The Town of Stoughton Local Energy Action Plan

Part III - Appendix

January 15, 2013

Prepared by the Metropolitan Area Planning Council (MAPC)

for

The Town of Stoughton

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Summary

This document is intended to provide guidance to communities for approximating weather normalization of their building energy consumption baseline. Energy consumption in thermally controlled buildings is dependent on outside air temperature. In order to compare building energy consumption from year to year and more accurately measure the effectiveness of energy efficiency measures, communities can adjust building energy consumption data based on historic weather data. In the absence of professional energy data analysis tools, this document can be used as a guide to approximate weather normalization for building energy consumption based on regional historic weather data.

The methodology in this document describes how to adjust building energy consumption for weather conditions based on historic temperature data in the Massachusetts coastal division. However, this data is publically available on the national level and can be replicated for a community anywhere in the United States with some modifications to historical weather data specific to geographic locations. In the interest of simplicity, this methodology only addresses three heating fuels: natural gas, fuel oil, and propane. Communities that rely heavily on other fuels (i.e., wood, electricity) or communities that consume significant amount by cooling buildings should consider expanding the methodology to account for the specific energy use patterns.

For reference, the following conversion factors are used to compare physical fuel units with Btu (British thermal units):

Energy Unit Conversion Factors		
Fuel Type	**Units**	**Factor**
Electricity	MMBTU/ kWh	0.003412
Natural Gas	MMBTU/ therm	0.1
Fuel Oil	MMBTU/ gallon	0.139

Referenced Data Set

National Climate Data Center (NCDC) Historical Climatologically Series (HCS) 5-1, 2007-2012

- Massachusetts Coastal Division (for communities outside the MAPC region, please refer to a different division according to your location.)
- Available online at: http://www1.ncdc.noaa.gov/pub/orders/CDODiv2610105927925.txt

TERMS TO KNOW

Term	Definition
Outside Air Temperature	"Outside air temperature" is the temperature measured outside a building.
Weather Normalization	"Weather normalization" is the process of adjusting building energy consumption for weather conditions based on historical outside air temperature data. Also known as "weather correction."
Base Temperature	The "base temperature" is the outside air temperature threshold below which a building needs to be heated. In the U.S. the typical base temperature used for most buildings is 65°F (18°C).
Heating Degree Days (HDD)	"Heating degree days" measure how much (in degrees) and for how long (in days) the outside air temperature is below the base temperature within a given period.
Average Year Degree Days (ADD)	"Average year degree days" is the average annual degree day value measured within a given period (in years).

STEP-BY-STEP INSTRUCTIONS

Step 1. Select a measurement period. A measurement period is the timeframe in which historical temperature data is collected. The start date of a measurement period should be the baseline year for a building. The end date of a measurement period should be AT LEAST five years after the baseline year or the energy reduction target year of the building. *(For demonstration purpose, the measurement period selected for this document is FY 2008 to FY 2012.)*

Step 2. Determine the monthly heating degree days for the measurement period. Use the dataset NCDC HCS 5-1 to determine the monthly heating degree days in the Massachusetts Coastal Division for each month during the measurement period and organized the data in a spreadsheet. Please note that NCDC HCS data is only available in .TXT format. Communities need to manually enter the data into a spreadsheet. A complete "Heating Degree Days Chart" for the Massachusetts Coastal Division from FY 2008 to FY 2012 is available at the end of this document.

Example:

SHEET 1 – HDD				
	A	B	C	D
1	**FISCAL YEAR**	**YEAR**	**MONTH**	**HDD**
2	2008	2007	July	5
3	2008	2007	August	7

Step 3. Determine the aggregated heating degree days for each fiscal year. Use "SUM" function to find the total heating degree days for each fiscal year.

Example: Calculate the total heating degree days for FY 2008.

SHEET 1 – HDD				
	A	B	C	D
1	FISCAL YEAR	YEAR	MONTH	HDD
2	2008	2007	July	5
3	2008	2007	August	7
4	2008	2007	September	56
5	2008	2007	October	262
6	2008	2007	November	693
7	2008	2007	December	1023
8	2008	2008	January	1026
9	2008	2008	February	927
10	2008	2008	March	846
11	2008	2008	April	531
12	2008	2008	May	291
13	2008	2008	June	17
14	**2008**		**Total HDD**	**5,684**

To find the "Total HDD" (cell D14), the following formula is used:

=SUM (D2:D13)

Step 4. Determine the average year degree day value for the given measurement period. The average year degree day is usually the five year, ten year, or twenty year average of the total heating degree days. For cross-regional comparisons purposes, a standard degree day value may also be used. A five year average for the Massachusetts coastal division is the value used in this example. To find the average value for a period of years, divide the sum of the total heating degree days in each fiscal year by the number of fiscal years in the measurement period.

Example: Calculate the average year degree day value for FY 2008 to FY 2012.

SHEET 1 – HDD				
	A	B	C	D
1	FISCAL YEAR	YEAR	MONTH	HDD
14	**2008**		**Total HDD**	**5,684**
27	**2009**		**Total HDD**	**6,109**
40	**2010**		**Total HDD**	**5,544**
53	**2011**		**Total HDD**	**5,947**
66	**2012**		**Total HDD**	**4,786**
67			**Average Year Degree Day**	**5,614**

To find the "Average Year Degree Day" (cell D67), the following formula is used:

=AVERAGE (D14,D27,D40,D53,D66)

Step 5. Determine each building's baseline energy consumptions by fuel type. Create a building inventory on a separate sheet in your weather normalization Excel workbook. List energy consumption for each building by fuel types in the selected baseline year.

SHEET 2 – BUILDING INVENTORY					
	A	B	C	D	E
1	BUILDING	2009 ELECTRICITY (kWh)	2009 GAS (therms)	2009 OIL (gallons)	2009 PROPANE (gallons)
2	Town Hall	90,800	4,980	-	-
3	Senior Center	30,700	-	4,200	-
4	Fire Station	35,000	44,20	-	240
5	High School	1,650,300	65,000	-	300

Step 6. Determine the energy consumption per degree day by building and heating fuel type.

Note: Weather normalization should be applied to heating fuel consumption only. The consumption of fuels whose usage is not affected by weather conditions, such as electricity, gasoline, and diesel should not be adjusted.

Calculate the energy consumption per degree day by building and heating fuel type (gas, oil, propane) by dividing the total baseline energy consumption by the total number of heating degree days in the baseline year.

<u>Example:</u> Calculate the gas consumption (therms) per degree day for the Town Hall for FY 2009.

SHEET 2 – BUILDING INVENTORY							
	A	C	D	E	F	G	H
1	BUILDING	2009 GAS (therms)	2009 OIL (gallons)	2009 PROPANE (gallons)	2009 GAS (therms) per DEGREE DAY	2009 OIL (gallons) per DEGREE DAY	2009 PROPANE (gallons) per DEGREE DAY
2	Town Hall	4,980	-	-	0.82	?	?
3	Senior Center	-	4,200	-	?	?	?
4	Fire Station	44,20	-	240	?	?	?
5	High School	65,000	-	300	?	?	?

In this example, the therms per degree day for the Town Hall in FY 2009 (SHEET 2 cell F2) is the quotient of the Town Hall's 2009 gas consumption (SHEET 2 cell C2) divided by the total heating degree days in 2009 (SHEET 1 cell D27). The following formula is used:

=C2/'SHEET 1 – HDD'!$D$27

At the end of this step, the sheet should look like this:

SHEET 2 – BUILDING INVENTORY							
	A	C	D	E	F	G	H
1	BUILDING	2009 GAS (therms)	2009 OIL (gallons)	2009 PROPANE (gallons)	2009 GAS (therms) per DEGREE DAY	2009 OIL (gallons) per DEGREE DAY	2009 PROPANE (gallons) per DEGREE DAY
2	Town Hall	4,980	-	-	0.82	-	-
3	Senior Center	-	4,200	-	-	0.67	-
4	Fire Station	44,20	-	240	0.72	-	0.039
5	High School	65,000	-	300	10.6	-	0.049

Step 7. Perform simple-ratio based weather normalization to determine the adjusted energy consumption by building and heating fuel type. To find the normalized equivalents of each

consumption value, multiply each energy consumption per degree day value (SHEET 2, columns F through H) by the average year degree day value (SHEET 1, cell D67).

<u>Example:</u> Calculate the weather normalized gas consumption (therms) for the Town Hall for FY 2009.

SHEET 2 – BUILDING INVENTORY							
	A	F	G	H	I	J	K
1	BUILDING	2009 GAS (therms) per DEGREE DAY	2009 OIL (gallons) per DEGREE DAY	2009 PROPANE (gallons) per DEGREE DAY	WEATHER NORMALIZED GAS (therms)	WEATHER NORMALIZED OIL (gallons)	WEATHER NORMALIZED PROPANE (gallons)
2	Town Hall	0.82			4,603	?	?
3	Senior Center		0.67		?	?	?
4	Fire Station	0.72		0.039	?	?	?
5	High School	10.6		0.049	?	?	?

In this example, the weather normalized gas consumption for the Town Hall in FY 2009 (SHEET 2 cell I2) is the product of the Town Hall's 2009 gas consumption per degree day (SHEET 2 cell F2) multiplied by the average year degree day value (SHEET 1 cell D67). The following formula is used:

=F2*'SHEET 1 – HDD'!$D$67

At the end of this step, the sheet should look like this:

SHEET 2 – BUILDING INVENTORY							
	A	F	G	H	I	J	K
1	BUILDING	2009 GAS (therms) per DEGREE DAY	2009 OIL (gallons) per DEGREE DAY	2009 PROPANE (gallons) per DEGREE DAY	WEATHER NORMALIZED GAS (therms)	WEATHER NORMALIZED OIL (gallons)	WEATHER NORMALIZED PROPANE (gallons)
2	Town Hall	0.82	-	-	4,603	-	-
3	Senior Center	-	0.67	-	-	3,761	-
4	Fire Station	0.72	-	0.039	4,042	-	219
5	High School	10.6	-	0.049	59,508	-	275

Step 8. Determine the total weather normalized energy consumption for each building. Find the sum of the (non-adjusted) electricity consumption and the weather normalized heating fuel energy consumption for each building in MMBTU's.

Example: Calculate the total weather normalized energy consumption for Town Hall for FY 2009.

SHEET 2 – BUILDING INVENTORY						
	A	B	I	J	K	L
1	BUILDING	ELECTRICITY (kWh)	WEATHER NORMALIZED GAS (therms)	WEATHER NORMALIZED OIL (gallons)	WEATHER NORMALIZED PROPANE (gallons)	WEATHER NORMALIZED TOTAL (MMBTU)
2	Town Hall	90,800	4,603	-	-	770
3	Senior Center	30,700	-	3,761	-	?
4	Fire Station	35,000	4,042	-	219	?
5	High School	1,650,300	59,508	-	275	?

In order to add up fuel consumptions measured in different physical fuel units, please remember to convert all energy consumption value in physical fuel units to MMBTU's. To find the total weather normalized consumption for the Town Hall (cell L2), the following formula is used:

=B2*0.003412 + I2*0.1 + J2*0.139 + K2*0.091

At the end of this step, the sheet should look like this:

SHEET 2 – BUILDING INVENTORY						
	A	B	I	J	K	L
1	BUILDING	2009 ELECTRICITY (kWh)	WEATHER NORMALIZED GAS (therms)	WEATHER NORMALIZED OIL (gallons)	WEATHER NORMALIZED PROPANE (gallons)	WEATHER NORMALIZED TOTAL (MMBTU)
2	Town Hall	90,800	4,603	-	-	770
3	Senior Center	30,700	-	3,761	-	628
4	Fire Station	35,000	4,042	-	219	544
5	High School	1,650,300	59,508	-	275	11,606

Results

The following is a comparison of the energy use baseline in each building before and after weather normalization. The weather normalization process adjusted the building energy consumptions for additional energy used for heating due to weather that was colder than average in the FY 2009 baseline (relative to the overall 5-year, FY 2008 to FY 2012 weather data measurement period).The weather normalized energy consumption value is therefore lower than the non-adjusted values.

Before weather normalization:

BUILDING	2009 ELECTRICITY (kWh)	2009 GAS (therms)	2009 OIL (gallons)	2009 PROPANE (gallons)	TOTAL (MMBTU)
Town Hall	90,800	4,980	-	-	808
Senior Center	30,700	-	4,200	-	689
Fire Station	35,000	44,20	-	240	583
High School	1,650,300	65,000	-	300	12,158

After weather normalization:

BUILDING	2009 ELECTRICITY (kWh)	WEATHER NORMALIZED GAS (therms)	WEATHER NORMALIZED OIL (gallons)	WEATHER NORMALIZED PROPANE (gallons)	WEATHER NORMALIZED TOTAL (MMBTU)
Town Hall	90,800	4,603	-	-	770
Senior Center	30,700	-	3,761	-	628
Fire Station	35,000	4,042	-	219	544
High School	1,650,300	59,508	-	275	11,606

Resources

Massachusetts Coastal Division Heating Degree Day Table (FY 2008 to FY 2012)

FY Year	Year	Month	HDD
2008	2007	July	5
2008	2007	August	7
2008	2007	September	56
2008	2007	October	262
2008	2007	November	693
2008	2007	December	1023
2008	2008	January	1026
2008	2008	February	927
2008	2008	March	846
2008	2008	April	531
2008	2008	May	291
2008	2008	June	17
2008		**Total HDD:**	**5,684**
2009	2008	July	0
2009	2008	August	11
2009	2008	September	62
2009	2008	October	440
2009	2008	November	693
2009	2008	December	942
2009	2009	January	1246
2009	2009	February	944
2009	2009	March	893
2009	2009	April	504
2009	2009	May	261
2009	2009	June	113
2009		**Total HDD:**	**6,109**
2010	2009	July	11
2010	2009	August	0
2010	2009	September	114
2010	2009	October	440
2010	2009	November	516
2010	2009	December	1032
2010	2010	January	1138
2010	2010	February	941
2010	2010	March	707
2010	2010	April	447
2010	2010	May	181
2010	2010	June	17
2010		**Total HDD:**	**5,544**

FY Year	Year	Month	HDD
2011	2010	July	0
2011	2010	August	0
2011	2010	September	41
2011	2010	October	344
2011	2010	November	654
2011	2010	December	1051
2011	2011	January	1184
2011	2011	February	994
2011	2011	March	846
2011	2011	April	531
2011	2011	May	255
2011	2011	June	47
2011		**Total HDD:**	**5947**
2012	2011	July	0
2012	2011	August	0
2012	2011	September	49
2012	2011	October	297
2012	2011	November	510
2012	2011	December	806
2012	2012	January	958
2012	2012	February	812
2012	2012	March	648
2012	2012	April	438
2012	2012	May	208
2012	2012	June	60
2012		**Total HDD:**	**4,786**
		5-Year Average Year Degree Day:	**5,614**

Appendix B: Recommended Municipal Energy Efficient Opportunities

The following chart summarizes the recommended energy efficiency opportunities listed in the Energy Efficiency Opportunities reports for Stoughton Town Hall and Fire Station #1.

Stoughton Town Hall

Energy Efficiency Improvemnet	Potnetial Savings	Simple Payback	Incentive Available
Computer power management	50 kWh/year per computer $500/year per 100 computers	Immediate – 1 year	No
Education & Awareness	2% on combined plug load, heating, colling, and HVAC energy use	< 1 year	No
Schedules, Set-Points, O&M	2% of HVAC cooling use 2% of HVAC heating energy use $750 - $1,500 per year	< 2 years	No
Upgrade Thermostats	2% - 4% on heating and mechanical ventilation savings	1 – 3 year(s)	No
Heating Valve Survey and Replacement	5% of heating energy use	4 – 6 years	Yes
Replace Chiller	10,000 – 20,000 kWh/year	15 – 25 years	Yes
Upgrade Boilers	8% - 15% on boiler efficiency increase	10 – 15 years	Yes
Destratification Fans	> 25% of heating energy	4 – 8 years	Yes
Lighting Upgrades	50 – 100 kWh annually per fixture	4 – 6 years	Yes
Occupancy Sensors in Meeting Rooms and Offices	3% – 5% on lighting savings $600 - $800/year	3 – 6 years	Yes
Motor Upgrades	3% – 5% of annual pumping or fan electricity use	10 – 12 years	No

Fire Station #1

Energy Efficiency Improvemnet	Potnetial Savings	Simple Payback	Incentive Available
Computer power management	50 kWh/year per computer $500/year per 100 computers	Immediate – 1 year	No
Education & Awareness	2% on combined plug load, heating, colling, and HVAC energy use	< 1 year	No
Occupancy Sensors in Offices, Dorms, and Common Areas	3% – 5% on lighting savings $500-1,000/year	2 – 4 years	Yes
Vending Machine Controls	$100/year	1.5 – 2 years	Yes
Air Sealing/Weatherization	1% – 3% on heating savings	2 – 4 years	Yes
Upgrade Thermostats	2% - 4% on heating and mechanical ventilation savings	1 – 3 year(s)	Yes
Hot Water Pipe Insulation	3% of heating energy use	4 – 6 years	Yes
Heating Valve Survey and Replacement	5% of heating energy use	4 – 6 years	Yes
Replace Refrigerators	800 – 1,500 kWh/year	4 – 6 years	Yes
Upgrade Window Air Conditioning Units	200 – 500 kWh/year per window unit	5 – 8 years	No

Appendix C: Municipal Project Estimated Energy Savings

The following chart builds on the information provided by Stoughton's energy assessment reports to depict potential energy saving opportunities in the municipal sector. [1] The listed energy efficiency improvement projects are recommendations from the energy assessment reports. As of November 2012, Stoughton has completed lighting retrofits (shaded) in the eight school buildings. Four energy efficiency improvement projects are currently in progress. These projects include rooftop improvement in Jones Early Childhood Center, and occupancy sensors installation, classroom/corridor lighting upgrade, and exterior lighting upgrade in the eight school buildings.

Energy Efficiency Improvement	Expected Reduction		HS	MS	Elementary Schools					Jones	Town Hall	Clapp Library	Fire #1	Police Station	Pump Stations (8)
	Elec.	Gas			Dawe	Gibbons	Hansen	South	West						
R-30 roof insulation	1%	5%	X			X		X	X	X					
Door replacement	0.5%	2%		X	X	X	X								
New windows	1%	5%		X	X	X	X	X				X	X	X	X
Boiler replacement	-	10%	X		X	X		X			X				
Univent replacement	3%	1%	X	X	X	X	X	X	X	X					
HVAC controls upgrade	2%	2%	X	X	X	X	X	X	X	X					
Faucet retrofit	-	0.5%	X	X	X	X	X	X	X						
Occupancy sensors	1%	-0.15	X	X	X	X	X	X	X	X	X		X		
Classroom/corridor lighting upgrade	-	-	X	X	X	X	X	X	X	X					
Exterior lighting upgrade	-	-	X	X	X	X	X	X	X	X					
Burner improvements	0.25%	3%	X	X			X		X	X					
Steam traps	-	4%	X	X					X	X					
Pipe insulation	-	0.5%	X	X	X	X	X	X	X	X			X		
Cooling upgrade	1%	-	X	X	X	X	X	X	X	X					
Constant volume VSDs	4%	-	X	X	X	X	X	X	X	X					
Demand control vent	1%	3%	X	X	X	X	X	X	X	X					
Economizers	1%	-	X												
Lighting retrofit	6%	-0.5%	X	X	X	X	X	X	X	X	X				
Walk-in equipment	0.5%	-	X	X											
Hood controls	1%	2%	X	X						X					
Computer power management	0%	-	X								X		X		
Vending machine controls	-	-	X										X		
Thermostat replacement	-	3%	X								X		X		

[1] This chart was created using information from the following documents: Town of Stoughton's Facilities Master Plan; DOER's Energy Efficiency Opportunities report for Fire House #1; DOER's Energy Efficiency Opportunities report for Town Hall, Whole Building Energy Assessment report for Stoughton High School; Stoughton Water System Energy Performance report prepared by TNZ; and Stoughton's 5 Year Energy Use Reduction Plan draft report prepared by ESC member Eric Studer.

Energy Efficiency Improvement	Expected Reduction		HS	MS	Elementary Schools					Jones	Town Hall	Clapp Library	Fire #1	Police Station	Pump Stations (8)
	Elec.	Gas			Dawe	Gibbons	Hansen	South	West						
Kitchen hood controls	-	-	X										X		
Heating valve survey and replacement	-	5%									X		X		
Chiller replacement	0.19%	-									X				
Destratification fans	25%	-									X				
Motor upgrades	4%	-									X				
Air sealing/ weatherization	-	2%											X		
Refrigerator replacement	0.01%	-											X		
Water Station Pump Optimization	-	-													X
Water Station Boiler Retrofit	-	20%													X
Water Station Weatherization	-	20%													X
Water Station Heating Improvements	15%	-													X
Water Station VSD and Pup Motor Replacement	20%	-													X
Water Station Gas Conversion & Boiler Replacement	-	45%													X
Water Station Lighting Upgrade	-	-													X
Water Station Exterior Lighting Control	-	-													X
Water Station DHW Pipe Insulation	-	-													X
Water Station Dehumidifier Selection	-	-													X
Electricity % Reductions			22%	21%	20%	21%	20%	20%	19%	20%	36%	1%	2%	1%	66%
Natural Gas % Reductions			19%	8%	9%	14%	2%	12%	4%	5%	3%	5%	1%	5%	90%
Potential Energy Use Reductions			40%	29%	28%	34%	21%	32%	23%	25%	39%	6%	3%	6%	156%
Potential Energy Savings, %			20%	11%	10%	15%	5%	13%	19%	5%	17%	5%	1%	3%	66%

Appendix D: Greenhouse Gas Emissions Baseline Study Recommendations

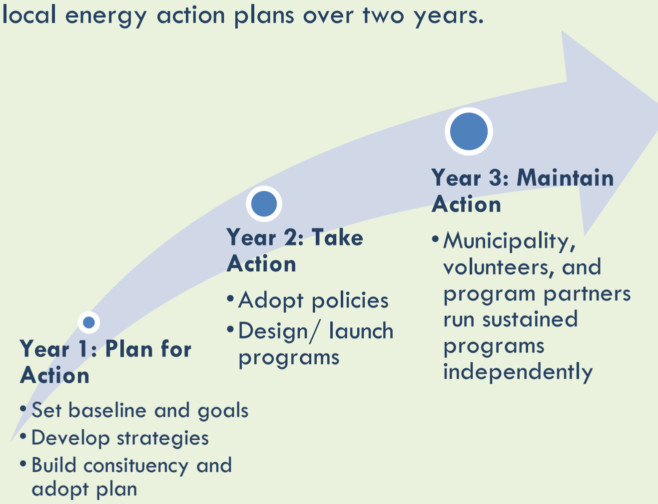
GHG Baseline Study Recommendations	LEAP Equivalent Energy Actions
GHG Reduction Efforts	
Encourage all residents to take advantage of free energy audits.	2a) Partner with energy service vendors to design and implement an outreach campaign that (1) promotes participation in MassSave and (2) distributes information on the benefits of, incentives, rebates, and other financial opportunities for energy efficiency upgrades and solar development.
Encourage residents to explore the installation of solar generation equipment and to take advantage of incentive programs.	2a) Partner with energy service vendors to design and implement an outreach campaign that (1) promotes participation in MassSave and (2) distributes information on the benefits of, incentives, rebates, and other financial opportunities for energy efficiency upgrades and solar development.
Adopt the Stretch Code to require high performance new construction.	7b) Evaluate ability to become a Green Community by meeting the program's five criteria.
Encourage all commercial and industrial companies to explore incentive opportunities for their processes and equipment.	4a) Partner with energy service vendors, utilities, the Chamber of Commerce and other stakeholders to design and implement an annual green business outreach campaign to (1) inform local businesses of clean energy opportunities, (2) promote participation in MassSave, (3) encourage the implementation of energy efficiency measures, and (4) celebrate local clean energy.
Set a GHG/energy reduction target to be achieved within the next 5-8 years.	1a) Utilize the 2011 GHG inventory, the Energy Action Plan, and available aggregate residential energy consumption data to (1) set up a residential energy baseline, (2) establish energy reduction goals, and (3) benchmark energy reductions; and 3a) Utilize the 2011 GHG inventory, the Energy Action Plan, and available aggregate commercial energy consumption data to (1) set up a residential energy baseline, (2) establish energy reduction goals, and (3) benchmark energy reductions.
Complete updates to the GHG inventory to allow tracking of energy use and GHG emission reduction successes.	5a) Establish a standard process for (1) maintaining and updating the Town's MassEnergyInsight account and (2) utilizing the data to benchmark energy reductions.
Municipal Services Operating Cost Reduction Efforts	
Optimizing the HVAC systems at the High School and Middle School.	7d) Research and educate Town on innovative financing models to complete energy efficiency upgrades in municipal and school buildings.
Considering fuel efficiency when purchasing new police vehicles.	7f) Implement a policy and provide training to municipal staff for using life cycle cost analyses when making energy-related purchasing decisions.
Upgrading police station HVAC systems.	6d) Explore working with an ESCO through an energy performance contract as a financing option for implementing parts of Stoughton's Facilities Master Plan through energy cost savings.
Considering high-performance options during replacement of HVAC equipment.	7a) Create and maintain a plan for completing municipal retrofit work, which will include a list of priority projects, funding recommendations, and proposed strategies for implementation.
Reducing the number of streetlight operating hours if they are not required for public safety in early morning hours.	7h) Retrofit streetlights with LEDs through collective procurement services and install streetlight control systems.
Adopting and enforcing anti-idling policies for DPW vehicles, which may save considerable fuel.	7g) Adopt an anti-idling policy to limit idling time for DPW, police, and fire vehicles.
Including life-cycle analyses when making planning and purchasing decisions.	7f) Implement a policy and provide training to municipal staff for using life cycle cost analyses when making energy-related purchasing decisions.
Considering creation of an energy efficiency fund that can be used to finance the additional cost of identifying, studying, and implementing upgrade projects.	7d) Research and educate Town on innovative financing models to complete energy efficiency upgrades in municipal and school buildings.

Appendix E: Stoughton LEAP Working Group Meeting (April 26) Handouts[2]

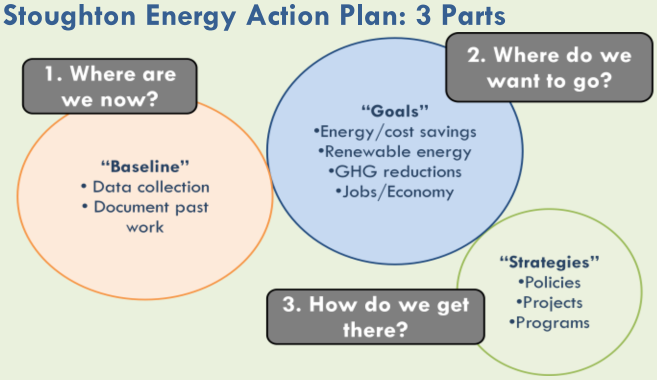
The Metropolitan Area Planning Council (MAPC) is a regional planning agency serving the people who live and work in the 101 cities and towns of Metropolitan Boston. Our mission is to promote smart growth and regional collaboration. We work toward sound municipal management, sustainable land use, protection of natural resources, efficient and affordable transportation, a diverse housing stock, public safety, economic development, an informed public, and equity and opportunity among people of all backgrounds. Our regional plan, "MetroFuture," guides our work and engages the public in responsible stewardship of the region's future.

What is LEAP?

Mission: To help cities and towns create and implement local energy action plans over two years.

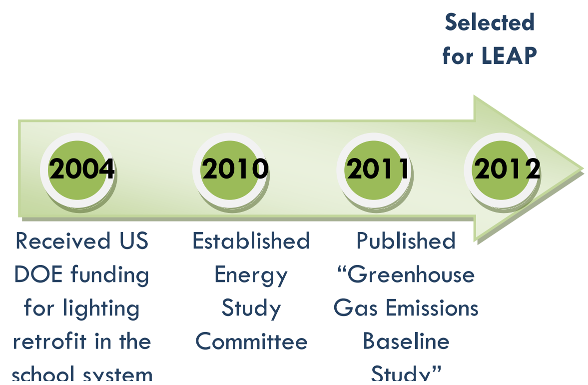


Stoughton Energy Action Plan: 3 Parts



WHERE ARE WE NOW?

Community Energy Achievements



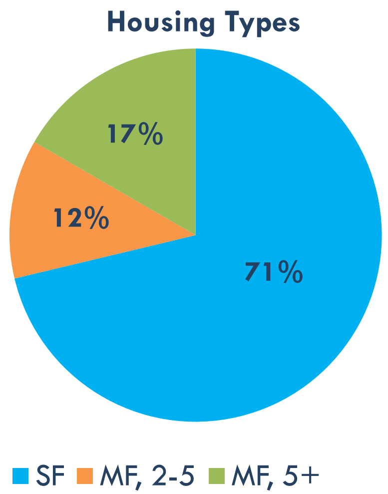
Greenhouse Gas Emissions Baseline Study:

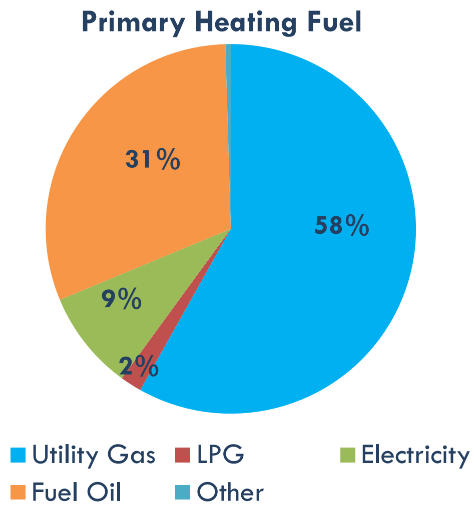
- Reviewed Stoughton 2009 GHG emissions, water consumption, and wastewater and solid waste generation
- Identified largest source of GHG emissions and resource consumption
- Provided recommendations to town leadership and parties interested in reducing Stoughton's GHG footprint and resource consumption

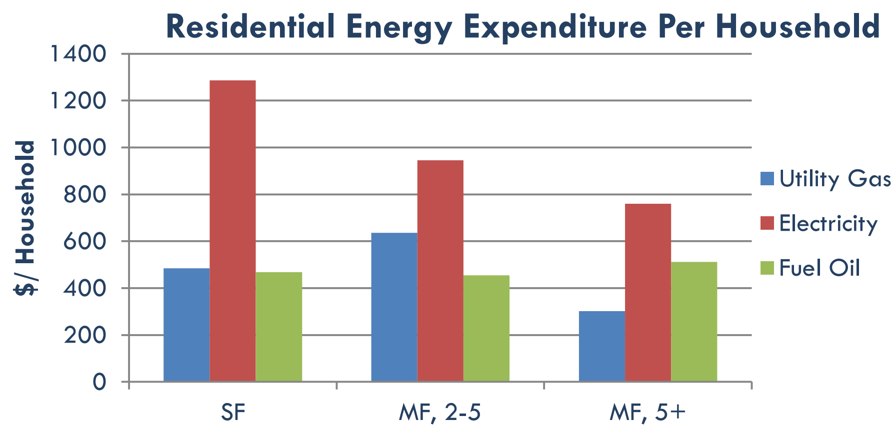
Past Energy Action	Municipal Sector	Residential Sector	Commercial, Industrial, Institutional Sectors
Committed Staff/Volunteer Time	◐	◐	?
Tracking of Energy Consumption	●	◐	?
Energy Goals & Commitments	●	○	?
Renewable Energy Projects	○	○ ?	◐ ?
Energy Efficiency Projects	◐	◐ ?	?
Outreach and Educational Programs	◐	○ ?	?
Local Cleantech Industry	-	-	○?

[2] The energy consumption data in this document is only an estimation derived using publicly available data such as census data, labor statistics, and building energy survey analyses in the absence of aggregated utility data. The data used here is different from the aggregated utility data referenced in the "Residential, Commercial, and Industrial Energy Profile" section in Part I of this Energy Action Plan.

Residential Sector



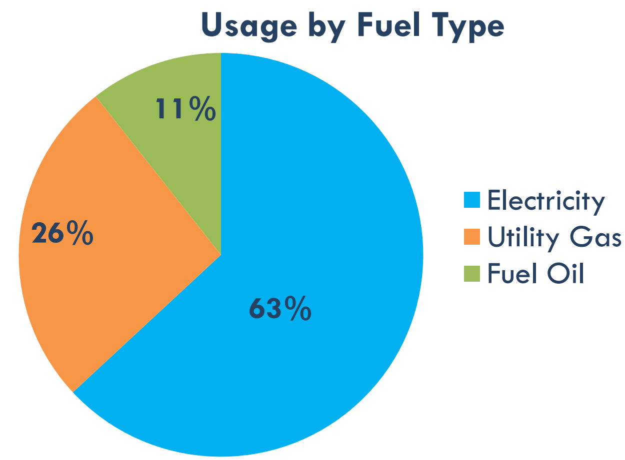




Residential Annual Energy Consumption:
Electricity: **84 million kWh**
Natural gas: **3.4 million therms**
Heating oil: **110 thousand gallons**
Residential Annual Energy Expenditures: $23 million

Commercial Sector*

Type	# Establishments	# Employees
Food Sales	19	340
Food Services	56	1,090
Outpatient Care	56	595
Lodging	11	399
Retail (Non-Mall)	42	1,225
Retail (Mall)	12	202
Office	270	2,272
Public Assembly	20	124
Religious	18	58
Service	82	499
Warehouse	62	887
Other	11	130
Total	**659**	**7,821**



Commercial Annual Energy Consumption:
Electricity: **137 million kWh**
Natural gas: **1.9 million therms**
Heating oil: **56 thousand gallons**
Commercial Annual Energy Expenditures: $17 million

* Does not include manufacturing/industrial sectors, in which Stoughton has an additional 1,530 jobs and 49 establishments

Appendix F: Medford LEAP Working Group Meeting (April 26) Minutes

STOUGHTON LEAP WORKING GROUP
MEETING MINUTES

Location: The Fitzpatrick Conference Room, Stoughton Town Hall
Date: Thursday, April 26, 2012
Time: 06:30 – 08:30 pm
Meeting Leader: Erin Brandt, Metropolitan Area Planning Council
Facilitator: Helen Aki, Metropolitan Area Planning Council
Note Taker: Po-Yu Yuen, Metropolitan Area Planning Council
Attendees: Stoughton Energy Committee members, Chamber of Commerce Executive Director, Municipal staff, Stoughton Residents, Next Step Living representative

Meeting Agenda

1. Welcome and Introductions
2. Purpose and Desired Outcomes
3. Introduction to Metropolitan Area Planning Council (MAPC) and LEAP
4. Past Community Achievements
5. Baseline: "Where are we now?"
6. Brainstorm
    a. What are the unique things about living/ working in Stoughton?
    b. What are the greatest challenges?
    c. What past community efforts worked well and why?
    d. What past community efforts didn't work well and why?
    e. What do you think should be part of LEAP's objectives and goals?

Meeting Purposes and Desired Outcomes

- To launch the LEAP program with stakeholders in the Stoughton community
- To present an overview of the program
- To begin discussions on opportunities in pursuing clean energy work in Stoughton
- To learn about past experience with energy work in Stoughton
- To begin discussions on developing next steps
- This meeting was for general brainstorming purposes
- In-depth discussions on pros and cons of any particular ideas were not encouraged
- This meeting aimed to develop clean energy ideas that would tie to the community's priorities

Introduction to MAPC and LEAP

Erin gave an overview of MAPC and LEAP. See handout.

Past Community Achievements

Meeting participants were asked to discuss past energy efforts and projects in considerations initiated by the Town, residents, local businesses, and community organizations in Stoughton. The following information was given:

- Stoughton is participating in YMCA's Partnering Health Community program, under which the town is looking at: building more sidewalks; putting in more streetlights; developing a farmers market
  - Many representatives from different town departments are apart of this initaitve
  - There may be ways to tie in energy to this effort
- Stoughton is planning to pursue energy efficiency opportunities in the new library building
- The Board of Selectmen has begun discussion on landfill solar installation

Brainstorming

Meeting participants were asked to brainstorm to help MAPC and the Town of Stoughton develop a strong understanding of the community's unique characteristics, challenges, and priorities and goals in clean energy work.

1. "What are the unique things about living/working in Stoughton?"

- Diversity
- Large Portuguese population
- "No place for hate" campaign
- Convenient transportation
- Active open space organizations
- Many churches
- Clergy Association
- Strong connections between community organizations
- The town does not have a large wealthy population, but people are generous in their own ways

2. "What are the challenges about living/working in Stoughton?"

- Community actions are incentive-driven
- The town did not pass stretch code in 2010
- Many residents are resistance to change
- Business vacancies
- Lack of parking spaces near town center

3. What past community efforts worked well and why?

- Events
  - "Doing it for Diane" – Fundraising for Stoughton Food Pantries

    - Stoughton Clean Up
        - Target and Stop and Shop sent volunteers to participate
    - "Cash Mob Stoughton" for supporting local small businesses
        - Organized by Carlos Vargas from Redevelopment Authority
    - Library focus groups/visioning groups

- Outreach Strategies
    - Advertisements in local Penny Saver
    - Local papers
    - Turn testimonials into ads
    - Social media – Stoughton Patch, Facebook
    - Nightly News (High School)
    - Documents translated into Portuguese and other languages

4. <u>What past community efforts didn't work well and why?</u>

- New residents may not feel the same connection as long-time residents do
- Not all residents have access to or are aware of opportunities, resources, and government assistances
- Some residents are not engaged since they are not involved in community organizations/ schools/ local businesses
- Some residents do not trust "outsiders," such as service suppliers and vendors

5. <u>What do you think should be part of LEAP's objectives and goals?</u>

- Goals
    - Building a strong residential clean energy program
    - Assisting fuel oil users
    - Creating a Stoughton-specific commercial sector clean energy program
    - "Get people to know about it, learn about it, and make decisions"
        - Educating the public about clean energy opportunities, tax incentives, and resources
        - Help clean energy programs gain credibility and trust in the town
        - Getting participation in financial incentives programs
    - Using effective messaging

        "You are doing it to save money"
- Strategies
    - Making and distributing information sheets on available financial assistance options
    - Incentivizing participation in programs through deals and competitions
    - Getting local residents to share their successful experiences through panels, workshops, and social media
    - Engaging the public through face-to-face conversations
    - Workshops can help directly engage to local residents
    - Tap into existing networks, such as the Garden Club, Women's Club trolley tours
    - Use high school as outreach resource
    - Flyers and messaging should be tailored to audience

Next Steps

- MAPC will follow up with IKEA to learn about their commercial clean energy efforts
- MAPC will follow with town to discuss opportunities with the soon-to-be capped landfill
- MAPC will get in touch with Chamber of Commerce members to further the discussion on business energy programs
- MAPC will contact with Kevin Bechet (point of contact for outreach) from High School
- MAPC will continue to compile research for energy action plan
- The Working Group will be invited to discuss the draft action plan between June and July
- The draft plan will be open for public comment before it is formally adopted
- MAPC will work with the Town of Stoughton stakeholders to begin implementing action plan strategies