

Southeast CHP Roadmap Workshop

CHP Market Review

September 20, 2005

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Energy and Environmental Analysis

- Professional services company focusing on energy markets and technologies
- Energy supply and demand modeling and forecasting
- Technology and market analysis
- Environmental policy analysis
- Distributed generation and CHP

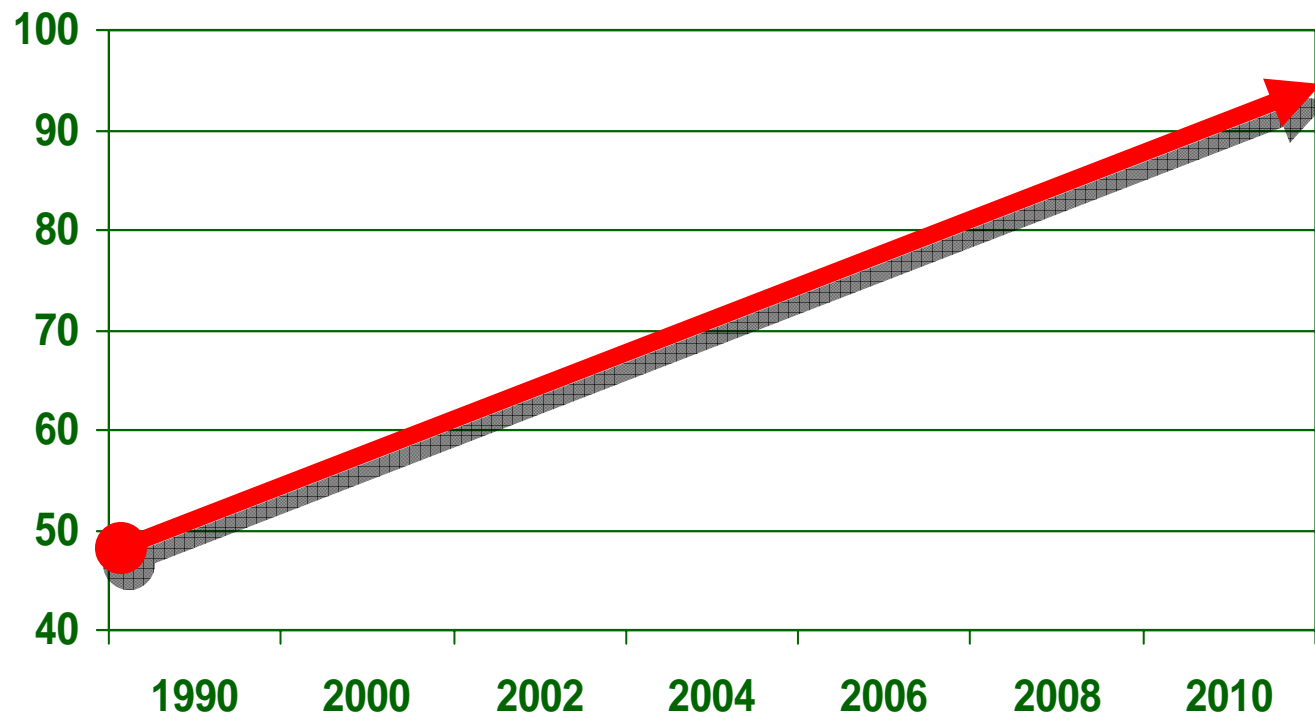


Agenda

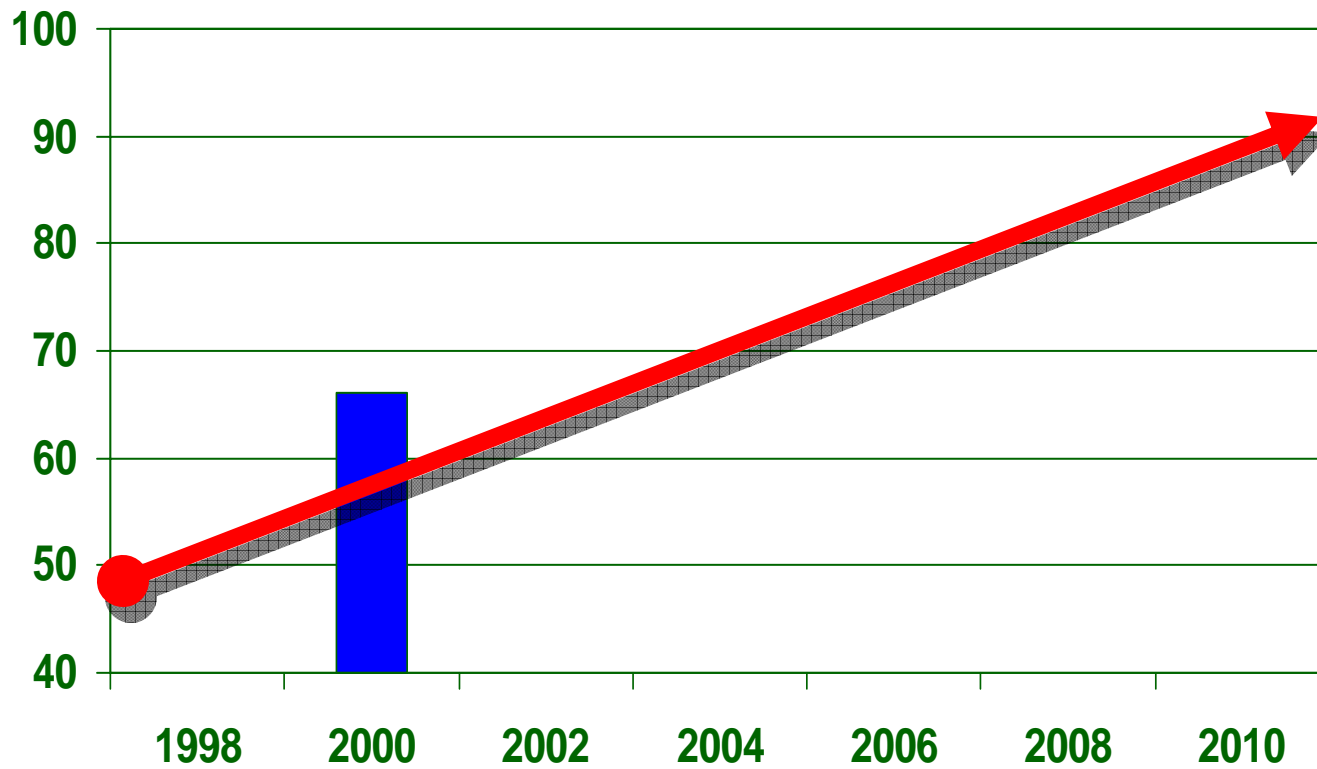
- Review Existing CHP
- Compare the region to the national picture
- First-cut look at the potential for additional CHP in the Region
- Review Regional Market Factors



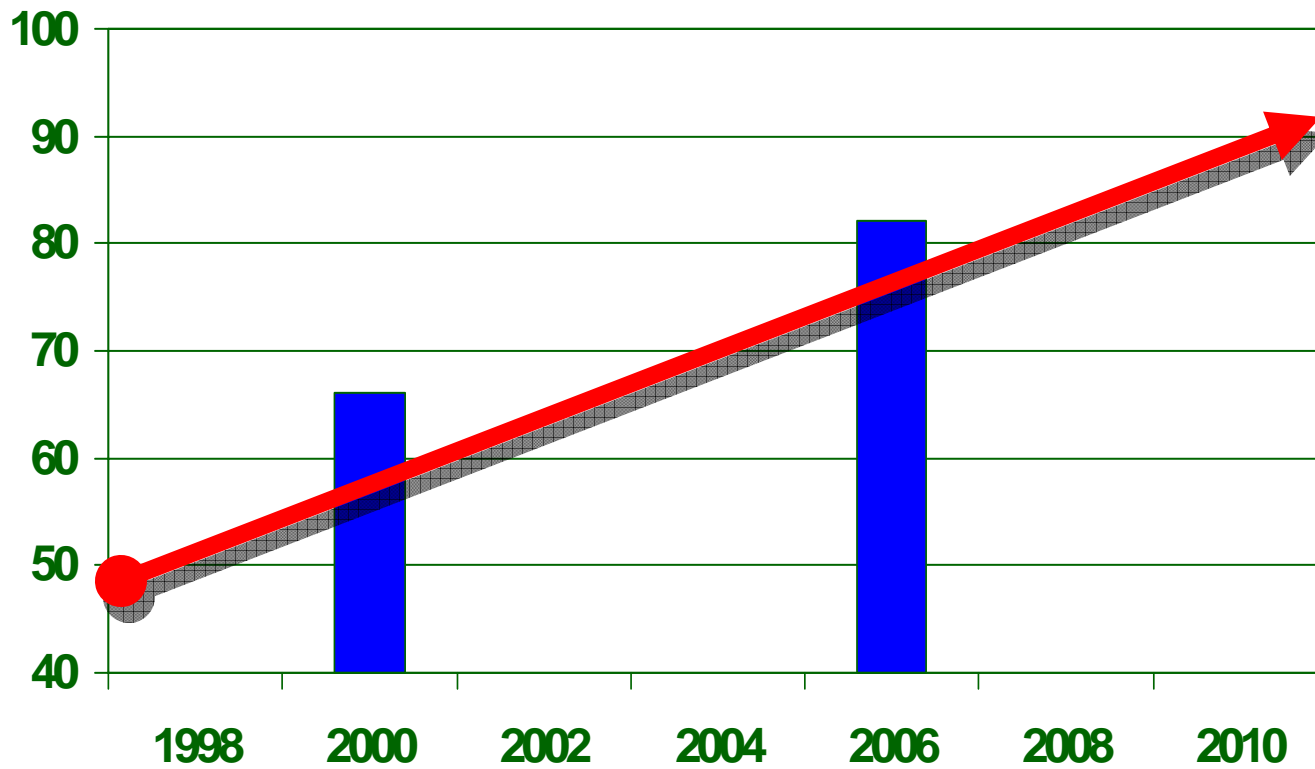
The National Goal – 92 GigaWatts by 2010



Progress – 66 GW in 2000...



Progress – 82.4 GW in 2005



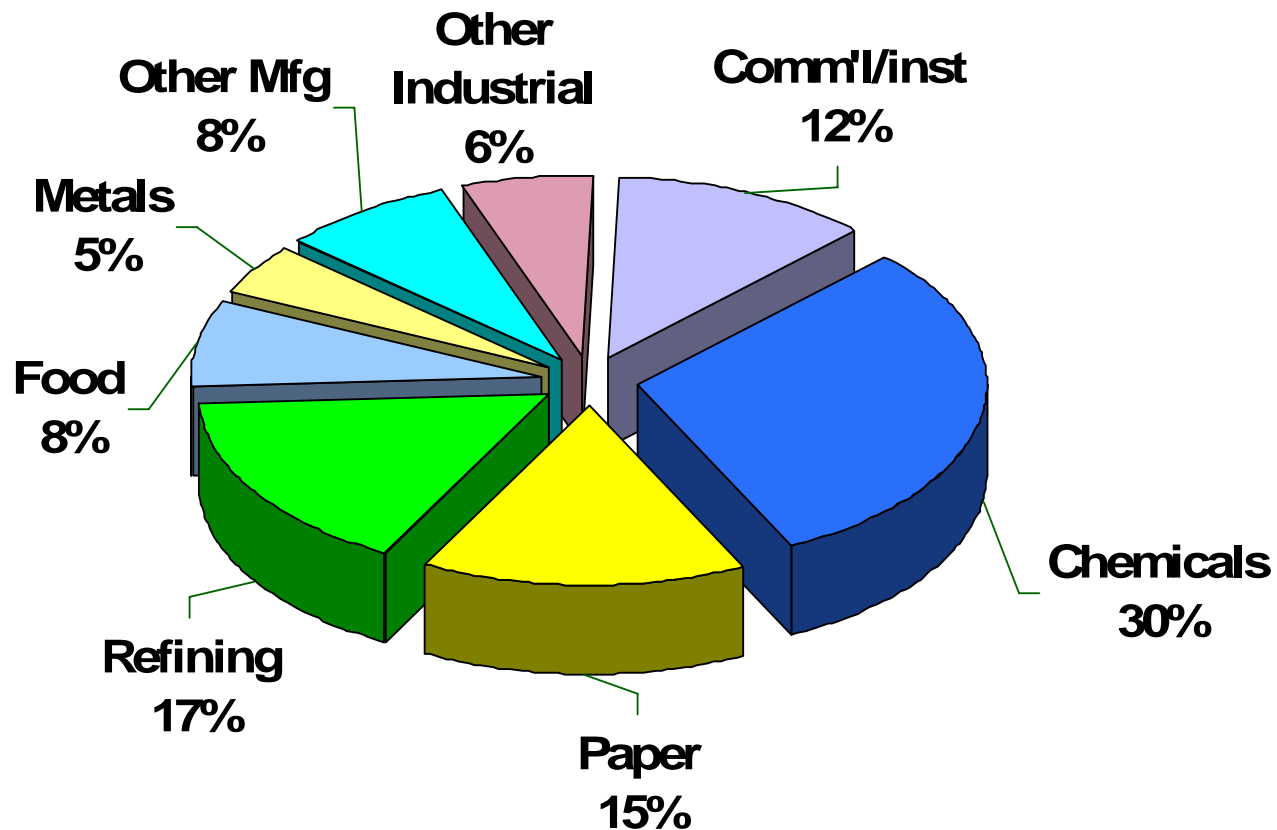
Installed CHP in 2004

- 82,411 MW at 2960 sites
- Average capacity is 27.8 MW
- Median capacity is 2.2 MW



Industrials Represent Close to 90% of Existing CHP

- *Existing CHP Capacity (2005): 82,411 MW*

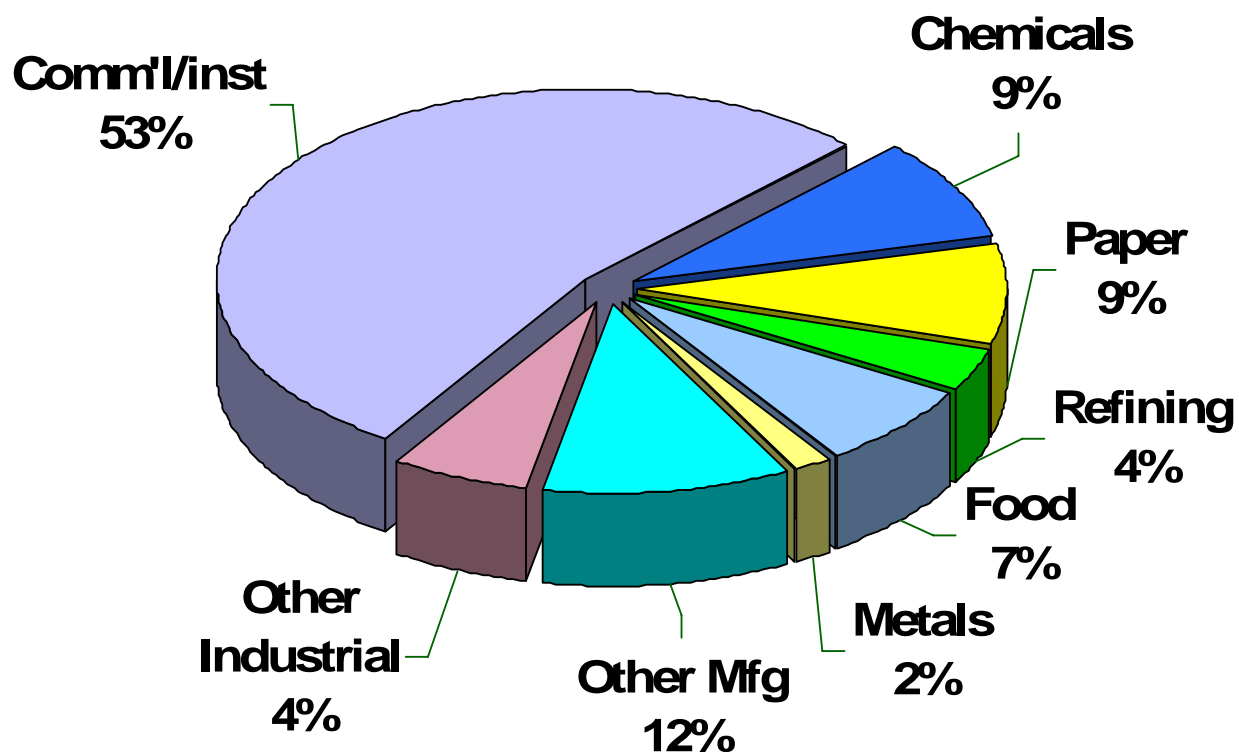


Source: EEA



But Over 50% of the Installations are Commercial/Institutional

- *Existing CHP Capacity (2005): 2,960 sites*

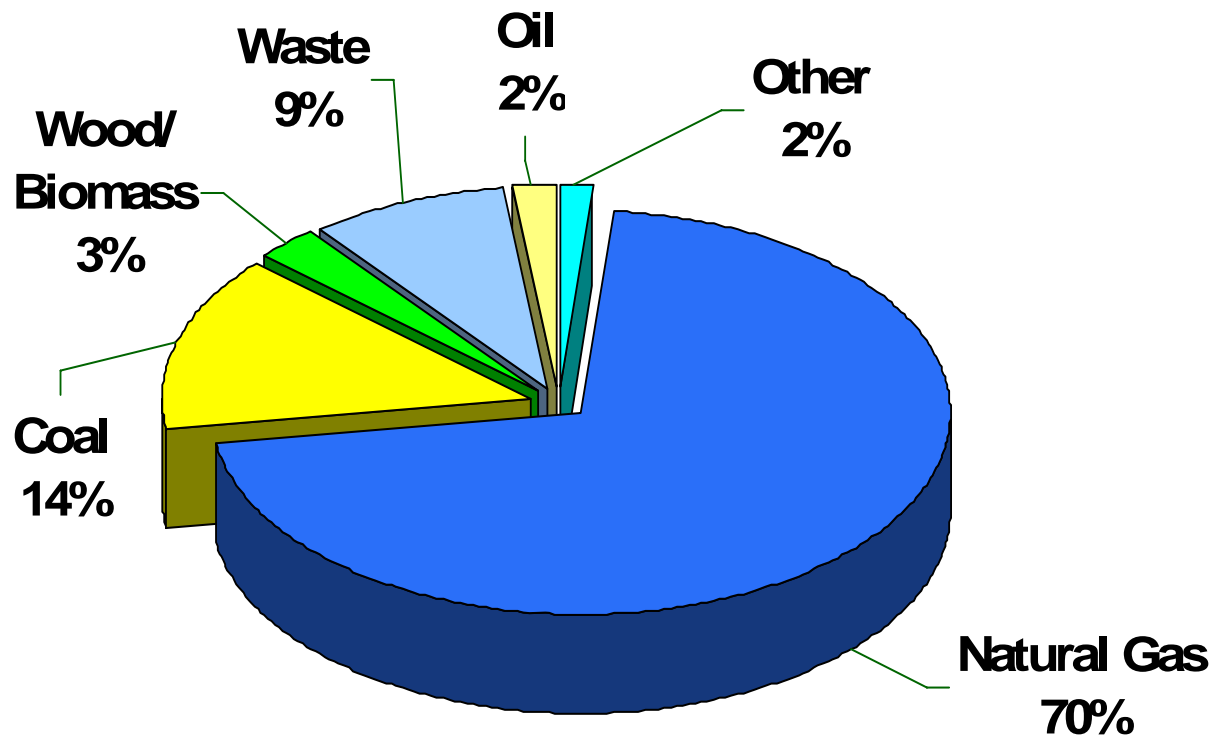


Source: EEA



Natural Gas Is the Preferred Fuel

- *Existing CHP Capacity (2005): 82,411 MW*

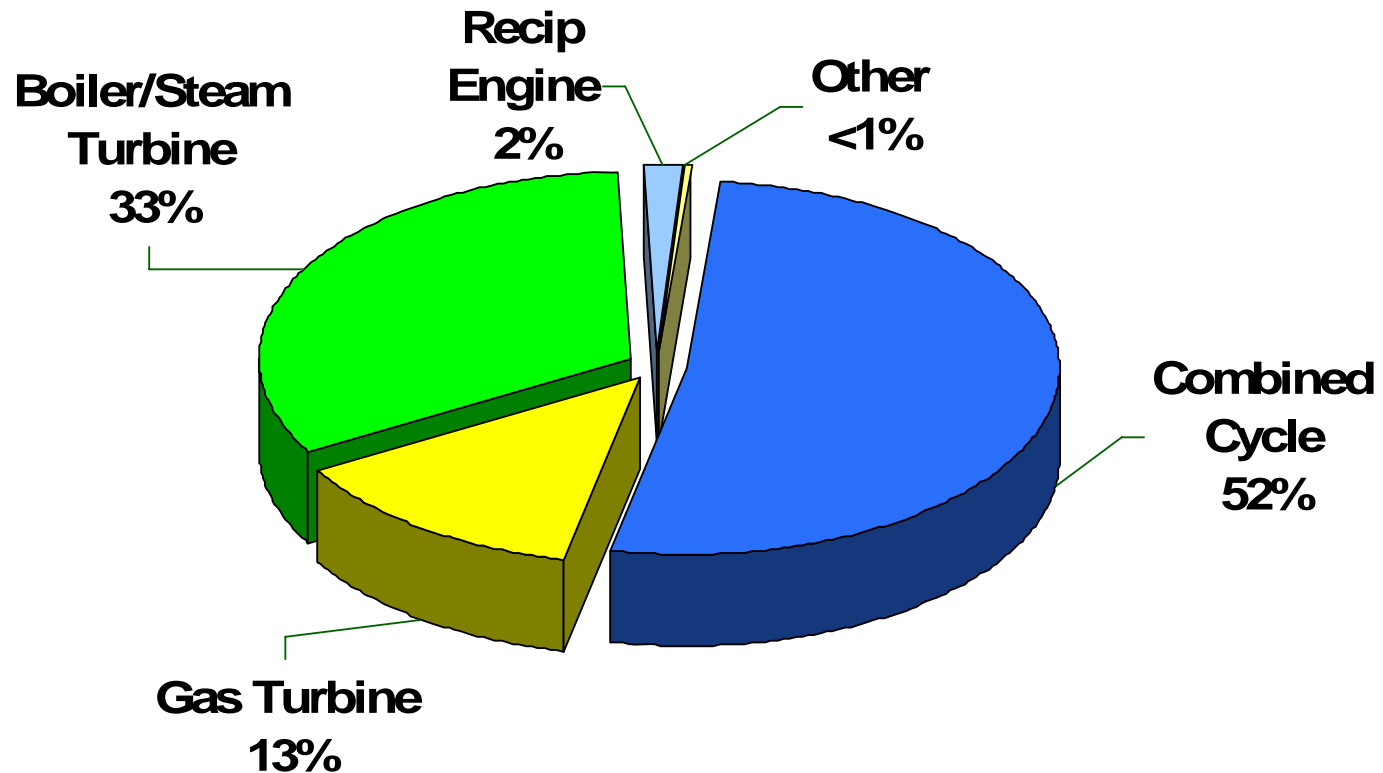


Source: EEA



Gas Turbines Represent Almost Two Thirds of the Capacity

- *Existing CHP Capacity (2005): 82,411 MW*

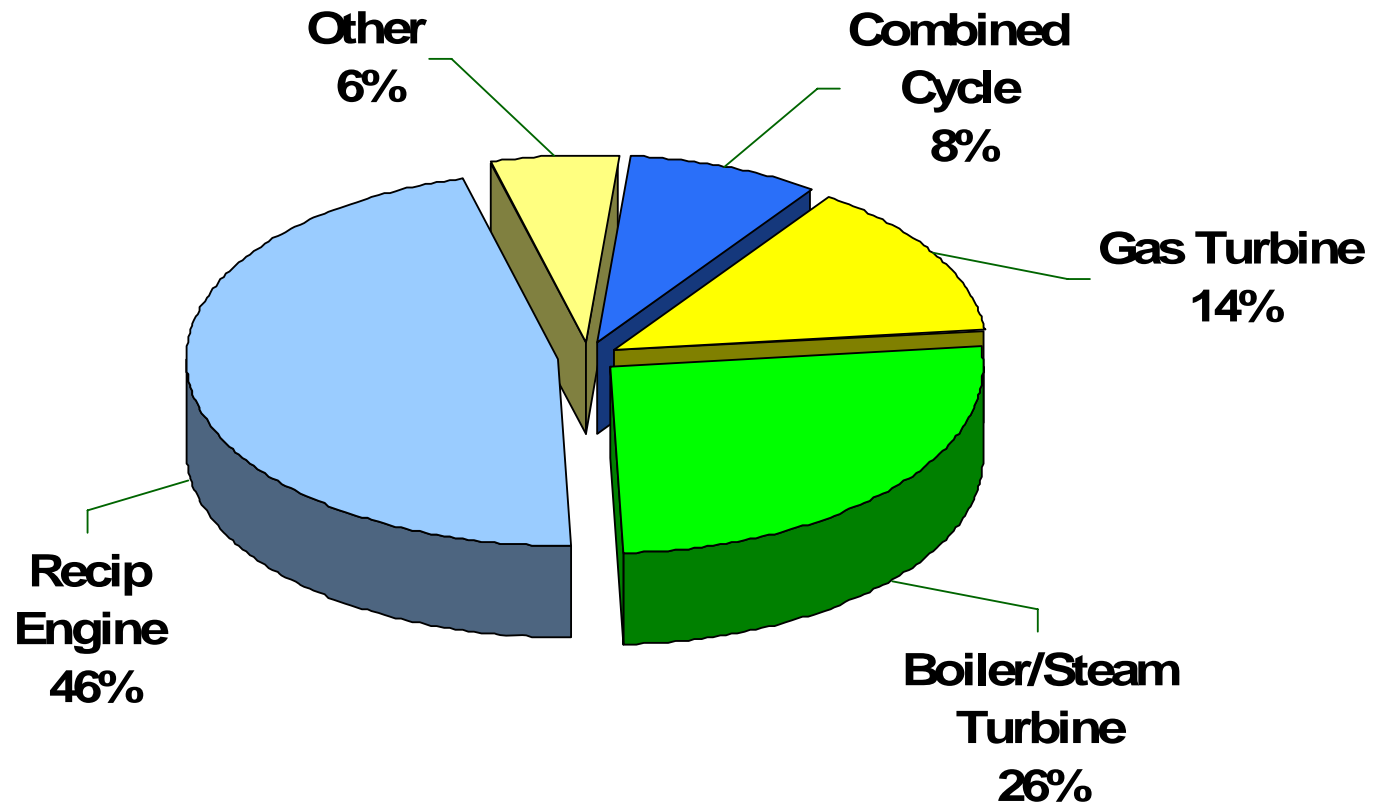


Source: EEA



Recip Engines Represent 46% of the Sites Nationwide

- *Existing CHP Capacity (2005): 2,911 sites*

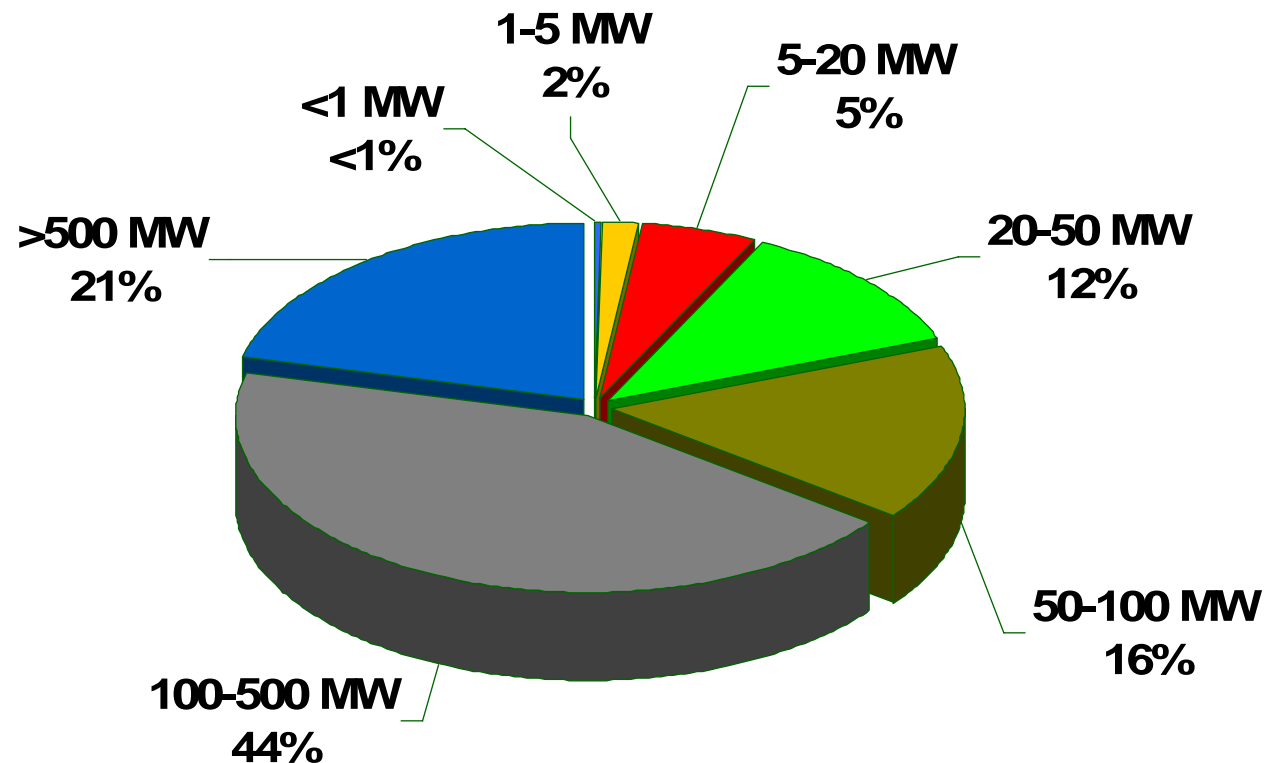


Source: EEA



Large Systems (>100 MW) Represent almost Two Thirds of the Nation's CHP Capacity

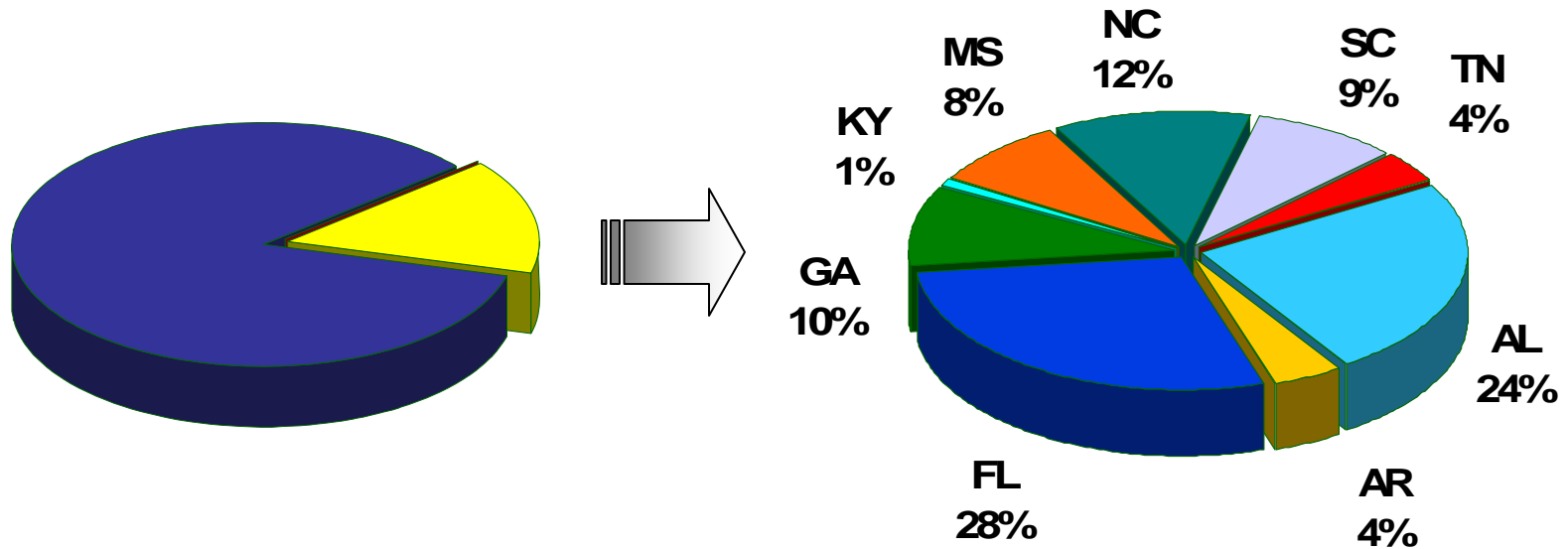
- *Existing CHP Capacity (2005): 82,411 MW*



Source: EEA



The Southeast Represents 15% of Existing CHP Capacity



U.S. = 82,411 MW
2,911 sites

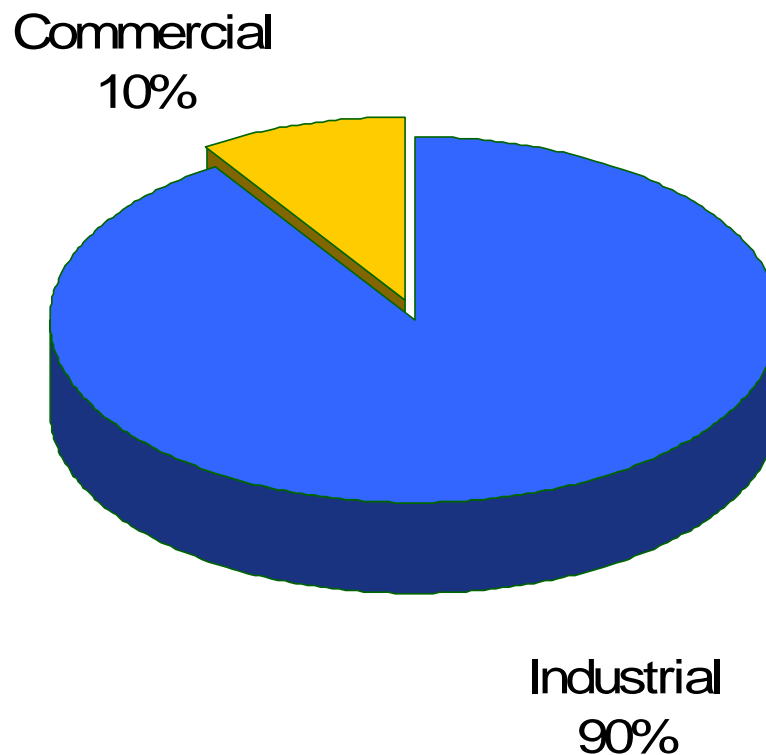
Southeast = 12,532 MW
265 sites

Source: EEA



Commercial/Institutional Represents 10% of Existing CHP in the Region

- *Existing CHP Capacity (2005): 12,532 MW*

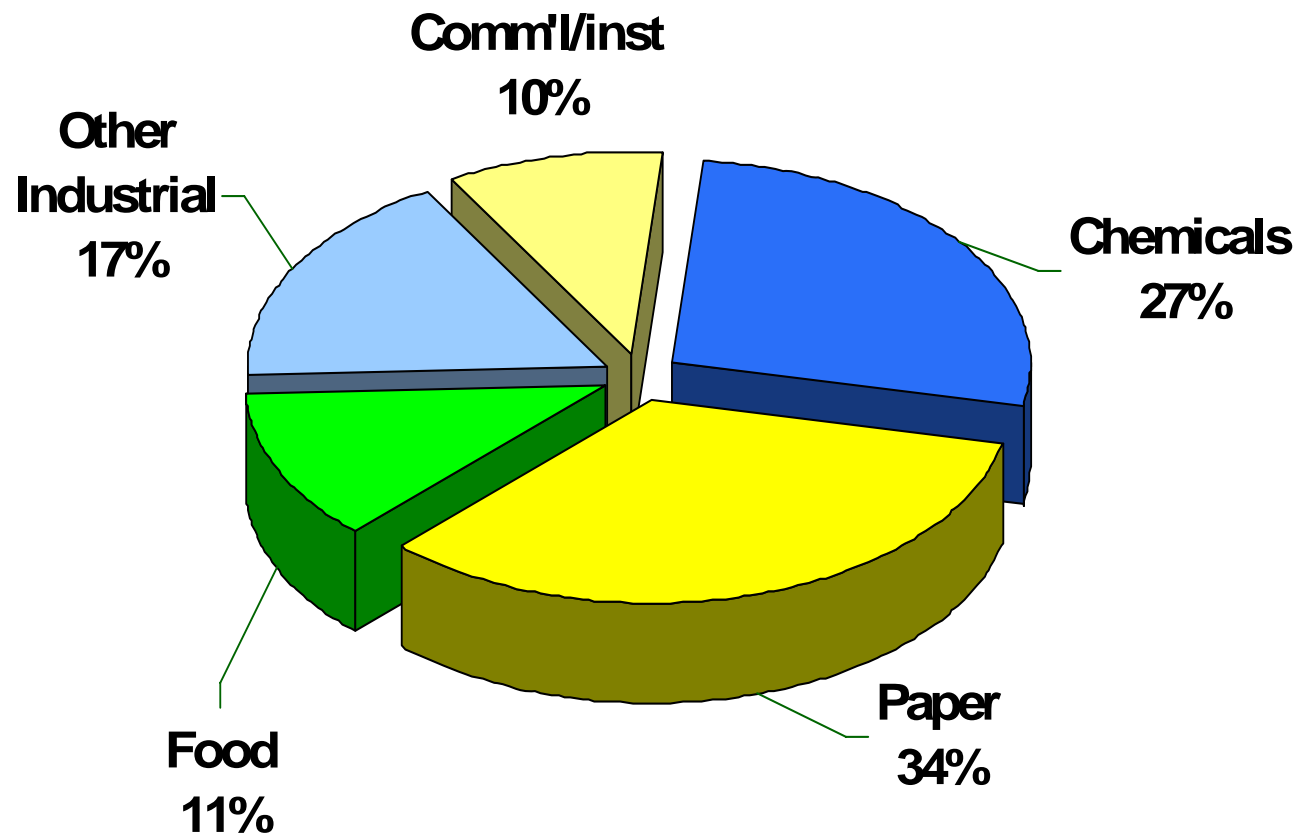


Source: EEA



Paper, Chemicals and Food Industries Represent 72% of Existing CHP in the Region

- *Existing CHP Capacity (2005): 12,532 MW*

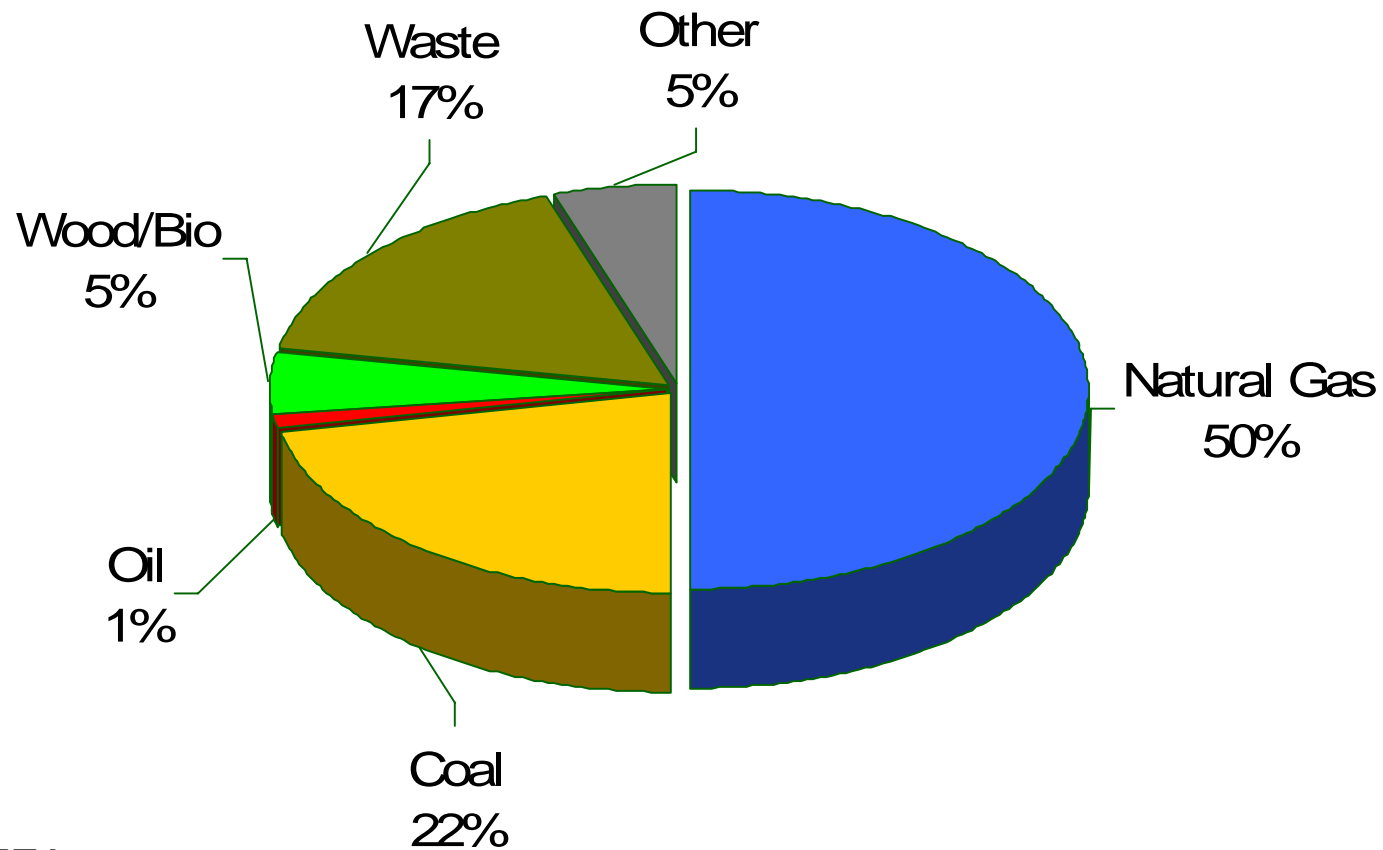


Source: EEA



The Southeast Has a Diverse Fuel Mix

- *Existing CHP Capacity (2005): 12,532 MW*

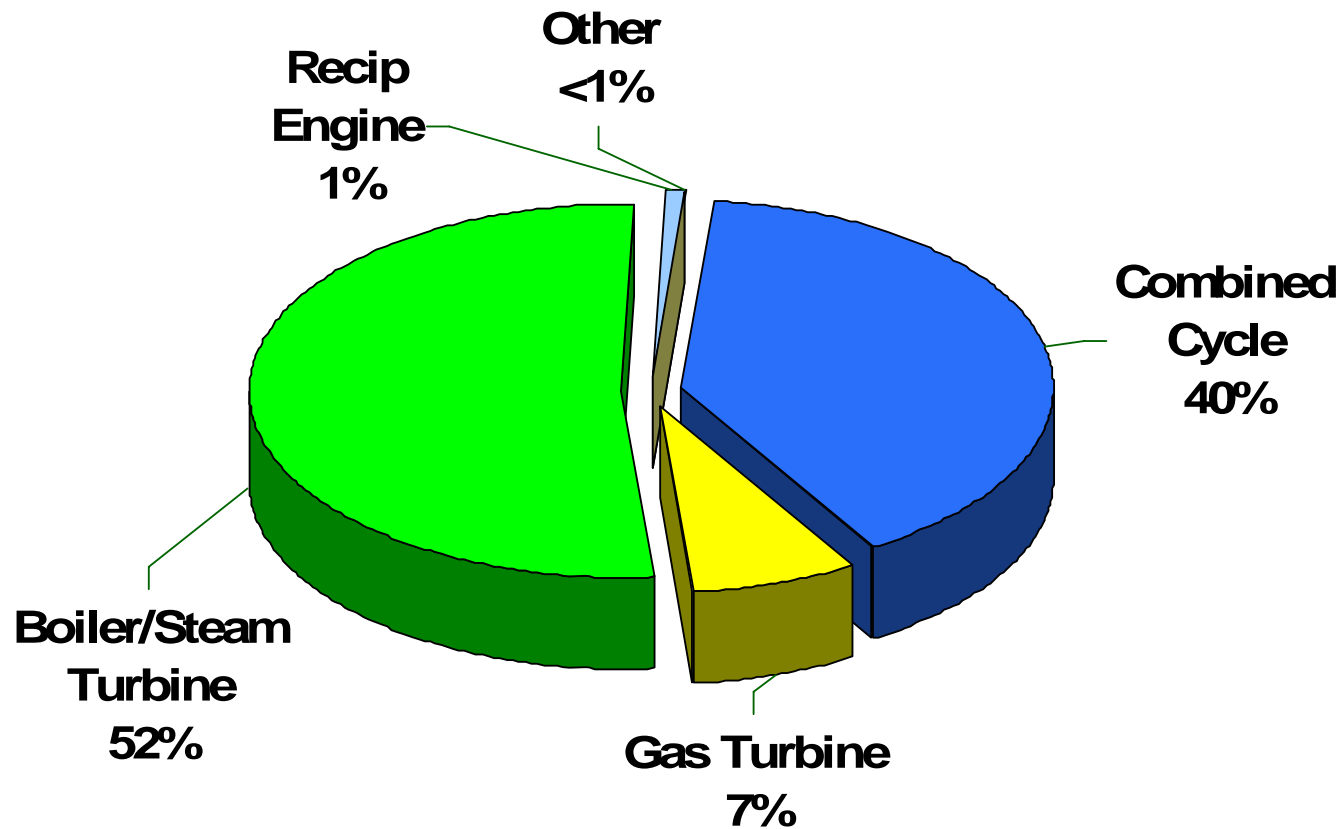


Source: EEA



Boiler/Steam Turbines Represent Over 50% of CHP Capacity in the Region

- *Existing CHP Capacity (2005): 12,532 MW*

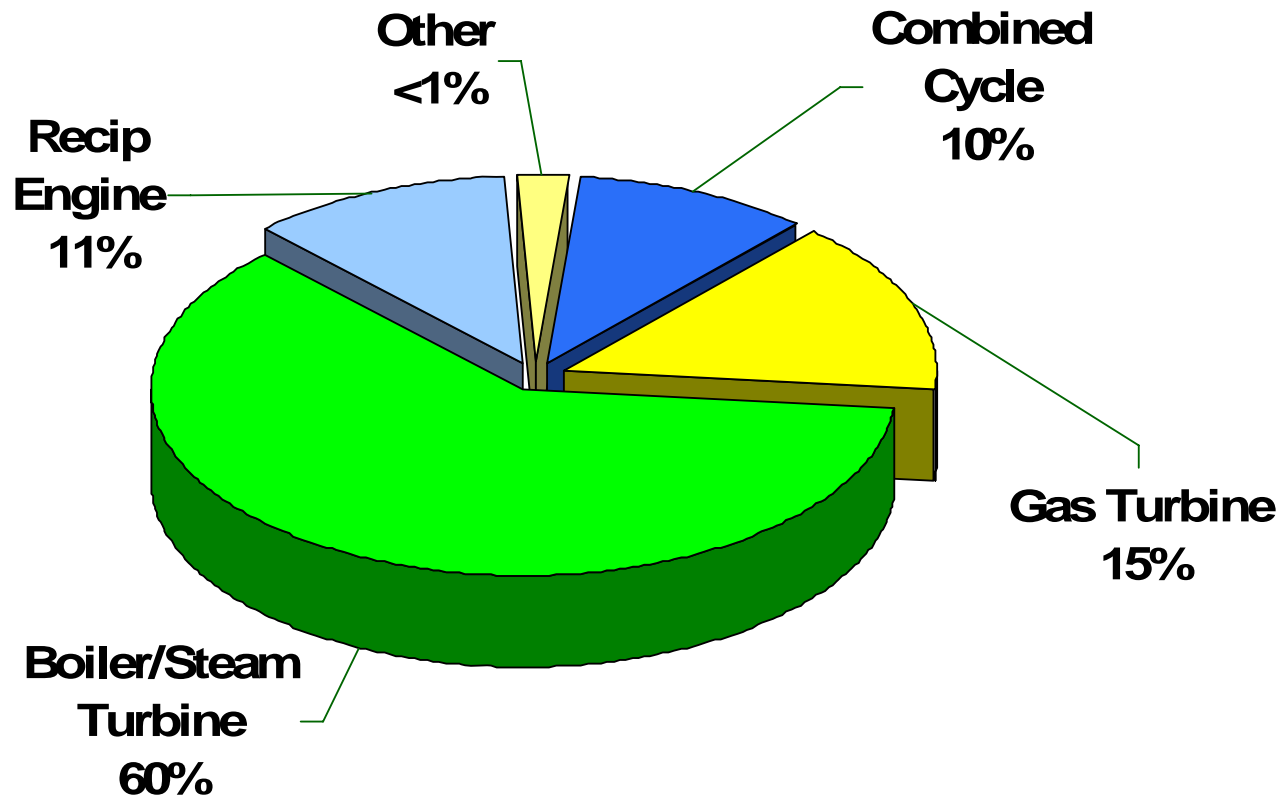


Source: EEA



Boiler/Steam Turbines Represent 60% of CHP Systems in the Region

- *Existing CHP Sites (2005): 265*



Source: EEA



The CHP Profile in the Southeast is Unique

- The existing CHP systems are larger than the national average (47 MW vs 28 MW)
- Much of the existing capacity is solid fuel based (coal, waste, biomass/wood)
- The region has relied heavily on boiler/steam turbine systems
- However, over 2,200 MW of new capacity installed between 2000 and 2005 has been at five combined cycle merchant plants in Alabama (3), Florida and Mississippi.



What's the Potential for Additional CHP in the Southeast? - A First-Cut Estimate

- Technical potential only – no economic screening
- Existing commercial and industrial sites with thermal and electric loads conducive to CHP
- Within-the-fence systems – sized to meet thermal loads with no power exports
- Does not consider economic growth for target markets or potential for retrofit/upgrade of existing CHP

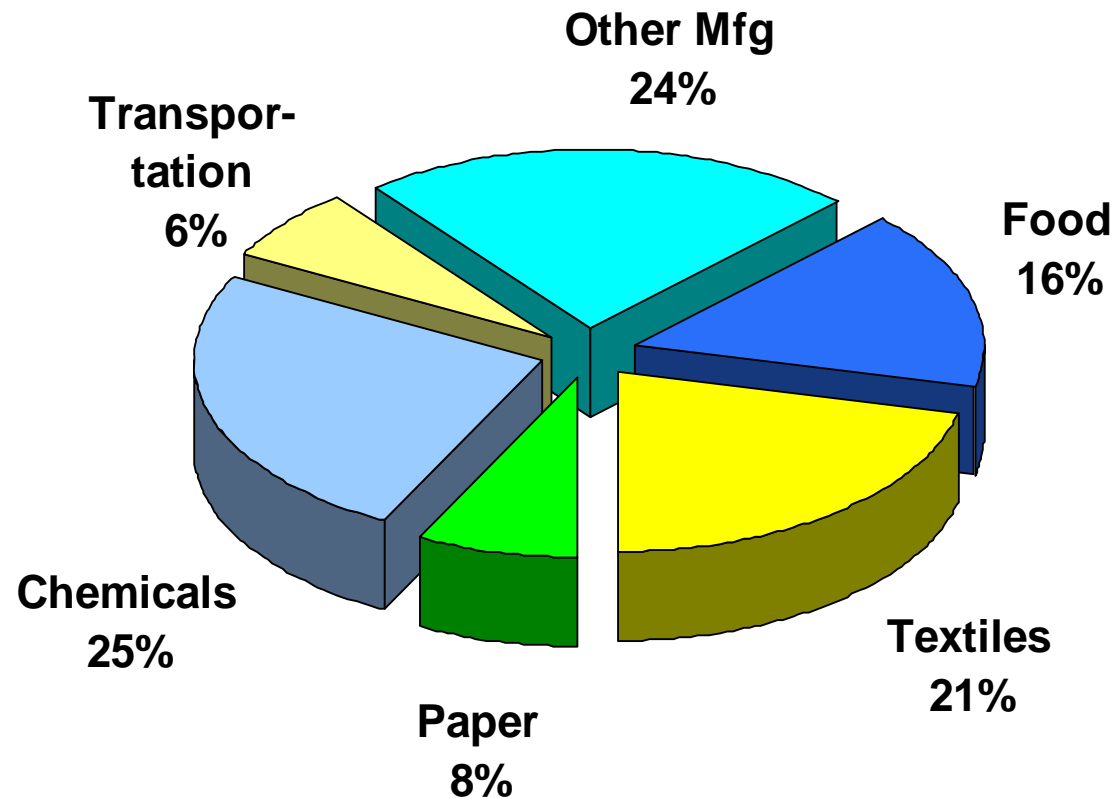


The Potential for Additional CHP in the Southeast (first cut estimate)

	Commercial (MW)	Industrial (MW)	Total (MW)
Arkansas	410	1,127	1,537
Alabama	572	2,996	3,568
Florida	3,140	1,019	4,159
Georgia	1,481	3,830	5,311
Kentucky	529	3,390	3,919
Mississippi	353	1,017	1,370
North Carolina	1,601	2,830	4,431
South Carolina	732	3,254	3,986
Tennessee	618	3,104	3,722
	9,436	22,564	32,000



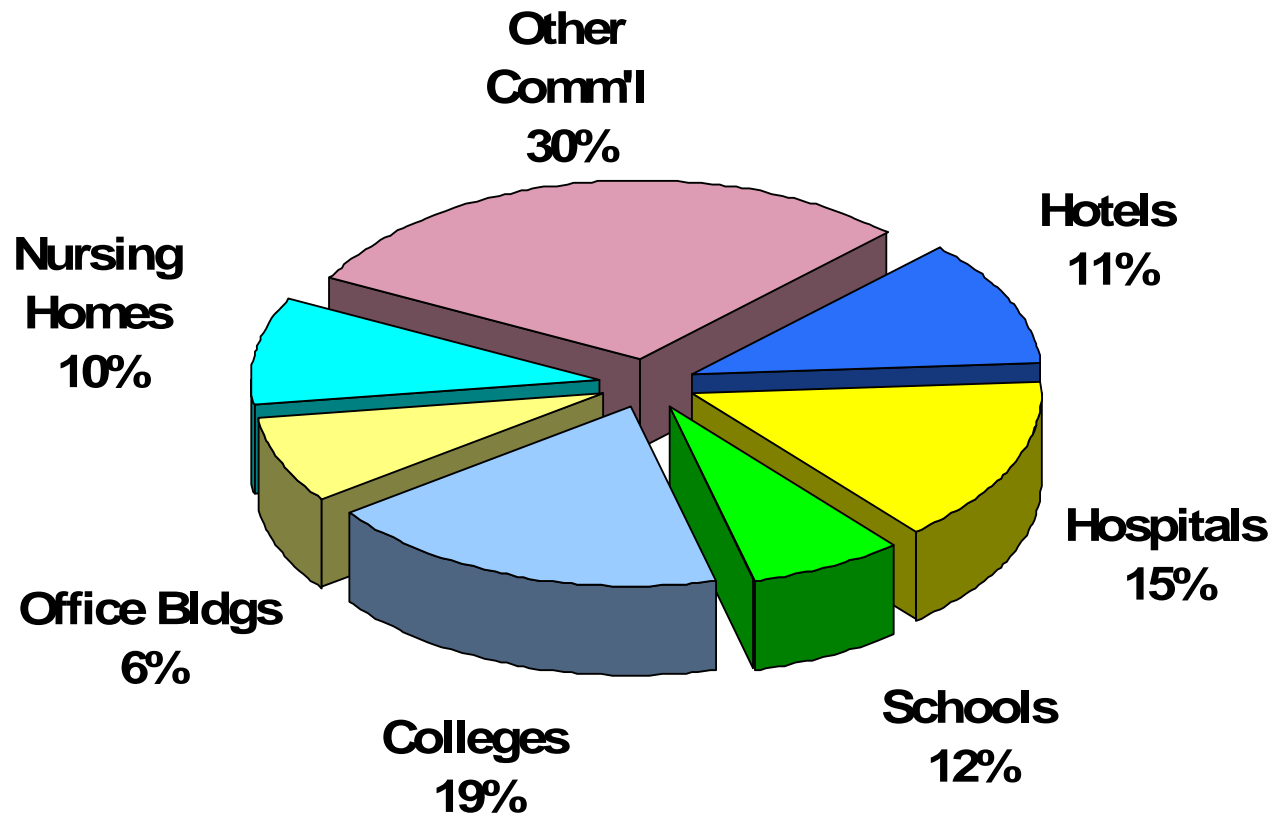
The Potential for CHP at Industrial Facilities is over 22,000 MW



Source: EEA



The Potential for CHP at Commercial and Institutional Facilities is over 9,000 MW



Source: EEA



Almost 50% of the Potential Is Below 5 MW in Size

	CHP Potential, MW			
	< 1MW	1-5 MW	5-20 MW	>20 MW
Commercial	4,842	2,557	1,658	375
Industrial	1,984	5,469	8,155	6,960
	6,826	8,026	9,813	7,335



Will This Potential Be Developed?

- The additional potential is much different than the existing capacity – smaller, within-the-fence, new applications
- Success depends on further technology development (integration of absorption cooling, etc)
- Success depends on actions at the state and regional level



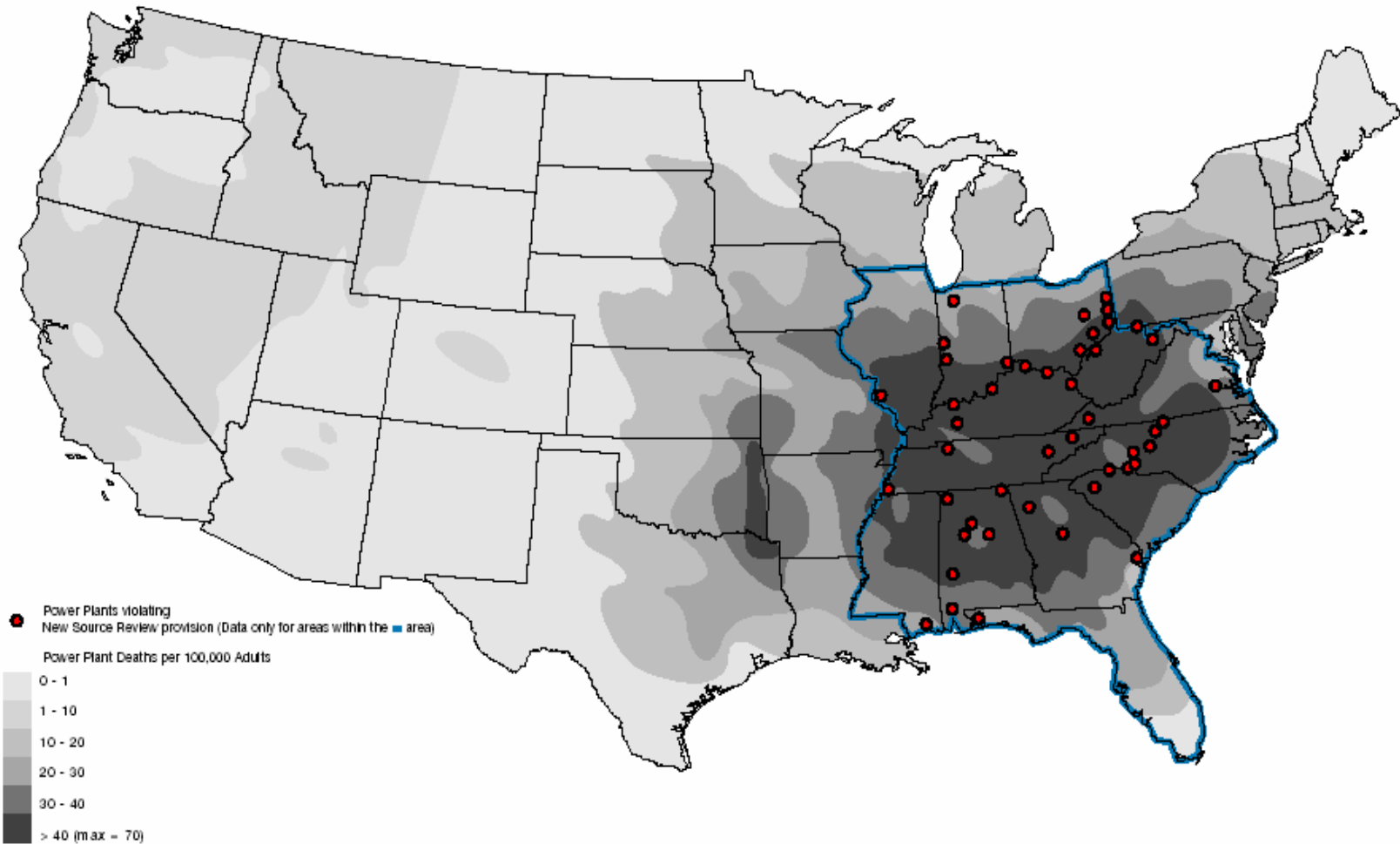
The Regional Environment for CHP: The Bad News

- Regional electric prices relatively low compared to national picture (coal-based)
- No political pressure for competitive electricity markets
- Natural gas prices are high



Southeast Has Relatively Cheap Power

Health risk from coal fired power plant caused particulates



The Regional Environment for CHP: The Good News

- Coal prices are increasing
- The region will rely more heavily on gas-fired generation in the future
- More user interest in waste/biomass fuels
- Increasing awareness of power reliability and security issues
- New products incorporating thermally activated cooling and dehumidification



Average Electric Prices and Reliance on Gas-Fired Generation

	Commercial (cents/kWh)	Industrial (cents/kWh)	Nat Gas/Dual Fuel Gen Capacity (%)
Arkansas	7.19	4.13	35.7
Alabama	5.65	3.93	25.4
Florida	7.63	5.78	52.5
Georgia	6.94	4.21	32.8
Kentucky	5.39	3.07	20.8
Mississippi	7.82	4.65	69.2
North Carolina	6.62	4.68	22.2
South Carolina	7.13	4.44	16.4
Tennessee	6.82	3.93	20.0

Source: EIA - State averages from May 2003 to May 2004



Opportunities

- Exploit wood/biomass resource in the region
- Work with municipal utilities that are more open to CHP
- Look for applications of integrated CHP/thermally activated cooling and dehumidification
- Promote enhanced power reliability benefits
- Target specific “high price” states/areas (gas on the margin)
- Promote demonstrations/implementation at federal and state government facilities



Questions?

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