



2006 Evaluation and Research Plan

New Jersey's Clean Energy Program

Energy Efficiency and Renewable Energy Programs

Final Report

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I. Introduction

This report is the third evaluation and research plan prepared by the Center for Energy, Economic and Environmental Policy (CEEPP). It sets out a proposed process for establishing and executing a detailed evaluation and research plan for New Jersey's Clean Energy Program.

The 2004-2005 Evaluation and Research Plan was issued in two phases. The Phase 1 report, dated October 12, 2004, set out general strategies to be employed in evaluating programs and identified evaluation activities with a high priority that should be initiated in 2005. The Phase 2 report, dated February 5, 2005, identified specific evaluation and research activities proposed for 2005 for each program and a timeline for implementing the recommended activities.

As stated in the previous plans, the two primary purposes for conducting evaluations and research regarding energy efficiency and renewable energy programs are: 1) to reliably document program effects, and 2) to inform program designs and operations to be more cost effective at meeting energy savings or other specified program goals. In this plan we add a third objective, which is to establish a formal methodology for assessing the costs and benefits of the energy efficiency and renewable energy programs.

Evaluation and research activities are intended to provide a continuous feedback loop to policymakers, program administrators and program managers. The recommended evaluation and research activities will supplement various evaluations recently performed or currently underway which are described in more detail in the 2004-2005 Evaluation and Research Phase 1 and Phase 2 reports.

CEEPP recommends that the Clean Energy Council, through its committees, review proposed evaluation and research activities and provide feedback to the Office of Clean Energy, the full Clean Energy Council and program managers. Once the proposed evaluation and research plan is approved by the Office of Clean Energy, CEEPP will review the requirements of the plan and identify where demonstrated expertise resides within Rutgers University and where a need exists to procure outside contractors to perform the work. CEEPP will either commence performance of the evaluation and research activities or assist in the preparation of requests for proposals to engage outside contractors to perform the work.

It is anticipated that one or more outside contractors will be procured by Treasury through a competitive solicitation to perform the major evaluation and research activities recommended herein including the proposed renewable energy market assessment, the process evaluations and the impact evaluation. CEEPP will continue to perform the types of evaluation activities it has performed in past years which included management and supervision of outside contractors providing evaluation services, a cost-benefit analysis of the energy efficiency programs and of the appliance cycling program, an assessment of the economic impacts of the proposed RPS rules and a high level evaluation of the programs.

CEEPP will assist Treasury in the procurement of evaluation contractors by developing draft RFPs and assisting in the selection of contractors and will oversee the work of selected contractors. Any requests for proposals for outside contractors will be issued by the Department

of the Treasury. CEEEP will coordinate with Office of Clean Energy, the Clean Energy Council, the Ratepayer Advocate and Program/Market Managers to develop RFPs and regarding the implementation of recommendations included in any evaluation reports.

Program evaluation and related research is best done systematically in steps over several years. A multiyear evaluation strategy is recommended. Accordingly, CEEEP will strive to coordinate evaluations across sectors or technologies to maximize value and minimize costs.

The process of planning program evaluations is dynamic. This report provides recommendations of the activities to be performed in 2006. As programs evolve and evaluation results become available, evaluation plans will be modified accordingly.

The Board of Public Utilities has begun the process of transitioning many of the programs currently managed by the Office of Clean Energy and the utilities to a third party Market Manager(s). RFPs to procure these services were released and proposals were submitted on October 21, 2005. It is anticipated that the transition from Office of Clean Energy and utility program management to management by the selected contractor(s) will occur in early 2006. The evaluation activities set out below reflect the anticipated transition to the Market Manager(s).

II. Timeline for 2006 Evaluation and Research Plan Approval

1. CEEEP submits Draft 2006 Evaluation and Research Plan to Clean Energy Council and Committees: by December 12, 2005
2. Comments of Clean Energy Council Committees regarding the Plan submitted to CEEEP: by December 23, 2005
3. CEEEP submits revised Plan incorporating Committee comments to the Clean Energy Council: by January 18, 2006
4. Comments of Clean Energy Council submitted to CEEEP: by January 25, 2006
5. CEEEP submits revised Plan to OCE: by January 31, 2006
6. Obtain Office of Clean Energy Approval of Plan: by February 15, 2006
7. Commence implementation of Plan: by February 16, 2006

III. Framework for Program Evaluation: Goals and Objectives

The Phase 1 report discussed above outlined a fundamental evaluation management framework designed to support systematic and meaningful evaluation investments. A summary of the key components of the evaluation framework set out in the Phase 1 report are as follows:

The chief goal of evaluation is to objectively study the effects of the programs. *Qualitative effects* involve customers' awareness and understanding of the benefits of the programs and the energy efficiency and renewable energy technologies. They also include assessments of the

program's design and implementation, barriers that limit program performance, changes to codes and standards, and, other actions that signify progress towards the programs goals.

Quantitative effects include kW, kWh and therm reductions due to efficiency improvements or the installation of renewable energy technologies resulting from the program. *Performance indicators* include quantitative and qualitative measures specifically designed to monitor progress towards the goal of market transformation. Performance indicators for market transformation programs evolve over time. Specific performance indicators developed for each market transformation program reflect that progression, starting with indicators of awareness. As the programs evolve, understanding and behavioral change should also be assessed. The Phase 1 report included a detailed listing of the objectives of evaluation of the programs.

IV. Evaluation and Research Needs: Recommended Evaluation and Research Activities, Tasks, and Priorities for 2006

There are a number of evaluation activities that were recommended in past evaluation plans issued by CEEEP that are currently underway that will carry over into 2006 and require additional work to be performed in 2006. CEEEP also recommends a number of new initiatives for 2006.

Specifically, an energy efficiency market assessment commenced in September 2005 that is scheduled for completion in February 2006. A draft of a similar market assessment for renewable energy programs was circulated for comment in October 2005 and is scheduled for release in early 2006. CEEEP is also in the process of preparing an impact evaluation RFP for both the energy efficiency and renewable energy programs that will be circulated for comment in December 2005 and is targeted for release in early 2006.

With regard to new evaluation activities, as mentioned above, the Office of Clean Energy anticipates that management of many of the programs will be transitioned from the utilities and the Office of Clean Energy to the selected Market Manager(s) in early 2006. CEEEP recommends several process evaluation activities that should commence later in 2006 related to this transition. Each of the recommended 2006 evaluation activities are discussed in more detail below.

A. Market Assessments

Market assessments address specified market attributes such as customer or market actor awareness and attitudes, program activity, product and service availability, common practice, prices, new products, codes and standards, amount and distribution of energy savings, and market share of energy efficiency and renewable energy products and services. Several activities related to market assessments are planned for 2006 as described below.

Energy Efficiency Market Assessment

Summit Blue Consulting was engaged by the BPU in September 2005 to perform an assessment of the energy efficiency marketplace. The assessment has three main objectives as follows:

- Update baseline studies and estimates used as performance indicators

- Assess the energy efficiency markets building upon recent market potential studies
- Provide information from the evaluation assessments and work efforts, as well as other studies and analyses that can be used as the basis of recommendations for future efforts. This might include information to support modifying the portfolio of programs, modifying rebate levels, adding or removing technologies eligible for rebates or increasing the minimum efficiencies to be eligible for rebates

Assessment results intended to assist in the development of recommended changes to 2006 programs and budgets are expected in January 2006 and the final report is scheduled for delivery in February 2006. These reports will lead to a number of evaluation activities that will need to be performed in 2006 as follows:

Update 2006 Programs and Budgets

Summit Blue will provide information related to the incremental cost of high efficiency equipment compared to standard efficiency equipment. Summit Blue will also assess recent or potential changes to federal and state codes, standards and tax law. This information will be utilized as a basis for revising existing rebate levels. Summit Blue will also conduct an assessment of the current portfolio of energy efficiency programs to assist in determining where to best allocate program resources. CEEEP will coordinate the review of any recommendations made by Summit Blue with the Office of Clean Energy and the Clean Energy Council Energy Efficiency Committee.

Update Baseline Studies

The objective of the baseline study is to update the baseline against which the energy savings will be calculated and to measure the program success. This could include updating the baselines for:

- Electric savings
- Gas savings
- Market share
- Incremental cost impacts
- Infrastructure impacts

CEEEP will coordinate a review of the baseline study with the Office of Clean Energy and the Energy Efficiency Committee to determine any changes needed to the protocols to measure energy savings and other metrics of program success.

Energy savings from certain programs may be reduced if the baseline against which energy savings are calculated is increased. CEEEP will coordinate the review of the impact of modified baselines on program goals, overall goals, and on any performance incentives that may be included in the contracts with the selected Market Manager(s). Additional changes to the protocols and baselines may be required subsequent to the completion of the Impact Evaluation discussed below.

Performance Indicator Assessment

The performance indicator assessment will include:

- Estimated values for program performance indicators

- Recommended changes to performance indicators
- Recommended performance indicators for new programs
- Recommendations on how to track and measure how program managers are doing relative to performance indicators

CEEEP will coordinate a review of recommended changes to performance indicators with the Office of Clean Energy and the Energy Efficiency Committee and assist in the development of updated performance indicators.

Market Barrier Assessment

A market barrier assessment will be performed by Summit Blue for all programs. This analysis will provide an overall summary and prioritization of key barriers to the specification and purchase of energy efficiency equipment and energy-efficient system designs including building designs, mechanical designs and lighting designs.

CEEEP will coordinate a review of the market barrier assessment with the Office of Clean Energy and the Energy Efficiency Committee to determine what changes should be made to programs, laws, or regulations, to better address identified market barriers.

Goals Assessment

Summit Blue will provide an assessment of the completion of each goal, recommend future specific goals for each program, and recommend how to track and measure how program managers are doing against these new goals. Summit Blue will also investigate the relationship between the baselines developed in the baseline study and the impacts on future program goals.

CEEEP will coordinate a review of the goals assessment with the Office of Clean Energy and the Energy Efficiency Committee to determine what changes should be made to update program goals.

Cost Benefit Analysis

The Board's regulations include a cost benefit methodology that was first adopted in 1991. Given the vast changes to the utility and energy industries that have taken place since that time, as well as additional research related to program evaluation that has been performed in the last decade, CEEEP believes that a review of the methodologies for assessing the costs and benefits of both the energy efficiency and renewable energy programs is warranted and that the regulations should be updated as needed.

Cost benefit analysis should assess the societal costs and benefits of individual programs and measures as well as the overall portfolio of programs. Costs should include both the costs of implementing the programs as well as any contributions made by participants or others. Benefits should include both resource savings and environmental, health and other savings.

Summit Blue is in the process of reviewing methodologies used in other jurisdictions for assessing the costs and benefits of programs. Summit Blue will develop recommendations related to the methodology it believes is most appropriate for use in New Jersey.

CEEEP believes that the Board should formally approve the methodology to be used to assess the costs and benefits of the programs. CEEEP will work with the Office of Clean Energy and the Clean Energy Council to facilitate a coordinated review of proposed cost benefit analysis methodologies and develop recommendations for consideration by the Board.

In 2004, CEEEP performed a cost benefit analysis of the energy efficiency programs. Due to lack of reliable information regarding the incremental cost of measures, the cost benefit analysis compared program costs to program benefits only. Summit Blue will provide updated data (e.g. incremental costs, measures lives, etc.) for use in the cost benefit analysis.

CEEEP will perform an updated cost benefit analysis in 2006. The analysis performed in 2004 will be updated to incorporate any changes to the methodology that may be adopted by the Board and incremental cost information provided by Summit Blue. The analysis will also be expanded to incorporate the CHP program, renewable energy programs and any new programs approved by the Board.

Objective Criteria for Ranking Programs

CEEEP recommended in past reports that objective criteria for ranking programs be developed. These criteria would be utilized for selecting among competing programs and for determining which programs should be funded and the level of funding.

Summit Blue will develop a set of objective criteria for ranking programs and program changes. Examples of criteria to be considered include:

- total resource benefit cost test
- environmental benefits
- economic development
- transmission and distribution benefits

CEEEP will coordinate a review of the recommended criteria for ranking programs and work with the Office of Clean Energy to develop the relative weighting for these criteria to determine an overall assessment of proposed new programs and program changes. CEEEP will work with Summit Blue to develop a process/tool to apply the recommended criteria for ranking existing and new programs and will coordinate with the Office of Clean Energy and the Clean Energy Council to memorialize the process.

Renewable Energy Market Assessment

As noted above, a draft RFP to procure a contractor to perform a renewable energy market assessment has been circulated for review by the Office of Clean Energy and the Renewable Energy Committee. The draft RFP is similar in scope to the energy efficiency market assessment described above.

The RFP is scheduled for release in early 2006 and results should be available by early summer 2006. CEEEP will coordinate a review of any recommendations included in the assessment and anticipates that the following aspects of the renewable energy programs will need to be reviewed and updated:

- program designs and rebate levels
- goals and performance indicators
- protocols for measuring renewable energy generation
- cost benefit analyses

B. Energy Impact Evaluation

Energy impact evaluations support the measurement of energy savings or renewable energy generation, the amount and distribution of savings, and the appropriateness and comprehensiveness of measures. Protocols are used in New Jersey to track and report program savings and renewable energy generation on a prospective basis. The protocols use measured and customer data as input values in industry-accepted algorithms. The data and input values for the protocol algorithms come from the program application forms and tracking systems, or from standard values. The standard input values were based on the best available measured data from prior studies or industry data applicable for the New Jersey programs.

CEEEP recommended in its Phase 2 Report that energy impact evaluations should be a priority for 2005 since energy impacts had not been evaluated in over three years for most programs. Technologies change, codes and standards change, practices change, and other factors change that could impact energy savings and renewable energy generation estimates. For certain new programs, such as CORE and CHP, impact evaluations have yet to be performed.

However, due to other priorities including the energy efficiency and renewable energy market assessment RFPs and the Market Manager and Program Coordinator RFPs, this did not occur. CEEEP recommends that performance of an energy impact evaluation be a high priority for 2006 and that the impact evaluation include an assessment of gross and net savings as discussed in more detail below.

A description of the proposed impact evaluation was included in the Phase 2 report. An updated proposal is provided herein as follows:

CEEEP recommends that energy impact evaluations be performed for the following programs:

- Residential HVAC
- Residential New Construction
- Energy Star Products
- C&I Construction
- Customer On-Site Renewable Energy

The proposed energy impact evaluation activities will support the protocols by assessing key data and input values to either confirm that current values should continue to be used or update the values going forward (prospective application). Impact evaluations can require 12 months of pre and post installation billing data and therefore require approximately 12 months to complete.

Protocols document the processes for measuring the quantitative results and energy impacts of programs. While evaluation activities are required to support market effect inputs to the protocols, additional work is required to update demand, load shape, and energy usage effects.

This should be done on a case-by-case (by program or measure) basis as needed. Typically, energy impact evaluations address some of the following issues:

Measurement versus Estimation: How close are actual program impacts to engineering estimates at the measure, building, and program level?

Appropriateness of Measures: What costs and savings can typically be expected from certain measures in specific settings?

Amount and Distribution of Savings or Clean Energy Generation: What are the savings or generation at different times of the year? Do the savings vary within the state? How do they vary regionally? Are they persistent?

Energy impact evaluations use several methods to obtain results. In some cases, more than one methodology is used to assess program impacts and the results are compared or used as upper and lower bounds for planning purposes. The methods include:

Billing Data Analysis: Energy usage prior to participation in a program is compared to usage after participation. Usage is often adjusted for weather and other factors, such as household or commercial characteristics. Often a control group is used. Depending on the type of program and measures installed, this method can generate results at the end-use level or by building unit. It can also generate savings estimates useful in applying or adjusting engineering estimates.

Metering: This method provides time-of-use and length of use information. If it is planned early in the program, it can be used to provide before- and after-usage information.

Simulation Modeling: Simulation modeling of energy usage is beneficial in cases when billing and metering data are unavailable, such as new construction programs. It may also be used in conjunction with other methods, to help separate out energy savings from load changes in billing or metered data.

Engineering Estimates: In certain cases, engineering estimation may be the only available technique for interim savings or generation estimates.

On-site observations: It is often useful to visit sites and observe how equipment is being used, or the condition and layout of the building. This method is used for technical assessments and evaluations of the comprehensiveness of services delivered to a customer through a program.

In addition, the Office of Clean Energy is interested in assessing gross versus net savings. Gross savings are calculated for program participants relative to their prior usage or to an established baseline. Net savings controls for savings that would have occurred for these participants over the same period whether the program was offered or not.

The existing protocols assume that the net of free riders and free drivers is zero in the counting of units from direct program participants. The protocols do not adjust savings estimates for any other effects.

The Office of Clean Energy is interested in obtaining additional research regarding whether netting free riders and free drivers continues to be appropriate and whether other adjustments to energy savings or renewable energy generation estimates should be incorporated into the protocols. For example, the energy savings estimates from a customer that installs a high efficiency furnace should be reduced if the customer responds to lower energy costs by raising the thermostat thereby “taking back” some of the savings. Potential adjustments that should be researched include but are not limited to factors such as spillover and rebound effects.

CEEEP is in the process of drafting an RFP for an impact evaluation that incorporates the concepts set out above. CEEEP anticipates that the impact evaluation will commence in early 2006.

C. Tracking System Assessment

Tracking System Assessments review the tracking systems to ensure consistent tracking and reporting, and collection of all necessary data. The Program Coordinator RFP issued on August 2, 2005 provided that the Market Manager(s) shall be responsible for collecting and electronically compiling and storing in a consistent format data needed to monitor, assess, and evaluate its program performance, report on its activities, and improve the design and delivery of the programs such as:

- Customer/client data
- Customer use data
- Program measures and services data
- Trade ally data
- Distribution utility account data
- Baseline and market indicator data
- Other data for evaluation purposes

One of the factors critical to successful program evaluation planning is ensuring that appropriate data is available for analysis. Therefore, it is important for an evaluation plan to consider assessing and monitoring of data collection. Systems are needed to collect, organize, verify, and report the necessary data in a timely manner. The data collection systems are determined by the program’s goals and the type and number of customers involved. Tracking systems need to support consistency of results, consistent reporting and a sound basis for evaluation.

Review of tracking systems is generally part of a process evaluation. However, the Program Coordinator RFP requires the selected contractor to monitor the Market Manager(s) IT systems to insure all required data is being collected and reported in a consistent manner. Therefore, CEEEP recommends that a determination regarding whether any additional tracking system evaluation activities are required be made subsequent to a review by CEEEP of the related services to be provided by the Program Coordinator and Market Managers. CEEEP notes that the Program Coordinator solicitation issued in August 2005 has been cancelled and it is anticipated that Treasury will release a revised Program Coordinator RFP in early 2006.

D. Process Evaluation

Process Evaluations address implementation effectiveness, operational efficiency, and customer and market actor satisfaction, attitudes, and awareness related to specified programs. A process evaluation of the renewable energy programs performed by Aspen Systems Corporation was completed in November 2004. CEEEP provided the Office of Clean Energy with a summary of the recommendations included in Aspen's evaluation report. CEEEP proposes that a formal review of the status of the implementation of the recommendations be performed in 2006.

The Office of Clean Energy anticipates that many of the programs will be transitioned to the new Market Manager(s) in early 2006. CEEEP recommends that certain process evaluations be performed approximately six to nine months subsequent to the end of the transition period to insure the Market Manager(s) are performing as required.

As noted in the Phase 1 report, process evaluations are concerned with a program's design and operational efficiency. They typically examine both customers' and implementers' reactions to a program. Results of process evaluations can lead to improvements in the cost-effectiveness of the program. A process evaluation typically addresses some of the following issues:

Implementation Effectiveness: How consistent is the implementation with the planning? Are joint arrangements effective?

Operational Efficiency: Are there any bottlenecks, unnecessary bureaucratic obstacles, staff shortages or other problems affecting delivery of the program?

Satisfaction and Attitudes: How satisfied are program participants? This includes customers, vendors, and others, such as retailers, manufacturers, or trainers, involved in the program.

Program Acceptance: This includes the effectiveness of promotions and incentives as well as why customers, retailers, or manufacturers choose to participate or not. Is the program's promotion reaching the targeted groups? Is the message understood? Do the promotions and incentives encourage participation?

Process evaluations use a variety of data sources and methods to gauge customer and staff reactions. These include:

Telephone and Mail Surveys: Typically random samples of participants and non-participants are surveyed. Surveys generate quantitative and qualitative results.

In-Person Interviews: These often entail open-ended probing questions to learn the reactions of customers, utility/Market Manager Staff, and other market actors.

Focus Groups: The interactions among the participants (typically 8 – 10 people) can yield information not forthcoming in individual interviews.

CEEEP will draft RFPs for a process evaluation of the activities of the selected Market Manager(s) incorporating the concepts set out above approximately six months subsequent to the end of the transition period.

E. 2005 Program Evaluation

CEEEP will perform a high level evaluation of the 2005 programs similar to the reports prepared in the past two years. The 2005 Program Evaluation will provide a program by program assessment of 2005 results including a comparison of actual results to program goals. The assessment will include interviews with the Office of Clean Energy and the program managers and will be performed taking into consideration the ongoing changes to the administrative structure of the program.

In addition, the 2005 Program Evaluation will assess program spending by income levels and market sectors. This will be based upon a high level assessment of the markets targeted by the programs and will build upon customer survey results provided by Summit Blue.