

Purpose

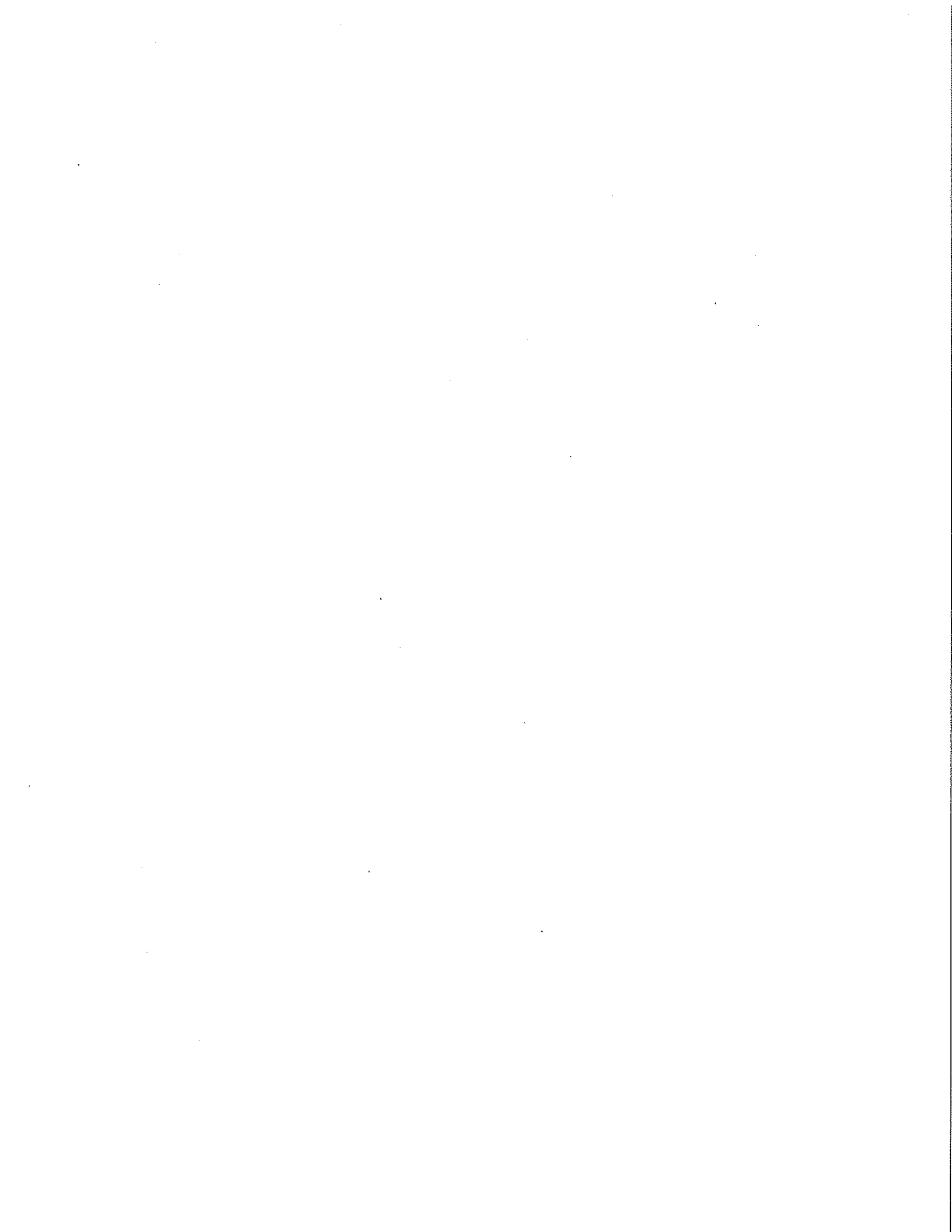
The Town of Sudbury intends to quantify and reduce energy consumption through measures described within the following documents. The Town has a long standing commitment to responsible energy management, and considers achieving Green Community status as an extension of this on-going effort. Town Officials have provided the signed letters of commitment that follow, showing their support.

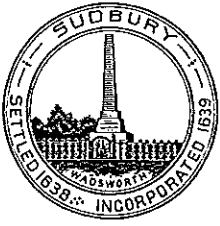
In 2008, the town consumed a total of 79,000 MMBTU for all end uses, and have already reduced consumption to 72,195 MMBTU as of the end of 2009, roughly an 8.5% reduction. By implementing the following plan, the Town expects to reach the remainder of the 20% savings goal by the 5-yr plan by 2013.

The energy reduction plan involves installing more advanced controls, higher efficiency equipment, and other energy conservation measures, as are mentioned in the Energy Audits. As the plan progresses, renewable energy generation systems will be reviewed as well.

Acknowledgements

The Town of Sudbury would like to acknowledge the DOER for their support for both the energy audits completed in 2009, and for the Green Communities Application Assistance.





TOWN OF SUDBURY
Office of the Town Manager
www.sudbury.ma.us

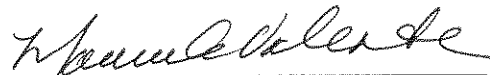
Maureen G. Valente
Town Manager

278 Old Sudbury Road
Sudbury, Massachusetts 01776-1843
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E-mail: townmanager@town.sudbury.ma.us

Department of Energy Resources
Green Communities Division
100 Cambridge Street, 10th Floor
Boston, MA 02114

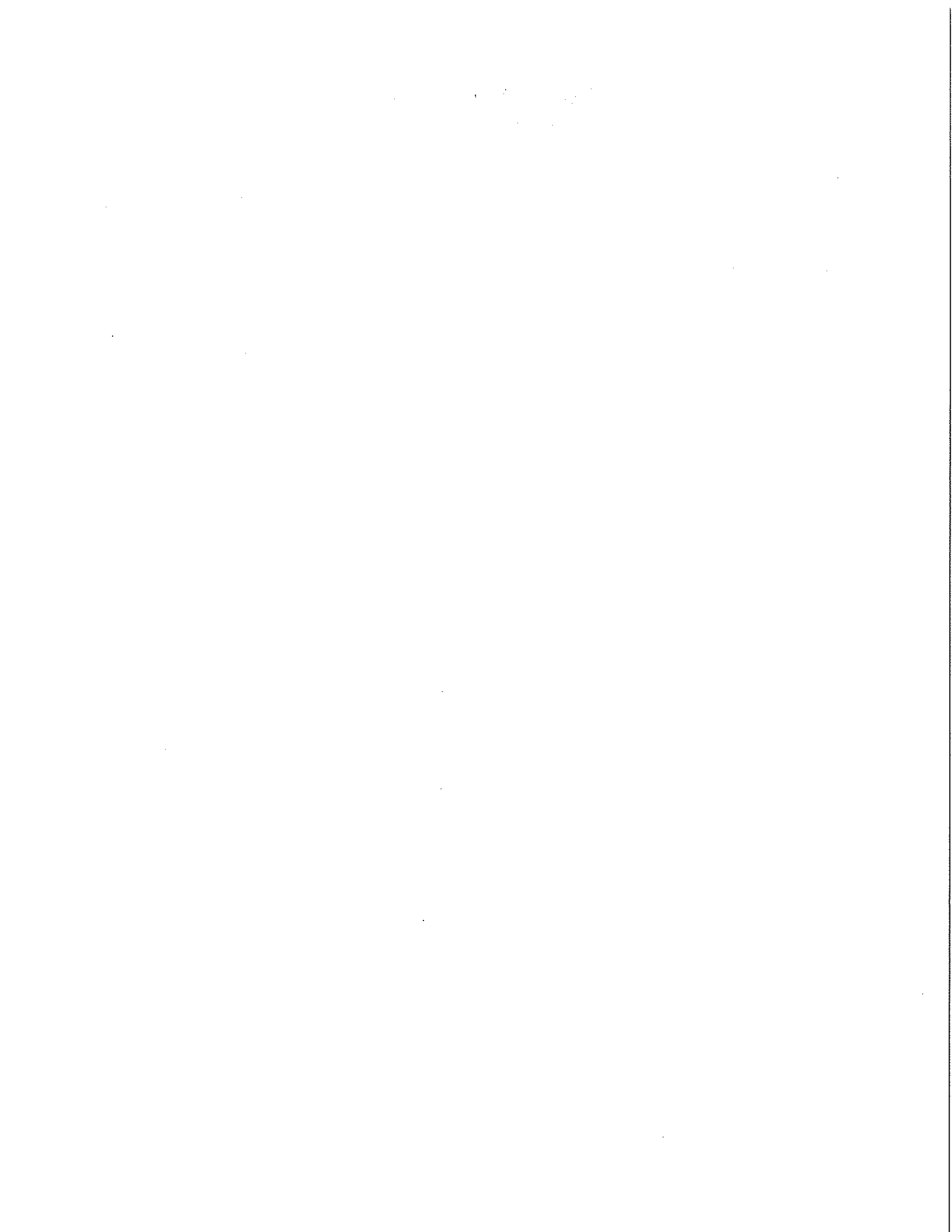
Please be advised that the general government of the Town of Sudbury has adopted the Energy Reduction Plan required to meet Criterion 3 for designation as Green Community and included separately with the Massachusetts DOER Green Community Designation Form.

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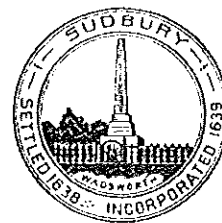
Maureen G. Valente
Town Manager

May 12, 2010
Date



Sudbury Public Schools

*40 Fairbank Road
Sudbury, Massachusetts 01776
(978) 639-3211
Fax (978) 443-9001*

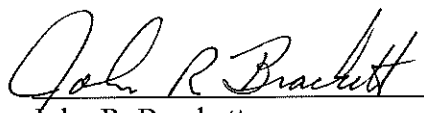


John R. Brackett, Ed.D.
Superintendent of Schools
john_brackett@sudbury.k12.ma.us

Department of Energy Resources
Green Communities Division
100 Cambridge Street, 10th Floor
Boston, MA 02114

Please be advised that the Sudbury School Committee has adopted the Energy Reduction Plan required to meet Criterion 3 for designation as Green Community and included separately with the Massachusetts DOER Green Community Designation Form.

Authorized signature:



John R. Brackett
Superintendent
Sudbury Public Schools

5/12/10
Date



Resolution:

The Sudbury School Committee supports the application by the Town of Sudbury for designation as a Green Community in accordance with the Massachusetts Green Communities act of 2008, and hereby adopts and directs the Superintendent to promote and assist in, the implementation of the Energy Reduction Plan specified as part of Criterion 3 for Green Community Designation.

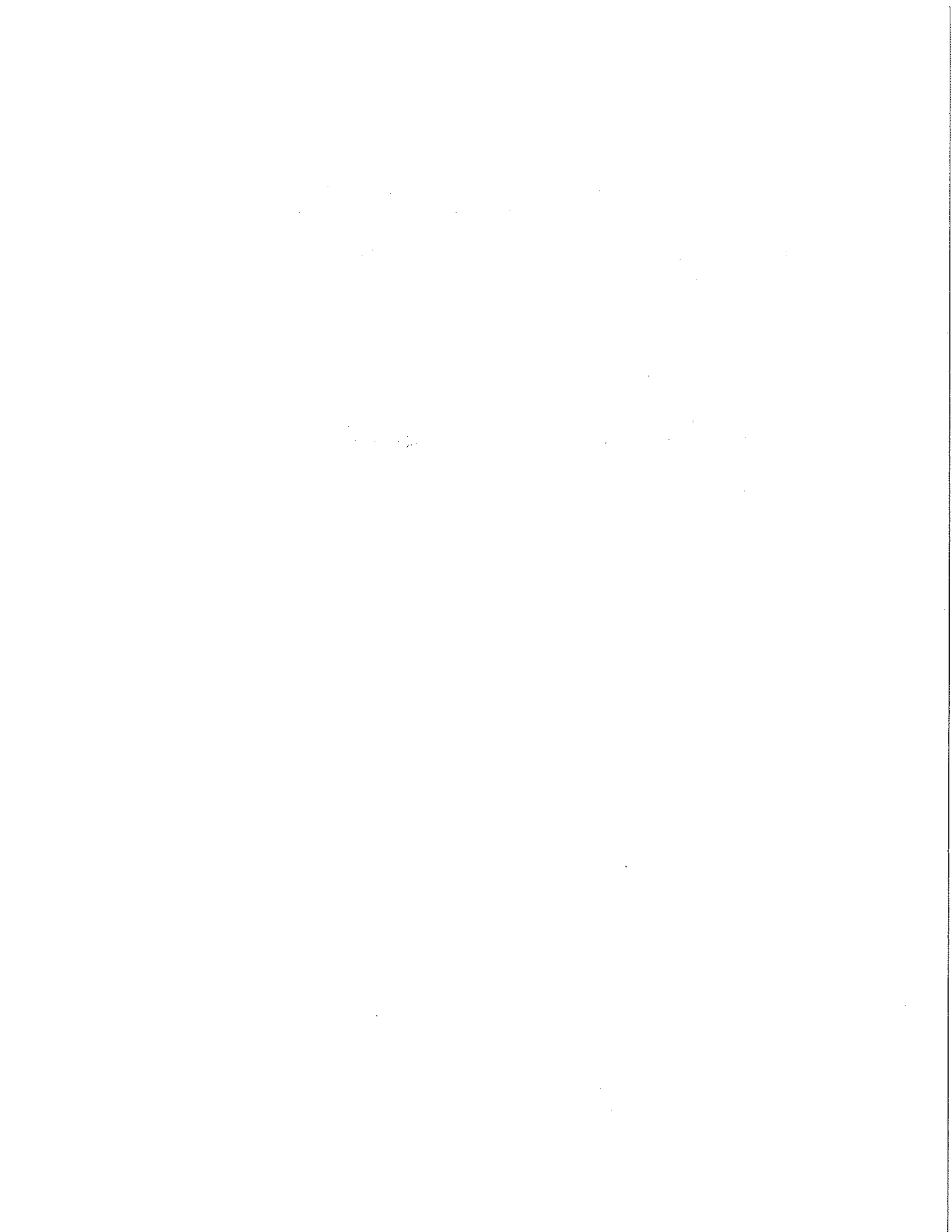
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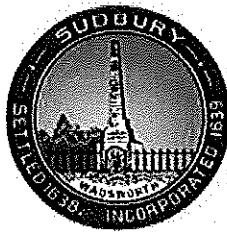


Susan Iuliano
Chairman
Sudbury School Committee



Date





Sudbury Energy Reduction Plan

I. INTRODUCTION:

Background

Located in the Metrowest region of the state, the Town of Sudbury is a community with a population of approximately 18,000 and actively committed to reducing its energy use and creating renewable energy opportunities. Through its commitment to become a Green Community, the Town has inventoried its buildings, vehicles and fuel usage to establish an energy baseline and reduction strategy. This Energy Reduction Plan lays out a roadmap of how Sudbury will aim to reduce its municipal energy use by 20 percent within five years of its baseline year (2008).

Sudbury's municipal building portfolio consists of 22 total buildings including elementary and middle schools, town offices, police and fire buildings and a community center with a pool. The Town also owns and operates 45 vehicles for Town purposes. As detailed in this submission within Criteria #4, the Town adopted a fuel efficient vehicle policy which will affect over half of its municipal vehicle inventory. The Town has continued to monitor its use of gasoline by several departments and their vehicles. As a result, Sudbury's Energy and Sustainability Green Ribbon Committee, established in May 2009, began to inventory the Town's energy use and costs.

II. RESULTS OF ENERGY USE BASELINE INVENTORY:

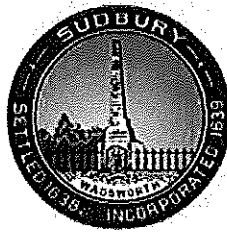
A. Inventory Tool Used:

The Town of Sudbury Energy and Sustainability Green Ribbon Committee created and maintains an Excel spreadsheet database of municipal utility accounts, energy use and costs for all of its buildings, street lights and fuel usage. The Town has completed training to utilize MassEnergyInsight (MEI)^b, but has not yet completed the set-up process. The Town anticipates completing the implementation of the MEI tool for energy use tracking in 2010.

B. Existing municipal energy use:

As detailed in Appendix B, for fiscal year 2008, the Town's baseline year, municipal energy use is summarized below:

Municipal Buildings	71,055 mmbtu
Vehicles	7,102 mmbtu
Street and Traffic Lighting	845 mmbtu
TOTAL	79,002 mmbtu



Sudbury Energy Reduction Plan

C. Existing efficiency measures implemented recently:

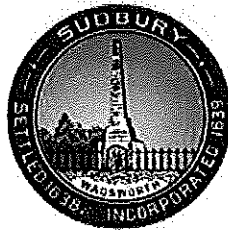
Over the past several years, the Town completed several energy efficiency/reduction measures that reduced energy use and continue to reduce municipal costs. Those measures include:

- The Town took part in the DOER's Energy Audit Program to review the town hall, all of the schools, the DPW, the Fairbanks Community Center, and the Flynn building.
- The schools have upgraded their automatic temperature controls, pumping systems, and lighting systems through the utility incentive programs in recent years.
- Two old boilers were upgraded in the Fairbanks Community Center through Keyspan's programs in 2004.
- Lighting in the DPW Garage and Flynn Building was upgraded in 2009 through NSTAR's program.
- Lighting in the senior center, public schools offices, and parks/recreation portions of the Fairbanks Community Center building was upgraded in 2004 through NSTAR's programs.
- Additional insulation was added to the Town Hall roof during a 2007 reroofing project.
- The Flynn Building boilers were upgraded in 2006 through Keyspan's programs.
- Ceiling insulation was upgraded at the Loring Parsonage in 2009.
- The police department purchased a hybrid vehicle in 2009.

D. Areas of least efficiency/greatest waste:

Overall, the day to day operation and maintenances of the environmental set points of buildings is the area of least efficiency. The staffs of the town and the schools are burdened with ever increasing responsibilities while their resources are constrained.

There are particular instances of aged, inefficient equipment, e.g. the Natatorium HVAC unit at the Fairbank Community Center, which represent opportunities for improvement.



Sudbury Energy Reduction Plan

E. Areas that can be most easily addressed:

Installation of direct digital control (DDC) systems offers the best opportunity for cost effective, energy efficiency investment. Improvements in the operational efficiency of Sudbury's buildings have been achieved in the past three years by the installation of "starter" DDC systems, especially in the elementary schools. Thus DDC initiative will be continued this year at the Fairbank Community Center, which is the worst performing building in the town's portfolio. A master plan is being developed for an integrated, open system (BACNet), direct digital control system encompassing the town and school buildings. These systems enable a trained operator to oversee the operation of many buildings from a single vantage point.

III. SUMMARY OF ENERGY AUDITS:

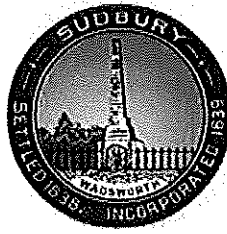
In June 2009, Facilities Energy Consultants of Bedford, MA performed comprehensive energy audits on a number of Sudbury municipal buildings and schools as part of the Massachusetts Department of Energy Resources Energy Audit Program. Based on the initial benchmarking of these facilities, it was determined that energy audits were warranted. The results of these audits are summarized here and detailed in appendix C

Municipal Buildings

A total of four buildings were evaluated based on data gathered during site visits, a review of the utility bills and discussions with administration officials. The Energy Performance Summary for the four buildings that were audited is provided below. The total energy index is a measure of energy intensity, or annual energy usage per square foot of building area. Similarly, the energy cost index is a measure of annual energy costs per square foot of building area.

Energy Performance Summary – Selected Municipal Buildings:

Facility	Square footage	Energy Intensity (kBtu/sqft/yr)	Energy Star Rating	Annual Energy Cost	Energy Cost (\$/sqft/yr)
Town Hall	12,798	117	33	\$ 30,505	\$ 2.39
Flynn Building	15,916	77	63	\$ 39,659	\$ 2.49
Fairbanks Center and Pool	39,076	183	NA	\$ 148,374	\$ 3.90
DPW Offices and Highway Building	32,000	107	NA	\$ 83,320	\$ 2.54
Total:	99,790			\$ 301,858	\$ 3.02



Sudbury Energy Reduction Plan

School Buildings

A total of five buildings were evaluated based on data gathered during site visits, a review of the utility bills and discussions with administration officials. The Energy Performance Summary for the five buildings that were audited is provided below. The total energy index is a measure of energy intensity, or annual energy usage per square foot of building area. Similarly, the energy cost index is a measure of annual energy costs per square foot of building area.

Energy Performance Summary – Sudbury Public School Buildings:

Facility	Square footage	Energy Intensity (kBTU/sqft/yr)	Energy Star Rating	Annual Energy Cost	Energy Cost (\$/sqft/yr)
Curtis Middle School	155,000	72	47	\$ 353,562	\$2.28
Nixon Elementary	58,215	68	62	\$ 111,902	\$1.92
Haynes Elementary	62,811	92	58	\$ 141,342	\$2.23
Noyes Elementary	65,000	89	38	\$ 156,005	\$2.40
Loring Elementary	74,451	74	42	\$ 158,946	\$2.22
Total:	418,477			\$ 921,757	\$2.20

IV. SUMMARY OF FOSSIL FUEL REDUCTION MEASURES:

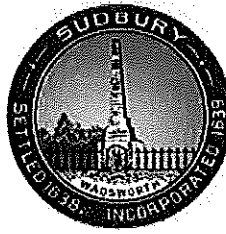
A. Overview of short-, and long-term goals

Sudbury has been actively pursuing energy conservation opportunities for many years, and several school buildings have reduced their energy use more than 20% in the last 5 yrs as a result of these efforts. The proposed energy conservation plan outlined in Appendix A of this proposal shows the five-year plan beginning with FY 2009 and ending with FY 2013. For the short term, Sudbury will perform the energy reduction activities outlined in appendix A as well as others that have been proposed, but require further definition and review before being implemented. These combined projects will exceed the 20% energy usage reduction from the FY 2008 baseline by 2013.

V. FOSSIL FUEL ENERGY REDUCTION MEASURES

A. Short-term energy reduction goals – getting to 20% reduction in 5 years

The four largest Sudbury municipal buildings and five schools were audited for energy use in June 2009. The resulting energy saving suggestions as well as a number of projects outside of these audits will be used as a basis for the Town's 20 percent fossil fuel reduction over the five year period of 2009 - 2013. The five year plan for Sudbury includes the following:



Sudbury Energy Reduction Plan

APPENDIX A - ENERGY REDUCTION PLAN DOCUMENTATION

ENERGY BASELINE YEAR: 2008
Existing Municipal Energy Use Summary (MMBTU)*

Municipal Buildings	71,055	(2008 utility data)
Vehicles	7,102	(gal used x .124)
Street and/or Traffic Lighting	845	(kWh * 0.003413)
TOTAL - Energy Baseline	79,002	
20 percent reduction goal	15,800	

ENERGY REDUCTION PLAN
Goal: Reduce municipal energy use by 20 percent by: 2013

Energy Reduction Measure (ERM)	Estimated Energy Savings (MMBTU)	Estimated Energy Savings (kWh)	Estimated Cost	Completion Status	Responsible Party
Completed Measure Since Baseline Year**					
1 Energy Reduction Achieved in 2009 Town-wide	6746			2009	
2 Street Light Replacement	0	124,488		2010	
3 Solar Panels on the Fairbank Center	800	7,440	\$141,864	2010	
Proposed Measure**					
Municipal Buildings					
1 Fairbanks Center	2,102	60,249	\$175,725	2010	
2 DPW Office and Highway Building	353	16,177	\$39,450	2012	
3 Sudbury Town Hall	215	1,800	\$8,650	2013	
4 Flynn Building	1	4,932	\$7,850	2013	
5 Other Town Buildings (~20% reduction)	535	112,818	\$200,000	2013	
Town School Buildings					
1 Curtis Middle School	1,026	152,807	\$191,400	2010	
2 Noyes Elementary	663	83,678	\$170,450	2012	
3 Haynes Elementary	404	12,056	\$83,200	2013	
4 Nixon Elementary	147	8,719	\$31,300	2013	
5 Loring Elementary	61	77,697	\$13,150	2013	
Regional School (85%)					
1 Lincoln-Sudbury High School (~10% reduction)	392	82,045	\$250,000	2013	

TOTAL - Energy Reduction Planned (annual)	13,445 MMBTU	744,906 kWh	\$1,313,039
Conversion of kWh savings to MMBTU	2,542 MMBTU		
Total annual energy Savings	15,988 MMBTU		

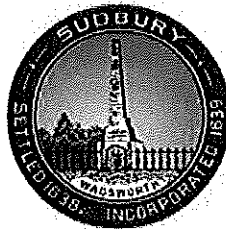
* Energy baseline data provided in Appendix B

** Backup data provided in Appendix C

i. Municipal Buildings (including schools)

Reductions at the municipal buildings will be attained through a variety of upgrades to control systems, heating, ventilation, air conditioning, and lighting in the buildings. In some cases, changes to the building envelope will be reviewed, and may be warranted. Solar photovoltaic and hot water systems will be used as an alternate non-fossil-fuel energy source, where practical. A summary of the planned reductions can be found in appendix A and details of the audit reports in appendix C

Audited Buildings

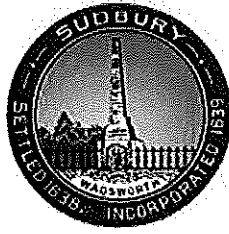


Sudbury Energy Reduction Plan

- Town Hall – 12,789sf, built 1930
- Flynn Town Office Building – 15,916sf, built 1960
- Fairbank Recreation Center and Pool – 28,076sf, built 1950
- Department of Public Works Offices and Highway Buildings – 28,000sf, built 2004

Summary of ECMs recommended for Town buildings by energy audits:

Proposed ECMs			Annual Energy Usage					Annual Reduction in Greenhouse Gas (CO ₂) Emissions	Annual Savings	Simple Payback	
#	Description	Installed Cost		Existing		Savings with ECM					% Reduction
		Town	Other	kWh/yr	MMBTU/yr	kWh/yr	MMBTU/yr				
Sudbury Town Hall											
1	Install Attic Insulation	\$3,600		0	1349	0	154	11.4%	8.17	\$2,312	1.5
2	Insulate Steam Pipes	\$3,800		0	1349	0	69	6.1%	3.65	\$1,032	3.7
3	Increase Radiator Output	\$1,350		1800	1349	1800	-8	-0.1%	0.35	\$171	7.9
	Building Total:	\$8,650		42572	1349	1800	215	14.8%	12.16	\$3,515	2.8
Sudbury Flynn Building											
1	On-Demand Water Heaters	\$1,400		170765	4	-618	4	0.3%	-0.06	\$189	7.4
2	Insulate Water Pipes	\$900		0	635	0	18	2.5%	0.83	\$236	3.8
3	Increase Radiator Output	\$4,050		170765	635	4320	-19	-0.3%	0.84	\$410	9.9
4	Replace Refrigerators	\$1,600		2200	0	1228	0	55.6%	0.62	\$196	7.8
	Building Total:	\$7,850		178,755	635	4932	1	1.4%	2.13	\$1,032	7.6
Sudbury Fairbanks Center											
1	Vending Machine Timer	\$876		6570	0	1971	0	30.0%	0.84	\$309	2.4
2	Replace Refrigerator	\$1,950		4620	0	3555	0	76.9%	1.51	\$685	2.8
3	Replace Water Heater	\$1,000		2157	0	2157	0	100.0%	0.91	\$278	3.0
4	HVAC Pump VFDs	\$5,800		16785	0	4006	0	24.4%	1.74	\$766	7.3
5	DCV in Gym	\$1,600		0	93	0	15	15.9%	0.78	\$222	6.8
6	VFDs on Gym AHU	\$5,800		8208	0	5391	0	65.7%	2.29	\$1,008	6.8
7	Relocate A/C Unit	\$800		3500	0	1700	0	48.6%	0.72	\$318	2.5
8	Pool Lighting	\$8,400		36720	0	15912	0	43.3%	6.76	\$2,976	2.9
9	Pump Motors	\$2,000		47314	0	4987	0	10.6%	2.12	\$935	2.1
10	Pool Pump VFDs	\$8,000		64902	0	7405	0	11.4%	3.14	\$1,385	6.8
11	Economizer	\$140,000		130646	6482	13065	2087	31.1%	116.17	\$33,754	4.1
	Building Total:	\$175,726		321420	6482	60249	2102	30.8%	136.96	\$42,674	4.1
Sudbury DPW Offices and Highway Building											
1	Lighting DPW Office Building	\$12,000.00		27300	0	13260	0	48.6%	5.82	\$2,652.00	4.5
2	Low Velocity Fans for Desstratification	\$22,000.00		0	900	-1056	270	29.6%	13.86	\$2,515.20	8.7
3	Lighting DPW Highway Building	\$3,000.00		6825	0	3315	0	48.6%	1.41	\$663.00	4.5
4	Replace Refrigerator	\$650.00		1100	0	658	0	59.8%	0.28	\$115.15	6.8
5	Reflectors	\$1,000.00		0	992	0	45	4.5%	2.39	\$787.50	1.3
6	Control Air Leakage	\$800.00		0	992	0	38	3.9%	2.04	\$672.28	1.2
	Building Total:	\$39,450.00		203,840	2742	16177	353	11.0%	25.59	\$7,405.13	5.3
Sudbury Town Buildings		\$231,676		738,587	11,128	83,158	2,672	21.7%	176.85	\$54,626	4.2



Sudbury Energy Reduction Plan

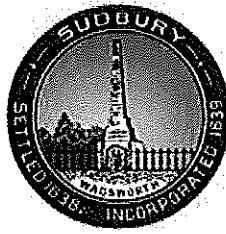
Other Town Buildings:

- Police Department
 - There is a continuing effort to build a new, more modern Police station, as the existing facility falls short of meeting the needs of the Police Department
 - As part of the energy reduction plan, the new police station design effort would apply for Green Communities funds to support green design of the new facility
- Library
 - A major renovation of the library was done in recent history, and therefore overall energy consumption is expected to be reasonable
 - Control systems and operational parameters will be reviewed, in an effort to understand potential savings
- Fire Dept HQ - 77 Hudson Road
 - A major renovation of FD HQ was done in recent history, and therefore overall energy consumption is expected to be reasonable
 - Control systems and operational parameters will be reviewed, in an effort to understand potential savings
- Secondary Fire Dept locations - 505 Boston Post Road, North Road
 - Both secondary FD locations are older, and should be audited
 - Lighting, heating, and control system upgrades might yield as much as 20% savings, though the energy usage of these facilities is a small % of total town usage
- Hosmer House - 299 Concord Road
 - Designated historical structure
 - Energy improvement opportunities to be identified.
- Park & Grounds Building
 - Prospective lighting improvements
 - Candidate for PV array

Reductions at the schools will be attained through a variety of upgrades to control systems, heating, ventilation, air conditioning, lighting, and kitchen equipment. Photovoltaic Solar panels will also be installed for educational purposes as well as energy use reduction. A summary of the planned reductions can be found in appendix A and details of the audit reports in appendix C

Audited Buildings

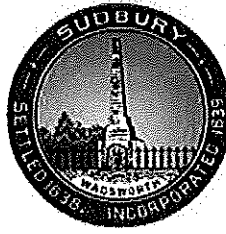
- Curtis Middle - 155,000sf, built 2000
- Haynes Elementary – 62,811sf, built 1950s, 1999
- Loring Elementary – 74,451sf, built 1999
- Nixon Elementary – 58,215sf, built 1960, 1994
- Noyes Elementary – 65,000sf, built 1950s, 1970s, 2000



Sudbury Energy Reduction Plan

Summary of ECMs recommended for school buildings by energy audits:

Proposed ECMs			Annual Energy Usage				Annual Reduction in Greenhouse Gas (CO ₂) Emissions	Annual Savings	Simple Payback		
#	Description	Installed Cost		Existing		Savings with ECM				% Reduction	
		Town	Other	kWh/yr	MMBTU/yr	kWh/yr	MMBTU/yr				
Sudbury Curtis Middle School											
1	Lighting Upgrades	\$12,000.00		13104	0	6365	0	48.6%	2.70	\$1,273	9.4
	Vending Machine										
2	Controls	\$250.00		2925	0	876	0	30.0%	0.37	\$178	1.4
3	VFDs on RTUs	\$58,000.00		214475	0	70455	0	32.9%	29.67	\$14,091	4.1
4	Pilot Light Conversion	\$900.00		0	6	0	6	100.0%	0.32	\$93	9.7
	Shut Down Water Heater	\$250.00		0	18	0	18	100.0%	0.67	\$250	1.0
6	Condensing Boiler(s)	\$120,000.00		0	6000	0	540	9.0%	26.62	\$8,370	14.3
	Building Total:	\$191,400.00		1274700	6486	152807	1026	14.3%	62.75	\$24,252	7.9
Sudbury Nixon Elementary											
	Vending Machine										
1	Controls	\$250.00		1950	0	585	0	30.0%	0.25	\$117	2.1
2	Replace Refrigerators	\$550.00		859	0	476	0	55.4%	0.20	\$90	6.1
3	DCV and VFDs for Gym AHU	\$6,000.00		13969	121	4595	19	20.7%	2.97	\$1,199	6.0
4	DCV and VFDs for Cafeteria AHU	\$6,000.00		6025	92	3063	18	21.6%	2.17	\$850	7.0
5	Convert Pilot Lights	\$300.00		0	2	0	2	100.0%	0.11	\$34	6.9
6	Seal and Insulate Ducts	\$2,200.00		0	150	0	29	19.2%	1.53	\$488	4.5
7	Replace Windows	\$16,000.00		0	60	0	60	100.0%	4.24	\$1,553	11.8
	Building Total:	\$31,300.00		345,360	4705	9719	147	3.0%	11.47	\$4,140	7.6
Sudbury Haynes Elementary											
	Vending Machine										
1	Controls	\$500.00		1950	0	585	0	30.0%	0.25	\$105	4.7
2	Replace Refrigerator	\$1,100.00		1518	0	750	0	49.5%	0.32	\$135	8.1
3	DCV and VFDs on Gym AHUs	\$6,000.00		13969	0	4595	0	32.9%	1.95	\$1,263	4.4
4	DCV and VFDs for Cafeteria AHU	\$10,000.00		16850	0	6127	0	32.9%	2.60	\$1,588	6.3
5	Pilot Light Conversion	\$600.00		0	4	0	4	100.0%	0.21	\$67	9.0
6	Condensing Boiler	\$65,000.00		0	4000	0	400	10.0%	21.26	\$6,680	9.7
	Building Total:	\$83,200.00		386518	4480	12058	404	7.7%	26.52	\$9,938	8.4
Sudbury Hayes Elementary											
	Vending Machine										
1	Controls	\$250.00		975	0	293	0	30.0%	0.12	\$59	4.3
2	DCV and VFDs on Gym AHUs	\$10,000.00		27975	202	9160	32	21.4%	5.60	\$2,282	4.4
3	DCV and VFDs for Cafeteria AHU	\$6,200.00		6025	62	3063	15	22.0%	2.07	\$825	6.3
4	Gas Kitchen Appliances	\$35,000.00		71132	0	71132	303	-25.0%	14.68	\$9,018	3.9
5	Install Vestibule	\$10,000.00		0	70	0	70	100.0%	3.71	\$1,168	6.6
6	Condensing Boiler	\$110,000.00		0	4250	0	850	20.0%	45.05	\$14,195	7.7
	Building Total:	\$170,450.00		422800	4335	83679	663	16.4%	70.62	\$27,544	6.2
Sudbury Long Elementary											
1	Lighting Upgrade	\$4,400.00		9,060	0	4212	0	46.5%	1.74	\$800	6.5
	Vending Machine										
2	Controls	\$250.00		1,950	0	585	0	30.0%	0.26	\$111	2.2
3	Replace Refrigerator	\$550.00		800	0	417	0	52.1%	0.18	\$79	6.9
4	DCV in Gym	\$1,200.00		0	155	0	25	15.5%	1.31	\$414	2.9
	DCV and VFDs on Cafeteria AHUs	\$6,000.00		16,650	1282	6127	23	3.2%	3.81	\$1,649	3.8
6	Convert Pilot Lights	\$600.00		0	4	0	4	100.0%	0.21	\$67	6.9
7	Off-line Water Heater	\$150.00		0	9	0	9	100.0%	0.46	\$153	1.0
	Building Total:	\$13,150.00		1,274,700	6486	77697	61	3.0%	8.93	\$3,175	4.1
Sudbury Schools Total:											
		\$489,500.00		3,704,176	26,492	334,957	2,300	6.6%	179.39	\$69,049	7.1



Sudbury Energy Reduction Plan

ii. Vehicles (including schools)

The Town has adopted a fuel efficient vehicle policy that states that the town of Sudbury will maintain an annual vehicle inventory for non-exempt vehicles and a plan for replacing these vehicles with vehicles that meet the fuel efficiency ratings below. Based on the most recently published US Environmental Protection Agency data on fuel efficient vehicles, vehicles are to have a combined city and highway MPG no less than the following:

- 2 wheel drive car: 29 MPG
- 4 wheel drive car: 24 MPG
- 2 wheel drive small pick-up truck: 20 MPG
- 4 wheel drive small pick-up truck: 18 MPG
- 2 wheel drive standard pick-up truck: 17 MPG
- 4 wheel drive standard pick-up truck: 16 MPG

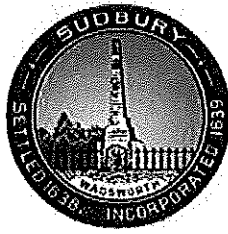
iii. Street and traffic lighting

Sudbury will be replacing 324 inefficient and aging streetlights with more efficient high pressure sodium lights, saving an estimated 124,000 kWh (\$24,000) per year. An \$18,000 rebate from Nstar is also expected. Pay back will be less than 2 years. Total cost of the project will be \$35,000.

iv. Municipally-owned and -operated clean renewable or alternative energy installations

Sudbury has a number of clean energy initiatives planned or in the works.

- A small scale photovoltaic (PV) solar array is planned for the Noyes Elementary School. This array is primarily for educational purposes and is being paid for with Clean Energy Choice money previously accumulated by the town.
- A slightly larger scale solar PV and hot water project is planned for the Fairbank Community Center and Pool. This combined array will help offset electric usage and help to heat water for the heavily used showers. This project will be primarily funded by an Energy Efficiency and Conservation Block Grant.
- The Town has voted unanimously to research and solicit bids for a large scale (2MW+) PV solar array on landfill which has been capped and is no longer in use.
- Sudbury will continue to seek out alternative energy sources as a viable way to reduce fossil fuel use.



Sudbury Energy Reduction Plan

B. Measurement and Verification Plan for Projected Reductions:

Energy usage is metered and read monthly at all municipal buildings and schools. The results of energy conservation efforts are reflected in the month to month and year to year energy usage comparisons, so metered aggregate building energy usage reductions will be the principal verification of energy savings measures. As more advanced and integrated control systems are implemented, feedback data and ease of measurement will improve, giving the town a better understanding of energy use, and areas of opportunity for savings.

All diesel and gasoline motor vehicle fuel usage is measured and recorded. Fuel savings from energy conservation measures will result in less fuel being consumed than otherwise would have been. The vehicle fuel energy reduction will be measured by the reduced energy usage of the vehicles identified in the non-exempt vehicles inventory.

Exact year to year energy comparisons will not be possible due to varying weather conditions, temperature, vehicle miles traveled, and types of projects, but trends can be seen. Whenever possible, factors such as degree-day units will be used to normalize building heating and cooling calculations, as well as actual miles traveled for gallons used in vehicles.

C. Long-term energy reduction goals – Beyond 5 years

In the long term, the Town will continue its efforts to reduce energy usage through energy efficiency upgrades. As more and more conservation measures are implemented, energy efficiency measures will become less cost effective, and alternative energy sources such as solar, wind, geothermal and micro hydro-electric will be evaluated and pursued more aggressively.

APPENDIX A - ENERGY REDUCTION PLAN DOCUMENTATION

ENERGY BASELINE YEAR: 2008

Existing Municipal Energy Use Summary (MMBTU)*

Municipal Buildings	71,055	(2008 utility data)
Vehicles	7,102	(gal used x .124)
Street and/or Traffic Lighting	845	(kWh * 0.003413)
TOTAL - Energy Baseline	79,002	
20 percent reduction goal	15,800	

ENERGY REDUCTION PLAN

Goal: Reduce municipal energy use by 20 percent by: 2013

Energy Reduction Measure (ERM)	Estimated Energy Savings (MMBTU)	Estimated Energy Savings (kWh)	Estimated Cost	Completion Status	Responsible Party
Completed Measure Since Baseline Year**					
1 Energy Reduction Achieved In 2009 Town-wide	6746			2009	
2 Street Light Replacement	0	124,488		2010	
3 Solar Panels on the Fairbank Center	800	7,440	\$141,864	2010	
Proposed Measure**					
Municipal Buildings					
1 Fairbanks Center	2,102	60,249	\$175,725	2010	
2 DPW Office and Highway Building	353	16,177	\$39,450	2012	
3 Sudbury Town Hall	215	1,800	\$8,650	2013	
4 Flynn Building	1	4,932	\$7,850	2013	
5 Other Town Buildings (~20% reduction)	535	112,818	\$200,000	2013	
Town School Buildings					
1 Curtis Middle School	1,026	152,807	\$191,400	2010	
2 Noyes Elementary	663	83,678	\$170,450	2012	
3 Haynes Elementary	404	12,056	\$83,200	2013	
4 Nixon Elementary	147	8,719	\$31,300	2013	
5 Loring Elementary	61	77,697	\$13,150	2013	
Regional School (85%)					
1 Lincoln-Sudbury High School (~10% reduction)	392	82,045	\$250,000	2013	

TOTAL - Energy Reduction Planned (annual)	13,445 MMBTU	744,906 kWh	\$1,313,039
Conversion of kWh savings to MMBTU	2,542 MMBTU		
Total annual energy Savings	15,988 MMBTU		

* Energy baseline data provided in Appendix B

** Backup data provided in Appendix C



MODIFIED DATA

	Electric, kWh									
	FY05	FY06	FY07	FY08	FY09	FY05	FY06	FY07	FY08	FY09
DPW Offices - 275 Old Lancaster Rd (2 bldgs)	224,400	207,760	221,760	203,840	200,080					
Flynn Building - 278 Old Sudbury Road	128,481	143,069	164,858	170,755	156,620					
Town Hall - 322 Concord Road	44,938	39,909	40,389	42,572	41,866					
Police Department	102,092	103,789	103,002	121,007	115,075					
Fairbank Center - 40 Fairbank Road	173,840	180,360	205,800	213,440	210,000					
Fairbank Ctr - Pool	0	392,080	392,000	384,800	388,400					
Library	336,120	340,320	327,360	321,360	299,880					
Fire Dept - 77 Hudson Road	0	0	84,040	84,480	97,240					
Fire Dept - 505 Boston Post Road	0	0	18,881	17,685	17,335					
Fire Department - North Road	0	0	13,569	13,815	10,389					
Curtis Middle School	1,643,790	1,477,890	1,217,610	1,274,700	1,136,850					
Loring Elementary	687,420	564,060	528,840	528,320	465,340					
Noyes Elementary	583,400	568,800	464,800	422,800	387,200					
Haynes Elementary	472,368	454,752	405,960	386,616	354,912					
Nixon Elementary	395,200	385,600	379,360	345,360	299,440					
Lincoln Sudbury Regional High School	3,750,560	3,669,120	3,474,060	3,291,750	3,109,440					
Lincoln Sudbury - Waste Water Facility	965,240	0	965,240	965,240	965,240					
Hosmer House - 299 Concord Road	5,784	6,031	4,982	5,740	7,109					
Park & Grounds Building	0	0	4,234	4,234	4,234					
Municipal Lighting	0	0	247,565	247,565	247,565					
Total Electricity Use, kWh	9,264,310	9,046,079	9,264,310	9,046,079	8,514,215					

	Heating Oil, gallons									
	FY05	FY06	FY07	FY08	FY09	FY05	FY06	FY07	FY08	FY09
Hosmer House - 299 Concord Rd	0	2,222	2,147	2,136	2,266					
Heating Degree Days	6,726	6,167	6,188	6,311	6,613					
Gallons per HDD	0.35	0.34	0.34	0.34	0.34					

	Natural Gas, therms									
	FY05	FY06	FY07	FY08	FY09	FY05	FY06	FY07	FY08	FY09
DPW Office - 275 Old Lancaster Road	29,276	16,020	15,969	15,021	13,089					
DPW Highway - 275 Old Lancaster Rd	10,734	11,163	11,790	12,404	10,926					
Flynn Building - 278 Old Sudbury Rd	9,430	8,075	6,925	6,354	6,423					
Town Hall - 322 Concord Road	14,496	12,139	13,800	13,485	12,754					
Police - 415 Boston Post Rd	3,867	3,857	4,146	4,268	4,663					
Fairbank Ctr - 40 Fairbank Rd (incl pool)	75,886	71,524	59,904	64,020	65,551					
Library - 21 Concord Road	0	9,283	9,931	9,313	10,025					
Fire Dept - 77 Hudson Road	0	0	6,732	6,961	6,310					
Fire Dept - 550 Boston Post Road	0	0	3,525	3,485	3,491					
Fire Dept - 266 North Road	0	0	2,418	2,428	2,262					
Curtis Middle School	95,072	73,680	53,865	66,954	63,624					
Loring Elementary	50,234	35,881	31,892	34,780	33,394					
Noyes Elementary	77,792	57,172	40,853	43,352	35,651					
Haynes Elementary	58,521	43,843	42,313	44,802	39,700					
Nixon Elementary	35,965	26,692	27,550	27,824	28,640					
Lincoln Sudbury Regional H.S.	0	6,134	45,150	46,156	33,336					
Total Gas Use, therms	6,726	6,167	6,188	6,311	6,613					
Heating Degree Days	6,726	6,167	6,188	6,311	6,613					
Therms per HDD	1.00	1.00	1.00	1.00	1.00					
Average HDD	6,401	6,401	6,401	6,401	6,401					

Normalized Energy Use				
	2007	2008	2009	
Electricity, kWh	3,412	9,264,310	9,046,079	8,514,215
Natural Gas, therms	100	389,732	407,334	357,983
Gasoline Vehicle Usage	124	56,257	57,278	56,767
Heating Oil, gallons	139	2,221	2,166	2,194

Energy Use for All Accounts				
	2007	2008	2009	
Total Energy, millions of BTUs	77,868	79,002	72,193	

ENERGY REDUCTION SUMMARY (millions of BTUs)				
	2007	2008	2009	
Using FY2008 as Baseline, 20% goal:	15,800	6,809	8.6%	
Energy reduction already achieved:	6,809	8,991	11.4%	
Energy reduction to achieve by FY2013	8,991			

