

MassDEP GHG Reporting Program Summary Report For Retail Sellers of Electricity Emissions Year 2010

March 2013

The information below summarizes the 2010 greenhouse gas (GHG) emissions and megawatt hours of electricity sales reported to the Massachusetts Department of Environmental Protection (MassDEP) by the 75 retail sellers that sold electricity in Massachusetts during that year, as required by MassDEP regulation 310 CMR 7.71. Additional information about MassDEP's GHG program is available at <http://www.mass.gov/dep/air/climate/reporting.htm>; see particularly *Retail Seller of Electricity Reporting*. MassDEP will use the information presented here in considering future measures to reduce emissions from the electric sector. This was the second year of reporting under the regulation. 2008 was the first reporting year. Comparisons of the two reporting years are provided in this summary.

MassDEP requires retail sellers to report emissions that occur from the generation of the electricity that they sell. The GHGs emitted from power plant smokestacks during combustion of fuels to generate electricity are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Biogenic and non-biogenic GHG emissions are reported separately. Biogenic GHG emissions are emissions of CO₂ that result from the combustion of biogenic (plant or animal) material, excluding fossil fuels. Non-biogenic GHG emissions include CO₂ released from the combustion of non-biogenic fuel, plus CH₄ and N₂O released from the combustion of any fuel.

For 2010, the retail seller reporting process consisted of 4 steps¹:

- Step 1. Some retail sellers chose to report use of MWh from particular generating units, and any associated emissions.
- Step 2. MassDEP developed initial GHG emission factors in terms of pounds of non-biogenic and biogenic GHGs in carbon dioxide equivalents per megawatt hour (lb CO₂e/MWh) based on all of the electricity consumed in Massachusetts.
- Step 3. MassDEP developed final GHG emission factors for the electricity consumed in Massachusetts that was not reported in Step 1, by removing the MWh and emissions reported in Step 1 from the initial emission factors developed in Step 2.
- Step 4. Retail sellers determined their GHG emissions by multiplying the final emission factors in Step 3 by the energy they sold that they did not report in Step 1, and then adding any emissions reported in Step 1.

The purpose of Step 1 is to allow retail sellers to document the use of clean energy. Because MWh associated with this clean energy are included in Step 2 but excluded in Step 3, the final emission factors are greater than the initial emission factors. For more details on the reporting process and development of GHG emission factors for electricity consumed in Massachusetts, see *Draft 2010 Greenhouse Gas (GHG) Emission Factors to be used by Retail Sellers of Electricity Reporting under 310 CMR 7.71(9) "Reporting Requirements for Retail Sellers of Electricity"* (<http://www.mass.gov/dep/air/climate/rsefrtc.doc>).

¹ Note: Steps 1 and 2 were reversed in the 2008 summary because the timing for the first reporting year of 2008 allowed calculation of the draft 2008 emission factors prior to the deadline for reporting the use of MWh from particular generating units. Reporting in future years will follow the steps laid out here.

GHG Emission Factors

For 2010, the non-biogenic emission factors and the regional-based biogenic emission factors decreased from their 2008 values, while the Massachusetts-based non biogenic emission factor increased slightly.

Table 1 shows the initial (Step 2) and final (Step 3) emission factors upon which retail seller GHG emissions are based. MassDEP recommends that anyone choosing to use emission factors presented in this document for purposes other than retail seller reporting should use the Initial (Step 2) GHG emission factors, not the final (Step 3) emission factors. For an explanation of the “Massachusetts-based” and “Regional-based” approaches, see *Draft 2010 Greenhouse Gas (GHG) Emission Factors to be used by Retail Sellers of Electricity Reporting under 310 CMR 7.71(9) “Reporting Requirements for Retail Sellers of Electricity”* (<http://www.mass.gov/dep/public/hearings/drseftsd.doc>).

Table 1. GHG Emission Factors for Electricity Consumed in Massachusetts, prior to and after accounting for particular generating units (lb CO₂e/MWh)

	Massachusetts-based approach		Regional-based approach	
	Non-Biogenic	Biogenic	Non-Biogenic	Biogenic
Initial Emission Factors: prior to accounting for particular generating units (Step 2)				
2008	854	97	700	139
2010	798	97	662	136
Final Emission Factors: after accounting for particular generating units (Step 3)				
2008	871	98	708	141
2010	824	101	672	138

MWh Sold by Retail Sellers and Reported from Particular Generating Units

For 2010, 2 electric utilities, 1 competitive supplier, and 24 municipal electric departments or light boards chose to report MWh from particular generating units in Step 1. All MWh reported from particular generating units in the first two reporting years have been from non-emitting units. The number of optional reporters, the amount of non-emitting MWh and total retail sales they reported, and the percent of non-emitting MWh to total retail sales all increased from 2008 to 2010.

Tables 2 through 4 show the number of retail sellers reporting in 2008 and 2010, the amounts of non-emitting MWh from particular generating units that they chose to report, and the fuel types and locations of these particular generating units.

Table 2. Number of Retail Sellers Reporting and MWh Reported

		Electric Utilities	Competitive Suppliers	Municipal Light Depts.	Total Retail Sellers
Optional Reporting (Step 1)					
Number of Reporters	2008	2	0	17	19
	2010	2	1	24	27
Non-emitting MWh	2008	267,806	0	1,209,698	1,477,504
	2010	450,034	18,213	1,581,612	2,049,859
Mandatory Reporting					
Number of Reporters	2008	4	22	40	66
	2010	4	31	40	75
Total MWh of Retail Sales	2008	25,514,875	24,806,760	8,154,220	58,475,855
	2010	23,997,222	26,028,871	11,297,1162	61,323,209
Non-emitting MWh as % of Total MWh of Retail Sales					
%	2008	1.0%	0%	14.8%	2.5%
	2010	1.9%	0.1%	14.0%	3.3%

Table 3. Non-Emitting Generation Reported by Retail Sellers by Fuel Type

Fuel Type	Hydro	Nuclear	PV	Wind	Total
2008 MWh Reported (as % of Total)	418,238 (28%)	801,263 (54%)	94 (<1%)	257,909 (17%)	1,477,504 (100%)
2010 MWh Reported (as % of Total)	519,266 (25%)	1,155,435 (56%)	3,590 (<1%)	371,568 (18%)	2,049,859 (100%)

Table 4. Non-Emitting Generation Reported by Retail Sellers by State or Province in which Generator is Located

Location	MA	CT	ME	NH	RI	VT	NY	Quebec	PEI	Total
2008 MWh Reported (as % of Total)	253,532 (17%)	313,238 (21%)	12,192 (1%)	488,558 (33%)	0	0	235,427 (16%)	168,185 (11%)	6,372 (<1%)	1,477,504 (100%)
2010 MWh Reported (as % of Total)	257,262 (13%)	336,674 (16%)	167,106 (8%)	851,812 (41%)	4,222 (<1%)	28,837 (1%)	296,417 (14%)	85,537 (4%)	21,992 (1%)	2,049,859 (100%)

GHG Emissions Reported by Retail Sellers

For 2010, the total reported non-biogenic emissions and regional-based biogenic emissions decreased from 2008 values, while Massachusetts-based biogenic emissions increased, following the trend of the emission factors. The differences in GHG emissions between 2008 and 2010 within each retail seller type would be caused by changes in the number of reporters, total MWh sales, and percent of MWh reported from particular generating units in Step 1 by each type of retail seller.

² It was pointed out to MassDEP that the MWh value from Line 15 of the 2010 *Annual Returns* to the Massachusetts Department of Public Utilities (DPU) that municipalities were required to report includes Sales for Resale. Therefore, the Sales for Resale (110,089 MWh) reported by the 6 affected municipalities has been subtracted from the total MWh reported by the municipalities from Line 15, resulting in the value shown in Table 2. The corrected, lower MWh values were used in reporting 2010 data throughout this summary. MassDEP will modify the reporting instructions in future years to avoid this problem.

Table 5 shows the total GHG emissions reported by the three types of retail sellers. GHG emissions were calculated by each retail seller using the reporting process shown on page 1 of this summary. The GHG emissions reported by each retail seller can be found in Appendix 1.

Table 5. GHG Emissions by Retail Seller Type (Short Tons CO₂e)

	Massachusetts-based approach		Regional-based approach	
	Non-Biogenic	Biogenic	Non-Biogenic	Biogenic
Electric Utilities				
2008	10,995,099	1,237,106	8,937,462	1,779,918
2010	9,701,441	1,189,133	7,911,855	1,624,756
Competitive Suppliers				
2008	10,803,344	1,215,531	8,781,593	1,748,877
2010	10,716,391	1,313,538	8,739,581	1,794,735
Municipal Electric Departments or Light Boards				
2008	3,024,275	340,274	2,458,309	489,578
2010	2,725,588	334,083	2,222,809	456,470
Total				
2008	24,822,718	2,792,912	20,177,365	4,018,373
2010	23,143,420	2,836,754	18,874,246	3,875,961

Individual Retail Seller Reporting for 2010

For each retail seller that chose to submit MWh from particular generating units in 2010, “individual” GHG emission factors were determined. These factors represent individual GHG emission rates for each retail seller based on their reported GHG emissions and MWh of electricity sales. The greater the percentage of total MWh electricity sales reported as non-emitting MWh, the lower a retail seller’s individual emission factors.

Figures 1 and 2 show the MWh reported, and the % those MWh were of that retail seller’s 2010 electricity MWh sales, for each retail seller that chose to report use of particular generating units. To illustrate trends, the figures present the retail sellers in order of increasing percentage of reported non-emitting power. The figures compare optional MWh reported as a percentage of total retail sales, with the second figure showing the variation in total MWh sales. See Appendix 2 below for individual retail values used in these two figures.

Figure 1. 2010 Electricity Sales Reported as Non-Emitting by Retail Seller (MWh and % of sales)
(retail sellers not shown chose not to report MWh from particular generating units)

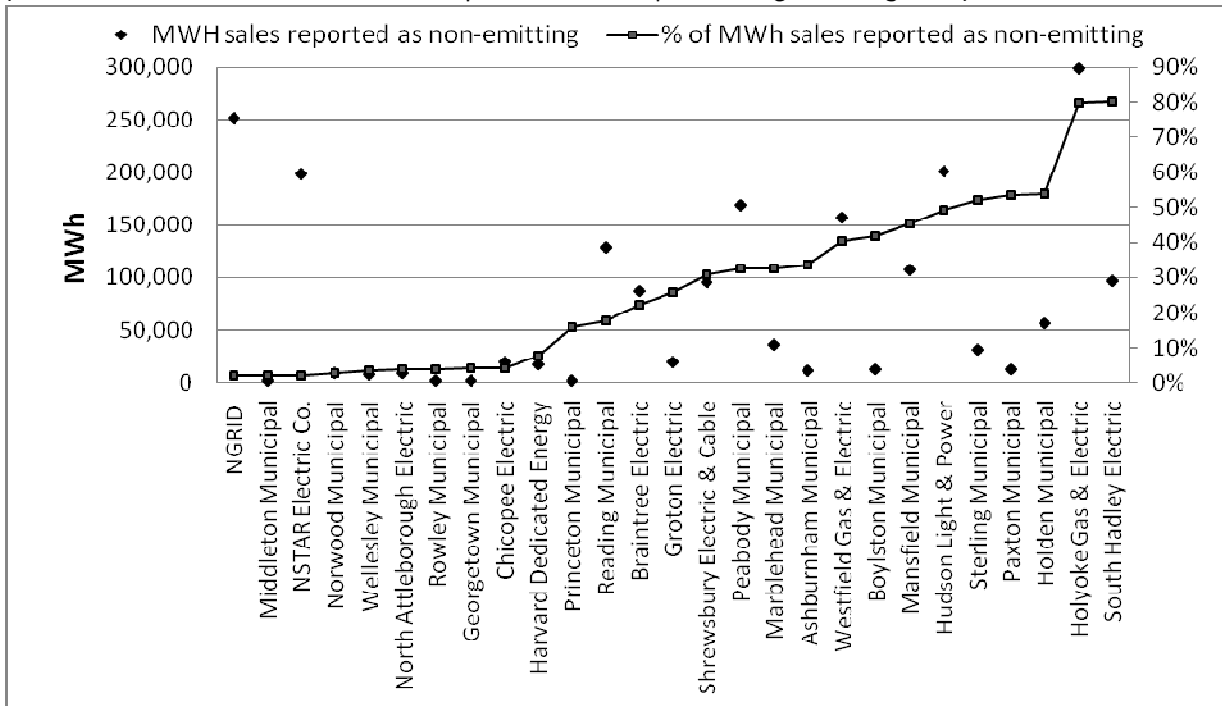
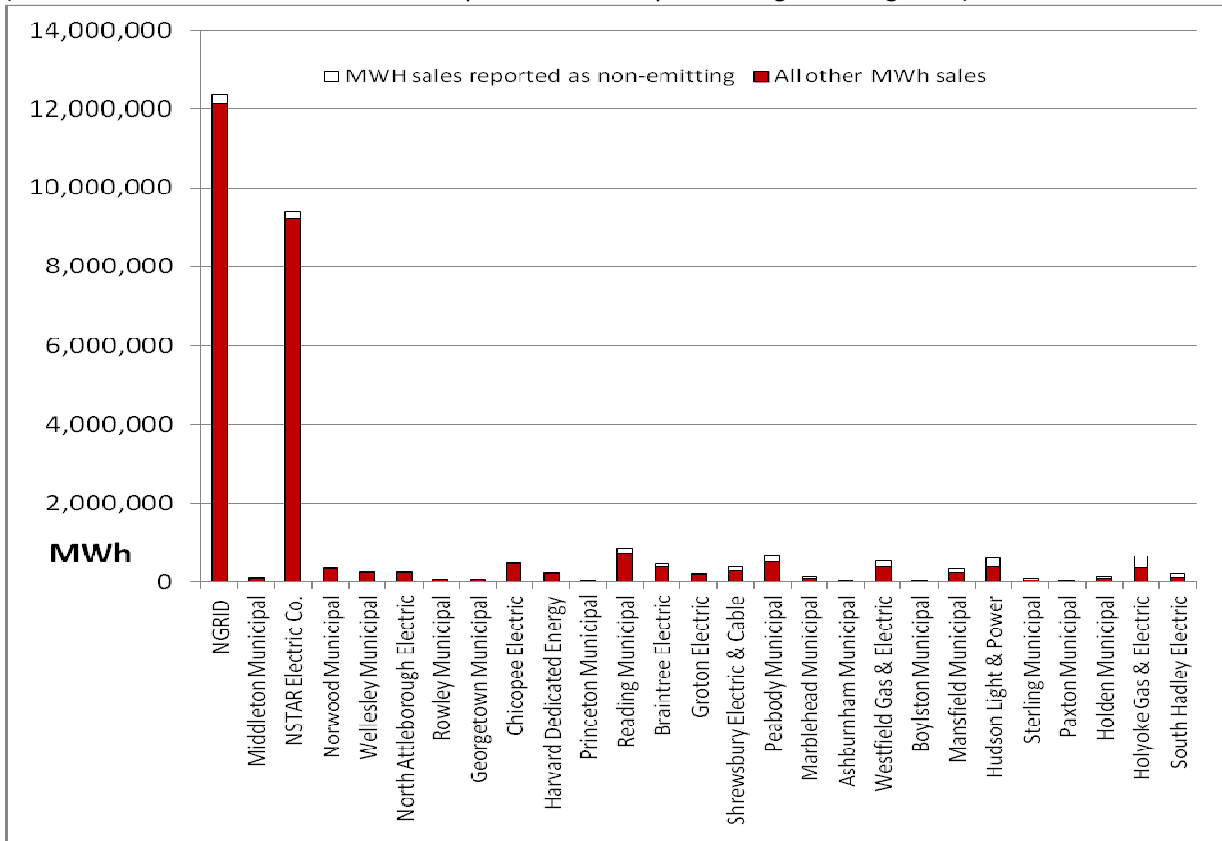


Figure 2. 2010 Electricity Sales by Retail Seller: Non-Emitting vs. All Other MWh Sales Reported
(retail sellers not shown chose not to report MWh from particular generating units)



Appendix 1: 2010 Individual Retail Seller GHG Emissions

Below are 2010 GHG emissions for each retail seller calculated by MassDEP based on:

- the final GHG emission factors from Step 3 above, and
- MWh reported to Department of Energy Resources by electric utilities and competitive suppliers and to DPU by municipal electric departments and light boards, less MWh from any particular generating units that a retail seller reported in Step 1. See footnote #2 regarding the 6 municipalities whose emissions differ from what they submitted.

Table 6. 2010 MA Retail Seller GHG Emissions (Short Tons CO₂e)

	Massachusetts-based approach		Regional-based approach	
	Non-Biogenic	Biogenic	Non-Biogenic	Biogenic
Electric Utilities				
NGRID (Mass. and Nantucket Elec.)	4,994,706	612,215	4,073,353	836,492
NSTAR Electric Co.	3,797,458	465,465	3,096,956	635,982
NU (Western Mass. Electric Co.)	799,308	97,973	651,863	133,865
Unitil (Fitchburg Gas & Electric Co.)	109,969	13,479	89,683	18,417
Competitive Suppliers				
Cianbro Energy, LLC	39	5	32	7
Consolidated Edison Solutions, Inc.	1,242,252	152,266	1,013,098	208,047
Constellation NewEnergy, Inc.	2,111,744	258,842	1,722,199	353,666
Devonshire Energy	55,206	6,767	45,022	9,246
Direct Energy Business, LLC	1,590,927	195,004	1,297,455	266,442
Direct Energy Services, LLC	13,566	1,663	11,063	2,272
Dominion Retail, Inc.	655,793	80,382	534,822	109,829
East Avenue Energy, LLC	467	57	381	78
Easy Energy of MA	11,470	1,406	9,355	1,921
ECM Energy Management Services	3,088	378	2,518	517
GDF Energy of Massachusetts, Inc.	1,254,747	153,798	1,023,289	210,140
Glacial Energy of Massachusetts, Inc	276,725	33,919	225,678	46,345
Hampshire Council of Governments	21,677	2,657	17,679	3,630
Hannaford Energy	4,793	587	3,909	803
Harvard Dedicated Energy, Ltd.	88,726	10,875	72,359	14,859
Hess Corporation	645,165	79,080	526,154	108,050
Horizon Power and Light LLC	12,283	1,506	10,017	2,057
Hudson Energy Services	3	0	3	1
Integrus Energy Services, Inc.	115,486	14,155	94,182	19,341
Just Energy Massachusetts	2,153	264	1,756	361
Liberty Power Holdings	136,421	16,722	111,256	22,847
MXenergy Electric, Inc.	54,488	6,679	44,437	9,125
NextEra Energy	293,777	36,009	239,585	49,201
Noble Americas Energy Solutions	677,328	83,022	552,384	113,436
Pepco Energy Services, Inc.	128,311	15,727	104,642	21,489
Public Power & Utility, Inc.	391	48	319	65
REP Energy	2,871	352	2,342	481
South Jersey Energy	40,124	4,918	32,722	6,720
Spark Energy, LP	3107	381	2,534	520
TransCanada Power Marketing Ltd.	1,271,310	155,828	1,036,797	212,914
WFM Intermediary NE Energy	1,953	239	1,593	327
Municipal Electric Departments or Light Boards				
Ashburnham Muni. Light Dept.	9,696	1,188	7,907	1,624

	Massachusetts-based approach		Regional-based approach	
	Non-Biogenic	Biogenic	Non-Biogenic	Biogenic
Belmont Municipal Light Dept.	56,609	6,939	46,167	9,481
Boylston Municipal Light Dept.	7,669	940	6,255	1,284
Braintree Electric Light Dept.	125,227	15,349	102,127	20,972
Chester Muni. Electric Light Dept.	2,348	288	1,915	393
Chicopee Electric Light Dept.	183,970	22,550	150,034	30,811
Concord Municipal Light Plant	78,456	9,617	63,984	13,140
Danvers Electric Division	142,271	17,439	116,027	23,827
Georgetown Municipal Light Dept.	21,068	2,582	17,182	3,528
Groton Electric Light Dept.	23,330	2,860	19,026	3,907
Groveland Municipal Light Dept.	17,139	2,101	13,978	2,870
Hingham Municipal Lighting Plant	84,305	10,334	68,754	14,119
Holden Municipal Light Dept.	19,920	2,442	16,246	3,336
Holyoke Gas & Electric Dept.	30,898	3,787	25,199	5,175
Hudson Light & Power Dept.	85,727	10,508	69,914	14,357
Hull Municipal Lighting Plant	23,723	2,908	19,347	3,973
Ipswich Municipal Light Dept.	50,077	6,138	40,839	8,387
Littleton Electric Light & Water	122,140	14,971	99,609	20,455
Mansfield Municipal Electric Dept.	53,761	6,590	43,844	9,004
Marblehead Municipal Light Dept.	31,452	3,855	25,650	5,267
Merrimac Muni. Light & Water	13,016	1,595	10,615	2,180
Middleborough Gas & Elec. Dept.	109,690	13,445	89,456	18,370
Middleton Muni. Electric Dept.	43,131	5,287	35,175	7,223
North Attleboro Electric Dept.	95,888	11,753	78,200	16,059
Norwood Municipal Light Dept.	137,243	16,822	111,926	22,985
Paxton Municipal Light Dept.	4,707	577	3,838	788
Peabody Municipal Light Plant	144,625	17,727	117,947	24,221
Princeton Municipal Light Dept.	5,838	716	4,761	978
Reading Municipal Light Dept.	248,409	30,448	202,586	41,603
Rowley Municipal Lighting Plant	17,990	2,205	14,671	3,013
Russell Municipal Light Dept.	2,133	261	1,740	357
Shrewsbury Electric & Cable Ops.	88,200	10,811	71,930	14,771
South Hadley Electric Light Dept.	9,979	1,223	8,138	1,671
Sterling Municipal Light Dept.	12,025	1,474	9,806	2,014
Taunton Municipal Lighting Plant	293,555	35,982	239,404	49,163
Templeton Muni. Light & Water	25,989	3,186	21,195	4,353
Wakefield Muni. Gas & Light	82,065	10,059	66,927	13,744
Wellesley Municipal Light Plant	100,901	12,368	82,288	16,899
West Boylston Muni. Light. Plant	24,625	3,018	20,082	4,124
Westfield Gas & Electric	95,792	11,742	78,122	16,043
2010 RETAIL SELLER TOTAL GHGs	23,143,420	2,836,754	18,874,246	3,875,961

Appendix 2: Individual 2010 Retail Seller Emission Factors

Below are the 2010 GHG emission factors for each retail seller that chose to report use of non-emitting MWh from particular generating units. These factors represent individual GHG emission rates for each retail seller based on their reported GHG emissions and MWh of electricity sales.

Table 7. Individual 2010 Retail Seller Emission Factors

	MWh reported as non-emitting	Massachusetts-based emission factors (lbs CO ₂ e/MWh)		Regional-based emission factors (lbs CO ₂ e/MWh)		% of sales reported as non-emitting MWh
		Non-Biogenic	Biogenic	Non-Biogenic	Biogenic	
Electric Utilities						
NGRID (Mass. and Nantucket Elec.)	251,321	807	99	658	135	2.0%
NSTAR Electric Co.	198,713	807	99	658	135	2.1%
Competitive Suppliers						
Harvard Dedicated Energy	18,213	760	93	620	127	7.8%
Municipal Electric Departments or Light Boards						
Ashburnham Muni. Light Dept.	11,956	546	67	446	92	33.7%
Boylston Municipal Light Dept.	13,338	480	59	391	80	41.7%
Braintree Electric Light Dept.	86,894	641	79	523	107	22.2%
Chicopee Electric Light Dept.	20,127	788	97	643	132	4.3%
Georgetown Municipal Light	2,261	789	97	644	132	4.2%
Groton Electric Light Dept.	19,763	611	75	498	102	25.9%
Holden Municipal Light Dept.	56,151	381	47	311	64	53.7%
Holyoke Gas & Electric Dept.	299,313	165	20	135	28	80.0%
Hudson Light & Power Dept.	200,934	419	51	342	70	49.1%
Mansfield Municipal Electric Dept.	107,726	451	55	368	76	45.2%
Marblehead Municipal Light Dept	36,937	555	68	453	93	32.6%
Middleton Municipal Electric Dept.	2,205	807	99	658	135	2.1%
North Attleboro Electric Dept.	9,442	792	97	646	133	3.9%
Norwood Municipal Light Dept.	9,236	802	98	654	134	2.7%
Paxton Municipal Light Dept.	13,243	382	47	311	64	53.7%
Peabody Municipal Light Plant	168,659	557	68	454	93	32.5%
Princeton Municipal Light Dept.	2,670	693	85	565	116	15.9%

	MWh reported as non-emitting	Massachusetts-based emission factors (lbs CO ₂ e/MWh)		Regional-based emission factors (lbs CO ₂ e/MWh)		% of sales reported as non-emitting MWh
		Non-Biogenic	Biogenic	Non-Biogenic	Biogenic	
Reading Municipal Light Dept.	128,327	679	83	554	114	17.5%
Rowley Municipal Lighting Plant	1,837	791	97	645	132	4.0%
Shrewsbury Electric & Cable Ops.	95,562	570	70	465	95	30.9%
South Hadley Electric Light Dept.	97,344	164	20	134	27	80.1%
Sterling Municipal Light Dept.	31,682	395	48	322	66	52.1%
Wellesley Municipal Light Plant	8,511	796	98	649	133	3.4%
Westfield Gas & Electric	157,494	491	60	401	82	40.4%
All Other Retail Sellers	0	824	101	672	138	0%