

Risky Business: Development and Implementation of a Risk Assessment Strategy to Guide Program Evaluation

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ABSTRACT

Faced with energy efficiency goals that have more than doubled over a four-year period, and a new regulatory climate that included performance incentives and increased focus on program evaluation, Puget Sound Energy undertook a comprehensive program evaluation planning effort. Faced with limited time, funding, and staff resources, a key challenge became the prioritization of the evaluation team's efforts.

To meet this challenge, the team developed a risk assessment process to guide the allocation of limited evaluation resources. The risk assessment process provided a framework, which enabled the team to undertake a systematic inventory of the technical, market, and organizational risks associated with achieving energy savings goals for each of the utility's efficiency programs. The process enabled the utility to identify and better understand important areas of risk and, in particular, identify those areas that should receive priority attention from evaluation staff. These results were then fed into the overall evaluation planning process and coordinated with on-going program planning and implementation efforts.

This paper details the origins of this risk assessment process and describes how the results were used. Significantly, the paper also reviews key findings that were uncovered and lessons learned for future risk assessments.

Introduction and Background to PSE's EES Risk Assessments

Since 2002, Puget Sound Energy's (PSE) Energy Efficiency Services (EES) programs have experienced significant growth. Energy savings targets, driven largely by a renewed upper management interest and direction outlined in PSE's Integrated Resource Plans, have multiplied dramatically over 2002 levels. In 2007, annual electric energy savings were three times that of 2002 and gas energy savings were four times that of 2002 (see Table 1). Projected savings for 2008 and 2009 continue to be ambitious calling for strong energy efficiency programs to deliver expected savings.

Table 1. Energy Savings and Expenditures from 2002-2008 at Puget Sound Energy

Year	Electric Energy Savings (MWh)	Gas Energy Savings (Therms)	Expenditures (Projected for 2008)
2002	75,307	699,011	\$11,848,000
2007	222,310	2,664,548	\$44,683,526
2008	233,520	2,520,000	\$69,458,130

Due to this significant growth in the overall portfolio of EES programs, the evaluation team was challenged to plan and implement program evaluations to meet the emerging and

increasingly complex market research and evaluation demands of the utility's regulatory, planning and implementation stakeholders.

Working with an energy planning and evaluation firm, Energy Market Innovations, Inc. (EMI), the utility engaged in a comprehensive process of evaluation planning that would address the following considerations:

- limited internal resources for evaluation of programs,
- internal organizational demand to ensure claimed savings were reliable as a resource, driven by a series of Integrated Resource Plans, and
- regulatory action, effective in 2007, to attach an annual financial incentive for exceeding energy savings targets.

In 2007, with the assistance of EMI, PSE's EES evaluation team developed an evaluation plan for the 2008-2009 regulatory period (Puget Sound Energy, 2007). The plan stated that all programs would be examined annually and that evaluation activities would be prioritized not only by forecasted energy savings and program budgets but also through a risk assessment process that would identify high-risk programs that warrant evaluation resources. This paper explores the process undertaken to generate Risk Assessment Papers (RAPs), how the EES evaluation team used RAPs, how RAPs changed over time, and lessons learned throughout the process to inform future risk assessments of energy efficiency programs. While this paper specifically addresses experiences at PSE, a similar process could be informative at other utilities to better understand evaluation priorities.

PSE Risk Assessments Compared to Others

Risk assessments are used in a variety of fields, from public health to business investment portfolios, to better understand how to manage assets and unknowns. Within energy efficiency, risks typically are associated with not meeting energy efficiency goals. Risk assessments have been used to manage program portfolio planning (Haeri et al. 2006; Bertoldi & Kromer 2006) and understand evaluation efforts and resources (Meissner et al. 2008; Ridge et al. 2007). These risk assessments, both for portfolio planning and evaluation efforts, were typically quantitative in nature and made use of sophisticated computer modeling tools to calculate risk. In addition, they mostly focused on the technical and economic aspects of reaching program goals. Similar to the above risk assessments, the assessments conducted at PSE focused on a variety of risks that impacted program goals and were created to help the evaluation team allocate resources. Many other aspects of the assessment were quite different from those performed previously at other utilities. PSE's assessments were much more qualitative in nature, did not utilize computer modeling tools, and focused on market and organizational risks as well as technical/economic risks. The resulting dialogue between evaluators and program managers were another important difference between previous risk assessments and PSE's risk assessment process.

PSE's Risk Assessment Process Defined

The risk assessment process outlined in this paper used a methodology that was created by EMI and PSE's evaluation team to inform energy efficiency program evaluation planning efforts at the utility. Such a process allowed for open communication and a systematic method to identify evaluation projects, centering on three strategic dimensions of efficiency programs: technical/economic, market, and organizational. These three dimensions provided a comprehensive assessment of the key components of efficiency programs, which needed to be managed in order to deliver a successful program. The objectives for undergoing the risk assessment process were to:

- Achieve a shared, comprehensive understanding of efficiency programs;
- Provide a communication tool for the evaluation team and program implementation staff;
- Provide comparable data to inform the allocation of program, planning, and evaluation resources;
- Determine risks each program faces in meeting energy savings goals; and
- Prioritize evaluation work by gathering information on each program and urgent program needs according to findings from interviews with program implementation staff.

As stated previously, these risk assessments were qualitative in nature. They did not focus on the magnitude or probability of risks, but rather on identifying perceived risks.

Risk Assessment in Action

PSE's risk assessment process was designed to serve several important functions, all of which ultimately was used to identify risks to program savings goals. At PSE, the risk assessment process was used primarily as an evaluation and communication tool.

The Risk Assessment Process as an Evaluation Tool

This risk assessment process provided the evaluation team with a standardized process for assessing all program needs. This was particularly important for PSE because the evaluation team made a commitment to examine all efficiency programs annually and completing a risk assessment provided a cost effective way to fulfill this evaluation goal.

The evaluation team used risk assessments to systematically identify evaluation needs across all efficiency programs. Risk scores, used in conjunction with program budget and savings data, ultimately allowed the evaluation team to prioritize evaluation activities, which was particularly important due to limited evaluation resources. Systematic risk assessments allowed the evaluation team to understand if there were technical and economic, market, and organizational risks that were common across all programs. For example, when PSE found that the majority of efficiency programs lacked adequate information relating to incremental measure costs and market characterization, they were able to confidently express the need for an incremental cost study and a market characterization study across all programs.

The Risk Assessment Process as a Communication Tool

While the original need for risk assessments was to serve as an evaluation tool, the simplicity of the risk assessment allowed it to also serve as a standard and reusable communication tool. The results of the risk assessment were presented in a consistent table so that results could be compared across programs and so evaluators would have a quick risk summary for each program (see Figure 1 for an example of how risk data was presented). These documents, known as Risk Assessment Papers (RAPs), were used to open dialogue between program implementers and evaluators and upper management about program and evaluation needs.

Since the risk assessments provided a systematic method to review questions, it helped EES develop a commonly defined understanding of technical and economic, market, and organizational risks to program savings goals. This shared understanding of risk helped to eliminate ambiguity about evaluation and program needs by creating a common language that staff could use to talk about risk. Once this common language was understood, the risk assessment opened a communication channel to discuss differences in opinions of program risks.

The original meetings with program implementers identified differences in opinion between program implementers and evaluators. It also identified discrepancies in what staff had considered to be valid data. For example, many program implementers did not understand what data was needed to evaluate and determine appropriate incentive levels. The risk assessment dialogue unearthed these differences of opinion and uncertainties, which allowed the evaluation team to determine that a key task of theirs was to provide information to program staff on what could be considered valid data. The RAP itself highlighted these differences and the risks the program faced in terms of meeting its savings goals.

When the evaluators and program implementers met to discuss the risk assessment findings, evaluators were given the opportunity to discuss current evaluation projects with program implementers. This enabled the evaluation team to solicit feedback from program implementers about particular up-coming evaluation RFPs and projects to ensure that their needs were being met. It also provided time to identify additional evaluation projects and develop an understanding from program implementers about their opinion on evaluation prioritization needs.

Since the risk assessment examined technical/economic, market, and organizational issues, the process also served as a means to identify projects that could be carried out by staff outside of the evaluation team. In the case of PSE, these types of projects generally related to marketing and organizational needs. The risk assessment process therefore provided a means to identify these needs and communicate them to marketing and management staff.

Lastly, RAPs served as a communication tool between the evaluation team and upper management as a means to document how evaluation resources were used and justify desired increases to evaluation resources, whether it be increased staff or budget.

Figure 1. Example of PSE's RAP

EVALUATION/ RESEARCH FOCUS	KEY: PI= Implementation Staff and Management EG= Evaluation Group Grey- lower priority for evaluation/ research Peach- potential need for evaluation/ research Green- higher priority for evaluation/research								
	NAME OF MEASURE	Technical/ Economic Risk		Market Risk		Organizational Risk		Overall Risk	
		PI	EG	PI	EG	PI	EG	PI	EG
<i>Calculated Performance per Building</i>	1.42	1.42	2.44	2.44	2.67	2.67	2.18	2.09	
<i>Clothes washers (Electric)</i>	1.42	1.67	2.44	2.44	2.67	2.67	2.18	2.09	
<i>Heat Pumps (mini-split) (Electric)</i>	1.42	1.67	2.22	2.22	2.67	2.67	2.10	2.02	
<i>Bulbs (Electric)</i>	1.42	1.42	2.44	2.44	2.67	2.67	2.18	2.18	
<i>Fixtures (Electric)</i>	1.42	1.17	2.44	2.44	2.67	2.67	2.18	2.09	
<i>Refrigerators (Electric)</i>	1.42	1.17	2.44	2.44	2.67	2.67	2.18	2.09	
<i>Showerhead/ Aerators (Electric)</i>	1.42	1.42	2.44	2.44	2.67	2.67	2.18	2.18	
<i>Whole House Ventilation Upgrade (Electric)</i>	1.42	1.17	2.44	2.44	2.67	2.67	2.18	2.09	
<i>Windows (double to double) (Electric)</i>	1.42	1.17	2.44	2.44	2.67	2.67	2.18	2.09	
<i>Dishwasher (Electric)</i>	1.42	1.17	2.44	2.44	2.67	2.67	2.18	2.09	
<i>Dishwasher (Gas)</i>	1.42	1.17	2.44	2.44	2.67	2.67	2.18	2.09	
<i>Furnace (Gas)</i>	1.42	1.29	2.44	2.44	2.67	2.67	2.18	2.13	
<i>Showerhead/ Aerators (Gas)</i>	1.42	1.42	2.44	2.44	2.67	2.67	2.18	2.18	
<i>Tankless Water Heater (Gas)</i>	1.42	1.17	2.44	2.44	2.67	2.67	2.18	2.09	
<i>High EE Water Heaters (Gas)</i>	1.42	1.67	2.44	2.44	2.67	2.67	2.18	2.26	
<i>Windows (double to double) (Gas)</i>	1.42	1.17	2.44	2.44	2.67	2.67	2.18	2.09	
Overall Priority	1.42	1.26	2.43	2.43	2.67	2.67	2.17	2.12	
SUMMARY OF FINDINGS									
Technical/ Economic	Manager would like to work more collaboratively with the Evaluation Group so that the Evaluation Group focuses on program needs.								
	No system in place to analyze incremental costs.								
Market	No data on market penetration estimates. Little understanding on whether remaining market is interested/ capable in participating in the program.								
	No plan to address remaining market potential.								
	The number of electric contractors is limited and in the future PSE will need to compete with other utilities as they ramp up their efficiency programs to meet goals.								
Organizational	Currently understaffed, however the program is approved to hire an additional staff person.								

Methodology: The Development of a RAP

All residential, commercial, and/or industrial programs were analyzed during the risk assessment process. Risk Assessment Papers (RAPs) were developed through interviewing program implementers with a standard set of questions, analyzing the interview data, and applying a scoring system to the findings. This methodology is outlined below.

The Interview Framework

Evaluation staff provided EMI with contact information of program implementers for each program in the energy efficiency portfolio of PSE. These program implementers were contacted and interviews were scheduled. A list of questions for the program implementers was prepared based on the Evaluation Plan (Puget Sound Energy, 2007). These questions were created to generate a “yes” or “no” answer; however, answers often fell in between or outside of these two possible answers. The answer provided other useful information, which was tracked by the EMI interviewee and shared with the evaluation team.

The questions, based on three strategic dimensions, are as follows:

1. Technical and Economic Risk Questions
 - Cost Effectiveness Calculation: Is the cost effectiveness calculation accurate for each measure? Do you have a good understanding of the incremental costs for each measure? Do you understand the persistency (life expectancy) of each measure?
 - Savings Assumptions: Are there recent studies/impact evaluations for the measures/program and are they accurate? Is there a need for an impact evaluation for the program/ any of the measures? Are you confident in the energy savings and non-energy benefit calculations for each measure?
2. Market Risk Questions
 - Market Intelligence: Does PSE have reliable data on existing market penetration estimates? Does PSE have a plan to strategically address remaining market potential? Are you aware of any market drivers influencing program performance (i.e.- supply/demand, price, emerging technologies, awareness of measure, persistence)?
 - Relationships: Do you have a relationship with customers and/or trade allies interested in the program/measure? If yes, please describe the relationship. Do you know customer and/or trade ally needs and interests? Does the program complement their needs?
 - Political and Regulatory: Do you know the current codes and standards relating to measures in this program or the program itself? Are there any expected regulatory policies or political changes that could impact program efforts (i.e. climate change, business environment)?
3. Organizational Risk Questions
 - Data Tracking and Reporting: Is the existing program tracking information usable, current, and of high quality? Is the tracking system adequate to fulfill program and evaluation needs?
 - Alignment: Are PSE staff, third-party implementers and trade allies aware of and aligned with short-term program goals?
 - Institutional Knowledge: Do you search out data or information relative to the program? Can you easily share data with your colleagues and does this happen? Do you have enough resources to perform?

The Interviews

During the interview process, the team gave “yes” answers a score of 3, “no” answers a score of 1, and “other” answers a score of 2. For each question and each program measure, a score was recorded, except for the few occasions when the question could be answered generally for the entire program. When this occurred, the same score was given for each measure. This scoring was means to qualitatively categorize responses. Other comments about risks, other concerns, or general program questions that needed to be addressed (according to the program implementer) were noted and tracked.

Analysis

EMI executed the following steps for the analysis portion of the post-interview process:

- Synthesized data and compared notes.
- Drew consensus on answers and qualitative scores.
- Averaged 1-3 subcategory scores for each measure.
- Averaged the subcategory averages to obtain the category scores for each measure.
- Averaged all category averages to obtain overall category score for the program.
- Received the scores for the same categories for each program from the evaluation team.
- Displayed the scores stemming from the opinions of the evaluation team and the program implementers.
- Applied the Color Scale,¹ shown below in Table 2, for 1-3 averaged scores for each measure and/or category for both the interview findings and the evaluation team’s opinions:

Table 2. Color Scale Applied to Final RAPs

SCORES	GRADES
2.50 – 3.0	Green
1.5 – 2.49	Peach
< 1.5	Grey

Limitations and Assumptions

- We assumed that each category of risk held the same value. For example, a market risk was no less or greater a risk than a technical/economic risk. A “relative risk” scoring system was developed by EMI but was not used with this utility in order to keep the process simple.
- Each subcategory held the same value as any other subcategory within the overhead category of risk.
- If a “yes” or “no” answer could not be given, then the resulting score was 2. However, some of these answers might actually be much closer to “yes” or “no”. Our scaling and grading systems did not necessarily reflect this possibility.

¹ See the *Process and Format Changes* section to read how the scoring system changed overtime.

- When the program implementer answered questions for the entire program instead of per measure, then the data might not reflect differences that were actually present between measures.
- No risk score was final, as some significant information might not have been drawn from the interviews. Some information could have been unknown to the interviewee and evaluation team, or staff might have hid it either deliberately or unknowingly. Nonetheless, to the team’s knowledge, the interviews were done openly and honestly.

Process and Format Changes

While the original purpose of the risk assessments remained constant, the final creation of the RAPs evolved in keeping with changing needs and requests of the utility’s evaluation team.

Evaluation Team Input

One source of change in the process involved the level of input from the evaluation team during data collection. At the outset of the assessment process, the evaluation team served solely as a bystander. Over time their input evolved into a balancing measure, which the findings of the interview could weigh against. The result was a new look for the RAP, which included two columns: one for the program implementer’s scores and one for the evaluation team’s scores.

The rationale the evaluation team used to get their input into the final papers was fairly straightforward. First and foremost, their opinions were different than implementation staff in some key areas. For example, one program implementer indicated very little, if any, risk for the technical and economic category, while the evaluation team was not confident in the technical or economic data because they were not comfortable with the savings estimates per measure. Tracking the differing risk responses from program implementers and evaluators allowed the evaluation team to clearly understand discrepancies in opinions and helped create dialogue to address these differences.

The RAP Appearance

The actual look of the RAP was altered several times to meet the needs of the client. The display of the scoring system changed over time. Ideas for this section included:

- a grading scale from A-D or A-F with or without numbers
- a red/yellow/green scale with or without numbers
- or a scale with different colors (the chosen scheme shown below).

Ultimately, a grading system and a red/yellow/green scale were seen as too controversial at the utility and the team decided on the last option, an alternative color scale, to represent risk findings. Names of the document sections also evolved, such as changing “risk report card” to “evaluation/research focus” in order not to make program implementers feel like they were being graded or ranked.

Needs Analysis or Risk Assessment?

Lastly, a modification occurred when the evaluation team needed to communicate the risk assessment findings with other staff and faced a challenge of using the term “risk”. Risk could be considered a loaded word, and some staff felt it was too harsh to use with implementation staff. Accordingly, some discussion occurred on whether the process should have been called a needs assessment. Since the process was not completely quantitative in nature, perhaps the process was more of an analysis of program needs. In any case, the process did result in the detection of several risks that the programs faced. The evaluation team will use the results of the assessment to better address these risks and will be more capable of determining what each program’s needs are.

Results of the Risk Assessment Process

While the color-coding and terminology of the RAPs evolved overtime, the risk assessment process was successful as an evaluation and communication tool. The process successfully met four of the original five objectives and partially met the remaining objective:

- Through open communication between evaluators and program managers, the risk assessment process developed a shared, comprehensive understanding of efficiency programs.
- Since the risk assessment process used standard interview questions, comparable data across programs was collected to inform the allocation of program, planning, and evaluation resources.
- Through analysis of the interview results, the evaluation team was able to determine risks that faced each program. A summary of these risks is show in Table 3.
- Through the interview process, the evaluation team was able to gather information on each program and identify urgent program needs for prioritization.
- While a communication tool was developed, the RAP, only the evaluation team used it. The original objective for the RAP was that program implementation staff could also use it. There is potential for the evaluation team to share the RAPs with program implementation staff in the future, but it has not occurred as of the date this paper was written.

While the evaluation team was generally aware of many of the concerns that were identified through the risk assessment, the process provided a formal and transparent means to clarify issues and data to validate research needs for themselves and administrators.

The information from the risk assessments also highlighted the need to formally create a means for better communication throughout and among departments. Program implementers expressed concern that they did not communicate effectively with efficiency support staff, such as evaluators, planners, and marketing staff. In turn, program staff often did not know whom to turn to for particular problems.

Most importantly, the risk assessment process did serve to open communication between program implementers and evaluators. Through the interview process, the program implementers were introduced to the various dimensions of evaluation work and planned evaluation projects.

The risk assessment process served as a catalyst for an open dialogue about what risk is, and created an agreed understanding of risks and evaluation needs facing the program.

Table 3. Summary of PSE’s Risk Analysis Results

RISK CATEGORY		RISK
Technical/Economic	Cost Effectiveness	Cost effectiveness numbers were generally well understood; however, there is some uncertainty relating to assumptions made to calculate the numbers. The evaluation team is reviewing this information and also speaking with program implementers about some of their concerns. Incremental costs associated with program measures were found as being difficult to calculate. The evaluation team is planning to submit an RFP for an incremental cost study.
	Savings	Assumptions made to perform savings calculations were a concern. The evaluation team was aware of some of concerns with assumptions and plans to address these. Non-energy benefits were rarely calculated throughout all programs. The evaluation team noted this issue and is considering how to manage it.
Market	Market Intelligence	There was limited market penetration data for nearly all the measures and programs. The evaluation team is recommending who should be in charge of collecting this data. Few programs had formalized plans to address remaining market potential. The evaluation team is working with program implementers on how best to address this issue.
	Relationships	EES had strong relationships with trade allies. Program implementers are planning to maintain these relationships. The quality of relationships with customers varied by program. Program implementers are now more aware about this concern.
	Political and Regulatory	There is a strong knowledge of codes/standards impacting program measures, but there is uncertainty about how codes/standards will change over time. Program implementers are looking into impacts from potential changes. There is concern about how the changing political climate will impact program implementation. Program implementers are looking into impacts from potential changes.
Organizational	Data Tracking and Reporting	The tracking system is a hurdle for many program managers. The evaluation team will recommend who should be responsible for managing this concern.
	Alignment	Short-term program goals were reported to align generally with those of stakeholders identified by program managers. Program implementers will continue to align program efforts with stakeholders.
	Institutional knowledge	Most program managers and/or their staff regularly research information about their programs. Program implementers will continue to do so. Data is usually shared rather easily but some managers would like to see more internal communication. The evaluation team will recommend who should be responsible for managing this concern. More tracking technology, more staffing, and more formal training are expressed wishes from program implementation staff. The evaluation team will recommend who should be responsible for managing this concern.

Conclusions and Lessons Learned

The risk assessment process and documentation was a new evaluation and communication tool that PSE and EMI created. Its form changed over time, but the general

purpose of the process remained constant. A number of findings were discovered about the process and are described below to inform future program risk assessment projects at other utilities.

The formalized risk assessment process standardized the communication approach between program implementers and the evaluation team. It provided a systematic way for evaluators to talk to all program implementers and for that dialogue to continue annually. It is important to note that while the evaluators were able to use the risk assessment process interview questions as a means of systematically reviewing programs, there were a few programs that did not fit the mold: pilot programs, education-focused programs, and a specialized incentive program for large customers. While the questions were not always applicable for these programs, the risk assessment process still provided a means for evaluators to obtain a basic understanding of the program and a means for dialogue about the programs.

An important consideration is that the RAP can look different for different audiences. While the evaluation team needed some detailed analysis of the data to help prioritize work, the tool used to communicate between the evaluation team and program implementers could be made much more simple. In the end, the evaluation team used more complex data sheets to compare programs and compare differing responses to risk between program implementers and evaluators while the program implementers really only reviewed the quantitative information about risks facing their program.

A very important lesson learned is that sponsorship from management is the key to success. Upper management did not initially own the risk assessment process; rather the evaluation team owned it. Thus, it did not have as much institutional support as it needed once the evaluation team started communicating with other utility staff about the work. And as previously discussed, the term “risk” was thought of as too controversial. Thus, the tool was utilized more as an internal evaluation and communication channel, and less of a public document to be shared with all staff.

Lastly, it is very important for the utility to take ownership of the RAP and be clear about its intentions. Since the RAPs deal with technical and economic, market, and organizational strategic dimensions, some of the results from the risk assessment interviews provided documentation for organizational changes at the utility. Due to this, some staff thought a team outside of evaluation should have managed the risk assessments.

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