

# Savings Verification in Utility Bidding: The Washington State Energy Office Case Study

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Since 1987 utilities have used competitive bidding to solicit third-party delivery of demand-side resources. Bidding programs began with hopes of reduced costs, increased participation levels, and direct comparison of supply and demand options.

In 1989 the Washington State Energy Office (WSEO) submitted a bid in Puget Sound Power and Light Company's all-source bid solicitation. WSEO viewed its participation as a test to evaluate the costs and benefits of acting as a developer in competitive bidding.

WSEO proposed to deliver four energy efficiency projects in two school districts, a state agency, and a state university in return for payments of 90% of avoided supply cost for ten years.

After two years of negotiation one of the four projects has been built. The largest project (half the total savings) has dropped out and the other two are expected to be accepted for construction shortly. Negotiations over how to verify the project savings have delayed the projects by two years and added costs of approximately \$200,000.

This experience is not unique to WSEO. Negotiation times have been similar for other utilities with ESCO bidders. Process evaluations of various utility DSM bidding programs indicate that negotiations are delayed most often by verification issues similar to those that held up WSEO's bid. This paper explores verification issues in the WSEO bidding experience and proposes remedies in bidding implementation practices.

## Introduction

In May of 1989 the Washington State Energy Office (WSEO) submitted a bid for demand side resources to Puget Sound Power and Light (Puget) in response to Puget's competitive bid solicitation. At the time, WSEO believed utility competitive bidding was a viable conservation funding source (Hirsch 1990). WSEO saw an opportunity for utility funds acquired through competitive bidding to finance the participating project costs, WSEO's administrative costs, and pursue additional conservation efforts.

Two years later, WSEO's appraisal of the bidding opportunity is less sanguine (Caan 1992). Negotiations with the utility on appropriate methods to verify energy savings have taken two years longer than anticipated. Costs associated with these negotiations have climbed to over \$200,000, nearly five times the initial budget. When the opportunity arose to bid in Puget's second demand-side solicitation, WSEO elected not to participate.

The WSEO bid proposed the delivery of 0.5 average megawatts (aMW) of demand side resources at 90% of Puget's avoided supply cost or 34.76 mills/kWh. This cost is levelized over 10 years -- the measure life assumed for the purpose of bid calculations.

WSEO's bid consisted of four specific projects which included two school districts, a state university and a state agency. These projects were negotiated with the institutions prior to the bid submittal. The state university, which accounted for 0.25 aMW, dropped out of the project due to indoor air quality problems just as the submittal was ready. The projects are outlined in Table 1.

WSEO's bid was accepted in December 1989. Since then, WSEO and Puget have been developing the technical details for each project. The documentation of the project details are prepared in a report referred to as a supplement. The supplement defines the analysis methodology,

*Table 1. WSEO Bid Summary*

<u>Project Name</u>	<u>Project Description</u>	<u>Total Estimated First Cost</u>	<u>Total Estimated kWh Savings</u>
State College	VAV and Lighting Controls	\$445,868	1,842,014
State Agency	Lighting Improvements Hot Water Modifications	\$33,597	231,260
School District #1	Heat Recovery Chiller	\$96,658	1,487,435
School District #2	Heat Recovery Chiller Lighting Improvements Roof Insulation	\$264,797	975,261

the monitoring requirements, and the maintenance plan for the long-term performance and concurrent purchase of these resources. As of May 1992 one supplement has been signed. None of the projects is "on-line" and producing revenue. The two subsequent supplements are expected to move quickly.

WSEO's bid was a test to evaluate the costs and benefits of acting as a developer in competitive bidding. In 1991 legislation created the Energy Partnerships (EP) Program which designated WSEO as the "corporate energy manager" for state agencies and school districts. EP's goal is to capture approximately 100 aMW of conservation over a 10 year period. WSEO had planned to use competitive bidding as one option to capture this resource.

## WSEO's Economic Analysis

WSEO conducted an economic analysis of the program in November of 1991 (Caan 1992). The analysis was examined from the facility's, WSEO's and the state's (citizens') perspectives. A summary of this analysis is presented in Table 2.

As Table 2 indicates WSEO is subsidizing these projects. With a Benefit/Cost of 0.9, which includes the three projects as well as the College and administration costs, WSEO will lose more than \$39,000 (NPV). The analysis assumed that the supplements would be signed and the projects would begin producing revenue in January 1992. As of March 1992 WSEO and Puget are still negotiating the first supplement. This loss is primarily due to WSEO's labor costs preparing and negotiating the supplements.

On the other hand the facilities make out well with an overall Benefit/Cost of 2.6 and a net present value (NPV) of \$636,000. This is because they have very little up-front labor and they get 100% of the energy savings and 50% of the Puget revenue. From an overall state/taxpayer perspective the program makes sense; it yields a NPV of \$471,000.

WSEO assumed a significant risk in investing \$210,000 of up-front labor prior to having a signed contract with Puget. The \$30,000 loss due to the withdrawal of the college project is a prime example. WSEO also shares the risk with the facilities that the projects may not perform as expected. The up-front labor costs preparing and negotiating the project supplements caused WSEO the greatest risk and prevented WSEO from breaking even.

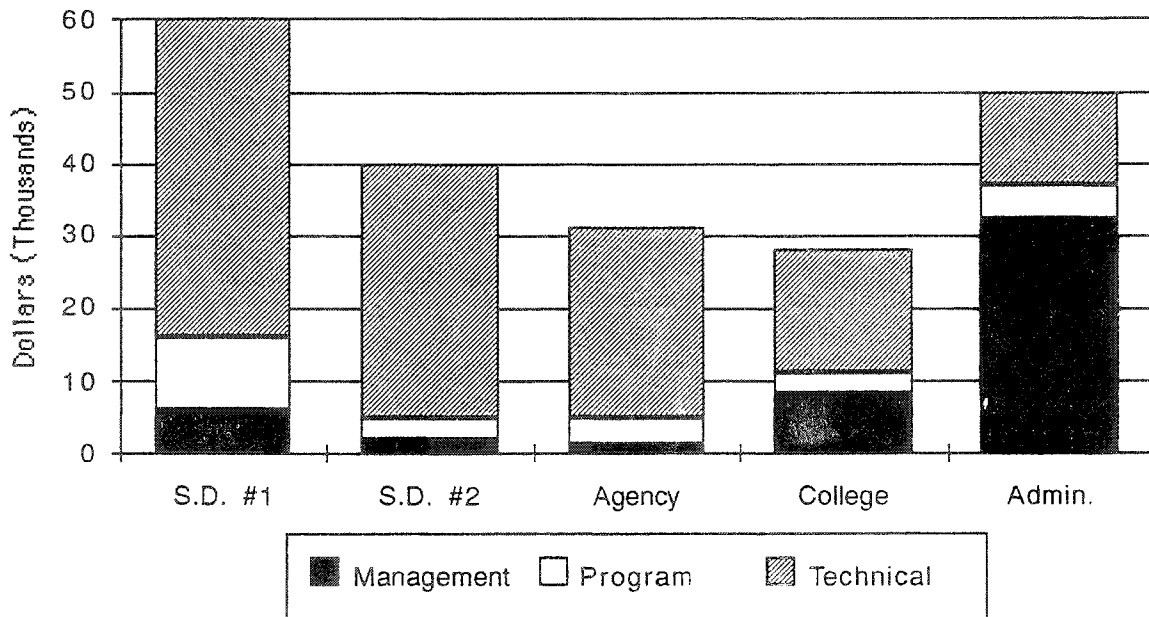
Figure 1 shows a breakdown of WSEO's costs by category. As Figure 1 shows, the majority of WSEO's labor has been technical. Included in the "Admin" column is \$30,000 of management's time to prepare the initial bid. If this is removed the technical staff costs dominate all other costs. This dominance reflects WSEO's internal and external difficulties in preparing and negotiating submittals in this bidding program.

## Negotiations

The largest obstacle delaying negotiations of the WSEO projects with Puget was reaching agreement on the method to verify actual energy savings. This is a crucial feature of any bid agreement because savings verification directly affects how much the utility will pay for the installed measures.

*Table 2. Program Economic Analysis Summary*

		<u>Facilities</u>	<u>WSEO</u>	<u>State</u>
Total Benefits	(\$1991)	\$1,040,000	\$369,000	\$1,868,000
Total Costs	(\$1991)	\$404,000	\$408,000	\$1,397,000
Cost/Benefit		2.6	0.9	1.34
NPV		\$636,000	(\$39,000)	\$471,000



*Figure 1. 1989 - 1991 WSEO Labor Costs*

WSEO believed that their proposal already included all analysis of the savings required. WSEO did not anticipate significant discussion of the engineering estimates because it proposed verification based on energy accounting with before and after energy use data.

However, Puget preferred a verification approach that used engineering estimates as its keystone. In Puget's approach, the utility and bidder agreed on the engineering methods that would be used to estimate savings for a project based on assumed inputs for operating hours, equipment efficiencies, etc. Metering would then be installed to verify these assumed operating conditions. The

metered operating data would be entered into the agreed calculation method to determine the "savings" used for the basis of payments to the bidder.

One of the factors contributing most to the long delays in implementing the WSEO projects was poor communication between Puget and WSEO on the subject of savings verification. Puget's RFP gave very little information on its standards for acceptable verification of savings. The terms "verification" and "measurement" do not appear in Puget's RFP. In Puget's evaluation of bids, no weight is given to savings verification methods.

Puget's bid solicitation requires "a detailed description of the process for estimating the amount of annual electricity savings for each measure at each eligible facility." In addition, the RFP gives prescriptive standards for installation of metering equipment in all participating facilities. These standards specify visual inspection, watt-hour metering, or kW demand and operating hours measurement depending on the size of the project (in annual kWh saved) and type of loads affected.

These standards are prescriptive about the type of metering required but do not state whether it is required before and after measure installation, for how long, or how it is to be used in determining payments. Puget's RFP did not identify clearly what issues the utility considers key to verification. The RFP did not indicate that the purpose of the monitoring was to validate key engineering assumptions.

WSEO was Puget's first bidder to bring a submittal. The submittal was for a swimming pool dehumidification heat recovery system. WSEO had evaluated the project using a custom spreadsheet based on ASHRAE documented calculations of swimming pool dehumidification loads.

Puget wanted an hourly simulation model for projects with variable loads with interactive effects and savings over 150,000 kWh/year. The dehumidification system exceeded this threshold but no hourly simulation program would accurately model WSEO's heat recovery project. Available hourly simulation programs, such as DOE 2, do not have analysis options for spaces such as swimming pools, the special environmental conditions they create, and the impact of conservation measures such as dehumidification heat recovery.

As a result of this failure to agree to clear savings verification principles as a part of the contract negotiations, further discussions required more than a year to agree on engineering calculations for this measure. In essence, negotiating agreement on how savings would be calculated and verified (measured) cost WSEO approximately \$150,000 in technical labor and delayed the projects by more than a year.

## Verification Issues in Other Utility Bids

The lack of information about how measurement and verification issues will be addressed in the Puget bid program may be extreme, but it is not unusual in bidding solicitations. Table 3 summarizes how verification issues are addressed in seven recent utility all-source or DSM bid solicitations.

Only three of these seven DSM RFPs discuss verification issues in sufficient detail to suggest what methods the utility considers acceptable. Perhaps as a result of this lack of clarity, process evaluations of DSM bidding programs confirm that savings measurement and verification are often the major issues in contract negotiations (personal communication: Jane Peters, Barakat & Chamberlin).

Problems arising in negotiation of savings verification span a broad range. In one case, bidders under a self-scored RFP did not consider their proposed verification methods to be binding. These bidders claimed points for specific verification techniques but during contract negotiations indicated they were unwilling to implement them. In some cases bidders did not understand the verification methods they proposed to use (Peters et al. 1992).

In another program, verification issues "drew out contract negotiations and in one case caused a bidder to withdraw entirely." Contractors felt that the utility stretched the requirements for verification stated in the RFP. Utility staff felt that they had to be certain that the measurement plans were valid and reliable (Peters et al. 1990).

## Recommendations

As demonstrated by WSEO's experience, delays caused by protracted negotiations over savings verification are costly. We believe that utilities can minimize unnecessary delays in contract negotiations by providing substantially more information in RFPs on what issues they consider important in verification plans. Ideally utilities would indicate minimum standards and, where possible, preferred methods to verify common energy conservation measures. When methods are listed the RFP should describe them in sufficient detail to ensure that bidders will know what they are committing to do.

One of the problems facing utilities is that consensus standards for measurement and verification have not yet been established. Several efforts moving toward this are currently underway. The Bonneville Power Administration plans to publish guidelines for site specific energy savings verification in 1992. The U.S. Environmental Protection Agency is developing guidelines for verifying conservation savings with the goal of publishing them by year end (ADSMP *Strategies* Spring 1992). The Measurement and Evaluation Phase underway in California regulatory proceedings will establish the next generation of measurement protocols for use in that state.

*Table 3. Verification Issues in Utility DSM RFPs*

Utility Solicitation	Proposal Information Required	Measurement and Verification Issues Identified	Suggested Methods	Evaluation Factor?
Public Service Co. of Colorado December 1990	Provide method of verifying peak demand reduction and operating hours.	Self-scoring for verification methods.	Yes 5 methods listed.	Yes 17.4% of score.
Puget Power September 1991	Describe process for estimating annual energy savings.	None	No	No
PacifiCorp October 1991	Specify in detail the method that will be used to measure or verify energy savings.	None	No	Yes
Sacramento Municipal Utility District January 1992	Submit detailed plan and schedule on how the energy and capacity savings will be measured and verified. Demonstrate that the measurement plan will provide a practical, feasible, and reliable methodology.	None	No	Yes
Montana Power January 1991	Submit detailed proposal for a method to verify [savings]. Must include sample calculations and software descriptions	Yes : Interactions	Yes (various)	Yes
Bonneville Power Admin. February 1991	Provide a detailed methodology for verifying energy savings that meet listed requirements.	Yes : Persistence Independence	Yes Listed by market.	Yes
Pacific Gas & Electric Company May 1992 (draft)	Specify verification, documentation, and audit procedures and demonstrate savings verification will be practical and statistically valid.	Yes: Baseline Pre- and post-measurement.	No	Yes 15% of score

In the meantime, DSM bidding RFPs should identify the utility's requirements or preferences in at least the following areas relevant to savings verification.

### Stipulated Savings or "Deeming"

The RFP should define under what circumstances, if any, the utility will agree to stipulated estimates of energy savings for each implementation of a measure. This is sometimes referred to as "deeming". An example of a situation in which deeming may be appropriate is replacement of incandescent exit signs with fluorescent exit signs.

The hours of use of the signs is known and the pre- and post-retrofit connected load can be reasonably determined by a simple inventory. In this case, a simple stipulation of savings per unit and verifying the number of units treated may be the best solution.

### Acceptable or Preferred Procedures

The RFP should identify what procedures the utility prefers or is willing to accept for savings verification. These might include billing analysis, end-use metering, "on-off" designs, energy use indexing, and other methods.

## Persistence

Evaluations of DSM programs demonstrate that many energy conservation measures do not produce savings over their initially assumed lifetimes. Bidding RFPs should state what verification they require to document the continuing performance of installed measures. This could take the form of ongoing measurement over the contract term or periodic inspections to document the continued presence and operation of the measures. An alternative approach is to stipulate a rate of savings decay over time.

## Baseline Development

Bidding solicitations should clearly define what measurements or assumptions about pre-treatment conditions are acceptable to establish a baseline for savings measurement. Baseline standards may vary according to the type of measure being installed, customer class, or type of program (e.g. retrofit vs. new construction). Baseline standards may be different for different measures within an individual program. For example, in a residential retrofit program it might be appropriate to use pre-treatment conditions as the baseline for weatherization measures and use current national or local efficiency standards as the baseline for an appliance replacement.

## "Net" or "Gross" Savings

Most utilities are interested in paying only for "net" energy savings, that is, savings which would not have occurred in the absence of the program. Net savings are often not the same as gross changes in energy use as measured by metering due to other market forces which influence customers to improve efficiency. Bidding solicitations should indicate what measurements or assumptions about the ratio of net to gross savings are acceptable for bid evaluation and/or payment calculations.

## Costs

The RFP should indicate what costs must be borne by the bidder (and included in the bid price) and what costs will be the utility's responsibility. For example, if end-use metering is required the responsibility for costs of the metering hardware, installation, maintenance, and data collection should be clearly specified. Alternatively, utilities may wish to indicate a fixed percentage of bid price that bidders should budget for verification activities. If the utility is willing to assist bidders in verification tasks (e.g. maintenance of control group billing records) the costs of these services to bidders should be itemized.

## Independence

Measurement of savings in bidding programs is generally performed by someone with a vested financial interest in the outcome of the measurement. To prevent a "fox guarding the hen-house" situation utilities should establish standards for the "independence" of the measurement process. For this purpose verification practices should be based on objective, auditable data and should be reproducible by a third party.

## Conclusion

Many utility bidding solicitations make general statements that they require measurement plans to demonstrate "practical and statistically valid" methods. In the absence of consensus standards for verification practices these general statements do not give bidders adequate guidance. Often they do little more than ensure that an inefficient negotiation process will delay program implementation.

Giving clear guidance on acceptable methods for savings verification in the RFP document contributes to a fairer selection process by helping bidders to realistically and consistently incorporate all verification costs into their bid price. Giving a clearer signal regarding verification standards will also help reduce bid prices by reducing the time required for contract negotiation and administration. Setting clear standards allows the utility and the bidder to focus on the work of achieving the energy savings, rather than counting them.

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