STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Case No. _____

The Brooklyn Union Gas Company d/b/a National Grid NY
And KeySpan Gas East Corporation d/b/a National Grid

GAS ENERGY EFFICIENCY PROGRAM PROPOSALS

September 22, 2008

nationalgrid

The Brooklyn Union Gas Company d/b/a National Grid NY

and

KeySpan Gas East Corporation d/b/a National Grid

Gas Energy Efficiency Program Proposals

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The Brooklyn Union Gas Company d/b/a National Grid NY
and
KeySpan Gas East Corporation d/b/a National Grid
Gas Energy Efficiency Program Proposals
September 22, 2008

I. Introduction

The Brooklyn Union Gas Company d/b/a National Grid NY (formerly d/b/a KeySpan Energy Delivery New York ("KEDNY")) and KeySpan Gas East Corporation d/b/a National Grid (formerly d/b/a KeySpan Energy Delivery Long Island ("KEDLI")) and collectively herein the Companies (the "Companies") propose to implement a suite of gas energy efficiency programs that have been designed to help customers to manage energy costs, provide environmental benefits, and that contribute to improved efficiency of energy use in New York as is contemplated in the Energy Efficiency Portfolio Standard ("EEPS") Proceeding. These proposed efforts build on the Companies' experience in implementing programs under the Commission's July 18, 2007 Order Authorizing Interim Gas Efficiency Programs,[1] as well as National Grid's experience implementing programs in New England.

The proposed programs incorporate market transformation strategies, services that are targeted directly to end-users and key trade allies, and strategies that help to minimize lost-opportunities. The proposed programs produce long-term natural gas savings, as well as other resource benefits. In addition, proposed program efforts are intended to both complement and coordinate with NYSERDA's, LIPA's, and other New York City area energy efficiency efforts.

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[1] *See* Case 06-G-1185, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of The Brooklyn Union Gas Company d/b/a KeySpan Energy Delivery New York for Gas Service*, and Case 06-G-1186, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of KeySpan Gas East Corporation d/b/a KeySpan Energy Delivery Long Island for Gas Service*, Order Authorizing Interim Gas Energy Efficiency Programs and Related Deferrals (issued and effective July 18, 2007).

Providing energy efficiency services to our customers is a core element of the National Grid vision.[2] It is key to assisting our customers in managing their energy costs and to addressing climate change.

For the last 20 years, National Grid has been an ardent supporter of energy efficiency programs and has implemented numerous award-winning programs and, as a result, is a nationally-recognized leader in this area. National Grid's innovative energy efficiency programs are an integral part of the Company's continuing commitment to providing superior customer service and environmental stewardship.

National Grid's dedicated staff and strong infrastructure of vendors and service providers deliver these programs by closely working with commercial and industrial customers, as well as small businesses, and aggressively marketing its programs to residential customers. This unique customer relationship has put National Grid in an excellent position to directly help customers cope with rising energy costs and address policy maker's desire to have energy efficiency be part of the solution to the increases in energy prices and climate change.

The Company strongly believes that it has a responsibility to customers, communities, and the areas where it operates to actively support energy efficiency programs that provide long-term economic and environmental benefits while mitigating climate change, ultimately helping to improve the quality of life for the region as a whole. National Grid looks forward to bringing these services and experience to New York.

Since 1987, National Grid has advocated in federal and state legislative arenas and other forums for energy efficiency policies and programs to benefit customers, communities and the environment. In 2007, the Company achieved a major milestone, marking the 20th

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2 National Grid's vision statement was adopted about a year ago and reads: We, at National Grid, will be the foremost international electricity and gas company, delivering unparalleled efficiency, reliability and safety, vital to the well-being of our customers and communities. We are committed to being an innovative leader in energy management and to safeguarding our global environment for future generations.

anniversary of its nationally recognized, award-winning energy efficiency programs and an investment of over $1 billion in energy efficiency programs. During the last 20 years, more than 4.7 million National Grid customer projects have been completed in New England saving more than $3.6 billion in energy costs and 26 billion kilowatt hours of electricity, enough to power 3 million homes for one year as well as saving 650 million therms of natural gas, enough to heat 500,000 homes for one year. The programs have reduced greenhouse gas emissions in New England by 18.3 million tons, the equivalent of removing 2.3 million cars from the road. The Company's efforts and commitment to this endeavor have yielded a 60% participation rate in the programs among National Grid's 1.7 million New England customers, saving them more than $250 million on an annual basis.

National Grid has earned numerous awards for its programs as part of its advocacy campaigns including the following:

- 2007 AESP Award for its "Outstanding Achievement in Program Implementation" for its 20 years of energy efficiency programs
- US EPA and DOE Excellence in ENERGY STAR® Outreach Award and the ENERGY STAR Sustained Excellence Award for leadership and outstanding contributions (9th consecutive award)
- US EPA and DOE Awards for ENERGY STAR® Homes in 2007 and Small Business Services in 2003
- 12 Exemplary Program Awards from ACEEE (Large and Small Commercial and Industrial Programs and Residential and Low Income programs)

A full list of awards is available upon request.

II. Collaboration

New York has set an ambitious goal for energy efficiency. Achieving it will require the concerted efforts of utilities, the New York State Energy Research and Development Authority ("NYSERDA"), vendors, contractors and other energy efficiency providers. The Companies have and will continue to collaborate with other New York State electric and natural gas utilities, the Long Island Power Authority ("LIPA"), Consolidated Edison, the New York Power Authority, New York State Energy Research and Development Authority ("NYSERDA"), Department of Public Service Staff ("DPS Staff"), the Association for Energy Affordability, the New York City Economic Development Corporation, the New York City Mayor's office, Natural Resources Defense Council, and other interested stakeholders about planned energy efficiency efforts, including but not limited to, discussions about the proposed expedited program designs, evaluation planning, and coordination of program services. These collaborative efforts to date have taken the form of numerous teleconferences and in-person meetings, as well as a webinar with interested stakeholders. The table below provides further details on these recent collaborative activities.

Downstate New York

Sample Collaborative Activities, July – September 2008

Dates	Attendees	Topics of Discussion
July 14, 2008 (teleconference; multiple follow-up calls)	National Grid and NYSERDA representatives	Reviewed residential program description drafts and discussed program options.
July 14, 2008 (teleconference)	Working Group VIII participants	Pre-organizational call for Working Group VIII. Discussed Working Group IV report, timing, scheduling, meeting locations, potential conveners, and general scope of work.
July 22, 2008 (NYSERDA's NYC Office)	National Grid representatives and NYSERDA program staff	Discussed opportunities for program coordination and collaboration in context of EEPS proceeding. The parties identified gaps in their combined programs and ways to address such gaps, as well as potential program barriers for customers. The parties agreed to identify the consistencies in their offerings and combine common attributes of program design, including incentives, eligibility criteria, technical assistance and measurement and verification.
July 23, 2008 (National Grid's Brooklyn Office)	National Grid and NYSERDA representatives	Discussed options for multifamily efficiency program development for downstate / upstate New York.
July 23, 2008 (NY Dormitory Authority, 1 Penn Plaza, New York City, and teleconference)	Working Group VIII participants	Co-conveners of WG VIII introduced themselves and overall WG scope was defined. Existing NYSERDA and NYISO demand response activities were discussed, as well as the role of CHP and AMI tie-in to Demand Response.
July 25, 2008 (teleconference)	Working Group VI (On-Bill Financing) participants	Defined WG's scope of activities by beginning to develop an issues list.

Dates	Attendees	Topics of Discussion
July 28, 2008 (webinar / teleconference) and August 1, 2008 (teleconference)	National Grid, Central Hudson, St. Lawrence Gas, National Fuel Gas, New York State Electric & Gas / Rochester Gas & Electric, Orange & Rockland, and NYSERDA representatives	Respective parties held discussions to identify areas of uniformity and where planned residential and C&I programs complement each other. Parties also discussed how program design, delivery and marketing might be complemented with NYSERDA's existing portfolio of energy efficiency programs. The overall objective of subsequent meetings with NYSERDA and utilities is to work at the program detail level, address individual company issues and maximize savings while reducing the risks of confusing customers or double counting savings.
August 5, 2008 (NYISO Headquarters, Troy NY, and teleconference)	Working Group VIII participants	The group reviewed Demand Response and Peak Reduction programs and measures not presently available through existing NYISO, SBC, and utility programs. Also discussed opportunities related to hourly pricing, integrating DR with EE, lost DR, renewable and CHP opportunities, AMI, and environmental issues pertaining to both peaking units and demand response sources.
August 6, 2008 (teleconference)	National Grid , Central Hudson, St. Lawrence Gas, National Fuel Gas, New York State Electric & Gas / Rochester Gas & Electric, and Orange & Rockland representatives.	Discussed evaluation planning and possible coordination.

Dates	Attendees	Topics of Discussion
August 8, 2008 (in person and teleconference)	Working Group VII (Workforce Development) participants	Co-Conveners laid out the charge for the working group and timeline for the process, which will address workforce needs for programs already approved, as well as the need to ramp up to fill longer-term needs after other programs are approved under the EEPS.
August 12, 2008 (teleconference)	National Grid, Central Hudson, St. Lawrence Gas, National Fuel Gas, New York State Electric & Gas / Rochester Gas & Electric, and Orange & Rockland representatives.	Reviewed Independent Program Administrator proposals.
August 13, 2008 (teleconference)	Working Group VI (On-Bill Financing) participants	Further defined WG's scope of activities by completing the issues list.
August 13, 2008 (NY DEC offices, Albany)	Working Group VIII participants	Discussed environmental justice issues; demand response, CHP, and AMI proposals; and drafted a scoping memo.
August 15, 2008 (teleconference)	National Grid, Central Hudson, St. Lawrence Gas, National Fuel Gas, New York State Electric & Gas / Rochester Gas & Electric, and Orange & Rockland representatives.	Discussed evaluation planning and possible coordination.
August 18, 2008 (teleconference)	Working Group V (Natural Gas) participants	Discussed methodology for compiling data on existing programs.
August 20, 2008 (teleconference)	Working Group VI (On-Bill Financing) participants	Began to develop recommendations related to issues list.
August 25, 2008 (teleconference)	National Grid and NYSERDA representatives	Discuss collaboration on downstate ENERGY STAR® Homes Program
August 26, 2008 (NY Dormitory Authority, 1 Penn Plaza, New York City)	Working Group VIII participants	The group conducted a Q & A session with Judge Stein, discussed coordination between WG VIII and utilities, and assigned sub-groups to address specific topics.
August 27, 2008 (teleconference)	Working Group VII (Workforce Development) participants	Group members discussed how to come up with recommendations and a budget for workforce development.

Dates	Attendees	Topics of Discussion
August 28, 2008 (teleconference)	Working Group VI (On-Bill Financing) participants	Further developed recommendations related to issues list.
August 28, 2008 (NYEDC, 110 William Street)	NYC Working Group on Energy Efficiency in Multi Family Buildings	Discussed 60-day plans proposed for the City, focusing on multifamily programs.
August 28, 2008 (NYEDC, 110 William Street)	NYC Working Group on Existing Commercial Buildings	Discussed 60-day plans proposed for the City, focusing on existing commercial programs.
August 29, 2008 (teleconference)	Working Group V (Natural Gas) participants	Reviewed gas load forecasts and program data compilation.
September 4, 2008 (teleconference)	Working Group VI (On-Bill Financing) participants	Further developed recommendations related to issues list.
September 5, 2008 (Con Ed / NYC)	Working Group V (Natural Gas) participants	Reviewed approaches, methodologies, assumptions and results of consultants' studies.
September 8, 2008 (teleconference)	National Grid, ConEd, Comverge, EnerNOC (WG VIII sub-group)	Discussed how to integrate demand response into SBC funded energy efficiency programs.
September 9-12, 2008 (teleconference and e-mails)	National Grid, Central Hudson, St. Lawrence Gas, National Fuel Gas, New York State Electric & Gas / Rochester Gas & Electric, and Orange & Rockland representatives.	Discussed residential 90-day filings and answer questions.
September 10, 2008 (teleconference)	Working Group VII (Workforce Development) participants	Group continued to work on recommendations and budgeting.
September 12, 2008 (teleconference)	National Grid and NYSERDA representatives	Discussed areas for collaboration on statewide 90-day filings.

III. Budget and Goals

Budgets[3] for each proposed gas energy efficiency program are provided below by year and for the period 2009 through 2011.[4] These budgets are presented separately for the each of the Companies' service territories.

Projected Energy Efficiency Program Costs in 2009 –

The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY")

Gas Programs	Program Planning and Administration	Program Marketing & Trade Ally	Customer Incentives or Services	Program Implementation	Evaluation & Market Research	Total Utility Cost
Enhanced Home Sealing Incentives	$43,831	$75,173	$1,200,000	$20,000	$66,950	$1,405,955
Residential ENERGY STAR® Products Program	$5,000	$5,000	$30,000	$5,000	$5,000	$50,000
Residential Low Income Program	$441,177	$754,490	$3,529,412	$882,353	$280,372	$5,887,803
Residential Building Practices and Demonstration Program	$8,581	$10,132	$15,000	$3,000	$1,836	$38,549
Energy Audit Program	$61,116	$101,861	$488,931	$122,233	$40,744	$814,885
Commercial, Industrial and Multi Family Energy Efficiency Program	$530,681	$1,138,593	$4,645,000	$1,064,561	$368,942	$7,747,776
Commercial High-Efficiency Heating and Water Heating Program	$145,068	$239,487	$520,000	$100,000	$50,228	$1,054,782
Building Practices and Demonstration Program	$30,685	$81,382	$435,360	$61,369	$30,440	$639,236
Total	$1,266,138	$2,406,118	$10,863,704	$2,258,516	$844,511	$17,638,987

[3] Descriptions of the costs included in the budget categories shown below are provided in attached Appendix A.

[4] The Commission's Order Concerning Utility Financial Incentives issued August 22, 2008 in the EEPS proceeding stated that "incentives for gas utility programs, if any, will continue to be set on a case-by-case basis for the near future." The Companies reserve the right to incorporate a performance-based incentive for their proposed gas energy efficiency programs should such a performance incentive be subsequently determined by the Commission as applicable for utility-administered gas energy efficiency programs.

Projected Energy Efficiency Program Costs in 2010 –

The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY")

Gas Programs	Program Planning and Administration	Program Marketing & Trade Ally	Customer Incentives or Services	Program Implementation	Evaluation & Market Research	Total Utility Cost
Enhanced Home Sealing Incentives	$43,831	$75,173	$1,200,000	$20,000	$66,950	$1,405,955
Residential ENERGY STAR® Products Program	$5,000	$5,000	$50,000	$5,000	$5,000	$70,000
Residential Low Income Program	$441,177	$754,490	$3,529,412	$882,353	$280,372	$5,887,803
Residential Building Practices and Demonstration Program	$8,581	$10,132	$15,000	$3,000	$1,836	$38,549
Energy Audit Program	$61,116	$101,861	$488,931	$122,233	$40,744	$814,885
Commercial, Industrial and Multi Family Energy Efficiency Program	$530,681	$1,138,593	$4,645,000	$1,064,561	$368,942	$7,747,776
Commercial High-Efficiency Heating and Water Heating Program	$145,068	$239,487	$520,000	$100,000	$50,228	$1,054,782
Building Practices and Demonstration Program	$30,685	$81,382	$435,360	$61,369	$30,440	$639,236
Total	$1,266,138	$2,406,118	$10,883,704	$2,258,516	$844,511	$17,658,987

Projected Energy Efficiency Program Costs in 2011 –

The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY")

Gas Programs	Program Planning and Administration	Program Marketing & Trade Ally	Customer Incentives or Services	Program Implementation	Evaluation & Market Research	Total Utility Cost
Enhanced Home Sealing Incentives	$43,831	$75,196	$500,000	$20,000	$31,951	$670,979
Residential ENERGY STAR® Products Program	$5,000	$5,000	$50,000	$5,000	$3,250	$68,250
Residential Low Income Program	$441,177	$754,691	$3,529,412	$882,353	$280,382	$5,888,015
Residential Building Practices and Demonstration Program	$8,581	$10,133	$15,000	$3,000	$1,836	$38,550
Energy Audit Program	$61,116	$101,861	$488,931	$122,233	$40,744	$814,885
Commercial, Industrial and Multi Family Energy Efficiency Program	$635,190	$882,676	$4,796,100	$1,061,362	$368,766	$7,744,094
Commercial High-Efficiency Heating and Water Heating Program	$145,068	$192,491	$650,000	$100,000	$54,378	$1,141,937
Building Practices and Demonstration Program	$30,685	$81,062	$362,800	$61,369	$26,796	$562,712
Total	$1,370,647	$2,103,111	$10,392,244	$2,255,317	$808,103	$16,929,422

Projected Energy Efficiency Program Costs in 2009 - 2011 –

The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY")

Gas Programs	Program Planning and Administration	Program Marketing & Trade Ally	Customer Incentives or Services	Program Implementation	Evaluation & Market Research	Total Utility Cost
Enhanced Home Sealing Incentives	$131,493	$225,543	$2,900,000	$60,000	$165,852	$3,482,888
Residential ENERGY STAR® Products Program	$15,000	$15,000	$130,000	$15,000	$13,250	$188,250
Residential Low Income Program	$1,323,530	$2,263,671	$10,588,237	$2,647,059	$841,125	$17,663,622
Residential Building Practices and Demonstration Program	$25,743	$30,398	$45,000	$9,000	$5,507	$115,648
Energy Audit Program	$183,349	$305,582	$1,466,794	$366,698	$122,233	$2,444,656
Commercial, Industrial and Multi Family Energy Efficiency Program	$1,696,552	$3,159,862	$14,086,100	$3,190,483	$1,106,650	$23,239,646
Commercial High-Efficiency Heating and Water Heating Program	$435,203	$671,465	$1,690,000	$300,000	$154,833	$3,251,501
Building Practices and Demonstration Program	$92,054	$243,827	$1,233,520	$184,108	$87,675	$1,841,184
Total	$3,902,923	$6,915,347	$32,139,651	$6,772,348	$2,497,125	$52,227,395

Projected Energy Efficiency Program Costs in 2009 –

KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI")

Gas Programs	Program Planning and Administration	Program Marketing & Trade Ally	Customer Incentives or Services	Program Implementation	Evaluation & Market Research	Total Utility Cost
Enhanced Home Sealing Incentives	$34,326	$59,311	$687,500	$24,000	$40,257	$845,394
Residential ENERGY STAR® Products Program	$5,000	$5,000	$30,000	$5,000	$5,000	$50,000
ENERGY STAR® Homes Program	$27,461	$47,187	$200,000	$75,000	$17,482	$367,130
Residential Low Income Program	$220,584	$382,591	$1,764,670	$441,167	$140,451	$2,949,462
Residential Building Practices and Demonstration Program	$4,590	$7,878	$26,400	$3,000	$2,093	$43,961
Energy Audit Program	$40,105	$66,841	$320,837	$80,209	$26,736	$534,728
Commercial, Industrial and Multi Family Energy Efficiency Program	$225,274	$412,653	$1,599,110	$430,867	$133,395	$2,801,299
Commercial High-Efficiency Heating and Water Heating Program	$59,313	$98,453	$260,000	$18,626	$21,820	$458,212
Building Practices and Demonstration Program	$15,773	$33,326	$120,000	$31,546	$10,032	$210,677
Total	$632,425	$1,113,239	$5,008,517	$1,109,415	$397,267	$8,260,863

Projected Energy Efficiency Program Costs in 2010 –

KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI")

Gas Programs	Program Planning and Administration	Program Marketing & Trade Ally	Customer Incentives or Services	Program Implementation	Evaluation & Market Research	Total Utility Cost
Enhanced Home Sealing Incentives	$34,326	$59,311	$687,500	$24,000	$40,257	$845,394
Residential ENERGY STAR® Products Program	$5,000	$5,000	$50,000	$5,000	$5,000	$70,000
ENERGY STAR® Homes Program	$27,461	$47,187	$200,000	$75,000	$17,482	$367,130
Residential Low Income Program	$220,584	$382,591	$1,764,670	$441,167	$140,451	$2,949,462
Residential Building Practices and Demonstration Program	$4,590	$7,878	$26,400	$3,000	$2,093	$43,961
Energy Audit Program	$40,105	$66,841	$320,837	$80,209	$26,736	$534,728
Commercial, Industrial and Multi Family Energy Efficiency Program	$225,274	$412,653	$1,599,110	$430,367	$133,370	$2,800,774
Commercial High-Efficiency Heating and Water Heating Program	$59,313	$98,453	$260,000	$18,626	$21,820	$458,212
Building Practices and Demonstration Program	$15,773	$33,326	$120,000	$31,546	$10,032	$210,677
Total	$632,425	$1,113,239	$5,028,517	$1,108,915	$397,242	$8,280,338

Projected Energy Efficiency Program Costs in 2011 –

KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI")

Gas Programs	Program Planning and Administration	Program Marketing & Trade Ally	Customer Incentives or Services	Program Implementation	Evaluation & Market Research	Total Utility Cost
Enhanced Home Sealing Incentives	$34,326	$47,664	$999,168	$24,000	$55,258	$1,160,415
Residential ENERGY STAR® Products Program	$5,000	$5,000	$50,000	$5,000	$3,250	$68,250
ENERGY STAR® Homes Program	$27,461	$26,308	$200,000	$75,000	$16,438	$345,207
Residential Low Income Program	$220,584	$382,528	$1,764,670	$441,167	$140,447	$2,949,396
Residential Building Practices and Demonstration Program	$4,590	$5,871	$33,000	$3,000	$2,323	$48,785
Energy Audit Program	$40,105	$66,841	$320,837	$80,209	$26,736	$534,728
Commercial, Industrial and Multi Family Energy Efficiency Program	$202,214	$430,765	$1,844,127	$404,429	$144,077	$3,025,612
Commercial High-Efficiency Heating and Water Heating Program	$59,313	$123,175	$450,000	$18,626	$32,556	$683,670
Building Practices and Demonstration Program	$15,773	$33,375	$120,000	$31,546	$10,035	$210,729
Total	$609,365	$1,121,527	$5,781,802	$1,082,977	$431,120	$9,026,791

Projected Energy Efficiency Program Costs in 2009 - 2011 –

KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI")

Gas Programs	Program Planning and Administration	Program Marketing & Trade Ally	Customer Incentives or Services	Program Implementation	Evaluation & Market Research	Total Utility Cost
Enhanced Home Sealing Incentives	$102,977	$166,286	$2,374,168	$72,000	$135,772	$2,851,203
Residential ENERGY STAR® Products Program	$15,000	$15,000	$130,000	$15,000	$13,250	$188,250
ENERGY STAR® Homes Program	$82,382	$120,681	$600,000	$225,000	$51,403	$1,079,466
Residential Low Income Program	$661,751	$1,147,709	$5,294,010	$1,323,502	$421,349	$8,848,321
Residential Building Practices and Demonstration Program	$13,771	$21,627	$85,800	$9,000	$6,510	$136,708
Energy Audit Program	$120,314	$200,523	$962,510	$240,627	$80,209	$1,604,183
Commercial, Industrial and Multi Family Energy Efficiency Program	$652,762	$1,256,071	$5,042,347	$1,265,663	$410,842	$8,627,685
Commercial High-Efficiency Heating and Water Heating Program	$177,939	$320,081	$970,000	$55,878	$76,195	$1,600,093
Building Practices and Demonstration Program	$47,319	$100,027	$360,000	$94,638	$30,099	$632,083
Total	$1,874,215	$3,348,005	$15,818,835	$3,301,308	$1,225,629	$25,567,992

Projected participation and savings in the proposed gas energy efficiency programs are provided in the following tables:

Participation and Savings Goals - The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY") Gas Programs

	2009			2010			2011			2009 - 201	
Gas Programs	Participants	Annualized MMBTu Savings	Lifetime MMBTu Savings	Participants	Annualized MMBTu Savings	Lifetime MMBTu Savings	Participants	Annualized MMBTu Savings	Lifetime MMBTu Savings	Participants	Annualized MMBTu Savings
Enhanced Home Sealing Incentives	500	16,560	331,200	500	16,560	331,200	500	16,560	331,200	1,500	49,6
Residential ENERGY STAR® Products Program	300	606	15,140	500	1,009	25,234	500	1,009	25,234	1,300	2,6
Residential Low Income Program	1,754	46,253	925,060	1,754	46,253	925,060	1,754	46,253	925,060	5,262	138,7
Residential Building Practices and Demonstration Program	10	0	0	10	0	0	10	0	0	30	
Energy Audit Program	1,200	648	4,536	1,200	648	4,536	1,200	648	4,536	3,600	1,9
Commercial, Industrial and Multi Family Energy Efficiency Program	1,217	154,521	2,223,893	1,217	154,521	2,223,893	1,317	167,508	2,383,633	3,751	476,5
Commercial High-Efficiency Heating and Water Heating Program	400	28,656	573,120	400	28,656	573,120	500	35,820	716,400	1,300	93,1
Building Practices and Demonstration Program	9	11,372	154,663	9	11,372	154,663	7	9,477	128,886	25	32,2

Participation and Savings Goals - KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI") Gas Programs

	2009			2010			2011			2009 - 201	
Gas Programs	Participants	Annualized MMBTu Savings	Lifetime MMBTu Savings	Participants	Annualized MMBTu Savings	Lifetime MMBTu Savings	Participants	Annualized MMBTu Savings	Lifetime MMBTu Savings	Participants	Annualized MMBTu Savings
Enhanced Home Sealing Incentives	300	9,936	198,720	300	9,936	198,720	436	14,440	288,806	1,036	34,3
Residential ENERGY STAR® Products Program	300	606	15,140	500	1,009	25,234	500	1,009	25,234	1,300	2,6
ENERGY STAR® Homes Program	200	4,932	123,300	200	4,932	123,300	200	4,932	123,300	600	14,7
Residential Low Income Program	878	23,153	463,057	878	23,153	463,057	878	23,153	463,057	2,634	69,4
Residential Building Practices and Demonstration Program	20	0	0	20	0	0	22	0	0	62	
Energy Audit Program	1,000	540	3,780	1,000	540	3,780	1,000	540	3,780	3,000	1,6
Commercial, Industrial and Multi Family Energy Efficiency Program	406	57,617	746,805	406	57,617	746,805	505	68,551	919,412	1,317	183,7
Commercial High-Efficiency Heating and Water Heating Program	200	14,328	286,560	200	14,328	286,560	300	21,492	429,840	700	50,1
Building Practices and Demonstration Program	6	7,836	106,576	6	7,836	106,576	6	7,836	106,576	18	23,5

IV. Program Cost-Effectiveness

1. Plan Results

National Grid has projected the expected benefits and costs associated with the proposed gas energy efficiency programs and services that it proposes to administer in 2009 - 2011 using a Total Resource Cost ("TRC") Test. The TRC Test is the primary test used by the New York Public Service Commission (the "Commission").[5] The following tables summarize the expected benefits, costs, and the benefit/cost ratios for the programs that will be implemented in 2009 - 2011. For more detailed information about the benefits and costs associated with these programs, see Appendix B attached hereto. The input assumptions used in this analysis can be found in attached Appendix C attached hereto.

[5] *See* Case 04-E-0572 – *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service,* Order on Demand Management Action Plan (issued and effective March 16, 2006).

The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY")
ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST

Summary of Benefit , Costs (2009 $s)
Total Resource Cost Test

Gas Programs	2009 TRC Benefit/ Cost	2009 Total NPV Benefits ($000)	2009 Total NPV Costs ($000)	2010 TRC Benefit/ Cost	2010 Total NPV Benefits ($000)	2010 Total NPV Costs ($000)	2011 TRC Benefit/ Cost	2011 Total NPV Benefits ($000)	2011 Total NPV Costs ($000)	2009 - 2011 TRC Benefit/ Cost	2009 - 2011 Total NPV Benefits ($000)	2009 - 2011 Total NPV Costs ($000)
Enhanced Home Sealing Incentives	1.40	$2,304	$ 1,646	1.51	$2,356	$ 1,560	2.96	$2,424	$ 818	1.76	$7,085	$4,025
Residential ENERGY STAR® Products Program	1.53	$113	$ 74	1.85	$193	$ 104	2.05	$199	$ 97	1.84	$506	$276
Residential Low Income Program	1.16	$6,435	$ 5,535	1.25	$6,582	$ 5,246	1.36	$6,771	$ 4,973	1.26	$19,788	$15,754
Residential Building Practices and Demonstration Program	n/a	n/a	$ 39	n/a	n/a	$ 37	n/a	n/a	$ 35	n/a	n/a	$110
Energy Audit Program	0.05	$44	$ 812	0.06	$44	$ 770	0.06	$44	$ 729	0.06	$132	$2,311
Commercial, Industrial and Multi Family Energy Efficiency Program	1.58	$17,249	$ 10,923	1.69	$17,526	$ 10,353	1.93	$19,300	$ 9,983	1.73	$54,075	$31,259
Commercial High-Efficiency Heating and Water Heating Program	2.71	$3,987	$ 1,471	2.92	$4,078	$ 1,394	3.51	$5,244	$ 1,493	3.05	$13,308	$4,358
Building Practices and Demonstration Program	1.25	$1,233	$ 988	1.34	$1,252	$ 936	1.39	$1,067	$ 766	1.32	$3,552	$2,690
Grand Total	**1.46**	**$31,364**	**$21,486**	**1.57**	**$32,030**	**$20,400**	**1.86**	**$35,051**	**$18,895**	**1.62**	**$98,445**	**$60,781**

Total NPV cost is the net present value of utility and participant costs
Residential Building Practices and Demonstration Program includes costs for the program but does not include expected benefits.

KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI")
ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST

Summary of Benefit , Costs (2009 $s)
Total Resource Cost Test

Gas Programs	2009 TRC Benefit/ Cost	2009 Total NPV Benefits ($000)	2009 Total NPV Costs ($000)	2010 TRC Benefit/ Cost	2010 Total NPV Benefits ($000)	2010 Total NPV Costs ($000)	2011 TRC Benefit/ Cost	2011 Total NPV Benefits ($000)	2011 Total NPV Costs ($000)	2009 - 2011 TRC Benefit/ Cost	2009 - 2011 Total NPV Benefits ($000)	2009 - 2011 Total NPV Costs ($000)
Enhanced Home Sealing Incentives	1.41	$1,382	$ 983	1.52	$1,414	$ 932	1.73	$2,114	$ 1,222	1.57	$4,910	$3,137
Residential ENERGY STAR® Products Program	1.53	$113	$ 74	1.85	$193	$ 104	2.05	$199	$ 97	1.84	$506	$276
ENERGY STAR® Homes Program	1.10	$780	$ 707	1.19	$799	$ 670	1.34	$822	$ 616	1.21	$2,402	$1,993
Residential Low Income Program	1.16	$3,221	$ 2,773	1.25	$3,295	$ 2,628	1.36	$3,390	$ 2,491	1.25	$9,905	$7,893
Residential Building Practices and Demonstration Program	n/a	n/a	$ 44	n/a	n/a	$ 42	n/a	n/a	$ 44	n/a	n/a	$129
Energy Audit Program	0.07	$36	$ 532	0.07	$36	$ 504	0.08	$37	$ 478	0.07	$110	$1,515
Commercial, Industrial and Multi Family Energy Efficiency Program	1.57	$6,028	$ 3,828	1.68	$6,111	$ 3,628	2.00	$7,595	$ 3,799	1.75	$19,733	$11,255
Commercial High-Efficiency Heating and Water Heating Program	2.93	$1,993	$ 680	3.16	$2,039	$ 644	3.45	$3,146	$ 913	3.21	$7,179	$2,237
Building Practices and Demonstration Program	2.77	$849	$ 307	2.97	$863	$ 291	3.20	$883	$ 276	2.97	$2,595	$873
Grand Total	**1.45**	**$14,404**	**$9,928**	**1.56**	**$14,749**	**$9,444**	**1.83**	**$18,187**	**$9,936**	**1.62**	**$47,339**	**$29,308**

Total NPV cost is the net present value of utility and participant costs
Residential Building Practices and Demonstration Program includes costs for the program but does not include expected benefits.

B. Avoided Costs and Description of Program Benefits

The TRC Test compares the present value of future electric system, natural gas, and other customer savings to the total of the expenditures and customer costs necessary to implement the programs. The benefit of a measure is the net present value of the avoided costs (i.e., value of the savings) associated with the net savings of a measure over the life of that measure. The net savings reflect findings from evaluation studies that National Grid has conducted in New England. The measure life is based on the technical life of the measure modified to reflect expected measure persistence.

The avoided costs used to determine program cost effectiveness for the natural gas energy efficiency programs were developed by DPS Staff, inflated by 20% to account for increased fuel prices since DPS Staff conducted their analysis. The electric energy savings anticipated from this program have been valued using the avoided electric and capacity values from "Niagara Mohawk Avoided Electricity and Natural Gas Costs" ("Avoided Cost Report"). A copy of that report is attached in Appendix D hereto. The Niagara Mohawk electric avoided costs have been used as a proxy for electric avoided costs downstate and have been used to value the electricity savings anticipated from the proposed gas energy efficiency program.

Avoided electric energy and capacity values used for this three-year plan are from Table 7 of the Avoided Cost Report. Table 7 presents avoided electric energy and capacity values for the Company's service area in New York in 2007 dollars. The avoided costs in Table 7 incorporate a reserve margin, pool transmission losses incurred from the generator to the point of delivery to the distribution companies, and a retail adder as recommended by Synapse. The New York Independent System Operator ("NYISO") reserve margins are incorporated into the capacity values, since energy efficiency avoids the back-up reserves for that generation as well as the generation itself. The avoided energy costs include the expected cost of complying with regional and federal carbon control requirements. The

avoided costs do not include non-pool transmission losses or distribution losses. They also do not include company specific avoided transmission and distribution capacity values.

Table 7 also provides CO_2 values that are termed "CO2 Related Costs NOT REFLECTED IN WHOLESALE POWER PRICES." These additional values reflect the difference between what is considered to be the cost of controlling carbon to a sustainable level and the costs of carbon mitigation—based on anticipated Regional Greenhouse Gas Initiative ("RGGI") and federal requirements—internalized into the avoided energy costs.

To escalate the avoided costs into 2009 constant dollars, an inflation rate of 2.98% was applied.

Avoided transmission and distribution capacity values used in the analysis are determined from a spreadsheet tool that was developed in 2005 by ICF International, Inc., the consultant that performed the biennial avoided cost study for New England's energy efficiency program administrators. The tool calculates an annualized value of avoided transmission and distribution capacity values from company specific inputs of historic and forecast capital expenditures and loads, as well as a carrying charge calculated from applicable tax rates and Federal Energy Regulatory Commission ("FERC") Form 1 accounting data. National Grid used this tool to develop its values of $18.07/kW for avoided transmission capacity and $63.87/kW for avoided distribution capacity in New York. These are in 2006 dollars and have been escalated to 2009 dollars for the benefit/cost analyses. These values are assumed to be constant in real dollars throughout the analysis period.

Demand and energy loss factors are applied to the avoided costs to account for local transmission and distribution losses from the point of delivery to the distribution company's system to the ultimate customer's facility.

The dollar value of the program's benefits is calculated by multiplying the expected savings by the appropriate avoided value component. The avoided value component for

each benefit (e.g., electric energy, capacity, natural gas) is the cumulative net present value (2009 dollars) of lifetime avoided costs for each year of the planning horizon from the base year. For example, the avoided value component in Year 10 for any given benefit is the sum of the net present value of the annual avoided costs for the resource for Year 1, Year 2, Year 3, etc., through Year 10, in 2009 dollars. This value is applied to the annual savings for a measure with a 10-year life to generate the lifetime avoided benefit for that measure. Since all of the future year values are in constant 2009 dollars, lifetime benefits thus calculated are discounted back to 2009 using a real discount rate equal to [(1 + Nominal Discount Rate) / (1 + Inflation)] - 1. The nominal discount rate used for this three-year plan is 8.6% which is equivalent to a real discount rate of 5.5%, the discount rate recommended for use by DPS Staff.

The expedited natural gas energy efficiency program is expected to produce electricity savings in addition to natural gas savings. The value of both the natural gas and electricity savings expected from the implementation of this gas energy efficiency program has been valued in the assessment of cost-effectiveness.

Avoided Benefits Calculations:

Avoided Electric Energy Benefits. The Avoided Cost Report identified four electric energy costing periods consistent with the NYISO definitions. Energy prices are divided into the following four time periods:

- Winter Peak: October – May, 6:00 a.m. – 10:00 p.m., weekdays excluding holidays.
- Winter Off-Peak: October – May; 10:00 p.m. – 6:00 a.m., weekdays. Also including all weekends and the NYISO-defined holidays.
- Summer Peak: June – September, 6:00 a.m. – 10:00 p.m., weekdays excluding holidays.
- Summer Off-Peak: June – September; 10:00 p.m. – 6:00 a.m., weekdays. Also including all weekends and the NYISO-defined holidays.

Net energy savings for a program (or measures aggregated within a program) are allocated to each one of these time periods and multiplied by the appropriate avoided energy value. The dollar benefits are then grossed up using the appropriate loss factors.

- Summer Peak Energy Benefit ($) = kWhNet * $Energy\%_{SumPk}$ * $SumPk\$/kWh_{(@Life)}$ * (1 + $\%Losses_{SumPk\text{-}kWh}$)
- Summer Off Peak Energy Benefit ($) = kWhNet * $Energy\%_{SumOffPk}$ * $SumOffPk\$/kWh_{(@Life)}$ * (1 + $\%Losses_{SumOffPk\text{-}kWh}$)
- Winter Peak Energy Benefit ($) = kWhNet * $Energy\%_{WinPk}$ * $WinPk\$/kWh_{(@Life)}$ * (1 + $\%Losses_{WinPk\text{-}kWh}$)
- Winter OffPeak Energy Benefit ($) = kWhNet * $Energy\%_{WinOffPk}$ * $WinOffPk\$/kWh_{(@Life)}$ * (1 + $\%Losses_{WinOffPk\text{-}kWh}$)

Avoided Generation Capacity Benefits. Capacity benefits from energy efficiency accrue because demand reduction reduces the NYISO's Unforced Capacity ("UCAP") requirement. The UCAP requirement is based on load's contribution to the system peak, which, for the NYISO, is the summer peak. Therefore, capacity benefits accrue only from summer peak demand reduction and are determined by multiplying net peak summer demand savings by avoided generating capacity values from the Avoided Cost Report and capacity loss factor representing losses downstream of the NYISO delivery point. There is no winter generation capacity benefit.

- Generation Capacity Benefit($) = kWSum*AnnualMarketCapValue$/$kW_{(@Life)}$ * (1 + $\%Losses_{SumkW}$)

Avoided Transmission and Distribution Capacity Benefits. These values are calculated similarly to the avoided generation capacity values, using the Company's specific avoided transmission and distribution ("T&D") capacity values. In theory, the benefit could be allocated to summer and winter periods, depending on the relation between summer and winter peaks on the local system. However, in recent years, National Grid's system in New York has been summer peaking. Therefore, the T&D benefits will be exclusively associated with summer demand reduction.

- Transmission Benefit ($) = (kWSum * $Trans\$/kW_{(@Life)}$ * [1 + ($Losses_{SumkWTrans}$)]
- Distribution Benefit ($) = (kWSum * $Dist\$/kWLife_{(@Life)}$ * [1 + ($Losses_{SumkWDist}$)]

Natural Gas Benefits. National Grid has used the natural gas avoided costs developed by DPS Staff to value the savings anticipated from its expedited natural gas energy efficiency program. The dollar value of natural gas benefits is calculated as:

- Natural Gas Benefits ($) = MMBTU_NetGas * Gas$/MMBTU

Projected Carbon Reductions From Proposed Programs. Table 1 of Appendix E attached hereto presents an Alternate Total Resource Cost Test which includes the benefit of carbon reduction. The value of carbon for each gas program is calculated by assuming 58.5 tons of carbon per billion BTUs saved. Each ton of carbon saved through the gas energy efficiency programs is valued using $15 per ton as recommended in the June 23, 2008 Order.

Other Screening Metrics. Appendix 3 in the Commission's June 23, 2008 Order in Case 07-M-0548 (the "June 23, 2008 Order")[6] identified screening metrics for each program and for the suite of proposed programs to be included in energy efficiency program proposals submitted by the utilities. In addition to benefit cost ratios with and without a carbon externality added, these metrics include the following for each proposed gas energy efficiency program:

- Number of participants as a percentage of the number of customers in the class as of 2015
- Gas rate impact
- Gas rate impact per MBTU saved, levelized over the years through 2015.

Metrics required for the suite of proposed gas energy efficiency programs as a whole include the following:

- Gas rate impact as of the year 2015.

These other screening metrics for the gas energy efficiency programs proposed herein are provided in Appendix E attached hereto.

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[6] Case 07-M-0548, *Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard*, Order Establishing Energy Efficiency Portfolio Standard and Approving Programs (issued and effective June 23, 2008) (the "June 23, 2008 Order").

V. Program Descriptions

A description of each proposed energy efficiency program follows.

a. Residential Programs

National Grid proposes to offer the following gas residential energy efficiency programs to its customers beginning in January 2009:

Enhanced Home Sealing Incentives Program
Residential ENERGY STAR® Products and Recycling Program
Residential Low Income Program
Residential Internet Audit and E-Commerce Sales
Residential Building Practices and Demonstration Program
Home Energy Audits
ENERGY STAR® Homes Program on Long Island

Each of these programs is described below.

Enhanced Home Sealing Incentives Program

Purpose

The purpose of this program is to encourage customers and contractors who are unable or unwilling to participate in the NYSERDA or LIPA Home Performance with ENERGY STAR® Programs to complete critical insulation, air sealing, ventilation, and health and safety measures. This program will replace the current Weatherization program currently offered by National Grid in the downstate area.

Coordination

This program will be coordinated with NYSERDA and LIPA to ensure there is no double counting of savings and as little customer confusion as possible. National Grid will encourage residential customers and contractors who are not currently participating in NYSERDA or LIPA's Home Performance with ENERGY STAR® program to do so, and if they are not able to do so, to ensure that safe insulation and air sealing work is alternatively completed through this program. National Grid will refer low income customers to its Low Income program or other programs as appropriate, to ensure they receive the lowest cost and most comprehensive service for which the customer is qualified.

Co-Benefits

Adding insulation and air sealing to existing homes increases the value and durability of housing stock. It also may improve health through the control of existing moisture problems and the identification of the potential for carbon monoxide poisoning or other unhealthy existing conditions. Insulation and air sealing reduces the heating and air conditioning bills of residents, resulting in more money that can be spent on other household needs and potentially improving the local economy.

Program Administration and Delivery

This program will be administered by vendors selected by National Grid through a competitive solicitation. National Grid will inspect 10% of the participants in this program through another third party vendor. Gas and electric measures will be addressed during the same home visit, allowing for a single customer contact.

Target Market and Marketing Approach

The target market for this program will be residential customers who heat with natural gas. Outreach will include bill inserts, direct mail, media advertising, and trade ally training of contractors.

Target End Uses, Recommended Technologies, and Financial Incentives

Work must be performed by BPI-certified contractors in order to be eligible for an incentive. National Grid will initially offer a 75% incentive up to $5,000 for insulation, blower-door assisted air sealing, mechanical ventilation, and related health and safety items. This level of incentive was supported by the DPS Staff in the Niagara Mohawk Interim Energy Efficiency Joint Proposal filed with the Commission on August 1, 2008. In the second and third years, National Grid will lower the incentive to 50% up to $3,000. This level of incentive was recommended by NYSERDA to improve the coordination of all programs. Contractors who are currently participating in the National Grid Weatherization program can continue to offer incentives of 50% up to $1,500. National Grid will encourage these contractors to receive training and their BPI-certification so they can offer the higher incentive to their customers.

Evaluation Plan

Year One Evaluation

In 2009, evaluation efforts will focus on identifying how the program is operating during the start-up phase, with the objective of identifying improvements that can be made to program implementation efforts. The Companies plan to initiate a process evaluation in support of these efforts. The plan is to hire an independent evaluation expert through a competitive solicitation to complete this work. This RFP will be issued shortly after the Commission authorizes the Companies to implement these programs with the objective of hiring the evaluation contractor during the program start-up phase of operations. The

Companies will request interim reports from the selected contractor so that modifications to the implementation effort can be adopted quickly where it appears that a change is likely to lead to improved results in the program. A final report summarizing results from the process evaluation will likely be completed by year-end 2009 or early in 2010.

Process Evaluation

The first year process evaluation will document program processes during start-up and will gather the following information:

- Level of customer satisfaction.
- Effectiveness of the program delivery mechanism from the position of the program delivery contractors, program customers, trade allies and other key stakeholders. Did the delivery mechanism differ from the program plan? If yes, how and why?
- Effectiveness of program promotion.
- Remaining barriers to program participation including an assessment of why some customers choose to not participate in the program.
- Identification of lessons learned and specific actionable recommendations for program improvement.
- A review of program tracking databases to ensure that data that will likely be required to support future program evaluation efforts is being collected.

As part of the process evaluation plan, the Companies will survey participating and non-participating customers as well as trade allies who have and have not promoted the program.

Year Two - Three Evaluation

Impact Evaluation

The Impact Evaluation will quantify the savings attributable to program efforts based on how the equipment installed through this program is actually operating. The Companies anticipate completing an impact evaluation of this program in 2010 through 2011 using industry-accepted methods of analysis.

The Companies will explore conducting this evaluation with the other utilities implementing a similar program so that consistent approaches are used to arrive at evaluated program savings. However, at this point in time, while awaiting guidance from the Evaluation Advisory Group, the Companies propose the following for consideration as part of its program evaluation plan.

- **Impact Evaluation Methodology.** An independent evaluation consultant will be hired through a competitive solicitation. Firms proposing to complete the work will be required to recommend an impact evaluation approach appropriate for this type of program that will produce results that meet the precision requirements set forth in the guidelines issued through the Evaluation Advisory Group. Possible evaluation approaches may include a billing data analysis, an engineering simulation model, metering, or some other approach. This analysis may include surveys with program participants and with trade allies in an effort to arrive at net savings attributable to program efforts. The results of the impact evaluation will be used to refine expectations about future program savings, and may be used to modify future programs. Results from this study are anticipated by mid-year 2011.

- **Net to Gross Analysis**. The assumptions used to develop goals for this program are provided in Appendix C attached hereto. These assumptions reflect National Grid's experience in delivering a similar program in New England, including relevant program evaluation findings. These assumptions will be updated in the

future based on evaluation findings, including updated information about free-ridership and spillover, or net-to-gross ratios as discussed above.

- **Benefit Cost Analysis.** Benefit cost analysis is performed at the measure and program level. National Grid has conducted a benefit cost analysis for this program using available information. Future assessments of cost-effectiveness will take into account findings from future program evaluation efforts.

- **Budget.** Consistent with the June 23, 2008 Order, the Companies have budgeted approximately 5% of program implementation costs to fund evaluation efforts. Actual evaluation expenses for this program may be higher or lower than this amount.

- **Sampling Strategies and Design and Data Reliability Standards.** Consistent with the Evaluation Plan Guideline for EEPS Program Administrators and as recommended by Working Group III,[7] National Grid's goal for estimating gross savings at the program level is at the 90% confidence interval, within +/- 10% precision. The Companies will develop sampling protocols for all of its evaluations based on this standard. However, actual evaluation results may deviate from this standard.

- **Steps to Identify and Mitigate Threats to Data Reliability.** The Companies will review the evaluation plan submitted by the selected evaluation contractor for consistency with the Evaluation Advisory Group guidelines, the requirement to maintain a 90% confidence interval with +/- 10 % precision and the overall need to identify and mitigate threats to reliability of the results. The evaluation contractor will be required to insure data reliability to the greatest practical extent, including methods for minimizing systematic and random error and techniques for reducing

[7] *See* Working Group III Final Report, dated December 5, 2007, at p. 37.

uncertainty introduced by necessary assumptions and adjustments to the data. The selected evaluation contractor will be asked to include a discussion about threats to data reliability in their reports.

- **Data Collection and Management Process.** Program data will be collected from customer application forms, site visits and surveys of participants and non-participants. National Grid's tracking system supplemented by data that the Companies require their implementation vendors to track supports program evaluation through the collection of all relevant data pertaining to customer rebates and installed equipment. Customer name, account, premise level and other non-program specific data is captured in the system. Measure-specific data as appropriate will also be captured. Examples of measure-specific data that will be collected can include:[8]
    - Date of contract/agreement to install measure(s)
    - Date of beginning of installation process
    - Installation completion date
    - Installation contractor
    - Installation location
    - Project or work order number
    - Type of measure
    - Annualized energy savings
    - Measure life
    - Total measure installed cost
    - Incremental measure cost
    - Incentive payment amount
    - Project completion date
    - Evaluation inspection/commissioning date
    - Date of evaluation of measure or program
    - Types of evaluation conducted
    - Result of evaluation

[8] Please note that not of all the measure-specific data listed here are going to be captured for this program.

- **Schedule and Deliverable Dates.** The Companies anticipate initiating a process evaluation early in 2009 and an impact evaluation in the fall of 2010. Final results of the process evaluation are anticipated by year-end 2009 or early in 2010. Final results for the impact evaluation are anticipated by mid-year 2011.

a. **Data Collection.** Data to be collected about this program is discussed above. Reporting is discussed below in Chapter VII. Evaluation and Reporting.

Residential ENERGY STAR® Products Program

Purpose

The purpose of this program is to encourage customers to choose ENERGY STAR® products and other high efficiency products, which will decrease their gas energy use and also support ENERGY STAR® market transformation efforts. National Grid will continue currently approved incentives for ENERGY STAR® windows and thermostats. Other cost-effective products may be added subject to available funding.

Program Administration and Delivery

This program will be administered by the Companies using vendors selected through a competitive solicitation.

Target Market and Marketing Approach

The Companies will promote ENERGY STAR® replacement windows and thermostats using various methods, including the National Grid website, electronic newsletters, bill inserts, and cooperative promotions with retailers.

Target End Uses, Recommended Technologies, and Financial Incentives

The ENERGY STAR® Replacement Window Program will provide a $10 mail-in incentive for each high-efficiency window installed in existing residential customers' homes. Eligible participants must be residential heating customers who have installed ENERGY STAR® labeled replacement windows with a U-factor of .35 or less[9] during the program year as specified on the incentive form. Windows installed in new construction or home additions will not qualify for the per window incentive. Each customer will be subject to a $500 maximum incentive per account. National Grid will work with contractors for multi-family or other large residential renovation projects on a case-by-case basis, and may provide different incentive levels for cost-effective projects.

When applying for this incentive, residential customers will be required to submit proof-of-purchase, as well as proof of the windows' U-factor. Efficiency ratings can be confirmed by the customer using either a copy of the National Fenestration Rating Council ("NFRC") label from the window, or by providing detailed specifications from the window manufacturer confirming the window's U-factor. The Companies plan to conduct inspections of the first two installations per new participating installation contractor. In addition, random inspections of self-installations may be administered to verify that the proper windows were installed.

Customers will be able to receive $25 for up to two (2) ENERGY STAR® labeled programmable thermostats, where the rebate does not exceed the price of the thermostat(s). Most sales will be through retail outlets, but program information will also be included in marketing for the high efficiency heating and controls programs. Savings for thermostats will be counted in this program.

[9] The U-Factor is a measurement of thermal conductivity. A lower U-factor indicates a higher level of window insulation.

Evaluation Plan

Year One Evaluation

In 2009, evaluation efforts will focus on identifying how the program is operating during the start-up phase, with the objective of identifying improvements that can be made to program implementation efforts. The Companies plan to initiate a process evaluation in support of these efforts. The plan is to hire an independent evaluation expert through a competitive solicitation to complete this work. This RFP will be issued shortly after the Commission authorizes the Companies to implement this program. The Companies will request interim reports from the selected contractor so that modifications to the implementation effort can be adopted quickly where it appears that a change is likely to lead to improved results in the program. A final report summarizing results from the process evaluation will likely be completed by year-end 2009 or early in 2010.

Process Evaluation

The first year process evaluation will document program processes during start-up and will gather the following information:

- Level of customer satisfaction.
- Effectiveness of the program delivery mechanism from the position of the program delivery contractors, program customers, trade allies and other key stakeholders. Did the delivery mechanism differ from the program plan? If yes, how and why?
- Effectiveness of program promotion.
- Remaining barriers to program participation including an assessment of why some customers choose to not participate in the program.
- Identification of lessons learned and specific actionable recommendations for program improvement.
- A review of program tracking databases to ensure that data that will likely be required to support future program evaluation efforts is being collected.

As part of the process evaluation plan, the Companies will survey participating and non-participating customers as well as trade allies who have and have not promoted the program.

Year Two - Three Evaluation

Impact Evaluation

The Companies anticipate completing an impact evaluation of the Residential ENERGY STAR® Products Program in 2010 through 2011 using industry-accepted methods of analysis. The Impact Evaluation will quantify the savings attributable to program efforts based on relevant market indicators[10] for the ENERGY STAR® products promoted through the program, information about rebated products, and observed or reported operation of promoted equipment in homes.

National Grid will explore conducting this evaluation with the other utilities implementing a similar program so that consistent approaches are used to arrive at evaluated program savings. However, at this point in time, while awaiting guidance from the Evaluation Advisory Group, the Companies propose the following for consideration as part of its program evaluation plan.

- **Impact Evaluation Methodology.** An independent evaluation consultant will be hired through a competitive solicitation. Firms proposing to complete the work will be required to recommend an impact evaluation approach appropriate for this type of program that will produce results that meet the precision requirements set forth in the guidelines issued through the Evaluation Advisory Group. Possible evaluation approaches may include engineering analysis, synthesis of secondary

[10] Relevant market indicators may include sales data about qualifying products from participating retailers compared to sales data in states that do not have active ENERGY STAR® programs and survey-derived ENERGY STAR® awareness statistics.

information available about savings, metering, or some other approach. This analysis may include market analyses, surveys with program participants and with trade allies such as retailers and distributors, and other appropriate methods in an effort to arrive at net savings attributable to program efforts. The results of the impact evaluation will be used to refine expectations about future program savings, and may be used to modify future programs. Results from this study are anticipated by mid to late 2011.

- **Net to Gross Analysis**. The assumptions used to develop goals for this program are provided in Appendix C attached hereto. These assumptions reflect National Grid's experience in delivering a similar program in New England, including relevant program evaluation findings. These assumptions will be updated in the future based on evaluation findings, including updated information about free-ridership and spillover, or net-to-gross ratios as discussed above.

- **Benefit Cost Analysis.** Benefit cost analysis is performed at the measure and program level. National Grid has conducted a benefit cost analysis for this program using available information. Future assessments of cost-effectiveness will take into account findings from future program evaluation efforts.

- **Budget.** Consistent with the June 23, 2008 Order, the Companies have budgeted approximately 5% of program implementation costs to fund evaluation efforts. Actual evaluation expenses for this program may be higher or lower than this amount.

- **Sampling Strategies and Design and Data Reliability Standards.** Consistent with the Evaluation Plan Guideline for EEPS Program Administrators and as recommended by Working Group III,[11] National Grid's goal for estimating gross

[11] *See* Working Group III Final Report, dated December 5, 2007, at p. 37.

savings at the program level is at the 90% confidence interval, within +/- 10% precision. The Companies will develop sampling protocols for all of its evaluations based on this standard. However, actual evaluation results may deviate from this standard.

- **Steps to Identify and Mitigate Threats to Data Reliability.** The Companies will review the evaluation plan submitted by the selected evaluation contractor for consistency with the Evaluation Advisory Group guidelines, the requirement to maintain a 90% confidence interval with +/- 10 % precision and the overall need to identify and mitigate threats to reliability of the results. The evaluation contractor will be required to insure data reliability to the greatest practical extent, including methods for minimizing systematic and random error and techniques for reducing uncertainty introduced by necessary assumptions and adjustments to the data. The selected evaluation contractor will be asked to include a discussion about threats to data reliability in their reports.

- **Data Collection and Management Process.** Program data will be collected from customer rebate forms, site visits and surveys of participants and non-participants. National Grid's tracking system supplemented by data that the Companies require its implementation vendors to track supports program evaluation through the collection of all relevant data pertaining to customer rebates and installed or removed equipment. Customer name, account, premise level and other non-program specific data is captured in the system. Measure-specific data as appropriate will also be captured. Examples of measure-specific data that will be collected can include:[12]
    - Date of contract/agreement to install measure(s)
    - Date of beginning of installation process
    - Installation completion date
    - Installation contractor
    - Installation location

[12] Please note that not of all the measure-specific data listed here are going to be captured for this program.

- Project or work order number
- Type of measure
- Annualized energy savings
- Measure life
- Total measure installed cost
- Incremental measure cost
- Incentive payment amount
- Project completion date
- Evaluation inspection/commissioning date
- Date of evaluation of measure or program
- Types of evaluation conducted
- Result of evaluation

- **Schedule and Deliverable Dates.** The Companies anticipate initiating a process evaluation in 2009 and an impact evaluation in the fall of 2010. Final results of the process evaluation are anticipated by year-end 2009 or early in 2010. Final results for the impact evaluation are anticipated by year-end 2011 or early in 2012.

b. Data Collection. Data to be collected about this program is discussed above. Reporting is discussed below in Chapter VII. Evaluation and Reporting.

Residential Low Income Program

Purpose

National Grid recognizes that low-income customers are severely impacted by high energy bills and often struggle to keep their families warm and safe. The Companies view the funding of low-income services as a high priority for energy efficiency. As they have done since 2007, the Companies seek to continue the Low Income Residential Energy Conservation Program in New York City and Long Island. This program is administered

by the Association for Energy Affordability ("AEA") of Bronx, NY, and delivered by AEA and a coalition of community-based organizations. These organizations include the Community Development Corporation of Long Island, Inc.; Margert Community Corporation; Sunset Park Redevelpment Committee; Bedford Stuyvesant Restoration Corporation; Northfield Community Local Development Corporation; HANAC, Inc., People's Firehouse, Inc., Crown Heights Jewish Community Council; Community Environmental Center; and Opportunity Development Association CDC.

Coordination

National Grid will fund AEA to deliver this program to low income customers. AEA works very closely with NYSERDA, the City of New York, the State of New York Division of Housing and Community Renewal's Energy Services Bureau, and many other agencies as partners in the metropolitan New York City area to ensure coordination of services.

Co-Benefits

Adding insulation and air sealing to existing homes increases the value and durability of housing stock. It may also improve health through the control of existing moisture problems and identification of the potential for carbon monoxide poisoning and other unhealthy existing conditions. Insulation and air sealing reduces the heating and air conditioning bills of residents, resulting in more money that can be spent on other households' needs, and potentially improving the local economy.

Program Administration and Delivery

The Companies and AEA have implemented the Low Income Residential Energy Conservation Program ("Low Income Program") since 2007 as part of the Companies' initial offering of gas energy efficiency programs. The Low Income Program was initially approved by the Commission at a $5.8 million funding level for New York City and at a

$2.9 million funding level for Long Island. National Grid, AEA, and collaborating agencies will continue to collaborate to serve additional customers with energy efficiency dollars. The Companies' customers who heat with natural gas and meet program guidelines will be eligible to participate in this program.

Target Market and Marketing Approach

AEA, collaborating agencies, and National Grid will promote this program directly to customers who are low income and have trouble paying their bills. The Company will develop, design, and print specialized educational materials in English and Spanish for limited income and payment-troubled customers.

Customers with household income levels at or below 60% of the New York State Area Median Income are eligible for services. Tenants are eligible to receive services if the customer is the bill payer and if the landlord agrees not to raise the rent based on the energy efficiency improvements made by the program. Services are free to program participants.

Target End Uses, Recommended Technologies, and Financial Incentives

Measures for the program include attic, roof space, crawl space, and wall insulation, blower-door assisted air sealing, Low E Argon filled windows, heating pipe insulation, heating system repair, upgrade, or replacement, heating controls, and energy management systems, and related health and safety measures. These are the same measures available to low-income customers through the state-administered Weatherization Assistance Program ("WAP"). This program also coordinates closely with the New York City Energy Services Bureau of the Division of Housing and Community Renewal.

Evaluation Plan

Year One Evaluation

In 2009, evaluation efforts will focus on identifying how the program is operating during the start-up phase, with the objective of identifying improvements that can be made to program implementation efforts. The Company plans to initiate a process evaluation in support of these efforts. The plan is to hire an independent evaluation expert through a competitive solicitation to complete this work. This RFP will be issued shortly after the Commission authorizes the Companies to implement this program with the objective of hiring the evaluation contractor during the program start-up phase of operations. The Companies will request interim reports from the selected contractor so that modifications to the implementation effort can be adopted quickly where it appears that a change is likely to lead to improved results in the program. A final report summarizing results from the process evaluation will likely be completed by year-end 2009 or early in 2010.

Process Evaluation

The first year process evaluation will document program processes during start-up and will gather the following information:

- Level of customer satisfaction.
- Effectiveness of the program delivery mechanism from the position of the program delivery contractors, program customers, trade allies and other key stakeholders. Did the delivery mechanism differ from the program plan? If yes, how and why?
- Effectiveness of program promotion.
- Remaining barriers to program participation including an assessment of why some customers choose to not participate in the program.
- Identification of lessons learned and specific actionable recommendations for program improvement.

- A review of program tracking databases to ensure that data that will likely be required to support future program evaluation efforts is being collected.

As part of the process evaluation plan, the Companies will survey participating and non-participating customers as well as trade allies who have and have not promoted the program.

Year Two - Three Evaluation

Impact Evaluation

The Impact Evaluation will quantify the savings attributable to program efforts based on how the equipment installed through this program is actually operating. The Companies anticipate completing an impact evaluation of this program in 2010 through 2011 using industry-accepted methods of analysis.

National Grid will explore conducting this evaluation with the other utilities implementing a similar program so that consistent approaches are used to arrive at evaluated program savings. However, at this point in time, while awaiting guidance from the Evaluation Advisory Group, the Companies propose the following for consideration as part of their program evaluation plan.

- **Impact Evaluation Methodology.** An independent evaluation consultant will be hired through a competitive solicitation. Firms proposing to complete the work will be required to recommend an impact evaluation approach appropriate for this type of program that will produce results that meet the precision requirements set forth in the guidelines issued through the Evaluation Advisory Group. Possible evaluation approaches may include a billing data analysis, an engineering simulation model, metering, or some other approach. This analysis may include surveys with program participants and with trade allies in an effort to arrive at net savings attributable to program efforts. The results of the impact evaluation will be

used to refine expectations about future program savings, and may be used to modify future programs. Results from this study are anticipated by mid-year 2011.

- **Net to Gross Analysis.** The assumptions used to develop goals for this program are provided in Appendix C attached hereto. These assumptions reflect National Grid's experience in delivering a similar program in New England, including relevant program evaluation findings. These assumptions will be updated in the future based on evaluation findings, including updated information about free-ridership and spillover, or net-to-gross ratios as discussed above.

- **Benefit Cost Analysis.** Benefit cost analysis is performed at the measure and program level. National Grid has conducted a benefit cost analysis for this program using available information. Future assessments of cost-effectiveness will take into account findings from future program evaluation efforts.

- **Budget.** Consistent with the June 23, 2008 Order, the Companies have budgeted approximately 5% of program implementation costs to fund evaluation efforts. Actual evaluation expenses for this program may be higher or lower than this amount.

- **Sampling Strategies and Design and Data Reliability Standards.** Consistent with the Evaluation Plan Guideline for EEPS Program Administrators and as recommended by Working Group III,[13] National Grid's goal for estimating gross savings at the program level is at the 90% confidence interval, within +/- 10% precision. The Companies will develop sampling protocols for all of its evaluations based on this standard. However, actual evaluation results may deviate from this standard.

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[13] *See* Working Group III Final Report, dated December 5, 2007, at p. 37.

- **Steps to Identify and Mitigate Threats to Data Reliability. The** Companies will review the evaluation plan submitted by the selected evaluation contractor for consistency with the Evaluation Advisory Group guidelines, the requirement to maintain a 90% confidence interval with +/- 10 % precision and the overall need to identify and mitigate threats to reliability of the results. The evaluation contractor will be required to insure data reliability to the greatest practical extent, including methods for minimizing systematic and random error and techniques for reducing uncertainty introduced by necessary assumptions and adjustments to the data. The selected evaluation contractor will be asked to include a discussion about threats to data reliability in their reports.

- **Data Collection and Management Process.** Program data will be collected from customer application forms, site visits and surveys of participants and non-participants. National Grid's tracking system supplemented by data that the Company requires its implementation vendors to track supports program evaluation through the collection of all relevant data pertaining to customer rebates and installed equipment. Customer name, account, premise level and other non-program specific data is captured in the system. Measure-specific data as appropriate will also be captured. Examples of measure-specific data that will be collected can include:[14]
    - Date of contract/agreement to install measure(s)
    - Date of beginning of installation process
    - Installation completion date
    - Installation contractor
    - Installation location
    - Project or work order number
    - Type of measure
    - Annualized energy savings
    - Measure life
    - Total measure installed cost

[14] Please note that not of all the measure-specific data listed here are going to be captured for this program.

- Incremental measure cost
- Incentive payment amount
- Project completion date
- Evaluation inspection/commissioning date
- Date of evaluation of measure or program
- Types of evaluation conducted
- Result of evaluation

- **Schedule and Deliverable Dates.** The Companies anticipate initiating a process evaluation early in 2009 and an impact evaluation in the fall of 2010. Final results of the process evaluation are anticipated by year-end 2009 or early in 2010. Final results for the impact evaluation are anticipated by mid-year 2011.

c. **Data Collection.** Data to be collected about this program is discussed above. Reporting is discussed below in Chapter VII. Evaluation and Reporting.

Residential Internet Audit Program and E-Commerce Sales

Purpose

The purpose of this program is to provide customers with easy access to information about energy usage in their homes, and encourage them to participate in the National Grid, LIPA, and NYSERDA energy efficiency programs. This program also provides easy access to on-line purchases of compact fluorescent lighting, weatherization materials, and other do-it-yourself products.

Coordination

National Grid will provide links to the NYSERDA, LIPA, and National Grid websites where energy efficiency information and program offerings are explained.

Co-Benefits

Customers who implement energy efficiency practices will contribute to the improvement of the area's housing stock. Reduced residents' heating and air conditioning bills result in more money that can be spent on other household needs and potentially improving the local economy.

Program Administration and Delivery

This program will be administered by National Grid using an internet and software vendor selected through a competitive solicitation. National Grid intends to continue to provide customers with access to its existing services available, and may modify the software and delivery vendor through a competitive bid process.

Target Market and Marketing Approach

The website address will be included on all of the Companies' residential energy efficiency program literature. A Spanish-language version may also be made available for on-line use. Several thousand customers have already participated in this program in National Grid's downstate New York territory, and tens of thousands have participated in New England. Customers are interested in easy access to information about energy efficiency.

Target End Uses, Recommended Technologies, and Financial Incentives

This self-service audit tool will allow customers to complete an electronic survey about their home, including age, size, appliances and average use patterns. The process starts with twelve basic questions to produce a report that compares the participant's home with similar homes and to generate their "Top Ways to Save," including estimated annual cost savings if recommended measures are taken.

Subsequent steps will require more detailed information from the customer, resulting in more personalized tips to improve the home's efficiency. The analyzer will be fuel-blind

and will list opportunities to save in heating/cooling, lighting, water use, etc. The customer will also receive information about any relevant energy efficiency opportunities such as those offered through National Grid, LIPA, and NYSERDA energy efficiency programs.

Evaluation Plan

Year One Evaluation

In 2009, evaluation efforts will focus on identifying how the program is operating during the start-up phase, with the objective of identifying improvements that can be made to program implementation efforts. The Companies plan to initiate a process evaluation in support of these efforts. The plan is to hire an independent evaluation expert through a competitive solicitation to complete this work. This RFP will be issued shortly after the Commission authorizes the Company to implement this program. The Companies will request interim reports from the selected contractor so that modifications to the implementation effort can be adopted quickly where it appears that a change is likely to lead to improved results in the program. A final report summarizing results from the process evaluation will likely be completed by year-end 2009 or early in 2010.

Process Evaluation

The first year process evaluation will document program processes during start-up and will gather the following information:

- Level of customer satisfaction.
- Effectiveness of the program delivery mechanism from the position of the program delivery contractors, program customers, trade allies and other key stakeholders. Did the delivery mechanism differ from the program plan? If yes, how and why?
- Effectiveness of program promotion.
- Remaining barriers to program participation including an assessment of why some customers choose to not participate in the program.

- Identification of lessons learned and specific actionable recommendations for program improvement.

As part of the process evaluation plan, the Companies will survey participating and non-participating customers.

Year Two - Three Evaluation

Impact Evaluation

National Grid anticipates completing an impact evaluation of the Residential Internet Audit Program and E-Commerce Sales in 2010 through 2011 using industry-accepted methods of analysis. The Impact Evaluation will quantify the savings attributable to program efforts based on surveys with customers that will be used to identify recommended actions from the audit that participating customers acted on and the savings realized from following those recommendations. The impact evaluation will also include an assessment of the savings related to products sold through the e-commerce service in the program.

National Grid will explore conducting this evaluation with the other utilities implementing a similar program so that consistent approaches are used to arrive at evaluated program savings. However, at this point in time, while awaiting guidance from the Evaluation Advisory Group, the Companies propose the following for consideration as part of its program evaluation plan.

- **Impact Evaluation Methodology.** An independent evaluation consultant will be hired through a competitive solicitation. Firms proposing to complete the work will be required to recommend an impact evaluation approach appropriate for this type of program that will produce results that meet the precision requirements set forth in the guidelines issued through the Evaluation Advisory Group. A survey based approach possibly supplemented by site visits is anticipated. The results of the impact evaluation will be used to refine expectations about future program

savings, and may be used to modify future programs. Results from this study are anticipated by year-end 2011.

- **Net to Gross Analysis**. The assumptions used to develop goals for this program are provided in Appendix C attached hereto. These assumptions reflect National Grid's experience in delivering a similar program in New England, including relevant program evaluation findings. These assumptions will be updated in the future based on evaluation findings, including updated information about free-ridership and spillover, or net-to-gross ratios as discussed above.

- **Benefit Cost Analysis.** Benefit cost analysis is performed at the measure and program level. National Grid has conducted a benefit cost analysis for this program using available information. Future assessments of cost-effectiveness will take into account findings from future program evaluation efforts.

- **Budget.** Consistent with the June 23, 2008 Order, the Companies have budgeted approximately 5% of program implementation costs to fund evaluation efforts. Actual evaluation expenses for this program may be higher or lower than this amount.

- **Sampling Strategies and Design and Data Reliability Standards.** Consistent with the Evaluation Plan Guideline for EEPS Program Administrators and as recommended by Working Group III,[15] National Grid's goal for estimating gross savings at the program level is at the 90% confidence interval, within +/- 10% precision. The Companies will develop sampling protocols for all of their evaluations based on this standard. However, actual evaluation results may deviate from this standard.

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[15] *See* Working Group III Final Report, dated December 5, 2007, at p. 37.

- **Steps to Identify and Mitigate Threats to Data Reliability.** The Companies will review the evaluation plan submitted by the selected evaluation contractor for consistency with the Evaluation Advisory Group guidelines, the requirement to maintain a 90% confidence interval with +/- 10 % precision and the overall need to identify and mitigate threats to reliability of the results. The evaluation contractor will be required to insure data reliability to the greatest practical extent, including methods for minimizing systematic and random error and techniques for reducing uncertainty introduced by necessary assumptions and adjustments to the data. The selected evaluation contractor will be asked to include a discussion about threats to data reliability in their reports.

- **Data Collection and Management Process.** National Grid will track "hits" on the internet audit site, e-commerce sales resulting from customer participation in the program, and data that will be collected from site visits and surveys of participants and non-participants. Measure-specific data as appropriate will also be captured. Examples of measure-specific data that will be collected can include:[16]
    - Date of contract/agreement to install measure(s)
    - Date of beginning of installation process
    - Installation completion date
    - Installation contractor
    - Installation location
    - Project or work order number
    - Type of measure
    - Annualized energy savings
    - Measure life
    - Total measure installed cost
    - Incremental measure cost
    - Incentive payment amount
    - Project completion date
    - Evaluation inspection/commissioning date

[16] Please note that not of all the measure-specific data listed here are going to be captured for this program.

- Date of evaluation of measure or program
- Types of evaluation conducted
- Result of evaluation

- **Schedule and Deliverable Dates.** National Grid anticipates initiating a process evaluation in 2009 and an impact evaluation in the fall of 2010 or early in 2011. Final results of the process evaluation are anticipated by year-end 2009 or early in 2010. Final results for the impact evaluation are anticipated by year-end 2011 or early in 2012.

d. Data Collection. Data to be collected about this program is discussed above. Reporting is discussed below in Chapter VII. Evaluation and Reporting.

Residential Building Practices and Demonstration Program

Purpose

The purpose of this program is to provide incentives to customers and contractor support to introduce new, highly efficient products and services to National Grid customers. This will include installation pilot programs and other demonstration projects.

Coordination and Co-Benefits

National Grid will share results from the demonstration projects with DPS Staff, other utilities, LIPA, and NYSERDA. This will allow for discussion and refinement of these offerings and may result in new programs that can be offered to all New York customers.

Program Administration and Delivery

This program will be administered by the Companies using vendors as needed. The program will demonstrate new and/or under-utilized energy efficiency practices and equipment that can enhance a home's overall energy savings potential. Eligible participants in this program will include homeowners, landlords and new home builders. Each participant may be asked to allow monitoring of the installation and publication of the results in case study format.

Target Market and Marketing Approach

Marketing of the program will rely on networking with those in the industry who are developing or offering new or under-utilized gas energy efficiency technologies, as well as other interested organizations, such as local Heating, Ventilation and Air Conditioning contractors, the Northeast Sustainable Energy Association ("NESEA"), Affordable Comfort, Inc ("ACI"), and the U.S. Green Building Councils' Leadership in Energy and Environmental Design ("LEED").

Target End Uses, Recommended Technologies, and Financial Incentives

The focus of this program is new technology that is not yet proven or that may be identified during the approved program delivery period although not currently identified. National Grid will continue to explore the installation and testing of additional products such as solar water heating, micro Combined Heat and Power units, and other technologies as they emerge.

Evaluation Plan

Year One Evaluation

In 2009, evaluation efforts will focus on identifying how the program is operating during the start-up phase, with the objective of identifying improvements that can be made to program implementation efforts. National Grid plans to initiate a process evaluation in support of these efforts. The plan is to hire an independent evaluation expert through a competitive solicitation to complete this work. This RFP will be issued shortly after the Commission authorizes the Companies to implement this program with the objective of hiring the evaluation contractor during the program start-up phase of operations. The Companies will request interim reports from the selected contractor so that modifications to the implementation effort can be adopted quickly where it appears that a change is likely to lead to improved results in the program. A final report summarizing results from the process evaluation will likely be completed by year-end 2009 or early in 2010.

Process Evaluation

The first year process evaluation will document program processes during start-up and will gather the following information:

- Level of customer satisfaction.
- Effectiveness of the program delivery mechanism from the position of the program delivery contractors, program customers, trade allies and other key stakeholders. Did the delivery mechanism differ from the program plan? If yes, how and why?
- Effectiveness of program promotion.
- Remaining barriers to program participation including an assessment of why some customers choose to not participate in the program.
- Identification of lessons learned and specific actionable recommendations for program improvement.

- A review of program tracking databases to ensure that data that will likely be required to support future program evaluation efforts is being collected.

As part of the process evaluation plan, the Companies will survey participating and non-participating customers as well as trade allies who have and have not promoted the program.

Year Two - Three Evaluation

Impact Evaluation

The Impact Evaluation will quantify the savings attributable to program efforts based on how the equipment installed through this program is actually operating. National Grid anticipates impact evaluation efforts will be an on-going and regular focus of this R&D focused program.

- **Impact Evaluation Methodology.** An independent evaluation consultant will be hired through a competitive solicitation. National Grid anticipates that the selected evaluation firm will participate in project planning efforts so that key findings and savings from efforts are well documented. Impact evaluation approaches appropriate for the unique measures installed through this type of program are anticipated to produce results that meet the precision requirements set forth in the guidelines issued through the Evaluation Advisory Group. Possible evaluation approaches may include a billing data analysis, an engineering simulation model, metering, or some other approach. This analysis may include surveys with program participants and with trade allies in an effort to arrive at net savings attributable to program efforts. The results of the impact evaluation will be used to refine expectations about future program savings, and may be used to modify future programs. Results from this study are anticipated by year-end 2011 or early in 2012.

- **Net to Gross Analysis.** The assumptions used to develop goals for this program are provided in Appendix C attached hereto. These assumptions reflect National Grid's experience in delivering a similar program in New England, including relevant program evaluation findings. These assumptions will be updated in the future based on evaluation findings, including updated information about free-ridership and spillover, or net-to-gross ratios as discussed above.

- **Benefit Cost Analysis.** Benefit cost analysis is performed at the measure and program level. National Grid has conducted a benefit cost analysis for this program using available information. Future assessments of cost-effectiveness will take into account findings from future program evaluation efforts.

- **Budget.** Consistent with the June 23, 2008 Order, the Companies have budgeted approximately 5% of program implementation costs to fund evaluation efforts. Actual evaluation expenses for this program may be higher or lower than this amount.

- **Sampling Strategies and Design and Data Reliability Standards.** Consistent with the Evaluation Plan Guideline for EEPS Program Administrators and as recommended by Working Group III,[17] National Grid's goal for estimating gross savings at the program level is at the 90% confidence interval, within +/- 10% precision. The Companies will develop sampling protocols for all of their evaluations based on this standard. However, actual evaluation results may deviate from this standard.

- **Steps to Identify and Mitigate Threats to Data Reliability.** The Companies will review the evaluation plan submitted by the selected evaluation contractor for consistency with the Evaluation Advisory Group guidelines, the requirement to

[17] *See* Working Group III Final Report, dated December 5, 2007, at p. 37.

maintain a 90% confidence interval with +/- 10 % precision and the overall need to identify and mitigate threats to reliability of the results. The evaluation contractor will be required to insure data reliability to the greatest practical extent, including methods for minimizing systematic and random error and techniques for reducing uncertainty introduced by necessary assumptions and adjustments to the data. The selected evaluation contractor will be asked to include a discussion about threats to data reliability in their reports.

- **Data Collection and Management Process.** Program data will be collected from customer application forms, site visits and surveys of participants and non-participants. National Grid's tracking system supplemented by data that the Companies requires its implementation vendors to track supports program evaluation through the collection of all relevant data pertaining to customer rebates and installed equipment. Customer name, account, premise level and other non-program specific data is captured in the system. Measure-specific data as appropriate will also be captured. Examples of measure-specific data that will be collected can include:[18]
    - Date of contract/agreement to install measure(s)
    - Date of beginning of installation process
    - Installation completion date
    - Installation contractor
    - Installation location
    - Project or work order number
    - Type of measure
    - Annualized energy savings
    - Measure life
    - Total measure installed cost
    - Incremental measure cost
    - Incentive payment amount
    - Project completion date

[18] Please note that not of all the measure-specific data listed here are going to be captured for this program.

- Evaluation inspection/commissioning date
- Date of evaluation of measure or program
- Types of evaluation conducted
- Result of evaluation

- **Schedule and Deliverable Dates.** National Grid anticipates initiating a process evaluation early in 2009 and an impact evaluation in the fall of 2010. Final results of the process evaluation are anticipated by year-end 2009 or early in 2010. Final results for the impact evaluation are anticipated by year-end 2011 or early in 2012.

e. Data Collection. Data to be collected about this program is discussed above. Reporting is discussed below in Chapter VII. Evaluation and Reporting.

Home Energy Audits

Purpose

The purpose of this program is to provide residential customers with thorough inspections of their homes to assess the homes' energy efficiency by energy advisors who are trained in building science and energy efficiency, and who will provide our customers with information and access to the expertise and financial incentives that are available from National Grid, NYSERDA, LIPA and Consolidated Edison.

Program Description

The residential in-home energy audit program provides natural gas customers with customized information that will help them understand how to make their home more energy efficient by making energy efficiency improvements to their home, thereby reducing the amount of natural gas that is consumed in their homes. The Companies began offering this program to customers in 2007. It is extremely popular and there is currently a

90-day waiting period for scheduling this service. In addition, participants in this program often participate in the Companies' other energy efficiency programs as a result of recommendations made during the audit. For this reason, National Grid recommends continuing this valuable service for customers, in spite of the low benefit-cost ratio for this program.

During the course of the energy assessment the energy advisor will, with the homeowner or tenant's permission, install high quality, low cost energy efficiency Instant Savings Measures ("ISMs") that have an average total value of $20 to $30. Examples of ISMs include compact fluorescent bulbs (up to a quantity of two), water saving showerheads and aerators, and sample weatherization materials. The advisor also performs standard health and safety assessments.

At the conclusion of the assessment, the energy advisor provides the customer with a report detailing prioritized recommendations to improve the energy efficiency of the home along with the financial incentives available from National Grid, NYSERDA, LIPA and Consolidated Edison, if eligible measures are installed. The Companies follow up with participating customers after the audit to encourage their participation in other energy efficiency programs that are likely to benefit the customer. The advisor also recommends and documents all home health and safety issues that are present and in need of correction.

Coordination and Co-Benefits

National Grid will coordinate with NYSERDA, LIPA and Consolidated Edison to ensure that customers are informed about all possible energy efficiency opportunities. A home energy audit provides important co-benefits such as creating an awareness of energy efficiency benefits for customers, identifying potentially life-threatening health and safety conditions in the home, and creating locally-based jobs for energy audit staff and contractors.

Program Administration and Delivery

This program will be administered by National Grid working with vendors who will be selected through a competitive solicitation.

Target Market and Marketing Approach

All residential customers who have a National Grid natural gas account are eligible to participate in this program. Marketing approaches will include direct mail campaigns, media advertising, bill inserts, community events, sponsorships and information on National Grid's corporate and energy efficiency web pages. Paper and electronic program brochures and incentive applications will be the primary marketing material utilized.

National Grid will offer a variety of marketing and educational awareness campaigns to create awareness for this program. A strong emphasis will be placed on working with local community and governmental partners who provide energy and environmental educational information to their constituents.

Evaluation Plan

Year One Evaluation

In 2009, evaluation efforts will focus on identifying how the program is operating during the start-up phase, with the objective of identifying improvements that can be made to program implementation efforts. National Grid plans to initiate a process evaluation in support of these efforts. The plan is to hire an independent evaluation expert through a competitive solicitation to complete this work. This RFP will be issued shortly after the Commission authorizes the Companies to implement this program with the objective of hiring the evaluation contractor during the program start-up phase of operations. The Companies will request interim reports from the selected contractor so that modifications to the implementation effort can be adopted quickly where it appears that a change is likely

to lead to improved results in the program. A final report summarizing results from the process evaluation will likely be completed by year-end 2009 or early in 2010.

Process Evaluation

The first year process evaluation will document program processes during start-up and will gather the following information:

- Level of customer satisfaction.
- Effectiveness of the program delivery mechanism from the position of the program delivery contractors, program customers, trade allies and other key stakeholders. Did the delivery mechanism differ from the program plan? If yes, how and why?
- Effectiveness of program promotion.
- Remaining barriers to program participation including an assessment of why some customers choose to not participate in the program.
- Identification of lessons learned and specific actionable recommendations for program improvement.
- A review of program tracking databases to ensure that data that will likely be required to support future program evaluation efforts is being collected.

As part of the process evaluation plan, the Companies will survey participating and non-participating customers as well as trade allies who have and have not promoted the program.

Year Two - Three Evaluation

Impact Evaluation

The Impact Evaluation will quantify the savings attributable to program efforts based on how the equipment installed through this program is actually operating. National Grid

anticipates completing an impact evaluation of this program in 2010 through 2011 using industry-accepted methods of analysis.

National Grid will explore conducting this evaluation with the other utilities implementing a similar program so that consistent approaches are used to arrive at evaluated program savings. However, at this point in time, while awaiting guidance from the Evaluation Advisory Group, the Companies propose the following for consideration as part of their program evaluation plan.

- **Impact Evaluation Methodology.** An independent evaluation consultant will be hired through a competitive solicitation. Firms proposing to complete the work will be required to recommend an impact evaluation approach appropriate for this type of program that will produce results that meet the precision requirements set forth in the guidelines issued through the Evaluation Advisory Group. Possible evaluation approaches may include a billing data analysis, an engineering simulation model, metering, or some other approach. This analysis may include surveys with program participants and with trade allies in an effort to arrive at net savings attributable to program efforts. The results of the impact evaluation will be used to refine expectations about future program savings, and may be used to modify future programs. Results from this study are anticipated by mid-year 2011.

- **Net to Gross Analysis**. The assumptions used to develop goals for this program are provided in Appendix C attached hereto. These assumptions reflect National Grid's experience in delivering a similar program in New England, including relevant program evaluation findings. These assumptions will be updated in the future based on evaluation findings, including updated information about free-ridership and spillover, or net-to-gross ratios as discussed above.

- **Benefit Cost Analysis.** Benefit cost analysis is performed at the measure and program level. National Grid has conducted a benefit cost analysis for this

program using available information. Future assessments of cost-effectiveness will take into account findings from future program evaluation efforts.

- **Budget.** Consistent with the June 23, 2008 Order, the Companies have budgeted approximately 5% of program implementation costs to fund evaluation efforts. Actual evaluation expenses for this program may be higher or lower than this amount.

- **Sampling Strategies and Design and Data Reliability Standards.** Consistent with the Evaluation Plan Guideline for EEPS Program Administrators and as recommended by Working Group III,[19] National Grid's goal for estimating gross savings at the program level is at the 90% confidence interval, within +/- 10% precision. National Grid will develop sampling protocols for all of its evaluations based on this standard. However, actual evaluation results may deviate from this standard.

- **Steps to Identify and Mitigate Threats to Data Reliability.** The Companies will review the evaluation plan submitted by the selected evaluation contractor for consistency with the Evaluation Advisory Group guidelines, the requirement to maintain a 90% confidence interval with +/- 10 % precision and the overall need to identify and mitigate threats to reliability of the results. The evaluation contractor will be required to insure data reliability to the greatest practical extent, including methods for minimizing systematic and random error and techniques for reducing uncertainty introduced by necessary assumptions and adjustments to the data. The selected evaluation contractor will be asked to include a discussion about threats to data reliability in their reports.

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[19] *See* Working Group III Final Report, dated December 5, 2007, at p. 37.

- **Data Collection and Management Process.** Program data will be collected from customer application forms, site visits and surveys of participants and non-participants. National Grid's tracking system supplemented by data that the Companies require their implementation vendors to track supports program evaluation through the collection of all relevant data pertaining to customer rebates and installed equipment. Customer name, account, premise level and other non-program specific data is captured in the system. Measure-specific data as appropriate will also be captured. Examples of measure-specific data that will be collected can include:[20]
    - Date of contract/agreement to install measure(s)
    - Date of beginning of installation process
    - Installation completion date
    - Installation contractor
    - Installation location
    - Project or work order number
    - Type of measure
    - Annualized energy savings
    - Measure life
    - Total measure installed cost
    - Incremental measure cost
    - Incentive payment amount
    - Project completion date
    - Evaluation inspection/commissioning date
    - Date of evaluation of measure or program
    - Types of evaluation conducted
    - Result of evaluation

- **Schedule and Deliverable Dates.** National Grid anticipates initiating a process evaluation early in 2009 and an impact evaluation in the fall of 2010. Final results

[20] Please note that not of all the measure-specific data listed here are going to be captured for this program.

of the process evaluation are anticipated by year-end 2009 or early in 2010. Final results for the impact evaluation are anticipated by mid-year 2011.

f. **Data Collection.** Data to be collected about this program is discussed above. Reporting is discussed below in Chapter VII. Evaluation and Reporting.

ENERGY STAR® Homes Program on Long Island

Purpose

National Grid continues its strong support of the comprehensive whole-house approach of New York State ENERGY STAR® Homes, with the purpose of encouraging the construction of energy-efficient homes through education and financial incentives.

Program Description

This program offers a prescriptive package to builders, developers, architects, and homeowners who are interested in building energy-efficient housing. The National Grid New Construction Program will support the Long Island Power Authority ("LIPA") ENERGY STAR® Homes Program by building awareness and better building practices in residential new construction. This will include trade ally training, enhanced incentives and consumer marketing and education. National Grid will build on established relationships with builders and developers and will manage this program in collaboration with LIPA to bring ENERGY STAR® Homes and energy efficiency options to this market segment.

Coordination and Co-Benefits

Collaborating with LIPA, National Grid will encourage contractors who are not currently participating in the LIPA ENERGY STAR® program to become active participants.

Important co-benefits include increasing the building and diagnostic skills of local builders, improving the overall energy efficiency of the Long Island housing stock, and safeguarding the health and safety of Long Island residents living in new homes.

Program Administration and Delivery

This program will be administered by National Grid in coordination with LIPA and program vendors.

Target Market and Marketing Approach

The target market for this program includes builders, developers and trade allies who are not active participants in the LIPA ENERGY STAR® Homes Program. Trade ally training will be a large component of marketing this program, taking full advantage of National Grid's very strong trade ally network to which we will promote the program and support LIPA's outreach efforts. Co-branding and enhanced incentives for builders and trade allies will be explored with LIPA.

Evaluation Plan

Year One Evaluation

In 2009, evaluation efforts will focus on identifying how the program is operating during the start-up phase, with the objective of identifying improvements that can be made to program implementation efforts. National Grid plans to initiate a process evaluation in support of these efforts. The plan is to hire an independent evaluation expert through a competitive solicitation to complete this work. This RFP will be issued shortly after the Commission authorizes National Grid to implement this program with the objective of hiring the evaluation contractor during the program start-up phase of operations. National Grid will request interim reports from the selected contractor so that modifications to the implementation effort can be adopted quickly where it appears that a change is likely to

lead to improved results in the program. A final report summarizing results from the process evaluation will likely be completed early in 2010.

Process Evaluation

The first year process evaluation will document program processes during start-up and will gather the following information:

- Level of customer satisfaction.
- Effectiveness of the program delivery mechanism from the position of the program delivery contractors, program customers, trade allies and other key stakeholders. Did the delivery mechanism differ from the program plan? If yes, how and why?
- Effectiveness of program promotion.
- Remaining barriers to program participation including an assessment of why some customers choose to not participate in the program.
- Identification of lessons learned and specific actionable recommendations for program improvement.
- A review of program tracking databases to ensure that data that will likely be required to support future program evaluation efforts is being collected.

As part of the process evaluation plan, National Grid will survey participating and non-participating customers as well as trade allies who have and have not promoted the program.

Year Two - Three Evaluation

Impact Evaluation

The Impact Evaluation will quantify the savings attributable to program efforts based on energy use of the completed ENERGY STAR® Home compared to energy use in a similar

home built to code. National Grid anticipates completing an impact evaluation of this program in 2010 through 2011 using industry-accepted methods of analysis.

National Grid will explore conducting this evaluation with the other utilities implementing a similar program so that consistent approaches are used to arrive at evaluated program savings. However, at this point in time, while awaiting guidance from the Evaluation Advisory Group, National Grid proposes the following for consideration as part of its program evaluation plan.

- **Impact Evaluation Methodology.** An independent evaluation consultant will be hired through a competitive solicitation. Firms proposing to complete the work will be required to recommend an impact evaluation approach appropriate for this type of program that will produce results that meet the precision requirements set forth in the guidelines issued through the Evaluation Advisory Group. Possible evaluation approaches may include a billing data analysis, an engineering simulation model, metering, or some other approach. This analysis may include surveys with program participants and with trade allies in an effort to arrive at net savings attributable to program efforts. The results of the impact evaluation will be used to refine expectations about future program savings, and may be used to modify future programs. Results from this study are anticipated by mid-year 2011.

- **Net to Gross Analysis**. The assumptions used to develop goals for this program are provided in Appendix C attached hereto. These assumptions reflect National Grid's experience in delivering a similar program in New England, including relevant program evaluation findings. These assumptions will be updated in the future based on evaluation findings, including updated information about free-ridership and spillover, or net-to-gross ratios as discussed above.

- **Benefit Cost Analysis.** Benefit cost analysis is performed at the measure and program level. National Grid has conducted a benefit cost analysis for this

program using available information. Future assessments of cost-effectiveness will take into account findings from future program evaluation efforts.

- **Budget.** Consistent with the June 23, 2008 Order, National Grid has budgeted approximately 5% of program implementation costs to fund evaluation efforts. Actual evaluation expenses for this program may be higher or lower than this amount.

- **Sampling Strategies and Design and Data Reliability Standards.** Consistent with the Evaluation Plan Guideline for EEPS Program Administrators and as recommended by Working Group III,[21] National Grid's goal for estimating gross savings at the program level is at the 90% confidence interval, within +/- 10% precision. National Grid will develop sampling protocols for all of its evaluations based on this standard. However, actual evaluation results may deviate from this standard.

- **Steps to Identify and Mitigate Threats to Data Reliability.** National Grid will review the evaluation plan submitted by the selected evaluation contractor for consistency with the Evaluation Advisory Group guidelines, the requirement to maintain a 90% confidence interval with +/- 10 % precision and the overall need to identify and mitigate threats to reliability of the results. The evaluation contractor will be required to insure data reliability to the greatest practical extent, including methods for minimizing systematic and random error and techniques for reducing uncertainty introduced by necessary assumptions and adjustments to the data. The selected evaluation contractor will be asked to include a discussion about threats to data reliability in their reports.

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[21] *See* Working Group III Final Report, dated December 5, 2007, at p. 37.

- **Data Collection and Management Process.** Program data will be collected from customer application forms, site visits and surveys of participants and non-participants. National Grid's tracking system supplemented by data that is required of its implementation vendors to track supports program evaluation through the collection of all relevant data pertaining to customer rebates and installed equipment. Customer name, account, premise level and other non-program specific data is captured in the system. Measure-specific data as appropriate will also be captured. Examples of measure-specific data that will be collected can include:[22]
    - Date of contract/agreement to install measure(s)
    - Date of beginning of installation process
    - Installation completion date
    - Installation contractor
    - Installation location
    - Project or work order number
    - Type of measure
    - Annualized energy savings
    - Measure life
    - Total measure installed cost
    - Incremental measure cost
    - Incentive payment amount
    - Project completion date
    - Evaluation inspection/commissioning date
    - Date of evaluation of measure or program
    - Types of evaluation conducted
    - Result of evaluation

- **Schedule and Deliverable Dates.** National Grid anticipates initiating a process evaluation early in 2009 and an impact evaluation in the fall of 2010. Final results of the process evaluation are anticipated by year-end 2009 or early in 2010. Final results for the impact evaluation are anticipated by year-end 2011.

[22] Please note that not of all the measure-specific data listed here are going to be captured for this program.

g. **Data Collection.** Data to be collected about this program is discussed above. Reporting is discussed below in Chapter VII. Evaluation and Reporting.

b. Commercial & Industrial Programs

National Grid proposes to implement three (3) commercial and industrial gas energy efficiency programs beginning January 2009:

- The Commercial and Industrial Energy Efficiency Program
- The Commercial High-Efficiency Heating and Water Heating Program
- The Building Practices and Demonstrations Program

Each of these programs is described below.

Commercial, Industrial and Multi Family Energy Efficiency Program

Purpose

The Commercial, Industrial and Multi Family Energy Efficiency Program ("CEEP") provides support services and financial incentives to encourage the Companies' commercial and industrial customers to install energy efficient natural gas equipment and gas saving measures. Through CEEP, energy efficient technologies and system designs that exceed local energy code minimum requirements may be eligible to receive rebates. Both prescriptive and custom rebates are available. In addition, energy audits and engineering services will be cost-shared by the Companies.

Program Administration and Delivery

The program will be delivered and administered by the Companies and will provide participants with financial assistance to help defray the cost of an energy audit by providing co-funding for engineering studies as well as financial incentives to help fund qualifying energy saving measures. The program is open to all firm natural gas sales customers on a commercial tariff including qualifying multifamily buildings.

The Companies will hire outside contractors to assist with technical review of comprehensive projects. It is anticipated that this program will coordinate with NYSERDA or LIPA services and offers. Customers can apply for program services or rebates through a number of trade ally channels including: Company representatives, plumbing and heating contractors, engineering firms, energy service companies, and equipment vendors. Quality assurance and control will be performed by the Companies' representatives as well as outside vendors hired by the Companies.

Coordination with NYSERDA and LIPA will leverage outside vendors to address comprehensive building operations from both electric and natural gas usage and efficiency. The Company has a coordinated approach to the multifamily segment with NYSERDA's Multifamily Building Performance Program to promote increased energy savings as well as accessible prescriptive options. The Company has coordinated with LIPA's Clean Energy Initiative Program to address engineering studies from both electric usage and natural gas.

Target End Uses, Recommended Technologies, and Financial Incentives

Energy efficient technologies or system designs that exceed the minimum requirements of the local energy code and not covered by another National Grid program offering may be eligible for a rebate under this program. Energy auditing and engineering services will be cost-shared with customers who require technical assistance to evaluate technologies associated with mechanical and or process equipment. The Companies will provide co-

funding to customers of up to 50% of the cost of an energy audit or engineering study, up to a maximum of $10,000. The types of technologies may include boiler or chiller plant redesigns, heat recovery systems, digital energy management systems or process efficiency improvement projects. In addition, the Companies will collaborate with the LIPA programs and NYSERDA to promote electric savings opportunities as well as other natural gas savings opportunities.

Prescriptive rebates will be available for common energy efficiency measures including programmable thermostats, boiler reset controls, steam trap replacements, pipe and/or duct insulation, building shell (wall, roof, floor, crawlspace) insulation and high efficiency windows. Other prescriptive measures will incorporate high efficiency kitchen equipment such as high efficiency fryers, steamers, convection ovens and combination ovens.

Custom incentives will be available for projects that demonstrate the use of natural gas more efficiently than typical industry practices or more efficiently than minimum building code requirements. Incentives will be limited to not more than 50% of the eligible installed costs, and National Grid's contribution will be subject to a cap per site and/or project.

Financial incentives (i.e., rebates) provided through the program must be pre-approved by National Grid and/or the vendor working on behalf of the Companies prior to delivery or installation of product(s) or service(s). Customers will be encouraged to choose a firm to complete this work that is registered as a partner with either LIPA or NYSERDA to ensure that work completed will be both comprehensive in terms of all fuels as well as eligible for all possible incentives for electric measures implemented.

Target Market and Marketing Approach

Under this program, customers will be eligible to receive up to $2.25 per first year therm saved, capped at 50% of the installation costs, and up to $250,000 per project for natural gas energy saving measures implemented. Incentives of up to $6 per first year therm saved,

capped at 50% of installation costs, and up to $250,000 per project will be available for projects that involve innovative building design, community and economic impacts and creation of affordable housing.

Primary marketing materials will include: program brochures, rebate applications, direct mail promotions, bill inserts, National Grid and other appropriate websites (e.g., NYSERDA and LIPA) and efficiency news. Outreach will include direct contact with plumbing and heating contractors, engineering firms, energy service companies and equipment vendors, trade ally events and trade ally network relations, association sponsorships and participation in trade and business groups and environmental organizations, internal communications and training for National Grid personnel who have contact with commercial customers.

Evaluation Plan

Year One Evaluation

In 2009, evaluation efforts will focus on identifying how the program is operating during the start-up phase, with the objective of identifying improvements that can be made to program implementation efforts. National Grid plans to initiate a process evaluation in support of these efforts. The plan is to hire an independent evaluation expert through a competitive solicitation to complete this work. This RFP will be issued shortly after the Commission authorizes the Companies to implement this program. The Companies will request interim reports from the selected contractor so that modifications to the implementation effort can be adopted quickly where it appears that a change is likely to lead to improved results in the program. A final report summarizing results from the process evaluation will likely be completed by year-end 2009 or early in 2010.

Process Evaluation

The first year process evaluation will document program processes during start-up and will gather the following information:

- Level of customer satisfaction.
- Effectiveness of the program delivery mechanism from the position of the program delivery contractors, program customers, trade allies and other key stakeholders. Did the delivery mechanism differ from the program plan? If yes, how and why?
- Effectiveness of program promotion.
- Remaining barriers to program participation including an assessment of why some customers choose to not participate in the program.
- Identification of lessons learned and specific actionable recommendations for program improvement.
- A review of program tracking databases to ensure that data that will likely be required to support future program evaluation efforts is being collected.

As part of the process evaluation plan, National Grid will survey participating and non-participating customers as well as trade allies who have and have not promoted the program.

Year Two Evaluation

Impact Evaluation

The Impact Evaluation will quantify the savings attributable to program efforts based on how the equipment installed through this program is actually operating. National Grid anticipates completing an impact evaluation of this program late in 2010 or early in 2011 using industry-accepted methods of analysis.

National Grid will explore conducting this evaluation with the other utilities implementing a similar program so that consistent approaches are used to arrive at evaluated program savings. However, at this point in time, while awaiting guidance from the Evaluation Advisory Group, National Grid proposes the following for consideration as part of its program evaluation plan.

- **Impact Evaluation Methodology.** An independent evaluation consultant will be hired through a competitive solicitation. Firms proposing to complete the work will be required to recommend an impact evaluation approach appropriate for this type of program that will produce results that meet the precision requirements set forth in the guidelines issued through the Evaluation Advisory Group. Possible evaluation approaches may include a billing data analysis, an engineering simulation model, metering, or some other approach. This analysis may include surveys with program participants and with trade allies in an effort to arrive at net savings attributable to program efforts. The results of the impact evaluation will be used to refine expectations about future program savings, and may be used to modify future programs. Results from this study are anticipated late in 2010 or early in 2011.

- **Net to Gross Analysis**. The assumptions used to develop goals for this program are provided in Appendix C attached hereto. These assumptions reflect National Grid's experience in delivering a similar program in New England, including relevant program evaluation findings. These assumptions will be updated in the future based on evaluation findings, including updated information about free-ridership and spillover, or net-to-gross ratios as discussed above.

- **Benefit Cost Analysis.** Benefit cost analysis is performed at the measure and program level. National Grid has conducted a benefit cost analysis for this program using available information. Future assessments of cost-effectiveness will take into account findings from program evaluation efforts.

- **Budget.** Consistent with the June 23, 2008 Order, the Companies have budgeted 5% of program implementation costs to fund evaluation efforts. Actual evaluation expenses for this program may be higher or lower than this amount.

- **Sampling Strategies and Design and Data Reliability Standards.** Consistent with the Evaluation Plan Guideline for EEPS Program Administrators and as recommended by Working Group III,[23] National Grid's goal for estimating gross savings at the program level is at the 90% confidence interval, within +/- 10% precision. National Grid will develop sampling protocols for all of its evaluations based on this standard. However, actual evaluation results may deviate from this standard.

- **Steps to Identify and Mitigate Threats to Data Reliability.** The Companies will review the evaluation plan submitted by the selected evaluation contractor for consistency with the Evaluation Advisory Group guidelines, the requirement to maintain a 90% confidence interval with +/- 10 % precision and the overall need to identify and mitigate threats to reliability of the results. The evaluation contractor will be required to insure data reliability to the greatest practical extent, including methods for minimizing systematic and random error and techniques for reducing uncertainty introduced by necessary assumptions and adjustments to the data. The selected evaluation contractor will be asked to include a discussion about threats to data reliability in their reports.

- **Data Collection and Management Process.** Program data will be collected from customer application forms, site visits and surveys of participants and non-participants. National Grid's tracking system supplemented by data that the Companies require of its implementation vendors to track supports program evaluation through the collection of all relevant data pertaining to customer rebates and installed equipment. Customer name, account, premise level and other non-program specific data is captured in the system. Measure-specific data as appropriate will also be captured. Examples of measure-specific data that will be collected can include[24]:
    - Date of contract/agreement to install measure(s)

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[23] *See* Working Group III Final Report, dated December 5, 2007, at p. 37.

[24] Please note that not of all the measure-specific data listed here are going to be captured for this program.

- Date of beginning of installation process
- Installation completion date
- Installation contractor
- Installation location
- Project or work order number
- Type of measure
- Annualized energy savings
- Measure life
- Total measure installed cost
- Incremental measure cost
- Incentive payment amount
- Project completion date
- Evaluation inspection/commissioning date
- Date of evaluation of measure or program
- Types of evaluation conducted
- Result of evaluation

- **Schedule and Deliverable Dates.** National Grid anticipates initiating a process evaluation in 2009 and an impact evaluation in the fall of 2010. Final results of the process evaluation are anticipated by year-end 2009 or early in 2010. Final results for the impact evaluation are anticipated by year-end 2010 or early 2011.

- **Data Collection.** Data to be collected about this program is discussed above. Reporting is discussed below in Chapter VII. Evaluation and Reporting.

Commercial High-Efficiency Heating and Water Heating Program

Purpose

The Commercial High-Efficiency Heating and Water Heating Program offers rebates to customers on a firm commercial service classification tariff that install high-efficiency heating equipment. The rebates are provided to reduce the incremental cost between standard and high-efficiency equipment.

Program Administration and Delivery

National Grid will administer this program through a third-party vendor who will handle customer inquiries via web and phone, as well as process applications and distribute rebate checks. Quality control and assurance will be conducted through National Grid's representatives and outside vendors.

Target End Uses, Recommended Technologies, and Financial Incentives

The program's rebate schedule applies to a variety of product types and a broad range of equipment sizes that are appropriate for the commercial market segments. The range of equipment sizes provides equal opportunity for participation among small and large commercial customers. In addition to high efficiency furnaces and boilers, there are also rebates for natural gas-fired, low intensity infrared heaters, high-efficiency condensing unit heaters and direct fired make-up air systems that are appropriate for the larger commercial and industrial segments. The boiler rebates are separated into three categories: (1) steam boilers; (2) hydronic boilers; and (3) condensing boilers. Rebates are also provided for high-efficiency indirect water heaters and instantaneous tankless water heaters

Rebate amounts will vary according to the size and type of the heating equipment installed with a cap of $15,000. Efficiency ratings for smaller heating equipment (up to 300,000 btuh input) are measured using Annual Fuel Utilization Efficiency ("AFUE") ratings. Efficiency ratings for larger heating equipment, which exceeds the size ranges for AFUE, will be measured using a thermal efficiency or steady state rating. National Grid reserves the right to negotiate a lower rebate amount per-unit for multiple installations at a single site. This practice ensures that rebate dollars are helping participants reduce the true incremental costs of installing high-efficiency heating equipment.

Target Market and Marketing Approach

The Commercial High-Efficiency Heating program is promoted primarily to contractors, architects, engineers, equipment vendors, and other trade allies. Since many of the trade allies overlap in the residential and smaller multifamily and commercial markets, the program is often promoted together with the Residential High Efficiency Heating and Water Heating and Controls Program. Trade ally awareness is increased through technology seminars and workshops, as well as direct mail, trade publications, newspapers, trade shows/seminars, field calls, and site visits. The program will be open to all firm natural gas sales customers on a commercial service classification tariff, including multifamily buildings. It will be marketed to customers through National Grid's account management staff, supply houses, HVAC contractors, architects, and engineers, as well as through direct marketing to customers.

Evaluation Plan

Year One Evaluation

In 2009, evaluation efforts will focus on identifying how the program is operating during the start-up phase, with the objective of identifying improvements that can be made to program implementation efforts. National Grid plans to initiate a process evaluation in support of these efforts. The plan is to hire an independent evaluation expert through a

competitive solicitation to complete this work. This RFP will be issued shortly after the Commission authorizes the Companies to implement this program. The Companies will request interim reports from the selected contractor so that modifications to the implementation effort can be adopted quickly where it appears that a change is likely to lead to improved results in the program. A final report summarizing results from the process evaluation will likely be completed by year-end 2009 or early in 2010.

Process Evaluation

The first year process evaluation will document program processes during start-up and will gather the following information:

- Level of customer satisfaction.
- Effectiveness of the program delivery mechanism from the position of the program delivery contractors, program customers, trade allies and other key stakeholders. Did the delivery mechanism differ from the program plan? If yes, how and why?
- Effectiveness of program promotion.
- Remaining barriers to program participation including an assessment of why some customers choose to not participate in the program.
- Identification of lessons learned and specific actionable recommendations for program improvement.
- A review of program tracking databases to ensure that data that will likely be required to support future program evaluation efforts is being collected.

As part of the process evaluation plan, National Grid will survey participating and non-participating customers as well as trade allies who have and have not promoted the program.

Year Two Evaluation

Impact Evaluation

The Impact Evaluation will quantify the savings attributable to program efforts based on how the equipment installed through this program is actually operating. National Grid anticipates completing an impact evaluation of this program late in 2010 or early in 2011 using industry-accepted methods of analysis.

National Grid will explore conducting this evaluation with the other utilities implementing a similar program so that consistent approaches are used to arrive at evaluated program savings. However, at this point in time, while awaiting guidance from the Evaluation Advisory Group, National Grid proposes the following for consideration as part of its program evaluation plan.

- **Impact Evaluation Methodology.** An independent evaluation consultant will be hired through a competitive solicitation. Firms proposing to complete the work will be required to recommend an impact evaluation approach appropriate for this type of program that will produce results that meet the precision requirements set forth in the guidelines issued through the Evaluation Advisory Group. Possible evaluation approaches may include a billing data analysis, an engineering simulation model, metering, or some other approach. This analysis may include surveys with program participants and with trade allies in an effort to arrive at net savings attributable to program efforts. The results of the impact evaluation will be used to refine expectations about future program savings, and may be used to modify future programs. Results from this study are anticipated late in 2010 or early in 2011.

- **Net to Gross Analysis**. The assumptions used to develop goals for this program are provided in Appendix C attached hereto. These assumptions reflect National Grid's experience in delivering a similar program in New England, including

relevant program evaluation findings. These assumptions will be updated in the future based on evaluation findings, including updated information about free-ridership and spillover, or net-to-gross ratios as discussed above.

- **Benefit Cost Analysis.** Benefit cost analysis is performed at the measure and program level. National Grid has conducted a benefit cost analysis for this program using available information. Future assessments of cost-effectiveness will take into account findings from program evaluation efforts.

- **Budget.** Consistent with the June 23, 2008 Order, the Companies have budgeted 5% of program implementation costs to fund evaluation efforts. Actual evaluation expenses for this program may be higher or lower than this amount.

- **Sampling Strategies and Design and Data Reliability Standards.** Consistent with the Evaluation Plan Guideline for EEPS Program Administrators and as recommended by Working Group III,[25] National Grid's goal for estimating gross savings at the program level is at the 90% confidence interval, within +/- 10% precision. National Grid will develop sampling protocols for all of its evaluations based on this standard. However, actual evaluation results may deviate from this standard.

- **Steps to Identify and Mitigate Threats to Data Reliability.** The Companies will review the evaluation plan submitted by the selected evaluation contractor for consistency with the Evaluation Advisory Group guidelines, the requirement to maintain a 90% confidence interval with +/- 10 % precision and the overall need to identify and mitigate threats to reliability of the results. The evaluation contractor will be required to insure data reliability to the greatest practical extent, including methods for minimizing systematic and random error and techniques for reducing

[25] *See* Working Group III Final Report, dated December 5, 2007, at p. 37.

uncertainty introduced by necessary assumptions and adjustments to the data. The selected evaluation contractor will be asked to include a discussion about threats to data reliability in their reports.

- **Data Collection and Management Process.** Program data will be collected from customer application forms, site visits and surveys of participants and non-participants. National Grid's tracking system supplemented by data that the Companies require of its implementation vendors to track supports program evaluation through the collection of all relevant data pertaining to customer rebates and installed equipment. Customer name, account, premise level and other non-program specific data is captured in the system. Measure-specific data as appropriate will also be captured. Examples of measure-specific data that will be collected can include:[26]
    - Date of contract/agreement to install measure(s)
    - Date of beginning of installation process
    - Installation completion date
    - Installation contractor
    - Installation location
    - Project or work order number
    - Type of measure
    - Annualized energy savings
    - Measure life
    - Total measure installed cost
    - Incremental measure cost
    - Incentive payment amount
    - Project completion date
    - Evaluation inspection/commissioning date
    - Date of evaluation of measure or program
    - Types of evaluation conducted
    - Result of evaluation

[26] Please note that not of all the measure-specific data listed here are going to be captured for this program.

- **Schedule and Deliverable Dates.** National Grid anticipates initiating a process evaluation in 2009 and an impact evaluation in the fall of 2010. Final results of the process evaluation are anticipated by year-end 2009 or early in 2010. Final results for the impact evaluation are anticipated by year-end 2010 or early 2011.

- **Data Collection.** Data to be collected about this program is discussed above. Reporting is discussed below in Chapter VII. Evaluation and Reporting.

Building Practice and Demonstration Program

Purpose

The Building Practices and Demonstrations Program is designed to promote the installation of new, emerging or under-utilized natural gas-related energy efficiency technologies and operating practices. These projects become case study examples for incorporating new technologies or improving practices in the energy efficiency program portfolio.

Program Administration and Delivery

The program will be administered directly by National Grid's engineering staff with assistance from outside consultants and professional engineering firms. To showcase the significant energy savings potential, National Grid will offer financial incentives towards the cost of installation. The program is open to all firm natural gas sales customers on a commercial tariff including qualifying multifamily buildings.

Interested customers will submit applications for financial assistance directly to National Grid. Applications must include a scope of work and an estimate of the savings and benefits to be realized. Participants are required to allow National Grid to meter the

installation and monitor its performance. Customers can apply for program services or rebates through a number of trade ally channels including: National Grid representatives, plumbing and heating contractors, engineering firms, energy service companies, and equipment vendors. This program will coordinate with NYSERDA or LIPA as well other partners such as the Consortium for Energy Efficiency, the Gas Technology Institute, and the Energy Solutions Center. National Grid has existing partnerships with these organizations that will be utilized and leveraged for product selection, feasibility, installation and monitoring.

Target End Uses, Recommended Technologies, and Financial Incentives

This program will provide National Grid with the flexibility to evaluate all end uses that could potentially provide cost-effective energy saving solutions to customers. Past examples of end uses evaluated by the program include energy recovery devices, combustion controls, advanced solar thermal technologies, desiccant units, commercial cooking equipment, and building control strategies. National Grid will offer an incentive of up to 50% of the project cost capped at $100,000 for technologies evaluated through this program.

Target Market and Marketing Approach

In an effort to identify potential new technologies for demonstration, National Grid seeks out program partners such as the Gas Technology Institute and trade associations and will coordinate with NYSERDA or LIPA when possible. In addition, National Grid may work with manufacturers of new technologies. To market the program, National Grid representatives will identify and recruit appropriate customer sites and applications. Coordination will occur with program partners and outside vendors. Primary marketing materials include program brochures, direct mail campaigns, case studies, and demonstrations, as well as direct outreach by National Grid representatives to architects and engineers, contractors, and commercial and industrial trade associations.

Evaluation Plan

Year One Evaluation

In 2009, evaluation efforts will focus on identifying how the program is operating during the start-up phase, with the objective of identifying improvements that can be made to program implementation efforts. National Grid plans to initiate a process evaluation in support of these efforts. The plan is to hire an independent evaluation expert through a competitive solicitation to complete this work. This RFP will be issued shortly after the Commission authorizes the Companies to implement this program. The Companies will request interim reports from the selected contractor so that modifications to the implementation effort can be adopted quickly where it appears that a change is likely to lead to improved results in the program. A final report summarizing results from the process evaluation will likely be completed by year-end 2009 or early in 2010.

Process Evaluation

The first year process evaluation will document program processes during start-up and will gather the following information:

- Level of customer satisfaction.
- Effectiveness of the program delivery mechanism from the position of the program delivery contractors, program customers, trade allies and other key stakeholders. Did the delivery mechanism differ from the program plan? If yes, how and why?
- Effectiveness of program promotion.
- Remaining barriers to program participation including an assessment of why some customers choose to not participate in the program.
- Identification of lessons learned and specific actionable recommendations for program improvement.
- A review of program tracking databases to ensure that data that will likely be required to support future program evaluation efforts is being collected.

As part of the process evaluation plan, National Grid will survey participating and non-participating customers as well as trade allies who have and have not promoted the program.

Year Two Evaluation

Impact Evaluation

The Impact Evaluation will quantify the savings attributable to the technology based on how the equipment installed through this program is actually operating. National Grid anticipates completing an impact evaluation of this program late in 2010 or early in 2011 using industry-accepted methods of analysis.

- **Impact Evaluation Methodology.** An independent evaluation consultant will be hired through a competitive solicitation. Firms proposing to complete the work will be required to recommend an impact evaluation approach appropriate for this type of program that will produce results that meet the precision requirements set forth in the guidelines issued through the Evaluation Advisory Group. Possible evaluation approaches may include a billing data analysis, an engineering simulation model, metering, or some other approach. This analysis may include surveys with program participants and with trade allies in an effort to arrive at net savings attributable to program efforts. The results of the impact evaluation will be used to refine expectations about future program savings, and may be used to modify future programs. Results from this study are anticipated late in 2010 or early in 2011.

- **Net to Gross Analysis**. The assumptions used to develop goals for this program are provided in Appendix C attached hereto. These assumptions reflect National Grid's experience in delivering a similar program in New England, including relevant program evaluation findings. These assumptions will be updated in the

future based on evaluation findings, including updated information about free-ridership and spillover, or net-to-gross ratios as discussed above.

- **Benefit Cost Analysis.** Benefit cost analysis is performed at the measure and program level. National Grid has conducted a benefit cost analysis for this program using available information. Future assessments of cost-effectiveness will take into account findings from program evaluation efforts.

- **Budget.** Consistent with the June 23, 2008 Order, the Companies have budgeted 5% of program implementation costs to fund evaluation efforts. Actual evaluation expenses for this program may be higher or lower than this amount.

- **Sampling Strategies and Design and Data Reliability Standards.** Consistent with the Evaluation Plan Guideline for EEPS Program Administrators and as recommended by Working Group III,[27] National Grid's goal for estimating gross savings at the program level is at the 90% confidence interval, within +/- 10% precision. National Grid will develop sampling protocols for all of its evaluations based on this standard. However, actual evaluation results may deviate from this standard.

- **Steps to Identify and Mitigate Threats to Data Reliability.** The Companies will review the evaluation plans submitted by the selected evaluation contractor for consistency with the Evaluation Advisory Group guidelines, the requirement to maintain a 90% confidence interval with +/- 10 % precision and the overall need to identify and mitigate threats to reliability of the results. The evaluation contractor will be required to insure data reliability to the greatest practical extent, including methods for minimizing systematic and random error and techniques for reducing uncertainty introduced by necessary assumptions and adjustments to the data. The

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[27] *See* Working Group III Final Report, dated December 5, 2007, at p. 37.

selected evaluation contractor will be asked to include a discussion about threats to data reliability in their reports.

- **Data Collection and Management Process.** Program data will be collected from customer application forms, site visits and surveys of participants and non-participants. National Grid's tracking system supplemented by data that the Companies requires of implementation vendors to track supports program evaluation through the collection of all relevant data pertaining to customer rebates and installed equipment. Customer name, account, premise level and other non-program specific data is captured in the system. Measure-specific data as appropriate will also be captured. Examples of measure-specific data that will be collected can include:[28]
    - Date of contract/agreement to install measure(s)
    - Date of beginning of installation process
    - Installation completion date
    - Installation contractor
    - Installation location
    - Project or work order number
    - Type of measure
    - Annualized energy savings
    - Measure life
    - Total measure installed cost
    - Incremental measure cost
    - Incentive payment amount
    - Project completion date
    - Evaluation inspection/commissioning date
    - Date of evaluation of measure or program
    - Types of evaluation conducted
    - Result of evaluation

[28] Please note that not of all the measure-specific data listed here are going to be captured for this program.

- **Schedule and Deliverable Dates.** National Grid anticipates initiating a process evaluation in 2009 and an impact evaluation in the fall of 2010. Final results of the process evaluation are anticipated by year-end 2009 or early in 2010. Final results for the impact evaluation are anticipated by year-end 2010 or early 2011.

- **Data Collection.** Data to be collected about this program is discussed above. Reporting is discussed below in Chapter VII. Evaluation and Reporting.

VI. Independent Program Administrator Proposals

National Grid received three (3) proposals from parties seeking to be Independent Program Administrators (IPAs). The proposals were from EnerNOC, Inc., Positive Energy, and ConsumerPowerline, Inc. The June 23, 2008 Order states:

> "Independent program administrators may submit proposals for programs, to be implemented within the 2009-2011 time period, to utilities and/or to NYSERDA within 45 days of the issuance of this Order. Such proponents should use best efforts to include the information required in Appendix 3. Any such proposal received by a utility or NYSERDA must be considered for inclusion in that entity's proposal to the Commission, and its inclusion or omission from the proposal to the Commission must be explained. If a utility and/or NYSERDA receives an independent proposal that is incomplete but warrants further examination, the utility and/or NYSERDA may petition the Secretary for additional time to submit its proposal."

On August 12, 2008, National Grid, Central Hudson, St. Lawrence Gas, National Fuel Gas, New York State Electric & Gas / Rochester Gas & Electric, and Orange & Rockland representatives reviewed and discussed submitted proposals. National Grid has undertaken internal reviews of these proposals and has discussed responses internally and with the proposed IPAs. A brief description of the proposals and the Company's response is described below.

EnerNOC, Inc. Proposal

National Grid received a proposal for a Monitoring-Based Commissioning Energy Efficiency Program from EnerNOC, Inc. ("EnerNOC") dated August 7, 2008.[29] The proposal describes a program that "assists commercial customers to better understand their energy usage, participate in a comprehensive audit, implement cost-effective energy efficiency measures and engage in an ongoing, monitoring-based commissioning process that will generate substantial energy efficiency savings." The proposed program budget is $5,668,500 through 2015 and is projected to serve 20 customers, conserve an estimated 125,020 MWh and 4.2 million therms, and reduce peak demand by 1.8 MW.

National Grid is encouraged by the proactive role that EnerNOC has presented. The Company plans further discussions with EnerNOC regarding our comments below and how Monitoring Based Commissioning Services might be structured to work with our related proposed offerings such as retro-commissioning services. For the reasons stated below, however, National Grid believes it would be premature to accept the EnerNOC proposal as it currently exists.

1. EnerNOC's proposal targets four (4) customers in year one, eight (8) customers in year two and eight (8) customers in year three for a total of twenty (20) customers over three years. The proposed EnerNOC budget for these twenty (20) customers is $5,668,500. This program targets only a very small number of customers, mostly large customers, for a limited, finite period of time. This approach will concentrate resources on a limited number of customers and reduce the market transformation effect of a broader based retro-commissioning program. National Grid prefers that a retro-commissioning effort be marketed to and implemented by many customers, including medium and small customers. Working with large commercial and industrial customers offers great savings opportunities; however, it limits market participation and market transformation.

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[29] EnerNOC, Inc. "Monitoring-Based Commissioning Energy Efficiency Program Proposal", August 7, 2008.

2. EnerNOC's proposal may understate the true cost of the program. In section 1.7 of EnerNOC's proposal, EnerNOC indicates that National Grid resources will be utilized to help with the marketing and the sale of the Monitoring-Based Commissioning services without describing in detail what is expected of National Grid. In order for National Grid to assess the budget, a more detailed description of National Grid's role and its costs are needed. National Grid's costs would then need to be included in the $5,668,500 EnerNOC proposal. Moreover, an additional budget to conduct independent measurement and verification of the proposed savings and cost calculations should be included. When these costs are included in the EnerNOC proposal, National Grid estimates the cost of the energy saved will be higher than equivalent savings from more traditional energy efficiency programs. Because of this, the cost-effectiveness of this proposal will reduce the overall portfolio cost-effectiveness. One driver for this increase is the cost of monitoring service for years two and three. Another potential and unknown cost of this proposal is the cost to customers of extending EnerNOC's tracking and notification services beyond year five.

3. The cost associated with the installation of metering by EnerNOC may not be necessary at some customer facilities. EnerNOC's proposal contemplates taking the same auditing/metering/reporting approach with each customer. National Grid's experience is that different approaches work best for different customers. Some customers will already have sophisticated energy management systems and/or highly skilled energy managers in place. EnerNOC's proposal would overlay additional metering and/or management on top of these capabilities. Most building energy management systems have the capabilities to monitor the energy consumption of the building, create trend logs, and control the operation of the building systems. When utilized properly, the building energy management system can eliminate the need of having a separate monitoring system in the building.

4. Acceptance of EnerNOC's proposal as it presently exists for independent retro-commissioning services will concentrate funding on a small number of customers. National Grid plans on soliciting proposals from qualified vendors to deliver retro-

commissioning services and other energy efficiency services in New York. Such a RFP will give all interested parties the opportunity to bid on these services. This will allow National Grid to compare proposals to ensure quality, uniformity and cost-effectiveness. National Grid encourages EnerNOC to participate in that process and continue to work with National Grid to further develop retro-commissioning services.

Positive Energy Proposal

National Grid received a proposal on August 22, 2008 for deployment of the Positive Home Energy Reporting System ("HERS") from Positive Energy. Based on the original proposal, Positive Energy has been working with National Grid as well as other utilities, and the Company has had multiple discussions with Positive Energy. National Grid requested Positive Energy to make certain adjustments to its original proposal. Positive Energy submitted to National Grid on September 5, 2008[30] an amendment which proposed a HERS Program based on following two options: (1) Base Option 1: Dual-Fuel, 50,000 homes in 2009, expanding to 100,000 homes in 2011 (The "50K/75K/100K" Plan); and (2) Option 2: Dual-Fuel, 75,000 homes in 2009, expanding to 150,000 homes in 2011 (The "75K/100K/150K" Plan).

National Grid has agreed to include the Positive Energy HERS program as part of the Company's Residential Building Practices and Demonstration Program in its Niagara Mohawk service territory since the benefits from this program are expected to be greatest where both gas and electric energy efficiency opportunities can be addressed together. This effort is expected to provide services to 25,000 electric customers and 25,000 gas customers in upstate New York over a 3 year period.

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[30] Positive Energy "NYS EEPS Proposal Amendment – delivered to National Grid", September 5, 2008.

ConsumerPowerline Inc. Proposal

ConsumerPowerline Inc. ("CPLN") submitted a proposal to all active parties in the EEPS proceeding via the EEPS listserv on August 8, 2008.[31] National Grid was served with a paper copy of the same proposal via mail on August 11, 2008. The CPLN proposal advocates the creation of an energy efficiency cap-and-trade program which would be administered by NYSERDA. The CPLN proposal represents a radical departure from the current approach set forth in the June 23 Order and is one that would require Commission action and approval. Essentially, CPLN put forth a whitepaper detailing an entirely different approach to administering energy efficiency in New York State. CPLN was seeking comments on their proposal within 45 days (i.e., on or about September 22, 2008) from any and all interested parties. CPLN stated that they were particularly seeking input from NRDC, Pace Law Institute and DASNY. Although the requested date for comments coincides with the 90-filing requirement of the June 23, 2008 Order for utility-administered programs, CPLN's proposal is not one that National Grid or any single utility could begin to implement.

For the above reasons, the Company does not consider this to be an independent program administrator proposal as contemplated in the June 23, 2008 Order and the Company is not including it in its 90-day program plans.

[31] ConsumerPowerline Proposal "Opportunity in Time", August 8, 2008.

VII. Evaluation and Reporting

Evaluation

Consistent with the June 23, 2008 Order, National Grid has budgeted 5% of program implementation costs to support program evaluation efforts. Detailed evaluation plans for each proposed program have been provided along with the description of each proposed program. In general, in the first year, National Grid anticipates focusing on process evaluation efforts that will assist the Companies in making timely adjustments to program implementation efforts to improve overall effectiveness. In later years, National Grid anticipates focusing on impact evaluation efforts so that actual savings from program efforts can be estimated more accurately. In some cases, some early impact studies may be undertaken where participants from National Grid's downstate New York service territories can be included with participants from New England to arrive at net savings that are relevant over the combined New York and New England service territories. This approach will result in lower evaluation expenses both in New York and in New England.

In planning evaluation activities, National Grid considers several factors including the length of time since a program or end-use was evaluated, the maturity of the program (particularly for process evaluation issues), the significance of expected savings for the end use or project in the recently completed program year, the stability of prior evaluation results for the program aspect under consideration, and expected opportunities to participate in joint studies, including market assessments, in the coming year. National Grid plans to oversee the efforts of independent evaluation consultants who will be selected through a competitive bidding process to complete National Grid's evaluation studies.

National Grid has representation on the Evaluation Advisory Group ("Advisory Group") convened by the Director of the Office of Energy Efficiency and Environment, Department of Public Services. A portion of National Grid's evaluation budget is anticipated to be

directed to the Advisory Group's efforts to fund the efforts of an evaluation expert who will advise DPS Staff and the Advisory Group as well as to fund evaluation studies that will be conducted across New York State. These studies are anticipated to include, but not be limited to, baseline practices studies and avoided cost studies. The Advisory Group is expected to create evaluation protocols that all program administrators in the state would agree to adopt. National Grid is committed to working with the parties to develop these protocols.

National Grid's Evaluation Team

National Grid USA Service Company includes centralized energy efficiency staff that oversees evaluation projects completed in support of the Company's energy efficiency efforts in both New England and New York. Carol White directs the Energy Efficiency Evaluation and Regulatory Affairs Group. She reports to the Vice President of Energy Efficiency and Distributed Resources.

Reporting

National Grid is proposing to provide the Commission with quarterly reports on the progress of program implementation. These reports will include information on actual expenses, customer participation, and savings realized compared to annual budgets and goals. These reports will also include information about ongoing program evaluation efforts. Each quarterly report will be submitted to the Commission approximately 45 days following the end of the calendar quarter.

In addition to quarterly reporting, National Grid proposes to submit an annual report to the Commission for the purpose of updating its proposed budgets and goals for the coming year informed by evaluation findings, customer response to program services, and other relevant market intelligence. The proposed budget to be included in this annual update will reflect any under or over-spending from the prior year. Each annual report will be

submitted to the Commission approximately 180 days following the end of the calendar year.

National Grid is proposing to use the reporting format it currently uses in its reports to the Commission regarding existing downstate New York energy efficiency efforts. (*See* attached sample Status Report in Appendix F.) The specific categories of information included in the report include:

- Program Planning & Administrative Expenditures, year-to-date
- Program Marketing Expenditures, year-to-date
- Customer Incentive Expenditures, year-to-date
- Program Implementation Expenditures, year-to-date
- Evaluation & Market Research Experience, year-to-date
- Total Expenditures, year-to-date
- Program Year Budget, year-to-date
- Annual Budget
- Number of Rebates (or Participants), year-to-date
- Participation Goal, year-to-date
- Annual Participant Goal for the Program Year
- Total Savings (kWh, kW, Therms), year-to-date
- Savings Goal, year-to-date
- Annual Savings Goals for the Program Year

VIII. Lost Revenues

National Grid proposes to continue to recover lost revenues related to its gas energy efficiency program efforts. Appendix G attached hereto describes how these lost revenues will be determined.

Appendix A

APPENDIX A

Explanation of Budget Categories

Appendix A
Explanation of Budget Categories

Program Planning and Administration

Costs to administer energy efficiency programs that include but are not limited to; staff salaries (management personnel, program managers, accounting personnel, evaluation staff, regulatory staff, and administrative support staff), and company overhead (i.e., office space, supplies, computer and communication equipment, staff training, industry related sponsorships and memberships).

Program Marketing and Trade Ally

Promotion of energy efficiency programs which includes but is not limited to; production of all energy efficiency program literature, advertising, promotion, displays, events, promotional items, bill inserts, internal and external communications. Advertising encompasses all forms of media such as direct mail, print, radio, television, and internet.

Trade Ally includes all activity associated with energy efficiency training/education of the trade ally community which includes but is not limited to; heating contractors, weatherization contractors, efficiency equipment/products installers, residential and C&I auditors, residential and C&I builders and developers.

Customer Incentives or Services

Costs associated with rebates paid to customers for implementing energy efficiency. Additionally, this includes services provided to customers such as energy audits, technical assessments, engineering studies, plans reviews, blower door tests and infrared scans.

Program Implementation

Costs associated with vendors and contractors administering programs on the Company's behalf. Tasks associated with this budget category include but are not limited to; lead intake, customer service, rebate application processing, rebate application problem resolution, equipment installation inspections, rebate processing and individual program reporting.

Evaluation and Market Research

All activities associated with the evaluation of current and potential energy efficiency programs. These activities include but are not be limited to; benefit cost ratio analysis, program logic models, cost per therm analysis, efficiency product saturation analysis, customer research and all ad hoc analyses that are necessary for program evaluation. In addition any activities that pertain to regulatory compliance or reporting conducted by energy efficiency group personnel or contractors would fall under this category. Expenses associated with evaluation include all internal and external costs (i.e., consultant contracts).

Appendix B

APPENDIX B

Benefit / Cost Analysis

ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST

Participation and Savings Goals - The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY") Gas Programs

	2009			2010			2011			2009 - 2011		
Gas Programs	**Participants**	**Annualized MMBTu Savings**	**Lifetime MMBTu Savings**	**Participants**	**Annualized MMBTu Savings**	**Lifetime MMBTu Savings**	**Participants**	**Annualized MMBTu Savings**	**Lifetime MMBTu Savings**	**Participants**	**Annualized MMBTu Savings**	**Lifetime MMBTu Savings**
Enhanced Home Sealing Incentives	500	16,560	331,200	500	16,560	331,200	500	16,560	331,200	1,500	49,680	993,600
Residential ENERGY STAR® Products Program	300	606	15,140	500	1,009	25,234	500	1,009	25,234	1,300	2,624	65,608
Residential Low Income Program	1,754	46,253	925,060	1,754	46,253	925,060	1,754	46,253	925,060	5,262	138,759	2,775,179
Residential Building Practices and Demonstration Program	10	0	0	10	0	0	10	0	0	30	0	0
Energy Audit Program	1,200	648	4,536	1,200	648	4,536	1,200	648	4,536	3,600	1,944	13,608
Commercial, Industrial and Multi Family Energy Efficiency Program	1,217	154,521	2,223,893	1,217	154,521	2,223,893	1,317	167,508	2,383,633	3,751	476,550	6,831,419
Commercial High-Efficiency Heating and Water Heating Program	400	28,656	573,120	400	28,656	573,120	500	35,820	716,400	1,300	93,132	1,862,640
Building Practices and Demonstration Program	9	11,372	154,663	9	11,372	154,663	7	9,477	128,886	25	32,222	438,213

Participation and Savings Goals - KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI") Gas Programs

	2009			2010			2011			2009 - 2011		
Gas Programs	**Participants**	**Annualized MMBTu Savings**	**Lifetime MMBTu Savings**	**Participants**	**Annualized MMBTu Savings**	**Lifetime MMBTu Savings**	**Participants**	**Annualized MMBTu Savings**	**Lifetime MMBTu Savings**	**Participants**	**Annualized MMBTu Savings**	**Lifetime MMBTu Savings**
Enhanced Home Sealing Incentives	300	9,936	198,720	300	9,936	198,720	436	14,440	288,806	1,036	34,312	686,246
Residential ENERGY STAR® Products Program	300	606	15,140	500	1,009	25,234	500	1,009	25,234	1,300	2,624	65,608
ENERGY STAR® Homes Program	200	4,932	123,300	200	4,932	123,300	200	4,932	123,300	600	14,796	369,900
Residential Low Income Program	878	23,153	463,057	878	23,153	463,057	878	23,153	463,057	2,634	69,459	1,389,172
Residential Building Practices and Demonstration Program	20	0	0	20	0	0	22	0	0	62	0	0
Energy Audit Program	1,000	540	3,780	1,000	540	3,780	1,000	540	3,780	3,000	1,620	11,340
Commercial, Industrial and Multi Family Energy Efficiency Program	406	57,617	746,805	406	57,617	746,805	505	68,551	919,412	1,317	183,786	2,413,022
Commercial High-Efficiency Heating and Water Heating Program	200	14,328	286,560	200	14,328	286,560	300	21,492	429,840	700	50,148	1,002,960
Building Practices and Demonstration Program	6	7,836	106,576	6	7,836	106,576	6	7,836	106,576	18	23,509	319,728

The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY")
ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST

Summary of Benefit , Costs (2009 $s)
Total Resource Cost Test

Gas Programs	2009 TRC Benefit/ Cost	2009 Total NPV Benefits ($000)	2009 Total NPV Costs ($000)	2010 TRC Benefit/ Cost	2010 Total NPV Benefits ($000)	2010 Total NPV Costs ($000)	2011 TRC Benefit/ Cost	2011 Total NPV Benefits ($000)	2011 Total NPV Costs ($000)	2009 - 2011 TRC Benefit/ Cost	2009 - 2011 Total NPV Benefits ($000)	2009 - 2011 Total NPV Costs ($000)
Enhanced Home Sealing Incentives	1.40	$2,304	$ 1,646	1.51	$2,356	$ 1,560	2.96	$2,424	$ 818	1.76	$7,085	$4,025
Residential ENERGY STAR® Products Program	1.53	$113	$ 74	1.85	$193	$ 104	2.05	$199	$ 97	1.84	$506	$276
Residential Low Income Program	1.16	$6,435	$ 5,535	1.25	$6,582	$ 5,246	1.36	$6,771	$ 4,973	1.26	$19,788	$15,754
Residential Building Practices and Demonstration Program	n/a	n/a	$ 39	n/a	n/a	$ 37	n/a	n/a	$ 35	n/a	n/a	$110
Energy Audit Program	0.05	$44	$ 812	0.06	$44	$ 770	0.06	$44	$ 729	0.06	$132	$2,311
Commercial, Industrial and Multi Family Energy Efficiency Program	1.58	$17,249	$ 10,923	1.69	$17,526	$ 10,353	1.93	$19,300	$ 9,983	1.73	$54,075	$31,259
Commercial High-Efficiency Heating and Water Heating Program	2.71	$3,987	$ 1,471	2.92	$4,078	$ 1,394	3.51	$5,244	$ 1,493	3.05	$13,308	$4,358
Building Practices and Demonstration Program	1.25	$1,233	$ 988	1.34	$1,252	$ 936	1.39	$1,067	$ 766	1.32	$3,552	$2,690
Grand Total	**1.46**	**$31,364**	**$21,486**	**1.57**	**$32,030**	**$20,400**	**1.86**	**$35,051**	**$18,895**	**1.62**	**$98,445**	**$60,781**

Total NPV cost is the net present value of utility and participant costs
Residential Building Practices and Demonstration Program includes costs for the program but does not include expected benefits.

The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY")
ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST

		Total Benefits										Load Reduction (kW)			MWh Saved		MMBTU Saved	
			Capacity				Energy											
			Generation				Winter		Summer									
Year	Gas Programs	Total Benefits	Summer	Winter	Trans	MDC	Peak	Off Peak	Peak	Off Peak	Natural Gas	Summer	Winter	Lifetime	Annual	Lifetime	Annual	Lifetime
2009	Enhanced Home Sealing Incentives	$2,303,945	$0	$0	$0	$0	$0	$0	$0	$0	$2,303,945	0	0	0	0	0	16,560	331,200
	Residential ENERGY STAR® Products Program	$113,021	$83	$0	$14	$49	$5,775	$5,832	$2,735	$2,725	$95,808	0	2	1	12	311	606	15,140
	Residential Low Income Program	$6,435,045	$0	$0	$0	$0	$0	$0	$0	$0	$6,435,045	0	0	0	0	0	46,253	925,060
	Residential Building Practices and Demonstration Program	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	0	0
	Energy Audit Program	$43,536	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	648	4,536
	Commercial, Industrial and Multi Family Energy Efficiency Program	$17,249,441	$0	$0	$0	$0	$0	$0	$0	$0	$17,249,441	0	0	0	0	0	154,521	2,223,893
	Commercial High-Efficiency Heating and Water Heating Program	$3,986,827	$0	$0	$0	$0	$0	$0	$0	$0	$3,986,827	0	0	0	0	0	28,656	573,120
	Building Practices and Demonstration Program	$1,232,615	$0	$0	$0	$0	$0	$0	$0	$0	$1,232,615	0	0	0	0	0	11,372	154,663
Grand Total - 2009		**$31,364,430**	**$83**	**$0**	**$14**	**$49**	**$5,775**	**$5,832**	**$2,735**	**$2,725**	**$31,303,681**	**0**	**2**	**1**	**12**	**311**	**258,616**	**4,227,612**
2010	Enhanced Home Sealing Incentives	$2,356,429	$0	$0	$0	$0	$0	$0	$0	$0	$2,356,429	0	0	0	0	0	16,560	331,200
	Residential ENERGY STAR® Products Program	$193,341	$148	$0	$24	$85	$9,921	$10,135	$4,728	$4,749	$163,551	0	3	2	21	518	1,009	25,234
	Residential Low Income Program	$6,581,635	$0	$0	$0	$0	$0	$0	$0	$0	$6,581,635	0	0	0	0	0	46,253	925,060
	Residential Building Practices and Demonstration Program	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	0	0
	Energy Audit Program	$43,707	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	648	4,536
	Commercial, Industrial and Multi Family Energy Efficiency Program	$17,526,015	$0	$0	$0	$0	$0	$0	$0	$0	$17,526,015	0	0	0	0	0	154,521	2,223,893
	Commercial High-Efficiency Heating and Water Heating Program	$4,077,647	$0	$0	$0	$0	$0	$0	$0	$0	$4,077,647	0	0	0	0	0	28,656	573,120
	Building Practices and Demonstration Program	$1,251,695	$0	$0	$0	$0	$0	$0	$0	$0	$1,251,695	0	0	0	0	0	11,372	154,663
Grand Total - 2010		**$32,030,469**	**$148**	**$0**	**$24**	**$85**	**$9,921**	**$10,135**	**$4,728**	**$4,749**	**$31,956,972**	**0**	**3**	**2**	**21**	**518**	**259,020**	**4,237,705**
2011	Enhanced Home Sealing Incentives	$2,424,360	$0	$0	$0	$0	$0	$0	$0	$0	$2,424,360	0	0	0	0	0	16,560	331,200
	Residential ENERGY STAR® Products Program	$199,435	$157	$0	$25	$87	$10,321	$10,630	$4,939	$4,991	$168,286	0	3	2	21	518	1,009	25,234
	Residential Low Income Program	$6,771,370	$0	$0	$0	$0	$0	$0	$0	$0	$6,771,370	0	0	0	0	0	46,253	925,060
	Residential Building Practices and Demonstration Program	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	0	0
	Energy Audit Program	$44,310	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	648	4,536
	Commercial, Industrial and Multi Family Energy Efficiency Program	$19,299,569	$0	$0	$0	$0	$0	$0	$0	$0	$19,299,569	0	0	0	0	0	167,508	2,383,633
	Commercial High-Efficiency Heating and Water Heating Program	$5,243,997	$0	$0	$0	$0	$0	$0	$0	$0	$5,243,997	0	0	0	0	0	35,820	716,400
	Building Practices and Demonstration Program	$1,067,486	$0	$0	$0	$0	$0	$0	$0	$0	$1,067,486	0	0	0	0	0	9,477	128,886
Grand Total - 2011		**$35,050,526**	**$157**	**$0**	**$25**	**$87**	**$10,321**	**$10,630**	**$4,939**	**$4,991**	**$34,975,067**	**0**	**3**	**2**	**21**	**518**	**277,275**	**4,514,948**
	Enhanced Home Sealing Incentives	$7,084,735	$0	$0	$0	$0	$0	$0	$0	$0	$7,084,735	0	0	0	0	0	49,680	993,600
	Residential ENERGY STAR® Products Program	$505,797	$388	$0	$63	$221	$26,017	$26,596	$12,402	$12,465	$427,645	0	7	5	54	1,346	2,624	65,608
	Residential Low Income Program	$19,788,050	$0	$0	$0	$0	$0	$0	$0	$0	$19,788,050	0	0	0	0	0	138,759	2,775,179
	Residential Building Practices and Demonstration Program	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	0	0
	Energy Audit Program	$131,553	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	1,944	13,608
	Commercial, Industrial and Multi Family Energy Efficiency Program	$54,075,024	$0	$0	$0	$0	$0	$0	$0	$0	$54,075,024	0	0	0	0	0	476,550	6,831,419
2009 -	Commercial High-Efficiency Heating and Water Heating Program	$13,308,471	$0	$0	$0	$0	$0	$0	$0	$0	$13,308,471	0	0	0	0	0	93,132	1,862,640
2011	Building Practices and Demonstration Program	$3,551,795	$0	$0	$0	$0	$0	$0	$0	$0	$3,551,795	0	0	0	0	0	32,222	438,213
Grand Total - 2009 - 2011		**$98,445,425**	**$388**	**$0**	**$63**	**$221**	**$26,017**	**$26,596**	**$12,402**	**$12,465**	**$98,235,720**	**0**	**7**	**5**	**54**	**1,346**	**794,911**	**12,980,266**

The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY")
ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST

Year	Gas Programs	Program Planning and Administration	Program Marketing & Trade Ally	Customer Incentives or Services	Program Implementation	Evaluation & Market Research	Performance Incentive	Total Utility Cost	Particpant Cost	Total Cost
2009	Enhanced Home Sealing Incentives	$43,831	$75,173	$1,200,000	$20,000	$66,950	$0	$1,405,955	$240,000	$1,645,955
	Residential ENERGY STAR® Products Program	$5,000	$5,000	$30,000	$5,000	$5,000	$0	$50,000	$24,000	$74,000
	Residential Low Income Program	$441,177	$754,490	$3,529,412	$882,353	$280,372	$0	$5,887,803	($352,941)	$5,534,862
	Residential Building Practices and Demonstration Program	$8,581	$10,132	$15,000	$3,000	$1,836	$0	$38,549	$0	$38,549
	Energy Audit Program	$61,116	$101,861	$488,931	$122,233	$40,744	$0	$814,885	($3,000)	$811,885
	Commercial, Industrial and Multi Family Energy Efficiency Program	$530,681	$1,138,593	$4,645,000	$1,064,561	$368,942	$0	$7,747,776	$3,174,988	$10,922,764
	Commercial High-Efficiency Heating and Water Heating Program	$145,068	$239,487	$520,000	$100,000	$50,228	$0	$1,054,782	$416,000	$1,470,782
	Building Practices and Demonstration Program	$30,685	$81,382	$435,360	$61,369	$30,440	$0	$639,236	$348,288	$987,524
2009 Total		$1,266,138	$2,406,118	$10,863,704	$2,258,516	$844,511	$0	$17,638,987	$3,847,334	$21,486,321
2010	Enhanced Home Sealing Incentives	$43,831	$75,173	$1,200,000	$20,000	$66,950	$0	$1,405,955	$240,000	$1,645,955
	Residential ENERGY STAR® Products Program	$5,000	$5,000	$50,000	$5,000	$5,000	$0	$70,000	$40,000	$110,000
	Residential Low Income Program	$441,177	$754,490	$3,529,412	$882,353	$280,372	$0	$5,887,803	($352,941)	$5,534,862
	Residential Building Practices and Demonstration Program	$8,581	$10,132	$15,000	$3,000	$1,836	$0	$38,549	$0	$38,549
	Energy Audit Program	$61,116	$101,861	$488,931	$122,233	$40,744	$0	$814,885	($3,000)	$811,885
	Commercial, Industrial and Multi Family Energy Efficiency Program	$530,681	$1,138,593	$4,645,000	$1,064,561	$368,942	$0	$7,747,776	$3,174,988	$10,922,764
	Commercial High-Efficiency Heating and Water Heating Program	$145,068	$239,487	$520,000	$100,000	$50,228	$0	$1,054,782	$416,000	$1,470,782
	Building Practices and Demonstration Program	$30,685	$81,382	$435,360	$61,369	$30,440	$0	$639,236	$348,288	$987,524
2010 Total		$1,266,138	$2,406,118	$10,883,704	$2,258,516	$844,511	$0	$17,658,987	$3,863,334	$21,522,321
2011	Enhanced Home Sealing Incentives	$43,831	$75,196	$500,000	$20,000	$31,951	$0	$670,979	$240,000	$910,979
	Residential ENERGY STAR® Products Program	$5,000	$5,000	$50,000	$5,000	$3,250	$0	$68,250	$40,000	$108,250
	Residential Low Income Program	$441,177	$754,691	$3,529,412	$882,353	$280,382	$0	$5,888,015	($352,941)	$5,535,074
	Residential Building Practices and Demonstration Program	$8,581	$10,133	$15,000	$3,000	$1,836	$0	$38,550	$0	$38,550
	Energy Audit Program	$61,116	$101,861	$488,931	$122,233	$40,744	$0	$814,885	($3,000)	$811,885
	Commercial, Industrial and Multi Family Energy Efficiency Program	$635,190	$882,676	$4,796,100	$1,061,362	$368,766	$0	$7,744,094	$3,366,801	$11,110,895
	Commercial High-Efficiency Heating and Water Heating Program	$145,068	$192,491	$650,000	$100,000	$54,378	$0	$1,141,937	$520,000	$1,661,937
	Building Practices and Demonstration Program	$30,685	$81,062	$362,800	$61,369	$26,796	$0	$562,712	$290,240	$852,952
2010 Total		$1,370,647	$2,103,111	$10,392,244	$2,255,317	$808,103	$0	$16,929,422	$4,101,100	$21,030,522
	Enhanced Home Sealing Incentives	$131,493	$225,543	$2,900,000	$60,000	$165,852	$0	$3,482,888	$720,000	$4,202,888
	Residential ENERGY STAR® Products Program	$15,000	$15,000	$130,000	$15,000	$13,250	$0	$188,250	$104,000	$292,250
	Residential Low Income Program	$1,323,530	$2,263,671	$10,588,237	$2,647,059	$841,125	$0	$17,663,622	($1,058,824)	$16,604,798
	Residential Building Practices and Demonstration Program	$25,743	$30,398	$45,000	$9,000	$5,507	$0	$115,648	$0	$115,648
	Energy Audit Program	$183,349	$305,582	$1,466,794	$366,698	$122,233	$0	$2,444,656	($9,000)	$2,435,656
	Commercial, Industrial and Multi Family Energy Efficiency Program	$1,696,552	$3,159,862	$14,086,100	$3,190,483	$1,106,650	$0	$23,239,646	$9,716,776	$32,956,422
	Commercial High-Efficiency Heating and Water Heating Program	$435,203	$671,465	$1,690,000	$300,000	$154,833	$0	$3,251,501	$1,352,000	$4,603,501
2009 - 2011	Building Practices and Demonstration Program	$92,054	$243,827	$1,233,520	$184,108	$87,675	$0	$1,841,184	$986,816	$2,828,000
2009 - 2011 Total		$3,902,923	$6,915,347	$32,139,651	$6,772,348	$2,497,125	$0	$52,227,395	$11,811,768	$64,039,164

Budget shows activity in program year dollars, not present valued to 2009 dollars.

KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI")
ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST

Summary of Benefit , Costs (2009 $s)
Total Resource Cost Test

Gas Programs	2009 TRC Benefit/ Cost	2009 Total NPV Benefits ($000)	2009 Total NPV Costs ($000)	2010 TRC Benefit/ Cost	2010 Total NPV Benefits ($000)	2010 Total NPV Costs ($000)	2011 TRC Benefit/ Cost	2011 Total NPV Benefits ($000)	2011 Total NPV Costs ($000)	2009 - 2011 TRC Benefit/ Cost	2009 - 2011 Total NPV Benefits ($000)	2009 - 2011 Total NPV Costs ($000)
Enhanced Home Sealing Incentives	1.41	$1,382	$ 983	1.52	$1,414	$ 932	1.73	$2,114	$ 1,222	1.57	$4,910	$3,137
Residential ENERGY STAR® Products Program	1.53	$113	$ 74	1.85	$193	$ 104	2.05	$199	$ 97	1.84	$506	$276
ENERGY STAR® Homes Program	1.10	$780	$ 707	1.19	$799	$ 670	1.34	$822	$ 616	1.21	$2,402	$1,993
Residential Low Income Program	1.16	$3,221	$ 2,773	1.25	$3,295	$ 2,628	1.36	$3,390	$ 2,491	1.25	$9,905	$7,893
Residential Building Practices and Demonstration Program	n/a	n/a	$ 44	n/a	n/a	$ 42	n/a	n/a	$ 44	n/a	n/a	$129
Energy Audit Program	0.07	$36	$ 532	0.07	$36	$ 504	0.08	$37	$ 478	0.07	$110	$1,515
Commercial, Industrial and Multi Family Energy Efficiency Program	1.57	$6,028	$ 3,828	1.68	$6,111	$ 3,628	2.00	$7,595	$ 3,799	1.75	$19,733	$11,255
Commercial High-Efficiency Heating and Water Heating Program	2.93	$1,993	$ 680	3.16	$2,039	$ 644	3.45	$3,146	$ 913	3.21	$7,179	$2,237
Building Practices and Demonstration Program	2.77	$849	$ 307	2.97	$863	$ 291	3.20	$883	$ 276	2.97	$2,595	$873
Grand Total	**1.45**	**$14,404**	**$9,928**	**1.56**	**$14,749**	**$9,444**	**1.83**	**$18,187**	**$9,936**	**1.62**	**$47,339**	**$29,308**

Total NPV cost is the net present value of utility and participant costs
Residential Building Practices and Demonstration Program includes costs for the program but does not include expected benefits.

KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI")
ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST

		Total Benefits										Load Reduction (kW)			MWh Saved		MMBTU Saved	
			Capacity				Energy											
			Generation				Winter		Summer									
Year	Gas Programs	Total Benefits	Summer	Winter	Trans	MDC	Peak	Off Peak	Peak	Off Peak	Natural Gas	Summer	Winter	Lifetime	Annual	Lifetime	Annual	Lifetime
2009	Enhanced Home Sealing Incentives	$1,382,367	$0	$0	$0	$0	$0	$0	$0	$0	$1,382,367	0	0	0	0	0	9,936	198,720
	Residential ENERGY STAR® Products Program	$113,021	$83	$0	$14	$49	$5,775	$5,832	$2,735	$2,725	$95,808	0	2	1	12	311	606	15,140
	ENERGY STAR® Homes Program	$780,249	$0	$0	$0	$0	$0	$0	$0	$0	$780,249	0	0	0	0	0	4,932	123,300
	Residential Low Income Program	$3,221,191	$0	$0	$0	$0	$0	$0	$0	$0	$3,221,191	0	0	0	0	0	23,153	463,057
	Residential Building Practices and Demonstration Program	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	0	0
	Energy Audit Program	$36,280	$0	$0	$0	$0	$0	$0	$0	$0	$36,280	0	0	0	0	0	540	3,780
	Commercial, Industrial and Multi Family Energy Efficiency Program	$6,027,737	$0	$0	$0	$0	$0	$0	$0	$0	$6,027,737	0	0	0	0	0	57,617	746,805
	Commercial High-Efficiency Heating and Water Heating Program	$1,993,414	$0	$0	$0	$0	$0	$0	$0	$0	$1,993,414	0	0	0	0	0	14,328	286,560
	Building Practices and Demonstration Program	$849,376	$0	$0	$0	$0	$0	$0	$0	$0	$849,376	0	0	0	0	0	7,836	106,576
Grand Total - 2009		**$14,403,636**	**$83**	**$0**	**$14**	**$49**	**$5,775**	**$5,832**	**$2,735**	**$2,725**	**$14,386,423**	**0**	**2**	**1**	**12**	**311**	**118,948**	**1,943,939**
2010	Enhanced Home Sealing Incentives	$1,413,858	$0	$0	$0	$0	$0	$0	$0	$0	$1,413,858	0	0	0	0	0	9,936	198,720
	Residential ENERGY STAR® Products Program	$193,341	$148	$0	$24	$85	$9,921	$10,135	$4,728	$4,749	$163,551	0	3	2	21	518	1,009	25,234
	ENERGY STAR® Homes Program	$799,163	$0	$0	$0	$0	$0	$0	$0	$0	$799,163	0	0	0	0	0	4,932	123,300
	Residential Low Income Program	$3,294,570	$0	$0	$0	$0	$0	$0	$0	$0	$3,294,570	0	0	0	0	0	23,153	463,057
	Residential Building Practices and Demonstration Program	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	0	0
	Energy Audit Program	$36,423	$0	$0	$0	$0	$0	$0	$0	$0	$36,423	0	0	0	0	0	540	3,780
	Commercial, Industrial and Multi Family Energy Efficiency Program	$6,110,588	$0	$0	$0	$0	$0	$0	$0	$0	$6,110,588	0	0	0	0	0	57,617	746,805
	Commercial High-Efficiency Heating and Water Heating Program	$2,038,824	$0	$0	$0	$0	$0	$0	$0	$0	$2,038,824	0	0	0	0	0	14,328	286,560
	Building Practices and Demonstration Program	$862,524	$0	$0	$0	$0	$0	$0	$0	$0	$862,524	0	0	0	0	0	7,836	106,576
Grand Total - 2010		**$14,749,289**	**$148**	**$0**	**$24**	**$85**	**$9,921**	**$10,135**	**$4,728**	**$4,749**	**$14,719,500**	**0**	**3**	**2**	**21**	**518**	**119,352**	**1,954,032**
2011	Enhanced Home Sealing Incentives	$2,114,042	$0	$0	$0	$0	$0	$0	$0	$0	$2,114,042	0	0	0	0	0	14,440	288,806
	Residential ENERGY STAR® Products Program	$199,435	$157	$0	$25	$87	$10,321	$10,630	$4,939	$4,991	$168,286	0	3	2	21	518	1,009	25,234
	ENERGY STAR® Homes Program	$822,296	$0	$0	$0	$0	$0	$0	$0	$0	$822,296	0	0	0	0	0	4,932	123,300
	Residential Low Income Program	$3,389,545	$0	$0	$0	$0	$0	$0	$0	$0	$3,389,545	0	0	0	0	0	23,153	463,057
	Residential Building Practices and Demonstration Program	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	0	0
	Energy Audit Program	$36,925	$0	$0	$0	$0	$0	$0	$0	$0	$36,925	0	0	0	0	0	540	3,780
	Commercial, Industrial and Multi Family Energy Efficiency Program	$7,595,174	$0	$0	$0	$0	$0	$0	$0	$0	$7,595,174	0	0	0	0	0	68,551	919,412
	Commercial High-Efficiency Heating and Water Heating Program	$3,146,398	$0	$0	$0	$0	$0	$0	$0	$0	$3,146,398	0	0	0	0	0	21,492	429,840
	Building Practices and Demonstration Program	$882,706	$0	$0	$0	$0	$0	$0	$0	$0	$882,706	0	0	0	0	0	7,836	106,576
Grand Total - 2011		**$18,186,521**	**$157**	**$0**	**$25**	**$87**	**$10,321**	**$10,630**	**$4,939**	**$4,991**	**$18,155,371**	**0**	**3**	**2**	**21**	**518**	**141,954**	**2,360,005**
	Enhanced Home Sealing Incentives	$4,910,267	$0	$0	$0	$0	$0	$0	$0	$0	$4,910,267	0	0	0	0	0	34,312	686,246
	Residential ENERGY STAR® Products Program	$505,797	$388	$0	$63	$221	$26,017	$26,596	$12,402	$12,465	$427,645	0	7	5	54	1,346	2,624	65,608
	ENERGY STAR® Homes Program	$2,401,708	$0	$0	$0	$0	$0	$0	$0	$0	$2,401,708	0	0	0	0	0	14,796	369,900
	Residential Low Income Program	$9,905,307	$0	$0	$0	$0	$0	$0	$0	$0	$9,905,307	0	0	0	0	0	69,459	1,389,172
	Residential Building Practices and Demonstration Program	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0	0	0	0	0	0
	Energy Audit Program	$109,627	$0	$0	$0	$0	$0	$0	$0	$0	$109,627	0	0	0	0	0	1,620	11,340
	Commercial, Industrial and Multi Family Energy Efficiency Program	$19,733,499	$0	$0	$0	$0	$0	$0	$0	$0	$19,733,499	0	0	0	0	0	183,786	2,413,022
2009 -	Commercial High-Efficiency Heating and Water Heating Program	$7,178,635	$0	$0	$0	$0	$0	$0	$0	$0	$7,178,635	0	0	0	0	0	50,148	1,002,960
2011	Building Practices and Demonstration Program	$2,594,606	$0	$0	$0	$0	$0	$0	$0	$0	$2,594,606	0	0	0	0	0	23,509	319,728
Grand Total - 2009 - 2011		**$47,339,446**	**$388**	**$0**	**$63**	**$221**	**$26,017**	**$26,596**	**$12,402**	**$12,465**	**$47,261,294**	**0**	**7**	**5**	**54**	**1,346**	**380,254**	**6,257,976**

KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI")
ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST

Year	Gas Programs	Program Planning and Administration	Program Marketing & Trade Ally	Customer Incentives or Services	Program Implementation	Evaluation & Market Research	Performance Incentive	Total Utility Cost	Particpant Cost	Total Cost
2009	Enhanced Home Sealing Incentives	$34,326	$59,311	$687,500	$24,000	$40,257	$0	$845,394	$137,500	$982,894
	Residential ENERGY STAR® Products Program	$5,000	$5,000	$30,000	$5,000	$5,000	$0	$50,000	$24,000	$74,000
	ENERGY STAR® Homes Program	$27,461	$47,187	$200,000	$75,000	$17,482	$0	$367,130	$340,000	$707,130
	Residential Low Income Program	$220,584	$382,591	$1,764,670	$441,167	$140,451	$0	$2,949,462	($176,467)	$2,772,995
	Residential Building Practices and Demonstration Program	$4,590	$7,878	$26,400	$3,000	$2,093	$0	$43,961	$0	$43,961
	Energy Audit Program	$40,105	$66,841	$320,837	$80,209	$26,736	$0	$534,728	($2,500)	$532,228
	Commercial, Industrial and Multi Family Energy Efficiency Program	$225,274	$412,653	$1,599,110	$430,867	$133,395	$0	$2,801,299	$1,026,541	$3,827,840
	Commercial High-Efficiency Heating and Water Heating Program	$59,313	$98,453	$260,000	$18,626	$21,820	$0	$458,212	$221,714	$679,926
	Building Practices and Demonstration Program	$15,773	$33,326	$120,000	$31,546	$10,032	$0	$210,677	$96,000	$306,677
2009 Total		$632,425	$1,113,239	$5,008,517	$1,109,415	$397,267	$0	$8,260,863	$1,666,788	$9,927,651
2010	Enhanced Home Sealing Incentives	$34,326	$59,311	$687,500	$24,000	$40,257	$0	$845,394	$137,500	$982,894
	Residential ENERGY STAR® Products Program	$5,000	$5,000	$50,000	$5,000	$5,000	$0	$70,000	$40,000	$110,000
	ENERGY STAR® Homes Program	$27,461	$47,187	$200,000	$75,000	$17,482	$0	$367,130	$340,000	$707,130
	Residential Low Income Program	$220,584	$382,591	$1,764,670	$441,167	$140,451	$0	$2,949,462	($176,467)	$2,772,995
	Residential Building Practices and Demonstration Program	$4,590	$7,878	$26,400	$3,000	$2,093	$0	$43,961	$0	$43,961
	Energy Audit Program	$40,105	$66,841	$320,837	$80,209	$26,736	$0	$534,728	($2,500)	$532,228
	Commercial, Industrial and Multi Family Energy Efficiency Program	$225,274	$412,653	$1,599,110	$430,367	$133,370	$0	$2,800,774	$1,026,541	$3,827,315
	Commercial High-Efficiency Heating and Water Heating Program	$59,313	$98,453	$260,000	$18,626	$21,820	$0	$458,212	$221,714	$679,926
	Building Practices and Demonstration Program	$15,773	$33,326	$120,000	$31,546	$10,032	$0	$210,677	$96,000	$306,677
2010 Total		$632,425	$1,113,239	$5,028,517	$1,108,915	$397,242	$0	$8,280,338	$1,682,788	$9,963,126
2011	Enhanced Home Sealing Incentives	$34,326	$47,664	$999,168	$24,000	$55,258	$0	$1,160,415	$199,833	$1,360,249
	Residential ENERGY STAR® Products Program	$5,000	$5,000	$50,000	$5,000	$3,250	$0	$68,250	$40,000	$108,250
	ENERGY STAR® Homes Program	$27,461	$26,308	$200,000	$75,000	$16,438	$0	$345,207	$340,000	$685,207
	Residential Low Income Program	$220,584	$382,528	$1,764,670	$441,167	$140,447	$0	$2,949,396	($176,467)	$2,772,929
	Residential Building Practices and Demonstration Program	$4,590	$5,871	$33,000	$3,000	$2,323	$0	$48,785	$0	$48,785
	Energy Audit Program	$40,105	$66,841	$320,837	$80,209	$26,736	$0	$534,728	($2,500)	$532,228
	Commercial, Industrial and Multi Family Energy Efficiency Program	$202,214	$430,765	$1,844,127	$404,429	$144,077	$0	$3,025,612	$1,203,305	$4,228,916
	Commercial High-Efficiency Heating and Water Heating Program	$59,313	$123,175	$450,000	$18,626	$32,556	$0	$683,670	$332,571	$1,016,241
	Building Practices and Demonstration Program	$15,773	$33,375	$120,000	$31,546	$10,035	$0	$210,729	$96,000	$306,729
2010 Total		$609,365	$1,121,527	$5,781,802	$1,082,977	$431,120	$0	$9,026,791	$2,032,742	$11,059,533
	Enhanced Home Sealing Incentives	$102,977	$166,286	$2,374,168	$72,000	$135,772	$0	$2,851,203	$474,833	$3,326,036
	Residential ENERGY STAR® Products Program	$15,000	$15,000	$130,000	$15,000	$13,250	$0	$188,250	$104,000	$292,250
	ENERGY STAR® Homes Program	$82,382	$120,681	$600,000	$225,000	$51,403	$0	$1,079,466	$1,020,000	$2,099,466
	Residential Low Income Program	$661,751	$1,147,709	$5,294,010	$1,323,502	$421,349	$0	$8,848,321	($529,401)	$8,318,920
	Residential Building Practices and Demonstration Program	$13,771	$21,627	$85,800	$9,000	$6,510	$0	$136,708	$0	$136,708
	Energy Audit Program	$120,314	$200,523	$962,510	$240,627	$80,209	$0	$1,604,183	($7,500)	$1,596,683
	Commercial, Industrial and Multi Family Energy Efficiency Program	$652,762	$1,256,071	$5,042,347	$1,265,663	$410,842	$0	$8,627,685	$3,256,386	$11,884,071
	Commercial High-Efficiency Heating and Water Heating Program	$177,939	$320,081	$970,000	$55,878	$76,195	$0	$1,600,093	$776,000	$2,376,093
2009 - 2011	Building Practices and Demonstration Program	$47,319	$100,027	$360,000	$94,638	$30,099	$0	$632,083	$288,000	$920,083
2009 - 2011 Total		$1,874,215	$3,348,005	$15,818,835	$3,301,308	$1,225,629	$0	$25,567,992	$5,382,318	$30,950,310

Budget shows activity in program year dollars, not present valued to 2009 dollars.

Appendix C

APPENDIX C

Master Worksheet With All Input Assumptions

MASTER WORKSHEET WITH ALL PROGRAM INPUT ASSUMPTIONS
nput Assumptions Energy Efficiency Programs - KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI")
September 19, 2008

Gas Programs	Measure Name	Measure Life	Source of Measure Life	Incremental Cost	Source of Incremental Cost	Annual Savings Per Participant or Per Unit of Installation	Source of Annual Savings	Net to Gross Impact Factors	Source of Net to Gross
Enhanced Home Sealing Incentives	BPI	20	Measure Life Report for the New England State Program Working Group, March 14, 2007 prepared by GDS Associates.	$3,100	This figure represents the incentive dollars divided by the total expected participation for this program. The average rebate will be approximately $2,300, and this represents 75% of the total cost of each weatherization. Thus the average cost of each weatherization job is approximately $3,100.	37	Based on RemRATE Analysis for small, medium and large homes in New Hampshire, and using degree days in Concord, New Hampshire. The REM/rate analysis was completed on March 12, 2004 by GDS.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Residential ENERGY STAR® Products Program	Windows	25	Measure Life Report for the New England State Program Working Group, March 14, 2007 prepared by GDS Associates.	$1.50/ square foot assume 12.5 square feet of window (or $18.75 per window).	Quantec LLC, Residential Market Assessment for ENERGY STAR Windows in the Northeast, January 2006.	2	Quantec LLC, Residential Market Assessment for ENERGY STAR Windows in the Northeast, January 2006.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
ENERGY STAR® Homes Program	ENERGY STAR Homes	25	Gas Networks estimate.	$3,000	Joint Management Committee, ENERGY STAR Homes Task D Evaluation Report, prepared by GDS for the JMC, 2003. Incremental cost is for a SF home built in New Hampshire.	27	National Grid Regulatory Filing for Massachusetts, Performance Measurement Reports for ENERGY STAR Homes, 2000 to 2002.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Residential Low Income Program	Low Income	20	Measure Life Report for the New England State Program Working Group, March 14, 2007 prepared by GDS Associates.	$2,010	The incentive offered by this program covers 100% of the project incremental cost. The projected rebate per participant is $2010. Thus the projected incremental cost is $2010.	29	Average of projects completed in NY service territory from AEA.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Energy Audit Program	Energy Audit	7	Measure Life Report for the New England State Program Working Group, March 14, 2007 prepared by GDS Associates.	$25	Assumes 2 CFLs per participant at an incremental cost of $8. Assumes 50% of participants receive DHW measures at an incremental cost of $17.	1	Average of projects completed in MA service territory in 2007 in the RCS Program for participants with gas heat that received DHW measures.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Commercial, Industrial and Multi Family Energy Efficiency Program	Multifamily	20	Data from KeySpan's "Cost per therm report for Massachusetts programs" for Program Year 3 (this is for the period May 1, 2004 to April 30, 2005)	$4,950	The incentive offered by this program covers 50% of the project incremental cost. The projected rebate per participant is $2,475. Thus the projected incremental cost is $4,950.	110	Average of projects completed in NY service territory from RISE Engineering.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Commercial, Industrial and Multi Family Energy Efficiency Program	Standard Comm EE Projects	12	Data from KeySpan's updated "Performance Report" report for Massachusetts programs" for Program Year 3 (this is for the period May 1, 2004 to April 30, 2005)	$5,775	Average of projects completed in NY service territory from RISE Engineering.	144	Average of projects completed in NY service territory from RISE Engineering.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Commercial, Industrial and Multi Family Energy Efficiency Program	Economic Redevelopment Projects	12	Data from KeySpan's Annual Report for Massachusetts programs for 2005-2006 (this is for the period May 1, 2005 to April 30, 2006)	$113,496	This figure represents the incentive dollars budgeted in 2009 for the Economic Redevelopment Program divided by the total number of expected participants. The rebate offered by this program covers 50% of the project incremental cost. The projected rebate	1,419	Average of projects completed in NY service territory from RISE Engineering.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.

MASTER WORKSHEET WITH ALL PROGRAM INPUT ASSUMPTIONS
nput Assumptions Energy Efficiency Programs - KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI")
September 19, 2008

Gas Programs	Measure Name	Measure Life	Source of Measure Life	Incremental Cost	Source of Incremental Cost	Annual Savings Per Participant or Per Unit of Installation	Source of Annual Savings	Net to Gross Impact Factors	Source of Net to Gross
Commercial High-Efficiency Heating and Water Heating Program	Comm High Efficiency Heating	20	ENERGY STAR Savings Calculator for Boilers. Lifetime from LBNL 2007.	$3,000	The rebate offered by this program covers 50% of the project incremental cost. The projected rebate per participant is $1,500. Thus the projected incremental cost is $3,000.	80	Average of projects completed in NY service territory from RISE Engineering.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Building Practices and Demonstration Program	Comm Building Practices and Demo	14	Data from KeySpan's "Cost per therm report for Massachusetts programs" for Program Year 3 (this is for the period May 1, 2004 to April 30, 2005)	$40,000	The rebate offered by this program covers 50% of the project incremental cost. The projected rebate per participant is $50,000. Thus the projected incremental cost is $100,000.	1,451	Average of projects completed in NY service territory from RISE Engineering.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.

MASTER WORKSHEET WITH ALL PROGRAM INPUT ASSUMPTIONS
nput Assumptions Energy Efficiency Programs - The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY")
September 19, 2008

Gas Programs	Measure Name	Measure Life	Source of Measure Life	Incremental Cost	Source of Incremental Cost	Annual Savings Per Participant or Per Unit of Installation	Source of Annual Savings	Net to Gross Impact Factors	Source of Net to Gross
Enhanced Home Sealing Incentives	BPI	20	Measure Life Report for the New England State Program Working Group, March 14, 2007 prepared by GDS Associates.	$3,200	This figure represents the incentive dollars budgeted for 10/08-5/09 divided by the total expected participation for 2009 for this program. The average rebate will be approximately $2,400, and this represents 75% of the total cost of each weatherization job. Thus the average cost of each weatherization job is approximately $3,200.	37	Based on RemRATE Analysis for small, medium and large homes in New Hampshire, and using degree days in Concord, New Hampshire. The REM/rate analysis was completed on March 12, 2004 by GDS.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Residential ENERGY STAR® Products Program	Windows	25	Measure Life Report for the New England State Program Working Group, March 14, 2007 prepared by GDS Associates.	$1.50/ square foot assume 12.5 square feet of window (or $18.75 per window).	Quantec LLC, Residential Market Assessment for ENERGY STAR Windows in the Northeast, January 2006.	2	Quantec LLC, Residential Market Assessment for ENERGY STAR Windows in the Northeast, January 2006.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Residential Low Income Program	Low Income	20	Measure Life Report for the New England State Program Working Group, March 14, 2007 prepared by GDS Associates.	$2,012	The incentive offered by this program covers 100% of the project incremental cost. The projected rebate per participant is $2012. Thus the projected incremental cost is $2012.	29	Average of projects completed in NY service territory from AEA.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Energy Audit Program	Energy Audit	7	Measure Life Report for the New England State Program Working Group, March 14, 2007 prepared by GDS Associates.	$25	Assumes 2 CFLs per participant at an incremental cost of $8. Assumes 50% of participants receive DHW measures at an incremental cost of $17.	1	Average of projects completed in MA service territory in 2007 in the RCS Program for participants with gas heat that received DHW measures.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Commercial, Industrial and Multi Family Energy Efficiency Program	Multifamily	20	Data from KeySpan's "Cost per therm report for Massachusetts programs" for Program Year 3 (this is for the period May 1, 2004 to April 30, 2005)	$5,317	The incentive offered by this program covers 50% of the project incremental cost. The projected rebate per participant is $2,658. Thus the projected incremental cost is $5,317.	93	Average of projects completed in NY service territory from RISE Engineering.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Commercial, Industrial and Multi Family Energy Efficiency Program	Standard Comm EE Projects	12	Data from KeySpan's updated "Performance Report" report for Massachusetts programs" for Program Year 3 (this is for the period May 1, 2004 to April 30, 2005)	$5,775	Average of projects completed in NY service territory from RISE Engineering.	144	Average of projects completed in NY service territory from RISE Engineering.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Commercial, Industrial and Multi Family Energy Efficiency Program	Economic Redevelopment Projects	12	Data from KeySpan's Annual Report for Massachusetts programs for 2005-2006 (this is for the period May 1, 2005 to April 30, 2006)	$113,496	This figure represents the incentive dollars budgeted in 2009 for the Economic Redevelopment Program divided by the total number of expected participants. The rebate offered by this program covers 50% of the project incremental cost. The projected rebate per participant is $56,748. Thus the projected incremental cost is $113,496.	1,419	Average of projects completed in NY service territory from RISE Engineering.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.

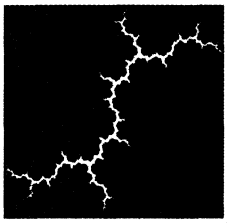
MASTER WORKSHEET WITH ALL PROGRAM INPUT ASSUMPTIONS
Input Assumptions Energy Efficiency Programs - The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY")
September 19, 2008

Gas Programs	Measure Name	Measure Life	Source of Measure Life	Incremental Cost	Source of Incremental Cost	Annual Savings Per Participant or Per Unit of Installation	Source of Annual Savings	Net to Gross Impact Factors	Source of Net to Gross
Commercial High-Efficiency Heating and Water Heating Program	Comm High Efficiency Heating	20	ENERGY STAR Savings Calculator for Boilers. Lifetime from LBNL 2007.	$3,000	The rebate offered by this program covers 50% of the project incremental cost. The projected rebate per participant is $1,500. Thus the projected incremental cost is $3,000.	80	Average of projects completed in NY service territory from RISE Engineering.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.
Building Practices and Demonstration Program	Comm Building Practices and Demo	14	Data from KeySpan's "Cost per therm report for Massachusetts programs" for Program Year 3 (this is for the period May 1, 2004 to April 30, 2005)	$40,000	The rebate offered by this program covers 50% of the project incremental cost. The projected rebate per participant is $50,000. Thus the projected incremental cost is $100,000.	1,451	Average of projects completed in NY service territory from RISE Engineering.	10% Net Free Ridership Rate	Net free ridership is a DPS staff estimate.

Appendix D

APPENDIX D

"Niagara Mohawk Avoided Electricity and Natural Gas Costs"



Synapse
Energy Economics, Inc.

Niagara Mohawk Avoided Electricity and Natural Gas Costs

March 31, 2008

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1. Executive Summary

Background

National Grid retained Synapse Energy Economics (Synapse) and its subcontractors, Swanson Energy Group and Resource Insight, to prepare projections of retail electricity and natural gas costs that would be avoided due to reductions in retail consumption resulting from energy efficiency programs offered to customers of Niagara Mohawk (NIMO). These projections were developed in order to support energy efficiency program decision-making and regulatory filings during 2008.

This projection of retail avoided costs is an add-on to the analyses that this Synapse project team completed for the 2007 AESC Study Group. That project entailed the development of long-term projections of avoided retail electricity and natural gas costs for utilities in New England. The assumptions, methodology and results from that study are documented in *Avoided Energy Supply Costs in New England 2007 Final Report* ("AESC 2007")[1].

In this add-on project, the Synapse team developed estimates of these retail avoided costs for NIMO using essentially the same methodology as they used in the AESC 2007 project. The team drew upon materials from the AESC 2007 Study to the maximum extent possible and reasonable. It made changes to input assumptions where appropriate to reflect the market conditions in which Niagara Mohawk operates.

Due to the extremely limited time available to develop these projections, Synapse did not develop a forecast of wholesale electric energy prices in New York base upon its own simulation modeling. Instead Synapse started with the Reference Case forecast in the most recent long-term electricity and fuel price outlook[2] prepared by Global Energy Decisions (GED).[3] The Reference Case forecast is a 25-year outlook for the electric and fuel markets in the United States Northeast. It is based upon a comprehensive, independent analysis of market trends and detailed modeling of electric and fuels markets in that region. Synapse is providing the GED outlook to National Grid with this report.

Synapse chose the GED forecast as a starting point because it is a recent detailed projection of fuel and electric energy prices for the Northeast, including New York, prepared using an updated version of the same database as well as the same production simulation model as Synapse used in AESC 2007. Synapse developed a customized forecast of wholesale natural gas and electric energy prices for NIMO by adjusting the respective GED forecasts to reflect the Synapse team's outlook on certain key components.

The balance of the report is organized as follows:

Chapter 2	Projection of wholesale electric energy prices
Chapter 3	Projection of avoided retail electricity costs by costing period.
Chapter 4	Projection of avoided natural gas costs by retail end-use sector.

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[1] *Avoided Energy Supply Costs in New England 2007 Final Report,* August 2007 ("AESC 2007). Available at: http://www.synapse-energy.com/Downloads/SynapseReport.2007-08.AESC.Avoided-Energy-Supply-Costs-2007.07-019.pdf

[2] ____, *Electricity & Fuel Price Outlook - Northeast Fall 2007,* Global Energy Decisions, Power Market Advisory Service, November 2007. Access to this intellectual property is restricted to parties that have directly licensed the report and parties that have signed a non-disclosure agreement (NDA) with Ventyx.

[3] Global Energy Decisions, a Ventyx Company.

A. Levelized Avoided Costs

The detailed, year by year, avoided costs of electricity and natural gas are presented later in this report. The twenty year (2008 – 2027) levelized values for these costs, in $2007, are summarized below. The levelized values were calculated at discount rate of 2.22%.

Avoided Electricity Costs

The levelized avoided costs of electric energy and capacity applicable to load reductions by NIMO retail customers over the next twenty years are shown in Table 1.

Table 1 - NIMO 20 Year Levelized Avoided Electricity Costs ($2007)					
Period	**Winter Peak**	**Winter Off-Peak**	**Summer Peak**	**Summer Off Peak**	**Capacity**
Units	**$/kwh**	**$/kwh**	**$/kwh**	**$/kwh**	**$/kw-yr**
Avoided Cost	**0.102**	**0.071**	**0.101**	**0.067**	**104.3**
CO_2 Externality	**0.035**	**0.029**	**0.034**	**0.028**	

This table also presents a projection of annual additional environmental costs associated with emissions of CO_2 related to electric energy consumption by NIMO customers. The estimates are equal to the cost of limiting CO_2 emissions to a "sustainability target" level, estimated to be a control cost of $60/ton, minus the forecast value of CO_2 allowances under the cap and trade regulations expected over the study period. We recommend that NIMO include CO_2 additional environmental costs in its analyses of DSM, unless specifically prohibited from doing so by state or local law or regulation.

Avoided Gas Costs

The levelized avoided costs of natural gas applicable to load reductions by NIMO retail customers over the next twenty years are shown in Table 2.

Table 2 - NIMO 20 Year Levelized Avoided Gas Costs ($2007/dT)							
Residential				**Commercial & Industrial**			**ALL**
Existing Heating	**New Heating**	**Hot Water**	**All**	**Non Heating**	**Heating**	**All**	**RETAIL**
Dec-Feb	Nov-Mar	annual	Nov-Apr	annual	Nov-Mar	Nov-Apr	Nov-Mar
12.54	12.39	11.70	12.18	10.11	10.80	10.59	11.54

2. Electric Energy Price Forecast

Niagara Mohawk (NIMO) customers acquire their wholesale electric energy from six zones within the New York wholesale market, i.e., NY-ISO Zones A through F. Synapse developed a forecast of the wholesale electric energy prices that NIMO would avoid as a result of reductions in retail customer consumption. We accomplished this in the following three major steps:

1. Review GED Reference Case forecast of wholesale electric energy prices by zone in New York, and all underlying assumptions;
2. Adjust GED Reference Case forecast prices to reflect our outlook regarding future natural gas prices and CO_2 compliance costs; and
3. Calculate NIMO load-weighted system-wide avoided wholesale electric energy costs.

The electric workpapers with these calculations are listed in Table 3. They are provided in a workbook titled *NIMO Avoided costs electric workpapers 2008 03 27.xls*.

Table 3 – Electric workpapers Supporting Avoided Retail Electric Energy Costs

Number	Name	Content
1	NY_AB MCPs	Zonal MCPs from GED Fall 2007 Northeast Reference Case Forecast
2	NY_CDE MCPs	
3	NY_F MCPs	
4	C6-NG NY ABC	GED zonal gas price forecast
5	C7-NG NY DEFG	
6	NY_AB Implied HR	Implied heat rates derived from GED MCPs and gas prices
7	NY_CDE Implied HR	
8	NY_F Implied HR	
9	[illegible]	[illegible]
10	[illegible]	[illegible]
11	[illegible]	[illegible]
12	CO2 Price Comparison	Comparison between GED and Synapse CO2 price forecasts
13	MarginalFuelData	Marginal fuel data from Market Analytics run of Northeast in 2008
14	MarginalFuelSummary	Marginal fuel by time period and zone
15	Emissions by Fuel	Emission rates by fuel type
16	[illegible]	[illegible]
17	Load Shape Price Ratios	Ratios of NIMO Load weighted Prices by period to NY ISO Prices by period, 2007 Data
18	NY_AB MCPs Adjusted	Zonal MCPs after Synapse adjustments
19	NY_CDE MCPs Adjusted	
20	NY_F MCPs Adjusted	
21	NIMO Hourly Zonal Load Data	
22	Final MCPs	NIMO System load-weighted MCPS and Zonal MCPs by costing period
23	[illegible]	[illegible]
24	[illegible]	[illegible]
25	[illegible]	[illegible]
26	[illegible]	[illegible]

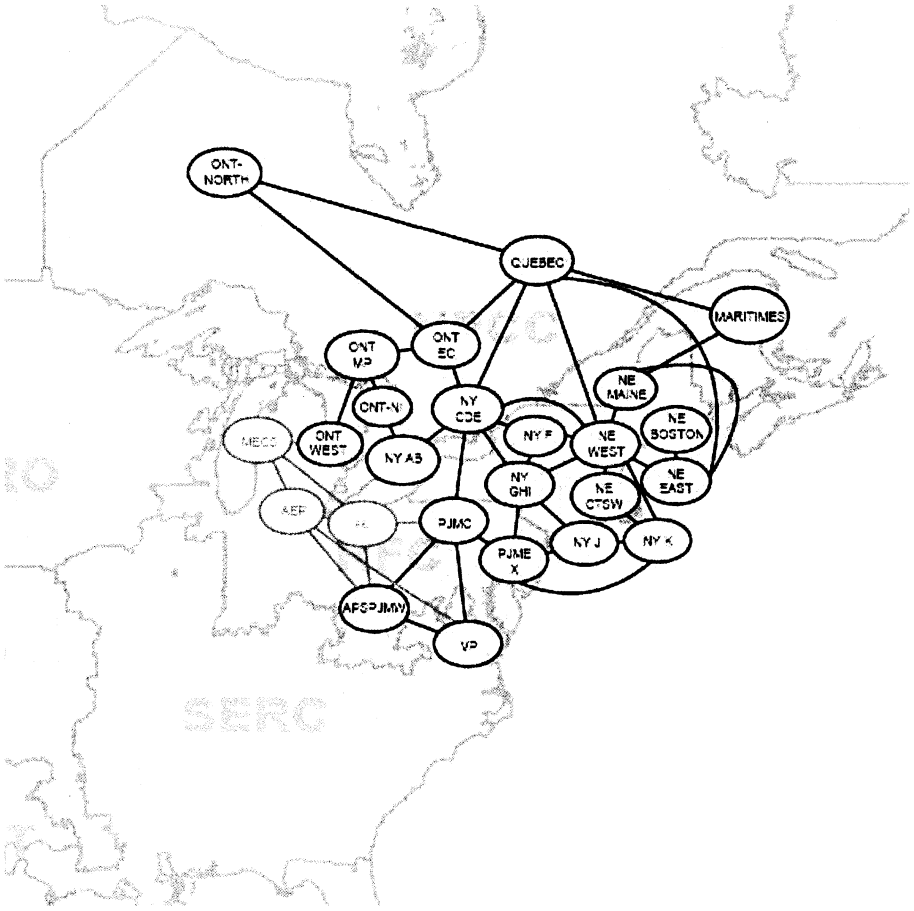
A. GED Forecast of Wholesale Electric Energy Prices

Synapse began with the Reference Case forecast of wholesale electric energy prices from GED. That forecast provides average monthly prices for peak and off-peak periods by zone in each of the wholesale electric energy markets in the Northeast. Peak period hours are 7 a.m. to 11 p.m. Monday through Friday, except for specified holidays. All other hours are off-peak.

Global Energy Decisions employs their MarketSym forecasting model to simulate the operations of those electric markets. MarketSym is a security-constrained, chronological, economic dispatch model that simulates the regional electric system on an hourly basis. The model utilizes an extensive database with detailed information for generator costs and operational constraints, transmission interfaces and constraints, customer loads, regional ancillary service requirements, and market bidding behavior.

The topology used in the Reference Forecast is shown in Figure 1.

Figure 1. Northeast Market Configuration for GED Reference Case Forecast.



Source: Global Energy Decisions

The GED forecast for New York provides average electric energy prices for peak and off-peak periods by month. These prices are provided for an aggregation of Zones A and B, i.e., "Zone AB", for an aggregation of Zones C, D, and E, i.e., "Zone CDE", and for Zone F. They are reported in electric workpapers 1, 2 and 3 respectively. The GED forecasts of wholesale gas price forecasts for the corresponding time periods and zones are presented in electric workpapers 4 and 5.

B. Adjust GED forecast of electric energy prices for Synapse outlook regarding future natural gas prices and CO_2 compliance costs.

Our second step was to adjust the GED forecast of electric energy prices to reflect our outlook regarding the future prices of natural gas and the costs of complying with future CO_2 regulation. Our review of the GED report found that we agree with most of the assumptions underlying its forecast of wholesale electric energy prices. However, our review indicates that GED has under-estimated natural gas prices at the Henry Hub in the near-term and has also under-estimated the future costs of complying with CO_2 regulation.

We adjust the GED forecast of electric energy prices by, in effect, calculating electric energy price "adders" that reflect the impacts of those differentials in forecast prices of natural gas and CO_2 respectively. For example, the adjustment for natural gas equals the differential in gas prices ($/MMBtu) multiplied by the implied heat rate for generating electricity from natural gas (MMBtu/MWh) multiplied by the percentage of time that natural gas is the marginal source of generation and thus setting the electric market price.

Analyze GED forecast to determine implied heat rates and percentage of time gas is the marginal source of generation

We began by analyzing the GED forecast to determine implied heat rates and the percentage of time gas is the marginal source of generation. We need those factors in order to

Implied heat rate is a measure of the efficiency at which a gas-fired unit produces electricity from natural gas. The implied heat rate in a zone for a given time period is the electric energy price forecast in that zone for that period in $/MWh divided by the natural gas price forecast in that zone for that period in $/MMBtu. The result is an implied heat rate, i.e. the quantity of MMBtu required to produce each MWh. We determined the implied heat rates in the GED forecast for the peak and off-peak periods in each month for Zone AB, Zone CDE and Zone F. These calculations use the GED forecasts of electric energy prices and wholesale gas prices for the corresponding zones and time periods. The results of those calculations are presented in electric workpapers 6, 7 and 8 respectively.

Differential in Outlook regarding Natural Gas Prices

The GED forecasts of wholesale gas prices for zones in New York consists of a forecast of gas prices at the Henry Hub and a forecast of the "basis" differential to those zones[4]. Our review of the GED forecast of wholesale natural gas prices for New York indicates that its corrected forecast of basis differential is reasonable but its forecast of Henry Hub prices are too low in the near-term.

The forecasts of "basis" differentials, implicit in GED's forecasts of wholesale gas prices in the New York zones, are reasonable. We did discover an error in the basis differential underlying GED's forecast of wholesale gas prices for New York zones ABC, which we brought it to GED's attention. GED corrected the error and provided a revised gas price forecast for those zones as well as a corresponding revised electric energy price forecast for those zones in those years.

[4] Henry Hub, located in Louisiana, is in the heart of the dominant producing region of the United States. It is the most liquid trading hub with the longest history of public trading on the New York Mercantile Exchange ("NYMEX"). Market prices of gas produced and sold elsewhere in North America reflect Henry Hub prices with an adjustment for their location, which is referred to as a basis differential. Basis differential for a given time period is the difference between the wholesale price of natural gas at a particular location and the price at the Henry Hub.

GED's forecast of gas prices at the Henry Hub for the years 2008 through 2013 are less than the NYMEX futures prices for those years, as of February 27, 2008. That differential is approximately $1 per million BTU (MMBTU). It is our view that the avoided gas and electric costs should be based upon the NYMMEX prices for Henry Hub as of the time our forecast is being prepared, because those prices reflect the most recent collective view of gas buyers and sellers. A comparison of those Henry Hub prices, as well as the differential by month, is presented in gas workpaper 6 and electric workpaper 9. Our adjusted forecasts of wholesale gas prices for the New York zones are presented in electric workpapers 10 and 11.

Differential in Outlook regarding CO_2 Allowance Prices

The Reference Case forecast of electric energy prices reflects the GED forecast of CO_2 emission allowance prices in the Northeast. GED assumes that the Regional Greenhouse Gas Initiative (RGGI) will be in effect from 2009 through 2011 and that national caps on greenhouse gas (GHG) emissions will go into effect in 2012. The GED report discusses these GHG regulatory initiatives on pages 1-13 to 1-16 and presents its forecast of CO_2 allowance prices in the Northeast on pages 2-9 and 4-22.

Synapse agrees with the GED assumption that RGGI will be in effect from 2009 through 2011 and that national caps will go into effect in 2012. In addition, the CO_2 allowance prices we are assuming under RGGI[5] are very close to the GED forecasts for those years. However, we believe the GED forecast of CO_2 allowance prices from 2012 onward, under a national cap on CO2, is too low. This position is based upon our review of numerous studies of the costs of complying with the range of national regulations under consideration, as well as our review of CO_2 allowance prices being used for long-term planning in various jurisdictions.

Our review of the range of national GHG regulations under consideration in Congress, and of various studies of the costs of complying with those regulations, is presented in *Climate Change and Power: Carbon Dioxide Emissions Costs and Electricity Resource Planning* ("Synapse CO_2 price report").[6] That report, released in June 2006 and updated in March 2007, forecasts CO_2 allowance prices under a base or "mid" case as well as under low and high cases. In addition to preparing that report we have reviewed and/or provided forecasts of CO_2 allowance prices in projects involving long-term electricity planning in various jurisdictions including New England, Nova Scotia and New Mexico as well as a review of CO_2 regulation in the several countries prepared for Dow.

Based upon that direct experience, and our CO_2 price report, we believe the avoided cost of electric energy in New York should reflect our mid case forecast of CO_2 prices, rather than the low case reflected in the GED forecast. The GED and Synapse forecasts of CO_2 allowance prices, and the differentials, are presented in electric workpaper 12 and summarized below in Table 4.

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[5] Drawn from IPM modeling results in *RGGI Package Scenario (Updated October 11, 2006)*. Available at http://www.rggi.org/docs/packagescenario_10_11_06.xls.

[6] Full report available at http://www.synapse-energy.com

Table 4. CO_2 Allowance Price Forecasts - GED and Synapse (2007$/short ton of CO2)

Year	GED	Synapse	Differential
2008	0.00	0.00	0.00
2009	2.11	2.21	0.10
2010	2.29	2.37	0.08
2011	2.46	2.53	0.07
2012	2.64	9.46	6.82
2013	2.94	11.56	8.62
2014	3.28	13.66	10.38
2015	3.64	15.76	12.12
2016	4.05	17.86	13.81
2017	4.50	19.96	15.46
2018	5.00	22.06	17.06
2019	5.55	24.16	18.61
2020	6.15	26.27	20.12
2021	6.82	27.32	20.50
2022	7.56	28.37	20.81
2023	8.38	29.42	21.04
2024	9.28	30.47	21.19
2025	10.28	31.52	21.24
2026	11.38	32.57	21.19
2027	12.59	33.62	21.03
2028	13.93	34.67	20.74
2029	15.40	35.72	20.32
2030	17.02	36.77	19.75
2031	18.32	36.77	18.45
2032	19.83	36.77	16.94

In order to adjust the GED forecast of energy prices for this differential in CO_2 costs we needed to identify the rate (i.e., tons per MWh) at which CO_2 would be emitted by generation of each fuel type. To do this we first estimated the percent of time generation from each fuel type would be on the margin in 2008. That analysis is presented in electric workpapers 13 and 14. We assumed that those percentages would be representative of future years. Next, we developed emission rates for generation from each fuel type based on the average heat rate for each fuel type in the on-peak and off-peak periods and the carbon content of each fuel type. Those calculations are presented in electric workpaper 15. The adjustment for the differential in CO_2 allowance prices is the marginal emission rates of CO_2 (short tons CO_2/MWh) by costing period and zone multiplied by the CO_2 allowance price differential. Those calculations are presented in electric workpaper 16.

Adjusted Forecasts of Wholesale Electric Energy Prices

We then determined the amount ($/MWH) by which the GED forecast of electric energy prices in each costing period had to be adjusted for the differential in gas price forecasts and for the differential in CO_2 allowance prices. Those calculations are presented in electric workpapers 18 to 20 respectively.

The adjustment for the differential in gas price forecasts in each costing period is essentially equal to the implied heat rate for each period multiplied by the differential in Henry Hub price forecasts in the

corresponding period. The adjustment for the differential in CO_2 allowance prices is added to our gas price adjusted forecast of electric energy prices.

C. Calculate NIMO load-weighted system-wide avoided wholesale electric energy costs.

In our third step we developed NIMO load-weighted system-wide avoided wholesale electric energy costs. To do this we first calculated NIMO load-weighted electric energy prices by costing period for the six zones in order to reflect the shape of NIMO's load in each of those zones. We then calculated NIMO system-wide wholesale avoided electric energy costs from the results by zone.

NIMO load-weighted electric energy prices by costing period.

The forecast of electric energy market prices by costing period represents a simple average of hourly market prices during the period, in essence a flat load shape. In contrast, NIMO customer load varies by hour. To determine an accurate estimate of the price of electric energy that NIMO could avoid in a given period, we wish to calculate a NIMO load-weighted energy price for each period from the forecast of market prices for the period. The key input to that calculation is factor by which we must adjust our forecast of electric energy market prices by costing period, i.e. peak and off-peak, to reflect the shape of NIMO's hourly load. We refer to that factor as a "load shape price ratio".

We developed NIMO load shape price ratios for each on-peak and off-peak period. We developed these based upon a review of the historical relationship between average electric energy market prices in each period and the corresponding NIMO load-weighted average price in the corresponding period. The historical data was from 2007, NIMO MW loads in each hour of 2007 for each zone, and actual LMPs for the corresponding hours and zones from the day-ahead market. We obtained the hourly loads from NIMO and the hourly LMPS from the NY-ISO web site.

We calculated a "load shape price ratio" for each on-peak and off-peak period of each month for each of the three sets of GED energy price forecasts, i.e., Zone F, Zone aggregation CDE and Zone aggregation AB. The load shape price ratio for a given period and zone is essentially the NIMO load-weighted average hourly price for that period divided by the average hourly price for that period.

Mathematically this can be expressed as:

$$\text{load - shape price ratio zone Z} = \frac{\left[\dfrac{\sum_{\text{hrs in period}} MW_{z,hr} \times DA\ LMP_{z,hr}}{\sum_{hrs} MW_{z,hr}}\right]}{\left[\dfrac{\sum_{hrs} DA\ LMP_{z,hr}}{\text{hours in period}}\right]}$$

For the GED forecasts prices for aggregate NYISO zones, i.e. AB and CDE, we calculated the load-shape price ratio for a given period by determining the average hourly price for that period weighted by NIMO hourly load in that aggregation of zones and dividing by the hourly market price weighted by the

NY-ISO load (MW) for the full aggregated zone for that period. Thus, the price in each NIMO zone (n) is weighted by relevant NIMO load (MWN) in the numerator and the relevant NY-ISO load (MWI) in the denominator.

Mathematically, that numerator can be expressed as,

$$\text{NiMo load} - \text{wtd price for GED zone} = \frac{\sum_{\text{n, hrs}} MWN_{n,hr} \times DA\ LMP_{n,hr}}{\sum_{hrs} MWN_{n,hr}}$$

and the denominator as

$$\text{Flat GED zone price, load - weighted across NYISO zones} = \frac{\sum_{hrs} \frac{\sum_{\text{ISO zones}} MWI_{n,hr} \times \text{DA LMP}_{\text{n,hr}}}{\sum_{\text{ISO zones}} MWI_{n,hr}}}{\text{number of hours in period}}$$

The calculations of load-shape price ratios are presented in electric workpaper 17.

We developed our estimates of NIMO load-weighted prices in each period by multiplying the relevant load-shape price ratio times the corresponding forecast of market electric energy prices. Those calculations are presented in electric workpapers18 to 20 respectively.

D. Calculate NIMO system-wide wholesale avoided electric energy costs

In our final step we develop NIMO system-wide avoided electric prices by costing period. These system-wide prices are the NIMO load-weighted prices for each of the three zones (NY-AB, NY-CDE, and NY-F) weighted by the corresponding percentage of total NIMO service territory load in each of those zones.

The percentage of total NIMO service territory load in each zone is calculated in electric workpaper 21. The calculation of NIMO system-wide avoided electric prices is presented in electric workpaper 22.

3. Avoided Retail Electricity Supply Costs

This chapter provides a projection of avoided retail electricity costs and a description of the underlying assumptions. These avoided retail electricity supply costs were developed from

- our projections of NIMO system-wide load-weighted avoided electric energy costs,
- avoided capacity costs,
- adjustments for losses from the point of generation to the point of use, and
- a retail adder, reflecting the risks and costs related to power procurement.

In addition we calculated an estimate of environmental externalities based upon the costs of CO_2 not reflected in the forecast of electric energy prices.

These avoided electricity supply costs do not include various components of wholesale power costs that we consider to be largely or entirely unavoidable through energy efficiency. These components include the locational forward reserve market, real-time operating reserves, automatic generation control (also called regulation), uplift, and the reliability contracts with particular generators.

The avoided electricity supply costs also do not include a renewable energy credit (REC) component. NYSERDA is essentially purchasing a pre-determined quantity of RECs through 2013 and allocating those costs to essentially all New York ratepayers for recovery. If NIMO customers reduced their energy usage they would be allocated a lower amount of those costs, and thereby avoid them, but the costs not allocated to NIMO would just be shifted to the remaining ratepayers in New York. The state of New York would not avoid those renewable costs.

A. Capacity Prices

The NY-ISO capacity prices are set by a series of auctions:

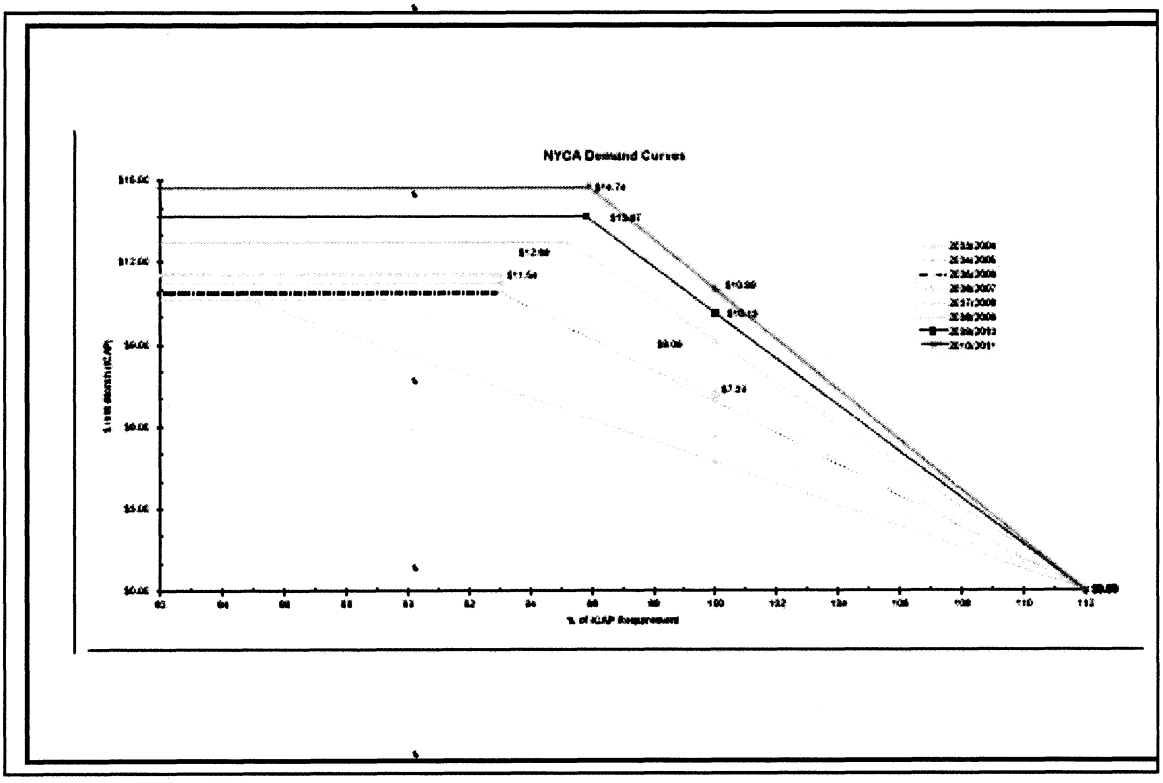
- A six-month strip acquired in April for the summer (May-October) and in October for the winter (November–April).
- Auctions for each month, from the month prior to the start of the season to the month prior to the delivery month.[7]
- A spot auction for each month, conducted in the preceding month.

The price in the spot auction is set by the demand curve, which reduces the capacity price as the reserve margin rises. Load-serving entities must provide capacity throughout the year, based on their contribution to the previous summer's peak (adjusted for migration) plus the reserve margin implied by the spot auction.

In Figure 2 we present a series of demand curves for the New York Control Area (NYCA). These curves are drawn from *Proposed NYISO Installed Capacity Demand Curves For Capability Years 2008/2009, 2009/2010 and 2010/2011*, issued by the NY ISO and dated October 5, 2007.

[7] So there is only one monthly auction for May and November capacity, while there are six for October and April.

Figure 2



NIMO's service territory is entirely in the rest-of-state (ROS) capacity zone, which is the entire state other than New York City and Long Island.

In principle, knowing the current demand-curve parameters, the proposed parameters for the next three-year period (2008–2011) and forecasted loads and additions, we should be able to forecast the ROS capacity price. As the statewide reserve margin declines, the capacity price should rise until it is high enough to support new entry, and then bounce around that price as generation is added, plants are retired, load grows, etc.

This simple picture is complicated by a number of factors:

- The demand curve for ROS capacity uses total New York Control Area (NYCA) load and capacity, so addition of capacity downstate can affect prices upstate. Con Edison, NYPA and LIPA have all built and contracted for generation capacity and transmission connections that the market did not provide, and NYPA and LIPA continue to pursue capacity additions.
- A new capacity-price mitigation scheme has been accepted by FERC, which would require the pivotal in-City generators to bid at lower prices, likely resulting in more capacity clearing in New York City.

- It is not clear how much capacity LIPA will bring into NYCA, and whether that capacity will continue to depress ROS capacity prices.
- Generators outside New York (in PJM, New England, Ontario, and Quebec) can export capacity to the ROS market, while New York generators can export capacity to PJM and New England. NYISO does not appear to report the amount of imports that clear in the capacity auctions, or the amount of capacity withdrawn from the NYISO market for export.

Recent ROS capacity prices have been somewhat less than would be implied by the demand curve with only the capacity in NYCA and net firm contract imports, suggesting that NYISO has been a net purchaser of capacity. This situation appears to be changing, as capacity prices rise in the new forward markets in both PJM and ISO-NE.[8] For 2007–2008, ROS capacity prices were about $30/kW-yr, while the capacity price in neighboring portions of PJM was under $15/kW-yr and in ISO-NE the capacity price was $36.60.

The reserve margin required by NYISO depends on the quantity of capacity included in the determination of the capacity price under the demand curve. The difference between winter and summer capacity also increases the average reserve margin over the year. In 2007 the effective reserve margin, the capacity charge to load divided by the capacity payment to generation, both in $/kW-yr, is 17.2%. Under the current demand curves, the ISO's target (or "reference") annual UCAP price of $92.20/kW-yr would be reached with an effective reserve margin of about 10.8%. That reference price is based on an estimate of the cost of new entry in 2015, by which time New York is expected to need of new capacity.[9] The capacity price that would be charged to load is the reference price increased by the reserve margin, i.e., $92.20×1.108, or $102.15/kW-yr.

Our forecast of capacity prices charged to load, i.e. increased for reserves, expressed in $2007, is a linear interpolation of capacity prices in ROS, staring from the actual price in 2007 ($35.19 per kw-yr) and ending with the ROS reference price in 2015 ($102.15 per kw-yr). After 2015 we hold the price constant.

Table 5 compares actual capacity prices for PJM and ISO-NE to our projection. The actual capacity prices are UCAP capacity prices for PJM, ISO-NE and the average of those two prices in constant 2007$, with no gross up for reserve margins. Our projection appears reasonable relative to the prices in those neighboring markets.

[8] In the February 2008 ISO-NE forward capacity auction, 641 MW of New York capacity was accepted.

[9] The 2008–2011 demand curves increase the ROS reference price by about 25%.

Table 5 – Capacity Prices ($/kw-yr)				
Year beginning	PJM nominal	ISO-NE nominal	Average of PJM and ISO-NE (2007$)	Projection (2007$)
	Do not reflect reserve margin			Do reflect reserve margin
2007				$35.19
2008	$38.7	$44.3	$41.5	$43.56
2009	$67.4	$48.9	$58.1	$51.93
2010	$64.1	$50.9	$57.5	$60.30
2011				$68.67
2012				$77.04
2013				$85.41
2014				$93.78
2015				$102.15

The calculation of NIMO capacity costs is presented in electric workpapers 24 and 25.

B. Losses

There is a loss of electricity between the generating unit and the ISO's delivery points, where power is delivered from the ISO-administered pool transmission facilities (PTF) to NIMO's local transmission and distribution systems. There are also losses on the NIMO system. Therefore, a 1 kilowatt load reduction by a customer at the point of end use reduces the quantity of electricity that a generator has to produce by 1 kilowatt plus the additional quantity it would have had to generate to compensate for losses.[10]

We calculated full losses from generator to end use at peak. We add those losses to the capacity price, which is stated in dollars per kilowatt-year at the generator, to obtain an avoided capacity cost at point of end-use. We also calculate losses from the transmission system to end use by energy pricing period. We add those losses to the energy prices, which are stated in $/MWh at the ISO delivery point, to obtain avoided energy prices at point of end-use. (The energy prices forecast by GED reflect the losses between the generating unit and the ISO delivery points into the NIMO system.)

For calculating the avoided cost of capacity we use average losses from the generator to the end use. For calculating the avoided cost of energy we use marginal losses from the ISO delivery point to the end use.

Derivation of losses from generator to end use in peak hour

We assumed average losses at the peak hour of 14%, from generator to end use, based on our experience with studies of losses at other utilities. We broke this estimate between losses on the NY-ISO system and losses on the NIMO distribution system.

[10] Computations of avoided costs sometimes assume that only average, and not marginal, losses are relevant at the peak hour. The reasoning for that approach is that changes in peak load will lead to changes in transmission and distribution investment, keeping average percentage losses approximately equal. The NIMO avoided costs do not include any avoided PTF investments, so marginal losses are relevant in this situation.

From a NYISO load-forecast report[11], transmission losses at peak in the NGrid transmission district[12] are 5% of load. The statewide average transmission losses are 1.9%. Since some of the losses in the NGrid district result from power flowing to other districts, we use an average of the losses in the NGrid district and the statewide average. This is 3.5%, i.e., 50% of (5+ 1.9).

Losses between transmission and point of end use at peak would thus be 10.2% (1.14 ÷ 1.035 – 1.00).

Of that 10.2%, we assumed losses of 1% of the peak load were fixed transformer-core losses, which do not vary with load, and the remaining 9.2% were variable.

Derivation of losses from ISO Delivery Point to end use

We computed the average percentage losses for each of the four energy costing periods from the 10.2% identified above. as the sum of fixed and variable losses.

- Fixed losses, estimated as the 1% of peak load, restated as a percentage of period load by dividing by period load factor.
- Variable losses, estimated as the 9.2% rate at peak multiplied by the load factor for the relevant period[13].

The resulting average loss factors are presented in Table 6.

Table 6 Loss Factors

Period	Load Factor	Average Losses			Marginal Losses Used To Calculate Retail Avoided Costs
		Variable	Fixed	Total	
W – Off Peak	57%	5.2%	1.8%	7.0%	**10.4%**
W – On Peak	70%	6.4%	1.4%	7.9%	**12.9%**
S – Off Peak	54%	4.9%	1.9%	6.8%	**9.9%**
S – On Peak	70%	6.4%	1.4%	7.9%	**12.9%**

Across periods, these energy losses average 7.4%, which is a reasonable value. NIMO's metered losses may be lower than this, since the 7.4% includes losses on the customer side of the meter

Since losses vary with the square of load, marginal percentage energy losses in any period are about twice average variable losses.[14] The average losses reported above translate into marginal energy

[11] 2007 Weather Normalization, Load Forecasting Task Force, December 18, 2007, Arthur Maniaci, System & Resource Planning, New York ISO.

[12] NIMO is served by the NGRID transmission district, which includes parts of zones A-F. NY-ISO transmission districts and energy-pricing zones overlap

[13] Variable losses in Watts vary roughly as the square of load, since the power dissipated in the lines varies with the square of current. Thus percentage losses (loss ÷ load) varies roughly linearly with load from the equation $W= I^2R$, where W is the energy released, I is the current and R is the resistance.

[14] The derivative of the losses is $dW/dI = 2IR$, while the average losses are $I^2R \div I = IR$.

losses of 12.9% on-peak, both summer and winter, 10.4% in the winter off-peak, and 9.9% in the summer off-peak.

The results would be somewhat higher for an analysis that reflected the higher losses at high-load hours within each period, which produces a higher average percentage loss than in the average-load hour. However, since the analysis started with a generic estimate of losses at peak, the greater detail of an hourly analysis did not seem warranted.

The calculation of losses applicable to NIMO is presented in electric workpaper 26.

C. Retail Adder

Retail electricity prices are generally higher than the sum of wholesale energy and capacity prices during the time period in which the electricity is being consumed. This differential is not fully explained by the costs of ancillary service, uplift, and load shapes. The primary factor underlying the retail adder appears to be costs suppliers incur to mitigate their risk of under-recovering their costs. These risks arise from the potential for their supply costs to exceed their revenues, i.e., under contracts in which suppliers do not have a "true-up" provision or adjustment to ensure that their revenues equal their costs. The potential for supply costs to exceed revenues arises due to factors such as unexpected variations in weather, economic activity and and/or customer migration. For example, during hot summers and cold winters LSEs may need to procure additional energy at shortage prices while in mild weather they may have excess supply under contract that they need to "dump" into the wholesale market at a loss. The same pattern holds in economic boom and bust cycles. In addition, the suppliers of power for utility standard-service offers run risks related to migration of customer load from utility service to competitive supply (presumably at times of low market prices, leaving the supplier to sell surplus into a weak market at a loss) and from competitive supply to the utility service (at times of high market prices, forcing the supplier to purchase additional power in a high-cost market).

NIMO did not provide public information on the retail adders implicit in the prices bid by their suppliers. In the absence of any detailed information on the strategy that NIMO employs to acquire supply we propose a 5% retail adder be applied to wholesale electric energy costs to calculate retail avoided electric energy costs. This is a conservative estimate, as our analyses of confidential supplier bids in other projects indicate that a 10% retail adder is common.

D. CO_2 Externalities

Externalities are impacts from the production of a good or service that are neither reflected in the price of that good or service nor considered in the decision to provide that good or service. There are many externalities associated with the production of electricity, including the adverse impacts of emissions of SO2, mercury, particulates, NOx and CO_2. However, the magnitude of most of those externalities has been reduced over time, as regulations limiting emission levels have forced suppliers and buyers to consider at least a portion of their adverse impacts in their production and use decisions. In other words, a portion of the costs of the adverse impact of most of these externalities has already been "internalized" in the price of electricity.

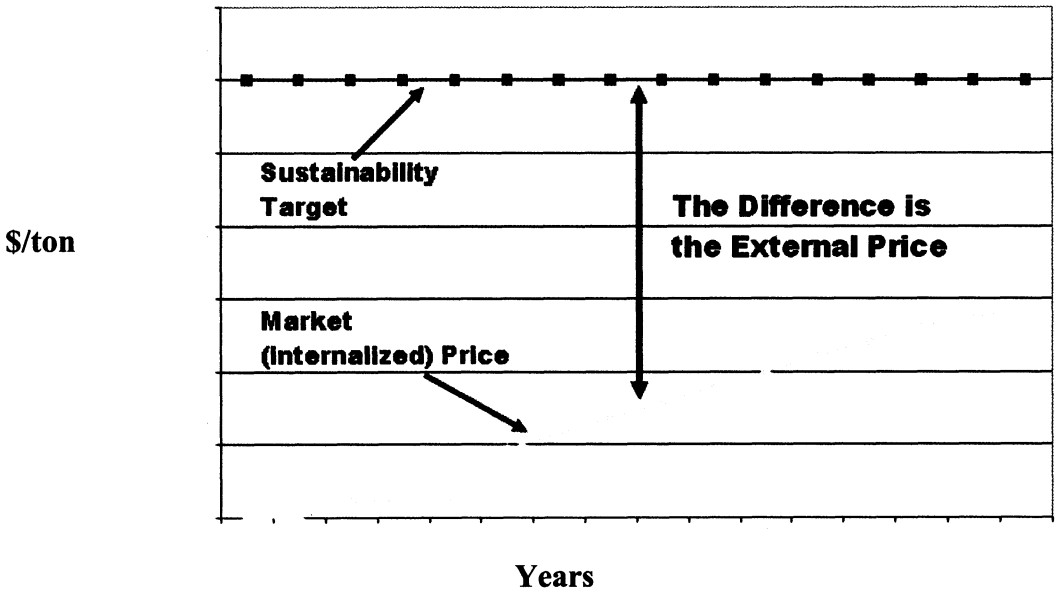
AESC 2007 identified the impacts of carbon dioxide as the dominant externality associated with marginal electricity generation in New England over the study period for two main reasons. First, policy makers are just starting to develop and implement regulations that will "internalize" the costs

associated with the impacts of carbon dioxide from electricity production and other energy uses. The Regional Greenhouse Gas Initiative and anticipated future federal CO_2 regulations will internalize a portion of the "greenhouse gas externality," but AESC 2007 projects that the externality value of CO_2 will still be high even with those regulations. Second, New England avoided electric energy costs over the study period are likely to be dominated by natural gas-fired generation, which has minimal emissions of SO2, mercury, particulates and NOX, but substantial emissions of CO_2.

CO_2 allowance costs are not expected to reflect the full societal costs associated with CO_2 emissions. In this report we use a compliance cost of $60/ton of CO_2 (2007$) to reflect the full societal costs associated with those emissions. That value is drawn from an analysis of externalities we prepared for AESC 2007 which identified a target level of physical CO_2 emissions that climate scientists have identified as potentially sustainable as well as the cost of complying with that target level. The analysis from AESC 2007 is presented in Appendix A.

Figure 3 illustrates this CO_2 externality. The blue line presents the forecast of allowance prices reflected in electric energy market prices. This assumes that the United States will gradually move to reflect a portion of the impact of greenhouse gas emissions in market prices. The "externality" is the difference between the estimated total cost of achieving a sustainability target, $60/ton, and the portion reflected in market prices. This is the area between the blue line and the redline in the figure.

Figure 3. Determination of Externalities based on CO_2 Emission Costs



The calculation of the CO_2 externality applicable to NIMO is presented in electric workpaper 23.

E. Avoided Retail Electricity Costs

Retail avoided costs of electricity consist of avoided energy costs ($/kwh) and avoided capacity costs ($/kw-yr).

- Avoided retail energy costs are presented by year for four energy costing periods – Winter Peak, Winter Off-Peak, Summer Peak, and Summer Off-Peak. The avoided energy cost for a

specific costing period is the avoided wholesale energy cost for that period increased by the retail adder and marginal line losses on the distribution system[15].

- Avoided retail capacity costs are presented for each year. The avoided capacity cost in each year is the avoided wholesale capacity market value for that year increased by the retail adder and line losses from generation to the point of end-use.

The detailed avoided retail electricity costs are presented in Table 7. The supporting calculations are presented in the *NIMO avoided electric costs* worksheet in *NIMO Avoided costs electric workpapers 2008 03 27.xls*.

Synapse also calculated environmental externalities based upon CO_2 emissions and allowance costs. The wholesale externality values are presented by year for the four energy costing periods. (The retail values would be wholesale value increased by marginal line losses on the distribution system).

[15] Avoided wholesale energy costs through 2032 are derived directly from the GED forecast as adjusted by Synapse. Values for 2033 through 2037 are derived from the 2032 value increased by the average rate of escalation of the prior ten years.

TABLE 7

Utility Niagara Mohawk

Constant Dollar Avoided Cost Results - $2007

Formatted for input to DSM screening models

Retail Adder	5%
Real Discount Rate	2.22%
Capacity Losses: Generation to ISO Delivery	3.5%
Peak losses: ISO to end use	10.2%

	Avoided Retail Costs, Constant Dollars					Wholesale Power Price, Constant Dollars								
	Niagara Mohawk					CO2 Related Costs NOT REFLECTED IN WHOLESALE POWER PRICES (see note below)				Wholesale Avoided Costs (i.e.before Adjustments for Losses and Retail margin)				
	Winter Peak Energy	Winter Off-Peak Energy	Summer Peak Energy	Summer Off-Peak Energy	Annual Market Capacity Value	Winter Peak Energy	Winter Off-Peak Energy	Summer Peak Energy	Summer Off-Peak Energy	Winter Peak Energy	Winter Off-Peak Energy	Summer Peak Energy	Summer Off-Peak Energy	Annual Market Capacity Value
Units:	$/kWh	$/kWh	$/kWh	$/kWh	$/kW-yr	$/kWh	$/kWh	$/kWh	$/kWh	$/kWh	$/kWh	$/kWh	$/kWh	$/kW-yr
2008	0.103	0.064	0.110	0.065	48.8	0.050	0.041	0.048	0.040	0.087	0.055	0.093	0.056	40.8
2009	0.110	0.067	0.100	0.060	58.8	0.048	0.040	0.047	0.038	0.093	0.057	0.084	0.052	49.1
2010	0.097	0.062	0.091	0.056	68.8	0.048	0.040	0.047	0.038	0.082	0.053	0.076	0.049	57.5
2011	0.091	0.061	0.089	0.057	78.9	0.048	0.039	0.046	0.038	0.077	0.053	0.075	0.049	65.9
2012	0.093	0.066	0.092	0.062	88.9	0.042	0.035	0.041	0.034	0.079	0.057	0.078	0.054	74.3
2013	0.092	0.064	0.091	0.062	98.9	0.041	0.033	0.039	0.032	0.078	0.055	0.077	0.054	82.6
2014	0.085	0.061	0.083	0.057	108.9	0.039	0.032	0.037	0.031	0.072	0.053	0.070	0.050	91.0
2015	0.096	0.066	0.096	0.061	118.9	0.037	0.030	0.036	0.029	0.081	0.057	0.081	0.053	99.4
2016	0.101	0.068	0.100	0.064	122.3	0.035	0.029	0.034	0.028	0.085	0.059	0.085	0.055	102.2
2017	0.102	0.071	0.103	0.067	122.3	0.034	0.027	0.032	0.027	0.086	0.061	0.087	0.058	102.2
2018	0.103	0.071	0.102	0.068	122.3	0.032	0.026	0.031	0.025	0.087	0.062	0.086	0.059	102.2
2019	0.103	0.073	0.103	0.069	122.3	0.030	0.025	0.029	0.024	0.087	0.063	0.087	0.060	102.2
2020	0.099	0.072	0.100	0.069	122.3	0.028	0.023	0.027	0.022	0.083	0.062	0.084	0.059	102.2
2021	0.106	0.074	0.107	0.071	122.3	0.027	0.022	0.026	0.022	0.090	0.064	0.091	0.062	102.2
2022	0.109	0.078	0.108	0.073	122.3	0.027	0.022	0.026	0.021	0.092	0.067	0.091	0.064	102.2
2023	0.111	0.080	0.110	0.075	122.3	0.026	0.021	0.025	0.020	0.094	0.069	0.093	0.065	102.2
2024	0.113	0.081	0.112	0.077	122.3	0.025	0.020	0.024	0.020	0.095	0.070	0.095	0.066	102.2
2025	0.115	0.083	0.114	0.078	122.3	0.024	0.020	0.023	0.019	0.097	0.072	0.096	0.068	102.2
2026	0.117	0.085	0.116	0.080	122.3	0.023	0.019	0.022	0.018	0.098	0.073	0.098	0.069	102.2
2027	0.118	0.086	0.118	0.081	122.3	0.022	0.018	0.021	0.018	0.100	0.074	0.100	0.070	102.2
2028	0.120	0.088	0.120	0.083	122.3	0.021	0.017	0.020	0.017	0.101	0.076	0.101	0.072	102.2
2029	0.122	0.090	0.122	0.084	122.3	0.020	0.017	0.020	0.016	0.103	0.077	0.103	0.073	102.2
2030	0.124	0.091	0.123	0.086	122.3	0.019	0.016	0.019	0.015	0.105	0.079	0.104	0.074	102.2
2031	0.125	0.092	0.124	0.087	122.3	0.019	0.016	0.019	0.015	0.106	0.079	0.105	0.075	102.2
2032	0.126	0.093	0.125	0.087	122.3	0.019	0.016	0.019	0.015	0.106	0.080	0.106	0.076	102.2
2033	0.128	0.094	0.127	0.089	122.3	0.019	0.015	0.018	0.015	0.108	0.081	0.107	0.077	102.2
2034	0.130	0.096	0.129	0.090	122.3	0.018	0.015	0.018	0.014	0.110	0.083	0.109	0.078	102.2
2035	0.132	0.098	0.131	0.092	122.3	0.018	0.014	0.017	0.014	0.111	0.084	0.111	0.080	102.2
2036	0.134	0.099	0.133	0.093	122.3	0.017	0.014	0.017	0.014	0.113	0.086	0.112	0.081	102.2
2037	0.136	0.101	0.135	0.095	122.3	0.017	0.014	0.016	0.013	0.114	0.087	0.114	0.082	102.2
Levelized														
20 years (2008-2027)	0.102	0.071	0.101	0.067	104.3	0.035	0.029	0.034	0.028					
20														

Notes:

- Peak hours are: Monday through Friday 7am - 11pm; Off-Peak Hours are: All other hours
- Summer is May through October; Winter is all other months
- Avoided Retail Costs reflect all relevant losses from generation to customer meter.
- Capacity price converted to $/kWh at zonal on-peak summer load factor.
- Capacity prices are based upon prices from Jan through April from previous power year and May to Dec from current year
- Projected costs related to CO2 represent costs that are not yet internalized. Sustainability Target = Allowance Price (internalized value) + Environmental Cost
- Costs for 2033 through 2037 are projected at the average annual rate of escalation during the prior ten years (2022 to 2032).

4. Avoided Retail Natural Gas Costs

This chapter provides a projection of wholesale natural gas prices for NIMO as well as a projection of avoided natural gas costs by retail end-use sector that would be avoided due to reductions in retail gas use by NIMO customers. The projection provides prices for 2008 through 2037 expressed in 2007 dollars per dekatherm (DT).[16] It provides prices for various shapes or types of retail load shapes. Note that in this analysis winter is defined as November through March.

The gas workpapers containing these calculations are listed in Table 8. They are provided in a workbook titled *NIMO Avoided costs gas workpapers 2008 03 27.xls*.

Table 8 – Workpapers for Avoided Retail Electric Energy Calculations

Number	Name	Content
1	HH Gas 2FO Prices'	Comparison of HH price forecasts, Develop #2 fuel price forecast
2	HH Price Chart	Chart comparing HH price forecasts
3	2 Oil Prices	No. 2 fuel oil prices from NYMEX
4	Notes re HH adjustment	
5	NYMEX HH Data-Const$	NYMEX HH prices, Feb 26 and 27, 2008 converted to constant 2007$
6	Data 2 HH Prices Monthly	HH prices Monthly, GED and NYMEX
7	DTI - HH Basis	Calculation of the Basis differential for Dominion Appalachian Index
8	Forecast Mon HH&DTI Gas Prices	Forecast of HH Natural Gas Prices for the NiMo Study
9	Data NIMO 2	Analyses of Sales and supply data from NIMO
10	LDC Fracs	Fractions (portions) of send-out by source and storage refill by month
11	Supply by Source	LDC fractions
12	DTI rates	Rates paid by for pipeline transportation and storage with Dominion Transmission Inc (DTI)
13	Dominion	Transformation of rates into LDC costs by gas source by month
14	cost by source	Example of costs of Dominion for various services in January and June
15	city gate avoided cost	Avoided Cost of Gas delivered to the LDC
16	ret margin	Retail margin for various end-use customers in NY

A. Avoided Wholesale Gas Costs

The avoided cost of gas of a local distribution company (LDC) such as NIMO is the cost of the marginal source of supply, or sources, that can be avoided in the relevant cost period. Because efficiency improvement is a long-term effect, the relevant avoided cost is the long-run cost that we estimate a local distribution company (LDC) such as NIMO can avoid. The long-run avoided cost

[16] One DT is one million BTU.

consists of the short-run variable costs and a portion, sometimes all, of the long-term fixed costs of gas supply sources.

In this analysis we compute the marginal cost (avoided cost) for each month and for the peak day. The avoided cost is the cost of delivering one DT of gas in a given month to the LDC via the three major resources: year-round, long-haul transportation; underground storage; and peaking service.

In each of the winter months (November through March) when gas is supplied by the three resources, the marginal cost is the weighted average of the cost of gas acquired from each supply source in each month. The factor used to "weight" the cost from each source is the fraction of total supply to customers, or "send-out", provided by each source. Our computation of this weighted average assumes that the LDC has optimized its mix of supply sources. Based upon that assumption we in turn assume that the LDC can avoid both the fixed and variable costs associated with each avoided supply source in response to a long-term efficiency improvement.[17]

B. Niagara Mohawk Send-out and Supply Sources

Niagara Mohawk send-out is significantly higher in the winter season than in the summer season. For example the January firm sales load can be about ten times the firm sales load in August. In addition, its send-out on winter days can vary substantially according to temperature.

In order to supply that load reliably and at reasonable rates, Niagara Mohawk relies upon a portfolio of supply resources. In general, that portfolio consists of:

- Gas delivered via long-haul pipeline transportation to meet a base portion of send-out each month of the year, as well as to refill underground storage during the summer months.
- Gas withdrawn from storage to meet incremental winter send-out[18]. The underground storage facilities used by NIMO are located in Pennsylvania, New York, and West Virginia.[19] Niagara Mohawk also use winter transportation to meet the winter sendout requirement because it can buy spot gas for delivery via the Dominion system even during the winter.
- Gas purchased from Canadian supply, and in the very last instance gas released by co-generation plants when they substitute No. 2 fuel oil, to meet peak day spikes in send-out.

The first step in calculating NIMO's avoided wholesale gas supply costs was to identify the fraction or portion of each source used to meet send-out each month. (We also identified the sources of storage refill in each of the summer months.) We analyzed data from NIMO to determine those fractions[20]. That data and our analyses are presented in gas workpapers 9 and 10. The fractions of send-out by source by month are presented in gas workpaper 11.

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[17] In a short-run marginal cost analysis only variable costs can be adjusted and thus the avoided cost is determined by the one supply source which has the highest variable cost.

[18] NIMO typically fills its underground storage during the summer months and removes gas during the winter months to serve its large winter customer load.

[19] LDCs acquire pipeline and storage services through a portfolio of contracts with natural gas transportation and storage companies that have terms, conditions and rates that are regulated by the U.S. Federal Energy Regulatory Commission (FERC).

[20] NIMO Sendout Update 01312008.

C. Components of Avoided Costs by Source

The second step in calculating NIMO's avoided wholesale gas supply costs was to forecast the future costs of gas from each marginal source. The cost of gas delivered to NIMO via long-haul pipeline transportation and from underground storage consists of the commodity cost of the gas and the various charges by Dominion for its pipeline transportation and underground storage services. The marginal source of NIMO peaking supply is gas released by the cogeneration facilities on its system, which is priced at the commodity cost of their alternate fuel, No. 2 fuel oil. This section describes our estimates of those commodity costs and Dominion service charges.

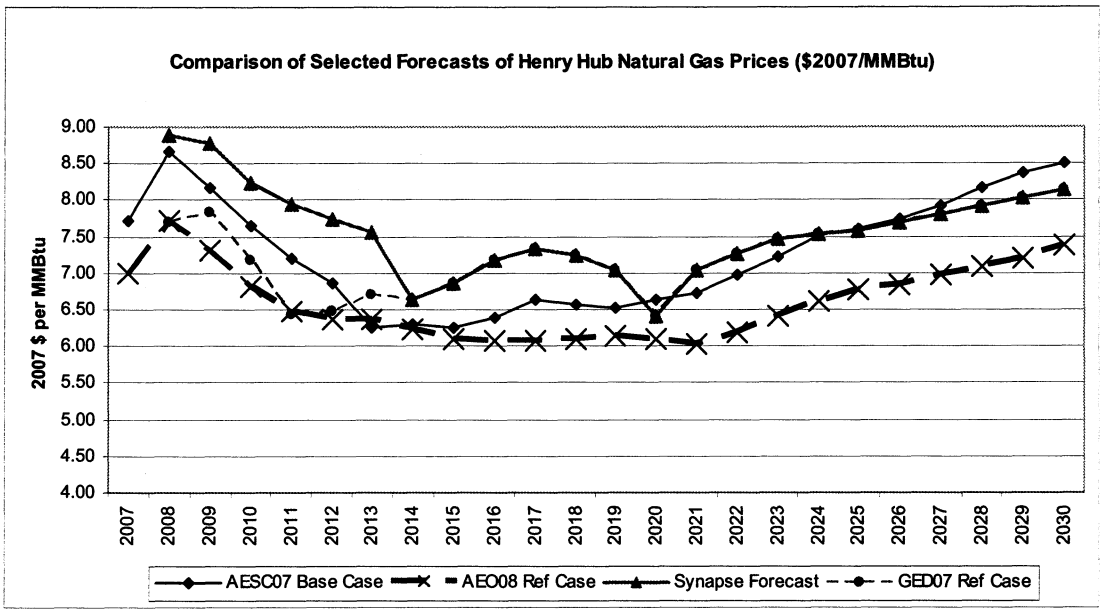
Commodity Costs

Natural Gas. Our avoided cost analysis assumes that NIMO's marginal supply is gas delivered into Dominion and priced at the "Dominion Appalachian Index" for that location or market hub. The forecast Dominion Appalachian Index is a monthly price equal to the forecast Henry Hub monthly price plus the forecast monthly basis differential to the Dominion Appalachian Index hub.

As discussed earlier, our forecast for Henry Hub prices through 2013 is based upon NYMMEX prices as of the time we prepared our forecast and the GED forecast of Henry Hub prices thereafter. Our review and analysis of the GED forecast of HH prices is presented in gas workpapers 1 through 6.

We compared our forecast for Henry Hub prices to the GED forecast as well as to forecasts we developed for AESC 2007 and the Energy Information Administration (EIA) Annual Energy Outlook 2008. That comparison is presented in Figure 4. Our forecast is higher than the others through 2013, but as noted earlier it reflects the NYMEX futures prices for those years. From 2014 onwards our forecast is comparable to the GED forecast and to the AESC 2007 forecast but higher than the AEO 2008 forecast.

Figure 4 – Comparison of Forecasts of Henry Hub prices ($2007/MMBtu)


Comparison of Selected Forecasts of Henry Hub Natural Gas Prices ($2007/MMBtu)
2007 $ per MMBtu
9.00
8.50
8.00
7.50
7.00
6.50
6.00
5.50
5.00
4.50
4.00
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
AESC07 Base Case
AEO08 Ref Case
Synapse Forecast
GED07 Ref Case

Our forecast of the annual Dominion Appalachian Index price is developed and provided in gas workpapers 7 and 8. The Dominion Appalachian Index price is our forecast of Henry Hub prices plus a forecast of basis differential to the Dominion Appalachian Index hub provided by NIMO.

No. 2 fuel oil. Our forecast of No. 2 fuel oil prices is presented in gas workpaper 1. Through 2013 it is derived from the February 27 NYMEX prices for West Texas Intermediate crude oil. From 2014 onward it is the GED forecast of No. 2 fuel oil prices.

Dominion service charges

Dominion levies three types of charges for its pipeline transportation and storage services:

- fixed demand cost of holding pipeline transportation capacity and of storage and withdrawal capacity on Dominion;
- usage (volumetric) charges for transporting gas on the pipeline and for storage injections and withdrawals; and
- the fraction (percentage) of volumes of gas received by the pipeline or storage facility that is retained by the facility for compressor fuel and losses. This "fuel and loss retention" increases the cost of gas above the Dominion Index price because the volume of gas that must be purchased for delivery into Dominion is greater than the volume that Dominion ultimately delivers to NIMO. Our analyses represent fuel and loss retention as a ratio of gas purchased (or delivered in storage) to gas delivered to NIMO.

The rates and the fuel and loss retention percentages charged by Dominion are presented in gas workpaper 12. Our analyses assume that these rates and retention percentages will persist for the forecast period, 2008 – 2032 with one exception. We have used the increase in DTI demand charges scheduled to take effect in November 2010.

D. Avoided Cost of Gas by Source

The third step in calculating NIMO's avoided wholesale gas supply costs was to develop avoided costs by supply source using the projections by cost component from the preceding section. These avoided costs were developed in gas workpaper 13. A representative set of costs by source are presented in gas workpaper 14.

Long-haul Pipeline "Cash" Costs

Gas is delivered to the LDC each month by pipelines from producing areas; in this analysis assumed to be Appalachia. By "cash cost" we mean the avoided cost of transportation arising from pipeline usage charges, which are paid for each DT of gas transported, and the demand charges allocated to that month, which pay for the reservation of pipeline capacity whether used or not.[21] The avoided commodity cost of gas purchased is the price of gas at The Dominon Appalachian Index that month multiplied by the ratio of the volume purchased to one DT of gas delivered to the LDC. Because of the retention of gas for fuel and loss in both transportation and storage, more than one dekatherm of gas must be purchased in order to deliver one dekatherm to the LDC.

[21] Rate Schedules assumed for the transportation: Dominion FTNN and FTNN-GSS for delivery of gas from underground storage.

This ratio of gas volumes purchased in the producing area to one DT of gas delivered to the LDC is established by the fuel and loss retention percentages of the various pipeline transportation and storage services used between the producing area and the LDC. For example, assume that the gas is transported by two pipelines: A and B from the producing area to the LDC. The fuel and loss percentage is 6 percent for A (Fa) and 4 percent for pipeline B (Fb). The fuel and loss amount taken by the pipeline is based on the volumes received by the pipeline (R) while the demand and usage charges are based on the volume of gas delivered by the pipeline (D). In order to compute the ratio of gas received to that delivered we use the following equations:

(1) $D = R - FR$

(2) $D = R(1-F)$

(3) $R/D = 1/(1-F)$

For pipeline A; $Ra/Da = 1/(1-.06) = 1.0638$; or $Ra = 1.0638\ Da$

For pipeline B; $Rb/Db = 1/(1-.04) = 1.0417$; or $Rb = 1.0417\ Db$

Since Db is the amount delivered to the LDC, we want to compute Ra/Db or the ratio of the amount to be purchased in the field to the amount delivered to the LDC.

Since: $Rb = Da$

$Ra = 1.0638\ Da = (1.0638)Rb = (1.0638)(1.0417)Db$

Thus: $Ra/Db = (1.0638)(1.0417) = 1.1082$

Or: 1.1082 DTs of natural gas must be purchased for each DT delivered to the LDC.

Illustrative avoided costs by gas source and pipeline route for January and June of 2009 are presented in gas workpaper 10.

Summer. Local gas distribution companies (LDCs) use a portion of their long-haul pipeline transportation in the summer to transport gas directly to the LDC from the producers for sendout. They use another portion to transport gas to fill underground storage. Consequently, a corresponding portion of the costs of demand and usage charges and the fuel and loss fraction for pipeline transportation from producers to refill storage are allocated to the avoided cost of underground storage. Even with the use of Dominion transportation capacity to fill underground storage in the summer, much of the transportation capacity is not use in the summer but has to be reserved to serve the winter firm sales load. This is typical of many LDCs and is not surprising given that January firm sales demand can be about ten times the August firm sales demand. Because marginal transportation capacity is needed for the winter, but is not used to capacity in the summer, we allocated the summer demand costs to the winter avoided cost.

We assume that there is no avoided demand cost for long-haul pipeline capacity in the summer months (April – October). We assume that there is insufficient market for Dominion FTNN released capacity in the summer that would pay for the demand charges. This means that an LDC would continue to pay the full demand charge in each summer month even if the gas requirements of customers were reduced due to energy efficiency in the summer; thus the LDC would not avoid the summer pipeline demand charges.

Winter. NIMO's use of its long-haul transportation capacity in the winter varies from about 74 percent in November to 100 percent in January. The total cost of pipeline transportation demand charges attributable to the five winter months consist of the demand charges the pipeline bills NIMO for each of those months plus the summer demand costs we have allocated to the winter season. The portion of that winter season cost allocated to each winter month is a function of the capacity used to serve load in that month. The cost of unused capacity in any month, such as November, is allocated to those months in which the capacity is used. As a result, the avoided transportation demand cost varies among the five winter months with the month of heaviest use, January, receiving the largest allocation of demand charges.

Underground Storage

Natural gas is delivered to the LDC from underground storage during the five winter months of November through March as shown in gas workpaper 11. The avoided cost of underground storage supply for one DT in January is shown in gas workpaper 14.

The avoided cost of underground storage includes the cost of buying gas on Dominion, pipeline demand charges to bring gas to the storage facility, the cost of injection, the demand cost of storage capacity, the demand and variable costs of withdrawing gas from storage, and the demand and variable costs of transporting gas to the LDC from underground storage.[22]

The cost of gas injected into storage is the cost of buying gas on Dominion, as adjusted for fuel and loss retention, plus the cost of transportation to underground storage including demand costs at 100% load factor. The cost of the gas injected into storage is less than the average cost of gas for a year, because gas is purchased for injection during the summer months when the price of gas is less than the annual average.

Since the demand charges for the withdrawal of gas from storage to the LDC are levied 12 months a year, we allocate the full year of those withdrawal demand charges to the five winter months. Then we allocate these demand charges of withdrawal and of transportation to NIMO to each of the five winter months by the use of the capacity in each month. January is the peak sendout month, as shown in gas workpaper 11. The other winter months, especially November and March experience less sendout. Thus, the demand cost of unused capacity of storage withdrawal and of transportation capacity from underground storage to the LDC in November and March is assigned to the sendout during December through February based on usage each month. Similarly the unused capacity during December and February is assigned to the cost of withdrawing and transporting gas to the LDC in January.

Peak-Day Supply

NIMO's marginal peaking supply is gas released by the cogeneration facilities on its system. For this gas NIMO pays the cost of their alternate fuel, which is No. 2 fuel oil. Thus the avoided cost of the peaking supply is the cost of No. 2 fuel oil delivered to large facilities in New York.

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[22] Rate schedules used in the calculation for Dominion are: Dominion FTNN to fill storage, GSS for Storage and FTNN-GSS to deliver stored gas to NIMO. When FTNN is used to fill storage the usage and retention charges are waived; instead there is an injection charge and gas retention for injection.

E. Avoided City-Gate Gas Costs

The avoided cost of natural gas by costing period is the average of the avoided cost in each of the months that comprise the costing period. As described earlier, the avoided cost in any month is the weighted average of the avoided cost of gas delivered to the LDC from each of the three sources: long-haul pipeline, underground storage, and gas released from the cogeneration units. The weightings or fractions by source by month were presented in gas workpaper 11.

NIMO's avoided city-gate costs are presented in gas workpaper 15. Also shown is the annual Dominion Appalachian Index forecast price of natural gas. Other than for the peak-day, the commodity cost of gas is the largest component of the avoided cost.

The levelized avoided cost is the cost for which the present value at the real riskless rate of return of 2.2165 percent has the same present value as the estimated avoided costs for the periods shown at the same rate of return. The average cost is the simple average over the period 2008 through 2022.

F. Avoided Distribution System Costs

Studies of marginal distribution system costs performed by the former KeySpan LDCs in New England indicate that the incremental cost of distribution is approximately one-half of the embedded cost. For this analysis we estimated the embedded cost of distribution as the difference between the city-gate price of gas in New York State and the price charged each of the different retail customer types: residential, commercial, and industrial in New York.[23] That analysis, and our estimates of average avoided distribution costs for New York LDCs by customer segment, is presented in gas workpaper 16.

G. Avoided Retail Gas Costs

We calculated avoided retail gas costs for various types of retail end-uses. For a given costing period the avoided cost for each retail end-use is the avoided city-gate cost of gas associated with the end-use type plus the avoided LDC margin for that end-use.

The avoided city-gate cost of gas and avoided margin associated with the each retail end-use can be determined from Table 9.

[23] The city-gate gas prices and the prices charged to each retail customer type are reported by the Energy Information Administration for each state each year.

Table 9 - End-Use Type and Associated Avoided Cost Periods

End-Use Types	Period	Months
Commercial and Industrial, non-heating	Annual	Jan – Dec
Commercial and industrial, heating	5 month	Nov – Mar
Existing residential heating	3 month	Dec – Feb
New residential heating	5 month	Nov – Mar
Residential domestic hot water	Annual	Jan – Dec
All commercial and industrial	6 month	Nov – Apr
All residential	6 month	Nov – Apr
All retail end uses	5 month	Nov – Mar

The detailed avoided retail gas costs from 2008 through 2037 are presented in Table 10[24]. The supporting calculations are presented in the *retail avd gas cost* worksheet in *NIMO Avoided costs gas workpapers 2008 03 27.xls*.

[24] Avoided wholesale energy costs through 2032 are derived directly from the GED forecast as adjusted by Synapse. Values for 2033 through 2037 are derived from the 2032 value increased by the average rate of escalation of the prior ten years.

TABLE 10
AVOIDED COSTS OF GAS DELIVERED TO RETAIL CUSTOMERS
Niagara Mohawk Power Corporation
Gas Delivered via Dominion Transmission, Inc.
(2007$/Dekatherm)

	RESIDENTIAL				COMMERCIAL & INDUSTRIAL				ALL RETAIL
Year	Existing Heating Dec-Feb	New Heating Nov-Mar	Hot Water annual	All Nov-Apr	Non Heating annual	Heating Nov-Mar	All Nov-Apr		Nov-Mar
2008	13.40	13.51	13.32	13.44	11.73	11.92	11.85		12.67
2009	14.00	13.79	12.94	13.55	11.35	12.20	11.96		12.94
2010	13.33	13.14	12.40	12.93	10.81	11.55	11.34		12.29
2011	12.99	12.80	12.12	12.60	10.53	11.21	11.01		11.96
2012	12.75	12.57	11.90	12.37	10.32	10.98	10.79		11.73
2013	12.55	12.37	11.72	12.18	10.14	10.79	10.59		11.53
2014	11.59	11.43	10.74	11.22	9.15	9.84	9.63		10.58
2015	11.85	11.69	10.99	11.48	9.40	10.10	9.89		10.84
2016	12.17	12.01	11.29	11.79	9.70	10.42	10.20		11.16
2017	12.35	12.19	11.46	11.97	9.88	10.60	10.38		11.34
2018	12.25	12.08	11.36	11.87	9.78	10.49	10.28		11.24
2019	12.04	11.87	11.17	11.66	9.58	10.29	10.07		11.03
2020	11.36	11.20	10.52	11.00	8.93	9.61	9.41		10.35
2021	12.03	11.86	11.16	11.65	9.57	10.28	10.06		11.02
2022	12.28	12.12	11.40	11.90	9.81	10.53	10.31		11.27
2023	12.49	12.33	11.60	12.11	10.01	10.74	10.52		11.48
2024	12.56	12.39	11.66	12.17	10.07	10.81	10.59		11.55
2025	12.62	12.45	11.72	12.23	10.13	10.86	10.64		11.61
2026	12.74	12.57	11.82	12.34	10.24	10.98	10.76		11.72
2027	12.85	12.68	11.94	12.46	10.35	11.09	10.87		11.84
2028	12.97	12.80	12.05	12.58	10.46	11.21	10.99		11.96
2029	13.10	12.92	12.16	12.69	10.57	11.33	11.11		12.08
2030	13.22	13.04	12.28	12.81	10.69	11.46	11.23		12.20
2031	13.34	13.17	12.40	12.94	10.81	11.58	11.35		12.32
2032	13.47	13.29	12.51	13.06	10.93	11.70	11.47		12.45
2033	13.60	13.42	12.63	13.18	11.04	11.83	11.59	0.00	12.57
2034	13.72	13.54	12.75	13.30	11.16	11.95	11.72	0.00	12.70
2035	13.85	13.67	12.87	13.43	11.28	12.08	11.84	0.00	12.82
2036	13.98	13.79	12.99	13.55	11.41	12.21	11.97	0.00	12.95
2037	14.11	13.92	13.11	13.68	11.53	12.34	12.09	0.00	13.08
LEVELIZED	Years								
2008-2027	20	12.54	12.39	11.70	12.18	10.11	10.80	10.59	11.54
	Real (constant $) riskless annual rate of return in %:					2.2165%			

Appendix A

Pages 7-9 to 7-16 from *Avoided Energy Supply Costs In New England: 2007 Final Report*

process. The regulatory history of acid rain and of ozone depletion contributed important foundations for efforts to regulate greenhouse gas emissions (federal government role in addressing pollution, and framework for international negotiations on pollutants, respectively).

ii. Carbon Dioxide will be the Dominant Externality from Electricity Production and Use in New England Over the Study Period

Externalities associated with electricity production and uses include a wide variety of air pollutants, water pollutants, and land use impacts. The principle air pollutants that have externalities include carbon dioxide, sulfur dioxide, nitrogen oxides and ozone, particulates, and mercury.

There have been several fairly comprehensive studies that assess the full range of environmental impacts from electricity generation and use. These include:

- *Environmental Costs of Electricity*, prepared by the Pace University Center for Environmental and Legal Studies: Ottinger, R, et. al,, for NYSERDA, Oceana Publications, Inc, 1990;
- The New York State Environmental Externalities Cost Study, RCG/Hagler, Bailly, Inc. and Tellus Institute, for the Empire State Electric Energy Research Corporation (ESEERCO), multiple volumes, 1994 and 1995;
- Non-Price Benefits of BECo Demand-Side Management Programs, for the Boston Edison Settlement Board, Tellus No. 93-174A, July 1994; and
- US-EC Fuel Cycle Study, by Oak Ridge National Laboratory and Resources for the Future, for the US Department of Energy and the Commission of the European Communities, multiple volumes, 1992 to 1994.

The list of externalities from energy production and use is quite long, and includes the following:

- Air emissions (including SO_2, NO_x, particulates, mercury, lead, other toxins, and greenhouse gases) and the associated health and ecological damages;
- Fuel cycle impacts associated with "front end" activities such as mining and transportation, and waste disposal;
- Water use and pollution;
- Land use;
- Aesthetic impacts of power plants and related facilities;
- Radiological exposures related to nuclear power plant fuel supply and operation (routine and accident scenarios); and
- Other non-environmental externalities such as economic impacts (generally focused on employment), energy security, and others.

Many of these externalities have been reduced over time, as regulations limiting emission levels have forced suppliers and buyers to consider at least a portion of those costs in their production and use decisions, thereby "internalizing" a portion of those costs. For example, the Clean Air Interstate Rule, passed by Congress in March 2005, adjusts the SO_2 emissions cap downward with an ultimate effect of reducing SO_2 emissions about 73% from 2003 levels. The Clean Air Act and the Clean Air Interstate Rule require further reductions in emission levels over the study period. As a result, while there remain some "external costs" associated with the residual NO_x and SO_2 pollution, these externalities are now relatively small. In contrast, regulators are just starting to "internalize" the impacts of carbon dioxide.

It is expected that the "carbon externality" will be the dominant externality associated with marginal electricity generation in New England. This is the case for two main reasons. First, as noted above, regulations to address the greenhouse gas emissions responsible for global climate change are lagging, particularly in the United States. The damages from criteria air pollutants are relatively bounded, and to a great extent "internalized," as a result of existing regulations. In contrast, global climate change is a problem on an unprecedented scale with far-reaching and potentially catastrophic implications. Second, New England avoided electric energy costs over the study period are likely to be dominated by natural gas-fired generation, which has minimal SO_2, mercury, and particulate emissions and relatively low NO_x emissions. Hence, spending extensive time reviewing the latest literature on externality values for these emissions would not be a good use of time and budget. Based on knowledge of the electric system, and review of model runs, it is believed that the dominant environmental externality in New England over the study period will be the un-internalized cost of carbon dioxide emissions. RGGI and any federal CO_2 regulations will only internalize a portion of the "greenhouse gas externality," particularly in the near term.

The California PUC has directed electric companies to include a value for carbon dioxide in their avoided cost determination and long-term resource procurement. The CA PUC found:

> "In terms of specific pollutants, of significant concern to regulators and the public today is the environmental damage caused by carbon dioxide (CO_2) emissions—an inescapable byproduct of fossil fuel burning and by far the major contributor to greenhouse gases. Unlike other significant pollutants from power production, CO_2 is currently an unpriced externality in the energy market.... CO_2 is not consistently regulated at either the Federal or State levels and is not embedded in energy prices...."[115]

For the above reasons, values were developed for the one major emission associated with avoided electricity costs for which the near-term internalized cost most significantly understates the value supported by current science.

[115] R.04-04-003, Appendix B, p. 5.

iii. General Approaches to Monetizing Environmental Externalities

There are various methods available for monetizing environmental externalities such as air pollution from power plants. These include various "damage costing" approaches that seek to value the damages associated with a particular externality, and various "control cost" approaches that seek to quantify the marginal cost of controlling a particular pollutant (thus internalizing a portion or all of the externality).

The "damage costing" methods generally rely on travel costs, hedonic pricing, and contingent valuation in the absence of market prices. These are forms of "implied" valuation, asking complex and hypothetical survey questions, or extrapolating from observed behavior. For example, data on how much people will spend on travel, subsistence, and equipment, can be used to measure the value of those fish, or more accurately the value of *not* killing fish via air pollution. Human lives are sometimes valued based upon wage differentials for jobs that expose workers to different risks of mortality. In other words, comparing two jobs, one with higher hourly pay rate and higher risk than the other can serve as a measure of the compensation that someone is "willing to accept" in order to be exposed to the risk.

There are myriad problems with these approaches, two of which will be discussed here. First, the damage costing approaches are, in the case of global climate change, simply subject to too many problematic assumptions. We do not subscribe to the view that a reasonable economic estimate of the "damages" around the world can be developed and used as a figure for the externalities associated with carbon dioxide emissions. In other words, estimating damage is a moving target – it depends upon what concentrations we ultimately reach (or what concentrations we reach and reduce from). This is exacerbated by the fact that we do not fully understand climate change, and cannot project with certainty the levels at which certain impacts will occur. A further complicating factor is that different emissions concentrations create different damages for different regions and different groups of people. Thus, such exercises, while interesting, are fraught with difficulties including: (a) identifying the categories of changes to ecosystems and societies around the planet; (b) estimating magnitudes of impacts; (c) valuing those impacts in economic terms; (d) aggregating those values across countries with different currency exchange rates and different cultures; (e) addressing the non-linear and catastrophic aspects of the climate change damage; and (f) dealing with the paradoxes and conundrums involved in applying financial discount rates to effects stretching over centuries. Second, the fact that the "regulators' revealed preferences" approach is unavailable, as regulators have not established relevant reference points, complicates the task of determining a carbon externality cost.

The "control cost" methods generally look at the *marginal* cost of control. That is, the cost of control valuations look at the last (or most expensive) unit of emissions reduction required to comply with regulations. The cost of control approach can be based upon a "regulators' revealed preference" concept. That is, if "air regulators" are requiring a particular technology with a cost per ton of $X to be installed at power plants, then this can be taken as an indication that the value of those reductions is perceived to be at or above the cost of the controls. The cost of control approach can also be based upon a "sustainability target" concept. With the sustainability target, we start with a level of

damage or risk that is considered to be acceptable, and then estimate the marginal cost of achieving that target.

The "sustainability target" approach relies on the assumption that the nations of the world will not tolerate unlimited damages. It also relies partly on an expectation that policy leaders will realize that it is cheaper to reduce emissions now and achieve a sustainability target than it is not to address climate change. It is worth noting that a cost estimate based on a sustainability target will be a bit lower than a damage cost estimate because the "sustainability target" is going to be a calculus of what climate change the planet is already committed to, and what additional change we are willing to live with (again complicated by the fact that different regions will see different impacts, and have different ideas about what is dangerous and what is sustainable). While we do not use a damage cost estimate, it is informative to consider damages to get a sense of the scale of the problem. In October 2006 a major report to Prime Minister Tony Blair stated that "the benefits of strong and early action far outweigh the economic costs of not acting." Based on its review of results from formal economic models, the Stern Review on the Economics of Climate Change estimated that in the absence of efforts to curb climate change, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and forever, and could be as much as 20% of GDP or more. In contrast, the Stern Review states that the costs of action – the cost of implementing actions to curb climate change – can be limited around 1% of global GDP each year.[116]

iv. Estimation of CO_2 Environmental Costs

Based upon our review of the merits of those various approaches, we selected an approach that estimates the cost of controlling, or stabilizing, global carbon emissions at a "sustainable level" or sustainability target. To develop that estimate, the most recent science regarding the level of emissions that would be sustainable was reviewed, as well as the literature on costs of controlling emissions at that level.

The conceptual and practical challenges for estimating a carbon externality price include the following:

- The damages are very widely distributed in time (over many decades or even centuries) and space (across the globe);
- The "physical damages" include some impacts that are very difficult to quantify and value, such as flooding large land areas; changes to local climates; species range migration; increased risk of flood and drought; changes in the amount, intensity, frequency, and type of precipitation; changes in the type, frequency, and intensity of extreme weather events (such as hurricanes, heat waves, and heavy precipitation);

[116] Stern, Sir Nicholas; *Stern Review of the Economics of Climate Change*; Cambridge University Press, 2007.

- This list of "physical damages" includes some that are extremely difficult, perhaps impossible, to reasonably express in monetary terms;
- The scientific understanding of the climate change process and climate change impacts is evolving rapidly;
- There may well be reasons (not considered here) that the environmental cost value could have a shape that starts lower and increases faster, or vice versa, having to do with periods in which rates of change are most problematic;
- The scale of the impact on the world economies associated with the impacts of climate change and/or associated with the transformations of economies to reduce greenhouse gas emissions are so large that using terms and concepts such as "marginal" can be problematic; and
- The impacts of climate change are non-linear and non-continuous, including "feedback cycles" that can most reasonably be thought of in terms of thresholds beyond which there are "run away damages" such as irreversible melting of the Greenland ice sheet and the West Antarctic ice sheet, and collapse of the Atlantic thermohaline circulation – a global ocean current system that circulates warm surface waters.

Given the daunting challenge of valuing climate damages in economic terms, AESC 2007 takes a practical approach consistent with the concepts of "sustainability" and "avoidance of undue risk." Specifically, the carbon externality can be valued by looking at the marginal costs associated with controlling total carbon emissions at, or below, the levels that avoid the major climate change risks according to current expectations.

Nonetheless, because the environmental costs of energy production and use are so significant, and because the climate change impacts associated with power plant carbon dioxide emissions are urgently important, it is worthwhile to attempt to estimate the externality price and to put it in dollar terms that can be incorporated into electric system planning.

(a) What is the Correct Level of CO_2 Emissions?

In order to determine what is currently deemed a reasonable sustainability target, current science and policy was reviewed. In 1992, over 160 nations (including the United States) agreed to "to achieve stabilization of atmospheric concentrations of greenhouse gases at levels that would prevent dangerous anthropogenic (human-induced) interference with the climate system…." (United Nations Framework Convention on Climate Change or UNFCCC).[117] Achieving this commitment requires determining the maximum temperature increase above which impacts are anticipated to be dangerous, the atmospheric emissions concentration that is likely to lead to that temperature increase, and the emissions pathway that is likely to limit atmospheric concentrations and temperature increase to the desired levels.

[117] There are currently over 180 signatories.

The definition of what level of temperature change constitutes a dangerous climate change will ultimately be established by politicians, as it requires value judgments about what impacts are tolerable regionally and globally.[118] We expect that such a definition and decision will be based upon what climate science tells us about expected impacts and mitigation opportunities.

While uncertainty and research continue, a growing number of studies identify a global average temperature increase of 2°C above pre-industrial levels as the temperature above which dangerous climate impacts are likely to occur.[119] Temperature increases greater than 2°C above pre-industrial levels are associated with multiple impacts including sea level rise of many meters, drought, increasing hurricane intensity, stress on and possible destruction of unique ecosystems (such as coral reefs, the Arctic, alpine regions), and increasing risk of extreme events.[120] The European Union has adopted a long-term policy goal of limiting global average temperature increase to 2°C above pre-industrial levels.[121]

Because of multiple uncertainties, it is difficult to define with certainty what future emissions pathway is likely to avoid exceeding that temperature increase. We reviewed several sources to determine reasonable assumptions about what level of concentrations are deemed likely to achieve the sustainability target, and what emission reductions are necessary to reach those emissions levels. The Intergovernmental Panel on Climate Change's most recent Assessment Report indicates that concentrations of 445-490 ppm CO_2 equivalent correspond to 2° – 2.4°C increases above pre-industrial levels.[122] A comprehensive assessment of the economics of climate change, The Stern Review, proposes a long-term goal to stabilize greenhouse gases at between the equivalent of 450 and 550 ppm CO_2.[123] Recent research indicates that achieving the 2°C goal likely requires stabilizing atmospheric concentrations of carbon dioxide and other heat-trapping gases near 400 ppm carbon dioxide equivalent.[124]

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[118] For multiple discussions of the issues surrounding dangerous climate change, *see* Schnellnhuber, Cramer, Nakicenovic, Wigley and Yohe, editors; *Avoiding Dangerous Climate Change*; Cambridge University Press, 2006. This book contains the research presented at The International Symposium on Stabilisation of Greenhouse Gas Concentrations, Avoiding Dangerous Climate Change, which took place in the U.K. in 2005.

[119] Mastrandrea, M. and Schneider, S.; *Probabilistic Assessment of "Dangerous" Climate Change and Emissions Scenarios: Stakeholder Metrics and Overshoot Pathways;* Chapter 27 in *Avoiding Dangerous Climate Change*; Cambridge University Press, 2006.

[120] Schnellnhuber, 2006.

[121] The European Union first adopted this goal in 1996 in "Communication of the Community Strategy on Climate Change." Council conclusions. European Council. Brussels, Council of the EU. The EU has since reiterated its long-term commitment in 2004 and 2005 (*see, e.g.* Council of the European Union, Presidency conclusions, March 22-23.)

[122] IPCC AR4, WGIII Summary for Policy Makers, 2007. Table SPM5.

[123] Stern, Sir Nicholas; *Stern Review of the Economics of Climate Change*; Cambridge University Press, 2007.

[124] Meinshausen, M.; *What Does a 2°C Target Mean for Greenhouse Gases? A Brief Analysis Based on Multi-Gas Emission Pathways and Several Climate Sensitivity Uncertainty Estimates;* Chapter 28 in *Avoiding Dangerous Climate Change*; Cambridge University Press, 2006.

The Intergovernmental Panel on Climate Change (IPCC) indicates that reaching concentrations of 450-490ppm CO_2-eq requires reduction in global CO_2 emissions in 2050 of 85-50% below 2000 emissions levels. [125] The Stern Review indicates that global emissions would have to be 70% below current levels by 2050 for stabilization at 450ppm CO_2-eq.[126] To accomplish such stabilization, the United States and other industrialized countries would have to reduce greenhouse gas emissions on the order of 80 – 90% below 1990 levels, and developing countries would have to achieve reductions from their baseline trajectory as soon as possible.[127] In the United States, several states have adopted state greenhouse gas reduction targets of 50% or more reduction from a baseline of 1990 levels or then-current levels by 2050 (California, Connecticut, Illinois, Maine, New Hampshire, New Jersey, Oregon, and Vermont). In 2001, the New England states joined with the Eastern Canadian Premiers in also adopting a long-term policy goal of reductions on the order of 75-80% of then-current emission levels.[128]

The sobering news is that a long term stabilization goal of even 400 ppm might not be sufficient: "while very rapid reductions can greatly reduce the level of risk, it nevertheless remains the case that, even with the strictest measures we model, the risk of exceeding the 2°C threshold is in the order of 10 to 25 per cent."[129] Similarly, the 2°C threshold may not be sufficient to avoid severe impacts.[130]

(b) What is the Cost of Stabilizing CO_2 Emissions at this Sustainable Level?

There have been several efforts to estimate the costs of achieving a variety of atmospheric concentration targets. The most comprehensive effort is the work of the Intergovernmental Panel on Climate Change. The IPCC was established by the World Meteorological Organization and UNEP in 1988 to provide scientific, technical and methodological support and analysis on climate change. IPCC has issued three assessment reports on the science of climate change, climate change impacts, and on mitigation and adaptation strategies (1990, 1995, 2001), and is currently issuing its fourth assessment report. In its fourth Assessment Report, the IPCC indicates that reductions on the order of 34 gigatonnes (Gt) would be necessary to achieve an 80% reduction below current. [131] That report estimates that up to 31 Gt in reductions are available for $100/te of

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[125] IPCC AR4, WGIII Summary for Policy Makers, 2007. Table SPM5.

[126] Stern Review, Long Executive Summary, 2007. Page xi.

[127] den Elzen, M., Meinshausen, M; *Multi-Gas Emission Pathways for Meeting the EU 2°C Climate Target;* Chapter 31 in *Avoiding Dangerous Climate Change*; Cambridge University Press, 2006. Page 306.

[128] New England Governors/Eastern Canadian Premiers, *Climate Change Action Plan 2001*, August 2001. NEG/ECP reiterated this commitment in June 2007 through Resolution 31-1, which states, in part, that the long term reduction goals should be met by 2050.

[129] Bauer and Mastrandrea; *High Stakes: Designing emissions pathways to reduce the risk of dangerous climate change;* Institute for Public Policy Research, U.K.; November 2006.

[130] See recent research by James Hansen, Goddard Space Flight Institute – NASA's top climate scientist.

[131] 2000 emissions levels were 43Gt CO_2-eq. IPCC AR4, WGIII, Summary for Policy Makers, 2007. Page 11.

CO_2 or less (Working Group III Summary for Policy Makers). Other studies on the costs of achieving stabilization targets include the following:

- A Vattenfalls study of abatement potential estimates that about 30 Gt reduction would be necessary for stabilization at 450 ppm, and about 27Gt are available for around \$50/tCO_2 – so cost would go above \$50/t;[132]
- McKinsey & Company have developed an abatement cost curve that indicates that stabilization at 450 ppm would have a marginal abatement cost of about \$50/t, stabilization at 400 ppm would have a marginal abatement cost of over \$60/tCO_2; and
- The Stern Review itself talks primarily about macro-economic costs; however an underlying meta-analysis of modeling literature concludes that "even stringent stabilization targets can be met without materially affecting world GDP growth, at low carbon tax rates or permit prices, at least by 2030 (in \$US(2000), less than \$15/tCO_2 for 550ppmv and \$50/tCO_2 for 450ppmv for CO_2)."[133]

The IPCC Working Group III Summary for Policy Makers states on page 29 (references omitted): "An effective carbon-price signal could realize significant mitigation potential in all sectors.

- Modeling studies show carbon prices rising to 20 to 80 US\$/tCO_2-eq by 2030 and 30 to 155 US\$/tCO_2-eq by 2050 are consistent with stabilization at around 550 ppm CO_2-eq by 2100. For the same stabilization level, studies since the Third Assessment Report that take into account induced technological change lower these price ranges to 5 to 65 US\$/tCO_2eq in 2030 and 15 to 130 US\$/tCO_2-eq in 2050.
- Most top-down, as well as some 2050 bottom-up assessments, suggest that real or implicit carbon prices of 20 to 50 US\$/tCO_2-eq, sustained or increased over decades, could lead to a power generation sector with low-greenhouse gas emissions by 2050 and make many mitigation options in the end-use sectors economically attractive."

Based on a review of these different sources, we believe that it is reasonable to anticipate a marginal cost of control of \$60/tCO_2-eq for achieving a stabilization target that is likely to avoid temperature increases higher than 2°C above pre-industrial levels. Of course, selection of this value requires multiple assumptions.

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[132] *Vattenfalls Global Climate Impact Abatement Map*, accessed May 30, 2007.

[133] Barker, Terry et. al.; *A report prepared for the HM Treasury Stern Review on "The economics of climate change" The Costs of Greenhouse Gas Mitigation with Induced Technological Change: A Meta-Analysis of Estimates in the Literature*; 4 CMR, University of Cambridge. July 2006.

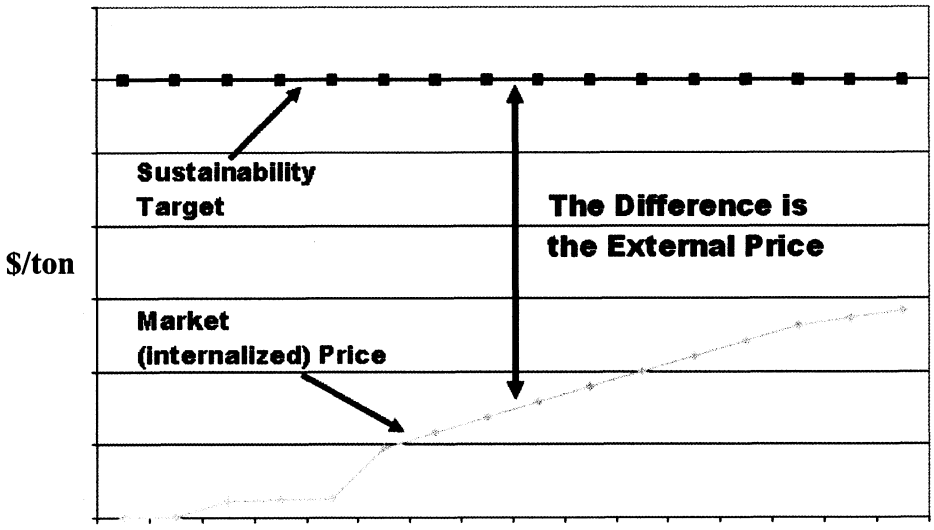
v. Estimating CO_2 Environmental Costs for New England

Our estimates of the "external" or additional cost associated with emissions of carbon dioxide in New England are based upon the sustainability target and the forecast of carbon emission regulation in New England over the study period. The externality value for carbon dioxide in each year was calculated as the estimated annual sustainability target value of $60/ton minus the annual allowance values internalized in the projected electric energy market prices.

The annual allowance values internalized in the projected electric energy market prices are described in Chapter 5. These values are based upon a Synapse forecast of the carbon trading price associated with anticipated carbon regulations. That carbon price was included in the dispatch model runs (in the generators' bids) and hence is embedded within the AESC 2007 avoided electricity costs. The additional value in each year is the difference between the estimate of marginal cost to achieve a sustainability target ($60/ton CO_2) and the value of the carbon trading price embedded in the projection of wholesale electric energy prices.

Exhibit 7-13 illustrates how the additional CO_2 cost was determined. The line for the allowance price is based on the forecast of carbon allowance costs, illustrating the notion that the United States will gradually move to incorporate the climate externality into policy. The "externality" is simply the difference between the estimate of the cost of achieving a sustainability target and the anticipated allowance cost; that is, the area above the blue line (and below $60/ton) in the graph.

Exhibit 7-13. Determination of the Additional Cost of CO_2 Emissions



The carbon dioxide externality price forecast is presented above as a single simple price. This is for ease of application and because doing something more complex such as varying the shape over time or developing a distribution to represent uncertainty would go beyond the scope of this project and would stretch the available information upon

which the externality price is based. We fully acknowledge the many complexities involved in estimating a carbon price, both conceptual and practical. Some of these are listed in the Estimation of CO_2 Environmental Costs section (iv) above

With regard to environmental costs, AESC 2007 focuses on the externality value of carbon dioxide for the purpose of screening DSM programs for two main reasons. First, the environmental costs of carbon dioxide emissions are substantially greater than the costs of the other environmental impacts of electricity generation. Second, carbon dioxide is expected to be the dominant environmental impact of the marginal sources of generation in New England over the study period. Thus, the cost associated with carbon dioxide emissions dominates other values to an extent that justifies focusing exclusively on carbon dioxide.

The additional value for carbon dioxide in each year is an estimated annual sustainability target value of $60/ton minus the annual projected allowance values internalized in our model. Synapse reviewed science and policy to assess current emerging consensus on what is an appropriate sustainability target. The sustainability target value is an estimate of the cost of stabilizing carbon dioxide emissions at levels that seem likely, based on current science, to avoid more than a 2°C increase in the global average temperature. The annual allowance values are drawn from our forecast of carbon allowance prices associated with anticipated carbon regulations over the study period. The following exhibit presents the recommended values.

Exhibit 7-14. Recommended Externality Values

Year	Sustainability Target ($/ton)	Allowance Price (internalized value $/ton)	Additional Environmental Cost (Sustainability Target - Allowance Price $/ton)
2007	60	0.00	60.00
2008	60	0.00	60.00
2009	60	2.21	57.79
2010	60	2.37	57.63
2011	60	2.53	57.47
2012	60	9.46	50.54
2013	60	11.56	48.44
2014	60	13.66	46.34
2015	60	15.76	44.24
2016	60	17.86	42.14
2017	60	19.96	40.04
2018	60	22.06	37.94
2019	60	24.16	35.84
2020	60	26.27	33.73
2021	60	27.32	32.68
2022	60	28.37	31.63

The values in the right hand column of the table are, in one sense, externalities. They may be borne by citizens in the form of damages from climate change. There is also a significant chance that the "additional" CO2 costs will be borne to some degree by

electricity consumers in the form of compliance costs in electricity rates if emission regulations require greater reductions more rapidly than we have assumed.

vi. Applying CO_2 Costs in Evaluations of DSM Programs

The externality values from Exhibit 7-14 are provided in the avoided electricity cost workbooks presented in Appendix E. They are expressed as $/kWh based upon our analysis of the CO_2 emissions of the marginal generating units in each year of the study period.

At a minimum program administrators should calculate the costs and benefits of DSM programs without, and then with, these values in order to assess their incremental impact on the cost-effectiveness of programs. However, we recommend the program administrators include these values in their analyses of DSM, unless specifically prohibited from doing so by state or local law or regulation. The next section explains why a DSM program could result in CO_2 emission reductions even under a cap and trade regulatory framework.

vii. Impact of DSM on Carbon Emissions Under a Cap and Trade Regulatory Framework

The Regional Greenhouse Gas Initiative is a cap and trade greenhouse gas program for power plants in the northeastern United States. Discussions to develop the program began in 2003, states signed a memorandum of understanding identifying the main elements of the program in December 2005, and in August 2006 they adopted a model rule for implementing the program. Currently nine states have decided to participate: Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. Maryland passed a law in April 2006 requiring participation in RGGI. Pennsylvania, the District of Columbia, the Eastern Canadian Provinces, and New Brunswick are official "observers" in the RGGI process. Individual states are now engaged in regulatory proceedings to adopt regulations consistent with the agreement.

As currently designed, the program will:

- Stabilize CO_2 emissions from power plants at current levels for the period 2009-2015, followed by a 10% reduction below current levels by 2019;
- Allocate a minimum of 25% of allowances for consumer benefit and strategic energy purposes. Allowances allocated for consumer benefit will be auctioned and the proceeds of the auction used for consumer benefit and strategic energy purposes; and
- Include certain offset provisions that increase flexibility to moderate price impacts and development of complimentary energy policies to improve energy efficiency, decrease the use of higher polluting electricity generation and maintain economic growth.

With carbon dioxide emissions regulated under a cap and trade system, as is assumed in this market price analysis, it is conceivable that a load reduction from a DSM program will not lead to a reduction in the amount of total system carbon dioxide emissions. The annual total system emissions for the affected facilities in the relevant region are, after all, capped. In the analysis that was documented in this report, the relevant cap and trade regulation is the Regional Greenhouse Gas Initiative (RGGI) for the period 2009 to 2012 and the assumed national cap and trade system thereafter. However, there are a number of reasons why a DSM program could result in CO_2 emission reductions, specifically:

- Reduction in load that reduces the cost (marginal or total cost) of achieving an emissions cap can result in a tightening of the cap. This is a complex interaction between the energy system and political and economic systems, and is difficult or impossible to model, but the dynamic may reasonably be assumed to exist;
- Specific provisions in RGGI provide for a tightening or loosening of the cap (via adjustments to the offset provisions that are triggered at different price levels). It is unknown at this point whether and to what extent such "automatic" adjustments might be built into the US carbon regulatory system;
- It is also possible that DSM efforts will be accompanied by specific retirements or allocations of allowances that would cause them to have an impact on the overall system level of emissions (effectively tightening the cap); and
- to the extent that the cap and trade system "leaks" because of its geographic boundaries, one would expect the benefits of a carbon emissions reduction resulting from a DSM program to similarly "leak." That is, a load reduction in New York could cause reductions in generation (and emissions) at power plants in New York, Pennsylvania, and elsewhere. Because New York is in the RGGI cap and trade system, the emissions reductions realized at New York generating units may pop up as a result of increased sales of allowances from NY to other RGGI states. But because Pennsylvania is not in the RGGI system, the emissions reductions at Pennsylvania generating units would be true reductions attributable to the DSM program.

Appendix E

APPENDIX E

Other Screening Metrics

The Brooklyn Union Gas Company d/b/a National Grid NY (formerly "KEDNY") Gas Programs
ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST with Carbon Externality Added

Summary of Benefit , Costs (2009 $s)
Total Resource Cost Test

Gas Programs	2009 TRC Benefit/ Cost	2009 Total NPV Benefits ($000)	2009 Total NPV Costs ($000)	2010 TRC Benefit/ Cost	2010 Total NPV Benefits ($000)	2010 Total NPV Costs ($000)	2011 TRC Benefit/ Cost	2011 Total NPV Benefits ($000)	2011 Total NPV Costs ($000)	2009 - 2011 TRC Benefit/ Cost	2009 - 2011 Total NPV Benefits ($000)	2009 - 2011 Total NPV Costs ($000)
Enhanced Home Sealing Incentives	1.51	$2,493	$ 1,646	1.64	$2,551	$ 1,560	3.21	$2,625	$ 818	1.91	$7,669	$ 4,025
Residential ENERGY STAR® Products Program	1.64	$121	$74	1.99	$207	$104	2.19	$213	$97	1.97	$542	$276
Residential Low Income Program	1.26	$6,963	$5,535	1.36	$7,126	$5,246	1.47	$7,332	$4,973	1.36	$21,421	$15,754
Residential Building Practices and Demonstration Program	n/a	n/a	$39	n/a	n/a	$37	n/a	n/a	$35	n/a	n/a	$110
Energy Audit Program	0.06	$47	$812	0.06	$47	$770	0.07	$48	$729	0.06	$142	$2,311
Commercial, Industrial and Multi Family Energy Efficiency Program	1.71	$18,672	$10,923	1.83	$18,991	$10,353	2.10	$20,924	$9,983	1.87	$58,587	$31,259
Commercial High-Efficiency Heating and Water Heating Program	2.93	$4,314	$1,471	3.17	$4,415	$1,394	3.80	$5,678	$1,493	3.31	$14,407	$4,358
Building Practices and Demonstration Program	1.35	$1,335	$988	1.45	$1,357	$936	1.51	$1,158	$766	1.43	$3,850	$2,690
Grand Total	**1.58**	**$33,946**	**$21,486**	**1.70**	**$34,694**	**$20,400**	**2.01**	**$37,977**	**$18,895**	**1.75**	**$106,617**	**$60,781**

KeySpan Gas East Corporation d/b/a National Grid (formerly "KEDLI") Gas Programs
ENERGY EFFICIENCY PROGRAMS
2009 - 2011 TRC BENEFIT COST TEST with Carbon Externality Added

Summary of Benefit , Costs (2009 $s)
Total Resource Cost Test

Gas Programs	2009 TRC Benefit/ Cost	2009 Total NPV Benefits ($000)	2009 Total NPV Costs ($000)	2010 TRC Benefit/ Cost	2010 Total NPV Benefits ($000)	2010 Total NPV Costs ($000)	2011 TRC Benefit/ Cost	2011 Total NPV Benefits ($000)	2011 Total NPV Costs ($000)	2009 - 2011 TRC Benefit/ Cost	2009 - 2011 Total NPV Benefits ($000)	2009 - 2011 Total NPV Costs ($000)
Enhanced Home Sealing Incentives	1.52	$1,496	$ 983	1.64	$1,531	$ 932	1.87	$2,289	$ 1,222	1.69	$5,316	$ 3,137
Residential ENERGY STAR® Products Program	1.64	$121	$74	1.99	$207	$104	2.19	$213	$97	1.97	$542	$276
ENERGY STAR® Homes Program	1.19	$843	$707	1.29	$864	$670	1.44	$889	$616	1.30	$2,597	$1,993
Residential Low Income Program	1.26	$3,486	$2,773	1.36	$3,567	$2,628	1.47	$3,670	$2,491	1.36	$10,723	$7,893
Residential Building Practices and Demonstration Program	n/a	n/a	$44	n/a	n/a	$42	n/a	n/a	$44	n/a	n/a	$129
Energy Audit Program	0.07	$39	$532	0.08	$39	$504	0.08	$40	$478	0.08	$119	$1,515
Commercial, Industrial and Multi Family Energy Efficiency Program	1.70	$6,526	$3,828	1.83	$6,623	$3,628	2.17	$8,236	$3,799	1.90	$21,385	$11,255
Commercial High-Efficiency Heating and Water Heating Program	3.17	$2,157	$680	3.43	$2,207	$644	3.73	$3,407	$913	3.47	$7,771	$2,237
Building Practices and Demonstration Program	3.00	$920	$307	3.22	$935	$291	3.47	$957	$276	3.22	$2,812	$873
Grand Total	**1.57**	**$15,588**	**$9,928**	**1.69**	**$15,974**	**$9,444**	**1.98**	**$19,702**	**$9,936**	**1.75**	**$51,264**	**$29,308**

KEDNY Residential - Gas Rate Impact of SBC charges

Number of Participants [%]	**as of 2011**
Enhanced Home Sealing Incentives	1,500
Residential ENERGY STAR® Products Program	1,300
Residential Low Income Program	5,262
Residential Building Practices and Demonstration Program	30
Energy Audit Program	3,600
Total	11,692
Number of Customers	1,167,555
Percentage of Participants	
Enhanced Home Sealing Incentives	0.1285%
Residential ENERGY STAR® Products Program	0.1113%
Residential Low Income Program	0.4507%
Residential Building Practices and Demonstration Program	0.0026%
Energy Audit Program	0.3083%
Total	1.0014%

	2009	**2010**	**2011**
Forecasted Average Price (Firm Customers) [$/dTh]:	$18.6991	$18.5800	$18.5765
Forecasted SBC Charge [$/dTh]:	$0.1136	$0.1186	$0.1138
Forecasted Average Price plus SBC [$/dTh]:	$18.8127	$18.6986	$18.6903
	Projected 2009	**Projected 2010**	**Projected 2011**
Projected Delivery Price Without Environmental Programs [$/dTh]:	$6.1975	$6.2233	$6.2539
Projected Commodity Price Without Environmental Programs [$/dTh]:	$12.5016	$12.3567	$12.3226
Projected Average Price without Environmental Programs [$/dTh]:	$18.6991	$18.5800	$18.5765
Total Residential Sales [dTh] - Rate Case	75,661,290	76,001,464	76,316,372
Impacts of Environmental Programs Cost [$/dTh]			
Program Cost			
Enhanced Home Sealing Incentives	$1,405,955	$1,405,955	$670,979
Residential ENERGY STAR® Products Program	$50,000	$70,000	$68,250
Residential Low Income Program	$5,887,803	$5,887,803	$5,888,015
Residential Building Practices and Demonstration Program	$38,549	$38,549	$38,550
Energy Audit Program	$814,885	$814,885	$814,885
Total Program Cost	$8,197,192	$8,217,192	$7,480,679
Program Cost per dTh [$/dTh]			
Enhanced Home Sealing Incentives	$ 0.0186	$ 0.0185	$ 0.0088
Residential ENERGY STAR® Products Program	$ 0.0007	$ 0.0009	$ 0.0009
Residential Low Income Program	$ 0.0778	$ 0.0775	$ 0.0772
Residential Building Practices and Demonstration Program	$ 0.0005	$ 0.0005	$ 0.0005
Energy Audit Program	$ 0.0108	$ 0.0107	$ 0.0107
Total Program Cost per dTh [$/dTh]	$ 0.1083	$ 0.1081	$ 0.0980
Projected Delivery Rate Impact			
Enhanced Home Sealing Incentives	0.2998%	0.2973%	0.1406%
Residential ENERGY STAR® Products Program	0.0107%	0.0148%	0.0143%
Residential Low Income Program	1.2556%	1.2448%	1.2337%
Residential Building Practices and Demonstration Program	0.0082%	0.0082%	0.0081%
Energy Audit Program	0.1738%	0.1723%	0.1707%
Total Projected Delivery Price with Environmental Programs	1.7481%	1.7373%	1.5674%
Projected Delivery Rate plus Commodity Impact			
Enhanced Home Sealing Incentives	0.0994%	0.0996%	0.0473%
Residential ENERGY STAR® Products Program	0.0035%	0.0050%	0.0048%
Residential Low Income Program	0.4162%	0.4170%	0.4153%
Residential Building Practices and Demonstration Program	0.0027%	0.0027%	0.0027%
Energy Audit Program	0.0576%	0.0577%	0.0575%
Total Projected Delivery Price with Environmental Programs	0.5794%	0.5819%	0.5277%

Impacts of Projected Lost Delivery Revenue - Collected through Lost Revenue Recovery Mechanism or RDM

Lost Sales [dTh]			
Enhanced Home Sealing Incentives	16,560	16,560	16,560
Residential ENERGY STAR® Products Program	606	1,009	1,009
Residential Low Income Program	46,253	46,253	46,253
Residential Building Practices and Demonstration Program	0	0	0
Energy Audit Program	648	648	648
Total Lost Sales	64,067	64,470	64,470
Lost Sales Accumulated [dTh]			
Enhanced Home Sealing Incentives	16,560	33,120	49,680
Residential ENERGY STAR® Products Program	606	1,615	2,624
Residential Low Income Program	46,253	92,506	138,759
Residential Building Practices and Demonstration Program	0	0	0
Energy Audit Program	648	1,296	1,944
Total Lost Sales Accumulated	64,067	128,537	193,007
Lost Delivery Revenue			
Enhanced Home Sealing Incentives	$102,630	$206,116	$310,693
Residential ENERGY STAR® Products Program	$3,753	$10,050	$16,412
Residential Low Income Program	$286,651	$575,692	$867,783
Residential Building Practices and Demonstration Program	$0	$0	$0
Energy Audit Program	$4,016	$8,065	$12,158
Total Lost Revenue	$397,051	$799,924	$1,207,045
Lost Delivery Revenue per Dth [$/dTh]			
Enhanced Home Sealing Incentives	$ 0.0014	$ 0.0027	$ 0.0041
Residential ENERGY STAR® Products Program	$ 0.0000	$ 0.0001	$ 0.0002
Residential Low Income Program	$ 0.0038	$ 0.0076	$ 0.0114
Residential Building Practices and Demonstration Program	$ -	$ -	$ -
Energy Audit Program	$ 0.0001	$ 0.0001	$ 0.0002
Total Lost Delivery Revenue per dTh [$/dTh]	$ 0.0052	$ 0.0105	$ 0.0158
Gas Rate Impacts - Percentage Increase			
Due to Lost Delivery Revenue	**0.0847%**	**0.1691%**	**0.2529%**
Due to Lost Delivery Revenue + Program Cost	**1.8328%**	**1.9064%**	**1.8203%**
Due to Lost Delivery Revenue + Program Cost + Commodity Cost	**0.6038%**	**0.6345%**	**0.6091%**
Gas Delivery Rate Impact per dTh saved [$/dTh]	**$ 6.1975**	**$ 6.2233**	**$ 6.2539**

KEDNY Non-Residential - Gas Rate Impact of SBC charges

Number of Participants [%]	**as of 2011**
Commercial, Industrial and Multi Family Energy Efficiency Program	3,751
Commercial High-Efficiency Heating and Water Heating Program	1,300
Building Practices and Demonstration Program	25
Total	5,075
Number of Customers	73,290
Percentage of Participants	
Commercial, Industrial and Multi Family Energy Efficiency Program	5.1178%
Commercial High-Efficiency Heating and Water Heating Program	1.7738%
Building Practices and Demonstration Program	0.0337%
Total	6.9252%

	2009	**2010**	**2011**
Forecasted Average Price (Firm Customers) [$/dTh]:	$15.5875	$15.4523	$15.4296
Forecasted SBC Charge [$/dTh]:	$0.2321	$0.2434	$0.2561
Forecasted Average Price plus SBC [$/dTh]:	$15.8196	$15.6958	$15.6857
	Projected 2009	**Projected 2010**	**Projected 2011**
Projected Delivery Price Without Environmental Programs [$/dTh]:	$4.2671	$4.2769	$4.2882
Projected Commodity Price Without Environmental Programs [$/dTh]:	$11.3204	$11.1754	$11.1414
Projected Average Price without Environmental Programs [$/dTh]:	$15.5875	$15.4523	$15.4296
Total Residential Sales [dTh] - Rate Case	44,255,269	45,623,189	46,970,299
Impacts of Environmental Programs Cost [$/dTh]			
Program Cost			
Commercial, Industrial and Multi Family Energy Efficiency Program	$7,747,776	$7,747,776	$7,744,094
Commercial High-Efficiency Heating and Water Heating Program	$1,054,782	$1,054,782	$1,141,937
Building Practices and Demonstration Program	$639,236	$639,236	$562,712
Total Program Cost	$9,441,794	$9,441,794	$9,448,743
Program Cost per dTh [$/dTh]			
Commercial, Industrial and Multi Family Energy Efficiency Program	$ 0.1751	$ 0.1698	$ 0.1649
Commercial High-Efficiency Heating and Water Heating Program	$ 0.0238	$ 0.0231	$ 0.0243
Building Practices and Demonstration Program	$ 0.0144	$ 0.0140	$ 0.0120
Total Program Cost per dTh [$/dTh]	$ 0.2133	$ 0.2070	$ 0.2012
Projected Delivery Rate Impact			
Commercial, Industrial and Multi Family Energy Efficiency Program	4.1028%	3.9707%	3.8448%
Commercial High-Efficiency Heating and Water Heating Program	0.5585%	0.5406%	0.5669%
Building Practices and Demonstration Program	0.3385%	0.3276%	0.2794%
Total Projected Delivery Price with Environmental Programs	4.9998%	4.8388%	4.6911%
Projected Delivery Rate plus Commodity Impact			
Commercial, Industrial and Multi Family Energy Efficiency Program	1.1231%	1.0990%	1.0685%
Commercial High-Efficiency Heating and Water Heating Program	0.1529%	0.1496%	0.1576%
Building Practices and Demonstration Program	0.0927%	0.0907%	0.0776%
Total Projected Delivery Price with Environmental Programs	1.3687%	1.3393%	1.3038%

Impacts of Projected Lost Delivery Revenue - Collected through Lost Revenue Recovery Mechanism or RDM

Lost Sales [dTh]			
Commercial, Industrial and Multi Family Energy Efficiency Program	154,521	154,521	167,508
Commercial High-Efficiency Heating and Water Heating Program	28,656	28,656	35,820
Building Practices and Demonstration Program	11,372	11,372	9,477
Total Lost Sales	194,549	194,549	212,805
Lost Sales Accumulated [dTh]			
Commercial, Industrial and Multi Family Energy Efficiency Program	154,521	309,042	476,550
Commercial High-Efficiency Heating and Water Heating Program	28,656	57,312	93,132
Building Practices and Demonstration Program	11,372	22,745	32,222
Total Lost Sales Accumulated	194,549	389,099	601,904
Lost Delivery Revenue			
Commercial, Industrial and Multi Family Energy Efficiency Program	$659,361	$1,321,743	$2,043,556
Commercial High-Efficiency Heating and Water Heating Program	$122,279	$245,118	$399,371
Building Practices and Demonstration Program	$48,527	$97,276	$138,173
Total Lost Revenue	$830,167	$1,664,137	$2,581,100
Lost Delivery Revenue per Dth [$/dTh]			
Commercial, Industrial and Multi Family Energy Efficiency Program	$ 0.0149	$ 0.0290	$ 0.0435
Commercial High-Efficiency Heating and Water Heating Program	$ 0.0028	$ 0.0054	$ 0.0085
Building Practices and Demonstration Program	$ 0.0011	$ 0.0021	$ 0.0029
Total Lost Delivery Revenue per dTh [$/dTh]	$ 0.0188	$ 0.0365	$ 0.0550
Gas Rate Impacts - Percentage Increase			
Due to Lost Delivery Revenue	**0.4396%**	**0.8529%**	**1.2815%**
Due to Lost Delivery Revenue + Program Cost	**5.4394%**	**5.6917%**	**5.9725%**
Due to Lost Delivery Revenue + Program Cost + Commodity Cost	**1.4672%**	**1.5509%**	**1.6328%**
Gas Delivery Rate Impact per dTh saved [$/dTh]	**$ 4.2671**	**$ 4.2769**	**$ 4.2882**

KEDLI Residential - Gas Rate Impact of SBC charges

Number of Participants [%]	**as of 2011**
Enhanced Home Sealing Incentives	1,036
Residential ENERGY STAR® Products Program	1,300
ENERGY STAR® Homes Program	600
Residential Low Income Program	2,634
Residential Building Practices and Demonstration Program	62
Energy Audit Program	3,000
Total	8,632
Number of Customers	511,435
Percentage of Participants	
Enhanced Home Sealing Incentives	0.2026%
Residential ENERGY STAR® Products Program	0.2542%
ENERGY STAR® Homes Program	0.1173%
Residential Low Income Program	0.5150%
Residential Building Practices and Demonstration Program	0.0121%
Energy Audit Program	0.5866%
Total	1.6878%

	2009	**2010**	**2011**
Forecasted Average Price (Firm Customers) [$/dTh]:	$18.7780	$18.7068	$18.7419
Forecasted SBC Charge [$/dTh]:	$0.1071	$0.1127	$0.1249
Forecasted Average Price plus SBC [$/dTh]:	$18.8851	$18.8195	$18.8668
	Projected 2009	**Projected 2010**	**Projected 2011**
Projected Delivery Price Without Environmental Programs [$/dTh]:	$6.5763	$6.6353	$6.7041
Projected Commodity Price Without Environmental Programs [$/dTh]:	$12.2016	$12.0715	$12.0378
Projected Average Price without Environmental Programs [$/dTh]:	$18.7780	$18.7068	$18.7419
Total Residential Sales [dTh] - Rate Case	47,136,597	47,309,003	47,475,395

Impacts of Environmental Programs Cost [$/dTh]

Program Cost			
Enhanced Home Sealing Incentives	$845,394	$845,394	$1,160,415
Residential ENERGY STAR® Products Program	$50,000	$70,000	$68,250
ENERGY STAR® Homes Program	$367,130	$367,130	$345,207
Residential Low Income Program	$2,949,462	$2,949,462	$2,949,396
Residential Building Practices and Demonstration Program	$43,961	$43,961	$48,785
Energy Audit Program	$534,728	$534,728	$534,728
Total Program Cost	$4,790,675	$4,810,675	$5,106,781
Program Cost per dTh [$/dTh]			
Enhanced Home Sealing Incentives	$ 0.0179	$ 0.0179	$ 0.0244
Residential ENERGY STAR® Products Program	$ 0.0011	$ 0.0015	$ 0.0014
ENERGY STAR® Homes Program	$ 0.0078	$ 0.0078	$ 0.0073
Residential Low Income Program	$ 0.0626	$ 0.0623	$ 0.0621
Residential Building Practices and Demonstration Program	$ 0.0009	$ 0.0009	$ 0.0010
Energy Audit Program	$ 0.0113	$ 0.0113	$ 0.0113
Total Program Cost per dTh [$/dTh]	$ 0.1016	$ 0.1017	$ 0.1076
Projected Delivery Rate Impact			
Enhanced Home Sealing Incentives	0.2727%	0.2693%	0.3646%
Residential ENERGY STAR® Products Program	0.0161%	0.0223%	0.0214%
ENERGY STAR® Homes Program	0.1184%	0.1170%	0.1085%
Residential Low Income Program	0.9515%	0.9396%	0.9267%
Residential Building Practices and Demonstration Program	0.0142%	0.0140%	0.0153%
Energy Audit Program	0.1725%	0.1703%	0.1680%
Total Projected Delivery Price with Environmental Programs	1.5454%	1.5325%	1.6045%
Projected Delivery Rate plus Commodity Impact			
Enhanced Home Sealing Incentives	0.0955%	0.0955%	0.1304%
Residential ENERGY STAR® Products Program	0.0056%	0.0079%	0.0077%
ENERGY STAR® Homes Program	0.0415%	0.0415%	0.0388%
Residential Low Income Program	0.3332%	0.3333%	0.3315%
Residential Building Practices and Demonstration Program	0.0050%	0.0050%	0.0055%
Energy Audit Program	0.0604%	0.0604%	0.0601%
Total Projected Delivery Price with Environmental Programs	0.5412%	0.5436%	0.5739%

Impacts of Projected Lost Delivery Revenue - Collected through Lost Revenue Recovery Mechanism or RDM

Lost Sales [dTh]			
Enhanced Home Sealing Incentives	9,936	9,936	14,440
Residential ENERGY STAR® Products Program	606	1,009	1,009
ENERGY STAR® Homes Program	4,932	4,932	4,932
Residential Low Income Program	23,153	23,153	23,153
Residential Building Practices and Demonstration Program	0	0	0
Energy Audit Program	540	540	540
Total Lost Sales	39,166	39,570	44,075
Lost Sales Accumulated [dTh]			
Enhanced Home Sealing Incentives	9,936	19,872	34,312
Residential ENERGY STAR® Products Program	606	1,615	2,624
ENERGY STAR® Homes Program	4,932	9,864	14,796
Residential Low Income Program	23,153	46,306	69,459
Residential Building Practices and Demonstration Program	0	0	0
Energy Audit Program	540	1,080	1,620
Total Lost Sales Accumulated	39,166	78,737	122,811
Lost Delivery Revenue			
Enhanced Home Sealing Incentives	$65,342	$131,857	$230,032
Residential ENERGY STAR® Products Program	$3,983	$10,716	$17,594
ENERGY STAR® Homes Program	$32,434	$65,451	$99,193
Residential Low Income Program	$152,261	$307,252	$465,655
Residential Building Practices and Demonstration Program	$0	$0	$0
Energy Audit Program	$3,551	$7,166	$10,861
Total Lost Revenue	$257,572	$522,441	$823,334
Lost Delivery Revenue per Dth [$/dTh]			
Enhanced Home Sealing Incentives	$ 0.0014	$ 0.0028	$ 0.0048
Residential ENERGY STAR® Products Program	$ 0.0001	$ 0.0002	$ 0.0004
ENERGY STAR® Homes Program	$ 0.0007	$ 0.0014	$ 0.0021
Residential Low Income Program	$ 0.0032	$ 0.0065	$ 0.0098
Residential Building Practices and Demonstration Program	$ -	$ -	$ -
Energy Audit Program	$ 0.0001	$ 0.0002	$ 0.0002
Total Lost Delivery Revenue per dTh [$/dTh]	$ 0.0055	$ 0.0110	$ 0.0173
Gas Rate Impacts - Percentage Increase			
Due to Lost Delivery Revenue	**0.0831%**	**0.1664%**	**0.2587%**
Due to Lost Delivery Revenue + Program Cost	**1.6285%**	**1.6989%**	**1.8632%**
Due to Lost Delivery Revenue + Program Cost + Commodity Cost	**0.5671%**	**0.5990%**	**0.6621%**
Gas Delivery Rate Impact per dTh saved [$/dTh]	**$ 6.5763**	**$ 6.6353**	**$ 6.7041**

KEDLI Non-Residential - Gas Rate Impact of SBC charges

Number of Participants [%]	**as of 2011**
Commercial, Industrial and Multi Family Energy Efficiency Program	1,317
Commercial High-Efficiency Heating and Water Heating Program	700
Building Practices and Demonstration Program	18
Total	2,035
Number of Customers	81,070
Percentage of Participants	
Commercial, Industrial and Multi Family Energy Efficiency Program	1.6240%
Commercial High-Efficiency Heating and Water Heating Program	0.8635%
Building Practices and Demonstration Program	0.0222%
Total	2.5096%

	2009	**2010**	**2011**
Forecasted Average Price (Firm Customers) [$/dTh]:	$16.7331	$16.6510	$16.6675
Forecasted SBC Charge [$/dTh]:	$0.1110	$0.1169	$0.1372
Forecasted Average Price plus SBC [$/dTh]:	$16.8440	$16.7679	$16.8046
	Projected 2009	**Projected 2010**	**Projected 2011**
Projected Delivery Price Without Environmental Programs [$/dTh]:	$4.5314	$4.5796	$4.6297
Projected Commodity Price Without Environmental Programs [$/dTh]:	$12.2016	$12.0715	$12.0378
Projected Average Price without Environmental Programs [$/dTh]:	$16.7331	$16.6510	$16.6675
Total Residential Sales [dTh] - Rate Case	34,528,004	35,922,608	37,272,191
Impacts of Environmental Programs Cost [$/dTh]			
Program Cost			
Commercial, Industrial and Multi Family Energy Efficiency Program	$2,801,299	$2,800,774	$3,025,612
Commercial High-Efficiency Heating and Water Heating Program	$458,212	$458,212	$683,670
Building Practices and Demonstration Program	$210,677	$210,677	$210,729
Total Program Cost	$3,470,188	$3,469,663	$3,920,010
Program Cost per dTh [$/dTh]			
Commercial, Industrial and Multi Family Energy Efficiency Program	$ 0.0811	$ 0.0780	$ 0.0812
Commercial High-Efficiency Heating and Water Heating Program	$ 0.0133	$ 0.0128	$ 0.0183
Building Practices and Demonstration Program	$ 0.0061	$ 0.0059	$ 0.0057
Total Program Cost per dTh [$/dTh]	$ 0.1005	$ 0.0966	$ 0.1052
Projected Delivery Rate Impact			
Commercial, Industrial and Multi Family Energy Efficiency Program	1.7904%	1.7025%	1.7534%
Commercial High-Efficiency Heating and Water Heating Program	0.2929%	0.2785%	0.3962%
Building Practices and Demonstration Program	0.1347%	0.1281%	0.1221%
Total Projected Delivery Price with Environmental Programs	2.2179%	2.1091%	2.2717%
Projected Delivery Rate plus Commodity Impact			
Commercial, Industrial and Multi Family Energy Efficiency Program	0.4849%	0.4682%	0.4870%
Commercial High-Efficiency Heating and Water Heating Program	0.0793%	0.0766%	0.1101%
Building Practices and Demonstration Program	0.0365%	0.0352%	0.0339%
Total Projected Delivery Price with Environmental Programs	0.6006%	0.5801%	0.6310%

Impacts of Projected Lost Delivery Revenue - Collected through Lost Revenue Recovery Mechanism or RDM

Lost Sales [dTh]			
Commercial, Industrial and Multi Family Energy Efficiency Program	57,617	57,617	68,551
Commercial High-Efficiency Heating and Water Heating Program	14,328	14,328	21,492
Building Practices and Demonstration Program	7,836	7,836	7,836
Total Lost Sales	79,782	79,782	97,880
Lost Sales Accumulated [dTh]			
Commercial, Industrial and Multi Family Energy Efficiency Program	57,617	115,234	183,786
Commercial High-Efficiency Heating and Water Heating Program	14,328	28,656	50,148
Building Practices and Demonstration Program	7,836	15,673	23,509
Total Lost Sales Accumulated	79,782	159,563	257,443
Lost Delivery Revenue			
Commercial, Industrial and Multi Family Energy Efficiency Program	$261,089	$527,722	$850,865
Commercial High-Efficiency Heating and Water Heating Program	$64,927	$131,232	$232,168
Building Practices and Demonstration Program	$35,511	$71,775	$108,841
Total Lost Revenue	$361,526	$730,729	$1,191,875
Lost Delivery Revenue per Dth [$/dTh]			
Commercial, Industrial and Multi Family Energy Efficiency Program	$ 0.0076	$ 0.0147	$ 0.0228
Commercial High-Efficiency Heating and Water Heating Program	$ 0.0019	$ 0.0037	$ 0.0062
Building Practices and Demonstration Program	$ 0.0010	$ 0.0020	$ 0.0029
Total Lost Delivery Revenue per dTh [$/dTh]	$ 0.0105	$ 0.0203	$ 0.0320
Gas Rate Impacts - Percentage Increase			
Due to Lost Delivery Revenue	**0.2311%**	**0.4442%**	**0.6907%**
Due to Lost Delivery Revenue + Program Cost	**2.4490%**	**2.5533%**	**2.9624%**
Due to Lost Delivery Revenue + Program Cost + Commodity Cost	**0.6588%**	**0.6973%**	**0.8161%**
Gas Delivery Rate Impact per dTh saved [$/dTh]	**$ 4.5314**	**$ 4.5796**	**$ 4.6297**

Appendix F

APPENDIX F

Sample Status Report

KeySpan Energy Delivery

Energy Efficiency Program - Quarter 2

APPENDIX F - Sample Status Report

Year to Date June 2008[1]

New York

Residential

PROGRAM/INITIATIVE	Program Planning & Administration Expenditures YTD	Program Marketing Expenditures YTD	Customer Incentives Expenditures YTD	Program Implementation Expenditures YTD	Evaluation & Market Research Expenditures YTD	Total Expenditures YTD	2007 - 2008 Budget YTD	Annual 2007 - 2008 Budget	No. of Rebates or Participants YTD	Participant Goal YTD	Annual Participant 2007-2008 Goals	Total Annual Savings (Therms) YTD	Savings Goal YTD	Annual Savings 2007-2008 Goals
Residential														
ENERGY STAR Homes	$4,124	$8,676	$0	$151	$302	$13,253	$131,668	$274,309	0	96	200	0	26,304	54,800
High Efficiency Heating Rebate	$25,159	$87,113	$16,989	($1,660)	$1,844	$129,446	$765,678	$1,595,162	43	720	1,500	7,095	126,000	262,500
High Efficiency Water Heating Rebate	$19,920	$74,312	$6,600	$198	$1,460	$102,491	$131,542	$274,046	33	192	400	2,541	15,168	31,600
Insulation & Air Sealing	$32,370	$111,530	$18,153	$2,121	$2,373	$166,547	$319,705	$666,052	36	240	500	13,248	88,320	184,000
Energy Analysis: Internet Audit Guide	$25,094	$84,329	$0	$17,849	$1,840	$129,111	$15,068	$31,392	2,070	1,200	2,500	N/A	N/A	N/A
Residential Technology Demonstration	$18,951	$65,145	$2,101	$0	$1,246	$87,443	$19,426	$40,471	1	5	10	0	1,680	3,500
Energy Audit/Home Performance	$61,263	$148,510	$24,766	$76,175	$4,491	$315,206	$261,346	$544,470	294	480	1,000	N/A	N/A	N/A
Energy Star Products[2]	$40,447	$149,926	$13,441	$1,327	$2,965	$208,106	$164,605	$342,927	457	2,400	5,000	15,193	180,000	375,000
Total Residential	**$227,326**	**$729,542**	**$82,051**	**$96,161**	**$16,523**	**$1,151,602**	**$1,809,038**	**$3,768,829**	**2,934**	**5,333**	**11,110**	**38,077**	**437,472**	**911,400**

PROGRAM/INITIATIVE	Program Planning & Administration Expenditures YTD	Program Marketing Expenditures YTD	Customer Incentives Expenditures YTD	Program Implementation Expenditures YTD	Evaluation & Market Research Expenditures YTD	Total Expenditures YTD	2007 - 2008 Budget YTD	Annual 2007 - 2008 Budget	No. of Rebates or Participants YTD	Participant Goal YTD	Annual Participant 2007-2008 Goals	Total Annual Savings (Therms) YTD	Savings Goal YTD	Annual Savings 2007-2008 Goals
Low-Income	$706,686	$2,892	$1,490,205	$19,248	$51,809	$2,270,840	$2,823,530	$5,882,354	839	842	1,754	283,582	284,569	592,852
Total Low-Income	**$706,686**	**$2,892**	**$1,490,205**	**$19,248**	**$51,809**	**$2,270,840**	**$2,823,530**	**$5,882,354**	**839**	**842**	**1,754**	**283,582**	**284,569**	**592,852**

Commercial and Multifamily

PROGRAM/INITIATIVE	Program Planning & Administration Expenditures YTD	Program Marketing Expenditures YTD	Customer Incentives Expenditures YTD	Program Implementation Expenditures YTD	Evaluation & Market Research Expenditures YTD	Total Expenditures YTD	2007 - 2008 Budget YTD	Annual 2007 - 2008 Budget	No. of Rebates or Participants YTD	Participant Goal YTD	Annual Participant 2007-2008 Goals	Total Annual Savings (Therms) YTD	Savings Goal YTD	Annual Savings 2007-2008 Goals
Commercial & Industrial														
C&I and Multifamily High Efficiency Heating Rebate	$44,256	$100,186	$8,900	$71,116	$3,245	$227,702	$548,054	$1,141,780	23	192	400	1,100	248,640	518,000
C&I Building Practices & Demonstrations	$4,241	$12,867	$0	$4,403	$311	$21,822	$419,727	$874,432	0	7	14	0	170,587	355,390
Economic Redevelopment	$6,905	$20,629	$0	$7,486	$506	$35,526	$777,756	$1,620,324	0	11	22	0	149,815	312,114
Multi-Family Energy Efficiency	$37,190	$98,887	$52,545	$0	$2,727	$191,348	$1,694,230	$3,529,645	6	188	392	3,021	381,588	794,976
Commercial Energy Efficiency	$14,773	$40,986	$10,960	$4,224	$1,025	$71,968	$1,052,314	$2,192,321	18	431	898	295,692	402,160	837,834
Business Analyzer: Internet Audit	$4,392	$13,732	$0	$2,798	$3,128	$24,050	$155,352	$323,651	60	1,358	2,830	N/A	N/A	N/A
Total C&I	**$111,757**	**$287,286**	**$72,405**	**$90,026**	**$10,941**	**$572,416**	**$4,647,433**	**$9,682,153**	**107**	**2,187**	**4,556**	**299,813**	**1,352,791**	**2,818,314**
On-Bill Financing	**$0**					**$0**	**$320,000**	**$666,667**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
PROGRAM TOTALS	**$1,045,769**	**$1,019,720**	**$1,644,661**	**$205,435**	**$79,273**	**$3,994,858**	**$9,600,001**	**$20,000,003**	**3,880**	**8,362**	**17,420**	**621,472**	**2,074,832**	**4,322,566**

*The credits shown above reflect the sum of charges and corrections from the beginning of the program year.

[1]June YTD includes activity from September 1 through December 31 (Interim Program)

[2]The methodology for capturing participants has changed from per window to per rebate for the windows program within the Energy Star Products program.

Appendix G

APPENDIX G

Determination of Gas Lost Revenue

APPENDIX G

DETERMINATION OF GAS LOST REVENUE

Until such time as the Companies implement a Revenue Decoupling Mechanism approved by the Public Service Commission, the Companies are entitled to recover Lost Revenue arising from the approval of gas energy efficiency programs, as submitted in compliance with Case 07-M-0548 on September 22, 2008 in regard to fast track programs and on August 22, 2008 in regard to one expedited fast track program, pursuant to the Commission's Orders in Case Nos. 06-G-1185 and 06-G-1186. If the approved Revenue Decoupling Mechanism does not apply to every service classification participating in the gas energy efficiency programs, lost revenues will continue to be calculated and recovered from the participating firm service classes not subject to a revenue decoupling mechanism.

The Companies will be allowed to collect Lost Revenue net of the associated deferred New York State and federal income taxes, plus carrying charges at the same rate as the allowance for funds used during construction ("AFUDC"), from customers. The Companies' Lost Revenue will be calculated pursuant to the method set forth in the Joint Proposal for Interim Energy Efficiency Programs, which was adopted by the Commission on July 18, 2007 in Case Nos. 06-G-1185 and 06-G-1186, Order Authorizing Interim Gas Efficiency Programs and Related Deferrals, and further expanded on in the Commission's December 21, 2007 Order Adopting Gas Rate Plans for KeySpan Energy Delivery New York ("KEDNY") and KeySpan Energy Delivery Long Island ("KEDLI"). Such Lost Revenue will be recovered through an increase to the Companies' existing System Benefits Charge for all customers in Service Classification Nos. 1A, 1AR, 1B, 1BR, 1BI, 2-1, 2-2, 3, 4A, 4B, and 7 for KEDNY and Service Classification Nos. 1A, 1AR, 1B, 1BR, 2A, 2B, 3, 15, and 16 for KEDLI upon approval to implement the gas energy efficiency programs.