
From: Crawford, Juli E. - Director Financial Planning & Analysis <crawje@jea.com>
Sent: Monday, January 14, 2019 6:47 PM
To: Wannemacher, Ryan F. - Chief Financial Officer; Zahn, Aaron F. - Managing Director/CEO; Dykes, Melissa H. - President/COO
Cc: Blackshear, Victor L. - Manager Financial Planning & Rates; 'Sarah Brody'
Subject: Status Quo Baseline Draft
Attachments: Basline Conversation 1.12_sb.pptx

Aaron/Ryan/Melissa,

Attached is the latest turn of the Status Quo Baseline presentation. We have noted where there are some areas to complete and we hope to continue updating and editing tomorrow in preparation for our Wednesday meeting. Please provide any comments, concerns or recommendations and we will incorporate.

Thank you,
Juli

Status Quo Baseline

The first step in the process

DRAFT

JEA



Disclaimer

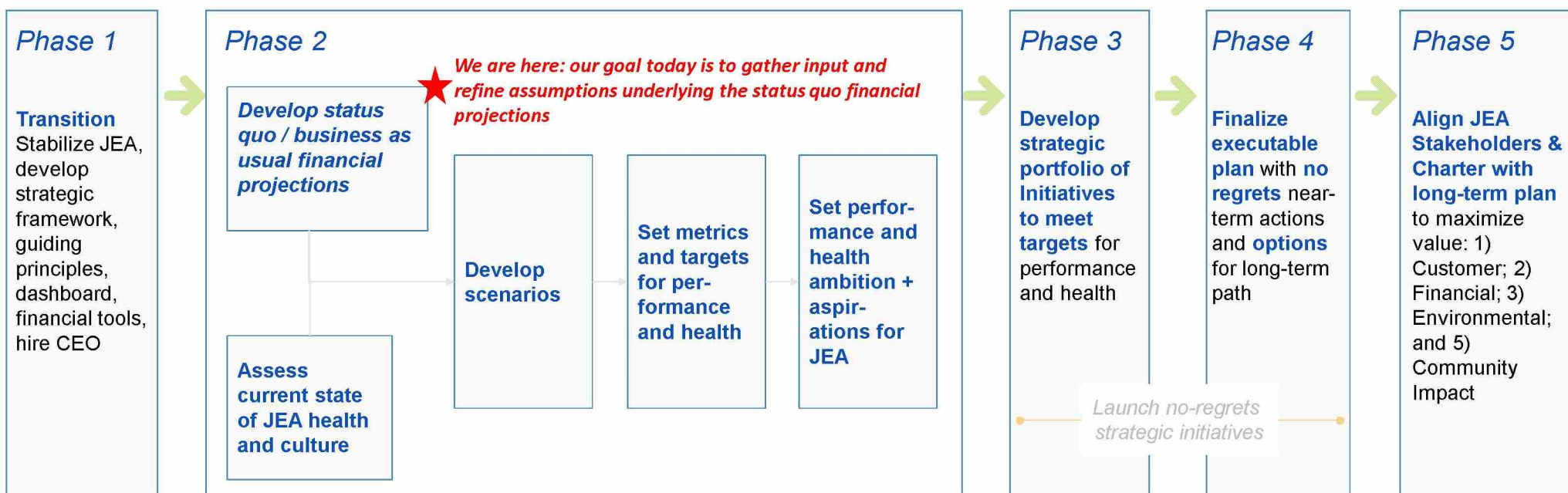
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Today, we will discuss JEA's first step in a broader strategy to succeed.

What does the future look like if JEA doesn't change?

Internal stakeholder alignment (Board, SLT, appointed employees, Union)



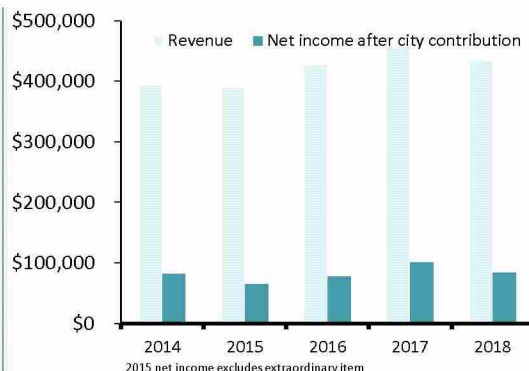
External stakeholder consultation and feedback (e.g. City of Jacksonville)

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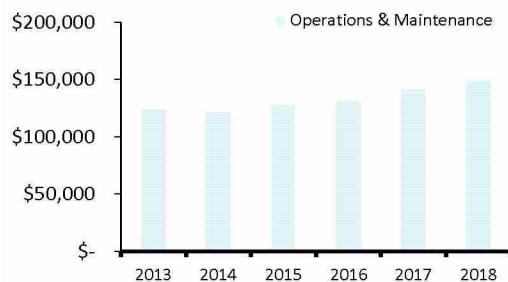
Financial Performance in the Past Five Years

JEA continued to sustain Income after Contributions during recent declines in consumption

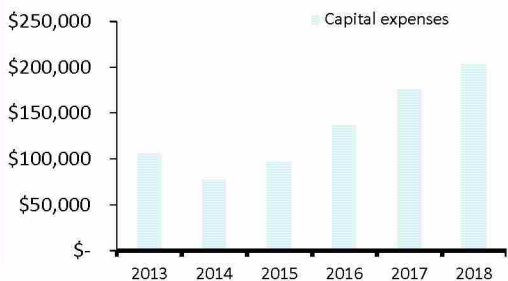
Current operating position – Water & Sewer



- Residential Sales per Customer have decreased by 1% since 2014 while rates have remained stable

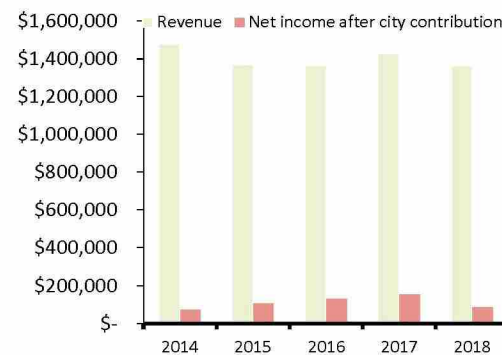


- Operation and Maintenance expenses increased annually by 5%



- Key investments in recent years include new wastewater plants such as Blacks Ford and Resiliency Projects with multiple pump stations

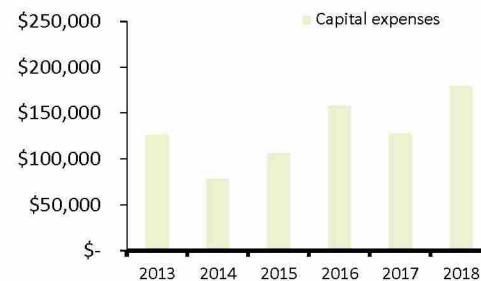
Current operating position - Electric



- Residential Sales per Customer have decrease by 1% since 2014 while rates have remained stable



- Operation and Maintenance expenses increased annually by 4%



- Renewal and replacement investments necessary to maintain electric systems infrastructure

[Slide 4]

Mention that the forecast is not clear based on history

Executive summary

Both Systems take action today to sustain value and profitability tomorrow

Water System

- Water/Wastewater income is forecasted to be **stable through 2030** with funds available for city contribution
- Preliminary forecasts show **continued growth during the period** driven by new connections, though may be offset by continued trend in more efficient use per capita
- While **no significant supply challenges** are forecast in the short-term, JEA is taking proactive steps to address the projected shortage in the South Grid
- While JEA is forecasting a healthy financial outlook for its water business, there are potential issues that could impact this forecast – including **capex overbuild** if load does not materialize **and new state water regulations** (though JEA is relatively well positioned for new regulations)

Energy System

- National trends in energy efficiency and distributed generation have begun to **shape utility energy sales forecasts across the county**
- JEA is no exception, with **declining loads over the past decade** driven by both the economic downturn and energy efficiency gains
- Looking forward to 2030, **strong economic growth will not offset accelerated distributed generation and energy efficiency**, leading to decreased load (7% reduction 2018-30), declining income, and a net loss after city contributions

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Water System Outlook



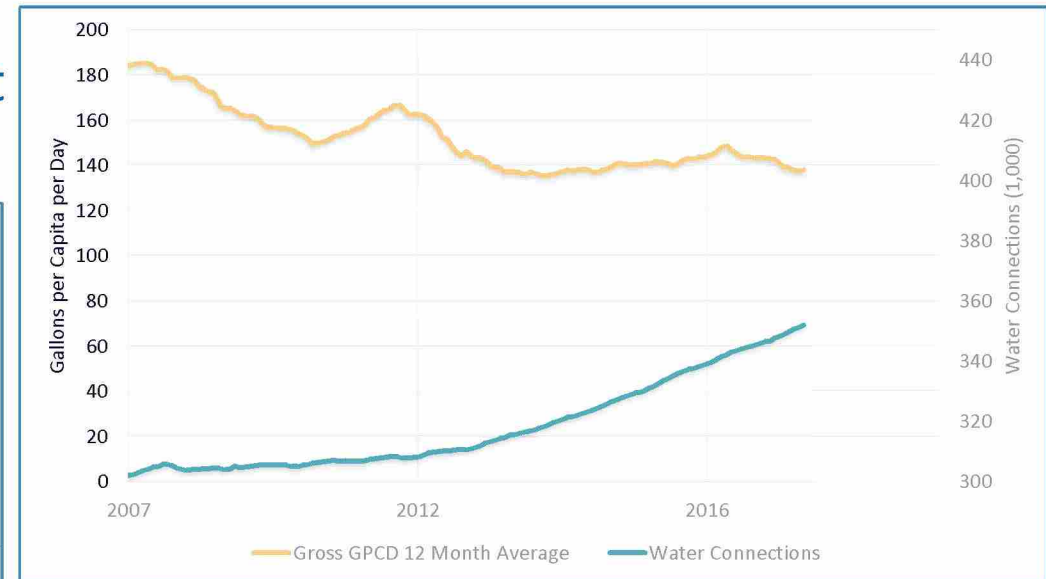
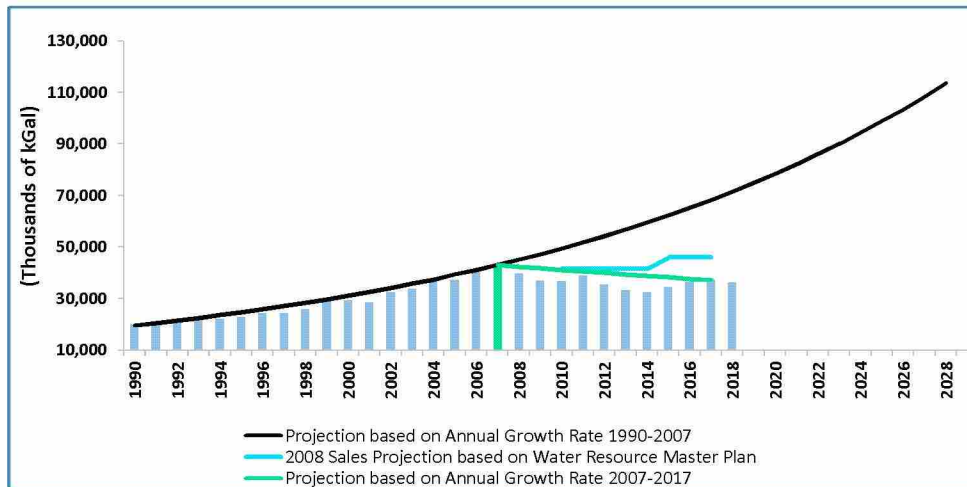
WATER SYSTEM – JANUARY 2019

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Water Connection Growth Continue

There are market influences that could diverge our forecast, up or down.

Historical water usage and sales forecast is impacted by consumption per capita



In recent years, water efficiencies have stabilized usage per JEA customer

Add in how JEA compares with national water use efficiency figures

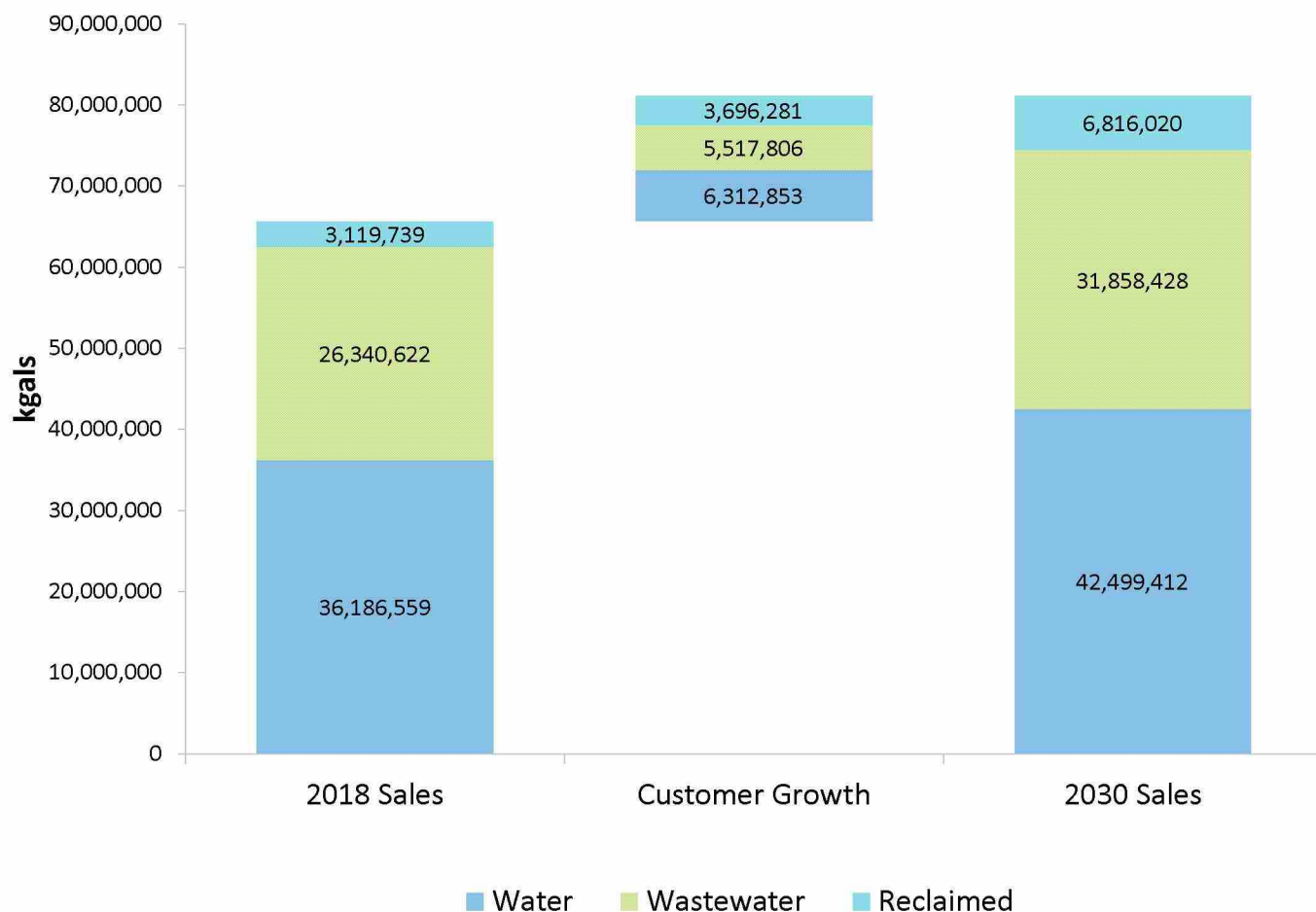
[Slide 7]

Decline due to rates, conservation messaging, efficient housing stock, and re
claimed water

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Water Sales Outlook by 2030

Sales expected to rise with population growth and a healthy economy



Customer growth outlook is developed using county level population projections published from the University of Florida's Bureau of Economic and Business Research (BEBR) Medium Population Projections by County

Sales per capital is held constant for the forecast

Water and Wastewater sales are forecasted to grow approximately 1.5% annually, however reclaimed is anticipated to grow approximately 7% annually

Customer Growth The population in the JEA service territory continues to grow with a robust economy. JEA's water sales outlook is developed using county level population projections published from the University of Florida's Bureau of Economic and Business Research (BEBR) Medium Population Projections by County. JEA forecasted grid demand reflects normalized weather effects on water demand and factors in the projected growth of reclaimed water use to offset potable water demand. Note, the most recent year used for the starting point of the sales outlook was a wetter than normal year which affected the outdoor irrigation component of water demand.

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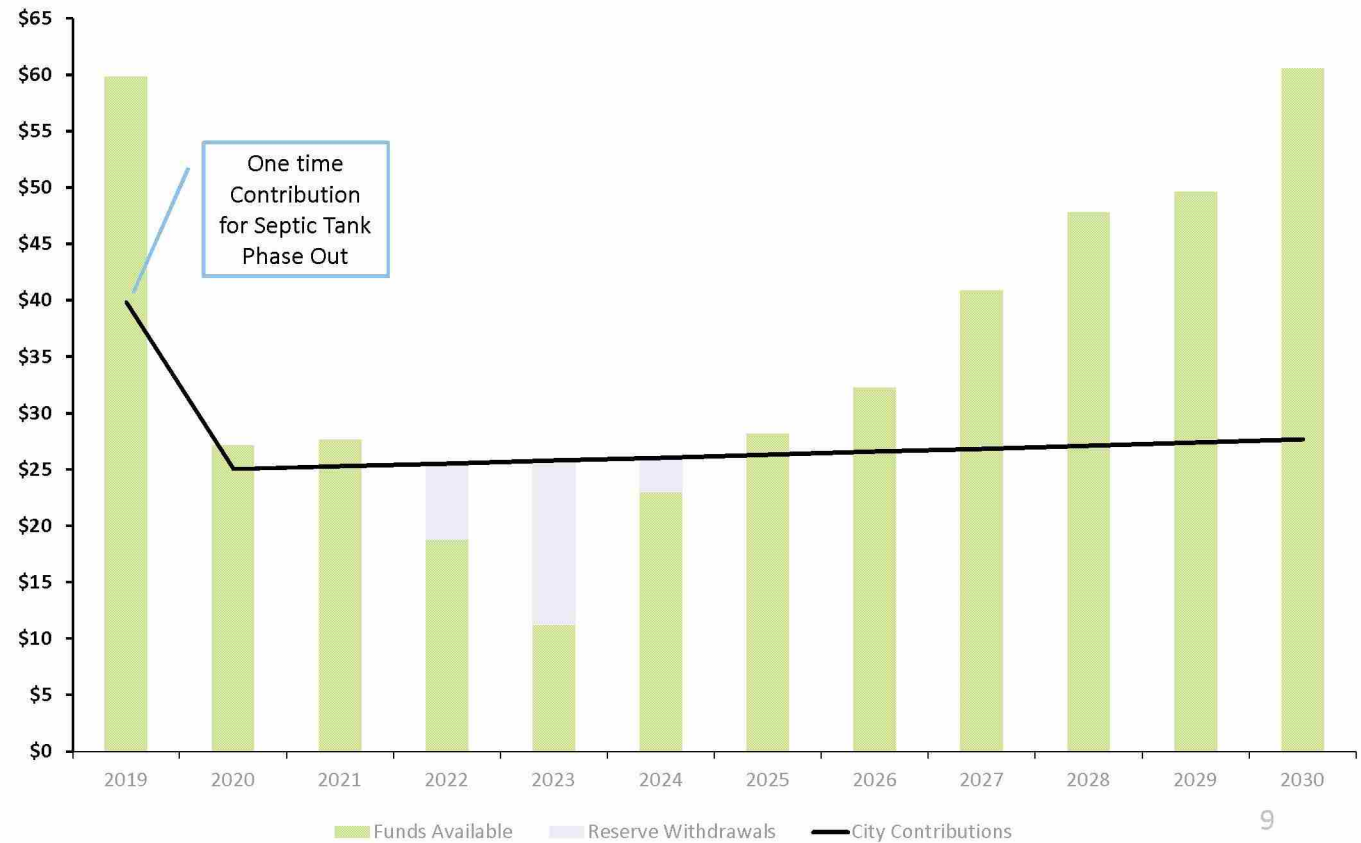
Water Financial Outlook by 2030

The Water and Sewer System Income is stable for its current portion of city contribution

Cost Assumptions for Sales Outlook

| Fiscal Year | O&M | Debt Service | Capital Investments |
|---------------|-------|--------------|---------------------|
| 2020 | \$173 | \$75 | \$210 |
| 2021 | \$176 | \$78 | \$210 |
| 2022 | \$180 | \$81 | \$210 |
| 2023 | \$184 | \$94 | \$210 |
| 2024 | \$188 | \$110 | \$190 |
| 2025 | \$192 | \$110 | \$190 |
| 2026 | \$196 | \$106 | \$190 |
| 2027 | \$201 | \$102 | \$190 |
| 2028 | \$205 | \$99 | \$190 |
| 2029 | \$210 | \$101 | \$190 |
| 2030 | \$214 | \$94 | \$190 |
| In \$Millions | | | |

Cash Flow Projections with no rate increases, \$M



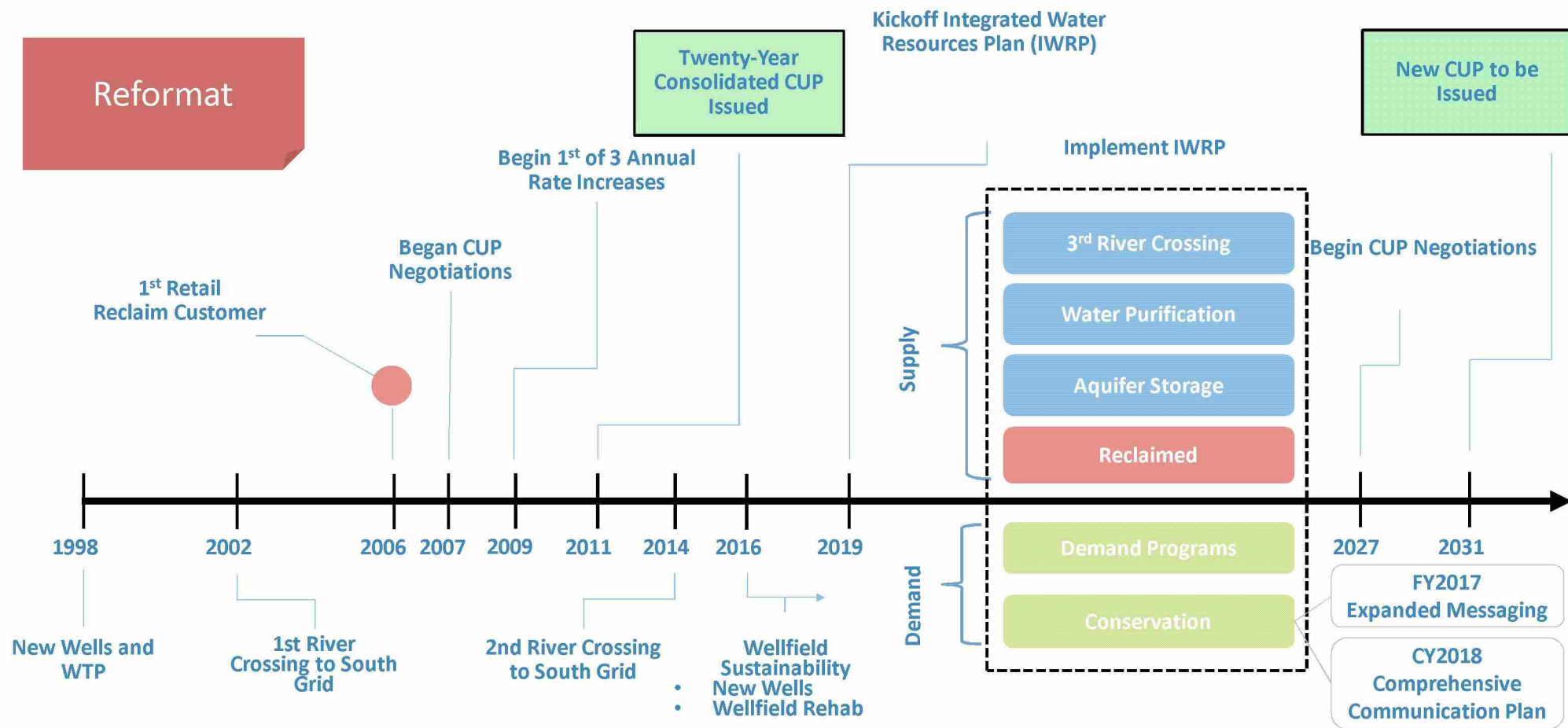
[Slide 9]

Add note for three year deficit explaining utilizing funds to handle

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Water Supply Management Milestones

Innovative efforts yesterday & tomorrow will be necessary to ensure a sustainable resource



Water use permitting-20 year Consumptive Use Permit (CUP) issued by St John's River Water Management District in 2011-Permit conditions require extensive monitoring and reporting including Wellfield groundwater allocations/reporting, Groundwater monitoring and reporting, Water quality sampling and reporting-JEA in full compliance with current permit

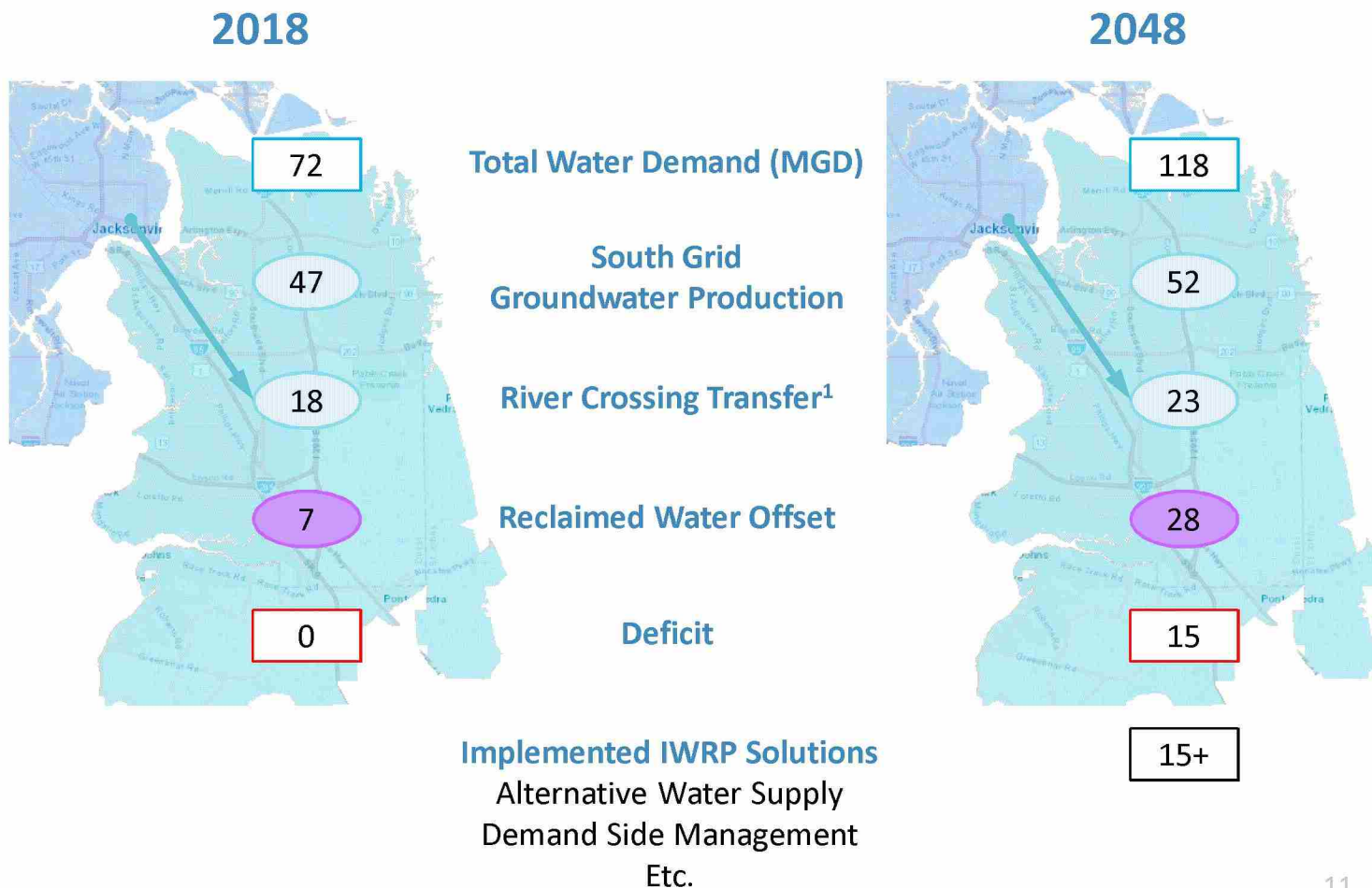
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Water Supply Outlook Challenge

Proceeding with IWRP, JEA will determine future supply options, costs, and limitations

South Grid
Groundwater
Production was
approximately 75
MGD prior to 2011

2011 CUP reduced
South Grid
allocation to 52
MGD



Proceeding with IWRP JEA will determine:-future alternative water supply options, costs, and limitations-Continued expansion of Reclaimed Water System-3rd River Crossing-Comprehensive Demand Side Management study to determine water conservation options and implementation planAlso, Implementing the next phase of the purified water project (proceeding with 0.5 – 1 MGD demonstration project)

Caution should be taken to ensure water financial forecast remains healthy

Potential issues:

- Maintaining current capex program in the event that forecasted load does not materialize, creating overbuild
- Borrowing to fund capex program at higher levels than in previous years
- Additional spend to comply with upcoming regulations (likely less of a threat given JEA current program of robust compliance)

Other municipal water utilities offer a lesson in "what can go wrong" – for example, West Milford water utility

TBD

Proceeding with IWRP JEA will determine:-future alternative water supply options, costs, and limitations-Continued expansion of Reclaimed Water System-3rd River Crossing-Comprehensive Demand Side Management study to determine water conservation options and implementation planAlso, Implementing the next phase of the purified water project (proceeding with 0.5 – 1 MGD demonstration project)

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Energy System Outlook



ENERGY SYSTEM – JANUARY 2019

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Companies and industries that have faced recent disruption have varied in their ability to adapt and remain successful - it remains to be seen how utilities will fare

Failure
Success

| | Blockbuster | Kodak | Telecom industry | Electric utilities |
|------------|---|---|---|---|
| Catalyst | <ul style="list-style-type: none"> Digital technology disruption in movies and video, with a focus on online streaming and convenience in the form of home delivery and automated kiosks | <ul style="list-style-type: none"> Emergence of digital photography, accompanied by digital cameras, phones, and a transition from printed photos to digital media | <ul style="list-style-type: none"> Shift from basic wireline telephony services to wireless and broadband services | <ul style="list-style-type: none"> Increasing penetration of economic generation alternatives (e.g., solar) Increased competition for home energy services (e.g., Nest) |
| Adaptation | <ul style="list-style-type: none"> Failure to adapt to digital competition Failure to update fee structure (per-video, late fees) in response to Netflix subscription offer | <ul style="list-style-type: none"> Continued focus on film, with digital used to enhance film processes Failure to provide products able to compete with new trends | <ul style="list-style-type: none"> Increased suite of service offerings Created increasing willingness to pay for a wider suite of telecom services Legacy business (fixed line) lost importance, but remained relevant and typically profitable | ? |
| Impact | <ul style="list-style-type: none"> Blockbuster's reliance on brick-and-mortar locations and late fees made it uncompetitive with new offerings Bankrupt in 2010 | <ul style="list-style-type: none"> Reliance on film-based products and failure to identify and pursue digital trend in a timely manner Bankrupt in 2012 | <ul style="list-style-type: none"> Loss of high-margin service typical to every home and business Increased competition for home telecommunications services | ? |

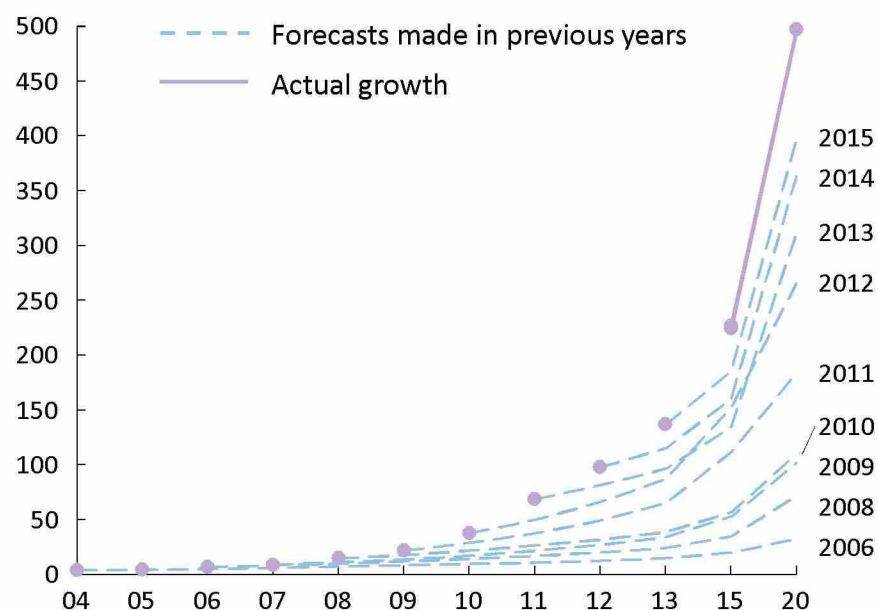
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The pace of change in the utility industry is rapid: global growth of new energy technologies have been consistently faster than analysts projected

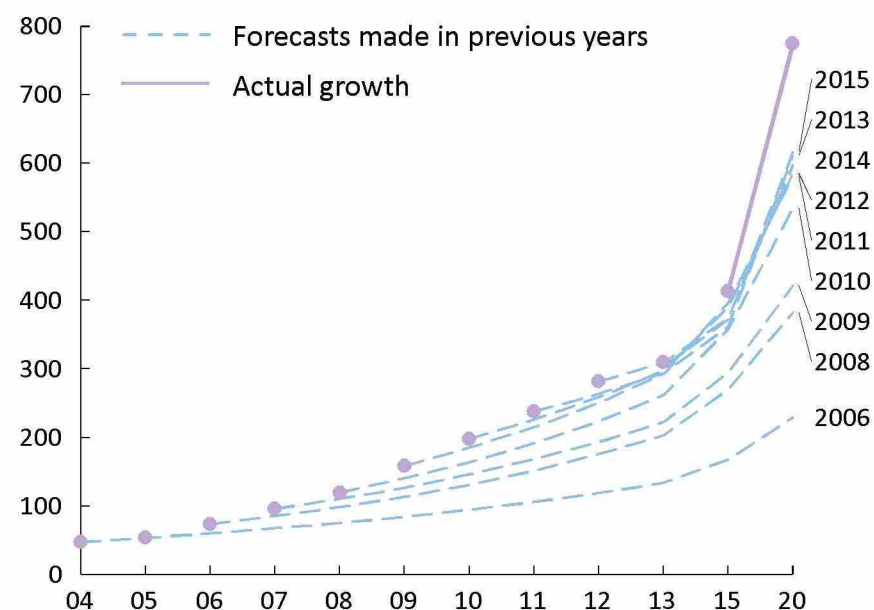
Global IEA forecast of cumulative installed capacity, GW

Solar power

(Utility scale)



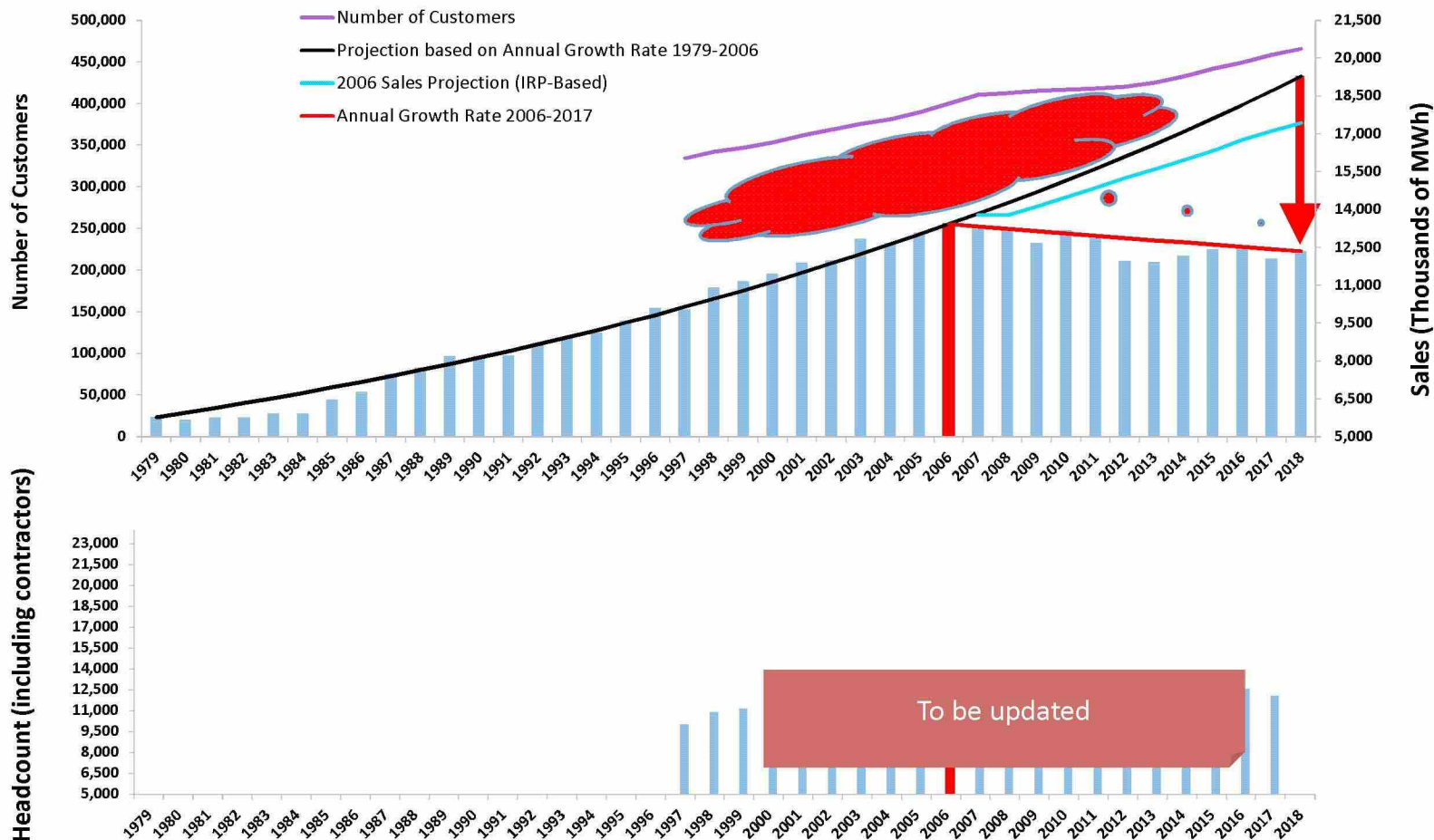
Wind power



- Even as solar and wind installations increased exponentially, analysts continuously underestimated future growth
- Rapid adoption was driven by costs declining faster than expected and increased willingness to adopt among customers
- Battery storage costs also exhibit rapid cost declines and high growth, though limited long-term historic forecasting exists given the relative nascence of modern large-scale batteries

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JEA is already starting to feel the impact of industry change: sales over the past decade show that JEA can no longer rely on customer growth to drive sales forecasts

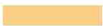

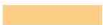





Prior to 2006, population growth drove steady increases in JEA's sales and an expansion of JEA's workforce

Since 2007, growth has continued to increase, but sales have remained flat, leading to \$XM lost income even as JEA has shed headcount

Energy efficiency accounted for the lost sales, with energy use per capita declining 15% in past decade – solar DG has not yet begun to impact sales

JEA's demand forecast is driven by trends affecting utilities nationwide

| | National trends | Assumptions used for JEA | 2008-17 impact | 2018-30 impact |
|---|--|--|---|---|
| Electric vehicles (EV) | <ul style="list-style-type: none"> EV adoption is growing steadily in the US, with 200k EVs¹ on the road in 2017 Over 2M EVs are expected on the road by 2030, constituting 7-12% of light duty vehicles | <ul style="list-style-type: none"> 3.5% of cars on the road expected to be EV's by 2030 (30K total) driving 95k MWh of increased energy sales |  |  |
| Distributed generation (solar) | <ul style="list-style-type: none"> There are 60 GW of solar installed in the US (as of December 2018); forecasted to grow to over 100 GW by 2021 Distributed solar accounts for ~40% of installed solar capacity in the US (half of which residential), and residential is expected to outpace large-scale growth | <ul style="list-style-type: none"> Solar+storage becomes cost effective in 2023, driving 9% of residential customers to adopt by 2030, offsetting 700k MWh of energy sales |  |  |
| Distributed generation (non-solar) | TBD | | | |
| Energy efficiency & new technology adoption | <ul style="list-style-type: none"> Energy efficiency has been a major driver of decreased energy sales in the past decades; improvements since 2000 led to a 10% reduction in US energy expenditures and \$140 energy savings per capita Efficiency is expected to continue to improve as key energy-saving upgrades have low penetration today (e.g. heat pump water heaters) | <ul style="list-style-type: none"> New home tech upgrades and continuation of service territory trends drive 22% reduction in residential sales per capita from 2018-30 |  |  |

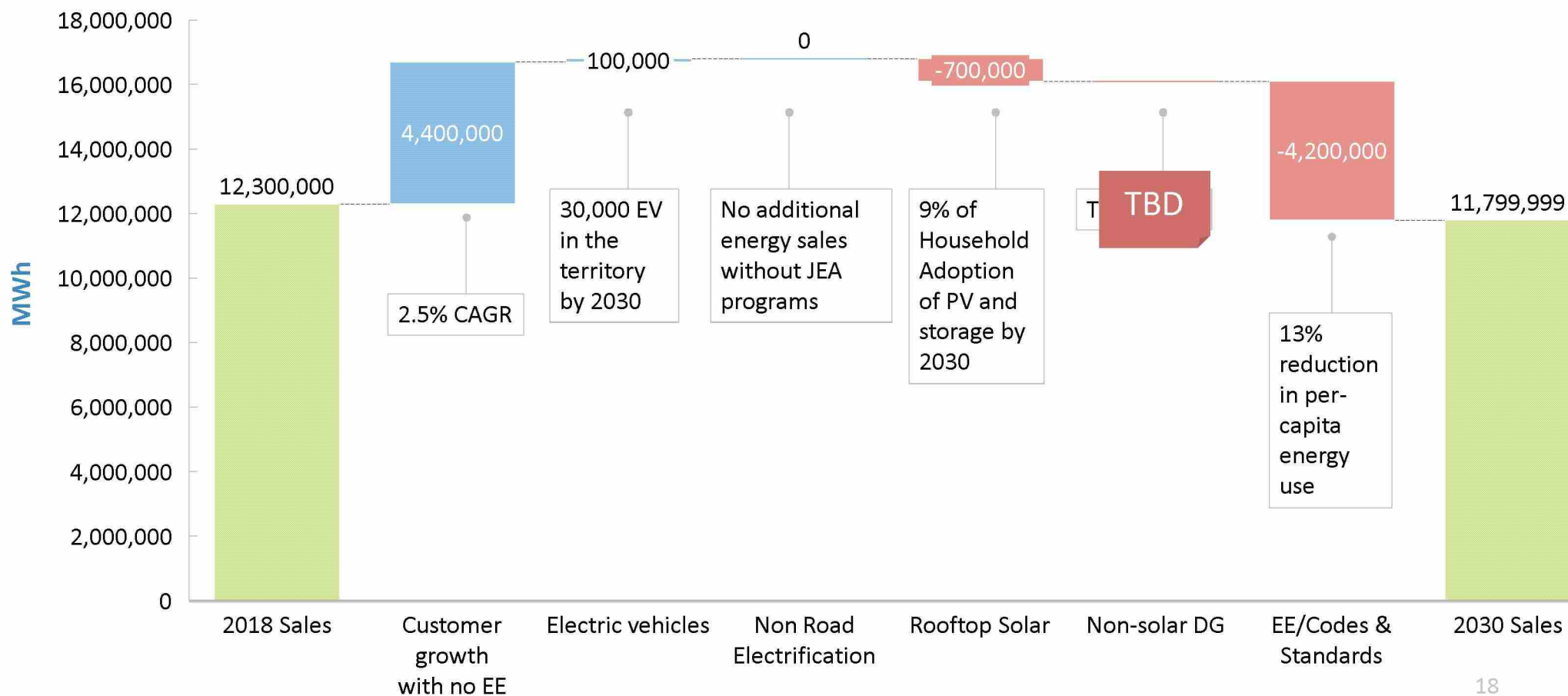
¹ "EV" includes PHEV and BEV

Source: McKinsey automotive forecast, SEIA, EIA, Edison Foundation

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Energy sales outlook by 2030 shows a potential 4% drop in sales relative to 2018

■ Total ■ Increase ■ Decrease



[Slide 18]

Anticipating 3.5% penetration in Jacksonville by 2030

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Energy Financial Outlook by 2030

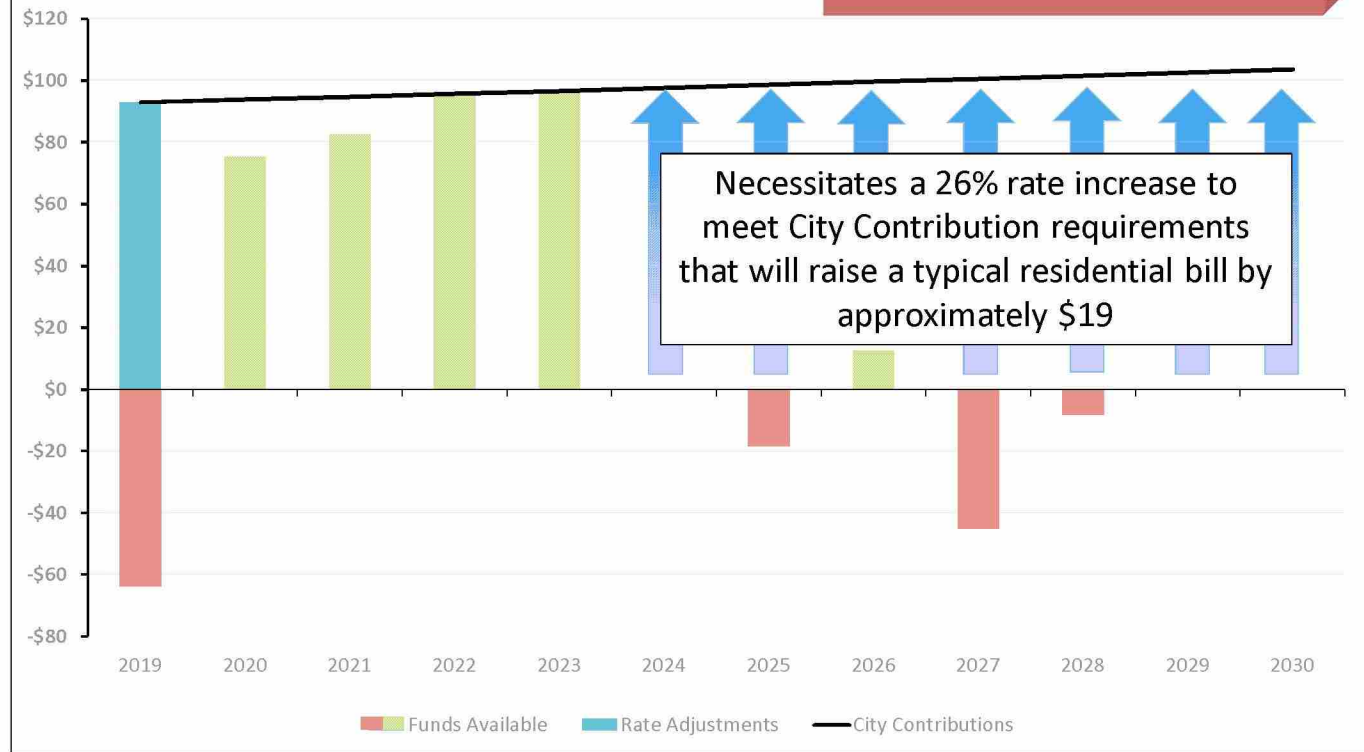
The Energy System Income will not be able to balance financial health, customer affordability, and value to the city by 2024

Cost Assumptions for Sales Outlook

| Fiscal Year | O&M | Debt Service | Capital Investments |
|-------------|-------|--------------|---------------------|
| 2020 | \$241 | \$238 | \$234 |
| 2021 | \$237 | \$293 | \$166 |
| 2022 | \$257 | \$169 | \$302 |
| 2023 | \$253 | \$99 | \$313 |
| 2024 | \$261 | \$97 | \$342 |
| 2025 | \$270 | \$111 | \$175 |
| 2026 | \$268 | \$111 | \$175 |
| 2027 | \$280 | \$110 | \$175 |
| 2028 | \$285 | \$147 | \$175 |
| 2029 | \$286 | \$180 | \$175 |
| 2030 | \$295 | \$201 | \$175 |

In \$Millions

Cash Flow Projections with no rate increases, \$M



[Slide 19]

Add note for three year deficit explaining utilizing funds to handle

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Further impacts to the sales forecast

With the forecasted rate increases, solar and non-solar DG will become more economically attractive, resulting in further lost sales

TBD

[Slide 20]

Add note for three year deficit explaining utilizing funds to handle

Reduced energy sales forecast drives a challenging financial outlook for JEA by 2030 *if JEA were to take no action*

- Under the status quo, JEA will not be able to balance **financial health** (positive net income and ability to pay debt service), **customer affordability** (avoidance of rate increases) and **value to the community** (payment of city contribution)
- JEA must **immediately take action to solve for a different future** for its electric business

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Supplemental Information



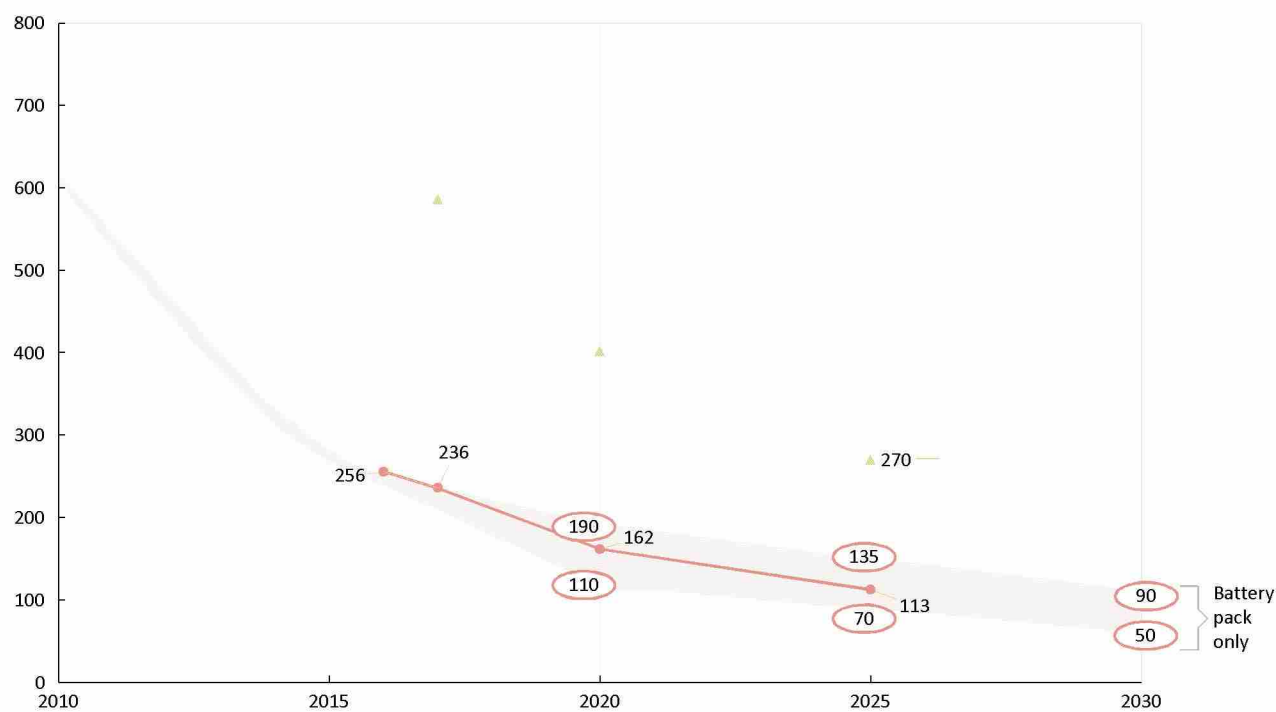
ENERGY SYSTEM – JANUARY 2019

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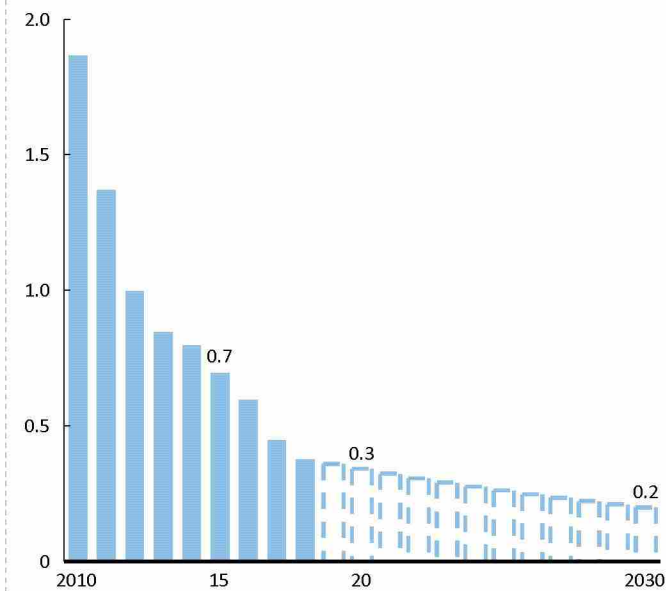
Solar and storage costs show steep declines over the past decade, creating positive economic cases for an increasing number of uses

Li-ion battery pack and total utility-scale system cost trajectories, \$/kWh

— Battery cost forecasted prices
 ■ 2015/2016 outlook



Solar module pricing, \$/W



Both solar and storage costs have declined over 50% since 2018; additional price declines are expected to drive continued double-digit growth

Source: PV pricing trends: historical, recent, and near-term projections, DOE, Source: BNEF; SNE research; Navigant; Avicenne Energy; Bernstein; Battery Model (2017); Expert interviews (2017)

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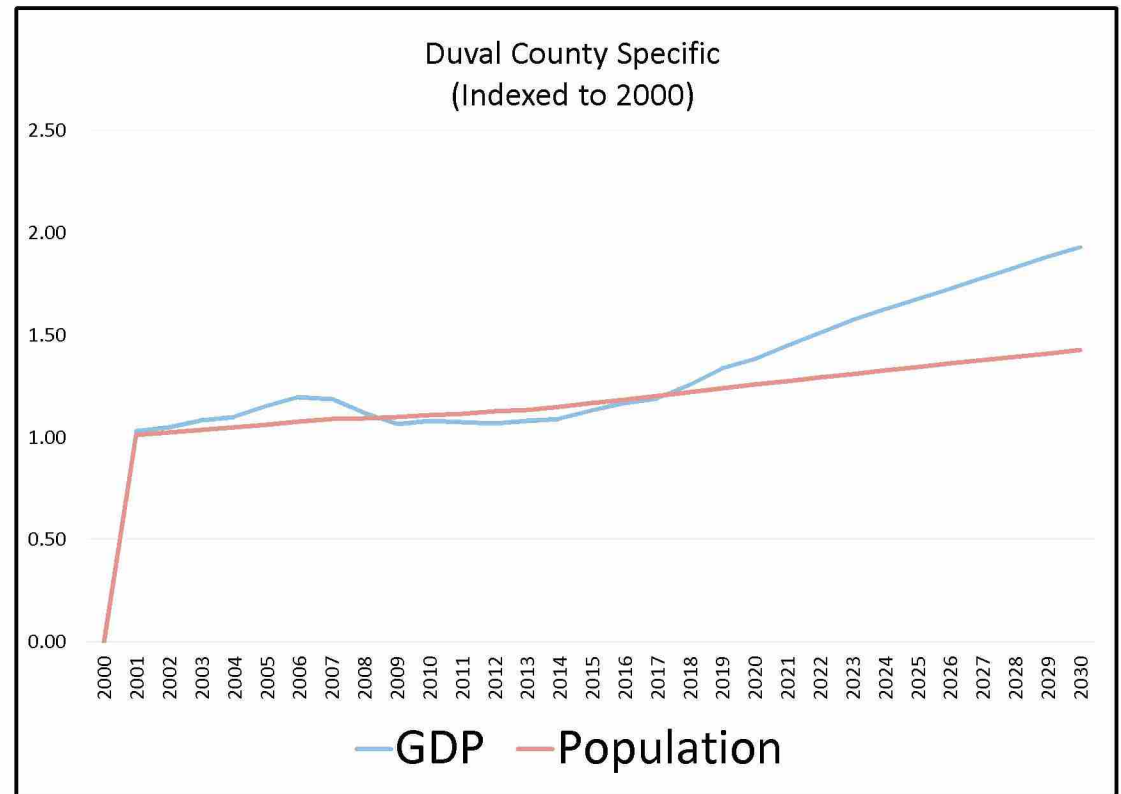
Customer growth likely to continue in the foreseeable future

Customer growth projections considers the U.S. Census Bureau (BOC): Population Estimates, Projections; Moody's Analytics Estimated and Forecasted for Duval County

JANUARY 2019



Customer Growth



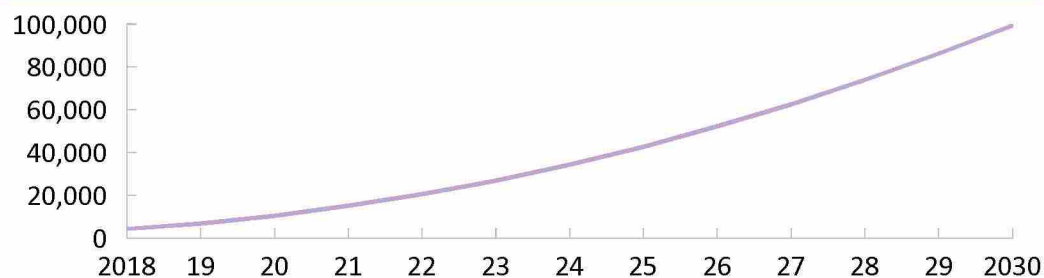
[Slide 24]

Separate res and commercial Include kwh and customer growth assumptions Rate
increase percentage

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30k EVs expected in in JEAs territory by 2030 based on EV modeling and penetration today

Energy added by EV fleet, MWh



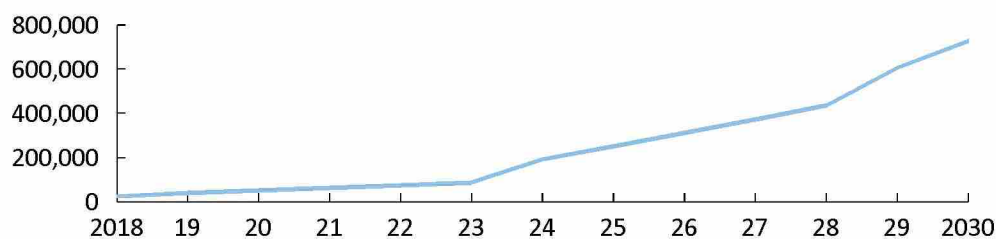
100k MWh in energy sales in 2030 because 31k EVs are added to Jacksonville fleet,
constituting 3.6% of light duty vehicles

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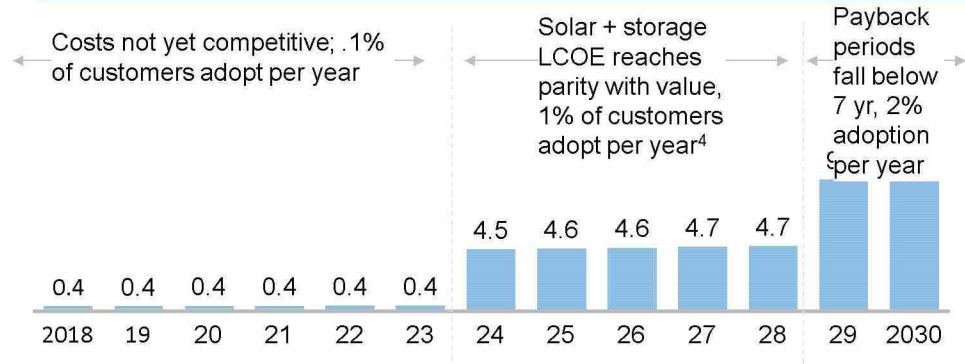
Solar reaching economic parity could lead to significant reduction in energy sales

- 730k MWh in energy sales reduced by 2030, with 45k homes and 1% of C&I load installing DG solar + storage by 2023
- Solar adoption is assumed to be a function of economic parity; once solar makes economic sense, uptake is expected to increase significantly

Energy sales lost to DG solar + storage, MWh



New residential solar + storage customers, thousand households



1 20 year system life; 7% discount rate; 17% capacity factor; assumes 5-10kW(DC) system size; 2% rate increase YoY based on trends in Europe and Australia

3 Considers backup as economic value towards payback

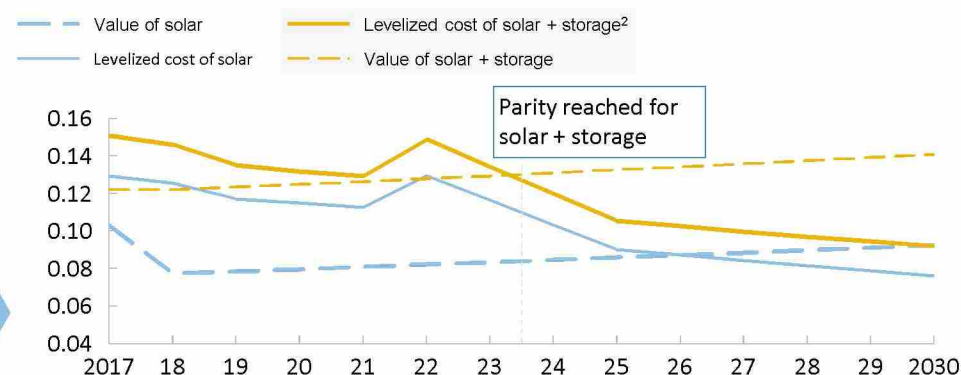
4 Uptake in line with post-parity adoption in other states (e.g., HI, CA)

Source: Sigrin and Drury, Diffusion into New Markets: Economic Returns Required by Households to Adopt Rooftop Photovoltaics, NREL

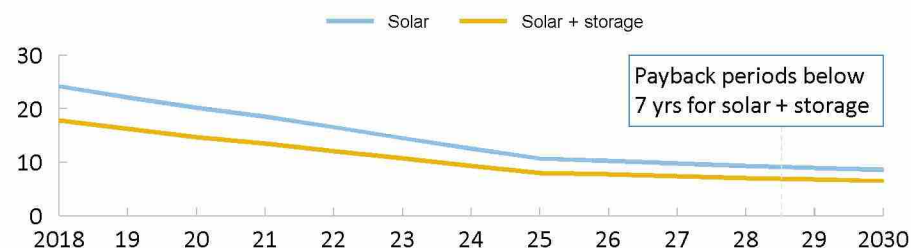
- Solar + storage has a higher value proposition for JEA customers than solar alone
- Though system costs are higher, value increases as well,³ driving shorter payback periods

Cost and value of solar for JEA customers¹, \$/kWh

Currently modeled



Simple payback period for JEA customers' systems,³ years



2 Assumes more aggressive solar soft cost declines post-2021 as ITC is phased out; cost reductions appear viable

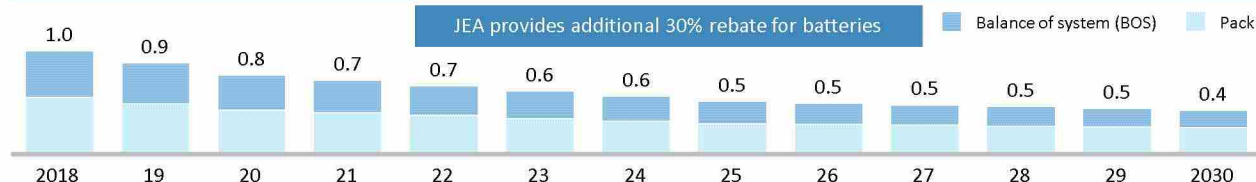
26

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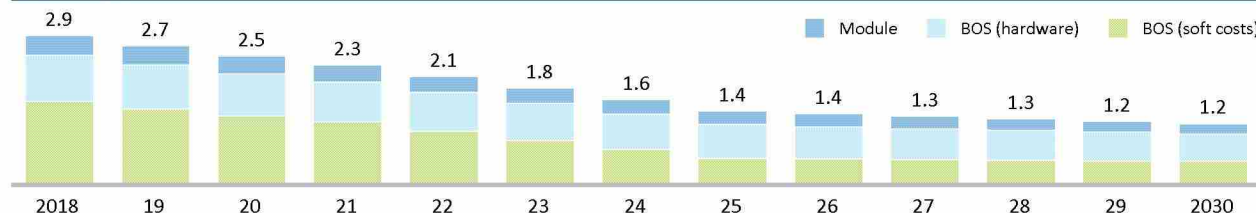
Economic parity driven by decreasing soft costs and potential added value of storage

Both solar and battery costs decline over the forecast period...

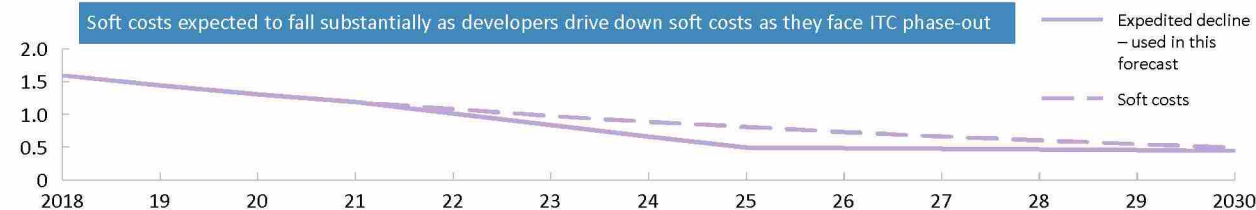
Battery costs, \$/W



Solar costs, \$/W



Solar soft costs, \$/W



1 Battery economics assume consistent willingness to pay premium for backup power in region

Source: Solar cost model, SEIA

...While Batteries add value to system due to willingness to pay for backup storage and reduced need to export energy

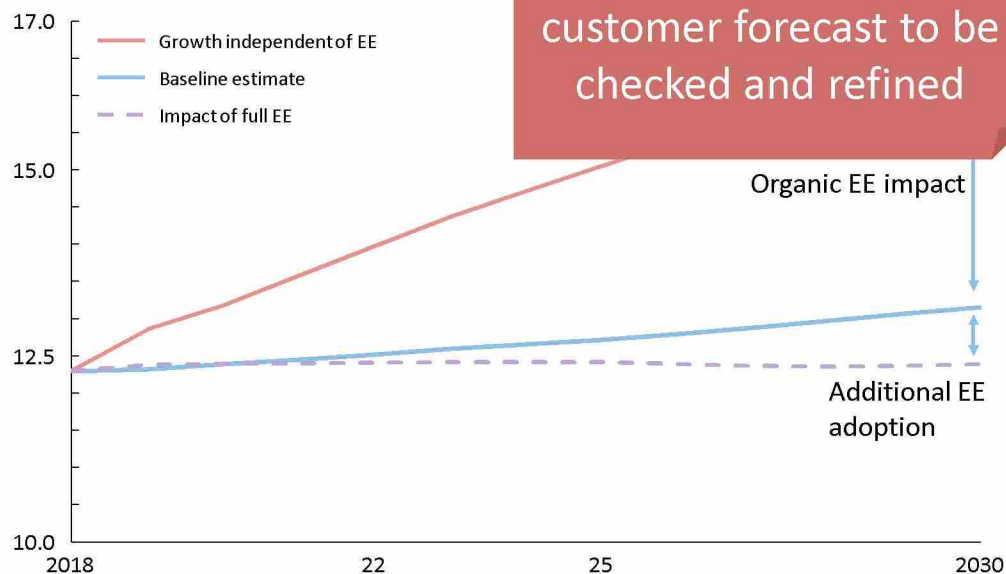
2030 system value, \$/kWh



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Energy efficiency momentum is the largest driver of energy sales reductions, consistent with US utility trends

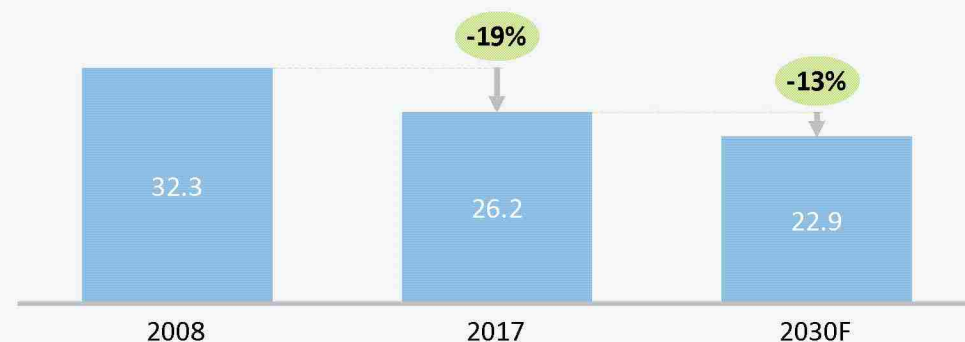
Annual energy sales, thousand MWh



- Organic EE includes continued adoption of energy efficient products as these products become more efficient, as well as the continuation of general building trends, e.g. gas connections
- Additional tech includes higher uptake of products and active decisions to purchase more economic solutions, e.g. heat pump water heaters

Discussed in additional detail on following page

Customer consumption per capita (all customers included)¹, kWh/customer



Residential consumption per capita, kWh/customer



¹ Includes Residential, Commercial, Industrial customers; C&I customer characteristics vary significantly

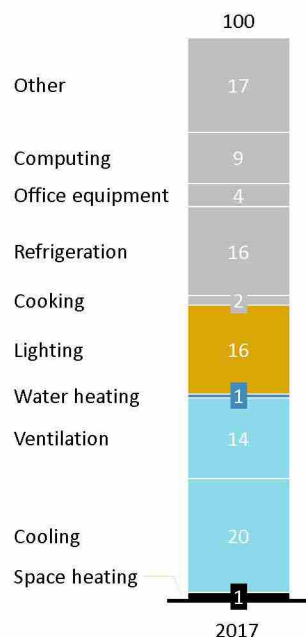
Source: JEA forecast, PowerIQ

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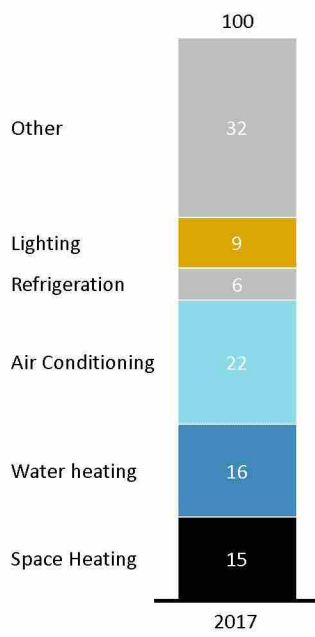
Natural EE improvements with new products will drive up EE; consumer choices regarding new water and space heating technologies can have outside impact on efficiency

To be updated – how does JEA customer base compare (from survey)

Commercial energy consumption,¹ %



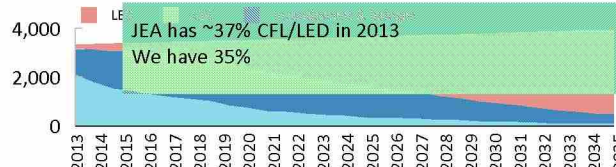
Residential energy consumption, %



Main drivers

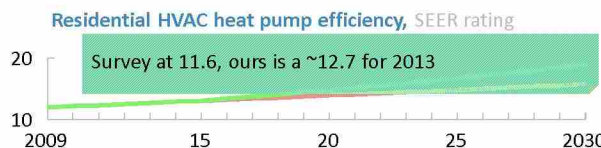


Trends

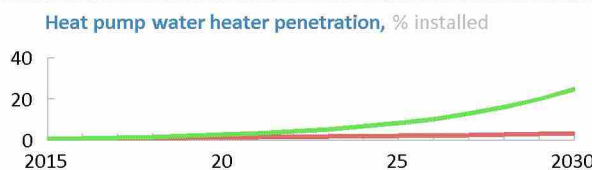


Reduction assumptions

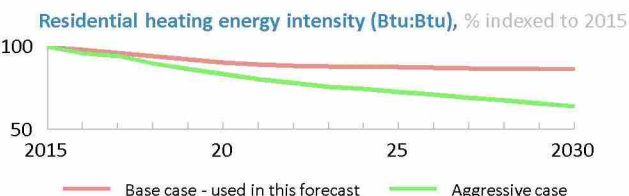
LED installed stock penetration increases to ~80% for commercial, residential and industrial customers



New units are 0.4% - 0.9% more efficient for the same level for each year between manufacture, resulting in natural EE as inventory turns



Improvements in efficiency of resistance units have nearly plateaued; decision to switch to heat pump water heaters would have outside impact. 3-4% install heat pump water heaters by 2030



Adoption of heat pumps reduces winter heating in adopted homes by 50%-60%; expecting 5-10% adoption

¹ ECS breakdown, South Atlantic, %

Source: EIA RECS 2015 and CBECS 2012, Pathways database