The Cape Light Compact Energy Efficiency Plan Phase II: 2003-2007

Providing Comprehensive Energy Efficiency Services to Cape Cod and Martha's Vineyard Through Municipal Aggregation

March 28, 2003

This page intentionally left blank.

Table of Contents

List of Tables

Acknowledgements

This Energy Efficiency Plan is the product of input from many parties:

Tim Woolf of Synapse Energy Economics was the primary author of and project manager for the Energy Efficiency Plan.

Maggie Downey and Kevin Galligan of the Cape Light Compact contributed to program design, provided feedback from customers and trade allies, were the primary authors of Section 8, Public Education and Marketing, and assisted with editing the Energy Efficiency Plan.

Cort Richardson of Richardson and Associates contributed to program design, was the primary author of Section 7, the Monitoring and Evaluation Plan, and assisted with editing the Energy Efficiency Plan.

Bill Kallock and Richard Faesy of the Vermont Energy Investment Corporation contributed to the design of the residential programs, and were primarily responsible for the design of the Residential New Construction Demonstration Project. Bill Kallock performed the measure screening and cost-effectiveness analyses for all of the residential and low-income programs.

Phil Mosenthal of Optimal Energy Incorporated contributed to the design of the commercial and industrial programs, performed the measure screening and cost-effectiveness analyses for all of the commercial and industrial programs, and assisted with editing the Energy Efficiency Plan.

Paul Jackson of Honeywell DMC contributed to program design, and assisted with editing the Energy Efficiency Plan.

The authors would like to thank several people who commented on drafts of this plan, including Bruce Ledgerwood and Larry Masland of Division of Energy Resources, Glenn Reed and Julie Michals of the Northeast Energy Efficiency Partnership, Jerry Oppenheim of Low-Income Energy Affordability Network, and Art Wilcox of South Middlesex Opportunity Council.

Also, in developing this plan, the authors have built upon the energy efficiency programs provided by Massachusetts electric utilities and other energy efficiency providers in the Northeast. These utility programs have been developed through collaborative processes that include a variety of stakeholders, and are themselves the product of years of experience in providing energy efficiency programs to electricity customers in Massachusetts.

Lastly, the authors acknowledge the contribution made by Building for Social Responsibility (Vermont) and Vermont Energy Investment Corporation in sharing their Vermont Built Green Scorecard with the Compact and allowing it to be used as the basis of the Residential New Construction Demonstration Project.

Forward

Dear Residential and Business Electric Consumers of Cape Cod and Martha's Vineyard:

I am pleased to present, on behalf of the Cape Light Compact, this innovative Energy Efficiency Plan: Phase II. Over many months the Compact worked with consumers, elected officials, state agencies and many energy efficiency experts to enhance our existing programs so we may bring increased benefits to all customers within the Compact's territory.

Though energy markets remained volatile in 2002, the Compact continued to set new precedents and expand savings for consumers. A number of projects delivered on promises to reduce costs to consumers, improve service, protect the environment, and insure that small kilowatt consumers would not be ignored in an evolving competitive market.

In a landmark Pilot Project, the Compact negotiated a favorably priced power supply contract for the period May 2002 through December 2003, for the 43,000 Cape and Martha's Vineyard default customers, with a savings to consumers of approximately $2 million in 2002. Hopefully, this project will serve as a precursor for competitive supply for all 193,000 electric customers on the Cape and Vineyard.

The Compact has expanded on the Energy Efficiency Program begun in 2001, as the first program of its type in the nation. The Compact's program insures that mandated "energy conservation" charges assessed on the electricity bill are indeed used to fund energy efficiency activities on behalf of consumers on the Cape and Vineyard. The program reduces a consumer's electricity bill and enhances comfort, and the benefits of this program will steadily accumulate with the use of new technologies. This efficiency program provides a cornerstone for the region's energy future.

The Compact's first Energy Fair attracted over 1,000 people, and the 300 dehumidifiers and 200 torchieres turned in yielded a combined total of 166,972 annual kilowatt-hour savings. A Spring, 2003 fair is planned for Martha's Vineyard, and a Fall, 2003 fair is planned for the Cape.

After considerable planning in 2002, and in partnership with Barnstable County's Cooperative Extension education department, the Compact, in the Fall of 2003, will introduce the National Energy Education Development (NEED) project for the third, fourth, and fifth grades on the Cape and Vineyard. Our communities will be the first to offer the NEED project in the Commonwealth.

The Compact looks forward to continuing productivity in 2003 and the years ahead.

Sincerely,

Bob Mahoney, Chairman, Cape Light Compact

1. Introduction and Summary

The Cape Light Compact Energy Efficiency Plan: 2003-2007

The Massachusetts Electric Utility Restructuring Act of 1997 allows municipalities that aggregate electricity customers to: (1) formulate an Energy Efficiency Plan, (2) submit the plan to town meetings for approval, (3) submit the plan to the Massachusetts Department of Telecommunications and Energy (the "Department") for review and certification; and (4) recover the energy efficiency funds raised from consumers for use in implementing local energy efficiency programs. The Cape Light Compact (the "Compact"), as the municipal aggregator of electricity customers for twenty-one towns on Cape Cod and Martha's Vineyard, developed its Energy Efficiency Plan in compliance with state law and consistent with state energy goals.

The Compact hereby submits an amendment to its original Energy Efficiency Plan, entitled "The Cape Light Compact Energy Efficiency Plan, Phase II: 2003-2007" (hereinafter referred to alternatively as the "EEP" or "Phase II") and states that it is also consistent with state energy goals.

The Cape Light Compact was formed in 1997 following two years of study and votes of town meeting, boards of selectmen, and town council. It is organized through a formal intergovernmental agreement signed by the towns and Barnstable and Dukes counties. The Compact's Aggregation Plan was approved by the Department in DTE 00-47. The purpose of the Compact is to advance the interests of consumers in a competitive electric supply market, including the promotion of energy efficiency. Each participating municipality has a representative on the Compact Governing Board, which sets policy and works with technical and legal support to put the Compact programs in place.

The programs included in this EEP are designed to advance consumer awareness and adoption of a wide variety of energy efficiency measures. Energy efficiency initiatives at the community level present opportunities for extensive local involvement, and help develop an energy efficiency ethic that can support market transformation beyond the implementation of individual technologies or practices, resulting in long-term, sustained energy efficiency savings.

The Compact's Energy Efficiency Plan has evolved in two phases. Phase I began in July 2001 when the Compact replaced Commonwealth Electric Company d/b/a NSTAR Electric ("NSTAR") as the program administrator of ratepayer-funded efficiency programs on Cape Cod and Martha's Vineyard. The Phase I efficiency programs were primarily a continuation and extension of the efficiency programs offered by electric utilities in Massachusetts and the region.

Phase II of the Compact's efficiency programs will begin in 2003, now that the Compact has established its programs and presence, and now that the legislature has re-authorized the ratepayer-funded energy efficiency programs for the next five years. The purpose of the Phase II program is to amend and improve upon the Phase I program for 2003 through 2007. This Energy Efficiency Plan describes the Phase II activities during that

time period. The goal of Phase II will be to go beyond what has been achieved to date by the Compact, and to maximize the efficiency and societal benefits available from the Compact's efficiency initiatives.

The Compact Governing Board unanimously approved this Energy Efficiency Plan on February 12, 2003.

Overview of the Energy Efficiency Programs

The Compact's programs are designed to comply with state energy efficiency goals and policies. In general, the programs are structured according to customer types, as well as the types of electricity end-uses utilized by customers. In this way, the marketing and delivery of the programs can address the unique interests and market barriers of each customer type, as well as the unique opportunities and challenges of each end-use type.

The programs are broadly divided into three areas: (a) residential customers, (b) low-income customers, and (c) commercial and industrial customers (including municipal and government customers). In addition, there is a core Public Education and Marketing Program that underlies the delivery of each of the Compact's programs.

The Energy Efficiency Plan includes the following programs:

- The Residential ENERGY STAR® New Construction Program, which provides home buyers, home builders, and construction trade allies with technical assistance and financial incentives to increase the home energy rating of homes that are newly built or undergo major renovations.
- The Residential New Construction Demonstration Project, which provides home builders and buyers with enhanced financial incentives for building highly efficient, environmentally sensitive new homes.
- The Residential Massachusetts Home Energy Services Program, which provides all interested residential customers with a home energy audit and financial incentives for numerous electric and non-electric efficiency measures, including a no-interest loan to switch electric space heating systems to more efficient systems that use alternative fuels. This program represents the integration of the Residential Conservation Services and the Residential High Use Programs that were offered previously.
- The Residential ENERGY STAR® Products and Services Program, which seeks to increase the availability and use of efficient lighting and appliances, including: clothes washers, water heaters, room air conditioners, dehumidifiers and refrigerators. This program is used to implement the Northeast Energy Efficiency Partnership ("NEEP") initiatives and other regional market transformation efforts.
- The Low-Income Single Family Program, which provides low-income customers in single-family dwellings with assistance in purchasing and installing efficient lighting, appliances, and weatherization measures.

- The Low-Income Multi-Family Program, which provides owners and managers of low-income multi-family dwellings with assistance in purchasing and installing efficient lighting, appliances and space heating measures.
- The Low-Income New Construction Program, which provides low-income housing development agencies, weatherization assistance program ("WAP") providers, and residential construction trade allies with incentives to increase the home energy rating of new low-income housing.
- The Commercial and Industrial New Construction Program, which provides technical assistance and financial incentives to increase the efficiency in the construction, renovation, and/or remodeling of all commercial, industrial, government and multi-family housing facilities.
- The Large Commercial and Industrial Retrofit Program, which provides technical and financial assistance to medium and large commercial and industrial ("C&I") customers (those with peak demands greater than 100 kW) seeking to do discretionary replacements of existing operating equipment and processes in their facilities with high-efficiency alternatives.
- The Small Commercial and Industrial Retrofit Program, which provides technical assistance, financial incentives and direct installation to C&I customers whose peak demands are less than 100 kW to replace existing operating equipment and systems with high-efficiency equipment.
- The Government Agencies Program, which provides technical and financial energy efficiency assistance to all government facilities, including municipal, state and federal facilities.
- The Commercial and Industrial Products and Services Program, which seeks to increase the availability and use of more efficient motors, lighting designs, and HVAC systems. This program is used to implement NEEP and other regional market transformation initiatives.

The Public Education and Marketing Program is designed to utilize the extensive network and opportunities that the Compact has at the community and local government level. Public education and marketing support are designed to help overcome common barriers of energy efficiency awareness, and facilitate participation in the Compact's programs.

Program Highlights

The Compact's Phase II programs improve upon the existing programs in several ways. The enhanced programs will all benefit from the substantial amount of feedback the Compact has obtained through its extensive network of local representatives, as well as from its staff members that have committed significant amounts of time working with customers and trade allies. In addition, during the drafting of this amended EEP, the existing programs have been extensively reviewed for improvement opportunities. Also the Compact held a set of public informational meetings to inform the community of the EEP and obtain feedback from potential program participants. Finally, the Compact has responded to its first round of program evaluations.

There are two important themes that run throughout the Phase II program changes to the Plan: integration and comprehensiveness. Programs will be better integrated, both with each other and with other related activities in the region, in order to enhance delivery and increase customer participation and adoption of measures. Programs will also be more comprehensive in order to include more efficiency measures and to promote greater energy savings opportunities among each participant, and also in terms of capturing maximum participation.

Some of the highlights of the Phase II program include the following:

- The Residential Conservation Service Program and the Residential High Use Program will be integrated into the HomEnergy Program.
- The program vendor for the existing Residential New Construction Program has agreed to work with more of the relatively small builders on the Cape and Vineyard. These are the builders who may be more focused on remodeling homes and who may build a few new homes each year. This recognizes the changes in the home building business on Cape Cod as buildable lots become scarcer.
- The Residential New Construction Demonstration Project will investigate the opportunities for promoting highly efficient, environmentally sensitive new homes.
- The Residential ENERGY STAR® Products and Services Program will offer incentives for an expanded array of efficiency measures, including ENERGY STAR® room air conditioners and dehumidifiers.
- The Low-Income Programs will be better integrated with the weatherization assistance programs offered by the US Department of Energy.
- The Compact will have significantly more funding to support the Commercial & Industrial programs, due to the completion of NSTAR's Integrated Resource Management ("IRM") program payments.
- The Compact will begin implementing a new management plan and marketing plan to support the expanded Large Commercial & Industrial Retrofit and New Construction Programs.
- The Small Commercial & Industrial Program will offer technical and financial support for an expanded array of efficiency measures.
- The Government Agencies Program will offer participants financial incentives equal to 100% of incremental costs of efficiency measures, up to $75,000 per project, in order to overcome the unique financing barriers that these customers face.
- The Compact has secured $200,000 from Barnstable County to supplement the energy efficiency funds that are available to improve the efficiency of County and town facilities.

- The Commercial & Industrial Products and Services Program will offer incentives for an expanded array of efficiency measures, such as vending machine retrofits, gas dryers and ENERGY STAR® coin-operated clothes washers.
- The Compact, jointly with KeySpan Energy Delivery, sponsored the NEEP Building Operator Certification ("BOC") course in 2002 on the Cape and will offer the BOC course again in 2003-2004 and in future years .
- The Compact is embarking on an exciting educational effort, based on the National Energy Education Development ("NEED") project, which will work with third through fifth grade classes to introduce energy efficiency as part of the science curriculum. The Cape and Vineyard are the first areas in Massachusetts to join and adopt the NEED curriculum.

2. Summary of Key Plan Components

2.1 Background on the Cape Light Compact

The Cape Light Compact was formed in 1997 as a consumer-based organization authorized by votes of town meeting, boards of selectmen, town council, and county commissioners. It consists of all twenty one Cape and Vineyard towns and Barnstable and Dukes counties.

The Compact's articles of organization are comprised of a formal Intergovernmental Agreement signed by each participating town or county member. Membership provides voting rights and inclusion for planning, analysis, and participation in Compact programs. The organization relies on the existing structure of local and county government, cooperation between government agencies, and the professional expertise provided by staff and contractors.

The purpose of the Compact is to advance the interests of consumers in a competitive electric power supply market. This purpose includes development and implementation of energy efficiency plans and programs.

Administration and implementation of the Compact's energy efficiency programs involves a combination of several different actors and stakeholders. The organizational structure is briefly summarized below.

Consumers/Town Members. The consumers in each Compact member town had the opportunity at town meeting, or through town council, to approve the original Energy Efficiency Plan and to work with Boards of Selectmen, Town Council and town departments to guide the Compact Governing Board on plan adjustments over time. As final recipients of service, in their oversight and responsive role, and as part of the Compact's local network, consumers, town departments, and social, civic and religious organizations in the member towns play an important part in the overall development and implementation of the EEP.

The Compact Governing Board. The Compact Governing Board includes one representative from each member town, and provides on-going policy, and budget oversight for the energy efficiency program. The Governing Board decisions are informed by input from the towns and consumers, legal and technical advisors, the program administrators, and reports and recommendations of the Energy Efficiency Subcommittee. The Governing Board provides guidance to the Compact staff personnel and the Compact Management Contractors. The Governing Board also approved the Phase II Plan on February 12, 2003.

Barnstable County Administrative Personnel. Barnstable County provides fiscal and administrative support services for the Compact. For fiscal matters this includes receipt of energy efficiency funds on behalf of the Compact; accounting and disbursement; and financial reporting. For administrative support this includes issuance of Requests For

Proposals ("RFPs"), contract formation with bidders recommended by the Compact, contract management and professional staff for oversight of efficiency programs.

Compact Administrative Staff. In 2002 the Compact hired a staff person to assist with many aspects of administrating the energy efficiency programs. In mid-2002, the Compact also added a part-time staff person to administer the energy education program. In 2003 the Compact will hire additional staff, and accordingly will rely less upon the support of outside technical consultants. The Compact staff are responsible for many aspects of efficiency program management, including coordination with the Governing Board; oversight of the Management Contractor; management of the technical consultants; representation of the Compact at regional meetings and events; making presentations to local boards, civic and environmental advocacy organizations; and responding to customer requests and concerns.

Compact Management Contractor. The Compact Management Contractor is responsible for the day-to-day management of the energy efficiency programs. The Management Contractor has the primary responsibility for ensuring that the programs are delivered as planned, in an effective and efficient manner. The Management Contractor assists the Compact in conducting competitive bidding processes to select vendors and review and recommend vendor claims for payment to the Compact. The Management Contractor also oversees the work of all the program vendors, provides guidance on program design, and ensures quality performance from each vendor. The Management Contractor is also responsible for maintaining a database on all efficiency program activities, costs and savings. The Management Contractor is hired through a periodic, competitive bidding process.

The Program Vendors. The vendors will deliver the energy efficiency services and products to participating customers, as outlined in the descriptions below for each energy efficiency program. These services will include marketing and outreach, providing energy audits and offering technical assistance, installing efficiency measures, customer education, working with trade allies to increase the availability of efficiency products and services, and other services that may be required of each program. The program vendors are hired through periodic, competitive bidding processes.

2.2 Overview of Efficiency Programs

Phase I and Phase II

There are many benefits of delivering energy efficiency programs that are consistent with the programs being provided by Massachusetts electric utilities. Consistency of program designs across service territories will minimize customer confusion, facilitate market transformation, and maximize the benefits available from energy efficiency initiatives.

During Phase I, the Compact's energy efficiency program designs were based primarily upon the programs offered by electric utilities in Massachusetts and the region. Consequently, the Compact's programs have benefited from the experience gained and lessons learned by electric utilities in the past, as well as the inputs of the many stakeholders in the utilities' collaborative processes.

During Phase II, the Compact will continue with the general structure of the Phase I programs, but will make several important changes to expand the efficiency opportunities provided to customers and improve the delivery of efficiency programs. These changes are described in the remaining sections of this EEP.

In general there are two important themes that run throughout the new program designs: integration and comprehensiveness. Programs will be better integrated in order to enhance delivery and increase customer participation and adoption of measures. The primary example is the new Massachusetts Home Energy Services Program that will integrate the existing Residential Conservation Service and Residential High Use Programs. Programs will also be more comprehensive in order to include more efficiency measures, integrate other efficiency program incentives, and to promote greater energy savings opportunities and participation. In particular, the Compact's programs will include incentives for several new efficiency measures, including several that address non-electric energy end-uses, and increase incentives to selected markets to ensure comprehensive measure adoption and participation.

The Compact will continue to work closely with the various regional and national efforts to promote transformation in the energy efficiency market. The Compact will continue to be an active member of Northeast Energy Efficiency Partnership ("NEEP"), and to implement several NEEP initiatives. The Compact will also implement the Residential Low-Income programs that have been developed by the Massachusetts Low-Income Energy Affordability Network ("LEAN"). In addition, the Compact will maintain membership in the Consortium for Energy Efficiency ("CEE") and take advantage of various initiatives and workgroups sponsored by CEE as well as the ENERGY STAR® program administered by the US Environmental Protection Agency and the US Department of Energy.

Structure of Programs and Overcoming Market Barriers

In general, the Compact's programs are designed to overcome the many market barriers that prevent customers from adopting cost-effective energy efficiency measures. The programs are structured according to markets, such as residential new construction, low-income retrofit, small C&I retrofit, large C&I retrofit, C&I new construction and government agencies. By structuring the programs in this way, the marketing and delivery of the programs can be designed to take account of the unique interests and needs of each market, and can be most effective in overcoming market barriers to improved energy efficiency for the Cape and Vineyard.

Residential customers face many market barriers to energy efficiency, including: high transaction costs, lack of awareness of efficiency measures, lack of awareness of efficiency benefits, limited access to financing, uncertainty about the performance of new and different measures, limited product or service availability, lack of financial incentive for landlords that do not pay electricity bills, and lack of ability of tenants to install efficiency measures in rented buildings.

Commercial and industrial customers face many of the same barriers as residential customers, and sometimes have additional barriers, including: lack of supply-chain and

distribution support, spending budgets that limit up-front investments, budgeting systems that offer no incentive to reduce electricity bills, and lack of procedures, staff or funding to evaluate energy consumption and energy efficiency opportunities.

Equitable Distribution of Program Funds

The Compact will maintain an equitable distribution of program funds across each of its member towns, to the extent reasonably possible. Each town will be allocated a target budget for those programs that are flexible enough to be distributed evenly across the territory, including: the Low-Income Single- and Multi-Family Programs, the Residential New Construction Program, the Massachusetts Home Energy Services Program, and the Small C&I Retrofit Program. These target budgets will be based upon NSTAR's electricity sales to each town, and thus will reflect each town's contribution to the Compact's efficiency funds.

Vendors for these town-by-town programs will be informed of the target budgets and will attempt to reach these targets each year through modifications to their marketing efforts. Those towns that are under-spending their budgets will be informed about the opportunities for increased efficiency spending, while those towns that are likely to overspend their budgets may be asked to postpone some efficiency investments until the other towns have had full opportunity to access their funds. Provisions will be made to account for the unique conditions in each town, such as the number of low-income customers, the number of commercial or industrial customers, and the opportunities for energy efficiency investments in general.

2.3 Program Budgets

Table 2.1 presents a summary of the Compact's forecasted energy efficiency budgets for 2003 through 2007. The forecast of electricity sales to Compact customers is applied to the energy efficiency charge to determine the amount of efficiency funds collected in each year. The sales in 2003 are estimated by assuming that 2002 sales increase by two percent. For the remaining years, electricity sales are conservatively assumed to grow at an average annual rate of 1.5%. Based on these assumptions, the Compact's annual energy efficiency collections are expected to increase from $4.8 to $5.1 million over the five-year period.

Table 2.1 Compact Budget Summary: 2003 Through 2007

	2003	2004	2005	2006	2007
Total Estimated Collections					
Forecasted MWh Sales					
Residential	1,047,313	1,063,022	1,078,968	1,095,152	1,111,580
Commercial and Industrial	884,999	898,274	911,748	925,424	939,305
Total Forecasted Sales (MWh)	1,932,311	1,961,296	1,990,715	2,020,576	2,050,885
Efficiency charge (mills/kWh)	2.5	2.5	2.5	2.5	2.5
Total Estimated Collections ($)	4,830,778	4,903,240	4,976,788	5,051,440	5,127,212
Adjustments to Total Estimated Collections					
Forecasted vs. Actual Collections from Prior Year	55,682	0	0	0	0
Estimated Carryover from Prior Year	1,339,553	0	0	0	0
Interest on Carryover from Prior Year	36,886	0	0	0	0
Other Adjustments (IRM leftover)	498,622	0	0	0	0
Committed Funds	-307,847				
Total Adjustments	1,622,896	0	0	0	0
Total EEP Budget	6,453,674	4,903,240	4,976,788	5,051,440	5,127,212

Table 2.1 also presents several adjustments to the energy efficiency collections. Once these adjustments are accounted for, the Compact's total EEP budget for 2003 is $6.4 million. These adjustments include the following:

- The electricity sales forecast for Cape Cod and Martha's Vineyard for 2002 was too low in the Compact's original EEP. Consequently, the efficiency collections were too low by $55,682. NSTAR has reimbursed the Compact by this amount.
- The Compact has a carryover of roughly $1.3 million from 2002. There are several sources of this large carryover, including unspent funds for the marketing and education program, unspent funds in the low-income programs, unspent funds for the residential fuel-switching initiative, and unspent funds in the large commercial and industrial programs.
- There was a total of $36,886 in interest related to the unspent funds in 2002.
- In 2001 and 2002 the Compact returned a portion of its energy efficiency revenues to NSTAR to pay for IRM expenses previously committed by NSTAR. The NSTAR IRM commitments have now been fulfilled; so for 2003 and beyond the Compact will not have to return any of its funds to cover IRM expenses. The adjustments for 2003 presented in Table 2.1 include two residual effects from the 2001 and 2002 IRM payments: (a) a reconciliation of $165,000 that was overcollected from the Compact by NSTAR, and (b) the freeing up of $333,622 that was set aside to cover potential undercollections by NSTAR.
- Finally, there is a total of $307,847 in committed funds, all of which are for on-going projects in the Residential New Construction Program that were begun in 2002. These commitments are subtracted from the available funds for 2003.

The calculations used to determine the low-income program budgets are detailed in Table 2.2. As described in Section 4.1, the Compact has increased the eligibility threshold for the low-income programs to be 60% of median household income. Consequently, the portion of electricity sales to the low-income customers has also increased, to 11% of total electricity sales. If low-income customers were to be allocated efficiency program

funds on the basis of their contribution to the total collections, the low-income program budget would be $531,386. The Massachusetts Restructuring Act requires that low-income customers should receive at least 20% of residential efficiency budget, and in no event less than the amount funded by a charge of 2.5 mills/kWh. G. L. c. 25, §19. As shown in Table 2.2, both of these funding "floors" are lower than the amount based on the low-income customers' contribution to total collections. Therefore, the low-income programs have been allocated $531,386 on this basis.[1]

Table 2.2 Contributions of Customer Classes to the Low-Income Budget in 2003

2003 Budget Items				Residential	Low-Income	C&I	Total
2003 MWh Sales				834,758	212,554	884,998	1,932,311
Percent of Total Sales				43.2%	11.0%	45.8%	100.0%
Total EE Budget	1,932,311,000	kWh, times			2.50	mills/kWh	4,830,778
Low-Income Budget Floor I	1,932,311,000	kWh, times			0.25	mills/kWh	483,078
Low-Income Budget Floor II	20% of residential budget						417,379
EE Budget				2,086,896	531,386	2,212,496	4,830,778
Percent of Total Budget				43.2%	11.0%	45.8%	100.0%
Contribution by Residential and C&I Classes to Low-Income Class:							
MWh Sales				834,758	0	884,998	1,719,757
Percent of Total Sales				48.5%	0.0%	51.5%	100.0%
Low-Income Budget Above Propotional Allocation:							
531,386	less	2.50	mills/kWh, times	212,554,210			0
Contribution by Class:							
Residential				48.5%	times	0	0
Commercial & Industrial				51.5%	times	0	0

Table 2.3 presents the details of the Compact's efficiency budget, by program. The program costs are broken out by planning and administration, marketing, financial incentives to customers, program implementation, and evaluation and market research. The Compact does not require shareholder performance incentives; thus these are not included in the budget.

The Compact plans to spend roughly 12% of its program budget on "program planning and administration," which includes the costs of the Management Contractor, technical support consultants, legal support, Compact in-house staff members, and program-specific costs such as membership dues to the Low-Income Energy Affordability Network and Northeast Energy Efficiency Partnership. This is a relatively small portion of the total budget, especially given that the Compact is still ramping up some of its administrative and program initiatives.

[1] This figure represents the low-income programs budget *prior* to the various adjustments to collections, such as carryover and IRM leftover.

Table 2.3 Detailed Program Budgets for 2003

	Program Planning & Admin	Program Marketing	Customer Incentives	Program Implement-ation	Evaluation and Market Research	Total Program
Residential Programs						
LI Single Family	47,453	16,391	177,737	59,246	57,110	357,936
LI Multi-Family	25,156	8,689	112,347	37,449	30,276	213,918
LI New Construction	18,790	6,490	63,609	21,203	22,614	132,707
LI Special Projects	0	0	150,000	0	0	150,000
Total Low-Income	91,399	31,570	503,694	117,898	110,000	854,561
New Construction Demo	9,516	3,720	59,005	1,800	0	74,041
New Construction	59,598	22,317	300,811	7,520	25,000	415,246
Products and Services	103,991	35,955	295,891	361,644	35,000	832,482
HomEnergy	179,881	61,992	750,312	305,777	85,000	1,382,962
Total Non Low-Income	352,987	123,984	1,406,019	676,741	145,000	2,704,731
Total Residential	444,386	155,554	1,909,713	794,639	255,000	3,559,291
Commercial & Industrial Programs						
Large New Construction	20,178	7,887	103,387	25,543	0	156,994
Large Retrofit	20,178	7,887	103,387	25,543	0	156,994
Small Customers	184,967	72,295	1,194,464	152,626	5,000	1,609,352
Government Agencies	84,076	32,862	566,569	78,209	0	761,716
Products and Services	44,904	10,516	97,234	41,672	15,000	209,326
Total Commercial & Industrial	354,303	131,446	2,065,040	323,593	20,000	2,894,382
Total Compact	798,689	287,000	3,974,753	1,118,232	275,000	6,453,674
Percent of Total Program	12%	4%	62%	17%	4%	100%

The "program marketing" column includes all the costs incurred by the Compact to conduct its program marketing and education campaign, which is described in Chapter 8. This column does not include any of the marketing expenses incurred by the program vendors.

The "customer incentives" budgets include the costs that are used to provide direct financial support to customers for the installation of efficiency measures. The "program implementation" budgets include the costs incurred by the program vendors to market, deliver, and provide technical assessments of efficiency measures. It also includes the costs of the Compact's quality control initiatives. The combination of these two budgets provides an indication of the portion of funds that are used directly to install energy efficiency measures. These budgets combined represent 79% of the total energy efficiency budgets – a relatively high proportion, especially given that the Compact is still in the early stages of program development and implementation.

The 2003 low-income program budgets include a new line item, referred to as "Low-Income Special Projects." This line item includes costs for special initiatives that are targeted to low-income customers but are not necessarily delivered through one of the other three low-income programs.

The Compact has secured $200,000 in funding from Barnstable County to support the Government Agencies Program. Half of these funds will be allocated to 2003, and the remaining half to 2004. All of the funds will be used to support town government

agencies within the 15 towns in Barnstable County. This additional funding is not included in the budgets presented in Table 2.3.

As described above, in 2001 and 2002 the Compact returned a portion of its energy efficiency revenues to NSTAR, to pay for IRM expenses previously committed by NSTAR. Those IRM expenses were to cover commitments incurred by NSTAR to serve C&I customers on Cape Cod and Martha's Vineyard. Accordingly, the Compact's C&I budgets in 2001 and 2002 were less than they would otherwise have been without the IRM commitments. In 2003 and beyond the Compact will have full funding available to serve C&I customers, and thus will have significantly greater efficiency activities for this important sector.

2.4 Program Cost-Effectiveness

The costs and benefits of the Compact's efficiency programs are summarized in Table 2.4. These costs and benefits include the impacts of the Compact's efficiency activities over the five-year program period.

The costs and benefits are calculated according to the total resource cost ("TRC") test, as required by the Department of Telecommunications and Energy (the "DTE" or the "Department") in Docket No. DTE 98-100. The TRC test requires that the cost of each efficiency measure includes both the cost to the Compact and, the cost to the participating customer, and any other costs associated with installing the measure. The TRC test also requires that the program benefits include certain non-electric benefits, such as non-electric resource savings (e.g., oil, gas, water), and customer benefits (e.g. reduced operation and maintenance ("O&M") costs), and several societal benefits associated with low-income programs. Where possible, these costs and benefits have been included in the results presented below.

As indicated in Table 2.4, the Compact's energy efficiency programs are very cost-effective. On average, all of the Compact's energy efficiency programs combined are estimated to have a benefit-cost ratio of roughly 2.0. All of the C&I, and all but one of the residential programs are highly cost-effective, with benefit-cost ratios ranging from 1.4 to 3.3.

The direct economic benefits of the efficiency programs are substantial. With a five-year investment of roughly $28.5 million (from both the Compact's funds and the participants' contributions), these programs will result in roughly $57.6 million in reduced energy costs. This means that the net benefits of these programs will be roughly $29.1 million. No other investment in electricity resources and infrastructure offers this type of return for the investment. Furthermore, these results do not account for the indirect economic benefits that occur when lower electric bills result in increased disposable income for households and improved productivity for businesses and industries.

Similarly, all of the Compact's energy efficiency programs result in significant environmental benefits that are not accounted for in the cost-benefit results above. By helping to avoid the construction and operation of power plants within New England, these programs can help mitigate some of the gravest environmental threats facing our

society today; including global warming, ground-level ozone, acid rain, and health impacts from fine particulate matter and air toxics.

Table 2.4 Program Cost-Effectiveness: Impacts of Activities from 2003-2007

	Benefits	Costs	Net Benefits	BCR
Residential Programs:				
LI Single Family	$959,142	$813,959	$145,184	1.18
LI Multi-Family	$895,670	$533,447	$362,223	1.68
LI New Construction	$435,070	$371,833	$63,236	1.17
Total LI	$2,289,882	$1,719,239	$570,643	1.33
New Construction Demo	$193,056	$349,430	$(156,374)	0.55
New Construction	$1,092,591	$761,762	$330,829	1.43
Products & Services	$7,798,734	$3,500,897	$4,297,837	2.23
HomEnergy	$14,499,684	$7,736,966	$6,762,719	1.87
Total Non-LI	$23,584,065	$12,349,054	$11,235,011	1.91
Total Residential	$25,873,947	$14,068,293	$11,805,654	1.84
C&I Programs:				
New Construction	$4,347,959	$1,297,646	$3,050,313	3.35
Med & Large Retrofit	$4,081,146	$1,810,351	$2,270,795	2.25
Small Customers	$15,403,363	$7,745,969	$7,657,394	1.99
Government Agencies	$7,944,156	$3,617,988	$4,326,167	2.20
Total C&I	$31,776,624	$14,471,954	$17,304,670	2.20
Total Compact	**$57,650,571**	**$28,540,247**	**$29,110,324**	**2.02**

All costs and benefits are presented as 2003 present value dollars.

Market transformation programs create many challenges in measuring program cost-effectiveness. It is difficult to estimate the extent to which energy efficiency measures will be adopted as a consequence of the program, but beyond those adopted by the program participants. Market transformation programs can also have impacts that go beyond the Compact's service territory, or that take many years to achieve but create long-term effects. The estimates of benefits in Table 2.4 do not include the benefits of these "post program effects." Consequently, our analysis is likely to understate the full amount of energy savings associated with these programs. The Compact is currently working with other Massachusetts energy efficiency program administrators to research opportunities and standardize methods for estimating non-participant spillover and market effects.

2.5 Summary of Program Savings and Impacts

Energy and Capacity Savings

Table 2.5 presents a summary of the energy savings associated with all efficiency measures to be installed by the Compact in 2003.[2] The first column presents the amount

[2] All of the energy and demand savings presented in this Plan are net savings, i.e., they do not include the effects of market transformation, spillover or free-riders. Also, the energy savings presented here are at

of energy savings experienced in the year of installation, while the second column indicates the amount of savings achieved over the full lifetime of the efficiency measures. In total, the Compact's 2003 efficiency program activities are expected to save roughly 12,084 MWh of energy per year.

The lifetime energy savings provide an indication of which programs offer the greatest total electricity savings over the long-term. For example, the HomEnergy Program offers the greatest amount of electricity savings of all programs, representing roughly 31 percent of the total lifetime energy savings. The Small C&I program results in the second-largest electricity savings, with roughly 27 percent of the total lifetime energy savings.

Table 2.5 Program Impacts From Efficiency Activities in 2003

	Annual Electricity Savings (MWh)	Lifetime Electricity Savings (MWh)	(% of total)	Annual Cost ($1000)	(% of total)	Cost of Saved Electricity ($/MWh)
Residential Programs:						
LI Single Family	249	4,054	2%	358	6%	88
LI Multi-Family	219	3,924	2%	214	3%	55
LI New Construction	10	198	0%	133	2%	669
Total LI	478	8,177	4%	705	11%	86
New Construction Demo	13	348	0%	74	1%	213
New Construction	69	1,372	1%	415	7%	303
Products & Services	1,929	24,041	12%	832	13%	35
HomEnergy	3,891	61,603	31%	1,383	22%	22
Total Non-LI	5,902	87,364	44%	2,705	43%	31
Total Residential	6,381	95,541	48%	3,409	54%	36
C&I Programs:						
New Construction	730	11,242	6%	262	4%	23
Med & Large Retrofit	886	12,144	6%	262	4%	22
Small Customers	3,690	53,505	27%	1,609	26%	30
Government Agencies	1,769	25,630	13%	762	12%	30
Total C&I	7,075	102,521	52%	2,894	46%	28
Total Compact	13,456	198,061	100%	6,304	100%	32

Table 2.5 also provides a summary of the costs to achieve the energy savings. The cost of saved energy provides an indication of how the programs compare in terms of annual cost to the Compact per unit of lifetime electricity savings. The Residential Products and Services Program, the HomEnergy Program, and most of the C&I programs have especially low costs of saved energy. The Low-Income Programs and the Residential New Construction Program have particularly high costs of saved energy from this perspective, because these programs save a relatively small amount of electricity. The cost of saved energy figures do not account for other benefits of these programs that can be substantial, including gas and oil efficiency savings, customer benefits and societal benefits.

the end-use level, i.e., they do not account for line losses and thus do not reflect the full amount of electricity generation that they will avoid.

Table 2.6 presents the cumulative energy savings from the Compact's efficiency programs over the total five-year program period. The cumulative annual energy savings represents the amount of savings that will be experienced in each future year, as a result of program activities in the previous years. By the end of the five-year program period, the Compact expects to save roughly 56,049 MWh of energy per year. This amount of energy is approximately three percent of the electricity currently consumed by the customers within the Compact member towns per year.

Table 2.6 Cumulative Annual Energy Savings Over the Five-Year Program (MWh)

	2003	2004	2005	2006	2007
Residential Programs:					
LI Single Family	249	442	637	836	1,037
LI Multi-Family	219	387	559	732	909
LI New Construction	10	18	26	34	43
Total LI	478	847	1,222	1,602	1,988
New Construction Demo	13	24	34	45	55
New Construction	69	122	176	231	286
Products & Services	1,929	3,417	4,927	6,460	8,016
HomEnergy	3,891	6,893	9,940	13,032	16,171
Total Non-LI	5,902	10,456	15,077	19,768	24,529
Total Residential	6,381	11,303	16,299	21,370	26,517
C&I Programs:					
New Construction	730	1,296	1,871	2,455	3,047
Med & Large Retrofit	886	1,574	2,272	2,981	3,700
Small Customers	3,690	6,553	9,459	12,408	15,402
Government Agencies	1,769	3,141	4,534	5,948	7,383
Total C&I	7,075	12,565	18,136	23,792	29,532
Total Compact	13,456	23,868	34,435	45,162	56,049

The cumulative lifetime energy savings represents the total amount of energy savings that will be experienced over the full lifetime of the efficiency measures, as a result of five years of program activities. By the end of the five-year program period, the Compact expects the cumulative lifetime energy savings to be roughly 824,965 MWh.

Table 2.7 presents the cumulative capacity savings from the Compact's efficiency programs over the total five-year program period. The cumulative capacity savings represents the amount of capacity savings that will be experienced in each future year, as a result of program activities in the previous years. By the end of the five-year program period, the Compact expects to be saving roughly 7.8 MW of electric capacity per year.

For the sake of simplicity, the program period savings presented in Tables 2.6 and 2.7 assume that the 2003 programs will continue unchanged through the remaining four years. In practice, the Compact may modify its program designs during the five-year amended program period.

Table 2.7 Cumulative Program Capacity Savings Over the Five-Year Program (kW)

	2003	2004	2005	2006	2007
Residential Programs:					
LI Single Family	25	44	63	82	102
LI Multi-Family	22	39	57	74	92
LI New Construction	1	2	2	3	4
Total LI	48	84	122	160	198
New Construction Demo	3	6	8	11	13
New Construction	5	10	14	18	23
Products & Services	240	424	612	802	995
HomEnergy	392	694	1,001	1,313	1,629
Total Non-LI	640	1,134	1,635	2,144	2,660
Total Residential	688	1,218	1,757	2,303	2,858
C&I Programs:					
New Construction	197	350	505	662	822
Med & Large Retrofit	175	310	448	587	729
Small Customers	522	927	1,338	1,755	2,178
Government Agencies	298	529	763	1,001	1,243
Total C&I	1,191	2,115	3,053	4,005	4,971
Total Compact	1,879	3,333	4,810	6,308	7,829

These savings represent capacity saved at the time of the New England summer peak demand.

It is important to note that the savings results presented in Tables 2.5, 2.6 and 2.7 do not present all of the efficiency savings that are expected to occur as a result of the Compact's programs. These estimates do not account for market transformation effects, whereby some customers adopt efficiency measures as a consequence of the Compact's programs but without participating in the programs. They also do not account for the long-term efficiency savings that are likely to result from the Compact's Education and Marketing campaign. Furthermore, they do not account for non-electric efficiency savings, which can be substantial for several of the Compact's programs.

Emission Reductions

Table 2.8 presents a summary of the air emissions from power plants that are likely to be avoided by the Compact's energy efficiency programs. The first line indicates the emission reductions expected from a single year's activities in 2003. The second line indicates the emission reductions expected from the cumulative annual energy savings by 2007.

The third line presents the 2007 reductions relative to the current emissions from electricity consumption on the Cape and Vineyard. For example, in 2007 the annual energy savings resulting from the five-year program will reduce CO_2 emissions by over 31,000 tons per year, which is roughly three percent of the current level of CO_2 emissions generated by electricity sales to the Compact member towns.

Table 2.8 Reductions in Air Emissions from the Compact's Efficiency Programs

	CO_2	SO_2	NO_X
Annual emission reductions in 2003 (tons)	6,137	13	5
Annual emission reductions in 2007 (tons)	29,100	26	20
Relative to current emissions	3%	1%	2%

In estimating emission reductions, the Compact's efficiency savings were scaled up by 9% to account for transmission and distribution line losses.

The emission reductions presented in Table 2.8 are based on forecasts of the marginal emission rates from New England power plants.[3] Because the electricity generators in New England operate within one large power pool, a reduction in electricity sales on the Cape of Vineyard can affect a marginal power plant anywhere in New England.

2.6 Consistency With State Energy Efficiency Goals

The Division of Energy Resources ("DOER") has established statewide energy efficiency goals that are to be used by efficiency program administrators as the basis for developing their energy efficiency programs. Section 6 describes these goals and demonstrates that the Compact's EEP is consistent with the statewide energy efficiency goals. In fact, the Compact's EEP is likely to achieve each of the goals to a high degree.

The *overall* statewide energy efficiency goal is "to protect the environment and strengthen the economy by increasing the efficiency of energy use." The Compact's efficiency programs will clearly achieve this overall goal. The efficiency measures installed by the Compact over the five-year planning period are expected to save roughly 58,150 MWh per year. These cumulative annual efficiency savings are expected to reduce annual CO_2 emissions by 29,000 tons, annual SO_2 emissions by 27 tons, and annual NO_X emissions by 19 tons. These emission reductions will be achieved at a net negative cost, which means that energy efficiency represents the most cost-effective means of reducing emissions and addressing some of the most pressing environmental issues facing our society today.

On average, every dollar spent on the Compact's efficiency programs will result in roughly two dollars saved in terms of avoided electricity generation, transmission and distribution costs. Participating customers will see even greater savings on their electric bills, because avoided electricity prices are higher than these avoided electricity costs. Lower electric bills will provide businesses and industries with lower operating costs, improved cash flow, and greater opportunities for investment. Lower electric bills will help government agencies reduce costs and keep their budgets in balance. Lower electric bills will also provide residential customers with greater disposable income, which in turn can be used to help stimulate the local economies on the Cape and Vineyard. These impacts will clearly help strengthen the local and state economy.

[3] Ozone Transport Commission, *The OTC Emissions Reduction Workbook 2.1: Description and User's Manual*, prepared by Synapse Energy Economics, December 2002.

3. Residential Programs

3.1 Introduction and Overview

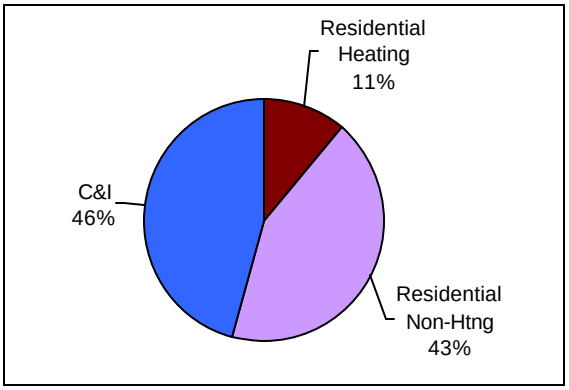
There were roughly 168,000 residential electricity customers in the Compact's member towns in 2001, and they consumed approximately 1,005 GWh of electricity throughout the year. Residential customers represent 87 percent of all Compact electricity customers, but their electricity consumption represents only 54 percent of total electricity consumption, due to the lower amount of electricity consumed per customer.

Table 3.1 Residential Customers and Sales in 2001

	Number of Customers	Percent of Class	Percent of Total	Sales (MWh)	Percent of Class	Percent of Total
Low-Income	27,973	17%	14%	204,401	20%	11%
Non-Low-Income	140,351	83%	73%	800,483	80%	43%
Electric Heat	19,517	12%	10%	206,923	21%	11%
Non Electric Heat	148,807	88%	77%	797,961	79%	43%
Total Residential	168,324	100%	87%	1,004,884	100%	54%
Total Compact	193,061	na	100%	1,852,904	na	100%

Table 3.1 provides a breakdown of different types of residential customers in the Compact's member towns. Low-income customers are roughly 14% of the total customers, and consume roughly 11% of the total electricity sold within the Compact. Customers with electric space heat (both low-income and non-low-income) are responsible for roughly 21% of the residential consumption, and roughly 11% of the total electricity consumption within the Compact, as indicated in Figure 3.1.

Figure 3.1 Compact Sales: Residential Breakdown



The Compact's residential energy efficiency programs are designed to address all of the main residential electricity end-uses, including space heating, water heating,

refrigeration, lighting and major appliances. They are also structured to be available to all of the various customer types, including low-income, new customers, high-use customers, and moderate-use customers. In addition, the programs are linked together, so that customers participating in one residential program will be informed of, and encouraged to participate in, other residential programs.

Beginning in 2003 the Compact will integrate the Residential High Use ("RHU") Program into the Residential Conservation Services ("RCS") Program to create the new Massachusetts Home Energy Services Program. The Department already approved the budget for this program on December 27, 2002 in DTE 02-64. The integration of the two programs will provide residential customers with a "one-stop shopping" approach to home energy efficiency services, will streamline the delivery of in-home energy programs, will optimize the financial incentives offered to residential customers, and will offer customers a wider range of efficiency opportunities. The new HomEnergy Program is designed to comply with the 2001 RCS Coalition Action Plan and the Compact's amendment to that plan. It is also designed to offer customers some of the advantages of the RHU program.

The Compact will continue to offer electric space-heating customers with a choice of switching to more efficient alternative fuel sources, through the Massachusetts Home Energy Services Program. Interested customers will be provided with a technical assessment of switching to efficient gas, propane or oil heating systems. For those customers where fuel-switching is cost-effective the Compact will provide up to a five-year, no-interest loan to support the costs of switching the heating system.

In 2003 the Compact will begin implementing a new Residential New Construction Demonstration Project. The purpose of this program will be to investigate the opportunities for modifying the existing New Construction Program to (a) work with relatively small home builders, (b) achieve greater energy savings per program participant, and (c) promote the construction of homes with relatively low environmental impacts. The results of the Demonstration Project will be used to inform the design and implementation of the Residential New Construction Program in future years.

3.2 Residential ENERGY STAR® New Construction Program

Background

This program will be a continuation of the Residential New Construction ("RNC") Program that the Compact is currently offering. The Compact is also offering a limited sample of customers and homebuilders an opportunity to participate in a Residential New Construction Demonstration Project (see Section 3.3) that seeks to promote greater efficiency savings per participant, as well as the construction of environmentally sound homes.

Program Design

The Residential New Construction Program promotes the ENERGY STAR® Homes standard in an effort to minimize lost energy efficiency opportunities. This regional fuel-

blind initiative was created to help homebuilders and buyers design and construct homes that use less energy than homes built to Model Energy Code standards.

The ENERGY STAR® Home Program is a national, voluntary program designed by the US Environmental Protection Agency that develops partnerships with new home builders, home building contractors and related industries. It is being implemented by electric and gas efficiency program administrators in Massachusetts and other Northeast states, and is oriented toward market transformation. In Massachusetts and neighboring regions, a Joint Management Committee ("JMC"), made up of representatives of the participating efficiency program administrators, administers the ENERGY STAR® Home Program. The Compact is an active member of the JMC.

This program is targeted to home buyers, home builders and the residential construction trade allies, with the long-term goal of promoting efficient residential construction practices and increasing demand for efficiency in both construction design and heating and cooling systems. The program is available to all new homes, regardless of the type of heating fuel used. As a part of this program, the Compact will work with local officials to enforce and improve the building codes on the Cape and Vineyard.

Marketing and Delivery of Program

This program will be marketed with direct builder outreach, home and trade show exhibits, trade journals, general public print and billboards advertisement, builder and homebuyer seminars, the Compact web site, the ENERGY STAR® website (www.energystarhomes.com) and other Compact marketing initiatives. A contractor hired by the JMC performs much of the marketing on a region-wide basis.

This program is also delivered by a builder-interface contractor hired by the JMC. The delivery contractor works with home builders and buyers, applies the Home Energy Rating System ("HERS") to the home, and provides the HERS certification. The administrative vendor processes the rebates and financial incentives.

Efficiency Measures and Customer Incentives

This program promotes efficiency upgrades to all end-uses in a new home, including building shell, HVAC, domestic water heating, and ENERGY STAR® lighting and appliances.

The program offers an ENERGY STAR® plan review, a pre-construction meeting, a post installation inspection, and HERS certification for homes that meet the ENERGY STAR® standards. The program also offers:

- A $500 shell rebate for single-family homes ($200 for each multi-family unit).
- Additional rebates up to $600 for achieving higher levels of energy efficiency beyond the ENERGY STAR® threshold of 86 points in the HERS rating.
- A $100 rebate for mechanical ventilation that is in compliance with the program specifications.

- An ENERGY STAR® lighting component that will identify with the builder or homeowner appropriate locations to install efficient fixtures and lamps. Rebates will be offered for ENERGY STAR® lighting fixtures and light bulbs.
- Free HVAC commissioning services.
- Free building code compliance documentation.

Program Budgets and Impacts

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. This is expected to be a cost-effective program.

Residential New Construction Program Budgets and Impacts

2003 Budgets	$415,246
2003 Participants	251
2003 Building Permits on Cape and Vineyard	2,128
2003 Annual Penetration Rate	12%
2003 Annual Energy Savings (MWh)	69
2003 Lifetime Energy Savings (MWh)	1,372
Program Benefit-Cost Ratio (2003-2007 activities)	1.43

New Program Elements Relative to Phase I

- The administrative vendor for this program was recently re-hired through a competitive bid process run by the JMC.
- The new administrative vendor has agreed to market to and work, through the builder interface contractor, with more of the relatively small builders within the Compact's member towns.
- The new administrative vendor has also agreed to meet the Compact's town-by-town budget allocations.

3.3 Residential New Construction Demonstration Project

Background

Based on its experience in 2001 and 2002, the Compact believes that the RNC Program operated by the JMC can be enhanced to increase the efficiency savings acquired from this important market sector. The existing RNC Program is focused on relatively few large home developers – those that build large numbers of homes per development. On the Cape and Vineyard, however, many of the new homes are built by small home developers – those that build only a few homes per year on independent sites. Thus, many of the key home builders on the Cape and Vineyard are being bypassed by the existing RNC Program, and market transformation opportunities are being lost.

In addition, the Compact believes that there are many efficiency opportunities available from new home construction that are not being captured by the existing RNC Program. Relatively small financial incentives are being offered, thus home builders and buyers are not motivated to adopt all cost-effective efficiency measures, nor to implement more environmentally-sensitive (or "green") building practices beyond energy efficiency concerns.

The purpose of the RNC Demonstration Project will be to address these and other concerns. This program will target several small home builders on the Cape and Vineyard, to investigate whether and how these key actors can be motivated to increase the efficiency of their new homes. This program will offer significantly greater financial incentives per housing unit than the existing RNC Program, but will require participants to achieve much higher standards of efficiency and design. This program will also encourage new home builders and buyers to adopt advanced building practices that reduce the overall environmental footprint of the new home.

In 2003 the Compact will continue offering the existing RNC Program, as well as the RNC Demonstration Project. If the Demonstration Project proves to be successful, then the Compact will replace the existing RNC Program with it, over an appropriate transition period.

Program Design

This program will build upon the various components of the existing RNC Program. It will promote the ENERGY STAR® Homes standard, and will provide participants with a Home Energy Rating and certificate, but will require participants to achieve a higher HERS rating (HERS 90) than is required by the existing program (HERS 86). It will offer both home builders and home buyers financial incentives to increase the efficiency of home design and appliances, but it will also offer additional financial incentives for additional efficiency savings. The overall objective of these incentives will be to maximize the efficiency savings from each participating home.

This program will also go beyond the existing RNC Program by offering technical support and financial incentives for adopting a variety of environmental building practices. The Compact expects that a "green building" approach will help attract the interest of home developers and buyers, as well as increase the environmental benefits of this important program.

The Compact is fortunate to be able to take advantage of a comprehensive, state-of-the-art green building program concept that has already been designed by a coalition of experts on this topic. Building for Social Responsibility ("BSR") and the Vermont Energy Investment Corporation ("VEIC") have developed the Vermont Built Green ("VBG") Scorecard (the "Scorecard") that can be used to assess and identify efficiency and environmental improvements to home design, and to offer points for improved performance that can be easily translated into an incentive structure. BSR/VEIC have allowed the Compact to use the VBG Scorecard, and it is the centerpiece of the RNC Demonstration Project.

This program is targeted to home buyers, home builders and residential construction trade allies, with the long-term goal of promoting highly-efficient, environmentally-sensitive residential construction practices. The program is available to all types of new homes, regardless of the type of heating fuel used.

Marketing and Delivery of Program

This program will be marketed with direct outreach to home builders and buyers that are likely to be interested in the green building concept. The Compact will work with a small number of interested home buyers in 2003, in order to test their interest and the impacts of the incentives package. The Compact will seek to work with several homes on both Cape Cod and Martha's Vineyard. The Compact will also apply the RNC Demonstration Project to several low-income housing developers. The Compact has already begun negotiations with Habitat for Humanity Cape Cod, which has expressed great interest in this program.

Given the small number of participants expected for 2003, this program will be implemented by the Compact staff, supported by the Management Contractor and the Compact's technical consultants. These parties will be responsible for working with home builders and buyers, applying the Home Energy Rating System to the home, providing the HERS certification, submitting the home for ENERGY STAR® certification, applying the VBG Scorecard green building rating system to the home, processing the financial incentives, and tracking the participants' activities and reactions to the program.

Efficiency Measures and Customer Incentives

The Scorecard will be applied to all homes participating in this project, and will be used to determine the financial incentives offered to participants. The Scorecard and financial incentives are structured in such way that home builders and buyers can choose which measures to adopt, and the level of financial support will be based on those choices. The financial incentive package available to participants is described in detail in Appendix A, and the Scorecard is presented in Appendix B. Both are summarized below.

The Scorecard includes seven categories of building design options and green building measures, including: (1) *siting and land use*; (2) *building design*; (3) *quality and durability*; (4) *energy use*; (5) *resource impacts*; (6) *occupant health and indoor air impacts*; and (7) *occupant education, and operations and maintenance*. Within each of these categories there are many different design options, or "approaches." Some of the approaches are considered "threshold requirements," because they must be met in order to qualify as a green building. The remaining approaches are all assigned point scores, ranging from one to three per option. Each approach is assigned the number of points based on their relative energy and environmental benefits: greater points indicate greater benefits. A new home can then be assigned points from the Scorecard in order to determine how efficient and how "green" it is.

The financial package also accounts for the size of the new home being built. All else being equal, a small home will require less energy and have a lower environmental impact than a larger one. The financial package offers incentives for building smaller

homes, by adding points to the score for relatively small homes. This adjustment is made with the use of a sizing matrix, which compares different size homes to average-size homes, depending upon the number of bedrooms per home. The sizing matrix is presented in Appendix B.

The financial incentive package includes three tiers, in order to promote greater efficiency and environmental measures with each increasing tier. The requirements and incentives associated with the three tiers are summarized in Table 3.2.

Table 3.2 Overview of the RNC Demonstration Project Financial Incentive Package

Tier	Requirements	Owner Incentive	Builder Incentive
Tier 1	▪ Achieve a HERS rating of 90 or greater. ▪ Meet all threshold requirements for energy use, occupant health and indoor air quality.	$3,000	$1,000
Tier 2	▪ Achieve Tier 1 requirements. ▪ Meet all other threshold requirements, including: siting and land use, building design, quality/durability, resource impacts, education and O&M. ▪ Earn at least a total of 175 points through the sizing matrix and Scorecard points. No less than 20 points must be earned through energy use criteria, except when the sizing matrix score (X) is greater than 155 points. When X is greater than 155, the number of required energy use points equals 175 – X.	$6,000	$2,000
Tier 3	▪ Achieve Tier 2 requirements. ▪ Earn at least a total of 250 Scorecard points. ▪ No less than 30 points of the total must be earned through energy use criteria not previously credited in an earlier Tier.	$9,000	$3,000

In order to participate in the RNC Demonstration Project the new home must meet the requirements of Tier 1. First, the new home must achieve a rating of 90 or greater from the Home Energy Rating System. This will require substantially more efficiency measures than the 86 rating that is required for the existing RNC program. At 5% savings per HERS point, this four-point increase translates into 20% savings over ENERGY STAR® Homes standards.

Second, the new home must meet all the threshold requirements that fall within the two categories of *energy use* and *occupant health/indoor air quality.* The *energy use* thresholds require many design features, such as efficient lighting fixtures, ENERGY STAR® appliances, and efficient HVAC ductwork and design. If a new home meets all the Tier 1 requirements, the home owner will receive a $3,000 incentive, and the builder will receive a $1,000 incentive.

In order to be eligible for Tier 2 incentives, a home must first achieve all of the Tier 1 requirements. Then the new home must meet the threshold requirements for every category of the Scorecard. Tier 2 also requires that the home earns a total of 175 points through the combined effect of the Scorecard points and the sizing points. In order to

ensure that sufficient attention is paid to saving energy, at least 20 Scorecard points must be earned through design options from the *energy use* category. In order to encourage smaller homes, the 175-point requirement is scaled down for those homes that are of less than average size. If a new home meets all the Tier 2 requirements, the home owner will receive a total $6,000 incentive, and the builder will receive a total $2,000 incentive.

In order to be eligible for Tier 3 incentives, a home must first achieve all of the Tier 2 requirements. Tier 3 also requires that the home earns a total of 250 Scorecard points. Again, in order to ensure that sufficient attention is paid to saving energy, at least 30 points must be earned through design options from the *energy use* category. These 30 points must be above and beyond those earned in qualifying for Tier 2 incentives. If a new home meets all the Tier 3 requirements, the home owner will receive a total $9,000 incentive, and the builder will receive a total $3,000 incentive.

Thus, the total financial incentive available to both the home builder and owner for all three tiers is $12,000. These incentive levels, to both the builder and owner, were developed with the goal of covering enough of the incremental cost of each tier to motivate the home builder and buyer. During the course of the Demonstration Project, the Compact will monitor the participant's reaction to the financial incentive package to see if it offers the appropriate incentives for achieving the program's goals.

Participants will also be offered technical support in the form of a builders manual. This manual will inform home builders and buyers how to adopt building design and construction practices for highly-efficient, environmentally benign houses. The manual will be developed specifically to provide advice on the many design options included in the RNC Scorecard used for this program.

Lesson Learned From This Project

One important aspect of this effort will be to conduct research on the Project's results to inform future new construction program design. The Compact plans to collect information regarding participants' and homebuilders' (a) experience with the Demonstration Project; (b) willingness to participate in a similar program going forward; (c) degree of adoption of energy efficiency and green building measures and designs; and (d) opinions about the necessity and appropriateness of the enhanced financial incentive structure to help new home owners to overcome any significant first cost barriers.

Specifically, the Compact will follow-up with each participant and builder for up to two years after completion of the building project, using post-occupancy surveys, periodic building inspections, analysis of utility bills and review of repair and maintenance records, to insure that the overall performance of the home meets or exceed the project's goals and standards. The initial surveying and fact-finding activity will take place within six months of building project completion. The Compact will compile and analyze this key information and use the findings to decide whether and how to move forward with an expanded new construction program in future years, based on some variation of the Demonstration Project design.

Program Budgets and Impacts

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. Our initial calculations suggest that this program will have a benefit-cost ratio of less than one. Nonetheless, the Compact believes that this is a worthwhile and potentially cost-effective demonstration project to pursue, for several reasons. First, it will provide valuable information about opportunities to improve the existing RNC Program and to transform the new construction housing market on the Cape and Vineyard.

Residential New Construction Demonstration Project Budgets and Impacts

2003 Budgets	$74,041
2003 Participants	6
2003 Annual Energy Savings (MWh)	13
2003 Lifetime Energy Savings (MWh)	348
Program Benefit-Cost Ratio (2003-2007 activities)	0.55

Second, there are many efficiency improvements that are likely to be adopted as a result of this program that the Compact was not able to incorporate into the cost-effectiveness analysis. These efficiency measures are listed in Table 3.3.

Table 3.3 Efficiency Measures Not Accounted For In the RNC Demo Screening

Ducted Heating and/or Cooling Systems:

- Installation of all heating and cooling ducts and mechanical equipment within the building envelope or ducting tested to be less than 1% leakage to outside.
- Air conditioning equipment sized within 10% or next available size of ACCA Manual J.
- Forced air heating/cooling ductwork for primary space conditioning system complies with ACCA Manual D design criteria.
- If necessary, any ducts that run in outside walls must have at least R-7.5 between ducts and outside.
- Central air conditioning refrigerant charge and air flow documented to be within 10% of manufacturer recommendation.
- Air filter housings must be air-tight to prevent bypass or leakage.
- Air flow for each register measured and complies with Manual J design.
- Returns OR transfer grill in each room with closeable door.
- More than one return per zone.

Hydronic Heating Systems:

- Hydronic distribution system located 100% within house envelope.
- Hydronic distribution system pipes insulated where they run through unconditioned (i.e. no thermostat) spaces (e.g. basements, crawlspaces, etc.).
- Hydronic distribution system designed and sized to match room-by-room loads (submit sizing plan).
- Hydronic boiler with less than 4 gallons water content and/or "low mass".
- Boiler controls set up to "cold start" (i.e. does not maintain boiler water temperature 24/7, but allowed to drift down).
- Modulating aquastat/outdoor temperature sensing controls to adjust circulating boiler water.

Other Energy Saving Strategies:

- Points per added Energy Rating point above 5-star 86 point rating for new and above 83 points for existing homes.
- No air conditioning installed.
- Points for each heating zone beyond one (excludes semi-conditioned basement).
- Paved areas shaded by trees.
- Planted (or building sited with) windbreak on north or northwest.
- Plant new and/or existing shade trees and vegetation for shading west sides of building.
- Additional interior mass by adding second layer of (minimal 1/2") gypsum wall board.
- Trellises to shade west side glass.
- Low-solar admittance glass on west, whole window SHGC <.40.
- Awnings or overhang designed to reduce summer heat gain.
- Locate hot water heater within 20 feet pipe run of all showers/baths and kitchen.
- Whole house cooling/'night flushing' fan with tight insulated winter closure system.

Lighting:

- Utilize automatic shutoff of at least 50% of outside lighting fixtures and all incandescent flood lamps during daylight hours.
- Per fixture of high-use ENERGY STAR® or equivalent lighting fixtures beyond required fixtures.
- Use a comprehensive approach to high-quality lighting design – points for lighting design submitted.
- Light pollution minimized through avoiding no direct beam illumination beyond visible property lines.
- Common spaces such as hallways that would otherwise require 24 hour lighting (e.g. multi-family) utilize day lighting and automatic lighting controls.
- Interior motion sensor with photocell. (1 point per fixture, maximum 3 points)

Appliances:

- Other ENERGY STAR® appliances. (1 point per appliance)
- Install a clothesline – 2 points each for indoor and outdoor permanent clotheslines. (max. 4 points)
- Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).

Third, there will be numerous environmental benefits from the RNC Demonstration Project that are also not accounted for in our cost-effectiveness analysis. Table 3.4 presents a list of the most important environmental benefits that may results from this project. In addition to these benefits, this project will provide environmental benefits as a result of reduced electricity consumption.

Table 3.4 Environmental Benefits Not Accounted For in the RNC Demo Screening

Scorecard Number	Approach	Points Earned	Environmental Issue
1.1.a.	Locate site within ¼ mile of public transport stop.	3	Smart Growth
1.1.e.	In-fill development – locate housing in empty lots in an existing neighborhood	3	Smart Growth
1.2.e.	Provide and implement responsible storm water management plan for site, including: Avoid storm sewering where possible; Minimize impervious ground coverings and reduce roadway widths & lengths; Provide vegetative swales for storm water infiltration.	3	Erosion
1.2.f.	Preserve existing trees and vegetation, except within 30' of buildings, except for driveway, solar access, areas cleared for food production and as required for grading for drainage requirements.	3	Preserve Viewscapes
1.3.a.	Creation of conservation and property sale restrictions to preserve sustainable intent.	3	Land Preservation
1.3.e.	Unit in multifamily housing development.	3	Smart Growth
2.1.a.	Construct building that optimizes the use of interior space, so that overall building size is kept to a minimum while still meeting occupants' needs.	Required	Affordable Housing, Preservation of Resources
5.1.e.	2 points for each 5% of total value of materials in the building products made with salvaged, recycled or waste-stream content.	2 per 5% of value	Waste Reduction
5.1.mm.	Points per 10% of value of non-wood materials that are regionally sourced within 200 miles, excluding concrete.	3	Local Economy, Transportation
5.2.a.	Create and implement a plan for construction to provide for the efficient separation of materials that are reusable or recyclable.	Required	Waste Reduction
5.4.a.	Landscaping that requires no irrigation once mature.	3	Water Conservation
6.2.b.	Install an automatic, effective ventilation system which is quiet (less than 1.5 sones for surface-mounted) and has low energy consumption (less than 0.5 watts/cfm), providing at least 15 cfm per bedroom plus 15 cfm.	Required	Indoor Air Quality

3.4 Massachusetts Home Energy Services Program

Background

During Phase I the Compact has offered residential customers both the Residential Conservation Service ("RCS") Program and the Residential High Use ("RHU") Program.

The Residential Conservation Service Program is offered by all Massachusetts electric and gas utilities, according to Massachusetts law. The Compact's RCS program is available to all residential customers. It follows the structure outlined in the June 2001 RCS Coalition Action Plan, and the Compact's amendment to that Plan. Participating

customers receive home energy education, a home energy audit, and financial incentives for a variety of efficiency measures, including incentives for efficiency savings from non-electric energy measures. As a part of the DOER-sponsored RCS redesign in 2002, the program will be renamed the Massachusetts Home Energy Services Program.

The Residential High Use Program is available to all residential customers whose electricity consumption exceeds 8,000 kWh per year. Participating customers receive a home energy audit, along with financial incentives for a variety of efficiency measures, with an emphasis on measures to reduce space-heating and -cooling requirements. The RHU program also offers customers a no-interest loan to assist them in switching their space-heating system from electric to an alternative fuel. The financial incentives offered by the RCS and RHU are different and, in some cases, cover different types of efficiency technologies.

Beginning in 2003 the Compact will integrate the Residential High Use Program into the Residential Conservation Services Program, to create the new Massachusetts Home Energy Services Program. (This new program is also referred to as the "HomEnergy" Program.) The integration of the two programs will provide residential customers with a "one-stop shopping" approach to home energy efficiency services, will streamline the delivery of in-home energy programs, will optimize the financial incentives offered to residential customers, and will offer customers a wider range of efficiency opportunities. The new HomEnergy Program is designed to comply with the 2001 RCS Coalition Action Plan and the Compact's amendment to that plan. It is also designed to offer customers the advantages of the RHU program. In sum, the HomEnergy Program will provide all participating residential customers with the best features of both programs. The Department previously approved the budget for this program on December 27, 2002 in DTE 02-64.

Program Design

This program will offer home energy services to all residential customers that pay an electric bill within the Compact's member towns. The overall objective of the program will be to provide comprehensive information, home energy audits and financial assistance to help customers retrofit their existing homes with more efficient measures. All residential customers will be eligible, regardless of their electricity usage levels. The program will offer fuel-blind assistance for non-electric energy measures, including non-electric space-heating efficiency measures.

The Compact will continue to be a participant in the RCS Network that includes representatives from DOER and the electric and gas utilities in Massachusetts. This will allow the Compact to keep the Massachusetts Home Energy Services Program up-to-date with modifications that are made by the RCS Network over time.

Marketing and Delivery of Program

This program will be marketed through several channels. The Compact will participate in the statewide HomEnergy 800 phone number, as outlined in the Compact's amendment to the 2001 RCS Coalition Action Plan. The program will also be marketed

through annual announcements in NSTAR's customer bills, as well as through local government access channels, the Compact's web site, informational flyers, public forums, and the various Compact marketing and education activities. Supplemental direct marketing will also be targeted to high-use electric customers in order to maintain historic service levels to this important segment of customers.

This program will offer both Tier I and Tier II services, in accordance with the Coalition Action Plan. Under the Tier I services, customers that call the 800 HomEnergy number will be interviewed in order to determine their need and reason for calling. The Tier I Customer Service Representative will use the interview to determine the most appropriate means of addressing the customer's needs. If the customer uses natural gas for space heating, then he or she will be referred to KeySpan Energy's HomEnergy Program. The Tier I Representative will also determine whether the customer can benefit from initiatives not related to energy efficiency, such as services offered through utility Customer Service Departments, or the low-income discount electric rate.

The Tier I Representative will also determine whether the customer is a good candidate for a Tier II in-home energy audit. If so, the customer will be referred to Tier II. If not, the customer will be provided with educational materials regarding energy use and efficiency opportunities. All customers that specifically request an in-home energy audit after talking with the Tier I Representative will be referred to Tier II, unless they have received Tier II services within the past 12 months.

A vendor selected by the Compact through a competitive bidding process will provide the Tier II services. The Tier II services will include a comprehensive home energy audit. The Tier II audit will be conducted using the RCS home energy audit tool. The purposes of the audit will be to assess the efficiency opportunities of the customer, deliver on-site energy education, deliver low-cost on-site efficiency measures, and to encourage the customer to implement the cost-effective efficiency measures that are identified.

Efficiency Measures and Customer Incentives – Tier II

This program will address all of the key end-use measures that are currently addressed through either the RCS or the RHU program. The Massachusetts Home Energy Services Program offers participating customers the same financial incentives that are currently offered through the RCS Program, where appropriate. It also offers the same financial incentives that are currently offered through the RHU program, where appropriate. Where the RCS and RHU incentives are different, the HomEnergy incentive will be based on which incentive appears to be more effective. Table 3.5 presents the incentives offered through the Massachusetts Home Energy Services program. It also presents the incentives offered by the RCS and RHU programs in 2002, for comparison.

Table 3.5 Efficiency Measures and Incentives Offered by the HomEnergy Program

Efficiency Measure	RCS Program (2002)	RHU Program (2002)	HomEnergy (2003+)
Domestic Hot Water:			
Electric.	ISM.	ISM.	ISM.
Non-Electric.	ISM.	No measures.	ISM.
Thermal Measures:			
Electric Heat & AC.	EEI of 33%, up to $500.	Rebate of 75%, no cap.	Rebate of 75%, no cap.
Non-Electric.	EEI of 33%, up to $500.	No measures.	Rebate of 50%, up to $1000.
Electric Heat.	no fuel-switching.	fuel-switching supported with no-interest loan.	fuel-switching supported with no-interest loan, capped at $5,000.
Lighting Measures:			
Fixtures.	No incentive offered.	Replace high-use, free.	Replace high-use, free.
Torchieres.	No incentive offered.	Replace halogen, free.	Replace halogen, free.
Bulbs.	ISM, plus rebates.	ISM, limited to high use lighting applications.	ISM, limited to high use applications, plus rebates.
Refrigerators.	Usage: AHAM or meter. EEI of 33%, up to 500. Eligibility: 7-yr payback.	Usage: metered. Rebates ($400-$1000), based on size and usage.	Usage: metered. Eligibility: 7-yr payback. Rebates: $300.
Appliance Timers.	No incentive offered.	Installed free.	Installed free for all.
Bill Disaggregation.	Covered in Tier I.	Disaggregation report provided to all.	Disaggregation report provided to all.

Notes:

- *ISM: Instant Savings Measure, includes no-cost or low-cost measures that are provided at the time of the initial audit at no cost to the customer.*
- *EEI: Energy Efficiency Incentive, includes a rebate of 33% for the cost of efficiency measures, with a cap of $500 annually for all measures (both electric and non-electric).*
- *Thermal measures include: blower door test, insulation, air-sealing, duct-sealing, ventilation and programmable thermostats.*
- *Non-electric thermal measures are not provided to customers with gas space-heating. These customers are instead offered thermal measures by the KeySpan RCS/HomEnergy program.*

The Compact is currently working with DOER to implement a more consistent refrigerator incentive program than what was provided in the past. The changes proposed to take place in the Spring of 2003 include a fixed $300 incentive for eligible ENERGY STAR® models, as well as additional quality control and assurance that the units removed by retailers and vendors are properly disposed of and do not enter the secondary market.

In addition, the thresholds to determine whether existing refrigerators are eligible for a replacement rebate will depend upon refrigerator size and usage levels. Table 3.6 presents the size and usage levels that define the replacement rebate thresholds.

Table 3.6 Refrigerator Replacement Rebate Eligibility

If the existing refrigerator is:	It is eligible for incentive if it uses at least:
13 to 13.9 CF	1000 kWh
14.0 – 14.9 CF	1200 kWh
15.0 – 15.9 CF	1400 kWh
16.0 – 17.9 CF	1600 kWh
18.0 – 18.9 CF	1800 kWh
19.0 – 21.9 CF	2000 kWh
22.0 – 23.9 CF	2200 kWh
Larger than 23.9 CF	2400 kWh

Electric space-heating customers will be provided with an analysis of the costs and benefits of replacing the existing electric space heating system with an efficient gas, oil or propane system. In order to qualify for Compact funding, a gas furnace must have an Annual Fuel Utilization Efficiency ("AFUE") rating of 90 percent or greater, and a gas boiler must have an AFUE rating of 85 percent or greater. Oil and propane systems will also be required to meet comparable efficiency ratings.

The space heating analysis will take account of the specific characteristics of the customer's home, e.g., the availability of natural gas or propane, whether there is existing ductwork in the home, whether there is an existing flue for the home, the remaining life of the existing system, and whether a partial space heating system (i.e., an area heater) would be appropriate. For those applications where fuel-switching is cost-effective, participants will be offered a five-year, no-interest loan of up to $5,000 to replace the electric system.

The Compact will also continue to support the RCS/HomEnergy program that is delivered by KeySpan Energy to customers with gas space heating. The Compact will reimburse KeySpan for all of the Energy Efficiency Incentives that they provide to customers for installing efficient electric end-use measures.

Program Budgets and Benefits

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. This is expected to be a highly cost-effective program.

HomEnergy Program Budgets and Impacts

2003 Budgets	$1,382,962
2003 Participants	1,729
2003 Annual Energy Savings (MWh)	3,891
2003 Lifetime Energy Savings (MWh)	61,603
Program Benefit-Cost Ratio (2003-2007 activities)	1.87

The program participants listed here are for the electric portion only

New Program Elements Relative to Phase I

- The existing RCS and RHU programs will be integrated into this single program in order to provide customers with one-stop shopping, and to streamline the delivery process.
- All residential customers that request an energy audit will be provided with one, regardless of their electricity usage levels.
- All residential customers will be offered consistent efficiency measures and incentives. Refrigerator incentives will be determined using a size-based approach.
- All residential customers will be offered financial incentives for non-electric efficiency measures, as well as electric.
- The Compact's program vendor will be allowed to perform the space-heat fuel-switch for those customers that choose to pursue this option. Customers will no longer need to find their own, independent fuel-switching vendor.
- The Compact will work with its program vendor to address many of the comments and suggestions from the recently completed process evaluation of the RHU program.

3.5 Residential ENERGY STAR® Products and Services Program

Background

This program is a continuation of the Residential Products and Services Program that the Compact is currently offering.

Program Design

This program promotes the purchase and installation of energy efficient lighting measures and appliances at the time of initial purchase or replacement. All residential customers will be eligible to take advantage of the measures provided in this program. Customers that are eligible for any other residential program offered by the Compact would be served primarily through that program, but would also be offered lighting and appliance measures through this program.

This program will promote and implement the Northeast Energy Efficiency Partnership ("NEEP") residential lighting and appliance initiatives. These initiatives are offered with other regional Program Administrators, with the overall goal of transforming the markets for efficiency products by increasing the availability, consumer acceptance, and use of these products.

The NEEP Lighting Initiative includes a catalog component and a retail sales component. The catalog component offers customers a selection of energy efficient lighting products, and NEEP sponsors subsidize the costs of the efficiency items. The retail sales component provides customers with instant rebates toward the purchase of qualifying lighting products, with rebate coupons provided through the mail and at point of sale.

The NEEP Appliance Initiative promotes the purchase of high-efficiency appliances at the point of sale, by working with appliance distributors and offering promotional literature and rebates at retail appliance stores. The program will also provide information and labels for use by retailers and manufacturers to identify which appliances meet the ENERGY STAR® energy efficiency guidelines.

Marketing and Delivery of Program

In collaboration with NEEP and other program administrators throughout the region, the Compact has developed a marketing campaign designed to promote ENERGY STAR® lighting and appliances at multiple levels. This campaign includes print and major media designed to reach consumers, information and education provided to retail sales staff, as well as enlistment of partnerships and coop advertisement with manufactures and retail organizations. The program is also promoted on the Compact web site. The tie-in to the ENERGY STAR® brand also offers marketing and promotional opportunities through that national program.

This program is delivered in coordination with other NEEP program administrators jointly utilizing three contractors. A retail outreach service coordinator provides recruitment, training, and placement of retail marketing materials. A marketing firm is used to develop and produce point of purchase advertisement as well as print and major media campaigns. A fulfillment contractor processes rebate applications and payments to customers and retailers.

In 2003 the Compact will attempt to find retailers that are willing to provide a small "showcase" for ENERGY STAR® products. This showcase would be a prominent display that demonstrates several key products, provides energy efficiency education materials, and informs customers of the Compact's energy efficiency programs.

Efficiency Measures and Customer Incentives

This program promotes ENERGY STAR® fixtures and screw-in compact fluorescent bulbs, as well as clothes washers, refrigerators, dishwashers, and room air conditioners. In 2003 the Compact will begin offering incentives to promote efficient dehumidifiers, which are commonly-used on Cape Cod and Martha's Vineyard due to the moist climate there.

This program provides rebate incentives directly to customers, as follows:

- Compact florescent bulbs: $2.
- Exterior fixtures: $10.
- Interior fixtures: $15.
- Torchieres: $20.
- Clothes washers: $50.
- Dishwashers: $25.
- Room air conditioners: $25.
- Dehumidifiers: incentive to be determined.

- Additional coordinated high-efficiency furnace initiative, where a $400 customer rebate is shared between the Compact and GasNetworks ($200 from Gas Networks, $200 from the Compact).[4]
- Additional national ENERGY STAR® and NEEP-coordinated initiatives may be offered during limited promotional times with regional partners (manufacturers and retailers). For example, the Compact may support the U.S. Environmental Protection Agency ("EPA") Change-A-Light initiative, a planned national ENERGY STAR® clotheswasher initiative, and various Earth Day efficiency activities.

Program Budgets and Impacts

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. This is expected to be a highly cost-effective program.

Residential Products and Services Program Budgets and Impacts

2003 Budgets	$832,482
2003 Participants	not available
2003 Annual Energy Savings (MWh)	1,929
2003 Lifetime Energy Savings (MWh)	24,041
Program Benefit-Cost Ratio (2003-2007 activities)	2.23

New Program Elements Relative to Phase I

- This program will offer incentives for several new efficiency measures, including: room air conditioners, dehumidifiers, and dishwashers.
- During 2003 the Compact will investigate alternative catalog options, such as using the Smart Living catalog produced by Connecticut Light and Power Company.
- The Compact will also work with several key energy product retailers in the region to set up a showcase for ENERGY STAR® products.

[4] GasNetworks is comprised of six member Massachusetts Natural Gas Companies serving residential and C&I customers throughout Massachusetts to roll-out in the Spring/Summer of 2003 (see www.gasnetworks.com).

4. Low-Income Programs

4.1 Introduction and Overview

There are 27,973 residential electricity customers eligible for the Compact's low-income programs, which is roughly 17% of all residential customers. These low-income customers consumed 204 GWh of electricity throughout the year, which is roughly 20% of sales to all residential customers. Table 4.1 provides information regarding the low-income customers in the Compact's member towns.

Table 4.1 Low-Income Customers and Sales in 2001

	Number of Customers	Percent of Class	Percent of Total	Sales (MWh)	Percent of Class	Percent of Total
Low-Income	27,973	17%	14%	204,401	20%	11%
Non-Low-Income	140,351	83%	73%	800,483	80%	43%
Total Residential	168,324	100%	87%	1,004,884	100%	54%
Total Compact	193,061	na	100%	1,852,904	na	100%

The number of low-income customers is based on 2000 census data. The sales to these customers have been estimated by multiplying the number of customers by the usage per customer of all customers on the discounted electric rate.

While low-income customers account for only 11% of the total sales, they are an important component of the Compact's efficiency initiatives because they tend to use more electricity than other residential customers. One reason for this is that they rely more heavily upon electricity for space heating. Roughly twenty percent of customers on the low-income electric rate rely upon electric space heating, while only eleven percent of other residential customers do. Low-income customers are also important because their electricity bills tend to represent a larger portion of their total expenses, relative to other residential customers, and reducing low-income electricity bills offers several societal benefits.

In 2003 the Compact will begin using a new criterion for determining the eligibility of customers for the low-income programs. Residential customers will be eligible for these programs if their household income is 60% or less of the median income of their county. In Barnstable County the median income is $45,933, and 60% of this is $27,560. In Dukes County the median income is $45,559, and 60% of this is $27,335. According to the 2000 Census, there are 26,285 households that fall within this category in Barnstable County, and 1,688 households in Dukes County – leading to a total of 27,973 low-income customers for the Compact as a whole.

In recent years, the Massachusetts electric companies have coordinated their low-income efficiency programs through the Low-Income Energy Affordability Network ("LEAN"). This network provides support in the design of low-income programs, and provides a connection to the local weatherization agencies that operate throughout Massachusetts. The Compact will continue to coordinate its low-income programs with the LEAN

initiatives. The program designs in this EEP are based on the LEAN programs and measures, and the delivery of these programs will be coordinated with the local weatherization agencies on Cape Cod and Martha's Vineyard.

The 2003 low-income program budgets include a new line item, referred to as "Low-Income Special Projects." This line item includes costs for special initiatives that are targeted to low-income customers but are not necessarily delivered through one of the other three low-income programs. Current plans include: $66,000 for efficiency measures in one of Barnstable County's assisted living facilities; $24,000 to assist Habitat for Humanity to participate in the Residential New Construction Demonstration Program, and $60,000 for qualifying low-income single-family home efficiency measures. The funds for this budget item are obtained from a portion of the low-income carryover funds from 2002.

4.2 Low-Income Single-Family

Background

This program is a continuation of the Low-Income Single Family Program that the Compact is currently offering.

Program Design

This program addresses all low-income customers living in single-family dwellings. The program will be made available to all customers that are presently billed on NSTAR's Residential Assistance Rate. Other eligible households include those who receive assistance from government agencies such as Fuel Assistance, Weatherization Assistance Programs ("WAP"), Aid to Families With Dependent Children, Supplemental Social Security, Women Infants and Children programs, or customers whose household income level falls below 60% of the median household income in their county.

The program includes two components: an appliance maintenance program ("AMP") and a space heating component. Eligible customers will receive an energy audit, including direct installation of low-cost measures addressing primarily the lighting and water heating end-uses. During the audit process, technicians will identify the need for additional services such as space heating measures or refrigerator replacements. Customers will also be provided with education materials providing advice on how to reduce electric bills through more efficient practices.

In 2003 the Compact will better integrate the electricity-based audits with the weatherization-based audits that are currently provided through WAP agencies, to ensure "one-stop shopping" for low-income customers. The Compact will work with the program vendor to ensure that participants are properly screened before being visited for an energy audit. If a customer has electric space heat, then the vendor will send an auditor that is trained to provide weatherization audits, assistance and education, as well as the electricity-based audits and assistance. The Compact will also ensure that weatherization funds are appropriately coordinated for participating customers.

Marketing and Delivery of Program

By statute, the low-income programs are implemented by the low-income weatherization and fuel assistance network. The lead agency for this program, the Housing Assistance Corporation ("HAC"), serves as the project coordinator and provides direction to other agencies and subcontractors.

Customers will be contacted directly by the Housing Assistance Corporation. Promotional material and literature will also be distributed through the WAP networks, local social service agencies, town governments, and other networks available to the Compact.

In 2003 the Compact will better identify and serve customers that might not be easily identified as eligible for the low-income programs. When the Compact's HomEnergy auditor identifies a customer that is eligible for a low-income program, that auditor will provide the appropriate low-income audit and program materials at the time of the visit. This will help prevent the inefficiencies and barriers created by having two separate visits and audits.

Efficiency Measures and Customer Incentives

The AMP component of this program offers participants site visit diagnostics, customer education, disaggregation of the customer's electricity bill, analysis of high-use appliances, and installation of efficiency measures. The package of measures also includes compact fluorescent lightbulbs, hot water flow restrictors, pipe insulation and water heating tank wraps as applicable, replacement of existing refrigerators where applicable, and replacement of electrically-heated water beds with "flat" beds.

The space heating component of this program will provide weatherization measures such as air sealing, insulation, thermostat controls, interior storm windows, and pipe and hot water tank wraps. These measures will also be provided at no cost to the participant.

Electric space-heating customers will be provided with an analysis of the costs and benefits of replacing the existing electric space heating system with an efficient gas, oil or propane system. In order to qualify for Compact funding, a gas furnace must have an AFUE rating of 90 percent or greater, and a gas boiler must have an AFUE rating of 85 percent or greater. Oil and propane systems will also be required to meet comparable efficiency ratings.

The space heating analysis will take account of the specific characteristics of the customer's home, e.g., the availability of natural gas or propane, whether there is existing ductwork in the home, whether there is an existing flue for the home, the remaining life of the existing system, and whether a partial space heating system (i.e., an area heater) would be appropriate. For those applications where fuel-switching is cost-effective, participants will be offered a grant of up to $6,000 to replace the electric system.

All materials and measures will be provided at no cost to the program participant. Where applicable, building owners (or tenants) will also be informed about any other relevant measures offered to customers through the Residential ENERGY STAR® Products and Services Program.

Program Budgets and Impacts

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. This program is expected to be cost-effective.

Low-Income Single-Family Program Budgets and Impacts

2003 Budgets	$357,936
2003 Participants	275
2003 Annual Energy Savings (MWh)	249
2003 Lifetime Energy Savings (MWh)	4,054
Program Benefit-Cost Ratio (2003-2007 activities)	1.18

New Program Elements Relative to Phase I

- Housing Assistance Corporation will replace South Middlesex Opportunity Council as the Compact's vendor for this program
- The Compact will better integrate the electricity-based audits with the weatherization-based audits, to ensure "one-stop shopping" for low-income customers.
- The Compact will work with the Human Services community to better identify and serve customers that might not be easily identified as eligible for the low-income programs.

4.3 Low-Income Multi-Family

Background

This program is a continuation of the Low-Income Multi-Family Program that the Compact is currently offering.

Program Design

This program addresses all low-income customers living in multi-family dwellings. The program will be made available to all customers that are presently billed on NSTAR's Residential Assistance Rate. Other eligible households include those who receive assistance from government agencies such as Fuel Assistance, Weatherization Assistance Programs ("WAP"), Aid to Families With Dependent Children, Supplemental Social Security, Women Infants and Children programs, or customers whose household income level falls below 60% of the median household income level of their county.

The program includes two components: an appliance maintenance program ("AMP") and a space heating component. Eligible customers will receive an energy audit, including direct installation of low-cost measures addressing primarily the lighting and water heating end-uses. During the audit process, technicians will identify the need for additional services such as space heating measures or refrigerator replacements.

Customers will also be provided with education materials providing advice on how to reduce electric bills through more efficient practices. Customers will not be required to incur any costs of program participation.

In 2003 the Compact will better integrate the electricity-based audits with the weatherization-based audits that are currently provided through WAP agencies, to ensure "one-stop shopping" for low-income customers. The Compact will work with LEAN and the program vendor to ensure that the program auditors are trained to provide weatherization audits, assistance and education, as well as the electricity-based audits and assistance. The Compact will also ensure that weatherization funds are appropriately utilized for participating customers.

Marketing and Delivery of Program

By statute, the low-income programs are implemented by the low-income weatherization and fuel assistance network. The lead agency for this program, the South Middlesex Opportunity Council ("SMOC"), serves as the project coordinator and provides direction to other agencies and subcontractors. However, during 2003 the Housing Assistance Corporation will make the transition to replace SMOC as the Compact's vendor in 2004.

Customers will be contacted directly by the South Middlesex Opportunity Council. Promotional material and literature will also be distributed through the WAP networks, local social service agencies, town governments, and other networks available to the Compact.

Efficiency Measures and Customer Incentives

The AMP component of this program offers participants site visit diagnostics, customer education, disaggregation of the customer's electricity bill, analysis of high-use appliances, and installation of efficiency measures. The package of measures also includes compact fluorescent lightbulbs, hot water flow restrictors, pipe insulation and water heating tank wraps as applicable, replacement of existing refrigerators where applicable, and replacement of electrically-heated water beds with "flat" beds.

The space heating component of this program will provide weatherization measures such as air sealing, insulation, thermostat controls, interior storm windows, and pipe and hot water tank wraps.

Public Housing Authorities, building owners and managers will be provided with educational materials offering advice on how to improve electricity efficiency and reduce operating costs through energy management and maintenance practices.

All materials and measures will be provided at no cost to the program participant. Where applicable, building owners (or tenants) will also be informed about any other relevant measures offered to customers through the Residential ENERGY STAR® Products and Services Program.

Program Budgets and Impacts

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. This is expected to be a cost-effective program.

Low-Income Multi-Family Program Budgets and Impacts

2003 Budgets	$213,918
2003 Participants	234
2003 Annual Energy Savings (MWh)	219
2003 Lifetime Energy Savings (MWh)	3,924
Program Benefit-Cost Ratio (2003-2007 activities)	1.68

New Program Elements Relative to Phase I

- During 2003, the Housing Assistance Corporation will make the transition to replace the South Middlesex Opportunity Council as the Compact's vendor in 2004.
- The Compact will work with the human services community to better integrate the electricity-based audits with the weatherization-based audits, to ensure "one-stop shopping" for low-income customers.

4.4 Low-Income New Construction and Rehabilitation

Background

This program is a continuation of the Low-Income New Construction Program that the Compact is currently offering.

Program Design

This program addresses all low-income housing units that are newly built or that undergo major renovations. The program is targeted to low-income housing development agencies, WAP agencies, home builders, and the residential construction trade allies. The program is available to all new low-income housing units, regardless of the type of heating fuel used.

This program will offer the same services that are provided by the Residential ENERGY STAR® New Construction Program. The program offers home builders a free home energy certification, as long as the completed home meets the minimum standard of 86 on the Home Energy Rating Scale ("HERS"). It also offers rebates for efficient lighting and appliances.

This program differs from the Residential ENERGY STAR® New Construction Program in that it (a) will be focused on a few key housing projects, (b) will rely on a more targeted marketing effort, and (c) will include coordination with low-income housing agencies. Experience has shown that some low-income housing projects have such limited funding

sources that the additional contribution for energy efficiency services can make the difference between a feasible and an unfeasible project. This program will seek to address those low-income housing projects most in need of energy efficiency services.

Marketing and Delivery of Program

By statute, the low-income programs are implemented by the low-income weatherization and fuel assistance network. The lead agency for this program, the South Middlesex Opportunity Council, serves as the project coordinator and provides direction to other agencies and subcontractors.

The program is marketed through direct mailing, telephone, and personal contacts with agencies building low-income housing projects on the Cape and Vineyard. The Compact also has a close working relationship with Habitat for Humanity Cape Cod, which will be building several dwelling units under this program.

Efficiency Measures and Customer Incentives

The program provides incentives directly to the participating homebuilders or low-income housing agencies. Participants receive a free Home Energy Rating certification for units that achieve a HERS rating of 86. The Home Energy Rating System addresses building shell measures, heating systems, lighting systems, and hot water heaters. In addition, the program offers rebates up to $500 for installation of energy efficient appliances, $500 incentive for energy efficient lighting, and subsidies for weatherization installations. There will be a maximum of $3,200 in financial incentives available per new construction project.

If additional incentives are needed to allow the project to incorporate energy efficiency design and products, those incentives will be considered on a case-by-case basis.

Program Budgets and Impacts

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. This is expected to be a cost-effective program.

Low-Income New Construction Program Budgets and Impacts

2003 Budgets	$132,707
2003 Participants	30
2003 Annual Energy Savings (MWh)	10
2003 Lifetime Energy Savings (MWh)	198
Program Benefit-Cost Ratio (2003-2007 activities)	1.17

New Program Elements Relative to Phase I

- The Compact will work to increase the efficiency standards to which new, low-income homes are built. In the past, many participants of this program did not achieve a HERS rating of 86, due to several obstacles that low-income builders

face. The Compact and its vendor will work with builders to increase the HERS rating of participating units.

- The Compact will work with Habitat for Humanity Cape Cod to build new low-income units under the New Construction Demonstration Project.

5. Commercial and Industrial Programs

5.1 Introduction and Overview

Table 5.1 presents an overview of the C&I customers and sales within the Compact member towns in 2001. The information is broken out by small versus medium/large customers, because of the important differences in serving these customer types. Small customers are defined as having peak electrical demands less than 100 kW (approximately 25,000 sq. ft. of typical commercial or industrial space.) In addition, government customers (including municipal, state and federal) are broken out separately, because of the Compact's interest in serving these important customers.

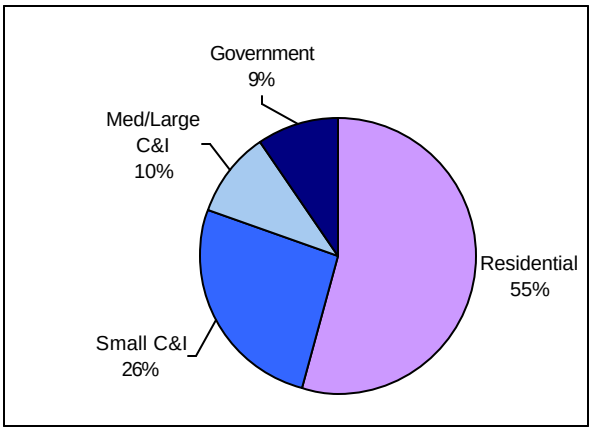
Table 5.1 Commercial and Industrial Customers and Sales in 2001

	Number of Customers	Percent of Class	Percent of Total	Sales (MWh)	Percent of Class	Percent of Total
Non-Government:						
Small	22,128	90%	12%	487,768	58%	26%
Medium/Large	356	1%	<1%	184,719	22%	10%
Total	22,484	91%	12%	672,498	79%	36%
Government:						
Small	1,628	7%	1%	91,667	11%	5%
Medium/Large	80	<1%	0%	77,510	9%	4%
Streetlights	544	2%	<1%	6,346	<1%	<1%
Total	2,252	9%	1%	175,522	21%	9%
All C&I:						
Small	23,756	96%	12%	579,435	68%	31%
Medium/Large	436	2%	<1%	262,239	31%	14%
Streetlights	544	2%	<1%	6,346	<1%	<1%
Total	24,737	100%	13%	848,020	100%	46%
Total Compact	193,061	na	100%	1,852,904	na	100%

Roughly 96% of the Compact's C&I customers are small customers, while only two percent are medium and large C&I customers. Therefore, the Compact's C&I programs will focus on reaching out to many of the small C&I customers. At the same time, the relatively few large and medium C&I customers are responsible for roughly 31% of total C&I sales and 14% of total sales to Compact member towns. Thus, the C&I programs will also serve this important sector of the C&I class.

In addition, the Compact's C&I programs will focus on providing efficiency services to the many government agencies on the Cape and Vineyard. While government agencies represent only one percent of all customers, they are responsible for 21% of the C&I sales and roughly 10% of the total Compact sales. The majority of the government agencies fall within the small customers category.

Figure 5.1 Compact Sales: Commercial and Industrial Breakdown



In previous years, NSTAR provided energy efficiency services to C&I customers through its IRM Program, including C&I customers on Cape Cod and Martha's Vineyard. In 2001 and 2002 the Compact returned a portion of its energy efficiency revenues to NSTAR to pay for those IRM expenses previously committed by NSTAR. Accordingly, the Compact's C&I budgets in 2001 and 2002 were much less than they would otherwise have been without the IRM commitments.

NSTAR's IRM commitments have now been fulfilled. For 2003 and beyond the Compact will not have to return any of its funds to cover IRM expenses, and thus will have full funding available to serve C&I customers. In addition, in 2003 the Compact will have access to nearly $500,000 that was set aside in 2001 and 2002 for IRM payments that were never needed. Between the full funding of C&I programs and the IRM carryover from previous years, the Compact will be able to significantly increase its activities in the C&I sector over the study period.

The Compact's C&I programs differ from the residential programs in that they offer customers and vendors with both prescriptive and custom approaches to energy efficiency measures. Under the prescriptive approach, customers are informed of a large number of energy efficiency measures and services that are available, along with pre-determined levels of financial support for each. Under the custom approach, Compact technical assistance providers and contractors, as well as customers and their vendors are free to propose efficiency improvements that are specifically tailored to the individual customer's needs and interests. The Compact will then review each proposal to ensure that it is cost-effective and meets relevant program guidelines. Under this approach, customers or vendors will be reimbursed for a certain percentage of the incremental cost of the installed efficiency measures.

The Compact is bringing a new staff person on board this year to concentrate on marketing the large C&I and government programs to customers and trade allies. The new staff person will be coordinating the marketing and outreach activities closely with the Compact Governing Board and staff, the Management Contractor, technical assistance contractors and the NEEP initiatives.

5.2 C&I New Construction and Rehabilitation

Background

This program is a continuation of the C&I New Construction Program that the Compact is currently offering, and is similar to that being offered by NSTAR and National Grid.

Program Design

The C&I New Construction Program targets all time-dependent energy efficiency opportunities in the commercial and industrial sector. It promotes energy efficiency in the design and construction of all new commercial, industrial, institutional, and government facilities. It is available to these customer types at the time of new or substantial reconstruction, renovation, remodeling of existing buildings, or equipment replacement at the end of its useful life. The intent is to help customers overcome the first-cost and other barriers to investing in energy efficiency. An additional component of the program includes marketing and implementation of regional market transformation initiatives such as MotorUp and Cool Choice.

This program is similar to the C&I new construction programs being offered by electric distribution companies in the region, in order to help eliminate customer confusion and achieve consistent approaches to C&I efficiency. Participating customers will be offered technical support, financial assistance, education, project design and commissioning services.

Marketing and Delivery of Program

Eligible customers and vendors are encouraged to submit proposals for site-specific projects, i.e., the program is vendor-driven. Qualified vendors and customers will be encouraged to propose projects to be serviced by this program. In some cases vendors and customers will take the initiative of performing engineering studies as appropriate, identifying efficiency measures, documenting the incremental costs and savings of the measures, installing all qualifying measures, performing any on-going O&M services, and demonstrating the savings that are achieved over time. In most cases, however, much of these services will be encouraged or directly provided by the Compact. For example, the Compact will provide technical and design assistance early in the development of designs to ensure efficient measures are analyzed and included in projects where appropriate and cost effective. For customers interested in these services, the Compact will work out financial arrangements where the customer may contribute some portion to these service costs.

Program implementation activities are directed through trade allies, energy service companies, and customers. The Compact contracts for support of certain activities including technical review of some applications, as well as technical and design assistance to work with customers and their contractors to ensure efficiency measures are identified and analyzed, potentially including full simulation modeling from comprehensive design projects. The Compact will also perform post installation inspection on some projects. Additionally, broad-based customer marketing and direct

upstream marketing to manufacturers, distributors and vendors for motors and unitary HVAC equipment will be performed through the MotorUp and CoolChoice programs delivered through the market transformation initiative coordinated by the Northeast Energy Efficiency Partnership. Additionally, these program contractors will perform some rebate fulfillment services for the Compact.

This program is marketed using media advertisements, direct mail to customers and trade allies, customer site visits, the Cape Light Compact web site, and construction bulletins. The Compact has also established partnerships with local Chambers of Commerce and trade associations to promote all C&I programs.

Efficiency Measures and Customer Incentives

This program covers a wide range of efficiency measures, depending upon the customer's electricity end-uses and measure cost-effectiveness. The technologies supported include, but are not limited to, lighting, variable speed drives, building envelope measures, controls, energy management systems, HVAC and process improvements. Prescriptive efficiency criteria and financial incentives are offered for selected lighting, motor, VFD and HVAC measures. All other cost effective measures are promoted with custom incentives.

Financial incentives are based on the incremental equipment and labor costs of installing efficient equipment, as compared to the costs of standard efficiency equipment. Two types of rebates are offered: prescriptive and custom. Prescriptive rebates are fixed amounts provided for specific measures, while custom rebates are based on the unique energy savings criteria of a customer's efficiency project. In general, rebates are designed to cover up to 80% of the incremental cost of the efficiency measure or to buy down the cost of the equipment to a one and a half year payback period, whichever is less. This program also offers design incentives, where appropriate, to cover 50 to 100 percent of incremental architectural and design costs for efficiency improvements.

The financial incentives will be limited to a maximum of $75,000 per project. The Compact may consider requests to exceed this limit on a project-by-project basis.

Program Budgets and Impacts

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. This will clearly be a very cost-effective program.

Commercial & Industrial New Construction Program Budgets and Impacts

2003 Budgets	$156,994
2003 Participants (excluding Products and Services)	10
2003 Annual Energy Savings (MWh)	730
2003 Lifetime Energy Savings (MWh)	11,242
Program Benefit-Cost Ratio (2003-2007 activities)	3.35

Program savings, costs and benefits include the impacts of the C&I Products and Services Program.

New Program Elements Relative to Phase I

- Because of the expiration of IRM payments, the Compact will have significantly more C&I funding available than in the past, and will therefore ramp up its activities in this sector.
- In 2003 the Compact will begin implementing a new, comprehensive marketing plan to address all medium, large and new construction C&I projects.
- In 2003 the Compact will begin implementing a new management plan to assist with the management and implementation of all medium, large and new construction C&I projects.

5.3 Large Commercial and Industrial Retrofit

Background

This program is a continuation of the Large C&I Retrofit Program that the Compact is currently offering, and that is similar to programs being offered by NSTAR and National Grid.

Program Design

The program encourages customers to replace existing operating equipment and processes in their facilities with high efficiency equipment. These would be discretionary retrofits to equipment the customer would otherwise not consider replacing, but for improved efficiency. It serves all commercial and industrial customers whose peak demands exceed 100 kW. This retrofit program is similar to the large C&I retrofit programs being offered by electric distribution companies in the region, in order to help eliminate customer confusion and achieve consistent approaches to C&I efficiency throughout the region.

Qualified customers and their vendors, contractors and design professionals are provided with education, technical assistance, financial assistance, and commissioning services. Eligible customers and vendors are encouraged to submit proposals for site-specific retrofit projects, i.e., the program is vendor-driven. This program will also encourage customers to participate in the C&I Products and Services Program, as appropriate. In some cases (particularly government customers, see below) the Compact may provide technical services to help initiate projects.

Marketing and Delivery of Program

Eligible customers and vendors are encouraged to submit proposals for site-specific projects, i.e., the program is vendor-driven. Qualified vendors and customers will be encouraged to propose projects to be serviced by this program. In most cases, vendors and customers will have the responsibility for performing engineering studies as appropriate, identifying efficiency measures, documenting the incremental costs and

savings of the measures, installing all qualifying measures, performing any on-going O&M services, and demonstrating the savings that are achieved over time.

Program implementation activities are directed through trade allies, energy service companies, and customers. The Compact contracts for support of certain activities including technical review of some applications, technical assistance for comprehensive design, chiller, and other projects, and post installation inspection. This program is marketed using media advertisements, direct mail to customers and trade allies, customer site visits, the Cape Light Compact web site, and construction bulletins. The Compact has also established partnerships with local Chambers of Commerce and trade associations to promote all C&I programs.

Efficiency Measures and Customer Incentives

The program offers customers financial assistance, education, technical assistance and commissioning services. This program covers a wide range of efficiency measures, depending upon the customer's electricity end-uses and measure cost-effectiveness. The technologies supported include, but are not limited to: lighting, variable speed drives, building envelope measures, controls, energy management systems, HVAC and process improvements.

Financial incentives are based on the total equipment and labor costs of installing efficient equipment. Two types of rebates are offered: prescriptive and custom. Prescriptive rebates are fixed amounts provided for specific measures, while custom rebates are based on the unique energy savings criteria of a customer's efficiency project. Prescriptive incentives are offered for selected lighting measures only. Any other electrical efficiency measures that pass the cost-effectiveness criteria are eligible for custom incentives. In general, rebates are designed to cover up to 50% of the cost of the efficiency measure or to buy down the cost of the equipment to a one and a half year payback period, whichever is less. This program also offers design incentives, where appropriate, to cover 50 to 100 percent of incremental architectural and design costs for efficiency improvements.

The financial incentives will be limited to a maximum of $75,000 per project. The Compact may consider requests to exceed this limit on a project-by-project basis.

Program Budgets and Impacts

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. This is expected to be a highly cost-effective program.

Large C&I Retrofit Program Budgets and Impacts

2003 Budgets	$156,994
2003 Participants	10
2003 Annual Energy Savings (MWh)	886
2003 Lifetime Energy Savings (MWh)	112,144
Program Benefit-Cost Ratio (2003-2007 activities)	2.25

New Program Elements Relative to Phase I

- Because of the expiration of IRM payments to NSTAR, the Compact will have significantly more C&I funding available than in the past, and will therefore ramp up its activities in this sector.
- In 2003 the Compact will begin implementing a new, comprehensive marketing plan to address all medium, large and new construction C&I projects.
- In 2003 the Compact will begin implementing a new management plan to assist with the management and implementation of all medium, large and new construction C&I projects.

5.4 Small Commercial and Industrial Retrofit

Background

This program is a continuation of the program that the Compact is currently offering, and is similar to that being offered by both NSTAR and National Grid.

Program Design

This program serves all existing commercial and industrial customers whose peak demands are 100 kW or less. Customers are provided with an energy audit and are encouraged to replace existing equipment in their facilities with high efficiency equipment. Participating customers are offered a single source for information, technical assistance, financial assistance, and installation services.

In 2003, this program will be better integrated with the Small C&I Program that KeySpan offers to its natural gas customers. At a minimum, the Compact program vendor will provide customers with an audit for both electric measures and gas measures (where applicable). In addition to the electric efficiency services, the program vendor will provide the customer information regarding the potential gas efficiency services available from KeySpan, as well as advice for how to participate in the KeySpan program. In early 2003 the Compact plans to work with KeySpan to develop this sort of integrated approach to the two programs.

The electric end-use audit will be expanded to offer more comprehensive information to customers about ways that they can save energy beyond the program's offering of eligible measures and financial incentives. In addition, the Compact anticipates adding

more measures as standard prescriptive measures, as well as a greater focus on comprehensive custom measures in 2003.

This program will also encourage customers to participate in the C&I Products and Services Program, as appropriate.

Marketing and Delivery of Program

This program is delivered utilizing a contract vendor that is hired through a competitive bidding process. The vendor will be responsible for all aspects of delivering this program, including developing and implementing the marketing plan, identifying eligible participants, conducting the energy audits, and installing measures or coordinating and managing third party installations as warranted.

The program vendors have the primary responsibility for marketing this program. The Compact has also established partnerships with local Chambers of Commerce and trade associations to promote all C&I programs.

Efficiency Measures and Customer Incentives

The specific technologies addressed will depend upon the needs of each participant. All end-uses are eligible for efficiency improvements, within cost-effectiveness constraints. The primary opportunities are likely to come from lighting, refrigeration, water heating and HVAC end-uses. Where appropriate, retrofitting multiple and interacting end-uses will be coordinated to ensure optimal system design (e.g., re-sizing and replacement of cooling equipment at the time of a comprehensive lighting replacement).

In the past, lighting and refrigeration efficiency measures have dominated the Small C&I programs because of their short pay-back periods. In 2003 the Compact will provide the program vendors with the mandate and the financial incentives (for the vendor) to expand the range of efficiency measures that are promoted to customers. Some additional measures may become standard practice. In addition, the contractor will be expected to identify and install (either directly or through a subcontractor) all cost effective electric efficiency measures on a custom basis.

Participants will be provided with audits to identify cost effective opportunities free of charge. Most participants will be required to pay 80% of the total equipment and labor costs of installing efficient measures.

Participants that are not eligible for gas efficiency programs from KeySpan will also be provided with educational materials and small financial incentives for non-electric efficiency measures. The program vendors will present such participants with a list of non-electric efficiency measures, such as faucet aerators, weatherstripping, insulation, duct sealing measures, commercial dishwasher efficiency measures, and others. Certain low-cost measures would be installed for free, some measures would be covered by the Compact with a 20% rebate up to a total $2,000 cap per project, and other measures would have to be fully paid by the customer.

Program Budgets and Impacts

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. This is expected to be a highly cost-effective program.

Small C&I Retrofit Program Budgets and Impacts

2003 Budgets	$1,609,352
2003 Participants	398
2003 Annual Energy Savings (MWh)	3,690
2003 Lifetime Energy Savings (MWh)	53,505
Program Benefit-Cost Ratio (2003-2007 activities)	1.99

New Program Elements Relative to Phase I

- The program vendors will expand the prescriptive and custom measures offered to customers, beyond the lighting and refrigeration measures that currently dominate the program.
- The program vendors will provide customers with information on energy savings measures that are not covered by the Compact's program, but may be in the customer's interest nonetheless.
- The program will be better integrated with the Small C&I Program that KeySpan offers to its natural gas customers.
- The Compact will work with its program vendors to address many of the comments and suggestions that came from the 2002 process evaluation of this program.

5.5 Government Agencies

Background

This program is a continuation of the Government Agencies Program that the Compact is currently offering. During Phase I the Compact learned that many government agencies do not currently have the funding or authority to pay for even 20% of the cost of efficiency investments. As a result, this program will cover 100% of the costs of the efficiency improvements. In addition, the Compact has secured supplemental funding from Barnstable County, which will be used to provide additional financial incentives to improve the efficiency of the facilities in Barnstable County and the government customers in its constituent municipalities.

Program Design

This program addresses all government facilities, including municipal, state and federal facilities. These customers will be offered the same efficiency services that are offered through the C&I New Construction, C&I Large and Medium, and C&I Small Customer

Programs, depending upon their size and needs. The primary difference between this program and the other C&I programs will be in the marketing and financial incentives. The Compact will aggressively market its C&I programs to all government customers though its government agency network on the Cape and Vineyard. In addition, technical and design assistance will be provided at no cost, and measure financial incentives will cover 100% of the incremental (new construction) and full (retrofit) costs of measures.

Marketing and Delivery of Program

For small government customers, the same vendor that implements the Small C&I Program will implement this program. For new construction, and large and medium government agencies, the same strategies and services will be used as for non-governmental customers.

Efficiency Measures and Customer Incentives

The efficiency technologies addressed through this program will depend upon the needs of each participant. The government agencies will be offered the same efficiency measures and technical support as the customers in other C&I programs. In addition, the LED Traffic Light component of this program will provide municipalities with rebates for retrofitting traffic lights with light emitting diode ("LED") traffic signals.

Beginning in 2003 the Compact will provide all participating government agencies with financial incentives to cover 100% of the incremental costs of new efficiency measures. This increase in the financial incentives will help address the fact that many government agencies currently have very limited budgets and are unable to contribute toward a portion of the efficiency costs.

The financial incentives will be limited to a maximum of $75,000 per project. The Compact may consider requests to exceed this limit on a project-by-project basis.

The Compact has secured $200,000 in funding from Barnstable County to support the Government Agencies Program. Half of these funds will be allocated to 2003, and the remaining half to 2004. At least half of the funds will be targeted to Barnstable County facilities. All of the funds will be used to support town government agencies within the fifteen towns in Barnstable County.

The supplemental funding from Barnstable County is not included in the budgets presented in Section 2.1. It is, however, presented in the table below.

Program Budgets and Impacts

The table below provides a summary of this program's budgets, estimated participants, energy savings, benefits and costs. This is expected to be a highly cost-effective program.

Government Agencies Program Budgets and Impacts

2003 Budgets	$861,716
2003 Participants	125
2003 Annual Energy Savings (MWh)	1,769
2003 Lifetime Energy Savings (MWh)	25,630
Program Benefit-Cost Ratio (2003-2007 activities)	2.20

New Program Elements Relative to Phase I

- The Compact will utilize $200,000 of Barnstable County funds, set aside as leverage dollars, to help support government agency participation in the efficiency programs.
- Government agencies will be provided with enough financial support to cover 100% of the costs of implementing energy efficiency measures, as well as full coverage of any technical and design assistance required.

5.6 C&I Products and Services

Program Design

The purpose of this program is to transform the markets for particular energy efficiency products, services and practices. The Compact will continue to participate in the regional C&I market transformation programs that are being designed and coordinated through NEEP and other regional efficiency agencies. This includes the following initiatives:

- MotorUp. This NEEP program seeks to transform the market for motors by offering customers rebates for purchasing and installing premium-efficiency motors, as qualified by the Consortium for Energy Efficiency. The sponsors of this program – including 21 organizations throughout New Jersey, Connecticut, Massachusetts, Vermont, Rhode Island, and New Hampshire – have hired a contractor which is responsible for identifying, recruiting, and training trade allies to support program efforts, and for broad-based print advertising targeted to trade allies and customers.
- Cool Choice. This NEEP initiative is designed to increase the adoption of energy efficient unitary HVAC products through marketing, customer rebates, promotion of high-efficiency unitary HVAC equipment among consumers equipment specifiers, and vendors, and working with other organizations to promote higher national standards for unitary HVAC equipment. The program is delivered through a regional circuit-rider who informs unitary HVAC vendors about the program and distributes the appropriate rebate information.
- Design Lights Consortium. This program seeks to improve lighting design decisions at the time of major renovation, remodeling and new construction. The goal of this program is to facilitate improved lighting design practices and make them commonplace in all segments of the commercial and industrial lighting

market. The program provides building owners, developers, electrical contractors, manufactures, designers and other stakeholders with the tools and information necessary to design lighting in a way that provides the highest quality of light from the standpoint of efficiency, comfort, productivity and aesthetics.

- Building Operators Certification. This NEEP program is a competency-based training and certification for building operators designed to improve the energy efficiency of commercial buildings. Operators earn certification by attending training sessions and completing project assignments in their facilities. The certification provides a credential for their professional development while offering employers a way to identify skilled operators.

These programs will be coordinated with other relevant C&I programs offered by the Compact. Actual motor and unitary HVAC rebates and savings will be counted under the C&I New Construction Program. Marketing efforts will be linked with this program, and customers will also be informed of these products and services during the course of audits and technical assessments provided through the other Compact C&I programs.

Marketing and Delivery of Program

The program is primarily delivered through the vendor network participating in the NEEP design initiatives. MotorUp is provided through a vendor who is responsible for identifying, recruiting, and training trade allies to support program efforts. Cool Choice is provided through a vendor which acts as a regional circuit rider who informs HVAC, retailers about the programs and distributes the appropriate rebate information. The Building Operators Certification course is provided directly by staff at NEEP. For MotorUp and Cool Choice (the unitary HVAC program), the Compact will promote the measures to its customers, and provide any technical assistance and rebates, as appropriate.

The eligible population for this program varies according to the type of product or service. In some cases the target market is C&I customers, while in other cases the target market includes builders, developers, contractors, retailers, and other trade allies.

Efficiency Measures and Customer Incentives

The primary efficiency measures addressed by this program include premium efficiency motors, HVAC equipment, lighting and lighting controls, and overall building efficiency maintenance and education. For motors and unitary HVAC the program offers prescriptive rebates that on average, cover about 75% of the incremental efficiency cost, and vary based on the size of the equipment installed. Training and educational assistance are also provided.

In 2003 the Compact will expand this program to promote two new efficiency measures. First, the Compact will offer laundromats and other commercial establishments with multiple washers incentives to purchase high-efficiency tumble washers. Participants will be offered rebates of $50 per washer, up to a total of $500 per participant. Second, the Compact will offer rebates of $75 for vending machine operators to install Vending Miser technologies.

In 2003 the Compact will also encourage C&I customers to participate in the Residential ENERGY STAR® Products and Services Program, where appropriate. For example, owners of hotels, inns, small shops and restaurants will be informed of the rebates available for purchasing new efficient room air conditioners. As another example, small C&I customers will be informed of the rebates available for purchasing new efficient dehumidifiers.

Program Budgets and Impacts

The 2003 budget for this program is $179,696. The estimated savings, costs and benefits of this program are included in the measure screening results for the C&I New Construction Program in Section 5.2.

New Program Elements Relative to Phase I

- The Compact will promote energy efficient clotheswashers for laundromats and other commercial establishments with multiple washers, as well as Vending Misers for vending machine operators.
- The Compact will promote additional efficiency measures to Small C&I customers through the Residential Products and Services Program, including dehumidifiers and room air conditioners.
- The Compact will continue to promote and expand participation in the NEEP Building Operator Certification Course on the Cape and Vineyard.

6. Consistency with Energy Efficiency Goals

The Massachusetts Energy Efficiency Goals

The DOER has established the state-wide energy efficiency goals presented in Table 6.1 These goals are to be used by efficiency program administrators as the basis for developing their energy efficiency plans. The DOER has proposed three levels of energy efficiency goals: an overall statewide goal, threshold goals, and priority-setting goals.

Table 6.1 Proposed State Energy Efficiency Goals.

Overall statewide energy efficiency goal:
To protect the environment and strengthen the economy by increasing the efficiency of energy use.
Ratepayer-funded energy efficiency threshold goals:
1. To reduce the use of electricity cost-effectively.
2. To provide funding for energy efficiency services to low-income customers at the levels directed by the Restructuring Act.
Ratepayer-funded energy efficiency priority-setting goals:
1. To ensure that energy efficiency funds are allocated equitably among customer classes.
2. To ensure that there is adequate support for capturing lost opportunities.
3. To give due emphasis to statewide and regional market transformation.
4. To utilize competitive procurement processes in the delivery of program services to the fullest extent practicable.
5. To facilitate the widespread development of a competitive market for energy efficiency products and services.
6. To reduce customer energy costs by balancing short- and long-run savings from energy efficiency programs.
7. To optimize cost-effectiveness.

The threshold goals are intended to represent mandatory requirements that must be met in order to obtain ratepayer funding to implement energy efficiency programs. They will each be applied independently as pass/fail criteria.

The priority-setting goals are not intended to be applied as strict pass/fail criteria, but rather as a package of goals that should be optimized by a well-balanced portfolio of energy efficiency activities. In some instances, achieving one goal may hinder the achievement of other goals, in which case the program administrator must seek to achieve the appropriate balance between the competing goals. See Guidelines Supporting the Massachusetts Division of Energy Efficiency Oversight and Coordination, p. 9.

Consistency With The Overall State Energy Efficiency Goal

The Compact's energy efficiency programs are clearly consistent with the overall goal of protecting the environment and strengthening the economy by increasing the efficiency

of energy use. As described in Section 2.5, the efficiency measures installed by the Compact over the five-year planning period are expected to save roughly 58,150 MWh per year. These cumulative annual efficiency savings are expected to reduce annual CO_2 emissions by 29,000 tons, annual SO_2 emissions by 27 tons, and annual NO_X emissions by 19 tons. These emission reductions will be achieved at a net negative cost, which means that energy efficiency represents the most cost-effective means of reducing air emissions.

On average, every dollar spent on the Compact's efficiency programs will result in roughly two dollars saved in terms of avoided electricity generation, transmission and distribution costs. Participating customers will see even greater savings on their electric bills, because avoided electricity prices are higher than these avoided electricity costs. Lower electric bills will provide businesses and industries with lower operating costs, improved cash flow, and greater opportunities for investment. Lower electric bills will help government agencies reduce costs and keep their budgets in balance. Lower electric bills will also provide residential customers with greater disposable income, which in turn can be used to help stimulate the local economies on the Cape and Vineyard. These impacts will clearly help strengthen the local and state economy.

Consistency With The Threshold Goals

1. To Save Electricity Cost-Effectively

The Compact energy efficiency programs are highly cost-effective. As indicated in Section 2.4, all of the Compact's programs combined have a benefit-cost ratio of roughly 2.0. Most of the Compact's programs are very cost-effective, especially the larger programs serving the Compact's core customers. The only program with a benefit-cost ratio of less than one (i.e., the residential New Construction Programs) also offers important market transformation and societal benefits that are not captured in the benefit-cost ratios.

2. Funding For Low-Income Energy Efficiency Customers

The Compact energy efficient programs offer three programs to low-income customers: one for single family units, one for multi-family units, and one for new construction. These programs have been designed by LEAN, and are also being implemented by a number of Massachusetts electric companies.

The amount of funding dedicated to these low-income programs is based on the requirements of the Electric Utility Restructuring Act. As described in Section 2.4, the total low-income budget was determined by multiplying projected 2003 electricity sales to the Compact's customers by 0.25 $/MWh. This amount of funding is higher than 20 percent of the residential programs budgets.

As discussed in Section 2.3, low-income programs will receive $532,940 of funding in 2003, equal to 10 percent of the total budget for the Compact's energy efficiency programs. In addition, low-income customers will be eligible for some of the measures offered through the Residential Products and Services Program.

Consistency With The Priority-Setting Goals

The Compact energy efficiency programs strike an appropriate balance among all of the priority-setting goals. In fact, the Compact's overall amended Energy Efficiency Plan contains a comprehensive portfolio of programs that achieves each of the priority-setting goals to a high degree. None of the priority-setting goals has been sacrificed in a significant way in order to emphasize any other goal.

1. Equitable Allocation Among Customer Classes

The Compact programs and budgets are specifically designed to be equitably allocated among all customer classes. First, the programs are designed to make energy efficiency services available to all customer types (low-income in single and multi-family units, low-income new construction, low- and moderate-use residential, high-use residential, residential new construction, small, medium and large C&I, government agencies, and C&I new construction).

Second, the energy efficiency budgets are allocated to the various programs in such a way as to achieve equity across the different customer types. The funding allocated to the residential and C&I program budgets is based on these customer classes' shares of total annual electricity sales. The level of funding to these two customer classes is therefore directly tied to the amount of money contributed by each class. Furthermore, the funding levels for the programs within each of these customer classes was roughly based on contributions from the different customers served by the programs. For example, electricity sales to small C&I customers are significantly larger than sales to medium and large customers, so the Small C&I Customer Program was allocated significantly more funding than the Large C&I Customer Program.

In addition, the Compact is allocating some of the energy efficiency budgets to each town according to the amount of efficiency money contributed by the town. If the Compact identifies significant geographic inequities it will take steps to improve geographic equity through targeting its marketing activities.

2. Adequate Support for Capturing Lost Opportunities

Some of the Compact's programs are specifically designed to capture lost opportunities, in a number of ways. New construction programs represent one of the most effective means of capturing lost opportunities, because it is significantly less expensive to adopt efficiency measures at the time of construction than as a retrofit to an existing building. Consequently, the Compact offers new construction programs, not only to residential and commercial customers, but also to low-income customers. Similarly, the C&I New Construction Program provides incentives to adopt efficiency measures whenever a business undertakes a major renovation or remodeling effort, or at the time of natural equipment replacement.

Another important means of capturing lost opportunities is by influencing a customer's purchasing decision when outdated equipment is retired and new equipment is purchased. Many of our programs – especially the Products and Services Programs – are designed to affect customers at the point of purchase.

3. Due Emphasis to Statewide and Regional Market Transformation

The Compact intends to participate in relevant statewide and regional market transformation initiatives. This amended EEP includes several market transformation programs offered through NEEP and the ENERGY STAR® program. In addition, our new construction programs are specifically designed to help transform the residential and C&I construction industries, by working with home builders, architects, and various construction trade allies in order to promote efficient construction practices over the long-term. New construction programs are offered separately for low-income, residential, and C&I construction industries, because of the unique characteristics and market barriers facing these different industries. Furthermore, the Residential New Construction Demonstration Program seeks to promote market transformation in a key market on the Cape and Vineyard: the small home-builder market.

4. Utilize Competitive Procurement Practices

Unlike the distribution companies in Massachusetts, the Compact has a very small internal staff to implement its energy efficiency programs. Consequently, the vast majority of the program activities -- administration, implementation, monitoring and evaluation, legal and technical services -- will be conducted by contractors outside of the Compact. Each of the contractors hired by the Compact to administer and implement the energy efficiency programs has been, or will be, selected through competitive bidding processes. These competitive processes will be open to all interested and qualified bidders.

5. Facilitate the Development of a Competitive Market for Energy Efficiency

The Compact will rely entirely upon competitive energy service companies to deliver its energy efficiency programs. These companies, in turn, rely upon a variety of other competitive companies that manufacture and distribute energy efficiency technologies. Combined, these businesses represent the core of the competitive market for energy efficiency. The Compact's energy efficiency programs will offer these companies opportunities to increase their activities, and will therefore facilitate the development of the competitive market for energy efficiency.

6. Balance Short- and Long-Run Savings From Energy Efficiency Programs

The primary purpose of this goal is to ensure that there is an appropriate balance between market transformation-type programs that might have small short-run savings, and more conventional programs that are designed to save energy immediately. The Compact's programs clearly achieve this goal. The market transformation programs are specifically designed to result in direct customer participation, and therefore direct energy savings in the short-run as well as the long-run. This is also true for the other Compact programs.

7. Optimize the Cost-Effectiveness of Energy Efficiency Programs

The primary purpose of this goal is to encourage program administrators to design highly cost-effective programs. In addition, this goal is meant to encourage program

administrators to balance the objective of increasing cost-effectiveness with the other priority-setting goals. Hence, this goal encourages program administrators to "optimize" cost-effectiveness, but not necessarily to "maximize" it.

The Compact's energy efficiency programs clearly achieve this goal. As described above, the Compact's energy efficiency programs are highly cost-effective. And as described throughout this section, the Compact's programs also achieve all of the other priority-setting goals.

7. Program Monitoring and Evaluation Plan

Background

The Compact has just completed its first eighteen months of running local energy efficiency programs and participating in joint program administrator statewide, regional and national initiatives. From the outset, the Compact has been firmly committed to evaluation of its in-house programs and multi-party market transformation activities.

The Compact has considered several factors for evaluation planning purposes including the length of time that the program has been in the field, the order of program roll-out, the number of participants that have been served, the duration of customer energy conservation measure ("ECM") installations, availability of participant's post-installation ECM billing data and other information, customer market priority, opportunities for conducting joint studies with other program administrators in order to take advantage of their expertise and cost sharing, and experience with program delivery vendors. These criteria are necessarily somewhat different than those employed by more mature programs that have existed for many years and undergone previous process and impact evaluations.

Monitoring and Evaluation Goals and Methods

The Compact has established several goals to guide the program monitoring and evaluation activities. These goals were first presented in the Compact's Phase I Energy Efficiency Plan, were included in the Compact's 2002 Evaluation Plan, and are presented again below:

- Ensure that programs are implemented as designed;
- Identify opportunities to improve program design and effectiveness;
- Verify energy and capacity savings from program impacts;
- Monitor program costs;
- Determine program cost effectiveness; and
- Assess end use market changes caused by efficiency program.

The Compact plans to achieve these goals through four primary monitoring and evaluation ("M&E") research techniques and studies. These studies will be conducted either independently by the Compact or through the joint efforts of the energy efficiency program administrators in Massachusetts:

- Market baseline studies to establish benchmark information on energy using equipment and practices;
- Process evaluations to assess program implementation and identify design improvement opportunities;

- Impact evaluations to measure program effects; and
- Market evaluations that assess market transformation objectives, including program impacts on market structure, trade allies and electric customers.

The Compact will continue to work constructively with DOER, DTE and other energy efficiency policy stakeholders on program evaluation during 2003, in order to support key state energy efficiency policy objectives, maintain high program standards for its customers and to cooperate on joint research efforts for statewide and regional program initiatives.

Response to Regulatory Directives

DOER, joined by DTE in the first document, issued two memos (12/21/01, 2/12/02) providing utility energy efficiency program administrators with specific guidance on how 2002 and subsequent evaluation plans should be developed, improved, filed and implemented. As was the case in 2002, the Compact's 2003 evaluation program will substantially comply with DOER and DTE's directives wherever appropriate to our circumstances and obligations, specifically regarding the following provisions:

1. Evaluation Budget. The Compact is committed to the importance of performing a thorough evaluation of its energy efficiency programs. DOER called for at least 3% of 2002 statewide energy efficiency funds to be budgeted for evaluation in 2002, citing the low levels of evaluation expenditures by the Investor Owned Utility program administrators during the previous two years. The DOER further stated that investment of up to 5% of program budgets were often indicated. The Compact's 18-month budget for the last half of 2001 and 2002 was allocated at 4% ($209.1K) of total program costs for evaluation and market research activities. The Compact has allocated 5% of its total 2003 energy efficiency budget ($275K) to evaluation and market research activities for 2003.

2. Staff and Contractor Resources. The Compact will devote adequate personnel resources (staff, contractors, and/or consultants), with the necessary expertise and experience, to plan, manage, and conduct evaluation and related activities. These personnel will make every reasonable effort to ensure that planned 2003 evaluation activities are completed this year or advanced according to plan.

3. Spending Evaluation Budgets. The Compact plans to spend its evaluation budgets and to complete or advance planned evaluation activities in a well-managed and cost-efficient manner. Given the Compact's relatively small program revenues and correspondingly limited associated evaluation budget, evaluation studies of different aspects of its programs will need to be staggered somewhat across several years in order to maintain affordability and balance budget priorities.

4. Evaluation Plans and Standardized Format. The Compact has used the standardized format here as described in DOER's February 2002 memo. The Plan includes a list and brief description of planned 2003 evaluation studies, other related activities and budgets with expected start and completion dates when available, as stated below. Unlike last

year, this Plan is filed as a section of the Compact's 2003 EEP update, as directed by DOER.

Commitment to Energy Efficiency Program Quality Control

The Compact has established internal quality control procedures to help assure the strong performance of the energy efficiency programs as implemented. These procedures include internal review of reported data; site visits to vendor operations and customer installations, outreach to trade allies, and continuous feedback from the members of the Compact Governing Board. In addition, a qualified third party vendor regularly inspects samples of customer installations for the Compact's in-house residential, low-income, small C&I and government agency programs.

Planned 2003 Evaluation Activities

The Compact's planned 2003 evaluation and research activities are as follows:

- Complete process evaluations of the following three low income programs administered in cooperation with LEAN and local weatherization provider agencies SMOC and HAC:
  - Low Income Single Family Program
  - Low Income Multi-Family Program
  - Low Income New Construction Program

  These process studies will evaluate how effectively the programs deliver services to customers. The evaluations will employ surveys of program participants and non-participants, interviews with provider agencies and contractors, program administrators and others to examine customer and trade ally satisfaction, barriers to participation, free-ridership and spillover effects. The process studies will also assess program marketing materials, data tracking systems, communications and electronic services, e.g., customer service, the Compact website, the quality of a sample of installations and some degree of measure persistence. As with all of the Compact's monitoring and evaluation studies, these process evaluations will be conducted by independent contractors who will be selected through competitive bidding processes.

- Begin an impact evaluation of the Residential High Use Program. The impact evaluation will verify reported program savings results through use of accepted methodologies for measurement and estimation of changes in customer energy usage. The study will include a billing analysis of a sample of customer participant savings from ECM installations, a non-participant baseline survey, end-use metering site work if indicated and adjustments of results for measure persistence, free ridership and market effects values where available.

- Begin an impact evaluation of the Small C&I Program, including the Government Agency and Refrigeration components, which will be completed during the first part of 2004. Conducting an impact evaluation of program offerings to small C&I customers is a high priority for the Compact. Evaluation budget constraints

dictate that these studies be scheduled to commence late this year and finish during early 2004, in order to share project expenses between the two evaluation periods.

- The Compact's C&I New Construction and Large Retrofit Programs are currently ramping up to full implementation status. The budgets for these programs were very small during the previous 18-month period due to funding commitments made by the previous plan administrator, which limited the number of projects that the Compact could conduct. With increased funding available this year for these customer markets, the Compact expects to significantly increase large C&I program activity during the latter half of 2003. Therefore, the Compact will develop plans to conduct process evaluations of these programs for implementation during 2004.
- Work with DOER and other in-state energy efficiency program administrators on any joint process and impact evaluations of the redesigned Residential Conservation Services (RCS/HomEnergy) program. At this time there are no plans to conduct such studies in 2003.
- Participate as a sponsor in evaluation and market research activities for regional market transformation program initiatives. Many of these efforts have multi-year program evaluation and market progress reporting plans ("MPER") underway or are developing such plans. The Compact will actively support and co-fund such efforts in 2003. Some of these activities are still under discussion. These joint evaluation planning and research activities include the following:
  - Energy Star® Lighting: implement MPER 2003 recommendations and follow-up with past research, as determined by initiative sponsors, including establishment of a market share product sales tracking reporting system;
  - Energy Star® Appliances: implement MPER 2003 recommendations and follow-up with past research, as determined by initiative sponsors, including establishment of a market share product sales tracking reporting system and evaluation of industry sales campaigns;
  - Energy Star® Windows: establish a market share product sales tracking reporting system (contingent on launch of residential windows initiative);
  - Energy Star® Homes: implement on-going MPER activities, including market assessment and evaluation research.
  - Residential HVAC: establish a market share product sales tracking reporting system;
  - Commercial HVAC / Cool Choice Program: conduct a scoping study to develop market-based indicators and assess the feasibility of market share tracking; develop market share projections to support cost-effectiveness assessments; plan regional market assessment study;
  - Commercial Motors / Motor Up Program: conduct a scoping study to develop market-based indicators and assess the feasibility of market share tracking;

develop market share projections to support cost-effectiveness assessments; develop regional market assessment study.

- Participate in update of avoided energy supply costs ("AESC") for cost-effectiveness planning conducted by regional working group.
- Participate in joint Free-ridership and Spillover ("FR & SP") study conducted by MA program administrators to develop standardized methods.
- Support joint C&I new construction market share monitoring efforts, if feasible.

Table 7.1 2003 Program Evaluation Schedule

Program	Research Activity	Delivery Date
Low Income – In-house	Conduct process evaluations of 3 programs	Third quarter 2003
Low Income Best Practices	Participate in follow-up on 2002 study results	Ongoing
Residential High Use	Begin program impact evaluation	Fourth quarter 2003
Small C&I/Government	Begin program impact evaluation	Fourth quarter 2003
RCS	Participate in any state-wide evaluations	Ongoing
ENERGY STAR® Lighting	Support joint utility initiative 2003 M&E plan activities	Ongoing
ENERGY STAR® Appliances	Support joint utility initiative 2003 M&E plan activities	Ongoing
ENERGY STAR® Windows	Support joint utility initiative 2003 M&E plan activities	Ongoing
ENERGY STAR® HOMES	Support joint utility initiative 2003 M&E plan activities	Ongoing
Residential HVAC	Support joint utility activities	Ongoing
C&I Market Share	Support joint utility new construction market monitoring project	Ongoing
C&I & Residential Market Assessment	Participate in joint (NSTAR) project	December
Cool Choice	Support joint utility activities	Ongoing
Motor Up	Support joint utility activities	Ongoing
FR & SP Study	Participate in joint MA study	April 2003
AESC Study	Participate in joint regional study	July 2003
2003 M&E Plan	Finalize Plan	March 2003
2004 M&E Plan	Develop Plan	December 2003
2002 M&E Report	File Report with DOER and DTE	Third quarter 2004

Table 7.2 2003 Program Evaluation Budget ($1000)

Program	Activity*	Internal Costs**	Contractor Costs	Total Costs
General:				
2002 M&E Report	process	$8.0	$0.0	$8.0
2003 M&E Plan	process	$1.0	$0.0	$1.0
2004 M&E Plan	process	$2.0	$0.0	$2.0
AESC Study Update	joint	$4.0	$4.5	$8.5
C&I & Residential Market Assessment	joint	3.0	22.5	$25.5
Subtotal – General	---	$18.0	$27.0	$45
Residential:				
Residential High Use	impact	$5.0	$5.0	$10.0
Low Income (3-Tier program)	process	$10.	$1450.0	$155.
Low Income Best Practices	joint	$1.0	$1.5	$2.5
Residential Conservation Services	joint	$0.5	$1.0	$1.5
ENERGY STAR® Lighting	joint	$1.0	$5.0	$6.0
ENERGY STAR® Appliances	joint	$1.0	$4.0	$5.0
ENERGY STAR® Windows	joint	$0.5	$1.0	$1.5
ENERGY STAR® Homes	joint	$1.0	$25.0	$26.0
Residential HVAC	joint	$0.5	$1.0	$1.5
Subtotal - Residential	---	$20.5	$188.5	$209.0
Commercial & Industrial (C&I):				
Small C&I / Government Agencies	impact	$4.0	$5.0	$9.0
C&I Market Share	joint	$0.5	$0.5	$1.0
Cool Choice	joint	$1.5	$2.5	$4.0
MotorUp	joint	$1.5	$2.0	$3.5
FR & SP Study	joint	$1.5	$2.0	$3.5
Subtotal - C&I	---	$9.0	$12.0	$21.0
Grand Total	---	**$47.5**	**$227.5**	**$275**

** Activity denotes type of evaluation to be performed in 2003: "process" = process evaluation; "impact" = impact evaluation; and "joint" = joint evaluation, research or planning effort with NEEP sponsors, Massachusetts utilities and/or DOER..*

*** Internal costs include M&E expenses of in-house consultants retained by the Compact; program administration and staffing costs are imbedded in fixed contracts and salaries that are allocated to other expense columns in the overall CLC EE program budget and are not included in this table.*

8. Public Education and Marketing

The Cape and Vineyard communities continue to struggle with a lack of consumer awareness and corresponding limited knowledge of energy efficiency technology and practices. Well designed programs and consumer education are key to overcoming these barriers. Building on lessons learned during the first eighteen months (Phase I) of the Compact's energy efficiency program, the Compact has revised several aspects of the Phase I education and marketing plan in this Phase II Plan. The revisions are described below.

The twenty-three members of the Compact Governing Board (the "Board") will remain a vital link to consumers. Board members, many of whom are elected officials and others who have extensive utility and energy experience, provide educational information to consumers through: (1) regular updates to town Boards of Selectmen and Councilors on the Compact energy efficiency programs (most of these meetings are televised on a local government access channel); (2) speaking engagements and membership on various civic and business committees; and (3) outreach to the media, including daily and weekly newspapers and radio spots.

Looking ahead, the Compact will continue to utilize the extensive network and opportunities it has at the community level to deliver its public education and marketing programs, and to advance existing and emerging energy efficiency services, technologies, and practices.

8.1 Cape Light Compact Schools Initiative

The Compact's education efforts will focus on the development and implementation of an energy and education program for the third, fourth, and fifth grades on the Cape and Vineyard. Partnering with Barnstable County's education department, Cooperative Extension, the Compact will introduce the National Energy Education Development ("NEED") project in the fall of 2003. The Cape and Vineyard will be the first communities to offer the NEED project in Massachusetts. The NEED project satisfies the MCAS science curriculum for the targeted grade levels and will be an asset to teachers on the Cape and Vineyard.

The Compact has organized an Advisory Committee consisting of teachers, school administrators, Compact Board members and staff to develop an implementation schedule. The Compact has held two teacher workshops designed to introduce the NEED project, provide energy and conservation education, and to receive feedback prior to the Fall, 2003 program roll-out.

The Compact intends to design and purchase a mobile classroom as part of the NEED program. The mobile classroom will feature experiment stations for the students to apply theories learned in the classroom as well as alternate fuel technologies. Working with teachers and students, the Compact intends to develop an energy efficiency ethic that will

expand beyond the classroom and into the homes and lives of Cape and Vineyard residents.

In addition to incorporating the NEED project into its education program, the Compact has partnered with Cooperative Extension and AmeriCorps Cape Cod to develop an *Energy Efficiency Puppet Show*. The puppet show will demonstrate to early grade school students that saving energy can be fun.

8.2 Local Events

Building on the success of the Compact's Energy Fair held in the Fall of 2002 (see Table 8.1), the Compact will hold an Energy Fair on the Vineyard in the late Spring of 2003 and will hold its second annual fair on the Cape in the Fall of 2003. The Compact intends to hold annual Energy Fairs on the Cape and the Vineyard over the next five years. The Energy Fairs will be designed to feature Compact efficiency programs and feature community "turn-in" events that focus on efficient lighting and home appliances.

Table 8.1 Results of the 2002 Energy Fair

	Number of Units	Annual kWh Savings
Lamps and Fixtures sold	968	120,683
Torchieres (through turn-in)	200	70,372
Dehumidifiers (through turn-in)	300	96,600
Totals	---	287,655

In addition to Energy Fairs the Compact will continue to participate and sponsor community events that provide demonstrations of existing and emerging technologies and services in energy efficiency. Examples of these events include Earth Day conferences, construction/builder seminars, and educational training seminars for facility managers. The Compact is embarking on a new initiative to provide information to consumers on how to save energy through the Compact's energy efficiency programs by attendance at annual spring Town Meetings and by raising awareness of the Compact.

8.3 Marketing Materials

The Compact will continue to participate in energy efficiency service provider and utility initiatives that market energy efficiency services to targeted customer groups. Over the last 18-months the Compact has worked successfully with energy efficiency service providers and the regional utilities to design, implement and market commercial and industrial programs such as Motor-up and Cool Choice, as well as the products and services programs for the residential and commercial sectors.

The Compact will also dedicate resources to the development of educational materials that describe the Compact's programs and the purpose of energy efficiency. These materials will help to increase consumer awareness about the Compact's programs and will complement the Compact's other educational efforts.

9. Opportunities for the Future

9.1 Background: The Compact's Efficiency Potential Study

The Compact has received funding from the Massachusetts Technology Collaborative ("MTC") to investigate electricity resource options available on Cape Cod and Martha's Vineyard over the mid- to long-term future (2003-2015). The Compact's investigation is addressing a variety of options for meeting growing electricity demand, including gas-fired power plants, renewable resources, distributed generation resources, and energy efficiency opportunities.

As a part of the MTC investigation, the Compact prepared a study of the long-term potential for energy efficiency savings, entitled *Energy Efficiency Potential on Cape Cod and Martha's Vineyard: Long-Term Forecasts and Potential*, February 2003. This study builds off of the analysis in this Energy Efficiency Plan, as described below.

This EEP includes a comprehensive set of programs providing many cost-effective efficiency measures to all customer types over the short-term future (2003-2007). However, the program budgets are limited to the funds that are raised through the $2.5/MWh system benefits charge. The efficiency potential study investigates the opportunity for achieving efficiency savings through activities above and beyond those included in this EEP.

9.2 Methodology: Expansion of the Current Efficiency Activities

Overall Approach

The efficiency potential study begins with a Business-As-Usual ("BAU") forecast of electricity demand on the Cape and Vineyard. This forecast represents the likely growth of electricity demand in the absence of additional efficiency programs, and acts as a reference case to compare with our energy efficiency forecasts.

The EEP is used as the foundation for the efficiency forecasts. It provides a wealth of data on the opportunities for achieving efficiency savings on Cape Cod and Martha's Vineyard. Several scenarios are developed to identify the various costs and benefits associated with different levels of efficiency investments and activities. The scenarios studied include the following:

- Continuation of Current Efficiency Activities: assumes that the efficiency programs currently offered by the Compact will be continued essentially unchanged through 2015.
- Reduce Future Electricity Load Growth in Half: assumes that current efficiency activities will be increased to the point where new electricity load growth is only half of what would be expected without efficiency activities.

- Stabilize CO_2 Emissions from Electricity Generation: assumes that current efficiency activities will be increased enough to eliminate the growth in CO_2 emissions over time.
- Eliminate Future Electricity Load Growth: assumes that current efficiency activities will be increased to the point where new electricity load growth is completely eliminated.

The efficiency scenarios are developed by assuming that the existing efficiency programs offered by the Compact are extended into the future, and, for the latter three, are expanded to achieve greater levels of savings. This is a simplifying assumption, because some future energy efficiency initiatives may involve different types of activities, e.g., efficiency standards or building codes. However, the Compact's current efficiency programs are a good proxy for a variety of different types of efficiency activities, because they include such a broad range of efficiency measures and they address all customer types.

In order to determine the efficiency opportunities for each of the future scenarios, the system benefits charge (and thus the program budgets and savings) are increased to the point where the particular scenario objective is achieved. This approach assumes that the current Compact efficiency programs will be expanded to reach additional participants, i.e., to increase the penetration rate of the efficiency measures and programs. For each scenario, the penetration rates of the programs are checked to ensure that they do not turn out to be implausibly high. If any program's penetration rate turns out to be too high, then that program's budget is reduced and the funding is shifted to another program within the same customer sector (residential, low-income, commercial & industrial).

Environmental Benefits

Energy efficiency programs provide a variety of environmental benefits as a result of avoiding electricity generation and avoiding the construction of new generation, transmission and distribution facilities. The benefits include reduced air emissions, reduced use of land and water, reduced thermal pollution from power plant cooling systems, and reduced liquid and solid wastes from fossil-fired power plants. Some efficiency measures will also result in environmental benefits by reducing the amount of water, oil or gas that is used in homes and businesses.

The efficiency potential study focused on reduced air emissions, because air emissions from power plants tend to result in the greatest environmental and human health impacts. The study investigates CO_2, NO_X, and SO_2 emissions, which lead to global warming, acid rain, ozone and particulates. The study begins with estimates of the emissions expected under the Business-As-Usual forecast, and then estimates the emission reductions associated with each of the efficiency scenarios.

The Cape and Vineyard are part of a region-wide electricity grid in New England, and thus the electricity consumed there is provided by power plants from all over New England. A recent study prepared for the Ozone Transport Commission is used to obtain

average and marginal emission rates from New England power plants, forecasted for the period 2003 through 2015.[5]

For the estimates of air emissions in the Business-As-Usual case, we multiply the *average* emission rates by the total electricity sales to the Cape and Vineyard. For the estimates of air emissions from the efficiency scenarios, we multiply the *marginal* emission rates by the amount of electricity generation avoided by the efficiency activities.[6]

9.3 Summary of Results

Table 9.1 presents a summary of the study's findings. It includes the key results for each of the four future efficiency scenarios, for the year 2015. The system benefits charge was an input to each scenario, while the other data are the outputs.

Table 9.1 Summary of Efficiency Impacts From All Scenarios: 2015

	Continuation of Existing Programs	Reduce Load Growth in Half	Stabilize CO_2 Emissions	Eliminate New Load Growth
System Benefits Charge ($/MWh)	2.5	5.0	8.9	10.8
Annual Program Cost (mil. nominal $)	$5.9	$11.2	$18.1	$21.1
Cumulative Net Benefits (mil. 2003 PV$)	$78	$150	$253	$300
Annual Energy Savings (GWh)	148.6	286.6	483.5	572.4
Annual Energy Savings (% of load)	6.3%	12.8%	23.7%	29.3%
Capacity Savings (MW)	21.1	39.2	64.9	76.3
Capacity Savings (% of peak)	3.5%	6.5%	10.8%	12.7%
CO_2 Emissions:	---	---	---	---
Reductions (1000 tons/year)	77	149	251	298
Reductions (% relative to BAU)	6.4%	12.4%	21%	25%
Growth (% change relative to 2002)	18.4%	10.8%	0%	-4.9%

As indicated in the table, the continuation of existing Compact efficiency programs will save enough energy to reduce energy demand in 2015 by 148.6 GWh, which is roughly 6.3% of demand. The programs will result in roughly 21 MW of capacity savings. The programs will reduce CO_2 emissions by roughly 77 million tons by 2015, which is roughly 6.4% of the total emissions. The annual CO_2 emissions will continue to increase, however, and by 2015 will be roughly 18.4 % higher than current levels.

A doubling of the system benefits charge to $5/MWh will result in enough efficiency savings to reduce future electricity load growth in half. This level of efficiency savings

[5] Ozone Transport Commission, *The OTC Emissions Reduction Workbook 2.1: Description and User's Manual*, prepared by Synapse Energy Economics, December 2002.

[6] The marginal emission rates are the emission rates from those New England power plants that are the last to operate in any given hour.

will reduce load in 2015 by roughly 12.8 %, and reduce annual CO_2 emissions by a comparable amount.

Increasing the system benefits charge to $8.9/MWh will result in enough efficiency savings to stabilize CO_2 emissions over time. This level of efficiency savings will reduce load in 2015 by roughly 23.7 %, and reduce annual CO_2 emissions by a comparable amount.

Finally, the study finds that a system benefits charge of $10.8/MWh will result in enough efficiency savings to eliminate all new load growth in the future. This level of efficiency activities would represent nearly a four-fold increase in the Compact's current energy efficiency activities.

Figure 9.1 presents the forecast of electricity demand on Cape Cod and Martha's Vineyard for each of the scenarios analyzed. It shows that the Business As Usual demand is expected to continue to increase at a relatively strong growth rate of 2% per year. It also shows how this growth rate will be tempered by each of the efficiency scenarios.

Figure 9.1 Forecast of Electricity Demand: All Scenarios

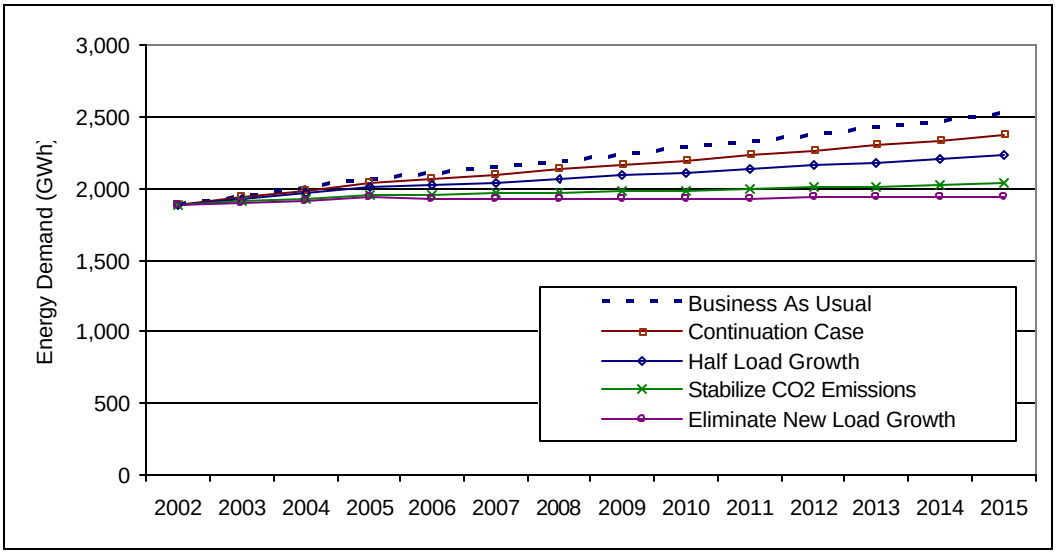
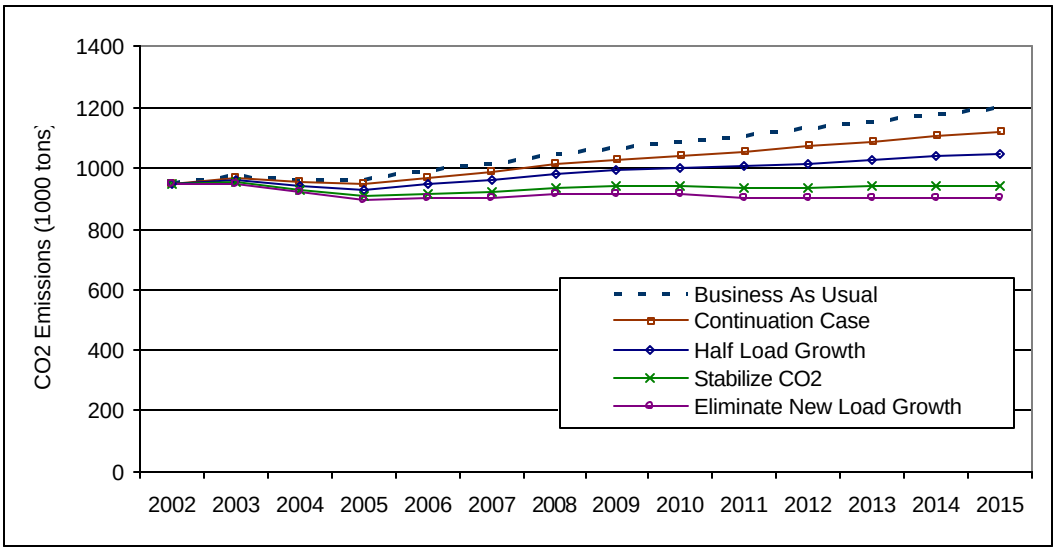


Figure 9.2 presents the forecast of CO_2 emissions from electricity consumption on Cape Cod and Martha's Vineyard for each of the scenarios analyzed. It shows that the Business As Usual emissions are expected to continue to increase at a relatively strong growth rate. It also shows how the CO_2 emissions will be tempered by each of the efficiency scenarios. The CO_2 emissions in the early years of this study are expected to decline in all scenarios, because the introduction of new gas-fired power plants is expected to reduce the marginal CO_2 emission rates in New England from current levels.

Figure 9.2 Forecast of CO_2 Emissions: All Scenarios



Penetration Rates

In order to check whether these levels of energy efficiency savings are achievable, the study estimated the penetration rates of the efficiency programs, for each of the four future scenarios. For many programs, the penetration rates remained within levels that can be considered technically achievable, i.e., 40% to 60% penetration. In those programs where the penetration rates reached unrealistically high levels, the program funds were switched to another program within the same customer sector (low-income, residential, or commercial/industrial).

Table 9.2 Program Penetration Rates: Continuation of Existing Programs

Program	Penetration Rate in 2015	Year in Which Program Budget is Scaled Back
Low-Income Single Family	12%	not scaled back
Low-Income Multi-Family	61%	not scaled back
Low-Income New Construction	30%	not scaled back
Residential New Construction	13%	not scaled back
Residential HomEnergy	8%	not scaled back
Large Commercial and Industrial	12%	not scaled back
Small Commercial and Industrial	10%	not scaled back
Government Agencies	59%	not scaled back

Table 9.2 provides a summary of the penetration rates of the relevant Compact programs, for the Continuation of Existing Programs Scenario.[7] As indicated, the Low-Income Multi-Family and the Government Agencies programs will begin to reach high penetration levels by the end of the study period. However, none of these customer sectors is likely to be saturated with efficiency measures in this scenario.

Table 9.3 provides a summary of the penetration rates of the relevant Compact programs, for the Eliminate New Load Growth Scenario. This scenario was chosen because it provides an indication of the penetration rates under the most aggressive efficiency scenario analyzed. The table also presents the year in which certain programs' budgets were scaled back in order to account for the fact that the customer sector is nearly saturated. As indicated, the Low-Income Multi-Family Program and the Government Agencies Program become nearly saturated by 2007. The Low-Income New Construction Program is large enough to capture most of the new housing units each year, by as early as 2003.

Table 9.3 Program Penetration Rates: Eliminate New Load Growth

Program	Penetration Rate in 2015	Year in Which Program Budget is Scaled Back
Low-Income Single Family	59%	not scaled back
Low-Income Multi-Family	91%	2007
Low-Income New Construction	70%	2003
Residential New Construction	48%	not scaled back
Residential HomEnergy	30%	not scaled back
Large Commercial and Industrial	41%	not scaled back
Small Commercial and Industrial	52%	not scaled back
Government Agencies	90%	2007

While some of the programs reach high penetration levels under this scenario, it is interesting to note that two of the Compact's central programs – Residential HomEnergy and Small C&I – are still within reasonable penetration levels. This suggests that there are additional cost-effective energy efficiency savings available beyond those identified in even the most aggressive efficiency scenario in this study.

Caveats and Considerations

The Compact's current efficiency programs were not simply designed to achieve the maximum amount of efficiency savings from the available funding. They were also designed to achieve other important goals, such as maintaining customer equity, minimizing lost opportunities, and addressing a broad range of potential efficiency opportunities. Consequently, the savings results presented here do not necessarily represent the maximum amount of efficiency savings available from each scenario.

[7] Given the uncertainties in the efficiency and eligible customer forecasts, the penetration rates presented here should only be considered as roughly indicative of the extent to which a customer sector has been served.

Additional efficiency savings and emission reductions could be achieved by shifting some of the funding away from the high-cost programs (e.g., low-income programs and new construction programs) and into the low-cost programs (e.g., HomEnergy and Small C&I Retrofit). This would also reduce the overall cost of the efficiency savings.

Furthermore, the Compact's efficiency programs are not the only means of achieving efficiency savings on the Cape and Vineyard. There are many other initiatives and policies that could complement the Compact's programs, including appliance efficiency standards, enhanced building codes, tax incentives, regional planning initiatives, environmental campaigns, and more. Therefore, it is possible to achieve the savings presented in Table 9.1, and even more, without necessarily applying the system benefits charges that were assumed in each scenario.

On a similar note, as efficiency programs begin to reduce electricity load over time, there will be less revenue available from a particular system benefits charge. In the study's high efficiency scenarios, the reduced sales have a significant effect on the revenues raised from a particular system benefits charge. Therefore, a system benefits charge must be higher than it would be otherwise, in order to offset its own long-term effects.

Finally, it is important to note that the efficiency savings presented in this EEP and used to derive the forecasts above do not include some significant savings that are expected to result from the Compact's programs. The forecasts do not include any savings that might result from program spillover and market transformation effects. They also do not include savings from the Compact's aggressive marketing and education campaign. Over the long-term horizon these additional savings are likely to be substantial, especially under the more aggressive efficiency scenarios.

Appendix A. RNC Demonstration Project: Financial Incentive Plan

I. Introduction and Overview

Customer and builder participants in the Cape Light Compact's Residential New Construction Program Demonstration Project can earn financial incentives for meeting its high energy efficiency and environmental standards. Financial incentives are awarded based on the adoption of threshold requirements and selection of point earning packages of options by owners and builders in the designs of new single homes or small multi-unit developments that participate in the Project. In addition, the Compact will provide additional value free of charge to participating homes and small developments in the form of technical assistance, i.e., plan review, post-installation inspections, system commissioning and construction and O&M manuals.

Project requirements and the ascending financial awards are set out below in a series of three Tiers. All the requirements of an underlying Tier must be satisfied before the Project participant can qualify for additional incentives under a succeeding Tier. Individual features that must be used to satisfy the total point scores required in some of the Tiers are also set out below. The list of individual features and related point scores is attached in the "Vermont Built Green – Scorecard" (V.3.0 12/03/02). The home sizing requirement for Tier 2 is included in the "House Size Points Chart."

Table 1. Overview of Tiers, Requirements and Incentives

Tier	Requirements	Owner Incentive	Builder Incentive
Tier 1	▪ Achieve a HERS rating of 90 or greater. ▪ Meet all threshold requirements for energy use, occupant health and indoor air quality.	$3,000	$1,000
Tier 2	▪ Achieve Tier 1 requirements. ▪ Meet all other threshold requirements, including: siting and land use, building design, quality/durability, resource impacts, education and O&M. ▪ Earn at least a total of 175 points through the sizing matrix and Scorecard points. No less than 20 points must be earned through energy use criteria, except when the sizing matrix score (X) is greater than 155 points. When X is greater than 155, the number of required energy use points equals 175 – X.	$6,000	$2,000
Tier 3	▪ Achieve Tier 2 requirements. ▪ Earn at least a total of 250 Scorecard points. ▪ No less than 30 points of the total must be earned through energy use criteria not previously credited in an earlier Tier.	$9,000	$3,000
Total	▪ All the requirements listed above	$9,000	$3,000

The next two sections describe the "threshold requirements" for Tiers 1 and 2. The final section provides a summary of the potential point scores available from the various Scorecard categories.

II. Tier 1 Threshold Requirements

Threshold Requirements for Energy Use

1. Envelope and Systems:

a. Certified as ENERGY STAR Home (5-Star or 90 points on the Home Energy Rating System scale) for new construction; 4-Stars Plus (86 points) for existing homes.
b. Mechanical equipment must be accessible for service, including AC condensate drain pan and trap.
c. Installation of all heating and cooling ducts and mechanical equipment within the building envelope or ducting is tested to be less than 1% leakage to outside.
d. Air conditioning equipment sized within 10% or next available size of ACCA Manual J.
e. Forced air heating/cooling ductwork for primary space conditioning system complies with ACCA Manual D design criteria.
f. If necessary, any ducts that run in outside walls must have at least R-7.5 between ducts and outside.
g. Central air conditioning refrigerant charge and airflow documented to be within 10% of manufacturer recommendation.
h. Air filter housings must be airtight to prevent bypass or leakage.

2. Efficient Lighting and Appliances:

a. At least 10 (or 6 in homes under 1500 sq.ft) ENERGY STAR or equivalent (or fluorescent tubes with electronic ballasts) high use light fixtures. [High Use = 2 or more hours average daily use]
b. Install an ENERGY STAR or equivalent Refrigerator. (See www.energystar.gov).
c. Install an ENERGY STAR or equivalent Dishwasher, if dishwasher installed. (See www.energystar.gov).
d. Install an ENERGY STAR or equivalent Clothes washing machine, if washing machine installed. (See www.energystar.gov).

3. Sustainable Equipment:

a. Electric space heat and/or domestic hot water system installed only as solar backup (if electric space heat consumption or domestic hot water consumption do not individually exceed 2,000 kWh/yr each, or combined, do not exceed 3,000 kWh/year)

Threshold Requirements for Occupant Health and Indoor Air Quality

1. Minimize Sources of Pollutants:

a. No carpet in environments where it can get wet.

b. No adhesives for carpet attachments unless zero VOC (100 grams per liter or less).

c. Use only direct-vent or closed-combustion or power vented space heating and water heating equipment. Do not install vent-free space heating or water heating equipment. Wood stoves or wood burning appliances must have ducted combustion air within 2' of the air intake.

d. Garages to be 100% air sealed form adjacent living spaces.

e. Furnaces in garage must have completely sealed duct, cabinet and filter systems.

f. Provide smoke detectors per code (hardwired with battery backup).

g. Provide carbon monoxide detectors if there is any open combustion equipment (gas range) or an attached garage, (hardwired with battery backup).

h. Foundation continuous footing drain with stone covered with filter fabric, drained to daylight or if necessary to drain to the interior, use a sealed sump pump system. (Drainage system not required in pure sand.)

i. Basement foundation walls use porous backfill material.

j. Vapor retarder directly under slab.

k. Provide continuous crushed stone under footings or provide pipe through footing for drainage of any accumulated water under slab to drainage.

l. Exterior of below grade foundation damp-proofed

m. Completely air seal indoor parking from housing, or locate garage remote from house.

n. Provide swales to divert surface water from hillsides.

o. If carpet is installed on slab on grade or on basement floor, must have slab insulated R-10 continuous and have vapor barrier directly under slab.

p. No open fireplaces; fireplaces only with sealed doors plus outside combustion air or tested to ensure no back drafting in worst-case condition.

q. Sheath and air seal bathroom exterior walls behind showers and tubs before installing showers and tubs. See also ventilation requirement.

2. Provide ventilation to remove pollutants generated in the house:

a. Install filtered exhaust ventilation in kitchen.

b. Install an automatic, effective ventilation system that is quiet (less than 1.5 sones for surface-mounted) and has low energy consumption (less than .5 watts/cfm), providing at least 15 cfm per bedroom plus 15 cfm, such as one of the following:

    i. Low-energy-use, quiet, durable bath fans with automatic control. As a minimum, the house must have an exhaust-only ventilation – EOV system or the following:

ii. Outside air ducted into furnace system return from outside, with fan-cycler control or the following:

iii. Ducted heat recovery ventilation system;

iv. Non-fan-powered ventilation system, if proven effective through performance testing.

c. Insulate all ventilation exchanging exhaust ductwork (minimum R-8) outside of the insulated envelope;
d. Use rigid duct or other methods to keep fan backpressure below 0.2" for EOV systems;
e. Air seal ventilation ductwork;
f. Exhaust fan or duct to central system in every bathroom that has a shower, spa or bathtub.

III. Tier 2 Threshold Requirements

Threshold Requirements for Siting and Land Use

2. Optimize land use to minimize damage to the environment and, where possible improve the environment:

a. Do not build on currently usable prime agricultural land.
b. Do not build on wetlands or sensitive wildlife habitat (as defined by the state of Massachusetts).
c. Protect against erosion during construction and landscaping.
d. Do not build in the 100-year flood plain

Threshold Requirements for Building Design

1. Efficient building design

a. Construct building that optimizes the use of interior space, so that overall building size is kept to a minimum while still meeting occupants' needs.

Threshold Requirements for Quality and Durability

1. Choose quality materials and details for minimum maintenance requirements:

a. Install materials with proper detailing to control degradation from sun, heat and moisture, including: Wood>8"above soil; Roof/wall flashing with siding cut 2" above roofing; Minimum 10" overhang size at eaves with a sloped roof.
b. Minimum 25-year expected lifetime roof warranty.

c. Provide 10-year warranty on vertical insulated glass.

d. Reduced ice dams: No non-airtight recessed light fixtures in insulated flat ceilings; no recessed fixtures in insulated cathedral ceilings.

e. Reduced ice dams: At least R-30 attic/roof-slope insulation R-value extends to over outside of exterior walls.

f. Window and door head casing flashing.

g. Detail deck to house connection to shed water away from house.

Threshold Requirements for Resource Impacts

1. Resource-efficient and environmentally responsible materials:

a. Only use tropical wood that is third-party certified sustainably harvested (includes Luan plywood)

2. Reduce, Re-Use and Recycle:[8]

a. Create and implement a plan for construction to provide for the efficient separation of materials which are reusable or recyclable, including separate containers, covered where required, for the following: wood, cardboard, metal, drywall (grind or recycle on site) plastics, asphalt shingles, other materials for re-use for which local infrastructure exists (comply with your local solid waste management plan

3. Encourage diversion of waste for recycling during occupancy

a. Provide space for recycling containers at convenient location for storage of recyclables (Define space).

Threshold Requirements for: Keeping IT Green - Occupant Education and Home O&M

1. Provide education for owners/occupants in the use and care of their dwellings

a. Educate occupants about the building's goals and strategies and impacts on costs of operating the building, while addressing obstacles to occupant education, such as language, literacy or elderly. Provide training of owners/occupants for all control systems in the house

b. Provide a "User's Manual" for the house, including written operation instructions for the house, maintenance schedule, maintenance instructions, equipment literature, equipment warranties

c. Provide "VBG Scorecard" to owners/occupants

[8] Re-use means to separate for later re-use by the builder or by others. Recycle means to separate and transport material to a central location for re-manufacturing by others.

IV. Tier 3 Requirements

The Tier 3 standards do not include any threshold requirements; they are all in terms of point scores. The following section provides a summary of the point scores available from the various Scorecard categories for wither Tier 2 or Tier 3 attainment.

V. Potential Point Scores From the Scorecard Categories

1. Siting and Land Use: 72 points

- Location – 11
- Optimize land use – 35
- Community – 26

2. Building Design: 40 points

3. Quality and Durability: 36 points

4. Energy Use: 93 points, additional points available for renewable energy system installation

- Envelop and Systems – 38
- Lighting and Appliances – 16
- Sustainable Equipment – 39
- 10 kW PV, Wind or Hydro System Installation @ .01 points/Watt – 10
- 10 kW PV, Wind or Hydro System Installation, grid-connected @ .02 points/Watt – 20

5. Resource Impacts: 117 points

- Responsible Materials – 65
- Reduce, Re-use, Recycle – 28
- Waste Diversion – 2
- Water Efficiency – 22

6. Occupant Health and Indoor Air Quality: 61 points

- Pollution Sources – 48
- Ventilation – 13

7. Keeping It Green – 9 points

Total Scorecard points available: 438 points

Appendix B.
Vermont Built Green Program Description

See attached.

Vermont Built Green
Program Description

Thank you for your interest in the *Vermont Built Green* (VBG) Program. This program has been in development for over two years. With the completion of the criteria, or "Scorecard" (version 3.0), we are pleased to present our new program. The *Vermont Built Green* Scorecard is the intellectual property of Building for Social Responsibility (BSR) and is propriety information. Any use or reproduction of the Scorecard without the express written permission of BSR is forbidden. However, we welcome input. It is our plan that this document will evolve and improve over time as more homes are evaluated and we fine-tune the program. The following is an outline of the VBG Program along with the *VBG* Scorecard (version 3.0).

Overview

The VBG Program, an initiative of BSR, certifies residential buildings that are constructed to sustainable criteria. The criteria, as detailed in the Scorecard, have been created and supported by regional experts and can be changed and updated periodically through an open review process. The focus of the program is to promote the construction of homes that are healthy, durable and have reduced impact on the immediate environment and the global resources that support our built environment. This initial program is for new residential construction and substantial renovation. It is our hope that we will more fully consider moderate renovation and remodeling at a future date.

Oversight for the program occurs by the VBG Program Committee that has been appointed by the BSR Board of Directors, which has ultimate oversight over the program. The program is likely to be initially administered in Vermont through the Vermont Energy Investment Corporation (VEIC). The VBG Scorecard is also being used in other residential sustainable-certified programs in the Northeast, including Massachusetts' Cape Light Compact. Membership in BSR is open to all that are interested and pay the minimal annual dues.

Certification

In order to receive VBG certification, applicants must 1) incorporate all of the required approaches and 2) score a minimum of 175 points. Points are achieved through a combination of sustainable strategies and approaches, including house size. To receive recognition beyond the minimum certification threshold, applicants accumulate points as designated on the Scorecard.

Certification is by a combination of self-documentation, inspections as part of certification of achieving the required home energy rating and spot inspections for other green features. Applicants seeking certification must document each of the approaches found in their building by submitting a completed VBG checklist. VBG staff or their designees reserve the right to inspect any building or the records of any building seeking or having sought certification. Certifications are awarded as "Vermont Built Green Certified with XX Points".

There will be a fee for certification that will be established by the VBG Program Committee and approved by the BSR Board of Directors.

Program Components

The VBG Program components (existing and envisioned) include the following:

- *Scorecard:* A multi-page list of approaches, including the basic requirements with the available points that determine a building's score. A minimum number of points (175) must be achieved in order to receive the basic level of certification. Points are also awarded for house size and can been determined using the House Size Point chart found at the end of the Scorecard.
- *VBG Handbook:* An accompanying guide that details exactly what is required to obtain points for each approach, provides supplemental details and explanations, and lists information on materials and product resources.
- *Certification Documentation:* Programmatic procedures and forms to document certification of buildings.
- *Web Site:* It is envisioned that much of the VBG Program materials would be made available over the Internet.

Oversight

The VBG Program Committee is made up of designees of the BSR Board of Directors and is comprised of a dozen individuals with expertise in construction and sustainability. Committee members shall be appointed for one-year terms with the option of renewal as determined by the BSR Directors. The BSR Directors have ultimate oversight over all aspects of the VBG Program.

Criteria Modification and Updates

VBG Criteria are modified and updated according to the following procedures:

- Changes are submitted in writing with:
    a) a specific suggestion of the modification being proposed;
    b) substantiation, research and justification for the change; and
    c) contact and affiliation information of the person proposing the change.
- Suggestions are reviewed and acted on by the Program Committee not less than once a year. Review and action by the Committee may occur more often if deemed warranted by the Committee or BSR Board of Directors. The BSR Board of Directors approves any VBG Program changes.
- Additional points created from action taken on suggestions and changes would be available retroactively to buildings on which these approaches had been installed.

Contact Information

Richard Faesy
Vermont Energy Investment Corp
14 School St.
Bristol, Vermont 05443
Phone: 802-453-5100 ext. 19
fax: 802-453-5001
rfaesy@veic.org

Building for Social Responsibility
P.O. Box 613
Hinesburg, Vermont 05461
buildingforsocialresponsibility@yahoo.com
www.bsr-vt.org

VERMONT BUILT GREEN
Scorecard
(for Residential Certification)
Version 3.0 (12/3/02)

Do not quote or cite without permission from Building for Social Responsibility/Vermont Energy Investment Corporation.

In order to receive certification as a "*Vermont Built Green* " home, all of the applicable basic *"Required Approaches"* must be installed and a minimum score of 175 points (the "*Vermont Built Green Threshold* ") must be earned by doing the following:

1. Ensure that all applicable *"Required Approaches"* are installed.
2. Determine points earned from "*House Size Points"* (see *House Size Points* sheet).
3. Tally points from any additional *Approaches* incorporated in the home beyond the *Required Approaches.*
4. Total *House Size Score* points and *Approach* points for *Vermont Built Green Total Points* .

Category	Strategy	Approach	Points	Points Achieved
1. SITING AND LAND USE				
1)	**Location: Choose location to reduce the dependence on automobiles**			
	a	Locate site within 3 miles of public transport stop. (within 1 mile - 2 pts., 1/4 mile - 3 pts.)	1	
	b	Locate within 3 miles of public school. (1 mile - 2 pts., 1/4 mile - 3 pts.)	1	
	c	Locate within 3 miles of a food store. (1 mile - 2 pts., 1/4 mile - 3 pts.)	1	
	d	Provision for pedestrians, including pathways, bicycle routes and bicycle storage facilities.	2	
	e	In-fill development – locate housing in empty lots in an existing neighborhood.	3	
	f	Build on a brownfield site or previously built-on site. (Brownfield: previously occupied site where ecosystems are damaged, requiring at least some landscape restoration)	3	
	g	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	
2)	**Optimize land use to minimize damage to the environment and, where possible improve the environment.**			
	a	Do not build on currently usable prime agricultural land.	Required	
	b	Do not build on wetlands or sensitive wildlife habitat. (as defined by the state of Vermont)	Required	
	c	Protect against erosion during construction and landscaping.	Required	
	d	Do not build in the 100 year flood plain.	Required	
	e	Provide and implement responsible storm water management plan for site, including: Avoid storm sewering where possible; Minimize impervious ground coverings and reduce roadway widths & lengths; Provide vegetative swales for storm water infiltration.	3	
	f	Preserve existing trees and vegetation, except within 30' of buildings, except for driveway, solar access, areas cleared for food production and as required for grading for drainage requirements.	3	
	g	Protect existing ecosystems during construction through the use of snow fencing and other access barriers.	2	
	h	Design roadways and parking to not intrude upon open space.	2	
	i	Restore damaged ecosystems.	3	
	j	Preserve topsoil on site. Restore after construction.	2	
	k	Use trees cut from site in house construction	2	
	l	Grind stumps and limbs for mulch.	1	
	m	Cut and reserve non-millable hardwood for firewood.	1	
	n	No trenching, covering or compacting tree root zones in building and site-work areas.	1	
	o	Preserve wildlife habitat and wildlife corridors.	2	
	p	Permeable pavement driveway/parking.	2	
	q	Integrate public transportation access into site plan.	2	
	r	Mowed lawn and landscaping area total less than 1/4 acre.	2	

	s	Lawn species selected to minimize mowing/lawn maintenance.	2	
	t	Landscape with at least 75% native species. One additional point for 100%.	2	
	u	Landscape with northern hardy edible plants/trees.	2	
	v	Landscape with wildlife habitat enhancing species.	1	
	w	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

3)	**Community: Promote community and security through site and building design.**			
	a	Creation of conservation and property sale restrictions to preserve sustainable intent.	3	
	b	Minimize visual impact of new structures from open fields, mountains and water bodies.	2	
	c	Developments of more than one home must utilize at least three (3) of the following approaches in order to receive these points:		
	i	Porches oriented toward neighbors or public right of way.	2	
	ii	Minimize front yard set-back.	2	
	iii	Cluster buildings in order to preserve land or foster community.	3	
	iv	Indoor spaces common to multiple units.	2	
	v	Outdoor spaces common to multiple units.	2	
	vi	Neighborhood parks.	2	
	vii	Creation of deed-protected affordable housing lots.	2	
	d	Unit in co-housing development.	3	
	e	Unit in multifamily housing development.	3	
	f	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

2. BUILDING DESIGN				
1)	**Efficient building design**			
	a	Construct building that optimizes the use of interior space, so that overall building size is kept to a minimum while still meeting occupants' needs.	Required	
	b	Incremental design (e.g. building only what is needed at the present with documented provisions to expand to meet growing needs).	2	
	c	Flexibility of design (e.g. adaptable for changing use in future such as stubbing plumbing for additional bathroom, running hardwood floors under partitions for changing room layout, etc.) Point per documented strategy, max of 3 points.	1	
	d	Multiple use areas (e.g. desk area with provisions for computer center/sewing space/work space or great room area for living/dining/recreation) (Point per area, maximum of 3 pts.)	1	
	e	Novel storage (e.g. using dead areas like knee walls for storage). (Point per area, maximum of 3 pts.)	1	
	f	Cold storage room cooled by outside air (i.e., root cellar).	2	
	g	Building without full basement, shallow frost protected slab on grade.	2	
	h	Earth-sheltered house.	3	
	i	Earth-bermed house.	2	
	j	Airlock at least 50% of exterior entrances. Additional point for 100%.	1	
	k	Mudroom.	1	
	l	Location of garage and other utility spaces on the north and winter windward sides.	2	
	m	Building orientated within 15% of south, with the long axis of the building east/ west.	3	
	n	Improve day lighting with more than 60% of all glass openings higher than mid-height of the average interior wall.	2	
	o	Restrict heat loss by limiting skylight/monitor area to no more than 6% of the total net floor area of the room in which it is located.	2	
	p	Unobstructed south facing roof for future PV or solar hot water. Pitch within 10% of latitude (35-45 degrees).	2	

	q	Automatically controlled high R-Value insulating window shades and shutters.	2	
	r	Chimney within building envelope.	1	
	s	Inclusion of comprehensive sustainable criteria requirements in project construction document specifications.	3	
	t	Inclusion of sustainable and energy conserving details and assembly instructions in project construction document drawings and/or specifications.	3	
	u	Efficient circulation design (circulation areas less than 10% of gross square footage).	2	
	v	Dedicated business office in home. (2 points per area, maximum 4 pts.)	2	
	w	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

3. QUALITY/DURABILITY				
1)	**Choose quality materials and details for minimum maintenance requirements.**			
	a	Install materials with proper detailing to control degradation from sun, heat and moisture, including: Wood>8"above soil; Roof/wall flashing with siding cut 2" above roofing; minimum 10" overhang size at eaves with a sloped roof.	Required	
	b	Minimum 25-year expected lifetime roof warranty.	Required	
	c	10 year warranty on vertical insulated glass.	Required	
	d	Reduced ice dams: No non-airtight recessed light fixtures in insulated flat ceilings; no non-airtight recessed fixtures in insulated cathedral ceilings.	Required	
	e	Reduced ice dams: At least R-30 attic/roof-slope insulation R-value extends to over outside of exterior walls.	Required	
	f	Window and door head casing flashing.	Required	
	g	Detail deck to house connection to shed water away from house.	Required	
	h	20 year insulated glass warranty.	2	
	i	Beyond 25 year roofing warranty. (an additional l-point for each five year increase in warranty or expected life time)	1	
	j	Reduced ice dams: R-38attic/roof-slope insulation to outside of exterior walls.	1	
	k	Membrane flashing on all rough openings, including membrane flashing on bottom of all rough openings for windows and doors.	1	
	l	Minimum 10" gable overhangs over wall siding.	1	
	m	Stainless steel fasteners. 1 point for each of the following applications:		
		i Siding.	1	
		ii Trim.	1	
		iii Decking.	1	
	n	40 year siding warranty or expected life time.	1	
	o	50 year siding warranty or expected life time.	2	
	p	Brick or stone siding 90% (or more).	3	
	q	Exterior siding/veneer built over vented drainage plane.	3	
	r	If wood, six sides of siding primed.	3	
	s	Crushed stone or other material below roof drip line to minimize splash on siding.	2	
	t	Properly detail roofing system.	3	
	u	Fiberglass composite framed windows.	3	
	v	Clad windows.	1	
	w	Entryway protection by roof overhang (minimum 3 feet).	1	
	x	Plan landscaping so that mature plantings will be at least 24" from house.	1	
	y	Insulated non-wood exterior doors, 1 point per door (maximum 3 points).	1	
	z	At grade stone, masonry or concrete patio in place of wood.	3	
	aa	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

4. ENERGY USE				
1)	**Envelope and Systems: Implement a comprehensive approach to energy-efficient design.**			
	a	Certified as ENERGY STAR Home (5-Star or 86 points on the Home Energy Rating System scale) for new construction; 4-Stars Plus (83 points) for existing homes.	Required	
	b	Mechanical equipment must be accessible for service, including AC condensate drain pan and trap.	Required	
		Ducted Heating and/or Cooling Systems:		
	c	Installation of all heating and cooling ducts and mechanical equipment within the building envelope or ducting tested to be less than 1% leakage to outside.	Required	
	d	Air conditioning equipment sized within 10% or next available size of ACCA Manual J.	Required	
	e	Forced air heating/cooling ductwork for primary space conditioning system complies with ACCA Manual D design criteria.	Required	
	f	If necessary, any ducts that run in outside walls must have at least R-7.5 between ducts and outside.	Required	
	g	Central air conditioning refrigerant charge and air flow documented to be within 10% of manufacturer recommendation.	Required	
	h	Air filter housings must be air-tight to prevent bypass or leakage.	Required	
	i	Air flow for each register measured and complies with Manual J design.	2	
	j	Returns OR transfer grill in each room with closeable door.	2	
	k	More than one return per zone.	1	
		Hydronic Heating Systems:		
	l	Hydronic distribution system located 100% within house envelope.	2	
	m	Hydronic distribution system pipes insulated where they run through unconditioned (i.e. no thermostat) spaces (e.g. basements, crawlspaces, etc.).	2	
	n	Hydronic distribution system designed and sized to match room-by-room loads (submit sizing plan).	2	
	o	Hydronic boiler with less than 4 gallons water content and/or "low mass".	2	
	p	Boiler controls set up to "cold start" (i.e. does not maintain boiler water temperature 24/7, but allowed to drift down).	2	
	q	Modulating aquastat/outdoor temperature sensing controls to adjust circulating boiler water.	2	
		Other Energy Saving Strategies:		
	r	Points per added Energy Rating point above 5-star 86 point rating for new and above 83 points for existing homes.	1	
	s	No air conditioning installed.	3	
	t	Points for each heating zone beyond one (excludes semi-conditioned basement).	1	
	u	Paved areas shaded by trees.	1	
	v	Planted (or building sited with) windbreak on north or northwest.	2	
	w	Plant new and/or existing shade trees and vegetation for shading west sides of building.	2	
	x	Additional interior mass by adding second layer of (minimal 1/2") gypsum wall board.	3	
	y	Trellises to shade west side glass.	1	
	z	Low-solar admittance glass on west, whole window SHGC <.40.	2	
	aa	Awnings or overhang designed to reduce summer heat gain.	1	
	bb	Locate hot water heater within 20 feet pipe run of all showers/baths and kitchen.	2	
	cc	Whole house cooling/'night flushing' fan with tight insulated winter closure system.	2	
	dd	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

2)	**Efficient Lighting and Appliances**			
	a	At least 10 (or 6 in homes under 1500 sq.ft) ENERGY STAR or equivalent (or fluorescent tubes with electronic ballasts) high use light fixtures [High Use = 2 or more hours/ average daily use].	Required	
	b	ENERGY STAR or equivalent Refrigerator. (See www.energystar.gov).	Required	
	c	ENERGY STAR or equivalent Dishwasher, if dishwasher installed. (See www.energystar.gov).	Required	
	d	ENERGY STAR or equivalent Clothes washing machine, if washing machine installed. (See www.energystar.gov).	Required	
	Lighting:			
	e	Utilize automatic shutoff of at least 50% of outside lighting fixtures and all incandescent flood lamps during daylight hours.	1	
	f	Per fixture of high-use ENERGY STAR or equivalent lighting fixtures beyond required fixtures.	2	
	g	Per hard wired non-ENERGY STAR fixture with ENERGY STAR screw-in bulbs installed.	1	
	h	Use a comprehensive approach to high-quality lighting design – points for lighting design submitted.	3	
	i	Light pollution minimized through avoiding no direct beam illumination beyond visible property lines.	1	
	j	Common spaces such as hallways that would otherwise require 24 hour lighting (e.g. multi-family) utilize day lighting and automatic lighting controls.	2	
	k	Interior motion sensor with photocell. (1 point per fixture, maximum 3 points)	1	
	l	Exterior motion sensor with photocell. (1 point per fixture, maximum 2 points)	1	
	Appliances:			
	m	Other Energy Star appliances (See www.energystar.gov). (1 point per appliance)	1	
	n	Gas-fired clothes dryers with electronic ignition, if dryer hookup provided.	1	
	o	Install a clothesline – 2 points each for indoor and outdoor permanent clotheslines. (max. 4 points)	2	
	p	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

3)	**Sustainable Equipment**			
	a	Electric space heat and/or domestic hot water system installed only as solar backup (if electric space heat consumption or domestic hot water consumption do not individually exceed 2,000 kWh/yr each, or combined, do not exceed 3,000 kWh/year).	Required	
	b	EPA, Canadian or MHA certified wood burning appliance as a primary heat source with an output capacity greater than 50% of Manual J heat load.	3	
	c	EPA, Canadian or MHA certified wood burning appliance as an auxiliary heat source with an output capacity less than 50% of Manual J heat load.	1	
	d	Wood burning appliances with outside combustion air.	3	
	e	Drain heat-recovery system (I.e. "GFX" or "Drain Gain") 2 points per system.	2	
	f	Grey water heat recovery system.	2	
	g	Rough-in of plumbing and wiring and roof orientation for future solar hot water or photovoltaics.	2	
	h	Solar water heating.	3	
	i	Points per peak Watt photovoltaics installed.	0.01	
	j	Points per peak Watt wind installed.	0.01	
	k	Points per peak Watt hydro installed.	0.01	
	l	Points per peak Watt photovoltaics, wind or hydro grid connected (bonus).	0.02	
	m	Intake air solar preheating system (e.g. Solarwall, etc.).	2	
	n	On-site fuel cell.	3	

	o	On-site fuel cell powered by a renewable fuel source (additive with above).	3	
	p	On-site district heating system.	3	
	q	On-site district district heating system powered by a renewable fuel source (additive with above).	3	
	r	On-site co-generation.	3	
	s	On-site co-generation powered by a renewable fuel source (additive with above).	3	
	t	Electric vehicle recharging station for two vehicles.	2	
	u	HFC refrigerant in air conditioning system.	1	
	v	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

5. RESOURCE IMPACTS				
1)	**Resource-efficient and environmentally responsible materials**			
	a	Only tropical wood that is third-party certified sustainably harvested (includes luan plywood).	Required	
	b	No old-growth wood, (except reused) including clear redwood, Western cedar, Douglas Fir.	3	
	c	No CFCs or HCFCs in building materials or in manufacturing process (excluding refrigerants in refrigerators or air conditioning systems).	3	
	d	No CCA treated wood above grade including sill plates.	2	
	e	2 points for each 5% of total value of materials in the building products made with salvaged, recycled or waste-stream content. Examples include re-habilitation of a used house, used doors or cabinets, cellulose insulation, straw-based particle-board, fly-ash-content concrete, re-sawn salvaged wood, recycled plastic lumber, etc.	2	
	f	Per 10% of value of solid structural wood FSC third-party certified sustainable harvested.	2	
	g	Per 10% of value of solid non-structural wood FSC third-party certified sustainable harvested.	2	
	h	Per 5% fly ash type “C” or type “F” in concrete .	1	
	i	Non-petroleum concrete form release oil.	1	
	j	Engineered wood or steel beams (90% minimum).	1	
	k	Engineered wood headers (90% minimum).	1	
	l	Engineered floor framing (90% minimum).	2	
	m	Engineered roof framing (90% minimum).	2	
	n	Engineered wall framing (90% minimum).	2	
	o	Steel interior wall studs (90% minimum).	2	
	p	OSB (without added urea formaldehyde adhesive) roof decking .	1	
	q	OSB (without added urea formaldehyde adhesive) floor decking.	1	
	r	OSB (without added urea formaldehyde adhesive) wall sheathing.	1	
	s	Interior finger-jointed trim, minimum of 50%.	2	
	t	Agricultural by-product based panels.	1	
	u	Straw bale, earth sheltered or other natural mass material system (not including log) construction: per 20% of component (i.e. walls) construction.	2	
	v	Cellulose insulation in walls.	3	
	w	Cellulose insulation in roof/ceilings.	3	

x	Recycled mineral fiber insulation.	2	
y	100% recycled fiberglass insulation with larger (less toxic) fibers.	2	
z	Structural Insulated Panel (SIP) construction: per 20% of component (i.e.. Walls/roof) construction.	1	
aa	Floor tiles - recycled content (at least 50%).	1	
bb	Carpet - recycled content (at least 50%).	1	
cc	Carpet pad - recycled content (at least 50%).	1	
dd	Recycled content non-wood outdoor lumber.	1	
ee	Recycled content gypsum board.	3	
ff	Natural-based product for finish siding (includes wood, masonry, fiber cement, stucco).	2	
gg	Natural-based product for finish trim (includes wood, masonry, fiber cement, stucco).	2	
hh	Exposed concrete floor with sealer and optional stain finish in living areas.	1	
ii	Soy based spray foam for walls and ceiling.	3	
jj	No PVC piping.	2	
	Use of local or regional materials:		
kk	Points per 10% of value of solid structural wood that is regionally sourced (3 points within 200 miles, 2 points within 400 miles, 1 point within 800 miles), excluding concrete.	1	
ll	Points per 20% of value of non-structural wood that is regionally sourced (3 points within 200 miles, 2 points within 400 miles, 1 point within 800 miles), excluding concrete.	1	
mm	Points per 10% of value of non-wood materials that are regionally sourced (3 points within 200 miles, 2 points within 400 miles, 1 point within 800 miles), excluding concrete.	1	
nn	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

2)	**Reduce, Re-Use and Recycle**		
	Minimize waste and encourage diversion of waste for re-use and recycling during the construction process:		
	Definitions: *Re-use* : to separate for later re-use by the builder or by others. *Recycling:* to separate and transport material to a central location for re-manufacturing by others		
a	Create and implement a plan for construction to provide for the efficient separation of materials which are reusable or recyclable, including separate containers, covered where required, for the following: wood, cardboard, metal, drywall (grind or recycle on site) plastics, asphalt shingles, other materials for re-use for which local infrastructure exists (comply with your local solid waste management plan	Required	
b	Optimize material use by designing for standard ceiling heights, wall lengths and building dimensions in 2 foot increments.	3	
c	Avoid waste from structural over-design. (Points for submitting engineer's calculations showing beam sizing)	2	
	Use typical OVE (Optimal Value Engineering) framing details:		
d	24" center studs *(OVE).*	2	
e	Eliminate jack studs in rough openings *(OVE).*	2	
f	Non-structural headers in non-load-bearing walls *(OVE).*	2	
g	Single top plate with stacked framing *(OVE).*	2	
h	2-stud corners with drywall clips or plywood drywall nailers *(OVE).*	2	
i	Job-site framing plan in architectural plan set and cut list on site.	3	
j	Donate excess and re-usable materials for re-use.	2	
k	Insulated concrete forms for foundation which stay in place, using at least 50% recycled content.	3	

	Countertops:			
	i	Install re-used countertops (minimum 75%).	2	
	ii	Install countertops made from recycled materials (minimum 75%).	1	
	iii	Install re-usable countertops (minimum 75%).	1	
	iv	Install recyclable countertops (minimum 75%).	1	
l		Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

3)	**Encourage diversion of waste for recycling during occupancy**			
	a	Provide space for recycling containers at convenient location for storage of recyclables (Define space)	Required	
	b	Provide composting and/or worm bins on site.	1	
	c	Built-in kitchen recycling center.	1	
	d	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

4)	**Water efficiency**			
	a	Landscaping that requires no irrigation system once mature.	3	
	b	Install 2.0 gpm shower heads (all).	1	
	c	Install 1.5 gpm shower heads (all).	2	
	d	Install high quality water-efficient toilet using 1.0 gallon or less per flush (all).	2	
	e	Separate and re-use gray water.	3	
	f	Install composting toilet.	3	
	g	High-efficiency drip automatic irrigation system for gardens.	1	
	h	Collect and use rainwater for garden use.	1	
	i	Collect and use rainwater for potable use.	3	
	j	Innovative wastewater technology (constructed wetland, etc.).	3	
	k	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

6. OCCUPANT HEALTH/INDOOR AIR QUALITY				
		This includes using materials and systems that minimize pollutant introduction into the home as well as the use of ventilation to dilute and remove any pollutants that are introduced. It also includes health and safety of builders and workers that produce materials.		
1)	**Minimize sources of pollutants**			
	a	No carpet in environments where it can get wet.	Required	
	b	No adhesives for carpet attachments unless zero VOC (100 grams per liter or less).	Required	
	c	Use only direct-vent or closed-combustion or power vented space heating and water heating equipment. Do not install vent-free space heating or water heating equipment. Wood stoves or wood burning appliances must have ducted combustion air within 2' of the air intake.	Required	
	d	Garages to be 100% air sealed from adjacent living spaces.	Required	
	e	Furnaces in garage must have completely sealed duct, cabinet and filter systems.	Required	
	f	Provide smoke detectors per code (hardwired with battery backup).	Required	
	g	Provide carbon monoxide detectors if there is any open combustion equipment (gas range) or an attached garage (hardwired with battery backup).	Required	
	h	Foundation continuous footing drain with stone covered with filter fabric, drained to daylight or if necessary to drain to the interior, use a sealed sump pump system. (Drainage system not required in pure sand.)	Required	
	i	Basement foundation walls use porous backfill material.	Required	
	j	Vapor retarder directly under slab.	Required	
	k	Provide continuous crushed stone under footings or provide pipe through footing for drainage of any accumulated water under slab to drainage.	Required	

l	Exterior of below grade foundation damp proofed.	Required	
m	Completely air seal indoor parking from housing, or locate garage remote from house.	Required	
n	Provide swales to divert surface water from hillsides.	Required	
o	If carpet is installed on slab on grade or on basement floor, must have slab insulated R-10 continuous and have vapor barrier directly under slab.	Required	
p	No open fireplaces; fireplaces only with sealed doors plus outside combustion air or tested to ensure no back drafting in worst-case condition.	Required	
q	Sheath and air seal bathroom exterior walls behind showers and tubs before installing showers and tubs. See also ventilation requirement	Required	
r	Exterior of below grade building envelope sealed with moisture barrier assembly system (e.g. Rub-R-Wall system, etc.).	3	
s	Zero urea formaldehyde interior panel products or seal with water-based sealer.	2	
t	If Carpet is installed, must meet CRI low emission label standard.	1	
u	No carpet in house.	3	
v	No petroleum-based flooring materials in house.	3	
w	Carpet with no site-applied adhesives.	1	
x	Slope top of backfill to achieve settled slope of 1" per foot to at least 3' from foundation. Pitch final grading to direct this water away from the building.	1	
y	Insulation over cold water pipes to avoid condensation on pipes in basements and crawlspaces.	2	
z	Seal top of footing prior to pouring foundation wall OR provide continuous crushed stone base under footings.	1	
	Design and build foundations to minimize soil gas entry:		
aa	Pipe all floor drains separate from footing drains; glue all floor drain joints.	1	
bb	Provide above-grade cleanout of footing drains at high point of footing drains.	1	
cc	Provide sub-slab 4" minimum crushed stone , connect sub slab drainage to footing drain.	1	
dd	Slab on grade minimum of 12" above 100-year flood level.	1	
ee	Crawlspaces not vented; crawlspace walls insulated; crawlspace floor with complete, continuous sealed vapor retarder, also sealed to walls. (Must complete all approaches.)	2	
ff	Provide exhaust fan in attached garage automatically controlled to run for pre-set period of time when garage door closes.	1	
gg	Provide storage space sealed and isolated from the living space for toxic materials such as paint, gasoline cans, etc.	1	
hh	Plumb/wire for central vacuum system.	1	
ii	Central vacuum system.	3	
jj	Mask floor registers during construction, and clean ducts before turning on furnace/AC fan.	1	
kk	Non-chemical termite/carpenter ant barriers.	1	
ll	Other non-chemical pest species resistant features.	1	
mm	No paper faced gypsum under tiles in tubs, showers and spas.	2	
nn	Track-off mats plus hard surface entry.	2	
oo	Rough-in for sub-slab radon exhaust stack, 4" sub-slab crushed stone installed .	2	
pp	Radon test after house is completed.	1	
qq	Complete radon-exhaust system installed , if radon test is positive for radon.	2	
rr	Heat detector (to automatically shut off heating system if fire).	1	
ss	Non-radioactive smoke detector (per device).	1	
tt	Non-mercury thermostat (per device).	1	
uu	No carpet in an area 3' inside entry doors. Points per entry door .	1	
vv	Low formaldehyde and low VOC-emission (250 grams per liter or less), including paints, solvents and adhesives.	3	
ww	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

2)	**Provide ventilation to remove pollutants generated in the house**			
	a	Install filtered exhaust ventilation in kitchen.	Required	
	b	Install an automatic, effective ventilation system which is quiet (less than 1.5 sones for surface-mounted) and has low energy consumption (less than .5 watts/cfm), providing at least 15 cfm per bedroom plus 15 cfm, such as one of the following:	Required	
	i	Low-energy-use, quiet, durable bath fans with automatic control. As a minimum, the house must have an exhaust-only ventilation – EOV system or the following:		
	ii	Outside air ducted into furnace system return from outside, with fan-cycler control or the following:		
	iii	Ducted heat recovery ventilation system (points – see below).		
	iv	Non-fan-powered ventilation system, if proven effective through performance testing.		
	c	Insulate all ventilation exchanging exhaust ductwork (minimum R-8) outside of the insulated envelope.	Required	
	d	Use rigid duct or other methods to keep fan back-pressure below 0.2" for EOV systems.	Required	
	e	Air seal ventilation ductwork.	Required	
	f	Exhaust fan or duct to central system in every bathroom that has a shower, spa or bathtub.	Required	
	g	Insulate all ventilation exchanging exhaust ductwork (minimum R-19) outside of the insulated envelope.	2	
	h	Install furnace fan cycler control and fresh air inlet with EOV system for forced-air houses.	2	
	i	Install automatically controlled balanced heat recovery ventilation system with fresh air ducted to all occupied living spaces, and exhausted from all bathrooms and other moisture producing rooms. Recovery efficiency minimum 75%.	3	
	j	Central air or ventilation system with minimum 30% dust spot efficiency filters.	2	
	k	Protect ductwork during construction from dust entry.	2	
	l	Post-construction testing to meet minimum air flow requirements or IAQ performance standards (submit results).	2	
	m	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

7. KEEPING IT GREEN – OCCUPANT EDUCATION AND O&M				
1)	**Provide education for owners/occupants in the use and care of their dwellings**			
	a	Educate occupants about the buildings' goals and strategies and impacts on costs of operating the building, while addressing obstacles to occupant education, such as language, literacy or elderly. Provide training of owners/occupants for all control systems in the house	Required	
	b	Provide a "User's Manual" for the house, including written operation instructions for the house, maintenance schedule, maintenance instructions, equipment literature, equipment warranties	Required	
	c	Provide "VBG Scorecard" to owners/occupants.	Required	
	d	Provide wire and valve labeling, diagrams and descriptions of system controls adequate for future maintenance and repair by a professional.	2	
	e	Provide photo record of framing with wiring and utilities installed, photos taken prior to installing insulation and interior sheathing/drywall. Photos keyed to location in or around home.	3	
	f	Label occupant controls for ease of use.	2	
	g	In rental housing provide user manual for new occupants.	1	
	h	Install approach that meets the goal of this strategy not listed above (upon documentation and submission to VBG Program Committee).	TBD	

TOTAL POINTS ACHIEVED (points awarded for Approaches incorporated into home beyond Requirements)	
POINTS AWARDED FOR HOUSE SIZE (see House Size chart)	
VERMONT BUILT GREEN TOTAL POINTS (Total Points Achieved + Points Awarded for House Size)	

Vermont Built Green
House Size Points (v. 5 11/15/02)

Average or Smaller Home

Gross Square Footage of Home	Bedrooms 1	2	3	4	5	6		Size Points
	1700	2000	2300	2600	2900	3200		88
	1615	1900	2185	2470	2755	3040		91
	1530	1800	2070	2340	2610	2880		94
	1445	1700	1955	2210	2465	2720		98
	1360	1600	1840	2080	2320	2560		103
	1275	1500	1725	1950	2175	2400		109
	1190	1400	1610	1820	2030	2240		117
	1105	1300	1495	1690	1885	2080		127
	1020	1200	1380	1560	1740	1920		140
	935	1100	1265	1430	1595	1760		156
	850	1000	1150	1300	1450	1600		175
	765	900	1035	1170	1305	1440		199
	680	800	920	1040	1160			227
	595	700	805					261
	510	600						302
	425							350

Average or Larger Home

Gross Square Footage of Home*	Bedrooms 1	2	3	4	5	6		Size Points
	1700	2000	2300	2600	2900	3200		88
	1870	2200	2530	2860	3190	3520		83
	2040	2400	2760	3120	3480	3840		77
	2210	2600	2990	3380	3770	4160		71
	2380	2800	3220	3640	4060	4480		63
	2550	3000	3450	3900	4350	4800		55
	2720	3200	3680	4160	4640	5120		46
	2890	3400	3910	4420	4930	5440		37
	3060	3600	4140	4680	5220	5760		26
	3230	3800	4370	4940	5510	6080		14
	3400	4000	4600	5200	5800	6400		0

Houses above these sizes must develop a VBG "Big Green" Strategy with approval from the VBG Review Committee.

VBG House Size Points Directions:

After verifying compliance with VBG Requirements, round your home's square footage UP to the next square footage on the chart, under your # of bedrooms. Read across to find your points.

> Average Size Homes: Homes twice average size score zero.
< Average Size Homes: Homes half the average size score the VBG threshold.
The size points change progressively as the home size differs from average.

* Gross square footage does not include ***home business*** or ***unconditioned space*** (see definitions).

Acknowledgements

This document draws from many sources and resources, including:

1. The New Jersey Department of Community Affairs/Public Service Electric and Gas Sustainable Design Affordable Housing Guidelines, developed by Blair Hamilton, Marc Rosenbaum, Andy Shapiro and Alex Wilson.
2. Earth Craft House, Southface Energy Institute.
3. Green Building Guide, A Sustainable Approach, A Program of the City of Austin, Texas.
4. A Blueprint for Greening Affordable Housing, Global Green USA.
5. Guide to Developing Green Building Programs, NAHB National Research Center.
6. Sustainable Is Affordable, The Affordable Housing Network of New Jersey.
7. Environmental Initiative Symposium Report, Habitat for Humanity.
8. Health House, American Lung Association.
9. The many knowledgeable members of Building for Social Responsibility (Vermont) and the Northeast Sustainable Energy Association.
10. Financial assistance and support from the Vermont Sustainable Jobs Fund, Vermont Department of Public Service, and U.S. Department of Energy.

Contact Information

Richard Faesy
Vermont Energy Investment Corporation
14 School Street
Bristol, Vermont 05443
phone: 802-453-5100 ext. 19
fax: 802-453-5001
rfaesy@veic.org