



**Tracy Beer**

Manager, Regulated Renewable Energy and Carbon Strategy

April 2009



## Topics

- **Renewable Energy Overview**
- **NC Renewable Energy Requirements**
- **Duke Energy Carolinas Renewable Initiatives**



# Renewable Energy Overview



# Renewable Energy Technologies

- Forms of Renewable Energy
  - Wind
  - Solar
  - Biomass
  - Landfill Gas
  - Small Hydro
  - Geothermal
  - Hydrogen derived from renewable resource
  - Wave or ocean current energy
  - Waste to Energy
- Renewable Energy Considerations
  - Cost
  - Intermittency
  - Interconnection to grid
  - Scale & location of resources
  - Legislative requirements



# Components of Renewable Energy



**Electricity  
(MWHrs)**

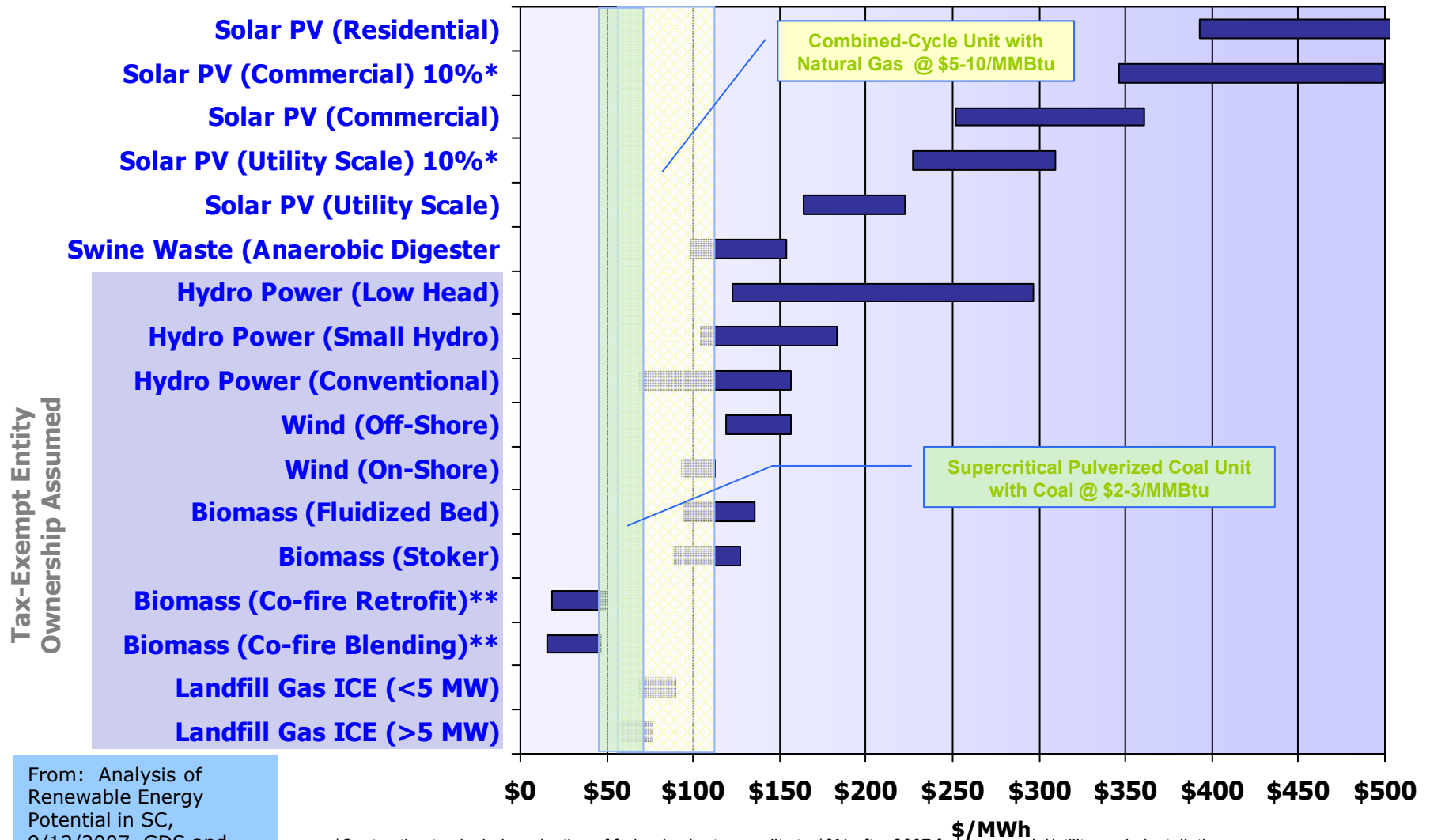
**+**



**Environmental  
Attribute  
(REC)**

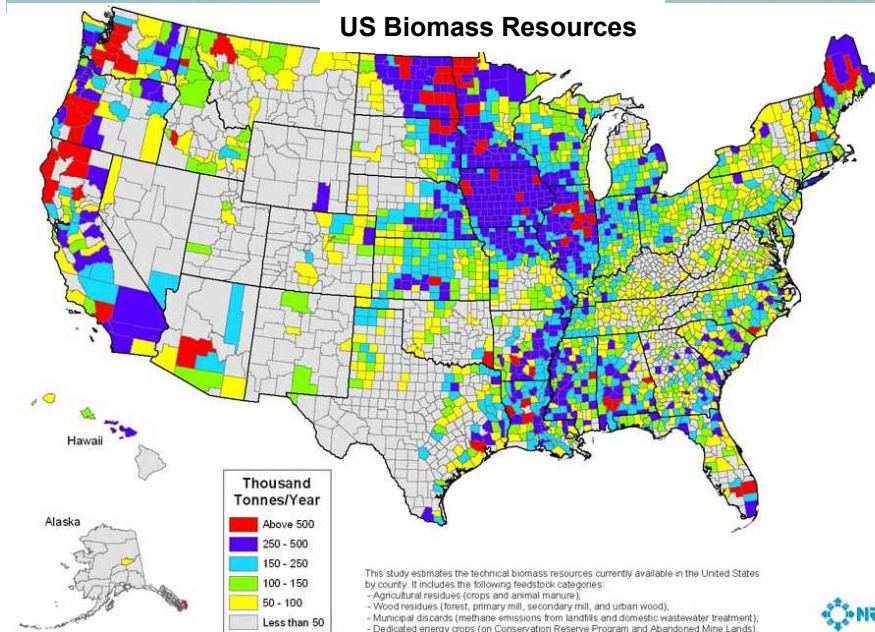
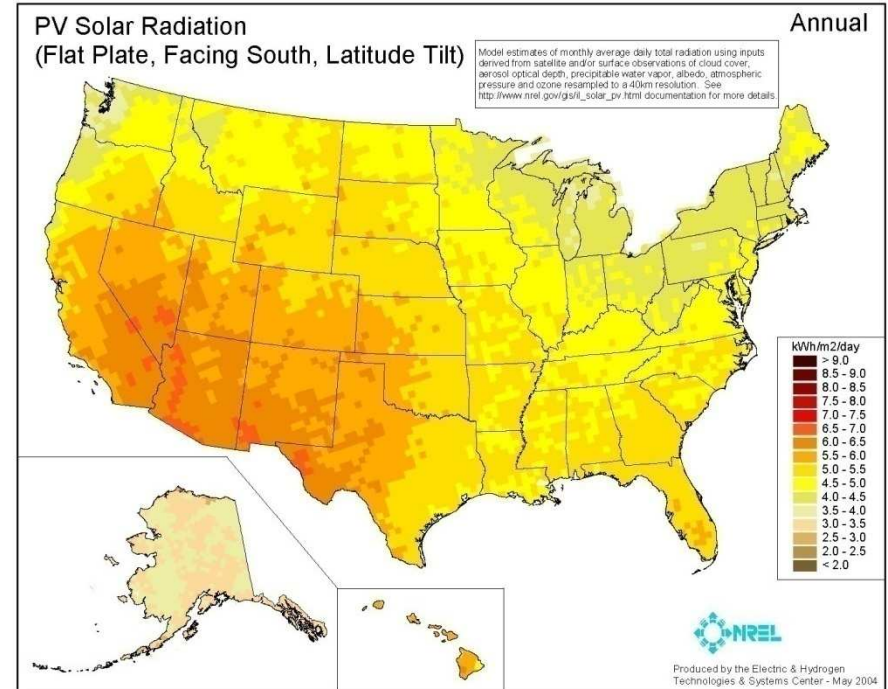
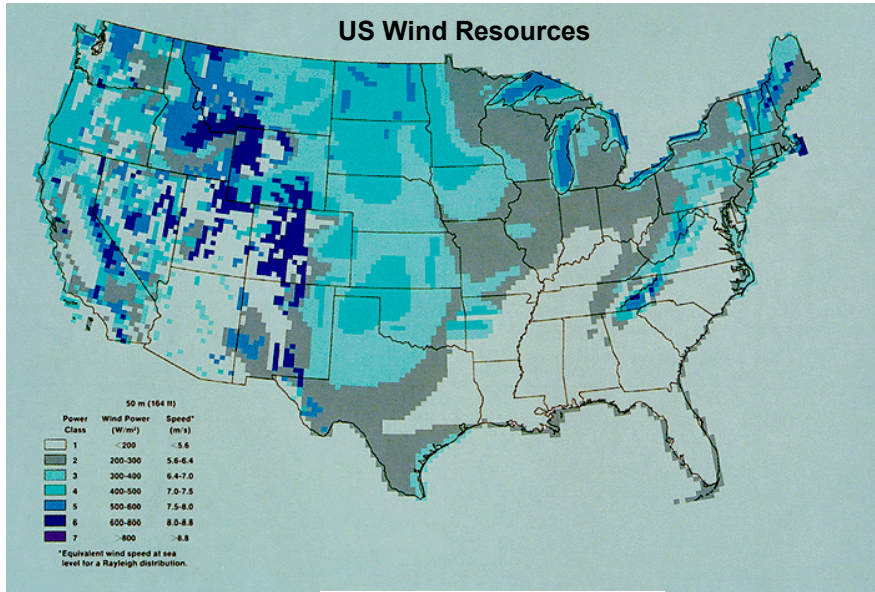
**Bundled = Energy + REC**  
**Unbundled = REC**

# Levelized Cost Comparison 2008\$



\*Cost estimates include reduction of federal solar tax credits to 10% after 2007 for commercial/utility scale installations.  
 \*\*Co-firing costs are calculated as incremental costs of avoiding coal consumption for generation (\$2.25/mmbtu (2006\$) coal cost assumed).

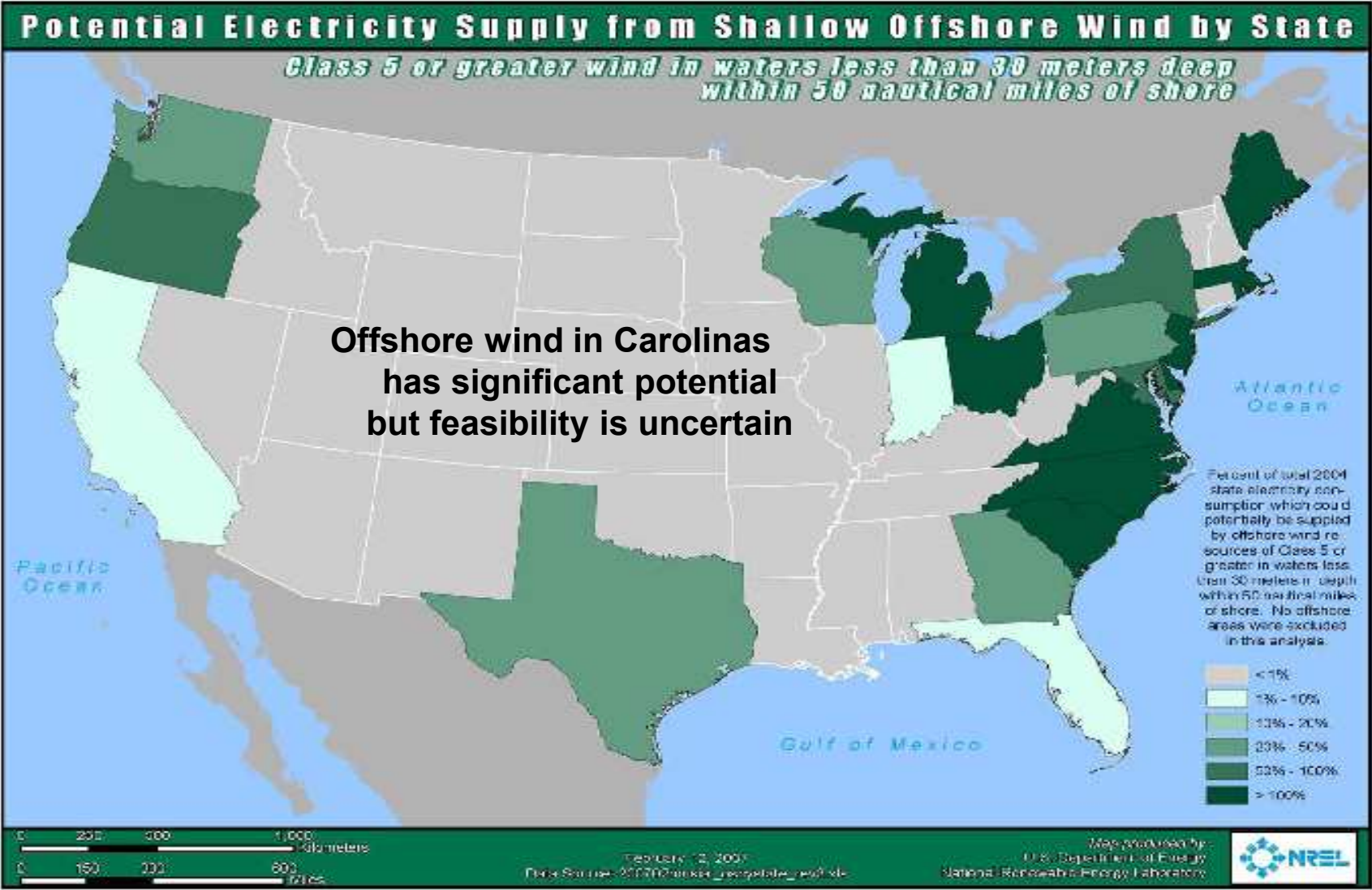
# Renewable Resources



- Renewable resources vary considerably nationally
- This has significant impact on policy design and price
- Transmission constraints also a consideration



# Off-Shore Wind Potential





# North Carolina Renewable Energy Requirements (NC REPS)



## North Carolina Requirements

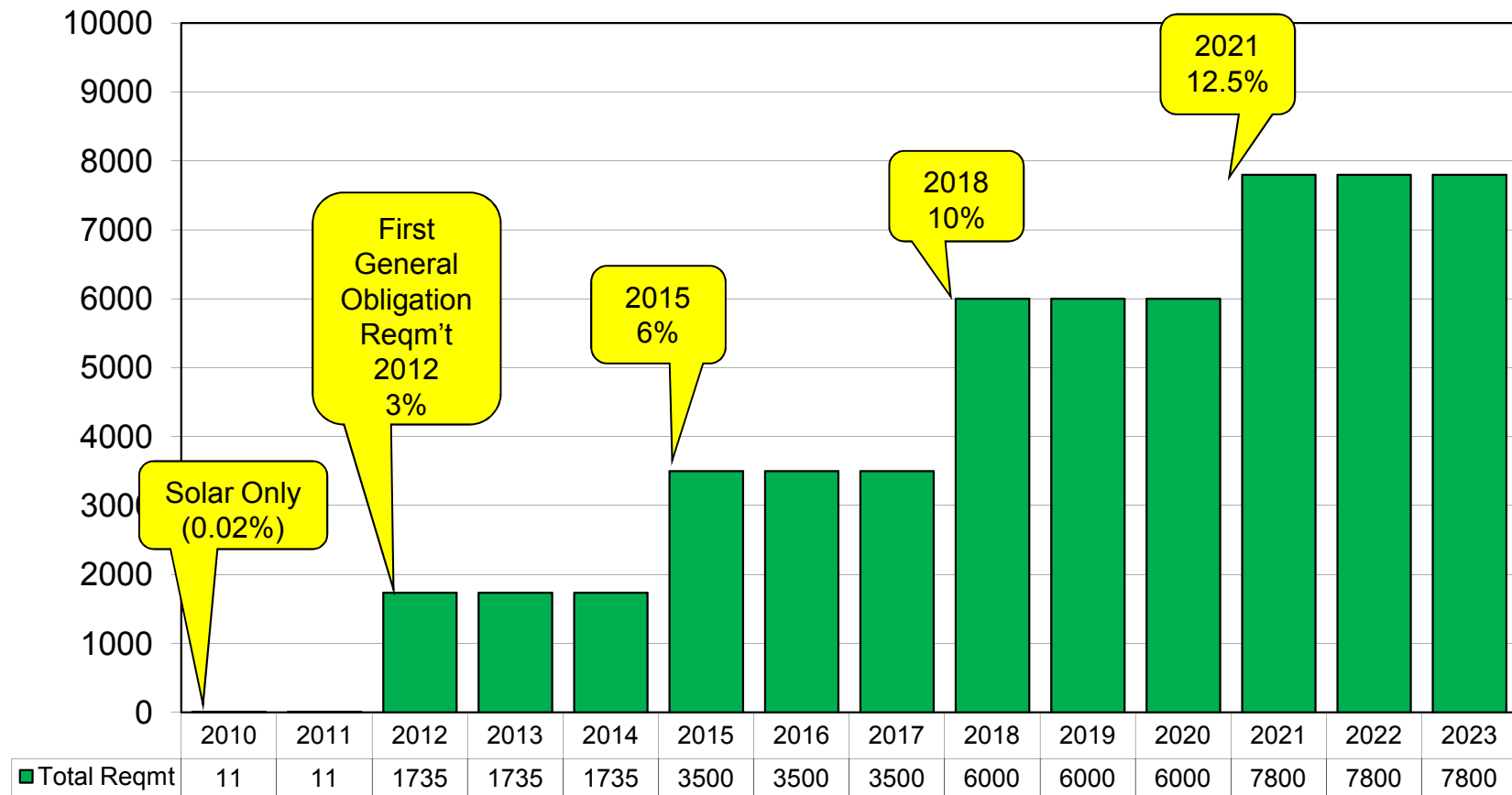
- How much and when?
  - Based on retail load
  - 0.02% solar requirement in 2010
    - 3% by 2012
    - 6% by 2015
    - 10% by 2018
    - 12.5% by 2021
  
- What counts?
  - Solar, wind, biomass, small hydro, geothermal, ocean current, wave, cogeneration, hydrogen
  - Set asides for poultry litter, swine waste, and solar
  - Unbundled, out of state RECs capped at 25%
  - Energy Efficiency capped at 25% until 2021, 40% after

# NC REPS Requirements (GWHrs)



## Renewable Energy Requirements (GWHrs)

Assumes 25% Energy Efficiency Through 2021, 40% 2021+



Note: Numbers are Rounded and based on Duke's Load Forecast. Estimates subject to legislative interpretation.



## NC REPS Cost Cap (“REPS Rider”)

- How much is it going to cost customers?
  - Cost impact to customers is capped
  - Utilities can seek relief from further obligation when cap is reached
  - Statewide annual incremental cost expected to be \$325M+ in 2021

Customer Class (\$ per account per year)	2008 - 2011	2012 - 2014	2015- thereafter
Residential	\$10	\$12	\$34
Commercial	\$50	\$150	\$150
Industrial	\$500	\$1000	\$1000



# Duke Energy Carolinas Renewable Initiatives



## Renewable Energy Initiatives

### Solar Distributed Generation Program

- Approved with conditions by NCUC on 12/31/2008
- Approval limits cost recovery
- Partial recovery could lead to federal tax violations
- Duke Energy has requested Motion for Clarification
- Motion asks for removal of cost recovery conditions
- Public Hearing 3/23/2009

### Renewable RFPs and PPAs

- Competitive process supports prudence and least cost compliance
- Builds familiarity with technologies and players
- SunEdison, Methane Power, Greenville Gas
- No active Renewables RFP in Carolinas
- Duke accepts and reviews unsolicited proposals



## Renewable Energy Initiatives

### Qualifying Facilities

- Required by PURPA to purchase energy
- NCUC says RECs not included
- Duke has issued standard offer for RECs
- RECs would be separate contract
- Considered in-state if delivered to grid

### Biomass Co-Firing and Repowering

- Co-firing blends small amounts of biomass with coal
- Repowering is 100% biomass
- Utilizing wood waste and residues
- Substantial GWHrs, considered carbon neutral
- Phase 1 assessments have been completed
- Successful co-firing test burn 2007
- Additional test burns are planned for 2009





## Renewable Energy Initiatives

### Out of State Unbundled RECs

- Allowed but limited to 25% of compliance
- Duke has purchased cost-effective wind RECs
- RECs purchased/generated prior to 2012 are banked for future compliance

### Hydro Generation

- On-going regulatory discussion of how much hydro generation will count towards NCREPS compliance
- Could be significant portion of 2012 compliance
- Most proposed federal RPS allow incremental hydro only



# Other Renewable Topics of Interest



## Other Renewable Issues/Notes

- Potential Federal Renewable Standard
  - May not be consistent with varying state standards
  - Ex. Solar hot water, biomass, hydro
- Additional state standards
- Carbon legislation impact
- Stimulus bill extends and creates alternate tax provisions
- ADAGE biomass venture
- Swine/poultry discussions
- SC projects can contribute to NCREPS
- Motion for clarification regarding shared statewide requirements and priority of carve-outs vs cost cap



# Questions ?

Tracy Beer

980-373-7890

[tlbeer@duke-energy.com](mailto:tlbeer@duke-energy.com)