Attachment 1-1-(a)-2

Bay State Gas

Energy Efficiency Plan

For the period

May 2004 – April 2009

Attachment C-1

Benefit/Cost Analysis Introduction

Introduction

This attachment describes the cost-effectiveness analysis performed for each of the energy efficiency programs proposed by Bay State Gas for implementation during the 5-Year Program Period beginning May 1, 2004 through April 30, 2009. The first section of this attachment is a copy of GDS Associates, Inc.'s ("GDS") "Report for GasNetworks on Benefit/Cost Screening Results for Regional Natural Gas Energy Efficiency Programs". GDS performed the cost-effectiveness analysis for the ten regional energy efficiency programs[1] offered by GasNetworks member utilities, including Bay State Gas. Analysis of the Company-specific[2] energy efficiency programs offered by Bay State Gas was also performed by GDS and the results are summarized in the second section of this attachment.

The cost-effectiveness of the Bay State Gas energy efficiency program portfolio (both regional GasNetworks and Company-specific) is summarized in Table 1. Cost effectiveness results for all programs offered by the Company show an overall portfolio benefit/cost ratio ("BCR") of 2.29.

[1] The ten regional programs analyzed by GDS are: the Residential High Efficiency Heating Rebate Program, the Residential High Efficiency Water Heating Rebate Program, the Residential ENERGY STAR Thermostat Rebate Program, the Residential ENERGY STAR Homes Program, the Residential ENERGY STAR Windows Program, the C&I Infrared Rebate Program, the C&I High Efficiency Heating Rebate Program, the C&I High Efficiency Water Heating Rebate Program, the C&I ENERGY STAR Thermostat Rebate Program, and the C&I Efficient Food Service Equipment Rebate Program.

[2] The company-specific programs are: the Residential Custom Measures Program, the Residential Low Income Measures Program, the C&I Multi Family Custom Measures Program, the Small C&I Customer Measures Program, and the Large C&I Custom Measures Program.

Table C-1

Bay State Gas Energy Efficiency Program Portfolio

Summary of All Benefits vs. Costs and BCRs

Program/Initiative	NPV Total Benefits (2004$)	NPV Total Costs (2004$)	BCR
Residential High Efficiency Heating Rebate	$ 16,919,599	$ 4,725,341	3.58
Residential High Efficiency Water Heating Rebate	$ 463,319	$ 256,046	1.81
Residential ENERGY STAR Thermostat Rebate	$ 1,582,054	$ 446,005	3.55
Residential ENERGY STAR Homes	$ 5,237,131	$ 3,658,794	1.43
Residential ENERGY STAR Windows	$ 6,839,217	$ 1,956,582	3.50
C&I High Efficiency Heating Rebate	$ 901,191	$ 248,028	3.63
C&I High Efficiency Water Heating Rebate	$ 61,328	$ 30,707	2.00
C&I ENERGY STAR Thermostat Rebate	$ 158,205	$ 43,168	3.66
C&I Infrared Rebate	$ 2,321,715	$ 351,799	6.60
C&I Efficient Food Service Equipment Rebate	$ 837,560	$ 241,793	3.46
Total GasNetworks programs	$ 35,321,319	$ 11,958,263	2.95
Residential Weatherization	$ 8,458,629	$ 4,690,602	1.80
Residential Low-Income Single-Family	$ 7,658,258	$ 4,339,965	1.76
C&I Multi-Family	$ 8,533,610	$ 5,108,265	1.67
Small C&I Custom Program	$ 16,815,076	$ 9,310,100	1.81
Large C&I Custom Program	$ 23,540,812	$ 8,433,305	2.79
Total Company-Specific Programs	$ 65,006,385	$ 31,882,237	2.04
MA Building Code Support (Res. and C&I)			N/A
Market Transformation			N/A
Residential Total	$ 47,158,207	$ 20,073,335	2.35
C&I Total	$ 53,169,497	$ 23,767,165	2.24
Total All Programs	$ 100,327,704	$ 43,840,500	2.29

Bay State Gas

Energy Efficiency Plan

For the period

May 2004 – April 2009

Attachment C-2

Benefit/Cost Analysis GasNetworks Programs

Report for

GasNetworks

on

Benefit/Cost Screening Results for Regional Natural Gas Energy Efficiency Programs

March 25, 2004

Final Report

Prepared by

GDS Associates, Inc.
Engineers and Consultants

Table of Contents

1.0 Introduction 1

2.0 Benefit/Cost Results 3
2.1 Benefit/Cost Results for All Programs 3
2.2 Benefit/Cost Tests 5
2.2.1 The Total Resource Test 5
2.2.2 Market Effects of Market Transformation Programs 6
2.3 Process Used to Develop Benefit/Cost Ratios 6
2.3.1 Evolution of GasNetworks Benefit/Cost Screening of Energy Efficiency Programs 6
2.3.2 The Model 7
2.3.3 Development of General Assumptions 7
2.3.4 Preparation of Program Specific Data 8
2.4 Underlying Assumptions 8
2.5 Other Program Effectiveness Issues 10
2.6 Future Considerations for Program Effectiveness Screening 10

Appendix A – Residential Sector Programs – Measure Costs, Savings, Useful Lives

Appendix B – Commercial Sector Programs – Measure Costs, Savings, Useful Lives

Appendix C – Model Input Assumptions for Energy Star Windows

Appendix D – Company Specific Benefit/Cost Ratios for Gas Networks Programs

Appendix E – Calculations of Program Benefit/Cost Ratios with Market Effects

Appendix F – Year-By-Year Benefit/Cost Ratios for GasNetworks Regional Programs

PREFACE

This report provides benefit/cost ratios for all ten regional GasNetworks programs in Massachusetts for the period 2004 to 2008. Benefit/cost ratios have been calculated in accordance with the guidelines established in D.T.E. Docket 98-100. The overall benefit/cost ratio for all ten regional programs combined is shown in Table 1, along with the net present value savings for all ten programs over the study period. The appendices of this report list the key input assumptions for energy efficiency measure costs, savings, and useful lives (and their sources).

GDS Associates would like to thank the following GasNetworks members for their constant support in assisting GDS to complete the benefit/cost analyses included in this report: Matthew Dugan and John Neuhauser (Project Manager) of KeySpan Energy Delivery; Derek Buchler and Marjorie Izzo of Bay State Gas Company; Michael Sommer and Ken Sadlowski of Berkshire Gas Company; Deb Jarvis of Fitchburg Gas and Electric Light Company; Jim Carey of New England Gas Company; and Lisa Shea and Charles Olsson of NSTAR. All GasNetworks members reviewed drafts of this report and provided valuable insights and comments to GDS throughout this project.

Richard F. Spellman
Vice President
GDS Associates
March 25, 2004

Benefit/Cost Screening Results – Final Report
GasNetworks Regional Programs

1.0 Introduction

This report provides the benefit/cost ratios for nine existing and one proposed (Energy Star Windows) GasNetworks regional market transformation (MT) energy efficiency programs. The cost effectiveness analyses presented in this report assume that these programs will continue at least through 2008 and they are implemented in the service areas of GasNetworks member utilities in Massachusetts.[1] This report describes the benefit/cost test[2] used for cost effectiveness screening, the process used to develop benefit/cost ratios, the basis for assumptions common to all programs (e.g., avoided gas and electric costs, real discount rate, general inflation, etc.), and sources for other assumptions underlying the costs and benefits for these ten regional energy efficiency programs. The analysis period for the cost effectiveness analyses of these regional programs starts in program year 2004 and includes annual budget estimates supplied by GasNetworks members for five years. The results of this study for GasNetworks indicate that all of the regional GasNetworks programs are cost effective according to the Total Resource Cost Test, with an overall benefit/cost ratio of 2.88 for the study period. The net present value of program savings for these ten GasNetworks programs for the State of Massachusetts is $104.5 million in 2004 dollars.

The ten GasNetworks regional programs analyzed in this report include the following:

GasNetworks Residential Programs

1. Residential High Efficiency Heating Rebate Program
2. Residential High Efficiency Water Heating Rebate Program
3. Residential ENERGY STAR Homes
4. Residential ENERGY STAR Thermostat Rebate Program
5. Residential ENERGY STAR Windows Program

GasNetworks Commercial Programs

1. C & I High Efficiency Heating Rebate Program
2. C & I High Efficiency Water Heating Rebate Program
3. C & I ENERGY STAR Thermostat Rebate Program

[1] GasNetworks member gas utilities in Massachusetts include Bay State Gas Company, Berkshire Gas Company, Keyspan Energy Delivery, Fitchburg Gas and Electric Light Company, New England Gas, and NSTAR Gas.
[2] The GDS Team has followed the DTE's guidelines for cost effectiveness screening, consistent with the DTE's February 7, 2000 Order in DTE Docket 98-100.

4. Efficient Food Service Equipment Rebate Program
5. C & I Infrared Rebate Program

GDS has worked with GasNetworks' members to complete cost-benefit analyses of the ten regional programs listed above. The benefit/cost analyses have been performed using a GDS Associates benefit/cost screening model. This model is described in further detail in section 2.3.2 of this report, and the output of the model for the GasNetworks regional programs is provided in Table 1 of this report.

2.0 Benefit/Cost Results

This report presents updated information on the cost effectiveness of the ten GasNetworks regional energy efficiency programs, and describes the benefit/cost screening methodology used to develop Total Resource Test benefit/cost ratios. An overview of the information in this report is listed below:

- Section 2.1 presents benefit/cost results for the ten regional programs
- Section 2.2 describes the benefit/cost test used for cost effectiveness screening
- Section 2.3 describes the process used to develop benefit/cost ratios
- Section 2.4 presents information on other underlying assumptions used in the cost effectiveness screening analyses
- Section 2.5 presents a brief discussion of key cost effectiveness issues
- Section 2.6 presents a brief discussion of performance indicators that are integral to tracking progress of market transformation programs but are not accounted for in cost effectiveness tests

2.1 Benefit/Cost Results for All Programs

Table 1 on the next page lists for each GasNetworks regional program (as well as a ratio for all programs combined) the Total Resource Cost (TRC) Test ratio for program years 2004 to 2008. Company-specific benefit/cost ratios for each of the ten GasNetworks programs are provided in Appendix D of this report. The GDS Team has used the GDS benefit/cost spreadsheet model to calculate the benefit/cost ratios. The appendices to this report provide detailed information for the benefit/cost model runs:

- Appendix A provides residential sector measure costs, savings and useful lives.
- Appendix B provides commercial sector measure costs, savings and useful lives.
- Appendix C lists measure costs, savings and useful life assumptions for Energy Star Windows.
- Appendix D provides Company-specific benefit/cost ratios for each of the ten GasNetworks programs.
- Appendix E provides calculations of program benefit/cost ratios for the regional GasNetworks programs with long-term market effects
- Appendix F provides year-by-year benefit-cost ratios for the ten GasNetworks regional programs

TABLE 1 - PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY
GasNetworks Regional Programs in Massachusetts – Program Years 2004 to 2008

	GasNetworks Program	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$24,888,610	$ 94,290,791	$ 69,402,181	2,016,148	211,459,022	3.79
#2	Residential HE Water Heating Program	$ 2,169,326	$ 4,606,888	$ 2,437,562	132,088	11,709,953	2.12
#3	Energy Star Homes Program	$14,296,876	$ 19,902,330	$ 5,605,454	315,005	38,968,103	1.39
#4	Residential Energy Star Thermostat Program	$ 2,543,419	$ 6,979,572	$ 4,436,153	257,884	14,432,451	2.74
#5	Energy Star Windows Program	$ 5,666,484	$ 16,479,826	$ 10,813,342	67,130	10,195,122	2.91
	Residential Sector Subtotals:	**$49,564,716**	**$142,259,407**	**$ 92,694,691**	**2,788,254**	**286,764,651**	**2.87**
#1	Commercial HE Heating Program	$ 3,002,238	$ 4,847,554	$ 1,845,317	94,894	10,890,998	1.61
#2	Commercial HE Water Heating Program	$ 159,947	$ 230,567	$ 70,620	4,223	590,961	1.44
#3	Commercial Energy Star Thermostat Program	$ 110,847	$ 379,424	$ 268,577	12,463	787,658	3.42
#4	HE Cooking Equipment	$ 910,889	$ 2,951,580	$ 2,040,691	82,263	7,283,695	3.24
#5	Infrared Heating Program	$ 1,951,350	$ 9,544,477	$ 7,593,127	189,094	21,439,245	4.89
	C/I Sector Subtotals:	**$ 6,135,272**	**$ 17,953,603**	**$ 11,818,331**	**382,937**	**40,992,557**	**2.93**
	Totals	**$55,699,988**	**$160,213,009**	**$104,513,022**	**3,171,192**	**327,757,208**	**2.88**

2.2 Benefit/Cost Tests

The general costs and benefits that are included in the TRC test are shown in Table 2 below and follow the definitions provided in the DTE Final Guidelines.

Table 2 – Components of Total Resource Test

Benefit/Cost Test Components:	Total Resource Test
Benefits	
Avoided Gas & Electric Costs – Program Participants	X
Avoided Gas & Electric Costs – Market Effects	X
Other Avoided Costs (Water)	X
Other Non Resource Benefits (where quantifiable)	X
Costs	
Energy System Costs	X
Program Participant Costs (In program)	X
Participant Costs due to market effects	X

2.2.1 The Total Resource Test

In general, the benefit categories included in the Total Resource Test, as shown in Table 2, include gas system benefits and other measurable benefits (for example, participant resource benefits, participant non-resource benefits and benefits due to measurable market effects). Where applicable, the benefit/cost analyses include assumptions about monetized savings beyond gas savings (such as electricity savings associated with air conditioning systems in the ENERGY STAR Homes Program and the ENERGY STAR Windows Program). The benefit/cost ratios shown in this report do not include a full range of participant non-resource benefits because such benefits could not be identified and/or quantified. If additional benefits could be identified, program benefit/cost ratios would be higher.[3]

[3] The February 2000 D.T.E 98-100 cost effectiveness guidelines state that participant non-resource benefits shall account for those benefits that are specific to identifiable program participants as well as to people reached in the target markets. Participant non-resource benefits shall include factors such as, but not limited to, (i) reduced costs for operation and maintenance associated with efficient equipment or practices; (ii) the value of longer equipment replacement cycles and/or productivity improvements associated with efficient equipment; (iii) reduced environmental and safety costs, such as those for changes in a waste stream or disposal of lamp ballasts or ozone depleting chemicals; and (iv) reduced disconnections for inability to pay.

Costs used in the Total Resource Test for all programs studied in this report include all program administrator costs[4] and program participant costs[5].

2.2.2 Market Effects of Market Transformation Programs

Market effects have not been included in the initial benefit cost ratio calculations prepared by GDS for this report.

2.3 Process Used to Develop Benefit/Cost Ratios

Listed below is a description of the process used to develop the benefit/cost ratios provided in this report.

2.3.1 Evolution of GasNetworks Benefit/Cost Screening of Energy Efficiency Programs

This report represents the second time that GasNetworks has worked with GDS Associates to conduct regional cost effectiveness analyses of energy efficiency programs. GasNetworks published a similar cost effectiveness report in December 2000. This new report has been preceded by individual gas company filings of benefit/cost information with the Department of Telecommunications and Energy ("DTE"). The prior work completed by individual gas company filings in the late 1990's has provided a strong foundation for this study.

To prepare this report, the GDS Team has followed the DTE's "Guidelines for the Methods and Procedures for the Evaluation and Approval of Energy Efficiency Programs" and calculated benefit/cost ratios for the GasNetworks regional energy efficiency programs. The benefit/cost information provided in Table 1 of this report provides the latest information available on projected program expenditures, savings, value of the savings, and participation.

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[4] The DTE's Guidelines state that "Program Administrator Costs shall include (i) payments to vendors for energy efficient equipment and services; (ii) payments to contractors to plan for and/or install energy efficient equipment; (iii) rebates or incentives paid to program participants or vendors for energy efficient equipment and/or services; (iv) costs to check for proper functioning of and maintenance of equipment installed; (v) costs to market energy efficient equipment and services to customers and to seek participation in Energy Efficiency Programs; and (vi) costs to develop, plan, administer, monitor, and evaluate Energy Efficiency Programs." Shareholder incentives for the Companies' programs have not been included in benefit/cost calculations presented here because cost estimates for these incentives have not been finalized.

[5] Program Participant Costs, according to the DTE Guidelines, include all expenses incurred by program participants as a result of their participation in Energy Efficiency Programs, such as, but not limited to, (i) the net cost of energy efficient equipment; (ii) the cost to plan for and install energy efficient equipment; and (iii) the cost of energy efficiency services, such as inspections for proper equipment functioning.

2.3.2 The Model

2.3.2.1 Overview

The GDS benefit/cost screening Model was developed by GDS over the past three years. The Model has been updated to reflect new assumptions relating to program costs and benefits, the discount rate, the general rate of inflation, avoided electric[6] and gas costs, etc. The updated model is a spreadsheet model that calculates benefit/cost ratios based on assumptions about program costs and benefits. The model runs in an Excel spreadsheet environment. The model has the capability to accept multiple years of program modeling. For the analyses included in this report, utility funding for all programs was assumed to start program year 2004 and to finish five years later. Savings from program measures are counted in the model over the entire useful life of measures. Several Massachusetts utilities have previously filed benefit/cost analyses for their energy efficiency programs with the DTE using the GDS benefit/cost model.

2.3.2.2 Calculation of Costs and Benefits

The definition of costs has been provided previously in this report in footnotes. Benefits are calculated based on the energy savings of program measures and estimates of future gas and electric avoided costs from an August 2003 study prepared for the Avoided Energy Supply Component Study Group.[7] Other non-gas benefits, such as O&M savings, are included where measurable. The GDS Model uses all of this data to calculate the present value of the program benefits and costs, and then calculates ratios of these values to produce benefit/cost ratios for the Total Resource Cost Test. The present value of costs and benefits was calculated over the expected duration of the useful life of the measures installed resulting from the program.

2.3.3 Development of General Assumptions

Working with input developed by the GDS Team and thoroughly reviewed by GasNetworks staff, and using the DTE's February 7, 2000 guidelines, the GDS Team worked with GasNetworks staff to prepare a set of general benefit/cost study assumptions including program start and ending dates, the appropriate discount rate, and gas and electric avoided cost projections.

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[6] Several of the GasNetworks programs save electricity as well as gas. For example, the ENERGY STAR Homes Program and the ENERGY STAR Windows Program save electric air conditioning energy due to the improved thermal characteristics of participating homes.

[7] Avoided-Energy-Supply-Components Study Group, Avoided Energy-Supply Costs For Demand-Side-Management Screening in Massachusetts, Final Report, prepared for the Avoided-Energy-Supply-Component Study Group by ICF Consulting, August 2003.

2.3.4 Preparation of Program Specific Data

The GasNetworks' staff and the GDS Team prepared the following input assumptions for each of the five regional energy efficiency programs:

- Overall market size and number of customers eligible for each program
- Description of energy efficiency measures included in each program
- Measure incremental costs
- Utility costs (including projected rebate levels for 2004 through 2009)
- Participant costs
- Energy impacts (savings) for each measure or program
- Measure life assumptions

Where data specific to GasNetworks were not available, estimates were derived from other technical sources (such as ACEEE, the Joint Management Committee, the Federal Energy Management Program, the California Natural Gas Energy Efficiency Potential Study, and the Lawrence Berkeley Laboratory RESFEN Computer Model), through engineering modeling and building simulation, or from GasNetworks' members' previous experience and knowledge of the technologies under consideration. Documentation of these key input assumptions are provided in the Appendices of this report.

2.4 Underlying Assumptions

Listed below in Table 3 is an overview of the other major assumptions underlying the benefit/cost analyses for the ten GasNetworks programs.

Table 3 - Assumptions List	
CATEGORY	DESCRIPTION
Screening model	The GDS cost effectiveness spreadsheet model
Realization rate	100%, unless noted otherwise
Environmental externalities - reduction of SO_X, NO_X, particulates, and other non-quantified benefits	None
Program costs and rebates (utility budgets)	Provided by the GasNetworks members to GDS in February 2004
Gas and Electric Avoided Costs	Provided in the August 2003 Study prepared for the Avoided Energy Supply Component (AESC) Study Group
General rate of inflation	2.5% per year
Nominal discount rate	4.41%
Measure savings	See Appendices A & B
Measure costs	See Appendices A &B
Measure lives	See Appendices A & B
Program participation and utility budgets	Provided to GDS Associates by GasNetworks members
Duration of utility funding	Programs start in program year 2004 and extend for five years

2.5 Other Program Effectiveness Issues

In addition to collecting cost effectiveness information, GasNetworks has been active in collecting data on the degree to which market transformation programs are removing or reducing market barriers to adoption of energy efficiency practices and technologies.

A major reason for implementing market transformation programs is to permanently move the point at which markets work and to remove market barriers. Many of the program designs proposed by GasNetworks and other regional and national organizations (NEEP, CEE, JMC, etc.) include significant market effects and energy savings from installations of energy efficient equipment during and after the termination of a market transformation program. GasNetworks supports the consideration of long run market effects in program screening analyses to the extent that market effects are measurable. The "base case" GasNetworks cost effectiveness calculations presented in Table 1 in this report do capture gas savings over the useful life of program energy efficiency measures, but they do not include estimates of long run market effects for market transformation programs. For benefit/cost sensitivity analyses including market effects, see Appendix E of this report. In this Appendix, the beneficial market effects impacts of installations of energy efficiency equipment done because of the program (but where gas customers do not apply for gas utility financial incentives) are examined. Four market effects sensitivity analyses are included in Appendix E:

- Market effects equal to 25% of annual "in-program" participation
- Market effects equal to 50% of annual "in-program" participation
- Market effects equal to 75% of annual "in-program" participation
- Market effects equal to 100% of annual "in-program" participation

2.6 Future Considerations for Program Effectiveness Screening

Benefit/cost ratios are not the only measure of the effectiveness of an energy efficiency program. GasNetworks recognizes that a main feature of market transformation programs is their ability to remove or reduce market barriers and to foster regional cooperation among utilities and other market actors. GasNetworks member utilities continue to collect and analyze indicators of market transformation to assess progress with reducing and removing market barriers to energy efficiency.

APPENDIX A

APPENDIX A

GasNetworks Residential Sector Programs - Measure Lives, Costs, Savings - March 25, 2004

Program	Measure Name	Measure Life	Source	Incremental Cost	Source	Annual MMBtu Savings Per Participant or Per Unit	Source
Residential HE Heating Equipment	High Efficiency Gas Furnace (AFUE >= 90%)	20	GasNetworks data response to the GDS Associates Team, Section 1, dated February 13, 2004, and updated subsequently	$400.00	NSTAR 2003 incremental cost study of American Standard and Carrier/Bryant furnace manufacturers wholesale trade-prices.	18.5	American Council for an Energy Efficient Economy, "Integrated Space Conditioning and Water Heating Systems: One System is Often Better Than Two". December 1998
Residential HE Heating Equipment	High Efficiency Gas Hot Water Boiler	20	GasNetworks data response to the GDS Associates Team, Section 1, dated February 13, 2004, and updated subsequently	$500.00	Burnham Trade Price Book #177 effective for January 1, 2003. The incremental costs shown come directly from the price tables. No allowances have been made for preferred pricing extended to KeySpan from Burnham. These prices reflect the incremental cost of equipment at the trade level. Equipment used for analysis was Burnham Series 2 standing pilot boiler and vent damper for Standard Efficiency and Burnham Revolution for high efficiency	14.1	American Council for an Energy Efficient Economy, "Integrated Space Conditioning and Water Heating Systems: One System is Often Better Than Two". December 1998
Residential HE Heating Equipment	High Efficiency Gas Steam Boiler	20	GasNetworks data response to the GDS Associates Team, Section 1, dated February 13, 2004, and updated subsequently	$200.00	Burnham Trade Price Book #177 effective for January 1, 2003. The incremental costs shown come directly from the price tables. No allowances have been made for preferred pricing extended to KeySpan from Burnham. These prices reflect the incremental cost of equipment at the trade level. Equipment used for analysis was Burnham Independance Steam Boiler	14.1	American Council for an Energy Efficient Economy, "Integrated Space Conditioning and Water Heating Systems: One System is Often Better Than Two". December 1998
Residential HE Heating Equipment	ECM 92%	20	ACEEE - 2003 Furnace Fan Study and NSTAR manufacturer incremental pricing comparison study.	$500.00	ACEEE - 2003 Furnace Fan Study and NSTAR manufacturer incremental pricing comparison study.	18.5	ACEEE - 2003 Furnace Fan Study and NSTAR manufacturer incremental pricing comparison study.
Residential HE Water Heating	Indirect Water Heater	20	Gas Networks	$300.00	GasNetworks 2003 Incremental Cost Study of Major Water Heater Manufacturers Wholesale Trade-Prices.	7.9	Annual energy savings are from a RemRATE model run Analysis prepared by Bruce Bennett of GDS. See MS Word documentation prepared by GDS, dated 2-13-2004.
Energy Star Homes	Single Family Home	25	ACEEE report, "Selecting Targets for Market Transformation Programs, A National Analysis", August 1998.	$3,752.00	Joint Management Committee, Energy Star Homes Task D Evaluation Report, prepared by GDS for the JMC, 2003	39.4 mmbtu space heat savings; 272 kwh per year for AC savings	2000 - 2002 DSM Performance Measurement Reports, National Grid, 2000-2002
Energy Star Homes	Multi Family Home	25	ACEEE report, "Selecting Targets for Market Transformation Programs, A National Analysis", August 1998.	$1,860.00	Joint Management Committee, Energy Star Homes Task D Evaluation Report, prepared by GDS for the JMC, 2003	20.9 mmbtu space heat savings; 107 kWh per year for AC savings	2000 - 2002 DSM Performance Measurement Reports, National Grid, 2000-2002
Residential Energy Star Thermostat Program	Programmable thermostat	10	Source: Honeywell Customer Service Center, phone call by Richard Spellman of GDS to Honeywell on 5/4/2000.	$50.00	KeySpan Energy Delivery estimate, provided to GDS on February 13, 2004	4.4	Sources: 1. "Programmable Thermostats; Report to KeySpan Energy Delivery on Energy Savings and Cost Effectiveness", December 2002, prepared by GDS Associates, Inc. 2. Boston Gas Company, May 22, 1996 Filing of Proposed Changes to BGC DSM Programs, DPU-94-109, Exhibit 1, page 2
Energy Star Windows in Massachusetts	Energy Star Windows - The measure data on incremental costs, energy savings and useful life for Energy Star windows are documented in an analysis performed by GDS for KeySpan in October 2003.	35	ACEEE report, "Selecting Targets for Market Transformation Programs, A National Analysis", August 1998, page 60. This data source was supplemented by phone interviews conducted of window manufacturers by GDS in February 2004.	$2 per square foot	"Baseline Characterization of the Residential Market for Energy Star Windows in the Northeast." The study was prepared for NEEP by Quantec LLC and Nexus Market Research in October of 2002. Table V.10 on page V-11.	1.96 mmbtu (gas heat savings) and 126 kwh (electric cooling savings) per household per year for 10 Energy Star windows, each window being 10 square feet in size	The annual Mmbtu savings per window are based on a REM/rate analysis conducted by GDS on March 12, 2004. This analysis assumes that the program participant is already in the market and shopping for windows, and due to the program, buys Energy Star windows instead of standard efficiency windows. The analysis examines savings in a small home (1700 sf), a medium size home (2200 sf), and a large home (4300 sf). Heating and cooling degree days for this analysis are based on Boston, Massachusetts.

APPENDIX B

APPENDIX B

GasNetworks Residential Sector Programs - Measure Lives, Costs, Savings - March 25, 2004

Program	Measure Name	Measure Life	Source	Incremental Cost	Source	Annual MMBtu Savings Per Participant or Per Unit of Installation	Source
Commercial High Efficiency Heating Equipment Program	Gas Furnace	20	GasNetworks data response to the GDS Associates Team, Section 1, dated February 13, 2004, and updated subsequently	$400.00	NSTAR 2003 incremental cost study of American Standard and Carrier/Bryant furnace manufacturers wholesale trade-prices.	18.5	American Council for an Energy Efficient Economy, "Integrated Space Conditioning and Water Heating Systems: One System is Often Better Than Two". December 1998
Commercial High Efficiency Heating Equipment Program	Hot Water (Hydronic) Boiler	20	GasNetworks data response to the GDS Associates Team, Section 1, dated February 13, 2004, and updated subsequently	$500.00	Burnham Trade Price Book #177 effective for January 1, 2003. The incremental costs shown come directly from the price tables. No allowances have been made for preferred pricing extended to KeySpan from Burnham. These prices reflect the incremental cost of equipment at the trade level. Equipment used for analysis was Burnham Series 2 standing pilot boiler and vent damper for Standard Efficiency and Burnham Revolution for high efficiency	14.1	American Council for an Energy Efficient Economy, "Integrated Space Conditioning and Water Heating Systems: One System is Often Better Than Two". December 1998
Commercial High Efficiency Heating Equipment Program	Steam Boiler	20	GasNetworks data response to the GDS Associates Team, Section 1, dated February 13, 2004, and updated subsequently	$200.00	Burnham Trade Price Book #177 effective for January 1, 2003. The incremental costs shown come directly from the price tables. No allowances have been made for preferred pricing extended to KeySpan from Burnham. These prices reflect the incremental cost of equipment at the trade level. Equipment used for analysis was Burnham Independance Steam Boiler	14.1	American Council for an Energy Efficient Economy, "Integrated Space Conditioning and Water Heating Systems: One System is Often Better Than Two". December 1998
Commercial High Efficiency Heating Equipment Program	ECM 92%	20	ACEEE - 2003 Furnace Fan Study and NSTAR manufacturer incremental pricing comparison study.	$500.00	ACEEE - 2003 Furnace Fan Study and NSTAR manufacturer incremental pricing comparison study.	18.5	ACEEE - 2003 Furnace Fan Study and NSTAR manufacturer incremental pricing comparison study.
Commercial HE Water Heating Program	Indirect Fired Water Heaters	20	Gas Networks	$300.00	GasNetworks 2003 Incremental Cost Study of Major Water Heater Manufacturers Wholesale Trade-Prices.	7.9	American Council for an Energy Efficient Economy, "Integrated Space Conditioning and Water Heating Systems: One System is Often Better Than Two". December 1998
Commercial Energy Star Thermostat Program	Programmable thermostat	10	Source: Honeywell Customer Service Center, phone call by Richard Spellman of GDS to Honeywell on 5/4/2000.	$50.00	KeySpan Energy Delivery estimate, provided to GDS on February 13, 2004	4.4	Sources: 1. "Programmable Thermostats; Report to KeySpan Energy Delivery on Energy Savings and Cost Effectiveness", December 2002, prepared by GDS Associates, Inc. 2. Boston Gas Company, May 22, 1996 Filing of Proposed Changes to BGC DSM Programs, DPU 94-109, Exhibit 1, page 2
Food Service Equipment Program	1 Bay Fryer	15	ACEEE report, "Selecting Targets for Market Transformation Programs, A National Analysis", August 1998.	$600.00	This estimate was obtained by GDS from GasNetworks in a teleconference on February 13, 2004 with GasNetworks members and GDS.	36.5	Federal Energy Management Program (FEMP); http://www.eere.energy.gov/femp/procurement/gas_fryers.html
Food Service Equipment Program	2 Bay Fryer	15	10-14 years is the suggested life expectancy of gas fired fryers in the 2003 California Statewide Commercial Sector Natural Gas Energy Efficiency Potential Study (Final Report-Volume 2 Appendices).	$1,000.00	This estimate was obtained by GDS from GasNetworks in a teleconference on February 13, 2004 with GasNetworks members and GDS.	55.9	Federal Energy Management Program (FEMP); http://www.eere.energy.gov/femp/procurement/gas_fryers.html
Commercial Infrared Heating Equipment Program	Infrared Heaters	20	ACEEE report, "Selecting Targets for Market Transformation Programs, A National Analysis", August 1998.	$1,000.00	Baystate Gas Database	74.8	KeySpan Energy Delivery

APPENDIX C

APPENDIX C

GasNetworks Residential Sector Programs - Measure Lives, Costs, Savings - March 25, 2004		
Step	**Assumptions & BCRs for Energy Star Windows Program –3-25-2004**	**Run 1**
		Current Program
1	Use latest natural gas avoided costs for Northern and Central New England (published August 21, 2003)?	YES
2	This is a forward looking analysis for this program. Base the model run on 2004 to 2008 budgets and participants?	YES
3	Average useful life of Energy Star Window	35 yrs.
4	Incremental cost of an Energy Star Window from Table V.10 of the October 23, 2002 report titled "Baseline Characterization of the Residential Market for Energy Star Windows in the Northeast (page V-11).	$2 per square foot
5	Average square footage of glazing for a 2000 square foot home in Massachusetts	300
6	Size of average window (in square feet)	10
7	Number of existing windows assumed for the base case home	30
8	Number of windows purchased per participant	10
9	Annual mmbtu savings per household for gas space heat for installation of 10 Energy Star windows - from REM/rate model runs of March 12, 2004 and based on heating and cooling degree days in Boston, Mass.	1.96
10	Annual kWh per household for electric air conditioning for installation of 10 Energy Star windows - from REM/rate model runs of March 12, 2004 and based on heating and cooling degree days in Boston, Mass.	42
11	Rebate amount per window	$10 per window
12	Total square footage of Energy Star windows installed (10 windows per home)	100

Prepared by - GDS Associates, Inc. - March 12, 2004

APPENDIX D

APPENDIX D - PAGE 1

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY

BayState Gas Programs in Massachusetts - Program Years 2004 to 2008

	BayState Program	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 4,725,341.03	$ 16,919,599.13	$ 37,953,000.00	356,800	37,953,000	3.58
#2	Residential HE Water Heating Program	$ 256,045.58	$ 463,318.89	$ 1,185,000.00	9,480	1,185,000	1.81
#3	Energy Star Homes Program	$ 3,658,794.42	$ 5,237,131.32	$ 11,303,020.23	67,341	10,278,065	1.43
#4	Residential Energy Star Thermostat Program	$ 446,004.53	$ 1,582,053.87	$ 3,300,000.00	44,000	3,300,000	3.55
#5	Energy Star Windows Program	$ 1,956,581.70	$ 6,839,217.46	$ 4,212,040.00	19,600	4,212,040	3.50
	Residential Sector Subtotals:	**$ 11,042,767.25**	**$ 31,041,320.67**	**$ 57,953,060.23**	**497,221**	**56,928,105**	**2.81**
#1	Commercial HE Heating Program	$ 248,027.67	$ 901,190.64	$ 2,037,800.00	12,290	2,037,800	3.63
#2	Commercial HE Water Heating Program	$ 30,707.19	$ 61,328.46	$ 158,000.00	790	158,000	2.00
#3	Commercial Energy Star Thermostat Program	$ 43,168.31	$ 158,205.39	$ 330,000.00	4,400	330,000	3.66
#4	HE Cooking Equipment	$ 241,793.02	$ 837,559.58	$ 2,079,000.00	18,480	2,079,000	3.46
#5	Infrared Heating Program	$ 351,798.75	$ 2,321,714.84	$ 5,236,000.00	37,400	5,236,000	6.60
	C/I Sector Subtotals:	**$ 915,494.94**	**$ 4,279,998.90**	**$ 9,840,800.00**	**73,360**	**9,840,800**	**4.68**
	Totals:	**$ 11,958,262.19**	**$ 35,321,319.57**	**$ 67,793,860.23**	**570,581**	**66,768,905**	**2.95**

APPENDIX D - PAGE 2

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY

Berkshire Gas Programs in Massachusetts - Program Years 2004 to 2008

	Berkshire Program	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 800,162.10	$ 2,276,061.39	$ 1,475,899.29	47,800	5,106,000	2.84
#2	Residential HE Water Heating Program	$ 107,837.22	$ 165,306.24	$ 57,469.02	3,555	421,860	1.53
#3	Energy Star Homes Program	$ 1,028,285.76	$ 1,524,208.55	$ 495,922.79	19,580	2,991,345	1.48
#4	Residential Energy Star Thermostat Program	$ 129,749.24	$ 468,413.46	$ 338,664.22	17,600	968,000	3.61
#5	Energy Star Windows Program	$ 84,761.15	$ 280,330.42	$ 195,569.27	490	171,500	3.31
	Residential Sector Subtotals:	**$ 2,150,795.47**	**$ 4,714,320.06**	**$ 2,563,524.59**	**89,025**	**9,658,705**	**2.19**
#1	Commercial HE Heating Program	$ 223,434.11	$ 529,318.21	$ 305,884.10	6,317	1,199,100	2.37
#2	Commercial HE Water Heating Program	$ 38,878.26	$ 45,809.93	$ 6,931.67	395	118,500	1.18
#3	Commercial Energy Star Thermostat Program	$ 27,228.19	$ 79,306.33	$ 52,078.14	2,420	165,000	2.91
#4	HE Cooking Equipment	$ 82,981.43	$ 207,112.68	$ 124,131.24	2,310	519,750	2.50
#5	Infrared Heating Program	$ 251,873.32	$ 1,160,857.42	$ 908,984.10	18,700	2,618,000	4.61
	C/I Sector Subtotals:	**$ 624,395.32**	**$ 2,022,404.57**	**$ 1,398,009.24**	**30,142**	**4,620,350**	**3.24**
	Totals:	**$ 2,775,190.79**	**$ 6,736,724.63**	**$ 3,961,533.84**	**119,167**	**14,279,055**	**2.43**

APPENDIX D - PAGE 3

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY

FG&E Gas Programs in Massachusetts - Program Years 2004 to 2008

	FG&E Programs	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 170,556.07	$ 349,293.00	$ 178,736.93	7,824	782,400	2.05
#2	Residential HE Water Heating Program	$ 21,996.71	$ 74,488.94	$ 52,492.22	1,896	189,600	3.39
#3	Energy Star Homes Program	$ -	$ -	$ -	0	0	N/A
#4	Residential Energy Star Thermostat Program	$ -	$ -	$ -	0	0	N/A
#5	Energy Star Windows Program	$ 26,603.69	$ 74,962.06	$ 48,358.37	0	46,060	2.82
	Residential Sector Subtotals:	**$ 219,156.47**	**$ 498,744.00**	**$ 279,587.53**	**9,720**	**1,018,060**	**2.28**
#1	Commercial HE Heating Program	$ -	$ -	$ -	0	0	N/A
#2	Commercial HE Water Heating Program	$ -	$ -	$ -	0	0	N/A
#3	Commercial Energy Star Thermostat Program	$ -	$ -	$ -	0	0	N/A
#4	HE Cooking Equipment	$ -	$ -	$ -	0	0	N/A
#5	Infrared Heating Program	$ -	$ -	$ -	0	0	N/A
	C/I Sector Subtotals:	**$ -**	**$ -**	**$ -**	**0**	**0**	**N/A**
	Totals:	**$ 219,156.47**	**$ 498,744.00**	**$ 279,587.53**	**9,720**	**1,018,060**	**2.28**

APPENDIX D - PAGE 4							
PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY							
KeySpan Gas Programs in Massachusetts - Program Years 2004 to 2008							
	KeySpan Program	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 14,745,751.52	$ 60,557,250.40	$ 45,811,498.87	1,304,000	135,792,000	4.11
#2	Residential HE Water Heating Program	$ 1,371,282.56	$ 2,874,688.70	$ 1,503,406.14	51,350	7,347,000	2.10
#3	Energy Star Homes Program	$ 5,854,883.72	$ 7,926,211.90	$ 2,071,328.18	123,925	15,490,625	1.35
#4	Residential Energy Star Thermostat Program	$ 1,002,879.05	$ 1,869,487.52	$ 866,608.47	77,000	3,850,000	1.86
#5	Energy Star Windows Program	$ 2,998,298.19	$ 7,571,869.23	$ 4,573,571.04	39,200	4,704,000	2.53
	Residential Sector Subtotals:	**$ 25,973,095.04**	**$ 80,799,507.75**	**$ 54,826,412.71**	**1,595,475**	**167,183,625**	**3.11**
#1	Commercial HE Heating Program	$ 2,063,196.76	$ 2,301,833.72	$ 238,636.96	51,560	5,156,000	1.12
#2	Commercial HE Water Heating Program	$ 34,463.20	$ 46,555.58	$ 12,092.39	1,185	118,500	1.35
#3	Commercial Energy Star Thermostat Program	$ -	$ -	$ -	0	0	N/A
#4	HE Cooking Equipment	$ 413,558.37	$ 1,411,114.09	$ 997,555.72	46,200	3,465,000	3.41
#5	Infrared Heating Program	$ 827,116.74	$ 3,339,355.36	$ 2,512,238.62	74,800	7,480,000	4.04
	C/I Sector Subtotals:	**$ 3,338,335.08**	**$ 7,098,858.75**	**$ 3,760,523.68**	**173,745**	**16,219,500**	**2.13**
	Totals:	**$ 29,311,430.11**	**$ 87,898,366.50**	**$ 58,586,936.39**	**1,769,220**	**183,403,125**	**3.00**

APPENDIX D - PAGE 5

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY

NEGC - Fall River Gas Programs in Massachusetts - Program Years 2004 to 2008

	NEGC - Fall River Programs	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 318,170.83	$ 908,707.96	$ 590,537.13	21,199	2,032,500	2.86
#2	Residential HE Water Heating Program	$ 63,029.25	$ 104,114.25	$ 41,084.99	2,528	265,440	1.65
#3	Energy Star Homes Program	$ 515,022.71	$ 761,928.08	$ 246,905.37	12,393	1,487,100	1.48
#4	Residential Energy Star Thermostat Program	$ 29,678.80	$ 106,827.86	$ 77,149.05	4,400	220,000	3.60
#5	Energy Star Windows Program	$ 140,459.90	$ 460,598.98	$ 320,139.08	1,960	284,912	3.28
	Residential Sector Subtotals:	**$ 1,066,361.50**	**$ 2,342,177.13**	**$ 1,275,815.63**	**42,480**	**4,289,952**	**2.20**
#1	Commercial HE Heating Program	$ 113,966.67	$ 333,894.56	$ 219,927.89	8,000	746,080	2.93
#2	Commercial HE Water Heating Program	$ 6,191.38	$ 10,510.03	$ 4,318.66	237	26,860	1.70
#3	Commercial Energy Star Thermostat Program	$ 7,427.10	$ 26,706.96	$ 19,279.86	1,100	55,000	3.60
#4	HE Cooking Equipment	$ 44,531.49	$ 141,111.41	$ 96,579.92	4,620	346,500	3.17
#5	Infrared Heating Program	$ 55,532.25	$ 333,935.54	$ 278,403.28	7,480	748,000	6.01
	C/I Sector Subtotals:	**$ 227,648.89**	**$ 846,158.50**	**$ 618,509.61**	**21,437**	**1,922,440**	**3.72**
	Totals:	**$ 1,294,010.39**	**$ 3,188,335.63**	**$ 1,894,325.25**	**63,917**	**6,212,392**	**2.46**

APPENDIX D - PAGE 6							
PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY							
NEGC - North Attleboro Gas Programs in Massachusetts - Program Years 2004 to 2008							
	NEGC - North Attleboro Programs	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 59,896.34	$ 175,807.24	$ 115,910.90	3,938	393,800	2.94
#2	Residential HE Water Heating Program	$ 43,305.08	$ 46,555.58	$ 3,250.51	1,185	118,500	1.08
#3	Energy Star Homes Program	$ 32,823.77	$ 47,557.14	$ 14,733.37	744	92,944	1.45
#4	Residential Energy Star Thermostat Program	$ 13,457.64	$ 38,458.03	$ 25,000.39	1,584	79,200	2.86
#5	Energy Star Windows Program	$ 28,004.60	$ 69,089.85	$ 41,085.25	294	42,737	2.47
	Residential Sector Subtotals:	**$ 177,487.43**	**$ 377,467.84**	**$ 199,980.40**	**7,745**	**727,181**	**2.13**
#1	Commercial HE Heating Program	$ 54,672.42	$ 173,842.91	$ 119,170.49	3,894	389,400	3.18
#2	Commercial HE Water Heating Program	$ 10,178.17	$ 15,518.53	$ 5,340.35	395	39,500	1.52
#3	Commercial Energy Star Thermostat Program	$ 8,119.75	$ 27,775.24	$ 19,655.49	1,144	57,200	3.42
#4	HE Cooking Equipment	$ 9,433.20	$ 28,222.28	$ 18,789.09	924	69,300	2.99
#5	Infrared Heating Program	$ 35,295.22	$ 200,361.32	$ 165,066.10	4,488	448,800	5.68
	C/I Sector Subtotals:	**$ 117,698.76**	**$ 445,720.29**	**$ 328,021.53**	**10,845**	**1,004,200**	**3.79**
	Totals:	**$ 295,186.19**	**$ 823,188.12**	**$ 528,001.93**	**18,590**	**1,731,381**	**2.79**

APPENDIX D - PAGE 7

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY

NSTAR Gas Programs in Massachusetts - Program Years 2004 to 2008

	NSTAR Programs	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 4,068,732.30	$ 13,104,072.31	$ 9,035,340.01	274,587	29,399,322	3.22
#2	Residential HE Water Heating Program	$ 306,614.42	$ 447,156.16	$ 140,541.74	10,744	1,139,753	1.46
#3	Residential Energy Star Thermostat Program	$ 921,862.68	$ 2,914,331.04	$ 1,992,468.36	113,300	6,015,251	3.16
#4	Energy Star Homes Program	$ 3,351,007.49	$ 4,405,291.80	$ 1,054,284.31	62,458	8,628,025	1.31
#5	Energy Star Windows Program	$ 437,789.34	$ 1,252,847.79	$ 815,058.45	5,880	776,610	2.86
	Residential Sector Subtotals:	**$ 9,086,006.24**	**$ 22,123,699.11**	**$ 13,037,692.87**	**466,969**	**45,958,960**	**2.43**
#1	Commercial HE Heating Program	$ 298,939.93	$ 607,474.20	$ 308,534.27	12,833	1,362,618	2.03
#2	Commercial HE Water Heating Program	$ 39,766.81	$ 50,844.89	$ 11,078.08	1,221	129,601	1.28
#3	Commercial Energy Star Thermostat Program	$ 25,038.25	$ 87,429.93	$ 62,391.68	3,399	180,458	3.49
#4	HE Cooking Equipment	$ 118,523.38	$ 326,459.72	$ 207,936.34	9,702	804,145	2.75
#5	Infrared Heating Program	$ 429,477.87	$ 2,188,252.82	$ 1,758,774.95	46,226	4,908,445	5.10
	C/I Sector Subtotals:	**$ 911,746.23**	**$ 3,260,461.56**	**$ 2,348,715.33**	**73,380**	**7,385,267**	**3.58**
	Totals:	**$ 9,997,752.47**	**$ 25,384,160.66**	**$ 15,386,408.20**	**540,349**	**53,344,227**	**2.54**

APPENDIX E

APPENDIX E - PAGE 1

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY WITH MARKET EFFECTS

GasNetworks Regional Programs in Massachusetts - 25% Market Effects Each Year

	GasNetworks Program	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 33,231,909.21	$ 206,498,782.43	$ 173,266,873.22	2,520,185	553,943,237	6.21
#2	Residential HE Water Heating Program	$ 3,209,939.20	$ 14,122,920.00	$ 10,912,980.80	165,110	45,062,173	4.40
#3	Energy Star Homes Program	$ 19,709,028.24	$ 49,723,196.56	$ 30,014,168.32	358,050	124,900,177	2.52
#4	Residential Energy Star Thermostat Program	$ 3,151,377.16	$ 18,974,896.13	$ 15,823,518.97	322,355	50,213,856	6.02
#5	Energy Star Windows Program	$ 7,087,576.59	$ 24,256,596.45	$ 17,169,019.86	83,913	16,085,779	3.42
	Residential Sector Subtotals:	**$ 66,389,830.41**	**$ 313,576,391.57**	**$ 247,186,561.16**	**3,449,613**	**790,205,221**	**4.72**
#1	Commercial HE Heating Program	$ 3,525,017.00	$ 12,589,967.18	$ 9,064,950.18	118,617	34,851,675	3.57
#2	Commercial HE Water Heating Program	$ 193,213.38	$ 534,773.13	$ 341,559.75	5,278	1,657,155	2.77
#3	Commercial Energy Star Thermostat Program	$ 140,228.28	$ 959,133.06	$ 818,904.78	15,579	1,457,544	6.84
#4	HE Cooking Equipment	$ 1,206,310.47	$ 7,696,095.02	$ 6,489,784.55	102,795	15,610,090	6.38
#5	Infrared Heating Program	$ 2,475,806.11	$ 24,972,749.68	$ 22,496,943.56	236,638	37,039,533	10.09
	C/I Sector Subtotals:	**$ 7,540,575.25**	**$ 46,752,718.07**	**$ 39,212,142.82**	**478,907**	**90,615,997**	**6.20**
	Totals	**$ 73,930,405.66**	**$ 360,329,109.65**	**$ 286,398,703.98**	**3,928,520**	**880,821,218**	**4.87**

APPENDIX E - PAGE 2

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY WITH MARKET EFFECTS

GasNetworks Regional Programs in Massachusetts - 50% Market Effects Each Year

	GasNetworks Program	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 41,575,208.23	$ 318,706,773.44	$ 277,131,565.21	3,024,221	896,427,451	7.67
#2	Residential HE Water Heating Program	$ 4,250,552.27	$ 23,638,952.35	$ 19,388,400.07	198,132	78,414,393	5.56
#3	Energy Star Homes Program	$ 25,121,180.29	$ 79,544,063.33	$ 54,422,883.04	429,660	210,832,250	3.17
#4	Residential Energy Star Thermostat Program	$ 3,759,335.01	$ 30,970,220.48	$ 27,210,885.47	386,826	85,995,261	8.24
#5	Energy Star Windows Program	$ 8,508,669.00	$ 37,245,034.20	$ 28,736,365.20	100,695	21,976,437	4.38
	Residential Sector Subtotals:	**$ 83,214,944.80**	**$ 490,105,043.80**	**$ 406,890,099.00**	**4,139,534**	**1,293,645,791**	**5.89**
#1	Commercial HE Heating Program	$ 4,047,796.45	$ 20,332,380.13	$ 16,284,583.69	142,341	58,812,352	5.02
#2	Commercial HE Water Heating Program	$ 226,479.39	$ 838,978.83	$ 612,499.44	6,334	2,723,349	3.70
#3	Commercial Energy Star Thermostat Program	$ 169,609.62	$ 1,538,842.26	$ 1,369,232.64	18,695	2,127,430	9.07
#4	HE Cooking Equipment	$ 1,501,731.73	$ 12,440,610.29	$ 10,938,878.56	123,354	23,936,485	8.28
#5	Infrared Heating Program	$ 3,000,261.82	$ 40,401,022.06	$ 37,400,760.24	283,642	52,639,821	13.47
	C/I Sector Subtotals:	**$ 8,945,879.01**	**$ 75,551,833.58**	**$ 66,605,954.57**	**574,366**	**140,239,437**	**8.45**
	Totals	**$ 92,160,823.81**	**$ 565,656,877.38**	**$ 473,496,053.57**	**4,713,900**	**1,433,885,229**	**6.14**

APPENDIX E - PAGE 3

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY WITH MARKET EFFECTS

GasNetworks Regional Programs in Massachusetts - 75% Market Effects Each Year

	GasNetworks Program	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 49,918,507.24	$ 430,914,764.44	$ 380,996,257.19	3,528,258	1,238,911,666	8.63
#2	Residential HE Water Heating Program	$ 5,291,165.34	$ 33,154,984.69	$ 27,863,819.35	231,154	111,766,613	6.27
#3	Energy Star Homes Program	$ 30,533,332.35	$ 109,364,930.11	$ 78,831,597.76	501,270	296,764,324	3.58
#4	Residential Energy Star Thermostat Program	$ 4,367,292.86	$ 42,965,544.84	$ 38,598,251.98	451,297	121,776,666	9.84
#5	Energy Star Windows Program	$ 9,929,761.40	$ 47,627,638.32	$ 37,697,876.92	117,478	27,867,094	4.80
	Residential Sector Subtotals:	**$ 100,040,059.19**	**$ 664,027,862.40**	**$ 563,987,803.20**	**4,829,457**	**1,797,086,362**	**6.64**
#1	Commercial HE Heating Program	$ 4,570,575.89	$ 28,074,793.08	$ 23,504,217.20	166,064	82,773,029	6.14
#2	Commercial HE Water Heating Program	$ 259,745.40	$ 1,143,184.53	$ 883,439.13	7,389	3,789,543	4.40
#3	Commercial Energy Star Thermostat Program	$ 198,990.97	$ 2,118,551.46	$ 1,919,560.49	21,810	2,797,316	10.65
#4	HE Cooking Equipment	$ 1,797,152.98	$ 17,185,125.56	$ 15,387,972.58	143,913	32,262,880	9.56
#5	Infrared Heating Program	$ 3,524,717.53	$ 55,829,294.45	$ 52,304,576.92	330,915	68,240,109	15.84
	C/I Sector Subtotals:	**$ 10,351,182.77**	**$ 104,350,949.09**	**$ 93,999,766.32**	**670,091**	**189,862,877**	**10.08**
	Totals	**$ 110,391,241.96**	**$ 768,378,811.48**	**$ 657,987,569.52**	**5,499,548**	**1,986,949,239**	**6.96**

APPENDIX E - PAGE 4

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY WITH MARKET EFFECTS

GasNetworks Regional Programs in Massachusetts - 100% Market Effects Each Year

	GasNetworks Program	PV of Program Costs	PV of Program Benefits	NPV Savings	First Year therms Saved	Lifetime therms Saved	B/C Ratio
#1	Residential HE Heating Equipment	$ 58,261,806.26	$ 543,122,755.44	$ 484,860,949.18	4,032,295	1,581,395,880	9.32
#2	Residential HE Water Heating Program	$ 6,331,778.40	$ 42,671,017.03	$ 36,339,238.63	264,176	145,118,833	6.74
#3	Energy Star Homes Program	$ 35,945,484.40	$ 139,185,796.88	$ 103,240,312.48	572,880	382,696,397	3.87
#4	Residential Energy Star Thermostat Program	$ 4,975,250.72	$ 54,960,869.20	$ 49,985,618.48	515,768	157,558,071	11.05
#5	Energy Star Windows Program	$ 11,350,853.81	$ 58,010,242.45	$ 46,659,388.64	134,260	33,757,752	5.11
	Residential Sector Subtotals:	**$ 116,865,173.59**	**$ 837,950,681.00**	**$ 721,085,507.41**	**5,519,379**	**2,300,526,932**	**7.17**
#1	Commercial HE Heating Program	$ 5,093,355.33	$ 35,817,206.03	$ 30,723,850.71	189,788	106,733,706	7.03
#2	Commercial HE Water Heating Program	$ 293,011.41	$ 1,447,390.23	$ 1,154,378.82	8,445	4,855,737	4.94
#3	Commercial Energy Star Thermostat Program	$ 228,372.31	$ 2,698,260.66	$ 2,469,888.35	24,926	3,467,203	11.82
#4	HE Cooking Equipment	$ 2,092,574.23	$ 21,929,640.83	$ 19,837,066.60	164,472	40,589,275	10.48
#5	Infrared Heating Program	$ 4,049,173.24	$ 71,257,566.84	$ 67,208,393.60	378,189	83,840,397	17.60
	C/I Sector Subtotals:	**$ 11,756,486.52**	**$ 133,150,064.59**	**$ 121,393,578.07**	**765,820**	**239,486,317**	**11.33**
	Totals	**$ 128,621,660.11**	**$ 971,100,745.59**	**$ 842,479,085.48**	**6,285,199**	**2,540,013,250**	**7.55**

APPENDIX F

APPENDIX F - PAGE 1

YEAR BY YEAR PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY						
GasNetworks Regional Programs in Massachusetts						
	GasNetworks Program	**2004**	**2005**	**2006**	**2007**	**2008**
#1	Residential HE Heating Equipment	3.54	3.63	3.77	3.95	4.11
#2	Residential HE Water Heating Program	3.90	1.76	1.80	1.92	1.98
#3	Energy Star Homes Program	1.33	1.36	1.39	1.42	1.46
#4	Residential Energy Star Thermostat Program	2.61	2.63	2.66	2.88	2.96
#5	Energy Star Windows Program	2.63	2.79	2.93	3.02	3.13
	Residential Sector Subtotals:	**2.78**	**2.75**	**2.84**	**2.95**	**3.05**
#1	Commercial HE Heating Program	1.44	1.52	1.60	1.73	1.81
#2	Commercial HE Water Heating Program	1.26	1.29	1.36	1.58	1.67
#3	Commercial Energy Star Thermostat Program	3.13	3.20	3.29	3.69	3.79
#4	HE Cooking Equipment	3.18	3.19	3.22	3.26	3.34
#5	Infrared Heating Program	4.45	4.73	4.91	5.08	5.30
	C/I Sector Subtotals:	**2.67**	**2.79**	**2.90**	**3.08**	**3.19**
	Totals	**2.76**	**2.75**	**2.85**	**2.96**	**3.06**

APPENDIX F - PAGE 2

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY					
GasNetworks Regional Programs in Massachusetts - Program Year 2004					
	GasNetworks Program	PV of Program Costs	PV of Program Benefits	NPV Savings	B/C Ratio
#1	Residential HE Heating Equipment	$ 5,360,534.13	$ 18,958,641.00	$ 13,598,106.87	3.54
#2	Residential HE Water Heating Program	$ 280,374.96	$ 1,094,046.59	$ 813,671.63	3.90
#3	Energy Star Homes Program	$ 2,885,753.52	$ 3,841,421.72	$ 955,668.20	1.33
#4	Residential Energy Star Thermostat Program	$ 520,993.33	$ 1,361,607.18	$ 840,613.85	2.61
#5	Energy Star Windows Program	$ 1,025,027.07	$ 2,697,023.63	$ 1,671,996.55	2.63
	Residential Sector Subtotals:	**$ 10,072,683.01**	**$ 27,952,740.12**	**$ 17,880,057.11**	**2.78**
#1	Commercial HE Heating Program	$ 621,732.01	$ 892,324.00	$ 270,592.00	1.44
#2	Commercial HE Water Heating Program	$ 27,741.79	$ 34,974.16	$ 7,232.37	1.26
#3	Commercial Energy Star Thermostat Program	$ 21,044.92	$ 65,803.66	$ 44,758.73	3.13
#4	HE Cooking Equipment	$ 169,304.28	$ 538,247.07	$ 368,942.79	3.18
#5	Infrared Heating Program	$ 399,589.56	$ 1,778,130.13	$ 1,378,540.57	4.45
	C/I Sector Subtotals:	**$ 1,239,412.55**	**$ 3,309,479.01**	**$ 2,070,066.46**	**2.67**
	Totals	**$ 11,312,095.56**	**$ 31,262,219.13**	**$ 19,950,123.57**	**2.76**

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY					
GasNetworks Regional Programs in Massachusetts - Program Year 2005					
	GasNetworks Program	**PV of Program Costs**	**PV of Program Benefits**	**NPV Savings**	**B/C Ratio**
#1	Residential HE Heating Equipment	$ 5,120,487.24	$ 18,574,071.05	$ 13,453,583.81	3.63
#2	Residential HE Water Heating Program	$ 502,476.78	$ 885,759.54	$ 383,282.76	1.76
#3	Energy Star Homes Program	$ 2,868,009.03	$ 3,890,976.96	$ 1,022,967.93	1.36
#4	Residential Energy Star Thermostat Program	$ 521,225.88	$ 1,369,631.03	$ 848,405.15	2.63
#5	Energy Star Windows Program	$ 1,103,883.73	$ 3,083,508.02	$ 1,979,624.29	2.79
	Residential Sector Subtotals:	**$ 10,116,082.66**	**$ 27,803,946.60**	**$ 17,687,863.94**	**2.75**
#1	Commercial HE Heating Program	$ 613,790.01	$ 930,866.01	$ 317,076.00	1.52
#2	Commercial HE Water Heating Program	$ 31,314.19	$ 40,492.67	$ 9,178.48	1.29
#3	Commercial Energy Star Thermostat Program	$ 22,096.39	$ 70,721.89	$ 48,625.50	3.20
#4	HE Cooking Equipment	$ 176,834.10	$ 563,354.66	$ 386,520.56	3.19
#5	Infrared Heating Program	$ 388,515.58	$ 1,837,874.29	$ 1,449,358.70	4.73
	C/I Sector Subtotals:	**$ 1,232,550.27**	**$ 3,443,309.52**	**$ 2,210,759.25**	**2.79**
	Totals	**$ 11,348,632.93**	**$ 31,247,256.12**	**$ 19,898,623.19**	**2.75**

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY					
GasNetworks Regional Programs in Massachusetts - Program Year 2006					
	GasNetworks Program	**PV of Program Costs**	**PV of Program Benefits**	**NPV Savings**	**B/C Ratio**
#1	Residential HE Heating Equipment	$ 5,031,904.38	$ 18,976,020.79	$ 13,944,116.41	3.77
#2	Residential HE Water Heating Program	$ 487,866.49	$ 876,789.96	$ 388,923.47	1.80
#3	Energy Star Homes Program	$ 2,856,998.73	$ 3,962,776.22	$ 1,105,777.49	1.39
#4	Residential Energy Star Thermostat Program	$ 519,788.34	$ 1,384,069.04	$ 864,280.70	2.66
#5	Energy Star Windows Program	$ 1,174,789.99	$ 3,440,297.10	$ 2,265,507.11	2.93
	Residential Sector Subtotals:	**$ 10,071,347.93**	**$ 28,639,953.11**	**$ 18,568,605.18**	**2.84**
#1	Commercial HE Heating Program	$ 607,783.57	$ 971,418.37	$ 363,634.81	1.60
#2	Commercial HE Water Heating Program	$ 33,743.43	$ 45,891.79	$ 12,148.37	1.36
#3	Commercial Energy Star Thermostat Program	$ 22,975.01	$ 75,548.58	$ 52,573.56	3.29
#4	HE Cooking Equipment	$ 182,814.79	$ 588,797.78	$ 405,982.99	3.22
#5	Infrared Heating Program	$ 387,529.46	$ 1,902,670.80	$ 1,515,141.35	4.91
	C/I Sector Subtotals:	**$ 1,234,846.25**	**$ 3,584,327.32**	**$ 2,349,481.07**	**2.90**
	Totals	**$ 11,306,194.18**	**$ 32,224,280.44**	**$ 20,918,086.25**	**2.85**

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY					
GasNetworks Regional Programs in Massachusetts - Program Year 2007					
	GasNetworks Program	**PV of Program Costs**	**PV of Program Benefits**	**NPV Savings**	**B/C Ratio**
#1	Residential HE Heating Equipment	$ 4,753,737.22	$ 18,785,501.29	$ 14,031,764.07	3.95
#2	Residential HE Water Heating Program	$ 455,897.39	$ 875,665.37	$ 419,767.98	1.92
#3	Energy Star Homes Program	$ 2,843,506.07	$ 4,046,044.42	$ 1,202,538.36	1.42
#4	Residential Energy Star Thermostat Program	$ 492,189.19	$ 1,415,054.89	$ 922,865.70	2.88
#5	Energy Star Windows Program	$ 1,181,573.36	$ 3,567,420.48	$ 2,385,847.12	3.02
	Residential Sector Subtotals:	**$ 9,726,903.23**	**$ 28,689,686.45**	**$ 18,962,783.22**	**2.95**
#1	Commercial HE Heating Program	$ 579,516.69	$ 1,004,053.89	$ 424,537.20	1.73
#2	Commercial HE Water Heating Program	$ 32,804.07	$ 51,936.77	$ 19,132.71	1.58
#3	Commercial Energy Star Thermostat Program	$ 21,959.66	$ 80,976.81	$ 59,017.15	3.69
#4	HE Cooking Equipment	$ 188,900.51	$ 616,644.29	$ 427,743.78	3.26
#5	Infrared Heating Program	$ 388,622.32	$ 1,975,765.08	$ 1,587,142.76	5.08
	C/I Sector Subtotals:	**$ 1,211,803.25**	**$ 3,729,376.85**	**$ 2,517,573.60**	**3.08**
	Totals	**$ 10,938,706.48**	**$ 32,419,063.30**	**$ 21,480,356.82**	**2.96**

PROGRAM BENEFIT/COST SCREENING RESULTS SUMMARY					
GasNetworks Regional Programs in Massachusetts - Program Year 2008					
	GasNetworks Program	**PV of Program Costs**	**PV of Program Benefits**	**NPV Savings**	**B/C Ratio**
#1	Residential HE Heating Equipment	$ 4,621,947.22	$ 18,996,557.29	$ 14,374,610.07	4.11
#2	Residential HE Water Heating Program	$ 442,710.51	$ 874,626.20	$ 431,915.69	1.98
#3	Energy Star Homes Program	$ 2,842,608.84	$ 4,161,110.45	$ 1,318,501.61	1.46
#4	Residential Energy Star Thermostat Program	$ 489,222.57	$ 1,449,209.64	$ 959,987.07	2.96
#5	Energy Star Windows Program	$ 1,181,210.05	$ 3,691,576.73	$ 2,510,366.69	3.13
	Residential Sector Subtotals:	**$ 9,577,699.19**	**$ 29,173,080.31**	**$ 19,595,381.13**	**3.05**
#1	Commercial HE Heating Program	$ 579,415.29	$ 1,048,891.96	$ 469,476.67	1.81
#2	Commercial HE Water Heating Program	$ 34,343.90	$ 57,272.04	$ 22,928.14	1.67
#3	Commercial Energy Star Thermostat Program	$ 22,770.95	$ 86,372.92	$ 63,601.97	3.79
#4	HE Cooking Equipment	$ 193,035.55	$ 644,535.95	$ 451,500.40	3.34
#5	Infrared Heating Program	$ 387,093.49	$ 2,050,037.00	$ 1,662,943.51	5.30
	C/I Sector Subtotals:	**$ 1,216,659.17**	**$ 3,887,109.86**	**$ 2,670,450.69**	**3.19**
	Totals	**$ 10,794,358.36**	**$ 33,060,190.18**	**$ 22,265,831.82**	**3.06**

Bay State Gas Energy Efficiency Plan

For the period

May 2004 – April 2009

Attachment C-3

Benefit/Cost Analysis
Bay State Company Specific Programs

Cost-Effectiveness for Company-Specific Programs

The cost-effectiveness analysis of Bay State's company-specific energy efficiency programs and services to be delivered during the Pre-Approval period was conducted by GDS Associates, Inc. using the Total Resource Cost ("TRC") Test, in accordance with the guidelines established in D.T.E. 98-100. All company-specific programs were found to be cost-effective. Table C-2 summarizes the expected benefits, costs, and the benefit/cost ratios for Bay State Gas-specific programs to be implemented during the five-year Pre-Approval period.

Table C-2

Bay State Gas Energy Efficiency Program Portfolio

Summary of Company-Specific Benefits vs. Costs and BCRs

Program	NPV Total Benefits[3]	NPV Total Costs[4]	BCR
Residential Custom Measures	$8,455,993	$4,690,656	1.80
Residential Low Income Measures	$7,658,258	$4,339,965	1.76
Multi Family Custom Measures	$8,533,610	$5,108,265	1.67
Small C&I Custom Measures	$16,815,076	$9,310,100	1.81
Large C&I Custom Measures	$23,540,812	$8,433,305	2.79
Total Company-Specific Programs	**$65,003,748**	**$31,882,291**	**2.04**

The program benefits and costs are discounted at a nominal annual discount rate of 4.41 percent and the currently projected average long-term inflation rate of 2.5 percent.

Bay State Gas has updated the energy efficiency program budgets and program participation in its cost-effectiveness models. Additionally, each of the current model assumptions were reviewed and updated to reflect current program experience and market conditions.

[3] Benefits include quantifiable savings of fossil fuels. There may be other non-resource benefits that have not been quantified at this time.

[4] Costs include program planning, administration and implementation expenses; incentives paid to customers; customer contributions; program marketing and evaluation costs.

Bay State Gas has updated the energy efficiency program budgets and program participation in its cost-effectiveness models. Additionally, each of the current model assumptions were reviewed and updated to reflect current program experience and market conditions.

The cost-effectiveness screening model used by Bay State Gas for the GasNetworks programs and its Company-specific programs was developed by GDS Associates, Inc.[5] In accordance with the TRC test, the program costs include all utility program planning, administration and direct implementation costs, incentives paid to customers as well as expenses incurred directly by the customer as a result of participation in the energy efficiency program, and program marketing and evaluation costs. The program benefits have been calculated based on the gas savings of program measures and the avoided gas supply costs. These avoided costs were updated recently by an August 2003 regional study prepared for the Avoided Energy Supply Component Study Group.[6] The model used to screen the Bay State Gas-specific programs uses all of these data to calculate the net present value of the program costs and benefits over the expected life of the measures installed resulting from the program.

Program-specific results from Bay State's cost-effectiveness analyses are included in this Attachment.

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5 A description of the GDS model and related input assumptions is included in Sections 2.2 and 2.3 of GDS's report to GasNetworks entitled: "Report for GasNetworks on Benefit/Cost Screening Results for Regional Natural Gas Energy Efficiency Programs", dated March 25, 2004.

6 Avoided-Energy-Supply-Components Study Group, Avoided Energy-Supply Costs For Demand-Side-Management Screening in Massachusetts, Final Report, prepared for the Avoided-Energy-Supply-Component Study Group by ICF Consulting, August 2003.

Bay State Gas

Model Revision Date: 12/17/2003 P:\Massachusetts\Bay State Gas\2004 Update\[BSG BC Model 3-23-04.xls]Input Worksheet
Analysis Date: 3/11/2004

COST EFFECTIVENESS SCREENING TOOL - GAS PROGRAMS

Bay State Gas

Residential Custom Measures Program

PROGRAM ASSUMPTIONS		ECONOMIC ASSUMPTIONS	
Program Life	60 Months	General Inflation	2.500%
		Nominal Discount Rate	4.410%

			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
			1.0000	0.9578	0.9173	0.8786	0.8415	0.8059	0.7719	0.7393	0.7080	0.6781	0.6495	0.6221	0.5958	0.5706	0.5465	0.5234	0.5013	0.4802
Program Savings Data																				
Natural Gas Savings																				
1. Fuel: NG Old Bldg Heat Fuel Savings (therms) in a particular year			173,196	363,712	532,578	710,104	887,630	865,980	865,980	865,980	865,980	865,980	865,980	865,980	865,980	865,980	865,980	865,980	865,980	865,980
2. Cumulative Annual Fuel Savings (therms)	Total:	19,120,838	173,196	536,908	1,069,485	1,779,589	2,667,218	3,533,198	4,399,178	5,265,158	6,131,138	6,997,118	7,863,098	8,729,078	9,595,058	10,461,038	11,327,018	12,192,998	13,058,978	13,924,958
Other Resource Savings																				
3. Incremental Water Savings from installation in a particular year - (Gallons)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Cumulative Annual Water Savings (Gallons)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Program Costs		NPV Prog Costs	Fiscal Year End $'s 2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Utility Costs												
5. Internal Admin	$	290,448	$60,254	$61,761	$63,305	$64,887	$66,509	$0	$0	$0	$0	$0
6. External Admin/Implementation	$	828,577	$170,252	$175,360	$180,620	$186,039	$191,620	$0	$0	$0	$0	$0
7. Marketing	$	265,066	$91,375	$50,017	$47,241	$48,527	$47,321	$0	$0	$0	$0	$0
8. Evaluation	$	91,902	$20,000	$20,000	$20,000	$20,000	$20,000	$0	$0	$0	$0	$0
9. Rebates / Incentives	$	1,607,331	$333,445	$341,781	$350,325	$359,083	$368,061	$0	$0	$0	$0	$0
10. Direct Utility Costs (Sum Lines 5 thru 9)	$	3,083,325	$675,326	$648,918	$661,491	$678,537	$693,511	$0	$0	$0	$0	$0
Participant Costs												
11. Total Annual Incremental Customer Costs - Planning, Equip, & Install			$333,445	$341,781	$350,325	$359,083	$368,061	$0	$0	$0	$0	$0
12. Total Customer Admin O & M Costs or Benefits (shows any benefits as negative)			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
13. Direct Participant Costs (Lns 11+12)	$	1,607,331	$333,445	$341,781	$350,325	$359,083	$368,061	$0	$0	$0	$0	$0
Total Utility & Participant Costs												
14. Total Utility & Participant Costs (Nominal $)	$	4,690,656	1,008,770	990,699	1,011,816	1,037,621	1,061,571	-	-	-	-	-
Indirect Program Costs												
15. Indirect Program Costs	$	-	-	-	-	-	-	-	-	-	-	-
16. Total Indirect Program Costs	$	-	-	-	-	-	-	-	-	-	-	-
Total Program Costs												
17. Total Program Costs (Lns 14+16)	$	4,690,656	1,008,770	990,699	1,011,816	1,037,621	1,061,571	-	-	-	-	-

Program Benefits		NPV Prog Benefits	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Avoided Supply Costs																				
18. Water Costs	$	-	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
19. Avoided Other Fuel Costs (cumulative before decay)	$	174,227,759	$122,030	$365,723	$698,482	$1,138,219	$1,685,719	$2,213,633	$2,773,566	$3,284,478	$3,816,072	$4,373,118	$4,957,939	$5,548,863	$6,174,931	$6,818,143	$7,498,838	$8,188,715	$8,878,172	$9,576,633
19. Fuel: NG Old Bldg Heat	$	8,455,993	$122,030	$243,693	$332,759	$439,738	$547,500	$527,914	$559,933	$510,912	$531,594	$557,045	$584,821	$590,924	$626,069	$643,212	$680,695	$689,877	$689,456	$698,461
20. Total Avoided Supply Costs	$	8,455,993	$122,030	$243,693	$332,759	$439,738	$547,500	$527,914	$559,933	$510,912	$531,594	$557,045	$584,821	$590,924	$626,069	$643,212	$680,695	$689,877	$689,456	$698,461
Additional Benefits																				
21. Other Direct Resource Benefits	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
22. External Environmental Benefits	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Program Benefits																				
23. Total Avoided Supply Costs + Lines 21 and 22	$	8,455,993	$122,030	$243,693	$332,759	$439,738	$547,500	$527,914	$559,933	$510,912	$531,594	$557,045	$584,821	$590,924	$626,069	$643,212	$680,695	$689,877	$689,456	$698,461
Total Program Benefits Attributable to In-Program Units (incentivized)																				
24. Total Avoided Fuel Costs	$	8,455,993	$122,030	$243,693	$332,759	$439,738	$547,500	$527,914	$559,933	$510,912	$531,594	$557,045	$584,821	$590,924	$626,069	$643,212	$680,695	$689,877	$689,456	$698,461
25. Total Avoided Water Costs	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
26. Total Additional Benefits	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
27. Total Program Benefits Attributable to In-Program Units	$	8,455,993	$122,030	$243,693	$332,759	$439,738	$547,500	$527,914	$559,933	$510,912	$531,594	$557,045	$584,821	$590,924	$626,069	$643,212	$680,695	$689,877	$689,456	$698,461

Screening Results

28. ***Total Resource Cost Test*** **1.80** Line 23 divided by line 17

Bay State Gas

Model Revision Date: 12/17/2003 P:\Massachusetts\Bay State Gas\2004 Update\[BSG BC Model 3-23-04.xls]Input Worksheet
Analysis Date: 3/11/2004

COST EFFECTIVENESS SCREENING TOOL - GAS PROGRAMS

Bay State Gas

Residential Low-Income Measures Program

PROGRAM ASSUMPTIONS		ECONOMIC ASSUMPTIONS	
Program Life	60 Months	General Inflation	2.500%
		Nominal Discount Rate	4.410%

			1.0000	0.9578	0.9173	0.8786	0.8415	0.8059	0.7719	0.7393	0.7080	0.6781	0.6495	0.6221	0.5958	0.5706	0.5465	0.5234	0.5013	0.4802
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Program Savings Data																				
Natural Gas Savings																				
1. Fuel: NG Old Bldg Heat Fuel Savings (therms) in a particular year			141,139	282,277	423,416	564,555	705,693	705,693	705,693	705,693	705,693	705,693	705,693	705,693	705,693	705,693	705,693	705,693	705,693	705,693
2. Cumulative Annual Fuel Savings (therms)	Total:	17,642,332	141,139	423,416	846,832	1,411,387	2,117,080	2,822,773	3,528,466	4,234,160	4,939,853	5,645,546	6,351,239	7,056,933	7,762,626	8,468,319	9,174,012	9,879,706	10,585,399	11,291,092
Other Resource Savings																				
3. Incremental Water Savings from installation in a particular year - (Gallons)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Cumulative Annual Water Savings (Gallons)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Program Costs		*NPV Prog Costs*	*Fiscal Year End $'s* 2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Utility Costs												
5. Internal Admin	$	499,688	$95,363	$97,748	$100,191	$102,696	$105,263	$0	$0	$0	$0	$0
6. External Admin/Implementation	$	685,531	$137,294	$148,636	$151,270	$153,958	$156,700	$0	$0	$0	$0	$0
7. Marketing	$	229,755	$50,000	$50,000	$50,000	$50,000	$50,000	$0	$0	$0	$0	$0
8. Evaluation	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
9. Rebates / Incentives	$	2,964,990	$592,725	$643,497	$654,667	$666,060	$677,681	$0	$0	$0	$0	$0
10. Direct Utility Costs (Sum Lines 5 thru 9)	$	4,339,965	$875,382	$939,881	$956,128	$972,714	$989,645	$0	$0	$0	$0	$0

Participant Costs																				
11. Total Annual Incremental Customer Costs - Planning, Equip, & Instal			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
12. Total Customer Admin O & M Costs or Benefits (shows any benefits as negative)			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
13. Direct Participant Costs (Lns 11+12)	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Utility & Participant Costs																				
14. Total Utility & Participant Costs (Nominal $)	$	4,339,965	875,382	939,881	956,128	972,714	989,645	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Program Costs																				
15. Indirect Program Costs	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16. Total Indirect Program Costs	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Program Costs																				
17. Total Program Costs (Lns 14+16)	$	4,339,965	875,382	939,881	956,128	972,714	989,645	-	-	-	-	-	-	-	-	-	-	-	-	-

Program Benefits		*NPV Prog Benefits*																		
Avoided Supply Costs																				
18. Water Costs	$	-	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
19. Avoided Other Fuel Costs (cumulative before decay)	$	156,031,312	$99,443	$288,574	$553,127	$902,733	$1,338,012	$1,768,213	$2,224,506	$2,640,852	$3,074,052	$3,527,992	$4,004,567	$4,486,115	$4,996,303	$5,520,461	$6,075,164	$6,637,350	$7,199,193	$7,768,374
19. Fuel: NG Old Bldg Heat	$	7,658,258	$99,443	$189,131	$264,554	$349,605	$435,280	$430,201	$456,293	$416,346	$433,200	$453,940	$476,575	$481,548	$510,188	$524,158	$554,703	$562,186	$561,843	$569,181
20. Total Avoided Supply Costs	$	7,658,258	$99,443	$189,131	$264,554	$349,605	$435,280	$430,201	$456,293	$416,346	$433,200	$453,940	$476,575	$481,548	$510,188	$524,158	$554,703	$562,186	$561,843	$569,181
Additional Benefits																				
21. Other Direct Resource Benefits	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
22. External Environmental Benefits	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Program Benefits																				
23. Total Avoided Supply Costs + Lines 21 and 22	$	7,658,258	$99,443	$189,131	$264,554	$349,605	$435,280	$430,201	$456,293	$416,346	$433,200	$453,940	$476,575	$481,548	$510,188	$524,158	$554,703	$562,186	$561,843	$569,181
Total Program Benefits Attributable to In-Program Units (Incentivized)																				
24. Total Avoided Fuel Costs	$	7,658,258	$99,443	$189,131	$264,554	$349,605	$435,280	$430,201	$456,293	$416,346	$433,200	$453,940	$476,575	$481,548	$510,188	$524,158	$554,703	$562,186	$561,843	$569,181
25. Total Avoided Water Costs	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
26. Total Additional Benefits	$	-	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
27. Total Program Benefits Attributable to In-Program Units	$	7,658,258	$99,443	$189,131	$264,554	$349,605	$435,280	$430,201	$456,293	$416,346	$433,200	$453,940	$476,575	$481,548	$510,188	$524,158	$554,703	$562,186	$561,843	$569,181

Screening Results

28. ***Total Resource Cost Test*** 1.76 Line 23 divided by line 17