Presentation of the Project Definition Report

BURNS McDONNELL

Grand Haven Board of Light & Power

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Final Version

Agenda

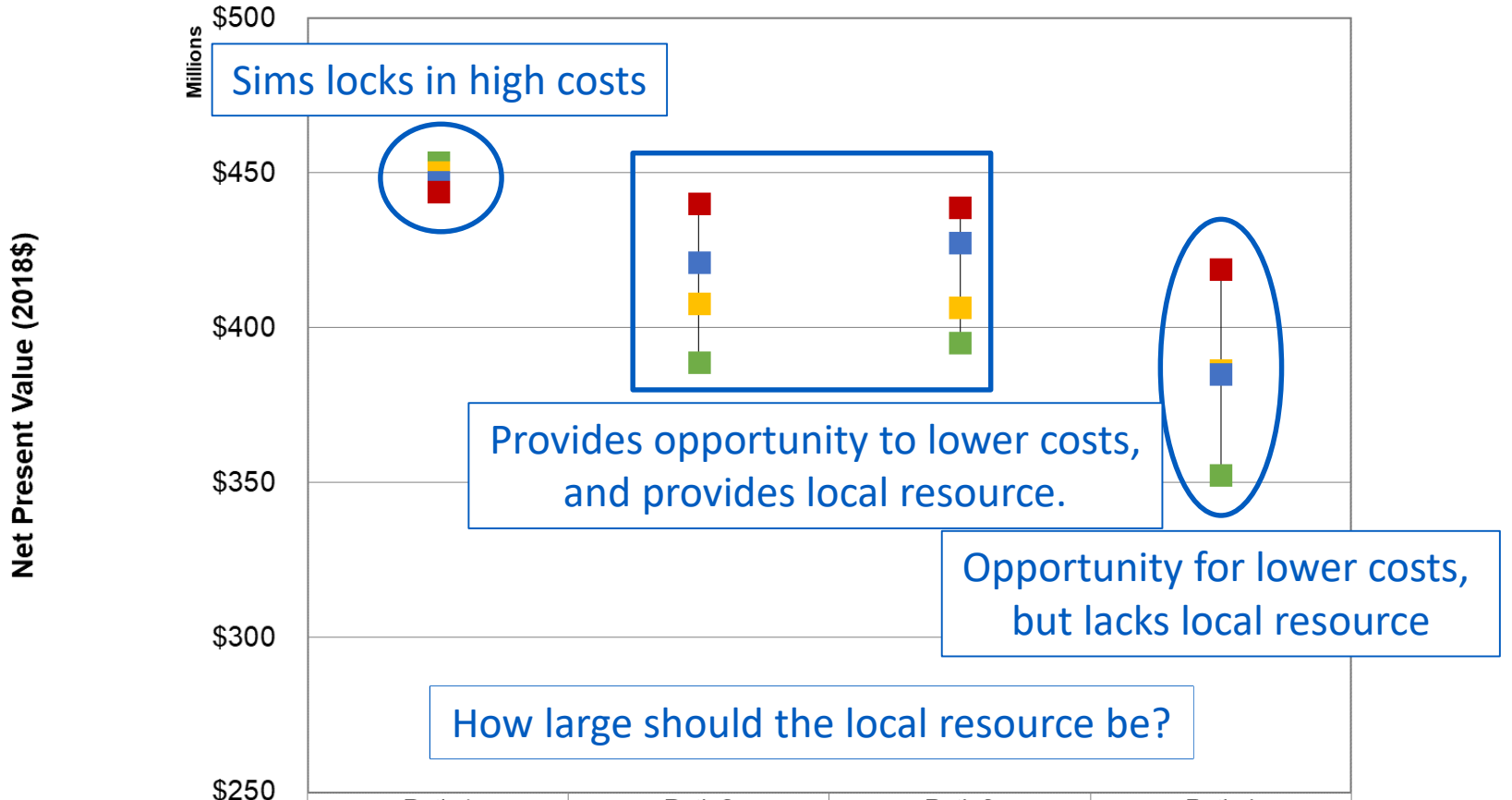
- Power Supply Planning Conclusions Review
- Project Definition Report Highlights
- Project Definition Results
- Conclusions & Recommendations

Power Supply Planning Conclusions Review

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 were 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.

Economic Evaluation – Net Present Value Results

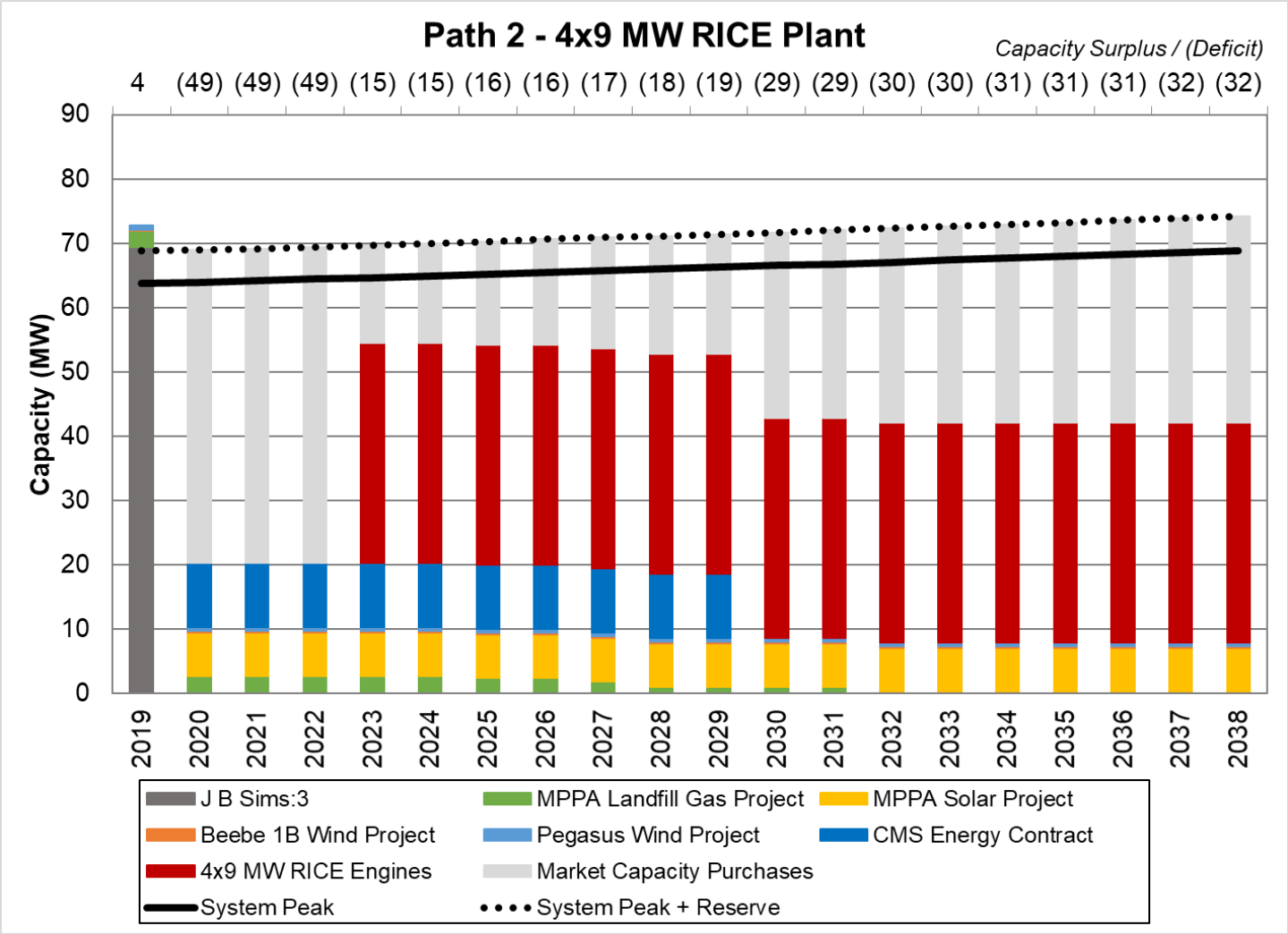


	Path 1 J.B. Sims Unit 3	Path 2 4x 9 MW Recips	Path 3 6x 9 MW Recips	Path 4 MISO Market
Low Gas/Low Capacity	$453,384,057	$388,717,345	$395,052,209	$352,347,011
Low Gas/High Capacity	$450,121,714	$407,701,944	$406,609,640	$386,185,943
High Gas/Low Capacity	$446,997,772	$421,107,982	$427,381,441	$384,942,027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

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

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



Action Plan (From December 2018)

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 Board's Resolution passed on December 20, 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 its replacement
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
- Phase I
  - Task 1: Project Design Basis Development
  - Task 2: Capital and O&M Cost Estimates
  - Task 3: Architectural Renderings
- Phase II
  - Task 4: Decommissioning/Demolition 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 – Project Definition Report

- Start the Project Definition Report
- Phase I
  - Task 1: Project Design Basis Development **- Completed**
  - Task 2: Capital and O&M Cost Estimates **- Completed**
  - Task 3: Architectural Renderings **- Completed**
- Phase II
  - Task 4: Decommissioning/Demolition Cost Estimate **- Completed**
  - Task 5: Preliminary Air Permitting and Noise Assessments **- Partially completed**
- Remediation and mitigation studies in parallel with PDR **- In progress**
  - 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.

This is Four Projects in One

- Decommissioning and demolition of Sims Unit 3
- Remediation and mitigation of the site
- Design and construction of reciprocating engine plant (36 MW)
- Snowmelt (transition and permanent solutions)

Project Definition Report Highlights

Project Definition Report Highlights

- A project definition report (PDR) is an analysis that provides better information than a “planning” study, but is short of full “detailed” engineering.
- A PDR aims to provide the utility with a more detailed budgetary cost estimate for decision making
- The “project” as currently defined is cost prohibitive
  - Current project: Demolition, remediation, snow melt, 36 MW reciprocating engine facility, operations and technical services building, and enhancements to Harbor Island
- Regardless of path, there are actions GHBLP will need to conduct after Sims is retired
  - Decommissioning and demolition
  - Remediation and mitigation
  - Temporary snow melt
  - Substation work
- GHBLP should continue to investigate the definition of the project and reflect on the priorities of the community
  - Hit “pause” on the reciprocating engine development, GHBLP should take time to further vet costs associated with the power generation component and determine what is the right amount to have locally

Project Definition Report Results

Reminder: This is Four Projects in One

- This is not a simple project, there are a lot of moving parts
  - Decommissioning and demolition of Sims Unit 3
  - Remediation and mitigation of the site
  - Snowmelt (transition and permanent solutions)
  - Design and construction of reciprocating engine plant (36 MW)

Reminder: This is ~~Four~~ Five Projects in One

- This is not a simple project, there are a lot of moving parts and steps
  - Step 1: Decommissioning and demolition of Sims
  - Step 2: Remediation and mitigation of the site
  - Step 3: Snowmelt (temporary solution)
  - Step 4: Power generation facilities
    - Design and construction of reciprocating engine plant (36 MW)
    - Office and maintenance facilities for plant and system operations and technical services
  - Step 5: Snowmelt (permanent solution)

Decommissioning and Demolition of Sims

- Majority of the structures were assumed to be demolished using conventional labor and heavy equipment
- A combination of controlled felling and explosives would be used to demolish structures such as the boilers, scrubber building, and chimneys.
- Abatement
  - Boilers 1 through 3 (including refractory removal)
  - Asbestos containing material removal
  - Universal regulated waste removal
- Demolition
  - Intake and discharge closures
  - Demolition of structures and removal of material
  - Material salvage value included (i.e. credit for recycling materials)
- Developed planning level cost estimate: $5.9 million
- Consider bidding demolition contracting this year to complete demolition in 2020

Remediation and Mitigation of the Site

- GHBLP retained Golder & Associates to evaluate remediation (in progress)
- Site will require environmental remediation and mitigation
  - Pond removal and new wetlands
- Costs to prepare Harbor Island for residential/commercial use is cost prohibitive.
  - For example, it would require additional remediation for the old city dump on the site.
  - Most of the site is located within the 100-year floodplain as well.
- Worst case screening cost estimate for continued industrial use (per Golder Associates): $3.9 million

Snow Melt

- Board and City Council established the need for uninterrupted snow melt for city
  - PDR determined temporary (and permanent) solutions necessary
  - Temporary snow melt – from Sims retirement through new facility completion
  - Permanent snow melt – would be incorporated into the new facility
- Leverage existing snow melt equipment for the temporary solution
- Any new equipment that is required would be leveraged for both temporary and permanent solutions

Snowmelt

- Temporary snow melt
  - Re-use existing intake building to save costs (snow melt / Units 1 and 2)
  - Need to confirm structural integrity of existing supports for added weight
  - New boilers, boiler pumps, and fired generators to support city snow melt
  - Removal of existing fire pumps and piping
  - Demolish building after permanent solution prepared
- Permanent snow melt
  - Re-locate boilers and boiler pumps from temporary solution
  - Add boiler, pumps, heat exchangers, etc. for complete heating system with redundancy
  - Integrated system for city snow melt, plant snow melt, plant heating, and engine heating

Power Generation Facilities

- The planning analysis used cost estimates for similar generating facilities
- These estimates did not address site or utility specific conditions or criteria
- The planning cost estimates did not include additional operations facilities now included in the project.
- Planning studies do not get that detailed, PDR efforts evaluate detailed engineering impacts due to site specific conditions and considerations

Costs of the “Four” Projects in Planning Efforts

- November 2018
  - Demolition
  - Remediation
  - Snowmelt
  - Based on similarly sized RICE facilities previously constructed
- Total project: $68.25 million
  - Gas pipeline additional $2 million (as re-confirmed during planning efforts by MGU in Fall 2018)

Total project costs approximately $70M to $75M

Site & Utility Specific Design Elements for Harbor Island Facilities

- PDR set out to define what is needed for project at Harbor Island
- PDR developed conceptual scope and design basis for overall plant
  - Integration and sourcing of utilities (electric, gas, water, wastewater)
  - Site development
  - Geotechnical and foundation requirements
  - Buildings and enclosure requirements
  - Plant control, communication, and security
  - Plant electrical system
  - Fire protection system
  - Air and noise permitting requirements
  - Stormwater design
  - Snow melt design
- Conceptual design deliverables: GAs, P&IDs, one-line, equipment list
- Execution plan and schedule for COD June 2023

PDR Discoveries – Engineering Requirements

- From PDR, discovered additional engineering requirements
  - Established site and utility specific design elements
  - Additional noise mitigation for proximity to community
  - Piling/foundation requirements
  - Sanitary line
  - Firewater storage
  - Additional gas infrastructure (MGU revised the cost estimate from $2M to nearly $6M)
  - Snow melt – temporary and permanent
- Remediation and demolition budgets slightly higher than planning costs

Total project costs approximately $80M to $85M

PDR Discoveries – Community / Site Enhancements

- Other site needs determined during PDR:
  - GHBLP operations and control center – administration building and fleet garage
  - Snow melt integration with plant heating and engine heating/cooling to maintain “partnership”
  - Operation and maintenance accommodations (tank building, platforms, etc.)
    - Enhancements have been found attractive at similar facilities during site visits
- Additional site elements incorporated into PDR design
  - Design and appearance of facilities to be consistent with proximity to downtown and marina
  - Expansion of Linear Park for additional public access to waterfront and recreational spaces

Total project costs approximately $95M to $100M

Harbor Island Transformation

Current: Sims Power Plant

New: Generation Plant and Operations Facilities

Note: Solar garden shown in picture, but no costs have been included at this time.

Harbor Island Project Renderings

Note: Solar garden shown in picture, but no costs have been included at this time.

Conclusions & Recommendations

Key Discoveries Identified during the PDR

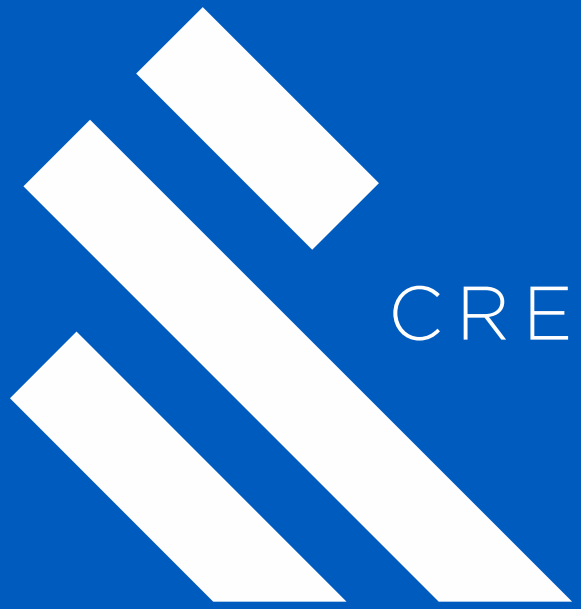
- Natural gas supply upgrades are significantly greater than originally anticipated due to MGU's delivery issues and recent reassessment process.
- Residential/Commercial redevelopment on Harbor Island is unlikely due to the large remediation concerns associated with the old city dump and floodplain.
- Architectural design associated with proximity to downtown and waterfront are impacting costs.
- Cost uncertainties remain
  - With existing plant operational, unable to determine if geotech/pilings are adequate to reuse
  - Due to the nature of demolition and remediation, firm costs are not "known" until bids are obtained
- Different contracting approaches for engineering, design, procurement, and construction can provide flexibility in execution, but GHBLP must determine tradeoff in costs vs. risk (i.e. price certainty, interface risk).
  - Use of more modularized equipment may be able to further reduce costs as well

Conclusions

- The GHBLP Harbor Island location has been an industrial site for well over 60 years, transition to residential/commercial use is unlikely (not financially feasible) at this point.
  - However, opportunities exist for community enhancements for Harbor Island, for example expansion of Linear Park, community solar, etc.
- The PDR further defined the costs of the project, but there are still numerous items that could impact costs.
- The PDR efforts, along with previous community feedback, unveiled several site specific considerations such as acoustical and aesthetic concerns, geotech (i.e. piling requirements), natural gas pipeline costs, among others that are impacting costs.
- Additional analysis is required to fully access piling reuse feasibility.
- The total cost to redevelop the Sims site with 36 MW of power generation and community enhancements is too costly.

Recommendations

- Focus on the “critical path” steps associated with Sims decommissioning.
  - Finalize demolition, site remediation, and environmental mitigation planning efforts and solicit proposals to conduct these tasks.
  - Continue to develop temporary snowmelt system for “interim” period (which will impact demolition activities and methodology).
- Confirm whether GHBLP’s continued use of Harbor Island for utility purposes is in the “best interest” of the City.
- Continue to assess the GHBLP Harbor Island redevelopment
  - Continue discussion to determine the balance of power generation and other improvements on the Island.
  - Be flexible on the level of self-generation vs. market purchases.
  - GHBLP should no longer continue pursuing a 36 MW power facility due to the requirement to upgrade extensive gas infrastructure.
- Continue to evaluate alternatives for power generation, utility operations, and Harbor Island redevelopment
  - Evaluate other power generation designs that may be a better fit for reduced capacity installations on Harbor Island.
  - Continue to evaluate natural gas system upgrade requirements and supply “break points.”
  - Obtaining firm bids on demolition and site remediation will reduce cost uncertainty to help determine path for power generation.



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