BWL FUTURE CONSIDERATIONS TO STRATEGIZE

Committee of the Whole

September 10, 2019

Significant corporate planning considerations that impact the BWL as a whole

Current & Future Considerations

INDUSTRY TRENDS & CONSIDERATIONS

1. Investment in “clean” and “renewable” energy that supports Mid- Michigan health and promotes environmental sustainability
2. Power supply
3. Infrastructure needs for electricity and water
4. Customer expectations and preferences
5. Business competitiveness and economic development
6. Technology and communication advancements
7. Shifting regulatory compliance standards
8. Industry business model evolution

CURRENT ACTIVITIES UNDERWAY

- Clean energy planning & goals
- Integrated resource planning
- Asset management principles and certification
- Enterprise risk management efforts
- District master plan review of steam and chilled water
- Public power branding
- Investment in technologies
- Inclusion, equity & diversity efforts
- Rate design strategies & efforts
- Business Development & Marketing efforts
- Implementation of 2016 Strategic Plan

IRP Update

Stage 2: Industry Insight & Modeling

INTEGRATED RESOURCE PLAN: INDUSTRY INSIGHT & MODELING

GOAL

- Review industry data, reports and practices on current state of utility resources as well as industry trends
- Main areas of focus will be modeling energy and capacity markets as well as supply side resources and demand side resources
- This research will be used to help provide direction on how BWL can provide clean, affordable and reliable electric service over the next 20 years

TARGET

- Integrated demand side management & Distributed Energy Resources (DER)
- Solar Penetration, Beneficial Electrification, Storage, etc.
- Transmission configuration

DELIVERABLE

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

Industry Insight

Studies Commissioned

- Energy Efficiency
- Demand Management
- Electric Vehicle Adoption Forecast
- Distributed Energy Forecast
  - Solar
  - CHP

Technology Reports

- Solar
- Energy Storage
- Electric Vehicle Infrastructure

Other IRP processes

Industry Insight & Modeling Value

- What options and directions are desirable or unacceptable, taking into consideration operational needs, corporate sustainability and stakeholder feedback.
- Some Examples
  - Fuel mix
  - Renewables
  - Energy Efficiency
  - Emission targets
- Choosing one option does not rule out the evaluation of other options
  - Sensitivities are important because some choices can dramatically change economics/emissions
  - Several options could have similar economics but different risk profiles.
    - Environmental Risk
    - Economic Risk
    - Reliability Risk

BASE MODEL & QUESTIONS TO CONSIDER

Base Model

- Minimum clean energy targets:
  - 35% 2025
  - 40% 2030
- Belle River retires 2030
- Full computer-based optimization of resources given the above assumptions

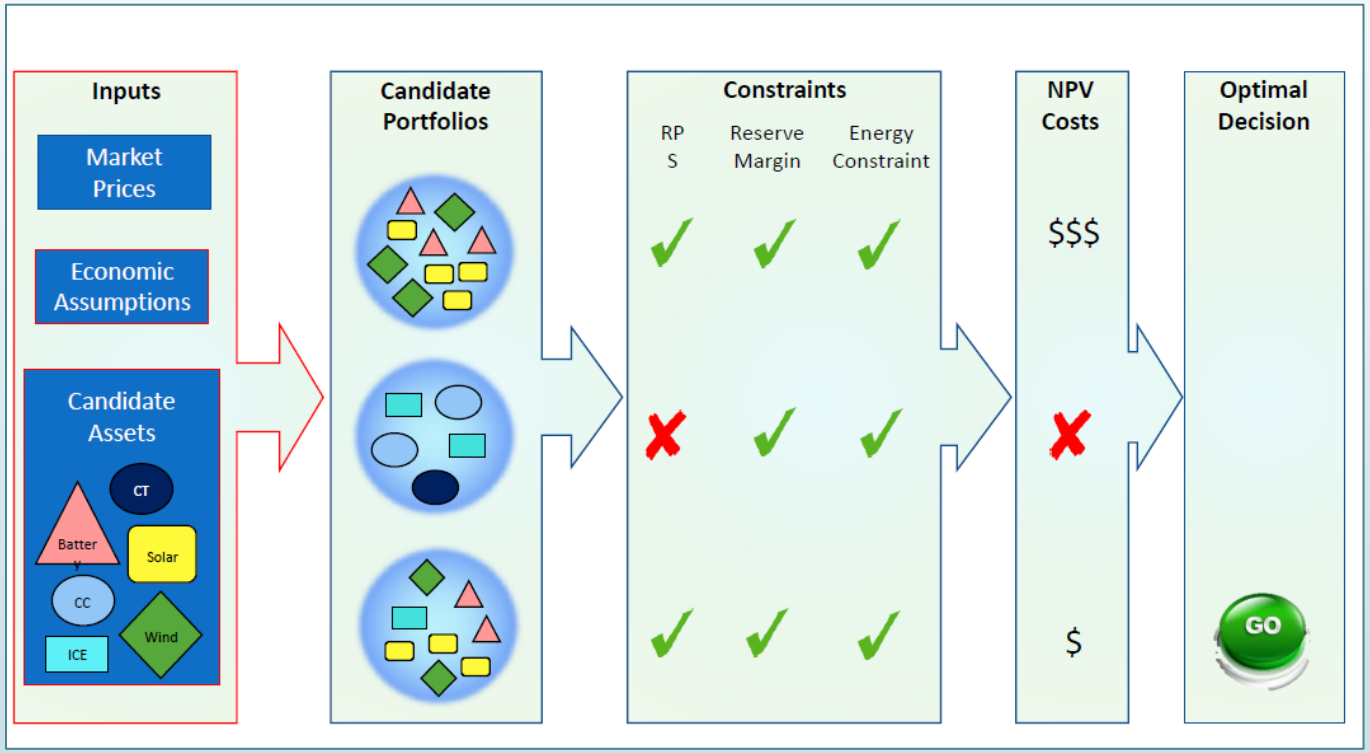
Candidate Resources

- Energy efficiency (EE)
- Demand response (DR)
- Customer-sited solar (DG)
- Utility-scale solar
- Li-Ion Batteries
- Wind Energy
- Market Energy
- Electric vehicle encouragement program (EV)
- Combined heat & power (CHP)
- Internal Combustion Engines (ICE)
- Combustion Turbines (CT)

Modeling Objectives

Software Modeling Purpose

- Create a baseline understanding of technology capabilities, especially related to reliability, affordability, and environmental impacts
- Drives the discussion to goals and trade-offs
- Modeling gives each resource type an equal chance of being in the least cost, least risk portfolio



New Software Model: Ascend Analytics' PowerSimm Planner

Computing

- ABB's Strategist model built using typical week averages
- One modeling result would take 24+ hours of computing time
- New model can run hundreds of simulations in less time
- More detail in modeling

Simulations

- Simulations based on chronological, hourly dispatch
- Simulate weather and its impact on load, renewables, and market prices of gas and power
- Meaningful variation in load/prices is correlated to identify probability of outcomes
- Highlights value of flexibility

Risk Valuation

- With hundreds of simulations, the software can calculate the risk premium of each study
- Levels the playing field between portfolios of different risk characteristics
- Considers probability of the riskier outcomes

Demand-Side

- New software better integrates demand-side technologies, including energy efficiency, demand response, and customer sited renewables
- Flexibility of resources important to modeling

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Questions

- What if no new combustion?
- What if we change optimal EE, DR, & DG?
- What if we increase clean-energy minimums?
- What if carbon tax/limits imposed?
- What if gas prices change?
- What if load forecast changes?
- What if Belle River retires earlier?

Now through July 2020

- Future C.O.W. discussions
- Informational material to supplement discussions
- Study & Modeling results and conclusions that will dovetail into Strategic Planning considerations
- Commissioner stakeholder meeting opportunities

Thank You