

A stylized map of New Jersey is centered in the background. The top portion of the map is a dark green, while the bottom portion is a light green. The map is set against a background of yellow and white rays emanating from the right side.

## 2004 – 2005 Evaluation and Research Plan

Phase 2: Activities to be Initiated 2005

New Jersey's Clean Energy Program  
Energy Efficiency and Renewable Energy Programs

February 4, 2005



CENTER FOR ENERGY,  
ECONOMIC & ENVIRONMENTAL POLICY

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## **I. Introduction**

This report represents the second phase of a two phase process for establishing and executing a detailed evaluation and research plan for New Jersey's Clean Energy Program energy efficiency and renewable energy programs. The Phase 1 report, dated October 12, 2004, set out general strategies to be employed in evaluating programs and evaluations with a high priority that should be initiated in 2004. Implementation of the activities proposed in the Phase 1 report is awaiting approval of the Office of Clean Energy.

This Phase 2 report will identify specific evaluation and research activities proposed for 2005 for each program and a timeline for implementing the recommended activities.

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. 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 that are described in more detail in the Phase 1 report.

CEEEP 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, CEEEP 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. CEEEP 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 an outside contractor will be procured through a competitive solicitation to perform the two major evaluation and research activities recommended herein, i.e. the proposed market assessment and impact evaluation. It is also anticipated that CEEEP will continue to perform in 2005 the types of evaluation activities it performed in 2004 which included cost-benefit analysis of the energy efficiency programs, appliance cycling program, renewable energy program and proposed RPS rules and the high level evaluation of the programs. CEEEP will also continue to supervise the procurement of evaluation contractors and oversee the work of such 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 Managers regarding the implementation

of recommendations included in any evaluation reports including circulating draft RFPs for review and comment prior to issuance.

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 recommended to be performed in 2005. As programs evolve and evaluation results become available, evaluation plans should be modified accordingly.

The Board of Public Utilities (BPU) recently approved a transition from utility to BPU administration of New Jersey's Clean Energy Program. The BPU's Office of Clean Energy is in the process of either commissioning other state agencies to manage programs or issuing requests for proposals to hire program managers to manage the implementation of programs. It is currently anticipated that the transition from utility program management to management by the selected contractors will occur sometime in 2005. The evaluation activities set out below reflect the expectation that utilities will soon be winding down many of the activities currently provided in support of the programs.

## **II. Timeline for Phase 2 Evaluation and Research Plan Approval**

1. CEEEP submits Phase 2 Evaluation and Research Plan to Clean Energy Council and Committees: by January 7, 2005
2. Comments of Clean Energy Council Committees regarding the Phase 2 Plan submitted to CEEEP: by January 21, 2005
3. CEEEP submits revised Phase 2 Plan incorporating Committee comments to the Clean Energy Council: by February 7, 2005
4. Comments of Clean Energy Council submitted to CEEEP: by February 10, 2005
5. CEEEP submits revised Phase 2 Plan to OCE: by February 18, 2005
6. Obtain Office of Clean Energy Approval of Phase 2 Plan: by February 28, 2005
7. Commence implementation of Phase 2 Plan: by March 1, 2005

CEEEP is not planning on facilitating any meetings to discuss the draft Phase 2 Plan. All comments and revisions will be done via email.

### III. Framework for Program Evaluation: Goals and Objectives

The Phase 1 report 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 efficient 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. Appendix A of the Phase 1 report included a listing of evaluation studies for New Jersey that were performed to support the many of the existing programs.

### IV. Evaluation and Research Needs

This Section provides a brief summary of each of the types of evaluations that CEEEP believes should be performed. More detailed descriptions were included in the Phase 1 report. This discussion is followed by Section V that presents recommendations regarding specific evaluation activities that should be initiated in 2005.

**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 efficient products and services. The Phase 1 report set out specific recommendations regarding market assessments that should be performed as soon as possible. Implementation of the recommended market assessments is awaiting approval of the Office of Clean Energy.

**Energy Impact Evaluations** support the measurement of energy savings, 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 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. Energy impact evaluations should be a priority for 2005 since energy impacts have not been evaluated in over three years for most programs.

**Tracking System Assessments** review the tracking systems to ensure consistent tracking and reporting, and collection of all necessary data. Assessing new tracking and reporting system processes should be a priority in the early stages of start-up as programs are transferred to new program managers in 2005. Tracking system assessments should be planned for 2005 to insure that the new program managers have systems in place to track and report required information and that the various program managers can do so in a consistent manner.

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 data collection and monitoring measures replaced or installed, where appropriate. 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 and evaluations will be planned to insure the new program managers have appropriate tracking systems in place.

**Process Evaluations** address implementation effectiveness, operational efficiency, and customer and market actor satisfaction, attitudes, and awareness related to specified programs. A process evaluation is underway for the renewable energy programs. Given that program management for most programs is expected to be transferred from the utilities to new program managers in early 2005, the performance of process evaluations is not a priority at this time. However, CEEEP recommends that certain process related activities described below be implemented in 2005 to insure a smooth transfer of the programs from the utilities to the new program managers.

## **V. Recommended Evaluation and Research Activities, Tasks and Priorities for 2005**

CEEEP recommended in its Phase 1 report that the highest priority for the 2004 - 2005 evaluation and research plan is to perform the studies necessary to: review current rebate levels; to make recommendations regarding changes to the rebate levels as well as what technologies should be added to or deleted from the list of eligible technologies; to update performance indicators and metrics for success; and to assess the impacts of the programs on the marketplace to determine the savings for market transformation programs such as the Energy Star Products program. The evaluation activities recommended in this Phase 2 report are predicated on the assumption that the activities recommended in the Phase 1 report are approved by the Office of Clean Energy.

The following sets out additional evaluation activities recommended for 2005:

### *Energy Impact Evaluations*

Energy impact evaluations have not been performed for most programs in over three years. Technologies change, codes and standards practices change and other factors change that could impact energy savings estimates. For certain new programs, such as CORE, impact evaluations have yet to be performed. CEEEP believes that the next priority for evaluation activities is to perform energy impact evaluations and update the protocols as needed.

Multiple contractors will be engaged via a competitive solicitation conducted in accordance with the State's procurement procedures through the Department of the Treasury. The solicitation and research will be managed by CEEEP. It is anticipated that at a minimum, one contractor will be engaged to evaluate the C&I markets and one for the residential markets although there may be some overlap between the two that will need to be coordinated. As well, the selected contractors may be asked to evaluate the energy impacts of both the energy efficiency and renewable energy programs in each of these markets or a separate contractor may be engaged for the efficiency and renewable energy programs.

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 typically require 12 months of pre and post installation billing data and therefore require approximately 12 months to complete. Impact evaluation activities should be scheduled to commence in early 2005.

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. Usage prior to participation 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 or realization 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 also used in evaluations that assess technical assessments and comprehensiveness of services delivered to a customer through a program.

CEEEP proposes that the energy impact evaluation commence with discussions between CEEEP and OCE and the program managers to identify program specific research issues and technology/program elements that require evaluation. Specific research topics identified through these discussions will be included in the RFP(s) to be developed by CEEEP.

The following evaluation activities should commence coincident with or immediately prior to the start up of the new program managers. However, given the uncertainty regarding the timing of when the new program managers will become operational, specific timelines for these activities cannot be determined at this time. A more detailed



proposal for these activities will be developed as the timeline and details regarding the transition to the new program managers become more certain.

### *Tracking Systems Evaluation Activities*

Program managers are required to track information required for functions such as regulatory reporting, financial management, program management, program evaluation, calculation of energy and emission savings or clean energy generation and tracking progress towards goals and performance indicators. Several categories of information that need to be tracked are generic and applicable to all programs such as program expenses. Other information that needs to be tracked is program specific and is a function the program design, performance indicators or protocols for measuring energy savings.

For example, for a rebate program information the program manager would need to track would include:

- Name of address of rebate applicant
- Date application received
- Date application approved or rejected
- Date check processed
- Size and type of system installed

Specific information and events that need to be tracked should be established for each program.

In addition to the information that needs to be tracked for process reasons such as those stated above, other information needs to be tracked for reporting purposes. Appendix A includes an example of the types of information that is currently tracked by utilities to meet regulatory reporting requirements for the HVAC Electric Program.

The information set out above and in Appendix A is provided as an example of the types of information that needs to be tracked for a specific program. CEEEP recommends that the specific information needs of each program be developed in a timeframe that allows OCE to inform selected program managers of the specific information that will need to be tracked prior to the transfer of the programs to the new program managers.

### *Process Evaluations*

Process evaluations should be planned to be timed with the start up of the new program managers. They should focus on activities related to insuring that the new program managers have the systems and processes in place that are needed for effective program management prior to the transfer of program management. Timelines for these activities will be developed when it becomes clearer when the transition to the new program managers will occur.

Aspen Systems Corporation was recently engaged by CEEEP to perform a process evaluation of the renewable energy programs administered by the OCE. Preliminary

recommendations included in Aspen's draft report identified program elements that should be in place prior launching a program such as:

- ◆ Identifying quantitative annual goals and objectives
- ◆ Identifying other State agencies whose missions might be affected by the program. Ensuring that these agencies fully understand how they may affect the program's success, and are prepared to cooperate and able to cooperate (e.g., staff and budgets in place). Perform training if such is needed.
- ◆ Develop procedures for coordinating activities and outputs with other program managers, state agencies, and electric and gas utilities (as needed)
- ◆ Determining whether sufficient numbers of trained trade allies are available. If not, recruit and train more.
- ◆ Developing a Program Theory document and a Program Logic Diagram
- ◆ Developing and documenting program rules for participants and trade allies
- ◆ Preparing application forms
- ◆ Developing a "Program Procedures" manual that documents the program's process for logging, reviewing, and acting-on applications, for authorizing expenditures, and for assuring high-quality performance by staff and trade allies
- ◆ Developing and documenting an information-dissemination marketing and outreach plan (including a Website)
- ◆ Developing electronic tracking systems for applications and for expenditures
- ◆ Developing a plan for the periodic evaluation of the program's performance and accomplishments

CEEEP anticipates that the selected program managers will have in place plans for developing the required processes and systems needed to implement the programs. CEEEP recommends that progress towards meeting any timelines set out in the plans of the program managers be monitored to insure deadlines can be met and that all of the needed processes and systems are in place prior to transferring the programs. CEEEP also believes critical systems should be pre-tested prior to transferring program management to insure that accurate reports can be provided in a timely fashion.

# Appendix A

## Data Tracking Requirements for HVAC Electric Program

Data Point	Fixed / Variable	Needed for:								
		Quarterly Reports	Primary Annual Report	Other Reports				Monthly Management Reports	Protocols	Program Evaluations
				Key Performance Indicators	Cost Effectiveness	Prior Program Commitment	Minimum Requirements			
<b>Program Expenditures:</b>										
Total Actual (calculated)	Variable	X	X		X				X	X
<b>Expense Details - Total:</b>										
Admin (Payroll, Overheads, Facilities, Legal, etc.)	Variable	X	X		X				X	X
Sales	Variable	X	X		X				X	X
Marketing & Promotions	Variable	X	X		X				X	X
Training	Variable	X	X		X				X	X
Market Research, Evaluation & Program Development	Variable	X	X		X				X	X
Grants, Incentives, Arrears Reduction	Variable	X	X		X				X	X
Implementation Contractors	Variable	X	X		X				X	X
2001 Performance Incentives	Variable	X	X		X				X	X
<b>Expense Details - Utility Portion:</b>					X				X	X
Admin (Payroll, Overheads, Facilities, Legal, etc.)	Variable	X	X		X				X	X

Sales	Variable	X	X		X				X		X
Marketing & Promotions	Variable	X	X		X				X		X
Training	Variable	X	X		X				X		X
Market Research, Evaluation & Program Development	Variable	X	X		X				X		X
Grants, Incentives, Arrears Reduction	Variable	X	X		X				X		X
Implementation Contractors	Variable	X	X		X				X		X
2001 Performance Incentives	Variable	X	X		X				X		X
<b>Participants:</b>											
From Program	Variable	X	X	X	X		X	X	X		X
From Market	Variable	X	X	X	X		X	X	X		X
<b>Energy Savings:</b>											
Annual kW From Program - Installed	Variable	X	X		X		X	X			
Annual MWh From Program - Installed	Variable	X	X		X		X	X			
Annual kW From Market - Installed	Variable	X	X		X		X	X			
Annual MWh From Market - Installed	Variable	X	X		X		X	X			
Total Annual kW - Installed (calculated)	Variable	X	X		X		X	X			
Total MWh - Installed (calculated)	Variable	X	X		X		X	X			
Lifetime MWh From Program - Installed	Variable	X	X		X		X	X			
Lifetime MWh From Market - Installed	Variable	X	X		X		X	X			
Total Lifetime MWh - Installed (calculated)	Variable	X	X		X		X	X			
Cum. Life. kW From Program - Inst. (calculated)	Variable	X	X		X		X	X			
Cum. Life. MWh From Program - Inst. (calculated)	Variable	X	X		X		X	X			
Cum. Life. kW From Market - Inst. (calculated)	Variable	X	X		X		X	X			
Cum. Life. MWh From Market - Inst. (calculated)	Variable	X	X		X		X	X			
Total Cum. Life. kW - Inst. (calculated)	Variable	X	X		X		X	X			
Total Cum. Life. MWh - Inst. (calculated)	Variable	X	X		X		X	X			

<b>Emissions Savings (calculated):</b>					X		X	X			
Annual Metric Tons of CO2 saved	Variable	X	X		X		X	X			X
Annual Metric Tons of NOX saved	Variable	X	X		X		X	X			X
Annual Metric Tons of SO2 saved	Variable	X	X		X		X	X			X
Annual Metric Tons of Hg saved	Variable	X	X		X		X	X			X
Lifetime Metric Tons of CO2 saved	Variable	X	X		X		X	X			X
Lifetime Metric Tons of NOX saved	Variable	X	X		X		X	X			X
Lifetime Metric Tons of SO2 saved	Variable	X	X		X		X	X			X
Lifetime Metric Tons of Hg saved	Variable	X	X		X		X	X			X
Cum. Lifetime Metric Tons of CO2 saved	Variable	X	X		X		X	X			X
Cum. Lifetime Metric Tons of NOX saved	Variable	X	X		X		X	X			X
Cum. Lifetime Metric Tons of SO2 saved	Variable	X	X		X		X	X			X
Cum. Lifetime Metric Tons of Hg saved	Variable	X	X		X		X	X			X
<b>Monthly Goals:</b>											
Number of central A/C and heat pumps rebated	Variable									X	
Number of HVAC technicians trained	Variable									X	
Number of NATE certified HVAC technicians	Variable									X	
<b>Protocol Elements:</b>											
CAPY	Variable										X
SEER <sub>b</sub>	Fixed										X
SEER <sub>q</sub>	Variable										X
EER <sub>b</sub>	Fixed										X
EER <sub>q</sub>	Variable										X
EER <sub>g</sub>	Variable										X
GSER	Fixed										X
EFLH	Fixed										X
ESF	Fixed										X
CF	Fixed										X

