LANSING ENERGY *tomorrow*

Integrated Resource Planning (IRP) Public Open House

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Welcome: Purpose Overview

What is Integrated Resource Plan?

BWL's Integrated Resource Plan is a long-term electric generation plan that provides direction on how BWL can best meet its customers' future electricity needs while incorporating a variety of goals. The IRP provides a broad, 20-year direction for the BWL that supports the Board of Commissioner's strategic planning process and future electric generating resource choices.

IRP Process

Energy Planning: 101

Begin with Planning Goals

The goals included in the IRP center around providing safe, reliable energy at the lowest possible cost while promoting environmental stewardship and economic development in the greater Lansing region. The goals are the product of broad community input, including customers, local governments, business leaders and other organizations.

How do the Various Resources Help Meet the IRP Goals?

No one type of electric generating option can satisfy all the IRP goals while managing future risks. Instead, each option has characteristics that contribute to a robust generation portfolio that allows the BWL to balance the supply with the demand for electric energy on a minute by minute basis and prepare for future uncertainties.

Evaluate Existing Resources to Determine if New Resources are Needed

The IRP then models the existing resource base to determine if it can economically and reliably meet forecast electricity requirements and other goals. Since the BWL will be retiring its last coal fired plant in 2025, new resource options are likely to be needed.

Incorporate Options for New Demand and Supply Side Resources Along with Rates and T&D Investment

Utility scale electric generation options

Solar energy
Wind energy
Energy storage
Thermal generation
Wholesale energy market purchases

Customer sited generation options

Distributed generation (solar)
Combined heat and power

Energy Waste Reduction

(Hometown Energy Savers)

Demand Management Programs

(Time of use rates, interruptible rates & load control)

Prepare Long-term Forecast of Electric Energy Requirements

BWL uses an econometric model to forecast energy requirements over the next 20 years.

Considers Future Uncertainty and Associated Risks Using Various Future Scenarios

- Electrification like the growth in electric vehicles
- Growth of customer owned generation
- Growth in demand for electric energy
- Environmental standards
- Market prices for power
- Fuel costs

Models Various Resource Portfolios with Future Scenarios

An essential feature of an IRP is computer modeling. You can visit station #2 to learn how the BWL uses computer modeling and future scenarios to evaluate resource options and future risk to arrive at a preferred generating portfolio. The portfolio will be presented to the BWL Board in 2020.

- **What goals do you think should be included in the IRP planning?**
- **Do you think it is important to have local generation?**
- **What additional future scenarios do you think should be considered?**

Energy Planning: 101

Resource Characteristics

Solar Energy
- Helps meet summer peak demand, no air emissions and no fuel cost
- Intermittent power production, little availability in winter months

Wind Energy
- No air emissions and no fuel cost
- Intermittent power production and least generation in peak summer months

Thermal Generation (natural gas)
- Reliable generation to meet continuous capacity and energy needs
- Contributes to air emissions including greenhouse gases and subject to fuel price changes

Distributed Generation
- Helps meet summer peak demand, no air emissions and can reduce future distribution costs
- Intermittent power production, little availability in winter

Energy Waste Reduction and Demand Management
- Reduces the need for additional generation, reduces system costs and helps meet environmental goals

Combined heat and power
- Reduces need for additional generation

Energy storage
- Supports operating reliability, used to meet peak demand, helps integrate intermittent renewable energy generation

Wholesale market purchases
- No need to secure additional generating resource
- Increased cost of transmission and subject to market price fluctuations

2 Modeling – Energy Options 2

Goal

- What options and directions are desirable or unacceptable, taking into consideration operational needs, corporate sustainability and stakeholder feedback.
- Provides direction on how BWL can provide clean, affordable and reliable electric service over the next 20 years.

Resources to Consider

- Integrated demand side management & Distributed Energy Resources (DER)
- Solar Penetration, Beneficial Electrification, Storage, etc.
- Energy Markets & Transmission configuration
- Energy Efficiency
- Combined heat & power (CHP), Internal Combustion Engines (ICE), Combustion Turbines (CT), etc.

Report to Capture

- Description of methods, assumptions and risks
- Ranking of Strategies of the following characteristics: environmental attributes, cost (affordability), resiliency (diversity of supply vs. local control)

3 Current Energy Initiatives 3

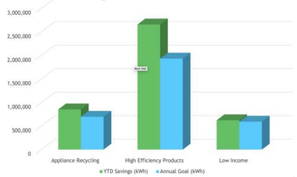
Energy Waste Reduction Programs

- **Services for Low Income Customers**
- **Residential Programs**
  - High Efficiency Lighting
  - Appliance Turn-in & Recycling
  - Multi-Family Services
  - Energy Star Products/Equipment
- **Business Prescriptive & Custom Incentives**
- **Energy Education Services**
- **Pilot Programs**

Energy Waste Reduction Summary

Program Portfolio	2018 Goals		2018 Actual	
	Gross 1st Yr. kWh Savings	Program Budget	Gross 1st Yr. kWh Savings	Program Budget
Low Income Services	592,565	$239,247	580,074	$239,247
Residential Programs	3,656,215	$1,017,889	4,445,113	$988,174
Business Services	15,239,703	$2,375,295	16,859,280	$2,156,979
Total Program Portfolio	19,488,483	$3,632,431	21,884,468	$3,384,400
Program Administration		$408,710		$214,538
Evaluation (EM&V)		$380,964		$204,859
ANNUAL TOTALS	19,488,483	$4,422,105	21,884,468	$3,803,808

Residential Energy Waste Reduction Programs 2018

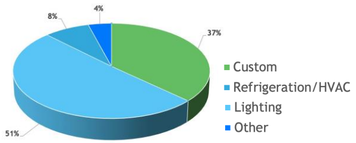


Low Income 2018

- **250 - Hometown Help energy assessments**
- **4 - Multifamily properties**
- **13,731 items installed or distributed**
  - 9,436 LED Bulbs
  - 2,266 Energy Kits
  - 123 Refrigerators
  - 18 Room Air Conditioners

Business Summary 2009-2018

Kilowatt Hour Savings

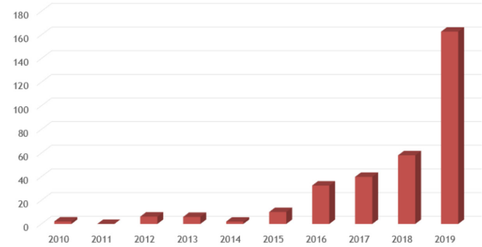


Million Kilowatt Hour Club

New Members for 2018	
Liquid Web	Meijer, Inc
East Lansing Public Schools	Lansing Mall

Previous Members	
General Motors	Quality Dairy
Ashley/Ryder	Demmer Properties LLC
State of Michigan DMB	Lansing School District
Peckham Vocational Ind.	General Motors
Sparrow Hospital	WMU Cooley Law School
Board of Water & Light	Ashley Capital
Jackson National Life	GM Delta Lighting & Pumps

Net Metering Program



Net Metering Program
Installed Capacity (kW)

GreenWise

- **Renewable Energy Credit Purchasing Program**
- **New Price in 2019**
  - Old - $7.50/250 kWh block
  - New - $3.25/250 kWh block (1.3 Cents/kWh)
- **Email – greenwise@lbwl.com**
- **Website – Updated**
- **Developed an FAQ for customers, provide usage review for customers who want to know more about their usage**
- **New enrollment process**

Program Highlights

- **Education in the Community**
  - Attended 63 local events
  - Did 34 presentations to community groups
  - Think! Energy (school program w/Consumers Energy)
- **Pilot Programs**
  - Non Profit Grants
  - Affordable Housing Grants
  - Michigan Saves Low Interest Financing
    - Partnership with Consumers Energy and Michigan Saves
    - Residential-0% for $1,000-$30,000 loans for up to 4 years
    - Business–0% for $2000-$250,000 for 2 years

2018 Solar Option Results

- **East Lansing Solar Park (12/28/2018)**
  - Installed capacity is 345 kW
  - Project is fully subscribed
  - Website: micommunitysolar.org
- **The Net Metering Solar Program**
  - Added 10 new Residential customers
  - Total number of customers: 23 Residential and 4 Commercial
  - Total New Metering Capacity is 160.65 kW as of 12/31/2018

4 Our Past and Our Future 4

OUR PAST

1968

The last of ten coal-fired units constructed at Eckert Power Station & Moores Park steam production plant

1973

Coal-fired Erickson Power Station constructed

2001

GreenWise RENEWABLE ENERGY PURCHASE PROGRAM

BWL initiated Greenwise Program to offer customers renewable energy options

2007

BWL adopted Michigan's first renewable energy standard and initiated plans for energy efficiency program

2007

BWL contracted for capacity and energy from landfill gas

2008

BWL constructed Cedar Street solar array, Michigan's largest at the time

2008

BWL received EPA environmental recognition for its participation in landfill methane emissions reduction program

2010

BWL adopted net metering program, providing incentives for customers installing renewable energy options

2013

BWL state-of-the-art natural gas-fired REO Town Cogeneration Plant constructed and replaced coal-fired units, dramatically reducing BWL emissions

2014

BWL contracted for approximately 20 MW of wind energy and expanded its Cedar Street Solar Array to 150 KW

2015

BWL led development of 300 KW community solar project allowing customers to directly purchase solar power

2016

BWL adopted Strategic Plan

2016

BWL contracted for 24 MW of solar power, the state's largest tracking solar power facility

2017

BWL contracted for 100 MW of wind energy

LANSING BWL
Hometown People. Hometown Power.

OUR FUTURE

2020

BWL achieves goal of 30 percent clean energy

2020

Coal-fired Eckert Power Station retires last three units and closes

2020

BWL contracts for 20 to 30 MW of new solar power

2020-21

BWL secures purchase power agreement for 80 MW of solar power.

2021

BWL constructs and commissions new natural gas-fired combined-cycle power plant

2021

BWL completes smart meter installations and implements time of use rates

2021

BWL initiates plan to expand energy efficiency program beyond State mandate and continues program after requirements sunset

2025

Coal-fired Erickson Power Station retires, ending coal generation in Lansing region

2025

BWL begins construction on 70 MW solar array

2030

BWL achieves goal of 40 percent clean energy

BWL
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Feedback Survey

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Thank you for coming.
We appreciate your feedback.

Opportunities to provide feedback:

***Web form**

***Hardcopy Handout**

***Scheduled Interview**

***Poll survey that will take place during November 2019**

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