

US EPA ARCHIVE DOCUMENT

New Jersey Sustainable Energy Efficiency Demonstration Projects (NJ SEED)

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Project Description

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 leveraging state and federal support
- How to share information on measures that reduce GHG emissions among residents and businesses.



Project Description

- Led by Sustainable Jersey and The College of New Jersey
- Three pilot municipalities:
 - Cherry Hill – pop. 75k
 - Montclair – pop. 35k
 - Highland Park – pop. 15k



Sustainable Jersey

Certification program for municipalities in New Jersey:

- Identifies **actions** to implement to help towns become more sustainable
- Provides **tools, resources, and guidance** to enable communities to make progress
- Provides access to **grants and funding** for municipalities that are working toward certification
- Coordinates public and private partners to align priorities and guide resources



Program Impact



- Program Launch 2009
- 410 (73%) NJ municipalities participating
- 83% of NJ's population lives in these communities
- 139 municipalities certified:
 - 117 towns at bronze level
 - 22 towns at silver level



Participating Communities



Certification Steps

- Pass a resolution; register municipality online
- Form Green Team
- Implement actions to score 150/350 points
- Submit documentary evidence for each action
- Certification awarded after review and verification



Program Impact

- Since 2010, over 4,000 discrete actions have been implemented and documented for certification
- Hundreds of formal “Green Teams” have been formed by local governments
- Over \$100,000,000 in incentives, grants, and leveraged resources to municipalities



Actions

- Concrete steps municipalities can implement to become certified and more sustainable; actions include:
 - Ordinances
 - Programs and Plans
 - Policies and procedures
 - Retrofit or renovation of facilities



Who Created The Actions/Standards?

- To create rigorous and broadly accepted standards
- Organized 22 Taskforces to identify best practices in their topic area
- Over 300 volunteer leaders from:
 - Academia
 - the non-profit sector
 - the business community, and
 - state, local, federal, and county government
- Identified top actions for local governments to undertake
- Coordinate responses - incentives, assistance, policy



Policy Alignment w/ Other Organizations

- Energy Audits: NJ Board of Public Utilities
- Walking and Wellness: Mayor's Wellness Campaign, NJ Dept. of Health
- Natural Resource Inventory: Assoc NJ Environmental Commissions
- Energy Star: US Environmental Protection Agency
- Anti-Idling: NJ Environmental Federation
- Lead: NJ Public Advocates Office
- Green Building: USGBC, Somerset Partnership
- Land Use: New Jersey Future (Land Use NGO)
- Recycling and Waste, Water and Resource Protection Ordinances: NJ Department of Environmental Protection



Tools, Training and Guidance

Who to Involve

Timeframe

Project Costs

Why Important

What to Do

Submission
Requirements

Spotlight

Resources

- Each “action” comes with a detailed tool and step by step “how to” directions
- Access to free Sustainable Jersey workshops, trainings, webinars and resource center
- Individualized support
- Partner organizations (public and private) provide technical assistance



CSC - NJSEED Methods of Implementation

- Work with three New Jersey municipalities to set energy use and GHG emission reduction targets
- Implementation programs to help residents, businesses, and local government reduce energy use and GHG emissions linked to the targets
- Modeling anticipated impacts and quantitatively documenting actual reductions for research purposes
- Rolling out new best practices through the Sustainable Jersey program



Process Tasks - Phase 1 (Planning)

- *Establish data collection protocols for Green House Gas (GHG) inventory and energy usage data.*
- *Develop a carbon footprint for both the municipal government and the community as a whole.*
- *Identify current programs and policies.*
- *Identify all state, federal, county, and private resources and funds that can be leveraged, Special focus was placed on leveraging the NJBPU New Jersey Clean Energy program, federal programs, and the actions and resources in Sustainable Jersey.*



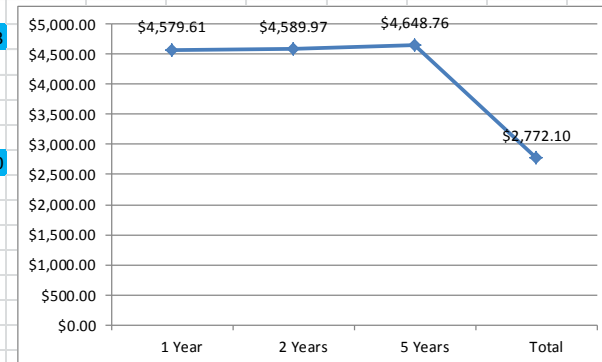
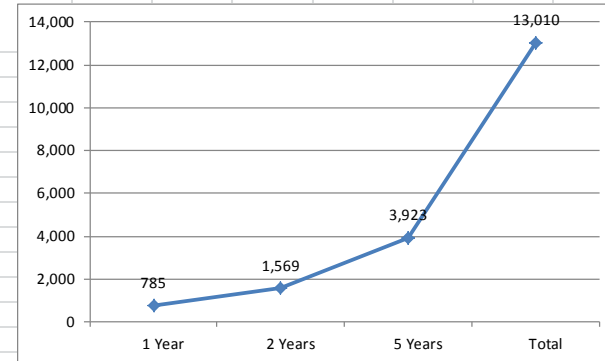
Process Tasks - Phase 1 (Planning)

- *Develop aggressive, but realistic, targets derived from the data and modeling*
- *Develop strategies and model them to show cost, impact on energy usage and GHG and other benefits*
- *Review impact of policies relative to targets using modeling tool*
- *Refine and select final slate of programs to implement.*



Spreadsheet Energy Modeling Tool

Action	# of Units Carbon in Metric Tons	Total Costs	Total Benefits	Unit Costs	Unit Benefits	\$ per Unit of Carbon
EE in New Municipal Buildings	Assumes New 20,000 Sq. Ft. Municipal Building					
1 Year	30	\$60,000	\$6,892	\$1,999.88	\$229.73	-\$1,770.15
2 Years	60	\$60,000	\$13,199	\$999.94	\$219.97	-\$779.97
5 Years	150	\$60,000	\$32,976	\$399.98	\$219.83	-\$180.15
Total	660	\$60,000	\$99,293	\$90.90	\$150.43	\$59.53
Retro Commissioning	# of 20,000 Sq. Foot Municipal Buildings					
1 Year	24	\$6,000	\$5,514	\$249.96	\$229.72	-\$20.24
2 Years	48	\$6,000	\$10,560	\$124.98	\$219.97	\$94.99
5 Years	120	\$6,000	\$26,383	\$49.99	\$219.82	\$169.83
Total	528	\$6,000	\$79,441	\$11.36	\$150.43	\$139.07
x Lighting Upgrades	Based on 400 fixtures T12 to T8					
1 Year	18	-\$444	\$4,080	-\$25.20	\$231.56	\$256.75
2 Years	35	-\$444	\$7,799	-\$12.60	\$221.30	\$233.90
5 Years	88	-\$444	\$19,464	-\$5.04	\$220.93	\$225.97
Total	264	-\$444	\$44,529	-\$1.68	\$168.47	\$170.15
Dual-Technology Occupancy Sensors	Assumes installation of 23 sensors					
1 Year	12	\$3,335	\$2,818	\$274.02	\$231.56	-\$42.47
2 Years	24	\$3,335	\$5,387	\$137.01	\$221.30	\$84.28
5 Years	61	\$3,335	\$13,444	\$54.80	\$220.93	\$166.12
Total	183	\$3,335	\$30,756	\$18.27	\$168.47	\$150.21
LED Exit Signs	Assumes 10 incandescent signs replaced					
1 Year	2	\$310	\$433	\$165.89	\$231.56	\$65.67
2 Years	4	\$310	\$827	\$82.94	\$221.30	\$138.35
5 Years	9	\$310	\$2,064	\$33.18	\$220.93	\$187.75
Total	34	\$310	\$5,420	\$9.22	\$161.14	\$151.92
Plug Loads - Power Management Software	Assumes 10 computers and 2 vending machines					
1 Year	6	\$530	\$1,391	\$88.20	\$231.56	\$143.36
2 Years	12	\$530	\$2,660	\$44.10	\$221.30	\$177.20
5 Years	30	\$530	\$6,638	\$17.64	\$220.93	\$203.29
Total	132	\$530	\$20,041	\$4.01	\$151.60	\$147.59
Energy Star Appliances and Office Equipment	Assumes 10 computers, 2 refrigerators, and 2 water coolers					
1 Year	2	\$1,240	\$486	\$590.90	\$231.56	-\$359.34
2 Years	4	\$1,240	\$929	\$295.45	\$221.30	-\$74.15
5 Years	8	\$1,240	\$1,843	\$147.72	\$219.53	\$71.80
Total	8	\$1,240	\$1,672	\$147.72	\$199.16	\$51.44



Process Tasks - Phase 1 (Planning)

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



Process Tasks - Phase 2 (Implementation)

- *Establish the local Project Team 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.*



Process Tasks - Phase 2 (Implementation)

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



Process Tasks - Phases 3 and 4

Phase 3 – 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.

Phase 4 – Program Implementation: The project team and the municipal participants will implement the programs developed in Phase III in a manner similar to that of Phase II.



Process Tasks - Phase 5 (Results)

Two Approaches:

- Comparison of pledges vs. goals
- Regression Analysis of program effectiveness



Comparison of Pledges vs. Goals

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	
		Target goal	23,692	
		% of Goal	49%	



Regression Analysis

We developed models to identify significant variables that affected participation in each of the following NJ Clean Energy Programs:

- Energy Efficient Appliances program
- Early Appliance Retirement program
- Direct Install
- Home Performance with ENERGY STAR

This was done using data for all 565 NJ municipalities



Regression Analysis

We then applied the model to the three NJ SEED municipalities and established a range of expected outcomes for each program at the 95% confidence level.

For those towns/programs that fell outside of the expected range, we attributed this to the effects of the work done through the Climate Showcase Program



Regression Analysis - Results by Program

Energy Efficient Appliances

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



Regression Analysis - Results by Program

Early Appliance Retirement

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

Regression Analysis - Results by Program

Direct Install

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



Regression Analysis - Results by Program

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
<i>Cherry Hill</i>	<i>127</i>	<i>77.97</i>	<i>58.99</i>	<i>103.07</i>	<i>Yes</i>	<i>49</i>	<i>63%</i>
<i>Highland Park</i>	<i>26</i>	<i>9.82</i>	<i>7.14</i>	<i>13.5</i>	<i>Yes</i>	<i>16</i>	<i>165%</i>
<i>Montclair</i>	<i>13</i>	<i>14.33</i>	<i>9.85</i>	<i>20.85</i>	<i>No</i>	<i>n/a</i>	<i>n/a</i>
<i>Total CSC Grant</i>	<i>153</i>	<i>87.79</i>				<i>65</i>	<i>+ 74%</i>



Results - Takeaways

- Cherry Hill did an outstanding job implementing the program as originally intended. They pushed hard on the outreach side at both the residential and commercial level. As a result, Cherry Hill had an average increase of 58% in these four programs over what would be expected.
- More targeted efforts on Direct Install in Highland Park and Home Performance w/ENERGY STAR in Montclair had larger impacts. However, general outreach efforts in those communities were not effective



Challenges & Lessons Learned

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. Climate is a less engaging, and too narrow frame, to build a movement and widespread local support.



Challenges & Lessons Learned

We only got traction when we moved from the campaign model, with multiple actions, to single action programs that were more heavily promoted

In two of the three towns, the original model of broad engagement failed significantly. In those instances, only targeted and intensive programs proved to be effective



Post-Project Impacts - What Really Worked?

- An array of strategies were tested
- Many had mixed but positive results
- Two strategies had significant and impressive results
 - Direct Install
 - Home Performance with Energy Star
- Successful strategies codified and turned into replicable models
- Widely promoted through the Sustainable Jersey program



New Actions in Sustainable Jersey

DIRECT INSTALL

Achieving Target Increase in Local Business Participation

 non-competitive funding available

10 Points ☐

Outreach Campaign to Local Business Community

 non-competitive funding available

10 Points ☐

HOME PERFORMANCE WITH ENERGY STAR

Municipal Program

 non-competitive funding available

20 Points ☐

Outreach

 non-competitive funding available

10 Points ☐



Direct Install

What is the Direct Install program?

- Part of NJ Clean Energy Program
- Targets existing small to mid-sized commercial & industrial facilities whose peak electric demand <150kW in any of the preceding 12 months
- Covers lighting, refrigeration, HVAC, motors, natural gas, and variable frequency drives



Direct Install (continued)

What are the benefits of Direct Install?

- Turnkey process
- Minimal costs
- Fast turnaround time
- Ongoing savings

What challenges have we identified with Direct Install?

Getting the attention of local businesses to educate them about and engage them in this program



New SJ Action on Direct Install

1. Choose an Outreach Coordinator
2. Identify local Direct Install contractor
3. Compile a list of local businesses to target
4. Working with municipal officials & DI contractor, craft letter to local businesses
5. Outreach coordinator works with DI contractor to follow up with local businesses
6. Perform two additional outreach activities to the business community



New SJ Action on Direct Install

Completing these requirements will get a community 10 points toward SJ certification.

An additional 10 points can be achieved if the community can demonstrate that they have achieved a predetermined increase in program completions

- this is based on the number of commercial businesses in a particular community



Home Performance with ENERGY STAR

What is the Home Performance with ENERGY STAR program?

- Part of NJ Clean Energy Program
- Offers “whole house” solutions to reduce energy costs and carbon footprint
- Initial comprehensive audit of your home to identify potential for energy efficiency & safety upgrades
- Homeowner and contractor agree on scope of work to be done on the home to achieve target % savings



Home Performance with ENERGY STAR

What are the benefits of the Home Performance with ENERGY STAR program?

- Low-interest financing and/or cash back options to help pay for improvements
- Significantly reduce energy bills and increase home value

What challenges have we identified with HPwES?

Hard to get attention and trust of busy homeowners

Multi-faceted process that can be confusing and intimidating for homeowners



New SJ Action on HPwES

1. Choose an Outreach Coordinator
2. Go through an RFP process to identify municipally-approved contractor (for 20 points). In lieu of this, establishing a basic package for an audit and providing an information clearing house will earn 10 points under this action
3. In addition, the community must do at least two other events to promote the HPwES program



Questions/Comments

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