

Gulf Power Company

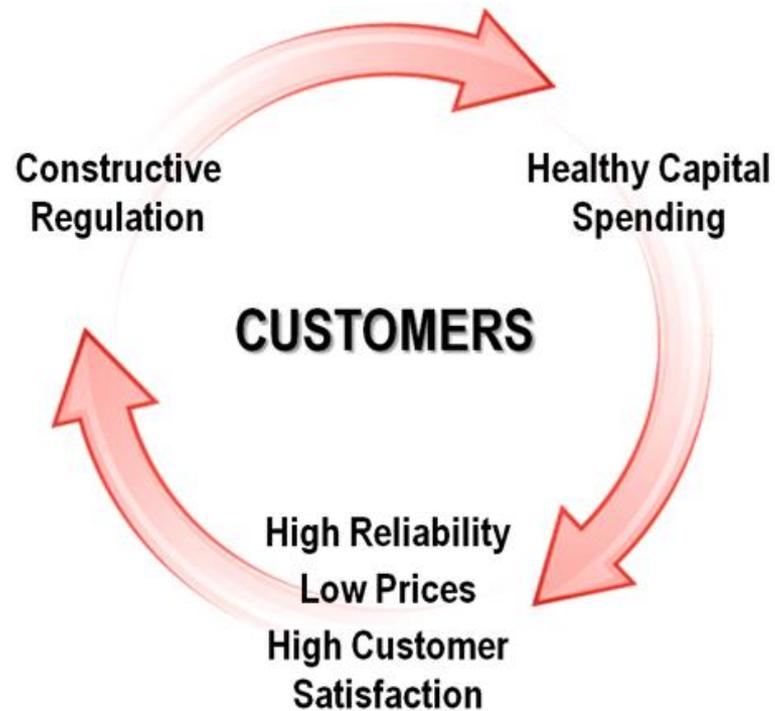


Florida Solar Energy Center Advisory Board

Michael Burroughs

October 23, 2015

Circle of Life



Presentation Outline



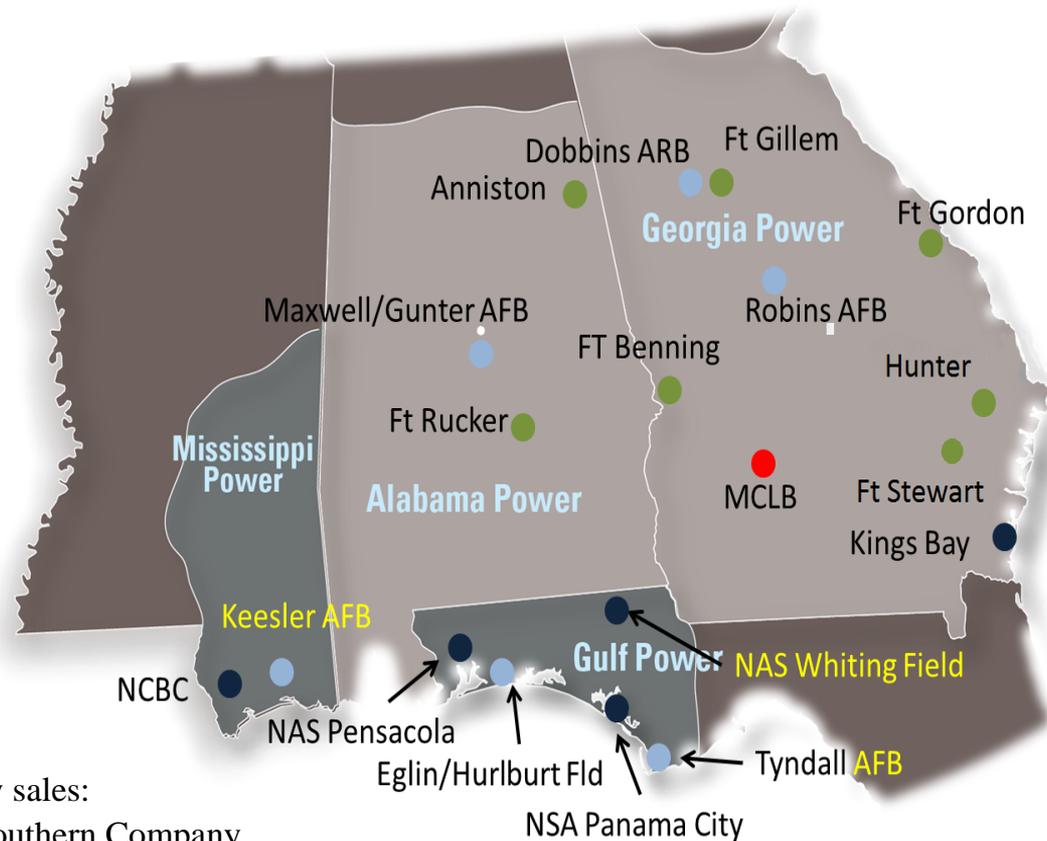
Gulf's Renewable Resources

- **Gulf Coast Solar Center Energy Purchase Agreements**
- **Morgan Stanley Wind Energy Purchase Agreement**
- **Perdido Landfill Gas Facility**
- **Bay County MSW Energy Purchase Agreement**
- **Future developments**

Southern Company



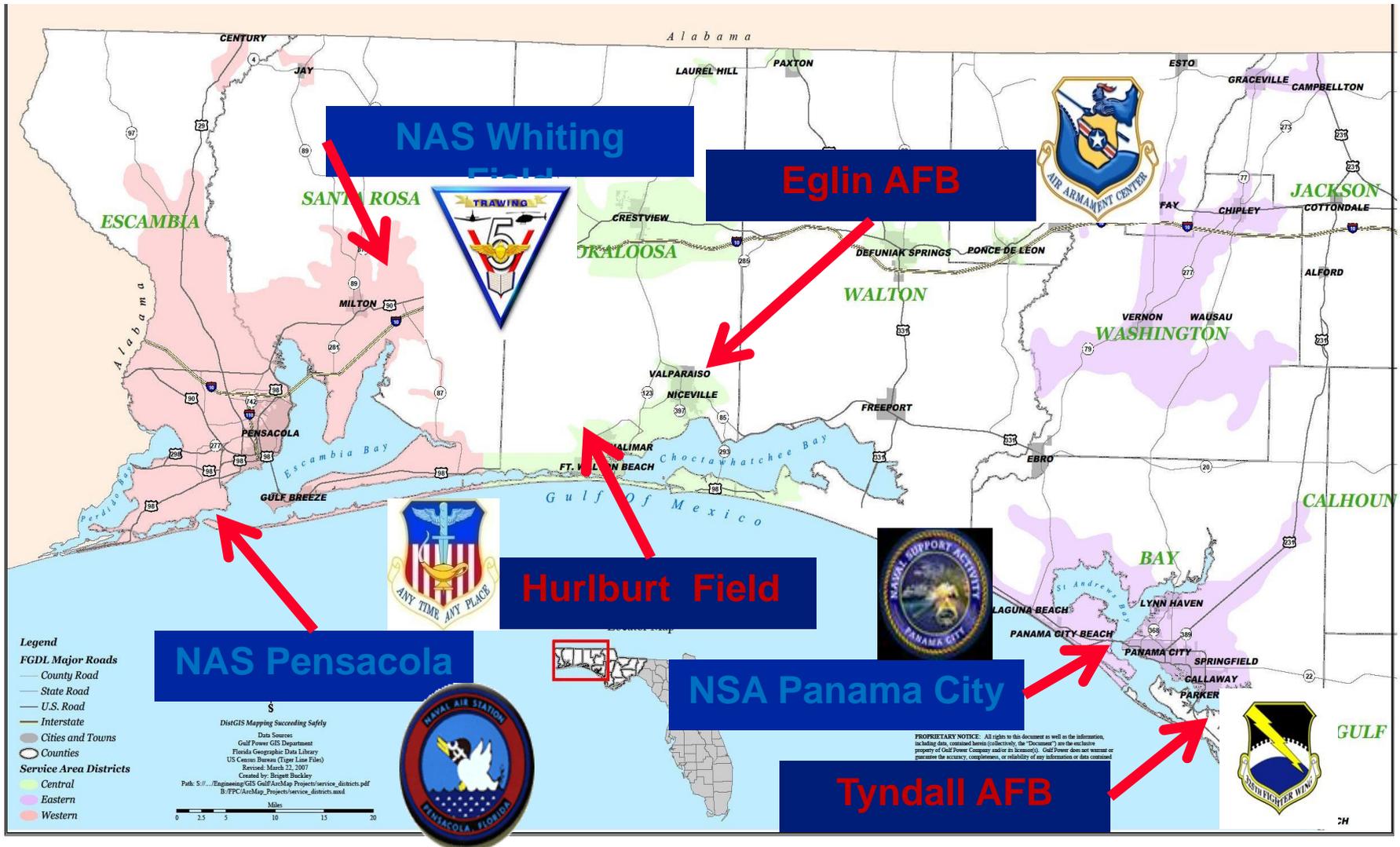
Robust Partnership with DoD

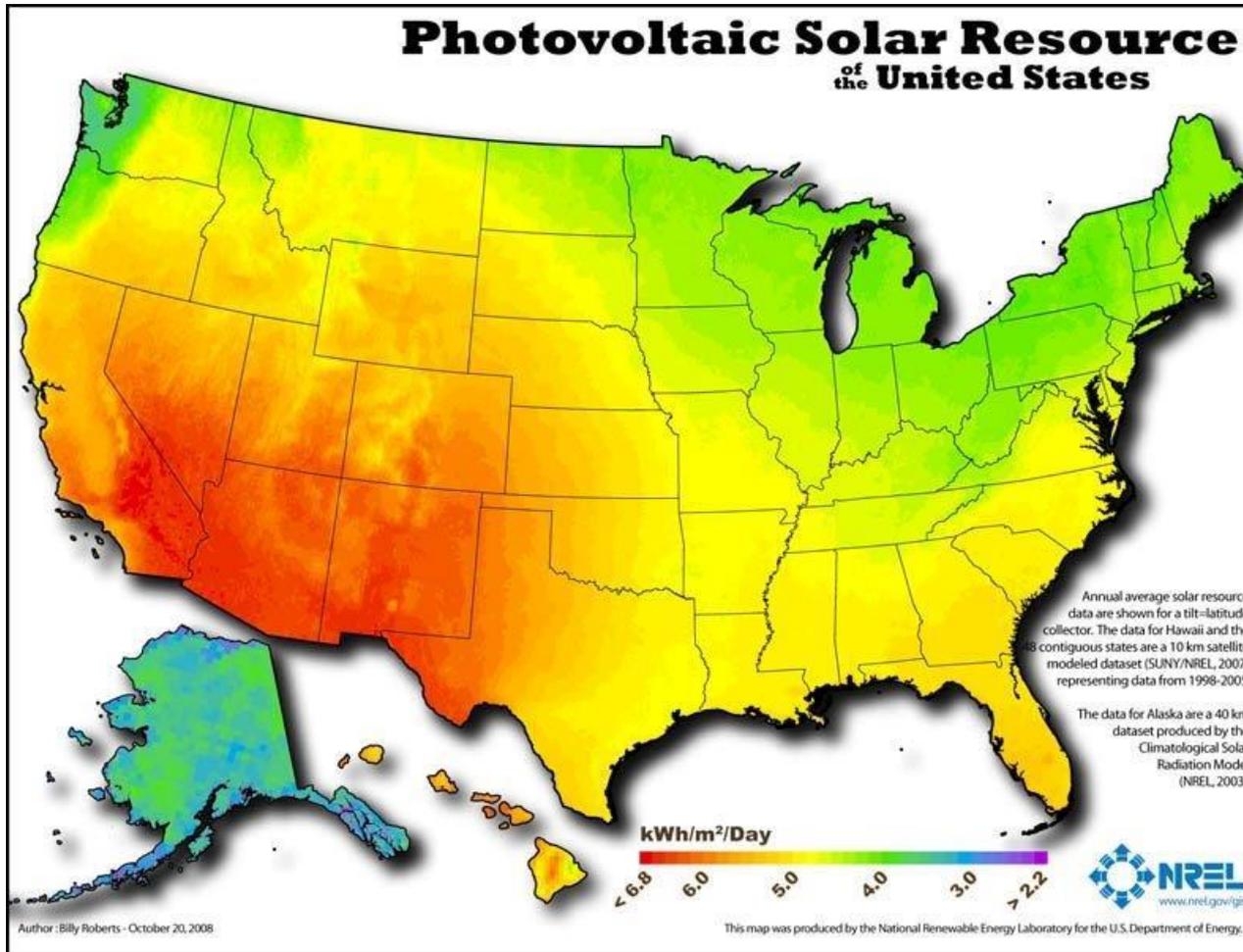


Annual electricity sales:

- \$171 million Southern Company
- \$89 million Georgia Power
- \$65 million Gulf Power

Six major bases plus outlying fields





Gulf's Renewable Resources



Location of Facilities in NW Florida



Important Issues



- **Military has a 1 gigawatt goal**
- **NAVY – Renewable Energy Program Office**
- **Air Force – Grass roots effort**
- **Partner with local utility**
- **Relationships and security important**
- **Future energy security & micro grids**
- **Investment Tax Credits**
- **Buy – Book – Build**
- **Third party sublease**
- **In kind consideration**

Project Challenges



- **Economics**
- **Third party sublease**
- **Market value for land**
- **Multiple approval levels**
- **Site environmental issues**
- **Interpretations of energy security**

Gulf's Renewable Resources



Gulf Coast Solar Center I, II, III Energy Purchase Agreements

- **GCSC I - 30 MWs at Eglin AFB - Fort Walton Beach, Okaloosa Co.**
- **GCSC II - 40 MWs at U.S. Navy's Holley Field - Navarre, Santa Rosa Co.**
- **GCSC III - 50 MWs at U.S. Navy's Saufley Field – Pensacola, Escambia Co.**
- **Term of each Agreement is 25 years**
- **Construction on schedule; January 2015**
- **Significant Milestones reached:**
 - ✓ **Public Service Commission approval**
 - ✓ **Environmental Assessments completed**
 - ✓ **Transmission Studies completed**
 - ✓ **Interconnection Agreements signed**
 - ✓ **Land Lease Agreement signed**



Gulf's Renewable Resources



Morgan Stanley Wind Energy Purchase Agreement

- **Located near Piedmont, Oklahoma**
- **Renewable Energy Credits Supplied from Kingfisher Wind Project**
- **Morgan Stanley obligated to deliver approximately 674,000 MWhs / yr**
- **Term of the Agreement is 20 years**
- **Construction on schedule; January 2015**
- **Significant Milestones reached:**
 - ✓ **Tower and blade sections stored on site**
 - ✓ **Tower foundations being poured**
 - ✓ **Substation construction well underway**
 - ✓ **Transmission line construction in progress**



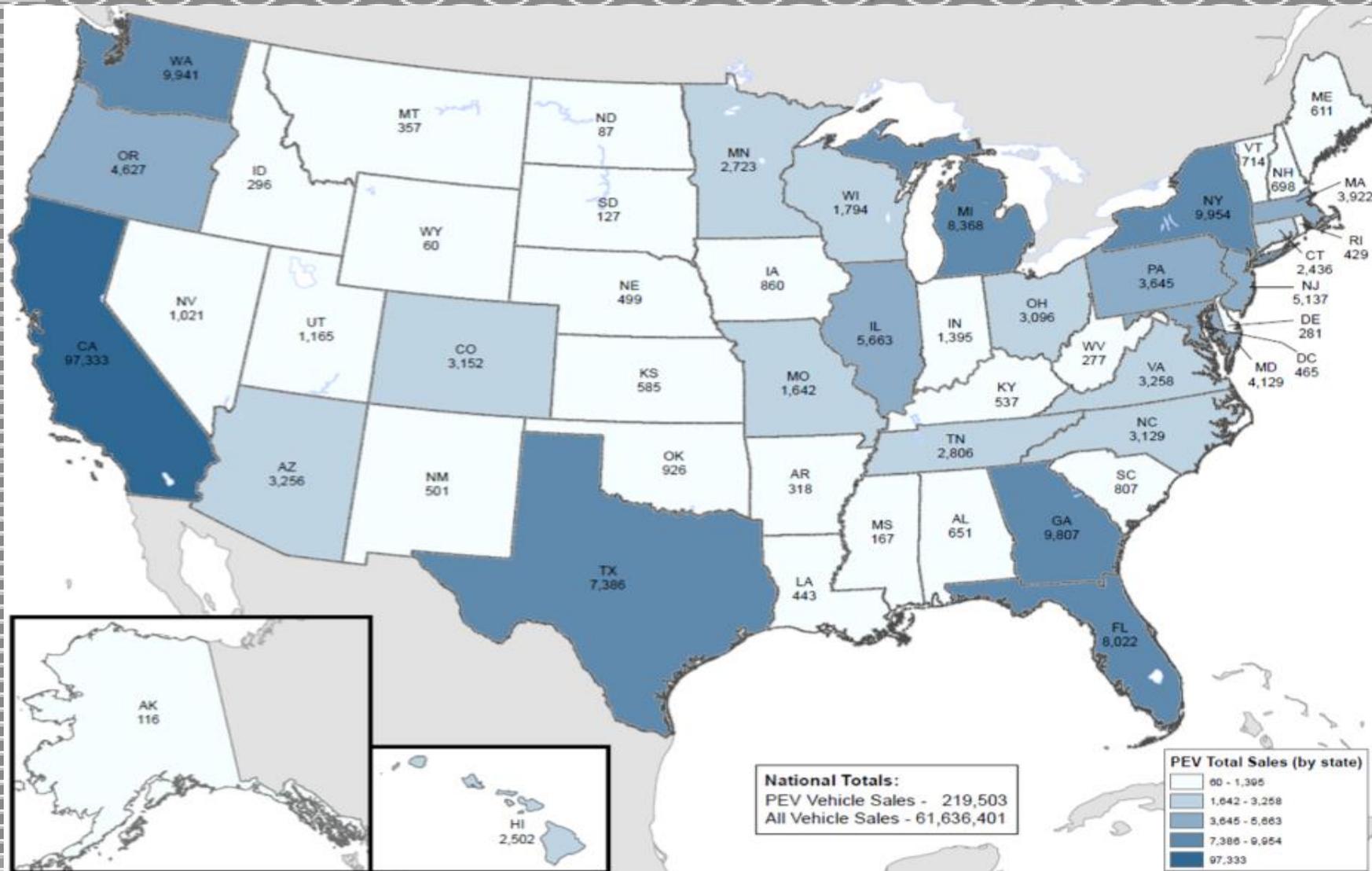
Gulf's Renewable Resources



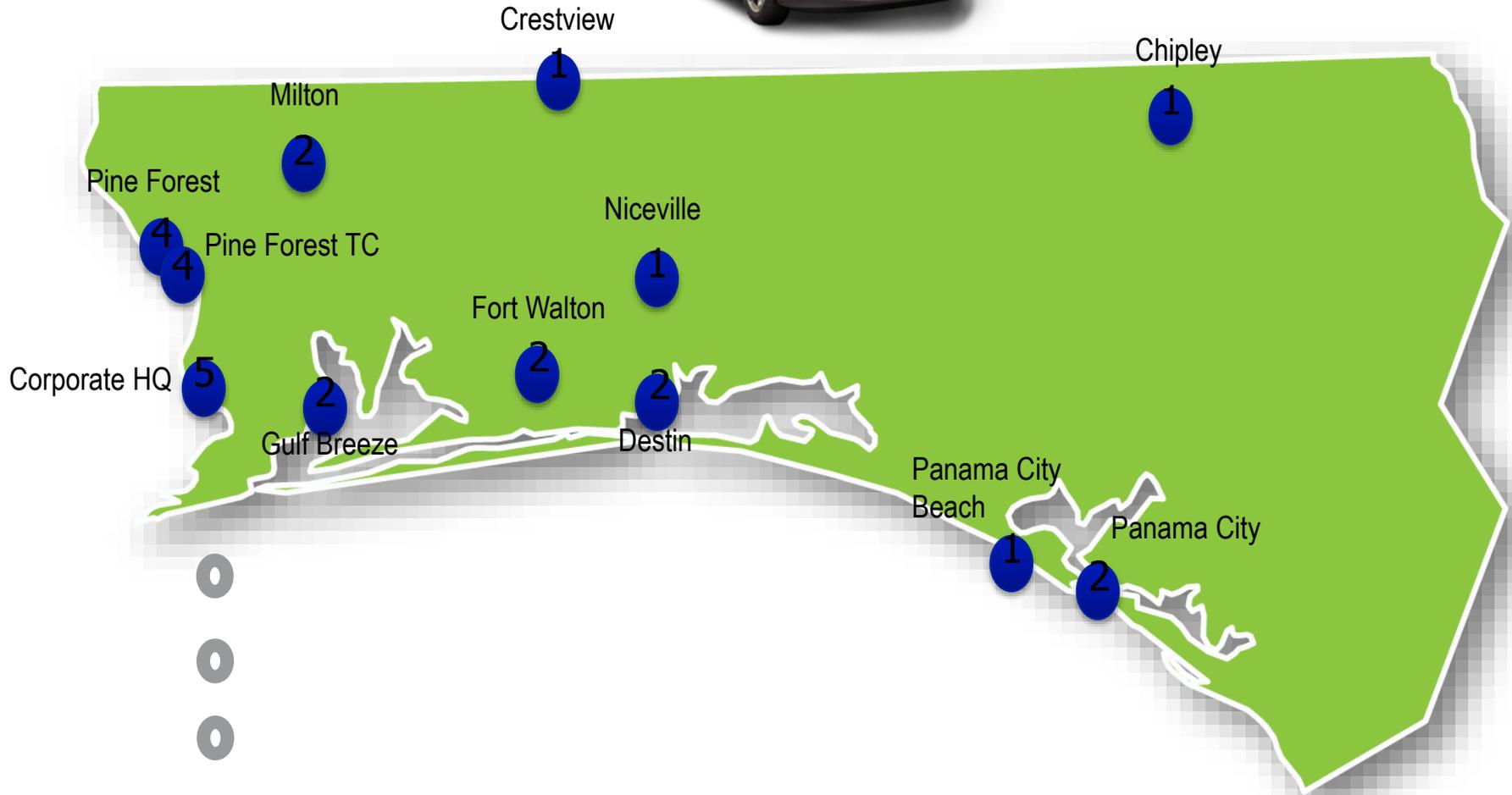
Wind Construction Pictures



U.S. National PEV Total Sales (2010-2014)



Green Pool Vehicle Program



Wind Research



Offshore Wind Feasibility Study

- Georgia Tech/Southern Company study completed in 2007
- Applying for lease to measure wind speed



Small Wind Demo Projects

- Rooftop wind (APC HQ)
- UAB senior design project
- Potential coastal demo project



Resource Assessment/Modeling

- Smith Dam, AL
- APC Headquarters Building
- Rabun Gap, GA



Resource Assessment/Data Collection

- Gulfport, MS
- Navarre Beach, FL
- Sassafra Mountain, GA

Navarre Beach Met Tower



Objective: To characterize the wind resource along the Gulf coast and to work with the local school system to learn about wind power

Background: Santa Rosa County, FL asked Gulf Power to help assess the wind resource at Navarre Beach. A meteorological tower was installed from September 2009 through October 2011.

Key Findings:

Avg. velocity scaled to 50m was 5.65 m/s

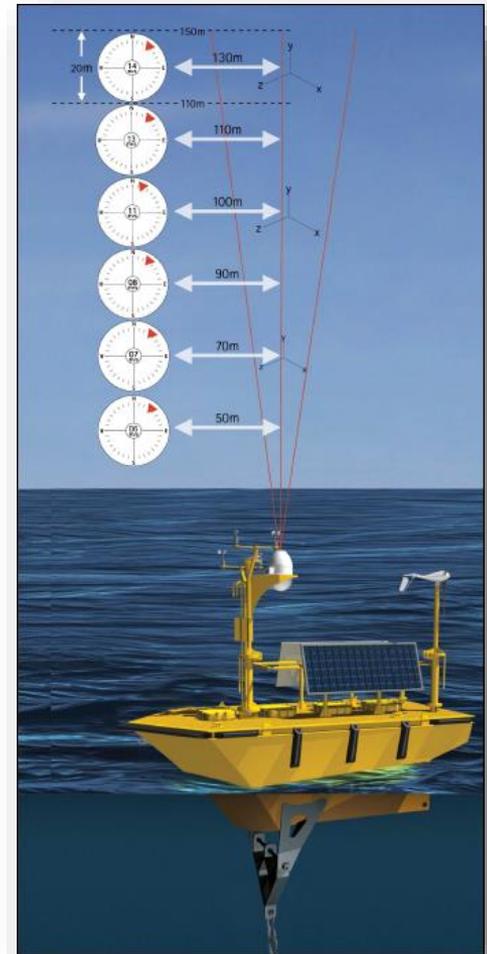
Avg. WPD was about 210 W/m²

Low Class 2 wind power resource

Offshore Wind Resource



Evaluating floating LIDAR platforms
Offshore fixed met towers are expensive (\$5-10M)
Floating LIDAR < \$2M
Relatively unproven configuration
Validation is currently being done by manufactures and others

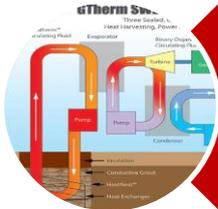


Other Technologies Being Evaluated



Marine Hydrokinetic

- Wave Energy
- Tidal Energy
- Run-of-river hydro



Geothermal Energy

- Low-temperature technologies
- Single-well designs
- Coupling with CO₂ sequestration



Renewables + Energy Storage

- Distribution scale - batteries
- Transmission scale – batteries, CAES



Renewables + Electric Transportation

- Solar assisted EV charging stations

Gulf's Renewable Resources



Perdido Landfill Gas Facility

2 - 1.5 MW internal combustion units in Escambia County, near Pensacola

- **Gulf owned facility, In-service October 2010**
- **Methane gas purchased from Escambia County's Landfill**
- **Over 119,000 MWhs generated since October 2010 (94% CE)**



Gulf's Renewable Resources

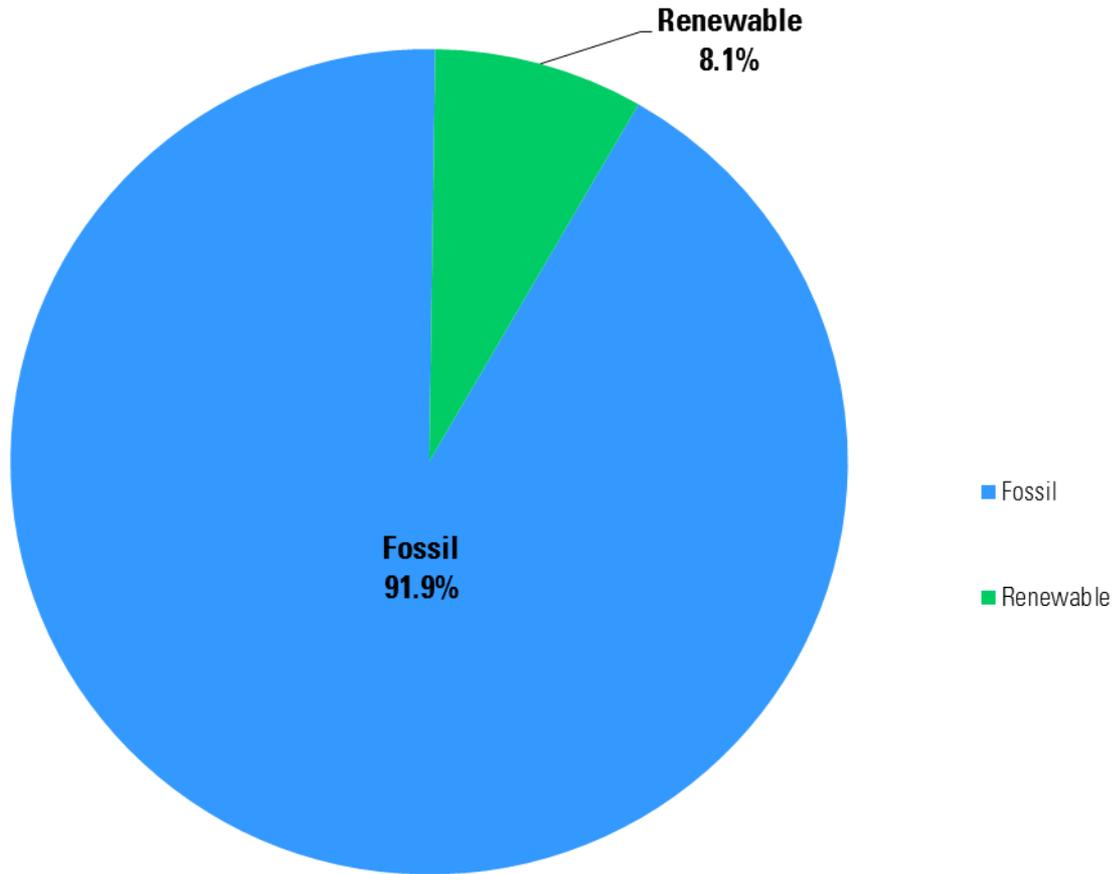


Bay County MSW Energy Purchase Agreement

- **11 MW Facility in Bay County, near Panama City**
- **As-Available Energy purchases thru July 2017**
- **Over 308,000 MWhs purchased since July 2008 (45% CF)**



2017 Energy Resources as % of Retail Load



Summary



- **Gulf has diverse mix of renewable energy resources**
- **Renewable energy as percent of retail load projected in 8% range by 2017**
- **Solar and Wind agreements have enabled construction of new renewable facilities**
- **Significant Milestones for Solar and Wind projects have been reached**
- **Solar and Wind construction activities currently on schedule**
- **Landfill gas and Municipal Solid Waste being converted to useful electrical energy**