

The New Hampshire Greenhouse Gas Emissions Reduction Fund

Year 2 (July 2010–June 2011) Evaluation





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The transformational change required to build a low carbon society demands collaboration among a wide range of stakeholders including the private sector, government, non-profits, and universities. Carbon Solutions New England is a public-private partnership based at the University of New Hampshire to promote collective action to achieve a clean, secure energy future while sustaining our unique natural and cultural resources. New England is uniquely positioned to demonstrate an effective regional response by focusing our substantial entrepreneurial and intellectual resources on this issue.

This report is available online at
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NH Greenhouse Gas Emissions Reduction Fund Annual Evaluation (July 2010 – June 2011)

March 2012

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1 Executive Summary

The Greenhouse Gas Emissions Reduction Fund (GHGERF) is administered by the New Hampshire Public Utilities Commission (PUC) and was created by the New Hampshire legislature in 2008. The purpose of the Fund is to support energy efficiency, energy conservation, and demand response programs to reduce New Hampshire's greenhouse gas emissions.¹

Funding is derived from the State's participation in the Regional Greenhouse Gas Initiative (RGGI), a cooperative effort by nine northeastern states to reduce carbon dioxide emissions in the electric power sector via a cap and trade program. RGGI conducts quarterly auctions of emissions allowances, the proceeds of which are distributed to the participating states, including New Hampshire.

Since December of 2008, RGGI auctions have resulted in revenues to New Hampshire of \$36.7 million. These funds are distributed primarily through a competitive grants process administered by the PUC. All grant awards require the approval of the Governor and Executive Council.

In the summer and fall of 2009, the GHGERF awarded \$17.7 million to 30 grantees with an average award amount of \$590,000. In December 2010, the GHGERF awarded an additional \$13.4 million to six grantees with an average award amount of \$2.2 million. The total amount of GHGERF grant awards is equal to 0.5% of the \$6 billion that New Hampshire spends annually on energy across all sectors. These grants funded a wide variety of projects and programs which directly benefitted New Hampshire homes, schools, businesses, towns, and non-profit organizations. Details for each grant award are available at the PUC's website (<http://www.puc.nh.gov/Sustainable%20Energy/GHGERF.htm>).

Completed projects supported by GHGERF funds (as of June 2011) have resulted in annual reductions of fossil fuel energy use in NH by 182,800 million BTUs (MMBTU). This is equivalent to the energy used in 1,400 NH households in one year. Additionally, the GHGERF creates annual energy savings for NH residents and businesses of over \$5 million and reduces annual carbon dioxide (CO₂) emissions by 18,900 metric tons. Lifetime energy savings due to projects (completed as of June 2011) are estimated to be 3.2 million MMBTU; this is equivalent to the annual energy use of 25,000 NH households. NH residents and businesses are expected to save \$84.5 million over the lifetime of the energy measures at current energy prices. Every dollar invested via the GHGERF program—as of June 2011—is expected to result in a lifetime energy savings of \$4.67 at current energy prices. Lifetime CO₂ emissions reductions are estimated to be 300,000 metric tons.

Lifetime savings due to grants expended as of June 2011 (\$18.1 million spent) are expected to be \$84.5 million in energy costs at current energy prices. For every dollar spent as of June 2011, the expected return is \$4.67 in energy savings.

¹NH General Court, RSA 125-O: 23

Table 1: Annual energy reductions for projects completed as of June 2011

Fuel Type	Energy Reduced	MMBTU	Energy Savings (\$ millions)	CO2 reduced (metric tons)
Electric	27.0 million (kWh)	92,000	\$3.75	13,300
Oil	283.3 thousand (gallons)	39,300	\$0.93	2,900
Natural Gas	538.6 thousand (therms)	55,300	\$0.75	2,900
Propane*	-41.5 thousand (gallons)	-3,800	(\$0.13)	-200
	Total	182,800	\$5.30	18,900

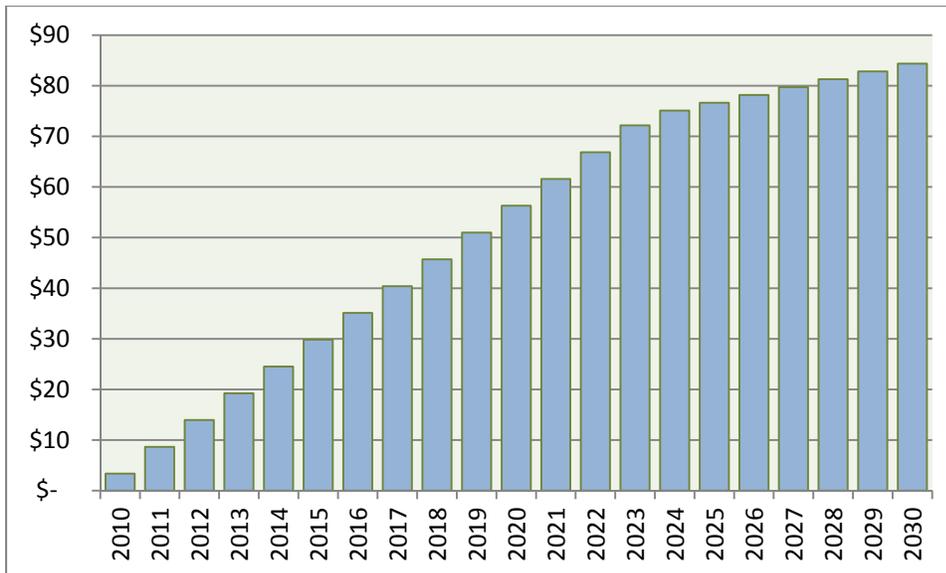
*Reflects an increase in propane usage due to fuel switching in some projects

Table 2: Projected lifetime energy savings for projects completed as of June 2011

Fuel Type	Energy Reduced	MMBTU	Energy Savings (\$ millions)	CO2 reduced (metric tons)
Electric	377.5 million (kWh)	1,290,000	\$52.5	186,100
Oil	5.7 million (gallons)	796,000	\$18.8	58,300
Natural Gas	11.3 million (therms)	1,200,000	\$15.7	59,800
Propane*	-783.3 thousand (gallons)	-72,000	(\$2.5)	-4500
	Total	3,214,000	\$84.5	299,700

*Reflects an increase in propane usage due to fuel switching in some projects

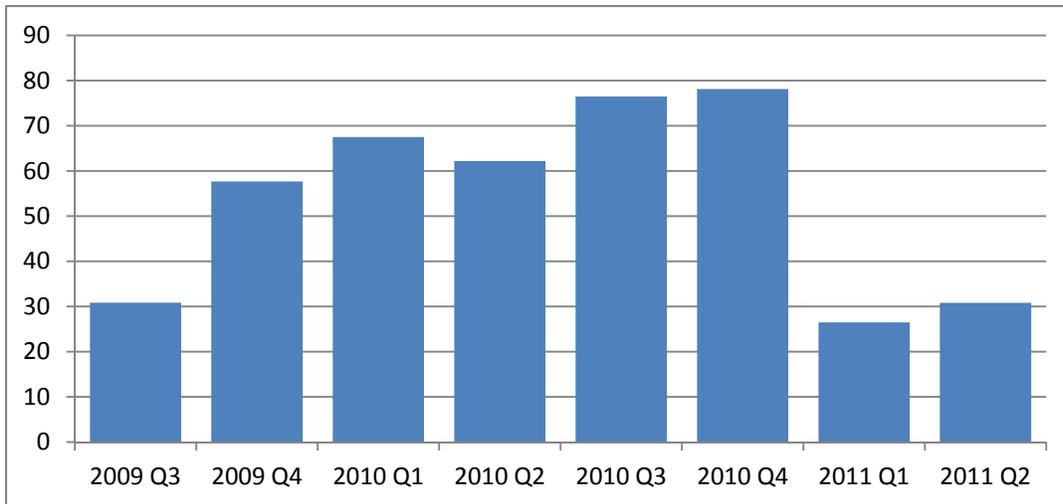
Figure 1: Cumulative energy savings for projects completed as of June 2011 (\$ millions)



The GHGERF grants directly supported 53 full time equivalent (FTE) jobs from July 2010 through June 2011. This is similar to the number of jobs that were supported by GHGERF in the previous year. After two years of quarterly job growth, job activity supported by the GHGERF dropped by 66% in the first quarter of 2011.

A portion of this decline can be explained by the completion of several of the grant programs, including the NH utility RECORE program. In addition, the 2010 grantees and their partners were reluctant to move forward on energy efficiency projects because of the uncertainty created in 2009 and 2010 by New Hampshire House Bill 519-FN which sought to repeal NH's involvement in the Regional Greenhouse Gas Initiative (RGGI). Until the bill was vetoed by the Governor, grantees proceeded very cautiously on their programs which reduced economic activity related to the GHGERF.

Figure 2: FTE jobs supported by GHGERF



In addition to energy reductions, GHGERF has supported energy efficiency workforce development for 320 workers with over 9,000 training hours (as of June 2011). GHGERF has also financially supported almost 1,100 building benchmarking and energy audit evaluations. Workforce development and benchmarking/audit activities are essential foundational steps in developing the next wave of cost-effective projects that reduce energy use and save money for New Hampshire's residents, municipalities, and businesses.

The initial round of grants awarded in 2009 was in part a learning and capacity building period for the GHGERF and the state. The energy reductions that have resulted from this initial investment period are significant and have had a positive impact on jobs and the NH economy. The grants awarded in 2010 are well-positioned to continue the trend of significant energy reductions achieved by the GHGERF.

2 Background

2.1 NH Greenhouse Gas Emissions Reduction Fund

The NH Greenhouse Gas Emissions Reduction Fund (GHGERF) was created by New Hampshire legislation, RSA 125-O: 23 in 2008.² The source of the funding comes from New Hampshire's participation in the [Regional Greenhouse Gas Initiative \(RGGI\)](#), a regional cap-and-trade program for greenhouse gas emissions among nine states from the Northeast and Mid-Atlantic. RGGI targets carbon dioxide emissions from fossil-fuel electric power generation. The program creates a market for carbon dioxide emissions allowances. New Hampshire's emissions allowances are sold at regional quarterly auctions. The proceeds from the auctions are paid into the GHGERF. As of June 2011, the GHGERF had received \$32.4 million in auction proceeds. The GHGERF is administered by the NH Public Utilities Commission (PUC) with the Sustainable Energy Division assisting with fund management. [Annual reports](#) for the fund are prepared jointly by the Department of Environmental Services and the Public Utilities Commission and submitted to the NH Legislature. The reports summarize the allocation and spending of auction revenues.

The first major expenditure from GHGERF was \$1.2 million for the [StayWarmNH](#) program in winter 2008-2009. StayWarm provided assistance to low-income households by expanding existing weatherization and air sealing programs administered through the Community Action Agencies (CAAs), and by funding a do-it-yourself (DIY) weatherization kit and volunteer based weatherization efforts.³ By May 2009, 3,400 homes were reached by the program. Volunteers installed over 1,000 compact fluorescent lights (CFLs), providing lifetime energy savings of \$116,000, reducing CO₂ emissions by 400 metric tons, and saving 575,850 kWh of electricity. Of the 3,400 StayWarm kits distributed for DIY Installation, assuming half the four CFLs included in the kit were installed by homeowners, lifetime savings for those 6,800 bulbs would be \$760,000 or 3.75 million kWh of electricity, and CO₂ pollution would be reduced by 2,600 metric tons.⁴

The next major round of expenditures supported the first round of grants that were awarded in the summer and fall of 2009. The first Request for Proposals (RFP) was issued in February of 2009. Out of 84 proposals submitted, 30 grants totaling \$17.7 million were awarded in four separate rounds: July 15, 2009, August 15, 2009, September 23, 2009, and October 21, 2009. Grants went to a variety of energy efficiency project types including, but not limited to, grants for education and outreach for the building trades, auditing and benchmarking for municipalities and schools, energy management for campuses, auditing and implementation for retail establishments and process improvements for several businesses.

² RSA 125 O:23, available online at <http://www.gencourt.state.nh.us/rsa/html/X/125-O/125-O-23.htm>.

³ The StayWarm program was not part of the grant award process, but this expenditure was mandated by the Governor and legislature.

⁴ "StayWarm Final Report 2008-2009" Available online at http://www.nh.gov/staywarm/#progress_reports.

A second RFP was issued by the NH PUC in May 2010. Drawing on the experience from the first round of grants, the PUC targeted three specific program areas. Out of 29 proposals, 6 grants totaling \$13.4 million were awarded by the PUC and approved by the Governor and Council on December 8, 2010. The grants were awarded in the following three categories:

1. Program continuation for grants awarded in the first RFP that had demonstrated success in implementing their initial proposals.
2. Programs that reduce energy use and greenhouse gas emissions at large energy user sites.
3. Programs that reduce energy use and greenhouse gas emissions in the affordable housing sector.

Of the 2009 grants, \$12.3 million (approximately 70% of the total 2009 grant award amount) was paid during State Fiscal Year (SFY) 2010. The remainder of the 2009 grant funding was reserved for expenditure during SFY 2011, as eleven of the 30 grants had a duration of more than one year, up to a maximum of two years. In SFY 2011, \$5.8 million was paid out to grants.⁵ As of June 2011, 88% of funding allocated by GHGERF has gone to grant activity. The other 12% consisted of \$1.2 million for StayWarmNH, as well as \$3.1 million that was transferred from GHGERF to the State’s General Fund in June 2010 at the direction of the NH state legislature to help balance the state budget.

Table 3: Allocation of GHGERF funds from January 2008 – June 2011

Expenditure	Amount (\$ millions)	Percentage
StayWarmNH	\$1.2	3%
2009 Grants	\$17.7	50%
2010 Grants	\$13.4	38%
State Budget	\$3.1	9%
Total	\$35.4	100%

2.2 2009 Grants

In 2009, the NH Public Utilities Commission competitively awarded 30 grants to support programs and projects that directly or indirectly supported the reduction of fossil fuel based energy. These grants went to a wide array of private, public and non-profit entities and program types (Table 4) and served a wide range of energy consumers. The average grant size was just under \$600,000. The list of grants is provided in

Table 5, and a short description of each funded project appears in Appendix A. For additional information on each of the funded projects, their proposals, contracts, and quarterly reports are

⁵ “RSA 125-O:21 RGGI annual report required of the Department of Environmental Services (DES) and the Public Utilities Commission (PUC),” Electric Utility Restructuring Legislative Oversight Committee, Oct. 2011, Available online at <http://www.puc.nh.gov/Sustainable%20Energy/GHGERF/RGGI%20Annual%20Reports/2011%20RGGI%20Annual%20Report%20to%20NH%20Legislature%20102511.pdf>

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available on the [GHGERF webpage](#) hosted by the PUC. A review of the energy, economic and environmental impacts of these grants is provided in the [first CSNE report](#) on the GHGERF program.

Table 4: Grants awarded in 2009 by recipient type

Recipient Type	Grants		Grant Funding		Average Award Size
	Count	Percentage	Amount	Percentage	
Non-Profit	8	27%	\$2,754,328	16%	\$344,291
Private	6	20%	\$9,130,780	52%	\$1,521,797
Public Entity	16	53%	\$5,776,227	33%	\$361,014
Total	30	100%	\$17,661,335		\$588,711

Table 5: Grants awarded in 2009

Grant	Award Amount	Program Category ⁶	Sector Served	Contract Duration (Years)
RECORE - NH Electric Utilities	\$7,646,020	Energy Efficiency	Residential, Commercial & Industrial	2
Business Finance Authority of NH	\$2,000,000	Energy Efficiency	Commercial & Industrial	1
NH Community Development Finance Auth	\$1,500,000	Energy Efficiency	Municipal	2
Retail Merchants Assn of NH	\$1,372,028	Energy Efficiency	Commercial & Industrial	1
UNH- Carbon Challenge	\$813,402	Energy Efficiency	Residential	2
TRC Companies	\$499,948	Energy Efficiency	K-12 School	2
Fraser NH LLC	\$470,000	Energy Efficiency	Commercial & Industrial	1
Clean Air-Cool Planet	\$400,000	Energy Efficiency	Municipal	1
City of Rochester	\$394,000	Energy Efficiency	Municipal	2
Town of Temple	\$332,100	Energy Efficiency	Municipal	2
Dartmouth College	\$330,936	Energy Efficiency	Higher Ed	2
LighTec Inc	\$316,000	Energy Efficiency	Commercial/Industrial/Municipal	2
Home Builders & Remodelers Assn of NH	\$178,169	Energy Efficiency	Workforce	2
Crotched Mtn Rehabilitation Ctr	\$176,531	Clean & Renewable Energy, Energy Efficiency	Non-Profit	1
DRED - Division of Economic Development	\$174,000	Energy Efficiency	Workforce	2
Stonyfield Farm Inc	\$148,927	Energy Efficiency	Commercial & Industrial	1
NH Institute of Art	\$146,060	Clean & Renewable Energy, Energy Efficiency	Non-Profit	2
UNH- Carbon Solutions New England	\$139,945	Administration	State Government	1
Town of Walpole	\$138,345	Energy Efficiency	Municipal	1
Plymouth Area Renewable Energy Initiative	\$99,250	Clean & Renewable Energy, Energy Efficiency	Residential	1
So NH Conservation & Development Area Council	\$87,000	Energy Efficiency	Agriculture	1
SAU 46/Merrimack Valley School District	\$83,685	Clean & Renewable Energy, Energy Efficiency	K-12 School	1
Chosen Vale Inc dba Enfield Shaker Mus	\$51,354	Energy Efficiency	Non-Profit	1
Propell Energy	\$49,885	Clean & Renewable Energy	Non-Profit	1
No Country Res Cons & Dev Area Council	\$43,850	Greenhouse Gas Abatement and Climate Change Adaptation	Municipal	1
Town of Gorham	\$26,000	Clean & Renewable Energy, Energy Efficiency	Municipal	1

⁶ As defined by RGGI, Inc. in Potential RGGI Benefits Metrics Draft #6 issued on 1/12/2012. These definitions are different from the definitions used in the previous annual report issued by CSNE, but are revised to be compatible with broader, regional reporting of RGGI's impact.

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Grant	Award Amount	Program Category ⁶	Sector Served	Contract Duration (Years)
Town of Jaffrey	\$16,250	Energy Efficiency	Municipal	1
Town of Warner	\$11,150	Energy Efficiency	Municipal	1
Town of Hancock	\$8,500	Energy Efficiency	Municipal	1
Town of Fremont	\$8,000	Energy Efficiency	Municipal	1

The largest single grant was \$7.6 million (over 40% of total 2009 grant awards) and went to the four electric utilities serving NH for their RECORE program. This program expanded the [CORE energy efficiency programs](#); these are statewide energy efficiency programs that are funded by the system benefits charge on electricity bills. The top four grants—RECORE (\$7.6 million), NH Business Finance Authority (\$2 million), NH Community Development Finance Authority (\$1.5 million), and Retail Merchants Association of New Hampshire (\$1.4 million)—comprised 70% of 2009 total funding awards.

Overall, approximately 90% of funding went to benefit Residential, Commercial, Industrial, and Municipal entities (Table 6, Figure 3,

Figure 4). The largest number of grants went to municipalities (11 grants) and accounted for 16% of fund expenditures. Other markets served included: non-profit, K-12 schools, workforce development, agriculture, state government, and higher education.

Figure 4 shows each grant award amount in each target market column.

Table 6: Grants awarded in 2009 and funding amounts by target market

Target Market	Grants		Grant Funding		Average Award Size
	Count	Percentage	Amount	Percentage	
Residential, Commercial & Industrial	1	3%	\$7,646,020	43%	\$7,646,020
Commercial & Industrial	5	17%	\$4,306,955	24%	\$861,391
Municipal	11	37%	\$2,878,195	16%	\$261,654
Residential	2	7%	\$912,652	5%	\$456,326
K-12 School	2	7%	\$583,633	3%	\$291,817
Non-Profit	4	13%	\$423,830	2%	\$105,958
Workforce	2	7%	\$352,169	2%	\$176,085
Higher Ed	1	3%	\$330,936	2%	\$330,936
State Government	1	3%	\$139,945	1%	\$139,945
Agriculture	1	3%	\$87,000	0%	\$87,000
Total	30	100%	\$17,661,335	100%	\$588,711

Figure 3: Grants awarded in 2009 by primary target market

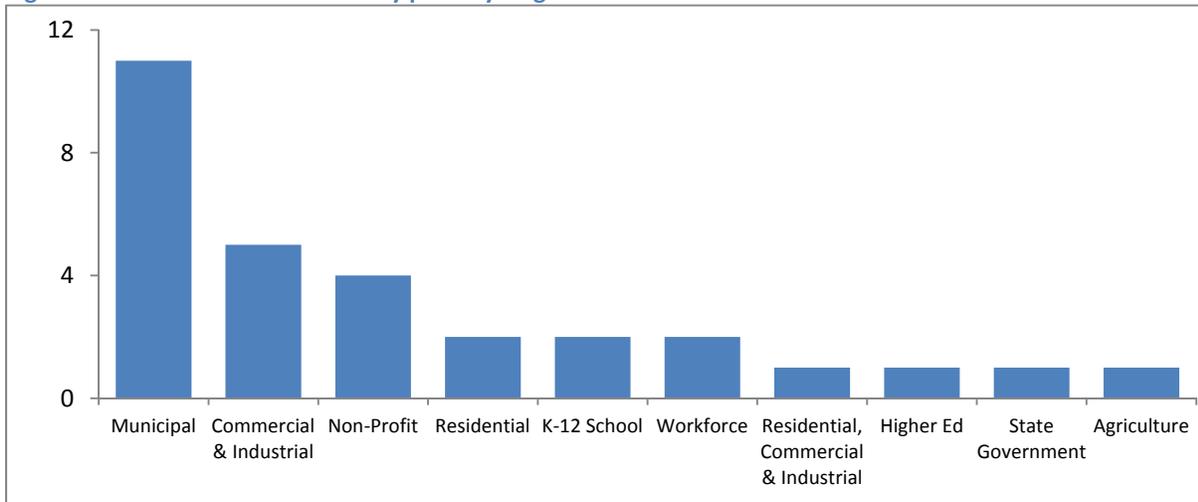
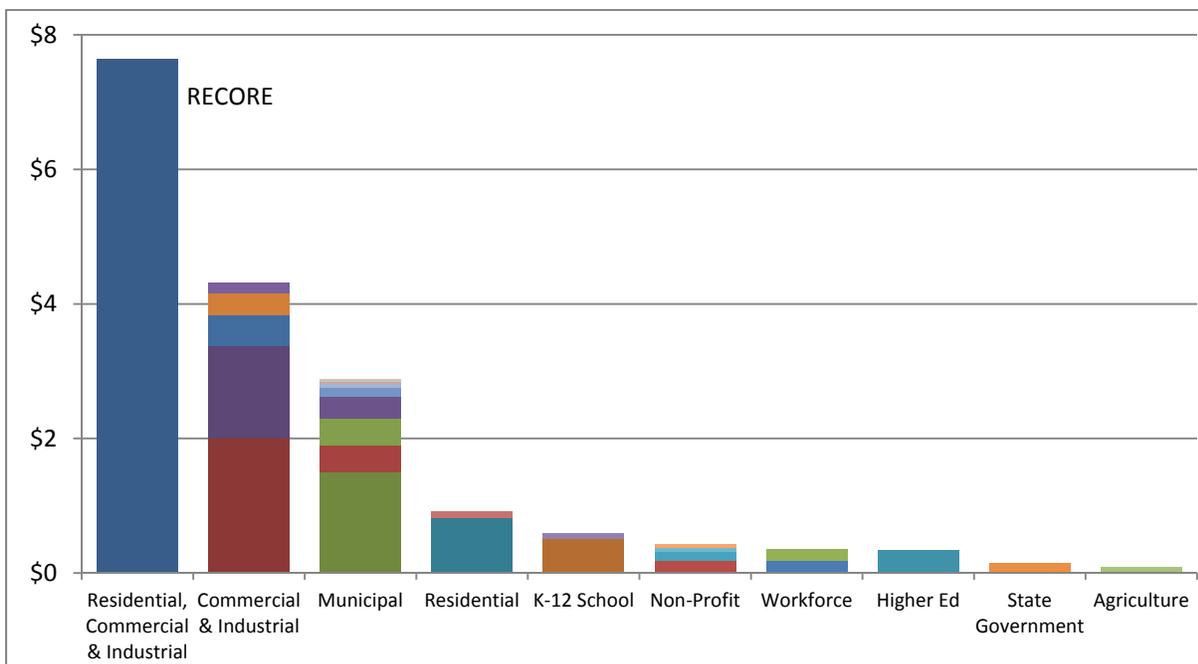


Figure 4: Grant award amounts for grants awarded in 2009 by primary target market (\$ millions)



* Different colors in the bars represent the amounts received for an individual grant in that category

Out of the 30 grants, 17 supported direct energy reductions through the installation of fossil-fuel energy reduction technologies. These grants accounted for 77% of total funding. The remaining grants focused on foundational support of energy efficiency development (i.e., one focused on energy performance benchmarking, four focused on building energy audits, two focused on measurement of energy usage, two focused on job training, two focused on education/marketing/outreach, and one focused on both benchmarking and energy audits).

2.3 2010 Grants

In 2010, the NH Public Utilities Commission competitively awarded six grants to support programs in three categories: 1) continuation of successful grants awarded in 2009, 2) promotion of energy use and greenhouse gas emission reductions for large energy users, and 3) promotion of energy use and greenhouse gas emission reductions for the affordable housing sector. This reflected a more targeted approach than the previous grant round which had been more flexible for program and project ideas that supported the goals of the GHGERF. The average grant size (\$2.2 million) was 3.7 times larger than the average grant size from the first RFP (\$0.6 million). A short description of each funded project appears in Appendix A. For additional information on each of the funded projects, their proposals, contracts, and quarterly reports are available on the [GHGERF webpage](#) hosted by the PUC.

Table 7: Grants awarded in 2010 by recipient type

Recipient Type	Grants		Grant Funding		Average Award Size
	Count	Percentage	Amount	Percentage	
Non-Profit	2	33%	\$4,000,000	30%	\$2,000,000
Private	1	17%	\$5,000,000	37%	\$5,000,000
Public Entity	3	50%	\$4,400,000	33%	\$1,466,667
Total	6	100%	\$13,400,000	100%	\$2,233,333

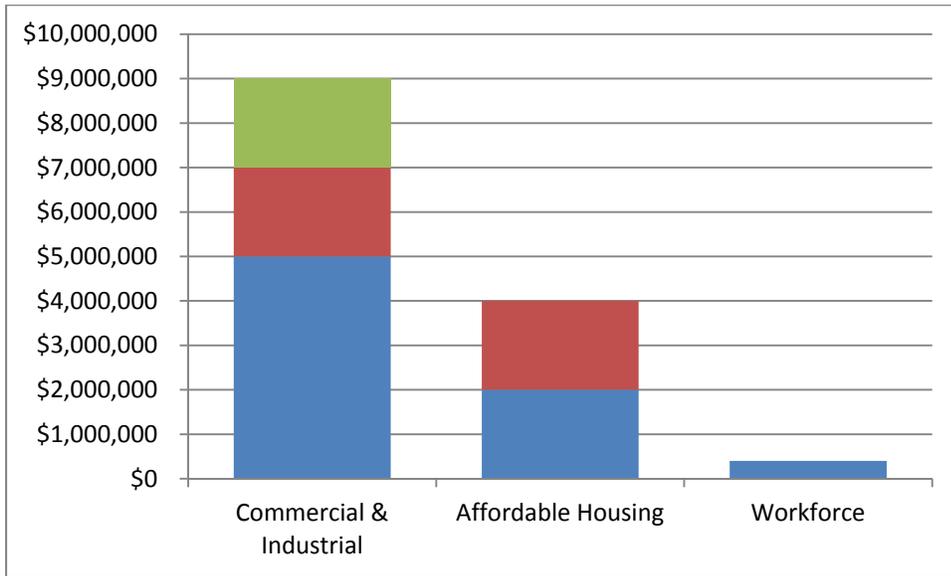
Table 8: Grants awarded in 2010

Grant	Award Amount	Program Category ⁷	Entity Served	Contract Duration (Years)
TRC Companies	\$5,000,000	Energy Efficiency	Commercial & Industrial	2.5
Business Finance Authority of NH	\$2,000,000	Energy Efficiency	Commercial & Industrial	2.5
NH Community Loan Fund	\$2,000,000	Energy Efficiency	Affordable Housing	2.5
NH Housing Finance Authority	\$2,000,000	Energy Efficiency	Affordable Housing	2.5
Retail Merchants Assn of NH	\$2,000,000	Energy Efficiency	Commercial & Industrial	2.5
DRED - Division of Economic Development	\$400,000	Energy Efficiency	Workforce	2.5

The largest single grant was \$5.0 million (17% of total grant awards) and went to TRC Companies for their Pay for Performance Program (P4P) serving large energy users. Overall, approximately 67% of funding is allocated to benefit NH commercial and industrial businesses, 30% of funding is allocated to affordable housing, and 3% of funding is allocated to energy efficiency workforce development.

⁷ As defined by RGGI, Inc. in Potential RGGI Benefits Metrics Draft #6 issued on 1/12/2012.

Figure 5: Grant award amounts for grants awarded in 2010 by primary target market (\$ millions)



* Different colors in the bars represent the amounts received for an individual grant in that category

2.4 GHGERF Reporting

This report has been prepared by Carbon Solutions New England (CSNE), a public-private partnership based at the University of New Hampshire. CSNE’s mission is to promote collective action to achieve a clean, secure energy future while sustaining New England’s unique natural and cultural resources. CSNE achieves this through collaboration, conducting independent analysis and research, and communicating its findings to key decision makers.

As one of the 30 grant recipients of the first round of GHGERF grants awarded in 2009, CSNE was funded to document the economic, energy, and environmental impacts of the GHGERF program. Following expiration of the initial tracking grant in the fall of 2010, CSNE was retained by the PUC to perform this evaluation work on a contract basis, including the production of an annual report documenting the energy, economic, and environmental impacts resulting from GHGERF for the previous fiscal year (FY). This contract was renewed in the winter of 2011.

CSNE’s measurement, verification and reporting activities help the PUC identify the most effective and efficient use of grant funding and identify promising energy efficiency practices for New Hampshire. This second annual report covers SFY 2011 (July 2010 to June 2011). The third Annual Evaluation Report (for the period July 2011 to June 2012) is scheduled to be released at the end of 2012.

3 Grant Activity

3.1 Energy Impacts

Projects completed through June 2011 will result in annual energy savings of \$5.3 million at current energy prices and reduce CO₂ emissions by 18,900 metric tons. This is the equivalent to the annual energy usage of 1,400 NH households.

Table 9: Annual energy reductions for projects completed as of June 2011

Fuel Type	Energy Reduced	MMBTU	Energy Savings (\$ millions)	CO ₂ reduced (metric tons)
Electric	27.0 million (kWh)	92,000	\$3.75	13,300
Oil	283.3 thousand (gallons)	39,300	\$0.93	2,900
Natural Gas	538.6 thousand (therms)	55,300	\$0.75	2,900
Propane*	-41.5 thousand (gallons)	-3,800	(\$0.13)	-200
	Total	182,800	\$5.30	18,900

*Reflects an increase in propane usage due to fuel switching in some projects

During this reporting period:⁸

- The electricity saved is the equivalent of that used by 720 NH homes in 1 year.
- The oil saved is the equivalent of that used by 300 NH homes in 1 year.
- The natural gas saved is the equivalent of that used by 430 NH homes in 1 year.

Lifetime savings due to grant funds expended as of June 2011 (\$18.1 million) are expected to be \$84.5 million in energy costs at current energy prices and CO₂ emissions are estimated to be reduced by 299,700 metric tons.⁹ This is the equivalent to the energy used in 25,000 NH households. For every dollar spent as of June 2011, the expected return is \$4.67 in energy savings.

⁸ NH Home energy equivalent is based on the U.S. Energy Information Administration 2005 Residential Energy Consumption Survey (RECS) for average northeast household consumption for that fuel type. Available online at http://www.eia.gov/emeu/recs/recs2005/hc2005_tables/detailed_tables2005.html

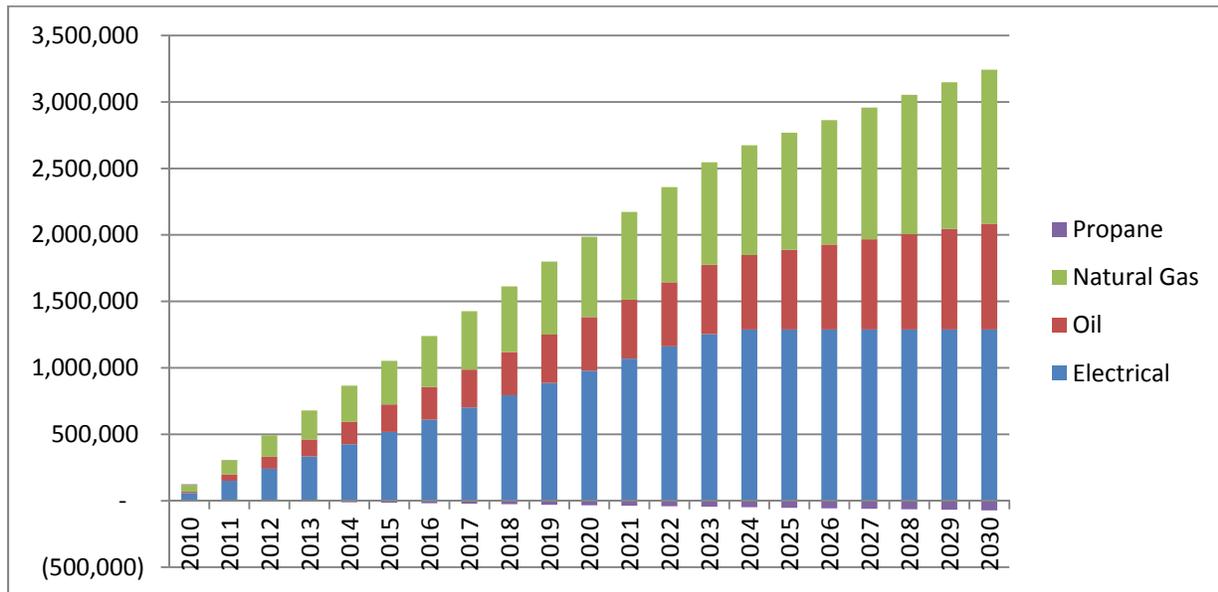
⁹ Lifetime savings was calculated by extrapolating annual energy savings over the assumed project lifetime. Electrical projects were assumed to have a lifetime of 13 years and building shell improvements and mechanical system upgrades were assumed to have a lifetime of 20 years.

Table 10: Projected lifetime energy savings for projects completed as of June 2011

Fuel Type	Energy Reduced	MMBTU	Energy Savings (\$ millions)	CO2 reduced (metric tons)
Electric	377.5 million (kWh)	1,290,000	\$52.5	186,100
Oil	5.7 million (gallons)	796,000	\$18.8	58,300
Natural Gas	11.3 million (therms)	1,200,000	\$15.7	59,800
Propane*	-783.3 thousand (gallons)	-72,000	(\$2.5)	-4500
	Total	3,214,000	\$84.5	299,700

*Reflects an increase in propane usage due to fuel switching in some projects

Figure 6: Cumulative energy savings for grants funded in 2010 through 2030 by fuel type (MMBTU)



This report does not include estimates of indirect avoided energy costs brought on through the reduction of energy use; only direct reductions in fuel use. While it was outside the scope of work for this annual report to quantify the indirect avoided costs associated with the grants awarded—such as avoided electrical capacity costs, reduced price of energy due to lower demand, and avoided environmental externalities— it is important to mention that there are benefits which accrue to all energy users in regards to reductions in energy use from the grants awarded through GHGERF.

An economic impact study of RGGI by the Analysis Group released in November 2011 found a net present value economic benefit of \$17 million to the NH economy as a result of New Hampshire’s

participation in RGGI.¹⁰ Net present value is a common economic measure that indicates a series of cash flow over time discounted for a social rate (see the Analysis Group report for additional discussion of this measure). The Analysis Group methodology differed from that used in this analysis in that the Analysis Group incorporated economic modeling to account for the macroeconomic effects on NH power plant owners and consumers in NH. The analysis in this report, by contrast, did not incorporate any economic modeling, but directly measured grant recipients' labor, costs, and energy savings. In fact, the results from the previous annual report performed by this research team were used as inputs for the modeling performed by the Analysis Group. While the methodologies and measures differ across the studies, both studies show a significant, positive economic impact on NH due to its participation in RGGI and the programs funded with RGGI proceeds.

3.2 Employment Impact

Direct employment impact associated with the grants was measured and documented by each grant recipient. Between July 2010 and June 2011, GHGERF grants supported 53 full-time equivalent (FTE) jobs.¹¹ A FTE is a standard measurement for labor and is 2,080 work hours. Job activity ranged from construction jobs to professional service jobs.¹² This was a similar level of job activity as in the previous year. Direct jobs supported were lowest in the first quarter of 2011. After two years of quarterly job growth, job activity directly related to GHGERF dropped by 66% in the first quarter of 2011. A portion of this decline can be explained by the completion of several of the grant programs – including the NH utility RECORE program—during the fourth quarter of 2010. The decline can also be explained—in part—due to regulatory uncertainty. Several grant recipients reported that many NH businesses were hesitant to move forward on energy reduction measures due to the regulatory uncertainty generated by the introduction of NH House Bill 519-FN.¹³ This bill sought to repeal NH's involvement in the Regional Greenhouse Gas Initiative (RGGI). While the bill did not pass into law in 2011, the uncertainty it created was a factor in reducing economic activity related to GHGERF during the first and second quarter of 2011.

For every million dollars of GHGERF money expended through this reporting period, six FTE jobs were supported. This equates to one job supported for every \$167,600 of grant funds spent. The ratio of six FTE jobs per million dollars provided by GHGERF funding is comparable but higher than that reported

¹⁰ "The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States: Review of the Use of RGGI Auction Proceeds from the First Three-Year Compliance Period," Analysis Group, Nov. 2011, Available online at

http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Economic_Impact_RGGI_Report.pdf

¹¹ Supported means that funding from GHGERF went to pay for workers directly engaged in carrying out the activities of the grant. During the year of grant reporting, labor hours were reported by grant administrators for all grant employees and contractors and subcontractors that performed work carrying out the activities of the grant.

¹² Labor type was not classified nor was a distinction made between a new vs. retained job.

¹³ Refer to Quarterly Reports for grant recipients for specific comments related to projects put on hold. Available online at <http://www.puc.nh.gov/Sustainable%20Energy/GHGERF.htm>

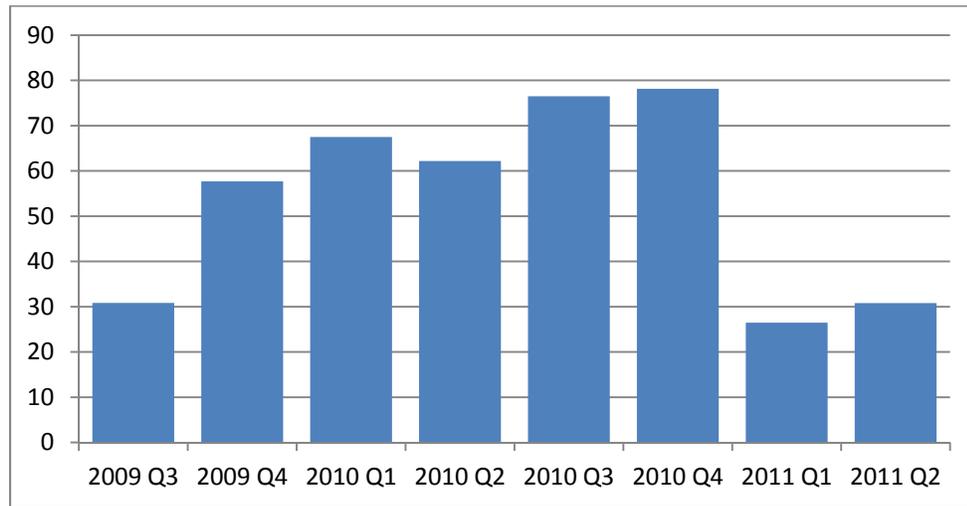
from the America Recover and Reinvestment Act funding from the Department of Energy, which recorded 3.92 FTE jobs per million spent or one job for every \$255,000 spent.¹⁴

This employment impact from GHGERF is modest, but well within expectations. In 2008, an economic impact study of RGGI on NH performed by the University of New Hampshire projected that in 2009, the job impact from NH participating in RGGI, if 100% of funding went to energy efficiency that it would result in job creation of 68 FTEs in 2009.¹⁵

Table 11: Direct FTE jobs supported by GHGERF from July 2009 to June 2011

2009 Q3	2009 Q4	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2
31	58	67	62	76	78	26	31

Figure 7: FTE jobs supported by GHGERF



In 2010, there was an estimated 12,900 jobs in New Hampshire’s “green” economy. Between 2003 and 2010, green economy jobs in New Hampshire have grown at an annual rate of 5.3%. This job growth rate ranked 11th highest out of the fifty states.¹⁶ While the approximately 50 jobs directly supported by GHGERF is small compared to the overall size of the green economy in NH, it is still an important and noteworthy contributor.

¹⁴ Through December 2011, ARRA funded \$22.12 billion in projects that resulted in 86,993 FTE jobs. <http://www.recovery.gov/Transparency/RecipientReportedData/Pages/JobSummary.aspx>

¹⁵ Gittel & Magnusson, “Economic Impact in New Hampshire of the Regional Greenhouse Gas Initiative (RGGI): An Independent Assessment,” Table 31, University of New Hampshire, January 2008.

¹⁶ “Sizing the Clean Economy: The Clean Economy in the State of New Hampshire,” Brookings Institute, July 2011, Available online at http://www.brookings.edu/~media/Files/Programs/Metro/clean_economy/clean_economy_profiles/states/33.pdf

3.3 Other Impacts

In addition to energy reductions, grants funded by GHGERF have also benefited workforce development and building benchmarking/audits. These are essential components for developing cost-effective energy efficiency projects.

3.3.1 Workforce Development

In this assessment framework, job training is defined as *formal activities that provide the “green” workforce the skills and knowledge to properly execute energy reduction projects.*¹⁷ There were many less formal education seminars funded through GHGERF, but those were not included in this specific measure of training. In this annual report, “training” was defined as in-depth classes that consisted of a half-day or more of instruction and provided specific energy reduction skill development.

Three grants (as of June 2011) funded formal training: Department of Resources & Economic Development – Lakes Regional Community College (DRED-LRCC), Home Builders & Remodelers Association of NH (HBRANH), and the Plymouth Area Renewable Energy Initiative (PAREI). Of the three, DRED-LRCC and HBRANH were specifically focused on providing workforce development, while PAREI included a training component for developing its member-based workforce. GHGERF supported a total of 34 formal training opportunities (courses) and resulted in 319 workers receiving formal training over 9,000 contact hours, or about 28 hours of training on average per worker.

Table 12: Training provided as of June 2011

Grant	Total Grant Award	Courses	Workers Trained	Contact Hours
Home Builders & Remodelers Assn of NH (HBRANH)	\$178,169	14	45 *	600*
Dept of Resources & Economic Development, Lakes Region Community College (DRED-LRCC) ¹⁸	\$574,000	19	269	8250
Plymouth Area Renewable Energy Initiative (PAREI) ¹⁹	\$99,250	1	5	200
		34	319	9050

*HBRANH did not report workers trained or contact hours for all courses

¹⁷ For a more detailed description of “green” employment, see “New Hampshire’s Green Economy and Industries: Current Employment and Future Opportunities,” University of New Hampshire, January 2009, Available online at <http://www.carbonsolutionsne.org/resources/reports/>

¹⁸ This includes amounts awarded from the first and second RFP. This program demonstrated success in energy efficiency workforce development and was awarded additional funding. The second RFP included PAREI as a partner.

¹⁹ Only a small amount of the overall grant to the Plymouth Area Renewable Energy Initiative’s scope of work went to workforce training. The grants to HBRANH and DRED-LRCC were primarily focused on workforce development and the grant funds per worker and grant funds per contact hour are more meaningful metrics.

3.3.2 Benchmarking and Audits

Another significant area of activity and a key component of initiating energy reduction installations are benchmarking and audits. Benchmarking is a less time-consuming and lower cost process which typically relies on an analysis of utility statements to determine a building’s energy use relative to other buildings with similar use. The Environmental Portfolio Agency (EPA) Portfolio Manager tool is a commonly used benchmarking tool in the commercial sector. Benchmarking is a tool to identify buildings that have above average energy demands and that may be good candidates for cost effective energy efficiency installations/retrofits. Audits are more time-consuming and costly and involve developing a prescriptive set of recommendations and measures to implement to reduce energy use in a building. GHGERF supported nearly 1,100 formal building benchmarking & audit activities for schools, towns, and residences.

Table 13: Benchmarking and audits as of June 2011

Grants	Total Grant Award	Buildings Benchmarked	Audits
Clean Air - Cool Planet	\$400,000	283	42
NH Community Loan Fund	\$2,000,000		42
NH Housing Finance Authority	\$2,000,000		439
LighTec, Inc	\$316,000		7
Plymouth Area Renewable Energy Initiative	\$99,250		33
Retail Merchants Association of NH ²⁰	\$3,372,028	32	8
Southern NH Resource Conservation & Dev	\$87,000		25
Town of Hancock	\$8,500		6
Town of Jaffrey	\$16,250		9
Town of Warner	\$11,150		8
TRC, Inc. – EnergySmart Schools	\$499,948	150	
TRC, Inc. – P4P	\$5,000,000		4
		465	623

²⁰ Retail Merchants Association of NH received a grant continuation in 2010 due to the success of the program. The amount awarded in 2009 was \$1,372,028 and in 2010 was \$2,000,000.

4 Discussion

The 30 grants awarded from GHGERF in a competitive process in 2009 met a wide range of needs in the energy efficiency marketplace and served a broad group of energy consumers across the State of New Hampshire. The six grants awarded in 2010 (including the continuation of 3 grants from 2009) built on the lessons learned from the first year of the program and were more targeted at specific sectors. The first two years of the program have delivered significant energy savings and provided positive economic impacts for the New Hampshire economy. The employment impact of GHGERF was the direct support of 108 full time equivalent jobs through June 2011.

There is not expected to be any significant additional direct employment or energy reduction impacts for the grants awarded in 2009. However, the majority of grants awarded in 2010 are just beginning to complete energy efficiency projects. The 2010 grants are expected to provide significant additional energy reductions in 2012 and 2013.

5 Appendix A: Grant Description & Status

Grant	Proposal Description	RGGI Inc. Program Categories	Markets	Status as of June 30, 2011
Crotched Mtn Rehabilitation Ctr	Upgrade the heating distribution and control system of a building whose residents are mainly low-income	Clean & Renewable Energy, Energy Efficiency	Commercial	Completed - 2009 Q4
NH Institute of Art	Install geothermal heating and cooling system, premium building envelope measures, and a vegetated roof.	Clean & Renewable Energy, Energy Efficiency	Commercial	Completed - 2009 Q4
SAU 46/Merrimack Valley School District	Connect its office building to an existing, central biomass plant that is already providing heat to three nearby schools, and will upgrade lighting fixtures, compressors, air handlers and controls to reduce the use of electricity and natural gas.	Clean & Renewable Energy, Energy Efficiency	Municipal	Completed - 2009 Q4
Fraser NH LLC	The Fraser paper mill in Gorham will utilize reuse of hot water, hot air and condensate to reduce usage of #6 oil by 729,000 gallons per year through 5 specific projects.	Energy Efficiency	Industrial	Completed - 2010 Q1
Town of Fremont	The Fremont Safety Complex will be retrofitted by adding insulation to ceiling areas and performing air sealing to eliminate leaks.	Energy Efficiency	Municipal	Completed - 2010 Q1
Town of Gorham	Replace the heating system in the Gorham Fire Station by installing a high-efficiency oil furnace and a wood pellet boiler	Clean & Renewable Energy, Energy Efficiency	Municipal	Completed - 2010 Q1
Town of Hancock	Energy audits will be performed in each of the town's 8 municipal buildings	Energy Efficiency	Municipal	Completed - 2010 Q1
Town of Warner	Energy audits will be performed in each of the town's 13 municipal buildings	Energy Efficiency	Municipal	Completed - 2010 Q1
Town of Jaffrey	Energy audits will be performed in each of the town's 16 municipal buildings	Energy Efficiency	Municipal	Completed - 2010 Q2
Town of Walpole	Perform comprehensive, energy-saving retrofits of the Walpole Town Hall and the North Walpole Municipal Building.	Energy Efficiency	Municipal	Completed - 2010 Q3
Clean Air-Cool Planet	Provide 24 to 48 NH towns with baseline energy information, specific recommendations and on-going support necessary to renovate their most inefficient municipal buildings	Energy Efficiency	Municipal	Completed - 2010 Q4
Plymouth Area Renewable Energy Initiative	Expand its successful "Energy Raiser" programs to provide homeowners with the technical information and volunteer support to install solar hot water systems and to weatherize homes. 10 homes will be weatherized and 10 will have solar hot water systems installed. 5 will receive refrigerator replacements.	Clean & Renewable Energy, Energy Efficiency	Residential	Completed - 2010 Q4
Propell Energy	Install a high efficiency wood pellet boiler in New England College's Science Building.	Clean & Renewable Energy	Commercial	Completed - 2010 Q4
RECORE - NH Electric Utilities	National Grid, NH Electric Co-op, PSNH, and Unitil will expand the CORE Efficiency Programs by increasing the budget for current programs and adding new program elements.	Energy Efficiency	Residential, Commercial & Industrial	Completed - 2010 Q4
Stonyfield Farm Inc	Install a variety of measures that will reduce energy consumption at their plant in Londonderry.	Energy Efficiency	Industrial	Completed - 2010 Q4
Chosen Vale Inc dba Enfield Shaker Mus	The Great Stone Dwelling will be retrofitted. The Museum will also create an educational exhibit on saving energy and reducing greenhouse gas emissions.	Energy Efficiency	Commercial	Completed - 2011 Q1
Home Builders & Remodelers Assn of NH	Provide training to building professionals and educate homeowners, buyers and occupants.	Energy Efficiency	Workforce Development	Completed - 2011 Q1
LighTec Inc	Install high efficiency lighting systems in 16 schools and town buildings across the state.	Energy Efficiency	Commercial & Industrial	Completed - 2011 Q1

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Grant	Proposal Description	RGGI Inc. Program Categories	Markets	Status as of June 30, 2011
So NH Conservation & Development Area Council	Known as the New Hampshire Farm Energy Initiative, this program will provide up to 10 workshops on energy efficiency to agricultural business owners and operators. In addition, the initiative will provide comprehensive energy audits to 25 farms	Energy Efficiency	Commercial	Completed - 2011 Q1
City of Rochester	Install equipment to reduce energy demand at the city's Wastewater Treatment Facility.	Energy Efficiency	Municipal	Completed - 2011 Q2
No Country Res Cons & Dev Area Council	Conduct outreach to NH communities and organizations seeking to pursue district heat/power biomass systems.	Greenhouse Gas Abatement and Climate Change Adaptation	Municipal	Completed - 2011 Q2
Town of Temple	Perform comprehensive, energy-saving retrofits of the Municipal Building and the Mansfield Library, and create several other conservation and outreach programs.	Energy Efficiency	Municipal	Completed - 2011 Q2
UNH- Carbon Challenge	Create a residential energy portal (website) as a central source of sound information on energy efficiency programs, sustainable energy technologies, and available resources and incentives such as rebates and tax incentives. Also provide direct assistance to communities through public presentations, guidance on best practices, and progress reports.	Energy Efficiency	Residential	Completed - 2011 Q2
UNH- Carbon Solutions New England	Track, analyze and report on the results of projects funded by the GHGERF.	Administration		Completed - June 2010
Business Finance Authority of NH	Establish a revolving loan fund to help businesses finance energy efficiency improvements.	Energy Efficiency	Commercial & Industrial	On-going
Dartmouth College	Implement a Campus Energy and Sustainability Management system to achieve improved building energy performance, campus smart-grid technology, and innovative energy feedback systems.	Energy Efficiency	Commercial	On-going
DRED - Division of Economic Development	Partner with Lakes Region Community College (LRCC) to develop a new training program to help develop a skilled labor force for energy efficiency improvements to buildings	Energy Efficiency	Workforce Development	On-going
NH Community Development Finance Auth	Establish a revolving loan fund to finance energy improvements in municipal buildings.	Energy Efficiency	Municipal	On-going
NH Community Loan Fund	Deep energy efficiency retrofits in approximately 425 manufactured homes	Energy Efficiency	Residential	On-going
NH Housing Finance Authority	Implement the Greener Homes Program (GHP) to provide rigorous energy audits, and energy efficiency upgrades for low-income apartment units in New Hampshire	Energy Efficiency	Residential	On-going
Retail Merchants Assn of NH	Create an energy efficiency program for RMA members and other similarly situated businesses that includes audits and project financing.	Energy Efficiency	Commercial	On-going
TRC - NH Energy Smart Schools Program	Launch a benchmarking initiative to measure the energy performance of 250 public K-12 schools.	Energy Efficiency	Municipal	On-going
TRC - P4P	Comprehensive, whole-building approach to saving energy in large commercial and industrial facilities while linking incentives directly to energy savings.	Energy Efficiency	Commercial & Industrial	On-going

6 Appendix B: Grant Status with Award Amount

Grant	Yr 1 Reporting Period				Yr 2 Reporting Period				Yr
	2009		2010		2011				
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Business Finance Authority				\$2,000,000				\$2,000,000	
DRED - Lakes Region CC				\$174,000					\$400,000
Home Builders Assoc. of NH				\$178,169					
Plymouth Area Renewable Energy Initiative				\$99,250					
Retail Merchants Assoc. of NH				\$1,372,028				\$2,000,000	
Southern NH Resource Conservation & Dev.				\$87,000					
TRC NH EnergySmart Schools Program				\$499,948					
UNH - NH Carbon Challenge				\$813,402					
UNH - Carbon Solutions New England				\$139,945					
Clean Air - Cool Planet				\$400,000					
Crotched Mountain Rehab. Center				\$176,531					
Fraser Papers				\$470,000					
LighTec				\$316,000					
RE- CORE				\$7,646,020					
SAU 46				\$83,685					
Town of Gorham				\$26,000					
Enfield Shaker				\$51,354					
NH Community Development Finance Authority				\$1,500,000					
North Country Resource Conservation & Dev.				\$43,850					
Propell Energy				\$49,885					
Stonyfield Farm				\$148,927					
Town of Hancock				\$8,500					
Town of Jaffrey				\$16,250					
City of Rochester				\$394,000					
Dartmouth College				\$330,936					
NH Institute of Art				\$146,060					
Town of Fremont				\$8,000					
Town of Temple				\$332,100					
Town of Walpole				\$138,345					
Town of Warner				\$11,150					
TRC - P4P								\$5,000,000	
NH Community Loan Fund								\$2,000,000	
NH Housing Finance Authority								\$200,000	
* Highlighted indicates active during reporting period									

The Authors



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at UNH teaching Sustainability Business Models. He has provided analysis on the economic impacts of several different environmental public policy initiatives including work on the NH Renewable Portfolio Standard (RPS) and the Regional Greenhouse Gas Initiative (RGGI), a carbon cap and trade program in the Northeast.

Other research includes “New Hampshire’s Green Economy and Industries: Current Employment and Future Opportunities”, “Economic Impact of the Proposed Antrim 30 MW Wind Power Project in Antrim, New Hampshire”, and the economic analysis of policies proposed in “The New Hampshire Climate Action Plan” performed for the NH Climate Change Task Force.



CAMERON WAKE is a research associate professor with the Institute for the Study of Earth, Oceans and Space and the Department of Earth Sciences at the University of New Hampshire. Cameron leads a research program investigating regional climate and environmental change through

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Cameron directs [Carbon Solutions New England](#), a public-private partnership promoting collective action to achieve a clean, secure energy future while sustaining our unique cultural and natural resources, and helps lead the [New Hampshire Energy and Climate Collaborative](#), established to track and facilitate the implementation of New Hampshire’s [2009 Climate Action Plan](#). In addition, he serves as the Climate and Energy Faculty Fellow with the [UNH Sustainability Academy](#), which integrates sustainability across the university’s curriculum, operations, research, and engagement.

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