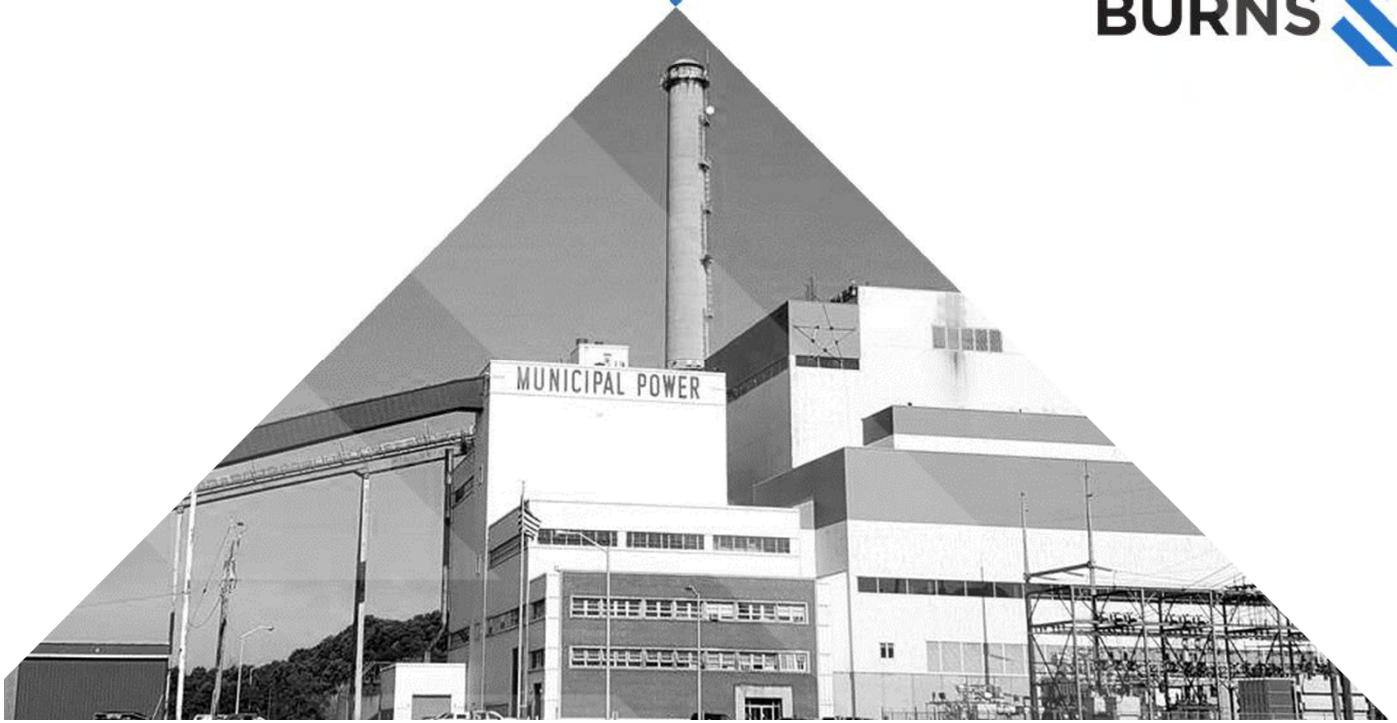
BURNS McDONNELL



Agenda

- **Power Supply Plan Highlights**
- Public Feedback and Comments
- Economic Analysis
- Post Public Meeting Evaluations
  - Local System Resiliency Analysis
  - Small-Scale Solar Analysis
- Conclusions & Recommendations
- Action Plan

Power Supply Plan Highlights

- GHBLP has evaluated its power supply comprehensively since 2012
- Within the electric utility industry, older, less efficient steam plants are now higher cost. This is true for J.B. Sims Unit 3. There are less expensive resources available.
- Having Network Integrated Transmission Service (NITS, full service transmission rights), the GHBLP electrical system will be more reliable and also provide the opportunity to access low cost capacity and energy.
- Maintaining appropriate level of on-system generation allows GHBLP to retain local generating capacity while taking advantage of low MISO power prices.
- Snowmelt system can be operated in a “decoupled” configuration with a new natural gas-fired heat generator and electric pumps.

A combination of local on-system resources, market capacity, and renewables would provide GHBLP a well diversified power portfolio.

Agenda

- Power Supply Plan Highlights
- **Public Feedback and Comments**
- Economic Analysis
- Post Public Meeting Evaluations
  - Local System Resiliency Analysis
  - Small-Scale Solar Analysis
- Conclusions & Recommendations
- Action Plan

Public Feedback and Comments

- Move away from coal by retiring Sims Unit 3
- Re-use as much infrastructure as possible at Harbor Island
- Incorporate more renewables moving forward, especially local
- Try to incorporate distributed energy generation
- Electric rates need to competitive
- Resiliency against terrorist threats
- Concerns around cost sharing for snowmelt between GHBLP, City, and Downtown Development Authority (DDA)
- Future design of new plant: cost of CHP, dual fuel capability, and noise concerns with the plant
- More public access to waterfront on Harbor Island

Agenda

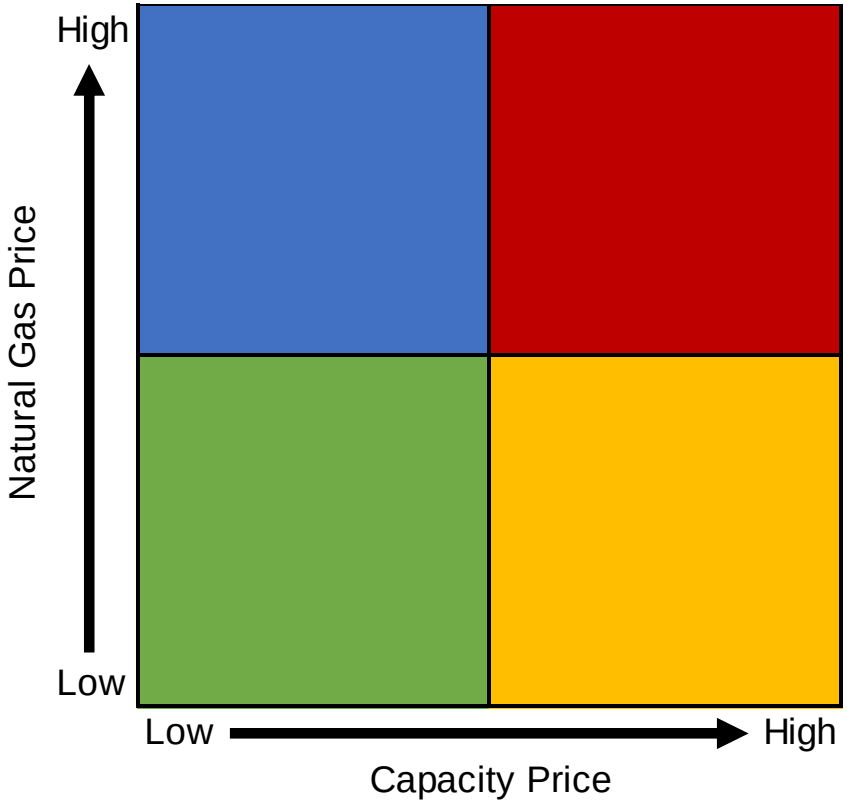
- Power Supply Plan Highlights
- Public Feedback and Comments
- **Economic Analysis**
- Post Public Meeting Evaluations
  - Local System Resiliency Analysis
  - Small-Scale Solar Analysis
- Conclusions & Recommendations
- Action Plan

Power Supply Paths

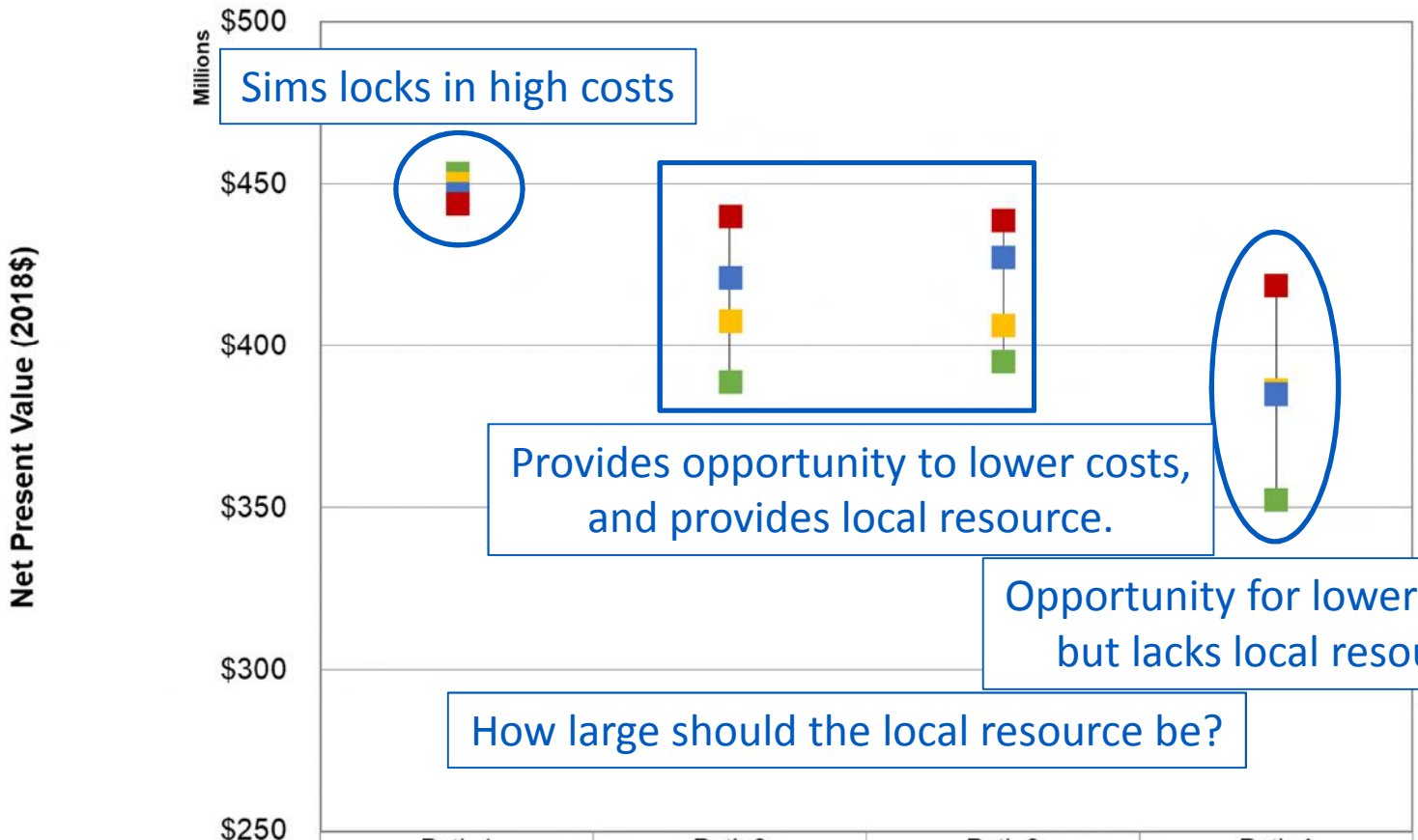
- Based on previous studies and technical evaluation, four power supply paths were determined and modeled for further evaluation:
  - **Path 1 -** Business-as-usual with continued Sims operation
  - **Path 2 -** Retire Sims and replace with 4x9 MW (36 MW total) reciprocating engines
  - **Path 3 -** Retire Sims and replace with 6x9 MW (54 MW total) reciprocating engines
  - **Path 4 -** Retire Sims and replace with market capacity
- All paths, specifically Paths 2, 3, and 4, include snow melt alternatives. Costs have been included for "decoupling" the snowmelt system from Sims and operational expenses associated with a new system.
- All paths interact with the wholesale energy market by selling and purchasing from MISO.

Numerous Scenarios Considered

- Sensitivity analysis was completed as part of the economic evaluation
  - Aimed to evaluate the robustness of power supply paths across uncertain variables
- Sensitivities on natural gas price and market capacity price
- Four scenarios were considered within the economic evaluation
  - Low Natural Gas & Low Capacity
  - Low Natural Gas & High Capacity
  - High Natural Gas & Low Capacity
  - High Natural Gas & High Capacity

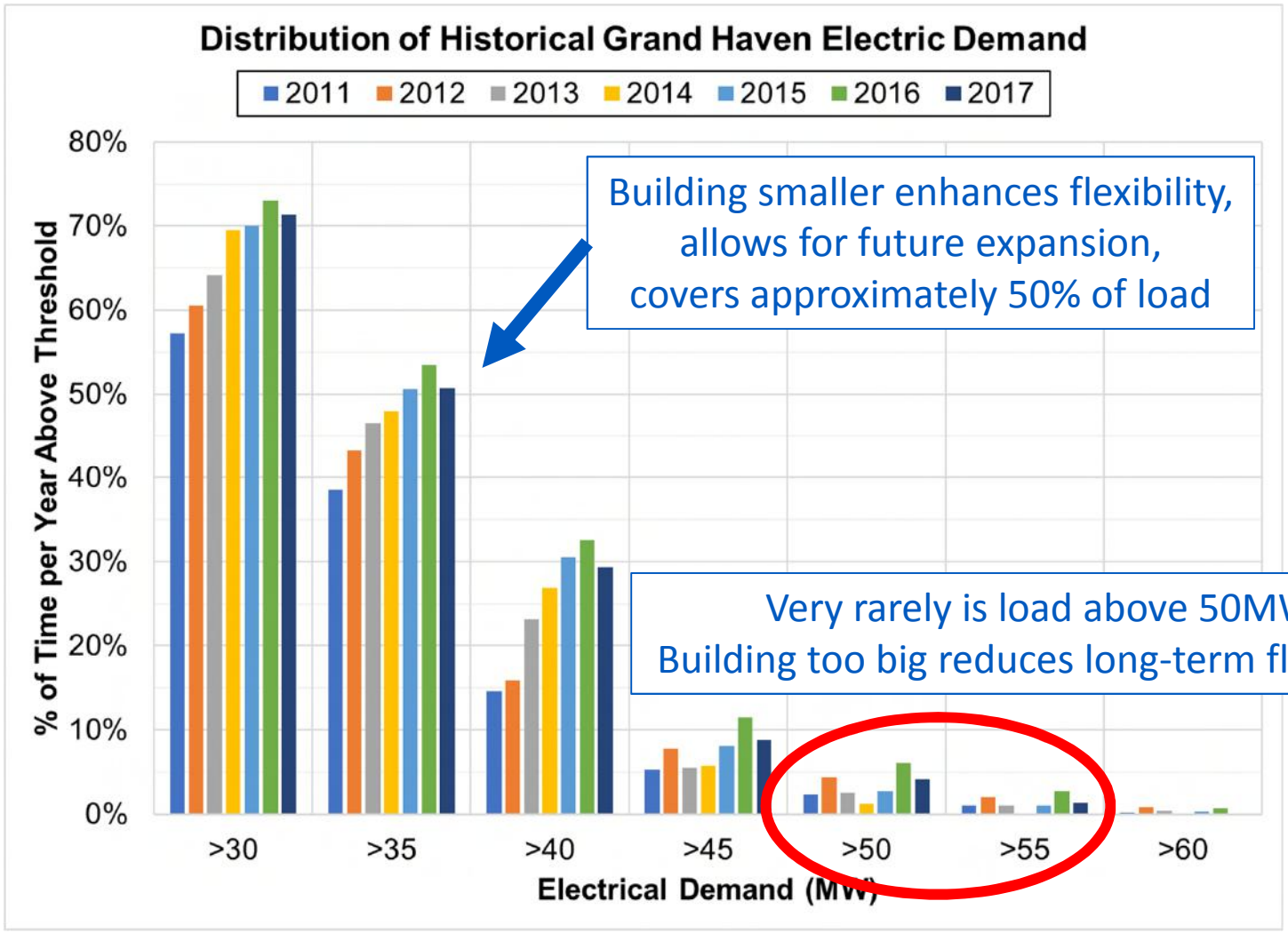


Economic Evaluation – Net Present Value Results



	Path 1 J.B. Sims Unit 3	Path 2 4x 9 MW Recips	Path 3 6x 9 MW Recips	Path 4 MISO Market
Low Gas/Low Capacity	$453,384,057	$388,717,345	$395,052,209	$352,347,011
Low Gas/High Capacity	$450,121,714	$407,701,944	$406,609,640	$386,185,943
High Gas/Low Capacity	$446,997,772	$421,107,982	$427,381,441	$384,942,027
High Gas/High Capacity	$443,735,429	$440,092,581	$438,938,872	$418,780,959

Why Not Replace All of Sims with a Large Plant?



Agenda

- Power Supply Plan Highlights
- Public Feedback and Comments
- Economic Analysis
- Post Public Meeting Evaluations
  - **Local System Resiliency Analysis**
  - Small-Scale Solar Analysis
- Conclusions & Recommendations
- Action Plan

Local System Resiliency Analysis

- High-level analysis performed after public feedback and board request
- Determined the amount of solar generation and energy storage required to serve GHBLP load in the event of widespread grid failure and natural gas supply disruption
  - Different levels of load were analyzed
- Focused on supplying load requirements in month of December
  - Solar generation has a capacity factor of 8.48% in December
  - Large number of overcast days
  - Least amount of daylight hours
- The system was designed to produce lowest cost while meeting 8,760 power requirements at each load level
- The analysis did not include costs associated with upgrading distribution assets, microgrid costs, device protection, or system hardening costs

Local System Resiliency Conclusion

- Designing and operating GHBLP's local system to provide long-term power supply through solar and energy storage resources in the event of an extended grid outage is cost prohibitive, even when supplying a small fraction of GHBLP load.
  - Covering 10% of load is approximately ~$250M
- GHBLP should focus its power supply planning efforts on providing low cost, reliable energy to its customers assuming access to the grid is available.
- Burns & McDonnell would recommend GHBLP focus its efforts on the replacement of Sims under the assumption that the grid resiliency is under the purview of federal agencies, MISO, and transmission system owners and operators.

Agenda

- Power Supply Plan Highlights
- Public Feedback and Comments
- Economic Analysis
- Post Public Meeting Evaluations
  - Local System Resiliency Analysis
  - **Small-Scale Solar Analysis**
- Conclusions & Recommendations
- Action Plan

Local Solar Evaluation

- High-level analysis performed at Board's request
- Used avoided cost methodology to determine the value of capacity of a local 5 MW solar project on GHBLP system
- Costs assumed GHBLP financing and no Investment Tax Credits (ITC)

Local Solar Evaluation Conclusions

- At current capacity credits and cost levels, local solar may provide a low-cost source of capacity and energy
- Continue to evaluate PPAs or future community solar projects as part of the power supply portfolio
- Building a 36 MW reciprocating engine facility will allow GHBLP to incorporate large-scale solar through MPPA, which are more cost effective
- Large-scale, local generation will be difficult to develop due to a lack of land availability in Grand Haven
- If GHBLP wishes to pursue a local solar option, Burns & McDonnell recommends assessing the local market by pursuing a small-scale community solar project on Harbor Island after construction of the new plant. The size of the project would be determined by the level of participation from GHBLP customers.

Agenda

- Power Supply Plan Highlights
- Public Feedback and Comments
- Economic Analysis
- Post Public Meeting Evaluations
  - Local System Resiliency Analysis
  - Small-Scale Solar Analysis
- **Conclusions & Recommendations**
- Action Plan

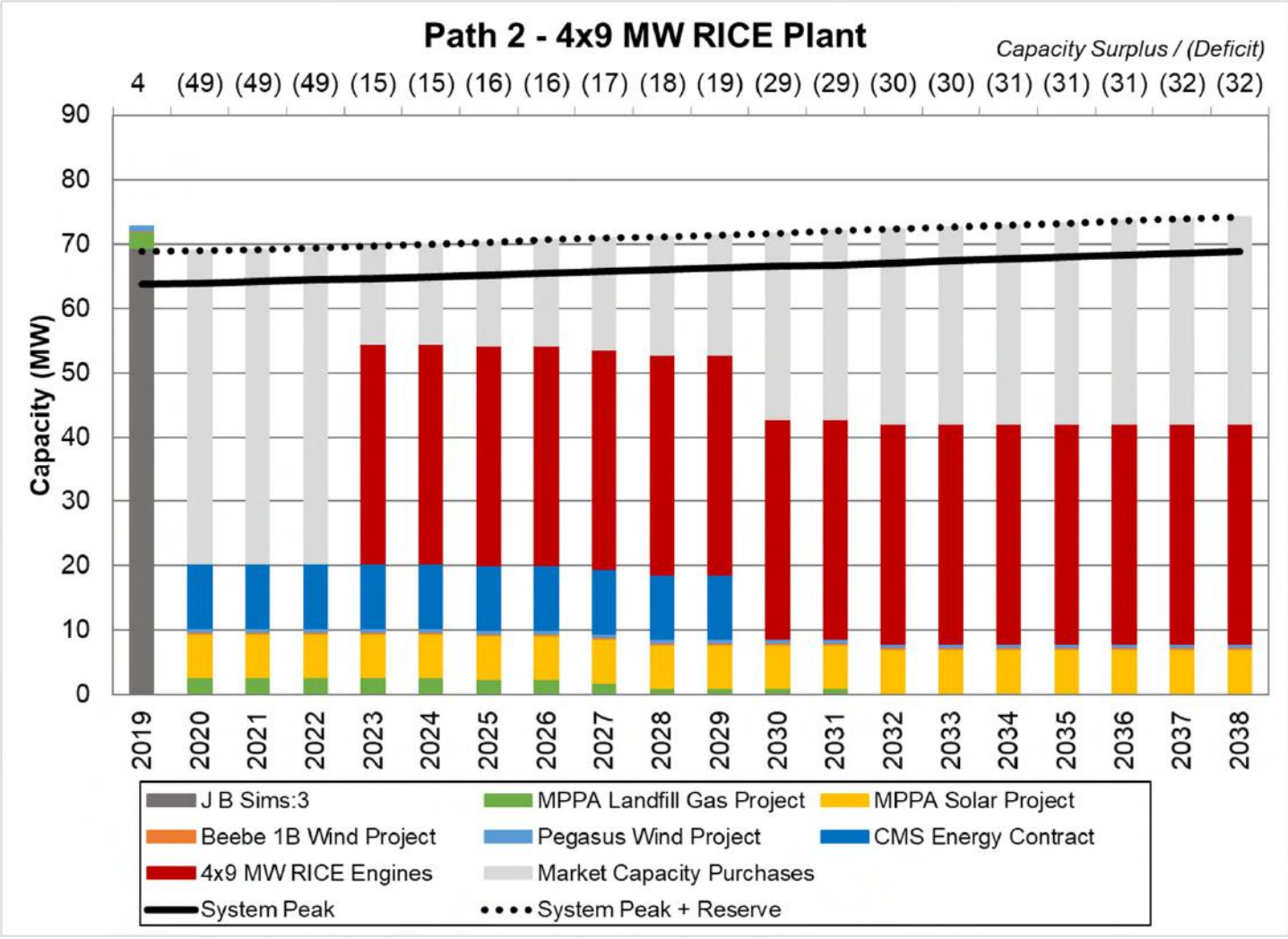
Conclusions

- Continued operation of Sims provides the most expensive power supply path with the least amount of flexibility.
  - Burns & McDonnell does not recommend this option, which is consistent with both Sargent & Lundy's and Black & Veatch's previous results and recommendations as well.
  - Burns & McDonnell agrees with the Board's and City Council's decision to cease operations in June 2020
- Relying only on market capacity and energy provides the lowest cost option in all scenarios
  - While this is the lowest cost option, it does expose GHBLP to potential rising prices in energy and capacity
  - This is a viable path for GHBLP
- New on-system generation provides lower cost than continued operation of Sims, but higher cost than relying only on the market
  - This is a higher cost option than relying solely on the market based on current forecasts for both energy and capacity
  - This is a viable path for GHBLP
- Either of the viable paths provides flexibility to allow for the use of emerging technologies such as local solar and energy storage

Conclusions & Recommendations

- Based on the combination of economics, public feedback, and Board & Council policy statements, Burns & McDonnell concludes the following:
  - Ongoing operation of Sims Unit 3 is higher cost than other options; Sims Unit 3 should be retired by June 2020.
  - The installation of a 35 to 40 MW reciprocating engine plant on Harbor Island will provide a local generation resource while allowing increased flexibility and should be pursued.
  - GHBLP should meet additional capacity requirements through market purchases or agreements.
  - This path provides GHBLP enhanced flexibility to be both proactive and reactive to changes within the power industry regarding advances in technology and power prices.
  - If market conditions change in the future, additional generating units can be added to the Harbor Island plant while avoiding the risk of overbuilding today.
  - As desired by customers, GHBLP should continue to evaluate the potential of a small-scale, community solar facility.

Path 2 BLR – Retire Sims & Build 36 MW of Recips



Agenda

- Power Supply Plan Highlights
- Public Feedback and Comments
- Economic Analysis
- Post Public Meeting Evaluations
  - Local System Resiliency Analysis
  - Small-Scale Solar Analysis
- Conclusions & Recommendations
- **Action Plan**

This is Four Projects in One

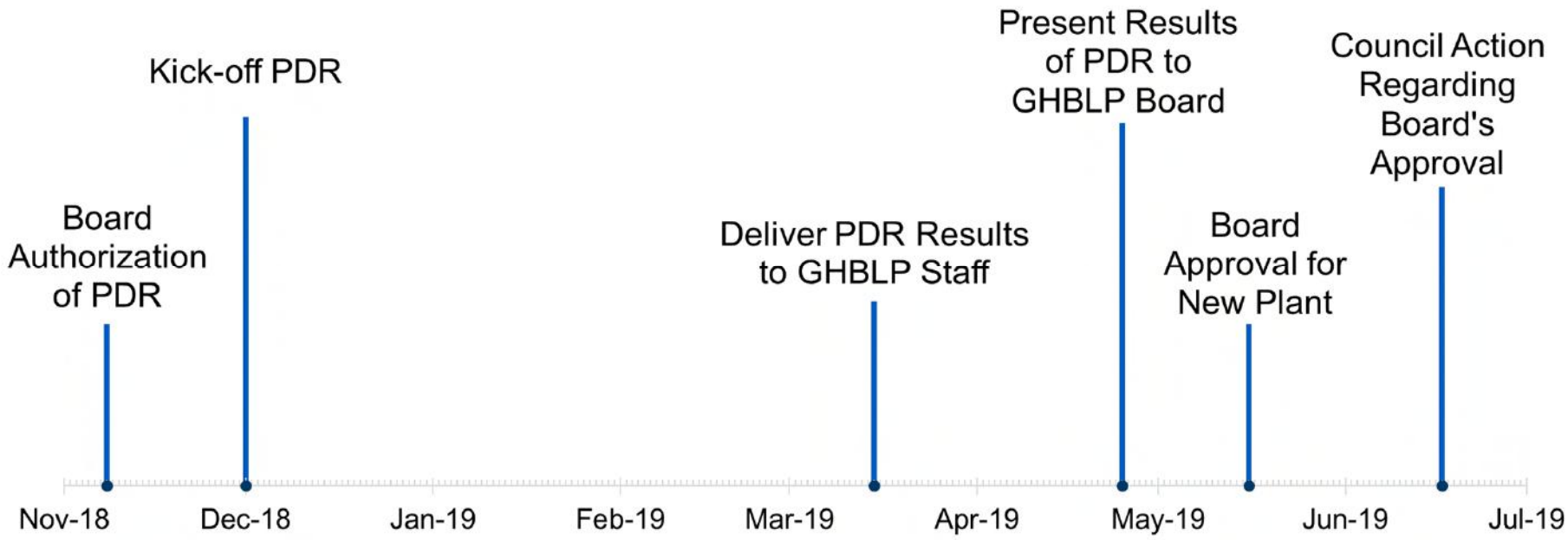
- Demolition and decommissioning of Sims Unit 3
- Remediation and mitigation of the site
- Design and construction of reciprocating engine plant
- Snowmelt (transition and permanent solutions)

General Project Execution Schedule

- Unit 3 retires: June 1, 2020
- Year 1: Snow melt transition, demolition and decommissioning
- Year 2: Mitigation/remediation of site, site preparation for construction
- Year 3: Build new recip engine plant
- New plant is operational: June 1, 2023

Short-term Timeline of Next Steps

Schedule to support new plant commercial operation date of June 1, 2023



Action Plan

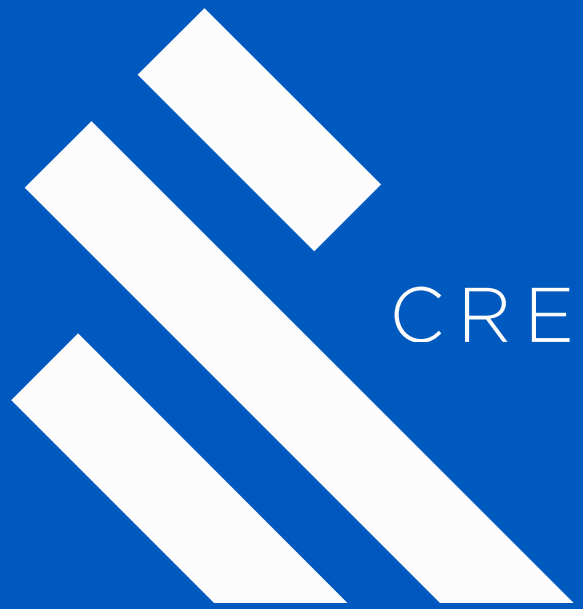
1. Move from planning to engineering phase
   a. Conduct a Project Definition Report (PDR) for the new plant: includes demolition plan of existing site, preliminary engineering, site layout, cost estimates, interconnection studies, permitting, execution schedules
   b. Engineer replacement for snow melt system both during the transition and permanently
   c. The PDR will be needed to meet the requirements of the City Council's Resolution passed on September 4, 2018.
   d. Develop remediation plans for Sims facility and coordinate with PDR execution schedules.
2. Secure short-term capacity and energy during the transition from Sims Unit 3 to the new plant
3. Begin building a long-term diversified portfolio, through the joint action agency, that will complement and supplement the new generating facility on Harbor Island that offers cost competitive power supply for electric customers.

Detailed Action Plan – Project Definition Report

- Start the Project Definition Report
  - This kicks-off preliminary engineering and defines the details for the demolition activities, snow melt, and new plant design
  - Two Phases, but need to be done in parallel
  - Evaluate local solar option on Harbor Island with the recip plant
- Phase I (Authorized at the November 8 Board Meeting)
  - Task 1: Project Design Basis Development
  - Task 2: Capital and O&M Cost Estimates
  - Task 3: Architectural Renderings
- Phase II (Pending Authorization from Board)
  - Task 4: Decommissioning/Demolition Plan and Cost Estimate
  - Task 5: Preliminary Air Permitting and Noise Assessments
- Remediation and mitigation studies in parallel with PDR
  - Staff is currently meeting with various environmental engineering firms for evaluation.
- Objective: Board will have the cost estimates, site layouts, renderings, and execution schedules to proceed with the reciprocating engine plant.

Detailed Action Plan

- Begin securing short-term capacity and energy during the transition from Sims Unit 3 to the new plant.
- After the engineering studies are complete, begin to conduct financial studies to support debt financing



CREATE AMAZING.