

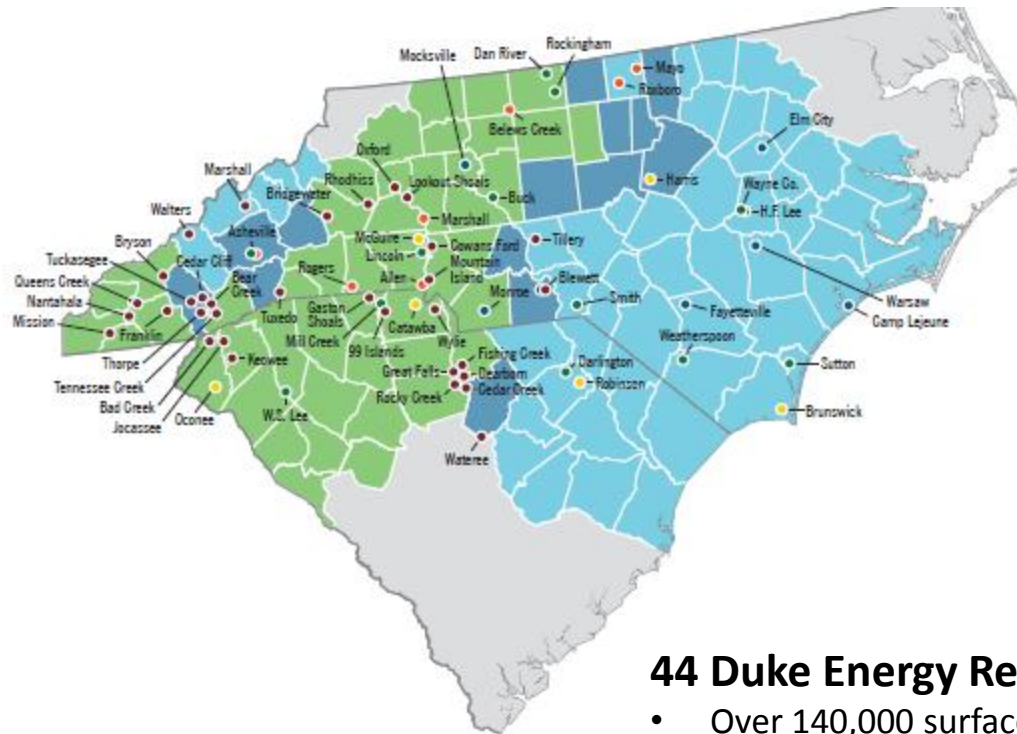


Power Generation and Reservoir Management

South Carolina State Water Plan Symposium
Using Science and Best Practices
Industrial Perspective
May 30, 2018

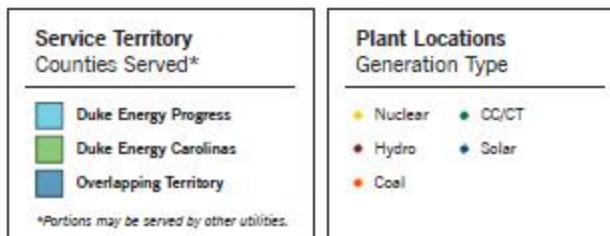
Presented by: Jeff Lineberger, Director, Water Strategy & Hydro Licensing

Water is Required to Keep the Lights on



44 Duke Energy Reservoirs in the Carolinas

- Over 140,000 surface acres
- Nearly 3,000 shoreline miles
- Over 637 billion gallons of usable water storage
- Raw water supply for about 3 million people



(Map updated 9/17)



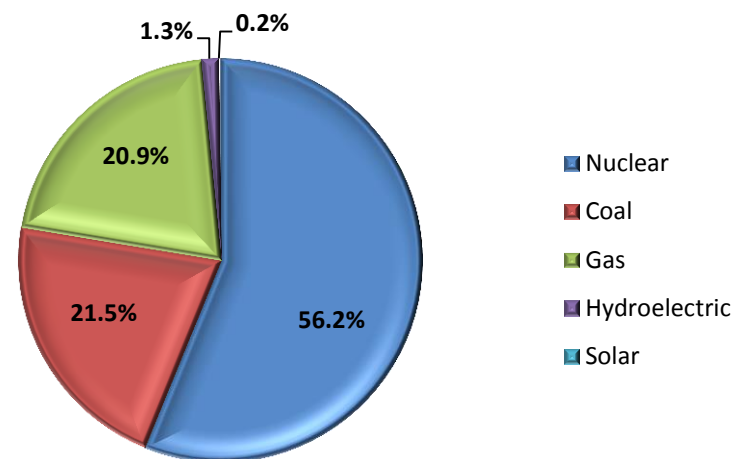
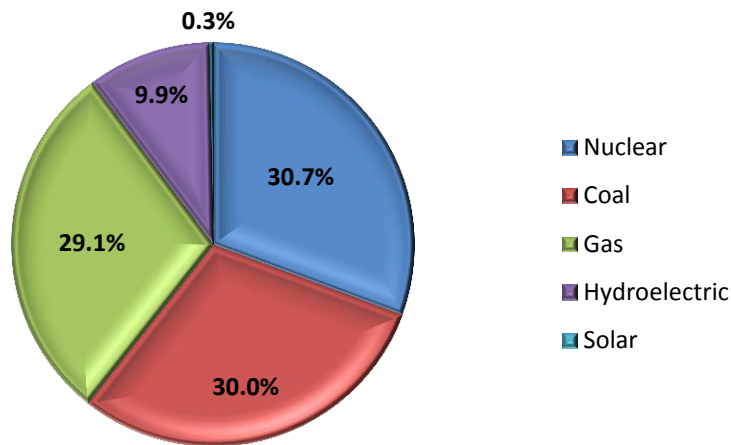
Duke Energy in the Carolinas

Capacity and Generation (DEC and DEP)



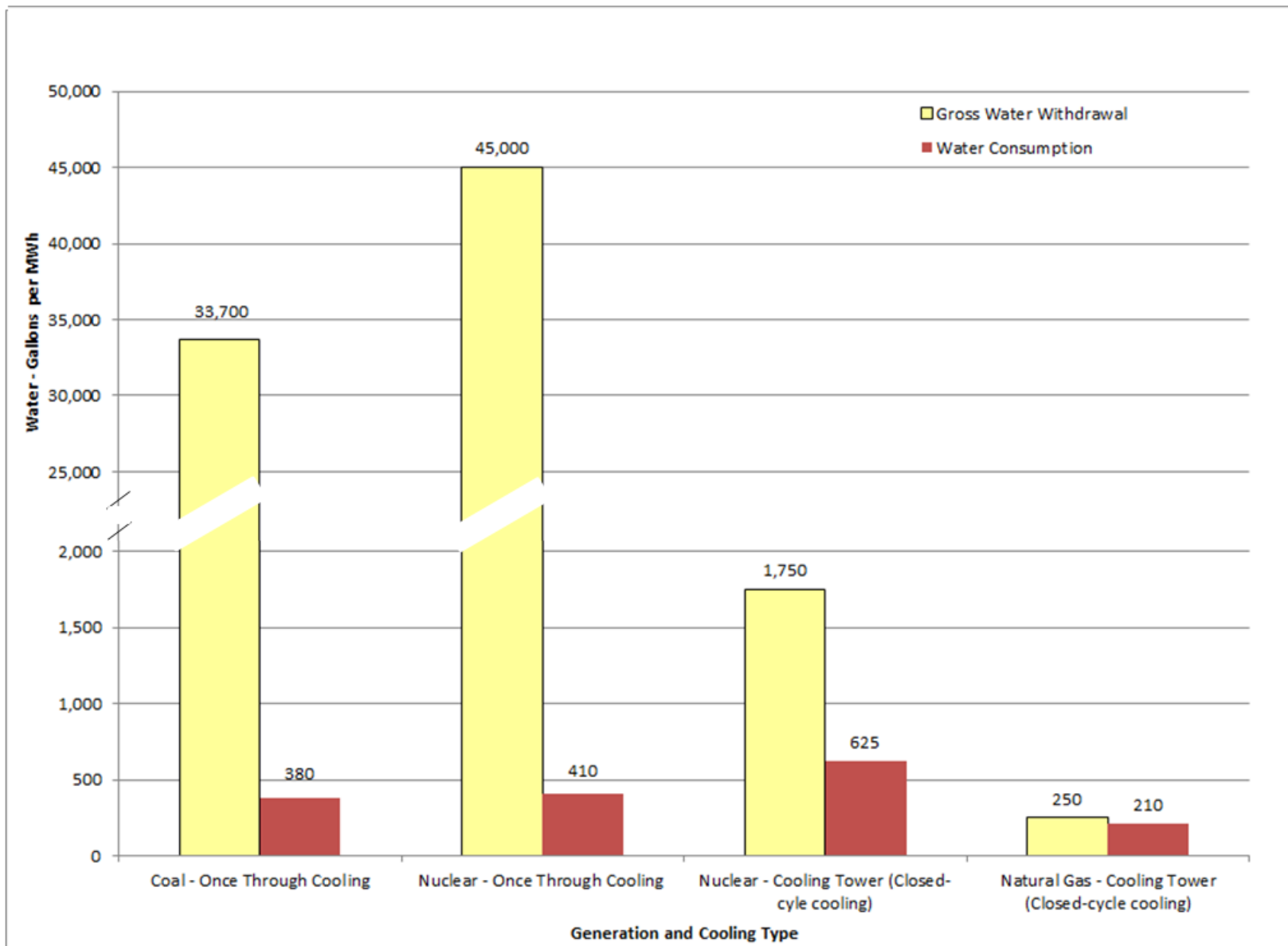
Total 2017 Capacity = 34,958 MW

Total 2017 Generation = 170,688,500 MWh



~58% of 2017 electricity production was carbon-free
~99% of 2017 electricity production consumed water

Gross Water Withdrawal and Consumption for Thermal Electric Generation Cooling (based on averages of representative Duke Energy power plants)

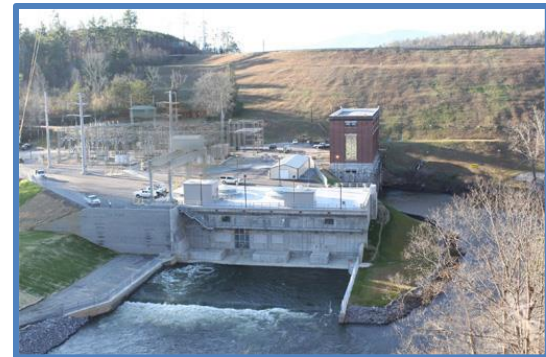


Improvements in Water Sustainability



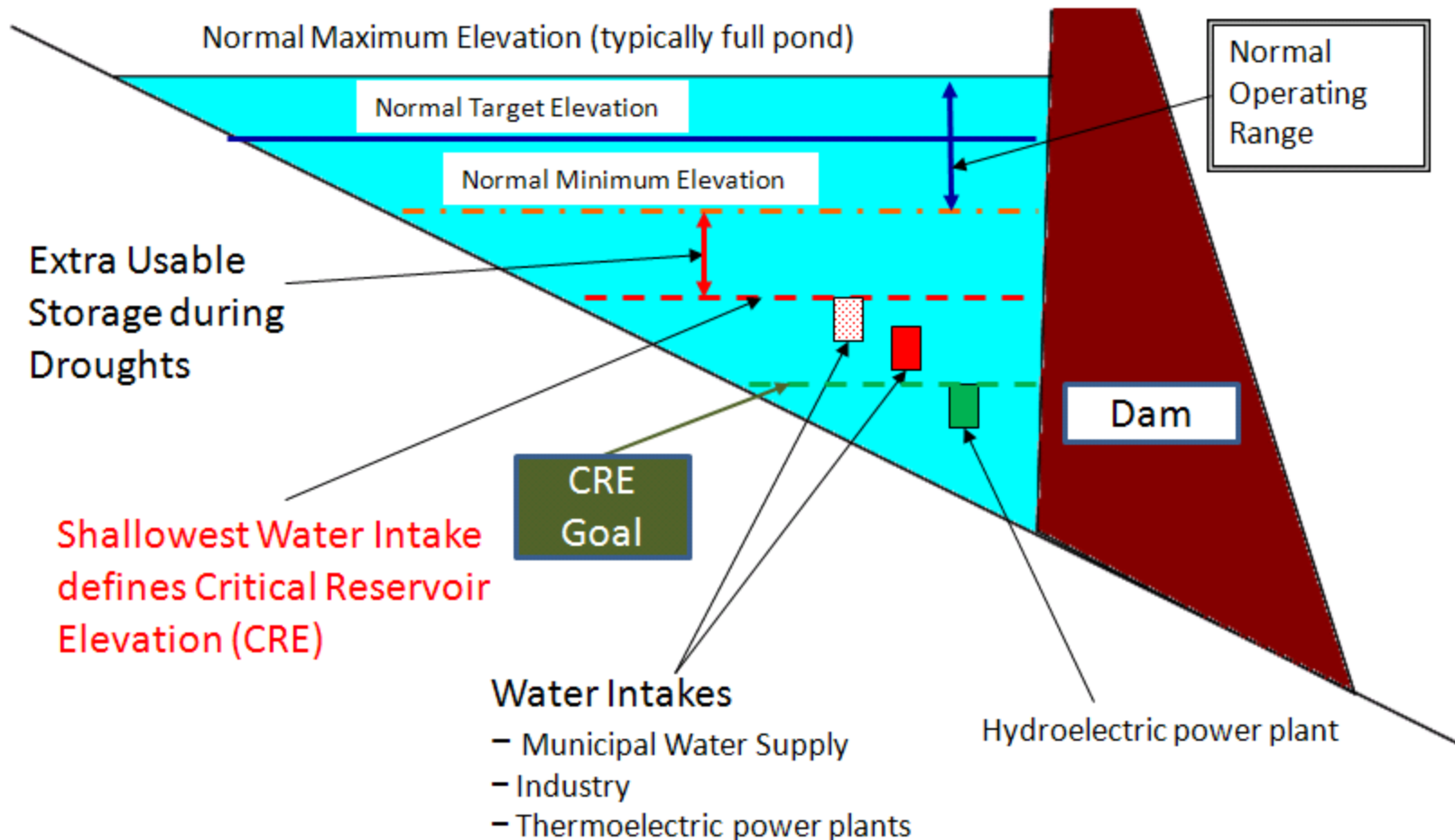
(Red = Product of Hydro Relicensing)

- Better water accounting (annual water use reports, improved modeling)
- Coordinated drought management (Catawba-Wataree, Savannah, Yadkin-Pee Dee)
- Integrated resource planning across business sectors
 - Catawba-Wataree Water Management Group's Water Supply Master Plan
 - Yadkin-Pee Dee Water Management Group
- Increased usable water storage in existing reservoirs
 - Lake use permitting requirements (intake depth, withdrawal limits, time limit)
 - Raising targeted summer lake levels at larger storage reservoirs on the Catawba-Wataree River
- New Operating Agreement with US Army Corps of Engineers in the Savannah River
- Land conservation (nearly 19,000 acres)
- Electric customer efficiency improvements
- Technology changes
 - Hydrovision
 - Gas-fired generation
 - Solar-----Pumped Storage Hydro



*Bridgewater (Lake James)
Old and New Hydros*

Getting More out of Existing Reservoirs



Gas-Fired Generation – Indirect Effect

Catawba-Wataree River



Catawba-Wataree River Basin Thermal Power Plants

2007 withdrawal = 4,905 MGD (avg.)

2007 Consumption = 77 MGD (est.)

5 plants

2017 withdrawal = 3,923 MGD (avg.)

2017 Consumption = 70 MGD (est.)

4 plants (1 retired)

20% reduction in gross water withdrawal
10% reduction in water consumption

We have to Keep Making Things Better



- Transition to more efficient (water and energy) modes of generation
- Help customers (water and energy) become more efficient
- Help lead river basin planning efforts, including important keys:
 - Sound science / engineering
 - Diverse interests
 - Strong partnerships and effective communications
 - Stakeholder-driven water supply plan for each river basin is essential



Water is a shared resource with shared benefits and shared responsibilities



Questions?



*Hydro Unit Crossing Tuckasegee River for
Installation in NP&L's (now Duke Energy's) Thorpe Hydro Station – 1941
(photo from Fred Alexander)*