

Linda Wetzel

From: ee-bounces@njcleanenergy.com on behalf of Linda Wetzel
<lwetzel@appliedenergygroup.com>
Sent: Thursday, June 07, 2012 9:24 AM
To: ee@njcleanenergy.com
Subject: Request for Comments: CEEEP DRAFT Avoided Costs
Attachments: DRAFT Avoided Cost Memo 6-5-12.pdf; ATT1815201.txt

This email is being sent on behalf of Jaci Trzaska:

Dear EE Committee Members,

CEEEP has developed a draft memo outlining our avoided cost assumptions for Wholesale/Retail natural gas and electricity, capacity, and CO2. Once finalized, these avoided costs are used in CEEEP's cost benefit model, and will also be used by the utilities in their RGGI filings and by EnerNOC for the Market Potential study. Please submit any comments that you have on the draft document by June 20 to jaclyn.trzaska@rutgers.edu. Any comments will also be forwarded to Linda Wetzel to be posted on the NJCEP website.

Thanks
Jaci Trzaska

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DRAFT Energy Efficiency Cost-Benefit Analysis Avoided Cost Assumptions

June 5, 2012

The key avoided cost assumptions for the energy efficiency cost-benefit analysis and the data sources and processes for determining these components are discussed below. The avoided costs presented here are assumptions and should not be considered forecasts or projections into the future. Additionally, these assumptions should be used for Energy Efficiency cost-benefit analysis only. CEEEP is circulating these avoided cost assumptions to stakeholders for review and comment and would appreciate any feedback by June 20, 2012.

Retail Electricity Prices: Historic 2011 U.S. Energy Information Administration (EIA) New Jersey retail electricity prices were escalated using an annual growth rate derived from the EIA Annual Energy Outlook 2012 Early Release for the Mid-Atlantic region. On average, the annual growth rate was about 1.67%. The NJ Clean Energy Programs do not distinguish between commercial and industrial sectors, therefore the commercial and industrial prices were averaged based on historic 2011 New Jersey retail electricity sales. The 7% Sales and Use Tax and Societal Benefits Charge¹ were also included.

Wholesale Electricity Prices: Historic 2011 New Jersey wholesale electric prices from PJM were escalated based on the annual percent change in the wholesale natural gas price forecast (described below). The annual percent change was, on average, about 4.5%. The seasonal peak and off-peak factors were derived using historic 2011 PJM LMP data. Summer is defined as May through September, winter is defined as October through April, on-peak is defined as Monday through Friday 8am-8pm, and off-peak is defined as Monday-Friday 8pm-8am and weekends and holidays.

Table 1: Retail and Wholesale Electricity

	Retail (\$/kWh)		Wholesale (\$/MWh)				
	Residential	Commercial & Industrial	Average Price	Summer Peak	Summer Off-Peak	Non-Summer Peak	Non-Summer Off-Peak
2011	\$ 0.18	\$ 0.15	\$47.39	\$64.09	\$37.03	\$49.40	\$40.80
2012	\$ 0.18	\$ 0.14	\$43.62	\$58.99	\$34.08	\$45.47	\$37.55
2013	\$ 0.17	\$ 0.13	\$50.45	\$68.24	\$39.42	\$52.59	\$43.44
2014	\$ 0.18	\$ 0.13	\$51.87	\$70.15	\$40.53	\$54.07	\$44.66
2015	\$ 0.18	\$ 0.13	\$54.34	\$73.50	\$42.46	\$56.65	\$46.79
2016	\$ 0.18	\$ 0.14	\$55.64	\$75.25	\$43.47	\$58.00	\$47.90
2017	\$ 0.19	\$ 0.14	\$58.35	\$78.92	\$45.59	\$60.83	\$50.24
2018	\$ 0.19	\$ 0.14	\$61.77	\$83.54	\$48.26	\$64.39	\$53.18
2019	\$ 0.19	\$ 0.14	\$64.83	\$87.69	\$50.66	\$67.59	\$55.82
2020	\$ 0.20	\$ 0.15	\$67.19	\$90.87	\$52.50	\$70.04	\$57.85
2021	\$ 0.20	\$ 0.15	\$71.43	\$96.61	\$55.81	\$74.47	\$61.50
2022	\$ 0.21	\$ 0.16	\$77.09	\$104.27	\$60.24	\$80.36	\$66.37
2023	\$ 0.21	\$ 0.16	\$81.57	\$110.32	\$63.74	\$85.03	\$70.23
2024	\$ 0.21	\$ 0.16	\$85.58	\$115.75	\$66.87	\$89.21	\$73.68
2025	\$ 0.22	\$ 0.16	\$89.12	\$120.53	\$69.63	\$92.90	\$76.73
2026	\$ 0.23	\$ 0.16	\$94.54	\$127.86	\$73.87	\$98.55	\$81.40
2027	\$ 0.23	\$ 0.17	\$99.49	\$134.56	\$77.74	\$103.71	\$85.66
2028	\$ 0.24	\$ 0.17	\$101.49	\$137.27	\$79.30	\$105.80	\$87.38

¹ The Societal Benefits Charge for electric customers was assumed to be 3.6% for residential and 4.8% for C&I.

2029	\$ 0.24	\$ 0.17	\$102.67	\$138.86	\$80.22	\$107.03	\$88.40
2030	\$ 0.24	\$ 0.17	\$105.86	\$143.17	\$82.71	\$110.35	\$91.14

Retail Natural Gas Prices: Historic New Jersey retail natural gas prices were escalated using an annual growth rate derived from the EIA Annual Energy Outlook 2012 Early Release for the Mid-Atlantic region. On average, the annual growth rate was about 2.9%. As of June 4, 2012, EIA has not updated Residential and Industrial retail natural gas prices for 2011, so the 2010 price is used. The 2011 Commercial retail natural gas price was available from EIA and is used in this analysis. The 7% Sales and Use Tax and Societal Benefits Charge² were also included.

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

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

	<i>Retail Prices</i>			<i>Henry Hub Wholesale Prices</i>		
	Residential	Commercial	Industrial	Average Price	Summer	Winter
2011	\$13.87	\$10.40	\$10.49	\$4.02	\$3.89	\$4.18
2012	\$14.05	\$10.62	\$9.89	\$3.70	\$3.58	\$3.84
2013	\$14.14	\$10.64	\$10.28	\$4.28	\$4.14	\$4.45
2014	\$13.96	\$10.56	\$10.56	\$4.40	\$4.25	\$4.57
2015	\$14.40	\$10.87	\$10.93	\$4.61	\$4.46	\$4.79
2016	\$14.74	\$11.08	\$11.13	\$4.72	\$4.56	\$4.90
2017	\$15.16	\$11.38	\$11.45	\$4.95	\$4.79	\$5.14
2018	\$15.69	\$11.76	\$11.90	\$5.24	\$5.07	\$5.44
2019	\$16.20	\$12.15	\$12.34	\$5.50	\$5.32	\$5.71
2020	\$16.70	\$12.51	\$12.74	\$5.70	\$5.51	\$5.92
2021	\$17.35	\$13.01	\$13.34	\$6.06	\$5.86	\$6.30
2022	\$18.09	\$13.60	\$14.06	\$6.54	\$6.32	\$6.79
2023	\$18.72	\$14.07	\$14.63	\$6.92	\$6.69	\$7.19
2024	\$19.29	\$14.49	\$15.10	\$7.26	\$7.02	\$7.54
2025	\$19.81	\$14.84	\$15.49	\$7.56	\$7.31	\$7.85
2026	\$20.49	\$15.37	\$16.14	\$8.02	\$7.75	\$8.33
2027	\$21.04	\$15.75	\$16.60	\$8.44	\$8.16	\$8.77
2028	\$21.47	\$16.02	\$16.88	\$8.61	\$8.32	\$8.94
2029	\$21.90	\$16.29	\$17.15	\$8.71	\$8.42	\$9.05
2030	\$22.54	\$16.75	\$17.72	\$8.98	\$8.68	\$9.33

Capacity Prices: New Jersey Utility PJM Reliability Pricing Model (RPM) prices for the 4-utilities (AE, JCP&L, PSE&G and RECO) for 2010 to 2014 were weighted by each utility's historic 2011 peak load³ to estimate an average New Jersey capacity price. From 2015 to 2030, the capacity prices were escalated based on the EIA projected annual change in U.S. Consumer Price Index (CPI), which is also reported.⁴

² The Societal Benefits Charge for natural gas customers was assumed to be 4.1% for residential and 5.0% for C&I.

³ PJM Reliability Pricing Model User Information. Base Residual Auction Results www.pjm.com/markets-and-operations/rpm/rpm-auction-user-info.aspx#Item01; PJM. Historic Load Data.

⁴ U.S. Department of Labor [ftp://ftp.bls.gov/pub/special.requests/cpi/cpiat.txt](http://ftp.bls.gov/pub/special.requests/cpi/cpiat.txt); EIA Annual Energy Outlook 2010.

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

	\$/kW-year	CPI
2011	\$49.87	2.25
2012	\$49.11	2.28
2013	\$75.38	2.31
2014	\$72.49	2.36
2015	\$74.02	2.41
2016	\$75.86	2.47
2017	\$77.40	2.52
2018	\$79.24	2.58
2019	\$81.09	2.64
2020	\$82.93	2.70
2021	\$84.77	2.76
2022	\$86.61	2.82
2023	\$88.46	2.88
2024	\$90.61	2.95
2025	\$92.76	3.02
2026	\$94.91	3.09
2027	\$97.06	3.16
2028	\$98.90	3.22
2029	\$101.36	3.30
2030	\$103.51	3.37

Discount Rate: Discount rates are used to convert future economic values into present day dollars. A nominal discount rate of 8% is used.⁵

Avoided Electric and Natural Gas Losses: Avoided electric transmission losses are assumed to be 9.1%⁶ and avoided natural gas losses are assumed to be 1.4%⁷ based on data calculations from EnerNOC Utility Solutions⁸. The unreferenced New Jersey Protocols assume 11% and 1% respectively. The updated avoided loss estimates have been submitted to Applied Energy Group to update the New Jersey Protocols in the future.

Environmental Externality Benefits: Avoided emission savings are calculated by multiplying the emission permit prices by the energy savings. In the cost benefit analysis, CEEEP assumes that the emission allowance prices for SO₂ and NO_x are already accounted for in energy prices. CEEEP is currently researching reputable sources of SO₂ and NO_x allowance price projections.

- **Forecasted CO₂ Social Cost:** Values for the Social Cost of Carbon were taken from the Interagency Working Group on Social Cost of Carbon⁹. Values were reported in 2007\$/metric ton, and were converted to nominal dollars using the EIA projected U.S. CPI (Table 3). The study presented three values for the social cost of carbon, using a discount rate of 2.5%, 3%, and 5%. The scenario using a discount rate of 3% is presented here.

⁵ Levitan & Associates, Inc. Long-term Capacity Agreement Pilot Program (March 2011).

⁶ "New Jersey Supply and Disposition of Electricity" <http://www.eia.gov/electricity/state/newjersey>

⁷ Energy Information Administration natural Gas Transmission:

<http://www.eia.gov/pub/itg/ghgp9.htm>

⁸ EnerNOC Utility Solutions performed the calculations as part of the 2012 Energy Efficiency Market Potential Study for the New Jersey Clean Energy Program.

⁹ Interagency Working Group on Social Cost of Carbon, "Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866", United States Government, February 2010.

Table 4: Social Cost of Carbon (Nominal \$/ton)

	CO2
2011	\$23.77
2012	\$24.63
2013	\$25.40
2014	\$26.52
2015	\$27.66
2016	\$28.95
2017	\$30.14
2018	\$31.48
2019	\$32.85
2020	\$34.25
2021	\$35.94
2022	\$37.54
2023	\$39.31
2024	\$41.12
2025	\$43.11
2026	\$45.01
2027	\$47.09
2028	\$48.92
2029	\$51.09
2030	\$53.31
2031	\$55.41
2032	\$57.73
2033	\$60.08
2034	\$62.49
2035	\$64.94

- **Historical Emissions Permit Prices:** Historical emission permit prices for SO₂ and NO_x were taken from EIA¹⁰. All emission permits are in \$/ton.

Table 5: Historical SO₂ and NO_x Emissions Allowance Prices (Nominal \$/ton)

	SO ₂	NO _x
2007	\$534.43	\$776.04
2008	\$278.50	\$807.33
2009	\$81.11	\$304.33
2010	\$16.52	\$44.66
2011	\$2.12	\$15.89

¹⁰ <http://www.eia.gov/todayinenergy/detail.cfm?id=4830>