Welcome

Raynetta Curry Marshall
Chief Operating Officer
IRP Stakeholder Meeting Agenda

1) Welcome & Introductions
   Raynetta Curry Marshall, Chief Operating Officer, JEA

2) February 9 Stakeholder Meeting Recap
   Laura Schepis, Chief External Affairs Officer, JEA

3) Planning Elements: A Closer Look
   - JEA Load Forecast – Melinda Fischer, Electric Generation Planning Manager, JEA
   - Plug-In Electric Vehicles – Felise Man, Black & Veatch Consultants
   - JEA Demand-Side Management/Energy Efficiency Programs & Initiatives – Brian Pippin, Strategic Segment Manager, JEA

4) Refine Proposed IRP Scenarios
   Brad Kushner, Black & Veatch Consultants

5) Open Discussion and Next Steps
   Laura Schepis, Chief External Affairs Officer, JEA
February Stakeholder Meeting Recap

Laura Schepis
Chief External Affairs Officer
Stakeholder Questions and Comments

• Customer input for JEA to consider when developing its load (peak demand and energy) forecast.

• Extent to which IRP will include strategies for increased energy efficiency and targets for sales reductions through increased efficiency.

• Consideration of future flood projections, and the need for/costs of potential upgrades to JEA’s electric system (elevating assets, hardening grid, etc.). Other environmental regulations other than CO$_2$ that will affect fuel costs.

• How JEA may be able to help customers manage upfront capital cost for solar or unfavorable rates if using third party to build and buy power back. Replacement of the Northside Generating Station with a cost-effective, lower emission energy sources.

(Continued on next slide)
Recap of February Stakeholders Meeting

Stakeholder Questions and Comments

• Ancillary services from loads (sync reserve, 10 and 30 spin) associated with intermittent resources (DER or otherwise).

• Expansion of resiliency and reliability in the variables and considerations similar to CO₂.

• Expansion of JEA’s Neighborhood Energy Efficiency (NEE) Program be expanded/enhanced to include home weatherization.

• Increased adoption around customer generating and repayments to customers when generating electricity returns to the grid. JEA’s position regarding customer solar.

• Avoiding “stranded assets” as new generation is added due to technology advancements?

• JEA’s reporting of CO₂ emissions.
JEA Load Forecast

Melinda Fischer
Electric Generation Planning Manager
JEA Forecast Overview

Forecast Divided into Different Classes

*Econometric Forecasting Analysis Methodology*

- Residential
- Commercial
- Industrial
- Electrification
- Demand-side Management/Energy Efficiency
- Other (Streetlights, Off-System Sales)

Data Sources

- Historical Weather & Temperatures
- Historical & Forecasted Economic Data
- Total Inventory Space
- Energy Sales and Number of Customers
Energy Forecast Calculation

Trend analysis performed on weather-normalized energy sales as well as historical and forecasted economic inputs

Economic Inputs:

Residential
Total population, number of households, number of housing starts, median household income

Commercial
Number of employments by Commercial classifications, total commercial square foot inventory, gross domestic product

Industrial
Number of employments by industrial classifications, gross domestic product
Peak forecast using Load Factor methodology.

Forecasted Load Factor based on 10 years average load factor calculated from normalized historical energy and peaks.

The peak forecasts are done by seasons. 
*Summer:* June to August
*Winter:* December to February

Forecasts for electrification and energy efficiency are done separately.
Plug-In Electric Vehicles

Felise Man
Black & Veatch Consultants
JEA Plug-In Electric Vehicle (PEV) – Current Outlook Scenario

PEV adoption and impact to electric forecasts are incorporated into JEA’s IRP load forecast

Key Observations – JEA Service Territory

- PEV vehicle growth forecasted to 12% annually
- By 2050, PEVs add 2.2% to Net Energy Load and 6.2% to Summer Peak
- Winter Peak shifted from historic evening hours to afternoon
Plug-In Electric Vehicle (PEV) Forecast

Current light-duty vehicle outlook informed by anticipated population growth, disposable income, and historical adoption rates

Inputs & Assumptions

**Historical Vehicle Registration**
- Registered Vehicles Duval County
- Existing PEVs

**Economic Forecast**
- Population Growth
- Median Income

**Forecast Energy Costs**
- Vehicle Efficiency
- Vehicle Miles Traveled
- Residential Electric Rate
- Gasoline Price Forecasts

PEV Growth
- Regression Analysis

Impact to Energy Forecasts

Results

Energy Forecasts
- Impact to Energy Load (MWh)
- Impact to Peak Demand (MW)

Charging Assumptions
- PEV Vehicle Types and Battery Capacity
- Daily Charge Pattern (US Census 2013)
- On Board Charge Rate
Additional PEV Forecasts

Different outlooks for PEV adoption and impacts will be developed and applied to meet scenario intents

- **Vehicle Type**
  - Passenger
    - Light Duty Vehicles
  - Commercial & Industrial (C&I)
    - Light, Medium and Heavy-Duty Vehicles

- **Economic Inputs**
  - Population Growth
  - Disposable Income
  - Commercial Growth

- **Key Adoption Drivers**
  - Historic Adoption
  - “Stock Rollover” Share of PEV Sales driven by policy targets/manufacturer projections
  - “Stock Rollover” Vehicle Availability Customer Economics
JEA's Existing Demand-Side Management/Energy Efficiency Programs and Initiatives

Brian Pippin
Strategic Segment Manager, Customer Solutions and Market Development
Regulated vs. Non-Regulated Programs

Florida Energy Efficiency & Conservation Act (FEECA)

- Reduce growth of weather-sensitive peak demand
- Reduce/control the growth rate of electricity consumption
- Reduce consumption of scarce resources (petroleum fuels)
JEA's Electric Demand-Side Management Portfolio

- Residential Energy Upgrades
- Residential Energy Efficient Products
- Residential Energy & Water Assessments
- Residential Solar Water Heating
- Residential Home Energy Efficiency
- Commercial Prescriptive (non-lighting)
- Commercial Custom
- Commercial Small Business Direct Install
- Commercial Energy & Water Assessments
- Commercial Prescriptive Lighting
Potential Future Demand-Side Management/Energy Efficiency/Customer-Sited Generation

Jim Herndon
Black & Veatch Consultants
Demand Side Management (DSM) analysis includes forecasting the market potential for the following:

**Energy Efficiency**
Reduce overall energy usage through upgrades to higher efficiency equipment, controls, other energy-saving measures.

**Demand Response**
Short term reduction in participants’ demand for electricity when JEA’s system demand for electricity is at its highest.

**Rooftop Solar and Battery Storage**
Installation of customer-sited rooftop solar and battery storage systems by JEA’s residential and commercial customers.
Describe the Market
- Customer segmentation
- Equipment baselines
- Identify where the opportunities lie

Achievable Potential
- Incorporate market dynamics
- Historic program participation
- Adoption rates of energy efficiency
- Determine savings potential from JEA programs
- Quantify potential costs and benefits

Characterize the Measures
- Engineering review of available technologies
- Screen for cost-effectiveness
  - Avoided Costs
  - Measure Incremental Costs
  - Program Admin Costs

Scenario Analyses
- Account for parameter changes from different modeling scenarios
DSM Energy Efficiency Forecast

Estimate Technical Potential

- Technical Potential of Efficient Measures
- Total Number of Households
- Base Case Equipment Energy Use Intensity (therms/unit)
- Saturation Share
- Remaining Factor
- Applicability Factor
- Savings Factor

Estimate Economic Potential

Screen Measures for Cost-Effectiveness and Report Associated Potential

Estimate Achievable Potential

Graph showing the percentage of potential achieved from 2021 to 2021 with different curves for Retrofit in 21, Retrofit in 30, Retrofit in 40, Retrofit in 50, Achievable Low, Achievable Base, Achievable High, and Tech/ Econ.
DSM Demand Response Forecast

Based on curtailable load from eligible sources during system peak hour for each season

**Residential**
- Air conditioning (Summer)
- Heating (Winter)
- Water Heaters (Year round)
- Pool Pumps (Summer)

**Small/Medium Business**
- Air conditioning (Summer)
- Heating (Winter)

**Large Commercial and Industrial**
- Total load (based on assumption that these customers will shed all load if you are willing to pay them enough)
Key Inputs

• Technology costs
• Performance characteristics
• Building stocks, roof area estimates
• Load and generation shapes
• Electric rates
• Tax credits and incentives

Key Outputs

• Adoption forecast by sector (Residential, Non-residential)
• MW installed, MWh generated, Peak MW impacts
• Hourly energy and peak demand impacts (hourly)
• Optimal storage dispatch
Refine Proposed IRP Scenarios

Bradley Kushner
Black & Veatch Consultants
Proposed IRP Scenarios

(as Presented on 2/9/2022)

Current Outlook

1. Economic Downturn
2. Efficiency + DER

3. Increased Electrification
4. Efficiency + DER + Lower Emissions
5. Future Net Zero
Variables and Considerations Influence Scenarios

The following variables and considerations may differ when comparing one Scenario to another:

- **Environmental Regulations**
  - Costs for emissions of carbon dioxide (CO2)
  - Specific targets for % of energy from resources that do not emit CO2

- **Load Growth**
  - Energy
  - Peak Demand
  - Demand-Side Management/Energy Efficiency
  - Plug-In Electric Vehicles
  - Electrification
  - Customer-Sited Generation

- **Fuel Costs**

- **Continued operation of existing generating units**

- **Cost for new Generating Resources**

- **Affordability** • Maintain system reliability • Environmental justice • Economic development • CO₂ emissions reductions
Example Scenario Comparison

Scenarios are developed to analyze resource decisions under various potential futures

- Each scenario looks at different areas and considers changes to variables relative to the current outlook
- Variables in current outlook are noted as "Base" or "None"
- Variables for other scenarios are shown relative to the Current Outlook variables:
  - **High** = lead to higher/larger outcome than the base
  - **Low** = lead to lower/smaller outcome than the base

This Chart illustrates the Current Outlook and Efficiency + DER + Lower Emissions scenarios
Scenario: Natural Gas Price Projections

Reflect near-term and longer-term assumptions

• Near-term prices based on NYMEX futures
• Longer-term prices based on escalation factors included in US Energy Information Administration (EIA) Annual Energy Outlook (AEO)

Include consideration of differential in prices for natural gas to be delivered to JEA’s generating units

• Price projections for natural gas at Henry Hub
• Additional costs for delivery to JEA
Open Discussion and Next Steps

Laura Schepis
Chief External Affairs Officer
Proposed IRP Scenarios

(as Presented on 2/9/2022)

1. Current Outlook
2. Economic Downturn
3. Efficiency + DER
4. Increased Electrification
5. Efficiency + DER + Lower Emissions
6. Future Net Zero
Open Discussion

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?
Next Steps

Mid-May report delivered on scenarios

Next Stakeholder Meeting

• Next Meeting: June 9, 2022 starting at 12:00 PM
• Topic of Discussion: Present Supply Side Options and DSM Potential
• Engage with Stakeholder Members & JEA Team
• We want your ideas...Share your thoughts and Opinions
• WE APPRECIATE YOU!
Appendix
IRP Stakeholder Participants

Reginald Caldwell
Bethel Baptist Institutional Church

Kimberly Cobb-Ray
NE Florida Community Action Agency (NFCAA)

Anne Coglianese
City of Jacksonville (COJ)

Gloria Crawford
COJ, Senior Services Division

Logan Cross
Sierra Club

Sam Dean
Baptist Medical Center

Greer Gillis
Jacksonville Transportation Authority

Jacob Gordon
Downtown Vision

Diana Greene
Duval County Public Schools

John Hale
University of North Florida

David Jones
Jacksonville Aviation Authority

Christina Kelcourse
North Florida Green Chamber of Commerce

Mari Kuraishi
Jesse Ball DuPont Fund

Linda Levin
Elder Source

Jeanne Miller
Jacksonville Civic Council

David Millinor
Mayport Naval Base

Charles Moreland
COJ, Mayor’s office

Lake Ray
First Coast Manufacturers Association

Lisa Rinaman
St Johns River Keeper

John Sapora
Local Initiative Support Corporation (LISC)

Lucinda Sonnenberg
Jacksonville University

Jessie Spradley
Northeast Florida Builders Association (NEFBA)

Jeff Winkler
United Way of Northeast Florida

Shamika Wright
JAX Chamber

Mark Zimmerman
CMC
JEA PEV High Adoption Forecast

More aggressive forecast will be used in select IRP Scenarios and leverage a stock rollover rather than a historical adoption approach.

Inputs & Assumptions

**Historical Data**
- Registered Vehicles Duval County
- Existing PEVs (Florida Department of Highway Safety and Motor Vehicles)

**Economic Forecast Data**
- Population Growth (Moody’s)

Results

**Vehicle Growth Forecast**
Stock Rollover Model

**Impact to Energy Forecasts**

**PEV Growth Forecast**

**Energy Forecasts**
- Impact to Energy Load (MWh)
- Impact to Peak Demand (MW)

Inputs & Assumptions

**Share of PEV Sales**
- Policy targets (e.g. Electric Vehicle Action Plan)
- Manufacturer Sales Offering

Inputs & Assumptions

**Charging Assumptions**
- PEV Vehicle Types and Battery Capacity Daily Charge Pattern (US Census 2013)
- On Board Charge Rate

Results

“Stock rollover” model informed by population growth, vehicle turnover rate, and PEV sales targeted by policy and/or manufacturer projections.
C&I Electrification Incentive Program

Commercial electrification informed by commercial growth, vehicle turnover rate, and PEV sales by economics and vehicle availability

**Inputs & Assumptions**

- **Historical Data**
  - Registered Vehicles Duval County
  - Existing PEVs (FL Dept of Highway Safety and Motor Vehicles)
  - Program participation rates

- **Economic Forecast**
  - Commercial Growth

**Turnover Analysis**

- **Share of PEV Sales**
  - Economics and vehicle available by economics, vehicle availability

**Vehicle Growth Forecast**

- "Stock rollover" model informed by commercial growth, vehicle turnover rate, and PEV sales by economics and vehicle availability

**Impact to Energy Forecasts**

- **Energy Forecasts**
  - Impact to Energy Load (MWh)
  - Impact to Peak Demand (MW)

**Results**

- **PEV Growth Forecast**

**Charging Assumptions**

- Daily Charge Pattern

**Daily Charging Pattern**

- 0% 50% 100%
- 0 10 20
Demand Side Management

Rooftop Solar and Storage: SPIDER™ Model
(Spatial Penetration & Integration of Distributed Energy Resources)
Demand Side Management

Analyze load forecast to determine how the system load shape is expected to change over the study horizon

Potential shifts include:
- Change in peak hour
- Change in peak season (e.g. summer to winter)

Assessing Potential:
- Which loads and customers can be curtailed to achieve system benefits?
- What options and strategies exist for making those reductions?
- Which customers are likely to be cost effective for the selected strategies?
- What induces customers to participate and offer curtailment services?
Emerging Technologies - Energy Storage

Solar energy results in carbon emission reduction benefits.

However, customer net load increases late in the day when the sun is setting.

Adding energy storage is a key solution, allowing us to take and store solar energy in the morning and discharge it later to serve load.
**Emerging Technologies - Energy Storage**

**Battery energy storage is the leading technology**
- Broadest application range and most proven

**Lithium Ion is leading battery storage chemistry**
- Lowest cost, highest modularity
- Leveraging electric vehicle supply chain

**Asian companies are leading manufacturers**
- BYD (China)
- LG (South Korea)
- Panasonic (Japan)
Emerging Technologies - Energy Storage

Potential Storage Options

• 25 MW capacity x 1-hour duration (=25 MWh)
• 50 MW capacity x 4-hour duration (=200 MWh)
• Multiples of each option can be combined into a larger plant
• Individual containers or housed in single building
• Integrated with adjacent solar plant or stand-alone

50 MWh Tesla Battery at a Solar Farm In Australia