ISSUES FOR EVALUATION OF PUBLIC BENEFITS ENERGY PROGRAMS

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Introduction

The rationale for utility demand-side management (DSM) programs is being challenged as the electric utility industry is restructured to introduce competitive forces in the generation and sales of electricity. Most utilities have already reduced their budgets and support for DSM in advance of any actual restructuring. At the same time, there is strong public support for energy efficiency and renewable energy resources. The manifestation of public support for energy efficiency and renewables (and low-income programs in many cases) is the creation of *public benefits energy programs* to be implemented simultaneously with—or even in advance of—restructuring. Such public benefits energy programs are likely to be supported and funded through universal, non-bypassable *access* or *distribution* charges as a means to collect funds equitably from all energy consumers.

Evaluation has been an integral, critical element of traditional DSM programs. Impact evaluations have been used to quantify program results, and process evaluations have been used to assess program effectiveness. The role of evaluation for public benefits energy programs is unknown. Moving from traditional DSM programs to public benefits energy programs entails fundamental changes in the objectives, measurements, audience and use of evaluations.

The challenges for evaluation of public benefits programs are numerous. The objective of this paper is to provide a framework and discussion of critical issues to be faced by evaluators of public benefits programs in restructured, competitive energy markets. The paper raises and discusses fundamental questions for evaluation of public benefits programs, including: (1) What is being evaluated?—the nature and objectives of public benefits programs, (2) What will be measured?—measurement of public benefits, (3) Who will use the evaluation?—public benefits program administration and delivery, and (4) How will evaluation results be used?—objectives and uses of public benefits energy program evaluations. This paper is organized around these four fundamental questions. The paper uses recent efforts in Wisconsin to develop public benefits energy programs as a case study to illustrate key points.

The Nature and Objectives of Public Benefits Programs

Public benefits is a recently developed concept with respect to energy efficiency, renewable energy, low-income customer needs and other related issues. The origins of the term *public benefits* appear to lie with the appearance of the concept *stranded assets* or *stranded costs*, which are those utilities assets assured cost-recovery under a regulated market structure, but that would be uneconomic under competitive, deregulated market conditions (thereby at risk of not being able to recover costs).

To counter this idea of *stranded costs*, the term *stranded benefits* arose to define public purpose programs and services that might be at risk under deregulated markets, such as utility demand-side management, renewable energy programs and low-income energy programs. Energy efficiency advocates, such as Cavanagh, propose *universal system benefits charges* as means to preserve these types of energy programs.[1] These types of proposals found a national voice in the National Association of Regulatory Utility Commissioners (NARUC), which concludes:

> *To the extent that cost-effective investments in energy efficiency, renewable resources, and research and development are not fully valued in the marketplace, there will continue to be a need for alternative methods for capturing the benefits that they offer.*[2]

Based on this conclusion, NARUC resolves that *new or existing mechanisms should be maintained* to provide *public benefits* that accrue from publicly supported energy efficiency and renewable energy initiatives. This NARUC resolution reflects a trend in the US and elsewhere to establish *public benefits energy programs* as a condition for deregulation and restructuring.[3]

Public benefits in the current context of public policy debates over utility restructuring generally is ill-defined. It is subject to wide interpretations and defies precise definition. *Public benefits* is most closely related to the economic concept of *public goods*, although these concepts are not entirely synonymous.[4] The fuzziness of the definition of *public benefits* contrasts sharply with *demand-side management*, which initially was defined in relatively precise engineering terms. Within the umbrella of *integrated resource planning (IRP)*, DSM was further defined according to various economic perspectives, which became strictly defined benefit-cost tests.

Public benefits is unlikely ever to be defined in strict engineering or economic terms. As noted above, *public benefits* is not a fundamental economic concept. The definition and scope of public benefits energy programs are likely to vary significantly from application to application. Public benefits is a way to group together a number of activities that occur under the current regulated market

structure, as well as to provide a structure for new initiatives deemed necessary as a result of restructuring.

The objective of public benefits energy programs is to support energy efficiency, renewable energy, and related activities above the levels provided by private, competitive markets. The rationale for supporting such programs is that private markets alone will not yield optimal levels of energy efficiency and renewable energy activity that benefit the economy and society as a whole. The objectives of public benefits energy programs are likely to be broad-based and qualitative—for example, transforming markets. Much traditional DSM has had specific quantitative *resource acquisition* goals in terms of power (kW) and energy reductions (kWh). Impact evaluations of DSM programs estimated the energy (kWh) and power (kW) impacts of such programs. The estimated program impacts were then used to evaluate a utility's performance in meeting goals or otherwise *acquiring DSM resources*, as well as to determine a utility's resource needs. Depending on the regulatory jurisdiction, the performance towards established goals could be used simply to assure program cost recovery or to determine rewards or penalties.

As the objectives of publicly supported energy efficiency and renewables programs change, the objectives of evaluating energy programs also will change. Development of public benefits energy programs in Wisconsin illustrates this point.

Case study: Scope of Public Benefits Energy Programs in Wisconsin

Wisconsin began investigating electric utility industry restructuring in 1994, a process initiated by the Public Service Commission of Wisconsin. The PSCW established an advisory committee of representatives from a wide array of interests—utilities (investor-owned utilities, rural co-ops and municipal utilities), regulators, government agencies, environmental groups, citizens groups and other interest groups. This 22-member committee worked through the issues associated with restructuring according to functional element of the utility industry—generation, transmission and distribution—and produced a summary report of its findings and recommendations.[5] The PSCW used the advisory committee's report to establish a regulatory framework and formal process for developing recommendations for industry restructuring. Since statutory changes are likely required, the PSCW will develop recommendations for the Wisconsin Legislature to consider during its 1997-98 session.

Providing public benefits is a key element of the PSCW's restructuring plan. The PSCW views continued provision of public benefits associated with renewables, DSM, low-income energy services, and environmental research and development (associated with impacts of energy production and use) as a condition for restructuring. Consequently, the PSCW initiated a process to develop a recommendation for a *public benefits advisory board*, (PBAB) which would be established as part of industry restructuring. This process began in spring 1996 (Docket 05-BU-100).

PSCW staff established working groups for each of the major areas of public benefits—DSM, low-income, renewables, and environmental R&D. Participation was open to all interested parties. The main function of each topic committee was to develop a scope for what would be included under the umbrella of PBAB.

DSM is one of the major categories of activities currently provided under the existing regulated market structure in Wisconsin. The PSCW's recommended scope of DSM under PBAB is:

1. Where appropriate, facilitate the transformation of markets so that they effectively respond to customers' needs and public interests in increased energy efficiency.
2. Administer, or otherwise insure, delivery of conservation services where market failures and/or barriers have been identified.
3. Provide consumer education that supports the efforts to deliver services and to transform energy efficiency and small renewable resource markets.
4. Administer applied research in support of programming and market transformation.

The emphasis of conservation and energy-efficiency programs in Wisconsin under PBAB clearly is *market transformation* and overcoming *market barriers*. These goals are not readily quantified compared to traditional DSM program goals of achieving a given kW or kWh savings impact. The next section discusses measurement difficulties with evaluation of public benefits energy programs.

Measurement of Public Benefits

Program evaluation requires addressing a series of fundamental questions, including: (1) What is to be evaluated? (2) How will performance be measured? and (3) What standards will be used against which to evaluate performance? Addressing these fundamental questions for evaluating public benefits programs will be difficult given their broad scope and relatively imprecise definition. Clearly the umbrella term *public benefits* will need to be broken down into narrower, more readily quantifiable elements in order for programs to be evaluated. However, even breaking down *public benefits* into a more discrete set of program elements or objectives does not eliminate some fundamental problems for evaluation. The program elements or objectives themselves may be broadly defined.

Developing evaluation standards or objectives may be difficult. For example, *market transformation* is a clear public benefits objective in Wisconsin, and is likely to emerge as an objective in public benefits energy programs in other jurisdictions. *Market transformation*, however, is itself a broadly defined concept. Eto, Prahl and Schlegel define market transformation as, *A reduction in market barriers from a market intervention, as evidenced by a set of market effects, that lasts after the intervention has been withdrawn, reduced or changed.*[6]

The key phrases and terms in this definition from an evaluator's perspective are (1) *reduction in market barriers,* (2) *set of market effects,* and (3) *that lasts.* Each of these terms and phrases is imprecisely defined from an evaluation perspective. What are *market barriers* and how do you measure changes in them? What are *market effects* and how do you measure them? What length of time is denoted by *that lasts?* These questions are answerable to degrees, but do not lend themselves to universal applications or approaches.

Evaluation of market transformation and related social and behavioral changes as part of broad public benefits energy programs raises numerous challenges compared to evaluation of *traditional* DSM programs. A key challenge stems from the differences in objectives of traditional DSM programs versus public benefits programs. The objectives of public benefits programs are not likely to be expressed in physical terms—kW or kWh savings—as were traditional DSM programs. Instead, the objectives focus on changing markets and ultimately individual behavior within these markets. Evaluating program performance relative to these goals is inherently more difficult than evaluating program performance for achieving resource acquisition.

Differences in spatial and time dimensions will greatly complicate evaluation of public benefits programs. Time horizons will be much longer and relevant populations of customers may be much broader geographically. The more complex market structure, the more diffuse nature of program delivery mechanisms, and the broader target population of programs will all create difficulties for evaluation in terms of being able to isolate program effects from other effects. Causal relationships and impact attribution will be difficult to establish for many public benefits programs. Table 1 summarizes some of these challenges.

Table 1: Differences in Evaluation Elements for DSM vs. Public Benefits Programs

Evaluation Element	Traditional DSM Programs	Public Benefits Programs
Program objective	Energy (kWh) and demand (kW) savings	Broad market and social change, e.g., *market transformation*
Spatial dimension	Single utility service territory	State, national and even international markets
Time dimension	Discrete program period—generally 1-3 years (often tied to rate cases)	Indeterminate—generally *long-term* change is objective
Baselines	Utility and end-use energy consumption	Varies—could be behavioral (attitudes and behavior), economic (sales of energy-efficient goods) or physical (end-use energy consumption)
Performance measures	Energy and demand savings; program participation	Varies according to appropriate baseline—changes in sales of energy-efficient goods; consumer behavior; and end-use energy consumption
Principal program delivery mechanisms	Financial incentives and direct relationships between program providers and participants	Diffuse information campaigns, broad *market-based* mechanisms among all market participants
Target population	Individual customers	Possibly all market participants: individual customers, manufacturers, retailers, energy service providers, trades, etc.
Causal relationships and impact attribution	Relatively clear—typically closely tied to financial incentives and direct relationship between service providers and participants	Likely unclear due to expanded spatial and time dimensions, and nature of program delivery mechanisms and target populations
Market structure	Single provider of services	Multiple providers of services

Public Benefits Program Administration and Delivery

Regulators and utility program administrators generally have been the audience for evaluations of traditional DSM programs. Regulators and utilities shared similar stakes in evaluation of DSM programs: (1) ensure that utility DSM programs met regulatory driven goals, and (2) ensure that program administration and spending were prudent. For utilities, evaluation results often were tied to

cost recovery and, in some cases, performance rewards or penalties. For regulators, evaluation results were the metric against which to determine DSM resource acquisition as part of implementation of integrated resource plans.

Regulators, utilities and other interest groups had relatively clear roles and responsibilities under this regulated structure. Utilities developed and implemented DSM programs. Regulators ensured that utilities developed and implemented integrated resource plans. Other stakeholder groups engaged themselves in the regulatory process to meet their own particular objectives. IRP proceedings provided a comprehensive public forum for utility planning and operation.

The roles and responsibilities for stakeholders in public benefits energy programs are not so clear. The apparent demise of IRP in the wake of restructuring potentially eliminates the associated regulatory process as a comprehensive public forum for utility planning and operation.[7] IRP provided a policy mechanism to achieve public benefits associated with renewables, energy efficiency and related issues.

Achieving public benefits under a restructured energy utility industry apparently will become the responsibility of public benefits boards or similar entities, if this responsibility is given to any specific entity at all. Some states and regulatory jurisdictions may choose not to establish any specific public benefits entity or any funding mechanism to support public benefits energy programs.

Returning to the example used earlier, Wisconsin's efforts to create a public benefits advisory board illustrate how roles and responsibilities of various stakeholders will change under restructuring. These changed roles and responsibilities will, in turn, affect the audience and objectives of program evaluation.

The exact structure and role of a public benefits board (or *advisory council*) in Wisconsin are not yet decided. The PSCW has developed recommendations to the Wisconsin Legislature for creation of public benefits advisory councils (initially termed *advisory boards).* The Legislature will consider and deliberate on this issue as part of its work to restructure the electric utility industry during its 1997-98 session. A final decision and legislation are expected in the Spring of 1998.

The PSCW met on 27 March 1997 and developed its recommendations for creation of public benefits advisory councils based on the inputs provided by stakeholder groups during the course of the Commission's proceedings in this docket. The PSCW's recommended structure is to create two advisory councils—one with responsibility for all low-income service issues and programs, and one with responsibility for renewables, energy efficiency (DSM), environmental R&D, and public participation. The *low-income advisory council* would be attached to the State Department of Administration. The *energy advisory council* would be attached to the Public Service Commission of Wisconsin. The councils' authority would be mostly advisory—the attached state agency would have policy making and budgetary authority for council initiatives. Each state agency would hire a program administrator(s) to implement programs. The administrator would not directly provide programs and services, but rather would contract with organizations and firms that would actually provide programs and services to customers or to otherwise serve the objectives of the public benefits councils.

This recommended structure for a public benefits board in Wisconsin would create a more complex structure than exists currently for delivery of DSM programs, which involves two principal entities—the PSCW and utilities. Under the proposed public benefits structure, there would be two advisory councils, two state agencies, two (or more) program administrators, and a multitude of program providers. These entities also would operate in a more complex industry structure—likely to consist of competitive markets for generation and retail sales, and regulated markets for transmission and distribution. Market players will include generation companies, power marketers, retail service providers, distribution companies, transmission companies, independent system operators, and energy service companies—functions provided today mostly by a single entity—vertically integrated utility companies.

Evaluation of public benefits energy programs is explicit in the PSCW's recommendation, which calls for a sunset review of the energy advisory council's activities (not the low-income advisory council, which is presumed to be needed indefinitely) after seven years of operation. Presumably, evaluation of individual programs and activities will occur under the public benefits structure, although this is not explicit in the proposals recommended by PSCW. This may be included as the recommendations are prepared for the Legislature.

Objectives and Uses of Public Benefits Energy Program Evaluations

A fundamental tenet of program evaluation is that it should serve a clear purpose. *Used and useful* is a guiding principle for program evaluation. Under traditional DSM, program evaluation was often clearly tied to cost recovery and performance rewards or penalties. The purpose of evaluation of public benefits programs is not necessarily so clear. The purpose could range from merely providing accountability for program expenditures—*Were public benefits funds spent prudently?*--to measuring performance relative to broad public benefits objectives—*Did programs transform the target market?*

The wide range of possible uses of public benefits program evaluations translates to wide ranges of efforts and approaches to the evaluation objectives. Evaluating for accountability can be done relatively simply as the evaluation standard or performance threshold would be clearly defined. Evaluating for determining market transformation is complex, as discussed earlier.

Wisconsin's proposed public benefits program structure illustrates the range of objectives among stakeholders for program evaluations. Program evaluations under the structure proposed in Wisconsin would likely serve a diverse set of stakeholders—including public benefits advisory councils, attached state agencies, program administrators and the program providers. Each of these stakeholders would have different uses for evaluation results, although the uses overlap to various degrees. The advisory councils would want to ensure that programs fulfill the overall public benefits mission. The attached state agency would want to ensure prudent spending. The administrator would want to ensure that programs meet specific program objectives. Program providers would want to ensure that program services are delivered effectively. Participants (individual energy services customers) would want to be offered and delivered programs and services that are responsive to their needs. Evaluations may need to produce results that can be used by this diverse audience.

Table 2 summarizes the different evaluation objectives that various stakeholders would have for public benefits energy programs as proposed in Wisconsin. Public benefits programs proposed or implemented elsewhere would face similar differences in evaluation objectives for various stakeholders. This summary is only to highlight potential differences and major objectives. Certain objectives also may be common across stakeholder groups.

Table 2. Possible Stakeholder Objectives for Evaluations of Public Benefits Programs as Proposed in Wisconsin

Stakeholder	Objectives for program evaluation
public benefits advisory council	fulfillment of broad mission for public benefits programs
attached state agency (with budgetary authority)	assurance of prudent spending and effectiveness of program administration
program administrator	success at meeting specific program objectives
program providers	effectiveness of service delivery
program participants	responsiveness to participants' needs

In any jurisdiction where public benefits energy programs are created, all stakeholders (in Wisconsin's case: advisory councils, associated public agencies, program administrators and program providers) will have to develop and coordinate clear evaluation objectives based on intended use of evaluation results. Stakeholders will have to weigh potential benefits and uses of evaluations against the costs of performing the evaluations. Evaluation of such broad objectives as *market transformation* will require a substantial commitment of resources over time to measure program impacts. Even when such program impacts can be measured, the level or certainty that can be assigned to such estimates may be relatively low. Measuring market transformation means that a baseline needs to be established against which change can be measured. However, even if change can be measured, there remains the perplexing challenging of impact causality and program attribution—*How much of the measured change can be attributed to the program?* And even if the change can be measured and attributed to a specific program, market transformation calls for achieving *lasting* effects. This means that a single evaluation for a given period is not necessarily sufficient to measure market transformation. Follow-up evaluations and monitoring of program effects need to be performed over time.

Conclusions

The nature of public benefits programs creates a quandary for evaluators. Evaluation has evolved to be an integral component of energy program implementation, creating expectations from policy makers and program administrators that evaluators can provide accurate measurement of program impacts and effectiveness. Such expectations are likely to be transferred to evaluation of public benefits programs. Meeting such expectations will be problematic at best, and may be impossible in some cases. The objectives of public benefits programs are broad social and market change, not simply measurements of discrete energy and power resource acquisitions (which are not that simple!). Public benefits programs are likely to be implemented with the expectation that evaluators can provide accurate analysis and measurement of program results relative to the policy objectives. Continuation of public benefits programs likely will depend on evaluation results, which may not be able to produce definitive results and attribution of program impacts.

What may emerge is that public benefits energy programs, due to their evolution and heritage, may well be held to different standards than a wide variety of other *public benefits* programs—such routinely and widely accepted governmental functions as highway construction, social welfare programs, public education, economic development, consumer protection and environmental protection.

To avoid potential problems with unrealistic expectations for evaluation of public benefits programs, the evaluation community should be actively engaged in restructuring processes. The role of evaluation should be an explicit and fundamental element of regulatory and legis-

lative initiatives to create public benefits energy programs—not an afterthought. The uses and limits of evaluation should be acknowledged and incorporated in the structure of these programs. Evaluation surely has an important role to play in restructured, competitive energy markets, but this role must change and adapt to new market structures and conditions, as well as new program types and objectives.

Reference

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2. National Association of Regulatory Utility Commissioners, (1996), "NARUC Principles to Guide the Restructuring of the Electric Industry," *NARUC Bulletin Number 32-1996,* August 5, pages 10-13.
3. For international perspectives and experience with publicly supported energy-efficiency programs, see King, M., G. Heffner, S. Johansen, and B. Kick, (1996), "Public Purpose Energy Efficiency Programs and the Utility in Restructured Markets," *The Electricity Journal 9(6),* July, pp. 14-25.
4. *Public goods* are distinguished by two key characteristics: (1) their benefits can be enjoyed by additional people at no extra cost once they have been produced, and (2) it is costly or impossible to exclude people from their use or consumption if they have been produced. The classic examples of public goods are national defense and public education. See Mills, E.S., and P.E. Graves, (1986), *The Economics of Environmental Quality, 2nd Edition,* New York: W.W. Norton & Company, or other economic textbooks for a complete discussion of public goods.
5. *Report of the Advisory Committee on Electric Utility Restructuring to the Public Service Commission of Wisconsin,* PSCW Docket No. 05-EI-114, October 1995.
6. Eto, J., R. Prahl, and J. Schlegel, (1996), *A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs,* Ernest Orlando Lawrence Berkeley National Laboratory, Berkeley, California, LBNL-39058/UC-1322, July, page 10.
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