Table 1.8 Benefits and Costs of Least-Cost Efficiency and Renewable Achievements Toward 2012 Greenhouse Gas Target (Statewide Low Avoided Costs)

			Total Resource			
	Annual GWh	Lifetime net cost per kWh saved	Benefits	Costs	Net Benefits	BCR
Energy Efficiency Savings						
Residential	3,105	$ (0.0224)	1,281,359,428	(26,107,167)	1,307,466,595	-49.08
Commercial	12,454	$ 0.0160	4,068,573,146	2,555,343,290	1,513,229,856	1.59
Industrial	538	$ (0.0164)	139,598,928	(3,325,355)	142,924,283	-41.98
Total Efficiency	16,096	$ 0.0084	5,489,531,502	2,525,910,768	2,963,620,734	2.17
Renewable Supply						
Biomass	2,520	$ (0.0122)	728,546,676	(162,757,236)	891,303,911	-4.48
Fuel Cells	-	NA	-	-	-	
Hydropower	859	$ 0.0075	440,421,346	135,787,348	304,633,997	3.24
Landfill Gas	-	NA	-	-	-	
Municipal Solid Waste	633	$ (0.0093)	329,616,958	(46,022,347)	375,639,305	-7.16
Photovoltaics	-	NA	-	-	-	
Solar Thermal	7	$ 0.0039	2,569,889	352,112	2,217,777	7.30
Windpower	-	NA	-	-	-	
Total Renewable	4,019	$ (0.0055)	1,501,154,868	(72,640,123)	1,573,794,990	-20.67
Total Efficiency Savings & Renewable Supply	20,115,208	$ 0.0050	6,990,686,370	2,453,270,646	4,537,415,724	2.85

Note: Benefits are Cumulative Through 2012 and stated in Present Worth 2003 Dollars

The study found that the net economic benefits to New York from pursuing this least-cost approach to meeting GHG reductions for 2012 are estimated at between $4.5 billion and $9.4 billion. This means that New York would be significantly better off economically if it pursued a least-cost portfolio of efficiency and renewable resources to meet its GHG targets, compared to the base case of doing nothing in the future to increase efficiency and renewable development. The net economic benefits of the least-cost GHG solution also significantly exceed those estimated by the study from currently planned initiatives.[8] The lower and upper ends of this range of net benefits from least-cost GHG reductions are the result of valuing efficiency and renewable energy benefits at the lowest and highest zonal avoided supply costs, and subtracting the total resource costs of achieving them. By 2022, net benefits from pursuing economically achievable efficiency and renewable energy contributions toward New York's GHG reductions would range between $9.1billion and $16.6 billion.

8 See Tables 1.8, 1.9, and 1.10.

Had the study *included* the additional value of these effects, it would have affected results in the following general direction:

- *Economic potential analysis*: A higher fraction of the technical potential for all efficiency and renewable energy resources would have been found to be economic.
- *Achievable contributions toward GHG reductions*: Incorporating the value of avoided T&D costs would lower the net achievable cost of electric energy, since the analysis subtracts the value of capacity from the total achievable cost of electric energy. The estimated benefits to New York's economy from achieving the least-cost solution to New York's GHG reductions would therefore increase.
- *Expected contributions from currently planned initiatives*: The estimated net benefits to New York's economy would increase from policies and strategies contained in the State Energy Plan to promote efficiency and renewable energy resources.

CAVEATS

The Project Team offers several caveats about the use of this study, which are summarized here:

- *It would be a mistake to confuse technical and economic potential with other types of potential analysis.* Technical potential is not achievable potential, and therefore cannot be applied directly to represent the efficiency and renewable resources that New York could actually realize through policy or program initiatives. Doing so would be a misuse of the study's analysis.

  The study's technical and economic potential analysis can and should be used to inform other analysis of policy, program, and resource options. The technology costs and performance characteristics developed from this analysis can be applied in the planning and design of programs, policies, and resource acquisition.

  If using the study's technical and economic potential analysis results in efficiency and renewable energy program or resource planning, then such additional analysis should account for future market acceptance, specific program strategies for realizing market acceptance, and the administrative costs of such programs.
- *Zonal technical and economic potential should be used with caution.* The quality and reliability of supplemental information used to characterize markets within zones is limited, particularly in the industrial sector. The zonal technical and economic potential results are readily applicable in conjunction with more accurate information about zonal market characteristics (e.g., if more information is available regarding the location of specific industries within the State).
- *To avoid understating the economic potential for efficiency and renewable resources and the economic benefits from achieving this potential, future estimates of electricity benefits should account for benefits beyond electric generation.* Such additional potential benefits include avoided transmission and distribution capacity costs, avoided environmental costs not reflected in market prices, (i.e., externalities), the effect of lowering electric demand on wholesale market prices, and the economic stimulus that results from lowering New York's total costs of meeting energy requirements with economic efficiency and renewable resources.

Table 1.12 Summary of New York Zonal Avoided Costs — 2003 $

	A: WEST (Low avoided costs in statewide analysis)		F: CAPITAL		G: HUDSON		J: NEW YORK CITY		K: LONG ISLAND (High avoided costs in statewide analysis)	
	Annual Energy	Summer Capacity	Annual Energy	Summer Capacity	Annual Energy	Summer Capacity	Annual Energy	Summer Capacity	Annual Energy	Summer Capacity
	$/kWh	$/kW-Yr	$/kWh	$/kW-Yr	$/kWh	$/kW-Yr	$/kWh	$/kW-Yr	$/kWh	$/kW-Yr
2003	0.0286	37.42	0.0328	37.42	0.0348	37.42	0.0372	92.17	0.0406	92.17
2004	0.0266	37.60	0.0294	37.60	0.0344	37.60	0.0361	92.62	0.0420	92.62
2005	0.0269	28.20	0.0278	28.20	0.0292	28.20	0.0313	69.46	0.0348	69.46
2006	0.0269	28.31	0.0278	28.31	0.0291	28.31	0.0316	69.74	0.0351	69.74
2007	0.0269	28.42	0.0277	28.42	0.0291	28.42	0.0319	70.01	0.0355	70.01
2008	0.0269	28.53	0.0277	28.53	0.0291	28.53	0.0303	70.28	0.0359	70.28
2009	0.0264	28.64	0.0278	28.64	0.0295	28.64	0.0307	70.55	0.0365	70.55
2010	0.0260	28.76	0.0279	28.76	0.0299	28.76	0.0311	70.83	0.0372	70.83
2011	0.0270	28.87	0.0284	28.87	0.0303	28.87	0.0316	71.11	0.0381	71.11
2012	0.0281	28.98	0.0290	28.98	0.0308	28.98	0.0321	71.39	0.0390	71.39
2013	0.0287	29.10	0.0295	29.10	0.0314	29.10	0.0329	71.67	0.0401	71.67
2014	0.0293	29.21	0.0301	29.21	0.0321	29.21	0.0337	71.95	0.0411	71.95
2015	0.0298	29.32	0.0306	29.32	0.0327	29.32	0.0345	72.23	0.0421	72.23
2016	0.0304	29.44	0.0312	29.44	0.0334	29.44	0.0352	72.51	0.0432	72.51
2017	0.0309	29.55	0.0316	29.55	0.0338	29.55	0.0357	72.79	0.0441	72.79
2018	0.0313	29.67	0.0320	29.67	0.0343	29.67	0.0361	73.08	0.0450	73.08
2019	0.0318	29.78	0.0324	29.78	0.0347	29.78	0.0365	73.37	0.0459	73.37
2020	0.0322	29.90	0.0329	29.90	0.0352	29.90	0.0370	73.66	0.0467	73.66
2021	0.0327	30.02	0.0333	30.02	0.0357	30.02	0.0375	73.94	0.0477	73.94
2022	0.0332	30.14	0.0338	30.14	0.0362	30.14	0.0380	74.23	0.0487	74.23

Notes: Annual energy is simple average of avoided costs in summer, winter, on-peak, and off-peak hours. Potential analysis applied detailed avoided costs to electric energy and capacity in each period.

Table 1.13 NYSERDA Avoided Costs of Fossil Fuels – 2003 $/MMBTU

	Res. Oil	Com. Oil	Ind. Oil	Res. Gas	Com. Gas	Ind. Gas	Coal
2003	8.71	6.14	5.83	10.55	6.80	5.22	1.59
2004	8.75	6.19	5.87	10.67	6.93	5.20	1.60
2005	8.78	6.21	5.89	10.64	6.91	5.24	1.60
2006	8.77	6.21	5.89	10.50	6.80	5.12	1.60
2007	8.73	6.17	5.85	10.38	6.69	5.13	1.59
2008	8.74	6.18	5.86	10.30	6.61	5.13	1.58
2009	8.92	6.36	6.03	10.18	6.47	5.20	1.57
2010	9.03	6.47	6.13	10.06	6.36	5.26	1.56
2011	9.05	6.48	6.14	10.01	6.31	5.28	1.57
2012	9.08	6.52	6.18	9.95	6.25	5.30	1.56
2013	9.27	6.71	6.35	9.89	6.19	5.35	1.55
2014	9.50	6.95	6.57	9.82	6.12	5.37	1.54
2015	9.53	6.97	6.59	9.77	6.08	5.41	1.53
2016	9.55	6.99	6.61	9.71	6.01	5.44	1.52
2017	9.57	7.01	6.63	9.65	5.94	5.47	1.51
2018	9.59	7.03	6.65	9.64	5.88	5.51	1.50
2019	9.61	7.05	6.67	9.63	5.82	5.55	1.49
2020	9.63	7.08	6.69	9.63	5.76	5.60	1.48
2021	9.65	7.10	6.71	9.63	5.72	5.64	1.47
2022	9.67	7.12	6.73	9.63	5.72	5.64	1.47

Source: NYSERDA