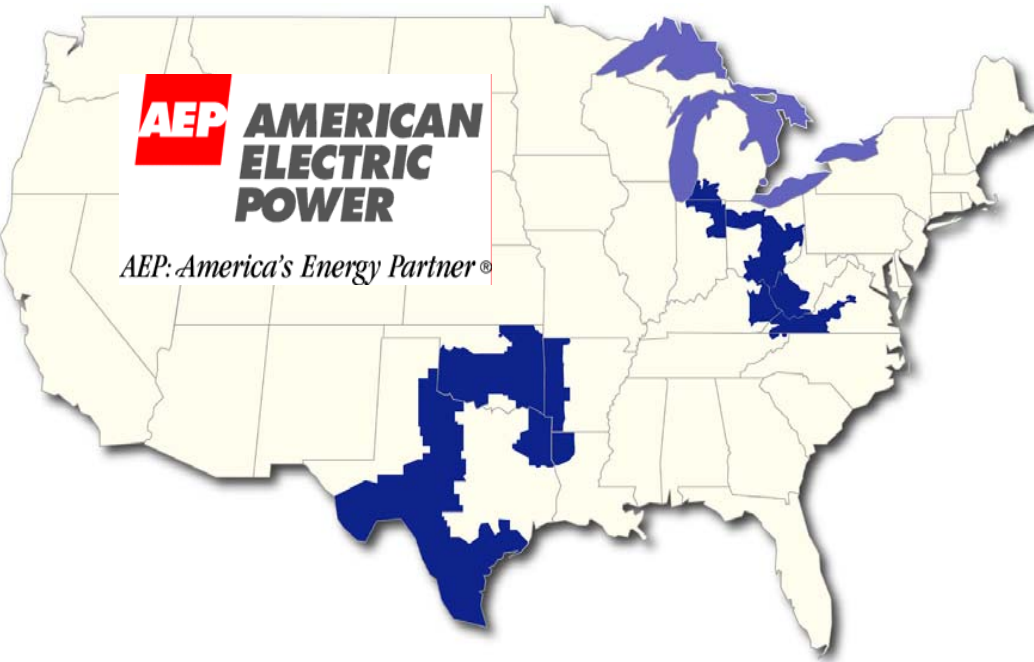


Integrated Gasification Combined Cycle Technology

**Presentation to NARUC Annual Meeting
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Technology Development**

AEP: An Introduction



- Largest U.S. electricity generator and coal user
- A leading consumer of natural gas
- Third largest wind generator
- 225,000+ miles of T&D

AEP's Generation Portfolio

Coal	Gas	Nuclear	Hydro	Wind
70%	20%	7%	2%	1%

5 million customers in 11 states

Now is the Time to Upgrade our Nation's Infrastructure



- 70% load growth in past 25 years
 - Little new baseload capacity added
 - Little new transmission added
- Nuclear generation capacity reaching output limit
 - 1990 66% capacity factor
 - 2004 91% capacity factor
- Coal generation capacity becoming fully utilized
 - 1990 59% capacity factor
 - 2004 74% capacity factor
- Demand expected to grow another 20% over next 10 years
 - Long lead time for all baseload generation capacity

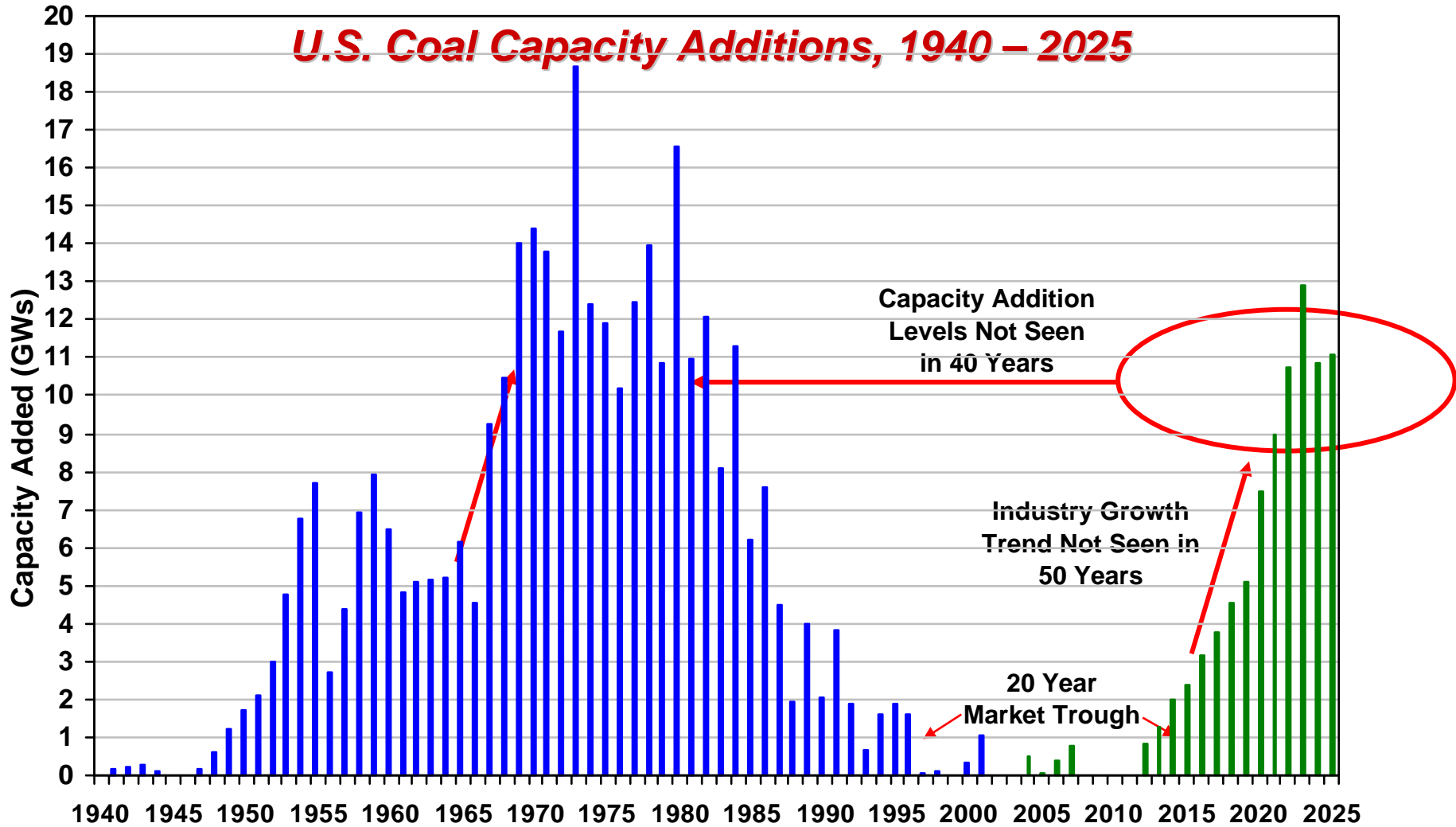
Electric Power's Future

- Population growth and increased electrification requires about 250-300 GW of baseload generating capacity over next 25 years
- No silver bullet ... Need a portfolio
- Future demand probably met largely by coal:
 - Gas supply issues and price volatility in North America
 - LNG imports will exacerbate U.S. trade imbalance
 - Nuclear could be revived, but probably decades away from a major resurgence
 - Renewables (particularly wind) promising, but infrastructure/intermittency limits penetration

U.S. Forecasts Largest Coal



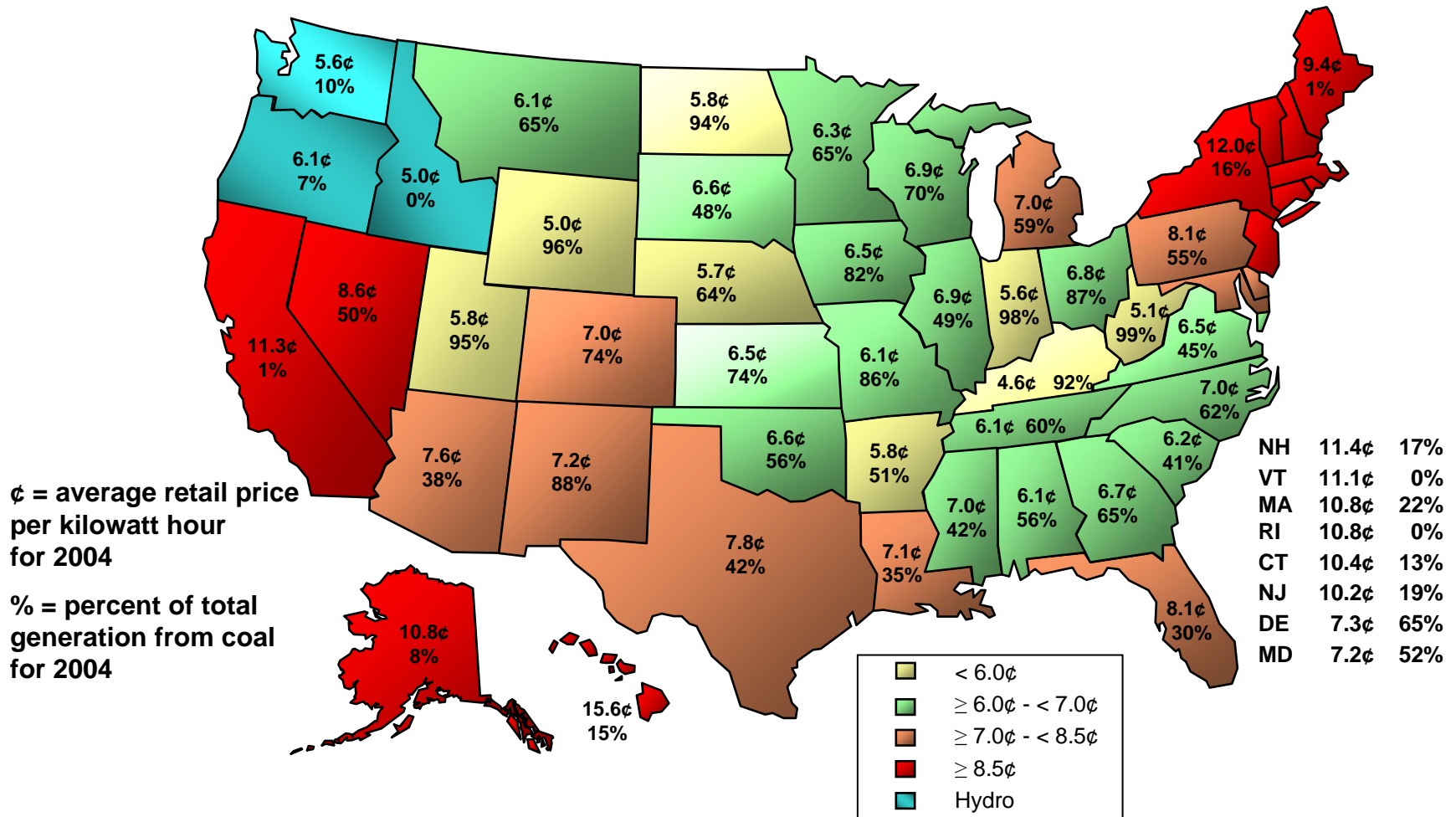
Generation Capacity Installation in 40 Years



Source: U.S. Department of Energy NETL & Annual Energy Outlook 2005.

Low-Cost Electricity from Coal: Coal Fuels 50%+ of U.S. Electricity

Retail Cost Per kWh & Percent of Coal Generation

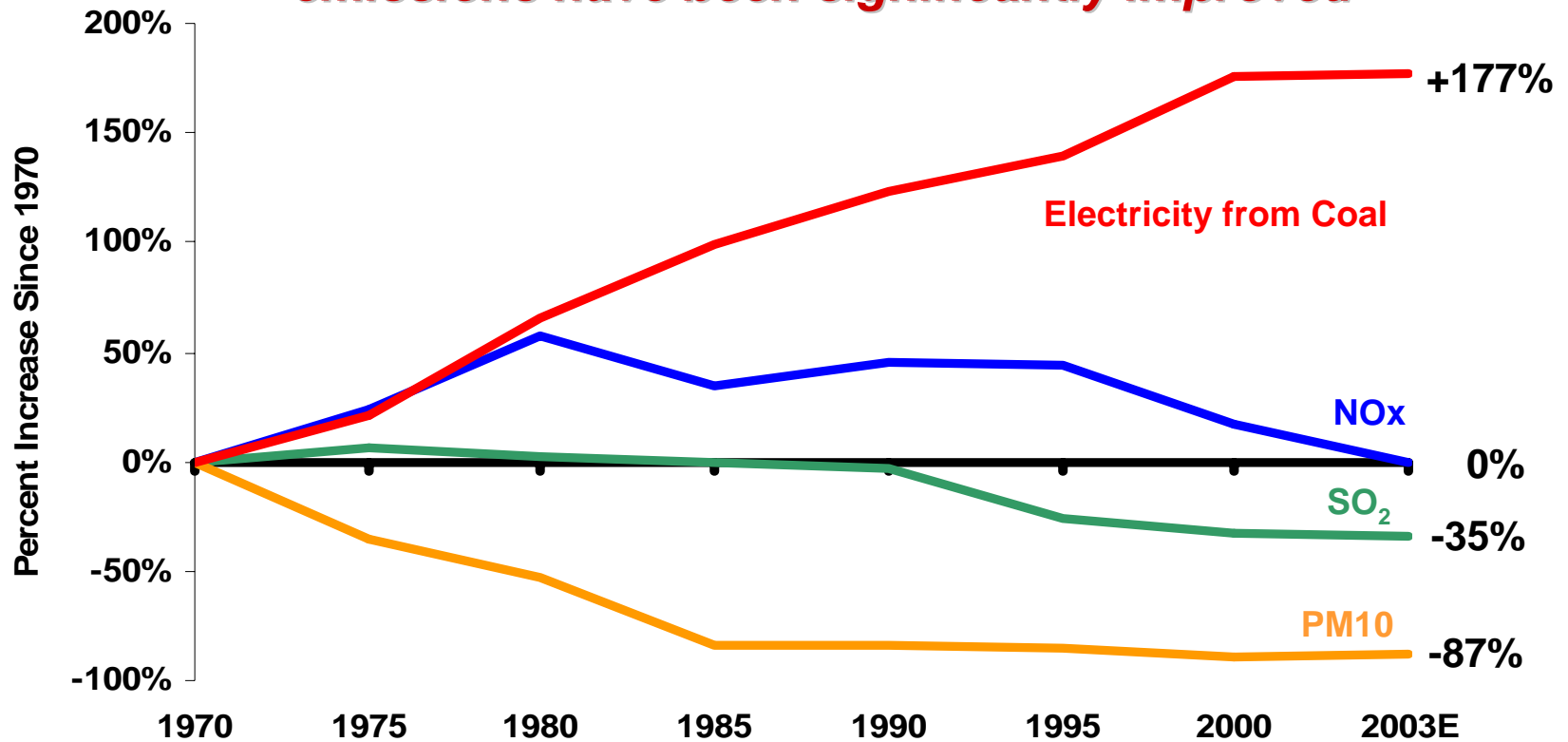


Source: Energy Information Administration, March 2005.

Coal Use Grows While Emissions Decline



Coal used for electricity has tripled since 1970 while emissions have been significantly improved



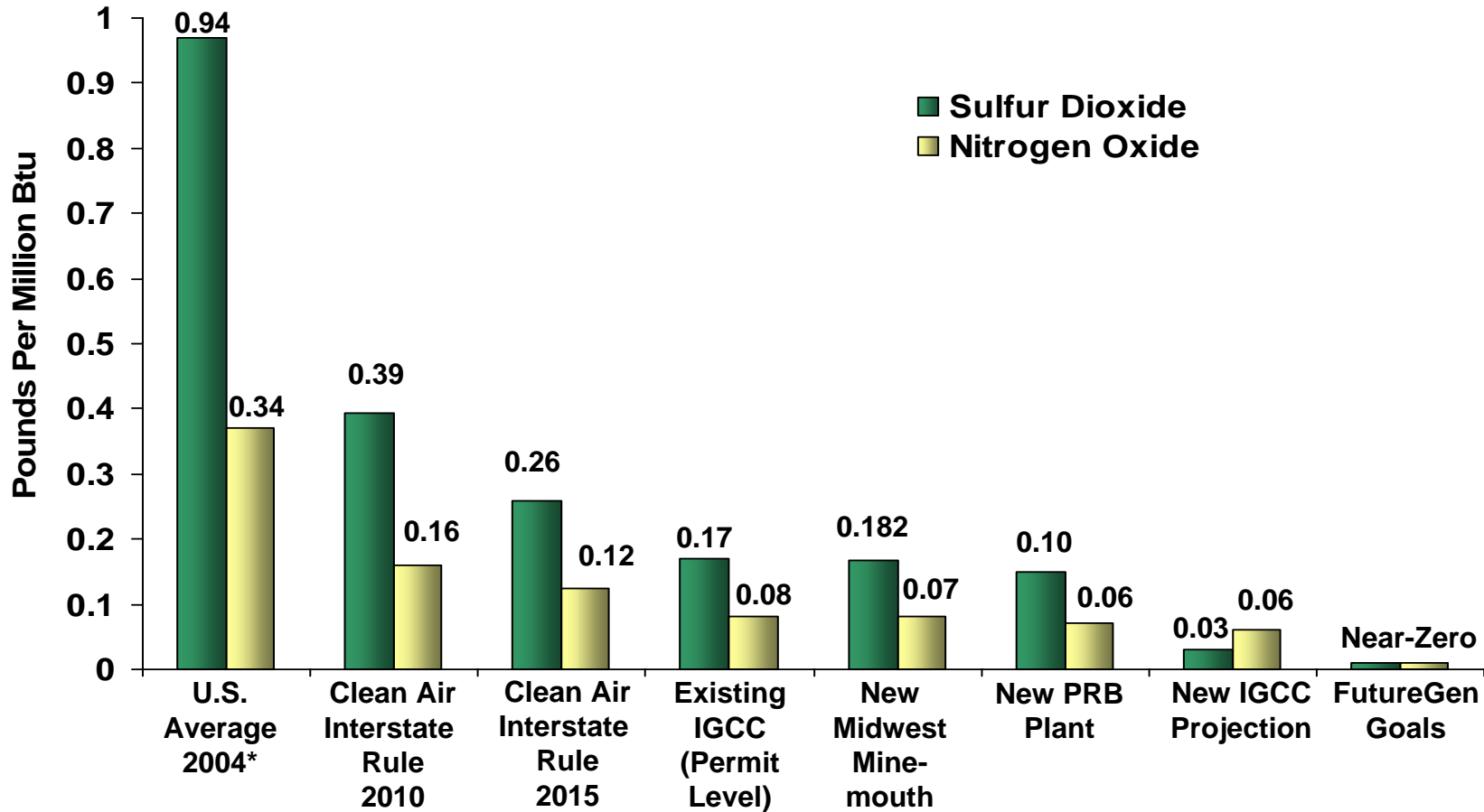
Air Emissions Will Be Reduced

- Emissions:
 - Clean Air Interstate Rule (CAIR) and Utility Mercury Reduction Rule promulgated by the U.S. EPA
 - 45,000 MW of new scrubbers in the Eastern U.S. by 2010 (100,000 GW already scrubbed)
 - 5 – 10% of the coal fleet (smaller, older plants) expected to be retired
 - CO₂: Climate Change?

The Path Toward Near-Zero Emissions from Coal-Fueled Generating Plants



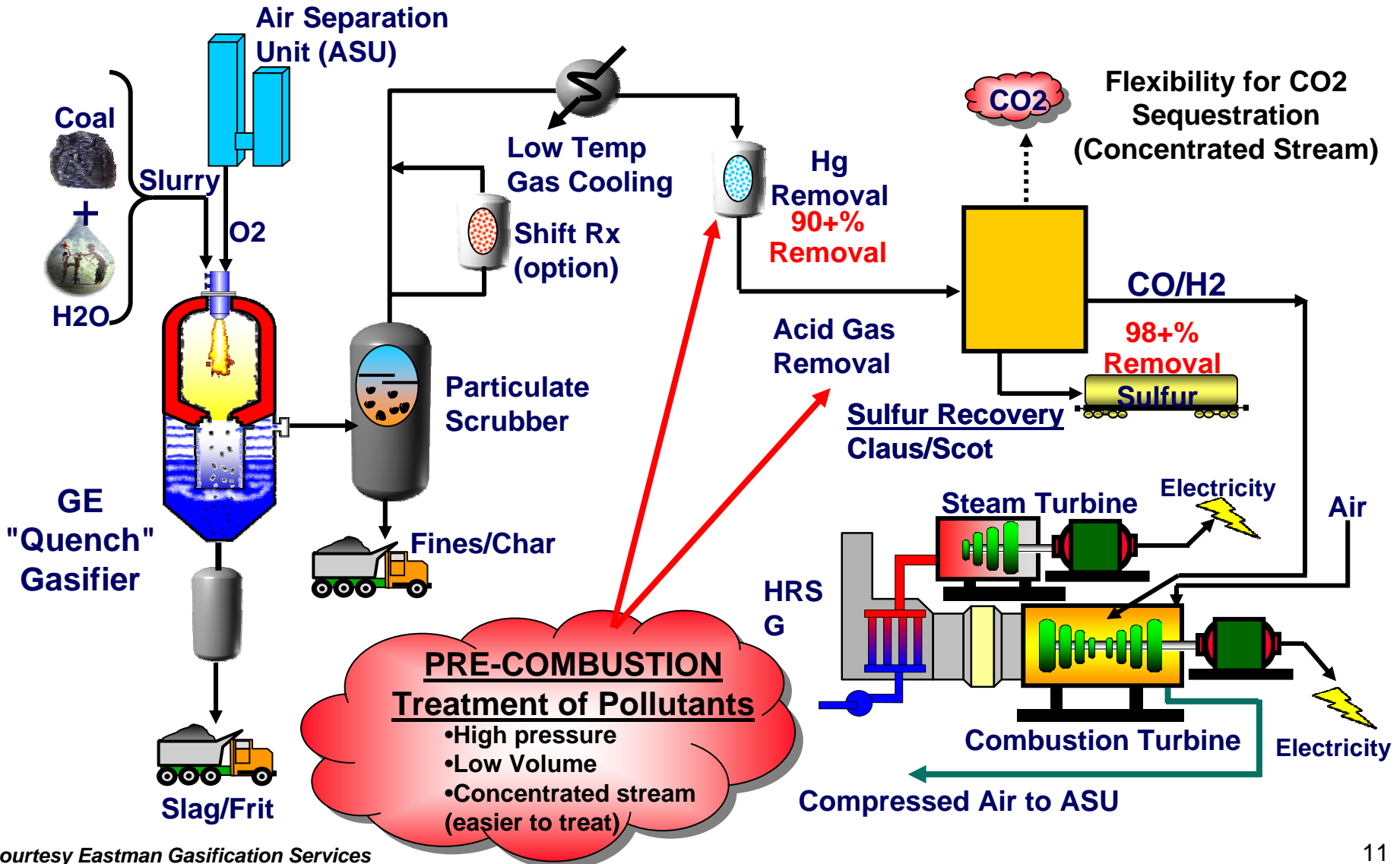
Emissions from Coal-Fueled Generating Plants



* Estimate

Source: EPA's Clean Air Markets database; EIA 2004 Annual Energy Outlook; GE Energy; SFA Pacific.

IGCC Overview

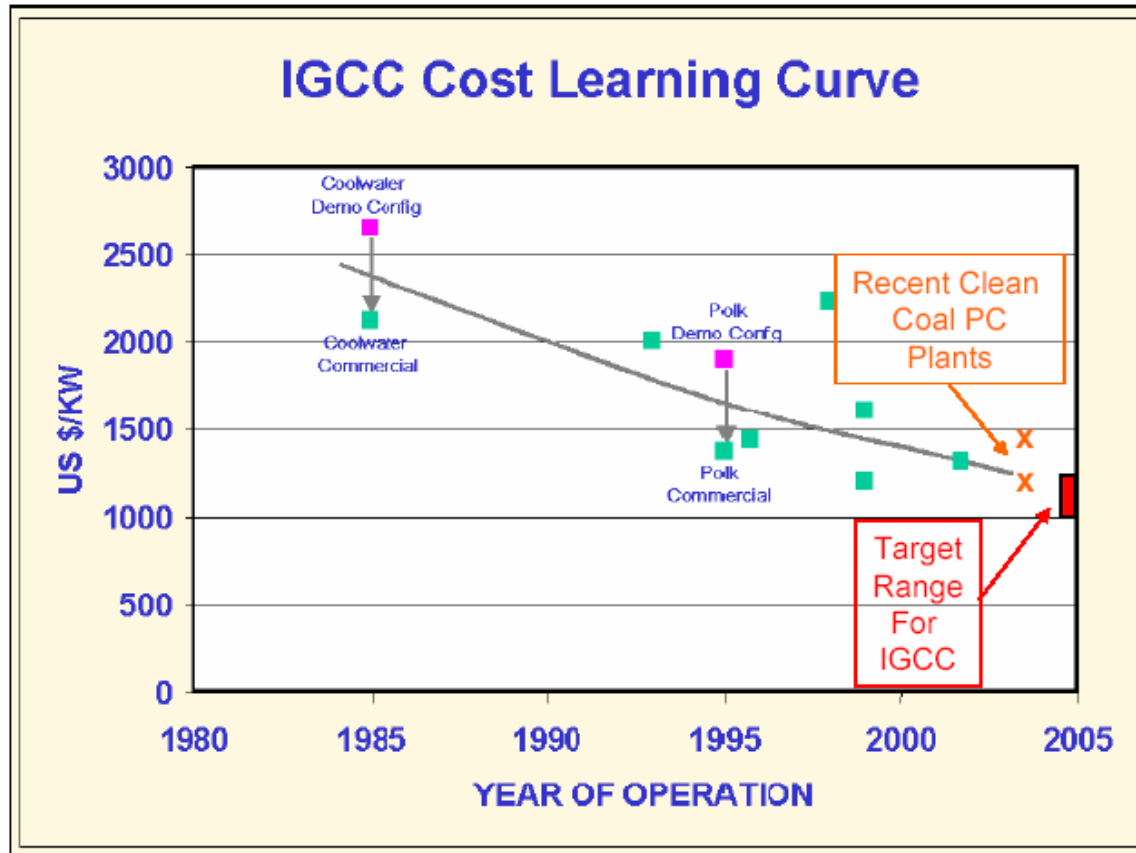


Integrated Gasification Combined Cycle's Promise



- **Lowest capital cost** (when mature) among coal-based technologies
- **Feedstock & product flexibility** (with added cost)
 - Coal, petcoke, or biomass feedstocks
 - Electricity, steam, syngas, liquid fuels, or chemical products
- **Highest efficiency** among coal-based technologies (when mature)
- **Best emission** characteristics among coal-based technologies
- Most **carbon-friendly** fossil-fuel technology
- The **technology of choice** to KEEP COAL IN THE MIX
 - Strategically important to the energy security and economies of states

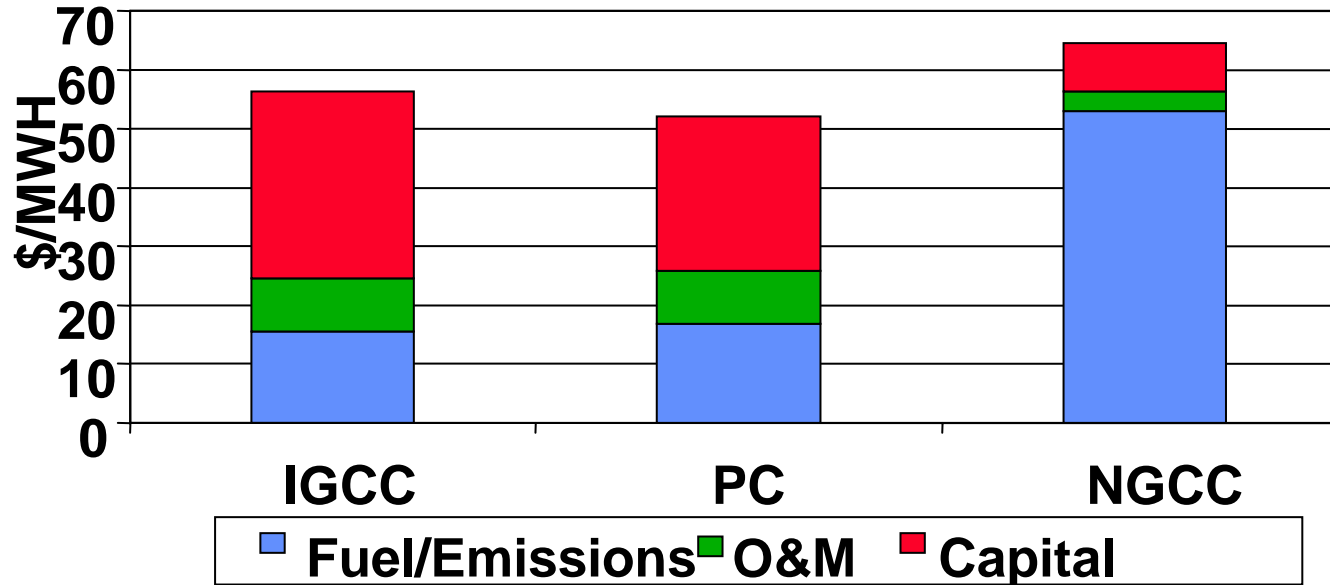
IGCC – Costs



Source Eastman Chemical Company

Take away: Several IGCC plants must be built to reduce the capital cost and improve the operating availability.

Current Economics of New Baseload Generation

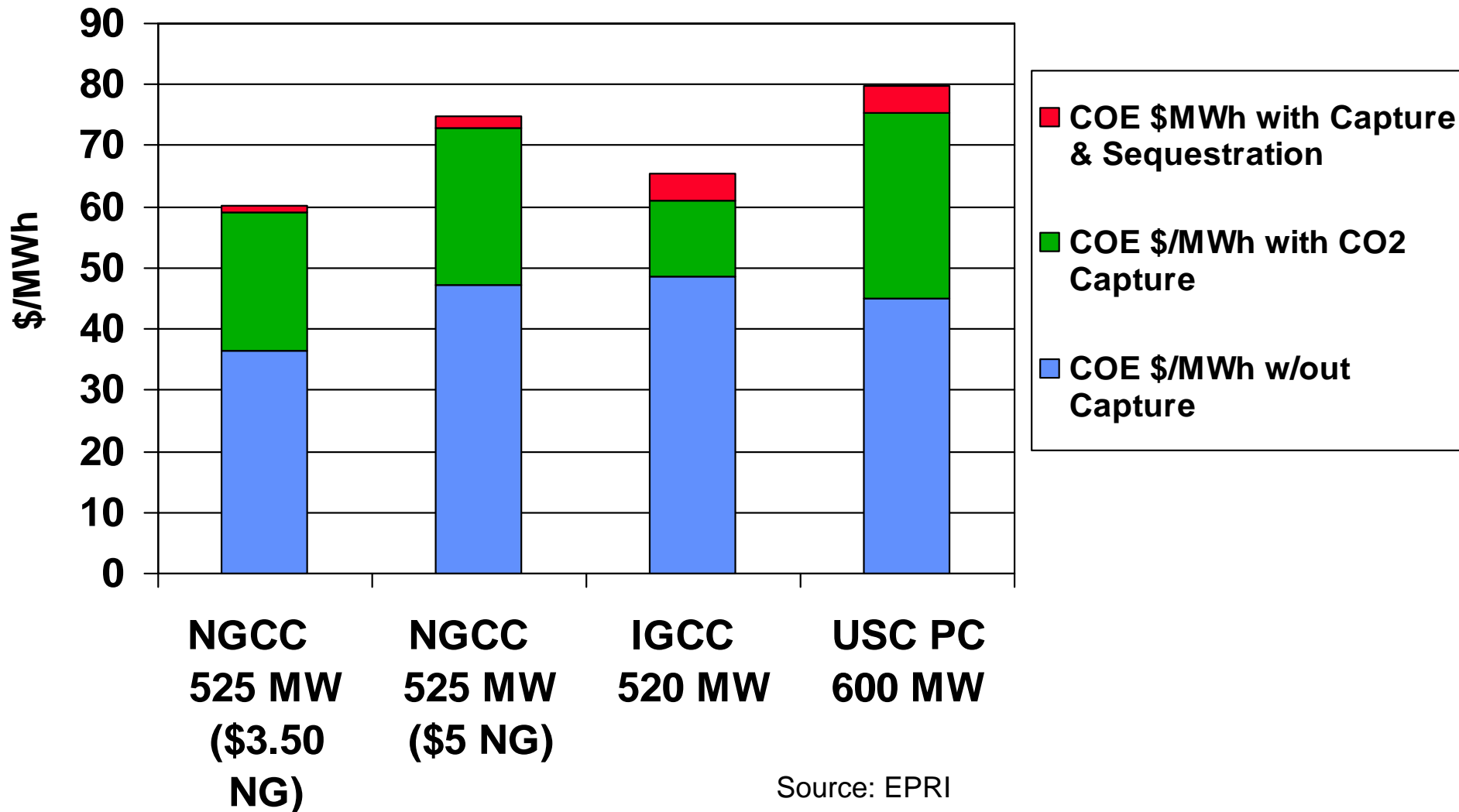


New Baseload Technical Parameters

	IGCC	PC	NGCC
Total Plant Capital (\$/KW)	\$1550	\$1290	\$440
O&M (\$/MWH)	\$9.1	\$8.9	\$3.5
Heat Rate (BTU/KWH)	8,700	8,690	7,200

Source: EPRI

Costs of Electricity from New Fossil Fuel Power Plants with & without CO₂ Capture



Source: EPRI

AEP's Strategy

- **Asset diversification and optimization**
 - Multi-fuels (coal, gas, renewables)
- **Coal has important long-run role**
 - Substantial air emissions compliance:
~\$5 billion in retrofit controls thru 2020
 - AEP Board Report (August 2004) “***An Assessment of AEP's Actions to Mitigate the Economic Impacts of Emissions Policies***” committed AEP to being an industry leader in development of IGCC technology
 - IGCC/new technology: **Building 600 MW IGCC plant by 2010**

AEP's IGCC Investment

- **600 MW Plant built by 2010; Possible additional plants post-2010**
 - Preliminary design and engineering, project scoping, and environmental permitting begun
 - Transmission feasibility studies requested of PJM
- **Sites being considered include:**
 - Meigs County, OH
 - Lewis County, KY
 - Mason County, WV (adjacent to Mountaineer Plant)
- **Regulatory cost recovery**
 - Filed cost recovery plan with PUCO; Awaiting approval
 - Provided notice of 'intent to file' with WV PSC
- **R&D Activities:**
 - Mountaineer Sequestration Demonstration
 - FutureGen participation

Public Policy Tools to Support IGCC: Regulated Jurisdictions (Indiana Example)



- **Need pre-construction assurance investment is recoverable**
- Financial incentives codified in IC 8 for reasonable and necessary projects:
 - Timely recovery of costs incurred during pre-construction, construction and operation
 - Authorization up to 3 percent on return on shareholder equity
 - Cost recovery for purchase of fuels produced by a coal gasification facility
 - Other incentives the commission considers appropriate
 - Eligibility and approval determined less than 120 days after application containing completion schedule, integrated resource plan, capital investment amount, other information as necessary

Public Policy Tools to Support IGCC: Regulated Jurisdictions (Indiana Example)



- Financial incentives codified in IC 8 for reasonable and necessary projects (continued):
 - Rate adjustment based on actual or forecasted data, with reconciliation if forecasted data used. Recovery of costs above forecasts is possible
 - Cost recovery for research and development to increase use of Indiana coal
 - Accelerated depreciation (not less than 10 years or useful life, whichever is less) not more than 20 years
 - Investments during construction are recoverable, even if commission cancels certificate
 - Certificate forecloses future challenges to including costs in rate base due to excessive costs, inadequate quality control, or inability to employ the technology

Public Policy Tools to Support IGCC: Regulated Jurisdictions (Indiana Example)



- Financial incentives in SB 378 passed in 2005
 - The bill establishes a tax credit against a taxpayer's tax liability arising under the AGI Tax, Financial Institutions Tax, Insurance Premiums Tax, and Utility Receipts Tax for qualified investment in an integrated coal gasification powerplant.
 - The credit is equal to 10% of the first \$500 M in qualified investment, and 5% of the qualified investment exceeding \$500 M.
 - The taxpayer may take the credit in 10 annual installments beginning with the year in which the taxpayer places the integrated coal gasification powerplant into service.
 - The annual credit installment that a taxpayer may claim is equal to the lesser of the amounts described below in (1) and (2) multiplied by the percentage of the coal utilized during the taxable year in the powerplant that was Indiana coal:
 - (1) 10% of the total credit amount.
 - (2) The greater of (a) 25% of the taxpayer's total state tax liability for the taxable year; or (b) the taxpayer's Utility Receipts Tax liability for the taxable year.

Public Policy Tools to Support IGCC:

Restructured Jurisdictions (Ohio Example)

- **Need pre-construction assurance investment is recoverable**
- Public Utilities Commission suggested IGCC plant be built
- AEP Ohio filed plan (March 2005) for recovering costs for 600 MW plant in operation mid-2010
 - Phase 1: In 2006, \$18 million collected for site engineering services. Monthly surcharge less than 60 cents for residential customers using 1,000 KWH/month.
 - Phase 2: In 2007 to mid-2010, \$237.4 million collected to recover financing costs. Monthly surcharge less than \$2 for residential customers using 1,000 KWH/month.
 - Phase 3: After mid-2010, as plant operates, recover \$1.033 billion estimated plant cost over its 40-year operating life at market prices.
- Under Ohio Senate Bill 3 providing customer choice, surcharges will be added to the generation portion of customer bills, but customers can choose an alternate supplier and avoid the costs.

Leadership

- Choosing IGCC is not just a technology decision; it's a leadership decision
 - If not AEP, then who
 - If not your state, then whose state
 - If not coal, then what
- Being leaders has its perils and risks
 - Partnerships and cooperation are necessary for success
- Federal Government has a role
 - Provide incentives and remove roadblocks, but do not attach unacceptable strings