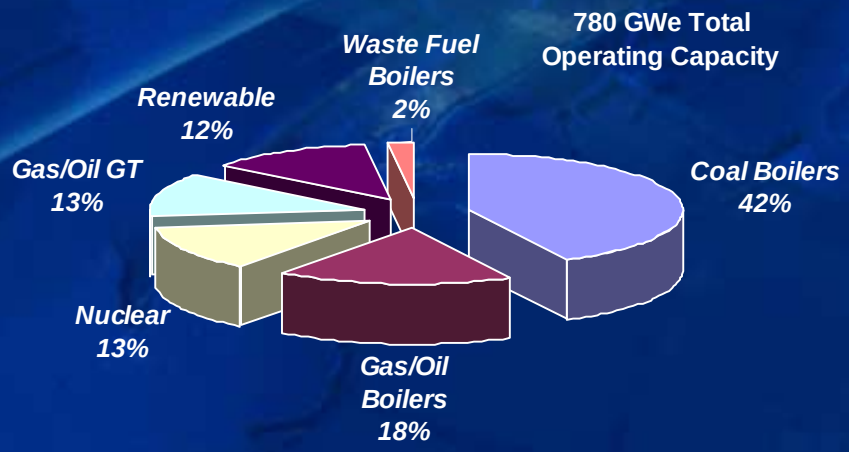
# Partial Gasification Combined Cycle Technology –

# A Practical Pathway to Clean Coal Advancement

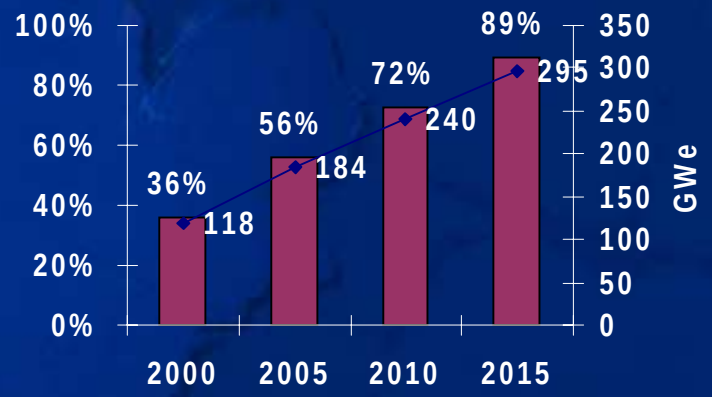
R. Giglio

# The U.S. Power Generation Fleet ?

## Existing US Power Fleet




Coal Plants Over 30 Design Year Life



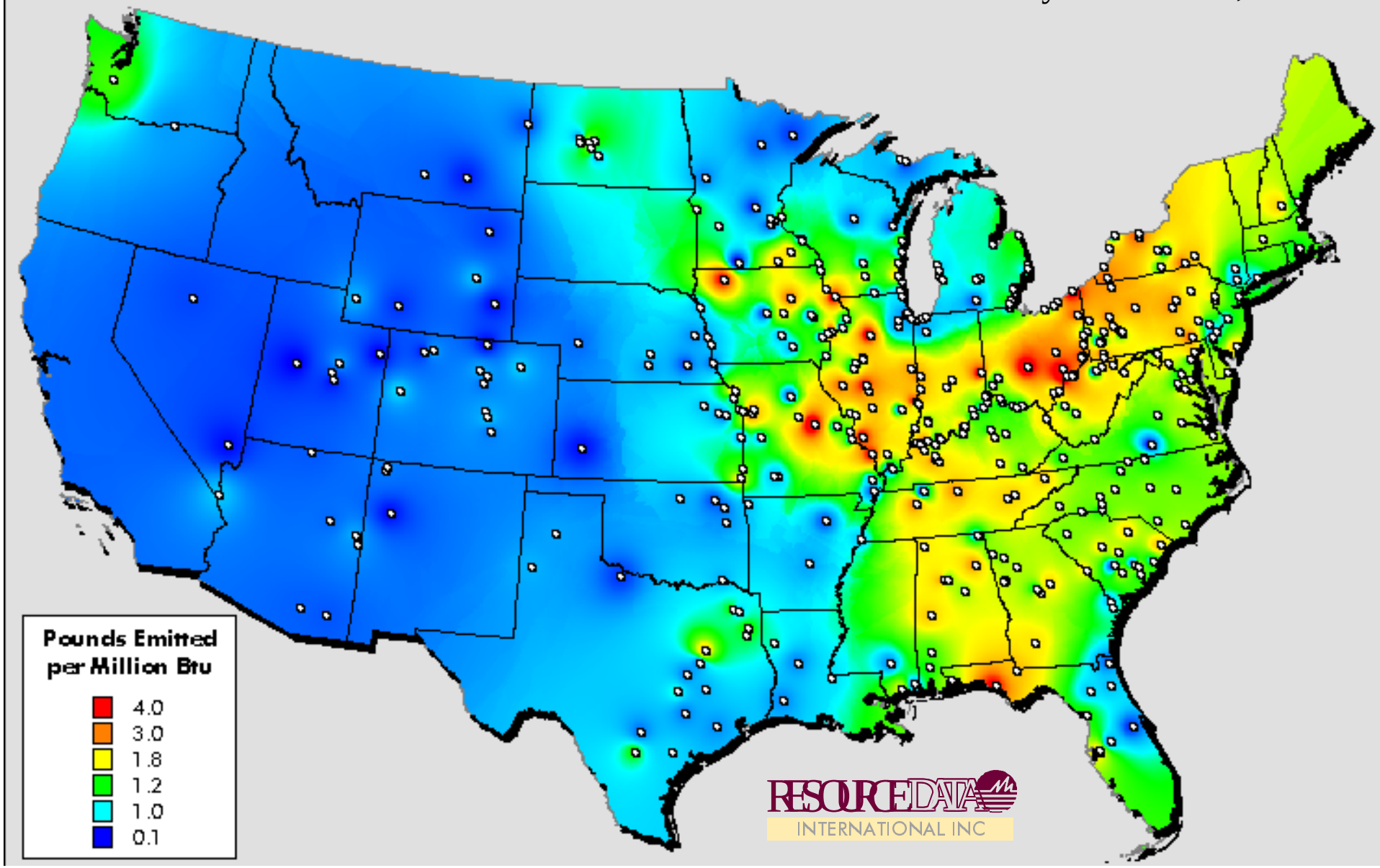

Source: UDI

- New Gas Capacity Aimed at Filling Short Term Supply Problem
- But Bigger Long-Term Capacity Problem is Evident
  - Most US Power Comes from Coal (51%)
  - Many are Emitting Well Above NSPS
  - Aging Fleet

***What is our Energy Strategy to Addresses our Long Term Energy Need ?***

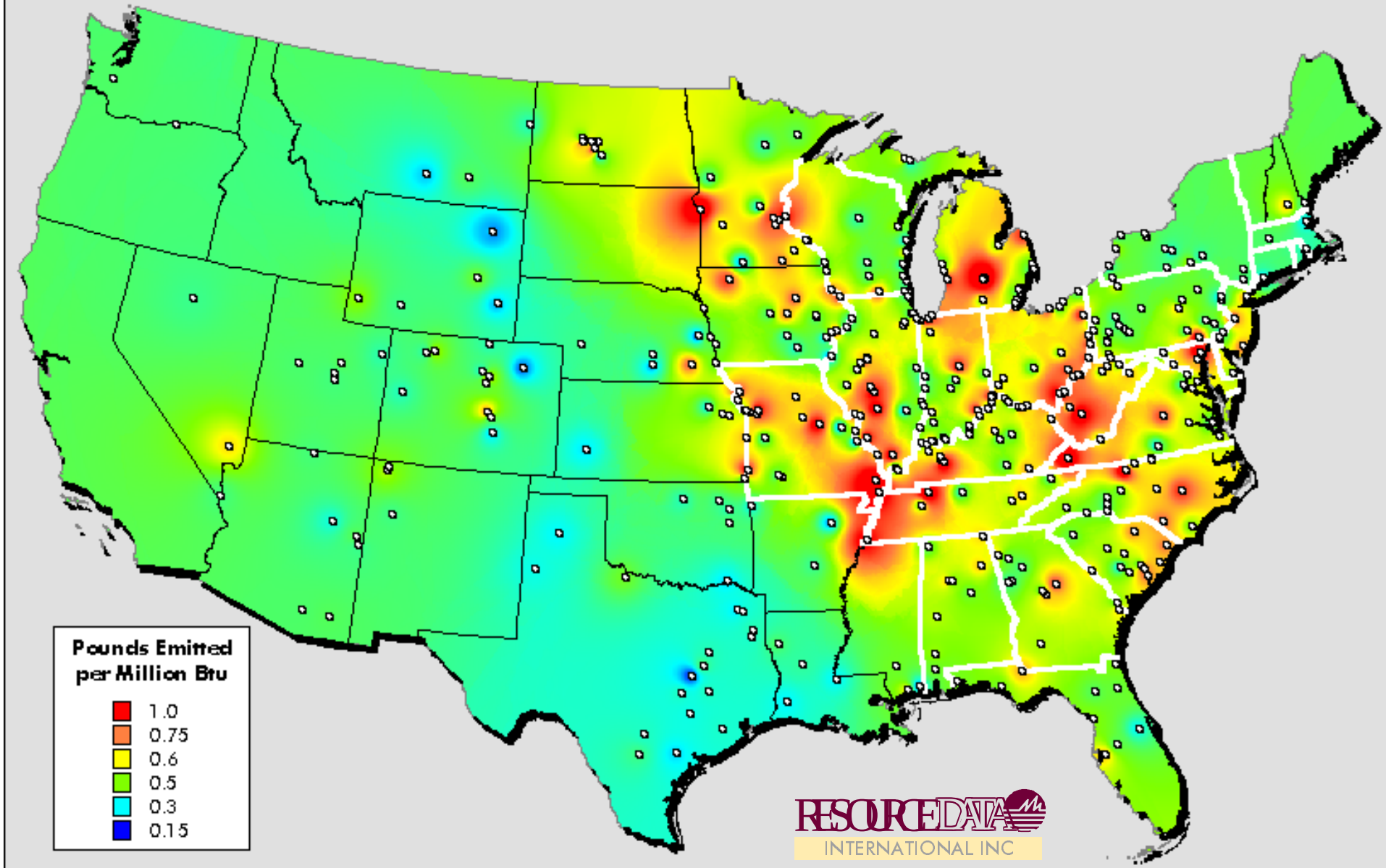
# Sulfur Dioxide Emission Rates

For Coal-Fired Utility Power Plants, 1998

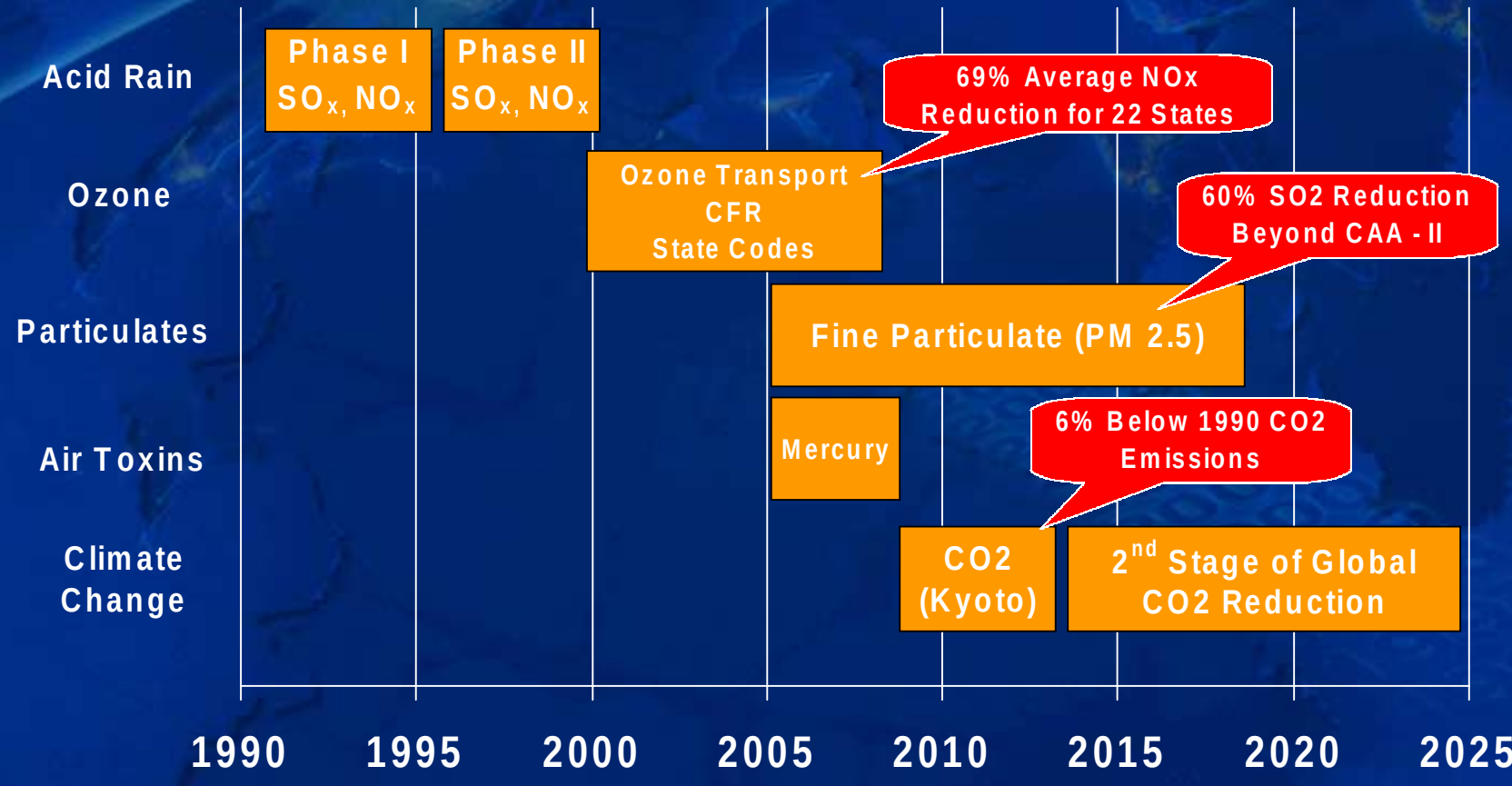


# $NO_x$ Emission Rates

## For Coal-Fired Power Plants - 1998



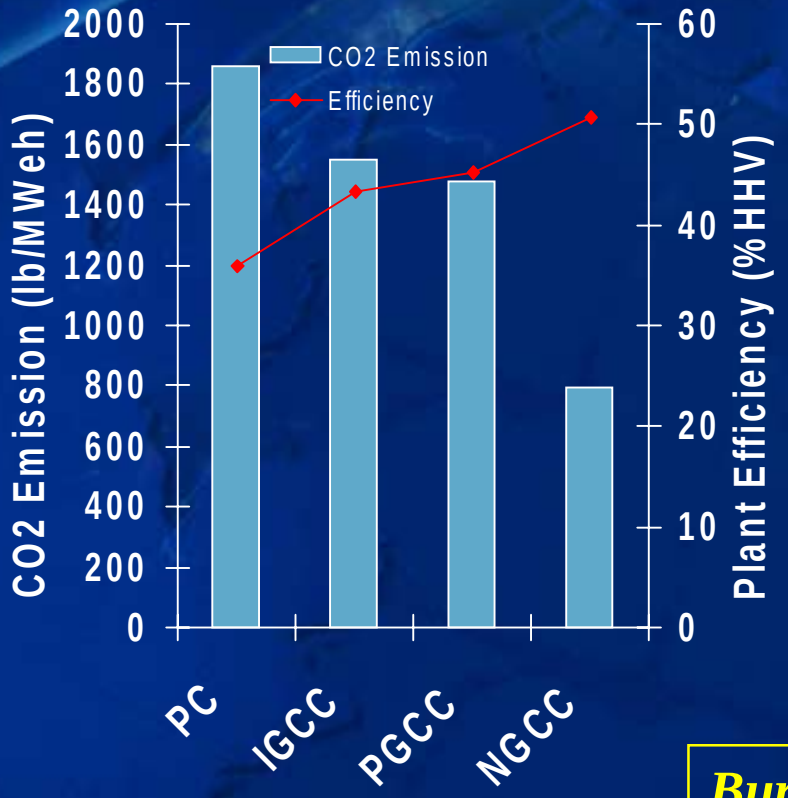
# US Emission Regulation Outlook

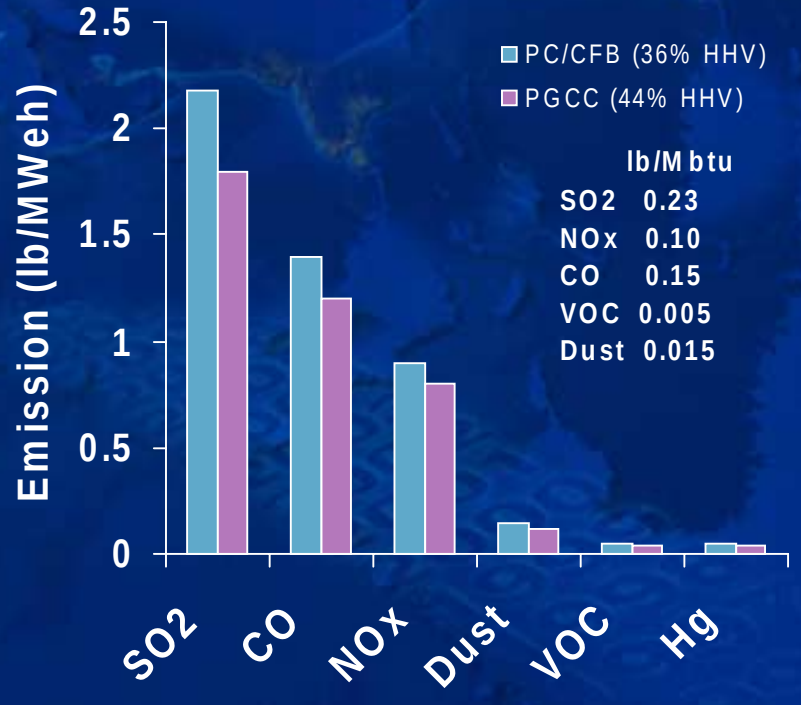



EPA Office of Air and Radiation,1997
Coal Utilization Research Council, 1998

# Efficiency Translates into Reduced Emissions

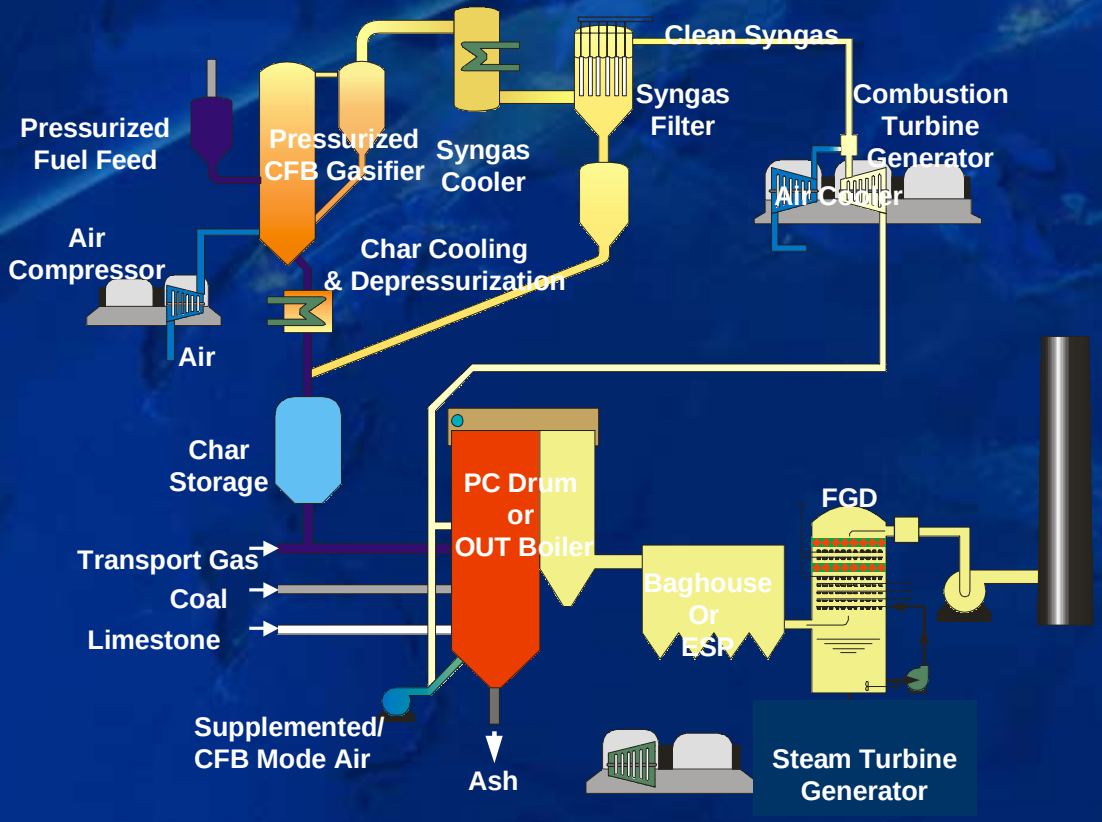
*10 Points in Plant Efficiency Translates to 24% Less Emissions per MWe Produced*




***Burn Less Fuel - Generate Less Pollutants***

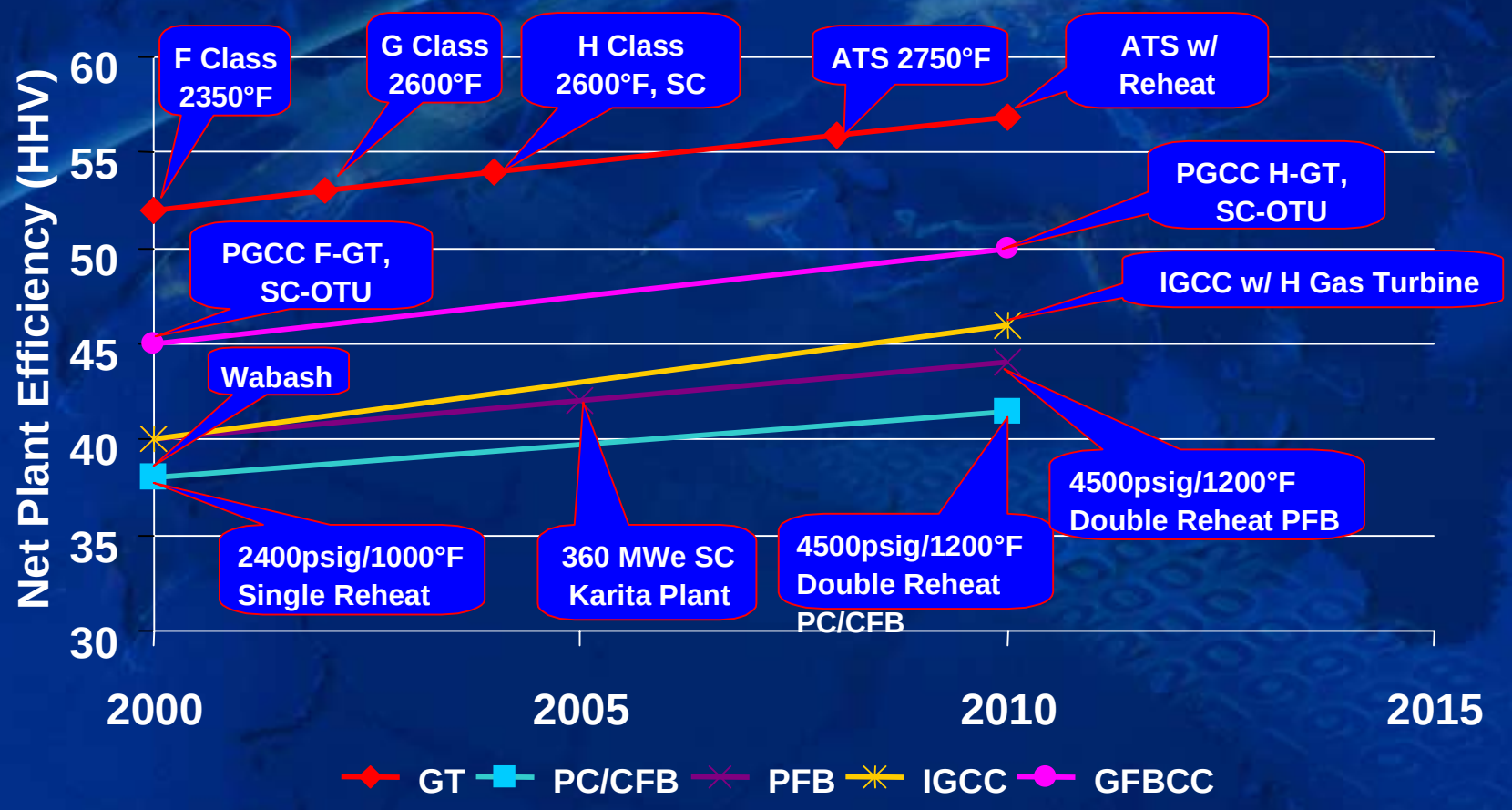
# FW's Partial Gasification Combined Cycle Technology




- Solid Fuel is Gasified by CFB Gasifier
- Syngas is Cleaned with Efficient Hot Gas Filtration
- Advanced Gas Turbine Burns Syngas to Generate Power
- Energy of Hot GT Exhaust is Recovered in CFB or PC Steam Plant
- Residual Carbon Rich Char from Gasification Process Burned in Steam Plant while Capturing Harmful Pollutants

***1000–1200 $/KWe EPC Plant Cost***
***43-45% HHV Net Plant Efficiency***

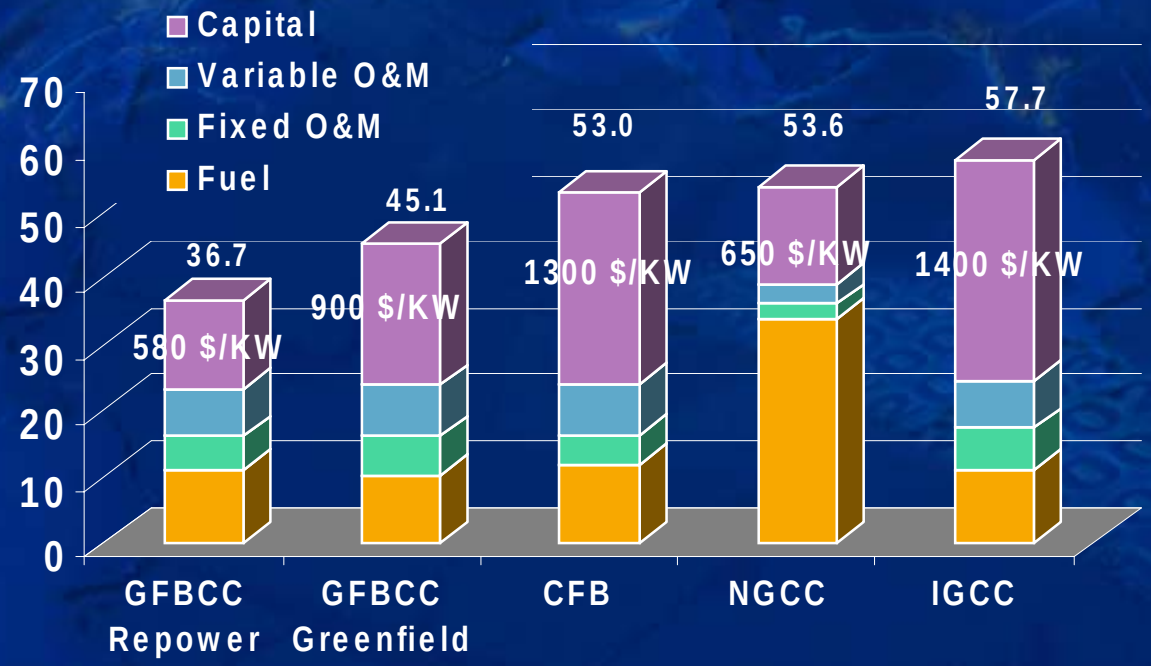
# Combined Cycle : A Quantum Jump in Efficiency




***Gasification Brings Combined Cycle Efficiency to Solid Fuel Plants***

# The Demonstration Project Competitiveness

Figure 7. "All In" Electricity Generation Cost Comparison
20 Year Levelized $/MWh




*1.25 $/Mbtu Coal, 5.00 $/Mbtu Gas, 85% Capacity Factor*

# Possible Project Execution Schedule for Demonstration Project