.gov; Jeff Harris; jennifer.gross@nwnatural.com; john.kaufmann@state.or.us; kerchep@shmc.org; Daeschel, Lea (ATG); lisa.labolle@oer.idaho.gov; lynn.anderson@puc.idaho.gov; Kimball, Mary (ATG); matt.elam@puc.idaho.gov; mearly@icnu.org; michael_shepard@esource.com; Parvinen, Mike (UTC); moshrek.sobhy@state.or.us; paul.kjellander@oer.idaho.gov; ppyron@nwigu.org; roscarson@spokanecounty.org; sarah.smith2@terasengas.com; scarter@nrdc.org; sdavidson@nwalliance.org; Johnson, Stefanie (ATG); stuckart@snapwa.org; teckman@nwcouncil.org; kterpak@spokanecity.org; dacquisto@gem.gonzaga.edu; tomnoll@idahopower.com; mike_kersh@iepco.com; rick.sterling@puc.idaho.gov; carrie@nwenergy.org; elizabeth.hossner@pse.com; villamor.gamponia@pse.com; davev@nwenergy.com; Wilson, Kirsten G. (GA); forda@mail.wsu.edu; Kalich, Clint; Johnson, Steven (UTC); Novak, Vanda (UTC); Murray, Chuck (COM); tmorlan@nwcouncil.org; Barcus, Randy; anderson.arielle@gmail.com; matto@McKinstry.com; phillip.popoff@pse.com; mschilmoeller@nwcouncil.org; achang@nrdc.org; Christie, Kevin; rtoth@greaterspokane.org; MStokes@idahopower.com; jeffmorris@energyhorizonllc.com; Greg.Duvall@PacifiCorp.com; AshA@McKinstry.com; jking@nwcouncil.org; KKNITTE@gcpud.org; Hirsh, Nancy; danielle@nwenergy.org; teckman@nwcouncil.org; mearly@icnu.org; randy.lobb@puc.Idaho.gov; Waples, Scott; PHutton@kleinfelder.com; Daeschel, Lea (ATG); Lisa.LaBolle@oer.idaho.gov; MikeC@BennettForest.Com; mike.k.schneider@us.abb.com; Howard.Ray@clearwaterpaper.com; joe_ross@transcanada.com; baz@pivotal-investments.com; Nightingale, David (UTC); bart_jones@transcanada.com; Shane, Xin; Rolstad, Tracy; Englert, Eric; Allen, Cathie
Cc: Folsom, Bruce; Powell, Jon; Ehrbar, Pat; Gibson, John; Weiss, Mark; Wood, Patty; Kirkeby, Curt; Coelho, Renee;

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Parvinen, Mike (UTC)
Subject: RE: Avista I-937 Compliance

Hi Linda,
Thank you for providing this information. Due to workload issues, we have been unable to respond. However, we do have some general concerns.

First, the approach you have chosen does not allow for dialog among your stakeholders about the targets you are proposing. Staff would have preferred a meeting with the group.

Second, the targets you have proposed are based on the NWPCC calculator. Council staff have stated that large utilities should not need to use the calculator, because their IRPs will probably provide better, more tailored analysis. Staff looked at Avista's 2009 IRP, and notes that the estimates of cost-effective conservation in the IRP are higher than those provided by the calculator. Staff is concerned about this difference.

Third, the description of the conservation is lacking. Staff would expect to see detail such as that provided in the company's business plan.

Fourth, the company's evaluation, measurement and verification plans should have been presented and discussed in a public forum before inclusion in the forthcoming compliance filing. Proving that conservation has been achieved will be a key part of the 2012 report, and the company should be proposing standards in the 2010 filing.

Thank you,

Deborah Reynolds
Regulatory Analyst
360-664-1255

From: Gervais, Linda [mailto:Linda.Gervais@avistacorp.com]
Sent: Wednesday, November 11, 2009 3:43 PM
To: Beamer, Nick; carrie@nwenergy.org; cdavis@snapwa.org; Murray, Chuck (COM); chuck_eberdt@opportunitycouncil.org; cfulenwider@nwalliance.org; DanB@community-minded.org; danielle@nwenergy.org; Nightingale, David (UTC); Reynolds, Deborah (UTC); donn.english@puc.idaho.gov; Jeff Harris; jennifer.gross@nwnatural.com; john.kaufmann@state.or.us; kerchep@shmc.org; Daeschel, Lea (ATG); lisa.labolle@oer.idaho.gov; lynn.anderson@puc.idaho.gov; Kimball, Mary (ATG); matt.elam@puc.idaho.gov; mearly@icnu.org; michael_shepard@esource.com; Parvinen, Mike (UTC); moshrek.sobhy@state.or.us; paul.kjellander@oer.idaho.gov; ppyron@nwigu.org; roscarson@spokanecounty.org; sarah.smith2@terasengas.com; scarter@nrdc.org; sdavidson@nwalliance.org; Johnson, Stefanie (ATG); stuckart@snapwa.org; teckman@nwcouncil.org; kterpak@spokanecity.org; dacquisto@gem.gonzaga.edu; tomnoll@idahopower.com; mike_kersh@iepco.com; rick.sterling@puc.idaho.gov; carrie@nwenergy.org; elizabeth.hossner@pse.com; villamor.gamponia@pse.com; davev@nwenergy.com; Wilson, Kirsten G. (GA); forda@mail.wsu.edu; Kalich, Clint; Johnson, Steven (UTC); Novak, Vanda (UTC); Reynolds, Deborah (UTC); Murray, Chuck (COM); tmorlan@nwcouncil.org; Barcus, Randy; anderson.arielle@gmail.com; matto@McKinstry.com; phillip.popoff@pse.com; mschilmoeller@nwcouncil.org; achang@nrdc.org; Christie, Kevin; rtoth@greaterspokane.org; MStokes@idahopower.com; jeffmorris@energyhorizonllc.com; Greg.Duvall@PacifiCorp.com; AshA@McKinstry.com; jking@nwcouncil.org; KKNITTE@gcpud.org; Hirsh, Nancy; danielle@nwenergy.org; teckman@nwcouncil.org; mearly@icnu.org; randy.lobb@puc.Idaho.gov; Waples, Scott; PHutton@kleinfelder.com; Daeschel, Lea (ATG); Lisa.LaBolle@oer.idaho.gov; MikeC@BennettForest.Com; mike.k.schneider@us.abb.com; Howard.Ray@clearwaterpaper.com; joe_ross@transcanada.com; baz@pivotal-investments.com; Nightingale, David (UTC); bart_jones@transcanada.com; Shane, Xin; Rolstad, Tracy; Englert, Eric; Allen, Cathie
Cc: Folsom, Bruce; Powell, Jon; Ehrbar, Pat; Gibson, John; Weiss, Mark; Wood, Patty; Kirkeby, Curt; Coelho, Renee; Gervais, Linda
Subject: Avista I-937 Compliance

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Avista Triple E, TAC members and interested parties:

Avista Utilities is in the beginning process of drafting its compliance filing with the Washington Utilities and Transportation Commission (UTC) specifying its plans for meeting the requirements of Initiative 937 (I-937). By January 1, 2010, and every two years thereafter, utilities must project their cumulative ten-year conservation potential and establish a biennial conservation goal.

Public involvement is essential to this process. Consequently, we are seeking your input as an interested stakeholder.

The attached is a summary outline of the approach that Avista plans to take in the upcoming compliance filing due by January 29, 2010. Additionally, we have provided some insights into our planning process for meeting the I-937 requirements.

Much of this was discussed at our September 30, 2009 public meeting at Avista's Jack Stewart Training Facility that many of you attended. This is an additional opportunity to comment on these or other issues related to Avista's I-937 compliance.

To file by the required date, we will need to receive this first round of comments no later than November 30th, 2009. Preferably we would receive comments by e-mail to expedite the process of incorporating them into our planning process as quickly as possible.

Comments should be sent to me at: (linda.gervais@avistacorp.com or 509-495-4975). Thank you for taking the time to review and comment on this important issue.

Sincerely,

Linda Gervais

Manager, Regulatory Policy
State and Federal Regulation
Avista Utilities
509-495-4975 (W)

509-953-8057 (C)
linda.gervais@avistacorp.com <<I-937 -11.11.09.docx>> <<6th Power Plan Targets for I937 (2).xlsx>>

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Gervais, Linda

From: Daeschel, Lea (ATG) [LeaD@ATG.WA.GOV]
Sent: Wednesday, December 16, 2009 3:13 PM
To: Gervais, Linda
Subject: RE: Avista I-937 Compliance - Conference call tomorrow

Thanks!

From: Gervais, Linda [mailto:Linda.Gervais@avistacorp.com]
Sent: Wednesday, December 16, 2009 3:12 PM
To: Daeschel, Lea (ATG)
Subject: Re: Avista I-937 Compliance - Conference call tomorrow

Absolutely we will. Thanks for following up. Linda

From: Daeschel, Lea (ATG) <LeaD@ATG.WA.GOV>
To: Gervais, Linda
Sent: Wed Dec 16 15:08:30 2009
Subject: RE: Avista I-937 Compliance - Conference call tomorrow

Linda,

I accidentally hung up when trying to hit mute..I signed back on but it looks like everyone departed. I had one final question---will Avista CC the Triple E when they make their informal filing with the Commission?

From: Gervais, Linda [mailto:Linda.Gervais@avistacorp.com]
Sent: Tuesday, December 15, 2009 11:07 AM
To: Reynolds, Deborah (UTC); Beamer, Nick; carrie@nwenergy.org; cdavis@snapwa.org; Murray, Chuck (COM); chuck_eberdt@opportunitycouncil.org; cfulenwider@nwalliance.org; DanB@community-minded.org; danielle@nwenergy.org; Nightingale, David (UTC); donn.english@puc.idaho.gov; Jeff Harris; jennifer.gross@nwnatural.com; john.kaufmann@state.or.us; kerchep@shmc.org; Daeschel, Lea (ATG); lisa.labolle@oer.idaho.gov; lynn.anderson@puc.idaho.gov; Kimball, Mary (ATG); matt.elam@puc.idaho.gov; mearly@icnu.org; michael_shepard@esource.com; Parvinen, Mike (UTC); moshrek.sobhy@state.or.us; paul.kjellander@oer.idaho.gov; ppyron@nwigu.org; roscarson@spokanecounty.org; sarah.smith2@terasengas.com; scarter@nrdc.org; sdavidson@nwalliance.org; Johnson, Stefanie (ATG); stuckart@snapwa.org; teckman@nwcouncil.org; kterpak@spokanecity.org; dacquisto@gem.gonzaga.edu; tomnoll@idahopower.com; mike_kersh@iepco.com; rick.sterling@puc.idaho.gov; carrie@nwenergy.org; elizabeth.hossner@pse.com; villamor.gamponia@pse.com; davev@nwenergy.com; Wilson, Kirsten G. (GA); forda@mail.wsu.edu; Kalich, Clint; Johnson, Steven (UTC); Novak, Vanda (UTC); Murray, Chuck (COM); tmorlan@nwcouncil.org; Barcus, Randy; anderson.arielle@gmail.com; matto@McKinstry.com; phillip.popoff@pse.com; mschilmoeller@nwcouncil.org; achang@nrdc.org; Christie, Kevin; rtoth@greaterspokane.org; MStokes@idahopower.com; jeffmorris@energyhorizonllc.com; Greg.Duvall@PacifiCorp.com; AshA@McKinstry.com; jking@nwcouncil.org; KKNITTE@gcpud.org; Hirsh, Nancy; danielle@nwenergy.org; teckman@nwcouncil.org; mearly@icnu.org; randy.lobb@puc.Idaho.gov; Waples, Scott; PHutton@kleinfelder.com; Daeschel, Lea (ATG); Lisa.LaBolle@oer.idaho.gov; MikeC@BennettForest.Com; mike.k.schneider@us.abb.com; Howard.Ray@clearwaterpaper.com; joe_ross@transcanada.com; baz@pivotal-investments.com; Nightingale, David (UTC); bart_jones@transcanada.com; Shane, Xin; Rolstad, Tracy; Englert, Eric; Allen, Cathie
Cc: Folsom, Bruce; Powell, Jon; Ehrbar, Pat; Gibson, John; Weiss, Mark; Wood, Patty; Kirkeby, Curt; Coelho, Renee; Parvinen, Mike (UTC)
Subject: Avista I-937 Compliance - Conference call tomorrow

All,

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The following is the phone in information to our conference call scheduled for tomorrow at 2 p.m. If you have any questions, please feel free to contact me at 509-495-4975.
Thanks!
Linda Gervais

Please call: (888) 422-7128
Host: Linda Gervais
Participant Code: 257367

December 31, 2009

David Danner
Executive Director
Washington Utilities & Transportation Commission
1300 S. Evergreen Park Drive S. W.
P.O. Box 47250
Olympia, Washington 98504-7250

Dear Mr. Danner:

RE: Avista Utilities Informal Compliance Filing with WAC 480-109-101(1)

Triple E and Interested Parties,
Please find attached, per WAC 480-109-010(1), Avista's projected cumulative ten-year electric conservation potential in Washington. This document is provided as a means to begin the process for meeting the I-937 compliance. Avista will provide to the UTC on or before January 29, 2010 in compliance with WAC 480-109-010 (3) the detail behind the 10-year potential. If you have any questions regarding this information, please contact Bruce Folsom at 509-495-8706 or myself at 509-495-4975.

Have a Happy New Year!!

Sincerely,
Linda Gervais
Manager, Regulatory Policy
Avista Utilities
509-495-4975
linda.gervais@avistacorp.com

c: Mr. David Nightingale
Ms. Deborah Reynolds
Mr. Steve Johnson

Gervais, Linda

From: Gervais, Linda
Sent: Thursday, December 31, 2009 1:30 PM
To: 'BeameN@dshs.wa.gov'; 'Carrie Dolwick (carrie@nwenergy.org)'; 'cdavis@snapwa.org'; 'Chuck Murray (ChuckM@CTED.WA.GOV)'; 'chuck_eberdt@opportunitycouncil.org'; 'Claire Fulenwider (cfulenwider@nwalliance.org)'; 'Dan Baumgarten (DanB@community-minded.org)'; 'danielle@nwenergy.org'; 'David Nightingale (dnightin@utc.wa.gov)'; 'Deborah Reynolds (dreynolds@utc.wa.gov)'; 'Donn English (donn.english@puc.idaho.gov)'; 'Jeff Harris'; 'Jennifer Gross (jennifer.gross@nwnatural.com)'; 'John Kaufman (john.kaufmann@state.or.us)'; 'kerchep@shmc.org'; 'Lea Daeschel (LeaD@atg.wa.gov)'; 'Lisa Labolle (lisa.labolle@oer.idaho.gov)'; 'lynn.anderson@puc.idaho.gov'; 'maryk2@atg.wa.gov'; 'Matt Elam (matt.elam@puc.idaho.gov)'; 'mearly@icnu.org'; 'michael_shepard@esource.com'; 'Mike Parvinen (mparvine@utc.wa.gov)'; 'Moshrek Sobhy (moshrek.sobhy@state.or.us)'; 'Paul Kjellander (paul.kjellander@oer.idaho.gov)'; 'ppyron@nwigu.org'; 'Ron Oscarson (roscarson@spokanecounty.org)'; 'Sarah Smith (sarah.smith2@terasengas.com)'; 'scarter@nrdc.org'; 'Scott Davidson (sdavidson@nwalliance.org)'; 'stefaniej@atg.wa.gov'; 'stuckart@snapwa.org'; 'teckman@nwcouncil.org'; 'kterpak@spokanecity.org'; 'dacquisto@gem.gonzaga.edu'; 'tomnoll@idahopower.com'; 'mike_kersh@iepco.com'; 'rick.sterling@puc.idaho.gov'; 'carrie@nwenergy.org'; 'elizabeth.hossner@pse.com'; 'villamor.gamponia@pse.com'; 'davev@nwenergy.com'; 'kwilson@ga.wa.gov'; 'forda@mail.wsu.edu'; Kalich, Clint; 'SJohnson@utc.wa.gov'; 'vnovak@utc.wa.gov'; 'Reynolds, Deborah (UTC)'; 'ChuckM@CTED.WA.GOV'; 'tmorlan@nwcouncil.org'; Barcus, Randy; 'anderson.arielle@gmail.com'; 'matto@McKinstry.com'; 'phillip.popoff@pse.com'; 'mschilmoeller@nwcouncil.org'; 'achang@nrdc.org'; Christie, Kevin; 'rtoth@greaterspokane.org'; 'MStokes@idahopower.com'; 'jeffmorris@energyhorizonllc.com'; 'Greg.Duvall@PacifiCorp.com'; 'AshA@McKinstry.com'; 'jking@nwcouncil.org'; 'KKNITTE@gcpud.org'; 'Hirsh, Nancy'; 'danielle@nwenergy.org'; 'teckman@nwcouncil.org'; 'mearly@icnu.org'; 'randy.lobb@puc.Idaho.gov'; Waples, Scott; 'PHutton@kleinfelder.com'; 'Daeschel, Lea (ATG)'; 'Lisa.LaBolle@oer.idaho.gov'; 'MikeC@BennettForest.Com'; 'mike.k.schneider@us.abb.com'; 'Howard.Ray@clearwaterpaper.com'; 'joe_ross@transcanada.com'; 'baz@pivotal-investments.com'; 'dnightin@utc.wa.gov'; 'bart_jones@transcanada.com'; Shane, Xin; Rolstad, Tracy; 'Englert, Eric'; 'Allen, Cathie'; records@utc.wa.gov
Cc: Folsom, Bruce; Powell, Jon; Ehrbar, Pat; Gibson, John; Wood, Patty; Kirkeby, Curt; Coelho, Renee; Olsness, Patty
Subject: Avista Informal Compliance with WAC 480-109-010(1)

Triple E and Interested Parties,
Please find attached, per WAC 480-109-010(1), Avista's projected cumulative ten-year electric conservation potential in Washington. This document is provided as a means to begin the process for meeting the I-937 compliance. Avista will provide to the UTC on or before January 29, 2010 in compliance with WAC 480-109-010 (3) the detail behind the 10-year potential. If you have any questions regarding this information, please contact Bruce Folsom at 509-495-8706 or myself at 509-495-4975.

Have a Happy New Year!!

Sincerely,

Linda Gervais
Manager, Regulatory Policy
State and Federal Regulation
Avista Utilities
509-495-4975 (W)
509-953-8057 (C)
linda.gervais@avistacorp.com

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Avista I-937
Projected Potenti...

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Avista Utilities
Projected "Cumulative Ten-Year Electric Conservation Potential"
December 31, 2009

Initiative 937 (I-937) and the Washington Administrative Code (WAC) 480-109 permit the utility to elect to establish electric energy efficiency acquisition targets based upon either the most recent Northwest Power and Conservation Council (NPCC) power plan or their most recent integrated resource plan (IRP), on the condition that the methodology used in that IRP is consistent with the NPCC power plan methodology.

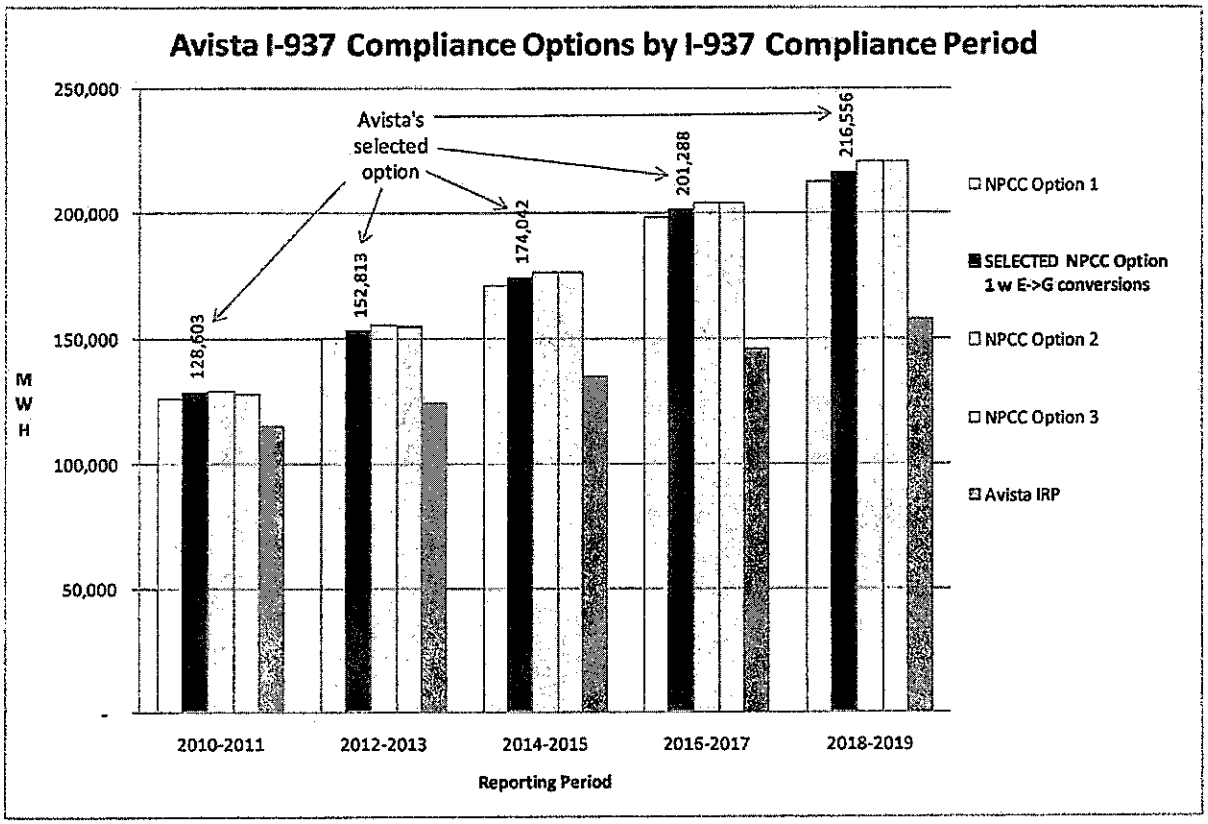
The 6th Power Plan establishes three options for determining the target of a particular utility and jurisdiction. The options are distinguished by the degree of market segment disaggregation contained within the estimate. Option #1 is the least disaggregated and contains an acquisition target for the entire utility and jurisdiction, option #2 disaggregates the acquisition into four market segments and option #3 disaggregates acquisition into five market segments.

Avista has chosen to use option #1 of the plan, to communicate our belief that the acquisition target is based upon overall acquisition without regard to the segment that the acquisition is derived from.

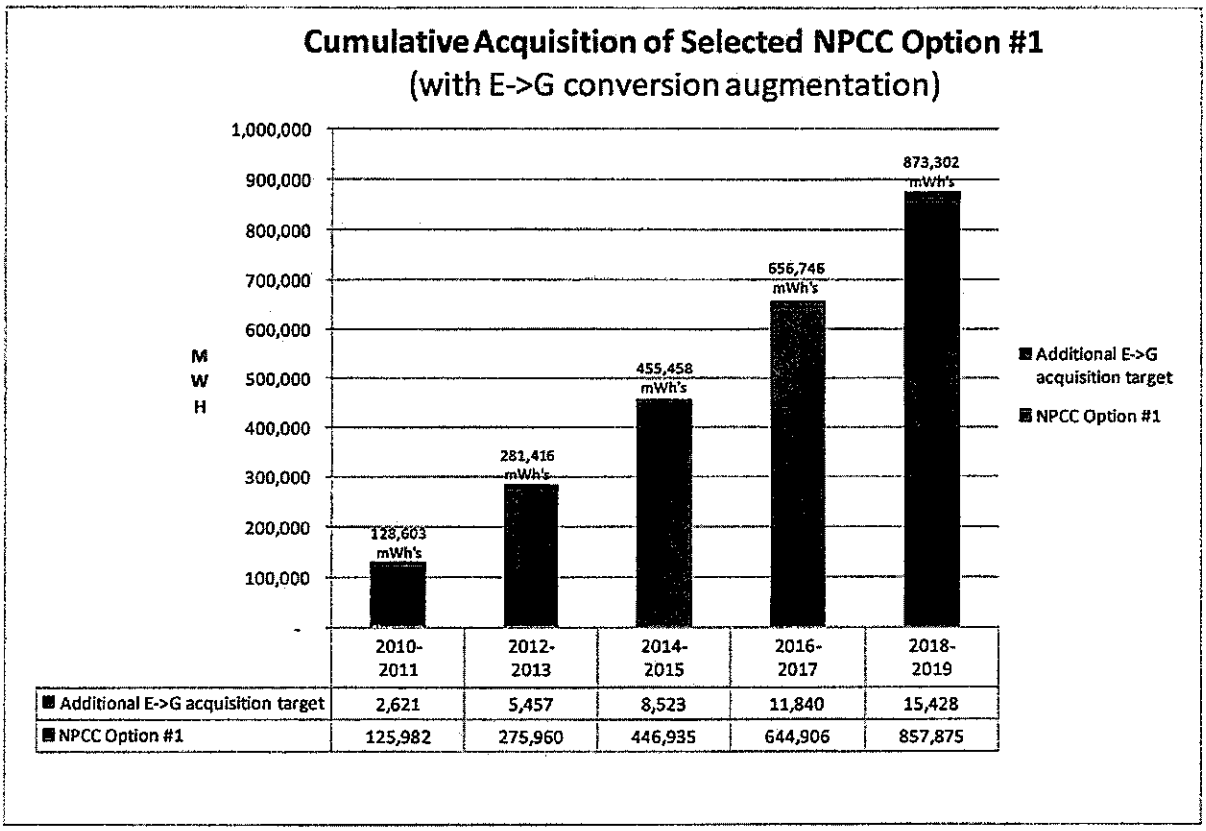
Avista's Demand Side Management (DSM) programs are somewhat unique in that any efficiency measure is deemed eligible for the non-residential site-specific program; the Company will provide a financial rebate to Commercial and Industrial customers through our site-specific program for any electric energy saving measure with a simple financial payback of one-year or over; pursuant to Tariff Schedule 90. For purposes of the IRP, Avista does attempt to define to the degree possible these efficiency opportunities to develop an estimate of future cost-effectiveness and acquirable potential. However, a significant quantity of acquisition comes out of measures that are extremely unique and therefore not amenable to generic analysis or from measures that could be reasonably anticipated during the IRP process. Consequently, Avista performs an estimate of the future acquisition of these measures primarily based upon historical acquisition with modifications for customer load growth, price elasticity and any other expected events that would improve this estimate. Acquirable potential for the site-specific program, and

all other programs, are made of results driven by program planners and technical staff based upon the specific characteristics of that program and expected market conditions.

Avista's IRP has historically established system (Washington and Idaho) electric energy-efficiency targets without independently distinguishing between the acquisition of the two jurisdictions. To establish a Washington jurisdictional level of energy-efficiency comparable to the Washington-specific NPCC 6th Power Plan, the identified system energy-efficiency IRP acquisition target was disaggregated by jurisdiction based upon the 2010 total firm energy sales forecast used in the development of the IRP. A 4.0% growth factor was applied to establish 2011 DSM acquisition. Based upon these calculations a 2010-2011 Washington jurisdictional electric energy-efficiency target consistent with the IRP and comparable to the NPCC 6th Power Plan was established.



The federal law establishing the requirement for the NPCC power plan process contains a specific definition of "conservation" that excludes electric-to-natural gas conversions. These conversions are eligible for incentives under Avista's electric efficiency programs, and these measures are often the most cost-effective alternative for both the customer and the utility. Consequently, Avista has chosen to increase the NPCC option #1 target in the amount of the acquisition incorporated into our corporate budget submittal. By increasing the target by the amount of acquisition expected from these programs during 2010-2011 we also are proposing that these conversions will become an eligible measure for meeting that target.



	2010-2011	2012-2013	2014-2015	2016-2017	2018-2019
Additional E->G acquisition target	2,621	5,457	8,523	11,840	15,428
NPCC Option #1	125,982	275,960	446,935	644,906	857,875

Based upon the selection of this option, it is Avista's intent to acquire 128,603 mWh's of energy efficiency qualifying under our proposal in the first 2010-2011 I-937 compliance period. Avista's projection of the acquisition over a ten-year period, assuming that this same option is selected in future compliance periods, is 873,302 mWh's. This acquisition will include traditional local electric efficiency measures, as well as, electric to natural gas conversions,

quantifiable behavioral efficiencies, distribution system efficiencies on both the customer and utility side of the meter, quantifiable adoption of efficiency measures contained within the scope of the 6th Power Plan beyond utility program intervention and Avista's share of acquisition achieved by the Northwest Energy Efficiency Alliance (NEEA). Only Washington jurisdictional acquisition will be credited towards achieving the I-937 target. Avista is not committing to any predetermined allocation of the target acquisition across customer segments or efficiency technologies.

For this first compliance period, Avista is electing to establish a target based upon a single acquisition target rather than a range of target acquisition. It is also our intent to treat the acquisition target in the 2nd (2012-2013) compliance period and beyond as a cumulative target. The cumulative 2010-2013 acquisition target applied to the second (2012-2013) I-937 compliance period would include all acquisition achieved in 2010-2011 or acquisition for which penalties, if any, have been paid during that period. This approach better aligns utility and shareholder interest by eliminating the tendency to limit acquisition in excess of a compliance period in order to preserve market potential in subsequent compliance periods.

Gervais, Linda

From: Reynolds, Deborah (UTC) [DReynold@utc.wa.gov]
Sent: Friday, January 15, 2010 4:04 PM
To: Allen, Cathie; Hopkins, William; tom.deboer@pse.com; Gervais, Linda
Cc: Nightingale, David (UTC); Murray, Chuck (COM); Danielle Dixon; carrie@nwenergy.org; Kimball, Mary (ATG); Johnson, Steven (UTC); Johnson, Stefanie (ATG); Daeschel, Lea (ATG); Eckman, Tom; Charles, Gillian; Grist, Charlie
Subject: Council Methodology Link - I-937

Hi,
The Northwest Power and Conservation Council has kindly provided a link to its methodology and calculators for companies affected by I-937.

http://www.nwcouncil.org/energy/powerplan/6/supplycurves/I937/default.htm

Deborah Reynolds, Regulatory Analyst
Utilities & Transportation Commission
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Process Evaluation Protocol Draft

Avista Utilities

10-28-09

Contents

Revision History

Date	Revision	Notes
10-28-09	Draft	Initial

Process Evaluation Protocol

1.0 Purpose

Process evaluations are an investigation and assessment of one or more program characteristics in order to provide recommendations that improve the program's efficiency.

This protocol identifies how process evaluations will be conducted at Avista. Because of the diversity of researchable issues, it is difficult to account for all considerations of process evaluations. For further information on process evaluations refer to *The California Evaluation Framework.*

2.0 Scope

This protocol applies to all process evaluations of DSM energy efficiency, outreach and educational programs.

3.0 Process

Process evaluations generally follow these steps (Figure 1).

1. Determine a need for an evaluation.
   - Scheduled.
   - Change in assumptions.
   - Poor performance.
   - Requested by stakeholder.
   - Etc.
2. Identify the evaluation objectives.
   - Investigate barriers to program participation.
   - Impact of rebate levels on participation.
   - Evaluate effectiveness of program delivery channels in reaching intended targets.
   - Etc.
3. Create a Process Evaluation Plan.
4. Perform the evaluation per the plan.
5. Create a report that addresses the objectives of the evaluation and provide recommendations.
6. Provide the report to interested parties and include it in an annual DSM report.

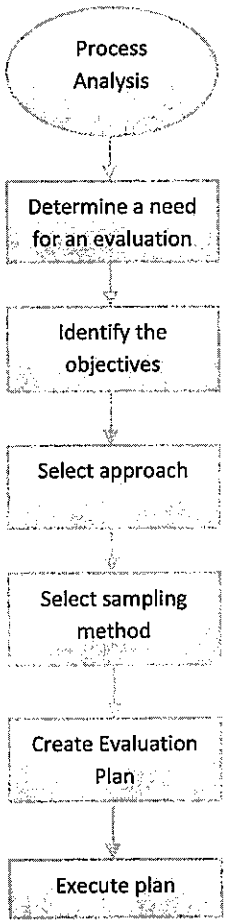


Figure 1

4.0 Process Evaluation Plan

The plan template can be found here TBD and will contain the following information.

4.1 Program Background

Description of the program highlighting the following information: market, technologies, objectives, delivery method, etc.

4.2 Evaluation Overview

List the objectives of the evaluation and how the information supports the program goals. Include a budget and schedule summary.

4.3 Evaluation Details

4.3.1 Approach

Select and justify one or more evaluation approaches.

4.3.1.1 Interviews
Conduct interviews in person or over the phone with the participants, contractors or implementers of the program.

4.3.1.2 Group Interviews
Interview with a group whose members have similar characteristics.

4.3.1.3 Surveys
Surveys can be mailed, web based or emailed.

4.3.1.4 Observations and field testing
Care should be taken to not affect the observed.

4.3.1.5 Unannounced participation
Program managers are not informed of who will be participating in the program. Observations are made about the process from a customer's perspective.

4.3.1.6 Analysis Method
For the chosen approach describe the analysis method to be used.

4.3.1.7 Data Collection
A description of the data that will be collected, how it will be collected and how it will be used.

4.3.1.8 Uncertainty of Results
Describe any uncertainties or threats to validity, biases, methods to minimize bias, and the level of precision and confidence associated with sample selection methods.

4. 3.2 Budget
Detailed budget.

4.3.3 Schedule
A schedule that details the significant milestones of the evaluation.

4.3.4 Evaluators
List the evaluation team. Include contact information.

5.0 Reporting

5.1 Working Documents
Will be stored here TBD

5.2 Final Report
A template can be found here TBD. The following information will be found on the report.

Table of Contents

- List of Figures and Tables
- Acronyms
- Abstract
- Acknowledgments

1. Executive Summary (Include highlights of key recommended improvements to the program, if relevant.)

2. Introduction

- Program Overview (e.g., program description, objectives)
- Evaluation Objectives and Methods
- Structure of the Report

3. Study Methodology

- Data Collection Approach(es)
- Analysis Methods
- Limitations, Caveats

4. Key Evaluation Results: Provide answers for all of the questions specified in the evaluation plan.

5. Recommendations: Include clear, actionable, and prioritized recommendations that are supported by the analysis.

6. Summary and Conclusions

7. Appendices (examples listed below):

- Recommended improvements to the evaluation process, including any lessons learned for future evaluation studies.
- Appendices containing detailed documentation of the research design and assumptions, data collection methods, evaluation analysis methodology, results tables, etc.
- Sources and quality (caveats on data) of primary and secondary information.
- Details on quantitative data analysis: analytical framework, modeling approach, and statistical results.
- Possible sources of overestimation and underestimation.
- Sensitivity of energy savings estimates.
- Assumptions and justifications.

Measurement & Verification Protocol Draft

Avista Utilities

12-20-09

Contents

Revision History

Date	Revision	Notes
12-20-09	Draft	Initial

Measurement & Verification Protocol

1.0 Purpose

This document defines the process of performing Measurement and Verification (M&V) at Avista Utilities. M&V is a systematic approach used to verify energy or demand savings of an energy efficiency measure. A robust M&V approach is transparent and reproducible. The plan required by this protocol will set expectations for the customer and will be the framework by which the study can be reproduced.

It is not intended to provide detailed explanations of all the considerations of M&V. The approach that Avista generally follows can be found in these documents:

- **National Action Plan for Energy Efficiency (2007). *Model Energy Efficiency Program Impact Evaluation Guide.* Prepared by Steven R. Shiller, Shiller Consulting, Inc. <www.epa.gov/eeactionplan>**
- ***Measurement of Energy and Demand Savings* ASHREA Guideline 14-2002.**
- **International Performance Measurement and Verification Protocol (IPMVP) 2009**

2.0 Scope

This protocol applies to all measures where it is determined that instrumentation and measurement will be used to determine savings. Deemed savings will only fall under this protocol if the savings value is being verified.

3.0 Process

The M&V process generally follows these steps (Figure 1).

1. Determine a need for M&V.
    - To support an Impact Evaluation.
    - Site-specific measures that are not well known.
    - Difficult to understand measures.
    - Etc.
2. Choose an analysis method (see supplement at the end of this document).
    - Option A: Retrofit Isolation with key parameter measurement.
    - Option B: Retrofit Isolation with ALL parameter measurement.
    - Option C: Whole Building, Utility bill analysis.
    - Option D: Calibrated Computer Simulation.
3. Create an M&V Plan. The plan contains all the information to perform the verification of the measure. It also sets expectations for how the final savings will be calculated.

4. Implement the plan. The plan will specify a baseline period and a performance period that will define the length of the evaluation. Evaluations can last up to a year depending on the measure and independent variables.
5. Create a savings report. The final report will be similar to the M&V plan but with the measured numbers in place of estimates. It will also include an appendix that includes sample data and other pertinent information.
6. Provide the report to interested parties. Depending on the need for the M&V analysis the reports can be given to a customer or rolled into a program evaluation report.

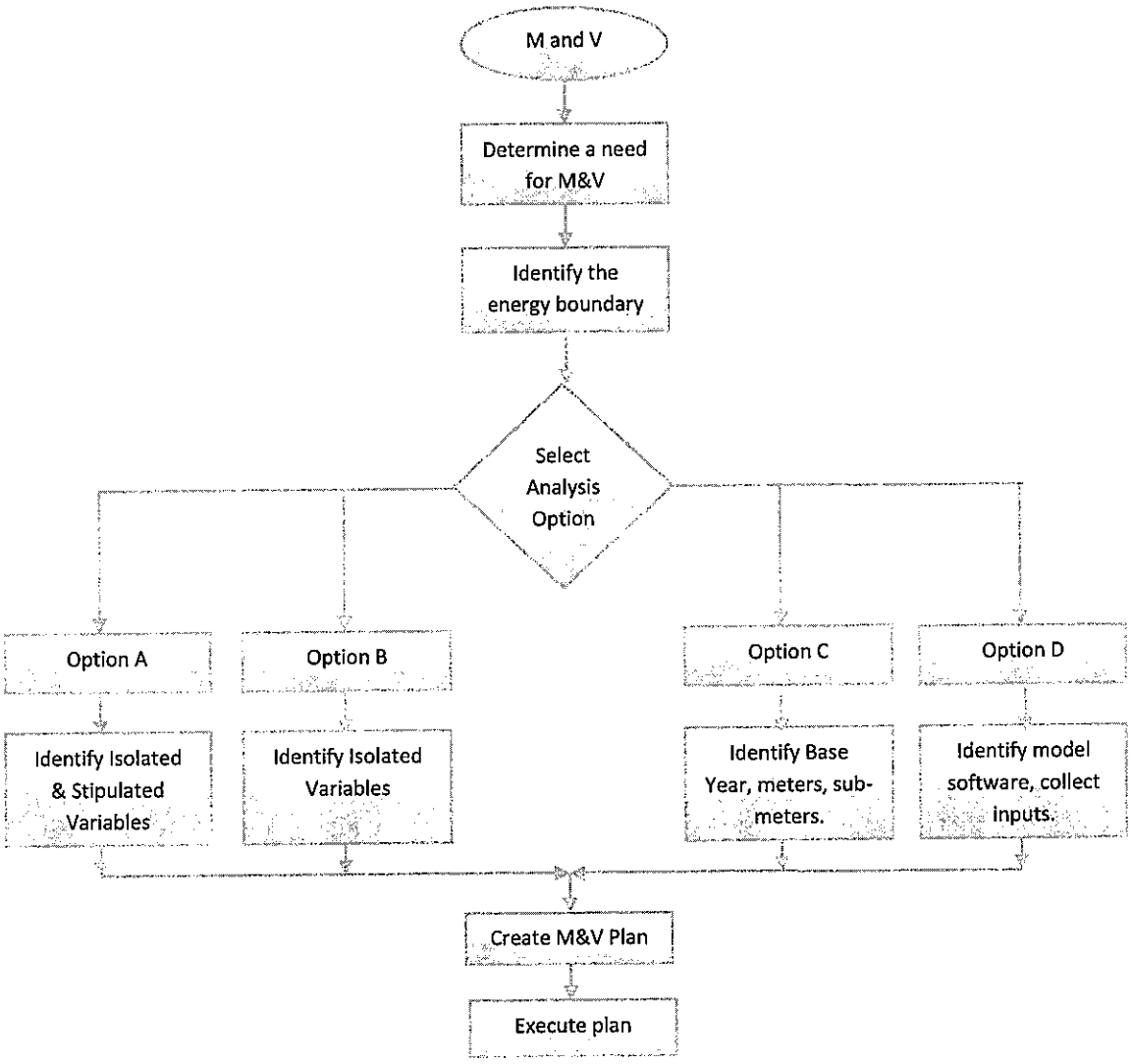


Figure 1

The deliverables from the M&V process is the M&V Plan and the Final Report.

4.0 M&V Plan

Plan templates for each analysis option can be found here TBD. M&V plans will contain the following information-

1. *Project Description*
    a. *Current process operation.*
    b. *Deficiencies in current operation.*
    c. *Proposed Changes.*
    d. *Intended Results.*
    e. *Analysis Option and justification.*
        i. *Option A: Key Parameter Retrofit Isolation*
        ii. *Option B: All Parameter Retrofit Isolation*
        iii. *Option C: Whole Building, Utility Bill Analysis*
        iv. *Option D: Calibrated Computer Model*
2. *Determination of Energy Saving.*
    a. *Base Year energy usage.*
        i. *Describe calculation method and define energy boundaries.*
        ii. *Identify measured process variables, stipulated variables and assumptions germane to base year energy usage.*
        iii. *Determine base year usage.*
    b. *Post project energy usage (The M&V plan is provided before the ECM is complete so the following are descriptions of how the usage will be determined after the M&V Plan is complete).*
        i. *Describe calculation method and define energy boundaries.*
        ii. *Identify measured process variables, stipulated variables and assumptions germane to the post ECM energy usage.*
    c. *Describe how the final savings determination will be made. Justify the length of the performance period and any periodic verification that may occur through the term of the contract. Include a description of how adjustments are accounted for.*
3. *List the responsibilities of each party that must be completed in order to complete the M&V plan. These lists will be ECM dependant.*
    a. *List of actions the customer needs to perform in order to complete the plan such as-*

i. *Provide Avista access to the equipment*

ii. *Provide invoices.*

iii. *Provide requested data.*

iv. *Etc.*

b. *List of actions Avista needs to perform in order to complete the plan such as-*

i. *Monitor power consumption.*

ii. *Analyze data and determine energy usage.*

iii. *Install data loggers.*

iv. *Etc.*

4. *Explain the incentive calculation and provide the current incentive schedule.*

– Upon completion of the M&V performance period, provide the customer a final report with details of the analysis and final incentive amount.

5.0 Final Report

5.1 Working Documents

Will be stored here TBD

5.2 Final Report

A template can be found here TBD. The final report will duplicate the M&V plan with the addition of measured data and results.

1. *Results Summary*
2. *Project Description*
   a. *Current process operation.*
   b. *Deficiencies in current operation.*
   c. *Proposed Changes.*
   d. *Intended Results.*
   e. *Analysis Option and justification.*
      i. *Option A: Key Parameter Retrofit Isolation*
      ii. *Option B: All Parameter Retrofit Isolation*
      iii. *Option C: Whole Building, Utility Bill Analysis*
      iv. *Option D: Calibrated Computer Model*
3. *Determination of Energy Saving.*

a. *Base Year energy usage.*
    i. *Describe calculation method and define energy boundaries.*
    ii. *Identify measured process variables, stipulated variables and assumptions germane to base year energy usage.*
    iii. *Determine base year usage.*
b. *Post project energy usage (The M&V plan is provided before the ECM is complete so the following are descriptions of how the usage will be determined after the M&V Plan is complete).*
    i. *Describe calculation method and define energy boundaries.*
    ii. *Identify measured process variables, stipulated variables and assumptions germane to the post ECM energy usage.*
c. *Describe how the final savings determination will be made. Justify the length of the performance period and any periodic verification that may occur through the term of the contract. Include a description of how adjustments are accounted for.*

4. *List the responsibilities of each party that must be completed in order to complete the M&V plan. These lists will be ECM dependant.*
    a. *List of actions the customer needs to perform in order to complete the plan such as-*
        i. *Provide Avista access to the equipment*
        ii. *Provide invoices.*
        iii. *Provide requested data.*
        iv. *Etc.*
    b. *List of actions Avista needs to perform in order to complete the plan such as-*
        i. *Monitor power consumption.*
        ii. *Analyze data and determine energy usage.*
        iii. *Install data loggers.*
        iv. *Etc.*
5. *Explain the incentive calculation and provide the current incentive schedule.*
6. *Detailed Results*
    a. *Baseline data calculations.*
    b. *Performance period calculations.*
    c. *Savings Calculation.*
    d. *Deviations from the original M&V plan.*

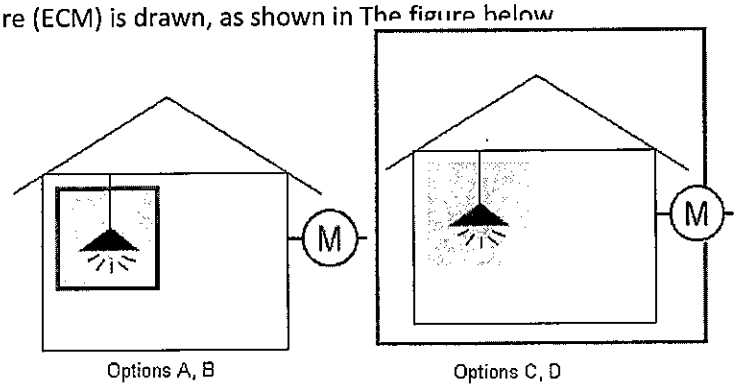
e. Sample Data.

Supplemental Information

IPMVP Overview

The measurement and verification (M&V) protocol mandated for projects conducted by the Avista DSM engineering unit is the International Performance Measurement and Verification Protocol (IPMVP). We do not measure savings, we can only characterize the energy using systems and measure energy use and the independent variables that determine energy use. We do not use the IPMVP for program savings, only for individual ECM estimates that then may be extrapolated to programmatic savings. These guidelines group M&V methodologies into four general categories: Options A, B, C, and D. The options are generic M&V approaches for energy saving projects.

M&V approaches are divided into two general types: retrofit isolation and whole-facility. Retrofit isolation methods look only at the affected equipment or system independent of the rest of the facility; whole-facility methods consider the total energy use and de-emphasize specific equipment performance. One primary difference in these approaches is where the boundary of the energy conservation measure (ECM) is drawn, as shown in The figure below



All energy used within the boundary must be considered. Options A and B are retrofit isolation methods; Option C is a whole-facility method; Option D can be used as either, but is usually applied as a whole-facility method.

Retrofit Isolation (Options A and B) vs Whole-Facility M&V Methods (Options C and D)

The four generic M&V options are summarized in the following table and described in more detail below. While each option defines an approach to determining savings, it is important to realize that savings are not directly measured, and all savings are estimated values. The accuracy of these estimates, however, will improve with the number and quality of the measurements made.

Table Overview of M&V Options A, B, C, and D

M&V Option	Performance1 and Usage2 Factors	Savings Calculation
Option A— Retrofit Isolation with Key Parameter Measurement	This option is based on a combination of measured and estimated factors when variations in factors are not expected. Measurements are spot or short-term and are taken at the component or system level, both in the baseline and post-installation cases. Measurements should include the key performance parameter(s) which define the energy use of the ECM. Estimated factors are supported by historical or manufacturer's data. Savings are determined by means of engineering calculations of baseline and post-installation energy use based on measured and estimated values.	Direct measurements and estimated values, engineering calculations and/or component or system models often developed through regression analysis Adjustments to models are not typically required.
Option B— Retrofit Isolation with All Parameter Measurement	This option is based on periodic or continuous measurements of energy use taken at the component or system level when variations in factors are expected. Energy or proxies of energy use are measured continuously. Periodic spot or short-term measurements may suffice when variations in factors are not expected. Savings are determined from analysis of baseline and reporting period energy use or proxies of energy use.	Direct measurements, engineering calculations, and/or component or system models often developed through regression analysis Adjustments to models may be required.
Option C – Utility Data Analysis	This option is based on long-term, continuous, whole-building utility meter, facility level, or sub-meter energy (or water) data. Savings are determined from analysis of baseline and reporting period energy data. Typically, regression analysis is conducted to correlate with and adjust energy use to independent variables such as weather, but simple comparisons may also be used.	Based on regression analysis of utility meter data to account for factors that drive energy use Adjustments to models are typically required.
Option D— Calibrated Computer Simulation	Computer simulation software is used to model energy performance of a whole-facility (or sub-facility). Models must be calibrated with actual hourly or monthly billing data from the facility. Implementation of simulation modeling requires engineering expertise. Inputs to the model include facility characteristics;	Based on computer simulation model (such as eQUEST) calibrated with whole-building or end-use metered data or both. Adjustments to

	performance specifications of new and existing equipment or systems; engineering estimates, spot-, short-term, or long-term measurements of system components; and long-term whole-building utility meter data. After the model has been calibrated, savings are determined by comparing a simulation of the baseline with either a simulation of the performance period or actual utility data.	models are required.

When Avista DSM uses each method:

OPTION A—RETROFIT ISOLATION WITH KEY PARAMETER MEASUREMENT

M&V Option A involves a retrofit or system level M&V assessment. The approach is intended for retrofits where key performance factors (e.g., end-use capacity, demand, power) or operational factors (e.g., lighting operational hours, cooling ton-hours) can be spot- or short-term-measured during the baseline and post-installation periods. Any factor not measured is estimated based on assumptions, analysis of historical data, or manufacturer's data.

All end-use technologies can be verified using Option A. However, the accuracy of this option is generally inversely proportional to the complexity of the measure. Thus, the savings from a simple lighting retrofit will typically be more accurately estimated with Option A than the savings from a more complicated chiller retrofit. If greater accuracy is required, Options B, C, or D may be more appropriate. Properly applied, an Option A approach:

- Ensures that baseline conditions have been properly defined
- Confirms that the proper equipment/systems were installed and that they have the potential to generate predicted savings
- Verifies that the installed equipment/systems continue to have the capacity to yield the predicted savings during the term of the contract

Option A can be applied when identifying that the potential to generate savings is the most critical M&V issue, including situations where:

- The magnitude of savings is low for the entire project or a portion of the project to which Option A is applied.
- The risk of not achieving savings is low.
- The independent variables that drive energy use are not difficult or expensive to measure, and are not expected to change.
- Interactive effects can be reasonably estimated or ignored
- Long-term measurements are not warranted

- The value of savings and barrier removal will accept some uncertainty

Avista's approach to Option A:
Option A is an approach designed for projects in which the potential to generate savings must be verified, but the actual savings can be determined from short-term measurements, estimates, and engineering calculations. Performance period energy use is not measured throughout the term of the contract. Performance period energy use and baseline energy use are predicted using an engineering or statistical analysis of information that does not involve long-term measurements.

With Option A, savings are determined by measuring the key parameters such as capacity, efficiency, or operation of a system before and after a retrofit, and by multiplying the difference by an estimated factor. Using estimates is the easiest and least expensive method of determining savings. It can also be the least accurate and is typically the method with the greatest uncertainty in savings. This level of savings determination may suffice for certain types of projects where a single factor represents a significant portion of the savings uncertainty.

Measurements
Within Option A, various methods and levels of accuracy determining savings are available. The level of accuracy depends on what measurements are made to verify equipment ratings, capacity, operating hours, and/or efficiencies; the quality of assumptions made; and the accuracy of the equipment inventory including nameplate data and quantity of installed equipment. There may be sizable differences between published information and actual operating data. Where discrepancies exist or are believed to exist, field-operating data should be obtained. The following forms are used to gather information from vendors regarding Option A parameters: Show forms in appendix

A key consideration in implementing Option A is identifying the parameters that will be measured and those that will be estimated. For example, the watts/fixture is the key performance parameter for a lighting retrofit. Other parameters that affect energy use (e.g., operating hours) that no one controls, can be estimated and then stipulated in the calculation. Where these other parameters are not known with sufficient certainty, they should be measured either in the baseline case and then stipulated, or verified against the estimates made. The penalty associated with low accuracy is not achieving the estimated savings and the associated utility bill cost reductions. Appropriate sources of estimated values are discussed below.

Estimates
The estimated parameters will affect the reported savings over the entire contract term. All estimates should be based on reliable, documentable sources or experiential findings from earlier reports. While direct measurements from short-term logging or existing EMCS records are the preferred information source, such information may not be available or may be costly to obtain.

Sources of information on which estimations should be based include the following (in decreasing order of preference):

- Models derived from measurements and monitoring

- Manufacturer's data or standard tables (such as lighting tables shown in appendix ?)
- Manufacturer's curves, such as pump, fan, and chiller performance curves
- Industry-accepted performance curves, such as standards published by the American National Standards Institute (ANSI), American Refrigeration Institute (ARI), and the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)
- Typical Meteorological Year (TMY) weather data
- Observations of building and occupant behavior
- Facility operations and maintenance logs

Estimated parameters should not come from the following:

- Undocumented assumptions or "rules-of-thumb"
- Proprietary "black-box" algorithms or other undocumented software
- Handshake agreements with no supporting documentation
- Guesses at operating parameters
- Equations that do not make mathematical sense or are derived from questionable data

Ongoing Verification

The potential to generate savings may be verified through spot/short-term metering and inspections conducted immediately before and immediately after installation. Bi-annual spot inspections may be conducted to verify that the proper equipment/systems are installed and the equipment/systems are performing to specification based on the program. If conditions have changed, additional performance period measurements or non-routine adjustments may be appropriate.

Avista Option A examples:

- Prescriptive and Site Specific Lighting
- Savings calculations for one dimensional heat transfer with no other active ECM's.
- Prescriptive and Site Specific Window savings
- Prescriptive Motors
- Prescriptive Food Service
- Residential Measures

OPTION B—RETROFIT ISOLATION WITH ALL PARAMETER MEASUREMENT

M&V Option B is a retrofit isolation or system-level approach. The approach is intended for retrofits with performance factors (e.g., end-use capacity, demand, power) and operational factors (lighting operational hours, cooling ton-hours) that can be measured at the component or system level and where long-term performance needs to be verified. It is similar to Option A, but uses periodic or continuous metering of all energy quantities, or all parameters needed to calculate energy, during the performance period. This approach provides the greatest accuracy in the calculation of savings, but increases the performance-period M&V cost.

The Option B approach ensures the same items as Option A, but also:

- Determines energy savings using periodic or continuous measurement of energy use or all parameters needed to calculate energy use during the term of the contract.

Option B is typically used when any or all of these conditions apply:

- For simple equipment replacement projects with energy savings that are less than 20% of total facility energy use as recorded by the relevant utility meter or sub-meter (Option C is not applicable)
- When energy savings values per individual measure are desired
- When interactive effects can be estimated using methods that do not involve long- term measurements
- When the independent variables that affect energy use are not complex and excessively difficult or expensive to monitor
- When operational data on the equipment is available through control systems
- When sub-meters already exist that record the energy use of subsystems under consideration (e.g., a separate sub-meter for heating ventilation and air-conditioning (HVAC) systems)

Avista's Approach to Option B

Option B verification procedures involve the same items as Option A, but require more end-use metering. Option B relies on the physical assessment of equipment change-outs to ensure that the installation is to specification. The potential to generate savings is verified through observations, inspections, and spot/short-term/continuous metering of energy or proven proxies of energy use, such as variable frequency drive speed for motor power. Baseline models are typically developed by correlating metered energy use with key independent variables. Depending on the ECM, spot or short-term metering may be sufficient to characterize the baseline condition, and the continuous metering of one or more variables may occur after retrofit installation. It is appropriate to use spot or short-term measurements in the performance period to determine energy savings when variations in performance are not expected, and may support some normalized savings approaches though adjustments to the baseline and/or the performance period model(s). When variations are expected, it is appropriate to measure factors continuously during the evaluation period. Continuous monitoring of information can be used to improve or optimize the operation of the equipment over time, thereby improving the performance of the retrofit.

M&V Considerations

Option B is for projects in which the potential to generate savings must be verified and actual energy use during the contract term needs to be measured for comparison with the baseline model for calculating savings. Option B involves procedures for verifying the same items as Option A plus the determination of energy savings during the contract term through short-term or continuous end-use metering. Some considerations when using Option B approaches include:

- All end-use technologies can be verified with Option B; however, the degree of difficulty and costs associated with verification increases as metering complexity increases.
- The task of measuring or determining energy savings using Option B can be more difficult and costly than that of Option A. However, results are typically more precise using Option B than the use of estimations as defined for Option A.

- Periodic spot or short-term measurements of factors are appropriate when variations in loads and operation are not expected. When variations are expected, it is appropriate to measure factors continuously.
- Performing continuous measurements or periodic measurements over the term of the contract will account for operating variations and will result in closer approximations of actual energy savings. Continuous measurements provide long-term persistence data on the energy use of the equipment or system.
- Data collected for energy savings calculations can be used to improve or optimize the operation of the equipment on a real-time basis, thereby improving the benefit of the retrofit. For constant-load retrofits, however, there may be no inherent benefit of continuous over short-term measurements.

Avista Option B Examples(not an exhaustive list):

- Industrial pumping processes
- Residential Solar water heating pilot
- Performance DSM contracts
- VFD's (maybe A depending upon approach)
- Renewables

OPTION C—WHOLE-BUILDING DATA ANALYSIS

M&V Option C involves whole-facility utility or sub-meter data analysis procedures to verify the performance of retrofit projects in which whole-facility baseline and performance period data are available. Option C usually involves collecting historical whole-facility baseline energy use and related data and continuously measuring whole-facility energy use after ECM installation. Baseline and periodic inspections of the equipment are also needed. Energy savings under Option C are estimated by developing statistically representative models of whole-facility or sub-metered energy consumption (i.e., therms and/or kWh). This method confirms total energy savings, but does not measure the savings from individual components.

In general, Option C should be used with complex equipment replacement and controls projects for which predicted savings are relatively large, i.e., greater than about 10% to 20% of the site's energy use, on a monthly basis. Option C regression methods are valuable for measuring interactions between energy systems or determining the impact of projects that cannot be measured directly, such as insulation or other building envelope measures. Regression analysis requires experienced, qualified analysts, and Option C methods should be employed only for projects that meet the following requirements:

- Savings are predicted to be greater than about 10% to 20% of the overall consumption measured by the utility or sub-meter.
- At least 12 and preferably 24 months or more of pre-installation data are used to calculate a baseline model.

- At least 9 and preferably 12 months of performance period data are used to calculate annual savings.
- Adequate data on independent variables are available to generate an accurate baseline model, and procedures are in place to track the variables required for performance period models.
- Significant operational or other changes are not planned for the facility during the performance period, and procedures are in place to document changes that do occur at the site.

Avista's Approach to Option C

With Option C, energy savings are determined using whole-building utility meter or facility-level metered data. Savings are determined through analysis of utility data (therms, fuel oil, kW, kWh, etc.) and the independent variables that affect energy consumption. Regression models are developed to predict energy use based on the appropriate independent variables for the project. Although simple mathematical techniques utilizing utility bill comparison are sometimes used, they are unreliable and not recommended. Regression models can take into account the impacts of weather and other independent variables on energy use, whereas simple utility bill comparison techniques cannot. The analysis requires an evaluation of the behavior of the facility as it relates to one or more independent variables (e.g., weather, occupancy, production rate) using regression analysis.

The key elements of utility data analysis include developing an appropriate baseline model which relates the baseline energy use to key independent variables, and continuously measuring the performance period energy use and the key independent variables. Savings are often calculated by comparing the energy use predicted by the baseline model using measured conditions with the actual energy use of the performance period. Alternately, performance period models may be developed if the baseline and performance period models are to be adjusted to typical conditions prior to comparison. Performance period models may also be needed if there is not a full year's worth of data available for the performance period.

Data Collection

Collecting, validating, and properly applying data are important elements of using utility data analysis. Option C techniques utilize three types of data: utility billing data, independent variables, and information on unrelated changes at the site. These data elements are discussed below.

Utility Billing Data

Utility billing data provide the basis for savings calculations by allowing a comparison of adjusted baseline models with performance period energy use. Regardless of the type of utility data used, a key to properly applying the data is ensuring that all start and end dates of the utility data are aligned with those of the independent variables. Collecting data on independent variables more often than collecting billing data can help align time frames. Billing data can be:

- Monthly billing data. Billing data should be measured at least once a month. There are typically two types of monthly billing data: total usage for the month and usage aggregated by time-of-use periods. Although either type of data can be used with a regression model, time-of-use is preferable because it provides more insight into usage patterns. In many cases, the peak demand is also recorded.

- Interval demand billing data. This type of billing data records the average demand (or energy use) for a given interval (e.g., 15 minutes) associated with the billing period, and typically includes peak demand charges.
- Stored energy billing data. Inventory readings or delivery information can be used to determine historical consumption for resources such as fuel oil, although sub-metering is preferred.

One of the challenges in applying Option C is accounting for factors beyond the ECM that affect overall site energy use, such as changes in square footage or loads. Tracking site changes provides a means for accounting for changes in energy use not associated with ECM installation. Adequately tracking the information needed to make these non-routine baseline adjustments can be a challenging task for long-term contracts and sites that have significant operational changes.

M&V Considerations

The following points should be considered when conducting Option C utility data analyses for M&V:

- All independent variables that affect energy consumption must be specified, whether or not they are accounted for in the model. Critical variables can include weather, building occupancy, set points, time of day, number of meals served, etc. The most common variable for many types of ECM's is outdoor air temperature.
- The form and content of any separate performance period model(s) (if used) should be specified, along with the statistical validation targets. Statistical validity of the final regression model(s) must be demonstrated.
- Independent variable data need to correspond to the time periods of the billing meter reading dates and intervals. A plan for data collection, including sources and frequencies, should be specified.
- It is best to develop models using data in whole-year sets (12, 24, 36, or 48 months) so that any seasonal variations are not overstated.
- It is necessary to specify how site changes unrelated to the installation of the ECM's will be tracked over the performance period and how these data will be used to perform savings adjustments.
- If baseline energy use needs to be adjusted to incorporate minimum energy or operating standards (such as minimum ventilation rates or lighting levels), any modification to the model needs to be detailed.

Avista Option C Examples:

- Avista does not regularly use Option C
- This might be a candidate for some of our controls projects & maybe DCV for buildings that only have large occupancy swings

OPTION D—CALIBRATED SIMULATION

Option D involves whole facility or system analysis procedures to verify the performance of retrofit projects using calibrated computer simulation models. Computer simulation is a powerful tool that allows an experienced user to model the building and mechanical systems in order to predict building energy use both before and after the installation of ECM's. The accuracy of the models is ensured by using metered site data to describe baseline and/or performance period conditions. Carefully constructed models can provide savings estimates for the individual ECM's on a project. More elaborate

models generally improve the accuracy of savings calculations, but increase costs. A calibrated simulation of a building, however, can be utilized to easily evaluate savings from other potential improvements.

Building simulation requires experienced, qualified analysts, and Option D methods should be used only for projects that meet any or all of the following requirements:

- For complex equipment replacement and controls projects with too many ECM's to cost-effectively use retrofit isolation methods A or B
- When interactive effects between ECM's are too complex for retrofit isolation approaches, but need to be quantified
- When the Option C utility data analysis approach is not viable due to the overall level of savings being less than 20% of metered use
- When complex baseline adjustments are expected during the performance period
- When energy savings values per individual measure are desired
- When new construction projects are involved
- When savings levels are sufficient to warrant the cost of simulation
- When either baseline or performance period energy data, but not both, are unavailable or unreliable.

Option D is especially useful where a baseline does not exist (e.g., new construction or major building modification) or the factors responsible for savings are not easily measured (e.g., reduced solar gain and heat loss through new windows).

Situations for which computer simulation is not appropriate include:

- Analysis of ECM savings that can be more cost-effectively determined with other methods
- Buildings that cannot be adequately modeled, such as those with complex geometries or other unusual features
- Building systems or ECM's that cannot be adequately modeled, such as radiant barriers or demand-response control algorithms that are important in comparing baseline and performance period scenarios
- Projects with limited resources that are not sufficient to support the effort required for data collection, simulation, calibration, and documentation

Even for the simplest projects simulation modeling and calibration are time-intensive activities and should be performed by an accomplished building simulation specialist. Calibrated simulation analysis is an expensive M&V procedure, and should be undertaken only on projects that generate enough savings to justify its use.

Avista's Approach to Option D

M&V Option D for an existing building typically follows five general steps: 1) collect data; 2) input data and test baseline model; 3) calibrate the baseline model; 4) create and refine the performance period model; and 5) verify performance and calculate savings. Each of these steps is discussed in detail below.

The methodology followed for new construction projects is somewhat different. One primary difference between the methods used for existing and new buildings is the availability of utility data. In new construction, the performance period model would be calibrated to utility data, whereas the baseline model would not due to lack of data, although comparisons with similar buildings or an EUI calculation may be made. This approach would also apply to an existing building that does not have reliable baseline energy data.

Collecting the Data

The data required for simulating an existing building can be voluminous, and ensuring collection of all data required to develop the simulation models is key. Collecting comprehensive baseline data is advised. All data collected do not necessarily need to be incorporated into the model, but may be included to meet specific model accuracy requirements. All collected information and inputs need to be documented in a format that allows due-diligence review. Show form in appendix.

To obtain end-use data for model calibration, building subsystem metering must be included in the project M&V activities for baseline and performance periods. The specific sub-systems selected for monitoring are in most cases the installed ECM's and related systems. For ECM's such as windows or insulation that cannot be monitored, the impacted HVAC system should be sub-metered. The model calibration will benefit the most from monitoring the energy end uses for which the least information is available.

Required data typically includes:

- Utility bill records: Collect a minimum of 12 (and preferably 24, 36, or 48) consecutive months of utility bills for the months immediately before installation of the ECM's. The billing data should include meter read date, kWh consumption, peak electric demand, and heating fuel use (e.g., natural gas). Additional data in hourly and 15-minute formats may be required.
- Architectural, mechanical, and electrical drawings: as-built drawings are preferred.
- Site survey data: Comprehensive equipment and system data, typically collected during an investment grade audit, including:
- HVAC systems: primary equipment (e.g., chillers and boilers): capacities, number, model and serial numbers, age, condition, operating schedules, etc.

HVAC systems secondary equipment may include:

- Characteristics, fan sizes and types, motor sizes and efficiencies, design-flow rates and static pressures, duct-system types, economizer operation, and type of controls
- HVAC system controls, including location of zones, temperature set-points, control set-points and schedules, and any special control sequences
- Lighting systems: number and types of lamps, with nameplate data for lamps and ballasts, lighting schedules, etc.
- Building occupants: population counts, occupation schedules in different zones

- Other major energy-consuming loads: type (industrial process, air compressors, water heaters, elevators), energy consumption, schedules of operation

Site survey data that may be required in addition to data normally collected during an audit include:

- Plug loads: summarize major and typical plug loads for assigning values per zone
- Building envelope and thermal mass: dimensions and type of interior and exterior walls, properties of windows, and building orientation and shading from nearby objects. Infiltration rates are important, but are often difficult to determine
- HVAC systems: ventilation air-flow rates can have a dramatic effect on energy use
- Short-term monitoring: The building energy management control system (EMCS) or data-logging equipment is set up to record system data as it varies over time. Typically, primary energy using systems and equipment involved in an ECM are monitored. These data may be required if particular subsystems (e.g., the chiller plant) need to be accurately modeled in order to determine savings. The data reveal how variable loads change with building operating conditions such as weather, occupancy, daily schedules, etc.
- Spot measurements of specific equipment: The power draw on lighting, plug load, HVAC equipment, and other circuits should be recorded to determine actual equipment operating powers.
- Operator interviews: Building operators can provide much of the above listed information and also any deviation in the intended operation of building equipment.
- Weather data: For calibration purposes, representative site weather data are required for the period in question, as outlined below (Section 4.6.3).
- Minimum code performance standards: For new construction projects and major renovations, minimum performance standards are often mandated for the baseline based on required codes including ASHRAE 90.1, IECC 2006, and WA State energy codes. If standards must be referenced in the baseline model, the minimum equipment efficiencies to represent the standards should be used.

Inputting the Data and Running the Baseline Model

The data must be adapted as required to the baseline model and entered into the simulation program input files. Key data for inclusion are physical properties of the facility, equipment and system types and efficiencies, appropriate weather data, and control sequences. Specific attention should be given to systems that will be modified by ECM's.

The more site-specific data incorporated the more accurate the savings calculations, but the greater the costs. The simulation program's user guide and other resources should be consulted as needed to determine how to properly input the collected data into the model. From the volume of data collected, many decisions must be made to best represent the data in the simulation program's input file. This can be done most cost-effectively by an experienced building modeling specialist.

After the data have been inputted, a few simulations should be run to debug the model and the model output files should be checked to verify that there are no errors in running the program, such as:

- Does the HVAC system satisfy the heating and cooling loads?
- Are the equipment schedules correct?

- Are equipment efficiencies accurate?
- Are the model predictions reasonable?

Calibrating the Baseline Model

The baseline simulation model should be calibrated by comparing the energy usage and demand projected by the model with the usage and demand of the measured utility data. For new construction projects, the baseline energy use should be compared to other buildings that have similar operation and function. If required tolerances to the measured data are not met, the input data to the model should be refined until requirements are met.

The calibrated model should be documented by showing final input parameters for the model. This information, as well as the actual calibration results, needs to be provided in the M&V submittals.

Create and Refine the Performance Period Model

Starting with the calibrated baseline model, the model should be updated to include the building's ECM's to create the performance period model.

If individual savings levels from each ECM are desired, an approach that includes the interactive effects of the ECM's is to input the ECM's consecutively into the baseline model. eQuest, the Software used by Avista, allows the modeler to create a rolling baseline by including the previous ECM's in the model. After each ECM has been modeled, the simulation is run. The first run is the baseline model, the second run is ECM 1, the third run is ECM 1 and ECM 2, the fourth run is ECM 1, ECM 2, and ECM 3, etc. After the final ECM has been inputted, the model should represent the performance

period condition with all ECM's installed. This approach includes interactive effects in the savings for each ECM.

Determining the sequence to input the ECM's into the model is an important consideration in managing interactive effects. Typically, measures that will affect the overall heating and cooling loads of the building (e.g., envelope improvements or lighting upgrades) should be inputted first. Secondary ECM's are those that affect the HVAC subsystems, and the final ECM's that should be inputted are those affecting the central plant.

Verifying Performance and Calculating Savings

The method used to determine savings will depend upon the phase of the project. During project development, proposed savings are determined by subtracting the results of the performance period model from the results of the calibrated baseline model, both using the agreed-upon weather data and facility operating conditions.

As with all M&V methods, after implementation of the ECM's the proper installation and operation of the ECM's must be verified periodically. Data should be collected not only to calibrate the model, but to validate that the new equipment and systems are installed and operating properly.

After the first year of performance, there are two options to calculate verified savings: 1) calibrate the performance period model and subtract the results of baseline model using the same conditions; or 2) subtract measured utility data for the performance period from the results of baseline model that was updated to actual conditions. The first option requires that the performance period model be calibrated using the procedures described above. Update the performance period model using data collected during the performance period from site surveys, spot measurements, short-term monitoring, and utility data. Effort can be minimized by focusing data collection on the installed ECM's.

If savings are to be estimated for a specific year, actual weather and other data from that year must be used. If savings are to be normalized to typical conditions (see Section 7.2), for example, then typical weather data (e.g., TMY data) should be used. In any case, both the baseline model and the performance period model must be run with the same weather data. The weather data to be used are specified in the site-specific M&V Plan. Although time-intensive, Option D approaches are well suited to adjust models when significant site changes occur during the performance period.

If savings for each ECM are to be determined including interactive effects, the ECM's must be inputted consecutively into the model and simulations run after each input, as described above. For our purposes, we should input ECM's in the order being looked at by the customer. The ECM order will be denoted in the evaluation report for the customer to see. It should be noted, this is an area where our incentives may be changed by the order of analysis. If, for example, the owner is doing a shell measure of insulation as well as an HVAC measure like a new boiler, the obvious design priority should be insulation first, and boiler second. In this manner the new boiler could be properly sized for the new heating load. Unfortunately this will change the incentive on the boiler which may have a higher cost than the insulation. However, it is done, the customer should understand how it was modeled.

Individual ECM savings are determined by the difference in energy or demand use between two consecutive runs. The savings determined for the individual ECM's should total the savings determined from the baseline and performance period runs. It is important that savings be determined with both models using the same conditions (weather, occupancy schedules, set points, etc.), except for the characteristics of the installed ECM's.

The energy values and rate structure specified in the M&V Plan are applied to the energy savings determined by the model. If utility rates are included in the model, sufficient information on the savings should be provided so that cost calculations can be verified. When time-of-use charges or other variable usage schedules are applied, the demand (kW) and energy (kWh) savings must be broken down into the proper categories to determine cost savings (see Section 7.2).

Model Calibration

The model calibration for existing buildings is accomplished by linking simulation inputs to actual operating conditions and comparing simulation results with whole-building and/or end-use data. The simulation may be of a whole facility or just for the end use or system affected by the ECM. Both baseline and performance period models should be calibrated wherever possible. Model calibration is typically an iterative process of adjusting model inputs and re-comparing the results to measured data.

A model is considered in calibration when the statistical indices demonstrating calibration have been met. Expected calibration requirements should be specified in the project-specific M&V Plan. These requirements should be adjusted as required to meet the needs of the project.

For most models, there are multiple levels of calibration that can be performed:

- System level calibration with hourly monitored data
- Whole-building level calibration with monthly utility data
- Whole-building level calibration with hourly utility data

Determining the level of calibration that is needed depends on the value of the project, the availability of data, and the need for certainty in the savings estimates. All models should be calibrated to monthly data at a minimum. Simulation models that focus on specific systems should be calibrated to system level data. Also, calibrating the models to hourly data will help ensure accuracy, especially for determining peak demand savings. Calibrating a computer simulation to measured utility data necessitates that actual weather data be used, as discussed below.

The calibration procedures should apply to all energy sources (demand, electricity, natural gas, etc.), but should focus on the primary source(s) of savings. Each of these model calibration strategies is discussed below.

Weather Data

The first step in calibrating a model is updating and running the model using weather data that correspond precisely to the same calendar days as each utility bill. Obtaining weather data for the appropriate location and time-period is an important step in calibrating any simulation model. DOE maintains a website that provides weather data from 1998 to the present from up to 4,000 weather stations which can be converted for use with eQUEST and other programs. The time period and frequency of the weather data need to align with the utility data periods, which can require data manipulation. The measure-specific M&V Plan must specify which weather data sources will be used, including both the source of the data and the physical location of the weather station.

M&V Considerations

Many issues must be considered and addressed in developing a project-specific M&V Plan using Option D. Some of the more common steps are outlined below.

- Use an experienced building modeling professional. Although new simulation software packages make much of the process easier, a program's capabilities and real data requirements cannot be fully understood by inexperienced users, and resulting models may not be accurate.
- Determine the availability of utility bill data.
- Determine whether hourly or monthly billing data are available and whether meters can be installed to collect hourly data. Calibrations to hourly data are generally more accurate than calibrations to monthly data because there are more points to compare. Hourly energy or demand data, however, are generally only available for a utility's largest customers or may be collected with portable data loggers. If only monthly billing data are available, conducting

additional short-term monitoring of building sub-systems can improve the accuracy of the model.

- Use actual equipment performance data in the simulation models. Many software packages have libraries of HVAC equipment that closely match actual system performance. Be cautious and investigate the library HVAC description to be sure it is a good representation of the real system and consider developing user-defined equipment performance curves based on field measurements or manufacturer's data.
- Specify spot measurements and short-term monitoring of key parameters for both the baseline and performance period models. Spot and short-term measurements augment the whole-building data and more accurately characterize building systems. It is recommended that an end use be monitored over a period that captures the full range of the equipment's operation (e.g., spring and summer for cooling systems. The data must also be collected in a way that facilitates sub-system level calibration. Careful selection of spot measurements and short-term monitoring is necessary because it can add significant cost and time to the project.
- Use trend data to determine actual controls. Sequencing of building controls is difficult to interpret from interviews, site surveys, manufacturer's data, and spot measurements. The best way to ascertain actual sequences is through trending data. Sometimes, the EMCS systems can be utilized to determine actual operating scenarios. However, the capability for data storage in many systems may be limited.
- Specify model calibration procedures that will be followed for monthly, hourly, or subsystem data for both the baseline and performance period models. Prescribe statistical calibration requirements based on the accuracy required for the project.
- Specify the simulation program and version and the source of weather data used (onsite, local weather station or typical weather data).
- Clearly explain how savings will be calculated after the first year. Keeping models up to date can be expensive. For projects without substantial site changes expected, an Option C utility billing analysis approach may be viable. Regardless of how savings are calculated each year, the ongoing performance of the measures needs to be verified periodically.

Avista Option D Examples:

- New Building multi-measure projects
- Present facility multi-measure projects
- Residential Prescriptive modeling for average savings by square foot
- Prescriptive Steam Traps

Impact Evaluation Protocol Draft

Avista Utilities

10-28-09

Contents

Revision History

Date	Revision	Notes
10-28-09	Draft	Initial

Impact Evaluation Protocol

1.0 Purpose

This document defines the process of performing Impact Evaluations at Avista Utilities. It is not intended to provide detailed explanations of all the considerations of Impact Evaluations. The details of evaluations that Avista generally follows can be found here: National Action Plan for Energy Efficiency (2007). *Model Energy Efficiency Program Impact Evaluation Guide.* Prepared by Steven R. Shiller, Shiller Consulting, Inc. <www.epa.gov/eeactionplan>

2.0 Scope

This protocol applies to all impact evaluations of DSM energy efficiency, outreach and educational programs.

3.0 Process

Impact evaluations generally follow these steps (Figure 1).

1. Determine a need for an evaluation.
   - Scheduled
   - Change in assumptions
   - Requested by stakeholder
   - Etc.
2. Identify the objectives.
   - Measure and document program energy savings.
   - Provide data needed to assess cost effectiveness.
   - Assess if there is any further need for the program.
   - Etc.
3. Create an Impact Evaluation Plan.
4. Perform the evaluation per the plan.
5. Create a report that addresses the objectives of the evaluation and provide recommendations.
6. Provide the report to interested parties and include it in an annual DSM report.

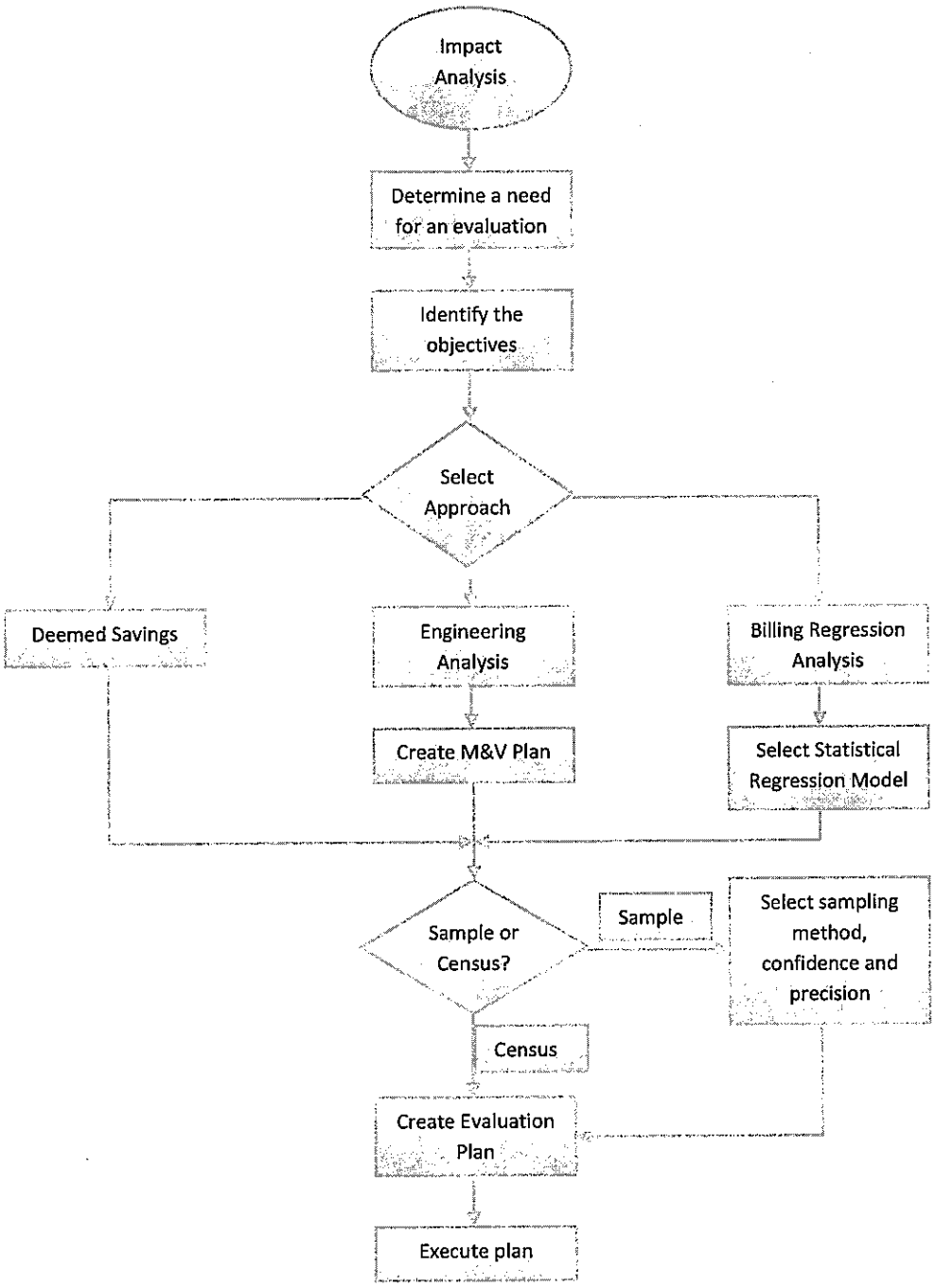


Figure 1

4.0 Impact Evaluation Plan

The plan template can be found here TBD and will contain the following information.

4.1 Program Background

Description of the program highlighting the following information: market, technologies, objectives, delivery method, etc.

4.2 Evaluation Overview

List the objectives of the evaluation and how the information supports the program goals. Include a budget and schedule summary.

4.3 Evaluation Details

4.3.1 Approach

Select and justify an evaluation approach.

4.3.1.1 Deemed Savings

When measure savings is well known and not complicated a deemed savings approach may be appropriate. In this approach it is assumed that the savings is acquired if the measure was installed and installed correctly. During this evaluation the determination of savings will be based on the confirmation of installation. Typically, a sample of projects would be selected and installation verified.

Choose this approach when many of the following are true-

- Limited evaluation resources
- Simple measures with well understood savings mechanisms.
- Uncertainty of savings estimates is low and the risk of over/under estimating savings is low.
- Documented deemed values are available and applicable to installation circumstances

4.3.1.2 Engineering Analysis

When measure savings is more complex and/or include multiple measures, an approach that includes measurements may be appropriate. In this approach a sample of measures would be instrumented and measured. The sample savings would then be applied to the population. This approach requires an M&V plan.

Choose this approach when many of the following are true-

- Adequate evaluation resources.
- Per project results are needed.
- Estimated savings are less that 10%.
- Smaller number of participants.

4.3.1.3 Billing Regression Analysis

When assumed savings is greater than 10% of facility energy consumption then whole facility regression analysis may be appropriate.

Choose this approach when many of the following are true-

- Participation is well defined.
- Large number of participants (>100).
- If a comparison group is used at least one year of energy use after the measure. If a comparison group is not used then one year before and one year after energy use data. Less than a year may be adequate if the data is granular enough.
- The participants are similar.
- The expected change in energy consumption is greater than 10%.

4.3.1.4 Analysis Method

For the chosen approach describe the analysis method to be used.

- Time series comparison: This method compares the participants' energy use before and after the measure is installed.
- Use of a comparison group: This method compares the post-measure participants' energy use to a group of non-participants.
- Comparison group/time-series: This combines the two above approaches.

When regression analysis is used describe the statistical model that will be used.

- Normalized annual consumption (NAC) analysis
- Conditional Savings Analysis (CSA)
- Statistically adjusted engineering (SAE) model
- Analysis of covariance (ANCOVA) model

4.3.2 Data Collection

A description of the data that will be collected, how it will be collected and what it will be used for. In the case where an M&V approach was selected, give a brief description of the data to be collected and refer to the M&V plan for details.

4.3.3 Uncertainty of Results

Describe any uncertainties or threats to validity, biases, methods to minimize bias, and the level of precision and confidence associated sample selection methods.

4.3.4 Budget

Detailed budget.

4.3.5 Schedule

A schedule that details the significant milestones of the evaluation.

4.3.6 Evaluators

List the evaluation team. Include contact information.

5.0 Reporting

5.1 Working Documents

Will be stored here TBD

5.2 Final Report

A template can be found here TBD. The following information will be found on the report.

Table of Contents

- List of Figures and Tables
- Acronyms
- Abstract
- Acknowledgments

1. Executive Summary (Include highlights of key recommended improvements to the program, if relevant.)

2. Introduction

- Program Overview (e.g., program description, objectives)
- Evaluation Objectives and Methods
- Structure of the Report

3. Study Methodology

- Data Collection Approach(es)
- Analysis Methods
- Limitations, Caveats

4. Key Evaluation Results: Provide answers for all of the questions specified in the evaluation plan.

5. Recommendations: Include clear, actionable, and prioritized recommendations that are supported by the analysis.

6. Summary and Conclusions

7. Appendices (examples listed below):

- Recommended improvements to the evaluation process, including any lessons learned for future evaluation studies.
- Appendices containing detailed documentation of the research design and assumptions, data collection methods, evaluation analysis methodology, results tables, etc.
- Sources and quality (caveats on data) of primary and secondary information.
- Details on quantitative data analysis: analytical framework, modeling approach, and statistical results.

- Possible sources of overestimation and underestimation.
- Sensitivity of energy savings estimates.
- Assumptions and justifications.

Evaluation Measurement and Verification (EM&V) Protocol Draft

Avista Utilities

10-28-09

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Contents

Revision History

Date	Revision	Notes
10-28-09	Draft	Initial

EM&V Protocol

1.0 Purpose

During the course of creating and implementing DSM programs assumptions are made. In order to affirm the program's effectiveness in delivering energy savings, those assumptions need to be tested in the field. Only then, can changes be made to improve a program or, if needed, eliminate it. This continuous improvement is important for a robust DSM program.

This document defines the processes and procedures Avista follows to provide a robust DSM program. The rationale for the program can be found in the document: National Action Plan for Energy Efficiency (2007). *Model Energy Efficiency Program Impact Evaluation Guide.* Prepared by Steven R. Shiller, Shiller Consulting, Inc. www.epa.gov/eeactionplan. Additional information can be found here:

The California Evaluation Framework. www.calmac.org

International Performance Measurement and Verification Protocol. Prepared by Efficiency Valuation Organization www.evo-world.org.

2.0 Scope

This protocol applies to all DSM energy efficiency, outreach and educational programs.

3.0 Governing EM&V Guidelines

Within regulatory constraints, it is required that the output from any EM&V activity is transparent to Avista's internal and external stakeholders. Any information that is necessary for a stakeholder to understand the effectiveness of a DSM program is documented and readily available.

4.0 EM&V Process

The process of EM&V will be continuous with annual reports and annual schedule updates. The annual process follows the diagram in (Figure 1).

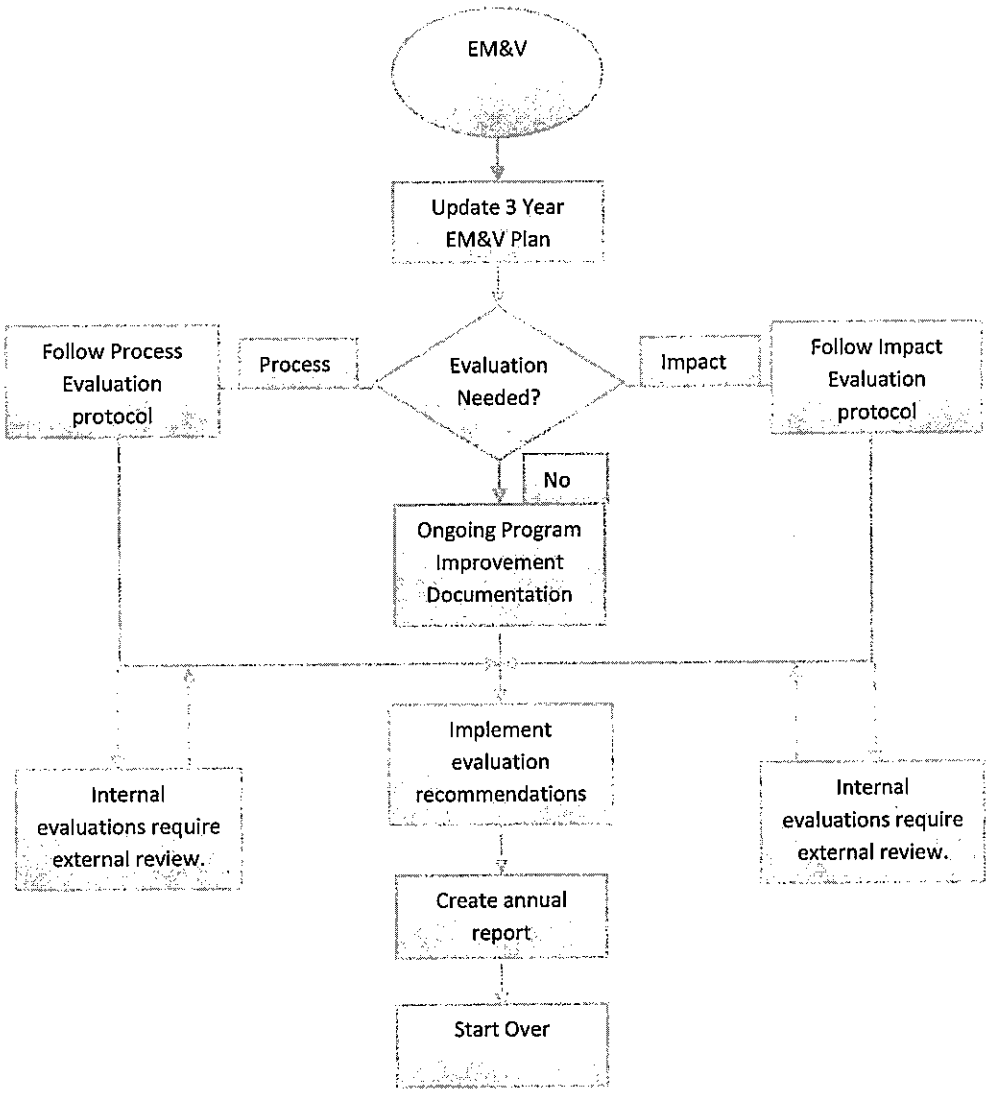

Figure 1

5.0 Evaluation Planning

Evaluations are performed at various depths and scopes. Both of which are determined based on the circumstances of the program and the judgment of the program manager, engineering and any external stakeholder requirements.

Evaluations are performed as needed and following a three year evaluation schedule. The schedule is reviewed each year with engineering and program managers in the 4th quarter where adjustments are made and the third year added. The schedule will contain the following information: program name, evaluation type, objective, internal or external, approximate start date, approximate finish date, approximate cost, TBD.

The schedule is maintained in TBD by the EM&V engineer. The location of the schedule is TBD.

In general, evaluations should be prioritized based on the following guidelines:

- Size of the project or program: A site-specific project that is exceptionally large or a prescriptive program with a significant aggregate output would increase the E, M & V prioritization.
    - Example: The high-efficiency residential space heating program would be a higher E, M & V priority than residential high-efficiency water heater program simply because the therm savings from the space heating program is substantially higher. Similarly, larger site-specific projects are likely to receive a more intensive E, M & V effort than smaller programs.
- Uncertainty regarding the results: Resource characteristics that are known within relatively tight confidence intervals are less of a priority for E, M & V efforts than those that are relatively uncertain.
    - Example: The calculation of the therm savings from a high-efficiency water heater program is dependent upon, among other characteristics, the quantity of water used within the home and the temperature of the inlet water that is supplied to the water heater. It is likely that the temperature of the inlet water is known within fairly tight tolerances. There is much greater uncertainty regarding the quantity of water used within the home. All else being equal, a measurement of the water usage would be prioritized higher than the temperature of the inlet water temperature.
- Criticality of the resource characteristic: The sensitivity (or insensitivity) of a resource characteristic to particular factors is an important consideration.
    - Example: The therm savings resulting from the installation of a high-efficiency furnace would be based partially upon the difference in the indoor vs. outdoor air temperatures (the "delta T") and the humidity (which impacts the amount of heat content that can be imparted to the air by the furnace and therefore how much air needs to be moved). The therm savings is much more sensitive to the "delta T" than the humidity, and therefore the direct or indirect measurement of the "delta T" would be a higher priority.
- Impact upon management decision making: Generally speaking, information only has value if it will impact a management or regulatory decision.
    - Example: The evaluation of a program or potential program that is marginally cost-effective or non-cost-effective will, all else being equal, have more value than the evaluation of a program that is clearly cost-effective or cost-ineffective because the information will be more likely to influence a management decision. (At the same time it's necessary to be sensitive to the avoidance of overburdening marginally cost-effective programs with E, M & V expenses so as to avoid making what would otherwise be a cost-effective program non-cost-effective).
- Impact upon regulatory processes or regulatory oversight: Information necessary for regulatory oversight will receive a higher E, M & V priority than information that is not necessary for that purpose, all else being equal

- Example: The measurement of therm savings of a program for which Avista is obtaining lost margin recovery is of a higher priority than the measurement of the therm savings of mandated programs for which Avista does not request lost margin recovery.

- Future plans for the same or similar programs or measures: Information that would have value in improving an ongoing program is more valuable than information regarding a program with a limited remaining life or affecting a program characteristic that Avista's management of the program has little ability to influence.
  - Example: A program with a long-term future within the DSM portfolio should receive a higher priority for E, M & V treatment than a program that is likely to be terminated in the future (perhaps due to higher codes or industry standard baselines or any other reason).
- Cost of measurement: Cost of E, M & V should be minimized. Alternative approaches should be considered when the value of incrementally better data is less than the cost of that data. This is generally a subjective decision and should be based more upon the relative cost and benefits of the alternatives than budgetary considerations.
  - Example: If it is possible to obtain the data necessary to perform the measurement of the therm savings from a high-efficiency residential furnace through either the measurement of run-time of the appliance or the direct measurement of the therm input into the furnace, clearly the direct measurement of usage would be preferable. However, if the cost of that direct measurement is several times higher than the alternative indirect measurement (through appliance run-time) and if the likely results are not materially different, then the lower cost and slightly less accurate approach should be used. (Note that in this example it may also be possible to increase the sample size of the indirect measurement approach to obtain better data at a lesser cost, which is clearly the ideal situation).

6.0 Impact Evaluations

An impact evaluation is used to verify program energy savings and cost effectiveness. Each program that has quantifiable energy savings is evaluated in terms of measure and program savings. Programs that don't have quantifiable savings are evaluated in terms of the original assumptions of the business case. Evaluations follow the Impact Evaluation Protocol found here- TBD.

6.1 Schedule

Ideally, impact evaluations are performed following the evaluation schedule. However, it is recognized that certain situations may warrant an evaluation sooner than scheduled. Among other things, these items could initiate an evaluation.

- A change in the underlying technology.
- New information suggests that the original assumptions were incorrect.
- A stakeholder makes the case that an evaluation would be prudent.

6.2 Reporting

Each evaluation will have documented objectives, results and, where needed, recommendations. Impact reports will follow the impact report template found here: TBD. Reports will be stored on the TBD drive and distributed to stakeholders. Completed reports will be in the appendices of the annual report.

7.0 Process Evaluations

A process evaluation is used to assess program delivery, from design to implementation, in order to identify bottlenecks, efficiencies, what worked, what did not work, constraints, and potential improvements. Timeliness in identifying opportunities for improvement is essential to making corrections along the way. Evaluations follow the Impact Evaluation Protocol found here- TBD.

7.2 Schedule

Ideally, process evaluations are performed following the evaluation schedule. However, it is recognized that certain situations may warrant an evaluation sooner than scheduled. Among other things, these items could initiate an evaluation.

- A change in the market conditions.
- New information suggests that the original assumptions were incorrect.
- A stakeholder makes the case that an evaluation would be prudent.
- New programs should be evaluated within the first year.

7.3 Reporting

Each evaluation will have documented objectives, results and, where needed, recommendations. Impact reports will follow the impact report template found here: TBD. Reports will be stored on the TBD drive and distributed to stakeholders. Completed reports will be in the appendices of the annual report.

8.0 Ongoing Process Evaluation

During the course of managing a program changes are continuously made to improve the program. The changes are documented and stored TBD and included in the annual report. Program managers make entries on a regular basis indicating changes or lack of changes.

9.0 Measurement and Verification (M&V)

For cases where M&V is performed on a measure that is not yet part of a program the M&V protocol will be followed.

10.0 Annual Report

By the end of March of each year an EM&V report will be created that contains the following information.

- Each evaluation report completed in the previous year.
- Summary of all EM&V activity, completed or not, for the previous year.
- Summary of the planned EM&V activity for the upcoming year.
- Detailed report of each program including cost effectiveness.