FMPA
MUNICIPAL POWER

Solar, Deregulation and Electric Vehicles – A Municipal Perspective

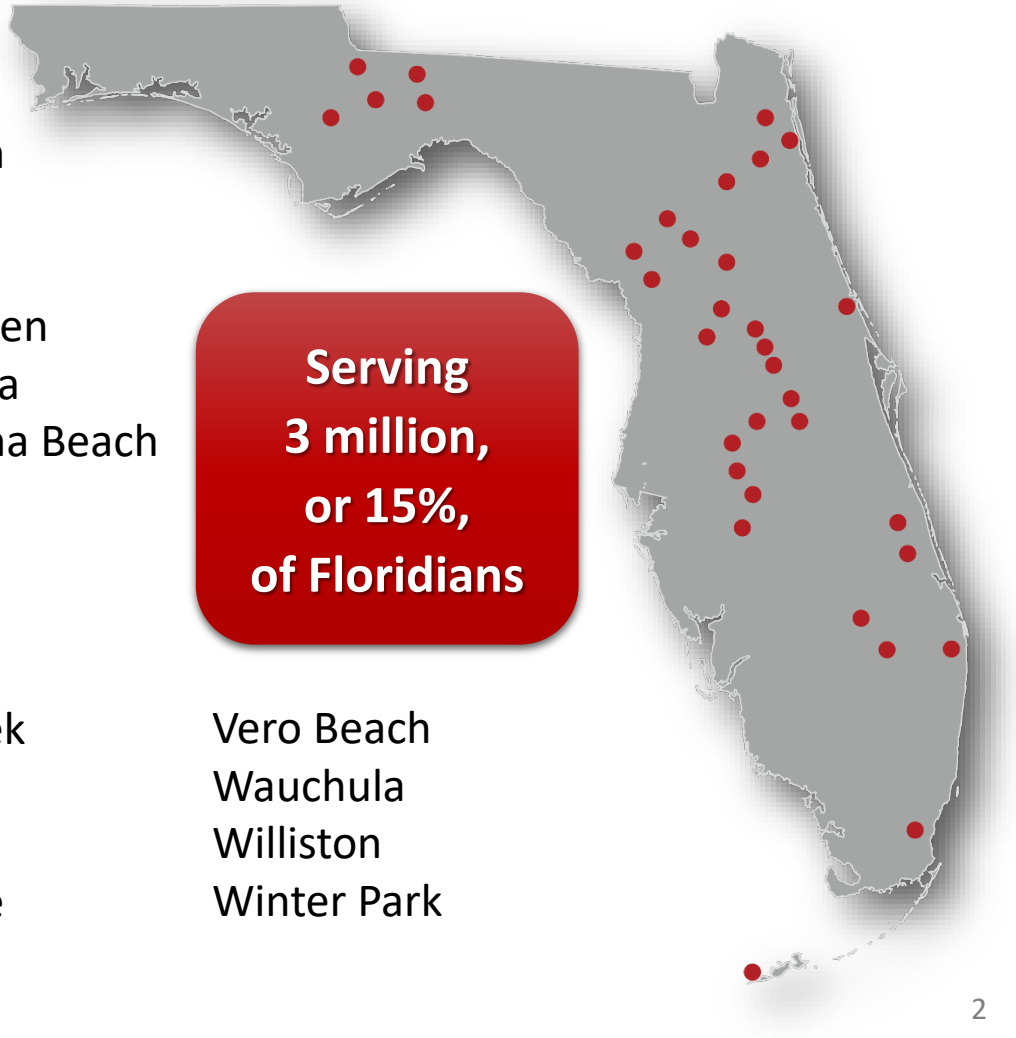
Florida League of Cities
Annual Conference

August 2018

34 Municipal Electric Utilities in Florida

Mission: Low-Cost, Clean and Reliable Power

Alachua
Bartow
Blountstown
Bushnell
Chattahoochee
Clewiston
Fort Meade
Fort Pierce
Gainesville
Green Cove Springs
Town of Havana
Homestead
Jacksonville Beach
JEA
Key West
Kissimmee
Lake Worth
Lakeland
Leesburg
Moore Haven
Mount Dora
New Smyrna Beach
Newberry
Ocala
Orlando
Quincy
Reedy Creek
St. Cloud
Starke
Tallahassee
Vero Beach
Wauchula
Williston
Winter Park



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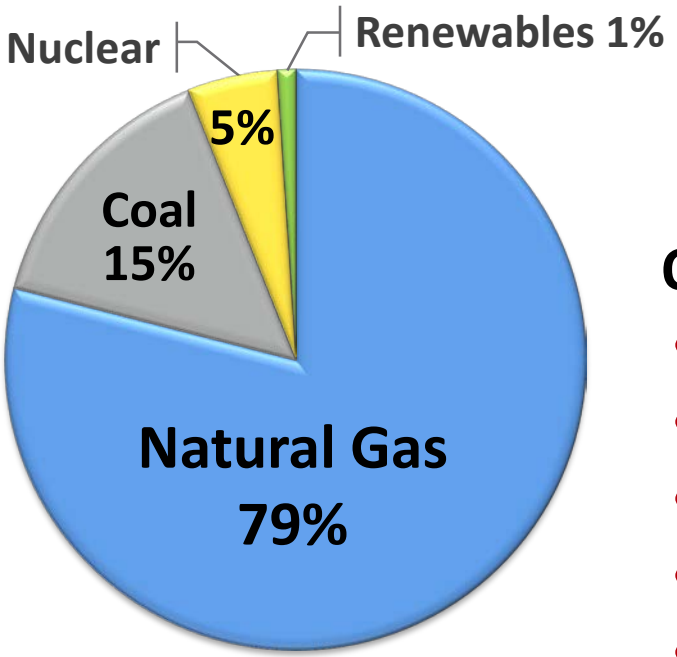
FMPA Controls 1,670 MW of Generation

Nearly 80% of Energy from Natural Gas



Fiscal 2017 ARP Energy Sources

Ownership in 20 units

- 10 natural gas-fired
- 2 coal-fired
- 1 nuclear
- 7 oil-fired (Key West)
- Plus renewable energy and power purchases

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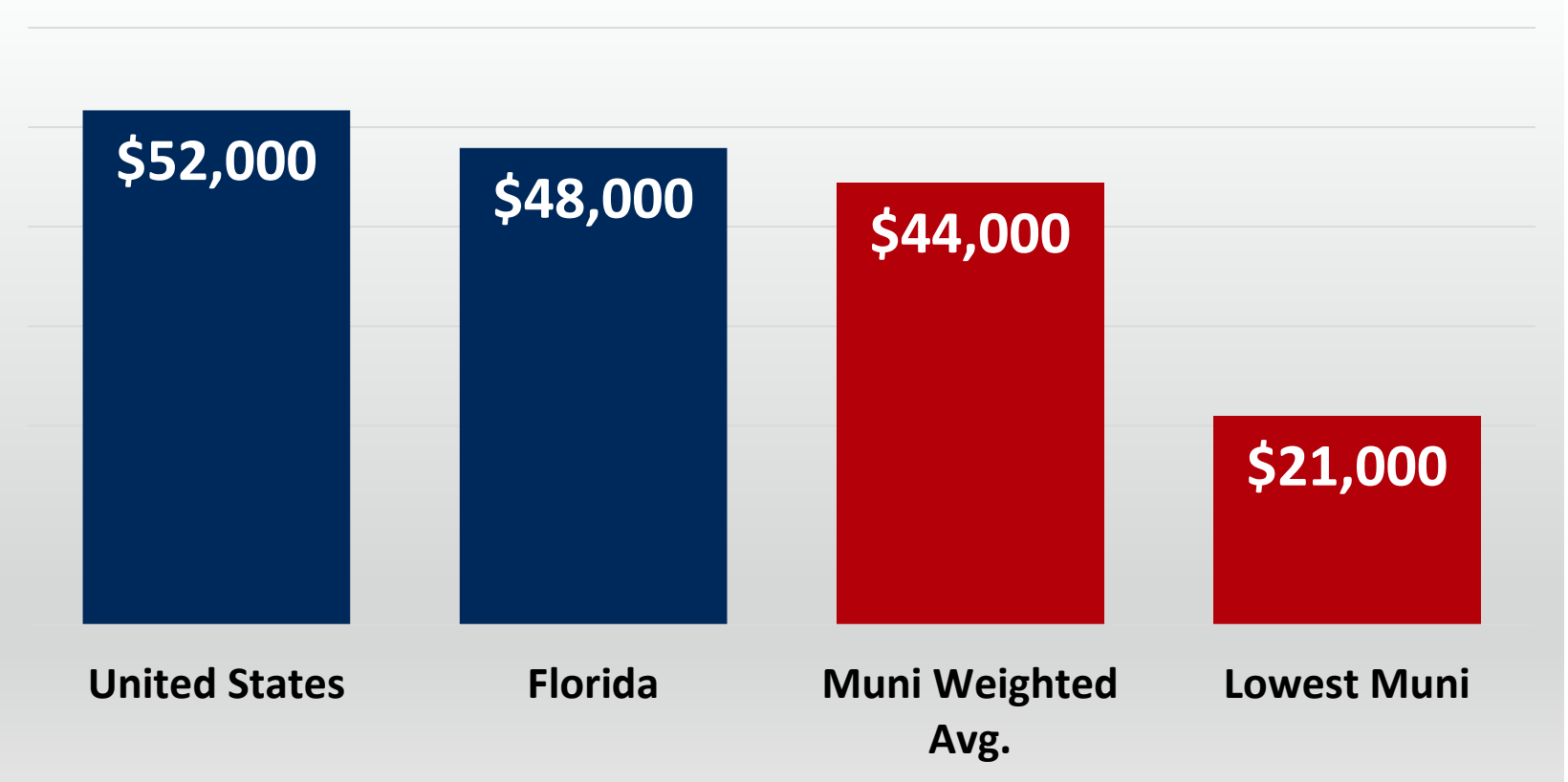
People Need Affordable Electricity

Income in 29 of 33 Fla. Cities Lower Than State Average

2017 Real Personal Income Per Capita

Rounded to Nearest Thousand



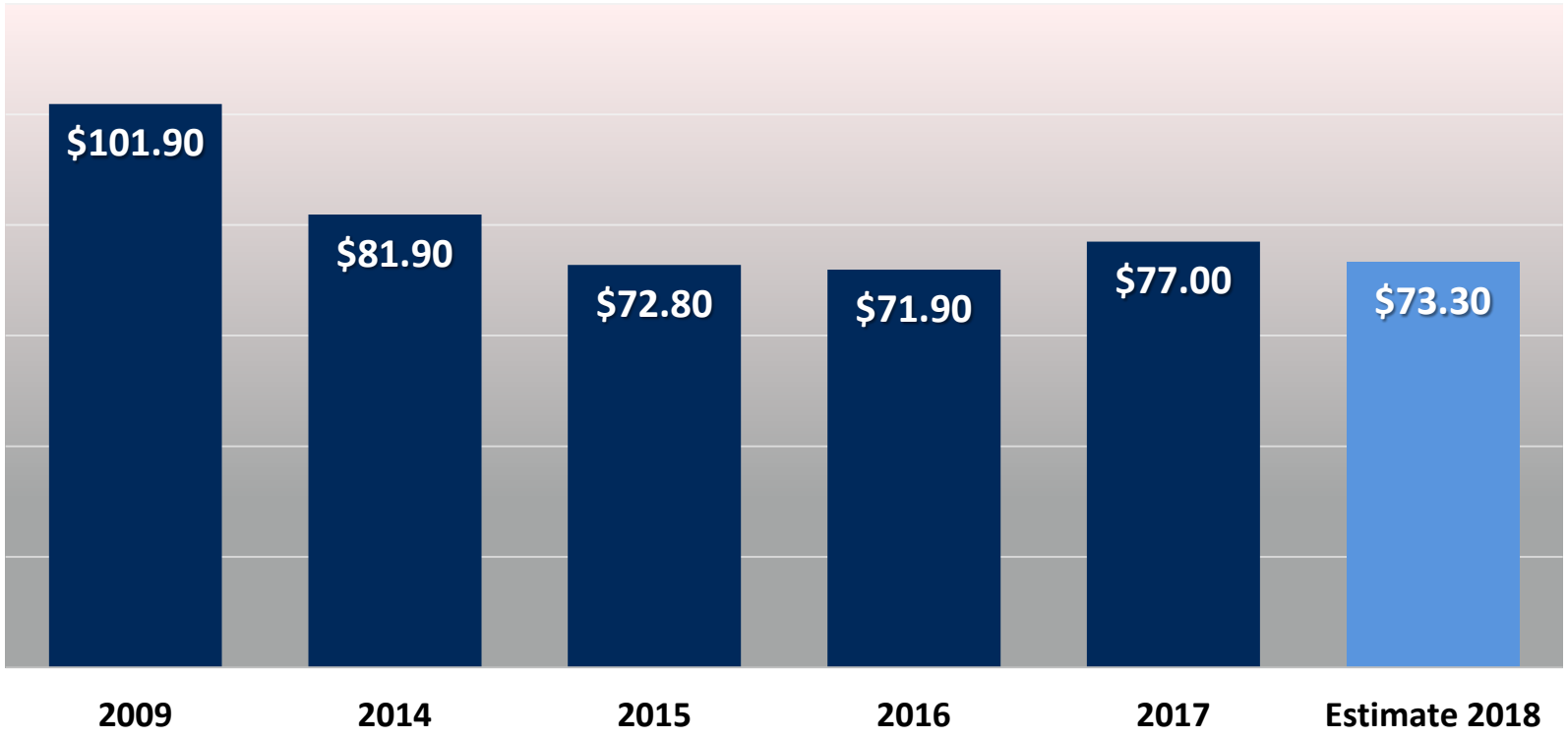
SOURCE: Woods and Poole Economics, Inc. and U.S. Census Bureau (adjusted to 2017 dollars)

FMPA's Costs Decreased 28% Since 2009

Nationally, Electricity Prices Increased 7%

All-Requirements Project: Historical and Budgeted Rates

Cost per Megawatt Hour



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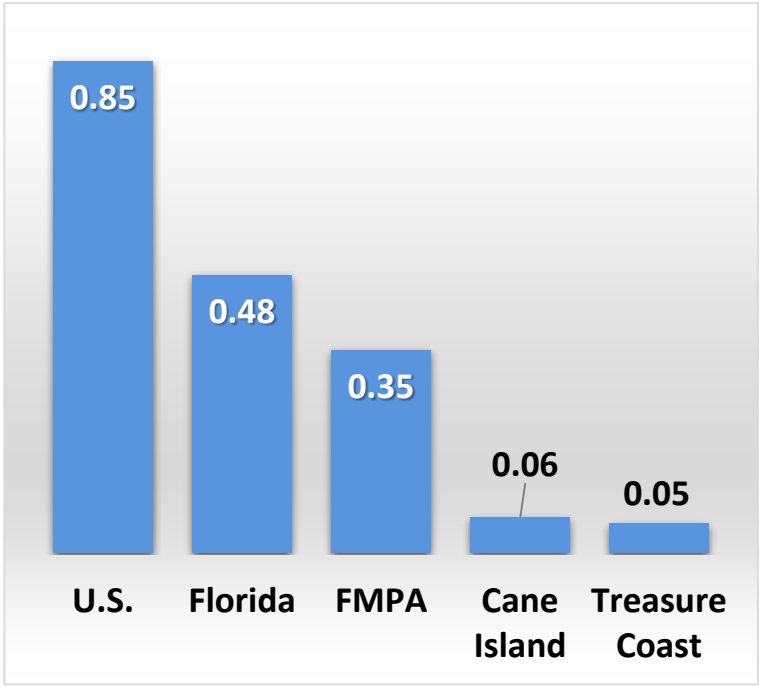
FMPA Has a Clean Power Generation Fleet

Emissions Well Below National Averages

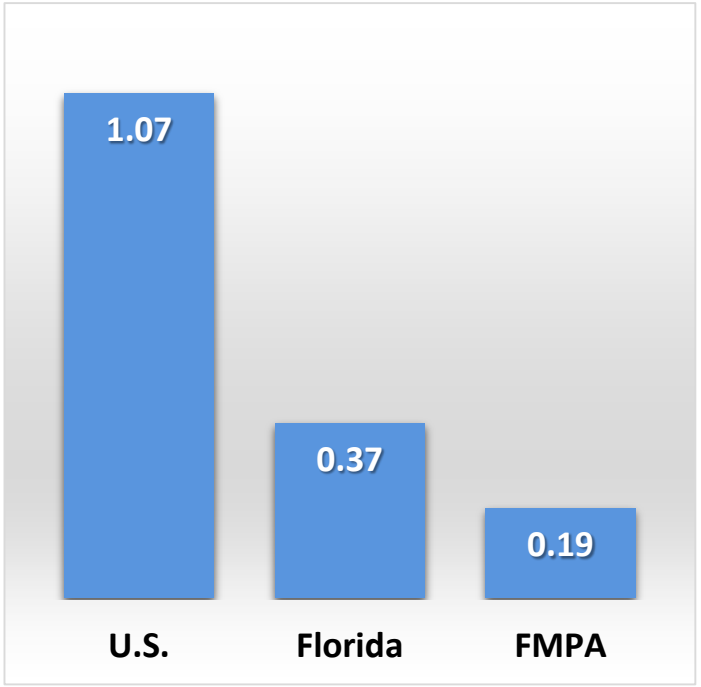
NO_x 56% Below U.S. Average

Lbs./MWh, all generation



SO_2 82% Below U.S. Average

Lbs./MWh, all generation



SOURCE: 2017 Annual Acid Rain Program

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The Big Picture
If You Remember Nothing Else, Know This

- Estimated 5% of Florida's power generation from solar by 2023*
  - Most will come from low-cost, utility-scale solar, which is 1/3 or less than the cost of customer-owned "rooftop" solar
  - Solar subscription services offer low-cost option for customers
- Electric deregulation does not mean lower costs
  - Not good for Florida: we are a peninsula and rely on 3 natural gas pipelines for 70% of our electricity
  - Similar characteristics to California before their power crisis, led by companies like Enron
  - Could result in much lower tax revenue for cities and counties
- In 10 years, electric vehicles only expected to be 2%-4% of auto stock
  - Cities should be cautious about massive investments in recharging – technology is improving mileage per charge
  - Potential loss of gas tax revenue for cities and counties

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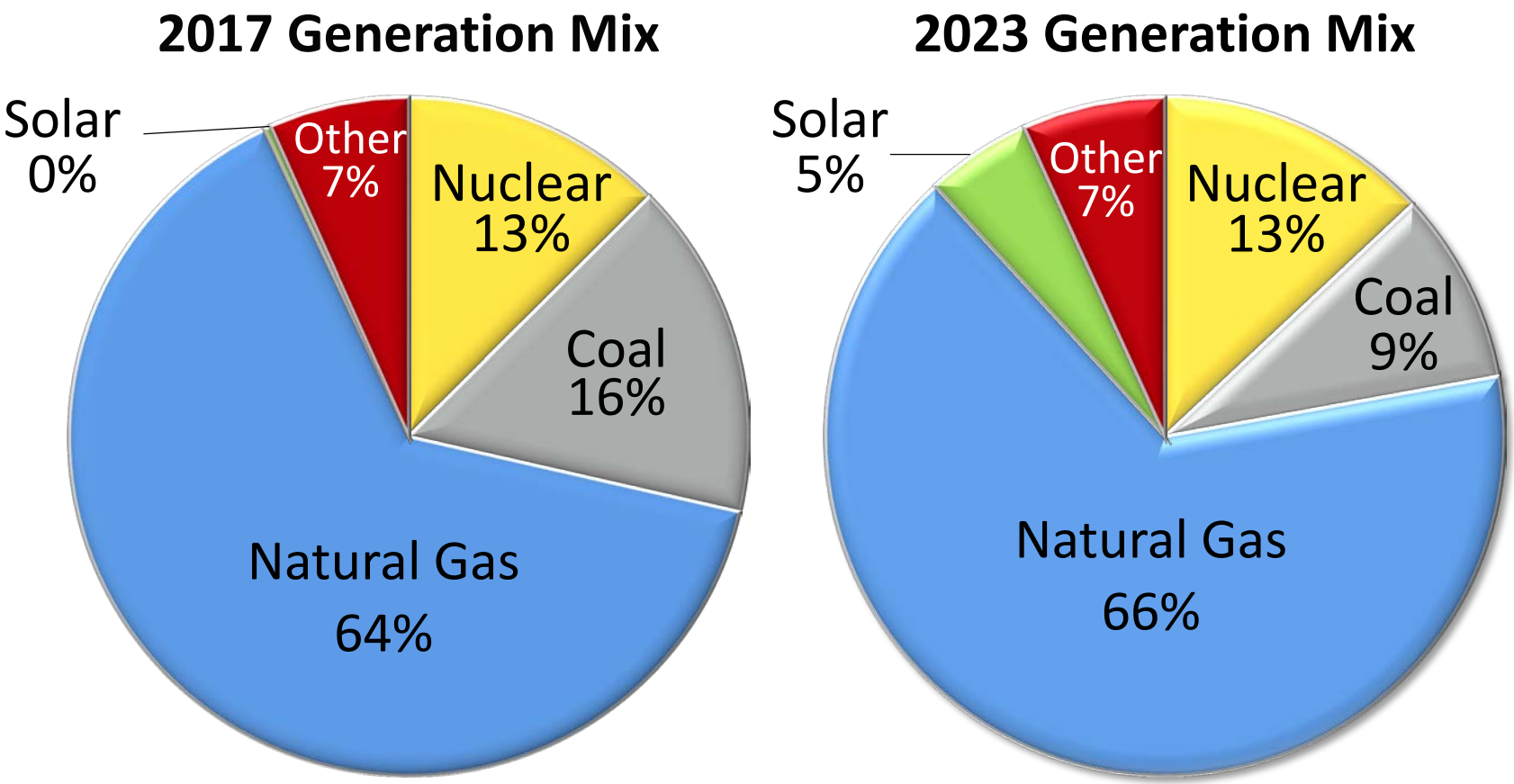
*SOURCE: Florida Reliability Coordinating Council 2018 Load and Resource Plan

Community Solar

Florida is a Gas-Dependent State

Solar Generation Continues to Grow

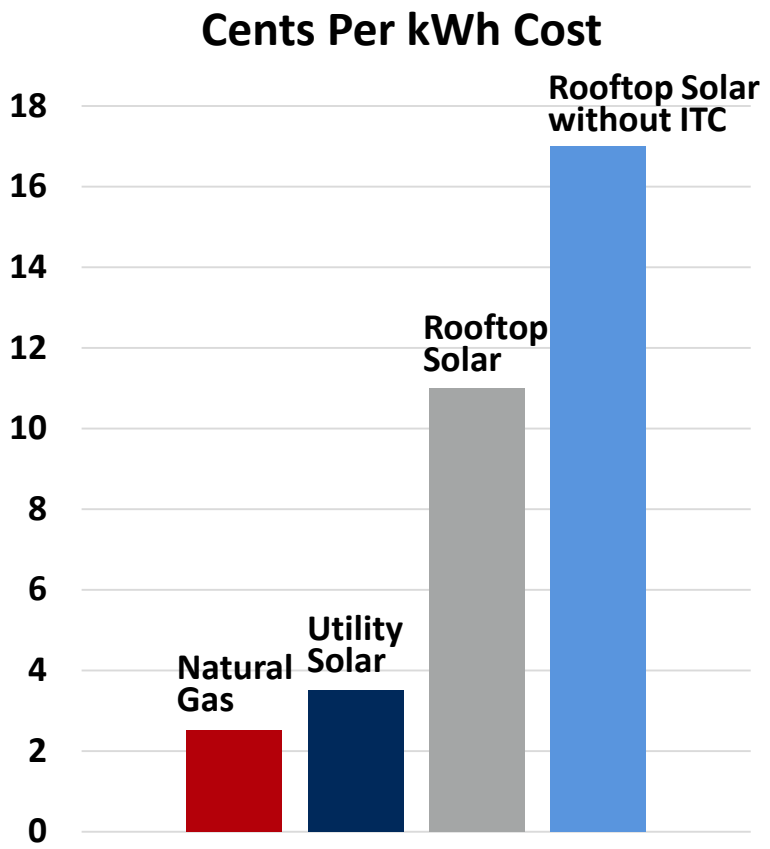


SOURCE: Florida Reliability Coordinating Council 2018 Load and Resource Plan

Utility-Scale Solar Low-Cost Solution

Community Solar Is Much Lower Cost

- Utility-scale solar higher cost than running existing low-cost, natural-gas fueled units
- Utility-scale solar costs 1/3 the cost of rooftop solar
- Utility-scale solar subscription service is of interest to customers
- Customers only pay a small adder to their electric rate
- Ideal for multi-family, low income and homes not suited for rooftop solar



SOURCE: NREL, FMPA

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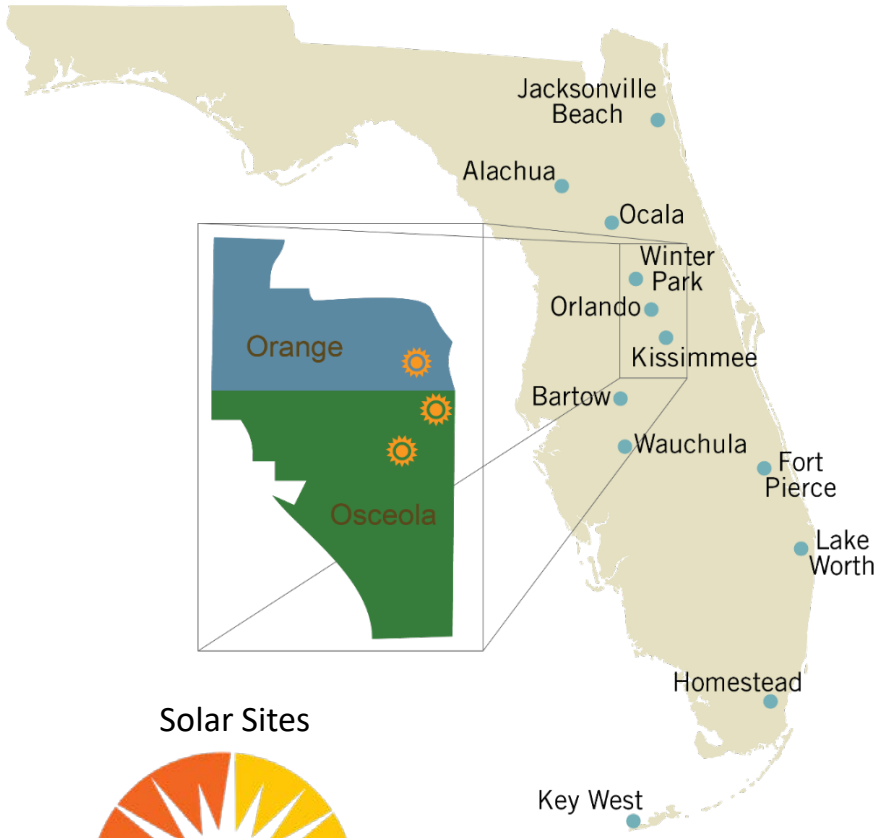
FMPA Provides 12 Cities Low-Cost Solar

Utility-Scale Solar One-Third the Price

- One of largest municipal-backed solar projects in U.S.
  - 1,200 acres, equal to 900 football fields
  - 900,000 panels; 223.5 MW
  - Equal to 37,250 average-size rooftop systems
- Large-scale solar more cost effective
  - About one-third the cost of a private, rooftop system
- Will increase FMPA's solar generation to 2% in 2021



FLORIDA MUNICIPAL SOLAR PROJECT

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Customers Support Solar Power

But Most Customers Don't Want to Pay More

- FMPA Survey – 72% of customers support solar but,
- Most customers don't want to pay more – only 13% very likely to pay more per month
- People have impression solar power lowers bills, but that's not generally the case
- Cities have an opportunity to market low-cost, utility-scale solar while examining rate impacts for all customers from private, rooftop solar

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Deregulation

Electric Deregulation History
Started in Mid-1990s in High-Cost States

- Electric deregulation started in mid-1990s in California
  - Others in Northeast later followed
- California implemented wholesale deregulation in April 1998, but by late-spring of 2000, power prices skyrocketed to nearly 40 cents/kWh*
- Enron event happened – "Star Wars", etc. with load shedding occurring on 31 days with 42 hours of outages
- Legislators and regulators forget California historically relied on adjacent states for ~20% of the power being brought in by transmission as demand in Arizona and Nevada grew rapidly*
- California limited new power plants being built and demand overran supply – price spikes
- Parties controlling the transmission for critical out-of-state supply won big-time

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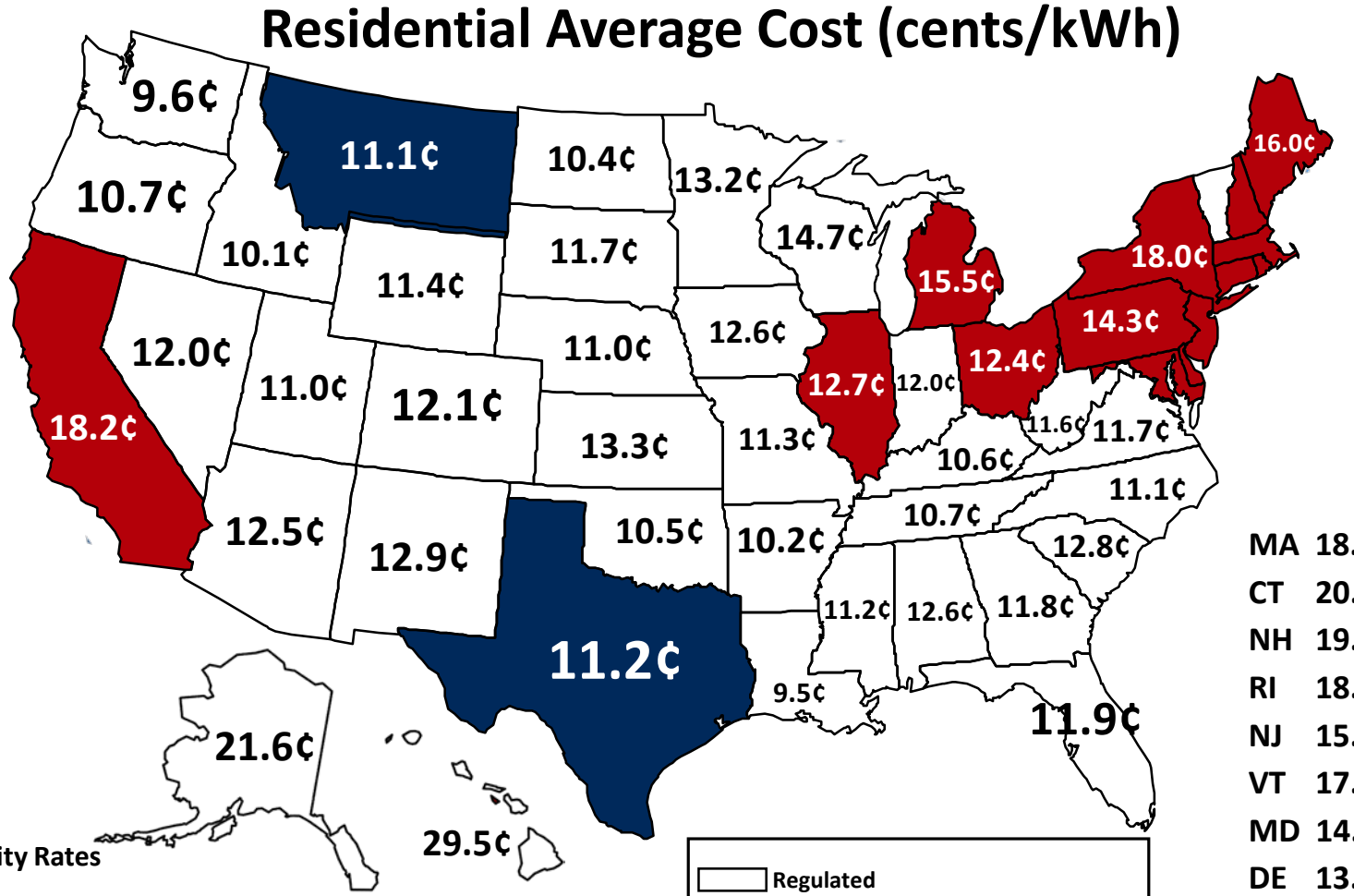
*SOURCE: The California Energy Crisis: Causes and Policy Options, Public Policy Institute of California (2003)

Most Choice States Higher Cost than FL

Texas Costs Similar to Florida – Both Rely on Gas



¢ = 2017 Average Residential Electricity Rates

MA	18.9¢
CT	20.3¢
NH	19.2¢
RI	18.3¢
NJ	15.7¢
VT	17.7¢
MD	14.0¢
DE	13.4¢
DC	12.9¢

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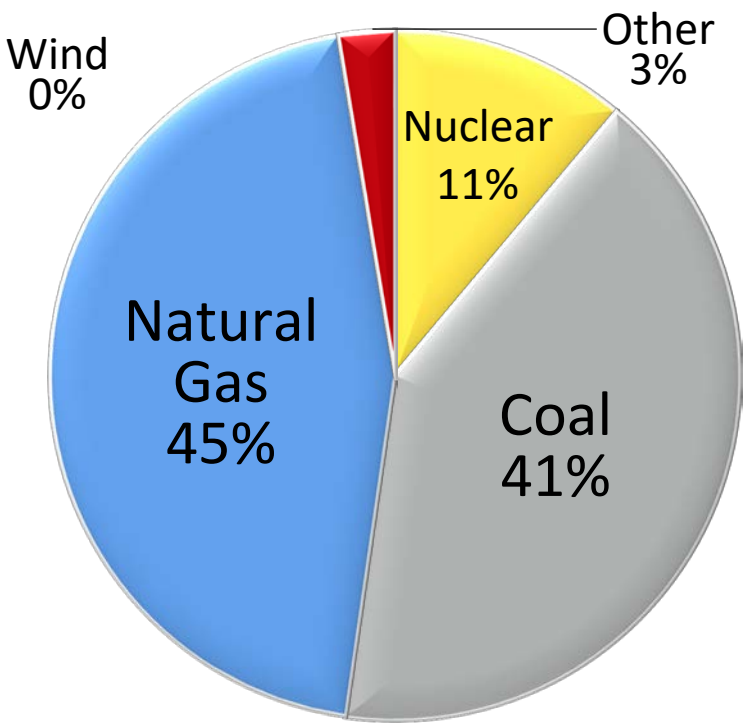
SOURCE: U.S. Energy Information Administration

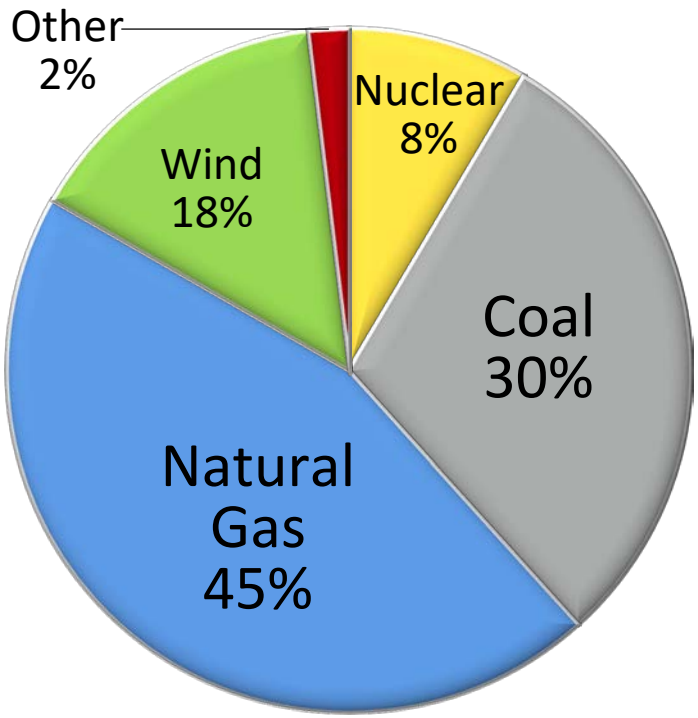
Texas Reliant on Natural Gas, Like Florida

Texas Gets Federal Tax Subsidy for Wind

1997 Texas Generation Mix



2017 Texas Generation Mix



- Wind in Texas gets an est. tax credit of $25/MWh or $1.8B annually (based on 2017)
- Tax credits equate to ~0.5 cents/kWh reduction in Texas prices paid for by U.S. taxes

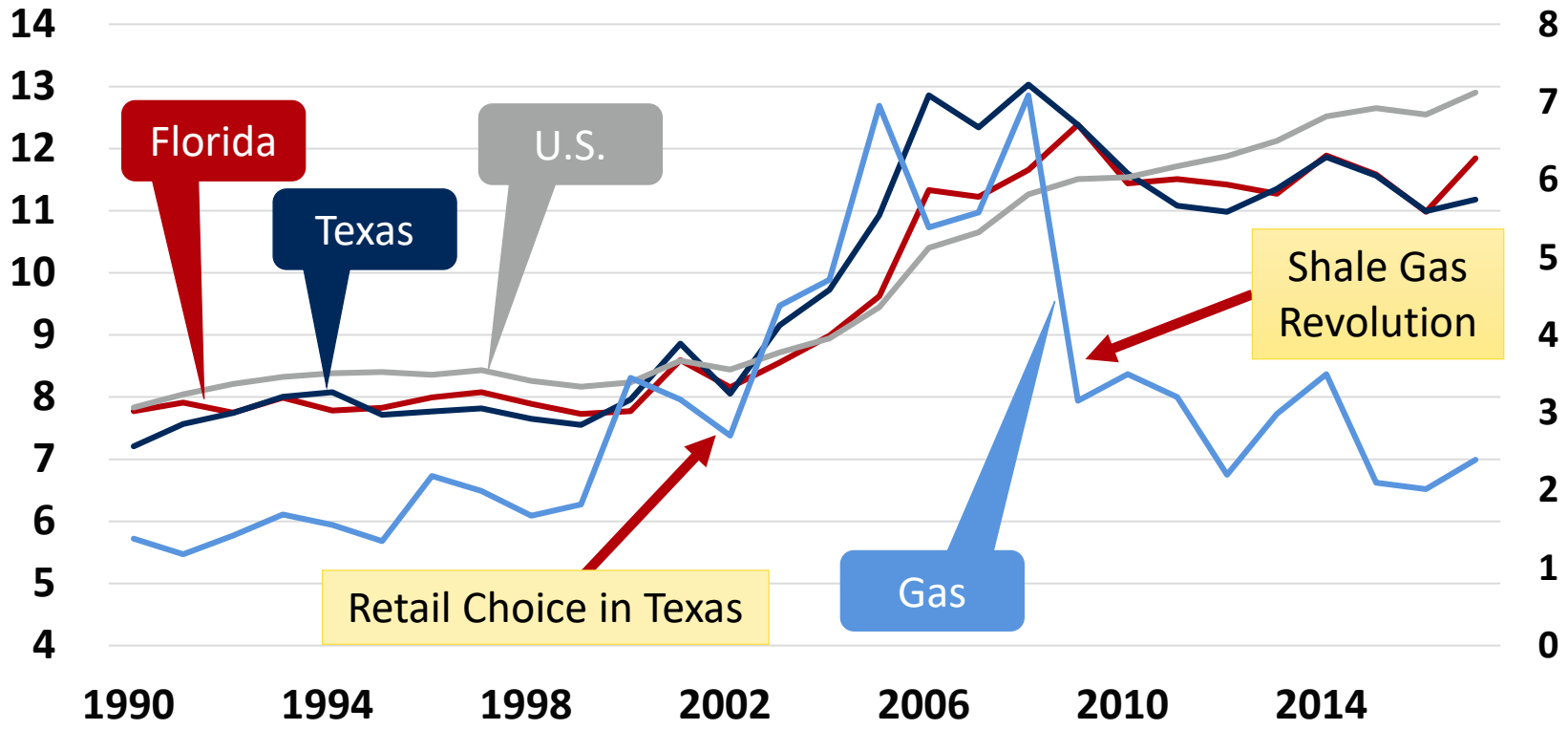
SOURCE: EIA Texas State Profile (Total Electric Industry) (2017 #s Preliminary)

Texas Residential Rates Similar to Florida

Prices Generally Follow Natural Gas Prices

Nominal Residential Average Cost and Gas Cost (cents/kWh)

Source: EIA



Texas Results Mixed

Even with Local Resource Advantage

- Electric prices in regulated areas of Texas remain lower than deregulated areas*
- Texas saves 0.5 cents per kWh compared to Florida due to wind tax subsidies
- TX has great access to local energy sources
  - Natural gas
  - Lignite coal
- Low transportation costs for fuel – natural gas/coal
- Hub for energy industry and resource extraction
- More resilient network to deliver power and fuel – no small set of assets critical to power supply

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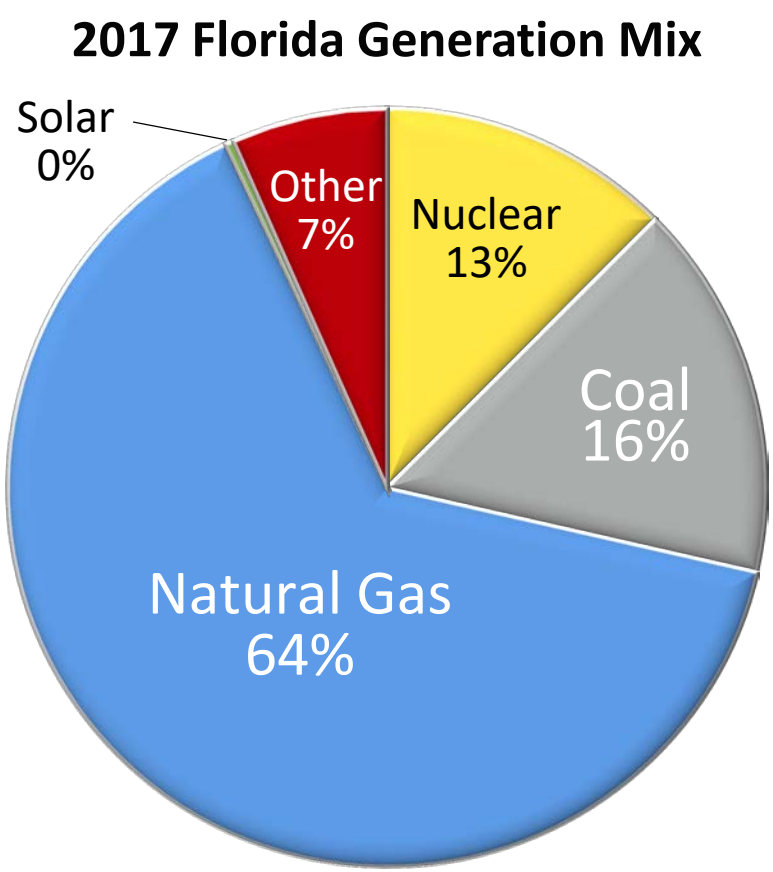
*SOURCE: Texas Coalition for Affordable Power 2016

Deregulation in FL – Unseen Challenges

State Dependent on Three Natural Gas Pipelines

- Peninsular nature limits access to three natural gas pipelines, all from same spot in Alabama
- One company owns 50% of Florida pipeline capacity and generation
- Deregulated entities charge what "market will bear"
  - They would not be cost regulated by the Florida PSC
- Alternative cost-effective generation not large enough to mitigate potential risks



SOURCE: Florida Reliability Coordinating Council 2018 Load and Resource Plan

Electric Service Tax Revenue Significant

Deregulation Puts ~$1.7B Revenue for Cities at Risk*

- Deregulation means:
  - 30%-50% of bill from electric utility for wires
  - 50%-70% of bill from unregulated supplier
- Gross receipts and public service taxes only on utility service
  - Will legislature expand to cover unregulated cost?
- If deregulation meant to push customer-owned generation:
  - Loss of state and local tax revenue

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Electric Vehicles

Electric Vehicles Will Grow

But Will Only Reach ~5% of Cars in U.S. by 2027

- Interest in electric vehicles (EVs) growing, but highly subsidized
- EVs can be as much as 5 times higher cost than standard cars*
  - Cost varies greatly based on battery and features
  - Fair number of EVs have no “apples to apples” gas counterpart
- EVs market challenge is to move beyond the high-income crowd
- EVs range (on battery alone) can vary greatly but generally ranges from ~50 miles per charge to as much as ~300 miles per charge, and looking to get more products to 350-400 miles by mid 2020s
  - Gas/electric hybrids with range-extending gas engines go farther
- Replacing existing car feedstock takes more than a decade
- Impact on overall electric demand up to 2% increase by 2027

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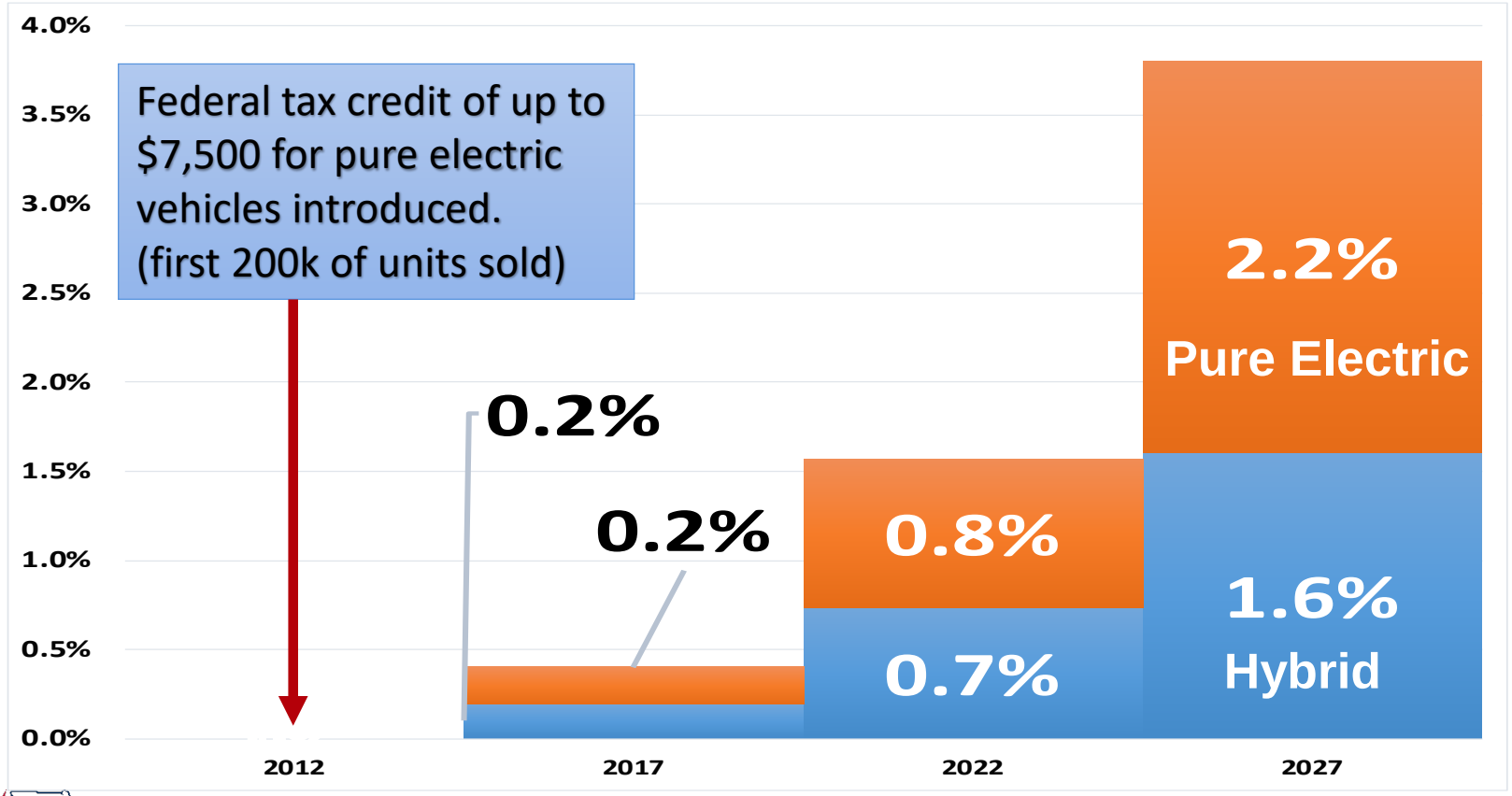
SOURCE: www.cargurus.com, American base 4-door/5-seat sedan vs. Tesla Model S

EIA Projects EV/Hybrid Stock at 4% by 2027

Pure EVs Expected to Have Larger Share

Share of Auto Stock for Pure EVs and Plug-in Hybrids

Source: EIA 2017 Annual Energy Outlook



1% of new US car sales today are electric (SOURCE: Intl' Energy Agency).

Electric Vehicles Support Scattered

Not Every Customer is Compelled to Change

Adoption Factor	PHEV/EV	Internet-Enabled (Smart) Phone
Low up-front capital cost	-	+
No need for government subsidies	?	+
Rapidly expanding/available infrastructure	?	+
Creates demand for something we never knew we needed	-	+
Enhances utility relative to the past	-	+
Social/environmental value	+	?
Very rapid adoption once introduced	-	+

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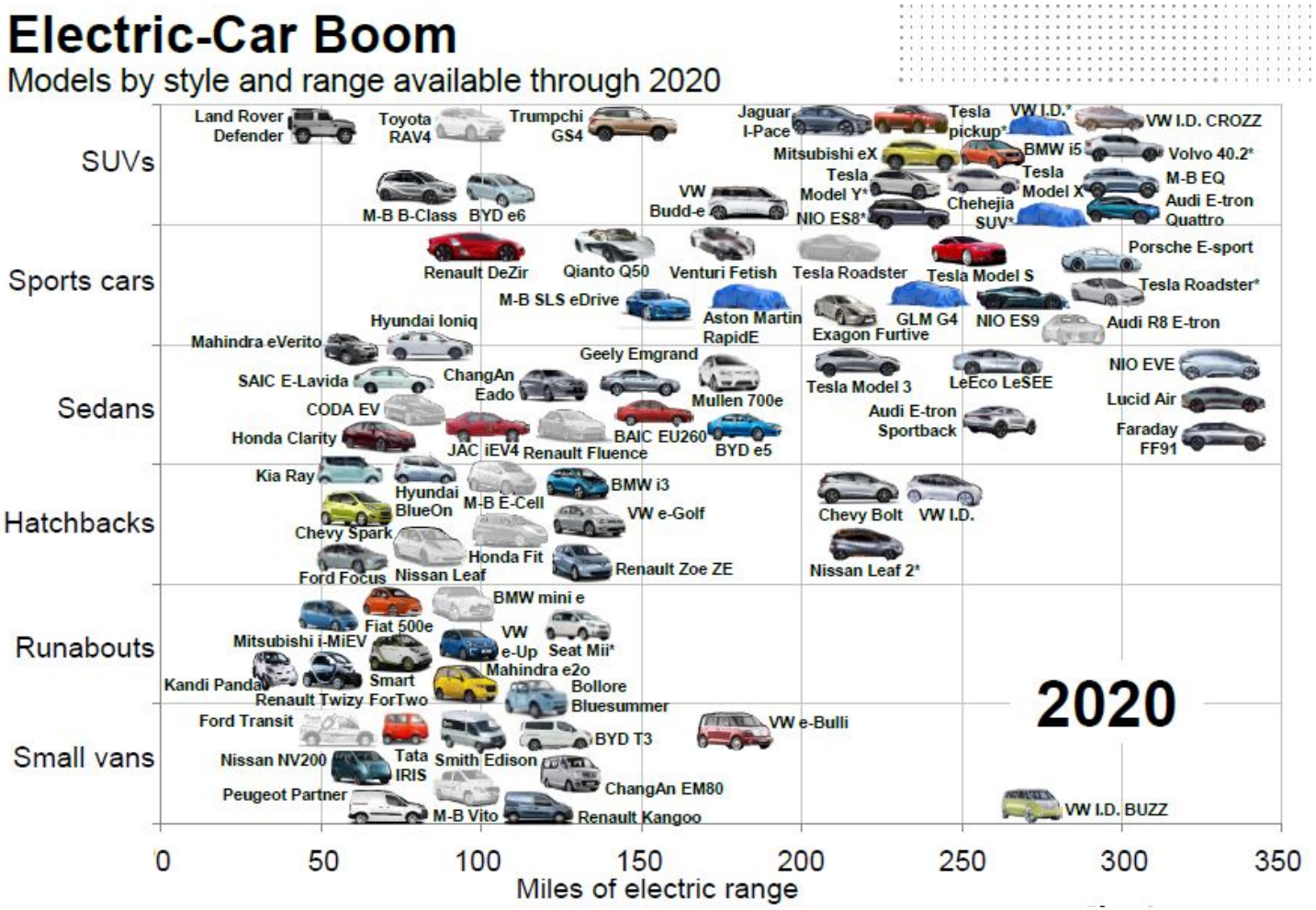
There is a Model Boom Coming…

Range Moving to 200 – 300 Miles Per Charge

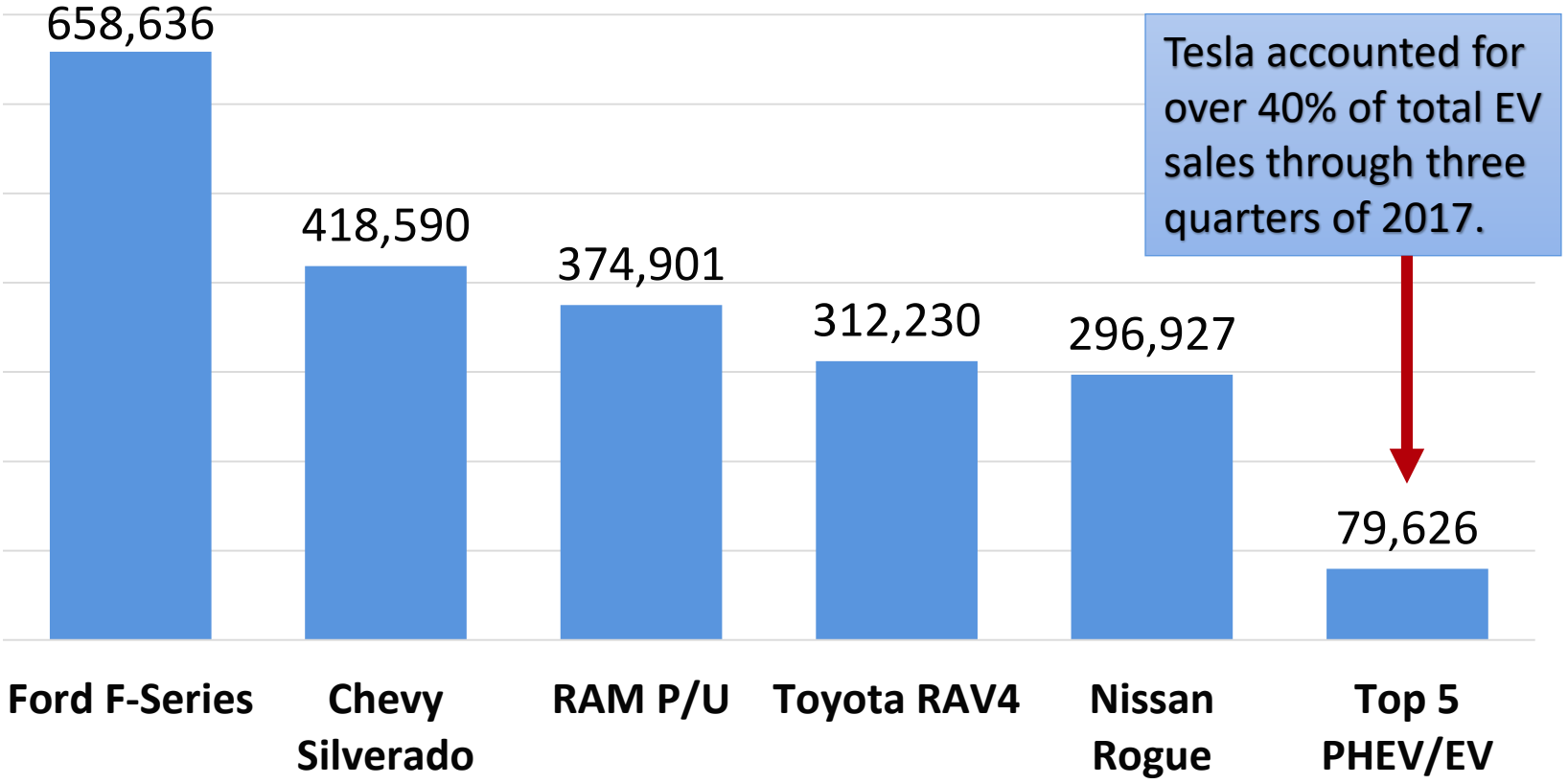


…But America Loves Trucks

Trucks and Sport-Utility Vehicles Dominating

2017 TYD (9/30) Top 5 USA Selling Vehicles vs. PHEV/EV

Sources: Inside EVs, goodcarbadcar.com



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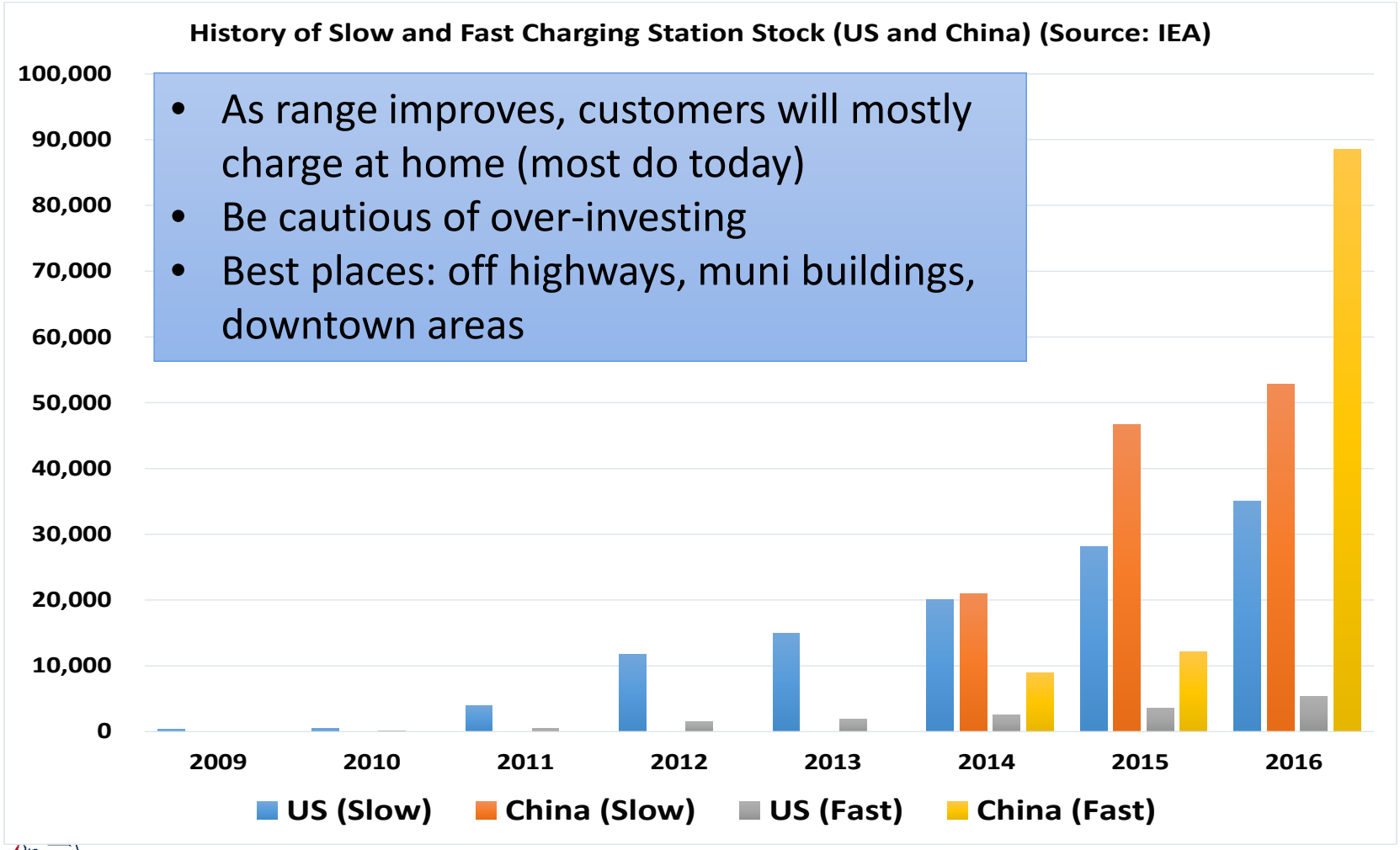
Public Charging Stations Increasing

China Demand Will Drive Tech Advances



- As range improves, customers will mostly charge at home (most do today)
- Be cautious of over-investing
- Best places: off highways, muni buildings, downtown areas

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Policies Could Increase EV Value

Certain States Legislating to Create Markets

- Restrict registrations to only EVs (California bill introduced in January 2018)
- Toll exemptions
- Dedicated parking spaces
- Access to publicly available charging infrastructure
  - May become less important as range increases
- Access bus and high-occupancy vehicle (HOV) lanes
- Public/Fleet procurement

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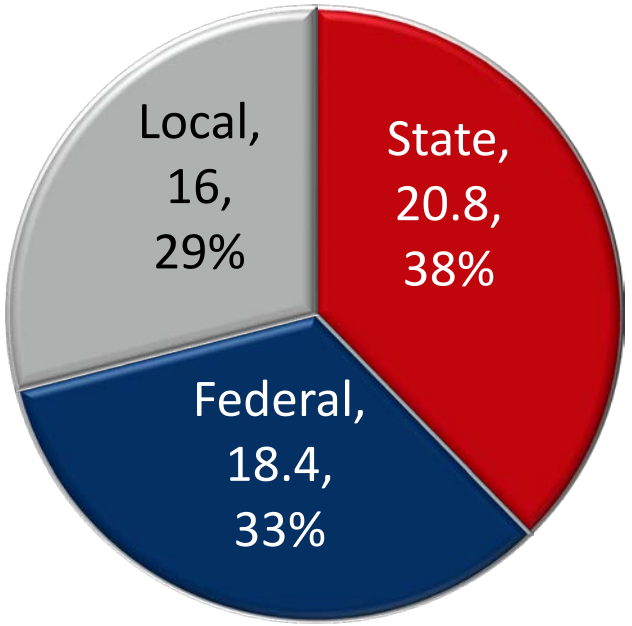
EV Adoption Impacts Local Taxes

State and Local Govt. Gets ~2/3 of Fuel Tax Dollars

- State and local government taxes and allocations make up ~2/3 of fuel tax revenues
- The average driver pays about $296/year in fuel taxes*
  - EV would reduce revenue by the same amount
- Less money available for acquisition, construction and maintenance of roads, other transportation projects

CY 2017 Florida Fuel Taxes*
(cents/gallon, %)



*SOURCE: Florida's Transportation Tax Sources – A Primer (FDOT, 2017)

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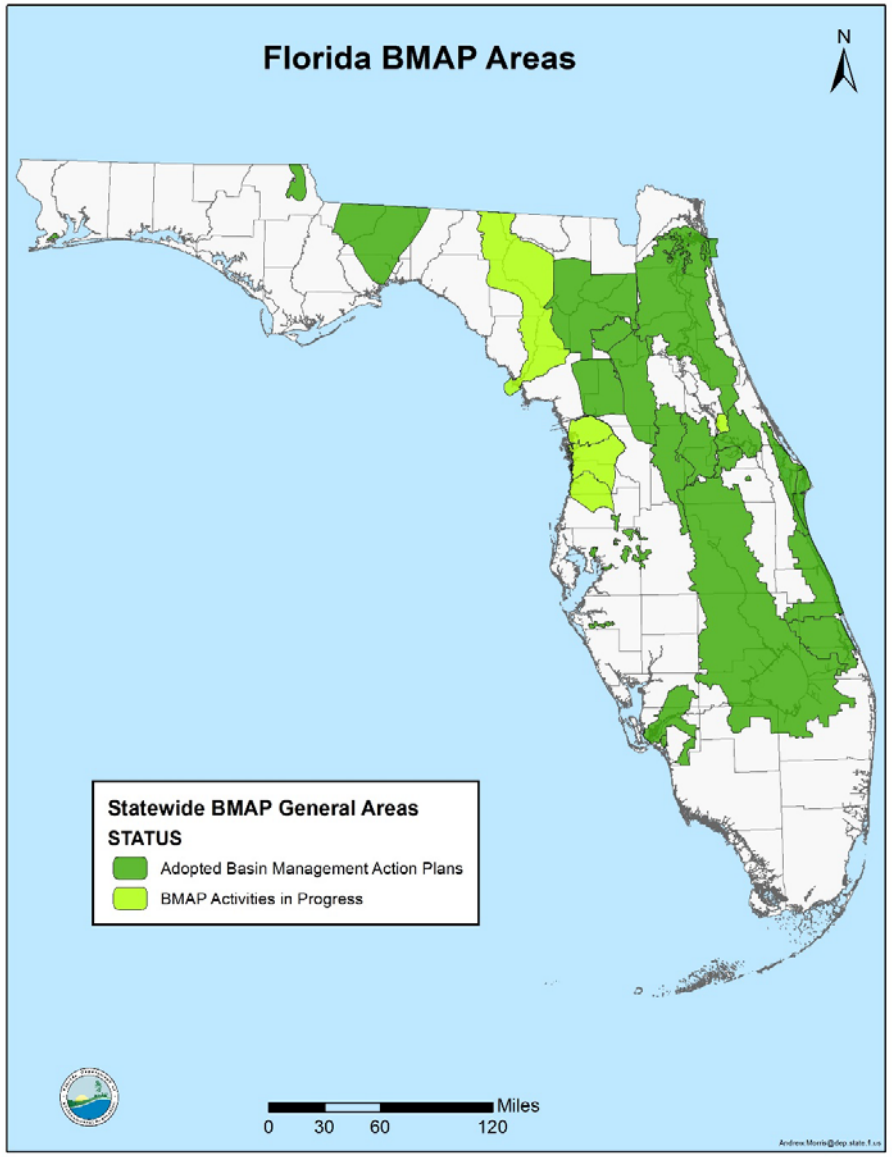
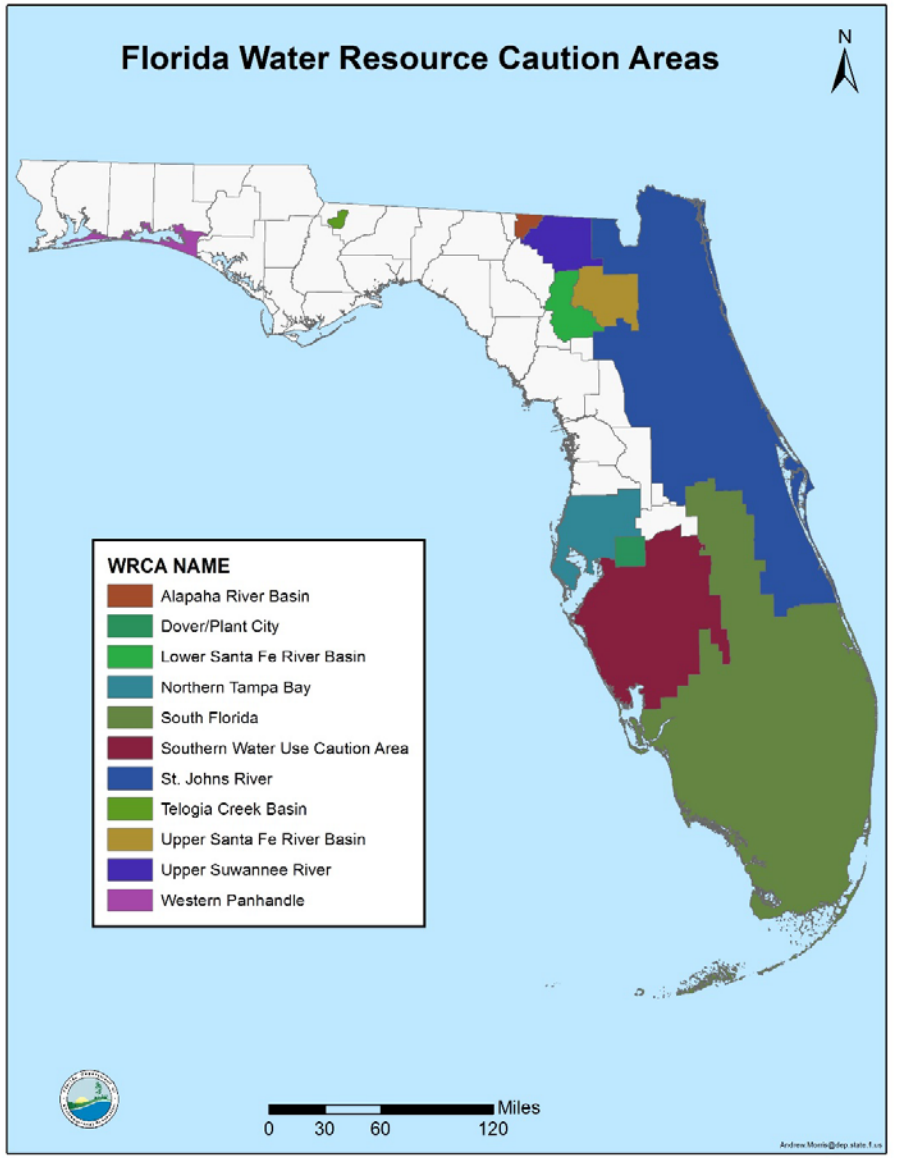
*SOURCE: Florida Reliability Coordinating Council 2018 Load and Resource Plan

Water Infrastructure

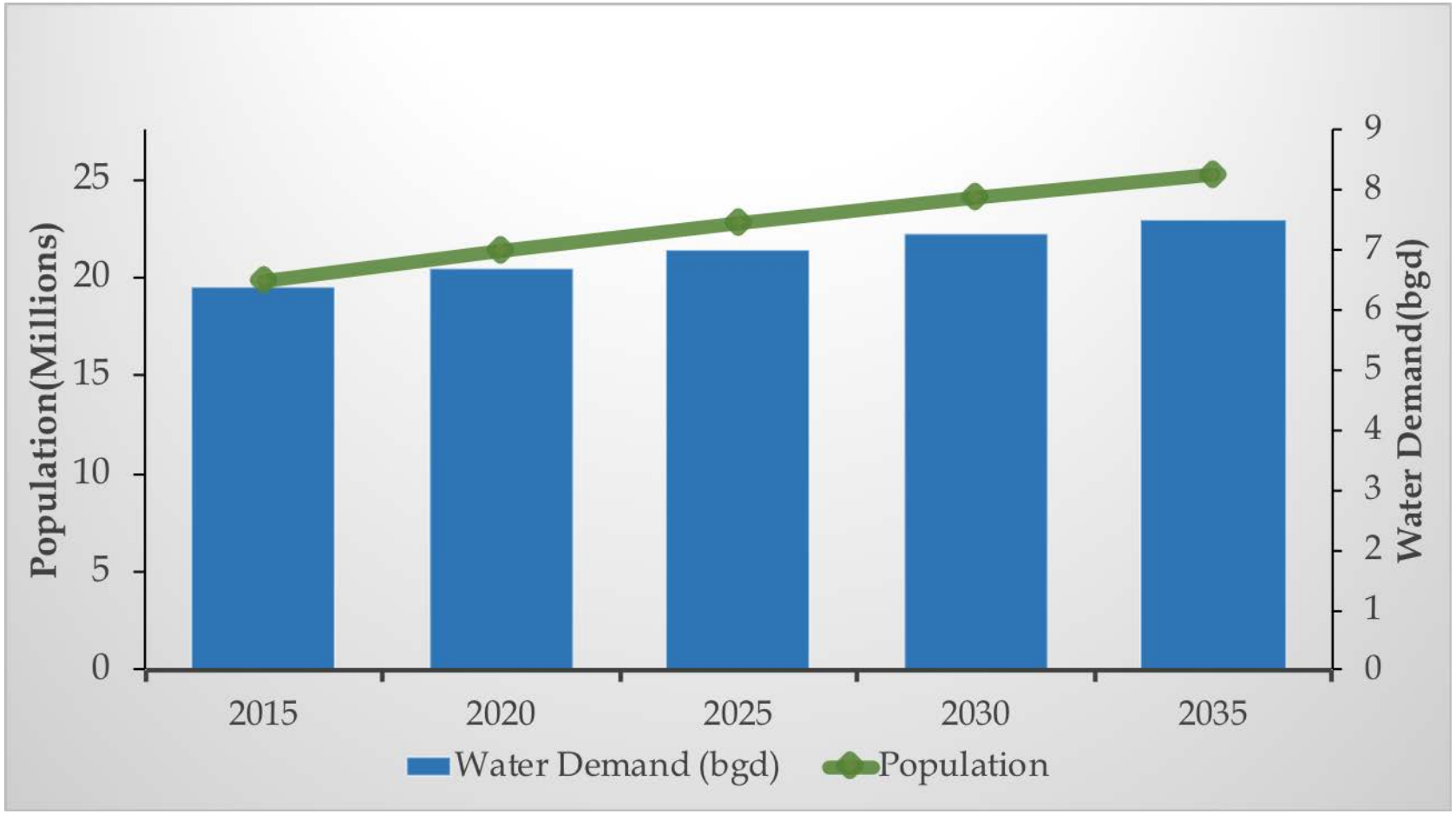
Drew Bartlett
Deputy Secretary, Ecosystem Restoration
Florida Department of Environmental Protection

Florida Water Pressures

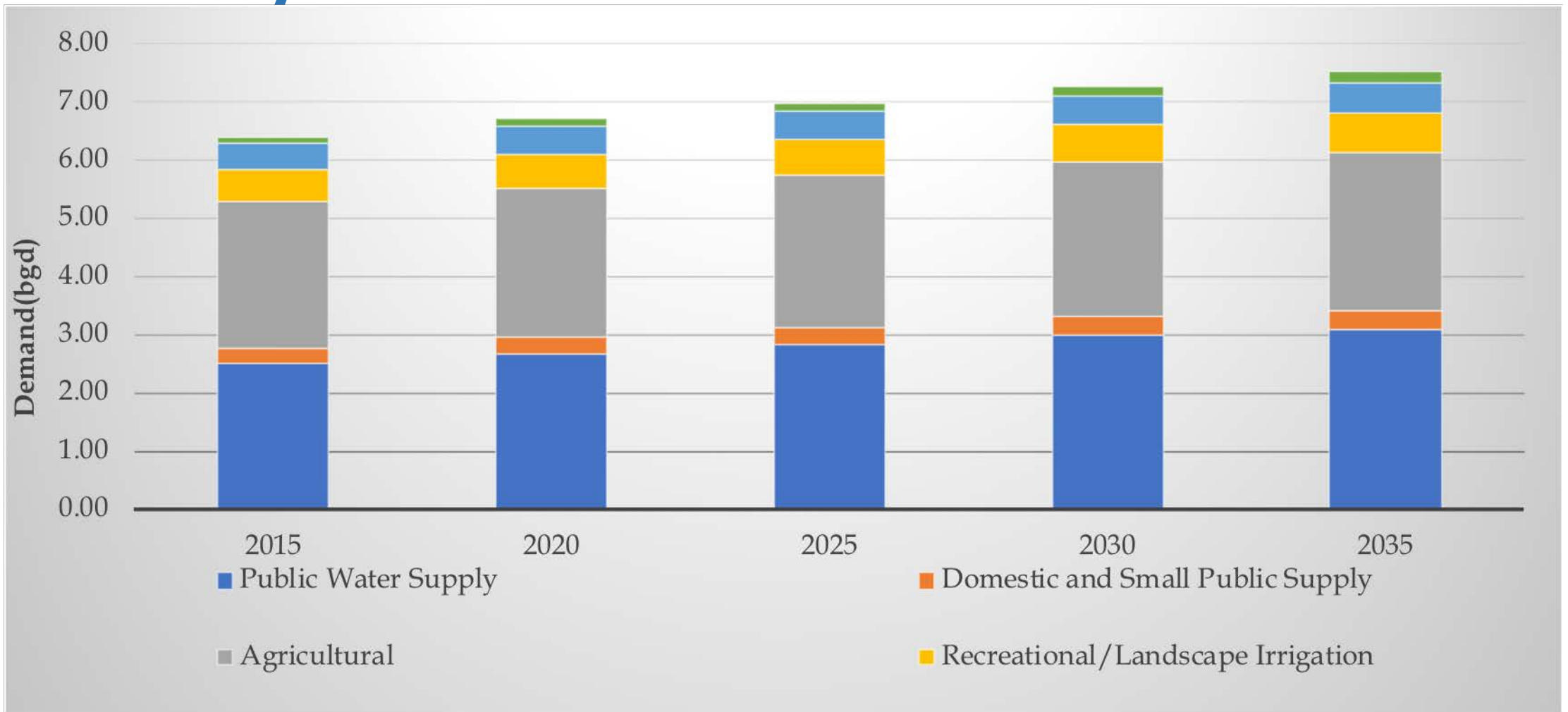




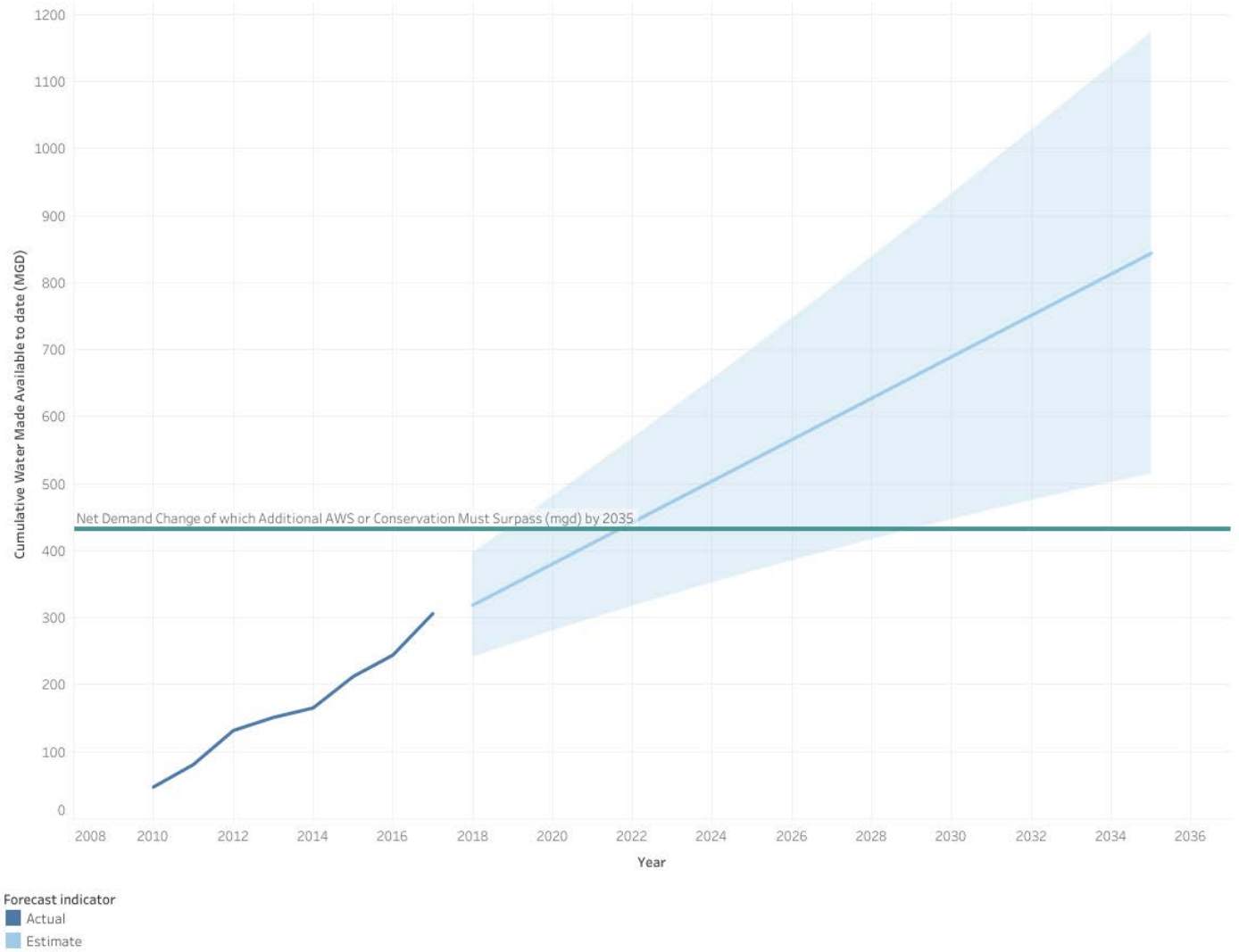
Statewide Demand & Population Projections



Statewide Projected Demand by Use



Forecasting Project Implementation to Meet Future Demands



2015-2035 Demands

Demands, Conservation, and AWS Options Identified in RWSPs				
Net Demand Change (mgd)	Estimated Existing Sources Available to Meet Future Demands (mgd)	Net Demand Change of which Additional AWS or Conservation Must Surpass (mgd)	Conservation Projection to Meet Future Demands (mgd)	AWS Options to Meet Future Demands (mgd)
1,108.9	677.2	431.7	328 - 353	1,604 – 1,642

Completed Projects by Type FY 05/06 – FY 17/18

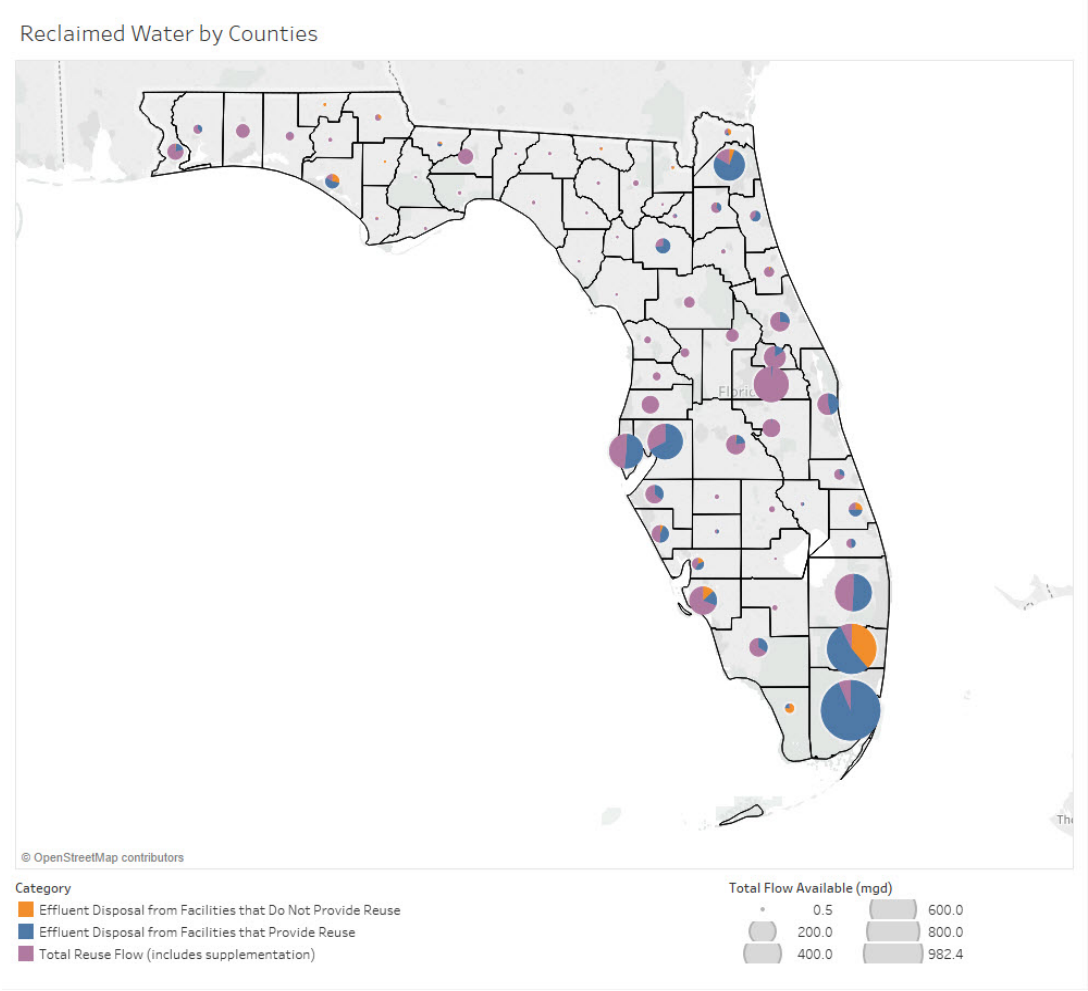
Project Type-Complete	Number of Projects by Type	Sum of Quantity of Water Made Available upon Completion (MGD)	Sum of Reuse Flow Made Available upon Project Completion (MGD)	Sum of Project Sponsor Match	Sum of Total State Funding	Sum of Total District Funding
Reclaimed Water	357	1.19	364.91	$1,468,745,676	$74,683,552	$226,206,653
Brackish Groundwater	91	255.92		$918,751,553	$32,983,566	$77,093,149
Surface Water	42	126.87		$283,092,963	$89,666,021	$358,987,709
Aquifer Storage and Recovery(ASR and Groundwater Recharge	30	27.00	2.20	$78,312,104	$1,549,535	$23,426,552
Stormwater	12	23.95		$14,914,793	$250,717	$4,258,967
Other Project Types	215	38.24		$64,498,347	$15,970,000	$14,231,253
Grand Total	**747**	**473.16**	**367.11**	**$2,828,315,435**	**$215,103,392**	**$704,204,282**

Reclaimed Water Use and Opportunities

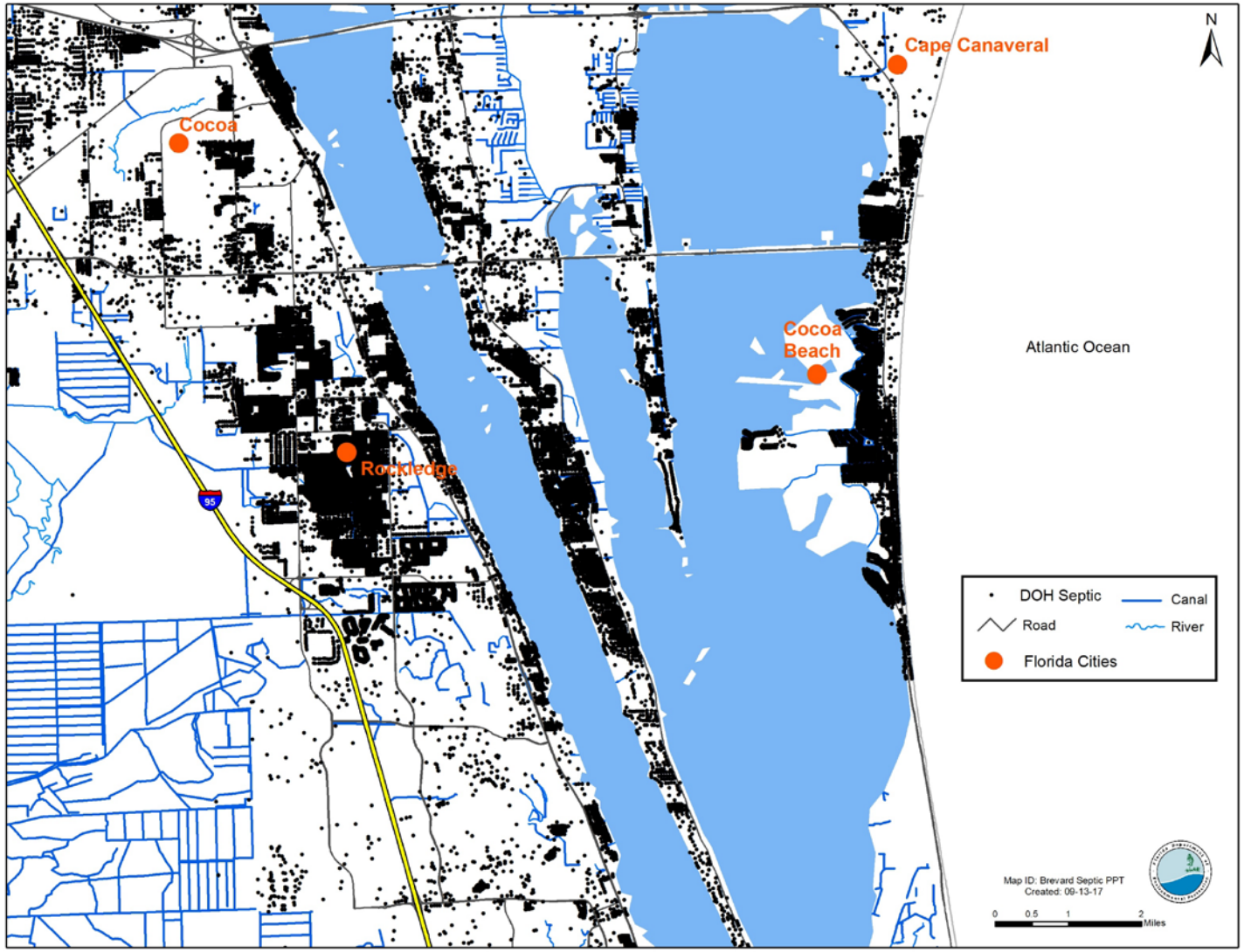
2016 saw 760 mgd of beneficial reuse (representing 44% of the total domestic wastewater flow in the state)

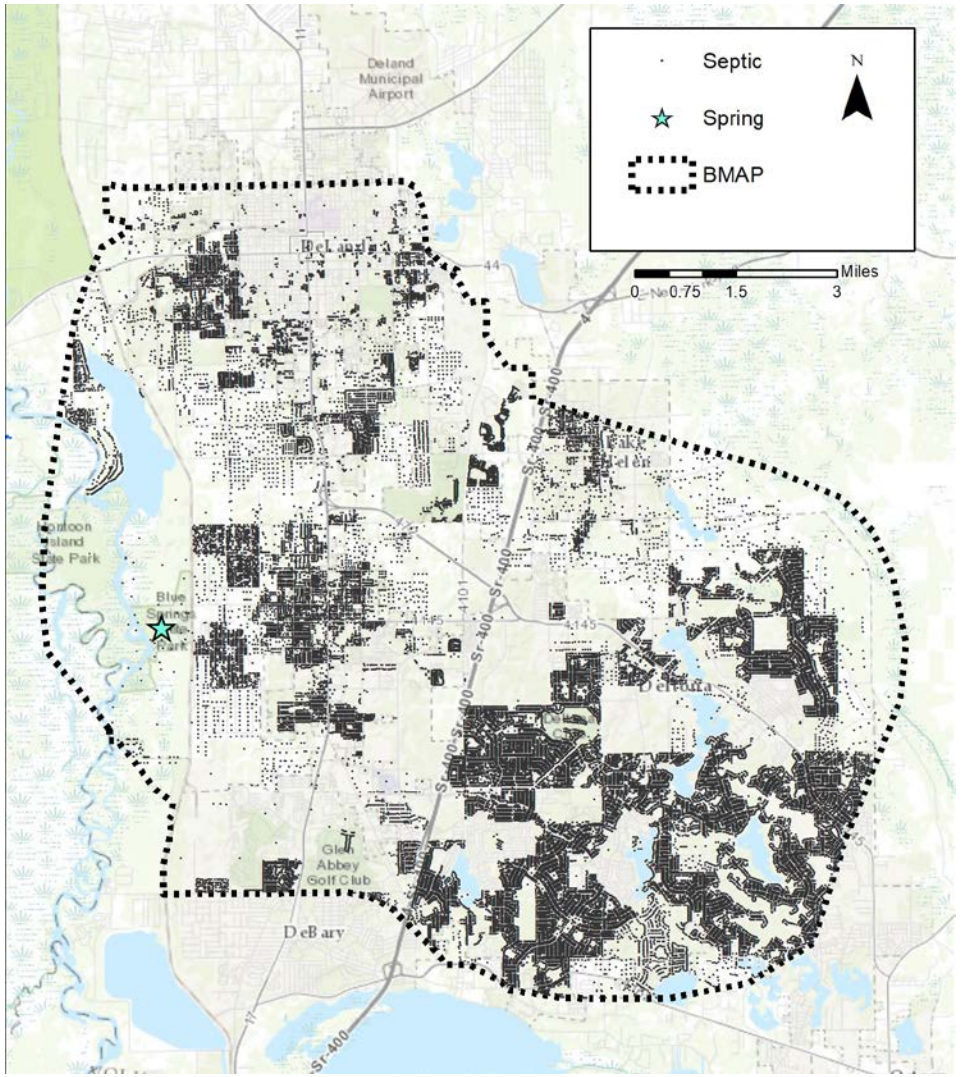
Reclaimed water was used to irrigate:

- 397,750 residences
- 574 golf courses
- 1,053 parks
- 381 schools
- 12,739 acres of edible crops on 65 farms



Wastewater Challenges





Springs and Septic Systems

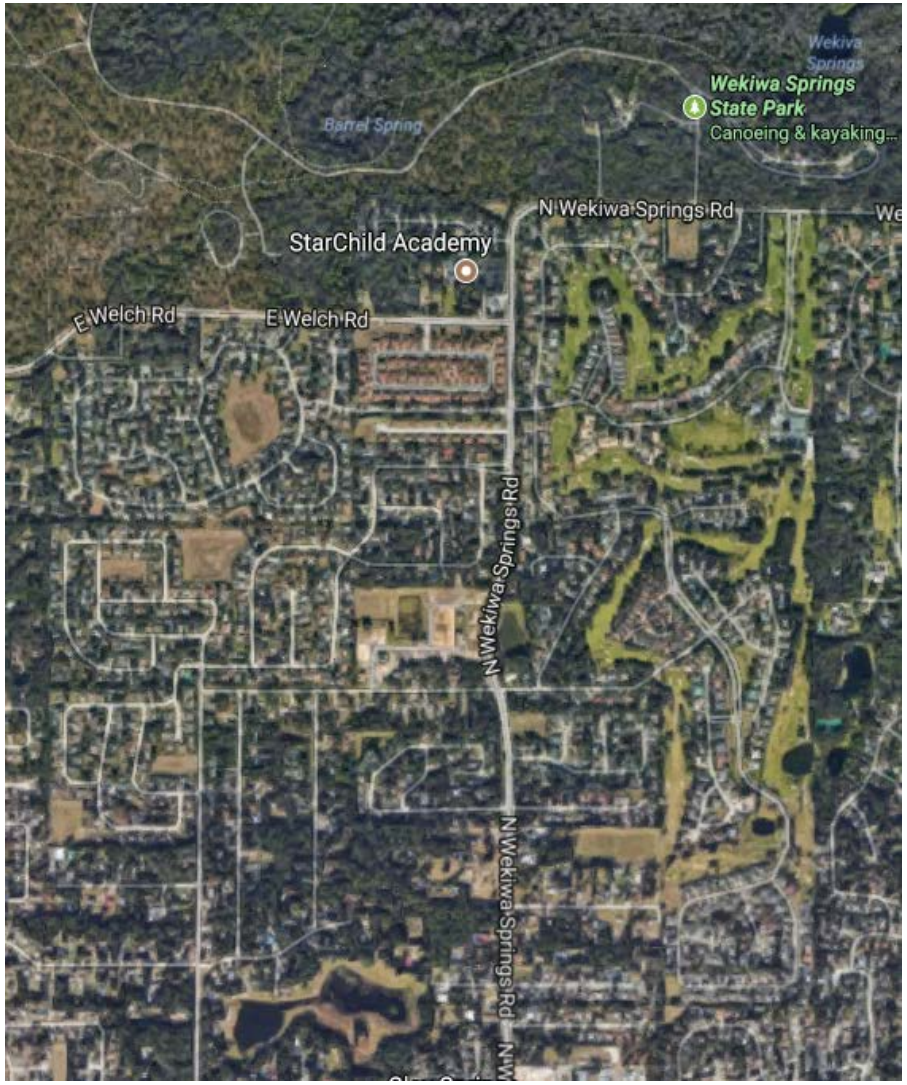
Florida Springs and Aquifer Protection Act (2016)

- Sub-Sections 373.801– 373.813, F.S
- Designates 30 Outstanding Florida Springs (OFS)
- Requires DEP to assess and implement restoration plans (BMAPs) for OFS that have water quality impairments, most by June 30, 2018

New septic systems within the PFA on lots less than 1 acre will need to include enhanced nitrogen treatment

Some existing septic systems requirements will begin after completion of:

- DOH rulemaking
- Homeowner assistance
- Local master wastewater plans
- No later than 5 years



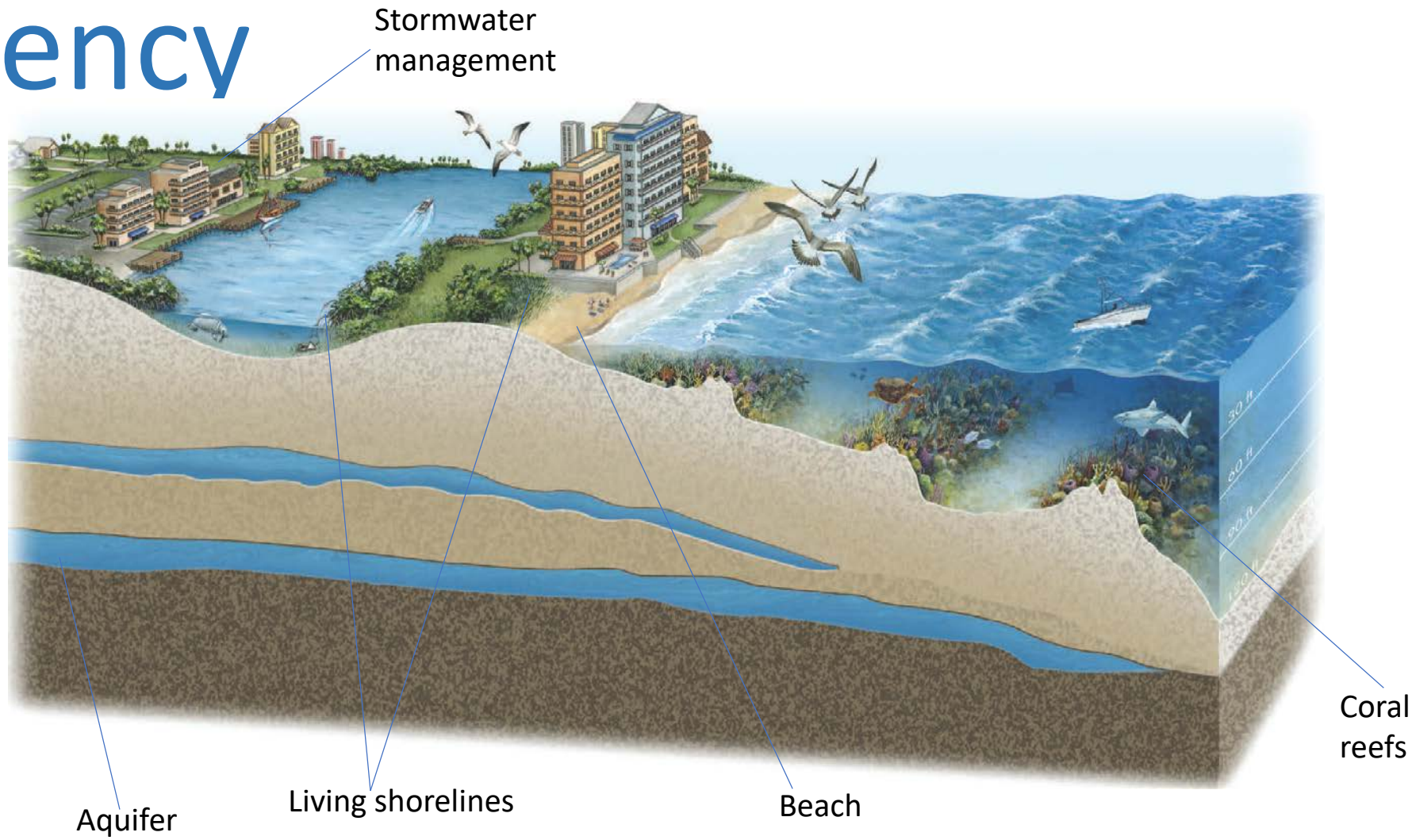
Water Infrastructure Funding

City of Crystal River to Duke Energy Reclaimed Water Project
28% Reduction in Nitrogen Load to Groundwater
0.75 MGD in Water Saved

Altamonte Springs Reuse
A-First: Stormwater, Wastewater, Reclaimed Water
Over 4.5 MGD of Alternative Water Supply Created
28,000 lbs of TP removed
62,813 lbs of TN removed

Investment in Coastal Resiliency

Florida Coastal Office
FY 18/19 Budget Request:
Resiliency Planning: $600,000
Healthy Beaches: $50,000,000
Storm Preparedness (Beaches): $2,000,000
Coral Health: $1,000,000



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Deputy Secretary, Ecosystem Restoration
Florida Department of Environmental Protection
Drew.Bartlett@Floridadep.gov