Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules

Printouts of Workpapers Used to Prepare Estimates

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Prepared for:

The New Jersey Division of the Ratepayer Advocate

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Table of Contents

1. Summary of Approach to Estimation of Rate and Bill Impacts of Proposed RPS

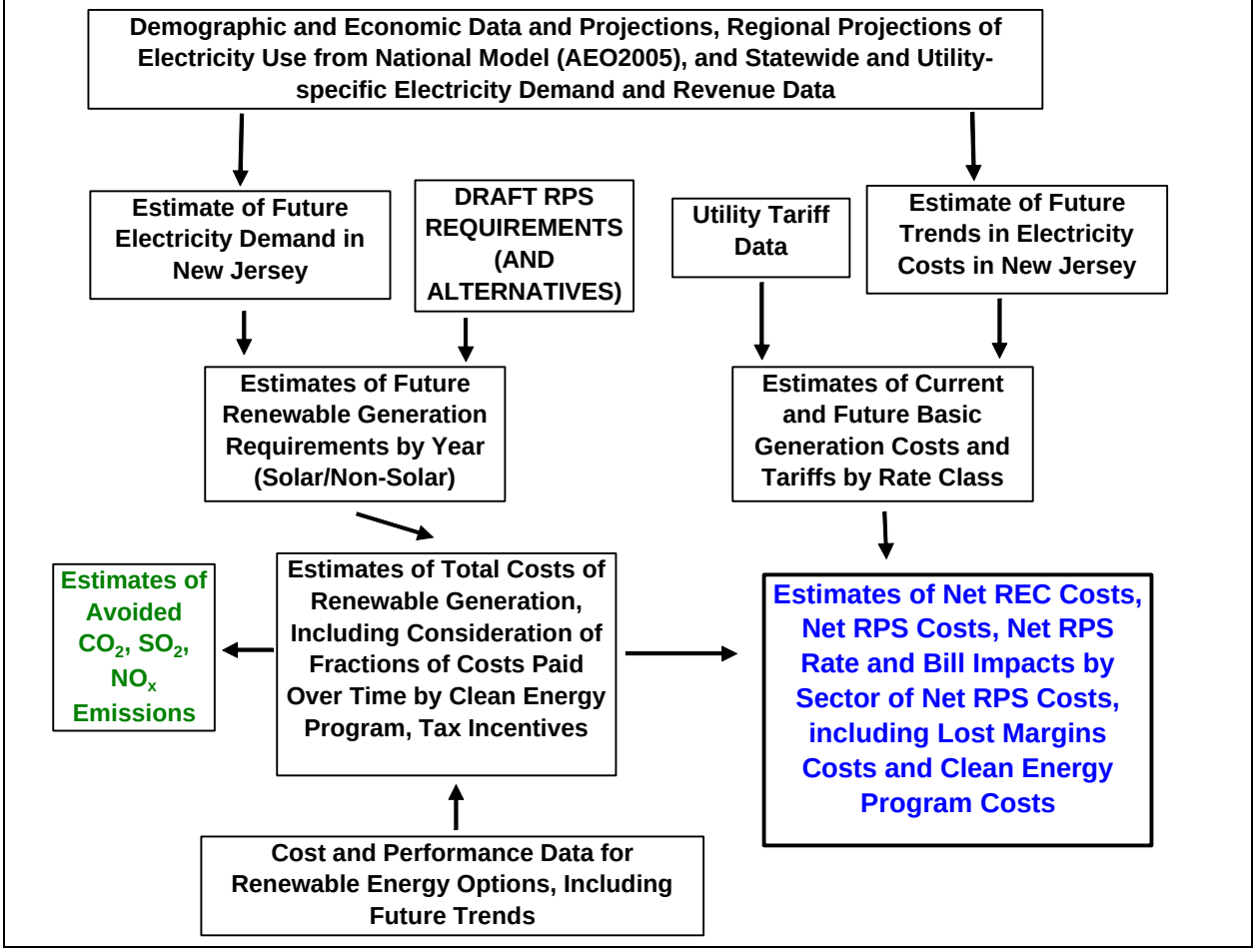
This technical report presents and fully documents the estimation of the rate and bill impacts—and of selected other impacts such as air pollutant emissions—of the renewable portfolio standard (RPS) proposed for New Jersey. The overall approach has been to estimate the cost through 2020 of the solar and non-solar generation that would be required in each year under the RPS, estimate the cost of conventional generation avoided by the renewable generation included in the RPS, use those results to estimate the total net cost of the RPS, and then use the total net cost estimates to estimate the rate and bill impacts for different classes of electricity customers. A flow diagram that summarizes how data and results are used in preparing these estimates is provided below. The estimates themselves, the data and assumptions used to perform the estimates, and the data sources and calculations employed, are all detailed in the following pages of this "Workpapers" volume.

Within the overall approach outlined above, the estimation of rate and bill impacts includes the following elements:

- Estimates of the **solar and non-solar renewable generation required** under the RPS in each year (2004 through 2020 "Energy Years"), based on assumptions about the fractions of generation by each renewable source mandated in each year, on the growth in overall electricity demand (excluding that served by municipal utilities) in New Jersey, and on the assumed savings in electricity demand due to energy efficiency programs.
- Estimates of the current and future capacity, operating and (for biomass) fuel **costs of solar and non-solar renewable generation** options, differentiated by sector "host" for solar (residential, commercial, industrial, or "utility/merchant" categories), and onshore wind, offshore wind, and biomass-fueled generation for non-solar options. As with RPS requirements, these estimates and other estimates below are prepared by year, for energy years 2004 through 2020.
- Estimates of the average **Basic Generation Service (BGS) costs, and full tariff costs**, by sector, for current and future years, for use in computing the net costs of RPS requirements.
- Estimates of the **total and net** (of BGS) **costs of the RPS requirement** in each year, including estimates of electricity output by type of renewable generator, peak generation capacity by renewable electricity source, total generation costs, avoided generation costs, net RPS costs, and avoided air pollutant (Carbon Dioxide, Sulfur Dioxide, and Nitrogen Oxides) emissions.
- Estimates of **total net RPS costs, and of RPS customer rate and bill impacts**, by sector, including costs of the Clean Energy Program and costs of utility lost revenue/lost margins due to net metering of customer-sited solar photovoltaic (PV) system output.
- **Supporting** these estimates are several **compilations of background data**, including data on current and future cost and performance of wind, solar PV, and biomass energy systems, data on population and employment projections, data on utility tariffs, sales, and revenues, and

projections of regional energy (Mid-Atlantic) use and other parameters from the US Department of Energy's Annual Energy Outlook (AEO2005).

DIAGRAM OF ESTIMATION PROCESS USED IN THIS WORKBOOK



In the workbook printouts that follow, with the exception of some parts of the Summary Tables and Graphs worksheet, most cells where values are either **calculated or imported from elsewhere in the workbook are shaded gray**. Also, some text is shaded gray, indicating that the text can change if different workbook settings are chosen. In several places in the workbook, "**switches**" have been inserted to allow the workbook user to change the way that some workbook results are calculated, that is, to change certain key settings. These switches are inactive in the printouts presented here, but are active in the Excel workbook itself. Switches use pull-down lists to make selection, and appear in the text that follows as a line of text, typically in smaller type, with a "down arrow" at the right. An example of a switch appears a few lines below the shaded text (starting "NOTE: RECs costs and rate impacts shown…") on page 9 of this document.

Assumptions and data sources used in this document are detailed in the "**Notes and Sources**" section found on the last page (or last few pages) of worksheets. The **subsections** of

section 2 of this document **correspond to each of the worksheets** contained in the overall workbook.

2. Printout of Excel Workbook Used to Prepare Estimates

2.1 Guide to Workbook Contents Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules
BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency
"Proposed Readoption With Amendments: N.J.A.C. 14:4
Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"
(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

GUIDE TO WORKSHEETS WITHIN THIS WORKBOOK

Worksheets (press buttons to access sheets)	Worksheet Contents
Summaries	SUMMARY TABLES AND GRAPHS BASED ON ANALYSIS
Rate&Bill_Impacts	ESTIMATE OF RPS AND SOLAR RPS PER-UNIT COSTS AND RATE AND BILL IMPACTS BY YEAR
RPS_Costs	ESTIMATE OF RPS AND SOLAR RPS GENERATION AND COSTS BY TYPE AND YEAR
RPS_Generation_Reqt	ESTIMATE OF RPS AND SOLAR RPS GENERATION REQUIREMENTS BY YEAR
Renewables_costs	ESTIMATE OF COSTS OF RENEWABLE GENERATION ALTERNATIVES
BGS_costs	ESTIMATE OF COSTS OF CONVENTIONAL GENERATION
Sales_Data	ELECTRIC UTILITY DATA FOR NEW JERSEY
Tariffs	ROUGH ESTIMATE OF BASIC GENERATION (ENERGY) COMPONENT OF TARIFFS BY UTILITY AND BY CUSTOMER CLASS IN NEW JERSEY
Biomass_fuels	BIOMASS RESOURCE AND POTENTIAL GENERATION ESTIMATE FOR NEW JERSEY
Wind_Cost_Data	BACKGROUND DATA ON WIND POWER SYSTEM COSTS (CURRENT AND FUTURE)
Solar_Cost_Data	BACKGROUND DATA ON SOLAR PV SYSTEM COSTS (CURRENT AND FUTURE)
Population	HISTORICAL POPULATION ESTIMATES AND PROJECTIONS FOR NEW JERSEY
AEO2005_data	ANNUAL ENERGY OUTLOOK ENERGY USE FORECASTS FOR MID-ATLANTIC REGION
NJ_Employment_Projections	EMPLOYMENT PROJECTIONS FOR NEW JERSEY

2.2 Summary Tables and Graphs Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules

BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency

"Proposed Readoption With Amendments: N.J.A.C. 14:4

Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"

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SUMMARY TABLES AND GRAPHS

Numbering shown below refers to tables in text of NJBPU Proposed Renewable Portfolio Standards Rule A Policy Analysis -- Draft Report, David Nichols -- November 2005

ALL COSTS IN 2004 DOLLARS

NOTE: Incremental cost totals below treat portion of capital costs paid by CEP as costs in the year that CEP rebates/grants and program costs are paid/incurred.

Table 1 -- Incremental Costs for Meeting Proposed RPS, 2008/9-2020/1

Energy Year*	Net Annual Cost for Class I RPS (2004 $)
2004	$ 61,700,000
2005	$ 32,300,000
2006	$ 107,900,000
2007	$ 155,600,000
2008	$ 251,500,000
2009	$ 139,900,000
2010	$ 180,000,000
2011	$ 190,600,000
2012	$ 214,500,000
2013	$ 248,400,000
2014	$ 279,200,000
2015	$ 249,500,000
2016	$ 297,400,000
2017	$ 364,900,000
2018	$ 415,600,000
2019	$ 456,400,000
2020	$ 502,100,000

Calculation of Net Present Value (NPV) of Net RPS costs	
Real Annual Discount Rate	8%
NPV, 2004 through 2020:	$1,830,000,000

*An "Energy Year" runs from from June 1 XX to May 31, XX + 1.
For example, Energy year 2008 runs from the beginning of June 2008 to the end of May, 2009.

NOTE: Bill Impacts estimates below treat portion of capital costs paid by CEP as costs in the year that CEP rebates/grants and program costs are paid/incurred. The bill impacts of recovery of lost revenues from customer-sited generation are also included.

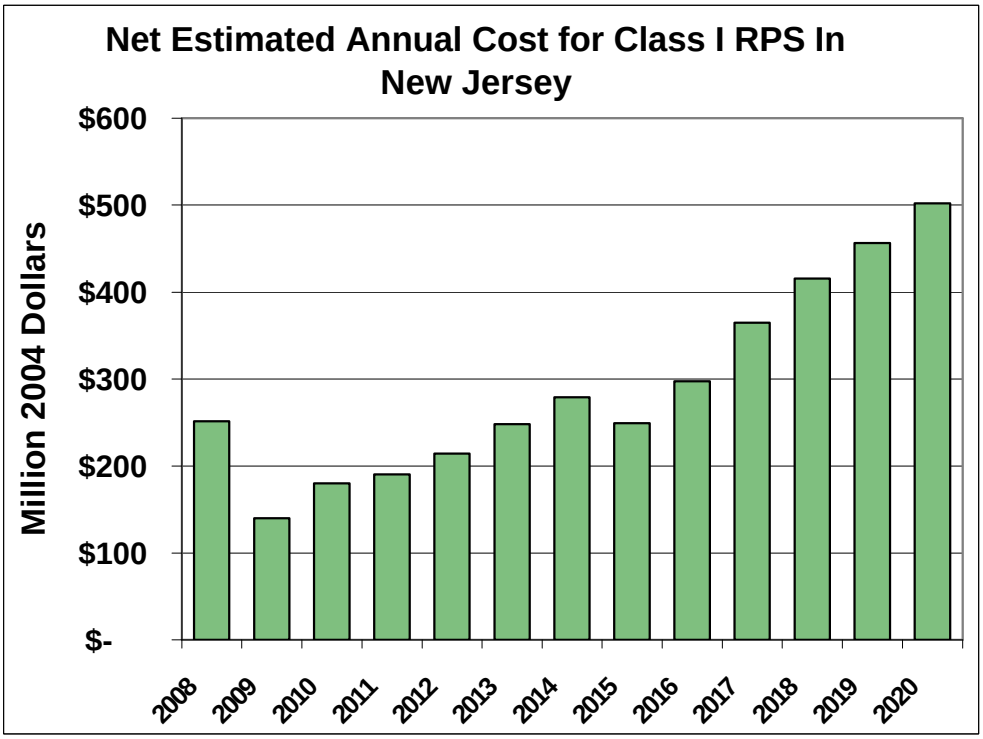
Table 2 -- Bill Impacts of Proposed RPS for Typical Residential, Commercial, and Industrial Customers

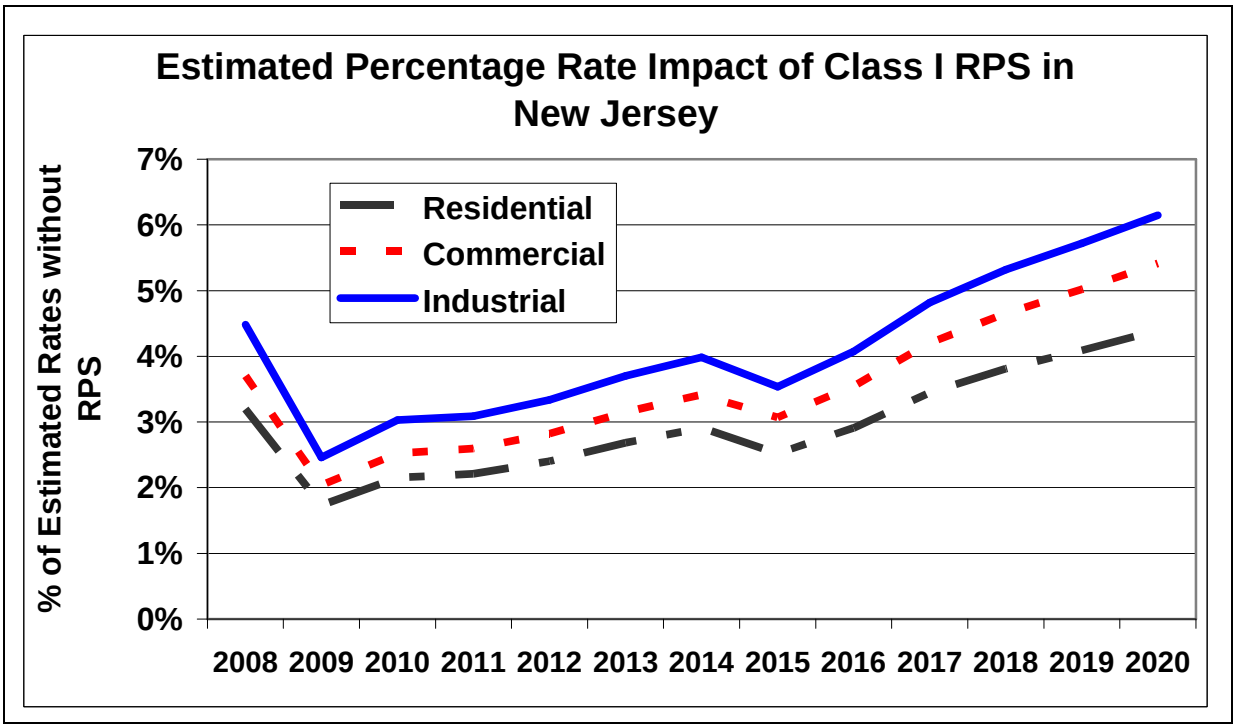
	Implied Average Annual Bill Impact per Customer Calculated After EE** Impacts on Sales AND Including Lost Revenues from Net Metering of Customer-sited PV		
Energy Year*	Residential	Commercial	Industrial
2008	$ 28	$ 276	$ 2,610
2009	$ 16	$ 157	$ 1,489
2010	$ 20	$ 201	$ 1,910
2011	$ 21	$ 214	$ 2,031
2012	$ 24	$ 241	$ 2,285
2013	$ 27	$ 279	$ 2,642
2014	$ 31	$ 314	$ 2,968
2015	$ 27	$ 290	$ 2,710
2016	$ 32	$ 345	$ 3,216
2017	$ 40	$ 420	$ 3,912
2018	$ 45	$ 478	$ 4,445
2019	$ 49	$ 527	$ 4,882
2020	$ 54	$ 580	$ 5,363

*An "Energy Year" runs from from June 1 XX to May 31, XX + 1.
For example, Energy year 2008 runs from the beginning of June 2008 to the end of May, 2009.

[Table for Graph]

Energy Year	Net Annual Cost for
2004	$ 62
2005	$ 32
2006	$ 108
2007	$ 156
2008	$ 252
2009	$ 140
2010	$ 180
2011	$ 191
2012	$ 215
2013	$ 248
2014	$ 279
2015	$ 250
2016	$ 297
2017	$ 365
2018	$ 416
2019	$ 456
2020	$ 502





NOTE: Rate Impacts estimates below treat portion of capital costs paid by CEP as costs in the year that CEP rebates/grants and program costs are paid/incurred. The bill impacts of recovery of lost revenues from customer-sited generation are also included.

Note also that the values below are affected by the "switches" on lines 74 and 104 of the "Rate&Bill_Impacts" worksheet.

Table 3: Rate Impacts of Proposed RPS for Typical Residential, Commercial, and Industrial Customers

	Estimated Average Annual Rate Impact per Customer Calculated After Energy Efficiency Impacts on Sales AND Including Lost Revenues from Net Metering of Customer-sited PV (2004 $/kWh)			Estimated Average Annual Rate Impact per Customer Calculated After Energy Efficiency Impacts on Sales AND Including Lost Revenues from Net Metering of Customer-sited PV (% difference from estimated average rates without RPS)		
Energy Year*	**Residential**	**Commercial**	**Industrial**	**Residential**	**Commercial**	**Industrial**
2008	$ 0.00320	$ 0.00319	$ 0.00317	3.20%	3.70%	4.48%
2009	$ 0.00179	$ 0.00181	$ 0.00181	1.73%	2.04%	2.46%
2010	$ 0.00228	$ 0.00232	$ 0.00231	2.15%	2.52%	3.03%
2011	$ 0.00242	$ 0.00246	$ 0.00246	2.21%	2.60%	3.09%
2012	$ 0.00271	$ 0.00277	$ 0.00276	2.40%	2.82%	3.34%
2013	$ 0.00313	$ 0.00320	$ 0.00319	2.68%	3.15%	3.70%
2014	$ 0.00351	$ 0.00359	$ 0.00359	2.91%	3.42%	3.99%
2015	$ 0.00307	$ 0.00327	$ 0.00323	2.52%	3.07%	3.53%
2016	$ 0.00359	$ 0.00383	$ 0.00378	2.91%	3.55%	4.07%
2017	$ 0.00431	$ 0.00460	$ 0.00454	3.45%	4.20%	4.82%
2018	$ 0.00482	$ 0.00516	$ 0.00509	3.81%	4.65%	5.32%
2019	$ 0.00524	$ 0.00564	$ 0.00555	4.09%	5.02%	5.72%
2020	$ 0.00571	$ 0.00617	$ 0.00607	4.40%	5.41%	6.15%

*An "Energy Year" runs from from June 1 XX to May 31, XX + 1.
For example, Energy year 2008 runs from the beginning of June 2008 to the end of May, 2009.

Table 4: Portion of RPS Cost Due to the Solar Set-Aside Proposed in the Draft Rule

Energy Year*	Portion of RPS Cost Due to the Solar Set-Aside Proposed in the Draft Rule
2008	85%
2009	82%
2010	87%
2011	88%
2012	89%
2013	91%
2014	92%
2015	92%
2016	93%
2017	89%
2018	90%
2019	92%
2020	92%

*An "Energy Year" runs from from June 1 XX to May 31, XX + 1.
For example, Energy year 2008 runs from the beginning of June 2008 to the end of May, 2009.

2.3 Rate and Bill Impacts Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules

BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency

"Proposed Readoption With Amendments: N.J.A.C. 14:4

Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"

(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by: David Von Hippel Date last Modified: 12/15/2005

ESTIMATE OF RPS AND SOLAR RPS PER-UNIT COSTS AND RATE AND BILL IMPACTS BY YEAR

All costs in constant (real) 2004 dollars

NOTE: RECs costs and rate impacts shown in the first table below DO NOT include the portion of capital costs paid for by Clean Energy Program grants. To change this assumption (thus placing the full cost of Class I options in RECs), use the menu found on line 45 of the 'Renewable_costs' worksheet in this workbook.

Note that additional tables with rate and bill impacts including costs paid by CEP are provided below. Tables that include the impacts of revenue lost from net metering of customer-sited solar PV output are also provided below.

Allow net negative RPS component (solar/non-solar) Class I costs in Table below?

NO--If net costs fall below zero, RPS costs considered to be zero

ESTIMATE OF RPS AND SOLAR RPS PER-UNIT COSTS

	Sales (MWh)		Net Cost of RPS Generation (at end-user)		Implied Average Cost of RECs for RPS Generation ($/MWh)**		Implied Average Rate Impact of RECs for Class I RPS Generation, $/kWh		
Energy Year*	Total	Net of DSM	Class I Solar PV	Class I Non-solar	Class I Solar PV	Class I Non-solar	Class I Solar PV	Class I Non-solar	Class I Total
2004	76,793,865	75,718,751	$ 609,048	$ 690,779	$ 80	$ 1.23	$ 0.00001	$ 0.00001	$ 0.00002
2005	78,984,625	76,803,726	$ 1,003,020	$ 626,671	$ 77	$ 0.83	$ 0.00001	$ 0.00001	$ 0.00002
2006	81,237,882	77,919,653	$ 2,119,667	$ -	$ 69	$ -	$ 0.00003	$ -	$ 0.00003
2007	83,555,420	79,067,415	$ 4,010,032	$ -	$ 62	$ -	$ 0.00005	$ -	$ 0.00005
2008	85,939,072	80,247,920	$ 7,073,993	$ -	$ 55	$ -	$ 0.00009	$ -	$ 0.00009
2009	87,184,869	80,883,422	$ 14,327,569	$ -	$ 80	$ -	$ 0.00018	$ -	$ 0.00018
2010	88,448,724	81,528,137	$ 23,829,698	$ -	$ 96	$ -	$ 0.00029	$ -	$ 0.00029
2011	89,730,901	82,182,197	$ 33,536,622	$ -	$ 104	$ -	$ 0.00041	$ -	$ 0.00041
2012	91,031,665	82,845,739	$ 44,267,039	$ -	$ 108	$ -	$ 0.00053	$ -	$ 0.00053
2013	92,351,284	83,518,900	$ 56,530,652	$ -	$ 109	$ -	$ 0.00068	$ -	$ 0.00068
2014	93,690,034	84,201,819	$ 70,053,153	$ -	$ 109	$ -	$ 0.00083	$ -	$ 0.00083
2015	95,170,857	86,027,060	$ 94,391,976	$ -	$ 118	$ -	$ 0.00110	$ -	$ 0.00110
2016	96,675,085	87,895,218	$ 121,973,129	$ -	$ 124	$ -	$ 0.00139	$ -	$ 0.00139
2017	98,203,089	89,807,373	$ 152,355,972	$ -	$ 127	$ -	$ 0.00170	$ -	$ 0.00170
2018	99,755,244	91,764,633	$ 185,229,458	$ -	$ 128	$ -	$ 0.00202	$ -	$ 0.00202
2019	101,331,931	93,140,959	$ 219,084,852	$ -	$ 128	$ -	$ 0.00235	$ -	$ 0.00235
2020	102,933,538	94,538,239	$ 254,177,176	$ -	$ 127	$ -	$ 0.00269	$ -	$ 0.00269

*An "Energy Year" runs from from June 1 XX to May 31, XX + 1.
For example, Energy year 2008 runs from June 2008 to the end of May, 2009.
** In years where Class I generation (solar, non-solar, or both) have costs LESS than average costs for basic generation service, costs of RECs are set at zero.

ESTIMATE OF RPS AND SOLAR RPS RATE IMPACTS BY YEAR

Capital costs paid by CEP are NOT INCLUDED in the total impacts shown in this Table.
To change this assumption (thus removing CEP contributions to capital costs in the rate impacts shown here) use the menu found on line 45 of the 'Renewable_costs' worksheet in this workbook.
Note that additional tables with rate and bill impacts including costs paid by CEP are provided below.

Implied Average Rate Impact of Purchase of RECs for RPS as a Fraction of Weighted Average Estimated Tariffs

	Residential			Commercial			Industrial		
Energy Year	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total
2004	0.007%	0.008%	0.015%	0.008%	0.009%	0.018%	0.010%	0.011%	0.021%
2005	0.012%	0.008%	0.020%	0.014%	0.009%	0.023%	0.017%	0.010%	0.027%
2006	0.026%	0.000%	0.026%	0.030%	0.000%	0.030%	0.036%	0.000%	0.036%
2007	0.049%	0.000%	0.049%	0.057%	0.000%	0.057%	0.069%	0.000%	0.069%
2008	0.088%	0.000%	0.088%	0.102%	0.000%	0.102%	0.125%	0.000%	0.125%
2009	0.172%	0.000%	0.172%	0.199%	0.000%	0.199%	0.241%	0.000%	0.241%
2010	0.275%	0.000%	0.275%	0.318%	0.000%	0.318%	0.382%	0.000%	0.382%
2011	0.373%	0.000%	0.373%	0.430%	0.000%	0.430%	0.513%	0.000%	0.513%
2012	0.473%	0.000%	0.473%	0.544%	0.000%	0.544%	0.645%	0.000%	0.645%
2013	0.580%	0.000%	0.580%	0.666%	0.000%	0.666%	0.784%	0.000%	0.784%
2014	0.690%	0.000%	0.690%	0.790%	0.000%	0.790%	0.925%	0.000%	0.925%
2015	0.899%	0.000%	0.899%	1.029%	0.000%	1.029%	1.202%	0.000%	1.202%
2016	1.124%	0.000%	1.124%	1.285%	0.000%	1.285%	1.496%	0.000%	1.496%
2017	1.357%	0.000%	1.357%	1.550%	0.000%	1.550%	1.801%	0.000%	1.801%
2018	1.595%	0.000%	1.595%	1.820%	0.000%	1.820%	2.110%	0.000%	2.110%
2019	1.836%	0.000%	1.836%	2.093%	0.000%	2.093%	2.421%	0.000%	2.421%
2020	2.072%	0.000%	2.072%	2.360%	0.000%	2.360%	2.724%	0.000%	2.724%

Lost Revenues from Net Metering of Customer-sited Solar PV Calculated With:

Lost Margins Allocated Based on PV Generation

Capital costs paid by CEP are NOT INCLUDED in the total impacts shown in this Table.
To change this assumption (thus removing CEP contributions to capital costs in the rate impacts shown here) use the menu found on line 45 of the 'Renewable_costs' worksheet in this workbook.
Note that additional tables with rate and bill impacts including costs paid by CEP are provided below.

Implied Average Rate Impact of Purchase of RECs for RPS AND Lost Revenues Due to Sales Lost Via Net Metering as a Fraction of Weighted Average Estimated Tariffs

	Residential			Commercial			Industrial		
Energy Year	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total
2004	0.011%	0.008%	0.019%	0.012%	0.009%	0.021%	0.013%	0.011%	0.024%
2005	0.018%	0.008%	0.026%	0.020%	0.009%	0.029%	0.021%	0.010%	0.032%
2006	0.041%	0.000%	0.041%	0.045%	0.000%	0.045%	0.047%	0.000%	0.047%
2007	0.081%	0.000%	0.081%	0.089%	0.000%	0.089%	0.094%	0.000%	0.094%
2008	0.152%	0.000%	0.152%	0.166%	0.000%	0.166%	0.175%	0.000%	0.175%
2009	0.226%	0.000%	0.226%	0.290%	0.000%	0.290%	0.347%	0.000%	0.347%
2010	0.347%	0.000%	0.347%	0.439%	0.000%	0.439%	0.522%	0.000%	0.522%
2011	0.463%	0.000%	0.463%	0.581%	0.000%	0.581%	0.687%	0.000%	0.687%
2012	0.583%	0.000%	0.583%	0.729%	0.000%	0.729%	0.856%	0.000%	0.856%
2013	0.714%	0.000%	0.714%	0.889%	0.000%	0.889%	1.038%	0.000%	1.038%
2014	0.849%	0.000%	0.849%	1.055%	0.000%	1.055%	1.225%	0.000%	1.225%
2015	1.042%	0.000%	1.042%	1.378%	0.000%	1.378%	1.560%	0.000%	1.560%
2016	1.293%	0.000%	1.293%	1.700%	0.000%	1.700%	1.923%	0.000%	1.923%
2017	1.557%	0.000%	1.557%	2.039%	0.000%	2.039%	2.303%	0.000%	2.303%
2018	1.827%	0.000%	1.827%	2.390%	0.000%	2.390%	2.694%	0.000%	2.694%
2019	2.103%	0.000%	2.103%	2.751%	0.000%	2.751%	3.094%	0.000%	3.094%
2020	2.377%	0.000%	2.377%	3.112%	0.000%	3.112%	3.493%	0.000%	3.493%

CEP Rebate, Grant, and Program Costs Distributed Assuming:

CEP Costs Distributed Evenly across Sectors

NOTE: The following table is valid ONLY if the rate impacts of Clean Energy Program rebates, grants, and program costs are accounted for separately from the portion of capital costs of Class I systems NOT paid for by CEP. At present, a calculation option in this workbook is set so that capital costs paid by CEP ARE accounted for separately, and the table below IS a valid estimate of total RECs, Lost Margins, and CEP Rate Impacts.

Implied Average Rate Impact of Purchase of RECs for RPS AND Lost Revenues Due to Sales Lost Via Net Metering AND Rate Impacts of CEP Rebates, Grants, and Program Costs for Class I Renewables as a Fraction of Weighted Average Estimated Tariffs

	Residential			Commercial			Industrial		
Energy Year	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total
2004	0.350%	0.382%	0.733%	0.403%	0.440%	0.843%	0.478%	0.524%	1.002%
2005	0.258%	0.135%	0.393%	0.297%	0.156%	0.453%	0.352%	0.187%	0.540%
2006	0.787%	0.538%	1.325%	0.908%	0.622%	1.531%	1.087%	0.749%	1.836%
2007	1.486%	0.460%	1.946%	1.717%	0.534%	2.251%	2.066%	0.646%	2.712%
2008	2.716%	0.480%	3.196%	3.143%	0.558%	3.701%	3.802%	0.679%	4.481%
2009	1.435%	0.297%	1.733%	1.692%	0.345%	2.036%	2.042%	0.417%	2.459%
2010	1.880%	0.271%	2.152%	2.211%	0.314%	2.525%	2.651%	0.377%	3.028%
2011	1.945%	0.265%	2.210%	2.290%	0.306%	2.595%	2.725%	0.365%	3.090%
2012	2.151%	0.251%	2.402%	2.532%	0.289%	2.821%	2.994%	0.342%	3.337%
2013	2.441%	0.242%	2.683%	2.871%	0.278%	3.149%	3.373%	0.327%	3.700%
2014	2.680%	0.229%	2.910%	3.152%	0.263%	3.415%	3.679%	0.307%	3.987%
2015	2.337%	0.182%	2.520%	2.860%	0.209%	3.069%	3.291%	0.244%	3.534%
2016	2.731%	0.179%	2.909%	3.343%	0.204%	3.548%	3.837%	0.238%	4.075%
2017	3.107%	0.343%	3.450%	3.810%	0.392%	4.202%	4.360%	0.456%	4.816%
2018	3.470%	0.340%	3.811%	4.266%	0.388%	4.654%	4.868%	0.450%	5.319%
2019	3.770%	0.322%	4.092%	4.651%	0.367%	5.018%	5.293%	0.425%	5.717%
2020	4.083%	0.316%	4.398%	5.055%	0.359%	5.414%	5.735%	0.415%	6.150%

ESTIMATE OF RPS AND SOLAR RPS BILL IMPACTS BY YEAR

Key Asumptions and Annual Rates of Change for Key Parameters

	2004 - 2008	2009 - 2014	2015 - 2020
Overall growth in Statewide Customer Count (*See Note 1*)			
Residential Customers	0.72%	0.62%	0.54%
Commercial Customers	0.62%	0.52%	0.44%
Industrial Customers	0.62%	0.52%	0.44%

	Residential	Commercial	Industrial	Other	Total
Estimated Customer Count in Calendar 2004*	3,238,058	441,337	13,557		
Estimated Customer Count in Energy Year 2004**	3,253,583	443,280	13,614		
Fraction of 2004 Investor-owned Utility and "Energy Only" Provider Sales by Sector	36.3%	49.0%	14.3%	0.4%	100.0%

**Estimated as customers of 4 investor-owned utilities as of 2004 plus customers of "energy only" service providers as of 2003.*

***Estimated using the average annual growth rates of New Jersey customer count by sector from 1990 to 2002. (Assumes trend in statewide customer numbers growth from 1999-2002 applies from the end of calendar year 2004 to the end of energy year 2004 (6 months).)*

	Implied Customer Count by Sector			Implied Sales by Sector Before DSM Impacts on Sales (MWh)			Implied Sales by Sector After DSM Impacts on Sales (MWh)		
Energy Year	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
2004	3,253,583	443,280	13,614	27,843,783	37,654,746	11,014,169	27,453,970	37,127,579	10,859,971
2005	3,276,898	446,013	13,697	28,638,105	38,728,953	11,328,379	27,847,358	37,659,581	11,015,583
2006	3,300,379	448,763	13,782	29,455,087	39,833,804	11,651,553	28,251,969	38,206,759	11,175,635
2007	3,324,029	451,530	13,867	30,295,376	40,970,175	11,983,946	28,668,123	38,769,547	11,340,253
2008	3,347,848	454,314	13,952	31,159,636	42,138,964	12,325,821	29,096,148	39,348,391	11,509,567
2009	3,368,649	456,683	14,025	31,611,334	42,749,822	12,504,500	29,326,567	39,660,000	11,600,714
2010	3,389,580	459,064	14,098	32,069,581	43,369,535	12,685,768	29,560,327	39,976,126	11,693,182
2011	3,410,640	461,457	14,172	32,534,470	43,998,231	12,869,665	29,797,475	40,296,835	11,786,991
2012	3,431,832	463,863	14,246	33,006,099	44,636,042	13,056,227	30,038,061	40,622,193	11,882,160
2013	3,453,155	466,281	14,320	33,484,564	45,283,098	13,245,494	30,282,134	40,952,268	11,978,708
2014	3,474,610	468,712	14,395	33,969,966	45,939,534	13,437,504	30,529,746	41,287,127	12,076,656
2015	3,493,406	470,778	14,458	34,506,880	46,665,634	13,649,891	31,191,538	42,182,107	12,338,441
2016	3,512,303	472,854	14,522	35,052,280	47,403,210	13,865,635	31,868,892	43,098,131	12,606,382
2017	3,531,302	474,939	14,586	35,606,301	48,152,444	14,084,789	32,562,198	44,035,728	12,880,633
2018	3,550,404	477,033	14,650	36,169,079	48,913,521	14,307,407	33,271,857	44,995,442	13,161,353
2019	3,569,609	479,137	14,715	36,740,751	49,686,626	14,533,544	33,770,883	45,670,303	13,358,753
2020	3,588,918	481,249	14,780	37,321,459	50,471,951	14,763,255	34,277,506	46,355,439	13,559,158

	Implied Annual Sales per Customer (MWh) by Sector Before DSM Impacts on Sales			Implied Annual Sales per Customer (MWh) by Sector After DSM Impacts on Sales			Implied Annual Sales per Customer (MWh) by Sector After DSM AND Solar PV Net Metering Impacts on Sales		
Energy Year	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
2004	8.56	84.95	809.06	8.44	83.76	797.73	8.44	83.75	797.65
2005	8.74	86.83	827.04	8.50	84.44	804.21	8.50	84.42	804.05
2006	8.92	88.76	845.42	8.56	85.14	810.89	8.56	85.11	810.54
2007	9.11	90.74	864.21	8.62	85.86	817.79	8.62	85.80	817.05
2008	9.31	92.75	883.42	8.69	86.61	824.92	8.68	86.48	823.45
2009	9.38	93.61	891.58	8.71	86.84	827.14	8.70	86.65	823.95
2010	9.46	94.47	899.81	8.72	87.08	829.41	8.71	86.81	825.00
2011	9.54	95.35	908.12	8.74	87.33	831.73	8.72	86.97	826.01
2012	9.62	96.23	916.51	8.75	87.57	834.09	8.73	87.13	826.87
2013	9.70	97.12	924.97	8.77	87.83	836.51	8.74	87.27	827.45
2014	9.78	98.01	933.51	8.79	88.09	838.97	8.75	87.40	827.79
2015	9.88	99.12	944.11	8.93	89.60	853.40	8.89	88.67	839.59
2016	9.98	100.25	954.82	9.07	91.14	868.10	9.03	90.00	851.19
2017	10.08	101.39	965.65	9.22	92.72	883.09	9.17	91.33	862.58
2018	10.19	102.54	976.61	9.37	94.32	898.38	9.31	92.66	873.76
2019	10.29	103.70	987.69	9.46	95.32	907.85	9.39	93.35	878.80
2020	10.40	104.88	998.89	9.55	96.32	917.42	9.47	94.03	883.52

Capital costs paid by CEP are NOT INCLUDED in the total impacts shown in this Table.
To change this assumption (thus removing CEP contributions to capital costs in the bill impacts shown here) use the menu found on line 45 of the 'Renewable_costs' worksheet in this workbook.
Note that additional tables with billl impacts including costs paid by CEP are provided below.

Implied Average Annual Bill Impact per Customer Calculated Before DSM Impacts on Sales

	Residential			Commercial			Industrial		
Energy Year	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total
2004	$ 0.07	$ 0.08	$ 0.15	$ 0.68	$ 0.77	$ 1.46	$ 7	$ 7	$ 14
2005	$ 0.11	$ 0.07	$ 0.19	$ 1.13	$ 0.71	$ 1.84	$ 11	$ 7	$ 18
2006	$ 0.24	$ -	$ 0.24	$ 2.41	$ -	$ 2.41	$ 23	$ -	$ 23
2007	$ 0.46	$ -	$ 0.46	$ 4.60	$ -	$ 4.60	$ 44	$ -	$ 44
2008	$ 0.82	$ -	$ 0.82	$ 8.18	$ -	$ 8.18	$ 78	$ -	$ 78
2009	$ 1.66	$ -	$ 1.66	$ 16.58	$ -	$ 16.58	$ 158	$ -	$ 158
2010	$ 2.77	$ -	$ 2.77	$ 27.61	$ -	$ 27.61	$ 263	$ -	$ 263
2011	$ 3.89	$ -	$ 3.89	$ 38.91	$ -	$ 38.91	$ 371	$ -	$ 371
2012	$ 5.14	$ -	$ 5.14	$ 51.42	$ -	$ 51.42	$ 490	$ -	$ 490
2013	$ 6.56	$ -	$ 6.56	$ 65.73	$ -	$ 65.73	$ 626	$ -	$ 626
2014	$ 8.13	$ -	$ 8.13	$ 81.54	$ -	$ 81.54	$ 777	$ -	$ 777
2015	$ 10.84	$ -	$ 10.84	$ 108.76	$ -	$ 108.76	$ 1,036	$ -	$ 1,036
2016	$ 13.85	$ -	$ 13.85	$ 139.12	$ -	$ 139.12	$ 1,325	$ -	$ 1,325
2017	$ 17.11	$ -	$ 17.11	$ 172.00	$ -	$ 172.00	$ 1,638	$ -	$ 1,638
2018	$ 20.56	$ -	$ 20.56	$ 206.97	$ -	$ 206.97	$ 1,971	$ -	$ 1,971
2019	$ 24.21	$ -	$ 24.21	$ 243.92	$ -	$ 243.92	$ 2,323	$ -	$ 2,323
2020	$ 27.96	$ -	$ 27.96	$ 281.97	$ -	$ 281.97	$ 2,686	$ -	$ 2,686

Capital costs paid by CEP are NOT INCLUDED in the total impacts shown in this Table.
To change this assumption (thus removing CEP contributions to capital costs in the bill impacts shown here) use the menu found on line 45 of the 'Renewable_costs' worksheet in this workbook.
Note that additional tables with billl impacts including costs paid by CEP are provided below.

Implied Average Annual Bill Impact per Customer Calculated After DSM Impacts on Sales

	Residential			Commercial			Industrial		
Energy Year	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total
2004	$ 0.07	$ 0.08	$ 0.14	$ 0.67	$ 0.76	$ 1.44	$ 6	$ 7	$ 14
2005	$ 0.11	$ 0.07	$ 0.18	$ 1.10	$ 0.69	$ 1.79	$ 11	$ 7	$ 17
2006	$ 0.23	$ -	$ 0.23	$ 2.32	$ -	$ 2.32	$ 22	$ -	$ 22
2007	$ 0.44	$ -	$ 0.44	$ 4.35	$ -	$ 4.35	$ 41	$ -	$ 41
2008	$ 0.77	$ -	$ 0.77	$ 7.63	$ -	$ 7.63	$ 73	$ -	$ 73
2009	$ 1.54	$ -	$ 1.54	$ 15.38	$ -	$ 15.38	$ 147	$ -	$ 147
2010	$ 2.55	$ -	$ 2.55	$ 25.45	$ -	$ 25.45	$ 242	$ -	$ 242
2011	$ 3.57	$ -	$ 3.57	$ 35.64	$ -	$ 35.64	$ 339	$ -	$ 339
2012	$ 4.68	$ -	$ 4.68	$ 46.79	$ -	$ 46.79	$ 446	$ -	$ 446
2013	$ 5.94	$ -	$ 5.94	$ 59.45	$ -	$ 59.45	$ 566	$ -	$ 566
2014	$ 7.31	$ -	$ 7.31	$ 73.28	$ -	$ 73.28	$ 698	$ -	$ 698
2015	$ 9.80	$ -	$ 9.80	$ 98.31	$ -	$ 98.31	$ 936	$ -	$ 936
2016	$ 12.59	$ -	$ 12.59	$ 126.48	$ -	$ 126.48	$ 1,205	$ -	$ 1,205
2017	$ 15.64	$ -	$ 15.64	$ 157.29	$ -	$ 157.29	$ 1,498	$ -	$ 1,498
2018	$ 18.92	$ -	$ 18.92	$ 190.39	$ -	$ 190.39	$ 1,813	$ -	$ 1,813
2019	$ 22.25	$ -	$ 22.25	$ 224.21	$ -	$ 224.21	$ 2,135	$ -	$ 2,135
2020	$ 25.68	$ -	$ 25.68	$ 258.98	$ -	$ 258.98	$ 2,467	$ -	$ 2,467

Lost Revenues from Net Metering of Customer-sited Solar PV Calculated With:
Lost Margins Allocated Based on PV Generation AND
Capital costs paid by CEP are NOT INCLUDED in the total impacts shown in this Table.
To change this assumption (thus removing CEP contributions to capital costs in the bill impacts shown here) use the menu found on line 45 of the 'Renewable_costs' worksheet in this workbook.
Note that additional tables with billl impacts including costs paid by CEP are provided below.

Implied Average Annual Bill Impact per Customer Calculated After DSM Impacts on Sales AND Including Lost Revenues from Net Metering of Customer-sited PV

	Residential			Commercial			Industrial		
Energy Year	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total
2004	$ 0.10	$ 0.08	$ 0.18	$ 0.96	$ 0.76	$ 1.73	$ 8	$ 7	$ 15
2005	$ 0.17	$ 0.07	$ 0.24	$ 1.60	$ 0.69	$ 2.28	$ 14	$ 7	$ 20
2006	$ 0.37	$ -	$ 0.37	$ 3.46	$ -	$ 3.46	$ 29	$ -	$ 29
2007	$ 0.72	$ -	$ 0.72	$ 6.76	$ -	$ 6.76	$ 56	$ -	$ 56
2008	$ 1.32	$ -	$ 1.32	$ 12.37	$ -	$ 12.37	$ 102	$ -	$ 102
2009	$ 2.02	$ -	$ 2.02	$ 22.33	$ -	$ 22.33	$ 210	$ -	$ 210
2010	$ 3.21	$ -	$ 3.21	$ 35.02	$ -	$ 35.02	$ 330	$ -	$ 330
2011	$ 4.42	$ -	$ 4.42	$ 47.97	$ -	$ 47.97	$ 451	$ -	$ 451
2012	$ 5.75	$ -	$ 5.75	$ 62.32	$ -	$ 62.32	$ 586	$ -	$ 586
2013	$ 7.27	$ -	$ 7.27	$ 78.80	$ -	$ 78.80	$ 741	$ -	$ 741
2014	$ 8.95	$ -	$ 8.95	$ 97.05	$ -	$ 97.05	$ 912	$ -	$ 912
2015	$ 11.30	$ -	$ 11.30	$ 130.28	$ -	$ 130.28	$ 1,196	$ -	$ 1,196
2016	$ 14.42	$ -	$ 14.42	$ 165.27	$ -	$ 165.27	$ 1,518	$ -	$ 1,518
2017	$ 17.84	$ -	$ 17.84	$ 203.84	$ -	$ 203.84	$ 1,871	$ -	$ 1,871
2018	$ 21.53	$ -	$ 21.53	$ 245.62	$ -	$ 245.62	$ 2,252	$ -	$ 2,252
2019	$ 25.30	$ -	$ 25.30	$ 288.64	$ -	$ 288.64	$ 2,642	$ -	$ 2,642
2020	$ 29.20	$ -	$ 29.20	$ 333.27	$ -	$ 333.27	$ 3,046	$ -	$ 3,046

In the calculations in the Table that follows:
Lost Margins Allocated Based on PV Generation
CEP Costs Distributed Evenly across Sectors
NOTE: The following table is valid ONLY if the rate impacts of Clean Energy Program rebates, grants, and program costs are accounted for separately from the portion of capital costs of Class I systems NOT paid for by CEP. At present, a calculation option in this workbook is set so that capital costs paid by CEP ARE accounted for separately, and the table below IS a valid estimate of total RECs, Lost Margins, and CEP Bill Impacts.

Implied Average Bill Impact of Purchase of RECs for RPS AND Lost Revenues Due to Sales Lost Via Net Metering AND Rate Impacts of CEP Rebates, Grants, and Program Costs for Class I Renewables

	Residential			Commercial			Industrial		
Energy Year	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total
2004	$ 3.31	$ 3.61	$ 6.91	$ 32.77	$ 35.81	$ 68.58	$ 311	$ 341	$ 652
2005	$ 2.38	$ 1.25	$ 3.63	$ 23.58	$ 12.43	$ 36.01	$ 223	$ 118	$ 341
2006	$ 7.12	$ 4.86	$ 11.99	$ 70.63	$ 48.38	$ 119.01	$ 669	$ 461	$ 1,130
2007	$ 13.17	$ 4.08	$ 17.24	$ 130.65	$ 40.61	$ 171.26	$ 1,236	$ 387	$ 1,623
2008	$ 23.58	$ 4.17	$ 27.75	$ 234.17	$ 41.55	$ 275.72	$ 2,214	$ 396	$ 2,610
2009	$ 12.86	$ 2.66	$ 15.52	$ 130.32	$ 26.55	$ 156.86	$ 1,237	$ 252	$ 1,489
2010	$ 17.38	$ 2.51	$ 19.88	$ 176.27	$ 25.01	$ 201.28	$ 1,672	$ 238	$ 1,910
2011	$ 18.55	$ 2.53	$ 21.08	$ 189.01	$ 25.24	$ 214.25	$ 1,791	$ 240	$ 2,031
2012	$ 21.21	$ 2.48	$ 23.68	$ 216.61	$ 24.72	$ 241.33	$ 2,050	$ 235	$ 2,285
2013	$ 24.88	$ 2.47	$ 27.35	$ 254.63	$ 24.64	$ 279.28	$ 2,408	$ 234	$ 2,642
2014	$ 28.27	$ 2.42	$ 30.68	$ 289.98	$ 24.16	$ 314.14	$ 2,739	$ 229	$ 2,968
2015	$ 25.36	$ 1.98	$ 27.34	$ 270.41	$ 19.74	$ 290.15	$ 2,523	$ 187	$ 2,710
2016	$ 30.45	$ 1.99	$ 32.45	$ 325.02	$ 19.88	$ 344.90	$ 3,028	$ 188	$ 3,216
2017	$ 35.61	$ 3.93	$ 39.55	$ 380.83	$ 39.19	$ 420.02	$ 3,542	$ 370	$ 3,912
2018	$ 40.89	$ 4.01	$ 44.90	$ 438.32	$ 39.92	$ 478.24	$ 4,069	$ 376	$ 4,445
2019	$ 45.36	$ 3.87	$ 49.23	$ 488.01	$ 38.52	$ 526.53	$ 4,519	$ 363	$ 4,882
2020	$ 50.16	$ 3.88	$ 54.03	$ 541.42	$ 38.50	$ 579.92	$ 5,001	$ 362	$ 5,363

ESTIMATE OF SOLAR RPS IMPACTS ON REVENUES BY YEAR

Key Assumptions: For customer-sited PV systems, we assume that net metering would result in utility lost revenues. We further assume that these lost revenues would be roughly equal to the difference between full tariffs and BGS costs (as estimated in this workbook) and that lost revenues would be recovered through tariffs. Lost revenues by customer class are calculated below in two ways: based on solar PV generation by customers in each class, and based on average lost revenues per kWh of overall net sales. Rate impacts are calculated based on post-DSM, post-net-metering sales (sales net of DSM impacts and PV generation).

	Solar PV Output by Sector (MWh)			Lost Revenue by Sector, Weighted Average over Summer and Winter PV Generation ($/kWh)			Lost Revenue by Sector, Weighted Average over Summer and Winter PV Generation ($/yr)		
Energy Year	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
2004	2,423	3,559	1,212	$ 0.0458	$ 0.0359	$ 0.0202	$ 110,899	$ 127,851	$ 24,496
2005	4,178	6,137	2,089	$ 0.0457	$ 0.0359	$ 0.0202	$ 190,960	$ 220,151	$ 42,180
2006	9,799	14,393	4,900	$ 0.0456	$ 0.0358	$ 0.0202	$ 447,239	$ 515,605	$ 98,788
2007	20,671	30,361	10,336	$ 0.0456	$ 0.0358	$ 0.0201	$ 942,125	$ 1,086,140	$ 208,101
2008	41,087	60,346	20,543	$ 0.0455	$ 0.0357	$ 0.0201	$ 1,869,956	$ 2,155,801	$ 413,044
2009	35,750	89,376	44,688	$ 0.0454	$ 0.0357	$ 0.0201	$ 1,624,793	$ 3,188,361	$ 897,229
2010	49,732	124,330	62,165	$ 0.0454	$ 0.0356	$ 0.0200	$ 2,257,056	$ 4,429,062	$ 1,246,372
2011	64,760	161,899	80,949	$ 0.0453	$ 0.0356	$ 0.0200	$ 2,934,929	$ 5,759,265	$ 1,620,701
2012	82,349	205,872	102,936	$ 0.0453	$ 0.0355	$ 0.0200	$ 3,726,825	$ 7,313,215	$ 2,057,994
2013	103,730	259,326	129,663	$ 0.0452	$ 0.0355	$ 0.0200	$ 4,687,891	$ 9,199,133	$ 2,588,706
2014	128,829	322,072	161,036	$ 0.0451	$ 0.0354	$ 0.0199	$ 5,813,969	$ 11,408,857	$ 3,210,539
2015	119,750	439,082	199,583	$ 0.0451	$ 0.0354	$ 0.0199	$ 5,396,633	$ 15,531,868	$ 3,973,442
2016	147,400	540,468	245,667	$ 0.0450	$ 0.0353	$ 0.0199	$ 6,633,391	$ 19,091,339	$ 4,884,044
2017	179,570	658,423	299,283	$ 0.0449	$ 0.0353	$ 0.0199	$ 8,069,737	$ 23,225,239	$ 5,941,599
2018	216,381	793,397	360,635	$ 0.0449	$ 0.0352	$ 0.0198	$ 9,710,326	$ 27,946,963	$ 7,149,535
2019	256,510	940,537	427,517	$ 0.0448	$ 0.0352	$ 0.0198	$ 11,494,975	$ 33,083,302	$ 8,463,539
2020	300,632	1,102,316	501,053	$ 0.0447	$ 0.0351	$ 0.0198	$ 13,453,235	$ 38,719,304	$ 9,905,370

	Lost Revenue Rate Impact by Sector, Annual Average, with Impacts Allocated to Sectors where Generation Occurs ($/kWh)			Lost Revenue Rate Impact by Sector, Annual Average, with Impacts Allocated Evenly Across Sectors ($/kWh)		
Energy Year	Residential	Commercial	Industrial	Residential	Commercial	Industrial
2004	$ 0.000004	$ 0.000003	$ 0.000002	$ 0.000003	$ 0.000003	$ 0.000003
2005	$ 0.000007	$ 0.000006	$ 0.000004	$ 0.000006	$ 0.000006	$ 0.000006
2006	$ 0.000016	$ 0.000014	$ 0.000009	$ 0.000014	$ 0.000014	$ 0.000014
2007	$ 0.000033	$ 0.000028	$ 0.000018	$ 0.000028	$ 0.000028	$ 0.000028
2008	$ 0.000064	$ 0.000055	$ 0.000036	$ 0.000056	$ 0.000056	$ 0.000056
2009	$ 0.000055	$ 0.000081	$ 0.000078	$ 0.000071	$ 0.000071	$ 0.000071
2010	$ 0.000076	$ 0.000111	$ 0.000107	$ 0.000098	$ 0.000098	$ 0.000098
2011	$ 0.000099	$ 0.000143	$ 0.000138	$ 0.000126	$ 0.000126	$ 0.000126
2012	$ 0.000124	$ 0.000181	$ 0.000175	$ 0.000159	$ 0.000159	$ 0.000159
2013	$ 0.000155	$ 0.000226	$ 0.000218	$ 0.000199	$ 0.000199	$ 0.000199
2014	$ 0.000191	$ 0.000279	$ 0.000269	$ 0.000245	$ 0.000245	$ 0.000245
2015	$ 0.000174	$ 0.000372	$ 0.000327	$ 0.000293	$ 0.000293	$ 0.000293
2016	$ 0.000209	$ 0.000449	$ 0.000395	$ 0.000353	$ 0.000353	$ 0.000353
2017	$ 0.000249	$ 0.000535	$ 0.000472	$ 0.000422	$ 0.000422	$ 0.000422
2018	$ 0.000294	$ 0.000632	$ 0.000559	$ 0.000498	$ 0.000498	$ 0.000498
2019	$ 0.000343	$ 0.000740	$ 0.000655	$ 0.000582	$ 0.000582	$ 0.000582
2020	$ 0.000396	$ 0.000856	$ 0.000759	$ 0.000673	$ 0.000673	$ 0.000673

ESTIMATE OF RATE IMPACTS OF CLEAN ENERGY PROGRAM REBATES, GRANTS, AND PROGRAM COSTS RELATED TO INCENTIVES PROVIDED FOR CLASS I GENERATION

Key Asumptions:

CEP program costs for administering grants and rebates for Class I generation average 10% of value of rebates and grants actually awarded. *Portion of current (2005) CEP Budget set aside for Administrative costs.*

Note: Costs in 2005 as estimated below are likely somewhat overstated, as some 2005 generation is provided by capacity installed before 2005.

(All Costs in real 2004 dollars)

	Clean Energy Program Rebate/Grant and Program Costs ($/yr)								
	Solar PV Systems				Wind Systems		Other Renewables		
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]	TOTAL
2004	$ 11,799,505	$ 11,962,964	$ 3,872,212	$ 1,126,613	$ 12,902,320	$ 18,564,935	$ 218,810	$ -	$ 60,447,359
2005	$ 8,205,198	$ 8,318,865	$ 2,692,678	$ 783,430	$ 4,347,957	$ 6,256,204	$ 75,485	$ -	$ 30,679,818
2006	$ 25,227,285	$ 25,576,759	$ 8,278,770	$ 2,408,694	$ 18,031,262	$ 25,944,884	$ 320,464	$ -	$ 105,788,119
2007	$ 46,842,697	$ 47,491,609	$ 15,372,240	$ 4,472,527	$ 15,230,384	$ 21,914,747	$ 277,104	$ -	$ 151,601,308
2008	$ 84,441,590	$ 85,611,360	$ 27,710,967	$ 8,062,458	$ 15,688,391	$ 22,573,766	$ 292,205	$ -	$ 244,380,736
2009	$ 41,450,658	$ 39,397,303	$ 16,377,630	$ 3,575,231	$ 9,904,273	$ 14,515,395	$ 362,097	$ -	$ 125,582,586
2010	$ 51,039,357	$ 53,325,610	$ 23,495,560	$ 4,789,746	$ 9,317,457	$ 13,758,020	$ 415,841	$ -	$ 156,141,592
2011	$ 44,829,548	$ 56,291,399	$ 27,174,249	$ 4,967,801	$ 9,399,950	$ 13,964,807	$ 485,371	$ -	$ 157,113,126
2012	$ 43,464,128	$ 64,451,081	$ 33,174,640	$ 5,611,137	$ 9,196,561	$ 13,755,698	$ 548,433	$ -	$ 170,201,678
2013	$ 43,818,203	$ 76,476,013	$ 41,397,127	$ 6,582,323	$ 9,167,511	$ 13,798,641	$ 618,065	$ -	$ 191,857,883
2014	$ 40,735,773	$ 87,706,312	$ 49,970,961	$ 7,456,011	$ 8,981,977	$ 13,611,225	$ 683,075	$ -	$ 209,145,335
2015	$ 41,298,130	$ 62,310,001	$ 27,269,571	$ 5,077,782	$ 7,372,763	$ 11,194,079	$ 583,829	$ 0	$ 155,106,155
2016	$ 44,958,370	$ 73,537,886	$ 31,623,885	$ 5,888,586	$ 7,424,540	$ 11,341,603	$ 646,832	$ 0	$ 175,421,702
2017	$ 47,144,052	$ 84,554,910	$ 35,688,421	$ 6,645,430	$ 14,898,354	$ 22,506,723	$ 1,125,999	$ 0	$ 212,563,889
2018	$ 48,196,730	$ 95,652,300	$ 39,612,609	$ 7,376,141	$ 15,182,830	$ 23,079,493	$ 1,271,614	$ 0	$ 230,371,717
2019	$ 45,862,289	$ 103,369,088	$ 41,887,662	$ 7,799,772	$ 14,639,961	$ 22,420,169	$ 1,370,400	$ 0	$ 237,349,340
2020	$ 43,802,210	$ 112,469,507	$ 44,673,161	$ 8,318,451	$ 14,639,152	$ 22,565,612	$ 1,503,169	$ 0	$ 247,971,262

	Implied Average Rate Impact of CEP Rebate, Grant, and Program Costs for Class I RPS Generation, $/kWh		
Energy Year	Class I Solar PV	Class I Non-solar	Class I Total
2004	$ 0.000380	$ 0.000418	$ 0.000798
2005	$ 0.000260	$ 0.000139	$ 0.000399
2006	$ 0.000789	$ 0.000568	$ 0.001358
2007	$ 0.001444	$ 0.000473	$ 0.001917
2008	$ 0.002565	$ 0.000480	$ 0.003045
2009	$ 0.001246	$ 0.000306	$ 0.001553
2010	$ 0.001627	$ 0.000288	$ 0.001915
2011	$ 0.001622	$ 0.000290	$ 0.001912
2012	$ 0.001771	$ 0.000284	$ 0.002054
2013	$ 0.002015	$ 0.000282	$ 0.002297
2014	$ 0.002207	$ 0.000276	$ 0.002484
2015	$ 0.001580	$ 0.000223	$ 0.001803
2016	$ 0.001775	$ 0.000221	$ 0.001996
2017	$ 0.001938	$ 0.000429	$ 0.002367
2018	$ 0.002080	$ 0.000431	$ 0.002510
2019	$ 0.002136	$ 0.000413	$ 0.002548
2020	$ 0.002214	$ 0.000409	$ 0.002623

	Clean Energy Program Rate Impact by Sector with Impacts from Rebates/Grants for Customer-sited Solar PV Allocated to Sectors Where Generation Occurs ($/kWh)								
	Residential			Commercial			Industrial		
Energy Year	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total	Class I Solar PV	Class I Non-solar	Class I Total
2004	$ 0.000445	$ 0.000418	$ 0.000863	$ 0.000337	$ 0.000418	$ 0.000756	$ 0.000371	$ 0.000418	$ 0.000790
2005	$ 0.000305	$ 0.000139	$ 0.000444	$ 0.000231	$ 0.000139	$ 0.000370	$ 0.000255	$ 0.000139	$ 0.000394
2006	$ 0.000924	$ 0.000568	$ 0.001492	$ 0.000700	$ 0.000568	$ 0.001269	$ 0.000772	$ 0.000568	$ 0.001340
2007	$ 0.001691	$ 0.000473	$ 0.002164	$ 0.001282	$ 0.000473	$ 0.001755	$ 0.001412	$ 0.000473	$ 0.001885
2008	$ 0.003003	$ 0.000480	$ 0.003483	$ 0.002276	$ 0.000480	$ 0.002757	$ 0.002508	$ 0.000480	$ 0.002989
2009	$ 0.001458	$ 0.000306	$ 0.001764	$ 0.001038	$ 0.000306	$ 0.001344	$ 0.001456	$ 0.000306	$ 0.001762
2010	$ 0.001785	$ 0.000288	$ 0.002074	$ 0.001393	$ 0.000288	$ 0.001681	$ 0.002068	$ 0.000288	$ 0.002356
2011	$ 0.001565	$ 0.000290	$ 0.001855	$ 0.001457	$ 0.000290	$ 0.001748	$ 0.002366	$ 0.000290	$ 0.002656
2012	$ 0.001515	$ 0.000284	$ 0.001798	$ 0.001654	$ 0.000284	$ 0.001938	$ 0.002860	$ 0.000284	$ 0.003143
2013	$ 0.001526	$ 0.000282	$ 0.001808	$ 0.001946	$ 0.000282	$ 0.002229	$ 0.003535	$ 0.000282	$ 0.003817
2014	$ 0.001423	$ 0.000276	$ 0.001699	$ 0.002213	$ 0.000276	$ 0.002489	$ 0.004226	$ 0.000276	$ 0.004503
2015	$ 0.001383	$ 0.000223	$ 0.001606	$ 0.001536	$ 0.000223	$ 0.001759	$ 0.002269	$ 0.000223	$ 0.002492
2016	$ 0.001478	$ 0.000221	$ 0.001699	$ 0.001773	$ 0.000221	$ 0.001994	$ 0.002576	$ 0.000221	$ 0.002796
2017	$ 0.001522	$ 0.000429	$ 0.001951	$ 0.001994	$ 0.000429	$ 0.002423	$ 0.002845	$ 0.000429	$ 0.003274
2018	$ 0.001529	$ 0.000431	$ 0.001960	$ 0.002206	$ 0.000431	$ 0.002637	$ 0.003090	$ 0.000431	$ 0.003521
2019	$ 0.001442	$ 0.000413	$ 0.001854	$ 0.002347	$ 0.000413	$ 0.002760	$ 0.003219	$ 0.000413	$ 0.003632
2020	$ 0.001366	$ 0.000409	$ 0.001775	$ 0.002514	$ 0.000409	$ 0.002924	$ 0.003383	$ 0.000409	$ 0.003792

Notes and Sources:

Note 1: Projection for customer numbers in future years are very approximate. For the residential sector, the number of customers is assumed to grow at the average rate of population growth plus 0.1%/yr, which has been approximately the pattern (that is, faster growth in the number of households than in population, as family size decreases) over the past decade in New Jersey. For the Commercial and Industrial sectors, growth in the number of customers is assumed to be similar to the rate of population growth, which has been the pattern in recent years, but it should be noted that growth in commercial and industrial customers has historically fluctuated significantly from year to year.

2.4 RPS Generation and Costs Estimation Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules
BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency
"Proposed Readoption With Amendments: N.J.A.C. 14:4
Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"
(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

ESTIMATE OF RPS AND SOLAR RPS GENERATION AND COSTS BY TYPE AND YEAR

KEY ASSUMPTIONS AND INPUTS

Fraction of Solar PV Generation by Type of Installation

	Fraction of Total Annual Average Solar PV kWh Generation by System Scale				
Energy Years	Residential	Commercial	Industrial	Utility/ Merchant	
2004	32%	47%	16%	5%	*See Note 1*
2008	32%	47%	16%	5%	*See Note 1*
2014	20%	50%	25%	5%	*See Note 2*
2020	15%	55%	25%	5%	*See Note 3*

Fraction of Other Class I Generation by Type of Installation

	Fraction of Total Annual Average Non-solar Class I kWh Generation by System Type (Utility/Merchant scale)				
Energy Years	Onshore Wind	Offshore Wind	Biomass	[Not Used]	
2004	49%	50%	1%	0%	*See Note 4*
2008	49%	50%	1%	0%	
2014	48%	50%	2%	0%	
2020	47%	50%	3%	0%	

Generation Multiplier for Other Class I Generation: 1 *Placeholder value-see note below.*

NOTE: This factor could be used to reflect the sales-level (end-user) requirements for Other Class I Generation. A similar factor is not required for Solar PV Generation (except PV used at the Utility/Merchant/level) because on-site PV power incurrs negligible transmission and distribution losses. In the comparison of Class I Renewables costs with conventional costs, conventional costs are estimated based on retail prices, thus transmission and distribution losses are by definition already included in the costs of conventional generation as used here. Note that a value of 1.00 is used in the intial form of this analysis because the New Jersey RPS rule is written so as to define the required amount of renewable generation purchased relative to total sales, regardless of where the renewable generation takes place. As a consequence, a kW of customer-sited and a kW of "merchant" generation producing electricity from renewable resources are counted the same under the RPS rule as currently configured.

Distribution capacity and ancillary system benefits of distributed PV generation	$50	/kW-yr
Additional on-peak system (generation) benefits of PV generation (including utility/merchant)	$50	/kW-yr

Average Fraction of Annual Solar PV Output in June through September: 39% *Calculated for a Newark location using the "PVWATTS" on-line calculator, and assuming a south-facing collector tilted at 30% to the horizontal. PVWATTS (v.1) is produced by USDOE NREL, available at http://rredc.nrel.gov/solar/calculators/PVWATTS/version1/code/pvwattsv1.cgi. Note that as the collector is tilted toward the horizontal, the fraction of generation in the summer months rises, but (at least when the tilt falls past about 35 degrees, for a Newark location) overall annual generation falls. This suggests that customers might choose (when possible) to optimize the tilt angle their fixed-array PVs so as to take advantage of the differential between summer and winter rates (assuming net metering of solar PV output).*

RESULTS

All costs in constant (real) 2004 dollars

RENEWABLE CLASS I GENERATION AND CAPACITY BY TYPE OF GENERATOR

	Solar PV Class I MWh Output by System Scale				Other Class I Renewables MWh Output by System Type			
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	2,423	3,559	1,212	379	274,556	280,159	5,603	-
2005	4,178	6,137	2,089	653	369,941	377,490	7,550	-
2006	9,799	14,393	4,900	1,531	777,739	793,612	15,872	-
2007	20,671	30,361	10,336	3,230	1,132,846	1,155,966	23,119	-
2008	41,087	60,346	20,543	6,420	1,509,945	1,540,760	30,815	-
2009	53,626	84,907	31,282	8,938	1,850,485	1,894,694	44,210	-
2010	69,625	119,357	47,246	12,433	2,179,062	2,238,763	59,700	-
2011	84,187	157,042	66,379	16,190	2,519,049	2,596,957	77,909	-
2012	98,818	201,754	90,584	20,587	2,860,208	2,958,836	98,628	-
2013	114,104	256,733	121,883	25,933	3,209,009	3,331,151	122,142	-
2014	128,829	322,072	161,036	32,207	3,559,514	3,707,827	148,313	-
2015	153,013	405,818	199,583	39,917	3,970,526	4,150,376	179,850	0
2016	180,156	507,712	245,667	49,133	4,392,871	4,607,907	215,036	0
2017	209,498	628,494	299,283	59,857	5,257,660	5,534,379	276,719	0
2018	240,423	769,355	360,635	72,127	6,156,948	6,503,818	346,870	0
2019	270,761	926,287	427,517	85,503	7,041,778	7,464,782	423,004	0
2020	300,632	1,102,316	501,053	100,211	7,944,615	8,451,719	507,103	0

	Solar PV Class I Implied Capacity (kW) by System Scale				Other Class I Renewables Implied Capaciity (kW) by System Type			
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	2,019	2,966	1,010	315	104,473	86,437	1,019	-
2005	3,482	5,114	1,741	544	140,769	116,466	1,373	-
2006	8,166	11,994	4,083	1,276	295,943	244,851	2,886	-
2007	17,226	25,301	8,613	2,692	431,068	356,647	4,204	-
2008	34,239	50,289	17,120	5,350	574,560	475,367	5,603	-
2009	44,688	70,756	26,068	7,448	704,142	584,566	8,038	-
2010	58,021	99,464	39,371	10,361	829,171	690,720	10,855	-
2011	70,156	130,868	55,315	13,492	958,542	801,233	14,165	-
2012	82,349	168,129	75,486	17,156	1,088,359	912,883	17,932	-
2013	95,086	213,944	101,569	21,611	1,221,084	1,027,752	22,208	-
2014	107,357	268,393	134,197	26,839	1,354,457	1,143,967	26,966	-
2015	127,511	338,182	166,319	33,264	1,510,855	1,280,506	32,700	0
2016	150,130	423,093	204,723	40,945	1,671,564	1,421,667	39,097	0
2017	174,582	523,745	249,403	49,881	2,000,632	1,707,509	50,313	0
2018	200,353	641,129	300,529	60,106	2,342,826	2,006,608	63,067	0
2019	225,634	771,906	356,264	71,253	2,679,520	2,303,092	76,910	0
2020	250,526	918,597	417,544	83,509	3,023,065	2,607,589	92,201	0

RENEWABLE CLASS I COSTS BY TYPE OF GENERATOR

NOTE: Calculations in the table below are carried out so that costs of renewable generation are "vintaged", that is, the costs of generation for systems built in a given year continue at the rate prevailing in that year throughout the lifetime of the analysis.

NOTE: Costs shown below DO NOT include the portion of capital costs paid for by Clean Energy Program grants. To change this assumption, use the menu found on line 45 of the 'Renewable_costs' worksheet in this workbook.

	Solar PV Class I Total Net Costs by System Scale				Other Class I Renewables Total Costs by System Type			
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	$ 294,023	$ 566,949	$ 177,124	$ 53,805	$ 14,033,348	$ 21,507,696	$ 431,110	$ -
2005	$ 493,508	$ 953,636	$ 297,660	$ 90,827	$ 18,784,228	$ 28,800,627	$ 580,391	$ -
2006	$ 1,090,912	$ 2,118,305	$ 659,823	$ 203,394	$ 38,579,541	$ 59,237,459	$ 1,216,522	$ -
2007	$ 2,169,381	$ 4,234,053	$ 1,315,990	$ 409,976	$ 55,381,033	$ 85,114,093	$ 1,768,650	$ -
2008	$ 4,055,654	$ 7,960,076	$ 2,468,213	$ 777,803	$ 72,773,873	$ 111,946,968	$ 2,353,064	$ -
2009	$ 5,813,121	$ 13,791,526	$ 4,835,748	$ 1,286,070	$ 88,544,139	$ 136,721,096	$ 3,381,227	$ -
2010	$ 7,937,474	$ 21,596,175	$ 8,190,338	$ 1,962,612	$ 103,442,552	$ 160,335,270	$ 4,566,417	$ -
2011	$ 9,767,260	$ 29,738,167	$ 12,019,931	$ 2,659,593	$ 118,537,554	$ 184,442,513	$ 5,954,975	$ -
2012	$ 11,505,043	$ 38,945,615	$ 16,631,605	$ 3,441,318	$ 133,370,851	$ 208,328,336	$ 7,529,855	$ -
2013	$ 13,219,087	$ 49,729,827	$ 22,304,141	$ 4,351,642	$ 148,223,654	$ 232,432,313	$ 9,311,407	$ -
2014	$ 14,776,049	$ 61,929,968	$ 29,048,751	$ 5,374,926	$ 162,842,550	$ 256,354,174	$ 11,287,820	$ -
2015	$ 19,046,030	$ 81,788,826	$ 37,536,586	$ 6,929,469	$ 180,000,148	$ 284,482,343	$ 13,685,166	$ 0
2016	$ 23,636,780	$ 105,001,964	$ 47,276,041	$ 8,722,328	$ 197,342,523	$ 313,122,368	$ 16,351,266	$ 0
2017	$ 28,388,361	$ 131,427,040	$ 58,146,647	$ 10,734,090	$ 232,273,996	$ 370,242,603	$ 21,010,000	$ 0
2018	$ 33,180,323	$ 161,010,376	$ 70,074,510	$ 12,953,869	$ 268,009,343	$ 429,115,580	$ 26,291,238	$ 0
2019	$ 37,675,716	$ 192,635,109	$ 82,536,935	$ 15,286,756	$ 302,601,634	$ 486,603,187	$ 32,004,489	$ 0
2020	$ 41,905,706	$ 226,656,760	$ 95,662,647	$ 17,758,969	$ 337,329,431	$ 544,768,221	$ 38,295,270	$ 0

CONVENTIONAL GENERATION COSTS AVOIDED BY TYPE OF CLASS I RENEWABLES GENERATOR

	Solar PV Class I Total Avoided Costs by System Scale				Other Class I Renewables Total Avoided Costs by System Type			
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	$ 154,513	$ 226,941	$ 77,256	$ 24,143	$ 17,287,874	$ 17,640,688	$ 352,814	$ -
2005	$ 266,436	$ 391,327	$ 133,218	$ 41,631	$ 23,293,901	$ 23,769,287	$ 475,386	$ -
2006	$ 624,886	$ 917,801	$ 312,443	$ 97,638	$ 48,971,619	$ 49,971,040	$ 999,421	$ -
2007	$ 1,318,198	$ 1,936,103	$ 659,099	$ 205,968	$ 71,331,496	$ 72,787,241	$ 1,455,745	$ -
2008	$ 2,620,081	$ 3,848,244	$ 1,310,040	$ 409,388	$ 95,076,116	$ 97,016,445	$ 1,940,329	$ -
2009	$ 3,419,668	$ 5,414,475	$ 1,994,807	$ 569,945	$ 116,518,753	$ 119,302,477	$ 2,783,724	$ -
2010	$ 4,439,932	$ 7,611,312	$ 3,012,811	$ 792,845	$ 137,208,176	$ 140,967,304	$ 3,759,128	$ -
2011	$ 5,368,566	$ 10,014,440	$ 4,232,908	$ 1,032,416	$ 158,615,969	$ 163,521,618	$ 4,905,649	$ -
2012	$ 6,301,570	$ 12,865,705	$ 5,776,439	$ 1,312,827	$ 180,097,597	$ 186,307,859	$ 6,210,262	$ -
2013	$ 7,276,290	$ 16,371,653	$ 7,772,401	$ 1,653,702	$ 202,060,440	$ 209,751,322	$ 7,690,882	$ -
2014	$ 8,215,308	$ 20,538,270	$ 10,269,135	$ 2,053,827	$ 224,130,548	$ 233,469,320	$ 9,338,773	$ -
2015	$ 9,757,546	$ 25,878,709	$ 12,727,234	$ 2,545,447	$ 250,010,575	$ 261,335,096	$ 11,324,521	$ 0
2016	$ 11,488,397	$ 32,376,392	$ 15,665,996	$ 3,133,199	$ 276,604,226	$ 290,144,293	$ 13,540,067	$ 0
2017	$ 13,359,529	$ 40,078,587	$ 19,085,041	$ 3,817,008	$ 331,057,076	$ 348,481,133	$ 17,424,057	$ 0
2018	$ 15,331,603	$ 49,061,131	$ 22,997,405	$ 4,599,481	$ 387,682,174	$ 409,523,423	$ 21,841,249	$ 0
2019	$ 17,266,197	$ 59,068,568	$ 27,262,416	$ 5,452,483	$ 443,396,909	$ 470,032,059	$ 26,635,150	$ 0
2020	$ 19,171,036	$ 70,293,799	$ 31,951,727	$ 6,390,345	$ 500,245,539	$ 532,176,105	$ 31,930,566	$ 0

CLASS I RENEWABLES GENERATION COSTS NET OF AVOIDED COSTS

	Solar PV Class I Total Avoided Costs by System Scale				Other Class I Renewables Total Avoided Costs by System			
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	$ 139,510	$ 340,009	$ 99,867	$ 29,662	$ (3,254,526)	$ 3,867,009	$ 78,296	$ -
2005	$ 227,073	$ 562,309	$ 164,442	$ 49,196	$ (4,509,673)	$ 5,031,339	$ 105,005	$ -
2006	$ 466,026	$ 1,200,504	$ 347,381	$ 105,756	$ (10,392,078)	$ 9,266,419	$ 217,101	$ -
2007	$ 851,183	$ 2,297,950	$ 656,891	$ 204,008	$ (15,950,463)	$ 12,326,853	$ 312,905	$ -
2008	$ 1,435,573	$ 4,111,832	$ 1,158,173	$ 368,415	$ (22,302,243)	$ 14,930,523	$ 412,735	$ -
2009	$ 2,393,452	$ 8,377,051	$ 2,840,941	$ 716,125	$ (27,974,614)	$ 17,418,619	$ 597,503	$ -
2010	$ 3,497,541	$ 13,984,862	$ 5,177,527	$ 1,169,767	$ (33,765,624)	$ 19,367,966	$ 807,289	$ -
2011	$ 4,398,695	$ 19,723,728	$ 7,787,023	$ 1,627,176	$ (40,078,415)	$ 20,920,895	$ 1,049,326	$ -
2012	$ 5,203,473	$ 26,079,910	$ 10,855,165	$ 2,128,491	$ (46,726,747)	$ 22,020,476	$ 1,319,593	$ -
2013	$ 5,942,797	$ 33,358,174	$ 14,531,740	$ 2,697,940	$ (53,836,786)	$ 22,680,991	$ 1,620,525	$ -
2014	$ 6,560,741	$ 41,391,697	$ 18,779,615	$ 3,321,099	$ (61,287,997)	$ 22,884,853	$ 1,949,047	$ -
2015	$ 9,288,484	$ 55,910,117	$ 24,809,352	$ 4,384,022	$ (70,010,427)	$ 23,147,247	$ 2,360,646	$ (0)
2016	$ 12,148,383	$ 72,625,572	$ 31,610,045	$ 5,589,128	$ (79,261,703)	$ 22,978,075	$ 2,811,199	$ (0)
2017	$ 15,028,832	$ 91,348,453	$ 39,061,606	$ 6,917,082	$ (98,783,080)	$ 21,761,471	$ 3,585,944	$ (0)
2018	$ 17,848,719	$ 111,949,245	$ 47,077,105	$ 8,354,388	$ (119,672,830)	$ 19,592,158	$ 4,449,989	$ (0)
2019	$ 20,409,519	$ 133,566,541	$ 55,274,519	$ 9,834,273	$ (140,795,275)	$ 16,571,128	$ 5,369,339	$ (0)
2020	$ 22,734,670	$ 156,362,962	$ 63,710,921	$ 11,368,623	$ (162,916,108)	$ 12,592,116	$ 6,364,703	$ (0)

ESTIMATES OF AIR POLLUTANT EMISSIONS AVOIDED BY RPS GENERATION

Estimates of emission factors by year based on Annual Energy Outlook 2005 projections of emissions and generation for load for the Mid-Atlantic Area Council for 2002 through 2025. See "AEO2005_data" Worksheet in this workbook for derivation of these emissions vectors. Vectors with estimates of distribution losses and nuclear fractions are derived from the same source.

	Emission Factors Based on Average Generation (tons/MWh generated)			Emission Factors Assuming Nuclear Generation Not Displaced (tons/MWh generated)			Fraction of Nuclear Generation in Output	Average Transmission and Distribution Losses
Energy Year	CO_2	SO_2	NO_x	CO_2	SO_2	NO_x		
2004	0.56	0.00448	0.000766	0.90	0.00713	0.00122	37.18%	6.58%
2005	0.57	0.00462	0.000769	0.89	0.00728	0.00121	36.59%	6.52%
2006	0.57	0.00451	0.000792	0.89	0.00704	0.00124	36.00%	6.46%
2007	0.58	0.00439	0.000793	0.89	0.00681	0.00123	35.49%	6.40%
2008	0.58	0.00396	0.000791	0.90	0.00610	0.00122	35.15%	6.32%
2009	0.58	0.00346	0.000792	0.90	0.00533	0.00122	34.97%	6.25%
2010	0.58	0.00340	0.000781	0.89	0.00521	0.00120	34.71%	6.19%
2011	0.58	0.00334	0.000771	0.89	0.00509	0.00118	34.39%	6.12%
2012	0.58	0.00324	0.000761	0.88	0.00491	0.00116	34.12%	6.06%
2013	0.58	0.00320	0.000750	0.88	0.00484	0.00113	33.87%	5.98%
2014	0.58	0.00316	0.000737	0.87	0.00477	0.00111	33.67%	5.91%
2015	0.58	0.00312	0.000743	0.87	0.00471	0.00112	33.71%	5.85%
2016	0.58	0.00307	0.000749	0.87	0.00463	0.00113	33.70%	5.83%
2017	0.57	0.00302	0.000722	0.86	0.00454	0.00109	33.52%	5.82%
2018	0.57	0.00302	0.000699	0.86	0.00453	0.00105	33.39%	5.80%
2019	0.57	0.00299	0.000687	0.86	0.00448	0.00103	33.28%	5.78%
2020	0.57	0.00293	0.000673	0.86	0.00439	0.00101	33.28%	5.76%

Calculations below assume emissions factors that: Are Calculated Based on System-Average Emissions

Calculating based on non-nuclear generation only effectively assumes that nuclear power will not be displaced by renewable power.

CLASS I RENEWABLES CARBON DIOXIDE EMISSIONS SAVINGS

	Solar PV Class I Total Avoided Total Avoided CO_2 Emissions (tons) by System Scale					Other Class I Renewables Total Avoided CO_2 Emissions (tons) by System Type				
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	TOTAL	Onshore Wind	Offshore Wind	Biomass	[Not Used]	TOTAL
2004	1,453	2,135	727	213	4,528	154,523	157,676	3,154	-	315,353
2005	2,521	3,702	1,260	370	7,853	209,515	213,791	4,276	-	427,582
2006	5,952	8,742	2,976	874	18,543	443,716	452,771	9,055	-	905,542
2007	12,650	18,579	6,325	1,858	39,412	651,554	664,851	13,297	-	1,329,702
2008	25,372	37,265	12,686	3,729	79,051	876,954	894,851	17,897	-	1,789,702
2009	33,276	52,687	19,411	5,220	110,594	1,080,688	1,106,507	25,818	-	2,213,014
2010	43,053	73,806	29,215	7,240	153,313	1,268,873	1,303,637	34,764	-	2,607,274
2011	51,902	96,816	40,922	9,405	199,045	1,463,377	1,508,636	45,259	-	3,017,272
2012	60,843	124,220	55,772	11,952	252,787	1,660,470	1,717,727	57,258	-	3,435,454
2013	70,168	157,878	74,952	15,047	318,044	1,861,956	1,932,826	70,870	-	3,865,652
2014	78,994	197,485	98,742	18,647	393,869	2,060,876	2,146,746	85,870	-	4,293,492
2015	93,630	248,323	122,126	23,074	487,154	2,295,235	2,399,201	103,965	0	4,798,402
2016	109,769	309,349	149,685	28,287	597,090	2,529,028	2,652,827	123,799	0	5,305,654
2017	126,952	380,856	181,360	34,278	723,446	3,010,906	3,169,374	158,469	0	6,338,749
2018	145,459	465,470	218,189	41,246	870,364	3,520,873	3,719,233	198,359	0	7,438,465
2019	163,498	559,335	258,155	48,810	1,029,798	4,019,807	4,261,280	241,473	0	8,522,560
2020	181,629	665,973	302,715	57,244	1,207,562	4,538,294	4,827,973	289,678	0	9,655,946
TOTAL	1,207,120	3,402,622	1,575,219	307,492	6,492,453	31,646,646	33,129,907	1,483,260	0	66,259,814

CLASS I RENEWABLES SULFUR DIOXIDE EMISSIONS SAVINGS

	Solar PV Class I Total Avoided Total Avoided SO_2 Emissions (tons) by System Scale					Other Class I Renewables Total Avoided SO_2 Emissions (tons) by System Type				
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	TOTAL	Onshore Wind	Offshore Wind	Biomass	[Not Used]	TOTAL
2004	12	17	6	2	36	1,231	1,256	25	-	2,511
2005	21	30	10	3	64	1,708	1,743	35	-	3,486
2006	47	69	24	7	146	3,505	3,576	72	-	7,153
2007	97	142	48	14	301	4,977	5,079	102	-	10,158
2008	173	254	86	25	539	5,977	6,099	122	-	12,199
2009	197	313	115	31	656	6,410	6,563	153	-	13,126
2010	251	431	171	42	895	7,406	7,609	203	-	15,218
2011	299	557	235	54	1,145	8,420	8,680	260	-	17,360
2012	339	692	311	67	1,409	9,255	9,574	319	-	19,148
2013	387	871	414	83	1,755	10,273	10,664	391	-	21,328
2014	431	1,079	539	102	2,151	11,255	11,724	469	-	23,449
2015	506	1,342	660	125	2,633	12,407	12,969	562	0	25,939
2016	585	1,649	798	151	3,183	13,483	14,143	660	0	28,286
2017	669	2,008	956	181	3,815	15,877	16,713	836	0	33,425
2018	767	2,454	1,150	217	4,589	18,564	19,610	1,046	0	39,220
2019	856	2,930	1,352	256	5,395	21,058	22,323	1,265	0	44,646
2020	932	3,418	1,554	294	6,198	23,295	24,782	1,487	0	49,564
TOTAL	6,570	18,257	8,430	1,653	34,911	175,101	183,107	8,006	0	366,215

CLASS I RENEWABLES NITROGEN OXIDES EMISSIONS SAVINGS

	Solar PV Class I Total Avoided Total Avoided NO_x Emissions (tons) by System Scale					Other Class I Renewables Total Avoided NO_x Emissions (tons) by System Type				
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	TOTAL	Onshore Wind	Offshore Wind	Biomass	[Not Used]	TOTAL
2004	2.0	2.9	1.0	0.3	6.2	210	214	4.3	-	429
2005	3.4	5.0	1.7	0.5	11	285	290	5.8	-	581
2006	8.3	12.1	4.1	1.2	26	616	628	12.6	-	1,257
2007	17.4	25.6	8.7	2.6	54	898	916	18.3	-	1,832
2008	34.5	50.7	17.3	5.1	108	1,194	1,218	24.4	-	2,436
2009	45.1	71.4	26.3	7.1	150	1,465	1,500	35.0	-	3,000
2010	57.7	98.9	39.2	9.7	206	1,701	1,748	46.6	-	3,495
2011	68.9	128.5	54.3	12.5	264	1,943	2,003	60.1	-	4,006
2012	79.8	162.9	73.1	15.7	332	2,178	2,253	75.1	-	4,505
2013	90.7	204.0	96.8	19.4	411	2,405	2,497	91.6	-	4,994
2014	100.5	251.3	125.7	23.7	501	2,623	2,732	109.3	-	5,464
2015	120.4	319.3	157.0	29.7	626	2,951	3,085	133.7	0	6,170
2016	142.7	402.2	194.6	36.8	776	3,288	3,449	161.0	0	6,899
2017	160.0	480.1	228.6	43.2	912	3,796	3,995	199.8	0	7,991
2018	177.8	569.1	266.8	50.4	1,064	4,305	4,547	242.5	0	9,095
2019	196.7	673.0	310.6	58.7	1,239	4,837	5,127	290.5	0	10,254
2020	214.1	785.1	356.8	67.5	1,424	5,350	5,691	341.5	0	11,383
TOTAL	1,520	4,242	1,963	384	8,109	40,043	41,895	1,852	0	83,790

FRACTION OF RENEWABLE CLASS I GENERATION BY TYPE OF GENERATOR AND BY YEAR

	Solar PV Class I MWh Output by System Scale				Other Class I Renewables MWh Output by System Type			
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	32.0%	47.0%	16.0%	5.0%	49.0%	50.0%	1.0%	0.0%
2005	32.0%	47.0%	16.0%	5.0%	49.0%	50.0%	1.0%	0.0%
2006	32.0%	47.0%	16.0%	5.0%	49.0%	50.0%	1.0%	0.0%
2007	32.0%	47.0%	16.0%	5.0%	49.0%	50.0%	1.0%	0.0%
2008	32.0%	47.0%	16.0%	5.0%	49.0%	50.0%	1.0%	0.0%
2009	30.0%	47.5%	17.5%	5.0%	48.8%	50.0%	1.2%	0.0%
2010	28.0%	48.0%	19.0%	5.0%	48.7%	50.0%	1.3%	0.0%
2011	26.0%	48.5%	20.5%	5.0%	48.5%	50.0%	1.5%	0.0%
2012	24.0%	49.0%	22.0%	5.0%	48.3%	50.0%	1.7%	0.0%
2013	22.0%	49.5%	23.5%	5.0%	48.2%	50.0%	1.8%	0.0%
2014	20.0%	50.0%	25.0%	5.0%	48.0%	50.0%	2.0%	0.0%
2015	19.2%	50.8%	25.0%	5.0%	47.8%	50.0%	2.2%	0.0%
2016	18.3%	51.7%	25.0%	5.0%	47.7%	50.0%	2.3%	0.0%
2017	17.5%	52.5%	25.0%	5.0%	47.5%	50.0%	2.5%	0.0%
2018	16.7%	53.3%	25.0%	5.0%	47.3%	50.0%	2.7%	0.0%
2019	15.8%	54.2%	25.0%	5.0%	47.2%	50.0%	2.8%	0.0%
2020	15.0%	55.0%	25.0%	5.0%	47.0%	50.0%	3.0%	0.0%

Notes and Sources:

Note 1 : Values for fractions of PV systems installed by type for 2004 - 2008 are at this point placeholder values based roughly on ratios of 2003 electricity sales by customer class. The relatively high percentage of residential systems for this period reflects, in part, the continued high CEP contribution toward system capital costs.

Note 2 : Values for fractions of PV systems installed by type for 2009 - 2014 assume that CEP incentives for installation of smaller PV systems (indeed, all systems) will be reduced after 2009, and that as a result more of the capital costs of PV system installation will ultimately be paid through RECs. This implies that solar PV systems will be installed more often as a business investment, meaning that a higher proportion of systems will be installed by customers in the commercial and industrial sectors after 2008.

Note 3: Values for fractions of PV systems installed by type for 2015 - 2020 assume that CEP incentives for installation of PV systems continue to slowly decline, and that the trend toward increasing factions of total PV generation on commercial and industrial customer sites increases, tempered somewhat by the assumption that falling PV prices make "solar roofs" more affordable.

Note 4 : Figures for fractions of non-solar Class I generation from onshore and offshore wind are placeholder values at present. Values for fractions of non-solar Class I generation from biomass-fueled plants reflect the assumption that biomass plants, and the fuel collection/supply networks needed to feed them, may develop more slowly than wind power infrastructure. Having risen to 3 percent of total non-solar Class I RPS generation by 2020, the total biomass generation will use each year roughly one-third of the biomass resources estimated by an Oak Ridge National Laboratory study (see the "Biomass_Fuels" worksheet in this workbook) as being available annually in New Jersey.

Note 5 : The results of several studies that estimated value of the on-peak and/or transmission and distribution system benefits of solar photovoltaic power or other distributed generation are provided below. Although clearly an anecdotal sampling for systems in various locations, these studies overall suggest that both the distribution capacity and ancillary system benefits of distributed PV generation and the additional on-peak system (generation) benefits of PV generation can be substantial.
We use $50 /kW-yr as starting values for each of these parameters, though higher values for each could arguably be justified based on the results shown below.

The paper "**Mid-Atlantic States Cost Curve Analysis**", by William B. Marcus, and Greg Ruszovan, dated September 18, 2002, prepared for the The National Association of Energy Service Companies and the Pace Law School Energy Project, and available as http://www.millionsolarroofs.org/articles/static/1/binaries/Mid_Atlantic_States_Cost_Curve_Analysis.pdf, includes a comparison of the value of both DSM load reduction and peak savings through solar PV distributed generation. Using 2000 data from the PJM utility system, and based on data from a PV installation in the Philadelphia area, this analysis concluded (page 13) that the value of solar generation was 206% higher than actual market prices the on-peak nature of solar PV generation. Discounting for the fact that higher summertime generation has already been accounted for above (with solar PV generation in the summer being a factor of 1.18 times higher than if generation were evenly averaged over the year), a net cost premium due to on-peak generation of 159% can be estimated. At 2005 weighted average BGS costs, this is $ 0.1011 per kWh of solar generation, or about $ 121.37 per kW-yr of Solar PV capacity.

In the article "**The Role of Electric Utilities in the Photovoltaics Industry**", in Renewable Energy Annual 1996, dated April 1997 (available as http://www.eia.doe.gov/cneaf/solar.renewables/renewable.energy.annual/chap07.html), Peter Holihan of the USDOE Energy Information Administration presents a study of a solar PV installation in the Pacific Gas and Electric (California) service territory that finds that total "non-traditional" (that is, benefits other than the avoided cost of fuel and generating capacity), excluding externalities (pollutant emissions) costs, was between $107 and $180 per kW-yr (1995 dollars--"nominal" and "high" estimates). The elements of these estimated benefits were "postpone planned reliability improvements" ($4/kW-yr), "reduce kWh and kVAR losses" ($14-15/kW-yr), "reduced transformer upgrade expenditures" ($16-88/kW-yr), "marginal cost of transmission capacity" ($45/kW-yr), and "marginal cost of keeping peak load-following units on line" ($28/kW-yr).

In a July 9, 2001 filing before the New Jersey BPU , a group of New Jersey Utilities filed as "**Supplement 1 to the Program Compliance Filing**" a document lableled "New Jersey Clean Energy Collaborative Energy and Economic Assessment of Energy Efficiency Programs", in which Table 3.10, on page 18, indicates a stream of "Projected Avoided Resource Costs" in 2000 dollars wherein electricity transmission and distribution avoided capacity from 2000 to 2016 had a values ranging from about $23 to $25 per kW-yr.

In a report entitled **QUANTIFYING THE BENEFITS OF SOLAR POWER FOR CALIFORNIA: A WHITE PAPER** by Ed Smeloff, dated January 2005, prepared for the Vote Solar Initiative, and available as http://www.votesolar.org/tools_QuantifyingSolar'sBenefits.pdf, includes estimates of avoided transmission and distribution losses for three California utilities ranging from about $40 to about $90 per kW-yr, for which the original source was "California Long-Term Avoided Costs, Energy and Environmental Economics, Inc., pages 129-130."

In the study **SYSTEM WIDE ECONOMIC BENEFITS OF DISTRIBUTED GENERATION IN THE NEW ENGLAND ENERGY MARKET**, by Dragoljub Kosanovic and Christopher Beebe, dated February 2005 prepared for the Center for Energy Efficiency and Renewable Energy, and available as http://www.ceere.org/iac/pubsdownloads/DG%20Benefits%20Report.pdf, the authors estimate a value of annual transmission deferment of $57.92/kW-yr, a distribution deferral value of $5.22/kW-yr, and a congestion cost reduction value of $23.50/kW-yr. They also cite a reduction in the cost of on-peak utility costs for power (locational marginal price) at $220.75/kW-yr. Note that these costs are calculated for fuel-fired distributed generation or cogeneration.

2.5 RPS and Solar RPS Generation Requirements Estimate Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules

BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency

"Proposed Readoption With Amendments: N.J.A.C. 14:4

Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"

(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by: David Von Hippel Date last Modified: 12/15/2005

ESTIMATE OF RPS AND SOLAR RPS GENERATION REQUIREMENTS BY YEAR

KEY ASSUMPTIONS AND INPUTS

Estimated NJ-wide sales in Energy Year 2005, excluding municipal utilities: 76,793,865 MWh

See "Sales_Data" worksheet in this workbook

Annual Rates of Change for Key Parameters

Growth Rates Between Energy Years*	2004 - 2008	2008 - 2014	2014 - 2020	
Overall growth in Statewide non-municipal Sales	2.9%	1.4%	1.6%	*See Note 3*
Annual new EE** savings as % of pre-EE sales	1.4%	0.7%	0.8%	*See Note 4*

**EE denotes "Energy Efficiency"

Total 2020 Class I Renewables Generation Requirement as % of Net Statewide Sales	20%	*See Note 1*
Total 2016 Class I Renewables Generation Requirement as % of Net Statewide Sales	11.603%	*See Note 1*
Total 2020 Class I Solar PV Generation Requirement as % of Net Statewide Sales	2.12%	*See Note 1*
Total 2020 Class I Non-Solar PV Generation Requirement as % of Net Statewide Sales	17.88%	

(Note that total Class I and Solar PV Class I generation requirements for 2004-2007 are as in existing estimates of RPS percentages of supplied energy from the BPU proposal, as shown in yellow in the table below. Annual percentage requirements increase to target values above from 2008 on, with relative year-to-year growth as in the BPU proposal.)

Annual 2004 - 2020 Class II Renewables Generation Requirement as % of Net Statewide Sales 2.50% *See Note 2*

Average persistence of EE Savings 10 years *Rough estimate based on average life of DSM measures*

Energy Year	Pre-EE Sales (MWh)	New EE Savings (MWh)	Net Total EE Savings (MWh)	Statewide Electricity Demand Net of EE	Class II Generation Requirements (MWh)	Total Class I Requirements as % of Net Generation	Class I Non-Solar Requirements as % of Net Generation	Class I Solar Requirements as % of Net Generation	Total Class I Generation Requirements (MWh)	Class I Non-Solar Generation Requirements (MWh)	Class I Solar Generation Requirements (MWh)	Total Class II Generation Requirements (MWh)
2004	76,793,865	1,075,114	1,075,114	75,718,751	1,892,969	0.750%	0.740%	0.010%	567,891	560,319	7,572	1,892,969
2005	78,984,625	1,105,785	2,180,899	76,803,726	1,920,093	1.000%	0.983%	0.017%	768,037	754,981	13,057	1,920,093
2006	81,237,882	1,137,330	3,318,229	77,919,653	1,947,991	2.076%	2.037%	0.039%	1,617,846	1,587,223	30,622	1,947,991
2007	83,555,420	1,169,776	4,488,005	79,067,415	1,976,685	3.006%	2.924%	0.082%	2,376,529	2,311,931	64,598	1,976,685
2008	85,939,072	1,203,147	5,691,152	80,247,920	2,006,198	4.000%	3.840%	0.160%	3,209,917	3,081,520	128,397	2,006,198
2009	87,184,869	610,294	6,301,446	80,883,422	2,022,086	4.906%	4.685%	0.221%	3,968,141	3,789,388	178,752	2,022,086
2010	88,448,724	619,141	6,920,587	81,528,137	2,038,203	5.797%	5.492%	0.305%	4,726,186	4,477,525	248,661	2,038,203
2011	89,730,901	628,116	7,548,704	82,182,197	2,054,555	6.714%	6.320%	0.394%	5,517,713	5,193,915	323,798	2,054,555
2012	91,031,665	637,222	8,185,925	82,845,739	2,071,143	7.640%	7.143%	0.497%	6,329,414	5,917,671	411,743	2,071,143
2013	92,351,284	646,459	8,832,384	83,518,900	2,087,973	8.598%	7.977%	0.621%	7,180,955	6,662,303	518,652	2,087,973
2014	93,690,034	655,830	9,488,214	84,201,819	2,105,045	9.572%	8.807%	0.765%	8,059,798	7,415,654	644,144	2,105,045
2015	95,170,857	761,367	9,143,797	86,027,060	2,150,677	10.577%	9.649%	0.928%	9,099,082	8,300,751	798,331	2,150,677
2016	96,675,085	773,401	8,779,867	87,895,218	2,197,380	11.603%	10.485%	1.118%	10,198,482	9,215,814	982,669	2,197,380
2017	98,203,089	785,625	8,395,716	89,807,373	2,245,184	13.658%	12.325%	1.333%	12,265,891	11,068,759	1,197,132	2,245,184
2018	99,755,244	798,042	7,990,611	91,764,633	2,294,116	15.747%	14.175%	1.572%	14,450,177	13,007,637	1,442,540	2,294,116
2019	101,331,931	810,655	8,190,972	93,140,959	2,328,524	17.865%	16.029%	1.836%	16,639,632	14,929,564	1,710,068	2,328,524
2020	102,933,538	823,468	8,395,299	94,538,239	2,363,456	20.000%	17.880%	2.120%	18,907,648	16,903,437	2,004,211	2,363,456

*An "Energy Year" runs from from June 1 XX to May 31, XX + 1.
For example, Energy year 2008 runs from the beginning of June 2008 to the end of May, 2009.

Notes and Sources

Note 1 : Base values of 20%, 11.603%, 2.12%, for 2020 Class I, 2016 Class I, and 2020 Solar PV Generation, respectively, are from BPU Proposal, Table A, as shown below.

Renewable Energy Percentages as included in the Proposed RPS Rule, Table A (Cite 37 N.J.R. 3937) of "Proposed Readoption With Amendments: N.J.A.C. 14:4
Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"
(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Energy Year	Solar Electric Generation	Class I Non-solar Renewable Energy	Total Class I Renewable Energy
2004	0.010%	0.740%	0.750%
2005	0.017%	0.983%	1.000%
2006	0.039%	2.037%	2.076%
2007	0.082%	2.924%	3.006%
2008	0.160%	3.840%	4.000%
2009	0.221%	4.685%	4.906%
2010	0.305%	5.492%	5.797%
2011	0.394%	6.320%	6.714%
2012	0.497%	7.143%	7.640%
2013	0.621%	7.977%	8.598%
2014	0.765%	8.807%	9.572%
2015	0.928%	9.649%	10.577%
2016	1.118%	10.485%	11.603%
2017	1.333%	12.325%	13.658%
2018	1.572%	14.175%	15.747%
2019	1.836%	16.029%	17.865%
2020	2.120%	17.880%	20.000%

Note 2 : Class II generation fraction from BPU Proposal cited above.

Note 3 : Long-term statewide electricity demand sales projections for New Jersey were not available as of the time this estimate of rate impacts was prepared, so the following adaptation of regional data from the the Annual Energy Outlook 2005 (AEO2005), prepared by the USDOE Energy Information Administration (EIA), was used. Data below, except as noted, are from the Supplement volume to AEO2005, available from http://www.eia.doe.gov/oiaf/aeo/supplement/supref.html.

Estimates of Mid-Atlantic States Electricity Consumption by Sector from AEO2005

See "AEO2005_data" worksheet in this workbook.

Units: Quadrillion Btu					Implied Rates of Growth of overall		
	2004	2008	2014	2020	2004-2008	2008-2014	2014-2020
Residential	0.4203	0.4592	0.4723	0.4951	2.24%	0.47%	0.79%
Commercial	0.5116	0.5740	0.6207	0.6680	2.92%	1.31%	1.23%
Industrial	0.2855	0.2996	0.3117	0.3198	1.21%	0.67%	0.42%
Total	1.2282	1.3443	1.4174	1.4968	2.28%	0.89%	0.91%

Demographic/Economic Parameters for Mid-Atlantic States

(Data in millions)	2004	2008	2014	2020	
Population	40.28	40.80	41.42	41.98	See "Population" worksheet in this workbook.
Non-Farm Employment	17.9	18.4	18.9	19.7	See "AEO2005_data" worksheet in this workbook.

Demographic/Economic Parameters for New Jersey

(Data in millions)	2004	2008	2014	2020	
Population	8.68	8.91	9.21	9.64	See "Population" worksheet in this workbook.
Total Employment*	4.08	4.27	4.56	4.94	See "NJ_Employment_Projections" worksheet in this workbook.

*Note that farm employment in New Jersey is very low--on the order of 0.1% of total employment, and therefore the difference between Total and Non-Farm Employment in New Jersey is neglected in these estimates. In the table above, employment values for 2004 and 2008 are linearly interpolated from projections for 2002 - 2012 as in source document, and value for 2020 is estimated based on relative rates of growth of employment in mid-Atlantic States in 2008-2014 and 2014-2020, plus growth in employment in New Jersey from 2008 to 2014 relative to growth in employment in the Mid-Atlantic States over the same period.

Note that both population and total employment in New Jersey, based on the figures shown here, are expected to increase significantly faster than in the other states of the Mid-Atlantic Region (New York and Pennsylvania). In the calculations shown below, this causes forecast growth in electricity use in New Jersey to increase significantly faster than in the region as a whole.

Implied per-person and per-employee electricity consumption in Mid-Atlantic States

					Implied Rates of Growth of Per-unit Electricity Use		
	2004	2008	2014	2020	2004-2008	2008-2014	2014-2020
Residential (MMBtu/person)	10.43	11.25	11.40	11.79	1.91%	0.22%	0.56%
Commercial (MMBtu/Empl.)	28.58	31.20	32.84	33.91	2.21%	0.86%	0.54%
Industrial (MMBtu/Empl.)	15.95	16.28	16.49	16.23	0.52%	0.22%	-0.27%

Estimated Electricity Consumption growth in New Jersey using per-person and per-employee growth as in Mid-Atlantic States from AEO projections, and growth in employment and population in New Jersey as shown above.

Units: MWh	**Energy Year**				Implied Rates of Growth of overall Electricity Use		
	2004	2008	2014	2020	2004-2008	2008-2014	2014-2020
Residential	27,717,257	30,686,205	32,136,636	34,785,913	2.58%	0.77%	1.33%
Commercial	37,492,205	42,841,796	48,129,563	53,816,802	3.39%	1.96%	1.88%
Industrial	10,964,177	11,716,984	12,667,146	13,499,480	1.67%	1.31%	1.07%
Sum of Above	76,173,639	85,244,984	92,933,345	102,102,194	2.85%	1.45%	1.58%
TOTAL Sales*	76,793,865	85,939,072	93,690,034	102,933,538	2.85%	1.45%	1.58%

*Note that electricity consumption for transport and "other" is not accounted for explicitly, so the totals of the residential/commercial/industrial sales shown are slightly less than full statewide sales from private utilities. The "Total Sales" row figures assume that transport and other sales will increase at the average combined rate of the other sectors.

Note 4: No firm estimates of EE (Energy Efficiency) savings to be achieved in the coming years by the Clean Energy Program and other initiatives in New Jersey are available, therefore it is assumed that roughly half of the estimated growth in (pre-EE) electricity service needs will be met through EE savings.

Note that both population and total employment in New Jersey, based on the figures shown here, are expected to increase significantly faster than in the other states of the Mid-Atlantic Region (New York and Pennsylvania). In the calculations shown below, this causes forecast growth in electricity use in New Jersey to increase significantly faster than in the region as a whole.

Implied per-person and per-employee electricity consumption in Mid-Atlantic States

					Implied Rates of Growth of Per-unit Electricity Use		
	2004	2008	2014	2020	2004-2008	2008-2014	2014-2020
Residential (MMBtu/person)	10.43	11.25	11.40	11.79	1.91%	0.22%	0.56%
Commercial (MMBtu/Empl.)	28.58	31.20	32.84	33.91	2.21%	0.86%	0.54%
Industrial (MMBtu/Empl.)	15.95	16.28	16.49	16.23	0.52%	0.22%	-0.27%

Estimated Electricity Consumption growth in New Jersey using per-person and per-employee growth as in Mid-Atlantic States from AEO projections, and growth in employment and population in New Jersey as shown above.

Units: MWh	**Energy Year**				Implied Rates of Growth of overall Electricity Use		
	2004	2008	2014	2020	2004-2008	2008-2014	2014-2020
Residential	27,717,257	30,686,205	32,136,636	34,785,913	2.58%	0.77%	1.33%
Commercial	37,492,205	42,841,796	48,129,563	53,816,802	3.39%	1.96%	1.88%
Industrial	10,964,177	11,716,984	12,667,146	13,499,480	1.67%	1.31%	1.07%
Sum of Above	76,173,639	85,244,984	92,933,345	102,102,194	2.85%	1.45%	1.58%
TOTAL Sales*	76,793,865	85,939,072	93,690,034	102,933,538	2.85%	1.45%	1.58%

*Note that electricity consumption for transport and "other" is not accounted for explicitly, so the totals of the residential/commercial/industrial sales shown are slightly less than full statewide sales from private utilities. The "Total Sales" row figures assume that transport and other sales will increase at the average combined rate of the other sectors.

Note 4 : No firm estimates of EE (Energy Efficiency) savings to be achieved in the coming years by the Clean Energy Program and other initiatives in New Jersey are available, therefore it is assumed that roughly half of the estimated growth in (pre-EE) electricity service needs will be met through EE savings.

2.6 Renewable Generation Alternatives Costs Estimation Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules
BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency
"Proposed Readoption With Amendments: N.J.A.C. 14:4
Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"
(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

ESTIMATE OF COSTS OF RENEWABLE GENERATION ALTERNATIVES

KEY ASSUMPTIONS AND INPUTS

Solar PV System Costs	System Scale					
Cost Element	Residential	Commercial	Industrial	Utility/ Merchant	Units	
Approximate Average Total Capital Cost in 2004	$ 8,000	$ 6,100	$ 5,800	$ 5,400	$/kW	*See Note 10*
Fixed Operations and Maintenance	$ 15.00	$ 12.00	$ 10.00	$ 7.00	$/kW-yr	*See Note 11*
Variable Operations and Maintenance	$ -	$ -	$ -	$ -	$/kWh	*See Note 11*
Annual Full-load-equivalent Hours of Operation/yr (kWh ac/kW dc)	1200	1200	1200	1200	kWh/kW	*See Note 9*
Capital Recovery Factor*	8.6%	12.7%	12.7%	11.0%	per year	*See Note 18*

*Real return on investment--designed to include payments to capital and required profit.

Other Generation System Costs	System Type (Utility/Merchant scale)					
Cost Element	Onshore Wind	Offshore Wind	Biomass	[Not Used]	Units	
Approximate Average Total Capital Cost in 2004	$ 1,150	$ 2,000	$ 2,000	$ 2,000	$/kW	*See Note 16*
Fixed Operations and Maintenance	$ 20.00	$ 50.00	$ 80.00	$ 10.00	$/kW-yr	*See Notes 8 (biomass) 14 (wind)*
Variable Operations and Maintenance	$ -	$ -	$ 0.026	$ 0.003	$/kWh	*See Notes 5 (biomass), 14 (wind)*
Annual Full-load-equivalent Hours of Operation/yr	2628	3241	5500	5500	kWh/kW	*See Notes 6 (biomass), 15 (wind)*
Capital Recovery Factor*	11.0%	11.0%	11.0%	11.0%	per year	*See Note 18*

*Real return on investiment--designed to include payments to capital and required profit.

Annual Rates of Change and Values for Key Parameters (all changes in real terms)

Variable	2004 - 2008	2009 - 2014	2015 - 2020	
Annual Average Change in Solar PV System Capital Costs	-4.0%	-3.5%	-3.0%	*See Note 12*
Annual Average Change in Wind System Capital Costs	-3.0%	-2.5%	-2.0%	*See Note 17*
Annual Average Change in Biomass System Capital Costs	-0.7%	-0.7%	-0.7%	*See Note 4*
Annual Average Change in [Not Used] System Capital Costs	-0.5%	-0.5%	-0.5%	*[Not Used]*
New Jersey Clean Energy Program Average Solar Capital Cost Grant as a Fraction of Capital Costs--Residential	66.4%	55.0%	35.0%	*See Note 1*
New Jersey Clean Energy Program Average Solar Capital Cost Grant as a Fraction of Capital Costs--Commercial/Industrial/Merchant	60.1%	35.0%	20.0%	*See Note 2*
New Jersey Clean Energy Program Average Capital Cost Grant as a Fraction of Capital Costs--Other Renewables	9.8%	7.0%	5.0%	*See Note 3*
Exclude New Jersey Clean Energy Program contributions toward capital costs from summary costs per kWh?	YES			*If "YES" is chosen, costs shown below will be reduced through CEP contribution.*
New Jersey Solar Tax Credit--Residential	0%	0%	0%	*None assumed at present*
New Jersey Solar Tax Credit--Commercial/Industrial/Merchant	0%	0%	0%	*None assumed at present*
Federal Solar Tax Credit--Residential	0%	0%	0%	*See Note 7*
Federal Solar Tax Credit--Commercial/Industrial/Merchant	10%	10%	10%	*See Note 7*
Total Investment Tax Credits, Other Renewables	0%	0%	0%	*See Note 13*

SUMMARY RESULTS: COSTS PER KWH FOR RENEWABLE ELECTRICITY OPTIONS

NOTE: Summary Costs per kWh EXCLUDE portion of capital costs paid by CEP

(All Costs in real 2004 dollars)

	Annual Total Costs ($/kWh) for Systems Purchased in Year Indicated							
	Solar PV Systems				Wind Systems		Other Renewables	
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	$ 0.205	$ 0.243	$ 0.230	$ 0.184	$ 0.051	$ 0.077	$ 0.077	$ 0.041
2005	$ 0.197	$ 0.233	$ 0.221	$ 0.177	$ 0.050	$ 0.075	$ 0.077	$ 0.041
2006	$ 0.190	$ 0.224	$ 0.212	$ 0.170	$ 0.049	$ 0.073	$ 0.076	$ 0.041
2007	$ 0.183	$ 0.216	$ 0.204	$ 0.163	$ 0.047	$ 0.071	$ 0.076	$ 0.040
2008	$ 0.176	$ 0.208	$ 0.196	$ 0.157	$ 0.046	$ 0.070	$ 0.076	$ 0.040
2009	$ 0.223	$ 0.321	$ 0.304	$ 0.244	$ 0.046	$ 0.070	$ 0.077	$ 0.041
2010	$ 0.216	$ 0.310	$ 0.293	$ 0.235	$ 0.045	$ 0.069	$ 0.077	$ 0.041
2011	$ 0.209	$ 0.299	$ 0.283	$ 0.227	$ 0.044	$ 0.067	$ 0.076	$ 0.041
2012	$ 0.202	$ 0.289	$ 0.274	$ 0.219	$ 0.043	$ 0.066	$ 0.076	$ 0.041
2013	$ 0.195	$ 0.279	$ 0.265	$ 0.212	$ 0.043	$ 0.065	$ 0.076	$ 0.040
2014	$ 0.189	$ 0.270	$ 0.256	$ 0.205	$ 0.042	$ 0.064	$ 0.076	$ 0.040
2015	$ 0.260	$ 0.320	$ 0.304	$ 0.243	$ 0.042	$ 0.064	$ 0.076	$ 0.041
2016	$ 0.252	$ 0.311	$ 0.295	$ 0.236	$ 0.041	$ 0.063	$ 0.076	$ 0.041
2017	$ 0.245	$ 0.302	$ 0.286	$ 0.229	$ 0.040	$ 0.062	$ 0.076	$ 0.040
2018	$ 0.238	$ 0.293	$ 0.278	$ 0.223	$ 0.040	$ 0.061	$ 0.075	$ 0.040
2019	$ 0.232	$ 0.285	$ 0.270	$ 0.216	$ 0.039	$ 0.060	$ 0.075	$ 0.040
2020	$ 0.225	$ 0.277	$ 0.262	$ 0.210	$ 0.038	$ 0.059	$ 0.075	$ 0.040

COST COMPONENT TRENDS OVER TIME FOR RENEWABLE GENERATION OPTIONS

(All Costs in real 2004 dollars)

	Full System Costs ($/kW)							
	Solar PV Systems				Wind Systems		Other Renewables	
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	$ 8,000	$ 6,100	$ 5,800	$ 5,400	$ 1,150	$ 2,000	$ 2,000	$ 2,000
2005	$ 7,680	$ 5,856	$ 5,568	$ 5,184	$ 1,116	$ 1,940	$ 1,986	$ 1,990
2006	$ 7,373	$ 5,622	$ 5,345	$ 4,977	$ 1,082	$ 1,882	$ 1,972	$ 1,980
2007	$ 7,078	$ 5,397	$ 5,131	$ 4,778	$ 1,050	$ 1,825	$ 1,958	$ 1,970
2008	$ 6,795	$ 5,181	$ 4,926	$ 4,586	$ 1,018	$ 1,771	$ 1,945	$ 1,960
2009	$ 6,557	$ 5,000	$ 4,754	$ 4,426	$ 993	$ 1,726	$ 1,931	$ 1,950
2010	$ 6,327	$ 4,825	$ 4,587	$ 4,271	$ 968	$ 1,683	$ 1,917	$ 1,941
2011	$ 6,106	$ 4,656	$ 4,427	$ 4,122	$ 944	$ 1,641	$ 1,904	$ 1,931
2012	$ 5,892	$ 4,493	$ 4,272	$ 3,977	$ 920	$ 1,600	$ 1,891	$ 1,921
2013	$ 5,686	$ 4,336	$ 4,122	$ 3,838	$ 897	$ 1,560	$ 1,877	$ 1,912
2014	$ 5,487	$ 4,184	$ 3,978	$ 3,704	$ 875	$ 1,521	$ 1,864	$ 1,902
2015	$ 5,322	$ 4,058	$ 3,859	$ 3,593	$ 857	$ 1,491	$ 1,851	$ 1,893
2016	$ 5,163	$ 3,937	$ 3,743	$ 3,485	$ 840	$ 1,461	$ 1,838	$ 1,883
2017	$ 5,008	$ 3,819	$ 3,631	$ 3,380	$ 823	$ 1,432	$ 1,825	$ 1,874
2018	$ 4,858	$ 3,704	$ 3,522	$ 3,279	$ 807	$ 1,403	$ 1,813	$ 1,864
2019	$ 4,712	$ 3,593	$ 3,416	$ 3,181	$ 791	$ 1,375	$ 1,800	$ 1,855
2020	$ 4,571	$ 3,485	$ 3,314	$ 3,085	$ 775	$ 1,347	$ 1,787	$ 1,846

	System Capital Costs ($/kW) Net of Tax Credits							
	Solar PV Systems				Wind Systems		Other Renewables	
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	$ 8,000	$ 5,490	$ 5,220	$ 4,860	$ 1,150	$ 2,000	$ 2,000	$ 2,000
2005	$ 7,680	$ 5,270	$ 5,011	$ 4,666	$ 1,116	$ 1,940	$ 1,986	$ 1,990
2006	$ 7,373	$ 5,060	$ 4,811	$ 4,479	$ 1,082	$ 1,882	$ 1,972	$ 1,980
2007	$ 7,078	$ 4,857	$ 4,618	$ 4,300	$ 1,050	$ 1,825	$ 1,958	$ 1,970
2008	$ 6,795	$ 4,663	$ 4,434	$ 4,128	$ 1,018	$ 1,771	$ 1,945	$ 1,960
2009	$ 6,557	$ 4,500	$ 4,278	$ 3,983	$ 993	$ 1,726	$ 1,931	$ 1,950
2010	$ 6,327	$ 4,342	$ 4,129	$ 3,844	$ 968	$ 1,683	$ 1,917	$ 1,941
2011	$ 6,106	$ 4,190	$ 3,984	$ 3,709	$ 944	$ 1,641	$ 1,904	$ 1,931
2012	$ 5,892	$ 4,044	$ 3,845	$ 3,580	$ 920	$ 1,600	$ 1,891	$ 1,921
2013	$ 5,686	$ 3,902	$ 3,710	$ 3,454	$ 897	$ 1,560	$ 1,877	$ 1,912
2014	$ 5,487	$ 3,765	$ 3,580	$ 3,333	$ 875	$ 1,521	$ 1,864	$ 1,902
2015	$ 5,322	$ 3,653	$ 3,473	$ 3,233	$ 857	$ 1,491	$ 1,851	$ 1,893
2016	$ 5,163	$ 3,543	$ 3,369	$ 3,136	$ 840	$ 1,461	$ 1,838	$ 1,883
2017	$ 5,008	$ 3,437	$ 3,268	$ 3,042	$ 823	$ 1,432	$ 1,825	$ 1,874
2018	$ 4,858	$ 3,334	$ 3,170	$ 2,951	$ 807	$ 1,403	$ 1,813	$ 1,864
2019	$ 4,712	$ 3,234	$ 3,075	$ 2,862	$ 791	$ 1,375	$ 1,800	$ 1,855
2020	$ 4,571	$ 3,137	$ 2,982	$ 2,777	$ 775	$ 1,347	$ 1,787	$ 1,846

	Annualized System Capital Costs ($/kW-yr) Net of Tax Credits (for systems purchased in year indicated)							
	Solar PV Systems				Wind Systems		Other Renewables	
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	$ 686	$ 700	$ 666	$ 535	$ 127	$ 220	$ 220	$ 220
2005	$ 659	$ 672	$ 639	$ 514	$ 123	$ 214	$ 219	$ 219
2006	$ 633	$ 645	$ 613	$ 493	$ 119	$ 207	$ 217	$ 218
2007	$ 607	$ 619	$ 589	$ 474	$ 116	$ 201	$ 216	$ 217
2008	$ 583	$ 595	$ 565	$ 455	$ 112	$ 195	$ 214	$ 216
2009	$ 563	$ 574	$ 545	$ 439	$ 109	$ 190	$ 213	$ 215
2010	$ 543	$ 554	$ 526	$ 423	$ 107	$ 185	$ 211	$ 214
2011	$ 524	$ 534	$ 508	$ 409	$ 104	$ 181	$ 210	$ 213
2012	$ 506	$ 516	$ 490	$ 394	$ 101	$ 176	$ 208	$ 212
2013	$ 488	$ 498	$ 473	$ 381	$ 99	$ 172	$ 207	$ 211
2014	$ 471	$ 480	$ 456	$ 367	$ 96	$ 168	$ 205	$ 210
2015	$ 457	$ 466	$ 443	$ 356	$ 94	$ 164	$ 204	$ 209
2016	$ 443	$ 452	$ 430	$ 346	$ 93	$ 161	$ 203	$ 207
2017	$ 430	$ 438	$ 417	$ 335	$ 91	$ 158	$ 201	$ 206
2018	$ 417	$ 425	$ 404	$ 325	$ 89	$ 155	$ 200	$ 205
2019	$ 404	$ 412	$ 392	$ 315	$ 87	$ 151	$ 198	$ 204
2020	$ 392	$ 400	$ 380	$ 306	$ 85	$ 148	$ 197	$ 203

	Annualized System Capital Costs ($/kW-yr) Net of Tax Credits and Clean Energy Program Rebates (for systems purchased in year indicated)							
	Solar PV Systems				Wind Systems		Other Renewables	
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	$ 231	$ 279	$ 265	$ 214	$ 114	$ 199	$ 199	$ 199
2005	$ 221	$ 268	$ 255	$ 205	$ 111	$ 193	$ 197	$ 198
2006	$ 213	$ 257	$ 245	$ 197	$ 108	$ 187	$ 196	$ 197
2007	$ 204	$ 247	$ 235	$ 189	$ 104	$ 181	$ 195	$ 196
2008	$ 196	$ 237	$ 225	$ 181	$ 101	$ 176	$ 193	$ 195
2009	$ 253	$ 373	$ 355	$ 285	$ 102	$ 177	$ 198	$ 200
2010	$ 244	$ 360	$ 342	$ 275	$ 99	$ 172	$ 196	$ 199
2011	$ 236	$ 347	$ 330	$ 266	$ 97	$ 168	$ 195	$ 198
2012	$ 228	$ 335	$ 319	$ 256	$ 94	$ 164	$ 194	$ 197
2013	$ 220	$ 323	$ 307	$ 247	$ 92	$ 160	$ 192	$ 196
2014	$ 212	$ 312	$ 297	$ 239	$ 90	$ 156	$ 191	$ 195
2015	$ 297	$ 373	$ 354	$ 285	$ 90	$ 156	$ 194	$ 198
2016	$ 288	$ 361	$ 344	$ 276	$ 88	$ 153	$ 192	$ 197
2017	$ 279	$ 351	$ 333	$ 268	$ 86	$ 150	$ 191	$ 196
2018	$ 271	$ 340	$ 323	$ 260	$ 84	$ 147	$ 190	$ 195
2019	$ 263	$ 330	$ 314	$ 252	$ 83	$ 144	$ 188	$ 194
2020	$ 255	$ 320	$ 304	$ 245	$ 81	$ 141	$ 187	$ 193

	Annual Fixed O&M Costs ($/kW-yr) for Systems Purchased in Year Indicated							
	Solar PV Systems				Wind Systems		Other Renewables	
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2005	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2006	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2007	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2008	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2009	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2010	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2011	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2012	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2013	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2014	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2015	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2016	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2017	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2018	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2019	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10
2020	$ 15	$ 12	$ 10	$ 7	$ 20	$ 50	$ 80	$ 10

	Annual Total Variable O&M Costs ($/kW-yr) for Systems Purchased in Year Indicated)							
	Solar PV Systems				Wind Systems		Other Renewables	
Energy Year	Residential	Commercial	Industrial	Utility/ Merchant	Onshore Wind	Offshore Wind	Biomass	[Not Used]
2004	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2005	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2006	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2007	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2008	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2009	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2010	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2011	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2012	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2013	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ 144.35	$ 16.50

Notes and Sources

Note 1 : Estimated based on NJ Clean Energy Program (CEP) incentives from http://www.njcep.com/html/2_incent.html, as of 11/3/2005, for 1 to 10 kW solar PV systems installed after 12/31/2005. Based on 2006 capital cost calculated from the parameters above, and a rebate level of $5.10 per Watt, the CEP program covers 66% of total system capital costs. Future values of CEP incentives assume that incentives will gradually be reduced as the cost of the technologies decrease and as more emphasis is placed on shifting costs from CEP grants to RECs.

Note 2 : Estimated based on NJ Clean Energy Program (CEP) incentives from http://www.njcep.com/html/2_incent.html, as of 11/3/2005, for 40 to 100 kW (taken as a very rough average of the sizes of systems that might be installed by commercial, industrial, and merchant solar PV plants in New Jersey) solar PV systems installed after 12/31/2005. Based on 2006 capital cost calculated from the parameters above, and a rebate level of $3.45 per Watt, the CEP program covers 60% of total system capital costs. Future values of CEP incentives assume that incentives will gradually be reduced as the cost of the technologies decrease and as more emphasis is placed on shifting costs from CEP grants to RECs.

Note 3: Estimated based on NJ Clean Energy Program (CEP) incentives from http://www.njcep.com/html/2_incent.html, as of 11/3/2005, for 500 to 1000 kW (taken as an indicator of the types of sizes of wind farms that might be developed in New Jersey) wind systems. Based on 2006 capital cost calculated from the parameters above, and a rebate level of $0.15 per Watt, the CEP program covers 10% of total system capital costs. Note that it is somewhat unclear whether this rebate would apply for merchant power plants selling to the grid, though other CEP inventives may apply to provide effectively similar financial support. This figure should therefore be considered a placeholder value. Future values of CEP incentives assume that incentives will gradually be reduced as the cost of the technologies decrease and as more emphasis is placed on shifting costs from CEP grants to RECs.

Note 4: Placeholder estimate, but this rate of cost decrease is less, for example, than that assumed for combined-cycle biomass-gasification power plants including in an EPRI study of the economics of such power plants in Brazil (an average decline of about 1.7%/yr from 2005 to 2020 in a "base case" scenario). Source of the latter estimate:
Electric Power Research Institute (1998) Economic and Risk Evaluation of the Brazil Biomass Integrated Gasification-Gas Turbine Demonstration Project, prepared by EPRI, Principal Investigators Charles R. McGowin, Evan Hughes, and Neville Holt, Draft Report, November 1998. Available as http://www.worldbank.org/html/fpd/em/biomass/igcc_appendix.pdf.
As such, a rate of decrease of 0.7%/yr might represent deployment of a blend of older and newer biomass generation technologies. The "Navigant" Report, namely
New Jersey Renewable Energy Market Assessment, Final Report to Rutgers University Center for Energy, Economic and Environmental Policy, Prepared by Navigant Consulting Inc., Sustainable Energy Advantage LLC, and Boreal Renewable Energy Development, August 2, 2004 (Navigant-REmarket8-04.pdf), lists future cost trends for two different technologies, biomass direct combustion (average cost decline, 2005 to 2020, 0.7%/yr) and BIGCC (biomass integrated gasification/combined-cycle), with cost declines averaging over 2 percent/yr. We use the lower of these two figures, assuming that in the next 15 years the more established technology might predominate (and/or the Navigant reductions in costs might be over-optimistic).

Note 5: For biomass-fired facilities, value includes both fuel and non-fuel costs, and is as estimated in the "Biomass_fuels" worksheet in this workbook. See Note 14 for explanation of wind cost assumptions.

Note 6: For biomass-fired facilities, value represents a capacity factor of 63%, which is within the typical range for the biomass-fired powerplants surveyed in G. Wiltsee (2000), Lessons Learned from Existing Biomass Power Plants, prepared for NREL, and available as http://www.nrel.gov/docs/fy00osti/26946.pdf, published as NREL/SR-570-26946, February 2000. Other figures are currently placeholder values.

Note 7: A description of the new Federal Solar Tax Credits for businesses and residences as contained in the Energy Policy Act of 2005 (EPAct 2005) (see, for example, http://www.seia.org/getpdf.php?iid=21) provides for 30% (of system cost) tax credits for solar PV investments by businesses in 2006 and 2007, reverting to 10% thereafter. For residences, the credit in 2006 and 2007 is 30% with a "cap" of $2000, reverting to zero after 2007. For the purpose of this analysis, we are modeling the federal tax credit at its long-term (10% business, 0% residential) level for 2005 - 2009, as the number of systems added in 2006 and 2007 is much smaller than the number added in 2008 and 2009 (when the higher credits will no longer be in effect). See also, for Example, http://www.sdenergy.org/uploads/PV-Federal%20Tax%20Credits%20Summary%206-01-04%20FINAL.pdf.

Note 8: The "Navigant" Report, namely
New Jersey Renewable Energy Market Assessment, Final Report to Rutgers University Center for Energy, Economic and Environmental Policy, Prepared by Navigant Consulting Inc., Sustainable Energy Advantage LLC, and Boreal Renewable Energy Development, August 2, 2004 (Navigant-REmarket8-04.pdf), lists current costs and future cost trends for fixed O&M for two different technologies, biomass direct combustion and BIGCC (biomass integrated gasification/combined-cycle), with cost averaging (over time and between the two technologies) about $100 per kW-yr. See page 235 of source. Other sources (see "Biomass_Fuels" worksheet in this workbook) suggest somewhat lower fixed O&M costs. For this analysis, we use a value of $80/kW-yr as a rough average between sources.

Note 9 : For example, as in CEP literature: http://www.njcep.com/media/NJ_Solar_Market_Update_Augu.pdf. The units here are kWh of AC (alternating current) energy output per kW of DC (direct current) rated system capacity, and therefore include losses in converting the DC power produced by the solar PV modules themselves to AC power for export to the grid (or for household use). By way of comparison, the annual solar energy input to a flat surface (tilted at an angle approximately equal to that of latitude to the horizontal) is between 4000 to 5000 Watt-hours per square meter per day, or about 1500 to 1800 kWh (heat) input (see, for example, http://www.eere.energy.gov/state_energy/tech_solar.cfm?state=NJ) per square meter per year. Since the maximum solar input at the earth's surface is about 1 kW per square meter, this implies about 1500 to 1800 hours of full-sun equivalent per year in New Jersey, and at a conversion rate of about 0.8 Wh of AC output per Wh of DC solar module output, expected AC output would be about 1200 to 1400 kWh AC per kW DC of system capacity per year.

Note 10 : Solar PV system capital costs in 2004, by system type/size, are composite estimates based on the review of data from several sources--see the "Solar_Cost_Data" worksheet in this workbook. Costs are expressed in $ per peak kW of DC output. In most cases they are somewhat higher (on this basis) than those listed in the "Navigant" report (full cite in Note 4).

Note 11 : Solar PV system fixed operating and maintenance costs, by system type/size, are also composite estimates based on the review of data from several sources--see the "Solar_Cost_Data" worksheet in this workbook. Costs are expressed in $ per peak kW-yr of DC output. In most cases they are somewhat higher (on this basis) than those listed in the "Navigant" report (full cite in Note 4), and reviewers should also note that as this worksheet does not include a factor to account for the decline in O&M costs over time, the O&M cost estimate provided here is effectively an average over the time period of the analysis. Variable O&M costs for solar PV systems are set at zero, as all O&M costs are assumed to be included in the fixed O&M cost estimate.

Note 12 : Future declines in solar PV system capital costs, by system type/size, are composite estimates based on the review of data from several sources--see the "Solar_Cost_Data" worksheet in this workbook. Costs are expressed in $ per peak kW of DC output. The cost declines assumed here are somewhat lower than those listed in the "Navigant" report (full cite in Note 4), which are consistently -5%/yr. The capital cost reduction factor assumed here are between the "baseline" and "road map" cases presented in a USDOE report on the US Solar PV industry. As such, they represent a future in which PV sales receive a policy "push" like that to be provided by the NJ RPS standard, but they do not reach the full level of reduction envisioned by the US DOE's "roadmap" case or included in the Navigant report.

Note 13 : No tax credits for non-solar renewable energy sources are currently included in this analysis. A 1.9 cent/kWh production tax credit for wind energy (and some kinds of biomass energy) generation was extended in 2005 by Congress, as a part of the Energy Policy Act of 2005, but expires at the end of 2007, and is thus not included in this analysis, since it would cover relatively few of the systems installed under the RPS. See http://www.compositesworld.com/ct/issues/2005/October/1000, "Energy Bill Extends Production Tax Credit For Wind Energy - October 2005".

Note 14 : Wind system fixed operating and maintenance costs, for onshore and offshore installations, are composite estimates based on the review of data from several sources--see the "Wind_Cost_Data" worksheet in this workbook. Costs are expressed in $ per peak kW-yr of capacity. In most cases they are somewhat higher than those listed in the "Navigant" report (full cite in Note 4), and reviewers should also note that as this worksheet does not include a factor to account for the decline in O&M costs over time, the O&M cost estimates provided here are averages over the time period of the analysis. Variable O&M costs for wind power systems are set at zero, as all O&M costs are assumed to be included in the fixed O&M cost estimate.
Fixed O&M costs for biomass-fueled facilities are set to $100/kW-yr

Note 15 : Wind system equivalent full-capacity operating hours, for onshore and offshore installations, are composite estimates based on the review of data from several sources--see the "Wind_Cost_Data" worksheet in this workbook. Onshore wind operating hours assume a capacity factor of 30% and offshore wind farm operating hours assume a capacity factor of 37%. The former is somewhat higher than that listed in the "Navigant" report (full cite in Note 4) for 2008, and the latter is equal to the 2008 value for offshore wind farms from the Navigant report.

Note 16 : Capital costs for onshore and offshore wind installations are composite estimates based on the review of data from several sources--see the "Wind_Cost_Data" worksheet in this workbook. Onshore wind costs estimates from several sources fall in a fairly narrow band between $1100 and $1200/kW. Offshore wind cost estimates show a somewhat broader range, from about $1100 to $1900/kW. Biomass generation capital costs from the Navigant report (see full cite in Note 4) start at $2000/kW for conventional plants and $2500 for combined-cycle gasification plants, with costs declining thereafter. Other biomass plant costs are noted in the "Biomass_Fuels" worksheet in this workbook.

Note 17 : Future capital cost trends for wind systems, for onshore and offshore installations, are composite estimates based on the review of data from several sources--see the "Wind_Cost_Data" worksheet in this workbook. In the Navigant report (see full cite in Note 4), capital costs decrease at between 2.5 and 3.1 percent per year for onshore plants over different intervals from 2005 to 2020, though cost reductions for offshore plants are smaller.
Data from the document Future for Offshore Wind Energy in the United States (Preprint), prepared by W. Musial and S. Butterfield of the USDOE National Renewable Energy Laboratory, suggests that offshore wind power cost reduction will be in the 2 to 3 percent per year range, with cost reductions decreasing as the technology matures. A study by the European Wind Energy Agency entitled "Wind Power Economics" uses the technique of "experience curves" to project a 9 to 17 percent decrease in capital costs for every doubling of industrial output (in this case, for every doubling of wind capacity built). With recent trends of doubling of global generation capacity every 5 years (less in Europe), These figures imply annual cost reductions in the 2 to 3 percent.yr range.

Note 18 : These figures are rough estimates based on the following considerations:
In all cases, average plant lifetimes of 25 years, are used, though some sources suggest that lifetimes for solar PV and wind power facilities will be 30 years within a decade or so, as the technologies mature.

For **residential** systems, it is assumed that home equity or other lower-interest loans will be used to purchase solar PV systems, at an average real interest rate of 7% per year. Note that this may be overstated, as a significant fraction of capital costs are being paid by the CEP program, especially in the early years.
At this interest rate, a capital recovery factor of 8.58% is implied.

For **commercial and industrial** systems, it is assumed that commercial loans will be used to purchase solar PV systems, at an average real interest rate of 12% per year, including profit. Again, this may be overstated, as a significant fraction of capital costs are being paid by the CEP program, especially in the early years.
At this interest rate, a capital recovery factor of 12.7% is implied.

For **utility/merchant** systems, it is assumed that the capital recovery factor will be similar to an average real cost of capital of about 10% per year, including profit. Again, this may be overstated, as a some capital costs may be paid by the CEP program, especially in the early years.
At this interest rate, a capital recovery factor of 11.0% is implied.

2.7 Costs of Conventional Generation Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules

BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency

"Proposed Readoption With Amendments: N.J.A.C. 14:4

Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"

(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

ESTIMATE OF COSTS OF CONVENTIONAL GENERATION

KEY ASSUMPTIONS AND INPUTS

Estimated Weighted Average Energy Year 2004 Basic Generation Service Costs (Retail costs assumed to be similar to costs of providing power with conventional generation alternatives)

	Summer Sales (June-Sept)				Winter Sales (Oct-May)			
	Residential	Commercial	Industrial	Weighted Average	Residential	Commercial	Industrial	Weighted Average
Basic Generation Service Costs	$ 0.0752	$ 0.0699	$ 0.0691	$ 0.0724	$ 0.0600	$ 0.0568	$ 0.0570	$ 0.0582
Non-Energy Component of Tariffs*	$ 0.0481	$ 0.0477	$ 0.0255	$ 0.0464	$ 0.0440	$ 0.0332	$ 0.0123	$ 0.0366
Non-Energy Component of Tariffs**	$ 0.0483	$ 0.0414	$ 0.0206	$ 0.0407	$ 0.0442	$ 0.0324	$ 0.0200	$ 0.0344

*Weighted over sales in 4 investor-owned utilities only

**Weighted over "Total EPM" sales for 2004

Annual Rates of Change and Values for Key Parameters (all changes in real terms)

Variable	2004 - 2008	2009 - 2014	2015 - 2020	
Annual Average Change in Basic Generation Service Component of Retail Tariffs	-4.69%	5.54%	2.02%	*See Note 1*
Annual Average Change in Non-Energy Component of Retail Tariffs	-0.14%	-0.14%	-0.14%	*See Note 1*

Note that estimates below assume that sales in all four investor-owned utility service territories in New Jersey grow (or shrink) at comparable rates. Also, the weighted average shown below are based on sales by sector as reported in 2004, and as a result assume that growth (or shrinkage) of sales in each sector and in each service territory grow (or shrink) at approimately the same rates.

SUMMARY RESULTS: COSTS PER KWH FOR BASIC GENERATION SERVICE (CONVENTIONAL GENERATION)

	Summer Sales (June-Sept)				Winter Sales (Oct-May)			
Energy Year	Residential	Commercial	Industrial	Weighted Average	Residential	Commercial	Industrial	Weighted Average
2004	$ 0.0752	$ 0.0699	$ 0.0691	$ 0.0724	$ 0.0600	$ 0.0568	$ 0.0570	$ 0.0582
2005	$ 0.0717	$ 0.0666	$ 0.0659	$ 0.0690	$ 0.0572	$ 0.0542	$ 0.0544	$ 0.0555
2006	$ 0.0684	$ 0.0635	$ 0.0628	$ 0.0658	$ 0.0545	$ 0.0516	$ 0.0518	$ 0.0529
2007	$ 0.0652	$ 0.0605	$ 0.0599	$ 0.0627	$ 0.0519	$ 0.0492	$ 0.0494	$ 0.0504
2008	$ 0.0621	$ 0.0577	$ 0.0571	$ 0.0598	$ 0.0495	$ 0.0469	$ 0.0471	$ 0.0481
2009	$ 0.0655	$ 0.0609	$ 0.0602	$ 0.0631	$ 0.0522	$ 0.0495	$ 0.0497	$ 0.0507
2010	$ 0.0692	$ 0.0643	$ 0.0636	$ 0.0666	$ 0.0551	$ 0.0522	$ 0.0524	$ 0.0535
2011	$ 0.0730	$ 0.0678	$ 0.0671	$ 0.0703	$ 0.0582	$ 0.0551	$ 0.0553	$ 0.0565
2012	$ 0.0771	$ 0.0716	$ 0.0708	$ 0.0742	$ 0.0614	$ 0.0582	$ 0.0584	$ 0.0596
2013	$ 0.0813	$ 0.0756	$ 0.0747	$ 0.0783	$ 0.0648	$ 0.0614	$ 0.0617	$ 0.0630
2014	$ 0.0858	$ 0.0798	$ 0.0789	$ 0.0826	$ 0.0684	$ 0.0648	$ 0.0651	$ 0.0664
2015	$ 0.0876	$ 0.0814	$ 0.0805	$ 0.0843	$ 0.0698	$ 0.0661	$ 0.0664	$ 0.0678
2016	$ 0.0894	$ 0.0830	$ 0.0821	$ 0.0860	$ 0.0712	$ 0.0675	$ 0.0677	$ 0.0692
2017	$ 0.0912	$ 0.0847	$ 0.0838	$ 0.0877	$ 0.0726	$ 0.0688	$ 0.0691	$ 0.0706
2018	$ 0.0930	$ 0.0864	$ 0.0855	$ 0.0895	$ 0.0741	$ 0.0702	$ 0.0705	$ 0.0720
2019	$ 0.0949	$ 0.0881	$ 0.0872	$ 0.0913	$ 0.0756	$ 0.0717	$ 0.0719	$ 0.0734
2020	$ 0.0968	$ 0.0899	$ 0.0890	$ 0.0931	$ 0.0771	$ 0.0731	$ 0.0734	$ 0.0749

SUMMARY RESULTS: COSTS PER KWH FOR NON-ENERGY COMPONENT OF TARIFFS

	Summer Sales (June-Sept)				Winter Sales (Oct-May)			
Energy Year	Residential	Commercial	Industrial	Weighted Average	Residential	Commercial	Industrial	Weighted Average
2004	$ 0.0483	$ 0.0414	$ 0.0206	$ 0.0407	$ 0.0442	$ 0.0324	$ 0.0200	$ 0.0344
2005	$ 0.0482	$ 0.0413	$ 0.0205	$ 0.0407	$ 0.0441	$ 0.0324	$ 0.0200	$ 0.0343
2006	$ 0.0482	$ 0.0413	$ 0.0205	$ 0.0406	$ 0.0440	$ 0.0323	$ 0.0199	$ 0.0343
2007	$ 0.0481	$ 0.0412	$ 0.0205	$ 0.0405	$ 0.0440	$ 0.0323	$ 0.0199	$ 0.0343
2008	$ 0.0480	$ 0.0412	$ 0.0204	$ 0.0405	$ 0.0439	$ 0.0322	$ 0.0199	$ 0.0342
2009	$ 0.0480	$ 0.0411	$ 0.0204	$ 0.0404	$ 0.0438	$ 0.0322	$ 0.0199	$ 0.0342
2010	$ 0.0479	$ 0.0410	$ 0.0204	$ 0.0404	$ 0.0438	$ 0.0322	$ 0.0198	$ 0.0341
2011	$ 0.0478	$ 0.0410	$ 0.0204	$ 0.0403	$ 0.0437	$ 0.0321	$ 0.0198	$ 0.0341
2012	$ 0.0477	$ 0.0409	$ 0.0203	$ 0.0403	$ 0.0437	$ 0.0321	$ 0.0198	$ 0.0340
2013	$ 0.0477	$ 0.0409	$ 0.0203	$ 0.0402	$ 0.0436	$ 0.0320	$ 0.0198	$ 0.0340
2014	$ 0.0476	$ 0.0408	$ 0.0203	$ 0.0402	$ 0.0435	$ 0.0320	$ 0.0197	$ 0.0339
2015	$ 0.0475	$ 0.0408	$ 0.0202	$ 0.0401	$ 0.0435	$ 0.0319	$ 0.0197	$ 0.0339
2016	$ 0.0475	$ 0.0407	$ 0.0202	$ 0.0400	$ 0.0434	$ 0.0319	$ 0.0197	$ 0.0338
2017	$ 0.0474	$ 0.0406	$ 0.0202	$ 0.0400	$ 0.0434	$ 0.0318	$ 0.0196	$ 0.0338
2018	$ 0.0473	$ 0.0406	$ 0.0202	$ 0.0399	$ 0.0433	$ 0.0318	$ 0.0196	$ 0.0337
2019	$ 0.0473	$ 0.0405	$ 0.0201	$ 0.0399	$ 0.0432	$ 0.0318	$ 0.0196	$ 0.0337
2020	$ 0.0472	$ 0.0405	$ 0.0201	$ 0.0398	$ 0.0432	$ 0.0317	$ 0.0196	$ 0.0336

SUMMARY RESULTS: IMPLIED TOTAL TARIFFS ($/KWH) BY SECTOR AND SEASON BY YEAR

	Summer Sales (June-Sept)				Winter Sales (Oct-May)			
Energy Year	Residential	Commercial	Industrial	Weighted Average	Residential	Commercial	Industrial	Weighted Average
2004	$ 0.1235	$ 0.1113	$ 0.0897	$ 0.1131	$ 0.1041	$ 0.0893	$ 0.0770	$ 0.0926
2005	$ 0.1199	$ 0.1080	$ 0.0864	$ 0.1097	$ 0.1013	$ 0.0866	$ 0.0743	$ 0.0899
2006	$ 0.1165	$ 0.1048	$ 0.0833	$ 0.1064	$ 0.0985	$ 0.0840	$ 0.0718	$ 0.0872
2007	$ 0.1132	$ 0.1018	$ 0.0803	$ 0.1032	$ 0.0959	$ 0.0815	$ 0.0693	$ 0.0847
2008	$ 0.1101	$ 0.0989	$ 0.0775	$ 0.1002	$ 0.0934	$ 0.0791	$ 0.0670	$ 0.0823
2009	$ 0.1135	$ 0.1020	$ 0.0806	$ 0.1035	$ 0.0961	$ 0.0817	$ 0.0695	$ 0.0849
2010	$ 0.1171	$ 0.1053	$ 0.0840	$ 0.1069	$ 0.0989	$ 0.0844	$ 0.0723	$ 0.0877
2011	$ 0.1208	$ 0.1088	$ 0.0874	$ 0.1106	$ 0.1019	$ 0.0873	$ 0.0752	$ 0.0906
2012	$ 0.1248	$ 0.1125	$ 0.0911	$ 0.1144	$ 0.1051	$ 0.0903	$ 0.0782	$ 0.0937
2013	$ 0.1290	$ 0.1164	$ 0.0950	$ 0.1185	$ 0.1084	$ 0.0934	$ 0.0814	$ 0.0969
2014	$ 0.1335	$ 0.1206	$ 0.0992	$ 0.1228	$ 0.1120	$ 0.0968	$ 0.0848	$ 0.1004
2015	$ 0.1351	$ 0.1221	$ 0.1007	$ 0.1244	$ 0.1133	$ 0.0981	$ 0.0861	$ 0.1017
2016	$ 0.1368	$ 0.1237	$ 0.1023	$ 0.1260	$ 0.1146	$ 0.0994	$ 0.0874	$ 0.1030
2017	$ 0.1386	$ 0.1253	$ 0.1039	$ 0.1277	$ 0.1160	$ 0.1007	$ 0.0887	$ 0.1043
2018	$ 0.1403	$ 0.1270	$ 0.1056	$ 0.1294	$ 0.1174	$ 0.1020	$ 0.0901	$ 0.1057
2019	$ 0.1422	$ 0.1287	$ 0.1073	$ 0.1312	$ 0.1189	$ 0.1034	$ 0.0915	$ 0.1071
2020	$ 0.1440	$ 0.1304	$ 0.1091	$ 0.1330	$ 0.1203	$ 0.1048	$ 0.0929	$ 0.1086

SUMMARY RESULTS: IMPLIED TOTAL TARIFFS ($/KWH) BY SECTOR BY YEAR

	Tariffs Weighted Over Annual Sales			
Energy Year	Residential	Commercial	Industrial	Weighted Average
2004	$ 0.1119	$ 0.0971	$ 0.0816	$ 0.1002
2005	$ 0.1087	$ 0.0942	$ 0.0787	$ 0.0972
2006	$ 0.1057	$ 0.0914	$ 0.0759	$ 0.0944
2007	$ 0.1028	$ 0.0887	$ 0.0733	$ 0.0916
2008	$ 0.1001	$ 0.0861	$ 0.0707	$ 0.0890
2009	$ 0.1030	$ 0.0889	$ 0.0735	$ 0.0918
2010	$ 0.1062	$ 0.0918	$ 0.0764	$ 0.0948
2011	$ 0.1095	$ 0.0949	$ 0.0795	$ 0.0980
2012	$ 0.1129	$ 0.0982	$ 0.0828	$ 0.1013
2013	$ 0.1166	$ 0.1016	$ 0.0863	$ 0.1049
2014	$ 0.1205	$ 0.1052	$ 0.0899	$ 0.1086
2015	$ 0.1220	$ 0.1066	$ 0.0913	$ 0.1100
2016	$ 0.1235	$ 0.1080	$ 0.0927	$ 0.1115
2017	$ 0.1250	$ 0.1094	$ 0.0942	$ 0.1129
2018	$ 0.1266	$ 0.1109	$ 0.0957	$ 0.1144
2019	$ 0.1281	$ 0.1124	$ 0.0972	$ 0.1159
2020	$ 0.1298	$ 0.1139	$ 0.0987	$ 0.1175

CALCULATION FOR COMPARISON PURPOSES: ESTIMATED $/KWH COST OF GAS-FIRED GENERATION

The USDOE Annual Energy Outlook 2005 (AEO2005) table labeled "Table 38: Cost and Performance Characteristics of New Central Station Electricity Generating Technologies", and available as page 70 of http://www.eia.doe.gov/oiaf/aeo/assumption/pdf/0554(2005).pdf, Assumptions to the Annual Energy Outlook 2005, includes the following cost information on conventional gas or oil-fired combined-cycle central station plants. This cost information was used in the AEO2005 modeling effort.

Plant size:	250 MW	
Capital cost:	$567	2003 $/kW (includes contingency factor)
Variable O&M cost:	1.83	mills/kWh (cost of zero listed)
Fixed O&M cost:	11.04	$/kW-yr (2003 $)
Heat Rate	6800	Btu/kWh

Other Assumptions

Capital Recovery Factor: 11% per year (real), as for other utility-scale plants evaluated in this workbook.

Natural Gas Price: $ 7.50 per thousand cubic feet, based roughly on "New Jersey Natural Gas Price Sold to Electric Power Consumers (Dollars per Thousand Cubic Feet)" for the months in the energy year 2004, as shown in http://tonto.eia.doe.gov/dnav/ng/hist/n3045nj3m.htm

Inflator, 2003 to 2004 dollars: 1.03

Average Natural Gas Thermal Converstion Factor: 1022 Btu/cubic foot. Average of thermal conversion factor for gas used in electricity generation in the United States from 1999-2003, based on data in Appendix B2 of USDOE EIA Natural Gas Annual 2003, released December, 2004, and available as http://www.eia.doe.gov/pub/oil_gas/natural_gas/data_publications/natural_gas_annual/current/pdf/table_b02.pdf.

Average Capacity Factor for Combined-Cycle Plants: 60% *Assumption*
(By way of reference, system-wide Mid-Atlantic Area Council capacity factors in AEO2005 ranged from about 45% in 2002 to about 54% in 2025. See the "AEO2005_data" worksheet in this workbook).

	2004 - 2008	2009 - 2014	2015 - 2020
Annual Average Change in Natural Gas Prices from USDOE EIA Annual Energy Outlook 2005 for 2009 to 2020. 2004 to 2008 values assume nominal prices for gas remain as in 2004, implying a real decline of about 3 percent/yr.	-3.00%	1.42%	2.79%

	Cost components in $/kWh (2004 dollars)					
Energy Year	Capital	Fixed O&M	Variable O&M	Fuel	Total	Fuel Cost $/MMBtu
2004	$ 0.0122	$ 0.0022	$ 0.0019	0.049902	$ 0.0662	$ 7.34
2005	$ 0.0122	$ 0.0022	$ 0.0019	0.048405	$ 0.0647	$ 7.12
2006	$ 0.0122	$ 0.0022	$ 0.0019	0.046953	$ 0.0632	$ 6.90
2007	$ 0.0122	$ 0.0022	$ 0.0019	0.045544	$ 0.0618	$ 6.70
2008	$ 0.0122	$ 0.0022	$ 0.0019	0.044178	$ 0.0605	$ 6.50
2009	$ 0.0122	$ 0.0022	$ 0.0019	0.044806	$ 0.0611	$ 6.59
2010	$ 0.0122	$ 0.0022	$ 0.0019	0.045443	$ 0.0617	$ 6.68
2011	$ 0.0122	$ 0.0022	$ 0.0019	0.046089	$ 0.0624	$ 6.78
2012	$ 0.0122	$ 0.0022	$ 0.0019	0.046744	$ 0.0630	$ 6.87
2013	$ 0.0122	$ 0.0022	$ 0.0019	0.047408	$ 0.0637	$ 6.97
2014	$ 0.0122	$ 0.0022	$ 0.0019	0.048082	$ 0.0644	$ 7.07
2015	$ 0.0122	$ 0.0022	$ 0.0019	0.049421	$ 0.0657	$ 7.27
2016	$ 0.0122	$ 0.0022	$ 0.0019	0.050798	$ 0.0671	$ 7.47
2017	$ 0.0122	$ 0.0022	$ 0.0019	0.052213	$ 0.0685	$ 7.68
2018	$ 0.0122	$ 0.0022	$ 0.0019	0.053667	$ 0.0700	$ 7.89
2019	$ 0.0122	$ 0.0022	$ 0.0019	0.055162	$ 0.0715	$ 8.11
2020	$ 0.0122	$ 0.0022	$ 0.0019	0.056699	$ 0.0730	$ 8.34

Notes and Sources

Note 1 : Future growth rates in BGS costs from 2009 onward are estimated based on the growth rates in the "Generation" component of future electricity rates in the "Mid-Atlantic Area Council" (MAAC) region, which includes New Jersey and corresponds roughly to the PJM region. These electricity rates are as provided in the Supplement Tables to the USDOE Annual Energy Outlook, 2005 (see the "AEO2005_data" worksheet in this workbook). A summary of the growth rates implied by the AEO2005 data are provided below.

End-Use Prices	Annual Average Growth by Period (%/yr)		
(2003 cents per kilowatthour)	2004 - 2008	2008 - 2014	2014 - 2020
Residential	-5.22%	3.45%	0.75%
Commercial	-6.94%	4.21%	1.54%
Industrial	-4.16%	1.49%	1.63%
Transportation	-4.59%	3.43%	0.92%
All Sectors Average	-5.66%	3.50%	1.29%
Prices by Service Category (2003 cents per kilowatthour)			
Generation	-9.19%	5.54%	2.02%
Transmission	0.00%	0.00%	0.00%
Distribution	0.00%	0.00%	-0.71%

For the period 2004-2008, the AEO2005 estimates suggest a substantial decline in the generation portion of power costs. This decline seems to be based on both an assumed decline in fuel prices--largely, a nearly 30% decline in the cost of natural gas from 2004 to 2008--plus assumed economies due to enhanced competition in the electricity market. Data on New Jersey average tariffs (see, for example, the "SUMMARY OF UTILITY REVENUES AND RATES IN NEW JERSEY, 1999-2005" table in the "Sales_Data" worksheet in this workbook), suggest that tariffs (in nominal dollars) changed relatively little between 1999 and 2005, though tariffs were lower in 2000-2003. Natural Gas prices paid by US Electricity Generators increased between 2003 and 2005, and as of mid-2005 stood about 20% above the AEO2005 estimate for 2005 (see, for example, http://tonto.eia.doe.gov/dnav/ng/hist/n3045us3m.htm). Note that this price point was before the effects of Hurricaine Katrina were felt in the market. Although the natural gas market is notoriously volatile, taken as a whole, we doubt that the 2004-2008 decline in electricity generation costs projected by AEO will come to pass, and instead assume that the trend of 1999 to 2005 continues, with nominal net tariffs being basically stable, implying a change in real tariffs of about -3% per year through 2008 (3%/yr being the approximate level of increase in consumer prices over that period).

For Transmission and Distribution costs, AEO2005 projections show basically no change between 2003 and 2025. (Note that the decrease in distribution costs in the 2014-2020 period in the table above is overstated due to rounding of the results provided in AES2005 tables). AEO2005 figures show Transmission costs increasing by 0.2%/yr, and Distribution costs decreasing by 0.2%/yr. Since AEO2005 distribution costs outweigh transmission costs by 6 to 1, The net change in non-generation costs is taken to be -0.14% annually from 2004 thorugh 2020.

Given, based on the estimates above, that the average BGS component of tariffs was 64% in summer and 63% in other months in 2004, and assuming this ratio holds for 2004-2008, we use the estimate that generation costs will change at a rate of -4.7% per year during the period.

2.8 Electric Utility Data for New Jersey Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules
BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency
"Proposed Readoption With Amendments: N.J.A.C. 14:4
Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"
(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

ELECTRIC UTILITY DATA FOR NEW JERSEY

Estimate of 2004 "Energy Year" Sales in NJ, excluding sales by municipal utilities

Calendar Year 2004 Statewide Sales (all providers)	77,291,545	MWh	
Average Annual Growth in Statewide Sales, 1999 - 2004:	1.80%	per year	
Annual Growth in Statewide Sales, 2003 - 2004:	0.92%	per year	
Fraction of Statewide Sales NOT provided by Municipal Utilities--Average, 1999 - 2002:			98.5%
Estimated "Energy Year" 2004 Statewide Sales (excluding sales by municipal utilities):			76,793,865 MWh

(Assumes trend in statewide sales growth from 1999-2004 applies to from the end of calendar year 2004 to the end of energy year 2004 (6 months).)

Summary Historical Data, 1990 - 2003

Year	Residential Sales (MWh)	Commercial Sales (MWh)	Industrial Sales (MWh)	Transportation and Other Sales (MWh)	Sales All Sectors (MWh)
1990	20,497,980	26,838,617	15,040,847	479,243	62,856,687
1991	21,539,103	27,627,097	15,031,232	485,119	64,682,551
1992	20,547,017	27,403,257	14,687,420	484,663	63,122,357
1993	22,042,043	28,493,042	14,595,879	489,682	65,620,646
1994	22,153,557	29,357,664	14,251,230	495,142	66,257,593
1995	22,469,707	29,791,577	13,988,821	503,680	66,753,785
1996	22,632,226	30,152,284	13,602,503	502,417	66,889,430
1997	22,286,447	29,752,874	13,369,139	506,574	65,915,034
1998	23,190,705	31,127,232	13,339,168	504,407	68,161,512
1999	24,550,826	32,506,105	13,121,470	524,752	70,703,153
2000	24,547,336	33,112,343	11,811,562	505,888	69,977,129
2001	25,429,245	34,046,269	12,365,292	498,885	72,339,691
2002	27,182,808	35,683,854	11,015,788	577,971	74,460,421
2003	27,331,434	36,053,869	13,068,144	135,886	76,589,333
Average Annual Growth Rate, 1990 - 2002	2.38%	2.40%	-2.56%	1.57%	1.42%

Year	Residential Revenue (Thousand $)	Commercial Revenue (Thousand $)	Industrial Revenue (Thousand $)	Transportation and Other Revenue (Thousand $)	Revenue All Sectors (Thousand $)
1990	2,123,447	2,400,040	1,107,443	76,505	5,707,435
1991	2,329,103	2,558,934	1,152,467	79,153	6,119,657
1992	2,232,823	2,557,717	1,131,970	81,154	6,003,664
1993	2,514,344	2,773,722	1,180,451	85,889	6,554,406
1994	2,555,916	2,888,861	1,132,092	87,649	6,664,518
1995	2,692,070	3,048,506	1,140,286	90,991	6,971,853
1996	2,713,991	3,111,470	1,109,074	91,879	7,026,414
1997	2,693,102	3,079,386	1,084,250	92,938	6,949,676
1998	2,642,039	3,140,760	1,058,844	90,371	6,932,014
1999	2,797,658	3,165,203	1,007,306	91,453	7,061,620
2000	2,521,947	3,027,248	1,013,120	61,271	6,623,586
2001	2,602,692	3,130,379	1,022,612	57,421	6,813,104
2002	2,821,156	3,165,851	862,184	81,141	6,930,332
2003	2,921,307	3,334,501	975,600	13,182	7,244,590
Average Annual Growth Rate, 1990 - 2002	2.40%	2.33%	-2.06%	0.49%	1.63%

Year	Residential Revenue (Thousand $)	Commercial Revenue (Thousand $)	Industrial Revenue (Thousand $)	Transportation and Other Revenue (Thousand $)	Revenue All Sectors (Thousand $)
1990	2,123,447	2,400,040	1,107,443	76,505	5,707,435
1991	2,329,103	2,558,934	1,152,467	79,153	6,119,657
1992	2,232,823	2,557,717	1,131,970	81,154	6,003,664
1993	2,514,344	2,773,722	1,180,451	85,889	6,554,406
1994	2,555,916	2,888,861	1,132,092	87,649	6,664,518
1995	2,692,070	3,048,506	1,140,286	90,991	6,971,853
1996	2,713,991	3,111,470	1,109,074	91,879	7,026,414
1997	2,693,102	3,079,386	1,084,250	92,938	6,949,676
1998	2,642,039	3,140,760	1,058,844	90,371	6,932,014
1999	2,797,658	3,165,203	1,007,306	91,453	7,061,620
2000	2,521,947	3,027,248	1,013,120	61,271	6,623,586
2001	2,602,692	3,130,379	1,022,612	57,421	6,813,104
2002	2,821,156	3,165,851	862,184	81,141	6,930,332
2003	2,921,307	3,334,501	975,600	13,182	7,244,590
Average Annual Growth Rate, 1990 - 2002	2.40%	2.33%	-2.06%	0.49%	1.63%

Year	Residential Customers	Commercial Customers	Industrial Customers	Transport and Other Customers	Total Customers
1990	2,898,533	386,093	12,124	9,109	3,305,859
1991	2,911,150	389,142	12,945	9,628	3,322,865
1992	2,931,411	372,185	13,902	9,812	3,327,310
1993	2,953,736	376,711	13,868	9,990	3,354,305
1994	2,976,377	380,778	13,658	10,153	3,380,966
1995	3,004,951	386,324	13,583	10,325	3,415,183
1996	3,023,701	389,987	13,327	10,134	3,437,149
1997	3,049,903	397,331	13,209	10,537	3,470,980
1998	3,075,812	406,894	12,990	10,722	3,506,418
1999	3,151,285	434,515	13,438	10,798	3,610,036
2000	3,185,052	432,580	12,463	10,427	3,640,522
2001	3,204,881	418,567	13,170	10,607	3,647,225
2002	3,251,136	429,038	13,397	10,996	3,704,567
2003	3,259,242	449,061	14,205	3	3,722,511
Average Annual Growth Rate, 1990 - 2002	0.96%	0.88%	0.84%	1.58%	0.95%

Year	Average Revenue Per kWh -Residential (¢/kWh)	Average Revenue Per kWh - Commercial (¢/kWh)	Average Revenue Per kWh -Industrial (¢/kWh)	Average Revenue Per kWh -Other and Transportation (¢/kWh)	Average Revenue Per kWh -All Sectors (¢/kWh)
1990	10.36	8.94	7.36	15.96	9.08
1991	10.81	9.26	7.67	16.32	9.46
1992	10.87	9.33	7.71	16.74	9.51
1993	11.41	9.73	8.09	17.54	9.99
1994	11.54	9.84	7.94	17.70	10.06
1995	11.98	10.23	8.15	18.07	10.44
1996	11.99	10.32	8.15	18.29	10.50
1997	12.08	10.35	8.11	18.35	10.54
1998	11.39	10.09	7.94	17.92	10.17
1999	11.40	9.74	7.68	17.43	9.99
2000	10.27	9.14	8.58	12.11	9.47
2001	10.24	9.19	8.27	11.51	9.42
2002	10.38	8.87	7.83	14.04	9.31
2003	10.69	9.25	7.47	9.70	9.46

Year	Average Annual Revenue Per Customer - Residential	Average Annual Revenue Per Customer - Commercial	Average Annual Revenue Per Customer - Industrial	Average Annual Revenue Per Customer - Transportation and Other	Average Annual Revenue Per Customer -All Sectors
1990	$733	$6,216	$91,343	$8,399	$1,726
1991	$800	$6,576	$89,028	$8,221	$1,842
1992	$762	$6,872	$81,425	$8,271	$1,804
1993	$851	$7,363	$85,120	$8,597	$1,954
1994	$859	$7,587	$82,889	$8,633	$1,971
1995	$896	$7,891	$83,949	$8,813	$2,041
1996	$898	$7,978	$83,220	$9,066	$2,044
1997	$883	$7,750	$82,084	$8,820	$2,002
1998	$859	$7,719	$81,512	$8,429	$1,977
1999	$888	$7,284	$74,960	$8,469	$1,956
2000	$792	$6,998	$81,290	$5,876	$1,819
2001	$812	$7,479	$77,647	$5,414	$1,868
2002	$868	$7,379	$64,356	$7,379	$1,871
2003	$896	$7,425	$68,680	$4,394,000	$1,946

Year	Average kWh per Customer -Residential	Average kWh per Customer Commercial	Average kWh per Customer - Industrial	Average kWh per Customer - Other and Transportation	Average kWh per Customer -All Sectors
1990	7,072	69,513	1,240,585	52,612	19,014
1991	7,399	70,995	1,161,161	50,386	19,466
1992	7,009	73,628	1,056,497	49,395	18,971
1993	7,462	75,636	1,052,486	49,017	19,563
1994	7,443	77,099	1,043,435	48,768	19,597
1995	7,478	77,116	1,029,877	48,783	19,546
1996	7,485	77,316	1,020,673	49,577	19,461
1997	7,307	74,882	1,012,123	48,076	18,990
1998	7,540	76,500	1,026,880	47,044	19,439
1999	7,791	74,810	976,445	48,597	19,585
2000	7,707	76,546	947,730	48,517	19,222
2001	7,935	81,340	938,898	47,034	19,834
2002	8,361	83,172	822,258	52,562	20,100
2003	8,386	80,287	919,968	45,295,333	20,575
Average Annual Growth Rate, 1990 - 2002	1.41%	1.51%	-3.37%	-0.01%	0.46%

Fraction of NJ Sales (MWh) Provided by Private (Investor-owned) Utilities or "Energy-only Providers", 1999 - 2003

Year	Residential Sales (MWh)	Commercial Sales (MWh)	Industrial Sales (MWh)	Transportation and Other Sales (MWh)	Sales All Sectors (MWh)
1999	98.0%	99.0%	98.2%	98.0%	98.5%
2000	98.0%	99.0%	98.0%	98.1%	98.5%
2001	98.0%	99.0%	98.1%	98.0%	98.5%
2002	98.1%	99.2%	97.1%	98.2%	98.5%
2003*	98.0%	99.0%	89.9%	100.0%	97.1%

*EIA sales (MWh) data by utility for 2003, on which this table is based, appear to be incomplete. They may omit some sales (about 1.1 TWh) to commercial and (especially) industrial customers, possibly from "delivery-only" providers.

Note: Additional data used in this worksheet are derived from the following sources, but are not shown here. (Data not shown are available from sources shown, or on request)

Statewide 1999-2005 Sales and Revenue data from Excel workbook "sales_revenue.xls", from USDOE EIA Website http://www.eia.doe.gov/cneaf/electricity/page/data.html

Data on sales, 1990 – 2003, by type of provider from http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html,

"Electric Power Annual 2003: Spreadsheets", workbook sales_state.xls, downloaded 10/6/05

Data on revenue from 1990 – 2003, http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html,

"Electric Power Annual 2003: Spreadsheets", workbook revenue_state.xls, downloaded 10/6/05

Data on customer numbers from http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html,

"Electric Power Annual 2003: Spreadsheets", workbook customers_state.xls, downloaded 10/6/05

Data on sales, revenue, customer count by utility, 1999 to 2003 from "Form EIA-861 Database Annual Electric Power Industry Data", downloaded for each year from http://www.eia.doe.gov/cneaf/electricity/page/eia861.html. Data from each year are from "FILE2.DBF" of the set of data files provide for each year (downloaded 10/5/05).

Data on sales, revenue, customer count by utility, 2004, from f826util2004.dbf, downloaded from http://www.eia.doe.gov/cneaf/electricity/page/eia826.html.

Data from f826util2005.dbf, downloaded from http://www.eia.doe.gov/cneaf/electricity/page/eia826.html, (Data for first 6 months of 2005)

		RESREVENUE	RESSALES	RESCONSUMR	COMREVENUE	COMSALES	COMCONSUMR
Summary Data for Summer (June-Sept.) 2004							
	Atlantic City Electric Co	221804	1690234	457340	139704	1143312	61047
	Jersey Central Power & Lt Co	456904	3621724	935830	287656	2425713	114728
	Public Service Elec & Gas Co	622350	5213124	1788774	756063	6472983	252095
	Rockland Electric Co	32942	292849	62306	26663	248282	8741
	Total EPM	1371331	11100384	3244250	1523485	13687406	436611
Summary Data for Other Months 2004							
	Atlantic City Electric Co	282341	2563956		195321	1903102	
	Jersey Central Power & Lt Co	499100	5245047		405177	4210158	
	Public Service Elec & Gas Co	868297	7895920		946598	10977474	
	Rockland Electric Co	41215	422113		41181	447259	
	Total EPM	1777822	16918109		2114406	24203610	
Summary Data for October 2004 through May 2005							
	Atlantic City Electric Co	280277	2544102	461052	184633	1772162	61480
	Jersey Central Power & Lt Co	542167	5642546	942459	436262	4443010	115662
	Public Service Elec & Gas Co	834132	7749996	1794510	938466	11117296	251380
	Rockland Electric Co	42612	442860	62431	42770	467520	8763
	Total EPM	1743198	16740797		2218256	24851076	

Summary Data for Summer (June-Sept.) 2004	INDREVENUE	INDSALES	INDCONSUM	OTHREVENUE	OTHRSALES	OTHCONSUM	TOTREVENUE	TOTSALES	TOTCONSUMR
Atlantic City Electric Co	12521	118257	952	0	0	0	374029	2951803	519339
Jersey Central Power & Lt Co	21392	202816	2481	0	0	0	765952	6250253	1053039
Public Service Elec & Gas Co	107908	1203854	7812	3673	44328	2	1489994	12934289	2048684
Rockland Electric Co	1149	10808	234	0	0	0	60754	551939	71281
Total EPM	346930	3867474	11479	3673	44328	2	3251183	28743743	3692342
Summary Data for Other Months 2004									
Atlantic City Electric Co	25659	280697		0	0		503321	4747755	
Jersey Central Power & Lt Co	49135	602869		0	0		953412	10058074	
Public Service Elec & Gas Co	121173	2014862		7260	104250		1943328	20992506	
Rockland Electric Co	2389	26133		0	0		84785	895505	
Total EPM	614329	7215805		7260	104250		4526966	48531977	
Summary Data for October 2004 through May 2005									
Atlantic City Electric Co	19771	223822	964	0	0	0	484681	4540086	523496
Jersey Central Power & Lt Co	43226	486216	2476	0	0	0	1021655	10571772	1060597
Public Service Elec & Gas Co	113633	1876883	8289	2983	87847	16	1889214	20832022	2054182
Rockland Electric Co	2277	24472	237	0	0	0	87659	934852	71431
Total EPM	535146	6945910		0	0	0	4518343	48757896	3709706

2.9 Tariffs Estimation Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules

BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency

"Proposed Readoption With Amendments: N.J.A.C. 14:4

Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"

(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

ROUGH ESTIMATE OF BASIC GENERATION (ENERGY) COMPONENT OF TARIFFS BY UTILITY AND BY CUSTOMER CLASS IN NEW JERSEY

Based on Investor-owned Utility Tariff Data and 2004/2005 Sales and Revenue Data
From "Sales_Data" Worksheet in this workbook

	Average Total Revenues ($) per kWh by Customer Type and Season (2004 Energy Year)					
	Residential		Commercial		Industrial	
Utility	June - Sept.	Oct.- May	June - Sept.	Oct.- May	June - Sept.	Oct.- May
Atlantic City Electric Co	$ 0.1312	$ 0.1102	$ 0.1222	$ 0.1042	$ 0.1059	$ 0.0883
Jersey Central Power & Lt Co	$ 0.1262	$ 0.0961	$ 0.1186	$ 0.0982	$ 0.1055	$ 0.0889
Public Service Elec & Gas Co	$ 0.1194	$ 0.1076	$ 0.1168	$ 0.0844	$ 0.0896	$ 0.0605
Rockland Electric Co	$ 0.1125	$ 0.0976	$ 0.1074	$ 0.0921	$ 0.1063	$ 0.0914
Weighted Average over 4 Utilities, Seasonal, by Sector	$ 0.1233	$ 0.1040	$ 0.1176	$ 0.0901	$ 0.0946	$ 0.0693
Weighted Average over "Total EPM" consumption, Seasonal, by Sector	$ 0.1235	$ 0.1041	$ 0.1113	$ 0.0893	$ 0.0897	$ 0.0770
Weighted Average over 4 Utilities, Annual, by Sector	$ 0.1117		$ 0.1001		$ 0.0787	
Weighted Average over "Total EPM" consumption, Annual, by Sector	$ 0.1124		$ 0.0960		$ 0.0867	
Weighted Average over 4 Utilities, All Sectors, Seasonal	$ 0.1188	$ 0.0948				
Weighted Average over "Total EPM" consumption, All Sectors, Seasonal*	$ 0.1131	$ 0.0926				
Weighted Average over 4 Utilities, All Sectors, Annual	$ 0.1039					
Weighted Average over "Total EPM" consumption, All Sectors, Annual*	$ 0.1006					

*"EPM" is the "Electric Power Monthly" service of the USDOE, from which these data are derived. The weighted averages using the "Total EPM" figures from 2004, rather than the total over the sales of the four investor-owned utilities in the state, tends to weight the commercial and, especially, industrial sector more heavily because sales in these sectors in 2004 included significant sales from other (non-utility) providers.

	Estimated Average Basic Generation Charge ($) per kWh by Customer Type and Season (Energy Year 2004)					
	Residential		Commercial		Industrial	
Utility	June - Sept.	Oct.- May	June - Sept.	Oct.- May	June - Sept.	Oct.- May
Atlantic City Electric Co	$ 0.0766	$ 0.0580	$ 0.0760	$ 0.0577	$ 0.1083	$ 0.0649
Jersey Central Power & Lt Co	$ 0.0769	$ 0.0587	$ 0.0732	$ 0.0575	$ 0.0567	$ 0.0527
Public Service Elec & Gas Co	$ 0.0741	$ 0.0614	$ 0.0678	$ 0.0562	$ 0.0677	$ 0.0572
Rockland Electric Co	$ 0.0679	$ 0.0626	$ 0.0666	$ 0.0614	$ 0.0666	$ 0.0614
Weighted Average over 4 Utilities, Seasonal, by Sector	$ 0.0752	$ 0.0600	$ 0.0699	$ 0.0568	$ 0.0691	$ 0.0570
Weighted Average over 4 Utilities, Annual, by Sector	$ 0.0660		$ 0.0616		$ 0.0615	
Weighted Average over 4 Utilities, All Sectors, Seasonal	$ 0.0724	$ 0.0582				
Weighted Average over 4 Utilities, All Sectors, Annual	$ 0.0636					

	Estimated Average Basic Generation Charge as a Fraction of Total Revenue by Customer Type and Season, Energy Year 2004					
	Residential		Commercial		Industrial	
Utility	June - Sept.	Oct.- May	June - Sept.	Oct.- May	June - Sept.	Oct.- May
Atlantic City Electric Co	58.4%	52.7%	62.2%	55.3%	102.3%	73.5%
Jersey Central Power & Lt Co	60.9%	61.1%	61.7%	58.5%	53.7%	59.3%
Public Service Elec & Gas Co	62.1%	57.0%	58.0%	66.6%	75.6%	94.4%
Rockland Electric Co	60.4%	64.1%	62.0%	66.7%	62.7%	67.2%

	Sales-Weighted Average Basic Generation Charge as a Fraction of Total Revenue by Customer Type			Total Energy Year 2004 Sales by Customer Type (MWh)		
Utility	Residential	Commercial	Industrial	Residential	Commercial	Industrial
Atlantic City Electric Co	54.9%	58.0%	83.4%	4234336	2915474	342079
Jersey Central Power & Lt Co	61.0%	59.7%	57.6%	9264270	6868723	689032
Public Service Elec & Gas Co	59.1%	63.5%	87.1%	12963120	17590279	3080737
Rockland Electric Co	62.6%	65.1%	65.8%	735709	715802	35280
Sales-Weighted Average for 4 Utilities	59.19%	62.01%	81.69%			

Assumptions for Above Estimates:

Atlantic City Electric Co

Residential is 100% RS Tariff category. Average June-Sept Monthly Usage: 923.95 kWh

Commercial fractions of sales by rate class (assumed to hold year-round):

MGS-Sec	MGS-Prim	AGS-Sec	AGS-Prim	
34%	11%	28%	28%	*See Note 1*

Industrial fractions of sales by rate class (assumed to hold year-round):

MGS-Sec	MGS-Prim	AGS-Sec	AGS-Prim	
15%	45%	40%	40%	*See Note 1*

Jersey Central Power & Lt Co

Residential sales in the JCP&L service territory were ~95% in the RS Tariff category in 2003 (FERC Form 1 data--see Note 3 below). For the purpose of this analysis, we assume that 100% of Residential sales were in the RS service class.

Average June-Sept Monthly Usage: 967.52 kWh

Commercial fractions of sales by rate class (assumed to hold year-round):

GS	GST	GP/GT	
71%	9%	20%	*See Note 3* --figures are rough estimates. Tariff used in equation for GST is a simple (unweighted) averages of peak and off-peak values.

Industrial fractions of sales by rate class (assumed to hold year-round):

GS	GST	GP/GT/GTX
14%	6%	80%

Public Service Elec & Gas Co

Residential is treated as 100% RS Tariff category. Average June-Sept Monthly Usage: 728.59 kWh

Commercial fractions of sales by rate class (assumed to hold year-round):

GLP	LPL under 750 kW	LPL 750-1250 kW	
47%	13%	40%	*See Note 2* --figures are rough estimates. Tariffs used in equations above are simple (unweighted) averages of peak and off-peak values.

Industrial fractions of sales by rate class (assumed to hold year-round):

GLP	LPL under 750 kW	LPL 750-1250 kW	
10%	22.5%	67.5%	*See Note 2* --figures are rough estimates. Tariffs used in equations above are simple (unweighted) averages of peak and off-peak values.

Rockland Electric Co

Residential is 100% class 1 Tariff category. Average June-Sept Monthly Usage: 1,175.04 kWh

Commercial and Industrial are both 100% General Service (class 2) Tariff category.

BASIC GENERATION CHARGE DATA FOR NJ INVESTOR-OWNED UTILITIES PROVIDED BELOW

PSEG

PSEG Basic Energy Charges for Key Rate Classes
From Public Service Electric and Gas Company B.P.U.N.J. No. 14, "Tariff for Electric Service"
Effective 8/1/2003, available as "electric_tariff.pdf". Data below are from Sheets 67 and 67A:

Values below do not include Sales and Use Tax (SUT) of 6%

	Basic Generation Service (BGS) charges, cents/kWh	
Rate Class	October through May	June through September
RS, first 600 kWh/mo	6.1387	7.2563
RS, over 600 kWh/mo	6.1387	8.1215
BPL [Public Lighting]	4.7139	4.7258
GLP	5.4921	6.7786
GLP Night Use	4.1632	4.0329
LPL under 750 kW on-peak	6.5705	8.7655
LPL under 750 kW off-peak	4.1632	4.0329
LPL 750 to 1250 kW on-peak	7.0705	9.2655
LPL 750 to 1250 kW off-peak	4.6632	4.5329

JCPL

JERSEY CENTRAL POWER & LIGHT COMPANY Basic Energy Charges for Key Rate Classes
From JERSEY CENTRAL POWER & LIGHT COMPANY BPU NO. 10 ELECTRIC "TARIFF for SERVICE"
Effective 7/30/2003, available as "_85256A170068279F_la_NJ+Part+III+2005-0901__file_tariff_iii_eff090105.pdf".
Data below are from Sheet 36:

Values below do not include Sales and Use Tax (SUT) of 6%

	Basic Generation Service (BGS) charges, cents/kWh		
Rate Class	October through May	June through September	
RS, first 600 kWh/mo	5.8694	7.3397	
RS, over 600 kWh/mo	5.8694	8.2568	
OL, SVL, MVL, ISL [Street Lighting]	4.9755	5.3046	
GS (General Service Secondary)	5.877	7.8387	
GST on-peak	7.5698	11.2591	
GST off-peak	4.5385	4.7283	
GS 750 to 1250 kW	6.377	8.3387	Adds "retail adder" of 0.5 cents to GS charge
GST 750 to 1250 kW on-peak	8.0698	11.7591	Adds "retail adder" of 0.5 cents to GS charge
GST 750 to 1250 kW off-peak	5.0385	5.2283	Adds "retail adder" of 0.5 cents to GS charge

For Customers taking power at primary and transmission voltages, and customers taking power at secondary voltages with demand greater than 1250 kW, the following energy charges pertain (from Sheet 37 of above)

1) BGS Energy Charge per KWH: The sum of actual real-time PJM load weighted average Locational Marginal Price for JCP&L Transmission Zone and ancillary services of **$0.00300** per KWH, times the Losses Multiplier provided below, plus a Retail Margin of **$0.005** per KWH, times 1.06 multiplier for Sales and Use Tax as provided in Rider SUT.

Losses Multiplier:	GT – High Tension Service	1.019
	GT	1.041
	GP	1.061
	GST	1.118
	GS	1.118

Based on the algorithms above, and using a 2003 value for the PJM load weighted average locational marginal price (for PJM as a whole, not only for JCP&L) of $ 0.04123 /kWh from page 79 of State of the Market 2003, (by the Market Monitoring Unit of the PJM Interconnection, dated March 2004, and downloaded as http://www.pjm.com/markets/market-monitor/downloads/mmu-reports/pjm-som-2003-part2.pdf), yields tariffs for larger customers (before taxes) as follows:

	Cents/kWh
GT High Tension Service (GTX?)	5.00
GT	5.09
GP	5.17
GST	5.41
GS	5.41

This is a substantial simplification, because PJM prices vary significantly year to year and month to month (though JCPL's summer and winter industrial loads, at least in 2004, had similar monthly averages), but it is used to compute the estimates of weighted average tariffs above in the absence of more specific pricing data.

ATLANTIC ELECTRIC

ATLANTIC ELECTRIC TARIFF FOR ELECTRIC SERVICE SECTION IV - SERVICE CLASSIFICATIONS AND RIDERS
BPU NJ No. 11 ELECTRIC SERVICE, Tariff Change Effective: October 1, 2005
Available as: "nj_tariff_IV.pdf". Data are from Sheet 60.

	Basic Generation	
Rate Class	October through May	June through September
RS, first 750 kWh/mo	5.8029	7.4863
RS, over 750 kWh/mo	5.8029	8.408
RS TOU on-peak	7.5586	10.8023
RS TOU off-peak	4.7137	4.9458
SPL/CSL [Street Lighting]	5.1125	5.3506
MGS-Secondary	5.9338	7.8622
MGS-Primary	5.6243	7.4991
AGS-Secondary	5.8445	7.5170
AGS-Primary	5.5410	7.3920
DDC	5.6184	7.0230
MGS/AGS/DDC 750 to 1250 kW		

Adds "retail adder" of 0.5 cents to charges above

Text below from sheet 60a in Atlantic Electric document referenced above:

Basic Generation Service (BGS)

BGS-CIEP

Energy Charges
BGS Energy Charges for Rate Schedule TGS, AGS and MGS customers with a Peak Load Share (PLS) of 1,250 kW or more, and AGS and MGS customers with a PLS of less than 1,250 kW who have elected BGS-CIEP are hourly and are provided at the real time PJM Load Weighted Average Locational Marginal Prices for the Atlantic Electric Transmission Zone, adjusted for losses, plus administrative charges pursuant to N.J.S.A. 48:2-60 and New Jersey Sales and Use Tax as set forth in Rider SUT.

Retail Margin $0.005327 per kWh
This charge is applicable to all customers taking service under BGS CIEP and those BGS-FP customers on Rate Schedules MGS Secondary, MGS Primary, AGS Secondary or AGS Primary whose annual PLS for generation capacity is equal to or greater than 750 kW as of November 1 of each year. This charge includes administrative charges pursuant to N.J.S.A. 48:2-60 and New Jersey Sales and Use Tax as set forth in Rider SUT

ROCKLAND ELECTRIC COMPANY

From document ROCKLAND ELECTRIC COMPANY, P.U.C. NO. 2 ELECTRICITY
Available as "gi24-34.pdf".
Data below are from Sheet 48

	Basic Generation	
Rate Class	October through May	June through September
Residential – First 250 kWh	6.271	6.271
Residential – Over 250 kWh	6.259	6.935
General Service (Non-Demand Billed)	6.141	6.663
Residential TOD/WH -- Peak	8.142	10.036
Residential TOD/WH -- Off-Peak	5.048	4.548
Public Street Lighting	5.356	4.626
Residential SH – First 250 kWh	6.164	6.529
Residential SH – Next 450 kWh	6.164	7.196
Residential SH – Over 700 kWh	6.164	7.645
Private Overhead Lighting	5.339	4.603

(B) BASIC GENERATION SERVICE – COMMERCIAL AND INDUSTRIAL ENERGY PRICING (BGS-CIEP)

This service is applicable to all Service Classification No. 7 customers, and Service Classification No. 2 customers who maintain a billing demand of 1,250 kW or greater during any two months of a calendar year, taking BGS from the Company. Service Classification No. 2 metered customers who do not meet the above criteria may elect to take BGS-CIEP service on a voluntary basis. See General Information Section No. 28(A).

BGS Energy Charges:
Charges per kilowatthour:
BGS Energy Charges are hourly and are provided at the real time PJM Load Weighted Average Locational Marginal Prices for the Rockland Electric Transmission Zone, plus Ancillary Services (including PJM Administrative Charges) at the rate of $0.00330 per kilowatthour, adjusted for losses, plus a retail margin at the rate of $0.00530 per kilowatthour and applicable taxes.

Notes and Sources

Note 1 : Page 304 of FERC Form 1 for the Atlantic City Electric Company (for 2004) lists 100% of AEC's residential sales as being in the RS rate class. The same document lists Commercial and Industrial sales that are approximately distributed as follows:

1.44	TWh MGS
2.7	TWh AGS
1.33	TWh TGS

The sum of these sales, however, is much higher than the total sales for the classes as reported by EIA for the same year (see "Sales Data" worksheet in this workbook). Our assumption is that the discrepancy is because the FERC Form 1 figures include sales by AEC that are of distribution services only, for large customers buying power from energy providers. This would seem to be corroborated by the relatively low average tarrifs for the AGS (7.92 cents/kWh) and TGS (3.55 cents/kWh) rate classes in the FERC Form 1 data. We therefore assume that basically all of the TGS sales, and about 0.7 TWh of the AGS sales, in 2004, were for distribution-only. Therefore about 42% of total AEC commercial and industrial sales were in the MGS sales classes, with the remainder (or nearly all of it) in the AGS class.

We assume that about 80% of industrial sales were at the AGS level, meaning that about 1.7 TWh of AGS sales were in the commercial sector, thus about 55% of commercial sector sales were in the AGS sales classes. With no data at hand on how primary and secondary sales are divided, we assume that 75% of MGS sales are at the secondary level, along with 50% of AGS sales.

Note 2 : For the Public Service Electric and Gas Company (PSEG), on the order of 95% of residential sales are in the RS sales class (from Page 304 of 2004 FERC Form 1 for PSEG), so this rate is used for all residential customers. The same document lists Commercial and Industrial sales that are approximately distributed as follows:

8.5	TWh GLP
15.9	TWh LPL

The sum of these sales, however, is higher than the total sales for the classes as reported by EIA for the same year (see "Sales Data" worksheet in this workbook). Our assumption is that the discrepency is because the FERC Form 1 figures include sales by PSEG that are of distribution services only, for large customers buying power from energy providers. This would seem to be corroborated by the relatively low average tariffs for the LPL (7.1 cents/kWh) rate class in the FERC Form 1 data. We therefore assume that about 3.73 TWh of the LPL rate class sales were for distribution-only. Therefore about 41% of total PSEG commercial and industrial sales were in the GLP rate class.

We assume that about 90% of industrial sales were at the LPL level, meaning that about 9.3 TWh of LPL sales were in the commercial sector, thus about 53% of commercial sector sales were in the LPL sales classes. With no data at hand on how sales over and under 750 kW are divided, we assume that 75% of LPL sales are at the 750 - 1250 kW level.

Note 3 : For the Jersey Central Power and Light Company (JCPL), on the order of 95% of residential sales are in the RS sales class (from Page 304 of 2003 FERC Form 1 for JCPL), so this rate is used for all residential customers. The same document lists Commercial and Industrial sales that are approximately distributed as follows (TWh):

Tariff Class	Commercial	Industrial
GS	6.12	0.44
GST	0.79	0.18
GP	1.12	0.69
GT	0.58	1.43
GTX	N/A	0.32

The sum of these sales is somewhat higher than the total sales for the classes as reported by EIA for the same year, especially in the Industrial sector, suggesting that some large customers are served with distribution services only by JCPL.

2.10 Biomass Resource and Potential Generation Estimate Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules
BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency
"Proposed Readoption With Amendments: N.J.A.C. 14:4
Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"
(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

BIOMASS RESOURCE AND POTENTIAL GENERATION ESTIMATE FOR NEW JERSEY

The document Biomass Feedstock Availability in the United States: 1999 State Level Analysis by Marie E. Walsh, Robin L. Graham, Stephen E. Slinsky, and Daryll E. Ray, of Oak Ridge National Laboratory and related institutions, dated April 30, 1999 (Updated January, 2000), and available from http://bioenergy.ornl.gov/resourcedata/index.html with its accompanying Excel workbook 1999biomass_quantity.xls, offers the following estimates of availability of different types of biomass fuels in New Jersey at different prices:

	Cumulative Dry tons (Short Tons) Available by Type of Biomass by Cost Category						
Estimated Unit Cost	Urban Wastes	Mill Wastes	Forest Residues	Ag Residues	Switchgrass	SRWC*	TOTAL
Less than $20/ton	389,089	-	-	-	-	-	389,089
Less than $30/ton	648,481	8,000	70,000	-	-	-	726,481
Less than $40/ton	648,481	8,000	102,000	32,723	-	-	791,204
Less than $50/ton	648,481	21,000	130,700	32,723	142,902	-	975,806
Implied Average Cost**	$ 24.00	$ 42.38	$ 36.84	$ 40.00	$ 50.00		$ 30.46

* SRWC = Short Rotation Woody Crops, for which the workbook above included a zero estimate for each state. The reason why SRWC crops were deemed not to be available at a cost of less than $50 per ton is unclear from the text. It is possible that the "Switchgrass" category covers both Switchgrass and SRWC (these categories are lumped in the text document that the workbook accompanies), or that SRWC is simply not competitive with other agricultural land uses.

** Estimated roughly using $20/ton as the cost for the first row of biomass resource estimates, $30/ton for the second row of estimates, and so on. This method yields an upper estimate of the weighted averages of the costs for the resources as shown in the table.

Estimate of Average Biomass Fuel Costs

Assume a net heat rate for new biomass-fired power plants of 12000 Btu/kWh.
This heat rate would be among the better rates for the existing biomass-fueled powerplants surveyed in G. Wiltsee (2000), Lessons Learned from Existing Biomass Power Plants, prepared for NREL, and available as http://www.nrel.gov/docs/fy00osti/26946.pdf, published as NREL/SR-570-26946, February 2000.
Newer biomass generation technologies, such as biomass gasification-based technologies (such as BIGCC), have higher efficiencies (lower heat rates), sometimes lower than 10,000 Btu/kWh. See, for example, the EPRI report cited in Note 4 of the "Renewables_costs" worksheet in this workbook.
Also assume a biomass energy content of 16 MMBtu/dry ton, which is a fairly central average for mostly woody biomass (such as urban biomass wastes, which predominate in New Jersey).
With the average fuel costs calculated as above (given that the method used for calculation results in an upper estimate of fuel costs from the data in the original study, we ignore the impacts of inflation in going from the ORNL study's original 1999 dollars to the 2004 dollars used in this analysis), the heat rate above yields a per-kWh fuel cost of $ 0.0228, and assuming a non-fuel variable O&M cost of $ 0.0034 per kWh, yields an overall fuel plus non-fuel variable O&M cost of $ 0.0262 per kWh.
The variable O&M cost estimate shown here is somewhat lower than the value used for a plant purchased in 2005 in the report cited in Note 4 of the "Renewables_costs" worksheet in this workbook, and is roughly consistent with the average of variable non-fuel O&M costs for "solid woody biomass"-fueled plants provided in the report New Jersey Renewable Energy Market Assessment, Final Report to Rutgers University Center for Energy, Economic and Environmental Policy, Prepared by Navigant Consulting Inc., Sustainable Energy Advantage LLC, and Boreal Renewable Energy Development, August 2, 2004 (Navigant-REmarket8-04.pdf).
The average of non-fuel variable O&M costs from page 235 of this document for conventional and BIGCC technologies yields the non-fuel variable cost shown.

Maximum Annual Generation from Biomass in New Jersey

Based on the estimates of the New Jersey biomass resource shown above, and the average biomass generation heat rate estimate of 12000 Btu/kWh, the maximum (sustainable) generation from biomass in New Jersey would be 1,301 GWh per year, or, at 5500 full-load equivalent hours per year, approximately 237 MW of generation.

Biomass Plant Costs

The USDOE Annual Energy Outlook 2005 (AEO2005) table labeled "Table 38: Cost and Performance Characteristics of New Central Station Electricity Generating Technologies", and available as page 70 of http://www.eia.doe.gov/oiaf/aeo/assumption/pdf/0554(2005).pdf, Assumptions to the Annual Energy Outlook 2005, includes the following cost information on biomass power central station plants. This cost information was used in the AEO2005 modeling effort.

Plant size:	80 MW	
Capital cost:	$1,731	2003 $/kW (includes contingency factor)
Variable O&M cost:	29.6	mills/kWh
Fixed O&M cost:	46.47	$/kW-yr (2003 $)

Additional estimates of BIG-ST plant costs below from:
Electric Power Research Institute (1998) Economic and Risk Evaluation of the Brazil Biomass Integrated Gasification-Gas Turbine Demonstration Project, prepared by EPRI, Principal Investigators Charles R. McGowin, Evan Hughes, and Neville Holt, Draft Report, November 1998.
Available as http://www.worldbank.org/html/fpd/em/biomass/igcc_appendix.pdf.

Plant size:	40 MW gross	32 MW net
Capital cost:	$3,531	1998* $/kW (all costs for demonstration unit)
Variable O&M cost:	2.76	mills/kWh (non-fuel)
Fixed O&M cost:	79.6	$/kW-yr (1998 $)

*Currency date not specified in source document, but assumed to be 1998.

2.11 Background Data on Wind Power System Costs Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules

BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency

"Proposed Readoption With Amendments: N.J.A.C. 14:4

Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"

(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

BACKGROUND DATA ON WIND POWER SYSTEM COSTS (CURRENT AND FUTURE)

Costs of Solar PV systems as described in the "Navigant Report",
New Jersey Renewable Energy Market Assessment, Final Report to Rutgers University
Center for Energy, Economic and Environmental Policy, Prepared by Navigant Consulting Inc., Sustainable Energy Advantage LLC, and Boreal Renewable Energy Development, August 2, 2004 (Navigant-REmarket8-04.pdf), Pages 220-221. Costs in 2004 dollars for 1.8 MW (2004) to 5 MW (2020) turbines.
Source lists system lifetimes of 25 years for systems installed in 2005 and 2008, 30 years for systems installed thereafter.

	Installed Capital Cost ($/kWp ac)				Implied Average Change in		
Wind Farm Type	2005	2008	2015	2020	2005-2008	2008-2015	2015-2020
Onshore, 5 MW	$ 1,250	$ 1,155	$ 960	$ 850	-2.6%	-2.6%	-2.4%
Onshore, 20 MW	$ 1,185	$ 1,090	$ 895	$ 785	-2.7%	-2.8%	-2.6%
Onshore, 50 MW	$ 1,050	$ 955	$ 775	$ 665	-3.1%	-2.9%	-3.0%
Offshore	N/A	$ 1,900	$ 1,700	$ 1,650		-1.6%	-0.6%
	Average Capacity Factor						
System Size (kWp ac)	2005	2008	2015	2020			
Onshore Class 3	29.0%	29.8%	31.0%	31.6%	0.9%	0.6%	0.4%
Onshore Class 4	35.0%	36.0%	37.4%	38.2%	0.9%	0.5%	0.4%
Offshore Class 6	N/A	37.0%	40.0%	42.0%		1.1%	1.0%

Data on non-fuel O&M costs from the same source

	Non-fuel O&M Costs ($/kWac-yr)				Implied Average Change in		
System Size (kWp ac)	2005	2008	2015	2020	2005-2008	2008-2015	2015-2020
Onshore, 5 MW	$ 25.00	$ 22.80	$ 18.40	$ 15.80	-3.0%	-3.0%	-3.0%
Onshore, 20 MW	$ 23.30	$ 21.30	$ 18.00	$ 14.50	-2.9%	-2.4%	-4.2%
Onshore, 50 MW	$ 20.00	$ 18.30	$ 17.20	$ 12.70	-2.9%	-0.9%	-5.9%
Offshore	N/A	$ 49.00	$ 46.00	$ 44.00		-0.9%	-0.9%

The graph below, from "Chapter 23: United States" in International Energy Agency IEA Wind Annual Report 2004, available at http://www.ieawind.org/iea_wind_pdf/PDF_2004_IEA_Annual_Report%20PDF/239-252%20USA.pdf

Making the assumption that the majority (effectively, nearly all) of the decrease in the per-kWh cost shown in the graph below is from decreased capital costs, and making rough measurements from the graph, the trend in costs by year shown are as follows:

	Esitmated Levelized Cents/kWh				Implied Average Change in Capital Costs, %/yr		
Wind Farm Site	2005	2010	2015	2020	2005-2008	2008-2015	2015-2020
Low wind speed sites	4.10	3.50	3.40	3.30	-5.1%	-0.4%	-0.6%
High wind speed sites	3.40	3.30	3.20	3.10	-1.0%	-0.4%	-0.6%

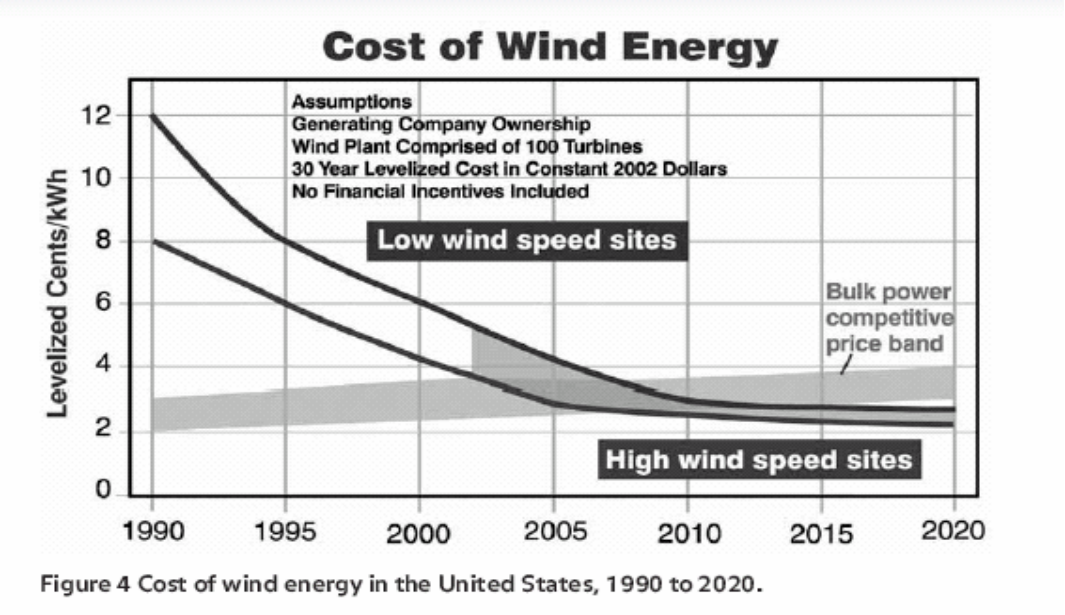


Figure 4 Cost of wind energy in the United States, 1990 to 2020.

The USDOE Annual Energy Outlook 2005 (AEO2005) table labeled "Table 38: Cost and Performance Characteristics of New Central Station Electricity Generating Technologies", and available as page 70 of http://www.eia.doe.gov/oiaf/aeo/assumption/pdf/0554(2005).pdf, Assumptions to the Annual Energy Outlook 2005, includes the following cost information on wind power central station plants. This cost information was used in the AEO2005 modeling effort.

Plant size:	50 MW	
Capital cost:	$1,134	2003 $/kW (includes contingency factor)
Variable O&M cost:	0	mills/kWh (cost of zero listed)
Fixed O&M cost:	26.81	$/kW-yr (2003 $)

In EIA Projections of Renewable Energy Costs, presented in "Forum on the Economic Impact Analysis of NJ's Proposed 20% RPS" by Chris Namovicz of the USDOE EIA (Energy Information Administration), dated February 22, 2005, and available as http://www.eia.doe.gov/oiaf/pdf/rec.pdf, a wind power average cost of 1100 dollars/kW is provided, with "Minimal cost decline expected in mid-term" and "Performance ranges from 32% [capacity factor] (Class 4) to 42% (Class 6)"

The table that follows is from the document Future for Offshore Wind Energy in the United States (Preprint), Prepared by W. Musial and S. Butterfield of the USDOE National Renewable Energy Laboratory, and labeled "To be presented at EnergyOcean 2004 Palm Beach, Florida June 28-29, 2004" (June 2004 • NREL/CP-500-36313). Document available as http://www.nrel.gov/docs/fy04osti/36313.pdf.

The capital cost data in the table below suggest the following rates of change of offshore wind capital costs:

%/yr Average Change in Capital Costs		
2006-2009	2009-2016	2016-2020
-3.3%	-2.85%	-2.16%

By way of comparison, the $0.015 per kWh variable O&M cost, at a capacity factor of 42% as listed for a 2006 offshore wind turbine in the table below would be equal in annual cost to a fixed O&M cost of $55.19 per kW/yr

Table 3 – Shallow Water Cost Estimates for Offshore Wind – Class 6 Winds

Shallow Water Wind COE Estimates - Class 6 - <30-m depth, 16-miles from shore ($ In Thousands)	Year of Installation					
	2008	2009	2012	2016	2020	2026
Turbine Size	5	5	5	5	5 MW	5 MW
Wind Farm Size	500 MW	500 MW	500 MW	500 MW	500 MW	500 MW
Rotor Diameter	128	128	128	128	128 M	128 M
Hub Height	80	80	80	80	80 M	80 M
Assumed Water Depth	<30-m	<30-m	<30-m	<30-m	<30-m	<30-m
Turbine Cost (total plant)	$338,730	$308,244	$289,750	$258,746	$237,184	$229,278
Monopile foundations (total plant)	$99,200	$87,296	$76,820	$67,602	$61,969	$59,903
Electrical Infrastructure	$159,300	$144,963	$135,265	$128,089	$117,415	$113,501
ICC / Rating ($/kw)	$1,194	$1,081	$1,006	$909	$833	$805
O&M ($/kwh)	$0.0150	$0.0132	$0.0116	$0.0102	$0.0092	$0.0083
LRC (Yr/total plant)	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Capacity Factor (%)	0.42	0.44	0.47	0.47	0.47	0.47
Availability (%)	0.85	0.9	0.95	0.95	0.95	0.95
Shallow water COE - $/kWh	$0.064	$0.048	$0.041	$0.037	$0.034	$0.032

2.12 Background Data on Solar PV System Costs Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules

BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency

"Proposed Readoption With Amendments: N.J.A.C. 14:4

Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"

(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

BACKGROUND DATA ON SOLAR PV SYSTEM COSTS (CURRENT AND FUTURE)

Costs of Solar PV systems as estimated in workbook "CORE PV Financials wproposed for 06 112805v.xls". authored by NJ BPU:

System Size (kW dc)	Installed Capital Cost ($/W dc)
2.5	$ 7.80
10	$ 7.75
40	$ 7.50
50	$ 7.50
70	$ 7.25
100	$ 7.00
300	$ 6.75
500	$ 6.50
700	$ 6.00

Costs of Solar PV systems as described in the "Navigant Report", New Jersey Renewable Energy Market Assessment, Final Report to Rutgers University Center for Energy, Economic and Environmental Policy, Prepared by Navigant Consulting Inc., Sustainable Energy Advantage LLC, and Boreal Renewable Energy Development, August 2, 2004 (Navigant-REmarket8-04.pdf), Pages 204-206. Costs in 2004 dollars.
Source lists system lifetimes of 25 years for systems installed in 2005 and 2008, 30 years for systems installed thereafter.

	Installed Capital Cost ($/kWp ac)				Implied Average Change in Capital Costs, %/yr		
System Size (kWp ac)	2005	2008	2015	2020	2005-2008	2008-2015	2015-2020
3 to 5	$ 8,000	$ 6,900	$ 4,800	$ 3,700	-4.8%	-5.1%	-5.1%
250 to 500	$ 6,000	$ 5,145	$ 3,590	$ 2,780	-5.0%	-5.0%	-5.0%
5000	$ 5,900	$ 5,060	$ 3,530	$ 2,735	-5.0%	-5.0%	-5.0%
	Installed Capital Cost ($/kW dc)						
System Size (kWp ac)	2005	2008	2015	2020			
3 to 5	$ 6,560	$ 5,658	$ 3,936	$ 3,034	-4.8%	-5.1%	-5.1%
250 to 500	$ 4,920	$ 4,219	$ 2,944	$ 2,280	-5.0%	-5.0%	-5.0%
5000	$ 4,838	$ 4,149	$ 2,895	$ 2,243	-5.0%	-5.0%	-5.0%

Data on non-fuel O&M costs from the same source

	Non-fuel O&M Costs ($/kWac-yr)				Implied Average Change in Capital		
System Size (kWp ac)	2005	2008	2015	2020	2005-2008	2008-2015	2015-2020
3 to 5	$ 15.00	$ 14.00	$ 11.00	$ 9.00	-2.3%	-3.4%	-3.9%
250 to 500	$ 12.00	$ 11.00	$ 9.00	$ 8.00	-2.9%	-2.8%	-2.3%
5000	$ 6.00	$ 5.50	$ 4.50	$ 4.00	-2.9%	-2.8%	-2.3%
	Non-fuel O&M Costs ($/kWdc-yr)						
System Size (kWp ac)	2005	2008	2015	2020			
3 to 5	$ 12.30	$ 11.48	$ 9.02	$ 7.38	-2.3%	-3.4%	-3.9%
250 to 500	$ 9.84	$ 9.02	$ 7.38	$ 6.56	-2.9%	-2.8%	-2.3%
5000	$ 4.92	$ 4.51	$ 3.69	$ 3.28	-2.9%	-2.8%	-2.3%

Alternative Cost Curves for Solar PV modules

Source: Our Solar Power Future: The US Photovoltaics Industry Roadmap through 2030 and Beyond, prepared by a group of US DOE laboratories and others led by an NREL team, dated 9/2004, and available as http://www.seia.org/roadmap.pdf. Data are from page 7 of referenced document.

	"Best System Selling Price" ($/kWp dc*)						
"Commercial" Systems	2004	2010	2015	2020	2005-2010	2010-2015	2015-2020
Baseline	$ 6,100	$ 4,870	$ 4,240	$ 3,760	-3.7%	-2.7%	-2.4%
"Roadmap"	$ 6,100	$ 4,650	$ 3,680	$ 3,010	-4.4%	-4.6%	-3.9%

*The source document doesn't specify whether the costs shown are on a kW DC or AC basis, or note the currency year, but we assume capital costs are on a DC basis, and currency is 2004 dollars.

Source: International Energy Agency (IEA), TRENDS IN PHOTOVOLTAIC APPLICATIONS Survey report of selected IEA countries between 1992 and 2004. Report #IEA-PVPS T1-14:2005. Page 18.

"Indicative costs" in 2004 in USD per kWp (assumedly DC output) for on-grid PV systems in the US:

<10 kW	7000 to 10,000
>10 kW	6300 to 8500

The USDOE Annual Energy Outlook 2005 (AEO2005) table labeled "Table 38: Cost and Performance Characteristics of New Central Station Electricity Generating Technologies", and available as page 70 of http://www.eia.doe.gov/oiaf/aeo/assumption/pdf/0554(2005).pdf, Assumptions to the Annual Energy Outlook 2005, includes the following cost information on solar PV central station plants. This cost information was used in the AEO2005 modeling effort.

Plant size:	5 MW	
Capital cost:	$4,467	2003 $/kW (includes contingency factor)
Variable O&M cost:	0	mills/kWh (cost of zero listed)
Fixed O&M cost:	10.34	$/kW-yr (2003 $)

In EIA Projections of Renewable Energy Costs, presented in "Forum on the Economic Impact Analysis of NJ's Proposed 20% RPS" by Chris Namovicz of the USDOE EIA (Energy Information Administration), dated February 22, 2005, and available as http://www.eia.doe.gov/oiaf/pdf/rec.pdf, a wind power average cost of

6000	dollars/kW is provided for a 25 kW Commercial system, or
8200	dollars/kW for a 2 kW Residential system, with

"Large potential for cost reduction".

The 2003 paper "Lifecycle Cost Assessment of Fielded Photovoltaic Systems", by Larry M. Moore, Leonard A. Malczynski, John W. Strachan, and Harold N. Post of Sandia National Laboratories (available as http://www.nrel.gov/ncpv_prm/pdfs/33586050.pdf) includes the estimate, based on review of existing utility-scale installations, that annual O&M costs are about 0.40% of total capital costs. This would suggest current O&M costs on the order of $20-24/kW-yr.

The older (1997) US DOE document OVERVIEW OF PHOTOVOLTAIC TECHNOLOGIES (available as http://www.eere.energy.gov/ba/pdfs/pv_overview.pdf) suggests that even early solar PV systems had O&M costs of under $ 0.005 per kWh, which under NJ conditions would be less than $ 6.00 per kW-yr

2.13 Historical Population Estimates and Projections Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules
BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency
"Proposed Readoption With Amendments: N.J.A.C. 14:4
Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"
(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by: David Von Hippel Date last Modified: 12/15/2005

HISTORICAL POPULATION ESTIMATES AND PROJECTIONS FOR NEW JERSEY

Following Population Data from
http://www.census.gov/popest/archives/2000s/vintage_2001/CO-EST2001-12/CO-EST2001-12-34.html

Time Series of New Jersey Intercensal Population Estimates by County: April 1, 1990 to April 1, 2000

County	State	April 1, 1990 Population Estimates Base	July 1, 1990 Estimate	July 1, 1991 Estimate	July 1, 1992 Estimate	July 1, 1993 Estimate	July 1, 1994 Estimate	July 1, 1995 Estimate	July 1, 1996 Estimate	July 1, 1997 Estimate	July 1, 1998 Estimate	July 1, 1999 Estimate	April 1, 2000 Census	Average Annual Growth Rate, 1990 to 2000
	New Jersey	7,747,750	7,762,963	7,814,676	7,880,508	7,948,915	8,014,306	8,083,242	8,149,596	8,218,808	8,287,418	8,359,592	8,414,350	0.83%
Atlantic	New Jersey	224,327	225,431	228,763	231,612	234,288	236,589	239,212	242,152	244,771	247,863	250,432	252,552	
Bergen	New Jersey	825,380	826,129	829,599	837,520	843,198	848,392	855,242	862,048	868,897	875,050	880,225	884,118	
Burlington	New Jersey	395,066	396,180	399,888	400,773	402,717	407,060	411,890	415,266	417,226	418,250	420,542	423,394	
Camden	New Jersey	502,824	503,524	505,772	507,326	508,094	508,479	509,582	508,926	509,219	509,451	509,410	508,932	
Cape May	New Jersey	95,089	95,368	97,006	98,121	98,504	99,561	100,405	100,861	101,380	101,883	102,135	102,326	
Cumberland	New Jersey	138,053	138,366	140,503	141,921	143,334	144,544	144,829	145,430	145,811	145,924	146,293	146,438	
Essex	New Jersey	777,964	778,564	779,031	782,855	785,960	784,460	783,308	782,503	782,774	785,348	789,678	793,633	
Gloucester	New Jersey	230,082	231,134	234,449	236,553	238,805	242,161	243,752	245,390	247,674	249,996	252,536	254,673	
Hudson	New Jersey	553,099	554,289	558,839	564,276	568,517	572,720	578,889	585,056	592,812	598,238	603,993	608,975	
Hunterdon	New Jersey	107,852	108,128	108,668	110,750	112,395	113,522	114,049	116,203	117,564	119,031	120,689	121,989	
Mercer	New Jersey	325,759	326,477	328,694	330,674	333,292	335,229	337,476	339,146	340,755	344,013	348,435	350,761	
Middlesex	New Jersey	671,712	673,469	679,273	686,901	693,445	701,090	709,223	716,673	725,103	733,257	742,213	750,162	
Monmouth	New Jersey	553,192	554,210	558,418	565,469	571,129	577,069	583,899	589,646	596,520	603,050	610,811	615,301	
Morris	New Jersey	421,330	421,803	423,470	427,343	432,906	439,533	445,308	450,816	456,961	462,263	467,678	470,212	
Ocean	New Jersey	433,203	434,623	439,530	444,676	452,916	461,152	471,243	480,608	488,519	497,395	504,007	510,916	
Passaic	New Jersey	470,872	470,951	470,946	472,484	475,951	478,164	479,717	481,892	484,283	485,760	488,131	489,049	
Salem	New Jersey	65,294	65,383	65,193	65,143	65,035	64,691	65,095	65,397	65,242	64,899	64,483	64,285	
Somerset	New Jersey	240,222	241,464	245,810	250,680	256,834	262,243	267,163	272,872	280,195	287,065	293,770	297,490	
Sussex	New Jersey	130,936	131,346	132,384	133,953	135,646	137,021	138,574	139,562	140,441	141,509	142,750	144,166	
Union	New Jersey	493,819	494,140	495,646	497,731	501,333	504,864	507,430	510,992	513,865	517,715	520,341	522,541	
Warren	New Jersey	91,675	91,984	92,794	93,747	94,616	95,762	96,956	98,157	98,796	99,458	101,040	102,437	

Suggested Citation:
Table CO-EST2001-12-34 - Time Series of New Jersey Intercensal Population Estimates by County: April 1, 1990 to April 1, 2000
Source: Population Division, U.S. Census Bureau
Release Date: April 17, 2002

Following from workbook "stproj.xls", downloaded from New Jersey Department of Labor and Workforce Development website, http://www.wnjpin.net/OneStopCareerCenter/LaborMarketInformation/lmi03/index.html.

Table 1. Projections of Total Population by Projection Model

New Jersey: 1990 to 2025

Proejction	Census on April 1,		Estimates	Projections to July 1,				
Model	1990	2000	2002	2007	2012	2015	2020	2025
Economic-Demographic	7,730,188	8,414,350	8,575,252	8,943,200	9,269,300	9,470,200	9,824,500	10,250,100
Zero Migration	7,730,188	8,414,350	8,575,252	8,782,900	8,913,800	8,972,600	9,073,100	9,168,100
Historical Migration	7,730,188	8,414,350	8,575,252	8,979,900	9,379,900	9,631,900	10,073,400	10,760,300
Linear Regression	7,730,188	8,414,350	8,575,252	8,979,500	9,311,600	9,510,800	9,842,900	10,174,900

Note: The Economic-Demographic Model is designated "preferred" due to its greater scope of input information and its consistency with the year 2012 employment projections prepared by the New Jersey Department of Labor. Projections by age, race, sex and Hispanic origin presented in subsequent tables were based on the Economic-Demographic model.

Calculations based on US Census Population Projections Below

	Average Annual Growth Rates			
Region/State	2005-2010	2010-2015	2015-2020	2005-2020
Middle Atlantic	0.30%	0.23%	0.15%	0.23%
New York	0.19%	0.11%	0.03%	0.11%
New Jersey	0.62%	0.52%	0.44%	0.53%
Pennsylvania	0.25%	0.20%	0.12%	0.19%

Following are from workbook "PressTab6.xls", downloaded from:

http://www.census.gov/population/www/projections/projectionsagesex.html. (Data for selected states/regions only are shown)

Table 6: Interim Projections: Total Population for Regions, Divisions, and States: 2000 to 2030

Region, division, and state	Census April 1, 2000	Projections July 1, 2005	Projections July 1, 2010	Projections July 1, 2015	Projections July 1, 2020	Projections July 1, 2025	Projections July 1, 2030
United States	**281,421,906**	**295,507,134**	**308,935,581**	**322,365,787**	**335,804,546**	**349,439,199**	**363,584,435**
Northeast	**53,594,378**	**54,802,949**	**55,785,179**	**56,565,669**	**57,135,437**	**57,470,313**	**57,671,068**
New England	13,922,517	14,372,985	14,738,789	15,052,263	15,309,528	15,491,545	15,623,015
Maine	1,274,923	1,318,557	1,357,134	1,388,878	1,408,665	1,414,402	1,411,097
New Hampshire	1,235,786	1,314,821	1,385,560	1,456,679	1,524,751	1,586,348	1,646,471
Vermont	608,827	630,979	652,512	673,169	690,686	703,288	711,867
Massachusetts	6,349,097	6,518,868	6,649,441	6,758,580	6,855,546	6,938,636	7,012,009
Rhode Island	1,048,319	1,086,575	1,116,652	1,139,543	1,154,230	1,157,855	1,152,941
Connecticut	3,405,565	3,503,185	3,577,490	3,635,414	3,675,650	3,691,016	3,688,630
Middle Atlantic	39,671,861	40,429,964	41,046,390	41,513,406	41,825,909	41,978,768	42,048,053
New York	18,976,457	19,258,082	19,443,672	19,546,699	19,576,920	19,540,179	19,477,429
New Jersey	8,414,350	8,745,279	9,018,231	9,255,769	9,461,635	9,636,644	9,802,440
Pennsylvania	12,281,054	12,426,603	12,584,487	12,710,938	12,787,354	12,801,945	12,768,184
Midwest	**64,392,776**	**66,005,033**	**67,391,433**	**68,569,609**	**69,455,175**	**70,041,457**	**70,497,298**
South	**100,236,820**	**106,916,476**	**113,583,614**	**120,440,208**	**127,570,819**	**135,160,886**	**143,269,337**
West	**63,197,932**	**67,782,676**	**72,175,355**	**76,790,301**	**81,643,115**	**86,766,543**	**92,146,732**

U.S. Census Bureau, Population Division, Interim State Population Projections, 2005.
Internet Release Date: April 21, 2005

2.14 Annual Energy Outlook Energy Use Forecasts for Mid-Atlantic Region Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules
BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency
"Proposed Readoption With Amendments: N.J.A.C. 14:4
Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"
(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

ANNUAL ENERGY OUTLOOK ENERGY USE FORECASTS FOR MID-ATLANTIC REGION

Table below downloaded from http://www.eia.doe.gov/oiaf/aeo/supplement/supref.html as suptab_xls.

Table 2. Energy Consumption by Sector and Source
(Quadrillion Btu per Year, Unless Otherwise Noted)
Middle Atlantic

Data in this source table, for the years 2002 through 2025, and from the sources cited below, are not shown, but are available from the sources indicated and on request.

Data extracted from Table 116. Indicators of Macroeconomic Activity, from the AEO2005 Supplement, downloaded as supplement_tables(2005).pdf: Nonfarm Employment by Census Division, Middle Atlantic Region, for the years 2002 through 2025.

Data extracted from page 297 to 300 of AEO 2005 Supplement Tables volume (supplement_tables(2005).pdf), Table 62. Electric Power Projections for Electricity Market Module Region Mid-Atlantic Area Council: End-user electricity prices, electricity prices by Service Category electricity demand, generation for customers, fuel prices, electricity generating capacity, and generation by fuel type, for the years 2002 through 2025.

Based on data from this source, a table of intermediate results as follows was calculated (only the first few years are shown here due to the width of the table).

	2002	2003	2004	2005	2006	2007	2008
Implied System Average Capacity Factor	45.1%	43.9%	44.9%	45.0%	45.6%	46.5%	47.6%
Implied System Average CO_2 (tons/MWh)	0.60	0.59	0.56	0.57	0.57	0.57	0.58
Implied System Average SO_2 (tons/MWh)	0.0051	0.0046	0.0043	0.0046	0.0046	0.0044	0.0044
Implied System Average NO_x (tons/MWh)	0.00095	0.00090	0.00077	0.00076	0.00078	0.00080	0.00078
Implied System Average Net Energy for Load divided by Sales	1.013	1.038	1.066	1.066	1.065	1.064	1.064
Implied Fraction of Net Energy for Load from Nuclear Power	38.34%	38.81%	37.42%	36.95%	36.24%	35.75%	35.23%

Table on 2002-2005 "New Jersey Natural Gas Price Sold to Electric Power Consumers (Dollars per Thousand Cubic Feet)" from http://tonto.eia.doe.gov/dnav/ng/hist/n3045nj3m.htm.

2.15 Employment Projections for New Jersey Worksheet

Estimate of Rate Impacts of Proposed New Jersey Renewable Portfolio Standard (RPS) Rules

BOARD OF PUBLIC UTILITIES, Energy Competition Standards, Renewable Energy and Energy Efficiency

"Proposed Readoption With Amendments: N.J.A.C. 14:4
Proposed New Rules: N.J.A.C. 14:4-1, 2.3, 2.4, 2.5, 2.7, and 5; and 14:8-1"
(As described in BPU proposal in the New Jersey Register, Monday, October 17, 2005, (Cite 37 N.J.R. 3911))

Prepared by:	David Von Hippel	Date last Modified:	12/15/2005

EMPLOYMENT PROJECTIONS FOR NEW JERSEY

Downloaded from http://www.wnjpin.net/OneStopCareerCenter/LaborMarketInformation/lmi04/state/index.html#ind as file "majorind.xls".

State of New Jersey
Employment Projections By Major Industry Division, 2002 - 2012

	2002		2012		Change: 2002-2012		
						Percent	
NAICS Industry Title	Number	Pct.	Number	Pct.	Number	Total	Annual
Total All Industries	**3,983,900**	**100.0**	**4,465,000**	**100.0**	**478,100**	**12.0**	**1.1**
Goods-Producing	**531,600**	**13.3**	**506,100**	**11.3**	**(25,500)**	**-4.8**	**-0.5**
Mining	1,600	0.0	1,500	0.0	-	0.0	-0.6
Construction	162,600	4.1	186,700	4.2	24,100	14.8	1.4
Manufacturing	367,500	9.2	317,900	7.1	(49,600)	-13.5	-1.5
Service-producing	**3,452,300**	**86.7**	**3,959,100**	**88.7**	**506,800**	**14.7**	**1.4**
Trade	701,000	17.6	781,300	17.5	80,300	11.5	1.1
Wholesale trade	236,500	5.9	260,400	5.8	23,900	10.1	1.0
Retail trade	464,500	11.7	520,900	11.7	56,400	12.1	1.1
Utilities	15,800	0.4	14,500	0.3	(1,300)	-8.2	-0.9
Transportation and warehousing	164,600	4.1	181,300	4.1	16,700	10.1	1.0
Information	113,200	2.8	116,300	2.6	3,100	2.7	0.3
Financial activities	276,700	6.9	302,000	6.8	25,300	9.1	0.9
Professional and business services	581,200	14.6	725,100	16.2	143,900	24.8	2.2
Educational services	82,300	2.1	101,500	2.3	19,200	23.4	2.1
Health care and social assistance	444,900	11.2	574,300	12.9	129,400	29.1	2.5
Arts, entertainment, and recreation	46,100	1.2	56,600	1.3	10,500	22.7	2.0
Accommodation and food services	264,900	6.6	293,200	6.6	28,300	10.7	1.0
Other Services (except government)	148,300	3.7	175,100	3.9	26,800	18.1	1.6
Government	613,500	15.4	637,900	14.3	24,400	4.0	0.4

* The industry employment estimates, projections and projected employment change, which are based on nonfarm payroll employment, will not match the occupational data which also include self-employed and unpaid family workers.

NOTE: Totals may not add due to rounding. Numbers are rounded to one hundred.
Employment and percentage changes are based on unrounded data.

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