EVALUATION FOR PUCs

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ABSTRACT

This paper discusses the role of Public Utility Commissions (PUCs) in evaluating demand-side management programs, using concrete examples from the experiences of one such agency, the Public Service Commission of Wisconsin (PSCW.)

The paper is divided into two major sections. In the first, several relevant issues are addressed generically. First, what are the arguments for and against PUC involvement in demand-side program evaluation? Second, what major options does a PUC have in structuring its approach to evaluation? And third, what major advantages and disadvantages does a PUC face in undertaking evaluation-related projects, compared to other types of organizations?

The second section of the paper is intended to illuminate these issues through a discussion of the concrete experiences of the PSCW. The PSCW has experimented with four different approaches to program evaluation:

1. Conducting evaluations more or less independently, using data submitted by regulated utilities.

2. Requiring utilities to submit plans for the evaluation of specific programs, and reviewing these plans for their research objectives, timing and methodology.

3. Requiring utilities to conduct joint evaluations of mandated programs, and participating in the inter-utility technical committees charged with this responsibility.

4. Encouraging the development of new, cooperative approaches to program evaluation and other kinds of demand-side research.

Advantages and disadvantages of each of these approaches are discussed, along with examples of the specific types of evaluation projects for which they may be appropriate.

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INTRODUCTION

In recent years, there has been virtually unanimous agreement in the energy conservation business that more program evaluation is a good thing. However, what is not so readily agreed upon is the proper role of various organizations in ensuring that needed evaluations take place and are conducted properly. What, for example, is the proper role of state Public Utility Commissions (PUCs) in demand-side program evaluation? In considering the role of state PUCs in program evaluation, at least three major issues arise. First, are PUCs justified in involving themselves in program evaluation in the first place? Second, when PUCs do become involved in evaluation, what approach should they use? For example, should they actually conduct evaluation studies, or simply regulate them broadly in the same way that other utility activities are regulated? And finally, what unique problems and/or opportunities do PUCs face in undertaking program evaluation activities?

The remainder of this paper is divided into two major sections, each of which takes a different approach to the major issues noted above. Section I contains a generic discussion of the issues behind PUC involvement in program evaluation. Section II discusses each of these issues in light of the concrete experiences of the Public Service Commission of Wisconsin over the past several years. In this period, the PSCW has experimented with the following approaches to program evaluation:

1. Conducting evaluations more or less independently, using data supplied by regulated gas and electric utilities.

2. Requiring utilities to submit plans for the evaluation of specific programs, and reviewing these plans for research objectives, timing and methodology.

3. Requiring utilities to conduct joint evaluations of mandated programs, and participating in the inter-organizational technical committees charged with this responsibility.

4. Encouraging the development of new, cooperative organizational mechanisms to conduct program evaluations and other kinds of demand-side research.

Each of these approaches is reviewed separately, including examples of evaluation projects in which the PSCW chose the approach, and a discussion of

the apparent advantages and disadvantages of the approach. Because the paper focuses on the process rather than the results of these projects, the specific findings of the evaluations are not discussed. Readers interested in specific findings are asked to consult the references at the end of the paper.

Finally, the conclusion of the paper provides a general review of the lessons that can be drawn from the PSCW's experience with program evaluation, including recommendations for the circumstances that warrant taking each of the four approaches discussed above.

I. PUC INVOLVEMENT IN PROGRAM EVALUATION: WHY, HOW AND WHAT?

The first broad issue that must be addressed in considering PUC involvement in demand-side program evaluation is: Why? Why should PUCs, which have traditionally been oriented to rate setting and other basic regulatory functions, concern themselves with program evaluation in the first place? A number of answers are possible:

1. Because the trend in utility demand-side programs has been away from generic, mandated programs and toward specific programs geared to each utility's unique characteristics, PUC involvement in program evaluation may be necessary to maintain an appropriate level of regulatory oversight.

2. In the case of programs that are either mandated or encouraged by regulatory agencies, those agencies may be best qualified to set the parameters used to determine whether or not the programs are meeting their objectives.

3. The increasingly broad responsibilities of PUCs under least-cost planning may require a steady stream of data produced from evaluation projects. The only way to ensure that reliable data are available when needed may be for the PUC to play a role in the planning and implementation of evaluation projects.

4. As demand-side budgets burgeon, it may become necessary for PUCs to develop cost-oversight mechanisms like those that often exist for the construction of production and transmission facilities. Playing a role in program evaluation is one way to maintain oversight over expenditures.

5. In cases where there is reason to doubt the objectivity of a utility-conducted evaluation--for example, when there are glaring deficiencies in a program or when the program is both planned and evaluated by the same utility employee--PUC involvement may be necessary to ensure reliable results.

6. In cases where it is considered desirable for the results of a utility-conducted evaluation to be transferred to other utilities, a PUC can play the role of a central clearinghouse for information.

7. In cases where a commission has established an incentive to stimulate utility conservation efforts, such as increasing authorized rates of return based on the amount of incremental conservation achieved, commission staff involvement may be necessary to determine whether the incentive should be awarded.

What these and other arguments in favor of PUC involvement in demand-side program evaluation have in common is that they revolve around the increasingly important role of demand-side management in long-term utility planning. If demand and supply options are truly to be put on the same footing, PUCs will eventually have to develop as sophisticated an understanding of the former as of the latter. Increased involvement in program evaluation is one way to foster such understanding.

If PUC involvement in program evaluation is considered justified, the second question that must be answered is: How? How should PUCs structure their evaluation efforts to best meet their information needs? There appear to be two basic options. The first is for a PUC to actually engage itself in the technical, nitty-gritty aspects of evaluation, such as developing and maintaining data bases, conducting surveys, and calculating the savings resulting from programs. The second option is to take a more hands-off approach, broadly regulating the evaluation activities of utilities in much the same way that other activities are regulated. Between these two primary options lie a variety of intermediate approaches, such as taking a hands-off approach but requiring utilities to provide raw data sets to the PUC along with finished copies of evaluation reports. As will be discussed in the next section of this paper, each of these general approaches has advantages and drawbacks.

A final issue regarding PUCs and program evaluation is: What? What unusual advantages and disadvantages can PUCs expect to encounter in undertaking program evaluation projects, compared to other organizations?

Perhaps the most obvious disadvantage is that most commissions are graced with extremely limited technical and financial resources compared to the utilities they regulate. Program evaluation can be both expensive and time-consuming, requiring both a high level of research expertise and/or sufficient funding to pay for the services of the numerous consulting firms that specialize in this area. A second disadvantage is that the relationship between a PUC and the utilities it regulates is often necessarily adversarial. This adversary relationship can both hobble the performance of evaluation projects and result in increased antagonism when the projects are completed. Thirdly, research activities such as program evaluation are often non-traditional PUC functions, and may thus require new ways of thinking. While new ways of thinking are not in and of themselves a disadvantage, overcoming institutional resistance to them can be. Finally, as government agencies, PUCs may face legislative restrictions on the way they execute projects, such as injunctions against sole-source bidding.

While PUCs face disadvantages in performing program evaluations, they enjoy

certain advantages as well. One of these, quite simply, is their regulatory authority. This authority may be used (albeit with caution) to mobilize the resources of regulated utilities. Evaluation projects may be mandated either during the planning phase of new programs or afterward, and utilities may be required to maintain and submit needed data. In addition, PUCs often have the benefit of pre-existing, central program data bases which were initiated for regulatory reasons, but which may be used for purposes of evaluation.

II. EVALUATION EXPERIENCES OF THE PUBLIC SERVICE COMMISSION OF WISCONSIN

In this section, the generic issues noted above are highlighted through a discussion of the concrete experiences of the Public Service Commission of Wisconsin. Each of the four approaches to program evaluation noted at the outset of this paper is discussed separately. These discussions are summarized in Table I.

A. Conducting Evaluations Independently

Under this approach, PUC staff either conduct by themselves or contract out the detailed technical work of an evaluation project. While the PSCW has yet to complete an entire evaluation project in this manner, this approach has been used to complete parts of several projects. For example, since 1985, two evaluations have been conducted of the Wisconsin Utility Weatherization Assistance Program, a state-wide mandated program providing weatherization grants to state residents with incomes below 150% of the poverty level (Airriess, et. al., 1985; Airriess, 1986; Banerjee, et. al., 1985; Horowitz, et. al., 1987; Prahl, 1987.) Both evaluations examined overall savings and cost-effectiveness of the program, the relative savings and cost-effectiveness of individual weatherization measures, and the relative performance of each of the 10 individual utility programs in the state. Methodologically, both studies employed a pre-post, quasi-experimental design with a control group to adjust for extraneous factors. In addition, both used the popular Princeton Scorekeeping Method, or PRISM, to normalize fuel consumption for variations in weather.

In both of these evaluations, participating utilities were responsible for gathering and maintaining demographic, housing and energy consumption data, and for forwarding this data to the PSCW. In both cases, PSCW staff were responsible for designing the sample and merging all of the relevant data bases into a coherent whole. Beyond these simple characterizations, the division of labor between the PSCW and participating utilities was complex. For example, in the second evaluation, research objectives were developed by a committee of weatherization program managers, while responsibilities for contractor recruitment, selection and management were divided among PSCW research staff and the chair of the weatherization committee. After this collaborative work was completed, additional analyses were conducted by PSCW staff using finished data sets provided by the contractor. A similar division of labor was adhered to in the first evaluation.

Table I. Approaches to program evaluation for PUCs.

Approach	Advantages	Disadvantages	Recommended for
Independently Conducting Evaluations	1. Provides full control over study. 2. Helps small utilities without sufficient evaluation resources. 3. Facilitates politically sensitive analyses.	1. Time-consuming and expensive. 2. Non-traditional PUC role. 3. Utilities not represented. 4. Stakeholders have no reason to accept results. 5. Can intensify antagonisms.	1. Sensitive analyses (I.E., comparisons between utilities). 2. Programs for which PUC maintains central data-base.
Evaluation By Inter-Organizational Committee	1. Stakeholders buy into process. 2. Makes use of utility expertise. 3. Facilitates data exchange and coordination. 4. Ensures adequate representation by affected parties. 5. Can improve quality.	1. Unwieldy for detailed technical decisions. 2. Differing political and research agendas. 3. Differences in resources across utilities.	1. Mandated programs. 2. State-wide programs.
Requiring and Reviewing Evaluation Plans	1. Leverages PUC resources. 2. Can meet both PUC and utility data needs. 3. Provides for quality control. 4. Allows PUC to set broad constraints on methods. 5. Closest to traditional PUC function.	1. PUC has limited control over performance of evaluation. 2. PUC may end up making decisions utility is better qualified to make.	1. Company-initiated programs.
Innovative Organizational Approaches	1. Can help to overcome resource limitations. 2. Can help to overcome adversarial relationships. 3. Can facilitate coordination.	1. Hard to come by. 2. Issues may be too sensitive to use this approach.	1. Unusually expensive or difficult projects. 2. Projects with large economies of scale.

Our experience with the commission-conducted portion of these evaluations suggests certain advantages and disadvantages. A primary advantage of this approach is that it allows for analyses that might be too sensitive to conduct cooperatively. For example, performing its own analyses after the joint work was completed allowed the PSCW to draw comparisons across utilities that probably would have proved divisive if done cooperatively. Second, direct involvement in the nuts and bolts of program evaluation may provide a PUC with greater control over the course of the work than do other approaches. For example, in order to foster comparisons between the two projects, the PSCW proposed that many of the methods used in the first weatherization evaluation be repeated in the second. This ultimately proved

important, as one of the most significant findings of the second evaluation was the overall stability of program impacts when compared to the first.

A final advantage of PUC-administered evaluation projects is that they can provide evaluation data for utilities that are too small to maintain their own staff for this purpose. Perhaps for this reason, the smaller Wisconsin energy utilities were among the more enthusiastic supporters of the two weatherization evaluations described here.

Perhaps the most significant disadvantage of PUC-performed analyses is that they can be extremely time-consuming and expensive compared to other approaches. Given the extremely limited resources of most PUCs, this is not a trivial concern. Furthermore, given that program evaluation is a non-traditional PUC activity, it may be difficult to obtain new staff positions and/or funding for consultants. A secondary disadvantage of PUC-conducted analyses is that they may make it difficult for utilities and other stakeholders to be adequately represented. This reduces the incentive of these stakeholders to accept the results of the analysis when presented, and may also intensify inherent antagonisms between PUC and utility staff.

Taken together, these advantages and disadvantages suggest the following circumstances when it may be profitable for a PUC to conduct evaluation analyses on its own. First, this approach may be desirable for projects that can be done relatively quickly and are non-labor intensive. Second, PUC-conducted work may be preferable for analyses that are particularly sensitive or politically controversial. Thirdly, PUC-conducted evaluations may be desirable for PUC-mandated programs. Finally, there may be administrative reasons for a PUC to do evaluation analyses, such as when the PUC is the repository of a pre-existing, centralized data base that can be adapted for evaluation purposes. This was the case in both evaluations of the weatherization evaluations discussed above.

B. Evaluation by Inter-Organizational Committee

A second approach to program evaluation for PUCs is to mandate that state-wide evaluations be conducted through cooperative mechanisms among participating utilities. This was the approach used in an evaluation of the Wisconsin version of the Commercial and Apartment Conservation Service (HBRS and Cambridge Systematics, 1988.) As part of the final order initiating the CACS program in Wisconsin, participating utilities were required to submit a plan for a cooperative analysis of the effectiveness of the program. This evaluation was conducted through the "Evaluation Task Force," an inter-organizational technical group which reports to a broader committee composed of utility and commission conservation managers. Utility representatives and commission staff jointly determined the goals, objectives, and methodology of the study; designed and constructed samples of program participants and non-participants; selected and managed the work of contractors; and disseminated and commented on the results of the project.

The project was marked by initial disagreement concerning the measurement of program impacts. Some participants believed that energy savings should be

used to assess the impact of the program, while others held that it would be both more workable and more appropriate to measure changes in the behavior of audit recipients. The solution to this disagreement was to conduct the evaluation in two phases. Phase I was to include an analysis of the effect of the program on the installation of conservation measures, while Phase II was to be an analysis of energy savings. However, results from Phase I showed that the impact of the program on installation rates, when adjusted for a control group, was so small as to make the measurement of savings difficult. Phase II was subsequently cancelled as an ineffective use of research funds. At the time this report was written, results from Phase I were being used to revise the CACS program in Wisconsin.

Our experience in jointly conducting the CACS evaluation has led us to believe that there are a number of advantages to conducting evaluations by inter-organizational committee. A primary advantage of this approach is that it makes use of extensive utility expertise and financial resources, while still allowing PUC staff to be involved in the technical process of program evaluation. Evaluation by committee also allows all interested parties to be represented, thereby decreasing antagonism and giving stakeholders an incentive to buy into the results of the project. In addition, by providing for diversity of opinion, a cooperative approach can increase the quality of an evaluation. For example, while the two-phase approach described above was initially adopted as a political compromise, it had the technical advantage of providing both for thoroughness and flexibility. Finally, a committee approach greatly facilitates project coordination and the exchange of data and information. For example, the evaluation plan for the CACS evaluation initially called for using the Evaluation Task Force as a vehicle for the exchange of billing data between gas and electric utilities operating in the same service territory.

Evaluation by committee also has its disadvantages. Chief among these is that a committee can be unwieldy for making detailed technical decisions, thereby delaying project execution. Secondarily, inter-organizational committees may well be divided by differing political and research agendas among participants, making it difficult to achieve consensus on technical issues that probably would not be problematic if approached by any one participant. Finally, technical committees tend to highlight the differences in technical and financial resources across participating utilities, and steps must be taken to ensure that all participants feel their contribution to the project is an equitable one.

Our experience with evaluation by committee suggests that it is most useful for evaluating mandated programs that are essentially the same throughout the state. Secondarily, this approach is useful for projects that require either extensive political or technical representation by all parties, such as when significant differences of opinion exist on the proper objectives of an evaluation.

C. Requiring and Reviewing Evaluation Plans

A third approach to evaluation for a PUC is to limit its involvement to

oversight over utility evaluation activities. For example, a commission may routinely review utility evaluation activities through rate cases or other fora, just as it reviews conservation program activity. Budget and staffing may be considered, along with the research objectives and methodologies of planned evaluation projects. The PUC may also require regulated utilities to initiate new evaluations, and review these plans for their objectives and methods. To track these evaluations, the PUC may request that the utility provide periodic reports and updates for review and comment.

The PSCW has taken this approach with increasing frequency in recent years. At the time this paper was submitted, the approach had been used at least once for 7 of the 10 major energy utilities in Wisconsin. For example, one regulated utility was recently required to submit plans to evaluate all of its major programs over a three year period. The resulting plans were reviewed in detail for their methodology and objectives, responsiveness to company and commission staff information needs, and potential for transferability to other service territories.

This regulatory approach to program evaluation offers a number of advantages. Primary among these is that it offers a tremendous leveraging of PUC resources in ensuring that needed evaluations take place and are conducted properly. This is so because it puts technical work in the hands of the utilities--who, arguably, are better equipped to handle it--while maintaining some PUC oversight. A secondary advantage is that requiring and reviewing evaluation plans is closer to a traditional PUC function than actually conducting or participating in research. Spending time and money on evaluation may thus be easier to justify administratively and also more acceptable to utilities. A third advantage of this approach is that, perhaps more than any other, it allows both utilities and PUCs to have their own distinctive input into the performance of evaluations. This is important, given that utilities and regulatory agencies generally have different agendas and research needs. Finally, in certain cases, regulatory oversight over program evaluation can amount to a form of quality control, much the way prudency reviews maintain control over construction programs.

The primary disadvantages of the regulatory approach to program evaluation are perhaps political in nature. Primary among them is that utilities may regard regulation of program evaluation as an infringement on management prerogative. This may be a particularly serious problem if the PUC seeks to play an active role in the selection of research methodologies--for example, requiring certain experimental designs for pilot programs or specific weather normalization procedures for the measurement of energy savings. Utilities may rightly ask if a regulatory agency has either the qualifications or the right to make such detailed methodological decisions.

One way out of this difficulty is for the PUC to lay out broad constraints on the variety of evaluation methodologies that are considered acceptable without dictating individual methods, just as it lays out broad constraints on conservation programs without trying to dictate individual programs. An example of this approach in Wisconsin is in the treatment of the issue of free-riding. PSCW staff have adopted the position that participant

self-reports, while frequently used, are not by themselves sufficient to accurately measure the level of free riding in financial incentive programs. However, rather than mandating the use of other specific methods, staff have asked that estimates of free-riding be buttressed by as many sources as possible, including sales reports, end-use forecasts, focus groups, and controlled experiments.

A second difficulty in requiring and reviewing evaluation plans lies in ensuring that utility staff understand PUC requirements. If the purpose and desired content of the plans are not made clear, the natural human tendency may be to file either exhaustive plans that are sure to please some of the people some of the time, or sketchy plans that keep the flexibility of the utility conducting the evaluation as great as possible. To deal with this potential problem, the PSCW distributed to regulated utilities a set of guidelines for the filing of evaluation plans. (Prahl, 1987, 2.) These guidelines are divided into two parts. The first part is prescriptive, describing issues such as objectives, methodology, timeline, and resources that utilities are asked to discuss in every evaluation plan. The second part is more discursive, describing the criteria that PSCW staff use in reviewing evaluation plans. These include broad judgments concerning the appropriateness of major research objectives, the reliability of proposed methods, the degree to which planning for the evaluation has been incorporated into planning for the program itself, and the adequacy with which transferability issues have been addressed.

A third potential pitfall in the regulation of program evaluation is that, once an evaluation plan has been filed and reviewed, the project is out of reach of the PUC. There is thus no guarantee that the work will be completed as requested. One way around this pitfall is to require periodic reports and meetings during the course of a required utility evaluation project.

In general, our experience with the regulatory approach to program evaluation has been that it works best with the kinds of company-initiated programs that are both unique and idiosyncratic. Being company-initiated, these types of programs can usually be most efficiently evaluated by company staff or company-hired contractors. It is worth noting that, because such programs appear to be the wave of the future, the regulatory approach to program evaluation may also be the wave of the future. However, as long as the advantages noted in the previous section persist, there will probably continue to be a rationale for some direct PUC involvement in evaluation projects.

D. Innovative Organizational Approaches

Lastly, it is possible for PUCs to develop a wide range of innovative approaches to facilitate the performance of program evaluation. Informal approaches include cooperative projects with utilities, other state agencies, and national research organizations. PUCs can also play a role in the development of more formal organizational mechanisms to perform program evaluation and other types of demand-side research.

With the help of a grant from the U.S. Department of Energy's Least-Cost Utility Planning Program, the PSCW has been experimenting with both formal and informal innovations in demand-side research.

An example of an informal innovation is an evaluation of the Wisconsin Electric Power Company's Smart Money conservation initiative. On a per capita basis, the Smart Money Program is the largest conservation initiative yet undertaken by a major American utility. For this reason, and because a corporate performance incentive was built into the PSCW order initiating the program, it was considered imperative to have an outside evaluation of the program. Yet PSCW staff had neither time nor money to conduct such an evaluation properly.

The answer to this problem was an unusual organizational arrangement. The evaluation as conducted was conceived by Wisconsin's Environmental Decade, a consumer advocacy group; paid for by Wisconsin Electric; administered by PSCW 2taff; and conducted by a consulting firm (Nicholls, et. al., 1988.)

In addition, with the full cooperation of state energy utilities and the University of Wisconsin, the PSCW is working to develop a new formal mechanism to perform state-level demand-side R&D. While the agenda for the mechanism was being developed at the time of this writing, it is expected that evaluation projects will be a high priority. When complete, this mechanism is expected to be affiliated with the University; to be funded primarily by revenue-based contributions from state utilities; and to be supported by technical committees drawn jointly from the public, private, university and non-profit sectors.

Overall, the PSCW's experience with this type of innovative approach to program evaluation has been limited thus far. However, we have had enough experience to offer a few conjectures on the advantages and disadvantages of such an approach. A primary advantage of cooperative efforts is that they can help to overcome resource limitations and adversarial relationships among participants. A primary disadvantage is that cooperation and innovation are hard to come by, particularly when different actors do not necessarily agree on overall research goals and needs. When they are possible to achieve, cooperative efforts are perhaps most useful for unusually expensive or difficult projects, or projects that offer large economies of scale when done jointly.

SUMMARY AND CONCLUSIONS

As the principles of both demand-side management and least-cost planning become more entrenched among state Public Utility Commissions, it is likely that many of these regulatory agencies will become more involved in program performance evaluation. By their nature, PUCs face certain disadvantages in conducting such evaluations, including severe resource limitations, adversarial relationships with regulated utilities, boundaries on the traditionally accepted functions of a PUC, and administrative restrictions on

the way projects are performed. However, PUCs also enjoy certain advantages, not the least of which is their statutorily derived authority to channel the resources of regulated utilities. A secondary advantage is that PUCs may be the natural repositories of centralized data bases of the kind required for program evaluation.

There are a variety of different approaches that PUCs may take to program evaluation, including conducting projects independently, mandating evaluations by inter-organizational committee, regulating the evaluation activities of utilities, and encouraging innovative organizational approaches to this and other types of demand-side research. Each of these approaches has characteristic advantages and disadvantages, and appears to be most appropriate to certain types of evaluation projects.

Ultimately, the extent to which a regulatory agency can and should involve itself in program evaluation will vary from state to state. There are tremendous variations across the 50 states in terms of resources, statutory charters, and the climate of utility-commission interactions. In addition, there are some functions of evaluation, such as providing input into marketing efforts, that should arguably remain strictly as utility functions. However, as PUCs become more involved in the regulation of demand-side management activities, and as the trend continues away from generic programs and toward utility-specific programs, it appears likely that many PUCs will want to expand their role in this critical component of the least-cost planning effort. As this occurs, relatively early experiences such as those described here may provide useful lessons.

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