REINHOLD ENVIRONMENTAL Ltd.

2011 NOx-Combustion Round Table & Expo Presentation

February 7-8, 2011, in Birmingham, AL / Hosted by Southern Company

Environmental Update

Chris Hobson

Chief Environmental Officer

Senior Vice President

Southern Company

February 7, 2011

SOUTHERN COMPANY

Welcome to Hoover!

- Riverchase Galleria – One of the largest shopping malls in the America, featuring a nine-story glass atrium and the world's largest skylight.
- Hoover High School Buccaneers – One of the top ranked high school football programs in the nation.
- City of Hoover, Alternative Fuels and Environmental Programs –
  - In 2006, President Bush visited the city to highlight alternative energy programs here.
  - 88% of the fuel used by the City of Hoover is made from alternative fuel sources.
  - Algae-to-energy plant to be built.
  - City vehicles driven over 14 million miles on ethanol.
  - Project to remove nitrogen and phosphorus from wastewater.
  - In 2007, recognized in London, England, by The International Awards for Livable Communities for its Environmentally Sensitive Practices.
- Cahaba River – More fish species per mile than any other river in North America and the world-famous Cahaba Lilies.

Southern Company Overview

Generation

- 46,400 MW
- 303 generating units

Financial

- $52 B total assets
- $16 B revenues
- $1.64 B Net Income

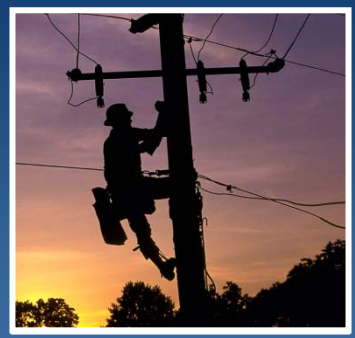
Environmental

- $7.5 B completed projects
- $2.5 B new projects

Transmission

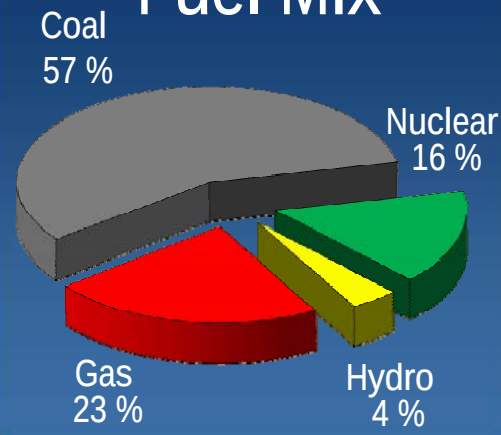
- 27,000 line miles
- 3,300 substations

Distribution



- 156,000 line miles
- 3.8 million poles

Fuel Mix

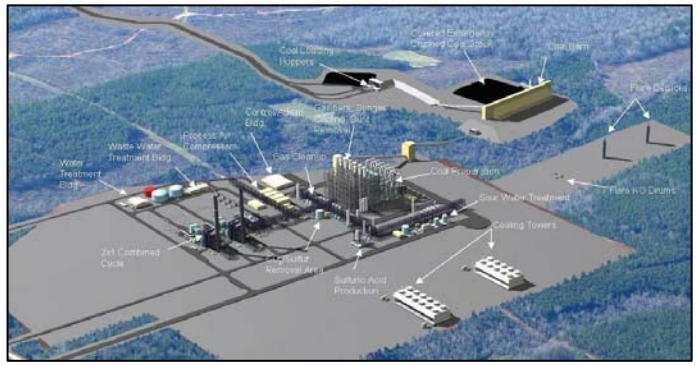


as of December 2009

Current Major Projects

Kemper/Ratcliffe

- 582-MW IGCC
- $2.5 Billion capital investment
- 65% CO2 capture
- Zero discharge



Vogtle

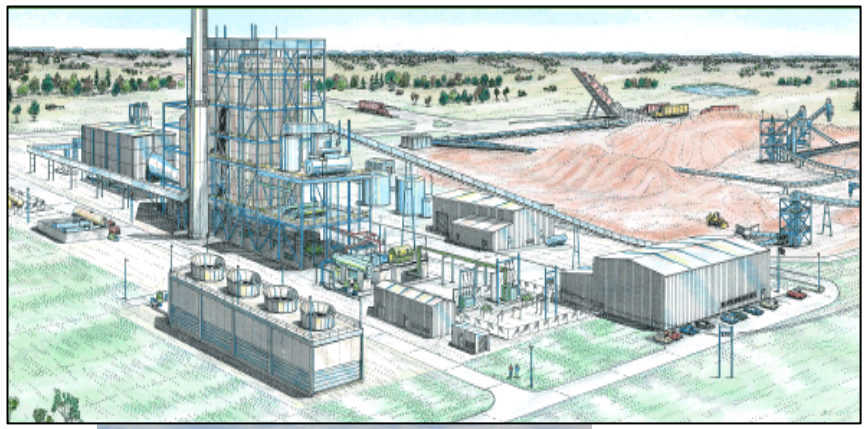
- Two 1117-MW PWR AP1000 nuclear units
- $14 Billion capital investment
- Commercial operation in 2016/2017

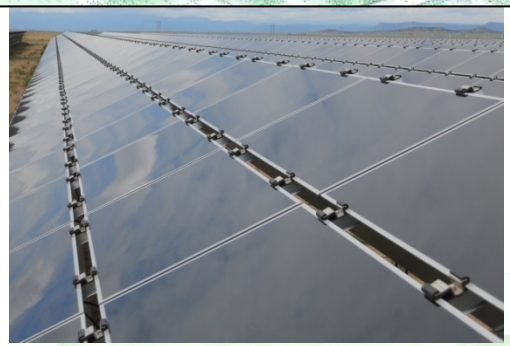
McDonough

- Coal-powered units to retire
- Three 840-MW natural gas CC units
- $2 Billion capital investment
- Emission reductions:
  - 59% reduction in nitrogen oxides emissions
  - 99% reduction in sulfur dioxide emissions
  - 100% reduction in Mercury (Hg) emissions
  - 50% reduction in carbon dioxide emission rate

Other Projects

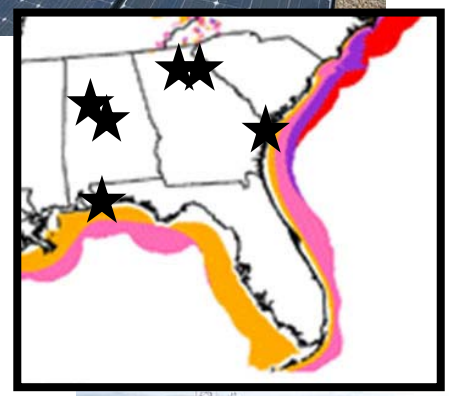
- Plant Gadsden
  - Biomass direct inject
  - Since 2001
  - One of the longest running systems in the U.S.
- Nacogdoches Generating Facility
  - 100-MW Biomass Plant
  - Commercial operation 2012
- Plant Mitchell
  - Unit 3 coal to biomass conversion
  - ~96 MW
- Cimarron Solar Facility
  - 30-MW PV solar project
  - Began operation January 2011
- Perdido Landfill Gas-to-Energy Facility
  - 3,200 kW



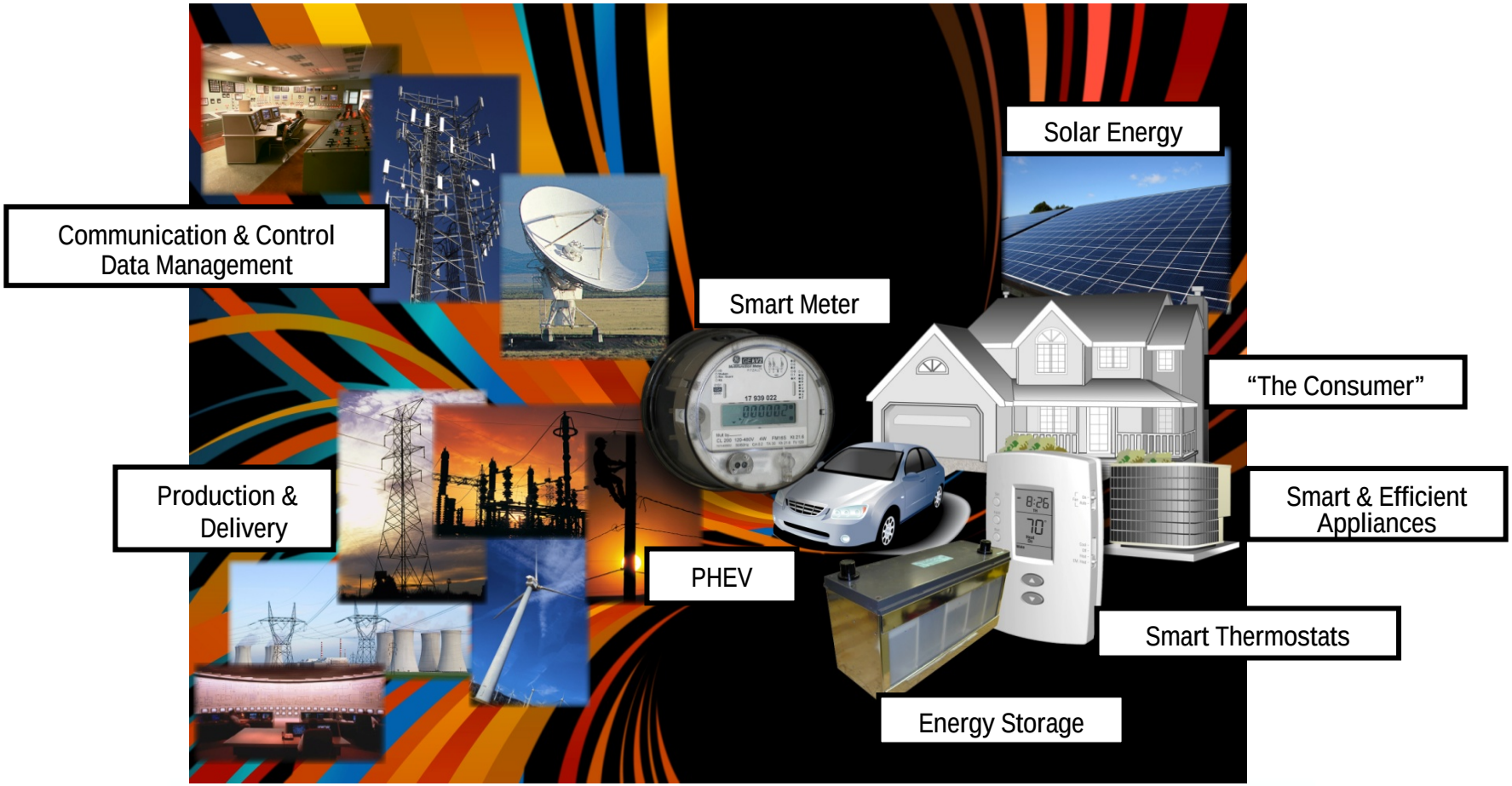


Research and Development

- Solar
  - Alabama Power PV Demonstration (with EPRI)
  - Georgia Power PV Demonstration
  - Solar Hot Water Heating Demonstration
  - Solar Augmented Steam Cycles (EPRI collaborative paper study)
  - Distributed PV Project (with EPRI)
- Wind
  - SoCo/Georgia Tech Offshore Wind Feasibility Study
  - Study with Georgia Tech completed; Offshore application process underway
  - APC/UAB Wind Project
  - Resource Assessment/Modeling
  - Resource Assessment/Data Collection

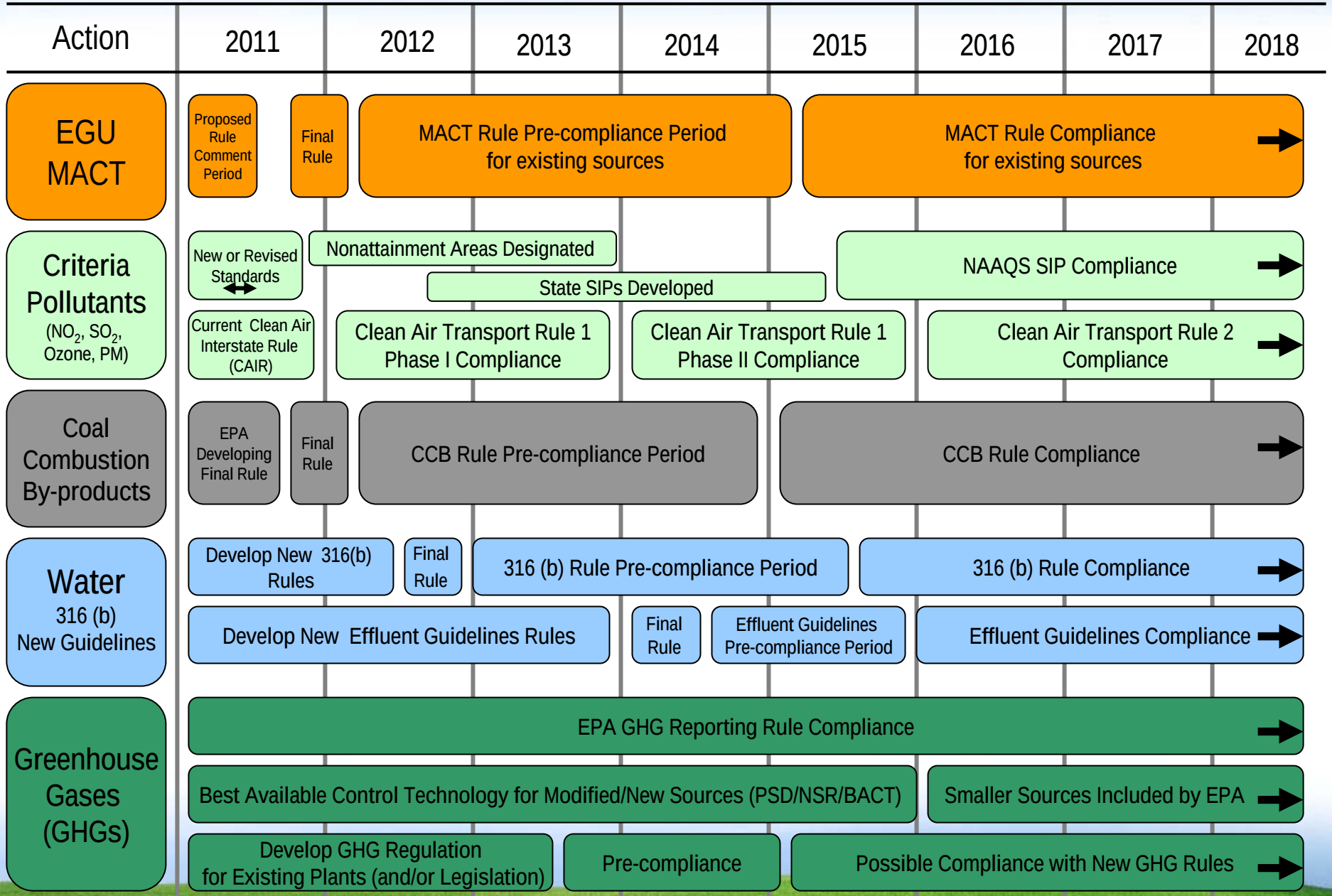


Electric System of the Future?



Courtesy of the Electric Power Research Institute

EPA New Regulatory Actions Timeline



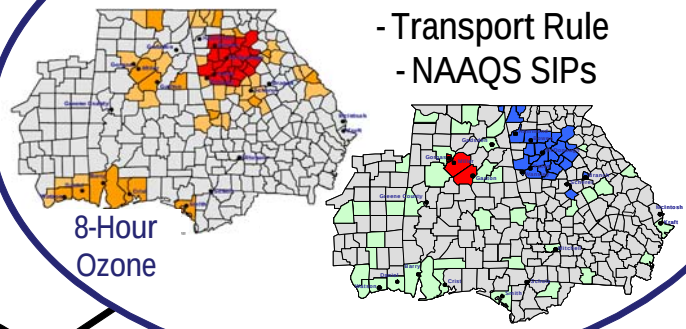
Environmental Regulatory Requirements

Renewable Energy Standards (RES)

Climate Change (CO_2, GHGs)

Air Quality

- Transport Rule
- NAAQS SIPs



Utility HAPs MACT

Environmental Control Requirements

Ash Management

Regional Haze/CAVR

Water Effluent Guidelines

Water Intake Structures 316 (b)

Likely Cap and trade or market based

Possible cap and trade and command and control

Likely command and control

Air Issues Overview

New and Existing National Ambient Air Quality Standards (NAAQS)

- Ozone
- PM
- NO_2
- SO_2

Transport Rule

– To address interstate transport of SOx and NOx emissions

Hazardous Air Pollutants (HAPs) Maximum Achievable Control Technology (MACT)

– Industrial Boiler MACT

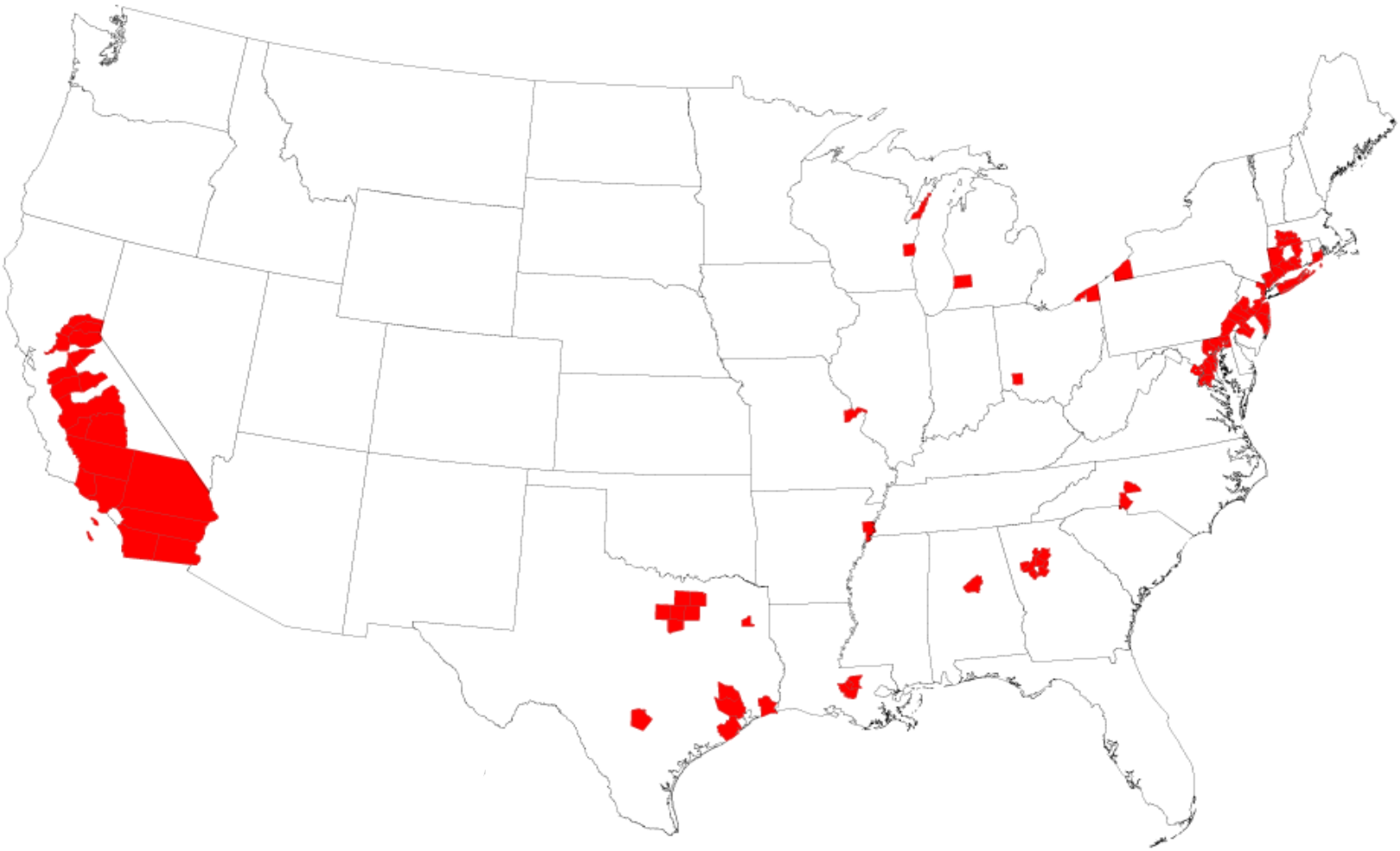
– Coal- and Oil-fired EGU MACT

Other Air Regulatory Issues:

- RICE MACT
- NSPS
- NSR

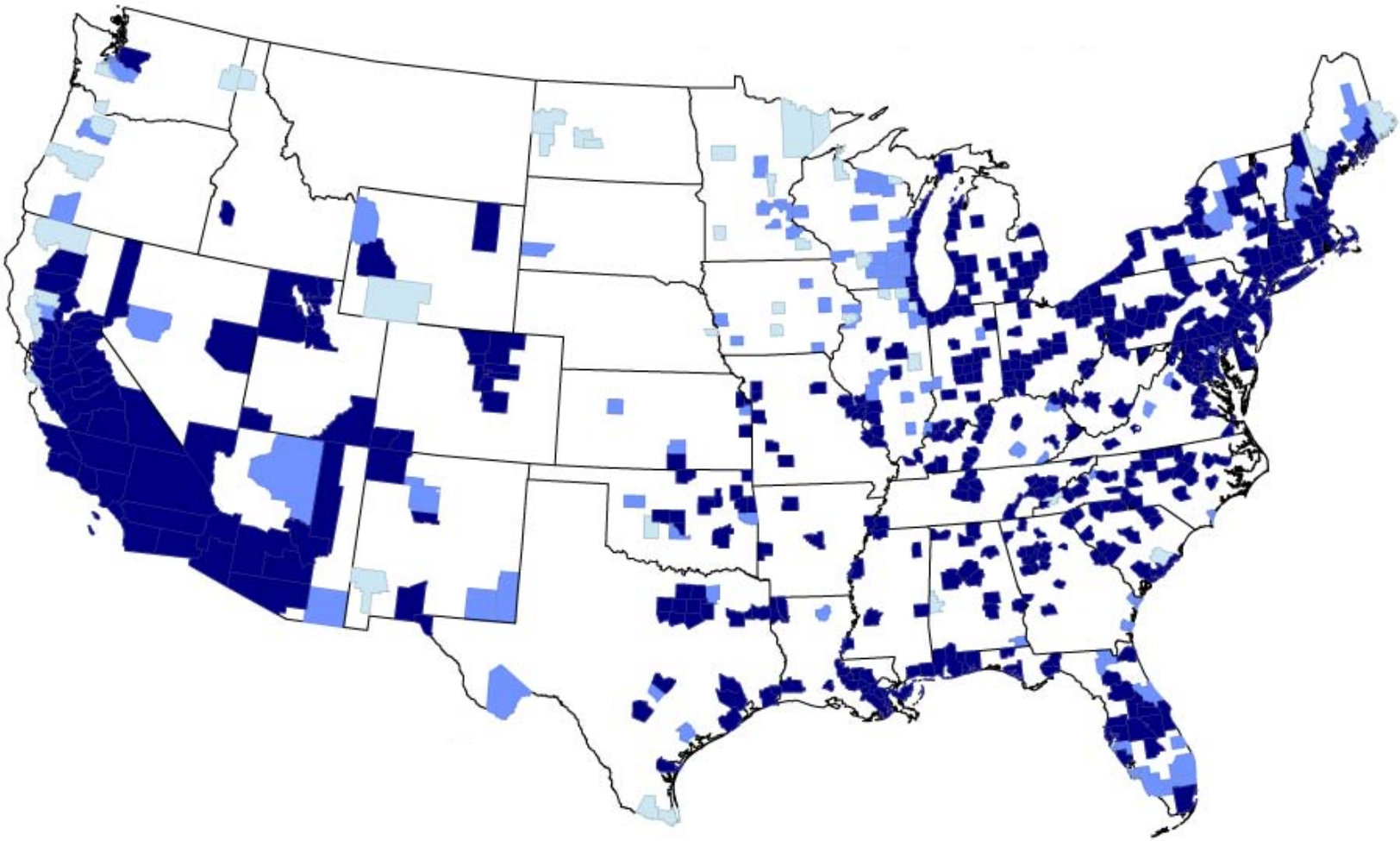
Air Issues – National Ambient Air Quality Standards (NAAQS)

Current/Recent Nonattainment – Existing Standards

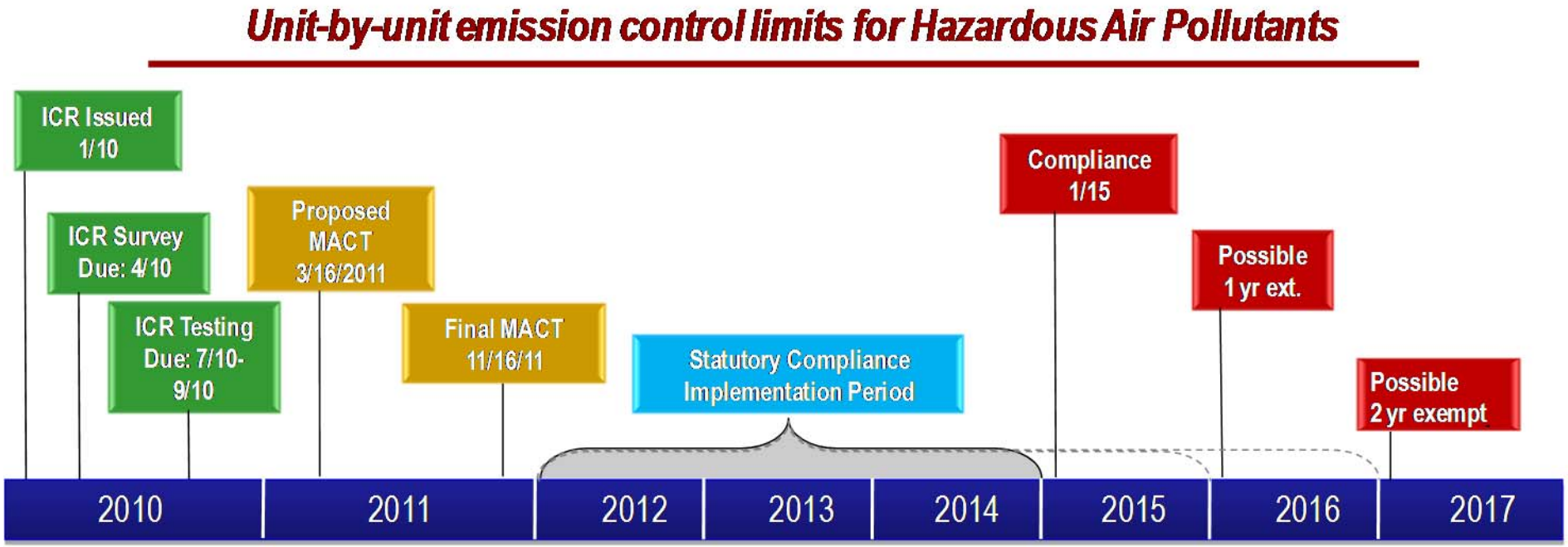


Air Issues – National Ambient Air Quality Standards (NAAQS)

Projected Nonattainment – New Standards



Maximum Achievable Control Technology (MACT)

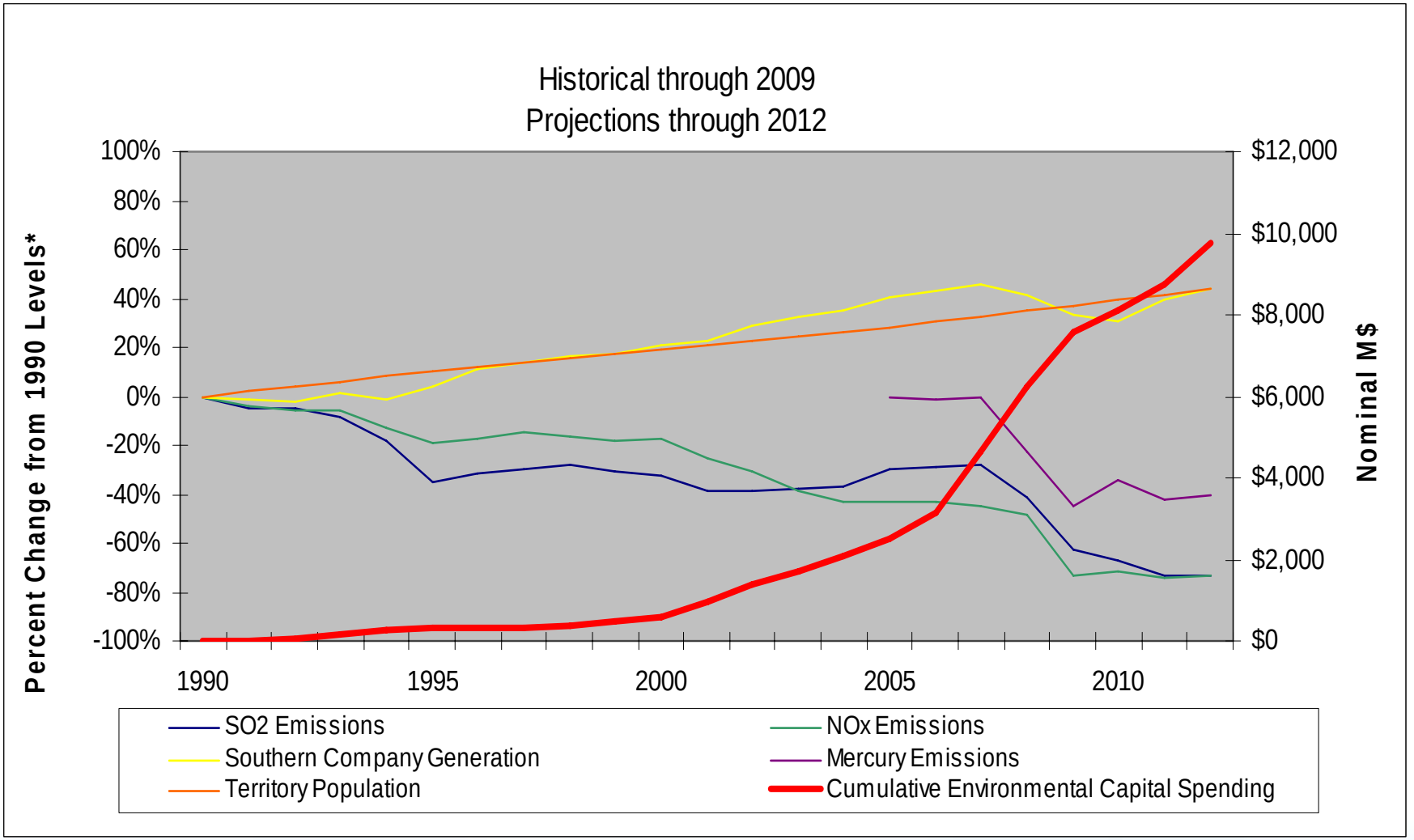


- Impacts all coal and oil-fired steam electric units
- Acid gases (HCl, HF)
- Metals with potential PM surrogate
- Organics
- Any of these could drive us to controls beyond SCR/FGD alone.
- Industrial Boiler MACT impacts conversion to biomass and gas-fired boilers

Compliance Extensions

Court Stay of the Final Rule

Environmental Capital and Emissions



Climate and Renewables Issues

- Climate Legislation
  - **Cap and trade**
  - **Energy legislation**
  - **Renewable Energy Standard**

- EPA Regulation

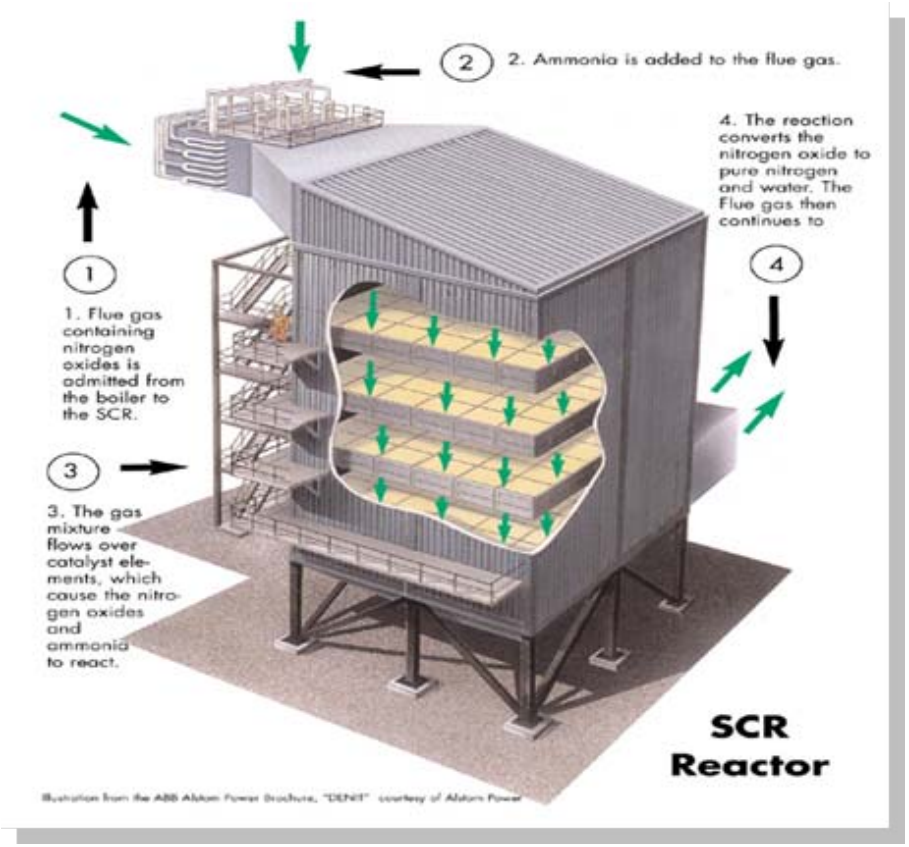
Endangerment Finding → Motor Vehicle Rule → Tailoring Rule → New & Modified Sources → Existing Sources

  - Endangerment finding provided the "cause"
  - Motor vehicle rule made GHGs "regulated pollutants"
  - "Tailoring rule" raised permitting thresholds and detailed the approach
  - GHGs will be considered in all new and modified plant permits, PSD, BACT
  - Future GHG requirements for existing sources (CAA cap and trade, emission limits?)

Technology Needs

NO_x Reduction Technology

- **SCR biomass applications**
- **Extend catalyst lifetimes**
- **Further reduce NOx emissions**
- **Improved control schemes / methodologies**
- **Lower SO_2 / SO_3 conversion**
- **Share best practices**
  - **LPA (large particle ash)**
  - **Catalyst poisoning**
  - **Cleaning (In-situ / Ex-situ)**
  - **Landfill disposal**



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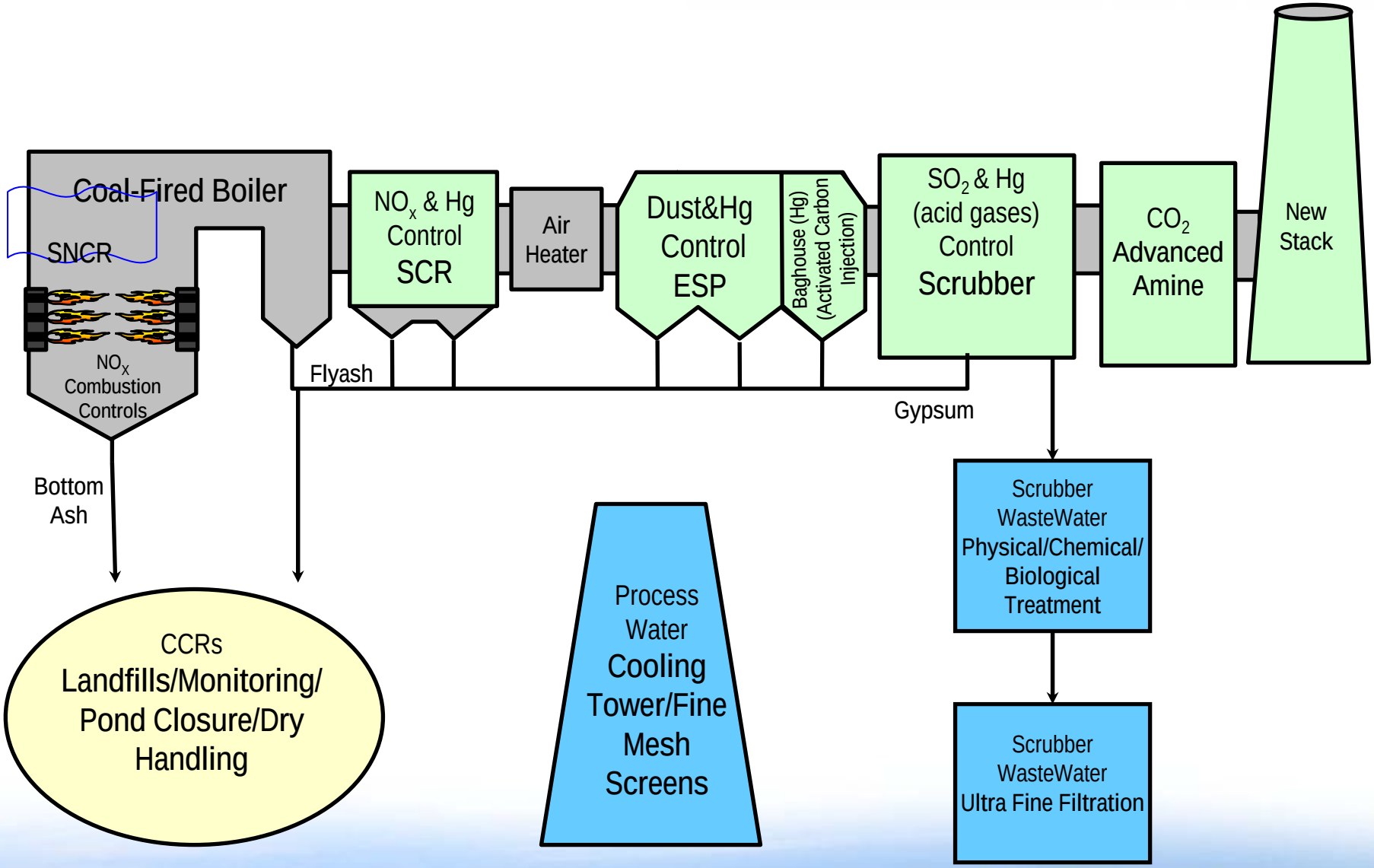
Technology Needs

Mercury Oxidation

- **~ 100% Hg Oxidation Needed**
- **Predicting Hg oxidization**
  - **Changes with time**
  - **Changes with coal characteristics**
- **Specialized catalyst formulations**
- **Improved catalyst mgt best practices**
- **Mercury oxidation performance guarantees**

Emission Control Technologies for Coal-Fired Boilers



25-MW Carbon Capture and Sequestration Project

- World's largest carbon capture unit on a coal power plant
- **Location: Alabama Power Company's Plant Barry**
- **Project Partners: SO, MHI, DOE, EPRI, Denbury**
- **COD: June 2011**
- **CO_2 capture: 500 metric tons/day**

National Carbon Capture Center – PC4

- Post-combustion Carbon Capture
  - PC4 construction well underway
  - Pilot Solvent Test Unit (PSTU) – modular assembly and mechanical interconnections completed
  - Commissioning of PSTU and BOP scheduled for Nov. 2010 – February 2011
  - PSTU baseline testing to begin in March 2011
- Oxy-combustion Carbon Capture
- Pre-Combustion Carbon Capture

2015 - What Will Happen?

- Why 2015?
  - EGU MACT – Control, convert or retire by 2015 compliance deadline
  - Hazardous versus non-hazardous – Compliance starts by 2015
  - NAAQS and Transport Rule – Compliance start before 2015
- Cost
  - Viability of many coal units not controlled
- Decision timing
  - Uncertainty of rules and recovery
  - Cost to preserve options
  - Time to implement
- Reliability
  - Not enough time to control, convert, or retire and replace
  - Conflicting reliability versus compliance requirements

Major Take-Aways

- Major environmental uncertainties exist.
- Environmental compliance costs are a threat.
- Difficult decisions about the existing generation fleet and new generation will be required.
- Future environmental requirements pose a reliability challenge.
- Minimizing costs to ratepayers remains a high priority.
- Our vision, strategy, and mission are evolving.

Chris Hobson

Chief Environmental Officer
Senior Vice President

Southern Company