

## **Renewable Energy Plan Lansing Board of Water & Light**

This filing by the Lansing Board of Water & Light (LBWL) complies with Public Act 295 of 2008 (the Act) and the related December 4, 2008 Michigan Public Service Commission Order (MPSC Case No. U-15800).

Part 2, Section 25, of the Act requires municipal utilities to file a twenty year plan to meet renewable energy credit portfolio standards that are specified in Section 27. The plan must be filed with the MPSC within 120 days of the MPSC's temporary order, issued pursuant to Section 191. Each electric providers plan must do the following:

- (a.) Describe how the provider will meet the RPS standards;
- (b.) Specify whether the number of MWh's used in the calculation of the RPS requirement will be weather normalized or based on the average number of MWh's of electricity sold by the provider annually during the previous 3 years;
- (c.) Provide expected incremental cost of compliance with the RPS requirement;
- (d.) Describe the manner in which the provider will allocate costs.

This document and its attachments satisfy all of the requirements of Section 25 (2) for the twenty year period running from 2009 to 2028 as described below.

### **Section 25 (2) (a) “Describe how the provider will meet the renewable energy standards”**

The LBWL developed a two phase approach to meeting the standards. Phase I addresses the compliance years 2012 through 2015 and Phase II addresses the years running from 2016 to 2028.

Phase I - In 2007, prior to enactment of PA 295 in October of 2008, the LBWL adopted its own Renewable Portfolio Standard (RPS). The LBWL's RPS called for acquiring renewable energy beginning in 2009. Compliance with Phase I of the Act is based on the renewable energy the LBWL began to secure during 2007 and 2008, to comply with its own RPS. Phase I renewable energy sources include two hydro units, two landfill gas facilities and a solar energy facility located in Lansing. “Banked” Renewable Energy Credits (REC) from these existing renewable energy sources for the years 2009 to 2012 (in accordance with Section 29 (3) (c) of PA295), when combined with their expected generation during the Phase I years of 2012 to 2015 provides the LBWL with an inventory of RECs sufficient to allow the LBWL to meet the PA 295 standards through 2015. See *Attachment A – Existing Renewable Energy Facilities* for further details.

Phase II - Beginning no later than 2016, the LBWL will add to its renewable energy sources to ensure compliance with PA 295 renewable energy portfolio requirements. To continue diversifying its renewable energy portfolio, the LBWL currently plans to construct approximately 12 MW of additional solar and wind projects in the Lansing area. These projects are forecast to generate approximately 26,000 MWh of electricity annually. The majority of

additional Phase II renewable energy will be obtained through co-firing existing coal generation boilers with a mixture of coal and biomass (including one or more of bio-gas, bio-methane and various bio-mass solids). Several sources of biomass are available for co-firing and are in the process of being tested by the LBWL. The eventual combination of biomass sources used will depend on the performance characteristics and costs of the various sources. In total, the LBWL anticipates initially producing approximately 3,000 MWh's of additional renewable energy in 2016 from biomass fuel sources, increasing to approximately 122,000 MWh's in 2017.

**Section 25 (2) (b) “Specify whether the number of megawatt hours of electricity used in the calculation of the renewable energy credit portfolio will be weather-normalized or based on the average number of megawatt hours of electricity sold by the electric provider annually during the previous 3 years to retail customers in this state. ”**

The LBWL will be calculating its renewable energy credit portfolio requirements based on the average number of MWhs of electricity sold by the LBWL annually during the three previous years to its retail customers in the state.

**Section 25 (2) (c) “Include the expected incremental cost of compliance with the renewable energy standards.”**

Following the *Filing Requirements and Instructions for Renewable Energy Plans for Municipally-Owned Electric Utilities* provided in Attachment C of the MPSC Order to implement PA 295, the LBWL has provided *Attachment B – Renewable Energy Plan Surcharge Summary*. In summary, the incremental cost of compliance is estimated to be less than the Section 45 (2) caps of \$3.00 per month for each residential meter, \$16.58 per month for each commercial meter, and \$187.50 for each industrial meter. The actual incremental costs, levelized pursuant to Section 45 (4), shall be detailed on customer's bills per Section 45 (5) beginning when the Renewable Energy Plan is approved by the Commission.

The incremental costs were calculated in the following manner:

- (1) Total renewable costs are calculated from the terms of power purchase agreements, forecast costs of biomass fuel, estimated capital costs to convert an existing boiler to also burn biomass, and forecast costs of future solar, wind, and hydro rehabilitation installations. Where appropriate, these costs are escalated over time.
- (2) Incremental renewable costs are offset by a long-term forecast of market energy prices. The forecast market price is based upon estimated MISO wholesale market prices and is calculated by use of a least cost unit dispatch model. These estimates span the period of time beginning with 2009 and running to 2028 and begin at approximately \$49/MWh in 2009 and escalate to \$120/MWh in 2028. Renewable costs are also offset by the forecast market value of capacity provided by each renewable resource. The value of capacity is forecast to increase from \$25/Kw in 2009 to \$109/Kw in 2028.
- (3) The difference between the renewable energy cost and the offsetting market value of energy and capacity is the estimated incremental cost of renewable energy.

(4) The only exception to this process was the biomass based generation. Since the biomass unit is an existing generator used to provide needed energy and capacity to LBWL customers, the conversion to burn a combination of biomass and coal fuels does not add or defer additional capacity. Therefore, we have not offset the cost of the biomass energy with a capacity value. Also, since the biomass used to produce power from this unit offsets current coal use, we used the avoided coal cost to offset the biomass cost for the unit.

(5) Incremental costs are summed for all the renewable energy sources for each year. The sums are offset in years 2009-2011 by the sale of excess REC's. The annual net sums are then present valued and this amount is used to calculate a levelized monthly charge for each customer class over a twenty year period

**Section 25 (2) (d) “Describe the manner in which the provider will allocate costs”**

Except for its secondary commercial and industrial customers, the LBWL intends to allocate costs on a per meter, per month basis. The LBWL's secondary rates 3, 4, and rate 12 contain commercial customers with a very wide diversity of monthly energy consumption amounts. A flat fee could cause monthly increases of 80% or more for some of these customers. In order to mitigate potential rate impacts, customers on these rates will be charged a two part rate. First, a flat monthly amount of \$3.50 will be charged to these customers and, second, a Kwh charge will be levied until the cap is reached.

Residential customers will be charged a flat rate of \$2.55, except for senior customers on the LBWL's senior rate. Senior customers on rate 21 will be charged \$1.25 per month.

The remaining customers will be charged the rate rates shown in Attachment B lines 52 through 62.

## **Attachment A – Existing Renewable Energy Facilities**

***LBWL Moores Park Hydro, South Unit*** – This hydro-electric unit, owned by the LBWL, was rehabilitated and brought back into service in March 2008. The unit is capable of approximately 0.6 MW gross generating capacity. Assuming a 51% capacity factor, this unit will generate approximately 2,700 MWh's annually. For the one year prior to the enactment of PA 295, this unit operated approximately five months and provided 881 MWh's of electric energy to the LBWL.

***Granger Landfill Energy, Wood Road*** – This facility, under a long term Power Purchase Agreement (PPA) with the LBWL, was interconnected directly to the LBWL distribution system and began commercial operation in November 2008. Using a Capacity Factor of 95% for this facility, we anticipate generating approximately 53,000 MWh's for 2009. By 2015 we expect the facility to generate 7.2 MW of energy (60,000 MWh's). For the one year prior to enactment of PA 295, this facility did not produce any electric energy for the LBWL.

***Granger Landfill Energy, Grand River*** – This facility, also under a long term PPA with the LBWL, will add another approximately 27,000 MWh's of renewable energy to the LBWL system beginning in March 2009. For the one year prior to the enactment of PA 295, this unit did not produce any electric energy for the LBWL.

***Tower/Kleber Hydro*** – This northern Michigan hydro-electric unit (near Cheboygan) with a gross generating capacity of 1.7 MW, is also under a PPA with the LBWL. With a capacity factor of nearly 60%, it will provide approximately 9,000 MWh's annually. For the one year prior to enactment of PA 295, this unit produced approximately 7,800 MWh's of electric energy for the LBWL.

### ***LBWL Cedar Street Solar Array***

This downtown Lansing solar array, brought online in December 2008, consists of 432 solar panels with 54 kW of gross generating capacity. Estimated annual output is approximately 82 MWh's. The solar panels are expected to remain operational over the entire 20 year period included in PA 295. For the one year prior to enactment of PA 295, this facility did not produce any electric energy for the LBWL.

### **Summary:**

As seen in the table *RECs from Existing Renewable Energy Sources* below, the LBWL forecast these sources to provide approximately 90,000 RECs in 2009, increasing to 97,000 RECs in 2015. The total amount of generation from these sources for the one year prior to enactment of PA 295 was approximately 8,700 MWh's.

**Attachment A**

**RECs from Existing Renewable Energy Sources**

	Units	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Additional Moores Park Hydro - South Unit	RECs	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789	1,789
Additional Tower/Kleber/Alverno	RECs	0	0	844	844	844	844	844	844	844	844	844	844	844	844	844	844	844	844	844	844
Granger	RECs	87,241	94,511	94,511	94,511	94,511	94,511	94,511	94,511	94,511	101,781	101,781	101,781	101,781	101,781	101,781	109,051	109,051	109,051	109,051	109,051
Reservoir Solar	RECs	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197
<b>Existing REC's Obtained</b>	RECs	<b>89,227</b>	<b>96,497</b>	<b>97,340</b>	<b>97,340</b>	<b>97,340</b>	<b>97,340</b>	<b>97,340</b>	<b>97,340</b>	<b>97,340</b>	<b>104,611</b>	<b>104,611</b>	<b>104,611</b>	<b>104,611</b>	<b>104,611</b>	<b>104,611</b>	<b>111,881</b>	<b>111,881</b>	<b>111,881</b>	<b>111,881</b>	<b>111,881</b>
<b>RPS Required REC's</b>					<b>45,318</b>	<b>78,869</b>	<b>121,462</b>	<b>246,096</b>	<b>246,096</b>	<b>246,096</b>	<b>246,096</b>	<b>246,096</b>	<b>246,096</b>	<b>246,096</b>	<b>246,096</b>	246,096	<b>246,096</b>	<b>246,096</b>	<b>246,096</b>	<b>246,096</b>	<b>246,096</b>
<b>Total REC's Available</b>		<b>89,227</b>	<b>185,723</b>	<b>283,064</b>	<b>380,404</b>	<b>388,518</b>	<b>389,362</b>	<b>365,240</b>	<b>216,484</b>	<b>97,340</b>	<b>104,611</b>	<b>104,611</b>	<b>104,611</b>	<b>104,611</b>	<b>104,611</b>	<b>104,611</b>	<b>111,881</b>	<b>111,881</b>	<b>111,881</b>	<b>111,881</b>	<b>111,881</b>
REC's Carryover Applied					45,318	78,869	121,462	246,096	216,484	0	1	2	3	4	5	6	7	8	9	10	11
REC's Compliance Balance		0	0	0	335,086	309,649	267,899	119,144	-29,612	-148,756	-141,486	-141,486	-141,486	-141,486	-141,486	-141,486	-134,215	-134,215	-134,215	-134,215	-134,215
REC's Eligible for Carryover		89,227	185,723	283,064	291,178	292,021	267,899	119,144	0	0	0	0	0	0	0	0	0	0	0	0	0
REC's Available for Sale		43,909	17,628	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>New Sources for RECs</b>																					
Biofuel Co-firing at Erickson/Eckert (to make up the difference)	RECs							0	3,332	122,476	115,206	115,206	115,206	115,206	115,206	115,206	107,935	107,935	107,935	107,935	107,935
New Solar/Wind Installation	RECs	0	0	0	0	0	0	0	26,280	26,280	26,280	26,280	26,280	26,280	26,280	26,280	26,280	26,280	26,280	26,280	26,280
<b>New RECs Obtained</b>	RECs	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>29,612</b>	<b>148,756</b>	<b>141,486</b>	<b>141,486</b>	<b>141,486</b>	<b>141,486</b>	<b>141,486</b>	<b>141,486</b>	<b>134,215</b>	<b>134,215</b>	<b>134,215</b>	<b>134,215</b>	<b>134,215</b>

## **Attachment B – Renewable Energy Plan Surcharge Summary**

Please find below a detailed description of each row in the attached worksheet.

- Row 4 – Sales Forecast based on three year average annual sales for preceding three year period.
- Row 6 – Number of renewable energy credits required per PA 295 section 27 (3). The annual requirement is phased in between 2012 and 2015 and then remains constant after 2015.
- Row 8 – Renewable energy credits required for compliance. Same number as in Row 6, but expressed in REC's instead of MWs.
- Row 9 – Existing number of REC's acquired by the end of that year. These REC's are from additional Moores Park and Tower Kleber/Alverno hydro generation not included in REC's generated one year prior to enactment of the act, forecast landfill gas electric generation under contract, forecast REC's from solar generation currently operational. The total number of REC's included represents forecast generation from the facility along with additional REC's for solar power, on-peak electric generation, use of Michigan products, and construction using Michigan labor. (See Attachment B for details)
- Row 10 – The number of REC's to be acquired by the end of that year to meet the interim target (Row 8) after subtracting the existing REC's generated (Row 9).
- Row 13 – Same as Row 10, the number of REC's to be acquired by the end of that year.
- Row 14 – The number of REC's the LBWL's renewable energy plan identifies to be acquired through new resources (new solar and wind projects and co-firing existing coal generation boilers) by the end of that year.
- Row 15 – The annual excess or deficient number of REC's.
- Row 16 – Percentage of the required REC's the LBWL has acquired by the end of the year.
- Row 17 – The cumulative number of excess REC's for the three previous years available for carryover.
- Row 40 - Cost of Renewable Energy Construction, O&M, and Purchased Power
- Row 41 – Forecast Energy Value
- Row 42 – Forecast Capacity Value
- Row 43 - Market Value of Energy and Capacity
- Row 44 – Sale of REC's
- Row 45 – Incremental costs of compliance.
- Row 46 – Present Value
- Row 47 thru 52 – Total meters, customers, or installations forecast for each rate class.
- Row 53 thru 57 – Calculations using Maximum Surcharge (all rate classes at caps).
- Row 58 thru 62 – Total Planned Surcharges for each rate class.
- Row 63 – Present Value



**Attachment B (Continued)**

Row 58	<b>Total Planned Surcharge</b>																					
	Residential																					
Row 59	Residential (\$2.50)	\$	2,460,000	2,460,000	2,460,000	2,472,300	2,484,662	2,497,085	2,509,570	2,522,118	2,534,729	2,547,402	2,560,139	2,572,940	2,585,805	2,598,734	2,611,727	2,624,786	2,637,910	2,651,100	2,664,355	2,677,677
	Senior Citizen Residential (\$1.25)	\$	33,000	33,000	33,000	33,165	33,331	33,497	33,665	33,833	34,002	34,172	34,343	34,515	34,688	34,861	35,035	35,211	35,387	35,564	35,741	35,920
	Secondary																					
	Street Light (\$0.20)																					
	Street Light (\$0.50)	\$	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452	143,452
	Traffic Signal (\$3.00)																					
	Traffic Signal (\$9.00)	\$	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172	26,172
Row 60	Traffic Signal (\$15.00)																					
	Small Secondary C&I (\$3.50)																					
	Medium Secondary C&I (range \$3.51-\$14.99)	\$	967,292	1,097,460	1,097,460	1,105,691	1,113,984	1,122,339	1,130,756	1,139,237	1,147,781	1,156,389	1,165,062	1,173,800	1,182,604	1,191,473	1,200,409	1,209,412	1,218,483	1,227,622	1,236,829	1,246,105
	- based on 0.003 per KWh																					
	Large Secondary C&I (\$15.00)																					
Row 61	Primary Metered (\$160.00)	\$	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600	249,600
Row 62	<b>Total Planned Recovery</b>	\$Mill	<b>\$3.9</b>	<b>\$4.0</b>	<b>\$4.0</b>	<b>\$4.0</b>	<b>\$4.1</b>	<b>\$4.1</b>	<b>\$4.1</b>	<b>\$4.1</b>	<b>\$4.1</b>	<b>\$4.2</b>	<b>\$4.2</b>	<b>\$4.2</b>	<b>\$4.2</b>	<b>\$4.2</b>	<b>\$4.3</b>	<b>\$4.3</b>	<b>\$4.3</b>	<b>\$4.3</b>	<b>\$4.4</b>	<b>\$4.4</b>
Row 63	Present Value	\$53																				

**Notes:**  
**Residential Classes**  
Rate 1  
Rate 21 - Senior Citizen  
**Street Light Luminarie Classes**  
[<100 Watt Luminarie (50KWH)]  
[>=100 Watt Luminarie (>50 KWH)]  
**Traffic Signal Classes**  
[<1250 (913 Active Watts)]  
[(914 ) >1250 to < 5000 (3650)]  
[>5000 (>3650 Active Watts)]  
**Secondary Commercial & Industrial (C&I)**  
Small C&I [ <1168]  
Medium C&I [1169 to 5000 KWH]  
Large C&I [ >5000 KWH]  
**Primary** [ >5001 KWH]