

**Renewable Energy Plan
2011 Biennial Review
Lansing Board of Water & Light
MSCP Case No. U-16619**

This Biennial Review filing by the Lansing Board of Water & Light (LBWL) complies with Public Act 295 of 2008 (the Act) and the related February 22, 2011 Michigan Public Service Commission Order (MPSC Case No. U-16619).

Part (4) of Section 25 provides that every two years after initial approval of the REP the MPSC shall review the REP after providing an opportunity for public comment (the provider itself can instead provide the opportunity for public comment).

An opportunity to convey public comments on the LBWL Renewable Energy Plan Biennial Review was communicated in the LBWL bill insert “Connections” to each customer in their May 2011 utility bill and on its website, www.lbwl.com. The LBWL solicited public comments until June 15, 2011 in three ways: 1) via the website, www.lbwl.com; 2) by mail: Lansing Board of Water and Light, 1232 Haco Drive, Lansing, MI 48901; and 3) in person by appointment with George Stojic, Executive Director of Strategic Planning and Development, May 16-27th (517-702-6585). All public comments received on the REP Biennial Review will accompany the July 1, 2011 filing.

The LBWL filed a 20-year Renewable Energy Plan (U-15868) with the MPSC on March 31, 2009 as required by PA 295; and on July 1, 2009, the MPSC issued an order finding that the LBWL’s plan complies with PA 295. The LBWL does not plan any major amendments to the REP filed on March 29, 2009 and this biennial review is only to provide progress made to date and an updated financial analysis.

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, including capacity additions, 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 2017. See *Attachment A – Existing Renewable Energy Facilities* for further details.

Update: The table below summarizes the status of the megawatt hours (MWh) and Renewable Energy Credits (RECs) that the LBWL has acquired and/or generated in 2009 and 2010. The

LBWL will continue “banking” the RECs which will be used together with RECs from ongoing generation to meet the PA 295 standards through 2017.

	Electricity	Renewable Energy Generated or Acquired Including Michigan Incentive RECs
Year	MWh	RECs
2009	81,043	87,816
2010	91,367	99,192

In addition to continuing with the existing renewable energy resources the LBWL is actively pursuing biomass fuels to be used in our existing generation boiler through a co-firing process.

Phase II - Beginning no later than 2018, 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 add approximately 10 MW of additional wind and solar projects near the Lansing area. These projects are forecasted to generate approximately 30,000 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 65,320 MWh’s of additional renewable energy in 2018 from biomass fuel sources. The current Phase II plan is consistent with the Renewable Energy Plan (U-15868) filed by the LBWL which the MPSC found to be in compliance with PA 295.

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. This is consistent with the LBWL original U-15868 plan filing.

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 installations. Where appropriate, these costs are escalated over time.

(2) Incremental renewable costs are offset by a long-term forecast of market energy, capacity and REC (for excess RECs) 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 2012 and running to 2029 and begin at approximately \$35/MWh in 2012 and escalate to \$87/MWh in 2029. Renewable costs are also offset by the forecast market value of capacity provided by each renewable resource.

(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 2012-2013 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 variation 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 \$2.50, 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.

Update: The LBWL began levying these surcharges in March of 2010, and plans to continue levying these surcharges over the next two years. This is consistent with the Renewable Energy Plan (U-15868) filed by the LBWL which the MPSC found to be in compliance with PA 295.

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 0.5 MW gross generating capacity. This unit typically generates approximately 1,100 MWh's annually.

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. We anticipate this facility to generate approximately 62,400 MWh's for 2012 through 2023. In 2024, we expect the facility to begin generating 9.0 MW of energy (75,000 MWh's).

Granger Landfill Energy, Grand River – This facility, also under a long term PPA with the LBWL, will add another approximately 25,000 MWh's of renewable energy to the LBWL system beginning in March 2009.

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. This facility has provided approximately 12,000 MWh's annually since 2008 and we expect it to continue to do so. In 2012 an expected PPA from other Tower Kleber facilities will add about 1.1 MW (8,000 MWh). An Additional 1.0 MW (5,000 MWh) is expected to be added in 2018.

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.

Summary:

As seen in the table *RECs from Existing Renewable Energy Sources* below, the LBWL forecast these sources to provide approximately 95,000 RECs in 2011, increasing to 118,000 RECs in 2012 and remaining at this level. The total amount of generation from these sources for the one year prior to enactment of PA 295 was approximately 8,700 MWh's. The following table details the electricity and RECs generated from the existing renewable energy facilities:

Source	Capacity MW	Electricity Generated MWh 2009	RECs Generated 2009	Electricity Generated MWh 2010	RECs Generated 2010
Tower Kleber	1.7	12,754	12,754	12,615	12,615
Granger Wood Rd	6.0	48,103	52,901	51,533	56,673
Granger Grand River	3.0	18,959	20,850	26,108	28,712
Moores Park Hydro	0.5	1,167	1,167	1,054	1,054
Cedar Solar Array	0.054	60	144	58	138
	11.25	81,043	87,816	91,367	99,192

The difference in MWhs and REC for Granger is due to on-peak production incentives.

The difference between MWhs and RECs for the BWL solar is incentives allowed under PA 295.

Attachment A - Renewable Energy Credit Portfolio

Line	(a)	(b)	(c)	(d)	(e)	(f)	(g) = (e) + (f)	(h)	(i) = (d) - (g) - (h) + Prior Yr (i)	Renewable Energy Sources							
	Year	REC Portfolio Standard	Total REC Compliance Obligation	RECs from Current Year	RECs Used from Current Year	RECs Used from Bank	Total RECs Used for Compliance	Total RECs Sold (or lost)	Cumulative RECs Banked and Carried Over to Next Year								
										Granger	Tower Kleber	BWL Solar	BWL Hydro	New Tower Kleber	Wind	Biomass	Total
1	2009	0.00%	0	87,816	0	0	0	0	87,816	73,751	12,754	144	1,167	0	0	0	87,816
2	2010	0.00%	0	99,192	0	0	0	0	187,007	85,384	12,615	138	1,054	0	0	0	99,192
3	2011	0.00%	0	95,240	0	0	0	0	282,248	82,368	11,628	144	1,100	0	0	0	95,240
4	2012	2.32%	50,076	118,013	0	50,076	50,076	37,740	312,445	96,096	0	132	1,100	20,685	0	0	118,013
5	2013	3.56%	79,171	118,013	0	79,171	79,171	20,021	331,267	96,096	0	132	1,100	20,685	0	0	118,013
6	2014	5.19%	116,637	118,013	0	116,637	116,637	0	332,643	96,096	0	132	1,100	20,685	0	0	118,013
7	2015	10.00%	226,222	118,013	0	226,222	226,222	0	224,435	96,096	0	132	1,100	20,685	0	0	118,013
8	2016	10.00%	226,222	118,013	0	226,222	226,222	0	116,226	96,096	0	132	1,100	20,685	0	0	118,013
9	2017	10.00%	226,222	118,013	109,996	116,226	226,222	0	8,017	96,096	0	132	1,100	20,685	0	0	118,013
10	2018	10.00%	226,222	218,205	218,205	8,017	226,222	0	0	96,096	0	132	1,100	25,685	29,872	65,320	218,205
11	2019	10.00%	226,222	226,222	226,222	0	226,222	0	0	96,096	0	132	1,100	25,685	29,872	73,337	226,222
12	2020	10.00%	226,222	226,222	226,222	0	226,222	0	0	96,096	0	132	1,100	25,685	29,872	73,337	226,222
13	2021	10.00%	226,222	226,222	226,222	0	226,222	0	0	96,096	0	132	1,100	25,685	27,156	76,053	226,222
14	2022	10.00%	226,222	226,222	226,222	0	226,222	0	0	96,096	0	132	1,100	25,685	27,156	76,053	226,222
15	2023	10.00%	226,222	226,222	226,222	0	226,222	0	0	96,096	0	132	1,100	25,685	27,156	76,053	226,222
16	2024	10.00%	226,222	226,222	226,222	0	226,222	0	0	109,824	0	132	1,100	25,685	27,156	62,325	226,222
17	2025	10.00%	226,222	226,222	226,222	0	226,222	0	0	109,824	0	132	1,100	25,685	27,156	62,325	226,222
18	2026	10.00%	226,222	226,222	226,222	0	226,222	0	0	109,824	0	132	1,100	25,685	27,156	62,325	226,222
19	2027	10.00%	226,222	226,222	226,222	0	226,222	0	0	109,824	0	132	1,100	25,685	27,156	62,325	226,222
20	2028	10.00%	226,222	226,222	226,222	0	226,222	0	0	109,824	0	132	1,100	25,685	27,156	62,325	226,222
21	2029	10.00%	226,222	226,222	226,222	0	226,222	0	0	109,824	0	132	1,100	25,685	27,156	62,325	226,222

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 MWhs.
- Row 13 – 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 - Renewable Energy Plan Surcharge

	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	FY 2029
Row 4 xxx Sales Forecast (xxx = 3 yr running average)	MWH	2,054,421	2,193,195	2,222,767	2,252,996	2,262,188	2,271,481	2,280,914														
Row 6 RPS Requirement (PA295 section 27(3))	MWH				50,076	79,171	116,637	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222
Row 8 RPS Required REC's from Attachment A	RECs				50,076	79,171	116,637	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222
RPS Renewable Energy Credit Compliance Required REC's	RECs	0	0	0	50,076	79,171	116,637	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222
Row 14 REC's Obtained		87,816	99,192	95,240	118,013	118,013	118,013	118,013	118,013	118,013	218,205	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222	226,222
Row 15 REC's Compliance Balance	RECs	0	0	0	67,937	38,843	1,377	-108,209	-108,209	-108,209	-8,017	0	0	0	0	0	0	0	0	0	0	0
Row 16 REC's Compliance %					100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Row 17 REC's Eligible for Carryover	RECs	87,816	187,007	282,248	312,445	331,267	332,643	224,435	116,226	8,017	0	0	0	0	0	0	0	0	0	0	0	0
Row 40 Cost of Renewable Energy Construction, O&M, and Purchased Power	\$	5,548,421 actual	6,299,901 actual	6,406,342	7,983,222	8,195,141	8,398,401	8,656,748	8,870,308	9,089,212	17,887,542	18,824,681	19,199,692	19,783,907	20,178,778	20,582,657	21,225,296	21,666,638	22,118,282	22,580,478	23,053,479	23,537,548
Row 41 Forecast Energy Value	\$/Mwh			33.46	35.12	37.08	38.14	40.39	52.50	53.72	55.91	58.02	60.02	62.54	65.37	67.89	71.11	74.57	76.94	79.90	83.28	86.99
Row 42 Forecast Capacity Value	\$/Kw/Yr			0.03	0.17	0.90	4.83	25.92	124.00	140.00	147.66	152.09	156.65	161.35	166.20	171.18	176.32	181.61	187.05	192.67	198.45	204.40
Row 43 Market Value of Energy and Capacity	\$			2,934,149	3,837,277	4,056,843	4,202,097	4,606,068	6,664,365	6,917,621	12,332,956	13,212,783	13,663,133	14,377,145	15,009,272	15,577,213	16,558,136	17,334,196	17,882,201	18,555,899	19,319,534	20,154,203
Row 44 Sale of REC's	\$				264,180	140,146																
Row 45 Incremental Cost of Compliance	\$	1,325,052	1,148,564	3,472,192	3,881,765	3,998,153	4,196,304	4,050,679	2,205,943	2,171,592	5,554,586	5,611,898	5,536,559	5,406,762	5,169,506	5,005,444	4,667,159	4,332,442	4,236,081	4,024,579	3,733,945	3,383,344
Row 46 Present Value	\$66.1	actual	actual																			
Row 47 Non-Volumetric Surcharge																						
Row 48 Meter (or customer) Forecast Residential																						
Residential			82,000	82,000	82,410	82,822	83,236	83,652	84,071	84,491	84,913	85,338	85,765	86,193	86,624	87,058	87,493	87,930	88,370	88,812	89,256	89,702