

A green silhouette map of New Jersey is centered in the background. Behind the map are several large, stylized sun rays in shades of yellow and orange, radiating from the right side of the page.

New Jersey Clean Energy Program

2004 - 2005 Evaluation Plan Phase 1

Prepared for NJ Board of Public Utilities Office of Clean Energy

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CENTER FOR ENERGY,
ECONOMIC & ENVIRONMENTAL POLICY

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THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS



New Jersey Clean Energy Program 2004-2005 Evaluation Plan Phase 1

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

Prepared for:



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I. Introduction

This report represents the first phase of a proposed 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. It sets out general strategies to be employed in evaluating programs and evaluations with a high priority that should be initiated in 2004. A second phase of this report to be issued in November 2004 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 below.

The initial draft of this report was circulated by the Center for Energy, Economic and Environmental Policy (CEEPP) in August 2004. CEEPP recommended a procedure whereby the Clean Energy Council, through its committees, would review proposed evaluation and research activities and provide feedback to the Office of Clean Energy, the full Clean Energy Council and program managers. To date, feedback from the committees regarding proposed evaluation plans has been minimal. This may be due, in part, to the reports initial focus on energy efficiency programs and the time demands upon the Clean Energy Council Committees arising from the current Comprehensive Resource Analysis proceeding. Those factors have also impacted the time frames proposed in the initial draft resulting in a two to three week delay. Going forward, CEEPP will work with the committees to develop a process for providing feedback to CEEPP and the Office of Clean Energy regarding ongoing evaluation activities.

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. Upon approval of the Office of Clean Energy, CEEPP will either commence performance of the evaluation and research activities or prepare requests for proposals to engage outside contractors to perform the work. CEEPP will coordinate with Office of Clean Energy and program managers regarding 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, CEEPP will strive to coordinate evaluations across sectors or technologies to maximize value and minimize costs.

Periodic evaluations are vital to track progress and inform program designs to meet the targeted objectives of different programs. In addition to achieving energy savings, many programs are intended to reduce barriers to the penetration of new technologies. Evaluations should include a variety of activities, ranging from focused engineering studies to market assessments.

The proposed evaluation and research efforts build upon and improve the methods that have been developed in New Jersey and other states over the past 15 years. It is important to note, however, that market transformation and evaluation of market transformation programs are relatively new concepts. Both the programs and the evaluation methods are evolving and may change with practical experience.

The process of planning program evaluations is dynamic. This report provides recommendations of the activities recommended to be performed in 2004 and 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 also 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 in early 2005. The evaluation activities set out below reflect the expectation that utilities will soon be winding down activities currently provided in support of the programs.

II. Timeline for Evaluation and Research Plan Approval

1. CEEEP submits Phase 1 Evaluation and Research Plan to Clean Energy Council and Committees: August 5, 2004
2. Comments of Clean Energy Council and Committees on Phase 1 Plan submitted to CEEEP: by August 20, 2004
3. CEEEP meets with CEC Committees to Review Phase 1 Plan: by September 8, 2004
4. CEEEP submits revised Plan to OCE: by October 12, 2004
5. Obtain OCE Approval of Phase 1 Plan: by October 26, 2004
6. Commence implementation of Phase 1 Plan: November 1, 2004
7. Submit Phase 2 Plan for review by CEC Committees: by November 15, 2004

III. Framework for Program Evaluation: Goals and Objectives

The following outlines a fundamental evaluation management framework designed to support systematic and meaningful evaluation investments.

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 objectives of evaluation of the programs include:

To assess how well each program is meeting its goals. This entails measuring and documenting performance indicators and documenting achievement of metrics. This also entails the development of prioritized performance indicators and goals for the new program managers and new programs.

To support assessments of energy impacts. Protocols define the process for computing energy and demand savings from energy efficient technologies or generation from renewable energy technologies. Certain protocols require evaluation inputs to measure appropriate market parameters (e.g. volume, market shares, etc.) for energy efficient or renewable energy products being promoted, or technical inputs (operating characteristics, market baselines, etc). As evaluation results from these programs become available, protocols should be updated and the new values should be used going forward. Cost-effectiveness analyses should use inputs that are consistent with and constructed from the protocols. This objective also entails process reviews of tracking and reporting systems related to participation and expenses. Results of such assessments may be used to support performance incentives for program administration.

To provide timely feedback to program managers. Evaluation should be used to inform and improve program design and implementation in a timely manner. Marketing campaigns, energy efficient and renewable energy products available, and barriers to program performance should be reviewed.

To provide the necessary information for decision-making. For many programs, this entails market assessments and periodic status reports that can be provided to regulators, as well as market actors, and program planners who all play roles in support of market transformation and other program activities.

While program evaluation is driven by these broad objectives, it is important to emphasize that evaluations must be tailored to the specific needs of each program. The approved programs differ widely in accordance with the customers targeted, services provided, program designs, and specific objectives. These programs require different approaches to evaluation. In addition, the need for timely feedback means that program evaluation depends on the implementation schedule of the program and evolves according to changing needs, rather than serving as a static, annual snapshot.

Systematic tracking of performance indicators to support baseline and market developments is vitally important to assessing market changes. It provides insight on what would have been done without a program, and thus provides the basis for measuring changes attributable to the program. Customer saturation surveys or other market penetration studies often provide useful information about baseline conditions from the customer perspective.

Formal surveys of market information from the supplier perspective are often difficult to obtain because of time lags associated with assembling market-level information or because of confidentiality concerns of manufacturers and retailers. Therefore, data used to update market shares and prices and other market indicators typically includes a mix of sales data from formal sources, such as trade associations and subcontractors to the EPA Energy Star program, and from results of surveys conducted by independent contractors as part of the evaluation activities. Ideally baseline studies and baseline updates should include predictions of how the market would evolve in the absence of the market transformation program, and a clear assessment of the reliability of the estimate. Any assessment of changes in market should be supportable with a systematic approach with clear indication of statistical confidence and accuracy.

One of the differences between traditional energy efficiency and market transformation programs relates to the target audience for the programs. In traditional programs, program managers are usually able to track and identify the specific customers who participate and to measure how much energy is saved at the individual customer level. Since the goal of market transformation programs is to move the market, which is larger than any service territory or state, the target audience is typically broader than in traditional programs. This difference between programs is reflected in the recommended evaluation activities. Market transformation program evaluations focus on changes in the market compared to baseline conditions. The evaluations and the data sources to support them are currently evolving as the programs develop. By comparison, evaluations of traditional programs, such as the NJ low income program, focus more narrowly on understanding and characterizing behavior of individual participating customers.

Appendix A summarizes evaluation studies for New Jersey that were performed to support the many of the existing programs.

IV. Evaluation and Research Needs

This Section discusses each of the types of evaluations that CEEEP believes should be performed in 2004 and 2005 and provides a more detailed discussion of the need for and substance of the market assessment studies that are recommended to be initiated during 2004. This discussion is followed by Section V that presents recommendations regarding specific evaluation activities that should be initiated in 2004. The final section of this report, Section VI, presents a more detailed discussion of the types of research to be initiated in Phase 2 of this study.

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. Market assessments should be performed every few years to help gauge the success of the programs and to provide updated market information to inform changes to programs. Market assessments are also necessary to calculate savings from programs for which savings have yet to be calculated such as the Energy Star Products program and to support estimated savings from other programs.

Current rebate levels have, for the most part, been in effect since 2001 when the programs were implemented. Also, since the market assessments that are needed to calculate energy savings from market transformation programs such as the Energy Star program have not been performed in over two years, the energy savings from the Energy Star Products program have not been calculated since the programs inception in 2001.

Market assessments are concerned with the effects of programs on markets. Changes in the market are measured by a set of market indicators. In order to evaluate changes in the market, it is important to evaluate changes over time in relation to baseline market conditions. The proposed market assessment should address the following issues:

Awareness and Attitudes. Are customers and suppliers aware of the benefits of the products or services? Are purchasers satisfied with the products? Have attitudes and awareness changed over time from baseline conditions?

Specific Program Activity. How many rebates have been issued? How many retailers have received training? How many promotional special events have been held? How many contractors have been certified? These are examples of ways of measuring program activity.

Availability and Common Practice. Is the product readily available? How does its availability compare with conventional products? To what extent are energy efficient products stocked, labeled, used by building managers or in specifications? How has this

changed from baseline conditions? Are manufacturers or retailers investing in marketing this product through coop advertising or on their own?

Prices. What is the average retail price of the efficient products and how does this compare with conventional products? What are the prices of energy efficiency and renewable energy technologies and how have prices changed over time?

New Products. Are there new or modified versions of products that would reduce barriers to customer acceptance or otherwise increase the penetration of technologies?

Labels, Codes and Standards. Have any changes been made to labels, building codes, or federal standards that would exert influence on the market for products or services? Do opportunities exist to enact new codes or standards to lock in savings or eliminate the need for rebates?

Amount and Distribution of Savings. What are the estimates of individual and aggregate energy savings associated with the market transformation program? What assumptions are appropriate, in the absence of complete information about product sales and usage characteristics of program participants?

Market share. What is the market share (percent of total sales) of the products and how has this changed over time?

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.

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. Since impact evaluations have not been performed for most programs, impact evaluation activities should be scheduled to commence in early 2005.

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. Process evaluations should be planned for 2005 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 implementation.

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 early 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.

V. Recommended Near Term Evaluation and Research Activities, Tasks and Priorities

CEEEP believes that the highest priority for the 2004 - 2005 evaluation and research plan is to perform the studies necessary to review current rebate levels and 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. CEEEP believes these studies should commence in accordance with the timeline presented in Section II of this report.

As well, performance indicators and metrics for success need to be updated. For example, the residential new construction program commenced as a statewide program in 2001. As a new program, an appropriate performance indicator was homes signed into the program. However, given that the program has now been up and running for three years, a more appropriate performance indicator may be homes constructed. The selected contractor will review existing performance indicators and provide recommendations regarding appropriate changes.

Multiple contractors will be engaged via a competitive solicitation conducted in accordance with Rutgers University procurement procedures through the Rutgers University procurement office. 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.

CEEEP is aware that several other organizations, such as CEE and EPA, are performing regional/national market assessments/evaluations that may provide useful information regarding the NJ marketplace. The selected contractors will be expected to coordinate with such efforts to leverage such studies where appropriate.

CCEEP recommends that market assessments that build upon the market potential studies recently completed by Navigant and KEMA, as well as other baseline studies that address NJ markets, be performed for the following programs:

- Residential HVAC
- Residential New Construction
- Energy Star Products
- C&I Construction

It is important to closely review the program measures and incentives, particularly with regard to energy efficiency and CHP. With respect to rebates, for example, KEMA, in its Energy Efficiency and Distributed Generation Market Assessment of August 2004, recommended C&I incentives that maximize net adoptions and minimize free riders but did not address how to do this; the selected consultant will be asked to look closely at this topic and provide recommendations.

With respect to technologies, the existing programs need to be faster at upgrading the efficiency levels required to participate. The American Council for an Energy-Efficient Economy has issued a study of *Emerging Technologies* (Report A042) that the selected consultant will be asked to review to determine how to promote these best practices through New Jersey's Clean Energy Program. As well, the consultant will be asked to review the efficiency levels for New Jersey's Clean Energy Program qualifying equipment to insure the levels are set high enough in view of changing markets and standards, e.g. water heaters went to EF = .57 (minimum for a 50-gallon unit) in January 2004, and central air conditioners go to SEER = 13 in January 2006. The Clean Energy Council and its committees can address these issues based on resident expertise, but having consultant input will benefit the process.

In addition to addressing the general issues set out in Section IV above, the market assessments should include the following specific components:

1. Update baseline studies and estimates used as performance indicators. Performance indicators should be: simple and understandable; small in number; and based on data that are reliable and inexpensive to collect.

The performance indicators should emphasize such dimensions as the following:

Energy production and savings measures:

Renewable technology capacity installed (kW); annual energy supply from installed capacity.

Electric energy efficiency: electric energy capacity reduced through efficiency measures; annual energy savings from measures installed.

Gas energy efficiency: annual energy savings from measures installed.

Market share of deployed technologies:

The Statewide market penetration level, to capture any market transformation impacts beyond the measures implemented through program activity per se.

Costs per technology unit or measure installed:

Installed costs and supply costs of measures, compared with the prices of competing conventional resources. How do the installed costs of renewable and efficiency technologies compare with planning assumptions, and are they going up or down over time?

Business development and support services:

Number of in-State businesses that can (a) manufacture and assemble, (b) sell/install, and (c) service/maintain technologies.

Awareness and understanding of sustainable energy technologies:

Among users; among potential users.

The indicators need to be measured periodically, approximately every two to three years, in order to assess changes over time. Plausible relationships (not necessarily strict cause-effect) between New Jersey's Clean Energy Program activities and changes in the indicators need to be established through supporting impact and market evaluation activities.

- a. Perform a statewide survey to collect data on market share of high efficiency equipment and practices promoted by New Jersey's Clean Energy Program.
 - b. Review and prioritize the appropriateness of the current performance indicators (see Appendix B):
 - i. Provide estimated values for program performance indicators.
 - ii. Recommend changes to performance indicators as appropriate.
 - iii. Recommend performance indicators for new programs.
 - iv. Determine how to track and measure how program managers are doing against performance indicators.
 - c. Determine extent to which programs contribute towards meeting program goals:
 - i. Update goals as required.
 - ii. Determine how to track and measure how program managers are doing against goals.
2. Assess the market overall including:

- a. The influence of Clean Energy Programs and other forces on the market since program implementation;
 - i. Assess changes in the market for HVAC equipment and installation practices
 - ii. Assess the influence of the RNC program on the transformation of the new construction market since the start of the program
 - iii. Assess changes in the market for ENERGY STAR products
 - 1. Provide the market information needed to calculate energy savings from the Energy Star program since its inception in 2001
 - iv. Assess changes in the market for equipment and practices promoted by the C&I program
 - b. Identification of existing barriers and the effectiveness of the programs in overcoming these barriers, and;
 - c. Expected market trends
3. Provide recommendations regarding the future directions for the program such as modifying rebate levels, adding or removing technologies eligible for rebates or increasing the minimum efficiencies to be eligible for rebates.

VI. Overview of Other Evaluation and Research Activities

As discussed previously, evaluations generally fall into three categories: process, market assessment, and energy impact. These have different goals, although the same data are often used. Process evaluation tends to involve qualitative analyses; impact evaluation tends to involve quantitative analyses, and market assessments involve a mix.

The previous section discussed the issues to be addressed and methods for the performance of market assessments. This section will discuss in general other types of evaluations that need to be performed. Specifics regarding the timing and scope of these other evaluations will be set out in the Phase 2 Report to be issued in November 2004.

Process Evaluation

Process evaluations are concerned with a program's design and operational efficiency. They typically examine both customers' and implementers' reactions to the program. Results of process evaluations can lead to improvements in the cost-effectiveness of the program. They can also uncover barriers to participation in 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?

In addition to answering these questions, process evaluations often provide an important opportunity to document the details of a program's design, goals, implementation, and progress. This information is otherwise seldom available in one report.

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 staff, and other market actors.

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

Formal process evaluations should be done by an outside contractor. A contractor's independence ensures that respondents can express their reactions more freely. The evaluations are usually the earliest feedback available to program managers. They can usually be initiated much earlier than other evaluations or market assessments since there is no wait to collect data on post-installation usage or market responses. For programs with long-term goals, such as market transformation programs, process evaluations provide the only short-term feedback available to optimize the program.

Energy Impact Evaluation

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 those protocols, some additional work may be 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, some of the following issues are addressed:

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. What are the savings 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 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.

Program Data Collection (Tracking)

One of the factors critical to successful program evaluation planning is ensuring that the appropriate data are 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.

The Phase 2 report will provide a more detailed scope and timeline for any proposed process, impact or tracking system evaluations.

Appendix A: Recent Market Evaluation Studies

NJ BASELINE STUDIES	Author	Date
Baseline Data Projection Book	GRI Baseline Center	January 2000
New Jersey Statewide Market Assessment Prepared for the New Jersey Utilities Working Group	Xenergy	August 1999
Commercial & Industrial Studies		
NJ New Construction, Renovation, and Equipment Replacement baseline study (HVAC, Lighting, and Other)	RLW	Winter 2000
Compressed Air Systems Market Assessment in PSE&G's Territory	Aspen Systems	March 2000
Commercial & Industrial O&M Market Segment Baseline Study, for the NE/NJ Utilities	RLW	June 1999
Northeast Premium Motor Initiative Market Baseline and Transformation Assessment	Easton Consultants	August 1999
PSE&G Motor Baseline Study	Easton Consultants	October 1996
PSE&G Commercial Lighting Design Assessment - Addendum to the New Jersey Commercial Baseline Study	Robert Sardinsky	January 2000.
Commercial/Industrial Chiller Market Database - Draft Report; Prepared for Richard F. Hoernlein, Public Service Electric & Gas of New Jersey (in draft: chiller inventory for PSE&G and program issues.)	Les Tumidaj, Fred Gordon, Steven Scott, Pacific Energy Associates, Inc.	July 2000
The Market for Operations and Maintenance Training in New Jersey - Final Report Public Service Electric and Gas of New Jersey and Conectiv Power Delivery;	Frederick M. Gordon, Gary Smith, Will Miller, Pacific Energy Associates, Inc.	May 2000
Residential Studies		
Baseline Study of the New Jersey Residential Lighting Market; to Northeast Energy Efficiency Partnerships and Public Service Electric and Gas Company, JCP&L, and Conectiv Power Delivery	Opinion Dynamics Corporation and Regional Economic Research	November 1999
Baseline Study of the NJ Appliance and Window Markets	RLW	October 2000
Baseline Study of Attitudes and Awareness of Key Market Actors in the NJ Residential New Construction and Renewable technology market	Roper-Starch and Xenergy	June 2001
Baseline Study of Gas and Electric Residential HVAC Market	Xenergy	November 2001

In addition to the market evaluation studies identified above, two additional evaluation activities were recently completed as follows:

1. A statewide market assessment was performed to assess the technical, economic and market potential of energy efficiency, distributed generation and renewable energy technologies. KEMA Xenergy performed the assessment for energy efficiency technologies and Navigant Consulting performed the assessment for renewable energy technologies.
2. A process evaluation of the renewable energy programs is being performed by Aspen Systems Corporation. The main objective of the process evaluation is to assess the systems, processes and procedures for program management, financial management and quality control. The final report is due in October 2004.

Appendix B: Performance Indicators

The following sets out performance indicators that were proposed by the utilities in past filings with the BPU:

Residential Electric HVAC Program	Performance Indicator	Data Source
Rebate volumes and energy savings	Number of central A/C, heat pump and thermostat rebates	Program tracking data and protocols
HVAC training	Number of technicians participating in utility sponsored training on Manual J, charging/airflow, duct design, etc. Number of HVAC firms with at least one technician that has participated in utility-sponsored training	Program tracking.
Rebate inspections	“Passing” rate for inspections of rebate systems	Program tracking.
Contractor certification	Number of HVAC technicians and/or contractors that have been certified	Data from independent authority the Utilities should work with to promote certification.
Awareness/Attitudes	% of customers aware of benefits of efficient equipment and quality installations; % of contractors using and/or aware of benefits and key elements of efficient equipment and quality installations	Baseline study/Market Assessment
Market share monitoring	Sales of high efficiency A/C and heat pumps as % of total NJ sales if possible	Baseline study/Market Assessment

Residential Gas HVAC	Performance Indicator	Data Source
Participation and energy impacts	Number of HVAC incentives paid for furnaces, boilers, water heaters and thermostats.	Program tracking and protocols
Trade Ally Training	Number of HVAC technicians and/or contractors that have received sales training.	Program tracking
Customer Awareness/Attitudes	Percent of customers aware of benefits and key elements of high efficiency equipment.	Market Assessment
Contractor Awareness/Attitudes	Percent of contractors aware of benefits and key elements of high efficiency equipment.	Market Assessment
Market share monitoring	Sales and installation of high efficiency water heaters, furnaces, and boilers as % of total NJ sales of these products if possible.	Surveys and Distributor Sales Data
Incremental Cost (long term impact)	Incremental cost of high efficiency water heaters, furnaces, and boilers relative to standard equipment.	Market Assessment

Residential ENERGY STAR Windows	Performance Indicator	Data Source
Retailer Participation	Number of trade allies promoting or co-sponsoring promotions of ENERGY STAR windows.	Program Tracking
Manufacturer Participation	Number of manufacturers promoting or co-sponsoring promotions of ENERGY STAR windows.	Program Tracking
Product Availability	% of retail space devoted to ENERGY STAR windows relative to space devoted to windows overall.	Market Assessment
Market share monitoring	Sales of ENERGY STAR windows as % of total NJ sales of these products.	Program Tracking
Public Awareness and Consumer Knowledge	% of customers aware of benefits and key elements of ENERGY STAR windows.	Market Assessment

Residential ENERGY STAR Lighting	Performance Indicator	Data Source
Retailer Participation	Number of trade allies promoting or co-sponsoring promotions of ENERGY STAR lighting.	Program Tracking
Trade ally Training	Number of allies and percent of allies trained	Program Tracking
Product Availability	Inventory and shelf space of qualified products available in retailer stores and compared to non-qualified products.	Program Tracking
Market share monitoring	Sales of ENERGY STAR lighting as % of total NJ sales of these products (includes separate estimate for new construction/retrofit market).	Program tracking
Product pricing	Change, over time, of product prices	Program Tracking
Public Awareness and Consumer Knowledge	% awareness of benefits of ENERGY STAR lighting.	Evaluation

Residential ENERGY STAR Appliances	Performance Indicator	Data Source
Retailer Participation	Number of trade allies promoting or co-sponsoring promotions of ENERGY STAR appliances	Program Tracking
Sales Training	Number of sales associates trained in ENERGY STAR appliance products.	Program Tracking
Product Availability	Number of qualified products available and on display	Program Tracking
Market share monitoring	Sales of ENERGY STAR appliances as % of total NJ sales of these products if possible	Program Tracking
Public Awareness and Consumer Knowledge	% of awareness of benefits of ENERGY STAR appliances.	Evaluation

Residential New Construction	Performance Indicator	Data Source
Participation and energy savings	Number of homes certified (by single-family, townhouse, multifamily and affordable)	Program tracking and protocols.
Technical assistance to builders and subcontractors	Number of builders and subcontractors trained	Program tracking system and evaluation
Installation rates for efficient equipment	% of new homes built with qualifying ENERGY STAR gas and SEER 13+ HVAC equipment	Program tracking system
Supplemental measures	Number of lighting, appliance and ventilation installations	Program tracking system
Builder participation	% of builders for which Energy Star homes are a significant % of annual homes completed	Program tracking, market assessment and best available data on builders in NJ
Market share monitoring	Number of ENERGY STAR homes built as % of total NJ new residential construction	Program tracking system and best available data on new construction Initial market assessment of construction practices
Awareness/Attitudes concerning ENERGY STAR homes	% of consumers aware of benefits (including perceived value and quality) of ENERGY STAR homes; % of builders, realtors, other market actors aware of benefits of ENERGY STAR homes	Baseline survey and subsequent evaluation
Awareness/Attitudes concerning home energy ratings and mortgages	% of customers, builders, bankers, etc. aware of home energy ratings and energy efficient mortgage option; availability and use of home energy ratings and energy efficient mortgage options	Baseline survey and subsequent evaluation
Customer and builder satisfaction	% of participating home owners satisfied with energy efficiency of new ENERGY STAR home	Market Assessment

Commercial Construction Program	Performance Indicator	Data Source
Energy and Demand Impacts	Program Savings	Protocols
Program Activity - separate estimates for new construction and retrofit	Number of projects. Projects as a % of new construction and renovation activity statewide.	Program tracking for number of projects. Market assessment for % of statewide activity (using best available data).
Program Activity – separate estimates for new construction and retrofit	Number and percent of repeat design professionals in Comprehensive Design Assistance.	Program tracking
Distribution of Program Activity – separate estimates for new construction and retrofit	Number of prescriptive, custom, and CDA projects. Percent of energy savings from prescriptive, custom, and CDA projects, respectively.	Program tracking
Program Activity: Motors, HVAC, and Design Lights	Number of individuals trained, by specialized path and type of training.	Program tracking
Trade Ally Awareness	Percent of design professionals aware of the program, qualifying measures, and design practices.	Market Assessment
Customer Awareness	Percent of customers aware of the program, qualifying measures, and design practices.	Market Assessment
Market share monitoring	Periodic estimates (method TBD) of sales of energy efficient technologies as a percent of total NJ sales.	Market Share Monitoring
Market changes in energy efficient lighting design	Decrease in watts per square foot, for participants and non-participants, by building type.	Market Assessment