

**Cost-Benefit Analysis of the New Jersey Clean Energy Program
Energy Efficiency Programs:**

2011 Retrospective & 2012 Prospective

Summary Report

October 2012

**Center for Energy, Economics & Environmental Policy
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Rutgers, the State University of New Jersey**

I. Summary

The Center for Energy, Economic and Environmental Policy (CEEEP) of the Edward J. Bloustein School of Planning and Public Policy, Rutgers University was asked by the New Jersey Board of Public Utilities (NJBP) to conduct a cost-benefit analysis of the 2011 residential, commercial and industrial New Jersey Clean Energy Program (NJCEP) energy efficiency programs. The purpose of this report is to summarize the evaluation of the 2011 energy efficiency programs and compare the 2011 program cost-benefit analyses to 2006, 2007, 2008, 2009 and 2010. Please note that non-energy impacts, such as reductions in water usage and improved health and safety, have not been included in this analysis. These types of impacts should be investigated and quantified in the future. The nine NJCEP Energy Efficiency programs available to New Jersey residential, commercial and industrial customers in 2011 are provided in Table 1. The Energy Star Products program includes Change a Light, Room Air Conditioner, Dehumidifier Clothes Washer, and Refrigerator Turn-in.

At the current time, the cost-benefit analyses for Home Performance with Energy Star and Pay for Performance have not been completed. CEEEP is awaiting further Tier-level data from the program administrators. Additionally, the data available for the Pay for Performance program is not adequate to perform a cost-benefit analysis because of the individual nature of each project.

Table 1: NJCEP Energy Efficiency Programs

Residential	Commercial & Industrial
Residential HVAC	C&I New Construction
Residential New Construction	C&I Retrofit
Residential Low Income	Direct Install
EnergyStar Products	Pay-for-Performance
Home Performance with Energy Star	

The key assumptions and data sources are explained in Section III.

Please note that the 2012 Prospective cost-benefit results are presented in Appendix A at the end of this report.

II. Cost-Benefit Tests

Five costs tests are utilized for the cost-benefit analysis: Participant Cost Test, Program Administration Cost Test, Ratepayer Impact Measure Test, Total Resource Cost Test and Societal Cost Test.¹

Participant Cost Test: The measure of the quantifiable benefits and costs to the customer attributed to participation in a program. The participant benefits are equal to the sum of any participant incentives paid, any reductions in bills, and any federal or state tax deductions or credits. Participant costs include any out-of-pocket costs associated with the program.

Program Administrator Cost Test: The costs of a program as a resource option based on the costs incurred by the program administrator (including incentive costs), excluding any costs incurred by the participant. The benefits are the avoided supply costs of energy and demand and the reduction in capacity valued at marginal costs for the periods when there is a load reduction. The costs are the program costs incurred by the administrator, the incentives paid to the customers, and the increased supply costs for the periods in which load is increased.

Ratepayer Impact Measure Test: Measure of what happens to customer bills or rates due to changes in revenues and operating costs caused by the program. The benefits equal the savings from avoided supply

¹ California Standard Practice Manual. Economic Analysis of Demand-Side Programs and Projects. (October 2001).

costs, including the reduction in capacity costs for periods when load has been reduced and the increase in revenues for periods in which load has increased. The costs are the program costs incurred by administration of the program, the incentives paid to the participant, decreased revenues for any periods in which load has been decreased and increased supply costs for any periods when load has increased.

Total Resource Cost Test: The costs of a program as a resource option based on the total costs of the program, including both the participants' and the utility's costs. This test represents the combination of the effects of a program on both the participating and non-participating customers. The benefits are the avoided supply costs, federal tax credits, and the reduction in generation and capacity costs valued at marginal cost for the periods when there is a load reduction. The costs are the program costs paid by the utility and participants plus the increase in supply costs for the periods in which load is increased.

Societal Cost Test: Attempts to quantify the change in the total resource costs to society as a whole rather than only to the utility and its ratepayers. Costs include all consumer, utility and program expenses. Benefits associated with the societal perspective include avoided power supply costs, capacity benefits, avoided transmission and distribution costs, and emissions savings.

It is assumed by CEEEP that wholesale electricity prices account for the national sulfur dioxide and nitrogen oxide allowance programs and the Regional Greenhouse Gas Initiative carbon dioxide program (until New Jersey withdrew from the program in May 2011). Therefore, the societal cost test does not differ from the total resource cost test because emissions savings are not accounted for separately for the 2011 cost-benefit model societal cost test. Federal tax credits are not included.

III. Cost-Benefit Analysis Assumptions

The key avoided cost assumptions for the energy efficiency cost-benefit analysis and the data sources and processes for determining these components are discussed below. The avoided costs presented here are assumptions and should not be considered forecasts or projections into the future. Additionally, these assumptions are intended to be used for Energy Efficiency cost-benefit analysis only.

Retail Electricity Prices: Historic 2011 U.S. Energy Information Administration (EIA) New Jersey retail electricity prices were escalated using an annual growth rate derived from the EIA Annual Energy Outlook 2012 for the Mid-Atlantic region. On average, the annual growth rate was about 2.1%. The NJ Clean Energy Programs do not distinguish between commercial and industrial sectors, therefore the commercial and industrial prices were averaged based on historic 2011 New Jersey retail electricity sales. The 7% Sales and Use Tax and Societal Benefits Charge² were also included.

Wholesale Electricity Prices: Historic 2011 New Jersey wholesale electric prices from PJM were escalated based on the annual percent change in the Annual Energy Outlook Reliability First Corporation/East Electricity Generation Prices³. The annual percent change was, on average, about 2.2%. The seasonal peak and off-peak factors were derived using historic 2011 PJM LMP data. Summer is defined as May through September, winter is defined as October through April, on-peak is defined as Monday through Friday 8am-8pm, and off-peak is defined as Monday-Friday 8pm-8am and weekends and holidays.

² The Societal Benefits Charge for electric customers was assumed to be 3.6% for residential and 4.8% for C&I.

³ The RFCE Electricity Generation prices are approximately 16% higher than the wholesale electricity price assumptions CEEEP presents in Table 1.

Table 1: Retail and Wholesale Electricity

	<i>Retail (\$/kWh)</i>		<i>Wholesale (\$/MWh)</i>				
	Residential	Commercial & Industrial	Average Price	Summer Peak	Summer Off-Peak	Non-Summer Peak	Non-Summer Off-Peak
2011	\$0.18	\$0.15	\$47.39	\$64.09	\$37.03	\$49.40	\$40.80
2012	\$0.18	\$0.14	\$50.67	\$68.53	\$39.59	\$52.82	\$43.63
2013	\$0.18	\$0.14	\$49.36	\$66.75	\$38.56	\$51.45	\$42.49
2014	\$0.19	\$0.14	\$49.64	\$67.14	\$38.79	\$51.75	\$42.74
2015	\$0.19	\$0.14	\$49.48	\$66.93	\$38.66	\$51.58	\$42.60
2016	\$0.19	\$0.15	\$49.92	\$67.51	\$39.00	\$52.04	\$42.98
2017	\$0.20	\$0.15	\$52.92	\$71.58	\$41.35	\$55.17	\$45.56
2018	\$0.20	\$0.15	\$55.67	\$75.29	\$43.49	\$58.03	\$47.93
2019	\$0.20	\$0.15	\$54.51	\$73.73	\$42.59	\$56.83	\$46.93
2020	\$0.20	\$0.16	\$59.78	\$80.85	\$46.71	\$62.31	\$51.47
2021	\$0.21	\$0.16	\$62.79	\$84.92	\$49.06	\$65.45	\$54.06
2022	\$0.21	\$0.16	\$65.55	\$88.66	\$51.22	\$68.34	\$56.44
2023	\$0.22	\$0.17	\$68.99	\$93.31	\$53.91	\$71.92	\$59.40
2024	\$0.22	\$0.17	\$72.11	\$97.53	\$56.34	\$75.17	\$62.08
2025	\$0.23	\$0.17	\$74.03	\$100.12	\$57.84	\$77.17	\$63.74
2026	\$0.23	\$0.17	\$75.49	\$102.09	\$58.98	\$78.69	\$64.99
2027	\$0.24	\$0.17	\$77.37	\$104.65	\$60.45	\$80.66	\$66.62
2028	\$0.25	\$0.18	\$79.97	\$108.16	\$62.49	\$83.37	\$68.86
2029	\$0.25	\$0.18	\$82.86	\$112.07	\$64.74	\$86.38	\$71.34
2030	\$0.26	\$0.19	\$84.83	\$114.73	\$66.28	\$88.43	\$73.03
2031	\$0.27	\$0.19	\$88.13	\$119.20	\$68.86	\$91.87	\$75.88
2032	\$0.27	\$0.20	\$90.37	\$122.23	\$70.61	\$94.21	\$77.81
2033	\$0.28	\$0.20	\$94.00	\$127.14	\$73.45	\$97.99	\$80.93
2034	\$0.29	\$0.21	\$99.44	\$134.49	\$77.70	\$103.66	\$85.62
2035	\$0.30	\$0.22	\$104.78	\$141.71	\$81.87	\$109.22	\$90.21

Retail Natural Gas Prices: Historic 2011 EIA New Jersey retail natural gas prices were escalated using an annual growth rate derived from the Mid-Atlantic Region EIA Annual Energy Outlook 2012 electric price forecasts. On average, the annual growth rate was about 2.9%. Missing monthly Residential and Industrial Retail Natural Gas prices were estimated using a linear interpolation. The 7% Sales and Use Tax and Societal Benefits Charge⁴ were also included.

Wholesale (Henry Hub) Natural Gas Prices: Wholesale natural gas prices are taken from the EIA Annual Energy Outlook 2012.

⁴ The Societal Benefits Charge for natural gas customers was assumed to be 4.1% for residential and 5.0% for C&I.

Table 2: Retail and Wholesale Natural Gas (\$/MMBtu)

	<i>Retail Prices</i>			<i>Henry Hub Wholesale Prices</i>		
	Residential	Commercial	Industrial	Average Price	Summer	Winter
2011	\$13.68	\$10.44	\$9.95	\$4.02	\$3.89	\$4.15
2012	\$13.85	\$10.66	\$9.36	\$3.70	\$3.58	\$3.82
2013	\$13.88	\$10.62	\$9.65	\$4.24	\$4.10	\$4.37
2014	\$13.77	\$10.60	\$10.00	\$4.41	\$4.27	\$4.56
2015	\$14.16	\$10.87	\$10.32	\$4.62	\$4.47	\$4.78
2016	\$14.39	\$10.99	\$10.37	\$4.67	\$4.52	\$4.82
2017	\$14.67	\$11.15	\$10.51	\$4.79	\$4.63	\$4.95
2018	\$15.06	\$11.44	\$10.80	\$4.93	\$4.77	\$5.10
2019	\$15.50	\$11.76	\$11.15	\$5.16	\$4.99	\$5.33
2020	\$15.98	\$12.12	\$11.56	\$5.39	\$5.21	\$5.56
2021	\$16.59	\$12.61	\$12.12	\$5.77	\$5.58	\$5.95
2022	\$17.24	\$13.13	\$12.73	\$6.22	\$6.01	\$6.42
2023	\$17.82	\$13.57	\$13.24	\$6.58	\$6.37	\$6.80
2024	\$18.32	\$13.94	\$13.64	\$6.88	\$6.65	\$7.10
2025	\$18.94	\$14.43	\$14.21	\$7.23	\$6.99	\$7.47
2026	\$19.54	\$14.88	\$14.74	\$7.56	\$7.31	\$7.80
2027	\$20.14	\$15.33	\$15.25	\$7.93	\$7.67	\$8.19
2028	\$20.74	\$15.76	\$15.74	\$8.22	\$7.95	\$8.49
2029	\$21.38	\$16.24	\$16.27	\$8.57	\$8.29	\$8.85
2030	\$22.11	\$16.79	\$16.91	\$8.95	\$8.66	\$9.25
2031	\$22.96	\$17.43	\$17.67	\$9.35	\$9.04	\$9.66
2032	\$23.81	\$18.09	\$18.42	\$9.81	\$9.49	\$10.13
2033	\$24.54	\$18.63	\$19.04	\$10.19	\$9.85	\$10.52
2034	\$25.60	\$19.48	\$20.08	\$10.94	\$10.59	\$11.30
2035	\$26.63	\$20.29	\$21.05	\$11.67	\$11.28	\$12.05

Capacity Prices: New Jersey Utility PJM Reliability Pricing Model (RPM) prices for the 4-utilities (AE, JCP&L, PSE&G and RECO) for 2010 to 2015 were weighted by each utility’s historic 2011 peak load⁵ to estimate an average New Jersey capacity price. From 2016 to 2030, the capacity prices were escalated based on the EIA projected annual change in U.S. Consumer Price Index (CPI), which is also reported.⁶

⁵ PJM Reliability Pricing Model User Information. Base Residual Auction Results www.pjm.com/markets-and-operations/rpm/rpm-auction-user-info.aspx#Item01; PJM. Historic Load Data.

⁶ U.S. Department of Labor [ftp://ftp.bls.gov/pub/special.requests/cpi/cpi.txt](http://ftp.bls.gov/pub/special.requests/cpi/cpi.txt); EIA Annual Energy Outlook 2010.

Table 3: Capacity Price (\$/kW-year) and U.S. Consumer Price Index

	\$/kW-year	CPI
2011	\$49.87	2.25
2012	\$49.11	2.28
2013	\$75.38	2.31
2014	\$70.93	2.36
2015	\$59.41	2.42
2016	\$60.64	2.47
2017	\$61.62	2.51
2018	\$63.10	2.57
2019	\$64.32	2.62
2020	\$65.55	2.67
2021	\$66.78	2.72
2022	\$68.25	2.78
2023	\$69.48	2.83
2024	\$70.95	2.89
2025	\$72.42	2.95
2026	\$73.90	3.01
2027	\$75.62	3.08
2028	\$77.33	3.15
2029	\$79.30	3.23
2030	\$81.02	3.30
2031	\$83.23	3.39
2032	\$85.44	3.48
2033	\$87.16	3.55
2034	\$89.12	3.63
2035	\$91.33	3.72

Discount Rate: Discount rates are used to convert future economic values into present day dollars. A nominal discount rate of 8% is used.⁷

Avoided Electric and Natural Gas Losses: Avoided electric transmission losses are assumed to be 7.6%⁸ and avoided natural gas losses are assumed to be 1.4%⁹ based on data calculations from EnerNOC Utility Solutions¹⁰. The unreferenced New Jersey Protocols assume 11% and 1% respectively. The updated avoided loss estimates have been submitted to Applied Energy Group to update the New Jersey Protocols in the future.

Avoided Electric and Natural Gas Transmission and Distribution (T&D): Estimated Electric T&D costs from various studies have been compiled and are presented in Table 4.

⁷ Levitan & Associates, Inc. Long-term Capacity Agreement Pilot Program (March 2011).

⁸ 10 year (2001-2010) Average: "New Jersey Supply and Disposition of Electricity"

<http://www.eia.gov/electricity/state/newjersey>

⁹ Energy Information Administration natural Gas Transmission: <http://www.eia.gov/pub/itg/ghgp9.htm>

¹⁰ EnerNOC Utility Solutions performed the calculations as part of the 2012 Energy Efficiency Market Potential Study for the New Jersey Clean Energy Program. The line losses are derived from EIA data referenced above.

Table 4: Avoided Electric T&D Cost Estimates (\$/kW-yr)^{11,12}

Company/Area	State	Transmission	Distribution	Total
NStar	MA	\$14.41	\$85.28	\$99.69
CL&P	CT	\$1.25	\$29.74	\$30.99
WMECo	ME	\$20.30	\$60.87	\$81.17
National Grid MA	MA	\$19.95	\$109.25	\$129.20
National Grid RI	RI	\$19.95	\$87.13	\$107.08
UI	CT	\$2.54	\$45.96	\$48.50
CL&P	CT			\$29.20
Statewide	WI			\$30
Upstate	NY			\$33.50
SCE	CA			\$54.60
SDG&E	CA			\$74.80
PG&E	CA			\$76.60
Con Edison	NY			\$100

Based on the estimates presented in Table 4, EnerNOC Consulting has recommended that CEEEP use an Avoided Electric T&D cost of \$30/kW-yr.

Further investigation of reputable sources for Avoided Natural Gas T&D costs is needed.

Incremental Costs: Incremental cost is the additional cost of purchasing an energy efficient product instead of a standard product or the full cost of weatherization and insulation products. The average incremental cost of each measure was estimated using data from Summit Blue Consulting, California, Connecticut and Vermont. The Residential HVAC, Low Income, Home Performance with Energy Star, and Energy Star Products incremental costs were estimated based on the weighted average of measures actually installed under the programs. The Commercial & Industrial New Construction, Retrofit, and Direct Install program participant costs were computed using a list of measures that were installed under the program as well. For future analyses, the 2012 Energy Efficiency Market Potential Study is expected to provide additional measure level data that will be useful for the cost-benefit analysis, including measure cost and energy savings.

Measure Lives: The number of years that an energy efficient product will accrue energy savings. The measure life of each program was calculated using the same method as the incremental cost, using data from the New Jersey Protocols,¹³ Energy Star,¹⁴ Connecticut and Vermont.

¹¹ Avoided Energy Supply Costs in New England: 2011 Report. Prepared for Avoided Energy Supply Component Study Group by Synapse Energy Economics, Inc.

¹² PA: Potential study, Appendix 1: http://www.puc.state.pa.us/electric/pdf/Act129/Act129-PA_Market_Potential_Study_App1.pdf

WI: Page EE-13 of study:<http://psc.wi.gov/reports/documents/wipotentialfinal.pdf>

CA: Page 37 of Word Doc at: http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/128594.htm#P84_2869

NY: Appendix 2, Table 2 at: <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B329FD000-D108-47AC-ADAF-9E37730B68CA%7D>

¹³ NJCEP. New Jersey Clean Energy Program Protocols to Measure Resource Savings. (December 2007).

The 2011 Clean Energy Program Report includes installed, committed and total savings for all programs. For the purposes of the cost-benefit analysis, only the installed savings were used. Energy savings and budget data were reported for the total program, but calculations to determine per unit cost and savings were also made.

IV. Cost-benefit Analysis Results

The cost-benefit analysis results for the 2010 energy efficiency programs are presented in Tables 4 and 5. The Home Performance with Energy Star results will be reported at a later date when CEEEP has received further Tier-level data from the program administrators. Additionally, the Pay for Performance program data is not adequate to perform a cost-benefit analysis because of the individual nature of each project.

Table 4: Residential Programs

	Low Income	HVAC	Energy Star Products	New Construction
Participant Ratio	\$ 55,327,129	\$51,447,778	\$194,326,549	\$14,122,318
	N/A	3.1	4.8	2.4
Program Administration Ratio	\$(18,052,103)	\$2,436,099	\$ 49,462,512	\$ 1,739,453
	0.4	1.1	4.0	1.2
Ratepayer Impact Measure Ratio	\$(28,552,876)	\$(12,609,190)	\$(61,563,242)	\$(4,396,714)
	0.3	0.6	0.5	0.7
Total Resource Ratio	\$(16,224,027)	\$(6,318,672)	\$12,586,134	\$(4,061,991)
	0.4	0.8	1.2	0.7

Table 5: Commercial and Industrial Programs

	C&I New Construction	C&I Retrofit	Direct Install
Participant Ratio	\$23,528,890	\$138,397,378	\$85,893,244
	12.0	9.0	9.2
Program Administration Ratio	\$9,423,547	\$70,026,815	\$15,073,727
	4.9	5.5	1.7
Ratepayer Impact Measure Ratio	\$(1,966,671)	\$2,962,075	\$(18,768,883)
	0.9	1.0	0.7
Total Resource Ratio	\$9,050,124	\$65,630,825	\$25,466,261
	4.3	4.3	3.2

A comparison of 2006 through 2011 participant and total resource cost test cost-benefit analysis results are presented in Tables 6 and 7 respectively. The numerous updates made from year to year on the cost-

¹⁴ U.S. Environmental Protection Agency and U.S. Department of Energy, *Energy Star*. Available at www.energystar.gov/

benefit model inputs and assumptions have an impact on the cost-benefit results, making a direct comparison between the years difficult.

Table 6: 2006 to 2011 Participant Cost Test Ratios

		2006	2007	2008	2009	2010	2011
Residential Programs							
Low Income		N/A	N/A	N/A	N/A	N/A	N/A
	HVAC	4.3	5.1	7.4	3.4	3.4	3.1
Home Performance with Energy Star							
	Energy Star Products	1.6	1.8	4.3	10.3	8.4	4.8
	New Construction	3.1	3.2	4.0	2.7	2.5	2.4
Commercial & Industrial Programs							
	CHP	1.6	7.3	1.2	8.2	1.9	
	New Construction	14.7	11.9	20.1	13.3	15.7	12.0
	Retrofit	8.1	3.7	7.5	5.0	6.7	9.0
	Schools	5.2	7.7	4.0	4.1		
	Direct Install					4.0	9.2

Table 7: 2006 to 2011 Total Resource Cost Test Ratios

		2006	2007	2008	2009	2010	2011
Residential Programs							
Low Income ¹⁵					0.3	0.3	0.4
	HVAC	2.7	3.5	1.7	1.1	0.9	0.8
Home Performance with Energy Star							
	Energy Star Products	0.5	1.9	1.9	4.5	2.6	1.2
	New Construction	1.5	1.5	1.5	0.7	0.6	0.7
Commercial & Industrial Programs							
	CHP	1.1	7.5	1.4	5.3	0.8	
	New Construction	8.6	5.1	12.2	6.7	6.0	4.3
	Retrofit	5.0	1.7	5.0	2.8	3.2	4.3
	Schools	3.1	3.1	2.3	2.3		
	Direct Install					1.2	3.2

¹⁵ The Low Income values for 2006 through 2008 were initially calculated using an incorrect incremental cost and will be updated in the future to reflect a corrected value.

Appendix A: 2012 Prospective Cost-Benefit Analysis Results

Summary

The Center for Energy, Economic and Environmental Policy (CEEEP) of the Edward J. Bloustein School of Planning and Public Policy, Rutgers University was asked by the New Jersey Board of Public Utilities (NJBPU) to conduct a prospective cost-benefit analysis of the 2012 residential, commercial and industrial New Jersey Clean Energy Program (NJCEP) energy efficiency programs. The energy savings, participants, and budget assumptions are based on the 2012 Clean Energy Program filings¹⁶.

The nine NJCEP Energy Efficiency programs available to New Jersey residential, commercial and industrial customers in 2012 are provided in Table 8. There was not enough information available to assess the Comfort Partners and Pay for Performance programs.

Table 8: NJCEP Energy Efficiency Programs

Residential	Commercial & Industrial
Residential HVAC Residential New Construction Energy Efficient Products Home Performance with Energy Star	C&I New Construction C&I Retrofit Direct Install Combined Heat and Power Retrocommissioning

The key components of the energy efficiency cost-benefit analysis and the data sources and processes for determining these components are discussed in this section. The number of participant installations, participant electricity and natural gas savings, and program costs were provided by the New Jersey Clean Energy Program¹⁷. The energy prices, loss factors, time period allocation factors, incremental costs, and measure lives assumed in this analysis are the same as those used in the 2011 cost-benefit analysis. The projected ‘measures’ for each program were used to estimate Residential Program participants. This may result in double counting for programs such as Energy Efficiency Products, in which multiple measures may be purchased by one customer (ie. Multiple light bulbs in a household). For Home Performance with Energy Star, it was assumed that maximum loan value available for each tier was the participant incremental cost and the total incentives were weighted by participants in each tier.

Cost-benefit Analysis Results

The projected cost-benefit analysis results for the 2012 energy efficiency programs are presented in Tables 9 and 10. Home Performance with Energy Star results are presented by Tier. Please note that these

¹⁶ <http://www.njcleanenergy.com/filings#2012ProgramFilings>

¹⁷ 2012 Program Descriptions and Budget: Honeywell’s Residential Energy Efficiency and Renewable Energy Program Plan Filing for 2012:

<http://www.njcleanenergy.com/files/file/Library/Honeywell%20EERE%202012%20Compliance%20Filing%2005-03-2012.pdf> ;

Commercial & Industrial Energy Efficiency Programs Managed by TRC as C&I Market Manager:

<http://www.njcleanenergy.com/files/file/Library/TRC%202012%20CI%20Program%20and%20%20Budget%20Filing%20Final%2005%2011%2012%202%281%29.pdf> ;

Utility Residential Low Income Comfort Partners Program:

<http://www.njcleanenergy.com/files/file/Library/utility%20revised%20final%202012%20CP%20and%200CPC%20Program%20Plan%2012-28-11.pdf>

results are based on the anticipated program savings and budget goals presented in the 2012 program filings, not actual program data.

Table 9: Residential Programs

Cost Test	HVAC	Energy Star Products	New Construction
Participant	\$34,665,788	\$232,742,499	\$45,371,614
B/C Ratio	2.4	6.7	4.0
Program Administration	(\$10,428,674)	\$53,832,489	(\$448,197)
B/C Ratio	0.6	3.7	1.0
Ratepayer Impact Measure	(\$18,901,869)	(\$68,632,981)	(\$9,486,548)
B/C Ratio	0.4	0.5	0.6
Total Resource	(\$15,708,545)	\$31,186,732	(\$972,708)
B/C Ratio	0.4	1.7	0.9
Societal	(\$15,708,545)	\$31,186,732	(\$972,708)
B/C Ratio	0.4	1.7	0.9

Table 9: Residential Programs (Home Performance with Energy Star – Tier Level)

Cost Test	Tier 2	Tier 2 - Multifamily	Tier 3	Tier 3 - Multifamily	Total
Participant	\$4,498,605	\$912,235	(\$3,576,339)	(\$531,621)	\$7,984,766
B/C Ratio	1.7	1.4	0.9	0.9	1.2
Program Administration	(\$6,021,852)	(\$2,293,404)	(\$15,726,629)	(\$2,337,134)	(\$25,860,614)
B/C Ratio	0.2	0.1	0.2	0.2	0.2
Ratepayer Impact Measure	(\$6,789,911)	(\$2,446,907)	(\$18,080,529)	(\$2,686,866)	(\$29,798,063)
B/C Ratio	0.2	0.1	0.2	0.2	0.2
Total Resource	(\$5,476,954)	(\$2,105,816)	(\$30,433,989)	(\$4,522,748)	(\$36,846,103)
B/C Ratio	0.2	0.1	0.1	0.1	0.2
Societal	(\$5,476,954)	(\$2,105,816)	(\$30,433,989)	(\$4,522,748)	(\$36,846,103)
B/C Ratio	0.2	0.1	0.1	0.1	0.2

Table 10: Commercial and Industrial Programs

Cost Test	CHP	C&I New Construction	C&I Retrofit	Direct Install	Retrocommissioning
Participant	\$32,482,410	\$26,692,792	\$281,294,732	\$88,865,002	\$18,486,776
B/C Ratio	1.4	12.9	6.0	4.4	23.4
Program Administrator	\$20,961,817	(\$1,546,819)	\$49,657,496	(\$9,415,733)	\$1,448,842
B/C Ratio	2.0	0.8	1.8	0.8	1.3
Ratepayer Impact Measure	\$2,983,894	(\$11,008,977)	(\$82,009,855)	(\$43,345,179)	(\$4,588,700)
B/C Ratio	1.1	0.4	0.6	0.4	0.6
Total Resource	(\$34,483,426)	\$5,214,755	\$55,466,226	\$4,125,719	\$5,261,246
B/C Ratio	0.5	2.6	1.9	1.1	5.4
Societal	(\$34,483,426)	\$ 5,214,755	\$55,466,226	\$4,125,719	\$5,261,246
B/C Ratio	0.5	2.6	1.9	1.1	5.4