



# FPL's Experience with Alternative Water Sources

30th Annual Florida Chamber of Commerce Environmental Permitting Summer School

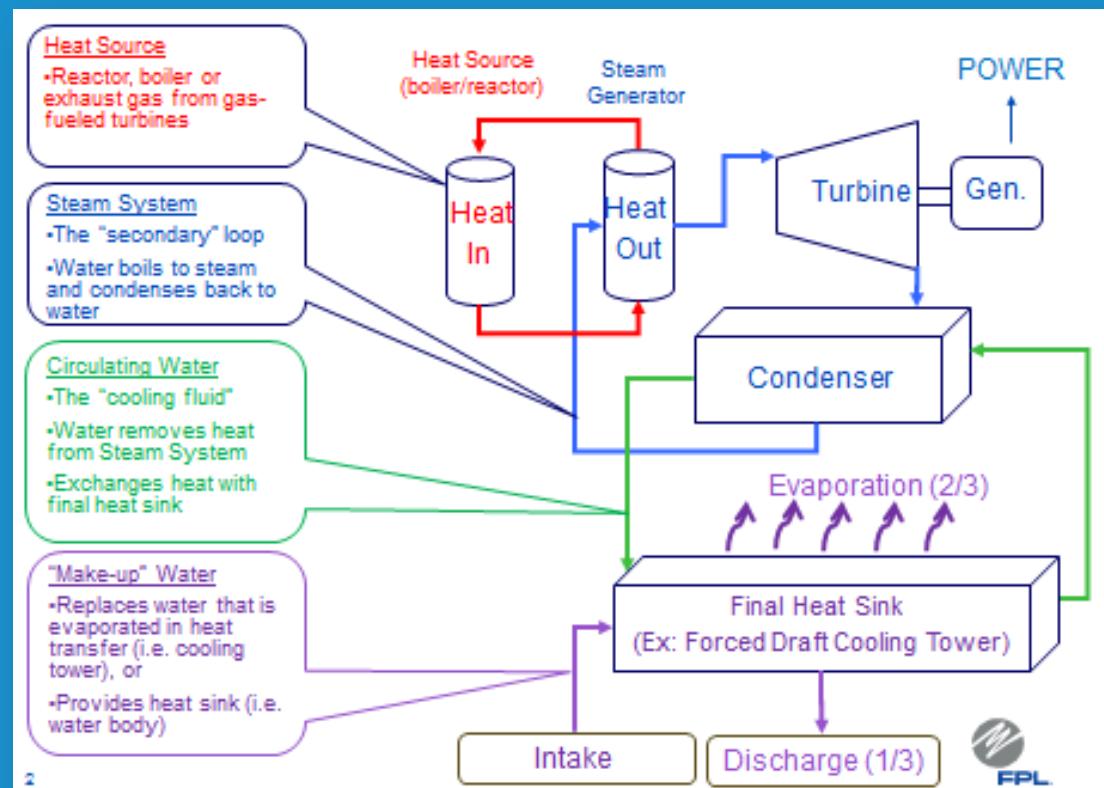
July 20, 2016



CHANGING THE CURRENT. FPL

# Make-up cooling water is a necessary part of most baseload power plants

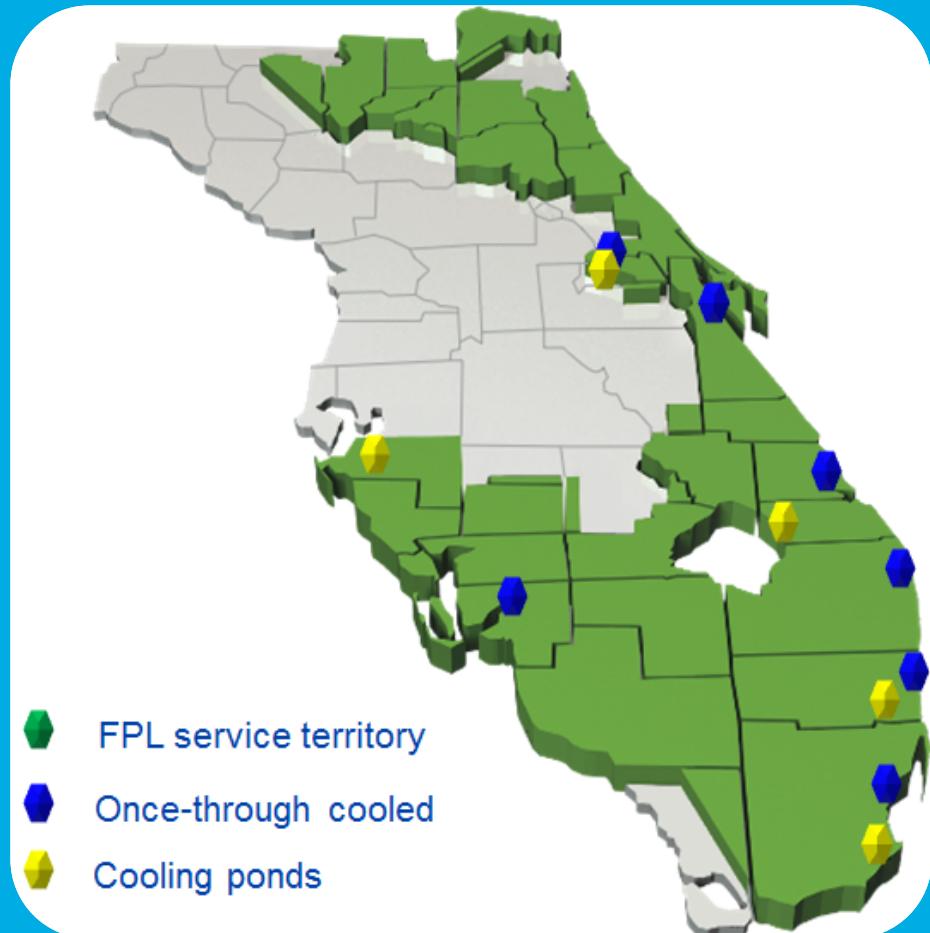
- ▶ Cooling technology and make-up water quality determine how much water is needed for cooling



# Power generation sites have historically relied on large bodies of water

Before the 1970s,  
Florida power plants  
were located on natural  
water bodies (coastal,  
lakes, rivers)

Later power plants  
(1970s and 1980s) used  
manmade cooling  
ponds or canals

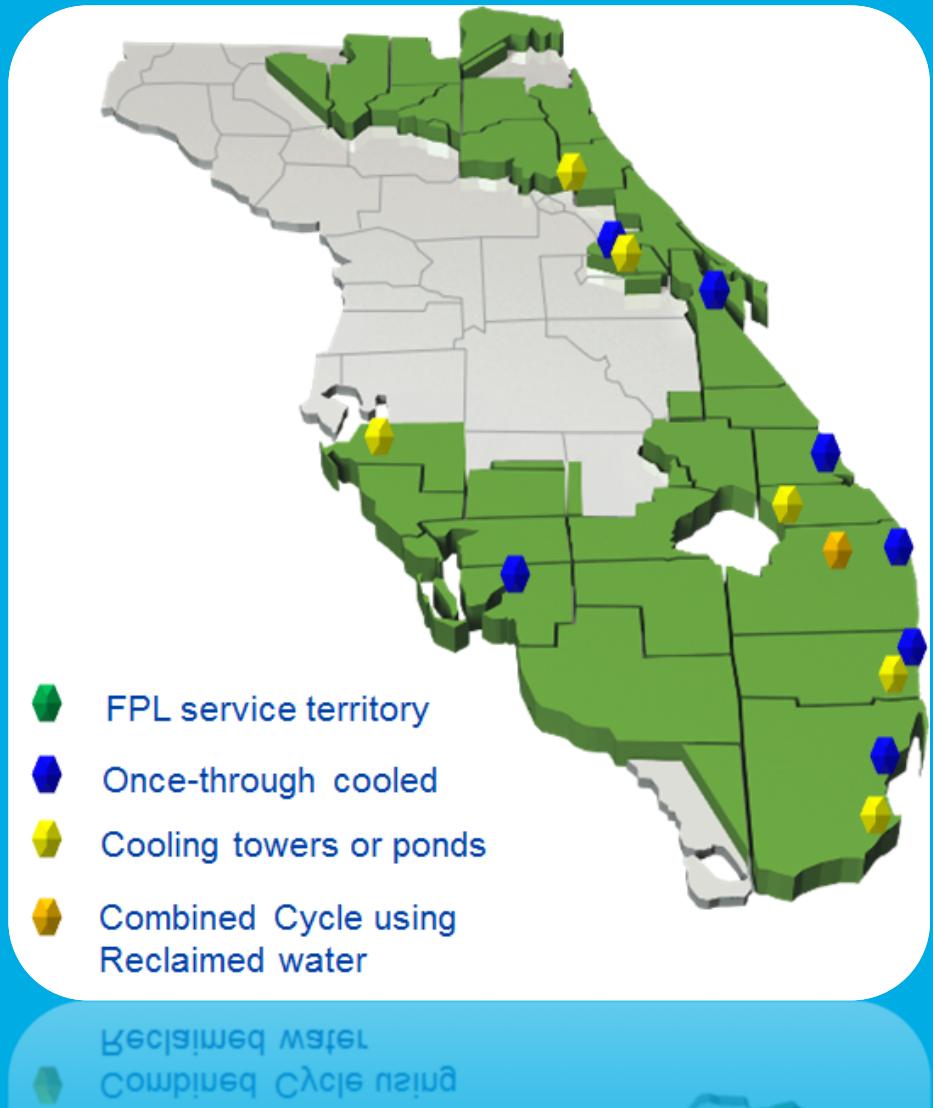


Cooling ponds  
Once-through cooled

# Current generation and cooling technologies require less water

Newer power plants (1990s to present)

- Combined-cycle plants require less water
- Forced draft cooling towers further reduce requirements



# Screening studies provide a relative evaluation of the various water sources

## Technical Factors:

- Volume
- Reliability
- Quality
- Permittability
- Navigation
- Security

## Environmental Factors:

- Construction impacts
- Operational impacts
- CERP consistency
- Permittability

- Reclaimed emerges highly ranked but with a reliability concern
- Municipal water entity is a non-recourse supplier

# FPL's West County Energy Center

- Uses 21 MGD reclaimed water from Palm Beach County
- Retains original Floridan well system as restricted backup



# West County Energy Center comprises three combined-cycle generating units that operate on clean natural gas

- Totals 3,750 MW – one of the largest power plants in the U.S.
- Requires approximately 22 MGD for cooling water
- Original State Certification granted with brackish Floridan Aquifer wells for water supply



# Plant was converted to use the county's treated wastewater via a large pipeline

- PBC wastewater facility is 17 miles east of WCEC
- Treated at PBC site, then pumped to WCEC
- Storage tanks at PBC and WCEC site provide for surge volume not storage
- Recent Upsets
  - PBC process upset resulted in high solid content in effluent
  - PBC curtailed deliveries until cleared
  - Curtailment exceeded storage, backup wells could not be brought online
  - WCEC had to shut down



Combining two serial processes without decoupling (by storage tanks or backup water sources) can impact electric grid reliability

# Turkey Point 6 & 7 design uses 60 MGD of reclaimed water as primary cooling source

- Joint Participation Agreement with Miami-Dade envisions tight coordination of operations
- 10-mile pipeline will deliver water to FPL site for further treatment
- Does not rely on existing cooling canal system
- A reservoir sufficient to provide five days of storage will decouple operations



Reclaimed water used by Turkey Point 6 & 7 will not compete with reclaimed water reserved for Everglades restoration