

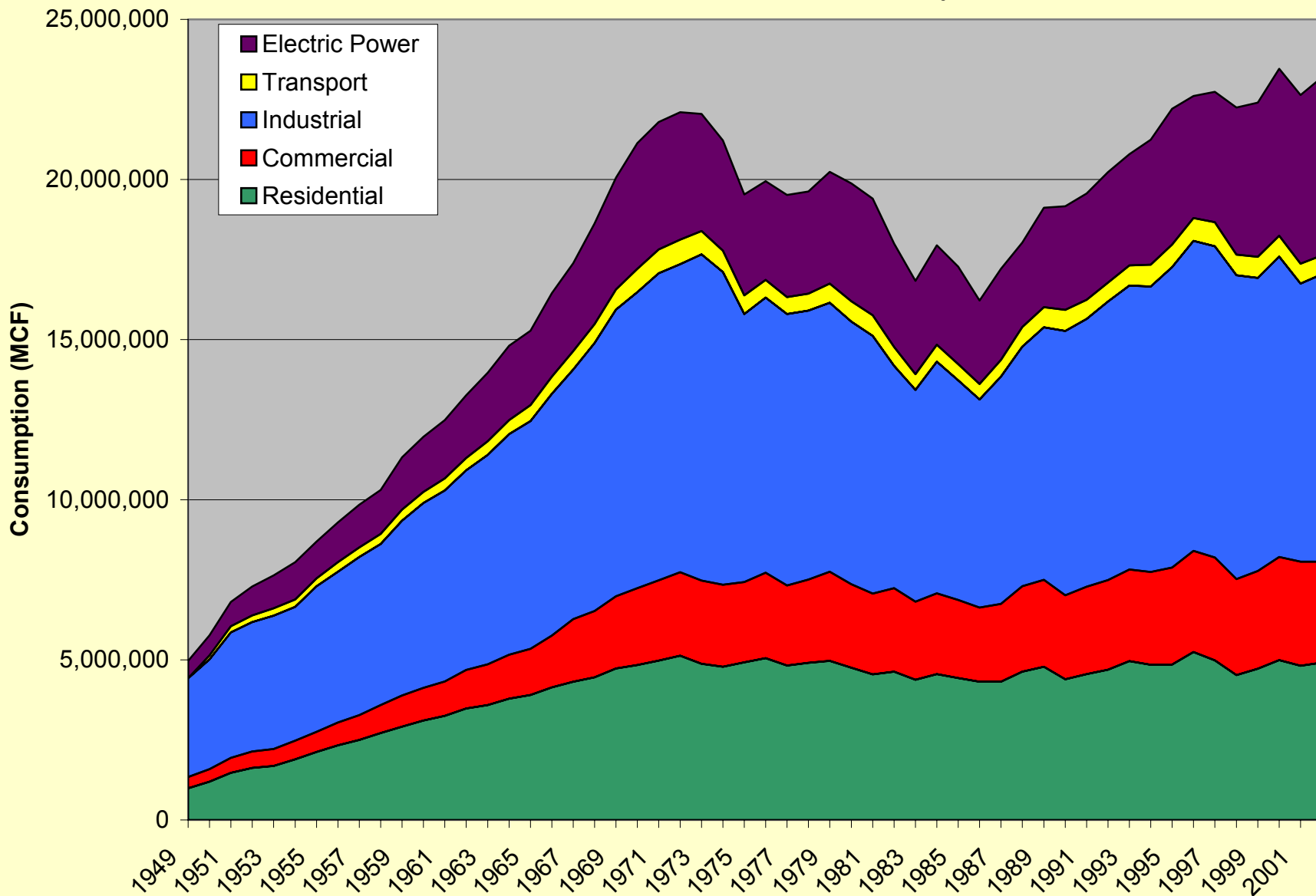
The Role of Energy Efficiency in Addressing Natural Gas Supply

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Key Gas Demand Issues

- Growth led by industry and electricity generation
- Industrial use has been declining recently
- Electricity generation key growth sector in recent years
- Almost 20% of electricity is produced from Gas
 - Fastest growing source of generation
- Increasingly used for peak and intermediate loads

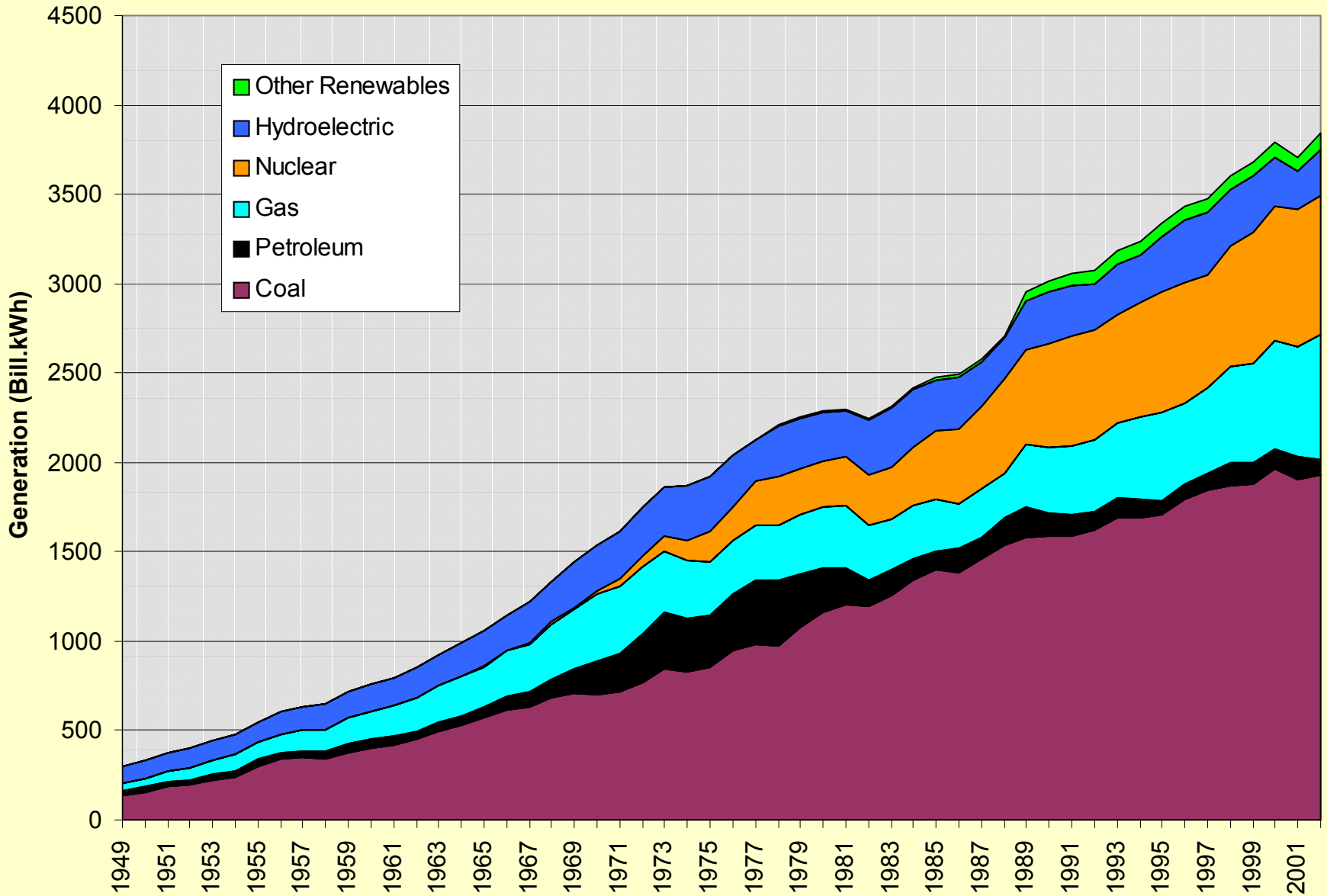
Natural Gas Consumption



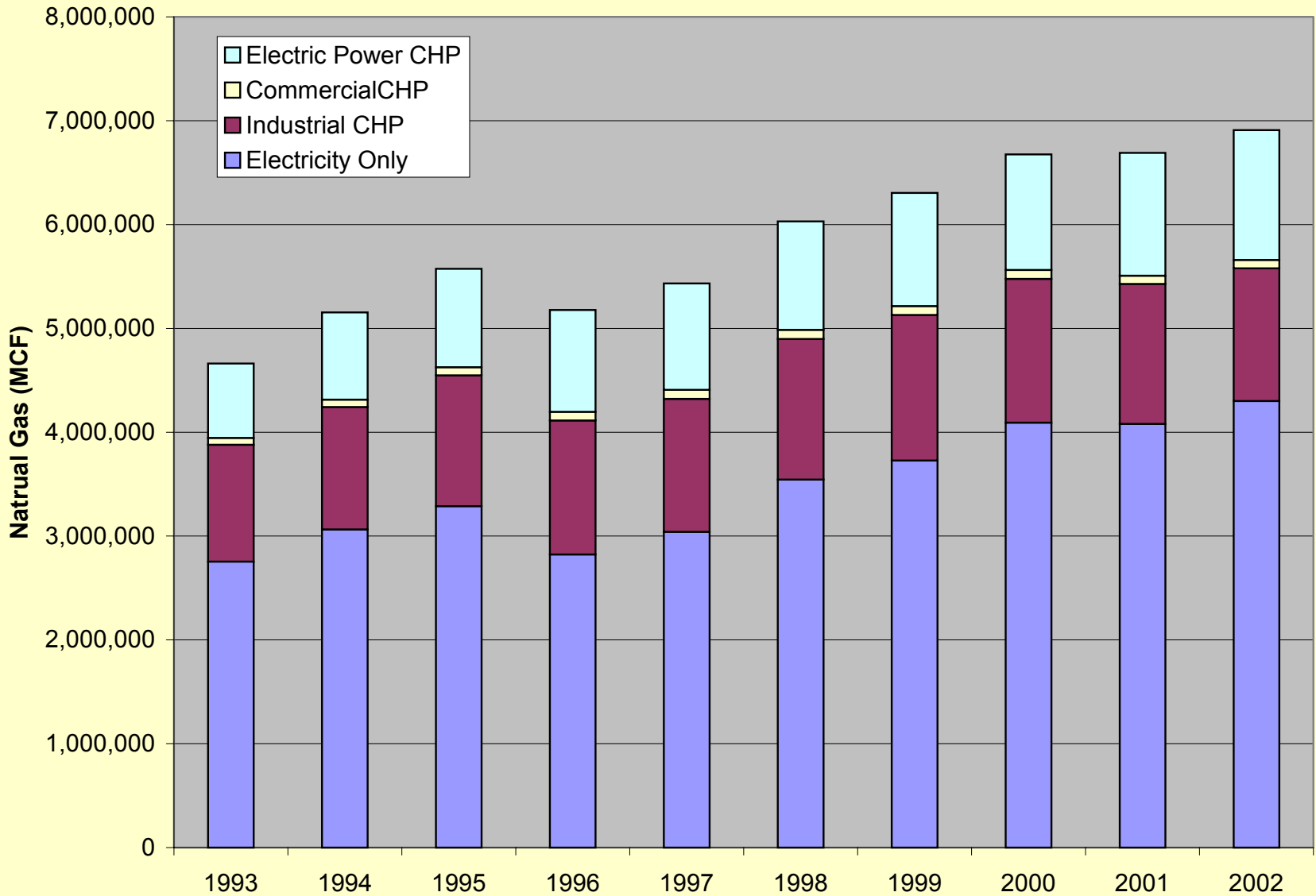
Gas Important to Electric Sector

- Peak generation efficiency between 12 and 20%
- Combined Cycle (CCGT) over 46% efficient
- Gas combined heat and power (CHP) systems can be over 75% efficient
- CHP 1/3 of gas electricity — share of gas generation static
- Much of recent growth in peaking units — several hundred hours of operation

Electricity Generation



Natural Gas Electricity Generation

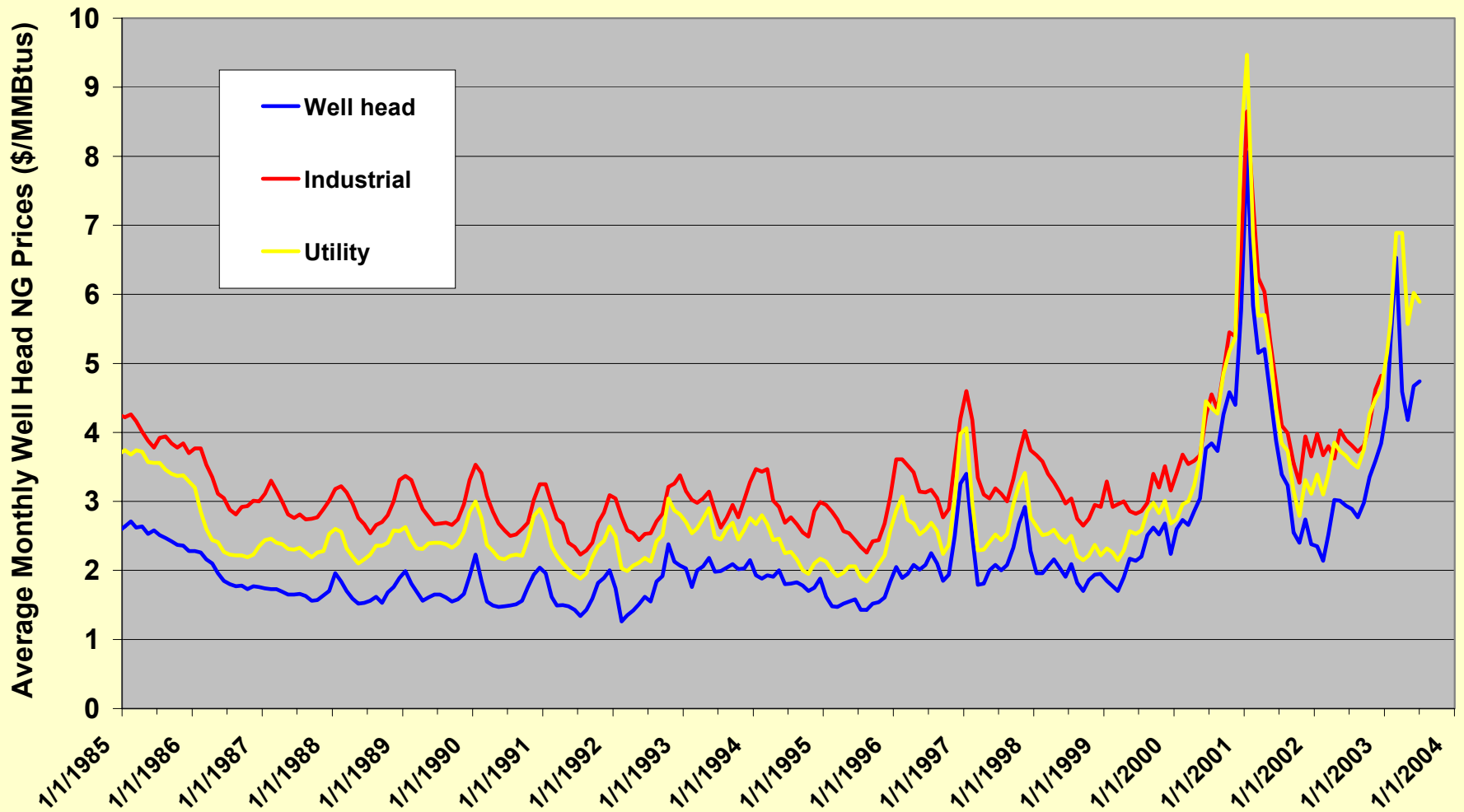


Source: EIA 2003

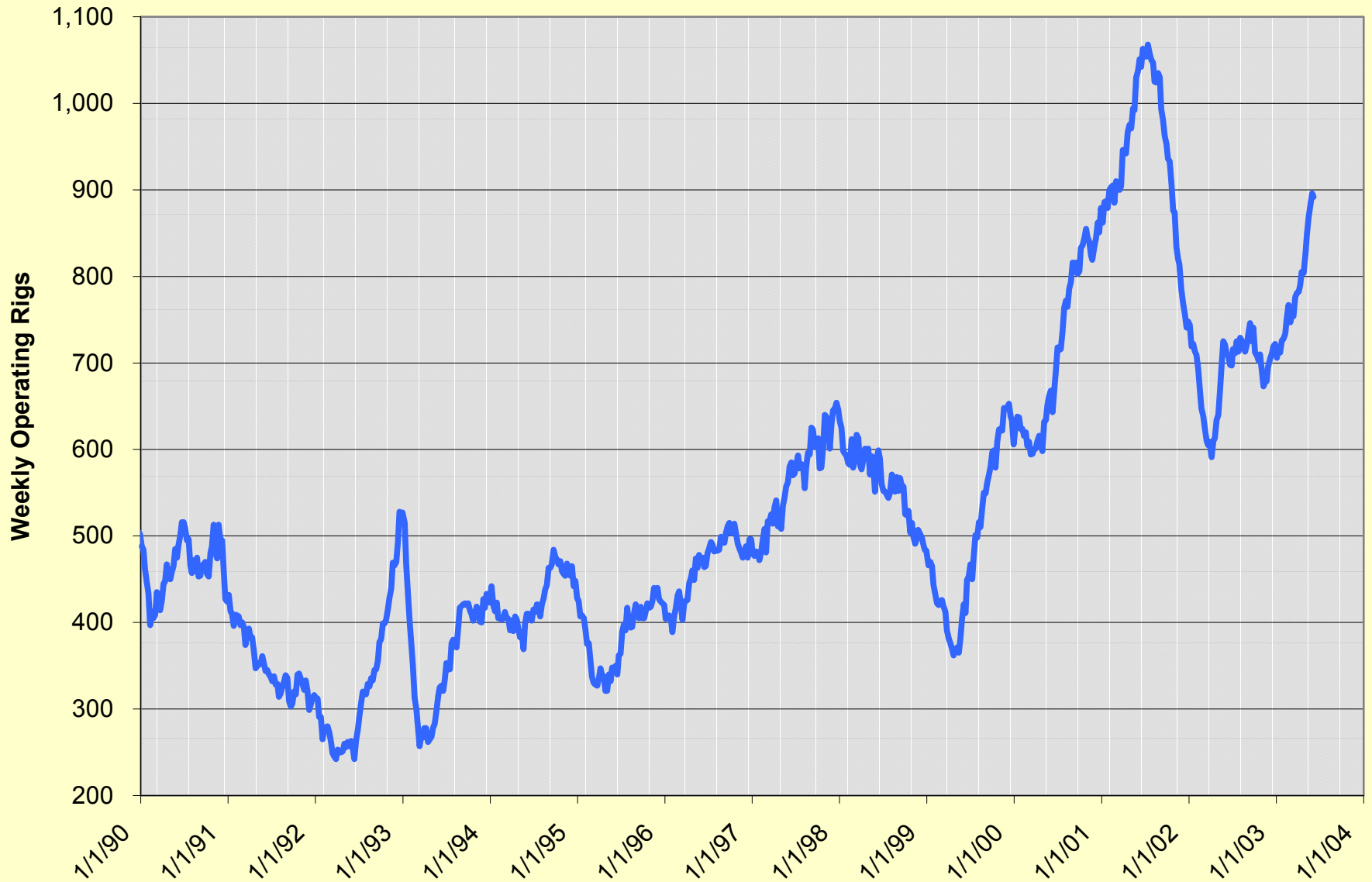
Gas Price Trends

- Historically price fluctuates with season
- Recent trends driven by local supply constraints
- Cause complex:
 - Demand growth
 - Transmission constraints
 - Limited exploration
- Exploration low during 1990's
- Spike in 2001 due to price spike
- Exploration fell as price fell
- Exploration at historically high levels

National Average Natural Gas Prices



Rigs Looking for Natural Gas



Source: Baker Hughes 2003

Natural Gas Policy Options

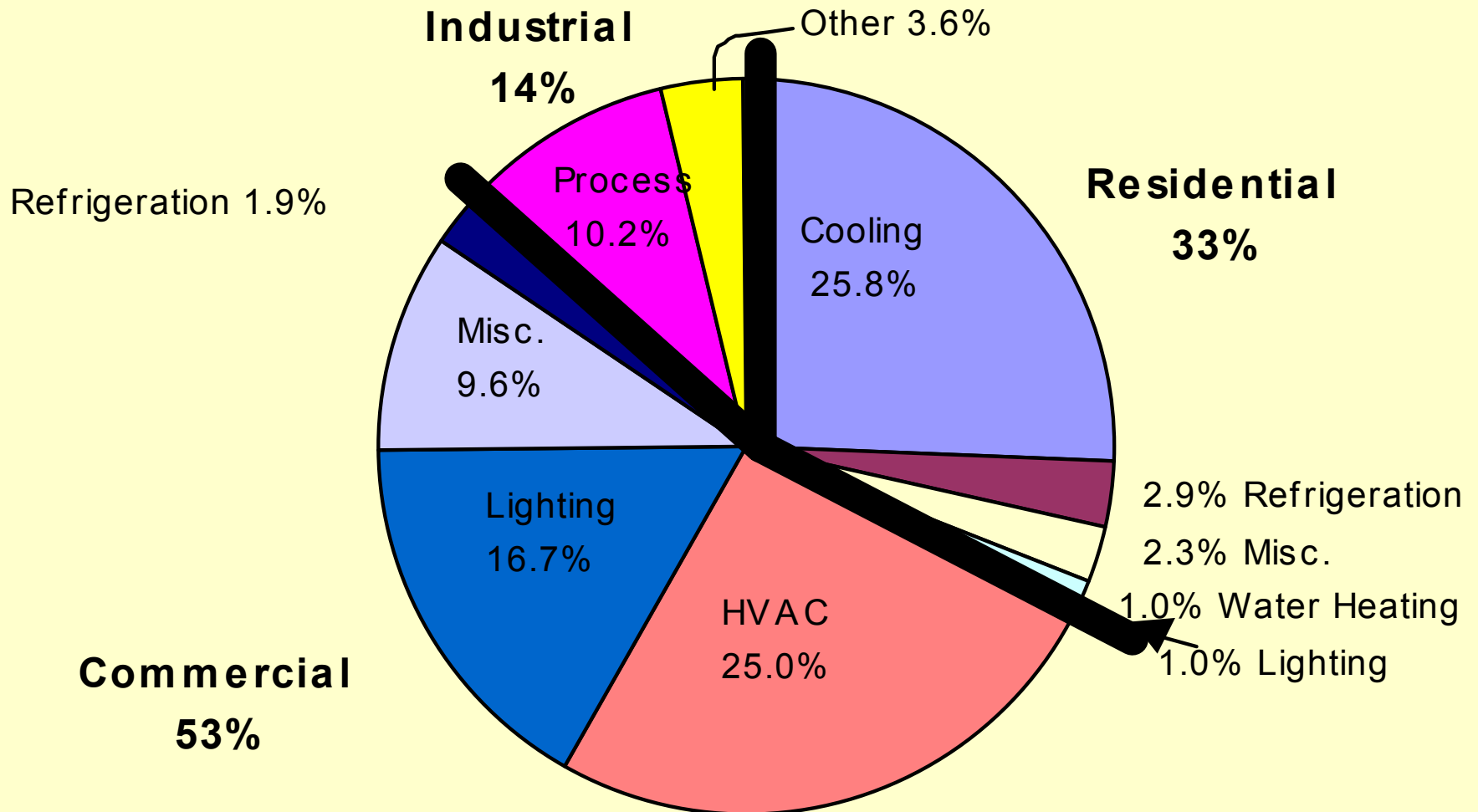
Near-term:

- Efficiency and conservation most important near-term resource available — 5% possible by winter
- Need to focus on both gas and electric measures
- Savings possible from building HVAC and industrial process control
- Residential savings from infiltration and duct losses
- Peak electricity largely from gas, peak electric savings produce large natural gas savings
- Expanded use of renewables (e.g., wind)

Major Gas End-Use Efficiency Opportunities

<u>Measure</u>	2020 Gas Savings (TBtu's)	Average Cost (\$/therm)
Comm'l building retrocommissioning & operator training	413	0.209
Ind'l management practices (e.g., 1-2-5)	402	0.351
Residential duct sealing & infiltration reduction	310	0.450
Residential windows	233	0.154
Residential appliances & water heating	190	0.344
Commercial furnaces and boilers	181	0.082
New homes	178	0.401
Residential furnaces/boilers (equipment & installation)	162	0.479
Sector-based commercial retrofit (e.g. offices)	162	0.361
Advanced commercial glazing	145	0.301
Commercial new construction	140	0.322
Commercial cooking and ventilation	76	0.205
Total in 2020	2,590	

Allocation of Peak Demand by End-Use



Source: Xenergy study for N.J. utilities.



Lessons from California

State policymakers & utility regulators quickly:

- Channeled additional funding to energy efficiency programs
- Developed public awareness campaign
- Authorized \$1.3 billion in funding — 250% increase over 2000 program funding

Efforts extremely successful:

- Cut avg. summer demand by 10% — June peak by 14%
- Cut electricity use by 6.7% for 2001
- Reduced peak demand by 5,500 MW
- Eliminated blackouts by summer of 2001
- Average saving cost 3¢/kWh saved

Natural Gas Policy Options (cont.)

Other near-term options not attractive:

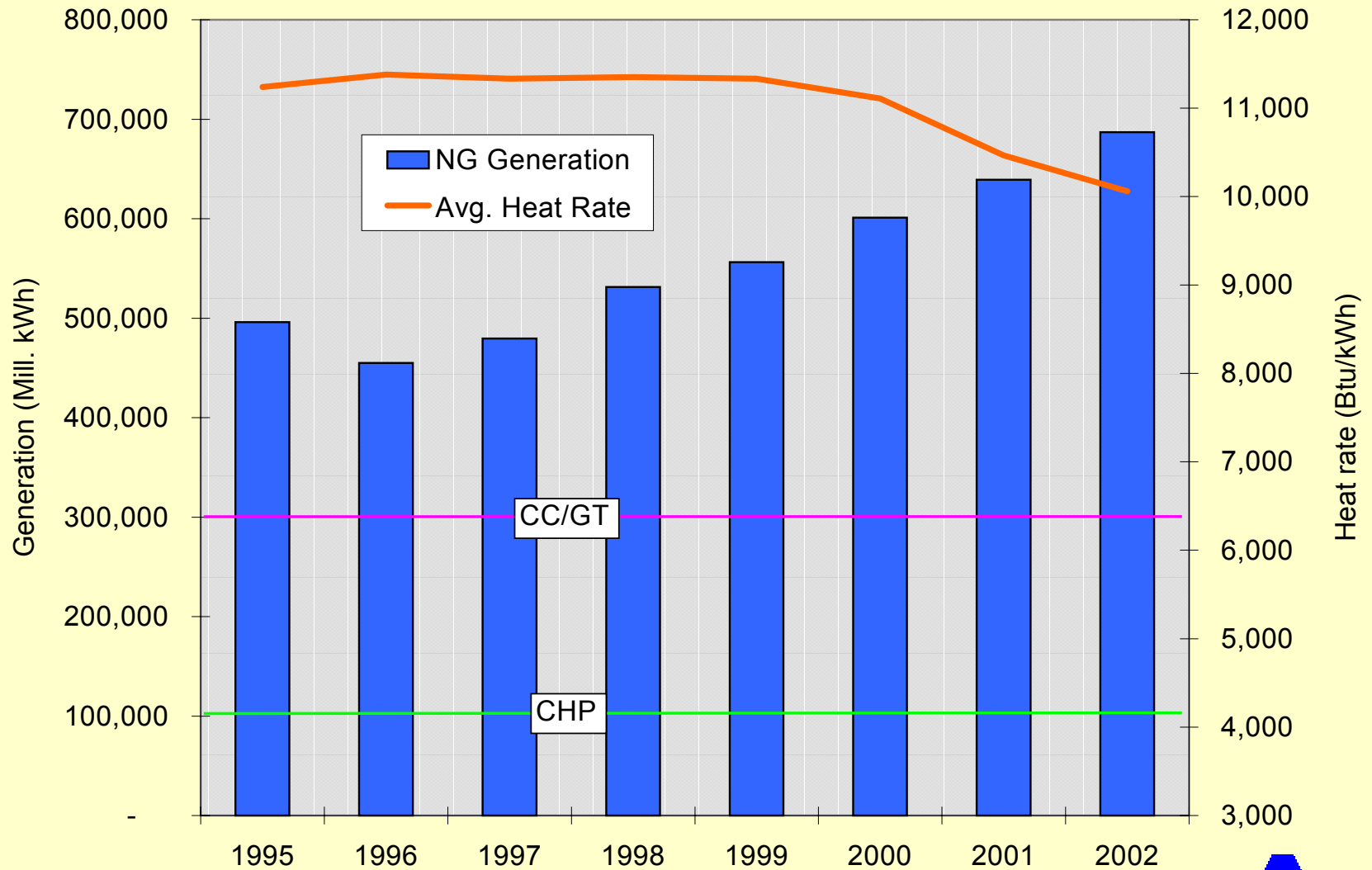
- Natural gas allocation - disruptive
- Price controls - does **NOT** really address problem

Natural Gas Policy Options (cont.)

Mid-Term:

- Energy Efficiency and CHP
- Improved NG electricity generation efficiency — NG current generation inefficient

Average Gas Electric Heat Rate



Source: EIA 2003



Natural Gas Policy Options (cont.)

Other Mid-Term:

- Dual-Fuel Capability — Fuel Switching
- Appliance Standards and Building Codes
- Expanded use of renewables
- Integrated Resource Planning
- Expanded Natural Gas supply — LNG and expanded domestic production

Conclusions

- Energy Efficiency and Conservation key to both long and short-term solution to natural gas supply problems
- Renewables also part of solution
- Electricity Generation and Natural Gas now linked in U.S. Energy Markets