

Possible Assumption Updates for "Final" NJ Energy Master Plan Modeling Runs

Assumption in 03/03/2008 Results	Update in Next Modeling Runs	Reason
BAU		
Renewable Energy Assumptions		
- Off-shore wind 300 MW	Off-shore wind 350 MW	RFP released with this parameter
- Off-shore wind located at Red Bank substation	Off the cost of Atlantic City	RFP released with this parameter
- On-Shore Wind: 100 MW	On-Shore Wind: 100 MW	
- Biomass: 450 MW	Biomass: 450 MW	
- Solar: 1,850 MW	Solar: 1,850 MW	
Global Insight Natural Gas Prices (Henry Hub)		
- 2020 Base Case NG = \$8.76/million Btu (based on 02/07 Global Insight)	-2020 Base Case NG = \$9.66/million Btubarrel (based on 06/08 Global Insight) -Peak NG Price: \$11.36/million Btu in 1st Quarter 2011	Capture some of the last year's fossil fuel price volatility
Global Insight Oil Prices (West Texas Intermediate)		
- 2020 Base Case Oil = \$60.08/barrel (based on 02/07 Global Insight)	-2020 Base Case Oil = \$81.00/barrel (based on 06/08 Global Insight) -Peak Oil Price: \$131.30/Barrel in 3rd Quarter 2008 -2020 Pessimistic Case Oil = \$94.00/barrel (based on 06/08 Global Insight) -Peak Oil Price: \$145.60/Barrel in 3rd Quarter 2008	Capture some of the last year's fossil fuel price volatility
Coal and Fuel Oil Prices from DAYZER		
- 2020 Coal = 2.49 \$/MMBtu (based on 09/07 DAYZER, Average of coal prices for New Jersey Generators)	- 2020 Coal = 3.33 \$/MMBtu (based on 05/08 DAYZER, Average of coal prices for New Jersey Generators)	A new version of DAYZER has been developed.
- 2020 Fuel Oil (based on 09/07 DAYZER, Average of fuel oil prices for New Jersey Generators) -FO2: 18.49 \$/MMBtu -FO6: 8.97 \$/MMBtu	- 2020 Fuel Oil (based on 05/08 DAYZER, Average of fuel oil prices for NJ Generators) -FO2: 19.18 \$/MMBtu -FO6: 9.54 \$/MMBtu	
Global Macroeconomic Indicators (GDP, CPI, Population, etc.)		
- 2020 US GDP = 25,228 Billion \$ (Based on 02/07 Global Insight)	- 2020 US GDP = 24,199 Billion \$ (Based on 06/08 Global Insight)	Capture some of the last year's economic volatility.
- 2020 US CPI = 2.63 (Based on 02/07 Global Insight)	- 2020 US CPI = 2.00 (Based on 06/08 Global Insight)	
- 2020 US Population = 337.2 Million (Based on 02/07 Global Insight)	- 2020 US Population = 337.7 Million (Based on 02/08 Global Insight)	

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Emission Permit Prices		
- 2020 NOx Permit Price = \$2,600/ton (based on 09/07 DAYZER)	- NOx Permit Price = \$2,600/ton (based on 5/08 DAYZER)	A new version of DAYZER has been developed.
- 2020 SOx Permit Prices = \$700/ton (based on 09/07 DAYZER)	- SOx Permit Price = \$700/ton (based on 5/08 DAYZER)	
- 2020 CO2 Permit Prices = \$5.67/ton (Based on RGGI Modeling)	Dependent on national legislation and initial RGGI Auction.	National legislation has been proposed.
Bergen situation (pending)		
- Bergen 2 included in model	Dependent on the result of the decision to connect Bergen 2 directly to the NYISO. May "retire" Bergen 2 and reduce the firm transmission withdrawal by 550 MW.	Bergen 2 may "disconnect" from the PJM grid and strictly supply power to New York City.
- Firm withdrawal of an additional 670 MW from northern NJ into NYC	- Firm withdrawal of an additional 670 MW from northern NJ into NYC	This project is progressing.
Generation capital costs		
- All Generation Capital Costs	-	Recent run-ups in construction costs due to the increased price of steel and concrete.
- Off-shore wind capital costs assumed to be between 2,000 - 2,800 \$/kW	The cost of the accepted off-shore wind proposal.	Proposals for the off-shore wind RFP and Global Insight Study have more recent cost estimates.
Generation expansion plan		
- In-State Generation Expansion (In MW, values are cumulative):	-	Load forecast, plant proposals, and the construction of new units has changed since the original plan was developed.
2010: 603	-	
2015: 1,745	-	
2020: 4,570	-	
Generation Retirements		
- In-State Retirements (In MW, values are cumulative with 2004 as the base year):		Some retirements have been deferred.
2006: 1,122	2006: 1,122	
2010: 1,575	2010: 1,575	
2015: 1,958	2015: 1,958	
2020: 2,881	2020: 2,428	

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Load		
- In 2020, NJ Peak Load is approximately 25,000 MW and total energy consumption is approximately 100,000 GWh	-	Load forecasts have been updated since the original assumptions were derived by the BPU.
Biomass assumptions		
- No cost assumptions have been developed – assume that biomass is already operational and economical	-	
Transmission Line Additions		
- Susquehanna to Roseland Line Not Included	-	Lines are in planning stages with proposed functionality by 2012 and 2013.
- Mid-Atlantic Power Pathway Line Not Included	-	
Space Heat vs Non Space Heat Ratios		
-Residential Natural Gas: 0.7	-	
-Residential Oil: 1	-	
-Commercial Natural Gas: 0.55	-	
-Commercial Oil: 1	-	
-Industrial Natural Gas: 0.126	-	
-Industrial Oil: 0.1	-	

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Alternative		
Renewable Energy Assumptions		
- Off-shore wind 1000 MW	Off-shore wind 3000 MW	To maintain renewable resource capacities under ALT scenario same as BAU as suggested by stakeholders. Additional off-shore wind capacity will provide 6,000 GWh.
- Off-shore wind located at Red Bank substation	Located off the coast of Atlantic City	RFP released with this parameter
- On-Shore Wind: 200 MW	On-Shore Wind: 200 MW	
- Biomass: 900 MW	Biomass: 900 MW	
- Solar: 1,251 MW	Solar: 1,251 MW	
CHP Assumptions (1500 MW):		
- 20% or 300 MW is metered	- 100% or 1,500 MW is behind-the-meter	CHP may not be viable for the residential sector, so that value becomes zero.
- 80% or 1200 MW is behind-the-meter		
- Residential sector gets 10% or 120 MW	- 0% to Residential	
- Commercial sector gets 67.5% or 810 MW	- 80% or 1200 MW to Commercial Sector	
- Industrial sector gets 22.5% or 270 MW	- 20% or 300 MW to Industrial Sector	There are many CHP technologies that utilize natural gas and oil.
- 100% utilize natural gas as its primary fuel	- 92% utilize natural gas as its fuel	
	- 8% utilize oil as its fuel	
- Heat Rate = 10,000 Btu/kWh	-	
- Heating Requirement Displaced: 33.3 Tbtu	-	
Biomass assumptions		
- Cost assumed to be \$2,000/kW	-	
- Include transportation assumptions (paying to transport garbage from NYC to produce electricity)	-	
Demand Response Assumptions		
- 2,200 MW of DR are achieved during the peak hour	- 2,200 MW of DR are achieved during the peak hour	

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SBC Charges		
TOTAL SBC: 2008-2010 = normal SBC charge; 2010-2020 = \$89 million	-	
- Comfort Partners = \$40 million	-	
- CORE Rebates = \$10 million	-	
- EDA/Renewable Energy = \$20 million	-	
- Low-Income Energy Efficiency = \$12 million	-	
- Administration = \$7 million	-	
- Electricity: 2008-2010 = \$0.00405/kWh, 49.8% for CEP programs	-	
- Electricity: 2010-2020 = 50.2% of previous rate + (\$61 million/total consumption)	-	
- Assume Electricity is approximately 69% of total CEP funds from the SBC	-	
- Natural gas: 2008-2010 = \$0.0468/Therm or \$0.483/cubic foot, 72% for CEP programs	-	
- Natural gas: 2010-2020 = 28% of previous + (\$27.6 million/total consumption)	-	
- Assume Natural Gas is approximately 31% of total CEP funds from the SBC	-	
Total potential energy efficiency savings		
- Building codes modeled (GWh): 2010 = 211; 2015 = 1,263; 2020 = 2,316	-	
- Appliance standards (2005 + future) modeled GWh: 2010 = 0; 2015 = 1,146; 2020 = 2,550	- Appliance standards (2005 + future) modeled GWh: 2020 = 1,850	
- Existing buildings (energy audits) modeled GWh: 2010 = 1,012; 2015 = 6,073; 2020 = 11,134	- Existing buildings (energy audits) modeled GWh: 2020 = 11,834	
- Consumer incentive program (energy efficient appliance incentives) modeled GWh: 2010 = 364; 2015 = 2,182; 2020 = 4,000	-	

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Sector and timeframe breakdowns for energy efficiency measures		
Policy changes related to energy efficiency measures	-	Energy Act of 2007 impact on the timing of appliance standards.
Energy Efficiency cost assumptions		
<u>Appliance standards</u>currently in R/ECON as a levelized cost savings on the “average cost of an appliance”	-	
- 2010 = \$0; 2015 = 26% reduction, \$330/average appliance; 2020 = 27% reduction, \$369/average appliance	-	
<u>Building codes</u>currently in R/ECON as a levelized cost savings on the “average cost of a home” and the assumptions for commercial and industrial are derived from the residential assumption.	-	
RESIDENTIAL - 2010 = 1% reduction, \$1,174/average home price; 2015 = 4% reduction, \$1,364/average home price; 2020 = 7% reduction, \$1,597/average home price	-	
COMMERCIAL & INDUSTRIAL - 2010 = 1% reduction, \$1.07/average price per sq. ft.; 2015 = 4% reduction, \$7.08/average price per sq. ft.; 2020 = 7% reduction, \$15.63/average price per sq. ft.	-	
<u>Energy efficiency in existing buildings + Appliance Replacement</u> ...currently based on conservative estimate of historical NJ CEP cost per unit saved	-	
- Electricity = \$0.04/kWh	-	
- Natural gas = \$5.16/TCF	-	
- Fuel oil = \$0.36/gallon (using natural gas assumption above)	-	

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Alternative - A		
Renewable Energy Assumptions		
-	Off-shore wind 3,009 MW, Located off the coast of Atlantic City	
-	On-Shore Wind: 200 MW	
-	Biomass: 900 MW	
-	Solar: 1,850 MW	