

2022 JEA

IRP Stakeholder Engagement Meeting Series



IRP

INTEGRATED RESOURCE PLANNING

Welcome

Raynetta Curry Marshall
Chief Operating Officer



IRP Stakeholder Meeting Agenda – June 9



1) Welcome & Introductions

Raynetta Curry Marshall, Chief Operating Officer, JEA

2) Overview of System Operations Control Center

Garry Baker, Senior Director, Energy Operations, JEA

3) March 10 Meeting Recap, May Stakeholders Report Discussion

Laura Schepis, Chief External Affairs Officer, JEA; Cantrece Jones, Black & Veatch Consultants

4) New Resource Options

Brad Kushner, Paul Maxwell, Darren Bishop Black & Veatch Consultants

5) Scenario Modeling and Sample Results

Brad Kushner, Black & Veatch Consultants

6) Open Discussion and Next Steps

Laura Schepis, Chief External Affairs Officer, JEA



March Stakeholder Meeting Recap, May Stakeholders Report Discussion

Laura Schepis

Chief External Affairs Officer

Cantrece Jones

Black & Veatch Consultant



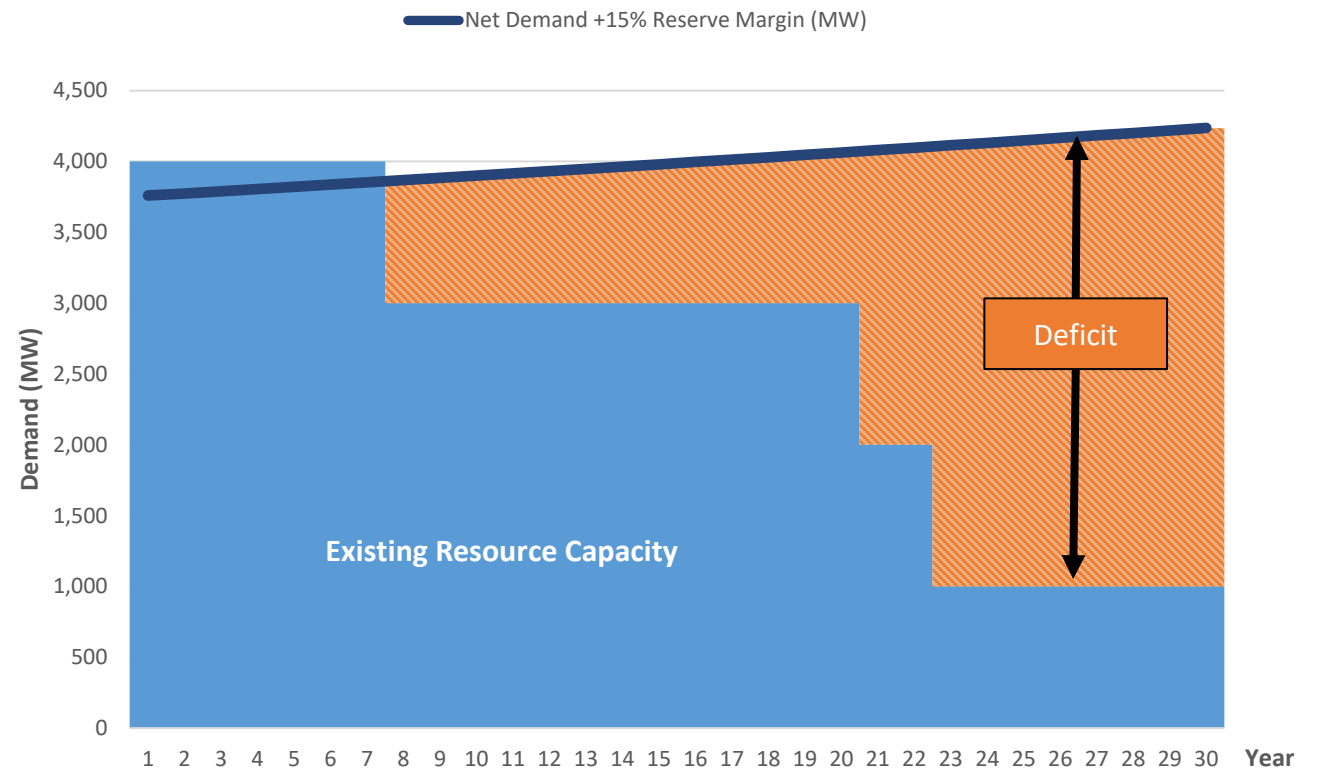
Capacity Expansion Planning

How do we best choose among the new resource side options and DSM measures to meet load growth, reliability standards and environmental constraints at the lowest cost to customers?

A very complex problem...

- Changing load, fuel, carbon and other forecasts with each Scenario
- Capacity changes due to retirements, new gas repowering, new intermittent renewables
- Capital and operating costs for existing and new resources and DSM measures

Customers' Electric Demand and Resource Capacity Forecasts



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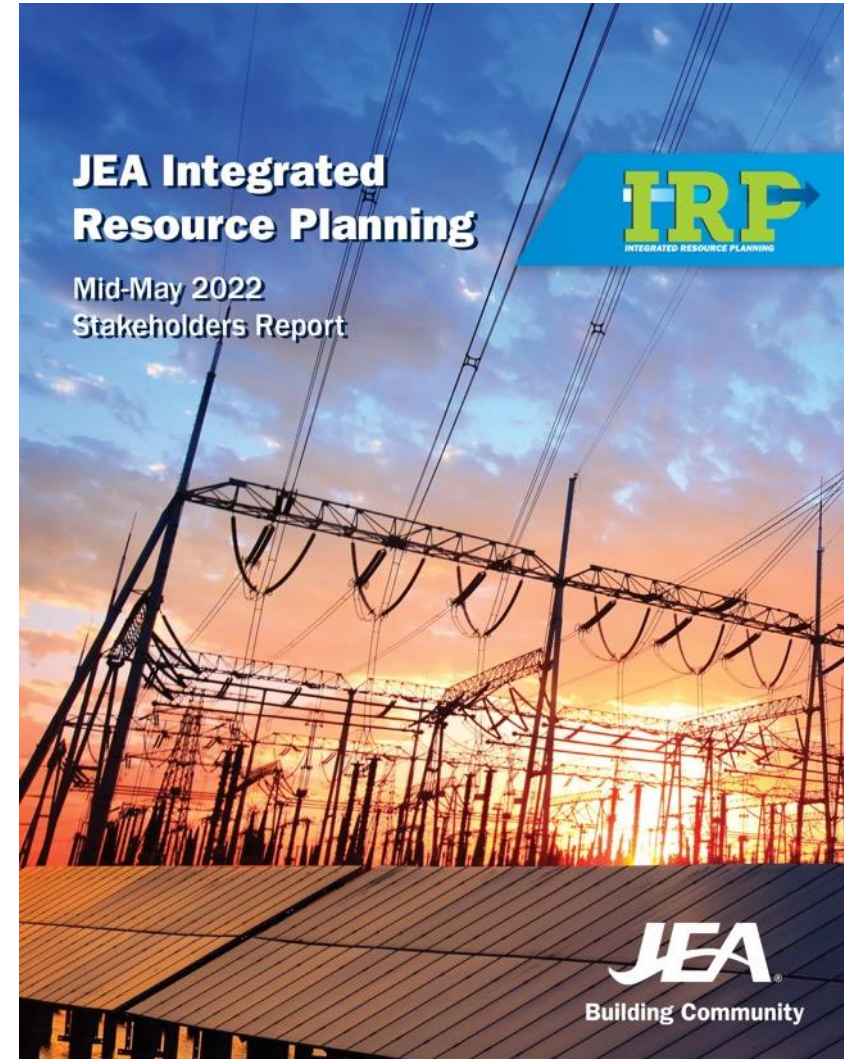
Stakeholder Feedback/Discussion



Questions

Stakeholder Insight

Report Overview





New Resource Options

**Bradley Kushner, Paul
Maxwell, Darren Bishop**
Black & Veatch Consultants

New Resource Options – Renewables

Solar

75 MW Solar Array



Solar Plus Storage

- 75 MW Solar Array with 37.5 MW Battery Storage
- 75 MW Solar Array with 75 MW Battery Storage



Stand-Alone Storage

- 37.5 MW Battery Storage
- 75 MW Battery Storage



Biomass

- 50 MW Biomass



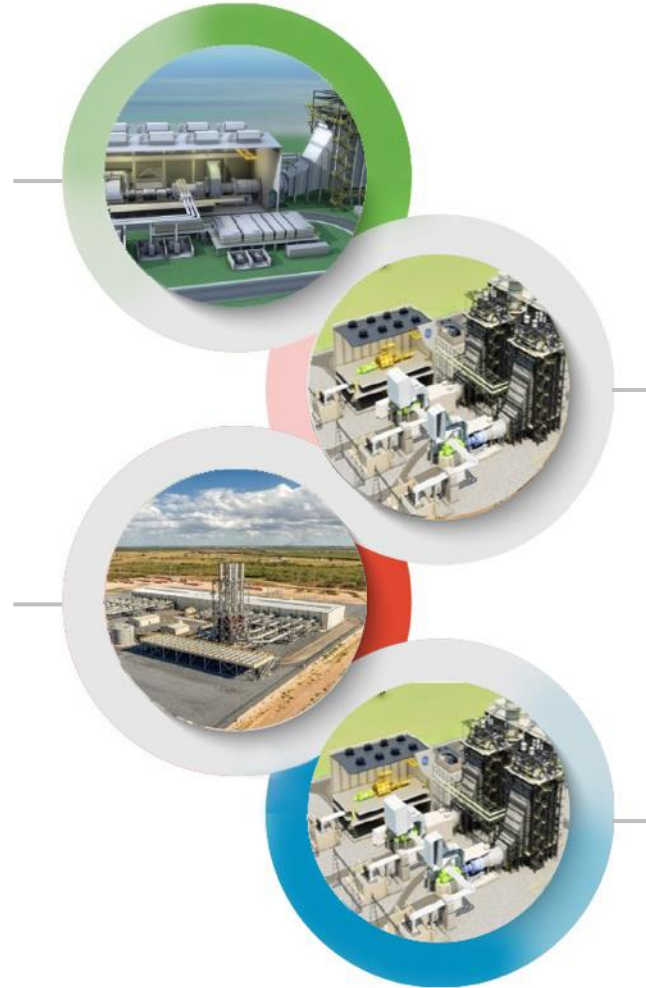
New Resource Options – Firming (Natural Gas)

Gas Turbine

- 91 MW 2x0 GE LM6000 PF SPRINT
- 111 MW 1x0 GE LMS100PA+
- 226 MW 1x0 GE 7FA.05
- 329 MW 1x0 GE 7HA.02

Reciprocating Engine

- 89 MW 5x0 Wartsila 18V50DF



Gas Turbine + Steam Turbine (Combined Cycle)

- 373 MW 1x1 GE 7FA.05
- 749 MW 2x1 GE 7FA.05
- 558 MW 1x1 GE 7HA.02
- 1119 MW 2x1 GE 7HA.02
- 1684 MW 3x1 GE 7HA.02
- 552 MW 1x1 GE 7HA.02 using Air Cooling instead of Water Cooling

Convert Existing Gas Turbine to Combined Cycle

- 318 MW Conversion of existing Gas Turbines at Greenland to 1x1 GE 7FA.05
- 638 MW Conversion of existing Gas Turbines at Greenland 2x1 GE 7FA.05

Future Technology Option – Hydrogen



Advanced Nuclear

- Relatively small-scale nuclear
- Technology in various stages of Nuclear Regulatory Commission licensing process
- Not yet commercially viable; anticipated to be available in 2035 timeframe



Small Modular Reactor

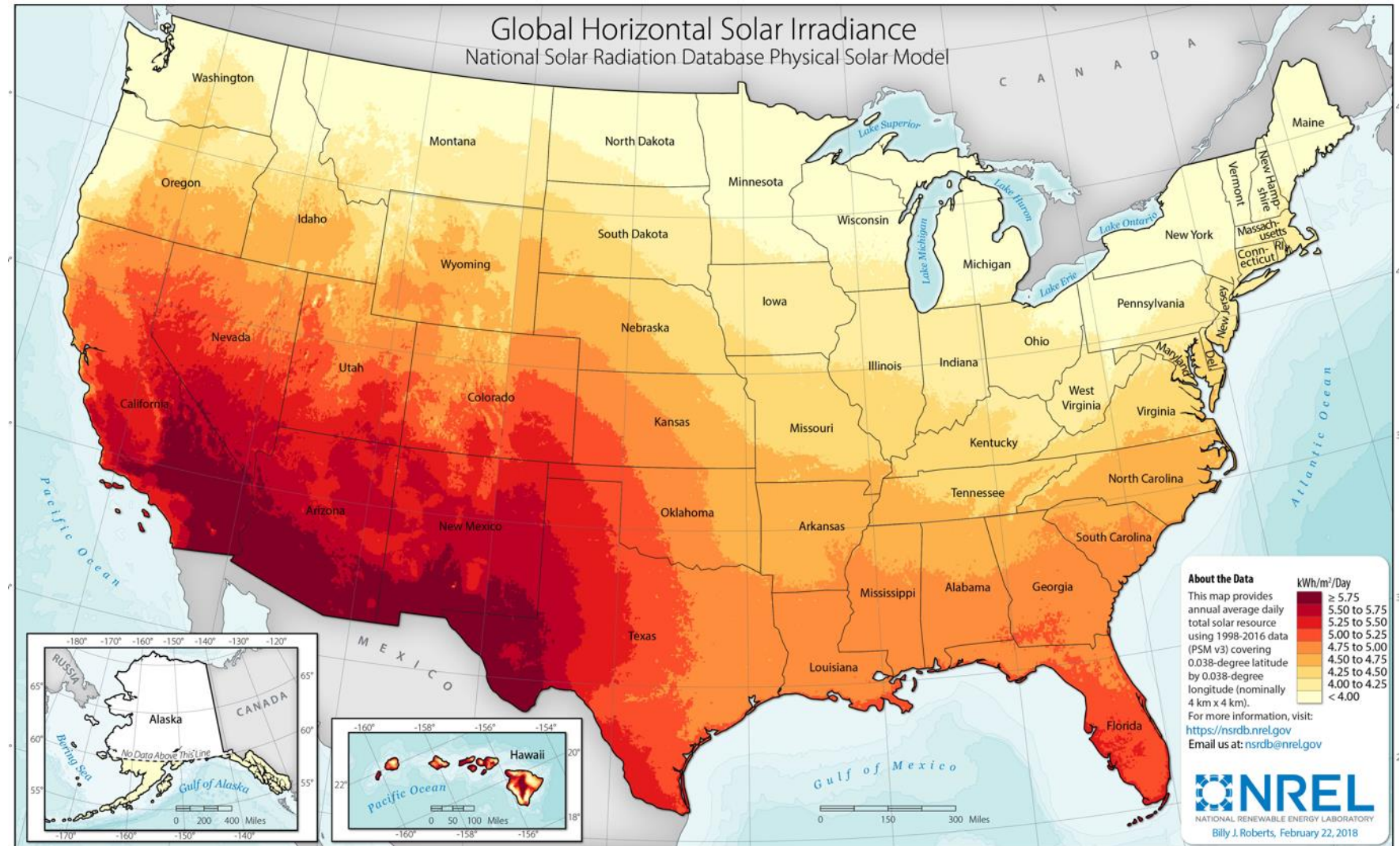
- 77 MW NUSCALE Power Module™
- 300 MW General Electric-Hitachi (GEH) BWRX-300
- 160 MW Holtec SMR-160
- NUSCALE currently projecting 2029 for first unit to be commercially operational

The background of the slide is a blue-tinted image of a city skyline, likely New York City, featuring several skyscrapers and a bridge over a body of water. In the bottom-left corner, there is a large, semi-transparent compass rose graphic with the letters N, E, and S visible.

Potential Sites for Solar Resource Options

Florida Solar Potential

- Florida has good solar resource potential
- Strongest in mid-state and south
- Northern and panhandle areas are similar in strength to the rest of the southeast and some western U.S. areas



SOURCE: <https://www.nrel.gov/gis/assets/images/solar-annual-ghi-2018-usa-scale-01.jpg>

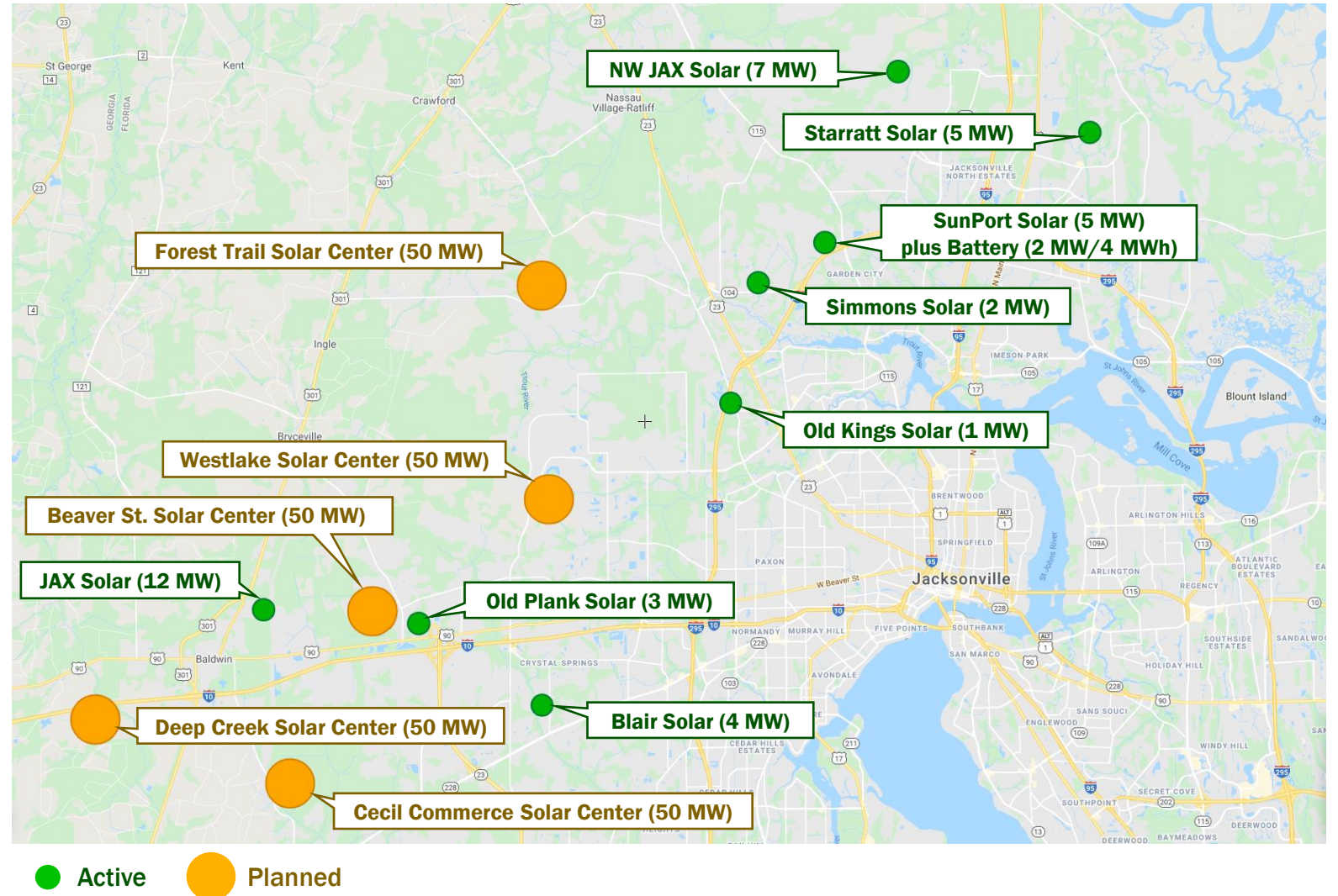
JEA Solar Generation

JEA already has eight solar sites in operation

- 1 - 12 MWs, 2010-2019
- One includes storage

Five new solar sites are under development

- 50 MW each
- JEA owns all the land and interconnects



Potential New Sites and Study Methodology



Scenario modeling results may call for significant amounts of new solar resource options

Deployment of 1,000 MW of new solar would require around 6,000 acres of land within and beyond the JEA service area*

We searched for sites for potential new solar resource options

- Used a GIS-based search tool for sites within Florida
- 22 different factors were evaluated (e.g. proximity to transmission, no wetlands, etc.)
- Scoring criteria were established for each factor
- Each site was scored based on how well it satisfies the criteria
- Scores were summed and sites were ranked by score

*Assuming 6 acres per MW which is a common industry assumption



Results

- Over 100 potential sites have been identified and ranked
- Spread across Duval and 23 other remote counties
- Each site is 450 acres to support 75MW
- Capacity vs. energy

Next Steps

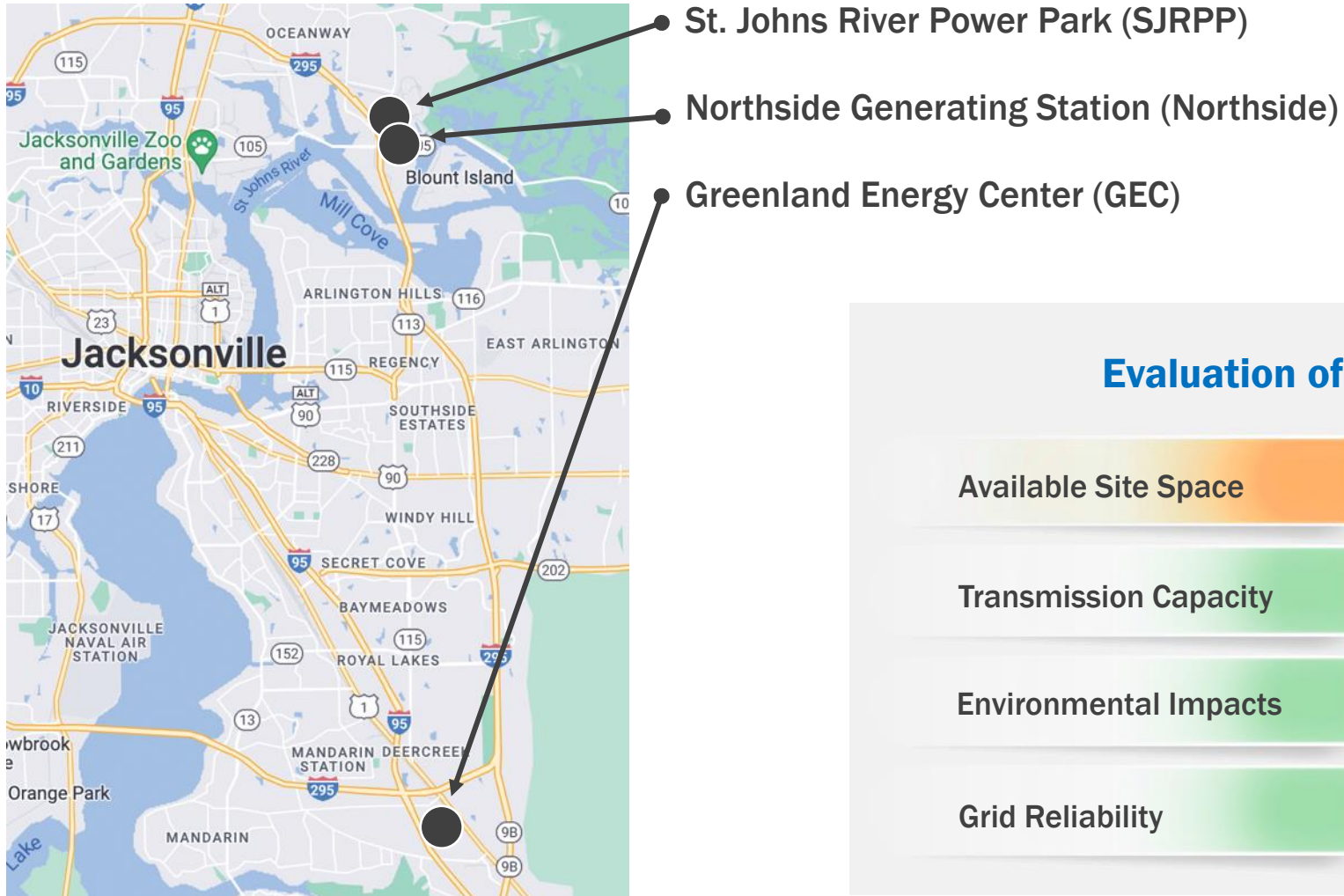
- Investigate additional local sites
- Estimate transmission improvements, costs*, losses and construction timing to deliver energy to JEA
- Include costs, losses, timing in modeling for each Scenario

*New solar is in demand by numerous other utilities. This competition may result in increased land costs

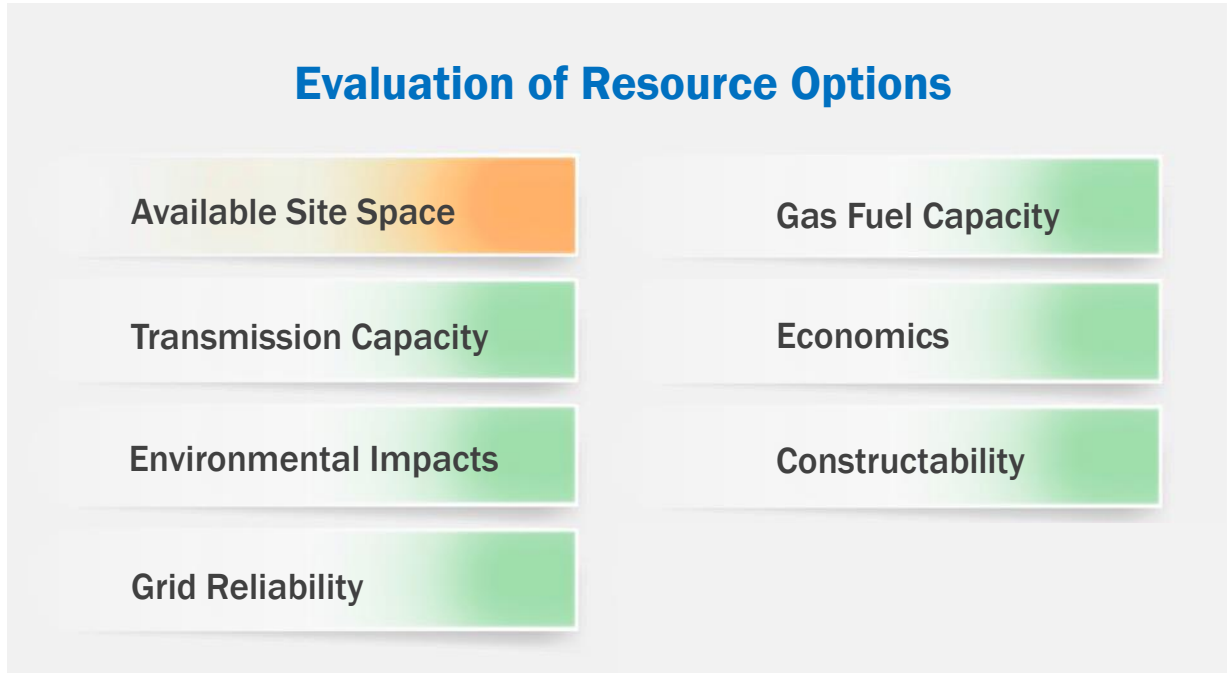
The background features a blue-tinted city skyline with several skyscrapers and a bridge over water. In the bottom left corner, there is a large, semi-transparent compass rose graphic with the letters N, E, and S visible.

Resource Options at Existing Sites

Existing JEA Sites Being Considered for Development



SOURCE: Google Maps



Evaluation Results - SJRPP



● SJRPP South (145 Acres)

Opportunities at SJRPP

145 Acres – SJRPP South

Existing transmission and distribution infrastructure in place

Solar

Insufficient land area (requires ~450 acres for 75 MW)

Biomass

Sufficient land area (requires ~43.5 acres for 50 MW)

Firming Gas-Fired Options

Sufficient land area for all 11 options

Battery Storage

Sufficient land area (requires ~5 acres for 75MW)

Evaluation Results – Northside Generating Station

Northside West (31.9 Acres)
Existing Unit 1 and Unit 2



Northside South (9.9 Acres)

Opportunities at Northside

9.9 acres at NGS South

31.9 acres – NGS West
Existing transmission and distribution infrastructure

Solar
Insufficient land area (requires ~450 acres for 75MW)

Battery Storage
Sufficient land area (requires ~5 acres for 75MW)

Biomass

Northside South
Insufficient land area

Northside West
Insufficient land area

Firming Gas-Fired Options

Northside South
Sufficient land area for the 5 smallest of 11 (peaking) options

Northside West
Sufficient land area (requires ~5 acres for 75 MW)

Evaluation Results – Greenland Energy Center

Greenland South
(10.5 Acres)

Greenland East
(28.1 Acres)



Opportunities at Greenland

28.1 acres – GEC East

10.5 acres – GEC South

Existing transmission and distribution infrastructure

Solar Options

Insufficient land area (requires ~450 acres for 75MW)

Biomass

Insufficient land area

Firming Options

Sufficient land area for all options

Battery Storage Options

Sufficient land area (requires ~5 acres for 75MW)

Conversion/Upgrade

Sufficient land area for 2 of 2 resource options



Scenario Modeling and Sample Results

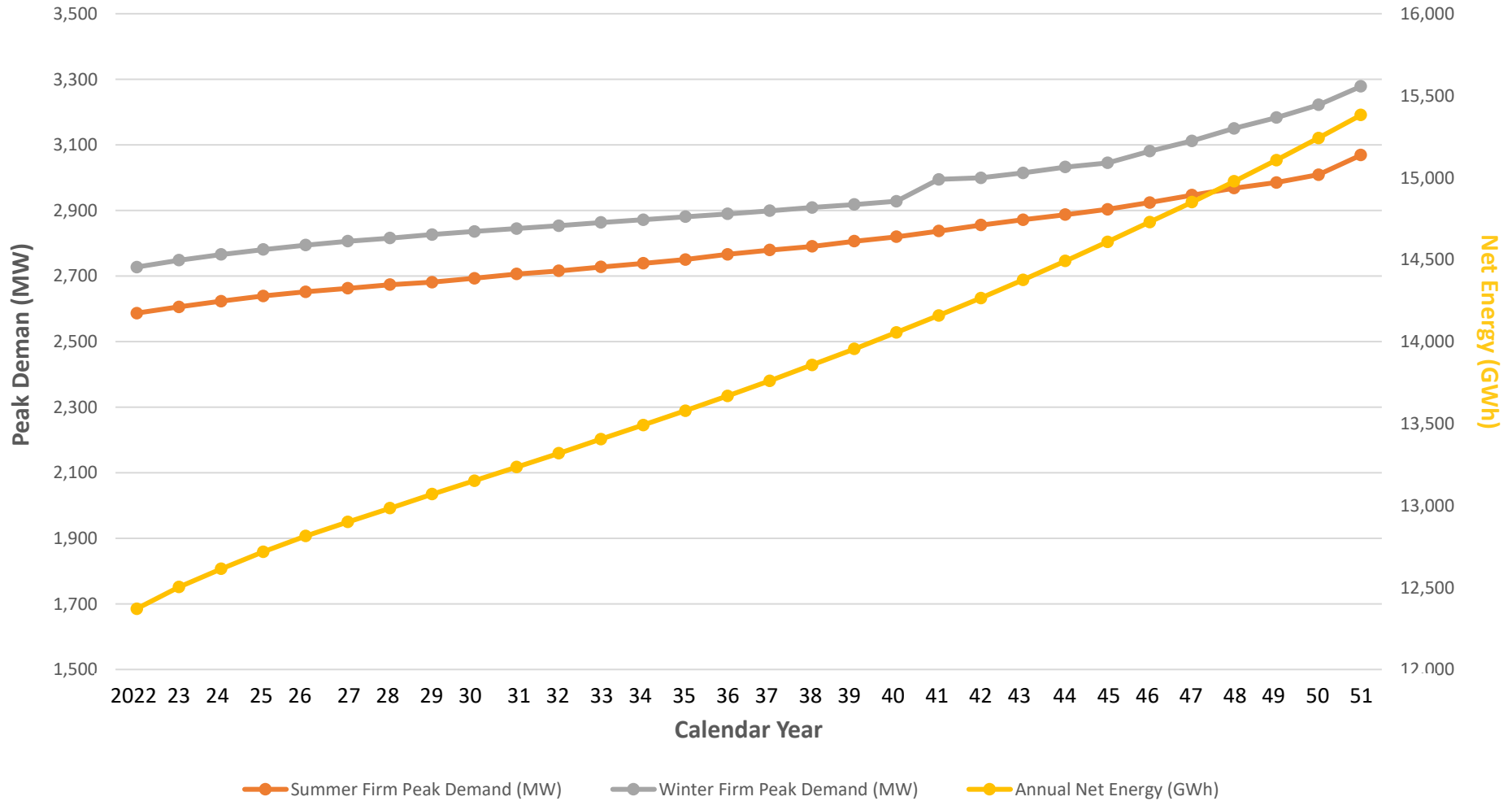
Bradley Kushner
Black & Veatch Consultants



Peak Demand and Energy Forecasts



Forecast Peak Demand (MW) and Annual Energy Requirements (GWh)



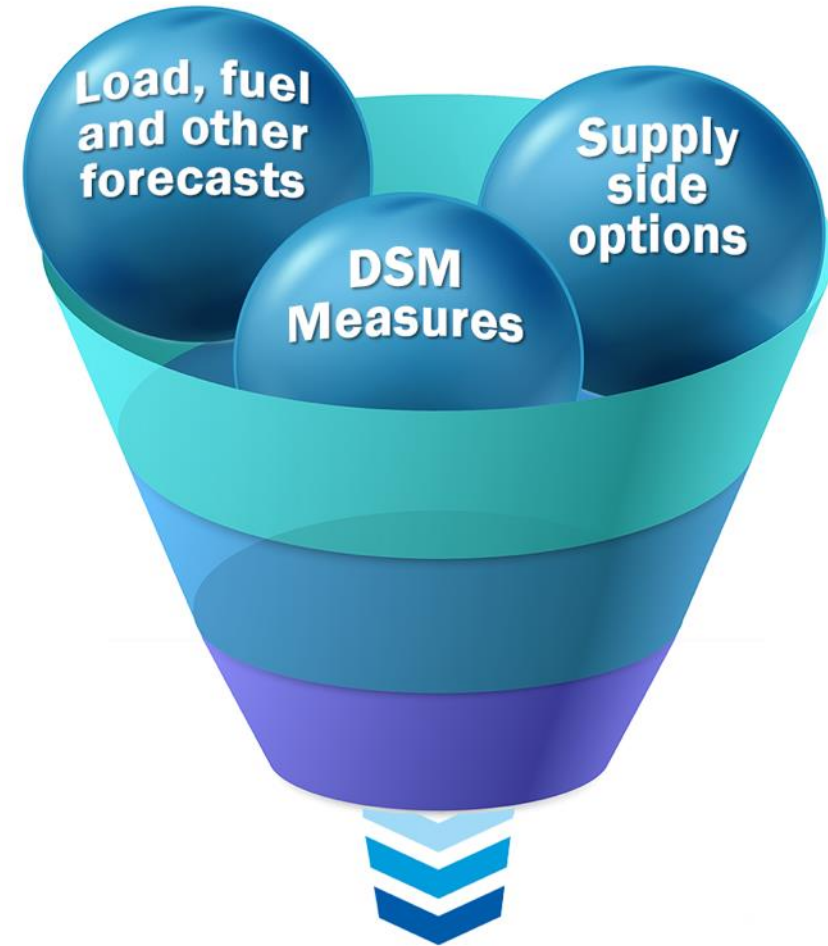
Optimization through PLEXOS Modeling

The JEA electrical system is replicated within a PLEXOS database (a “Digital Twin”)

- Properties and behaviors of the current and future physical system are converted into a mathematical system
- An optimization is then performed on the mathematical system to identify which resource options should be implemented in which years and in which numbers to satisfy the demand at the lowest total overall capital and operating cost

Optimization is for both resources (capacity expansion) and operation (operating simulation)

Optimization of a scenario can take several hours or days to run

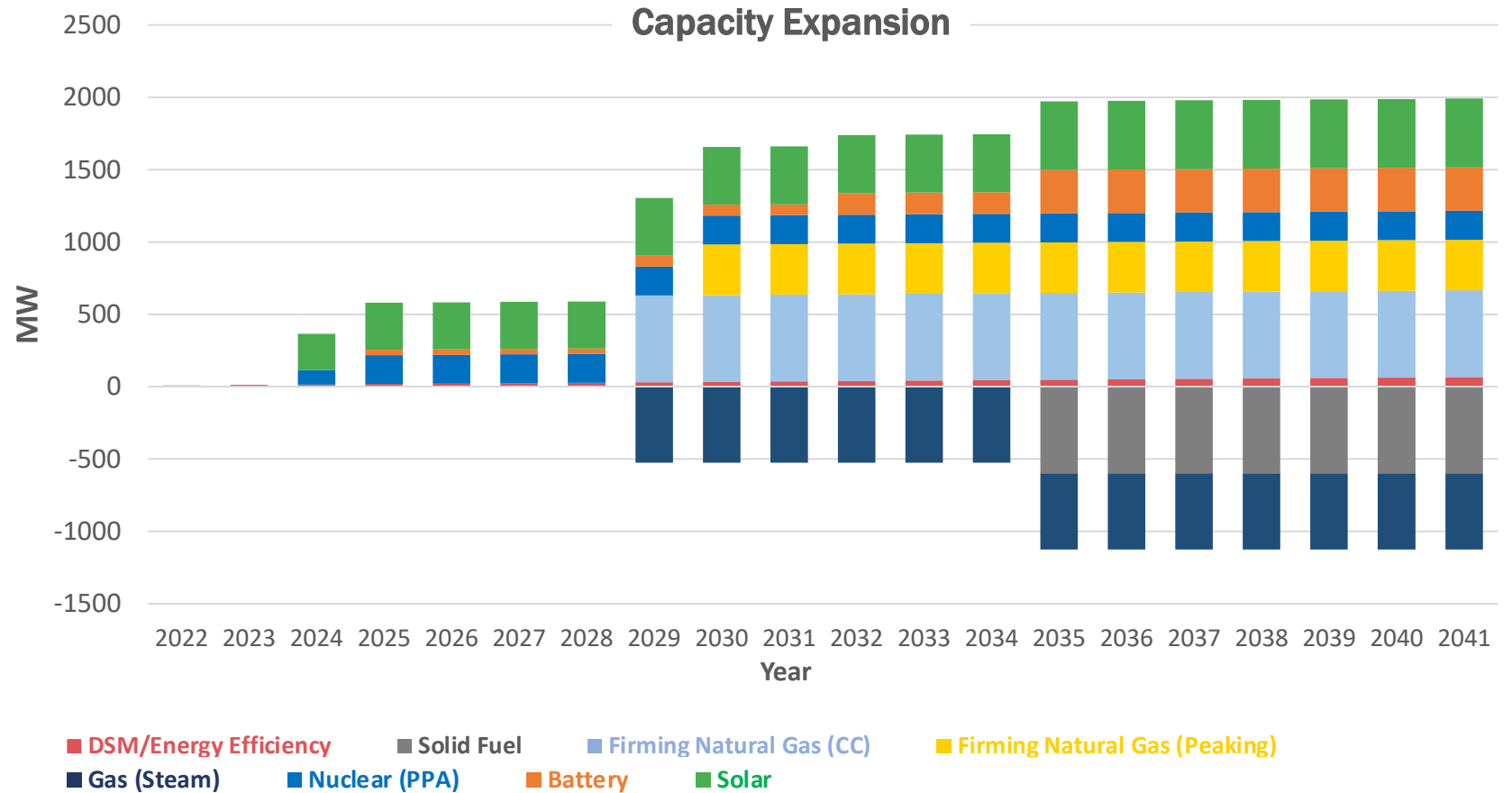


Optimal Capacity Expansion and Operation

Capacity Expansion Plan Results



Results of the expansion plan for each Scenario will illustrate the annual additions (new resource options) and subtractions (existing resource retirements) to the JEA resource portfolio



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Open Discussion and Next Steps

Laura Schepis
Chief External Affairs Officer

What is Important to You?

- What would Stakeholders like to see at upcoming Stakeholder meetings?
- Is there anything related to the electric industry you'd like to learn more about?
- Can we improve this experience for you in any way?

