From: McInall, Steven G. - Dir, Electric Production Resource Planning <mcinsg@jea.com>
Sent: Monday, September 10, 2018 10:03 AM
To: Crawford, Juli E. - Manager - Financial Planning & Rates
Subject: FW: Electrification Presentation
Attachments: JEA-ICF Presentation to JEA Board - CSMD 9-10-2018.pptx

FYI. Good luck working this in with your "gloom and doom" presentation.

Steve McInall. P.E.
Director, Electric Production Resource Planning
Direct: (904) 665-4309
Mobile: (904) 312-0739

From: Nichols, Vicki D. - Dir Customer Solutions & Market Development
Sent: Monday, September 10, 2018 9:54 AM
To: McInall, Steven G. - Dir, Electric Production Resource Planning <mcinsg@jea.com>
Subject: Electrification Presentation

Steve,
I appreciate your helpful feedback on our EV presentation. We made some key additions and it set a tone for further alignment with forecasts and financial performance. Here is a copy of the final just finished Friday. Really appreciate your teamwork.

Vicki D. Nichols
Director, Customer Solutions & Market Development
JEA

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JEA is a not-for-profit, community owned utility

BOARD MEMBER of
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EXHIBIT
3
7/8/20 C McInall
PENGAD 800-631-6989

Electrification

An Emerging Market

Kerri Stewart
Chief Customer Officer

9/18/2018

Agenda

- JEA Electrification 101
- JEA Strategy To Date
- JEA's Bold Electrification Future
- Introduction to ICF
- Business Drivers for Electrification
- Approaches to Electrification
- Program Examples
- Considerations with Electrification
- A Strategic Path Forward for JEA

Electrification 101: What is Electrification?

Electrification describes the adoption of electric end-use technologies.

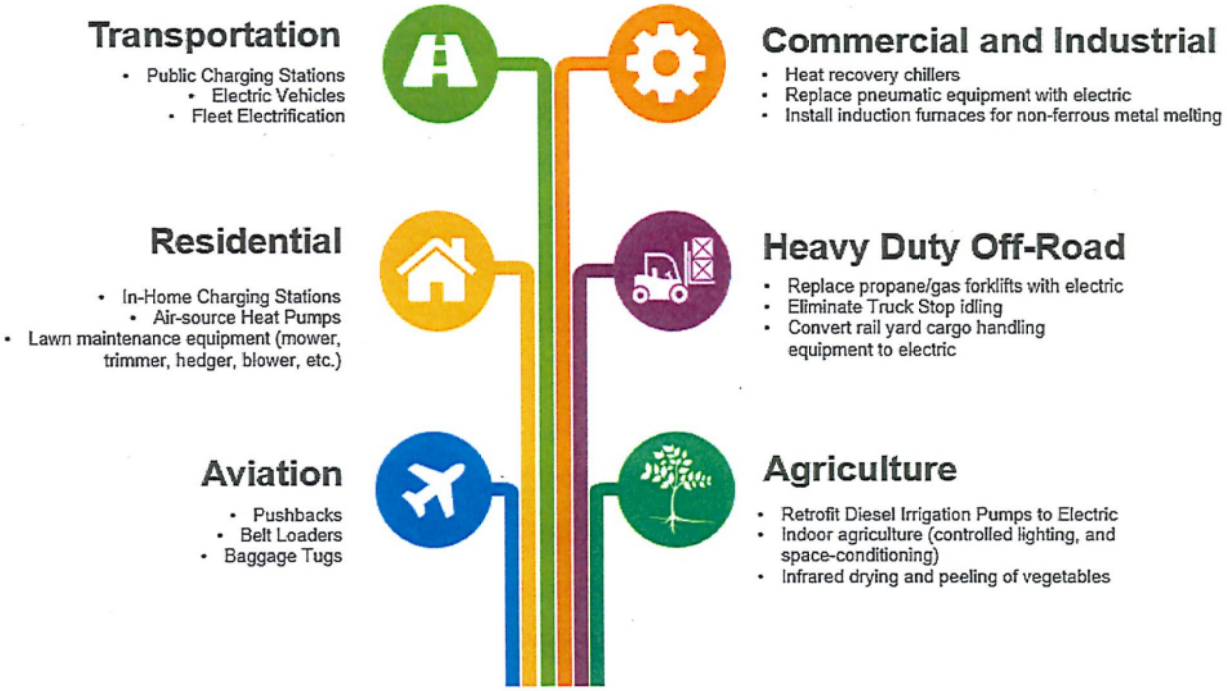
- *Electric Power Research Institute*

Electrification is the shift from any non-electric source of energy to electricity at the point of final consumption.

- *National Renewable Energy Lab*

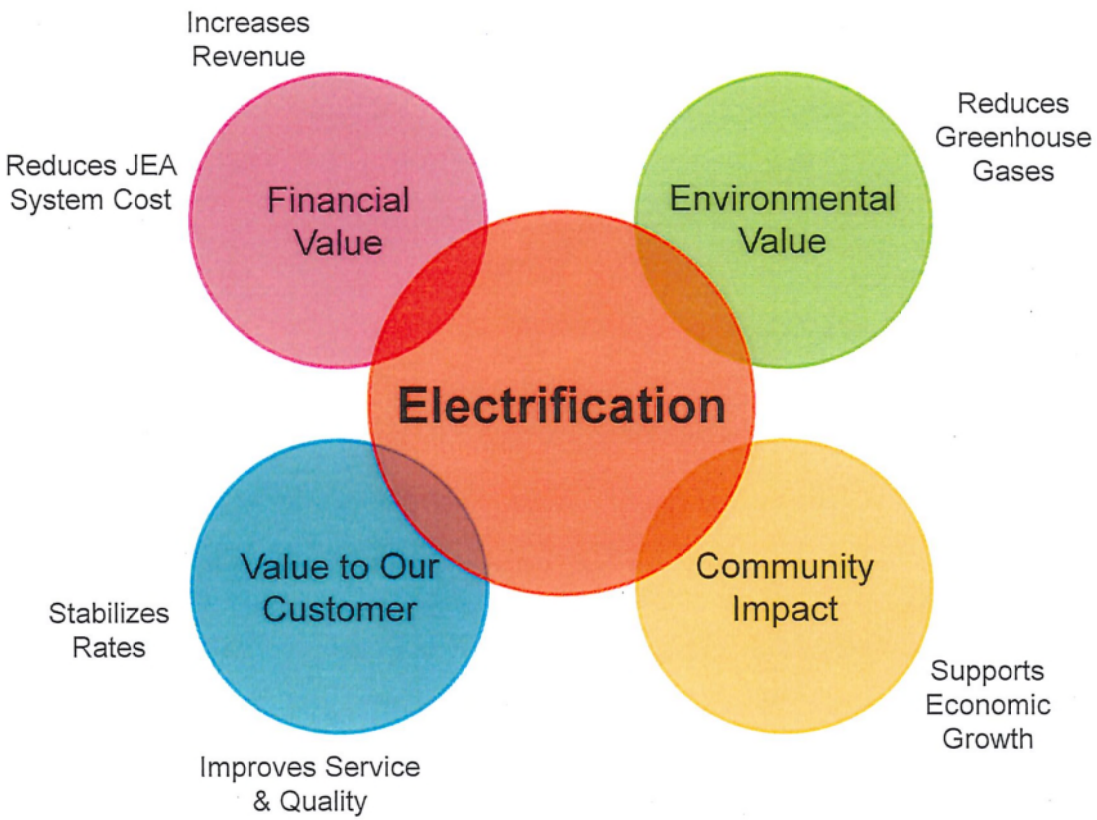
Beneficial Electrification requires that it be cost-effective for JEA, good for all customers (whether they participate in the program or not), and good or neutral for the environment.

- ICF



Source: Nexant, Electrification and the Utility of the Future, http://www.nexant.com/resources/electrification-and-utility-future

Why Electrification is so Important for JEA?



Supports All JEA's Core Values

JEA Strategy to Date

Leader Since 2014

On-Road Electrification Program

- Incentives on new Electric Vehicles
- Strategic partnership with Transportation Planning Organization (TPO) and Drive Electric Florida

Off-Road Program

- Conversion of commercial and industrial diesel/propane equipment to electric
- Direct business to business customer analysis and sales

On-Road Program Summary

Components

- EV Educational Forums
- Charging Infrastructures Support
- Trusted Advisor
- Promotional Outreach

Incentives

New Electric Vehicle	JEA Incentive
Battery size less than 15kWh	$500
Battery size of 15kWh or higher	$1,500

Results

- ✓1,032 EVs in Jacksonville
- ✓~$400k revenue
- ✓Program ROI (171 qualified participants) = 135%
- ✓High market growth projected

Non-Road Electro-technology (NRE) Program Summary

Components

- Marketing
- Vendor Training
- Consultation with JEA Customers
- Technical Support
- Financial analysis
- QA/QC inspections
- Incentive Payment

Incentives

Electrotechnology	JEA Incentive
Forklifts	$300
Airport Ground Support Equipment	$100 – $600
Truck Refrigeration Units	$200
Heavy-Duty Truck Stop Electrification	$200
Cranes	$15,000 – $75,000
Golf Carts	$50
Welders	$500

Results

- ✓ $8.8M revenue
- ✓ 67% of new sales off-peak
- ✓ Annual Budget ~$900k
- ✓ Program ROI = +1200%
- ✓ 267 participants
- ✓ 100% customer satisfaction

Strong Non-Road Participation and Customer Satisfaction

Sample Feedback

"The program is exactly as advertised and works very well, [the program] has been excellent to work with and always keeps us abreast of opportunities that we may not have thought of."

J. Peacock Southeastern Toyota/JM Family Enterprises

"We could not be happier with the program and with JEA. JEA treats us very well and we do appreciate that."

Jack McDuffie, Sysco Foods

"When we first entertained the idea of going to electric from diesel with our cranes we were skeptical. The program works very well for us, we have reduced our annual costs, electric versus diesel, and are looking forward soon to more conversions to electric.

Lynn Westbrook, Jacksonville Port Authority

"BMW is very happy with the program...We are very grateful to JEA."

Christopher McMurray, BMW Distribution Center

Notable Participants

JAXPORT Jacksonville Port Authority
Malnove Packaging & Packaging Solutions
America's Navy Forged by the Sea
Kraft
GE
United States Postal Service
amazon
FedEx
Volvo
Heinz
Publix
Toyota
BMW
Mercedes-Benz
Good things come from Sysco
Medtronic
Winn-Dixie
Hans-Mill Corporation
Crowley
GE Oil & Gas
JM Family Enterprises, Inc.
Pilot
Unilever
Office of Sheriff Jacksonville Police

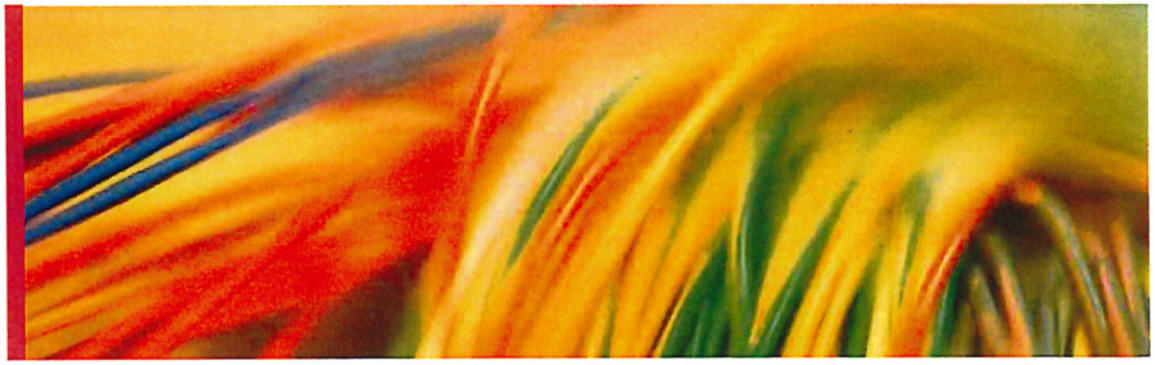
JEA's Bold Electrification Future

There exists an opportunity to increase the scale and scope of both the on-road and non-road program. By adding additional technologies, program design elements, and budget, JEA may be able to:

- Quadruple the revenue and values from the programs
- Put downward pressure on rates
- Provide a more flexible and efficient JEA load shape
- Significantly reduce JEA's (and its customers') environmental footprint

JEA is currently conducting a study with ICF to quantify the costs and risks of pursuing this opportunity. The study will be complete in 2019.

icf.com



David Pickles

Senior Vice President – Commercial Energy

Introduction to ICF

More than **5,000** People

55% Female Leaders and Gender Pay Equity

$1.2B In annual revenue

1 Providing More Electrification Services to Utilities than any other Consultancy

9 Global Sectors

Energy, Transportation, Government, Environment, Health, Education, Retail, Consumer, and Hospitality Sectors

Electrification Services

- Strategic Planning
- Technology Screening
- Market Assessment
- System/Locational Impact Analysis
- Environmental Impact Analysis
- Cost-Effectiveness Evaluation
- Program Design
- Marketing & Outreach
- Program Delivery
- Program Evaluation

Electrification Clients

Utilities

CenterPoint Energy, TVA, SMUD, JEA, Pacific Gas and Electric Company, Southern California Edison, Entergy, SRP, Duke Energy, Ameren Missouri, Southern Company, Alliant Energy, Joint Utilities of New York, SDGE, Yukon Energy, Sonoma Clean Power

Non-Utilities

CalETC, NJTPA, nyserda, dvrpc, SANDAG, Alberta Transportation, CVAG, scta, County of Los Angeles California, Metro, Tahoe Regional Planning Agency, Pima County Arizona, STA, Bay Area Air Quality Management District, NREL, MT

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Business Drivers of Beneficial Electrification (BE)

Business Driver

Slow Sales Growth	Desire to Reduce Rates	Pressure to Reduce Greenhouse Gases	Goal to Improve Grid Utilization	Need to Manage Distribution System Growth	Desire to Reduce Customer Costs	Need to Provide Exemplary Customer Service
BE programs can add as much as 0.75% system energy sales each year	A full-scale program can reduce average rates by as much as 2%	Customer-site GHG emissions often go to zero, and net emissions decline up to 85%	Utility system efficiency (load factor) can increase by as much as 3%, and Demand Response and Vehicle-to-Grid options provide additional benefits	Growth on capacity constrained distribution feeders can be managed and capital investments delayed or eliminated	Customer costs typically decrease from 10-60%	Electro-technologies often operate with significantly less noise, workplace pollution or particulates, and with greater control and less waste

BE Solution

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The Power of Improving System Utilization (Load Factor) by Increasing Off-Peak Sales

JEA's current load factor (i.e., Average MW / Peak MW) is **55.6%**

If we improve load factor **1 percentage point (to 56.6%)** by increasing annual energy sales 1.8% without increasing system peak…

Net Revenue (revenue less variable costs of $0.0325/kWh) increases by **$14.4 Million…**

To date, we estimate that JEA's NRE program has improved load factor by **0.42%**, increasing net revenue by **$6M** per year

Increased **"Financial Value"**

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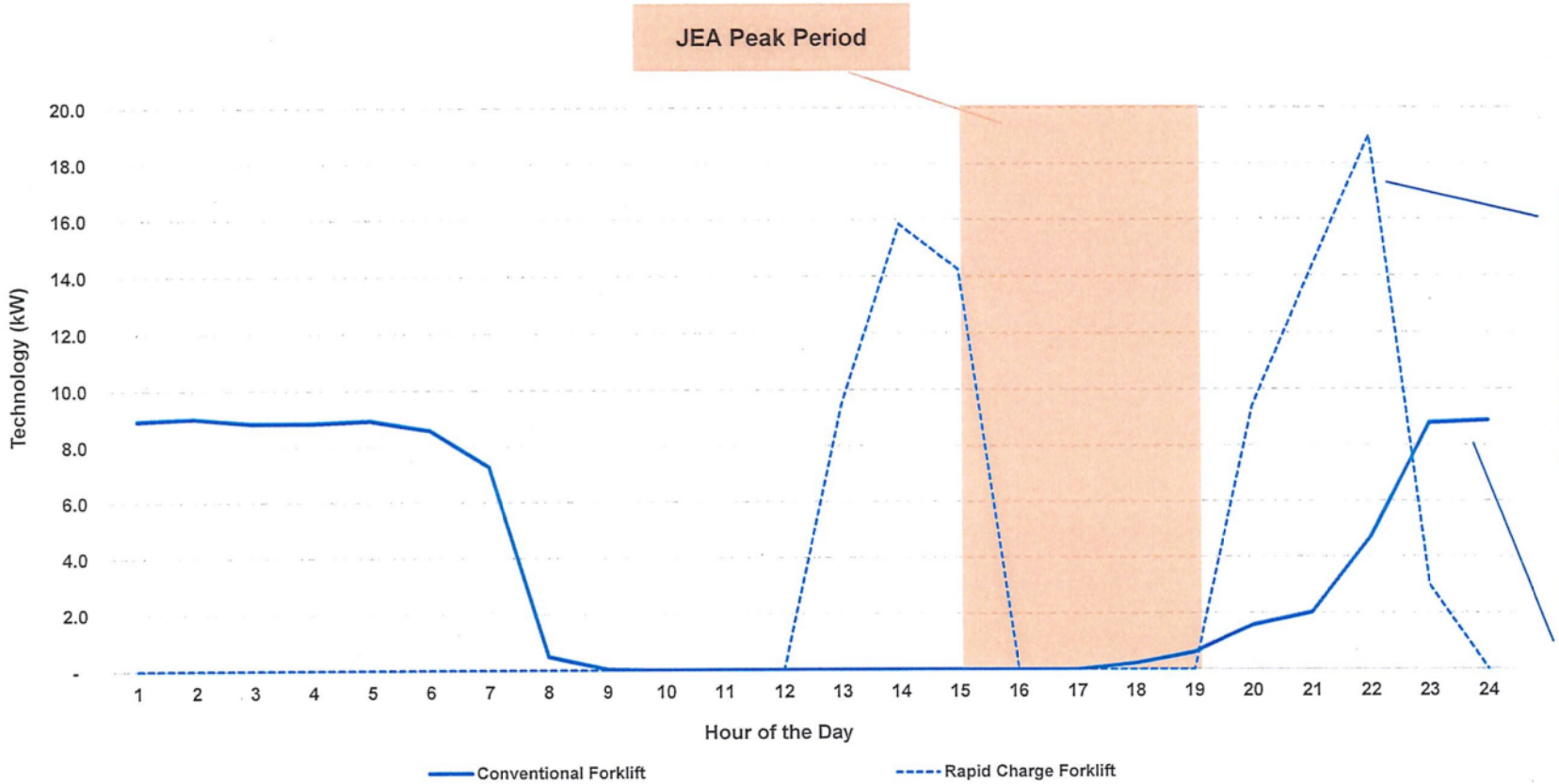
Note: In a future draft we need to net program costs against this and verify the calculations with JEA

JEA System Loadshape on 2017 Peak Day vs. Forklift Loadshapes



Rapid charge forklifts have a modest impact during extended peak periods, but shift much demand off-peak

Conventional forklifts have little impact on system peak and charge mostly at night

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Possible Expanded Approaches to Beneficial Electrification

Technologies

- Off-Road & Material Handling
- On-Road, Light-Duty
- On-Road, MD & HD
- On-Road, Buses
- Food Preparation
- Custom
- Manufacturing
- Infrastructure (Ports/Airports)
- HVAC
- Water Heating
- Recreational
- Trains

Locations

- Home
- Multi-family
- Workplace or Destination
- In-route
- Fleets

Strategies

- Infrastructure Deployment
- Rate Design
- Education & Outreach
- Incentives
- Financing
- Partnership Planning
- Managed Charging
- Active Load Management (DR, V2G)

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Many Additional Technologies Provide Significant Benefits

	Material Handling and Port Equipment			Airport Ground Support Equipment				On-Road		
	Rapid Charge Forklift	E/S TRU	RTG Cranes	Ground Power Units	Pushbacks	Baggage Tractors	Belt Loaders	Light-duty Vehicles	Transit Buses	Refuse Trucks
Annual kWh	27,190	15,000	600,000	148,000	61,420	23,360	12,260	4,000	50,000	35,000
% kWh Off Peak	56%	100%	63%	56%	74%	77%	77%	75% (+)	80% (+)	100%
Peak kW	7.6	0.0	124.7	35	19.4	7.2	3.8	7	50	0
JEA Net Annual Margin	$2,560	$1,320	$64,160	$12,900	$8,040	$3,230	$1,690	$326	$3,092	$2,164
JEA Present Value Lifetime Net Margin	$19,760	$9,560	$695,450	$100,240	$62,100	$24,960	$13,100	$2,510	$23,806	$16,664
Lifetime Site GHG Saved (Metric Ton)	337	237	12,164	1,325	550	250	131	36	534	553
Lifetime Site NOx Saved (Metric Ton)	0.3	1.0	24.3	6.0	2.5	0.6	0.4	0.2	1.6	2.3

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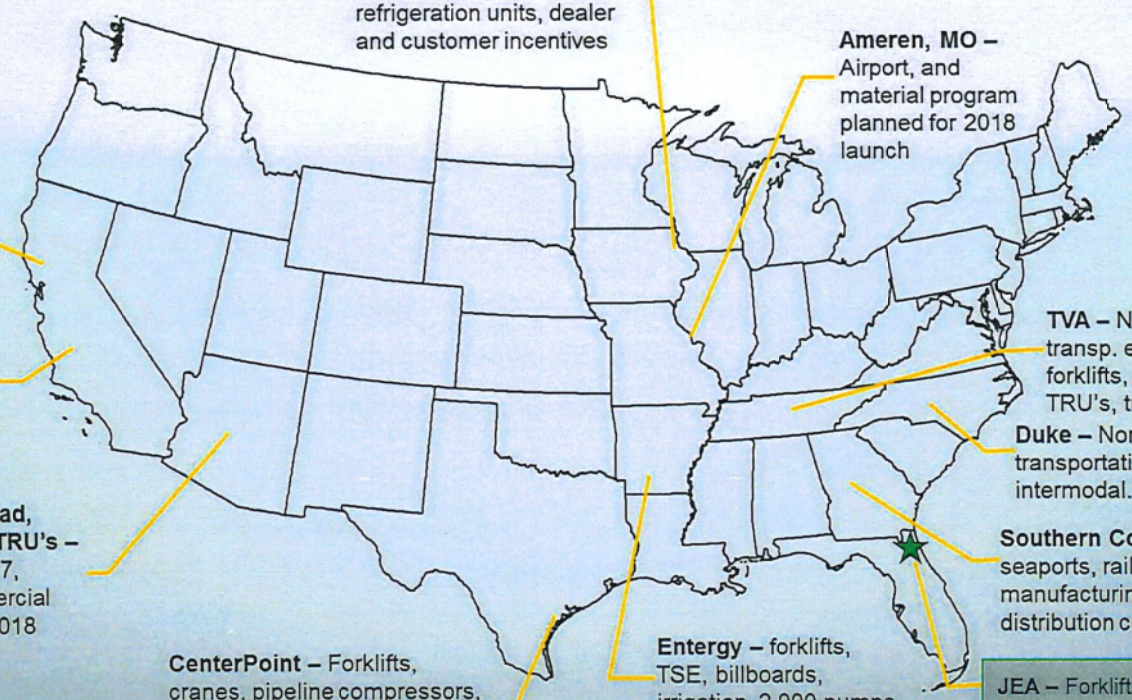
JEA Leads the Pack in Scope and Relative Impact

Non-Road Program Examples



Alliant – Forklifts, truck refrigeration units, dealer and customer incentives

Ameren, MO – Airport, and material program planned for 2018 launch

SMUD - $2,000 forklift incentives

SCE, PG&E, SDG&E – on and off road transportation, ports, rail, transit

TVA – Non-road transp. electrification - forklifts, airport GSE, TRU's, truck stops

Duke – Non-road transportation, ports, airports, intermodal. Launch Q2 2018.

SRP – non-road, forklifts and TRU's – Launched 2017, adding commercial food service 2018

Southern Co. – airports, seaports, rail yards, mines, manufacturing plants and distribution centers

CenterPoint – Forklifts, cranes, pipeline compressors, Launched 2006; added 17.5 MW in last 5 years

Entergy – forklifts, TSE, billboards, irrigation, 2,000 pumps converted since 2014

JEA – Forklifts, Cranes, Airports, Trucks, Manufacturing, Custom

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Considerations in Electrification

- Loads & locations to avoid
- Free riders
- Incentive strategy
- Fuel competition
- Allocation of benefits
- Operations of responsive technologies
- Integration with JEA and national initiatives (VW, Smart City, etc.)
- Recovery of costs
- Competitive markets
- Defining cost effectiveness

Assessing Cost-Effectiveness from Multiple Perspectives

Benefit Cost Tests	Key Question Asked	Benefits	Costs
Ratepayer Impact Measure (RIM)	Will utility rates increase?	Incremental Revenue	Program Incentives Program Overhead Incremental Electricity Supply
Participant (PCT)	Will participants benefit over the measure life?	Incentives Fuel Savings O&M Savings	Incremental Equipment Cost Incremental Electricity Supply
Modified Total Resource Cost (mTRC)	Will the total cost of energy in the utility service territory decrease?	O&M Savings Cost of IC Energy Supply	Net Participants Electric Supply and Net Participants Incremental Capital Cost Program Overhead Program Incentives Paid to "Free Riders"

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Strategic Questions We Will be Addressing with JEA

- How do we capitalize on the momentum created by the existing program?
- What is the size and value of future electrification opportunities?
  - On-Road
  - Off-Road
  - Controlled charging/load management
- Which technologies and customers show the greatest promise?
- Which program designs are most appropriate?
- How can we be sure we do not create future generation or distribution problems?
- What are the best entry strategies and where can we cooperate with others?
- What are the risks and how do we mitigate them?
- What are the financial expectations and measures of performance?
- How to resource internally and externally?
- Who are our best partners and how to partner?

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Guiding Principles

- Evaluate against JEA's core values
  - Value to our customer
  - Financial value
  - Community impact value
  - Environmental value
- Create a flexible and scalable platform
- Focus on cost-effectiveness and financial returns
- Consider capacity constraints (recognizing that some on-peak load will come along with significant off-peak sales growth)
- Align with JEA investments in AMI, solar, storage, rate design, and other programs
- Strengthen customer satisfaction and JEA brand
- Be innovative; Be bold

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What Might It Look Like for JEA?*

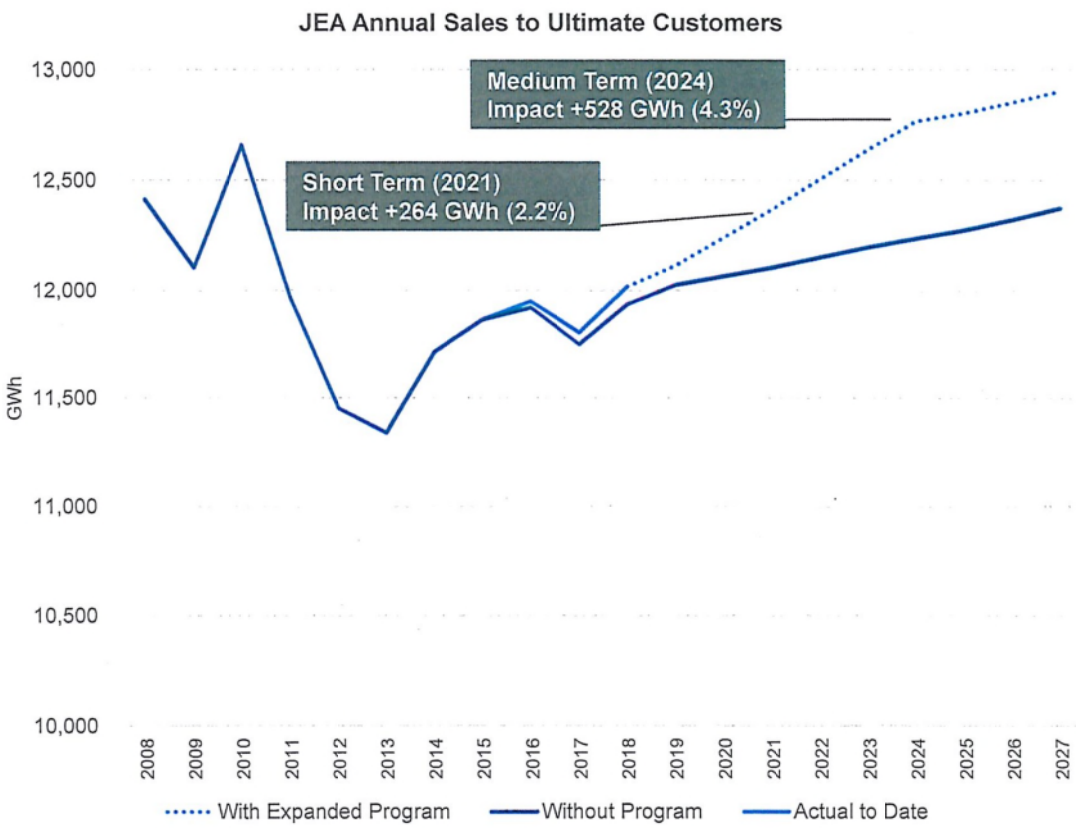
Comprehensive Strategic Electrification Plan

Short Term (<3 years)

- Expanded non-road program
- Pilot EV charging stations for personal and fleet vehicles
- Electric transit bus pilots
- Additional charging stations

Long Term (3-10 years)

- Dedicated port electrification
- Expand EV charging stations
- Expand transit bus electrification
- Electrify JEA fleet vehicles
- Support statewide charging network
- Link electric Transit Buses & Skyway with solar charging stations



Note: Under evaluation in JEA's Electrification Strategic Plan.

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Short-Term Opportunities*

Potential Projects and Opportunities

- Tug Boats at the Jacksonville Port Authority Ports, Naval Air Station Jacksonville, Mayport Naval Ship Yard, and possibly docking stations downtown on the Saint Johns River.
- Port Gantry Cranes (4)
- Mayport Ferry – ship for transporting vehicle and passengers.
- Shore Power for ships (instead of running generators) – ports listed above plus the cruise line port in Jacksonville.
- Vehicle-to-Grid (V2G) and Battery-to-Grid Pilots
- Locomotive Cold-Storage Generators (Florida East Coast Railways opportunity)
- Buses (both city and school)
- Drayage-Yard Trucks (primarily utilized at and around the ports.)
- Local Delivery FedEx, UPS, Amazon, and JTA (Jacksonville Transportation Authority) trucks
- "Garbage" Trucks
- Hangar doors (Boeing, Flightstar, local airports, Air National Guard, Naval Air Station Jacksonville, Mayport Naval Base)

**Note: Under evaluation in JEA's Electrification Strategic Plan.*

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Next Steps

1) Agreement on forward business case initiative
2) Inventory and review JEA's current portfolio of initiatives
3) On-road assessment
4) Expanded off-road assessment
5) Identify and assess potential technologies and designs
6) Develop business cases
7) Recommend strategic plan

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