Climate Showcase Communities

New Jersey Sustainable Energy Efficiency Demonstration Projects (NJ SEED)

Final Technical Report submitted to the U.S. Environmental Protection Agency in fulfillment of Grant Identifier AF-83453301

Ari Messenger, Grant Project Manager

5/14/2013

Table of Contents

Introduction/Project Overview

The New Jersey Sustainable Energy Efficiency Demonstration Project (NJ SEED) was designed to investigate what reductions in greenhouse gas (GHG) emissions are possible in small and medium municipalities. It offers lessons on how to establish a protocol for leadership in municipalities through state and federal support, and to share information on measures that reduce GHG emissions among residents and businesses. The program pursued these goals by:

- establishing a partnership among three New Jersey municipalities to set energy use and GHG emission reduction targets;
- implementing programs to help residents, businesses, and local government reduce energy use and GHG emissions linked to the targets;
- modeling anticipated impacts and qualitatively documenting actual reductions for research purposes; and
- rolling out new best practices through the Sustainable Jersey program

Each participating municipality developed and implemented energy plans with targets for reducing energy use and GHG emissions. The actions pursued by the municipalities included enrollment of community members and local businesses in state and federal energy-efficiency programs, efficiency retrofits of municipal buildings, and encouraging residents to change to more sustainable environmental behaviors.

As we planned our approach to reaching these goals, we relied on the following theory: we would use a plan chosen by community stakeholders, with clear targets adopted by the local governing body as a sign of support, to engage members of the community to "pledge" to undertake very specific actions that would help reduce GHG emissions. By establishing pledge target goals for each action, we felt that we would be creating a motivational tool for the community to rally around the campaign.

Among a number of successes, the major accomplishments of the project include:

- the development of an interactive spreadsheet modeling tool that allows planners the ability to assess the ultimate effects of a series of potential local actions on energy use, carbon emission reductions, and costs and benefits associated with these actions
- development of a successful pilot program to increase participation in the Home Performance with ENERGY STAR program for New Jersey residents

- development of a successful pilot program on Direct Install that will help municipalities encourage and reward their local business base for making energy upgrades to their facilities
- a combined reduction of approximately16,800 metric tons of carbon emissions annually during the grant period
- the successful coordination between state and local incentive programs to leverage energy savings into meaningful reductions in greenhouse gas emissions
- the additional actions put into place during the grant period in the three targeted communities are expected to yield a GHG reduction of approximately 22,000 metric tons by 2017.

This report is organized by the original approved scope of work in the signed and executed grant agreement.

Activity Under Grant/Cooperative Agreement

***Phase I Assessment and Planning*: Develop comprehensive energy plans for participating municipalities that have realistic and aggressive targets that are based on an assessment of the impact of new coordinated state and local programs that are the focus of this project.**

Task 1. *Work with each municipality to establish data collection protocols and for the ongoing collection of Green House Gas (GHG) inventory and energy usage data. Use data collected from the municipality to develop a baseline carbon and energy footprint for both the municipal government and the community as a whole.*

Result

Cherry Hill, Montclair, and Highland Park were all able to get to work immediately on collecting the data necessary to calculate baseline carbon footprint profiles at the outset of the grant in the fall of 2010. The collection of locally available data was also augmented with information provided by the local energy utilities on residential and commercial energy usage. PSE&G is the utility provider for Cherry Hill, Montclair, and Highland Park and was instrumental in helping to compile electricity and natural gas usage numbers for each municipality.

However, after collecting all the data that was available to us, there were still concerns regarding the completeness of the data at the level required to separate the individual footprints into important constituent components (residential, commercial, industrial, municipal, and transportation). There was also some concern about the uniformity of the data across the municipalities given the limited

resources available to collect it in such a short time frame. This was especially true in relation to the residential data that forms the largest part of the footprints in each municipality.

In order to get the most accurate carbon footprint baseline numbers upon which our goals would be formulated, it was decided that we would use the most recently available numbers from the regional planning organizations for each municipality. The North Jersey Transportation Planning Authority (NJTPA) was able to provide a complete carbon footprint for both Montclair and Highland Park. For Cherry Hill, we were able to get the necessary data from the Delaware Valley Regional Planning Commission (DVRPC).

Task 2. *Survey each municipality to identify current programs and policies. Use information to assess current conditions and evaluate policy alternatives to identify recommendations. Identify all state, federal, county, and private resources and funds that can be leveraged, assess the collective impact, and provide detailed guidance on how to utilize them. Special focus will be placed on leveraging the NJBPU Community Partners Initiative, federal programs, and the actions and resources in Sustainable Jersey.*

Result

Cherry Hill, Montclair, and Highland Park are all relatively progressive communities with respect to environmental initiatives. All three municipalities had been certified by the Sustainable Jersey program prior to being chosen as Climate Showcase Communities. As such, they were ideally situated to implement any new approaches that might be considered as part of the campaign, and they had a strong ability to leverage existing state and federal programs to maximize resident participation in energy savings.

The project lead at The College of New Jersey, working closely with the energy coordinators for each municipality, was able to identify a suite of actions centered on existing incentives offered in the NJ Board of Public Utilities Community Partners Initiative (CPI) program. The CPI is a NJ Board of Public Utilities (BPU) program that supports communities to take the lead in engaging residents, businesses, and municipalities in New Jersey's various Clean Energy Programs. It focuses on increasing participation rates in all of the following CEP programs: the Warm & Cool Advantage program, the CleanPower Choice program, the Energy Efficient Products Program, the Large Appliance Early Retirement program, and the Home Performance with ENERGY STAR program. The support for the municipalities came in the form of various financial incentives that accrued to municipalities for reaching pre-determined participation levels in each of the programs in the CPI package.

In addition to a heavy reliance on the CPI program, each municipality was also encouraged to leverage its pre-existing network of contacts from its participation in the Sustainable Jersey program to provide manpower for this campaign. In tandem with a close relationship with the local governing bodies in all three towns, this structure would provide an ability to test the effectiveness of targeted grass-roots campaigning on energy use in each community.

Task 3. *Develop policy strategies and recommendations that include cost, the impact of policies on energy usage and GHG emissions and other impacts in relation to cost, and projections for GHG emissions, costs, energy usage, renewable energy generation, funds leveraged, and jobs produced. These policies will include a comprehensive suite of measures including green building, fleet upgrades, ordinances, outreach and education programs, renewable energy, land use, revolving funds, etc.*

Result

Partly in fulfillment of its requirements to receive Energy Efficiency and Conservation Block Grants (EECBG), the Township of Montclair commissioned a comprehensive study in 2009 to identify strategic actions it could undertake in a new energy plan. The goals of the plan, with the New Jersey Sustainable State Institute (NJSSI) as the lead investigator, were to identify specific actions to help reduce fossil fuel emissions, reduce energy use, improve energy efficiency in the building and transportation sectors, and to create and retain jobs. The ultimate plan produced a detailed guideline of alternative energy and conservation plan measures, as well as a complete examination of recommended policy alternatives.

The framework of the Montclair Energy Plan was produced by NJSSI staff that is now at The College of New Jersey and served as the basic menu from which Cherry Hill, Highland Park, and Montclair would craft their Climate Showcase Community energy plans. The document was released in August 2010 (see Appendix) and lists 21 specific recommendations for Montclair. However, the research on the various programs available at all levels (state, federal, county, and private incentives) resulted in a spreadsheet based model that provided 58 different specific actions that could be taken. For each action, there is a detailed plan on how to implement it, what it will cost, and how it will ultimately affect the carbon emissions profile of the community if successfully implemented.

We significantly modified the NJSSI tool. In particular, we changed the output format to be user-friendly for a lay audience. For the Climate Showcase campaign, we needed to improve this tool to make it more interactive. To do this, we created an interactive template that provided the following unique abilities:

(1) It allows the user to change the variable inputs and see the overall effect on carbon emissions in real time, as well as including a feature to toggle on and off various programs as desired.
(2) The improved tool places the effects in an overall framework both numerically AND graphically so that the stakeholder groups are able to have a feel for how changing the model targets affect the outcomes.
(3) Finally, there is a separate measure for each action that calculates the costs and benefits associated with each action. By providing this functionality, the stakeholders can make decisions on the tradeoffs between effective emission reduction approaches and costs/benefits.
(4) These additions to the tool helped make it more usable as the focal point of a live, interactive public participation process.

Task 4. *Refine and select final slate of programs to implement. This will include reviewing policy alternatives and targets with all partners and selecting projects for inclusion into the final municipal work plan. This will include identifying the most effective way to package similar federal, state, and county benefits and programs as a cohesive whole, and market them as single actionable measures targeted at the private sector. Such programs will include but are not limited to signing residents and businesses up for energy efficiency programs at the state and federal level, promoting public and private renewable energy projects, land use and transportation patterns, economic and fiscal sustainability, government operations and maintenance of fleets and facilities.*

Result

Once the model was ready for use by the stakeholder groups in each municipality, a series of meetings was held to focus on which actions would be included in the final energy plan for each town. In addition to choosing the actions the stakeholder groups needed to come up with realistic but aggressive targets for each action. They also discussed in broad terms the likely implementation plans to achieve these goals and the likelihood of success given the demographics of their community.

Unfortunately, some budgetary and program changes in the NJ Clean Energy Program had serious effects on the slate of actions which we had planned for the campaign focus. The NJ BPU announced in the summer of 2010 that the Community Partners Initiative Program was being eliminated. While the individual programs that encompassed the CPI were still available, the financial incentives and educational and promotional support provided to municipalities through the CPI were discontinued. This change in a basic building block of our approach, while not in itself fatal to the success of our campaign, did nonetheless add quite a bit of time as we needed to rethink our approach to achieving the

energy reductions through a number of individual programs instead of one coordinated effort that CPI had represented.

Task 5. *Based on the final selection of programs and strategies in the municipal work plans, model and project expected short and long term program impacts for all costs and benefits noted above for a 30-year period.*

Result

The energy model (see Appendix for the complete spreadsheet model) automatically provided both short-term and long-term effects of the various actions on both carbon emissions and costs over a 1-year, 2-year, 5-year, and lifetime (assumed to be thirty years) span for each action. In the process of making the spreadsheet tool more user-accessible, the emission factors were updated with the most recent eGRID numbers used by the EPA, and the financial incentive changes necessitated by changes to the NJ Clean Energy Budget reduction were also incorporated into the model.

Task 6. *Develop aggressive, but realistic, targets derived from the data and modeling for the municipal government, community as a whole, and specific sectors, that maximize community-wide benefits and are aligned with programs and resources from state and federal government.*

Result

This process, although greatly facilitated by the improved energy tool spreadsheet model, was still a time and human capital intensive task. To make things simpler, the model was divided into three separate sections (residential, commercial, and municipal actions) and each section was discussed at length by the stakeholder groups at separate meetings. After the series of three meetings in each community was completed, a final round of "negotiation" on the target goals was completed and final plans and target goals were identified for each municipality.

After this was done, the project lead at The College of New Jersey packaged these goals into a formal document for each municipality (see Appendix for the individual energy plans for Cherry Hill, Highland Park, and Montclair). These documents were shared with the local governing bodies for their input, and then were formally adopted as municipal target goals for the Climate Showcase Community program in each town in the late spring/early summer of 2011.

The table on the following page summarizes the specific target goals chosen by each municipality. These pledge totals were correlated to the total target reductions for greenhouse gas emissions in each community.

Target Pledge Totals Adopted by each Municipality's Governing Body

	Cherry Hill	Montclair	Highland Park
Homeowners			
Home Performance with ENERGY STAR (Get a Home Energy Audit)	1,000	400	200
Refrigerator/Freezer Recycling	1,000	400	200
Purchase Only ENERGY STAR Appliances**	1,650	1,500	400
Purchase and Install Green Energy**	2,000	825	850
Fuel Efficient Vehicles**	700	1,000	35
Switch out 5 traditional incandescent bulbs to Energy Efficient Lighting**	2,000	2,200	750
Encourage a switch to Sustainable Landscaping for Homeowners	--	300	--
Commercial			
Purchase ENERGY STAR Appliances/Office Equipment	200	100	20
Buy Green Energy	200	--	20
Adopt a behavioral modification program for employees	200	--	20
Install programmable thermostats	200	--	20
Utilize the Direct Install or Smart Start Programs	300	40	20
Pay for Performance	--	4	--
Municipal			
Direct Install	3	5	5
Solar Power for Municipal buildings	2	4	1
Behavioral modification program for municipal employees	Yes	--	Yes
Education and enforcement to reduce idling	--	Yes	Yes
Plug load software	--	--	3
Convert public lighting to induction fluorescent lighting	--	--	Yes

**** Indicates an action that will be done for both homeowners and renters**

As of June 2011, Phase I of the study was complete. This phase took 18 months to complete, which is three times longer than the estimated time in the original scope of work. There are three main reasons for the delays in completing this critical phase of the project:

- Staffing issues – shortly after this phase commenced, the principal investigator and key staff members relocated from the New Jersey Sustainable State Institute at Rutgers to The College of New Jersey. This move complicated the coordination among the parties as they worked to achieve the six tasks outlined in this phase. For example, the staff person responsible for putting together the energy model was unable to work on that particular task for a number of months, which in turn pushed back the other tasks involved in this phase.

- Data issues – the intensity of the data demanded by a project of this scale probably required more time to collect than was budgeted for in this phase. Prior to hiring energy coordinators for each of the participating municipalities, it was difficult for existing municipal staff to devote enough of their time and resources to providing key data inputs for the model. This situation improved after the energy coordinators were hired in the fall of 2010, and the energy modeling phase accelerated greatly after a full-time staff member was hired in February 2011 to deal with modeling issues.

- State Energy program issues –one of the premises for this work was that there were a number of underutilized state energy programs that could be tapped to tremendous advantage in reducing greenhouse gas emissions. The Sustainable Jersey model had demonstrated that with effective grassroots organization, communities could be effectively mobilized to take advantage of resources that were previously unknown to them or if known underutilized for various reasons. In particular, the NJ Board of Public Utilities has a broad range of energy savings programs with structured economic incentives to encourage participation. These were designed specifically to reach the State goal of an 80% reduction of greenhouse gas emissions by 2050. Unfortunately, due to budget constraints, some of the incentives that were going to be heavily relied upon in this grant were scaled back or eliminated entirely (e.g. the Community Partners Initiative program as previously mentioned) in the summer of 2010. As a result, the modeling effort was seriously affected (staff had to rework the model upon which the target goals would be based), and our main delivery mechanism to the municipalities had to be recreated.

<u>Phase II – Program Implementation</u>: The project team and the municipal participants will implement the programs developed in Phase I. During Phases II-IV, each municipality will hold bi-weekly Project Team Meetings. There will also be monthly coordination meetings of all the project partners. The NJBPU and CPI/Honeywell will provide local partners with program materials,

participate in all public events and outreach efforts, and enroll all participants recruited by the municipal partners. NJSSI and MLUC will provide local trainings, and support the development of additional marketing and programmatic materials as needed.

Task 1. *Establish the local Project Team and meeting schedule. Each of the participating municipalities has an officially sanctioned "Green Team". The NJSEED project team will include the local outreach coordinator, key municipal staff, the green team, and key volunteers.*

Result

Program implementation efforts began in the fall of 2010. Part-time (20 hours/week) energy coordinators were hired in each municipality, and supporting green teams were recruited and created to help with the task of adopting a plan for each community.

Task 2. *Develop a calendar of events and outreach activities, secure venues, and contact local partners and sponsors.*

Result

Due to the elimination of the Community Partners Initiative program funding, each community adopted a temporary and scaled-back version of an outreach plan while the energy tool was revamped and a more complete package of target goals could be properly considered. The temporary plan involved asking the three energy coordinators to focus on getting residents to pledge to a limited slate of three actions (changing light bulbs to CFL's, getting a home energy audit, and purchasing only ENERGY STAR-rated appliances). The energy coordinators planned to use outreach events to gather pledges, as well as to create traffic to each municipality's campaign web site to further increase pledge totals.

Task 3. *Launch the effort with a public event and distribution of outreach materials. Announce the opening of the local Energy Counseling Office and other key initiatives.*

Result

Each community held an official kick-off event and began to collect pledges both in person and through the web sites. The use of social media was designed to allow the energy coordinators with the ability to follow up with those who pledged to do the individual actions. However, although people were open to receiving literature about the campaign at the kick-off events this did not turn into a large number of residents actually taking the pledge. The total pledges gathered at the kick-off event for each town was:

Montclair: 37 pledges
Cherry Hill: 48 pledges
Highland Park: 24 pledges

Task 4. *Implement each of the events and programs identified in the work plan. Keep records of participation and report all activities to the project coordinator at MLUC.*

Result

Each community energy coordinator took a different approach to outreach and events, tailoring their approach to the unique make-up of their town. These events were reported to the project coordinator at The College of New Jersey through a weekly update teleconference call every Thursday at Noon throughout the entire two-year duration of this grant.

Again, the pledge totals gathered as a result of these efforts was much lower than had been hoped, and were far below what would ultimately be necessary to reach the target goals set for the campaign in each municipality. After nearly a year's worth of effort, the pledge totals for each community for the campaign were as follows:

Montclair: 72 pledges
Cherry Hill: 130 pledges
Highland Park: 53 pledges

Phase III – Interim Assessment and Program Adaptation: The results of a year's worth of program implementation will be assessed, and changes, including wholly new programs jointly developed by the state and local partners, will be implemented.

Result

Due to the series of factors previously mentioned that delayed the full-blown implementation of Phase II according to the original time schedule, a project reevaluation was undertaken in the late spring of 2011 (see Appendix for the report titled "Advance Program Monitoring Report - New Jersey Climate Showcase Communities Grant").

The original plan was to have two rounds of implementation separated by a review and adaptation phase. Since the initial planning Phase I took so long to complete, the Phase II activities as of the summer of 2011 had only been implemented on a limited scale, and it was decided that the interim assessment and program adaptation originally described for Phase III would be of little value. Instead, this task would be performed concurrently with Phase IV. Phases II & III

would now become a continuous intensive rollout of the plans as originally planned for Phase II of the project. As the Board of Public Utilities shared data on program participation, it was hoped that program adaptation could be achieved in "real time" to tweak the approaches in each community as warranted by the results we were seeing from the data.

<u>Phase IV – Program Implementation</u>: The project team and the municipal participants will implement the programs developed in Phase III in a manner similar to that of Phase II.

<u>Result</u>

At this point, we had learned some important lessons from our scaled-back efforts from October 2010 through July 2011. The most important of these lessons was the realization that our strategy of driving up our pledge totals for the various actions through the use of social media and our web sites was not working. We also were far less successful than we had hoped at gaining pledge commitments by tabling at various community events. At this stage of the campaigns, none of the three municipalities had collected more than 300 pledges. So instead of continuing on with this approach, we decided to explore other avenues to help increase pledge totals. While we would still use the web sites as the hub of our campaigns, we identified a new strategy to help the energy coordinators spread the message of the campaign more effectively throughout the municipalities.

From attendance and participation at the annual Climate Showcase Communities conference, we learned that some grantees in other states were enjoying success by employing a "group outreach" strategy. In fact, the lead investigators at TCNJ learned a great deal from the success of the HEAL program used in the Arkansas Climate Showcase Community effort. After looking at the Arkansas approach, we decided to make a big shift in our efforts from focusing on collecting individual pledges to undertaking "group outreach" activities.

In the late summer/early fall of 2011, each of the three towns agreed to make an effort to recruit "energy ambassadors" to help reach out more effectively to the community. On the residential side, the energy coordinators were asked to identify a series of municipal groups (e.g. Boy Scouts, Recreation league participants, faith-based congregations, and other similar interest-based groups). Once these groups were identified, the idea was to get an ambassador from among each group to help recruit people in that group to take the pledge. The project lead at The College of New Jersey put together a complete package of materials that the Energy Coordinators could use to help the ambassadors in this approach; all that the ambassadors would need to do would be to make the initial connection with the members of their group and the energy coordinators would provide them with the

necessary materials and support to gather pledges. A similar effort and package of materials was made for business groups (see Appendix for both sets of packets). Each community agreed to do a "mini-pilot" of this approach for the last three months of 2011, and if it proved successful we would continue that approach through the remainder of the grant period.

In addition, Cherry Hill directly targeted businesses and began to reward them with recognition as "Energy Champions". Combined with a vigorous outreach to the business community through a series of business breakfasts, Cherry Hill was effective at spreading the word on the campaign at a level not seen as much in the other two communities. Cherry Hill also made an aggressive use of the local school district, fashioning activities for the children based on the idea of "friendly competition" to great effect. In light of their success, Cherry Hill continued with this approach through 2012, and ended up with a pledge total of just over 1,100 people as a result.

Neither Highland Park nor Montclair was very successful in their "mini-pilots" of the energy ambassador approach. The pledge numbers in both campaigns, while improved, remained well below what was needed to reach their target. In a course correction, they instead focused their efforts in this phase on two unique approaches to very specific actions that would prove to be very successful. In Highland Park, the energy coordinator worked closely with Borough officials to craft an RFP to create a municipal-wide Home Energy Assessment program that identified a single municipally-endorsed energy auditor through the Home performance with ENERGY STAR program. While efforts to recruit pledges still continued in Highland Park throughout 2012, the primary effort for the balance of the grant there was spent on this program as the early indications in 2012 showed the program to be very popular. By the close of 2012, this approach had yielded over 200 Home Performance audits in under the course of one year. This exceeded the original target set for this action for Highland Park, and essentially did so in less than half the time originally envisioned for this effort. Of the audits completed, an unusually large number followed through with energy upgrades. This resulted in Highland Park increasing their participation rate in HPwES for 2012 by more than 700% as of October 2012.

In Montclair, the energy coordinator came up with the idea to closely partner with both the municipal officials and the local Direct Install contractor to make a targeted outreach effort to the local business community to get them to make energy efficiency upgrades to their facilities. By leveraging the imprimatur of the municipality to send out a targeted letter touting the Direct Install program, Montclair almost doubled the participation rate in the Direct Install in the first half

of 2012. In the original mailing to approximately 300 businesses, 31 building owners responded and 16 of those ultimately enrolled their buildings for upgrades through Direct Install. As with the effort in Highland Park, the early success rates for this approach were so successful that Montclair focused much of their effort in the remainder of the grant in 2012 on expanding this approach to as many businesses as possible. Both the Montclair and Highland Park efforts on these programs are detailed more thoroughly in the replicability section later in this report.

As of December 2012, the pledge totals and media statistics for each town were as follows:

Montclair: 226 pledges & 71 Facebook "Likes"
Cherry Hill: 1,106 pledges & 136 Facebook "Likes"
Highland Park: 285 pledges & 66 Facebook "Likes"

<u>Phase V – Final Assessment</u>: During the final year, and for the year after, the project team will track key metrics of program performance. This will include outputs, such as the number of businesses and residents reached, events held, and the number of entities that enrolled in programs or took specific actions to reduce their carbon footprints. It will also include outcomes that will be tracked by looking at measures included in the energy plan created in Phase I, including GHG and criteria air pollution emissions and electricity and gas consumption in key sectors.

Task 1. *Gather data for assessment, including: Quantitative data from utilities and state agencies and local government; Program data (outputs) on outreach programs, events, contacts; Conduct survey of program participants at the municipal level; Conduct focus group and debrief of Project Team.*

<u>Result</u>

Each of the energy coordinators reported their activities on a regular basis to the project coordinator. The approximate number of contacts made at each event was tracked in order to reallocate resources as needed for efficiency. In addition to participation rates at the individual outreach events, the project coordinator also tracked web site traffic during Phase IV of the project to try to establish the effectiveness of the outreach campaign at driving people to the web site to take the pledge.

Due to problems with data quality, the NJ BPU was unable to share with us the data on program participation in "real-time" as planned during the course of the grant. However, in October 2012 the data quality problems were resolved and as a result we have precise data on a number of the programs that were targeted in each

municipality. The BPU has agreed to provide monthly data updates throughout 2013 as we continue to monitor the effects of our work on this project throughout the next calendar year.

A complete 1-hour, in-person exit interview was conducted with each of the energy coordinators for Cherry Hill, Highland Park, and Montclair. An in-house evaluation of the grant was also completed by the project coordinator among the staff at The College of New Jersey. The findings of these evaluations are detailed in the "Challenges and Lessons Learned" section of this report.

Task 2. *Detail fiscal, economic, and environmental impacts.*
Result

The fiscal, economic, and environmental impacts of the grant study are outlined in detail in the "Results" section of this report. In addition, as mentioned we will be tracking this data through 2013 and will report back at the end of the year with a final update on the effects of the grant on all three municipalities.

Task 3. *Review strengths and weaknesses of program, codify and detail replicable procedures.*
Result

The analysis on the strengths and weaknesses of the program as well as the issues relating to project replicability are covered in the respective sections of this report.

Phase VI – Dissemination: The lessons from the program will be turned into new Sustainable Jersey Actions and integrated into the certification program.

Task 1. *Develop complete Sustainable Jersey Actions for all new measures.*
Result

Four new actions have been completed based on the most successful aspects of this grant. Two are based on the successful pilot of the Direct Install program in Montclair, and two more are based on the residential Home Performance with ENERGY STAR audit program established in Highland Park. (See Appendix for a complete copy of these new actions).

Task 2. *Review and test new Actions with the Sustainable Communities Working Group, assign points, identify and create new incentives*
Result

After reviewing the programs on Direct Install and Home Performance with ENERGY STAR piloted in this grant, the Sustainable Jersey Energy Task Force approved four new actions in the summer of 2012. Points have been established

for these new actions, and the fully-resourced action write ups have become a part of the Sustainable Jersey program starting in 2013.

Task 3. *Hold one statewide workshop, and 2 regional workshops, for municipalities on new measures.*

Result

Four workshops were held on the new actions in 2012, and all were very well-received. The dates and locations for these workshops follow:
May 30 Montclair, NJ
June 5 Blackwood, NJ
June 25 Highland Park, NJ
July 23 Galloway, NJ (The Richard Stockton State College)
(Please see Appendix for agendas for these workshops as well as sampling of the evaluations from program attendees).

Results

Discussion of Available Data to Track Progress

A primary objective of the Climate Showcase Communities national program is to document results with an eye toward replicability. As with any study, we anticipate finding a wide range of results regarding the effectiveness of our approaches. In this case, the NJ SEED project is well situated to document results due to the involvement of the New Jersey Board of Public Utilities. Many of the programs that were targeted in this study are administered by the NJBPU through the Clean Energy Program (CEP). As a result, we have the information on actual participation data for each municipality for a number of these programs. By using regression analysis, it is thus possible to gauge the effectiveness of our campaigns in each of the three municipalities.

However, there are some areas where we will need to take other approaches to document our progress. Across the three municipalities in our project, 19 different target actions were attempted. In general, the data availability for these 19 target actions falls into one of four categories:

(1) Those for which we will have excellent and reliable data on residential and commercial participation within the municipality as a result of the action being in the Clean Energy Program - Examples here include the Home Performance with

ENERGY STAR Program, the Refrigerator/Freezer Recycling Program, and the Direct Install Program.

(2) Those for which we will have excellent and reliable data on project participation because they are being implemented by the municipality itself – For those programs that are being undertaken by the governing bodies of each municipality, we will have direct access to cost data and in most cases data on energy efficiency as well.

(3) Those for which a larger database may be tracked, but for which we will not have specific numbers for individual municipalities – Examples here include the purchase of ENERGY STAR Appliances and the purchase of Fuel Efficient Vehicles. In these cases, we can make very educated and reasonable estimations using regression analysis.

(4) Those for which there is no readily available national, regional, or local database upon which to make estimations – Examples here include the commercial action on Installing Programmable Thermostats and the residential action to encourage a Switch to Sustainable Landscaping Practices. In these cases, we will have to make estimations on participation by making educated guesses based on the number of people who pledged to do these actions. The energy coordinators for all three municipalities are keeping contact data on pledges to make this possible.

Brief discussion of regression analysis

Regression analysis is a statistical tool for the investigation of relationships between variables. Usually, the researcher tries to establish the causal effect of one variable upon another—the effect of a price increase upon demand, for example, or in the case of this study the factors that influence participation in a particular program such as Home Performance with ENERGY STAR. To explore the possibility of a relationship, the investigator compiles data on the underlying variables of interest (the dependent variable) and uses regression analysis to estimate the quantitative effect of explanatory variables (the independent variables) upon the variable that they influence. In this example, the number of homes in a community and the income level of the community might be some variables used to help explain the participation levels in the Home Performance with ENERGY STAR Program. The analyst also assesses the "statistical significance" of the estimated relationships, in order to establish that the true relationship is close to the estimated relationship.

In order to use regression analysis to find relationships among data, there are several strict assumptions that must be met. In practice, it is rare to find a data set that does not violate at least some of these assumptions. Fortunately, there are also techniques to adjust for many of these shortcomings, and in most cases the results of a properly conducted regression analysis can be very informative in establishing a cause and effect relationship. For example, one of the most basic assumptions of regression analysis is that the dependent variable must exhibit the tendencies of a normal distribution. This requirement must be met or else the tests of statistical significance used in regression analysis become meaningless. In several of the variables we will be examining in this analysis, the normality assumption clearly does not hold. This is because we are using "count data". Count data is simply the total number of participants for any given action or event. Therefore, by definition, count data cannot be negative and in fact often clusters around zero. The distribution of count data usually does not approximate the "bell curve" of a normal distribution, and as a result different statistical methods need to be used to draw valid conclusions from it.

There are ways to account for this departure from the normality assumption in a regression model. We chose to conduct the analysis using a "negative binomial distribution". Perhaps the most difficult hurdle to using regression analysis to ferret out relationships among data is when a researcher is using poorly collected data. Fortunately, that is not the case in the NJ SEED project.

Benefits of using Regression Analysis on NJ SEED project data

Given our partnership with the NJBPU, we have a wealth of accurate data to use as both our subject group of interest (Highland Park, Montclair, and Cherry Hill) and our control group (the other 563 municipalities in New Jersey). For this analysis, we collected data on municipal participation for four CEP programs for all 566 New Jersey municipalities going from January 2010 to September 2012. We will also continue to collect this data through 2013 and perform more tests at the end of 2013 in order to catch the lagged effects of our campaign.

To try to capture the effectiveness of our work, the methodology rests on the following approach: once we establish a statistical relationship between the independent variables and the participation in the various programs, we can make predictions for each municipality based on the data for that municipality. For example, if our analysis predicts that we would expect 25 people to have participated in HPwES in Montclair over a three-month period, and we instead see an actual participation rate of 60 people we can attribute the additional participation to the work done in the Montclair Climate Showcase campaign. Such

an approach offers strong unbiased and statistical proof of the effectiveness of our program.

For those programs where we do not have direct data on individual municipal participation, but instead have regional or national trends, the results from our regression analysis can prove especially useful. For example, suppose that we have hard data on seven different actions that we have targeted and we establish regression relationships for each of them that allow us to track actual performance versus predicted performance as described above. Assume that this data shows that in Highland Park, for example, the Climate Showcase effort has caused an average increase in participation of 23%. We can then legitimately apply this 23% figure to data we might have on a national level to make a reasonable estimation of participation for Highland Park in a different program like buying ENERGY STAR appliances where we do not have the ability to track municipal level data. While this approach would not be as strong as the hard participation data we would have on programs where we do have municipal level detail, it would nonetheless be a very good estimation of the likely effects of our campaign.

Explanatory Variables Used in our Analysis

The dependent variables in our regression equations will be the count of the number of participants in each program of interest. The independent variables were chosen to control for variables that we felt influenced our dependent variable. Doing this allows us to isolate our independent variable and, if it is found to be significantly outside of the range we would expect given our model, we can attribute the change to the effects of the Climate Community Showcase grant campaign. We are comparatively fortunate in that New Jersey is a very "data-rich" state. There is no shortage of available statistics at the municipal level upon which to establish the relationships we are looking for. The choice of independent variables was guided by economic theory, and the list of those variables used in the analysis and expected to have significant influence on program participation is as follows:

a) Population – numbers of households (or in the case of Direct Install, the number of commercial parcels in a municipality).
b) Income – all other things equal, we would expect higher income to positively correlate with participation in these programs.
c) Home values – as with income, home values should be positively correlated with participation in energy programs.
d) Age of the Housing Stock – given that some of the programs we are targeting address deficiencies in home energy efficiency, there is likely to be

a correlation between communities with older housing stocks and the participation in programs like HPwES (keep in mind that this relationship is established by holding all other variables constant so that income and home value would already be adjusted for).

e) Education levels – there is a wealth of literature that shows that educational attainment is positively correlated with environmental awareness and action.
f) Whether or not a community is Sustainable Jersey Certified – it seems very possible that there will be a correlation between those communities that have achieved their Sustainable Jersey certification and participation in these types of energy efficiency programs.
g) Whether or not a community received points in any of the Sustainable Jersey actions relating to Energy Outreach or Green House Gas Emissions - the relevant actions here include:
    - Municipal Carbon Footprint
    - Community Carbon Footprint
    - Energy Audit for One Municipal Building
    - Audit and Upgrade All Municipal Buildings
    - Energy Tracking and Management

h) A number of demographic variables will be included as controls to help describe the differences between communities – these will include the unemployment rate, the poverty rate, the percentage of homeowners who own their houses free and clear without a mortgage, and the percentage or residents who find alternative ways to work other than driving alone.
i) Business climate variables – for the analysis on the Direct Install program, we will include measures on the fiscal spending patterns of municipalities (a key user of the program over the past few years) as well as "dummy variables" to isolate the effect of the individual county Direct Install providers on the outcome.

Results – Spreadsheet Tool Calculations

During the course of the grant, we tracked the pledge totals from each of the three municipalities. We developed our carbon emission reduction reports based on previous research showing that approximately 60% of people who pledge to undertake a "sustainability-related action" actually follow through with their commitment. By plugging these pledge numbers into the spreadsheet tool we developed in the early phase of the project, we continued to monitor our progress over time.

Using that same approach one final time, we will provide the best estimate we have on the effects of our work at reducing greenhouse gas emissions. However, it should be noted that while great care went into crafting the spreadsheet tool (it uses current e-Grid carbon emission factors, for example), the very nature of reporting carbon emissions based on "pledged actions" as opposed to a more tangible measure is likely to cause a rather wide margin of error for these estimates.

The following charts represent a final tally for each municipality using their originally adopted target plans as a template. The pledge numbers are used as noted to plug into the spreadsheet tool which then provides the related carbon emissions reduction for each action. The column to the far right in each table provides notes on the specific calculation as necessary. It should be noted upfront here that Cherry Hill's outreach effort was significantly more effective than in the other two municipalities. As such, in some areas a higher percentage of their pledge totals were counted than in Highland Park and Montclair. The justification for this disparity will become clearer in the next section.

Municipality: Cherry Hill	**Target Goal**	**Credit**	**Carbon Reduction from Model**	**Explanation/Justification**
Homeowners				
Home Performance with Energy Star (Get a Home Energy Audit)	1,000	277	105	Numbers provided by BPU for 2011-2012
Refrigerator/Freezer Recycling	1,000	952	1,116	BPU reports 399, plus 50% of pledge total (553)
Purchase Only Energy Star Appliances**	1,650	1,564	7,837	BPU reports 1,011, plus 50% of pledge total (553)
Purchase and Install Green Energy**	2,000	553	519	Estimate 50% of pledge total (553)
Fuel Efficient Vehicles	700	35	118	Estimating 5% of this goal - Held car fair featuring hybrid vehicles.
Switch out 5 traditional incandescent bulbs to Energy Efficient Lighting	2,000	1,385	554	Due to low cost of action, estimated 5 times 25% of pledge total (277)
Commercial				
Purchase Energy Star Appliances/Office Equipment	200	100	269	Estimate 50% of these goals are reached, due to combination of a strong business outreach effort and demonstrated success in encouraging residential customers through BPU statistics.
Buy Green Energy	200	100	94	
Adopt a behavioral modification program for employees	200	100	115	
Install programmable thermostats	200	100	95	
Utilize the Direct Install or Smart Start Programs	300	19	130	Numbers provided by BPU for 2011-2012
Municipal				
Direct Install	3	Yes	296	Number taken directly from DI contractor specs on work on municipal buildings
Solar Power for Municipal buildings	2	Yes	92	Done.
Behavioral modification program for municipal employees	Yes	Yes	230	Carbon savings based on estimate provided by induction lighting professional.
		Savings	**11,570**	
	21	**Target goal**	**23,692**	
		% of Goal	**49%**	

Municipality: Highland Park	Target Goal	Credit	Carbon Reduction from Model	Explanation/Justification
Homeowners				
Home Performance with Energy Star (Get a Home Energy Audit)	200	28	84	Numbers provided by BPU for 2011-2012
Refrigerator/Freezer Recycling	200	120	141	BPU reports 49, plus 25% of pledge total (71)
Purchase Only Energy Star Appliances	400	142	712	BPU reports 71, plus 25% of pledge total (71)
Purchase and Install Green Energy	850	71	67	Estimate 25% of pledge total (71)
Fuel Efficient Vehicles	35	?	n/a	Unknown
Switch out 5 traditional incandescent bulbs to Energy Efficient Lighting**	750	355	142	Due to low cost of action, estimated 5 times 25% of pledge total (71)
Commercial				
Purchase Energy Star Appliances/Office Equipment	20	5	13	Estimated 25% of goal for all of the commercial actions. This is based on beginnings of Direct Install program similar to Montclair late in the grant period which helped establish a connection to business community.
Buy Green Energy	20	5	5	
Adopt a behavioral modification program for employees	20	5	96	
Install programmable thermostats	20	5	5	
Utilize the Direct Install or Smart Start Programs	20	5	34	
Municipal				
Direct Install	5	3	106	Number taken directly from DI contractor specs on work on municipal buildings
Solar Power for Municipal buildings	1	0	0	Did not happen.
Behavioral modification program for municipal employees	Yes	Yes	96	Program launched.
Education and enforcement to reduce idling	Yes	Yes	492	Program launched.
Plug load software	3	0	0	Did not happen.
Convert public lighting to induction fluorescent lighting	Yes	Yes	125	Carbon savings based on estimate provided by induction lighting professional.
		Savings	**2,118**	
		Target goal	**4,667**	
		% of Goal	**45%**	

Municipality: Montclair	Target Goal	Credit	Carbon Reduction from Model	Explanation/Justification
Homeowners				
Home Performance with Energy Star (Get a Home Energy Audit)	400	35	105	Numbers provided by BPU for 2011-2012
Refrigerator/Freezer Recycling	400	151	177	BPU reports 94, plus 25% of pledge total (57)
Purchase Only Energy Star Appliances	1,500	262	1,313	BPU reports 205, plus 25% of pledge total (57)
Purchase and Install Green Energy	825	57	53	Estimate 25% of pledge total (57)
Fuel Efficient Vehicles	1,000	?	n/a	Unknown
Switch out 5 traditional incandescent bulbs to Energy Efficient Lighting	2,200	285	114	Due to low cost of action, estimated 5 times 25% of pledge total (57)
Encourage a switch to Sustainable Landscaping for Homeowners	300	57	46	Estimate 25% of pledge total (57)
Commercial				
Purchase Energy Star Appliances/Office Equipment	300	100	269	Estimated 33% of goal for this action. This is based on the successful publicity generated from the Direct Install effort.
Utilize the Direct Install or Smart Start Programs	40	28	192	Numbers provided by BPU for 2011-2012
Pay for Performance	4	0	0	Did not happen.
Municipal				
Direct Install	5	Yes	397	Number taken directly from DI contractor specs on work on municipal buildings
Solar Power for Municipal buildings	4	No	0	Did not happen.
Education and enforcement to reduce idling	Yes	Yes	492	Carbon savings based on estimate provided by induction lighting professional.
		Savings	**3,158**	
		Target goal	**15,178**	
		% of Goal	**21%**	

In combination, we estimate that Cherry Hill, Highland Park, and Montclair together achieved an annual savings of 16,846 metric tons of carbon and reached 39% of the goal they had originally set for carbon emission reductions for the Climate Showcase Grant. When one considers the challenges encountered in the initial phase of the grant, reaching 40% of the initial goal is a notable achievement.

In the next section, a more rigorous and objective look is taken at the effects of the Climate Showcase grant. Instead of judging the success of these efforts against subjective and possibly unrealistic goals, this approach compares the effects of the grant team's work by looking at the effects on a sampling of NJ Clean Energy Program programs in comparison to the rest of the state.

Results – Regression Analysis of Four NJ CEP Programs

The New Jersey Board of Public Utilities, as a key partner on this grant, was able to provide us with a complete data set that outlined participation rates for the following programs from January 2010 through December 2012:

- Energy Efficient Appliances program – this program offers rebates and incentives ranging from $20 to $100 for purchasing Energy-Star rated clothes washers, refrigerators, dehumidifiers, and air conditioning units.
- Early Appliance Retirement program – this program offers rebates for recycling old inefficient refrigerators and freezers. In addition to a $50 check, the NJ CEP arranges for pickup and disposal of these old appliances free of charge.
- Direct Install – this program offers generous incentives to local governments and businesses for making energy efficiency upgrades to small and medium sized buildings. The NJ CEP covers 70% of the costs of eligible repairs under this program.
- Home Performance with ENERGY STAR – this program offers grants up to $5,000 and the chance for zero-interest loans up to $10,000 for New Jersey homeowners to do whole-house energy efficiency audits and upgrades.

For each of these programs, the data was compiled and analyzed as described earlier using regression analysis. The SAS statistical package was used for the analysis. As noted, since the approach here examines count totals for participation in each of the NJ CEP programs, ordinary least squares (OLS) regression techniques cannot be used. The GENMOD procedure in SAS fits a generalized linear model to the data by maximum likelihood estimation of the parameter vector. There is, in general, no closed form solution for the maximum likelihood estimates of the parameters. The GENMOD procedure estimates the parameters of the model numerically through an iterative fitting process. This approach is ideally suited for data that has a dependent variable that cannot be negative and that will likely have many cases of non-participation (i.e. lots of zeros).

For each of the four models, the program output is presented as follows: first, the results of the fully specified model are provided so that the user can see the variables being used as controls. Then, a brief listing of the variables that are eliminated as insignificant and removed from the model is provided. This is done by re-running the regression in a stepwise fashion and eliminating variables one at

a time. When all that is left are statistically significant variables, the final fitted model is presented. A very brief description of the final fitted model is included to assist the reader in interpretation of the results.

Once we have a model established, it can be used to test whether or not the efforts in Cherry Hill, Highland Park, and Montclair were effective. To do this, we compare the predicted outcome from the model to the actual value. If the difference falls outside of the 95% confidence level range, that is proof that there has been an effect from the Climate Showcase work.

The following pages contain the model results for each of the four programs listed.

The GENMOD Procedure

Model Information	
Data Set	SASUSER.EE_APPLIANCES
Distribution	Negative Binomial
Link Function	Log
Dependent Variable	EE_2011and2012
Offset Variable	Ln_OwnerOccupied

Number of Observations Read	563
Number of Observations Used	563

Parameter Information	
Parameter	**Effect**
Prm1	Intercept
Prm2	Ln_Mean_Household_Income
Prm3	Sust Jers Certified
Prm4	Gas
Prm5	Electric
Prm6	Ln_Median_Home_Value
Prm7	No_Mortgage
Prm8	Pct_BSdegree_or_high
Prm9	Poverty_Rate
Prm10	Unemployment_Rate
Prm11	Alternative_Transportation

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Deviance	552	664.4238	1.2037
Scaled Deviance	552	664.4238	1.2037
Pearson Chi-Square	552	755.8360	1.3693

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Scaled Pearson X2	552	755.8360	1.3693
Log Likelihood		297332.1925	
Full Log Likelihood		-2980.8849	
AIC (smaller is better)		5985.7699	
AICC (smaller is better)		5986.3372	
BIC (smaller is better)		6037.7692	

Algorithm converged.

Analysis Of Maximum Likelihood Parameter Estimates						
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Intercept	1	0.0514	2.8446	-5.5239	5.6266	0.00	0.9856
Ln_Mean_Household_In	1	-0.4769	0.2649	-0.9962	0.0423	3.24	0.0718
Sust Jers Certified	1	-0.2506	0.0902	-0.4273	-0.0738	7.72	0.0055
Gas	1	0.0071	0.1950	-0.3750	0.3892	0.00	0.9709
Electric	1	-0.0848	0.5878	-1.2368	1.0671	0.02	0.8852
Ln_Median_Home_Value	1	0.1490	0.1582	-0.1612	0.4591	0.89	0.3465
No_Mortgage	1	-0.5940	0.4413	-1.4589	0.2710	1.81	0.1783
Pct_BSdegree_or_high	1	1.6456	0.5121	0.6419	2.6494	10.33	0.0013
Poverty_Rate	1	1.2903	0.9712	-0.6133	3.1939	1.76	0.1840
Unemployment_Rate	1	-2.3818	1.4506	-5.2250	0.4614	2.70	0.1006
Alternative_Transpor	1	-0.4874	0.4594	-1.3878	0.4130	1.13	0.2887
Dispersion	1	0.6448	0.0398	0.5713	0.7279		

Note: The negative binomial dispersion parameter was estimated by maximum likelihood.

The independent variables were removed in the following order using a stepwise regression procedure:

1. Gas (Pr > ChiSq = .9709)
2. Electric (Pr > ChiSq = .8575)

3. Ln Median Home Value (Pr > ChiSq = .3459)
4. Alternative Transportation (Pr > ChiSq = .3954)
5. Poverty Rate (Pr > ChiSq = .2531)
6. No Mortgage (Pr > ChiSq = .2498)
7. Unemployment Rate (Pr > ChiSq = .0685)
8. Ln Mean Household Income (Pr > ChiSq = .0967)

This resulted in the final fitted model detailed here:

The SAS System

The GENMOD Procedure

Model Information	
Data Set	SASUSER.EE_APPLIANCES
Distribution	Negative Binomial
Link Function	Log
Dependent Variable	EE_2011and2012
Offset Variable	Ln_OwnerOccupied

Number of Observations Read	563
Number of Observations Used	563

Parameter Information	
Parameter	**Effect**
Prm1	Intercept
Prm2	Sust Jers Certified
Prm3	Pct_BSdegree_or_high

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Deviance	560	665.8763	1.1891
Scaled Deviance	560	665.8763	1.1891
Pearson Chi-Square	560	844.4206	1.5079
Scaled Pearson X2	560	844.4206	1.5079
Log Likelihood		297327.0677	

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Full Log Likelihood		-2986.0098	
AIC (smaller is better)		5980.0196	
AICC (smaller is better)		5980.0913	
BIC (smaller is better)		5997.3527	

Algorithm converged.

Analysis Of Maximum Likelihood Parameter Estimates						
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Intercept	1	-3.6482	0.0834	-3.8116	-3.4847	1913.36	<.0001
Sust Jers Certified	1	-0.2428	0.0871	-0.4136	-0.0720	7.76	0.0053
Pct_BSdegree_or_high	1	0.9924	0.2196	0.5620	1.4229	20.42	<.0001
Dispersion	1	0.6550	0.0404	0.5803	0.7392		

Note: The negative binomial dispersion parameter was estimated by maximum likelihood.

Brief interpretation of the model

This model finds that the main determinants for participation in the Energy Appliances rebate program are education level and whether or not a town is Sustainable Jersey certified. As expected, as the education level increases so does participation in these programs. Oddly, the relationship for certification in Sustainable Jersey is an inverse one. That is, towns that are certified in Sustainable Jersey have slightly fewer participants in these programs. While the effect is rather small, one possible explanation might be that residents in those communities may be more likely to already own energy efficient equipment and thus would not need to buy new appliances.

The GENMOD Procedure

Model Information	
Data Set	SASUSER.EARLY_APPLIANCE_RETIRE
Distribution	Negative Binomial
Link Function	Log
Dependent Variable	Early_Appl_Retire_Total
Offset Variable	Ln_OwnerOccupied

Number of Observations Read	563
Number of Observations Used	563

Parameter Information	
Parameter	**Effect**
Prm1	Intercept
Prm2	Ln_Mean_Household_In
Prm3	Sust Jers Certified
Prm4	Gas
Prm5	Electric
Prm6	Ln_Median_Home_Value
Prm7	No_Mortgage
Prm8	Pct_BSdegree_or_high
Prm9	Poverty_Rate
Prm10	Unemployment_Rate
Prm11	Alternative_Transportation

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Deviance	552	660.2587	1.1961
Scaled Deviance	552	660.2587	1.1961
Pearson Chi-Square	552	712.5590	1.2909
Scaled Pearson X2	552	712.5590	1.2909

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Log Likelihood		103246.7785	
Full Log Likelihood		-2534.4921	
AIC (smaller is better)		5092.9843	
AICC (smaller is better)		5093.5515	
BIC (smaller is better)		5144.9836	

Algorithm converged.

Analysis Of Maximum Likelihood Parameter Estimates							
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Intercept	1	6.6380	3.0070	0.7443	12.5316	4.87	0.0273
Ln_Mean_Household_In	1	-1.7660	0.2940	-2.3422	-1.1897	36.08	<.0001
Sust Jers Certified	1	-0.2629	0.0922	-0.4436	-0.0821	8.13	0.0044
Gas	1	-0.3944	0.2053	-0.7969	0.0080	3.69	0.0547
Electric	1	-1.0404	0.6297	-2.2746	0.1937	2.73	0.0985
Ln_Median_Home_Value	1	0.7631	0.1729	0.4242	1.1019	19.48	<.0001
No_Mortgage	1	-1.3441	0.4737	-2.2725	-0.4156	8.05	0.0045
Pct_BSdegree_or_high	1	2.8826	0.5354	1.8332	3.9320	28.99	<.0001
Poverty_Rate	1	-0.2972	1.0696	-2.3936	1.7992	0.08	0.7812
Unemployment_Rate	1	-3.3672	1.6588	-6.6184	-0.1160	4.12	0.0424
Alternative_Transpor	1	-1.2331	0.4719	-2.1580	-0.3081	6.83	0.0090
Dispersion	1	0.6730	0.0433	0.5933	0.7635		

Note: The negative binomial dispersion parameter was estimated by maximum likelihood.

The independent variables were removed in the following order using a stepwise regression procedure:

1. Poverty Rate (Pr > ChiSq = .7812)
2. Electric (Pr > ChiSq = .1006)
3. Gas (Pr > ChiSq = .1853)

This resulted in the final fitted model detailed here:

The SAS System

The GENMOD Procedure

Model Information	
Data Set	SASUSER.EARLY_APPLIANCE_RETIRE
Distribution	Negative Binomial
Link Function	Log
Dependent Variable	Early_Appl_Retire_Total
Offset Variable	Ln_OwnerOccupied

Number of Observations Read	563
Number of Observations Used	563

Parameter Information	
Parameter	**Effect**
Prm1	Intercept
Prm2	Ln_Mean_Household_In
Prm3	Sust Jers Certified
Prm4	Ln_Median_Home_Value
Prm5	No_Mortgage
Prm6	Pct_BSdegree_or_high
Prm7	Unemployment_Rate
Prm8	Alternative_Transpor

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Deviance	555	660.8623	1.1907
Scaled Deviance	555	660.8623	1.1907
Pearson Chi-Square	555	748.4332	1.3485
Scaled Pearson X2	555	748.4332	1.3485
Log Likelihood		103244.5363	

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Full Log Likelihood		-2536.7344	
AIC (smaller is better)		5091.4687	
AICC (smaller is better)		5091.7942	
BIC (smaller is better)		5130.4682	

Algorithm converged.

Analysis Of Maximum Likelihood Parameter Estimates							
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Intercept	1	5.1477	2.6953	-0.1351	10.4304	3.65	0.0562
Ln_Mean_Household_In	1	-1.5954	0.2609	-2.1068	-1.0840	37.38	<.0001
Sust Jers Certified	1	-0.2869	0.0916	-0.4664	-0.1074	9.81	0.0017
Ln_Median_Home_Value	1	0.7117	0.1714	0.3758	1.0476	17.25	<.0001
No_Mortgage	1	-1.6005	0.4579	-2.4979	-0.7030	12.22	0.0005
Pct_BSdegree_or_high	1	2.6931	0.5232	1.6676	3.7185	26.50	<.0001
Unemployment_Rate	1	-3.5964	1.5693	-6.6722	-0.5206	5.25	0.0219
Alternative_Transpor	1	-1.3664	0.4301	-2.2093	-0.5234	10.09	0.0015
Dispersion	1	0.6779	0.0436	0.5976	0.7690		

Note: The negative binomial dispersion parameter was estimated by maximum likelihood.

Brief interpretation of the model

This model finds seven different variables as significant in the Early Appliance Retirement program. Sustainable Jersey certification and education level are again found to be predictors, as are four wealth-related variables: Mean Household Income, Home Value, the unemployment rate, and the percentage of homes that have no mortgage on them.

The GENMOD Procedure

Model Information	
Data Set	SASUSER.DIRECT_INSTALL
Distribution	Negative Binomial
Link Function	Log
Dependent Variable	DI_2012
Offset Variable	Ln_CI_Parcels

Number of Observations Read	566
Number of Observations Used	566

Parameter Information	
Parameter	**Effect**
Prm1	Intercept
Prm2	Ln_Budget_per_cap
Prm3	Sust Jers Certified
Prm4	Audit_One_Building
Prm5	Upgrade_All_Building
Prm6	Donnelly
Prm7	Lime
Prm8	Hutchinson
Prm9	TriState

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Deviance	557	587.8905	1.0555
Scaled Deviance	557	587.8905	1.0555
Pearson Chi-Square	557	966.2929	1.7348
Scaled Pearson X2	557	966.2929	1.7348
Log Likelihood		822.1840	
Full Log Likelihood		-1030.4537	

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
AIC (smaller is better)		2080.9074	
AICC (smaller is better)		2081.3038	
BIC (smaller is better)		2124.2934	

Algorithm converged.

Analysis Of Maximum Likelihood Parameter Estimates						
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Intercept	1	-7.1759	0.7958	-8.7356	-5.6163	81.32	<.0001
Ln_Budget_per_cap	1	0.3249	0.1061	0.1168	0.5329	9.37	0.0022
Sust Jers Certified	1	-0.0757	0.2675	-0.6000	0.4486	0.08	0.7772
Audit_One_Building	1	-0.0994	0.3200	-0.7265	0.5277	0.10	0.7561
Upgrade_All_Building	1	0.0331	0.3021	-0.5590	0.6253	0.01	0.9127
Donnelly	1	0.3222	0.2221	-0.1131	0.7575	2.10	0.1469
Lime	1	1.0273	0.2114	0.6130	1.4416	23.62	<.0001
Hutchinson	1	0.4294	0.2081	0.0216	0.8373	4.26	0.0391
TriState	1	0.3985	0.2416	-0.0751	0.8720	2.72	0.0991
Dispersion	1	0.9503	0.1059	0.7639	1.1823		

Note: The negative binomial dispersion parameter was estimated by maximum likelihood.

The independent variables were removed in the following order using a stepwise regression procedure:

1. Upgrade All Buildings (Pr > ChiSq = .9127)
2. Sust Jers Certified (Pr > ChiSq = .7296)
3. Audit One Building (Pr > ChiSq = .4052)
4. Donnelly (Pr > ChiSq = .1545)
5. TriState (Pr > ChiSq = .3497)
6. Hutchinson (Pr > ChiSq = .2066)

This resulted in the final fitted model detailed on the following page:

The GENMOD Procedure

Model Information	
Data Set	SASUSER.DIRECT_INSTALL
Distribution	Negative Binomial
Link Function	Log
Dependent Variable	DI_2012
Offset Variable	Ln_CI_Parcels

Number of Observations Read	566
Number of Observations Used	566

Parameter Information	
Parameter	**Effect**
Prm1	Intercept
Prm2	Ln_Budget_per_cap
Prm3	Lime

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Deviance	563	588.7234	1.0457
Scaled Deviance	563	588.7234	1.0457
Pearson Chi-Square	563	973.4453	1.7290
Scaled Pearson X2	563	973.4453	1.7290
Log Likelihood		819.5325	
Full Log Likelihood		-1033.1052	
AIC (smaller is better)		2074.2104	
AICC (smaller is better)		2074.2817	
BIC (smaller is better)		2091.5648	

Algorithm converged.

Analysis Of Maximum Likelihood Parameter Estimates							
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Intercept	1	-6.7576	0.7716	-8.2699	-5.2454	76.71	<.0001
Ln_Budget_per_cap	1	0.3110	0.1074	0.1006	0.5215	8.39	0.0038
Lime	1	0.6834	0.1298	0.4290	0.9377	27.72	<.0001
Dispersion	1	0.9659	0.1070	0.7774	1.2001		

Note: The negative binomial dispersion parameter was estimated by maximum likelihood.

Brief interpretation of the model

This model finds two main factors that help predict involvement in the Direct Install program. The first of these is the natural log of the Municipal budget per capita. This is a reliable measure of a community's willingness to spend, and is strongly and positively correlated with participation in Direct Install. The second significant variable is for one of the county Direct Install contractors. Lime Energy serves the northeastern part of the state and performed significantly more work than the other contractors (even after adjusting for the size of the business population).

The GENMOD Procedure

Model Information	
Data Set	SASUSER.HPWES_DATA
Distribution	Negative Binomial
Link Function	Log
Dependent Variable	HPwES_2012
Offset Variable	Ln_OwnerOccupied

Number of Observations Read	563
Number of Observations Used	563

Parameter Information	
Parameter	**Effect**
Prm1	Intercept
Prm2	Ln_Mean_Household_In
Prm3	Sust Jers Certified
Prm4	Gas
Prm5	Electric
Prm6	Ln_Median_Home_Value
Prm7	No_Mortgage
Prm8	Pct_BSdegree_or_high
Prm9	Poverty_Rate
Prm10	Unemployment_Rate
Prm11	Alternative_Transportation
Prm12	% Pre-1940 Homes

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Deviance	551	592.6413	1.0756
Scaled Deviance	551	592.6413	1.0756
Pearson Chi-Square	551	714.7289	1.2971

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Scaled Pearson X2	551	714.7289	1.2971
Log Likelihood		5315.1892	
Full Log Likelihood		-1284.8578	
AIC (smaller is better)		2595.7156	
AICC (smaller is better)		2596.3787	
BIC (smaller is better)		2652.0483	

Algorithm converged.

Analysis Of Maximum Likelihood Parameter Estimates							
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Intercept	1	5.7895	5.1887	-4.3801	15.9592	1.25	0.2645
Ln_Mean_Household_In	1	0.5740	0.4969	-0.3999	1.5478	1.33	0.2480
Sust Jers Certified	1	-0.0668	0.1385	-0.3382	0.2047	0.23	0.6297
Gas	1	2.1471	0.3929	1.3770	2.9173	29.86	<.0001
Electric	1	3.5132	1.1024	1.3526	5.6737	10.16	0.0014
Ln_Median_Home_Value	1	-1.6881	0.2624	-2.2025	-1.1738	41.38	<.0001
No_Mortgage	1	-0.7155	0.8112	-2.3055	0.8745	0.78	0.3778
Pct_BSdegree_or_high	1	3.3955	0.8846	1.6618	5.1292	14.74	0.0001
Poverty_Rate	1	3.5894	1.7573	0.1452	7.0335	4.17	0.0411
Unemployment_Rate	1	-1.3036	2.6458	-6.4892	3.8820	0.24	0.6222
Alternative_Transpor	1	-2.9021	0.8044	-4.4787	-1.3255	13.02	0.0003
% Pre-1940 Homes	1	1.3739	0.4482	0.4954	2.2524	9.40	0.0022
Dispersion	1	1.2100	0.1074	1.0168	1.4400		

Note: The negative binomial dispersion parameter was estimated by maximum likelihood.

The independent variables were removed in the following order using a stepwise regression procedure:

1. Sust Jers Certified (Pr > ChiSq = .6297)
2. Unemployment Rate (Pr > ChiSq = .6139)
3. No Mortgage (Pr > ChiSq = .3711)
4. Ln Mean Household Income (Pr > ChiSq = .1817)
5. Poverty Rate (Pr > ChiSq = .1207)

This resulted in the final fitted model detailed here**:**

The SAS System

The GENMOD Procedure

Model Information	
Data Set	SASUSER.HPWES_DATA
Distribution	Negative Binomial
Link Function	Log
Dependent Variable	HPwES_2012
Offset Variable	Ln_OwnerOccupied

Number of Observations Read	563
Number of Observations Used	563

Parameter Information	
Parameter	**Effect**
Prm1	Intercept
Prm2	Gas
Prm3	Electric
Prm4	Ln_Median_Home_Value
Prm5	Pct_BSdegree_or_high
Prm6	Alternative_Transpor
Prm7	% Pre-1940 Homes

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Deviance	556	593.5989	1.0676
Scaled Deviance	556	593.5989	1.0676
Pearson Chi-Square	556	726.4334	1.3065
Scaled Pearson X2	556	726.4334	1.3065
Log Likelihood		5312.4430	
Full Log Likelihood		-1287.6040	
AIC (smaller is better)		2591.2080	
AICC (smaller is better)		2591.4680	
BIC (smaller is better)		2625.8743	

Algorithm converged.

Analysis Of Maximum Likelihood Parameter Estimates							
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Intercept	1	11.7260	2.6967	6.4405	17.0114	18.91	<.0001
Gas	1	2.0087	0.3729	1.2779	2.7395	29.02	<.0001
Electric	1	2.9339	0.9633	1.0458	4.8220	9.28	0.0023
Ln_Median_Home_Value	1	-1.6513	0.2252	-2.0926	-1.2100	53.78	<.0001
Pct_BSdegree_or_high	1	3.7820	0.5709	2.6631	4.9009	43.89	<.0001
Alternative_Transpor	1	-2.2656	0.6882	-3.6144	-0.9169	10.84	0.0010
% Pre-1940 Homes	1	1.1977	0.4169	0.3805	2.0148	8.25	0.0041
Dispersion	1	1.2259	0.1081	1.0313	1.4573		

Note: The negative binomial dispersion parameter was estimated by maximum likelihood.

Brief interpretation of the model

This model finds six main factors that help predict involvement in the Home Performance with ENERGY STAR program. Not surprisingly, municipalities whose primary source of fuel for their homes is natural gas or electricity are more likely to participate in the HPwES program. In addition, communities with a

higher percentage of older homes (those built pre-1940) are also more likely to participate. Home value and education level again are found significant here, as is the measure for those who do not drive to work alone.

The results of these regressions is very encouraging, because the models are very robust and allow us to now assess the performance of Cherry Hill, Highland Park, and Montclair against the other 563 municipalities in the past two years.
The results of this examination show that, in fact, the work done in all three towns has had very significant improvements in program participation. In most cases, the effects have been positive, but in a few they show some failings of the Climate Showcase effort.

Here are the results, sorted first by NJ CEP program and then by municipality, for the Climate Showcase towns. I have bolded in blue font those programs and towns that show ***positive*** statistically significant findings. Also bolded in red font are those programs and towns that show ***negative*** statistically significant findings. For those programs where the actual value falls within the 95% confidence level, there is no finding of statistical significance. Those cases are listed in black font.

Energy Efficient Appliances

Municipality	Totals for 2011-2012	Predicted Value	Lower Bound 95%	Upper Bound 95%	Statistically Significant ?	Program Effect	Plus/Minus % of Effect
Cherry Hill	***1,011***	***720.67***	***625.9***	***829.79***	***Yes***	***290***	***40%***
Highland Park	***71***	***104.87***	***89.59***	***122.75***	***Yes***	***-34***	***-32%***
Montclair	***205***	***342.66***	***291.03***	***403.43***	***Yes***	***-138***	***-40%***
Total CSC Grant	***1,287***	***1168.2***				***119***	***+ 10%***

Early Appliance Retirement

Municipality	Totals for 2011-2012	Predicted Value	Lower Bound 95%	Upper Bound 95%	Statistically Significant ?	Program Effect	Plus/Minus % of Effect
Cherry Hill	*399*	*296.22*	*241.16*	*363.85*	*Yes*	*103*	*35%*
Highland Park	*49*	*59.53*	*44.99*	*78.75*	*No*	*n/a*	*n/a*
Montclair	*94*	*147*	*117.76*	*183.5*	*Yes*	*-53*	*-36%*
Total CSC Grant	*493*	*443.22*				*50*	***+ 11%***

Direct Install

Municipality	Totals for 2012	Predicted Value	Lower Bound 95%	Upper Bound 95%	Statistically Significant ?	Program Effect	Plus/Minus % of Effect
Cherry Hill	*17*	*8.74*	*7.52*	*10.16*	*Yes*	*8*	*95%*
Highland Park	*3*	*1.81*	*1.56*	*2.1*	*Yes*	*1*	*66%*
Montclair	*19*	*14.01*	*11.3*	*17.36*	*Yes*	*5*	*36%*
Total CSC Grant	*39*	*24.56*				*14*	***+ 59%***

Home Performance with ENERGY STAR

Municipality	Totals for 2012	Predicted Value	Lower Bound 95%	Upper Bound 95%	Statistically Significant ?	Program Effect	Plus/Minus % of Effect
Cherry Hill	*127*	*77.97*	*58.99*	*103.07*	*Yes*	*49*	*63%*
Highland Park	*26*	*9.82*	*7.14*	*13.5*	*Yes*	*16*	*165%*
Montclair	*13*	*14.33*	*9.85*	*20.85*	*No*	*n/a*	*n/a*
Total CSC Grant	*153*	*87.79*				*65*	***+ 74%***

Cherry Hill

Program	Participation	Predicted Value	Statistically Significant?	Program Effect	Plus/Minus % of Effect
Energy Efficient Appliances	*1,011*	*720.67*	*Yes*	*290*	*40%*
Early Appliance Retirement	*399*	*296.22*	*Yes*	*103*	*35%*
Direct Install	*17*	*8.74*	*Yes*	*8*	*95%*
Home Performance with Energy Star	*127*	*77.97*	*Yes*	*49*	*63%*

Highland Park

Program	Participation	Predicted Value	Statistically Significant?	Program Effect	Plus/Minus % of Effect
Energy Efficient Appliances	*71*	*104.87*	*Yes*	*-34*	*-32%*
Early Appliance Retirement	*49*	*59.53*	*No*	*n/a*	*n/a*
Direct Install	*3*	*1.81*	*Yes*	*1*	*66%*
Home Performance with Energy Star	*26*	*9.82*	*Yes*	*16*	*165%*

Montclair

Program	Participation	Predicted Value	Statistically Significant?	Program Effect	Plus/Minus % of Effect
Energy Efficient Appliances	*205*	*342.66*	*Yes*	*-138*	*-40%*
Early Appliance Retirement	*94*	*147*	*Yes*	*-53*	*-36%*
Direct Install	*19*	*14.01*	*Yes*	*5*	*36%*
Home Performance with Energy Star	*13*	*14.33*	*No*	*n/a*	*n/a*

Looking at the efficacy of the Climate Showcase effort in this way shows a pretty impressive record as a group. All four programs had at least 10% statistically significant increases in the Showcase towns, with the more-targeted Direct Install and Home Performance efforts showing 60-75% gains over what would be expected all other things held constant.

Digging a little more deeply into the numbers in the individual towns gives even more insight. While it was apparent to everyone that the Highland Park HPwES program has been a major success, it is nice to see that the scaled back approach being used in Cherry Hill is also effective. The major takeaways from this analysis seem to be the reinforcement of the idea that Cherry Hill did an outstanding job implementing the program as originally intended. That is, they pushed hard on the outreach side at both the residential and commercial level, and the results are clearly evident. In all four programs, they showed statistically significant and positive findings. Cherry Hill had an average increase of 58% in these four programs over what would be expected.

The results also reinforce what was already obvious in the success of the more-targeted Direct Install and HPwES efforts in Montclair and Highland Park. The negative statistical findings on the residential outreach programs in Highland Park and Montclair reinforce what the energy coordinators in those towns were telling the project leaders at TCNJ. For whatever reason, their efforts to connect in those communities in the way that Cherry Hill did were not successful.

Challenges and Lessons Learned

Many grant program evaluations focus primarily on measuring the specific target goal outcomes set at the beginning of the process, this effort also wants to create replicable models. As the previous regression analysis demonstrates, measuring the success of the NJ Seed effort solely through the lens of how closely we came to our carbon emission reduction goals would be misleading indeed. While our outcome numbers may be lacking from our original goal, we are very confident that if we had to do this all over again that we have learned many things that would help to successfully inform our second attempt. In addition, many of the programs we put into place are only now hitting their peak output. We expect significant new increases in the period immediately following this report that will put the total GHG reductions much closer to the target.

Besides the focus on quantitative outcomes, we looked at two other important areas when conducting our program evaluation. Those areas are "context evaluation" and "implementation evaluation". An examination of both proves very instructive for our efforts over the last few years.

In general, a context evaluation asks: ***"What about our community and our umbrella organization hinders or helps us achieve project goals? Which contextual factors have the greatest bearing on project successes or stumbling blocks?"*** Context evaluation may focus on gathering contextual information to modify project plans and/or explain past problems (e.g., slower than anticipated growth); identifying the political, social, and environmental strengths and weaknesses of both the community and the project; and/or examining the impact of changing federal and state climates on project implementation and success.

In regards to this project, the project participants I interviewed identified three key contextual elements that worked to hinder our progress. First, and perhaps most significantly, the grant happened to coincide with the worst economic climate to prevail in the United States in about 80 years. Many of the things we were asking people to do involved an initial investment of varying degrees, and given the state of the economy it is understandable that people may have been reluctant to entertain such expenditures until the economic outlook improved somewhat.

The second, and perhaps related issue, is the contextual climate of the NJ BPU Clean Energy budget. Having based a lot of the early planning on a series of actions that were subsequently eliminated (the Community Partners Initiative) put a serious dent in our ability to move productively forward. The loss of time and

momentum at the outset of the project as a result of these changes took away our opportunity to have two implementation phases. In addition, there was a perceived instability in the state programs we were promoting that caused the potential customers to be skeptical of our program. Given the success of our approaches when we finally did get rolling in early 2012, we are exceedingly confident that we could have produced larger results if we had another year to implement our plans.

Finally, one of the three municipalities indicated that the governing body, while supportive in public forums, did very little to coordinate its efforts with the program as originally formulated. The energy coordinator in that municipality noted that this was a real deterrent to success, and was a political context out of our control.

"Implementation context" refers to the general set of questions about the mechanisms used to achieve the program's stated goals. Specific questions might include:

- What characteristics of the project implementation process have facilitated or hindered project goals? (Include all relevant stakeholders in this discussion, such as clients/participants, residents/consumers, staff, administrators, board members, other agencies, and policymakers.)
- Which initial strategies or activities of the project are being implemented? Which are not? Why or why not?
- How can those strategies or activities not successfully implemented be modified or adapted to the realities of the project?
- Is the project reaching its intended audience? Why or why not? What changes must be made to reach intended audiences more effectively?
- What lessons have been learned about the initial planned program design? How should these lessons be utilized in continually revising the original project plan? Do the changes in program design reflect these lessons or other unrelated factors (e.g., personalities, organizational dynamics, etc.)? How can we better connect program design changes to documented implementation lessons?

In reviewing the challenges we faced, a few seemed to have real consequences that, combined with the context problems mentioned above, really slowed down progress in the first 18 months of the project. The first of these was the turnover rate and timing of personnel on the project. Over the life of the project, the grant administrator point person changed twice, one of the energy coordinators left and needed to be replaced, and when the energy model tool needed to be reworked in light of the cancellation of the CPI program, administrative red tape held up the hire of a project coordinator who would

eventually be responsible for retooling that important model. The effect of these changes was that the project did not really start to click and get any positive momentum until well into 2011.

A second challenge in regard to project implementation was that the energy coordinators seemed to be at a loss for what to do to promote the program in phase one while they waited for the energy model to be completed. While a set of program marketing tools was provided and a web site was set up to implement the initial plan, the energy coordinators did not make the most effective use of that early period. When questioned on this, it was discovered that there were some serious functionality issues with the web sites. This problem also took quite a while to correct, and, added to the other complications, really took a toll on the ability for the program to get any positive momentum.

All three of the energy coordinators indicated in their exit interviews that they felt the approach to use the web sites was not a productive one. They all agreed that at the outset this seemed like a good idea – however, it was very difficult to get any traction from the community to use the web site for taking the pledges. Since a large part of the initial strategy was to leverage those pledge contacts into actions by following up with them, the fact that people were for whatever reason not inclined to take the pledge online seriously interfered with the ability for the coordinators to get a feel for how much of a difference they were making in the community.

Closely tied to the issue of the reluctance of people to pledge and be tracked online was the time commitment required to effectively implement our fallback plan. We learned that having only one energy coordinator working part time in a community (20 hours/week) limited our ability to do justice to the ambitious campaigns we had outlined. In addition, since the energy coordinators were part-time, in all cases they had other job responsibilities that prevented them from being fully committed to our effort. So, while those community members who did get contacted by the campaign had a very positive reaction to their experiences, it is very likely that large portions of the community never became aware of the program during the entire project lifecycle. A key lesson to be learned is that either the ambitions of the program need to be scaled back to the available personnel, or else the personnel resources need to be increased. In fact, in Montclair and Highland Park when the energy coordinators focused their efforts on the very specific actions on Direct Install and the Home energy assessment program, they were able to devote enough of a critical mass of time to it to ensure that it was successful.

Finally, although it was not as critical an issue as the other implementation items already outlined, the physical distance of the project lead from the three towns sometimes slowed progress. While the group was engaged weekly by teleconference to discuss progress, over time it is hard to keep everyone on task as the project lead without seeing them in person on a semi-regular basis (meeting in person about once a month would be a reasonable time frame to facilitate such communication and keep open important lines of communication).

Other issues that are specific to our effort that can inform future attempts to replicate our program include:

- The communities did not really rally around the targets and plans as we had originally expected. The campaign as a "campaign" never took root in the towns. This was due to inadequate buy-in and effort from the municipal leadership. In the future, we would expend more resources building and nurturing these relationships.
- We only got traction when we moved from the campaign model, with multiple actions, to single action programs that were more heavily promoted.
- The community wide campaign model may still be an effective tool, but to do successfully would require more resources and more buy-in from the municipalities.

Sustainability and Replication

There are two significant advances from the NJ Seed project that will live well beyond the grant period and which will have significant positive effects on climate change mitigation programs going forward both in New Jersey and nationally.

Spreadsheet Energy Model tool

We received a large number of requests for a copy of the energy model action assessment tool. A few of these requests came from people within New Jersey who heard of the work we were doing and were interested in the interactive nature of the approach we were using. However, the bulk of these requests came after we demonstrated the tool on one of the EPA national webinars in July of 2011. Unfortunately, we never were able to provide extensive documentation on how to use the tool during the grant period since we were too busy following its use with program implementation. Perhaps now that the grant period is over, we can revisit creating a user guide and share it with those who expressed interest.

New Actions in Sustainable Jersey program

One of the explicit goals for this project was to turn the successful efforts that arose from our work into a template for use in the Sustainable Jersey program. As discussed earlier in this report, we have been very pleased with the outstanding response to the pilots we ran on Direct Install in Montclair and on the Home Performance with ENERGY STAR program in Highland Park. The NJ Board of Public Utilities has asked us to take the lead on marketing these approaches in 2013, and as a result of the workshops we conducted over the past 6 months we have received input from several New Jersey municipalities that plan to try these approaches.

In fact, Woodbridge Township in Middlesex County has entered into an agreement with the same home energy audit contractor that Highland Park used for their program (Ceil Power) to run an identical program in Woodbridge over the next year. The potential for success in Woodbridge in tremendous, especially given that their residential homes base is roughly ten times greater than that of Highland Park. The new action as outlined in the Sustainable Jersey program guides municipalities through the process of creating a "Town-Wide Home Energy Assessment and Upgrade Program." Implementing this action can be done by leveraging existing state incentives at NO COST to local governments. Local

governments can market this as a new municipal program that provides significant benefits to residents, but costs the town nothing to implement.

The crux of the program is to identify a single, municipally approved contractor to perform energy audits through a competitive RFP process. No money changes hands between the municipality and the contractor. Rather, the RFP process enables the municipality to negotiate the price and quality of the energy audit on behalf of its residents, making the process safer and simpler for residents. We have provided a model RFP that has been tested successfully, and all the materials needed to implement the program are also provided.

Municipalities will earn 20 points toward certification for implementing this action. A second action relating to Home Performance (titled "Home Performance with ENERGY STAR – Outreach") is also being offered that will earn a municipality 10 points toward certification. This second path only requires the municipality to perform outreach to residents about Home Performance with ENERGY STAR, but will not require the issuance of an RFP by the municipality that results in a single energy audit provider. Instead, points will be earned by engaging in more general outreach and promotion.

The new action based on the Montclair Direct Install pilot program has actually also been started by Highland Park during the summer of 2012, and they enjoyed a similar response rate from the business community. The State of New Jersey has actually increased the cost share they pay under this program to 70% of the cost of building upgrades in 2012 (it was 60% previously). However, despite the lucrative benefits, the program is not well known and the vast majority of eligible NJ businesses have not taken advantage.

This new action in Sustainable Jersey leverages the existing Direct Install program by asking municipalities to help the local business take advantage of these savings. Specifically, this action asks municipalities to partner with the State program to promote Direct Install to local businesses. If done right, this action will be seen as a valuable municipal initiative that provides help to local businesses, at no cost to the local tax payers. This is a big win for all involved.

The Direct Install program was specifically designed for existing small to mid-sized facilities. The business owner is provided with a simple, turn-key process that utilizes a single pre-selected State contractor throughout the project. This begins with a free, no obligation energy assessment of the facility and ends with the installation of eligible energy-efficient equipment. The program is also attractive to businesses due to its quick turnaround time. In many cases, project installations are completed within 90 days of scheduling the original energy

assessment. As noted, only 30% of the costs are incurred by the business owner, and the State pays the balance directly to the contractor. These project upgrades quickly pay for themselves through dramatically reduced energy costs on the business' monthly utility bills.

Despite the tremendous advantages Direct Install offers, the vast majority of eligible businesses have yet to participate in the program. In many cases, this is due to a combination of two factors: (1) a general lack of awareness regarding Direct Install in the small business community, and (2) skepticism in the small business community concerning the potential cost savings associated with energy upgrades. This new action in the Sustainable Jersey program offers points towards certification for municipalities who take leadership in helping the business community take advantage of the lucrative incentives available to upgrade their physical infrastructure.

Municipalities will earn 10 points for implementing an outreach and education effort detailing the advantages of the Direct Install program for local businesses. Municipalities get those points for making the effort, regardless of how successful the program is. A separate stand-alone action (titled "Direct Install – Achieving Target Increase in Local Business Participation") is also available for municipalities who are successful in getting 5% of their eligible local businesses to participate (this is the normal success rate where this has been tried). A municipality can earn 10 points towards certification if the local program reaches the participation goal.

NJSEED Financial Summary Narrative

Overview

The New Jersey Sustainable Energy Efficiency Demonstration (NJSEED) project's budget totaled $750,000.00 with $250,000.00 representing In-Kind contributions. The majorities of funds was allocated to contractual obligations and were subaward agreements to project partners. The contractual line represented 83% of the project's grant funds ($418,000.00) with the remaining $82,000.00 being utilized by the prime, Cherry Hill Township.

The Grant funds can also be broken down into two categories, Municipal and Technical. The three Municipalities (Cherry Hill Township, Borough of Highland Park, and the Township of Montclair) were given funds to hire Energy Outreach Coordinators and fund their activities. The remaining funds of $268,000.00 were allocated for Technical Support/Analysis (College of New Jersey's Municipal Land Use Center, New Jersey Sustainable State Institute – Rutgers, and the New Jersey Clean Energy Office).

Table 1: NJSEED Budget and Final Expenditures

	Budget Amount			Final Expenditures		
	Grant Funds	In-Kind	Total	Grant Funds	In-Kind	Total
Personnel	**$60,000.00**	**$37,206.00**	**$97,206.00**	**$60,495.17**	**$66,760.39**	**$127,255.56**
Fringe Benefits	**$0.00**	**$14,989.00**	**$14,989.00**	**$0.00**	**$17,553.18**	**$17,553.18**
Travel	**$3,000.00**	**$0.00**	**$3,000.00**	**$2,274.08**	**$0.00**	**$2,274.08**
Equipment	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Supplies	**$19,000.00**	**$6,000.00**	**$25,000.00**	**$33,526.25**	**$8,207.85**	**$41,734.10**
Contractual	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Construction	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Other	**$418,000.00**	**$191,805.00**	**$609,805.00**	**$403,704.50**	**$3,181,344.53**	**$3,585,049.03**
MLUC@TCNJ	$253,000.00	$100,284.00	$353,284.00	$274,762.93	$104,609.00	$379,371.93
Montclair	$75,000.00	$28,277.00	$103,277.00	$57,417.22	$34,227.50	$91,644.72
Highland Park	$75,000.00	$4,860.00	$79,860.00	$71,524.35	$25,299.21	$96,823.56
New Jersey League of Municipalities	$15,000.00	$0.00	$15,000.00	$0.00	$0.00	$0.00
NJ Clean Energy Office	$0.00	$58,384.00	$58,384.00	$0.00	$3,017,208.82	$3,017,208.82
Total	***$500,000.00***	***$250,000.00***	***$750,000.00***	***$500,000.00***	***$3,273,865.95***	***$3,773,865.95***

Changes to the Budget

Due to matters outside of our control, such as reductions in state funding and personnel movement, the NJSEED project experienced a late start. Randy Solomon, the NJSEED's Technical Lead and his staff moved from Rutgers University to the College of New Jersey's Municipal Land Use Center (MLUC). Under the new agreement, MULC would pick up all the responsibilities originally given to Rutgers in addition to their In-Kind requirements. By July 2010 the transition was completed and all subaward documentation was finalized.

A few months later, each municipal partner forfeited a total of $7,333.33 of their budget to MLUC to procure the help of Design for Social Impact. Design for Social Impact assisted the team by facilitating creative brainstorming, messaging, and outreach training. This amendment raised the MLUC Subaward Agreement to $275,000.00; see Adjusted Budget in Table 2.

As we neared the end of the grant period, the municipalities and partners who were not meeting their spending requirements forfeited their remaining funds to the municipalities who had spending plans and were on target to spend all funds by the end of the grant period and/or subaward agreement. Table 2 (see next page) shows where funds were forfeited and reallocated.

In-Kind Requirements

The NJSEED Project had an In-Kind Requirement of $250,000.00 which was spread out across all the participating partners. Table 1 illustrates each partner's In-Kind requirement and their ending balance. All partners exceeded their requirements with a total of $3,258,433.35 of In-Kind contributions equating to an overage of $3,008,433.35. The majority of In-Kind contributions came from the NJ Clean Energy Office with a total of $3,017,208.82. This dollar figure represents the actual dollars paid out in incentives by the state to the programs implemented in the participating municipalities.

Table 2: NJSEED Partner Spending and In-Kind Tracking

			Original Budget	Adjusted Budget	Final Expenditures	Difference
Cherry Hill						
	Grant Funds		**$82,000.00**	**$86,666.68**	**$96,295.50**	**$9,628.82**
		Labor	$60,000.00	$60,000.00	$60,495.17	$495.17
		Other	$22,000.00	$26,666.68	$35,800.33	$9,133.65
	In-Kind		**$58,195.00**	**$58,195.00**	**$92,521.42**	**$34,326.42**
College of NJ						
	Grant Funds		**$253,000.00**	**$275,000.00**	**$274,762.93**	**-$237.07**
		Labor	$157,352.00	$157,352.00	$157,347.11	-$4.89
		Other	$95,648.00	$117,648.00	$117,415.82	-$232.18
	In-Kind		**$100,284.00**	**$100,284.00**	**$89,176.40**	**-$11,107.60**
Montclair						
	Grant Funds		**$75,000.00**	**$66,366.66**	**$57,417.22**	**-$8,949.44**
		Labor	$60,000.00	$60,000.00	$53,531.25	-$6,468.75
		Other	$15,000.00	$6,366.66	$3,885.97	-$2,480.69
	In-Kind		**$28,277.00**	**$28,277.00**	**$34,227.50**	**$5,950.50**
Highland Park						
	Grant Funds		**$75,000.00**	**$71,966.66**	**$71,524.35**	**-$442.31**
		Labor	$60,000.00	$60,000.00	$60,000.00	$0.00
		Other	$15,000.00	$11,966.66	$11,524.35	-$442.31
	In-Kind		**$4,860.00**	**$4,860.00**	**$25,299.21**	**$20,439.21**
New Jersey League of Municipalities						
	Grant Funds		**$15,000.00**	**$0.00**	**$0.00**	**$0.00**
		Labor	$15,000.00	$0.00	$0.00	$0.00
		Other	$0.00	$0.00	$0.00	$0.00
	In-Kind		**$0.00**	**$0.00**	**$0.00**	**$0.00**
NJ Clean Energy Office						
	Grant Funds		**$0.00**	**$0.00**	**$0.00**	**$0.00**
		Labor	$0.00	$0.00	$0.00	$0.00
		Other	$0.00	$0.00	$0.00	$0.00
	In-Kind		**$58,384.00**	**$58,384.00**	**$3,017,208.82**	**$2,958,824.82**

			Original Budget	Adjusted Budget	Final Expenditures	Difference
Totals						
	Grant Funds		$500,000.00	$500,000.00	$500,000.00	**$0.00**
	In-Kind		$250,000.00	$250,000.00	$3,258,433.35	**$3,008,433.35**

Deliverables/Products

A copy of all of the deliverables and products from this grant is provided in the Appendix.

Note that there are a number of deliverables that make more sense to include on a CD-ROM disc than to reproduce in print here (for example):

- The Energy Spreadsheet model tool
- Public Service announcements produced in Montclair and Highland Park

Provide copies of all materials produced under this funding agreement and other supplemental information. Examples include: fliers/brochures, reports, meeting agendas, websites, white papers, DVDs, photos and videos, press coverage of events, etc. Documents may be submitted electronically, and physical copies of other materials (e.g. DVDs, yard signs, etc) should be provided. Please include URLs for websites.