

**CENTRAL MAINE POWER COMPANY  
RESPONSE TO OFFICE OF THE PUBLIC ADVOCATE'S DATA REQUEST  
NO. 3  
DOCKET No. 2008-255**

**October 8, 2008**

**OPA-03-01**

- Q.** Ref.: B-2 Appendix A. Load Forecast Process Flow Diagram elements:
- a. Provide "CMP (John Davulis') 2011 Forecast." Explain how it was developed. Provide all supporting documents and analyses.
  - b. Provide Efficiency Maine Conservation Projections including all detailed documentation on energy and peak savings impact. In particular, describe the process used to develop summer peak demand impact estimates from Efficiency Maine energy conservation savings.
- A.** (a) Attachment 1 to this response provides a summary of how CMP's Fall 2006 Service Center Forecast was prepared. Attachment 1 to CES-01-10 provides the spreadsheet used to prepare the Fall 2006 Service Center Forecast. Additional documentation is provided in CMP's responses to CES-01-03, CES-01-04, CES-01-08, CES-01-11, CES-01-14, CES-01-15, CES-01-17 and CES-01-18.
- (b) Attachment 2 to this response provides information that CMP received from Denis Bergeron related to Efficiency Maine's conservation plan and peak load savings in August 2006. CMP is unaware of the particular process used by Efficiency Maine to develop summer peak demand impact estimates from their expected energy conservation savings. CMP assumes that 80% of Efficiency Maine's statewide savings will occur in CMP's service territory.

**Response and Submitted By:**

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**Attachment(s):**

1. CMP Service Center Net Energy & Peak Load Forecast, Fall 2006
2. Efficiency Maine's Conservation Plan, August 2006.

## **CMP Service Center Net Energy & Peak Load Forecast, Fall 2006**

CMP develops a five-year net energy for load and peak demand forecast for 11 service centers: Alfred, Augusta, Bridgton, Brunswick, Dover, Farmington, Lewiston, Portland, Rockland, Skowhegan and Waterville. The methodology allocates kWh sales growth projected to occur in the CMP service area to individual service centers based upon (1) Global Insight's economic forecast for Maine counties and (2) the results of interviews conducted with CMP's largest commercial and industrial customers. This document provides a brief description of the methodology using the Company's Fall 2006 forecast.

### **CMP Service Area Forecast Methodology**

Annually, the forecasting staff prepares a five-year forecast of kWh sales by class of service, net energy for load and monthly peak load for the entire CMP service area.

An end-use modeling approach is used to develop the **residential kWh forecast**. A sales projection is prepared for each of 24 residential appliances or usage categories. This is done by multiplying estimates for average annual kWh usage per appliance by the number of appliances. The forecast is then reduced by the amount of estimated savings from conservation programs. Annual usage estimates for the various end uses are calculated by modifying base year (1995) values to reflect the adoption of energy efficient appliances, changes in real income per household, changes in the real price of electricity, etc. Additionally, usage for weather-sensitive end uses is normalized to reflect normal conditions. The number of appliances is calculated by multiplying a forecast of the number of year-round customers by estimated saturation values for each end use. The annual gain in residential customers is based upon Global Insight's forecast of housing starts for Maine. Trends in appliance ownership (saturation) are developed from data collected by CMP in its residential customer surveys. Future saturations for space heating, water heating and fossil heating auxiliaries are estimated based upon assumptions related to fuel choice and fuel switching, and CMP efforts to retain space & water heating customers.

CMP uses a segment-based forecasting approach for the **commercial sector**. A sales projection is prepared for 22 different segments that correspond to a variety of functional groupings of business establishments. The segments cover the gamut of commercial activities from Agriculture to Business & Financial Services, from Construction to Restaurants and Colleges. The Company's commercial sales forecast is actually the sum of two forecasts: one for large business customers which account for about 30% of total sales, and one for the smaller customers that purchase 70% of commercial electricity. The sales forecast for smaller customers is calculated by applying Global Insight's forecast of growth in commercial output to the historic sales levels for the defined business segments. This forecast, in turn, is adjusted to reflect changes in the projected price of electricity. The near-term sales forecast for large customers is based on interviews conducted by CMP account managers. The interview-based forecasts are used in combination with Global Insight's forecast of growth in commercial output to obtain sales estimates for future years. Growth in output by segment is adjusted by an output elasticity that reflects the fact that there is not a one-to-one relationship between growth in commercial output and growth in electricity

sales. That is, historically, commercial output has grown at a faster rate than electricity sales. Finally, the total commercial sales forecast is adjusted to reflect expected savings from conservation programs.

A segment-based forecasting approach is used for the **industrial sector**. A sales projection is prepared for 19 industrial segments have been identified that correspond to the commonly recognized manufacturing categories. The forecast for each industrial segment is the sum of the interview-based sales projections for the large customers and the output-based sales forecast for smaller customers in the sector. The forecast for large customers (generally those customers on LGS or IGS rates) is developed from interviews conducted by CMP account managers. Large customers account for about 86% of industrial sales. In cases where a customer is not able to provide CMP with an estimate of future electricity usage, the appropriate Global Insight output growth rate is used. The sales forecast for the smaller other industrial customers is based on Global Insight's forecast of growth in industrial output and changes in the price of electricity. Growth in output by segment is adjusted by an electricity-to-output factor that reflects the fact that there is not a one-to-one relationship between growth in industrial output and growth in electricity sales. That is, historically, industrial output in a number of segments has grown at a faster rate than electricity sales. Finally, the industrial sales forecast is adjusted for expected savings from energy conservation programs.

Separate forecasts for **street and area lighting** are prepared. The lighting forecasts are developed using an exponential smoothing technique.

**Monthly load shape factors** for peak demand and average hourly load for two categories of SOP customers (Residential & Small, and Medium & Large) were calculated based upon CMP hourly load data for the period January 2002 to August 2006. A monthly load shape factor is a measure of the magnitude of load in a particular month relative to the average annual hourly load. Average hourly load is equal to annual kWh sales divided by 8,760 hours adjusted for line losses (6.5% for Residential & Small and 3.8% for Medium & Large). **Monthly peak load** for a particular year is equal to the appropriate load shape factor for peak demand times the average annual hourly load for the two categories of SOP customers. **Monthly net energy for load** is equal to the appropriate load shape factor for average demand times the average annual hourly load times the number of hours in the month.

### **CMP Service Area Forecast, 2006-2011**

The methodology used to develop load estimates for service centers begins with annual service center kWh sales by class of service in 2005. The forecasted sales levels for 2006-2011 reflect (1) the results of interviews with CMP's largest commercial and industrial customers conducted by key account & technical services personnel and (2) Global Insight's economic forecast for Maine counties through 2011.

Global Insight's forecast of household and employment growth by county is allocated to service centers based by the service center's share of county population in 2000 based upon data from the Census of Population.

Global Insight's expectation of household growth, as allocated to service centers, is used to apportion residential sales growth to individual service centers. For example, the Portland service center incorporates 71.7% of the population of Cumberland County and 4.0% of the population of York County. Based on Global Insight's forecast for Cumberland & York Counties, Portland is projected to account for about 21% of the cumulative growth in the number of households in the CMP service area between 2005 and 2011. However, residential kWh sales in the Portland service center are projected to decline due to increases in the price of electricity, appliance efficiency improvements, conservation programs offered by Efficiency Maine and a weak economy.

The **residential sales forecast** for service centers follows a two-step process. First, a naïve or status quo sales estimate is calculated based upon kWh usage per customer in 2005 and growth in the number of households. The resulting annual estimates for the sum of CMP's 11 service centers is compared to that for the service territory as a whole to establish an adjustment factor that is then used to modify the initial service center estimates to account for changes in the price of electricity, appliance efficiency improvements, conservation programs, a weak economy and other factors. (Household growth is also used to apportion growth in street lighting sales.)

**Commercial sales forecast.** In a similar manner, Global Insight's expectation of growth in nonmanufacturing employment, as allocated to service centers, is used to apportion commercial sales growth to individual service centers. Based on Global Insight's forecast for Cumberland & York Counties, Portland is projected to account for about 30% of the cumulative growth in the number of nonmanufacturing jobs in the CMP service area between 2005 and 2011. First, a naïve or status quo sales estimate is calculated based upon kWh usage per employee in 2005 and growth in the number of commercial employees. The resulting annual estimates for the sum of CMP's 11 service centers is compared to that for the service territory as a whole to establish an adjustment factor that is then used to modify the initial service center estimates to account for changes in the price of electricity, conservation programs, a weak economy, etc.. Electricity sales to large, surveyed commercial customers are added to that for small customers to determine sales to commercial class as a whole.

**Industrial sales forecast.** The apportionment of small industrial sales growth to individual service centers is simply based upon the service center's share of sales to small industrial customers in 2005. Thus, it is assumed that 24% of the small industrial sales growth in the CMP service area will occur in the Portland service center. Electricity sales to large industrial customers are added to that for small customers to determine sales to industrial class as a whole.

Finally, each Service Center's sales forecast is used to compute **net energy for load and peak demand** in a manner consistent with the methodology for the entire service area. The following charts and tables present service center forecast.

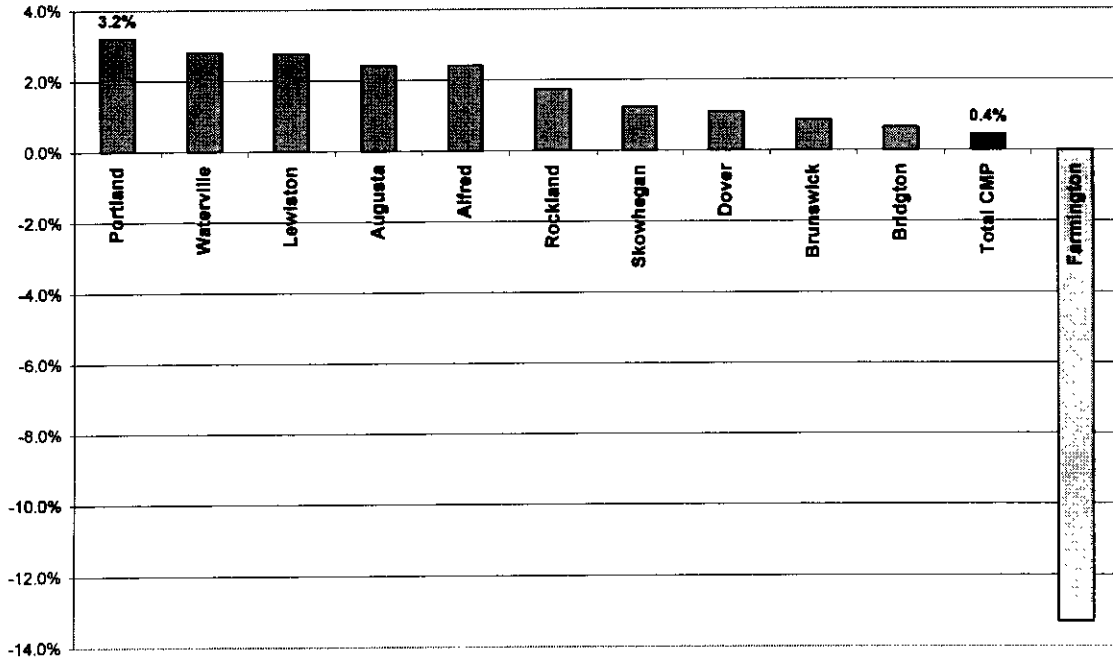
**Sales (mil. kWh) by CMP Service Center, Fall 2006 Outlook**

		2005	2006	2007	2008	2009	2010	2011	CAGR 2005-11
446-Alfred	Residential	687.8	677.9	676.4	669.5	672.6	683.9	690.6	0.1%
	Commercial	430.0	425.5	433.5	444.3	452.9	458.1	459.9	1.1%
	Industrial	460.2	473.3	483.6	484.7	477.4	470.2	465.4	0.2%
	Lighting	6.8	6.9	7.0	7.0	7.1	7.2	7.3	1.1%
	<b>Total Sales</b>	<b>1,584.7</b>	<b>1,583.7</b>	<b>1,600.4</b>	<b>1,605.5</b>	<b>1,610.1</b>	<b>1,619.4</b>	<b>1,623.2</b>	<b>0.4%</b>
211-Augusta	Residential	283.0	277.7	276.0	272.1	272.2	275.6	276.6	-0.4%
	Commercial	268.9	267.9	273.9	278.0	282.7	285.9	287.3	1.1%
	Industrial	20.3	19.5	19.6	19.4	18.5	17.4	16.2	-3.7%
	Lighting	2.6	2.7	2.7	2.7	2.7	2.7	2.7	0.6%
	<b>Total Sales</b>	<b>574.9</b>	<b>567.7</b>	<b>572.2</b>	<b>572.3</b>	<b>576.1</b>	<b>581.6</b>	<b>583.1</b>	<b>0.2%</b>
554-Bridgton	Residential	201.4	197.4	195.9	193.1	193.2	195.6	197.0	-0.4%
	Commercial	153.3	135.6	141.8	145.2	148.4	150.6	152.0	-0.1%
	Industrial	28.9	28.4	25.5	22.3	21.1	19.9	18.6	-7.1%
	Lighting	1.1	1.1	1.1	1.1	1.1	1.2	1.2	0.6%
	<b>Total Sales</b>	<b>384.7</b>	<b>362.6</b>	<b>364.3</b>	<b>361.7</b>	<b>363.9</b>	<b>367.1</b>	<b>368.8</b>	<b>-0.7%</b>
514-Brunswick	Residential	421.2	413.4	410.5	405.6	405.0	410.4	413.7	-0.3%
	Commercial	365.0	365.9	372.9	381.2	386.3	380.8	374.6	0.4%
	Industrial	178.0	169.1	163.0	159.4	154.8	150.4	149.0	-2.9%
	Lighting	3.4	3.4	3.4	3.5	3.5	3.5	3.5	0.7%
	<b>Total Sales</b>	<b>967.6</b>	<b>951.8</b>	<b>949.9</b>	<b>949.7</b>	<b>950.5</b>	<b>945.2</b>	<b>940.9</b>	<b>-0.5%</b>
222-Dover	Residential	132.4	129.8	128.6	126.8	126.7	127.8	128.7	-0.5%
	Commercial	68.2	68.1	69.4	70.8	71.8	72.5	72.6	1.0%
	Industrial	45.6	44.4	42.2	41.2	39.8	38.6	37.4	-3.2%
	Lighting	1.1	1.1	1.1	1.1	1.1	1.2	1.2	0.5%
	<b>Total Sales</b>	<b>247.4</b>	<b>243.4</b>	<b>241.4</b>	<b>239.9</b>	<b>239.5</b>	<b>240.0</b>	<b>239.9</b>	<b>-0.5%</b>
524-Farmington	Residential	219.7	214.5	212.5	209.2	208.2	210.5	211.1	-0.7%
	Commercial	175.2	180.6	182.4	186.0	190.2	192.8	194.3	1.7%
	Industrial	779.4	389.6	136.3	150.7	155.0	159.8	164.8	-22.8%
	Lighting	2.2	2.2	2.2	2.3	2.3	2.3	2.3	0.3%
	<b>Total Sales</b>	<b>1,176.6</b>	<b>786.9</b>	<b>533.5</b>	<b>548.1</b>	<b>555.6</b>	<b>565.4</b>	<b>572.4</b>	<b>-11.3%</b>
551-Lewiston	Residential	331.7	326.4	324.2	319.9	320.4	324.2	326.5	-0.3%
	Commercial	323.6	337.8	353.1	361.5	368.2	372.6	375.0	2.5%
	Industrial	255.6	256.3	254.6	251.8	247.5	243.0	238.4	-1.2%
	Lighting	3.7	3.7	3.7	3.8	3.8	3.8	3.8	0.7%
	<b>Total Sales</b>	<b>914.5</b>	<b>924.2</b>	<b>935.6</b>	<b>937.0</b>	<b>939.9</b>	<b>943.6</b>	<b>943.7</b>	<b>0.5%</b>
441-Portland	Residential	640.9	628.8	625.4	617.8	619.0	627.2	632.6	-0.2%
	Commercial	995.3	989.2	1,026.4	1,061.5	1,090.8	1,107.1	1,118.3	2.0%
	Industrial	351.4	357.7	357.8	358.5	356.6	352.1	348.5	-0.1%
	Lighting	9.7	9.8	9.9	9.9	10.0	10.1	10.2	0.8%
	<b>Total Sales</b>	<b>1,997.3</b>	<b>1,985.6</b>	<b>2,019.4</b>	<b>2,047.8</b>	<b>2,076.4</b>	<b>2,086.5</b>	<b>2,109.5</b>	<b>0.9%</b>
231-Rockland	Residential	302.7	296.9	295.6	292.0	292.1	295.3	297.7	-0.3%
	Commercial	209.9	204.4	208.6	213.6	218.2	221.3	223.5	1.1%
	Industrial	157.3	154.4	156.2	154.5	151.8	148.9	146.9	-1.1%
	Lighting	2.3	2.3	2.4	2.4	2.4	2.4	2.4	0.7%
	<b>Total Sales</b>	<b>672.2</b>	<b>657.9</b>	<b>662.8</b>	<b>662.5</b>	<b>664.5</b>	<b>668.0</b>	<b>670.5</b>	<b>0.0%</b>
225-Skowhegan	Residential	109.4	107.3	106.4	104.8	104.8	106.1	106.9	-0.4%
	Commercial	58.8	58.6	59.9	61.6	63.1	63.9	64.2	1.5%
	Industrial	32.5	31.9	32.1	29.2	27.9	26.7	25.5	-4.0%
	Lighting	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.6%
	<b>Total Sales</b>	<b>201.9</b>	<b>198.9</b>	<b>199.5</b>	<b>196.6</b>	<b>196.9</b>	<b>197.7</b>	<b>197.7</b>	<b>-0.3%</b>
221-Waterville	Residential	198.9	195.2	194.0	191.3	191.3	193.7	194.6	-0.4%
	Commercial	189.2	170.1	172.5	175.5	178.8	181.1	182.2	1.2%
	Industrial	254.7	283.3	282.9	281.7	278.1	274.7	271.1	1.0%
	Lighting	2.3	2.3	2.4	2.4	2.4	2.4	2.4	0.6%
	<b>Total Sales</b>	<b>625.2</b>	<b>650.9</b>	<b>651.8</b>	<b>650.8</b>	<b>650.5</b>	<b>651.9</b>	<b>650.3</b>	<b>0.7%</b>
Total CMP	Residential	3,529.1	3,465.3	3,445.6	3,402.1	3,406.4	3,450.2	3,476.2	-0.3%
	Commercial	3,217.3	3,203.7	3,294.3	3,379.2	3,451.3	3,486.7	3,504.0	1.4%
	Industrial	2,564.0	2,208.0	1,953.8	1,953.4	1,928.5	1,901.7	1,881.7	-5.0%
	Lighting	36.5	36.8	37.0	37.3	37.5	37.8	38.1	0.7%
	<b>Total Sales</b>	<b>9,346.8</b>	<b>8,913.8</b>	<b>8,730.7</b>	<b>8,772.0</b>	<b>8,823.8</b>	<b>8,876.5</b>	<b>8,899.9</b>	<b>-0.8%</b>

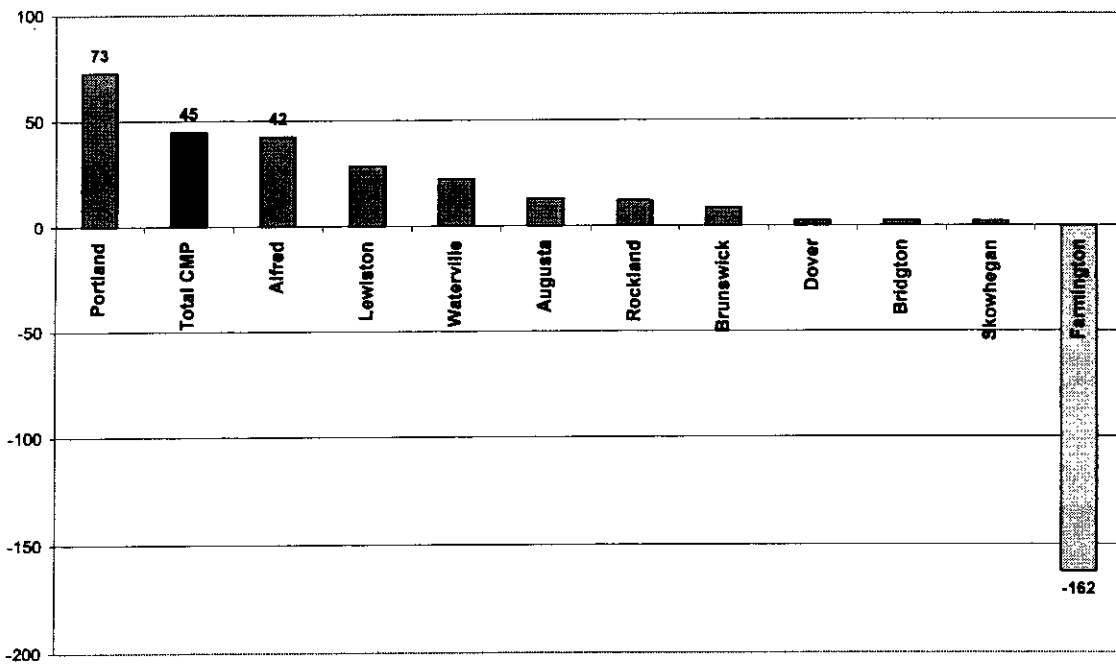
**Peak Load (MW) & Net Energy (mil. kWh) by Service Center, Fall 2006 Outlook**

		<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>CAGR</u> <u>2005-11</u>
446-Alfred	<b>Peak Load</b>								
	Summer	276.5	297.9	305.5	300.3	306.1	312.8	319.0	2.4%
	Winter	261.9	273.5	277.2	277.3	277.7	279.4	280.2	1.1%
	Net Energy	1,669.2	1,687.4	1,680.7	1,685.9	1,690.8	1,700.7	1,704.8	0.4%
211-Augusta	<b>Peak Load</b>								
	Summer	85.0	89.7	91.6	89.9	92.6	95.7	98.1	2.4%
	Winter	90.1	92.1	92.7	92.5	93.3	94.6	95.2	0.9%
	Net Energy	607.9	607.4	603.4	603.4	607.4	613.2	614.8	0.2%
554-Bridgton	<b>Peak Load</b>								
	Summer	60.4	58.5	59.5	57.6	59.3	61.2	62.8	0.7%
	Winter	61.4	59.3	59.5	58.8	59.2	60.0	60.5	-0.3%
	Net Energy	406.2	387.7	384.0	381.3	383.5	387.0	388.7	-0.7%
514-Brunswick	<b>Peak Load</b>								
	Summer	165.6	173.7	174.3	170.2	172.6	173.3	174.4	0.9%
	Winter	158.9	162.6	162.0	161.3	161.0	159.9	159.0	0.0%
	Net Energy	1,019.7	1,014.9	998.5	998.3	999.3	994.0	989.7	-0.5%
222-Dover	<b>Peak Load</b>								
	Summer	36.8	38.7	38.3	37.2	37.8	38.6	39.3	1.1%
	Winter	38.9	39.6	39.0	38.6	38.5	38.7	38.8	0.0%
	Net Energy	261.5	260.4	254.6	253.0	252.6	253.2	253.1	-0.5%
524-Farmington	<b>Peak Load</b>								
	Summer	281.9	182.5	105.0	107.1	111.2	115.8	119.7	-13.3%
	Winter	218.7	147.9	93.5	96.4	97.8	99.8	101.2	-12.1%
	Net Energy	1,227.2	833.4	559.8	574.9	582.6	592.9	600.2	-11.2%
551-Lewiston	<b>Peak Load</b>								
	Summer	160.8	176.4	181.6	178.0	181.8	186.0	189.4	2.8%
	Winter	151.5	160.5	163.1	162.8	163.2	164.1	164.2	1.3%
	Net Energy	963.1	964.3	982.2	983.5	986.6	990.5	990.6	0.5%
441-Portland	<b>Peak Load</b>								
	Summer	349.2	373.1	385.9	385.0	399.1	411.2	421.8	3.2%
	Winter	330.2	342.8	350.0	354.4	359.6	363.8	366.5	1.8%
	Net Energy	2,103.6	2,115.7	2,120.8	2,150.1	2,179.8	2,200.9	2,214.6	0.9%
231-Rockland	<b>Peak Load</b>								
	Summer	112.8	117.4	119.6	116.9	119.4	122.3	125.0	1.7%
	Winter	109.7	111.4	112.3	111.8	112.1	112.9	113.5	0.6%
	Net Energy	708.7	701.9	697.1	696.7	698.6	702.5	705.2	-0.1%
225-Skowhegan	<b>Peak Load</b>								
	Summer	29.5	31.1	31.4	29.9	30.4	31.2	31.8	1.2%
	Winter	31.6	32.1	32.1	31.4	31.4	31.7	31.8	0.1%
	Net Energy	213.5	212.9	210.4	207.6	207.7	208.7	208.6	-0.4%
221-Waterville	<b>Peak Load</b>								
	Summer	123.8	141.5	143.4	140.0	142.1	144.5	146.2	2.8%
	Winter	108.0	119.1	119.8	119.1	118.8	118.8	118.3	1.5%
	Net Energy	656.2	690.8	681.9	680.7	680.5	682.0	680.4	0.6%
Total CMP	<b>Peak Load</b>								
	Summer	1,682.5	1,680.6	1,636.2	1,612.0	1,652.3	1,692.5	1,727.4	0.4%
	Winter	1,560.8	1,540.9	1,501.2	1,504.4	1,512.6	1,523.7	1,529.1	-0.3%
	Net Energy	9,836.8	9,496.9	9,173.4	9,215.5	9,269.6	9,325.6	9,360.8	-0.8%

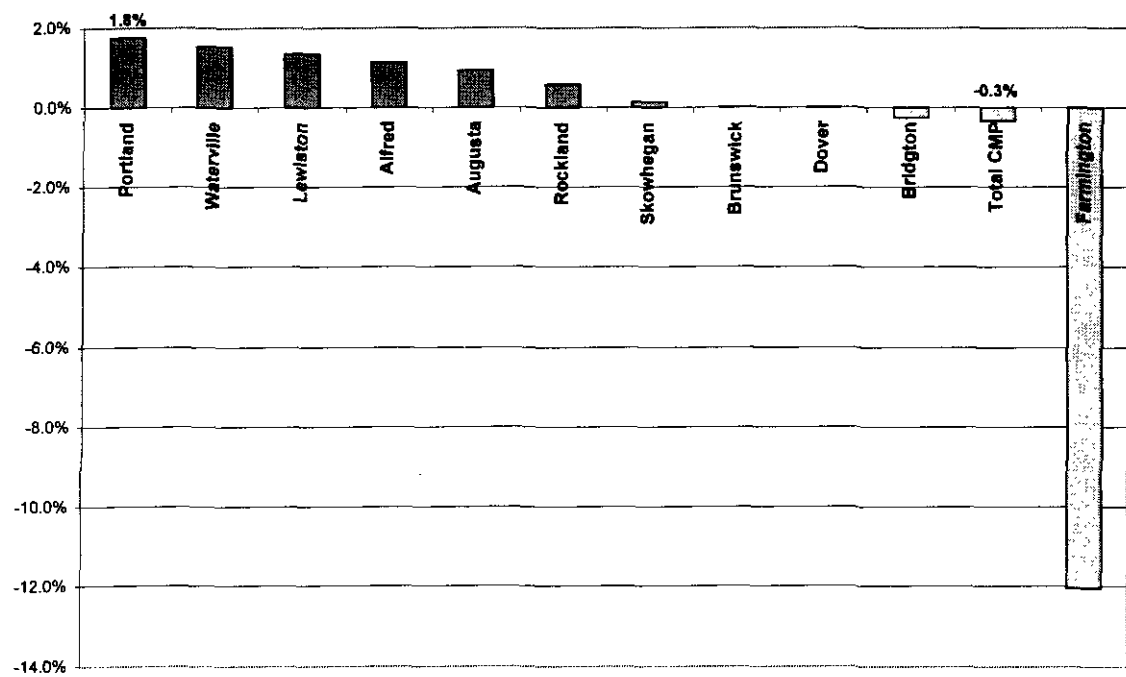
### Summer Peak Load Growth, CAGR 2005-2011



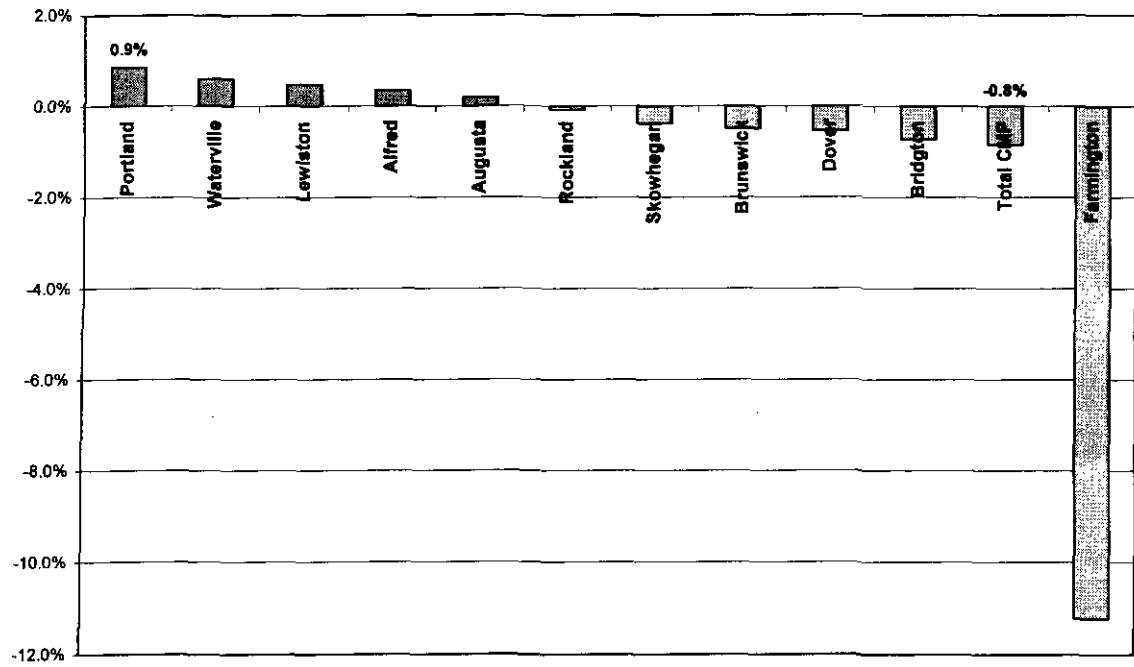
### MW Change in Summer Peak Load, 2005-2011



**Winter Peak Load Growth, CAGR 2005-2011**



**Net Energy for Load Growth, CAGR 2005-2011**



## EFFICIENCY MAINE'S CONSERVATION PLAN, AUGUST 2006

	2006	2007	2008	2009	2010
<b>Business Program (lighting)</b>					
annual energy saved	20,659	35,689	62,642	65,707	82,760
amount saved during summer peak	8,677	14,989	26,310	27,597	34,759
amount of capacity	3.39	5.86	10.28	10.78	13.58
MW demand reduction at peak	2.88	4.98	8.74	9.16	11.54
<b>Business Program (cooling)</b>					
annual energy saved	20,659	35,689	62,642	65,707	82,760
amount saved during summer peak	12,602	21,770	38,212	40,082	50,484
amount of capacity	4.92	8.50	14.93	15.66	19.72
MW demand reduction at peak	4.48	7.74	13.58	14.25	17.95
<b>BOC (Business load shape)</b>					
annual energy saved	5,674	5,674	30,348	30,348	30,348
amount saved during summer peak	2,383	2,383	12,746	12,746	12,746
amount of capacity	0.93	0.93	4.98	4.98	4.98
MW demand reduction at peak	0.79	0.79	4.23	4.23	4.23
<b>Residential Program (refrig)</b>					
annual energy saved	3,600	6,034	6,694	7,116	7,501
amount saved during summer peak	1,073	1,798	1,995	2,121	2,235
amount of capacity	0.42	0.70	0.78	0.83	0.87
MW demand reduction at peak	0.35	0.59	0.65	0.69	0.73
<b>Residential Program (lighting)</b>					
annual energy saved	19,200	17,913	17,487	19,619	22,217
amount saved during summer peak	5,011	4,675	4,564	5,121	5,799
amount of capacity	1.96	1.83	1.78	2.00	2.27
MW demand reduction at peak	0.31	0.29	0.28	0.32	0.36
<b>Annual Incremental</b>					
<b>Total (lighting for bus.)</b>	4.33	6.64	13.90	14.40	16.86
<b>Total (cooling for bus.)</b>	5.93	9.40	18.75	19.49	23.26
<b>Cumulative</b>					
<b>Total (lighting for bus.)</b>		8.18	22.08	36.48	53.34
<b>Total (cooling for bus.)</b>		9.40	28.15	47.64	70.90