



An Electric Utility's Perspective on Energy & Climate

SECARB Stakeholder's Briefing

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National Energy Policy Priorities



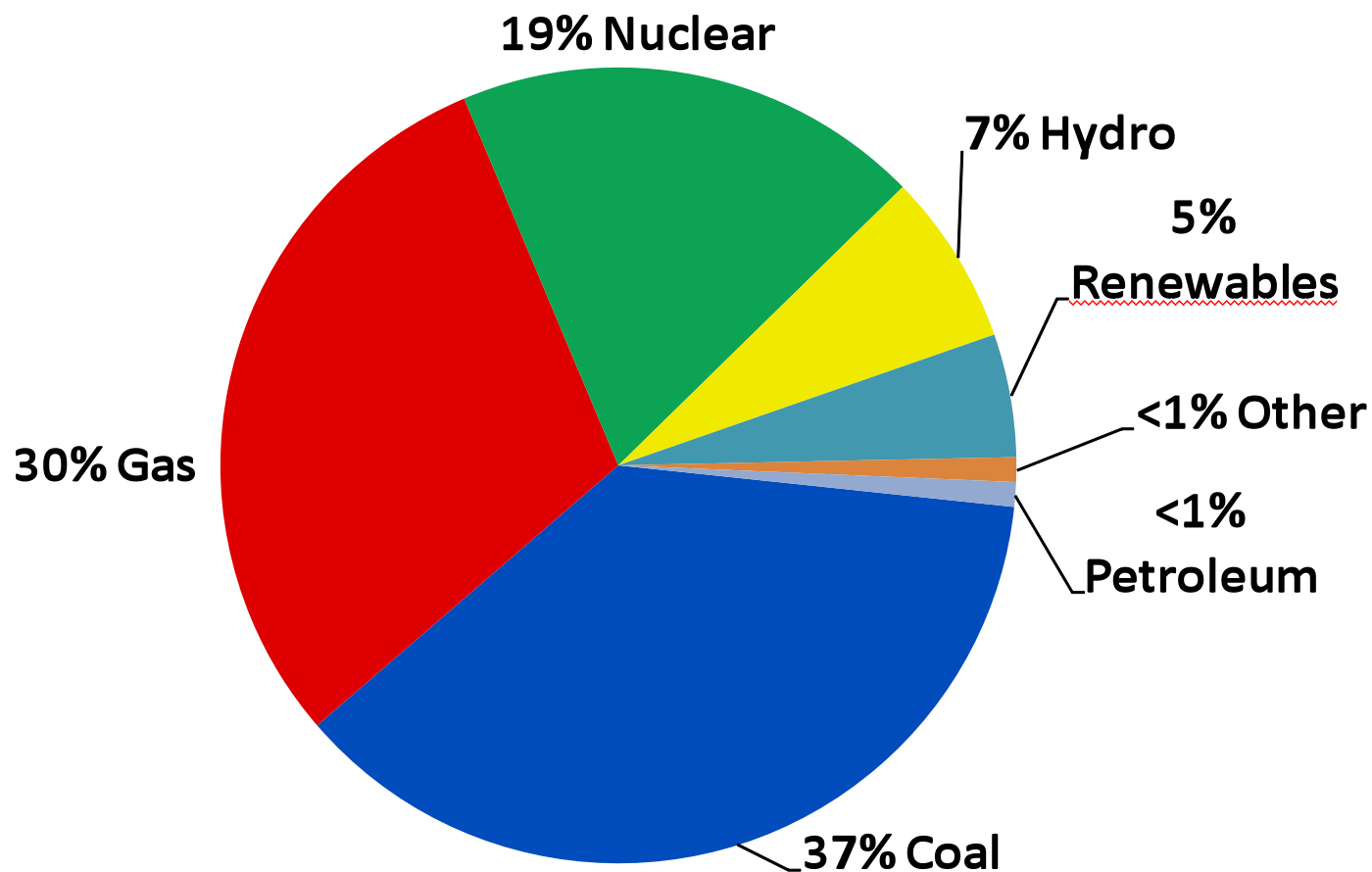
- Need a full portfolio of energy resources.
 - Nuclear
 - 21st Century Coal
 - Natural Gas
 - Renewables
 - Energy Efficiency
- Need a national, robust research and development effort to create new technologies for our future.

National Energy Policy

Where does our Nation's energy come from?

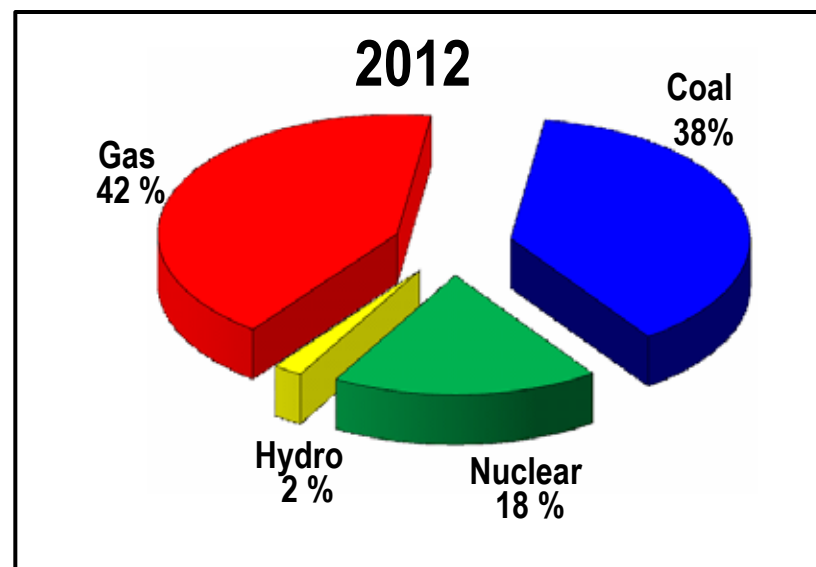
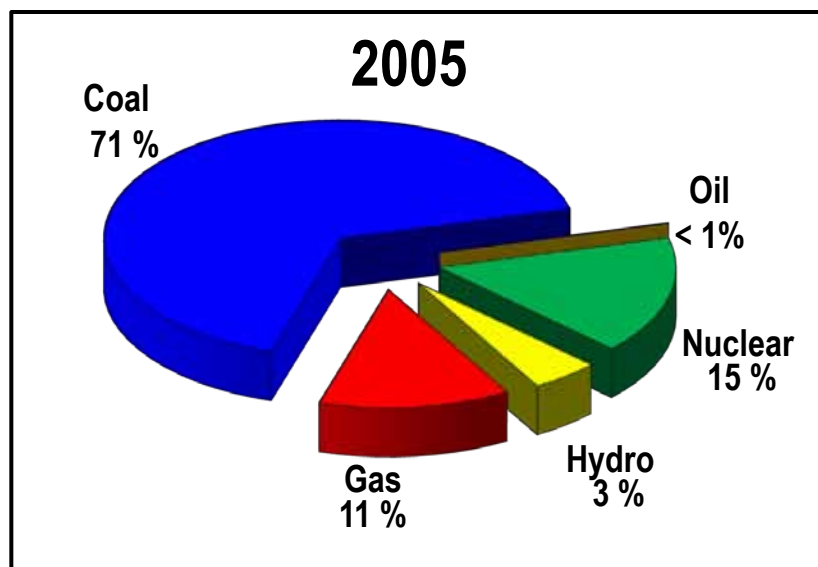


2012 Generation



Source: EIA Data

Southern Company Generation Mix 2005 and 2012



Source: Southern Company Form 10K filings

Assumptions/Drivers Impacting Fuel and Generation Mix and Forecasts



- Environmental requirements for coal plants
 - Natural gas market conditions and fuel costs
 - Carbon scenarios
 - Assumptions for generation additions (nuclear, renewables, CCS, etc.)
 - Demand growth
 - Transmission system impacts
 - Operationally and environmentally feasible fuels for each plant
 - Transportation costs
 - Mining/fracking issues
-

Current Major Environmental Drivers



National Ambient Air Quality Standards (NAAQS)

- Particulate matter (TSP, PM-10, PM-2.5)
- Sulfur dioxide (SO₂)
- Ozone (1-hour, 8-hour)
- Nitrogen dioxide (NO₂)
- Lead
- Carbon monoxide (CO)
- Reviewed every 5 years

GHGs and Climate

- PSD and Title V permits
- Emission performance standards
- ?

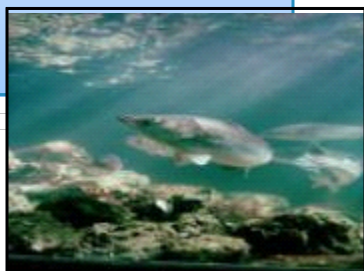
Hazardous Air Pollutants (MATS)

- Mercury
- Acid gases
- Other metals



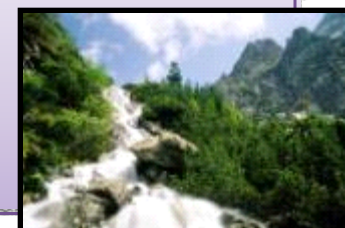
Water Quality and Quantity

- Water intake and fish protection
- Water quality standards
- Thermal discharges
- Biological issues
- Groundwater



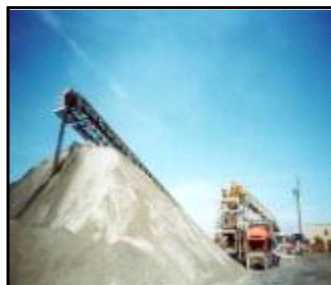
Visibility and Regional Haze

- Sulfates
- Nitrates
- Particulate matter



Land and Waste Issues

- Ash
- Scrubber material
- Hazardous materials

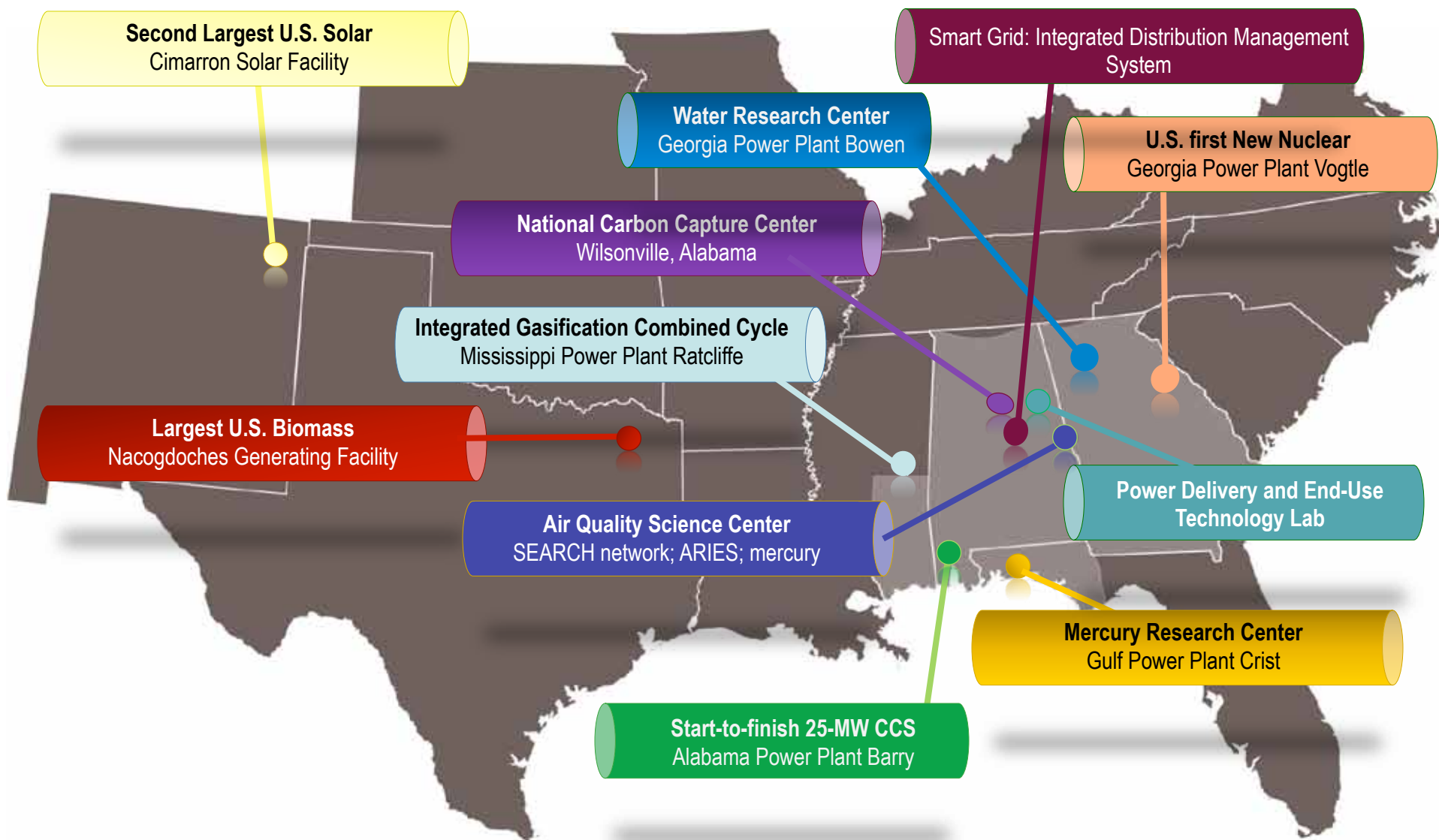


Critical Research for Coal



- Emissions Control Research
 - Mercury reductions
 - Scrubber performance and additives
 - Oxidation catalysts performance
 - Cross-media impacts
- Plant Performance and Reliability Improvements
- Advanced Generation Development
- Coal Combustion Byproducts
- Air Quality Studies
- Renewable Energy Technologies
- Carbon Capture and Sequestration

Research Programs and New Projects



The National Carbon Capture Center at the Power Systems Development Facility



Offering a world-class **neutral test facility** and a highly **specialized staff**, the National Carbon Capture Center accelerates the commercialization of advanced technologies and enables coal-based power plants to achieve **near-zero emissions**.

Post-Combustion

Pre-Combustion/Gasification

Oxy-Combustion



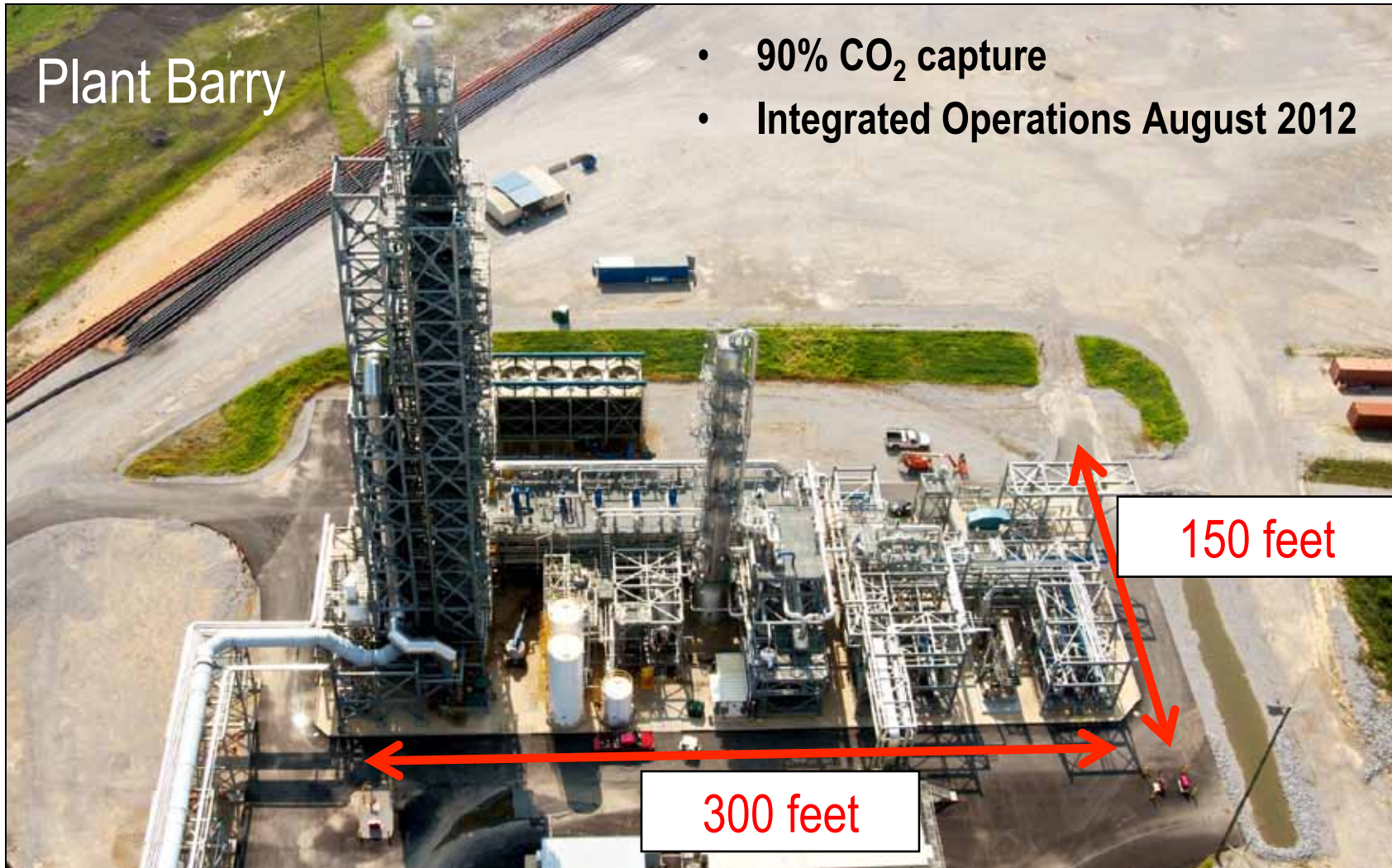
25-MW CCS Demo

“World’s largest carbon capture facility on a fossil-fueled power plant”



Plant Barry

- 90% CO₂ capture
- Integrated Operations August 2012



Plant Ratcliffe – The Kemper Project



- **Plant:** 582-MW TRIG™ IGCC
- **Location:** Kemper County, MS
- **Fuel:** Mine-Mouth Lignite, ~4M tons/yr
- **Cost:** \$2.4 billion
- **CO₂ Capture:** 65%
- **Water:** Meridian Treated Effluent
- **By-Products:** Sulfuric Acid & Ammonia

Issues and Uncertainties



- The environmental landscape is complex and remains uncertain.
- Must have diversity of energy sources for lower costs and lower risks.
- Solutions can be developed to preserve coal with a sense of balance with regards to reliability, economic consequences and environmental impact.
- Expansion of natural gas interstate pipeline system needed.
 - Reserves, detractors and unknowns related to shale gas must be resolved.
 - Issues related to fracking not resolved.
- Major expansions of high voltage transmission grid needed.
- Cumulative impacts – must consider all requirements and costs for decision making.
- Must invest in research and development that creates innovative, new technologies for our future.