

Update on Implementation of Clean Coal Provisions Included in the Energy Policy Act of 2005

Electric Power Conference

Atlanta, Georgia

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Coal Utilization
Research Council**

CURC

Topics to be Discussed

Energy Policy Act of 2005 (EPAct)

- DOE coal technology R&D (technology development)
- Clean Coal Power Initiative (demonstrations)
- Investment Tax Credits (deployment)
- Loan Guarantees (deployment)
- *Also: accelerated depreciation of transmission assets*
- *Also: coal leasing on federal lands*

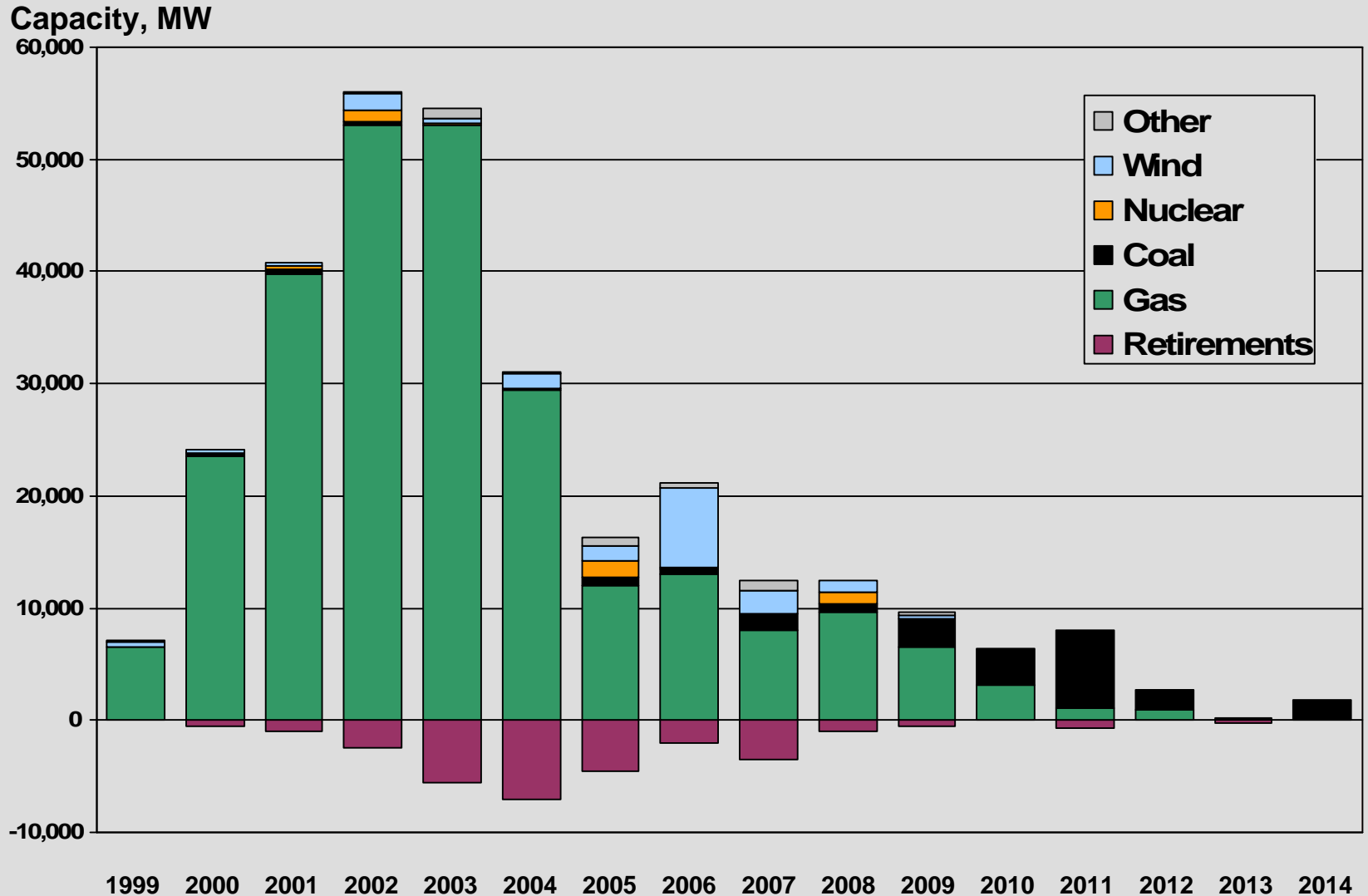
Regulation of CO₂: the pressure is building

Why Coal?

“The fuel opportunities in our business today are really coal or nuclear. Gas has priced itself out of the market. Oil has priced itself out of the market.”

Michael Morris, President, Chairman & CEO, AEP;
Interview in Argus Air Daily, 20Jan2006.

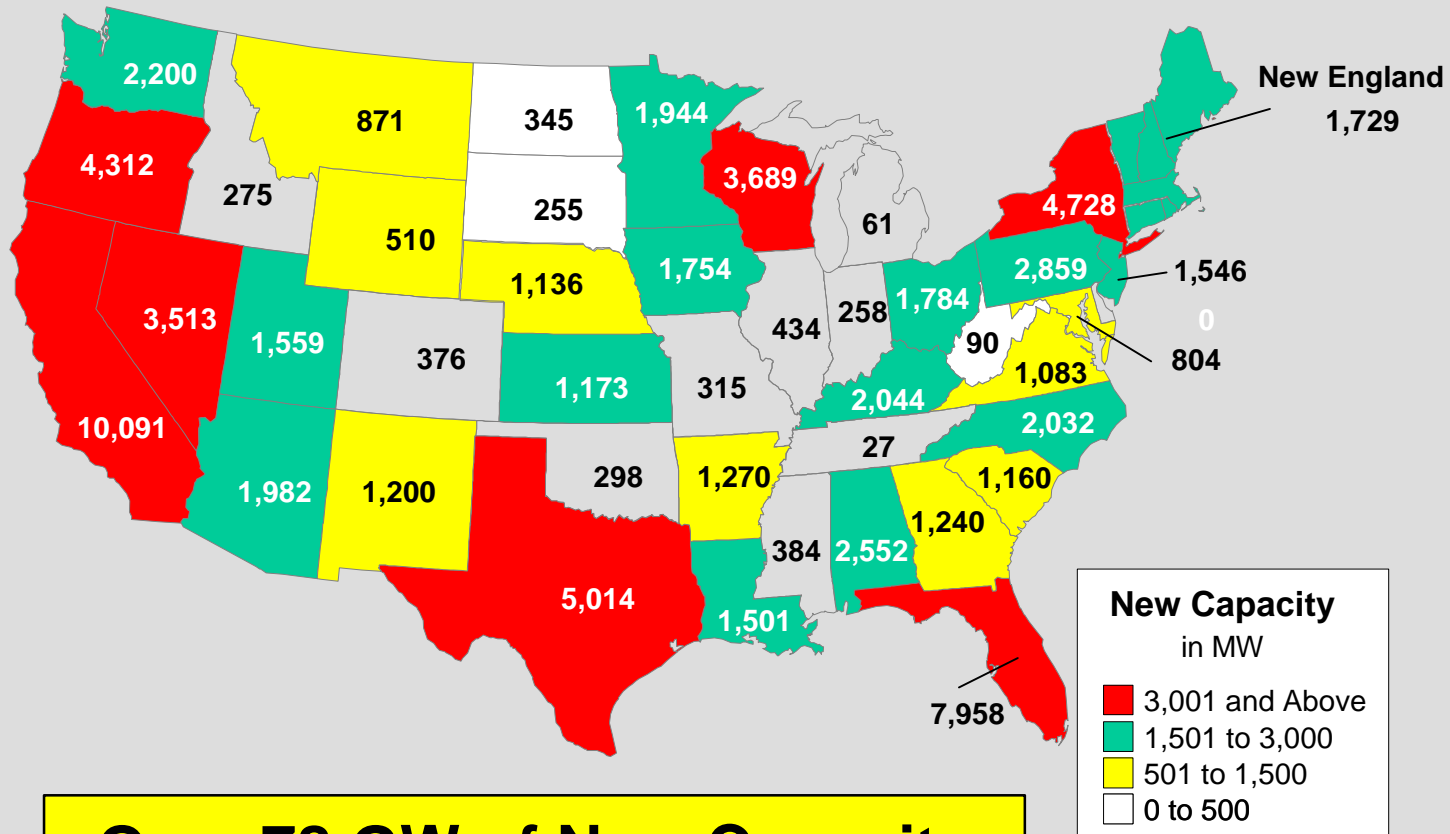
U. S. Capacity Additions by Year and Technology 1999 to 2014



Source: EPRI

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U. S. Capacity Additions... 2005 to 2010

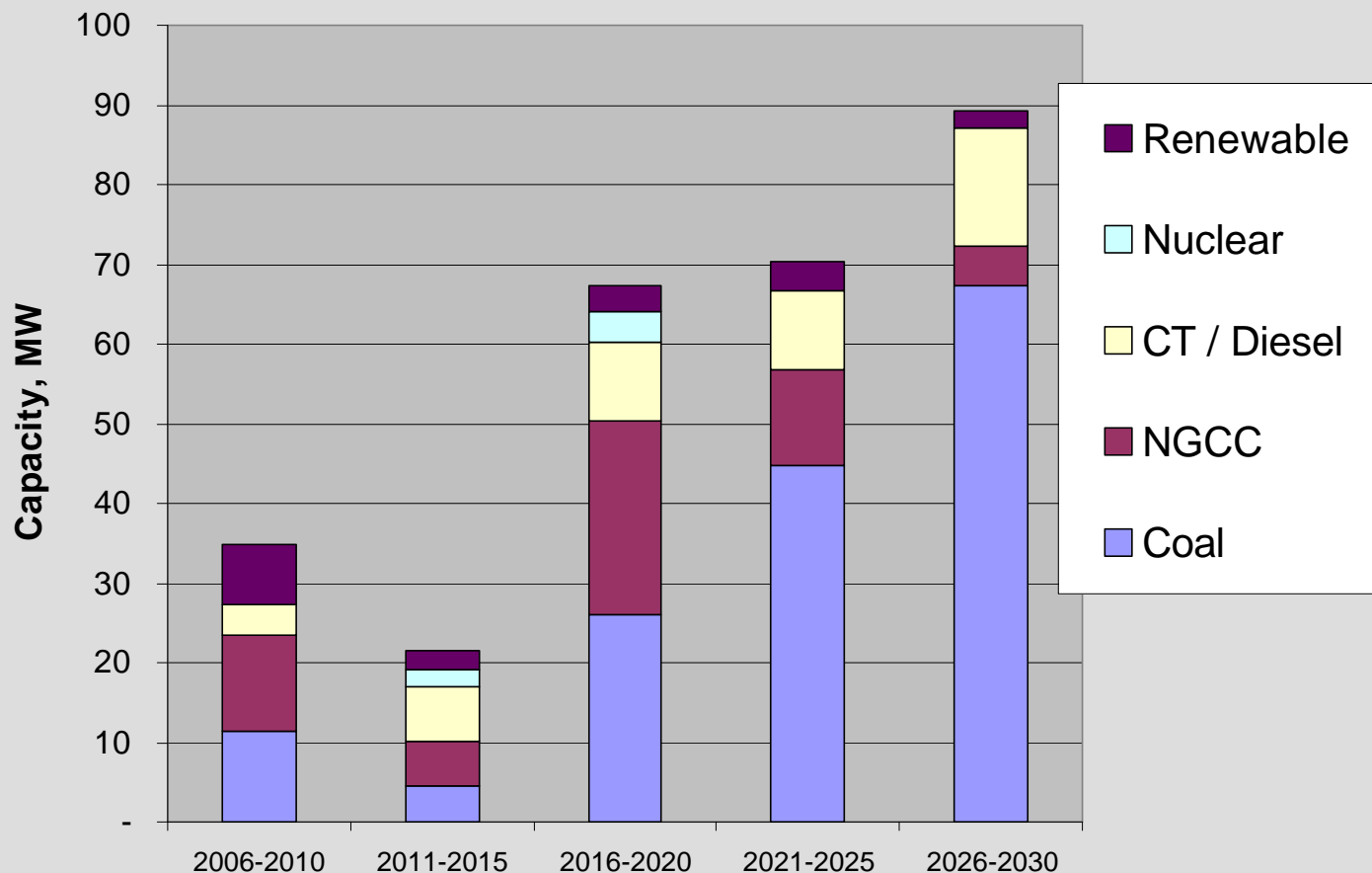


Source: EPRI

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Coal is competitive now, and becomes more competitive as gas prices rise

US Capacity Additions
(EIA/AEO 2006)

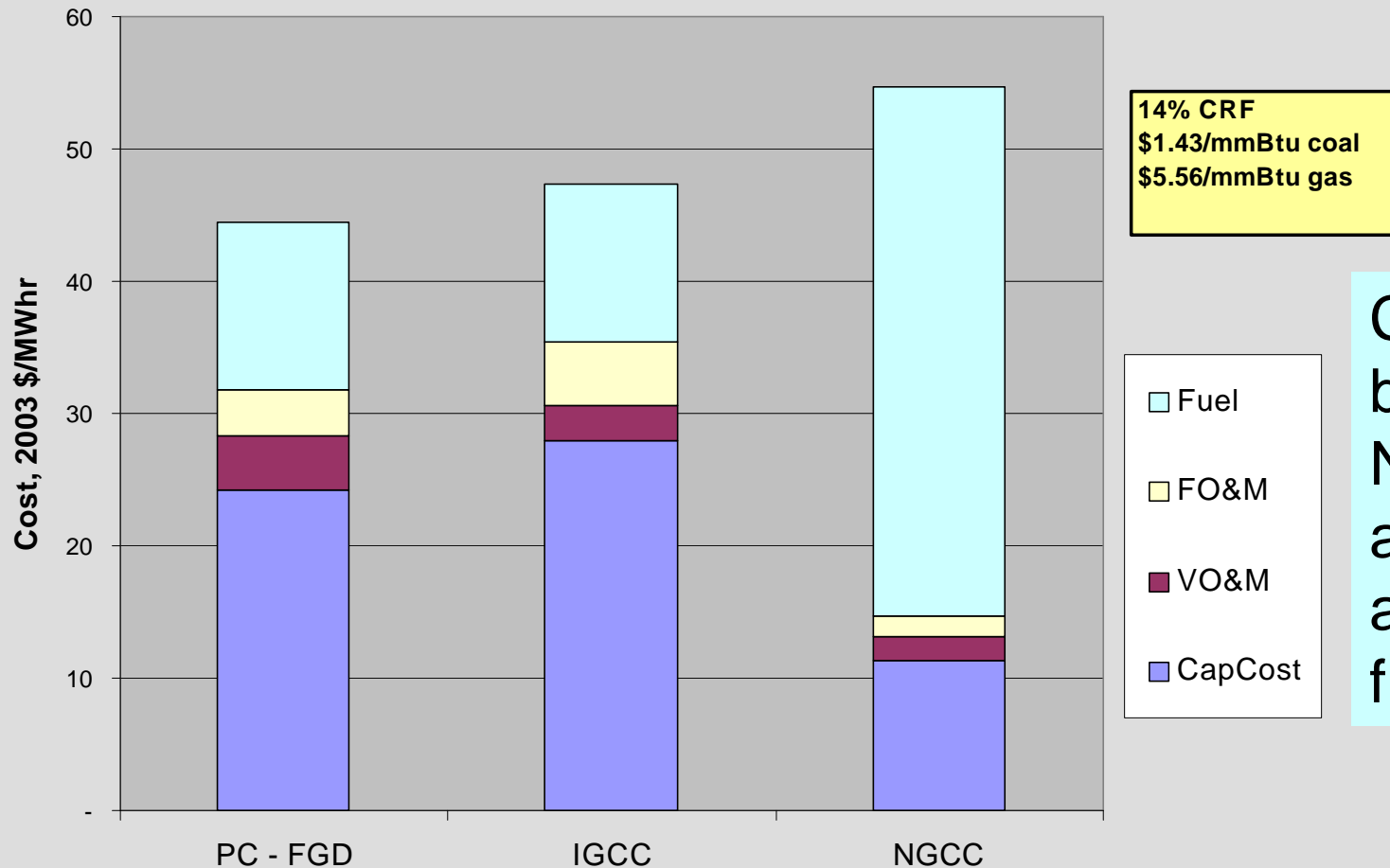


Principal Unknowns to Long-term and Increased Use of Coal

- **Availability and price of natural gas**
- **Public policy regarding carbon management, if any**

Without environmental issues, traditional pulverized coal looks good

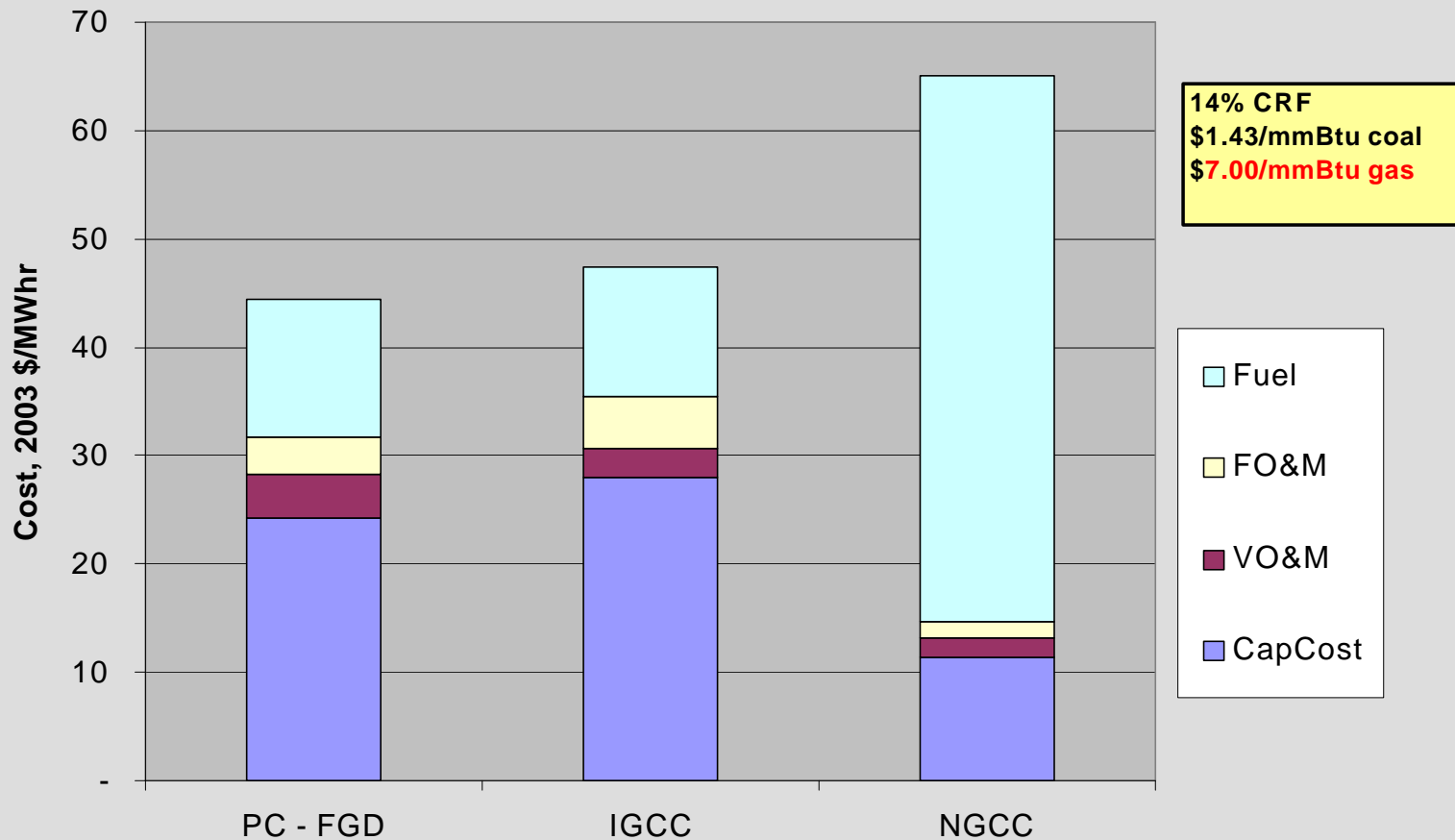
New Power Plant Costs



Calculations based on EIA NEMS assumptions and AEO 2006 fuel costs.

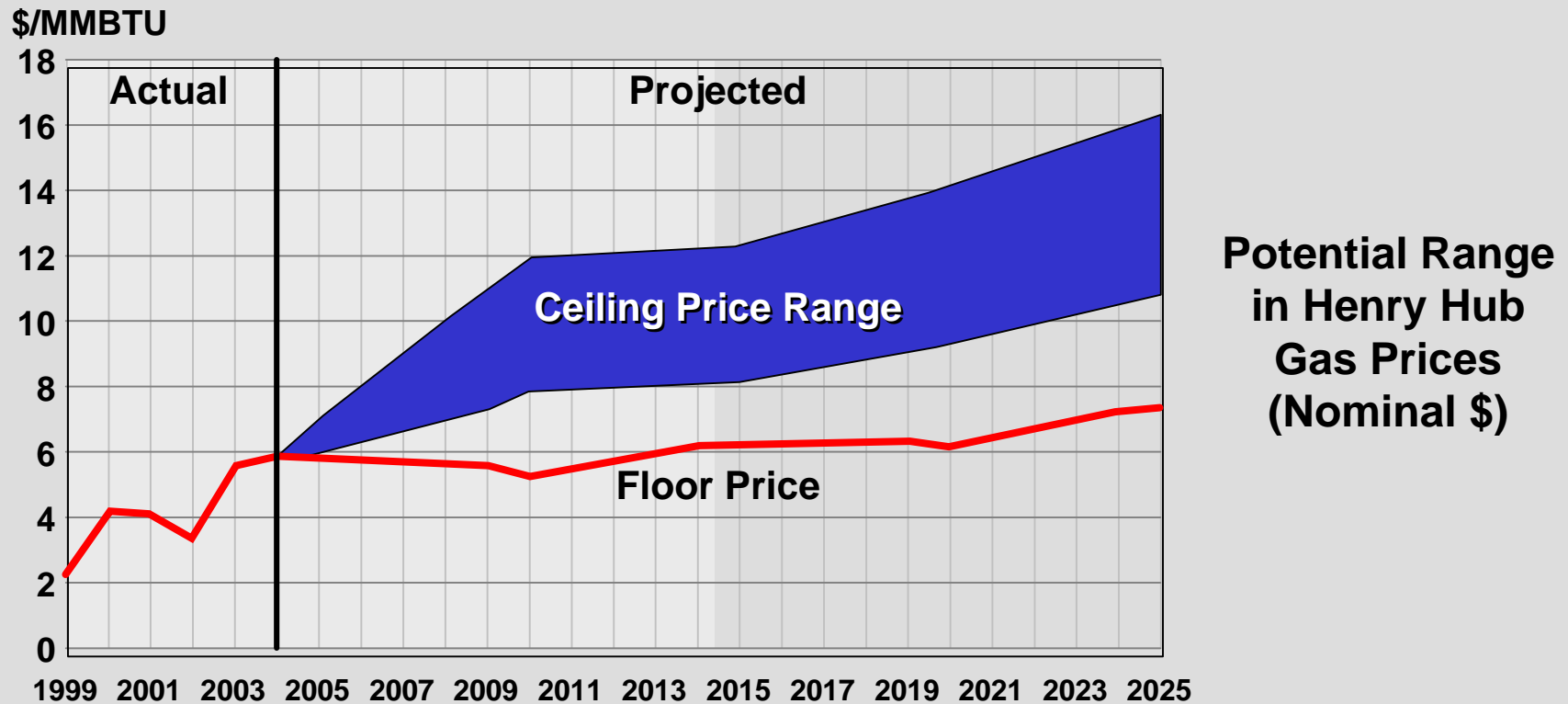
If gas is \$7/mmBtu delivered, coal looks even better

New Power Plant Costs



Future Natural Gas Prices...a Key Uncertainty

- Prices can range from the Ceiling Price (oil) to the Floor Price (coal)
- Gas prices between 2005 and 2007 will likely be set at the Ceiling Price
- Post-2007 the issue is debatable, and dependent upon outlook for LNG

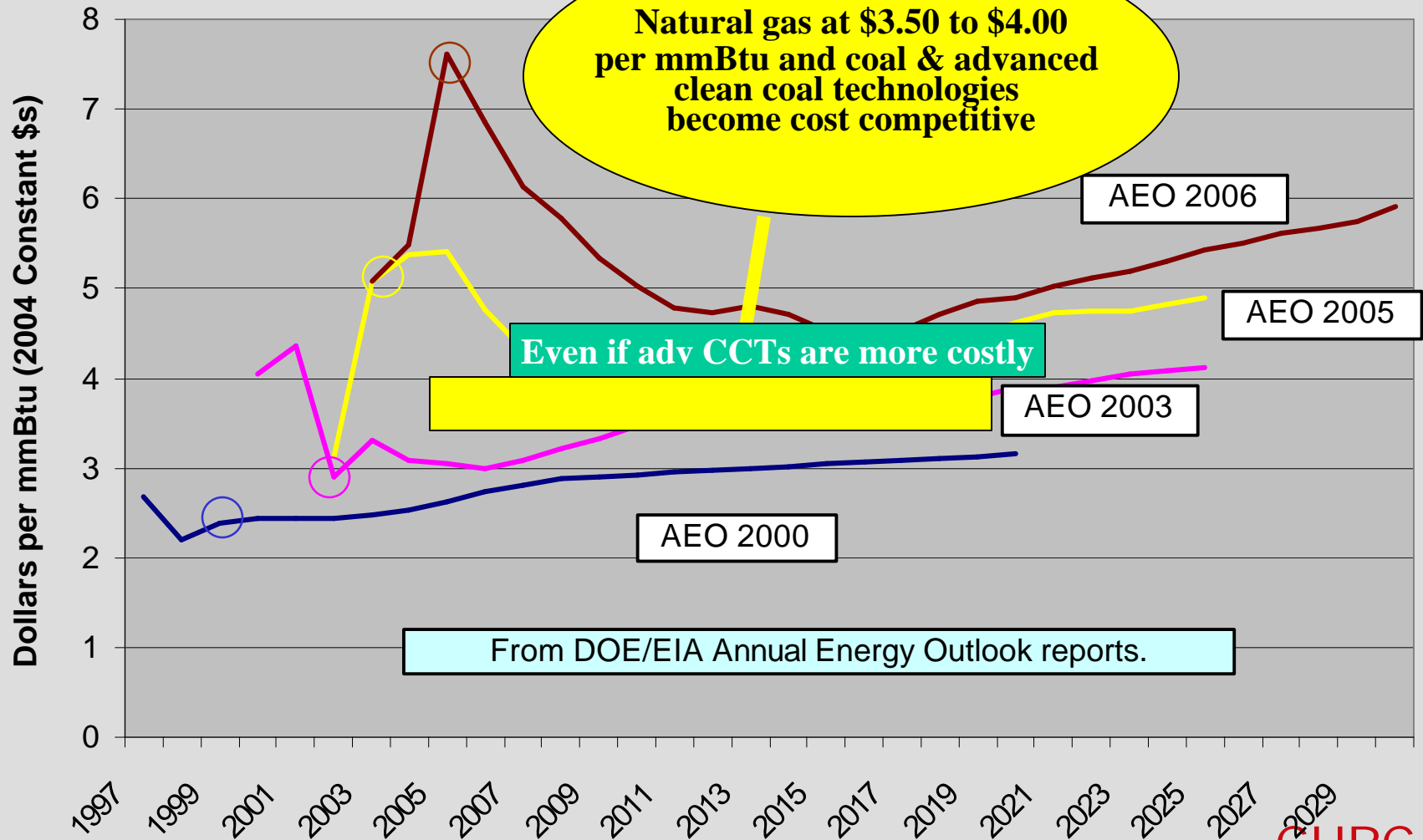


Source: EPRI

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Natural Gas Prices are Highly Uncertain

Natural Gas Wellhead Price Projections

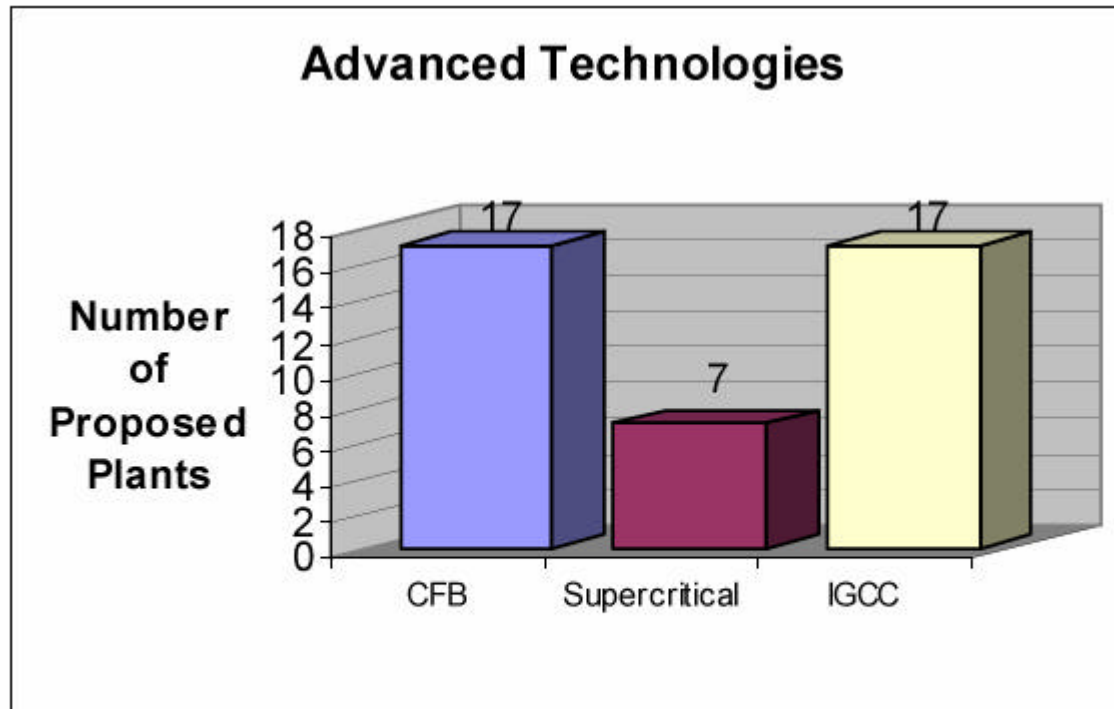


With CO₂ capture, COE is higher by 20% to 60% over today's PC unit

- Technology is the key to maintaining cost competitiveness of coal if CO₂ is regulated
- IGCC has current advantage to capturing CO₂
- Advanced combustion
 - CO₂ scrubbers
 - Oxycombustion & chemical looping
- Key to success – time, money, commitment

Which kind of coal plant?

41 of 129 new coal units announced “Advanced Technologies”

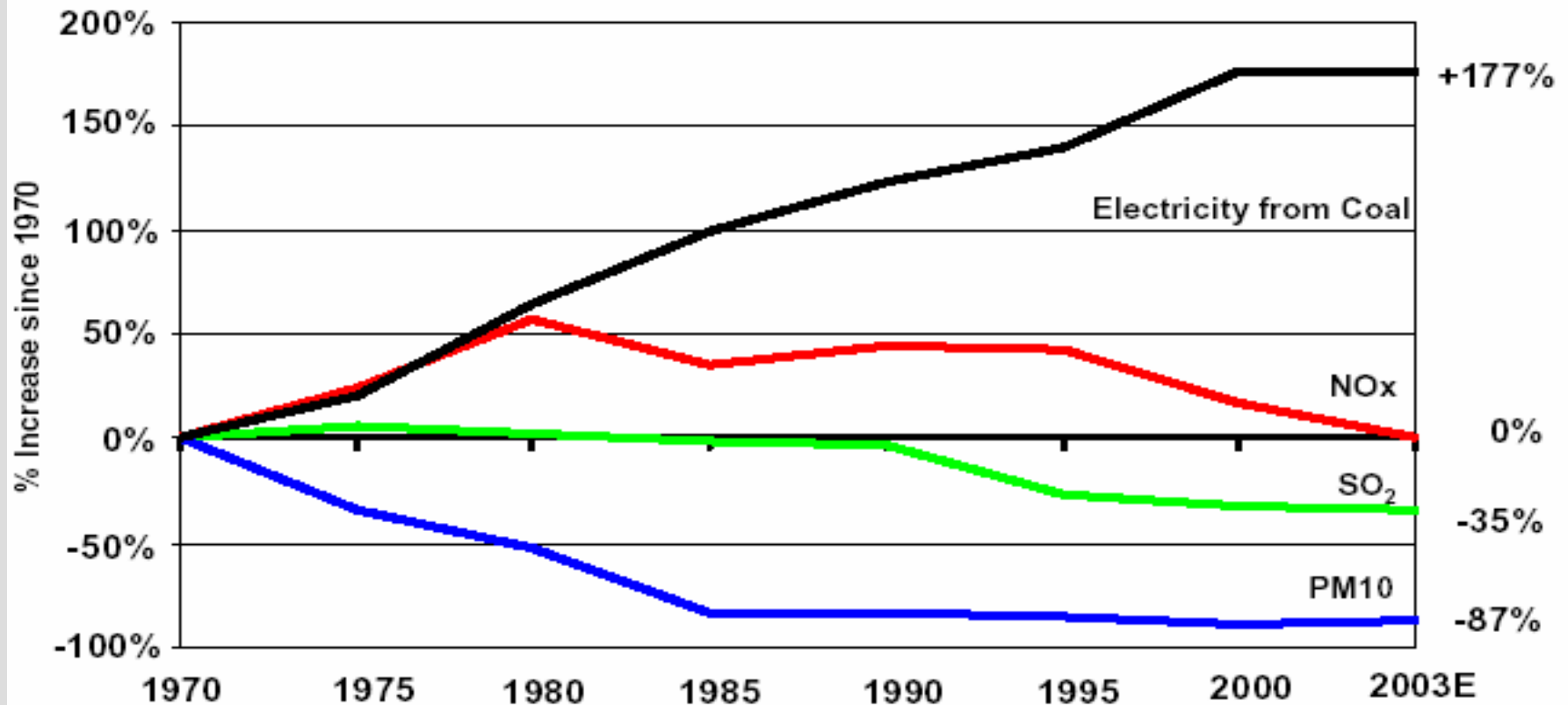


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OCES 11/1/2005

And, emissions are declining

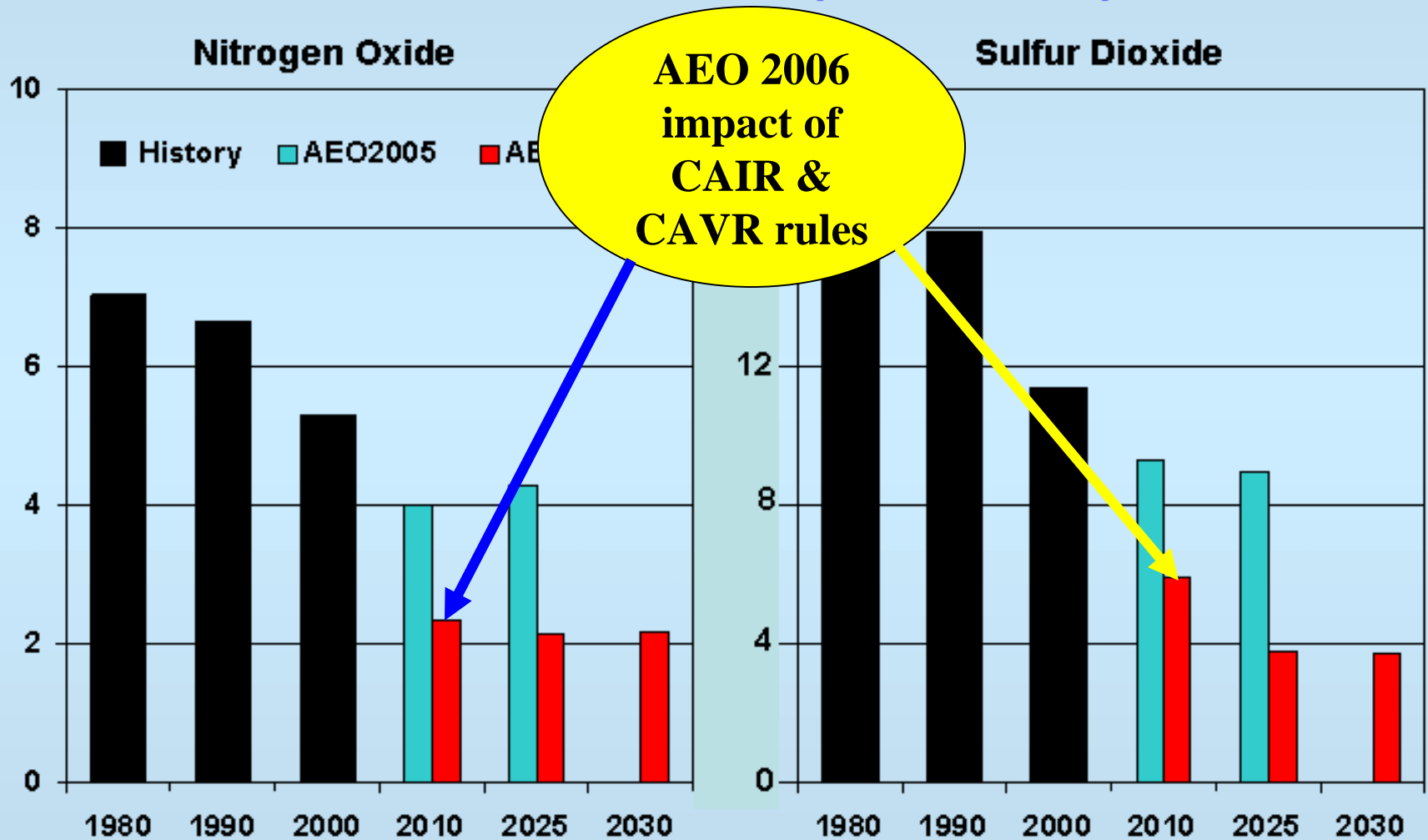
Changes in Coal-Based Electricity & Emissions Since 1970



Source: EIA Annual Energy Review 2003 (Sept. 2004), EPA National Emissions Inventory Trends (Dec. 2004)

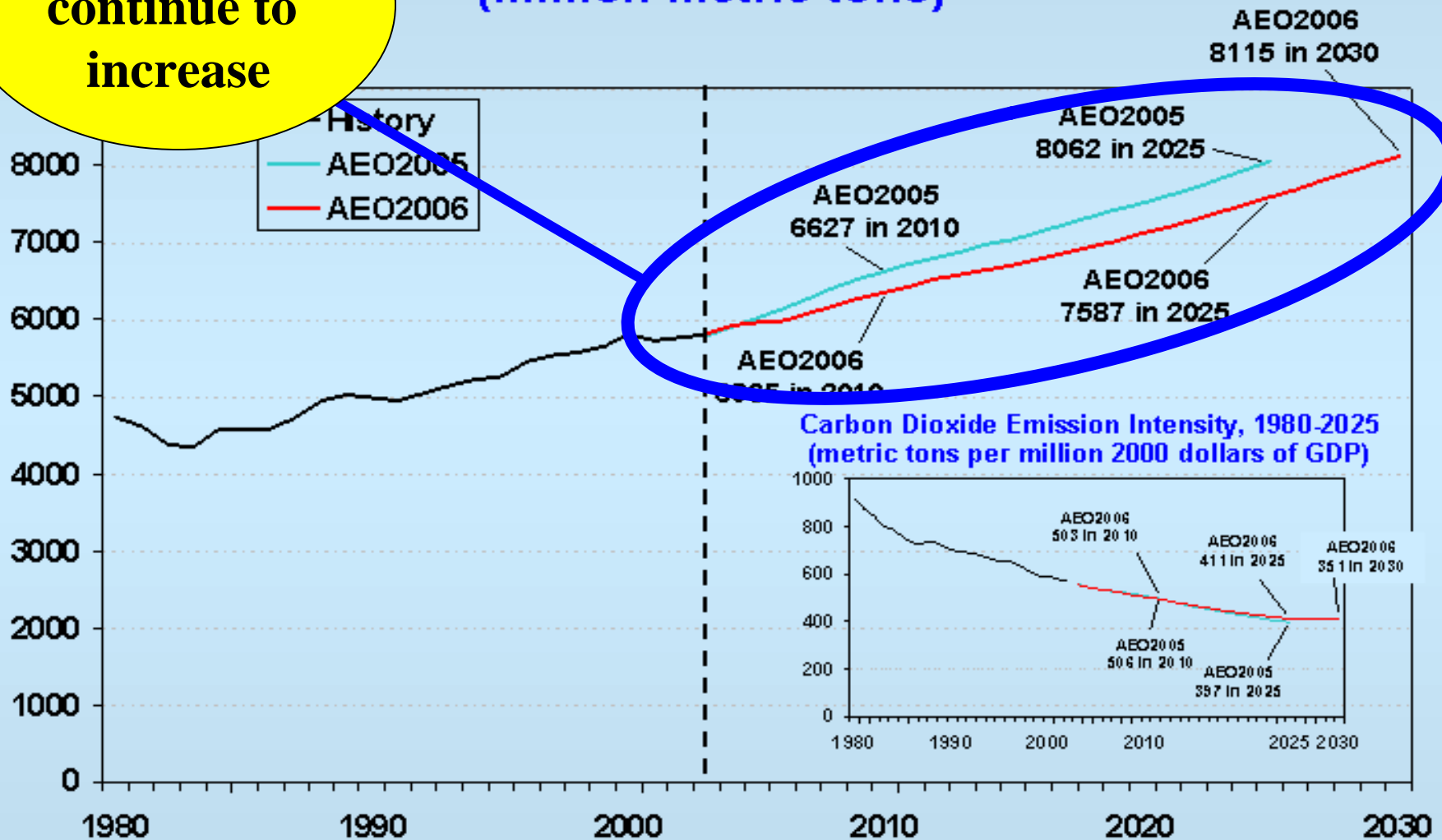
Environmental Impacts of Increased Electricity Generation

Emissions in the Electric Power Sector, 2010, 2025, and 2030 (million tons)

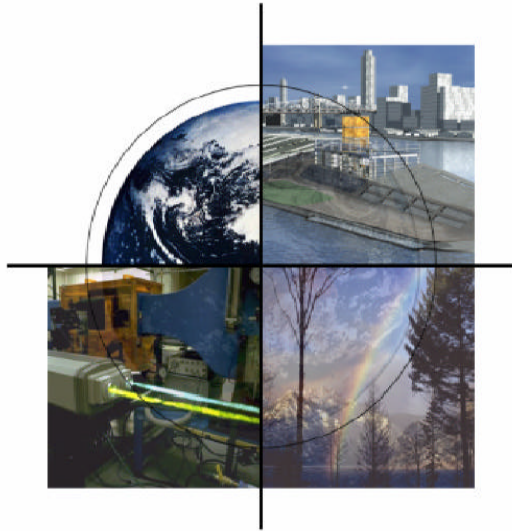


**CO2 emissions
continue to
increase**

Related Carbon Dioxide Emissions, 1980-2030 (million metric tons)



Clean Coal Technology Roadmap “CURC/EPRI/DOE Consensus Roadmap”



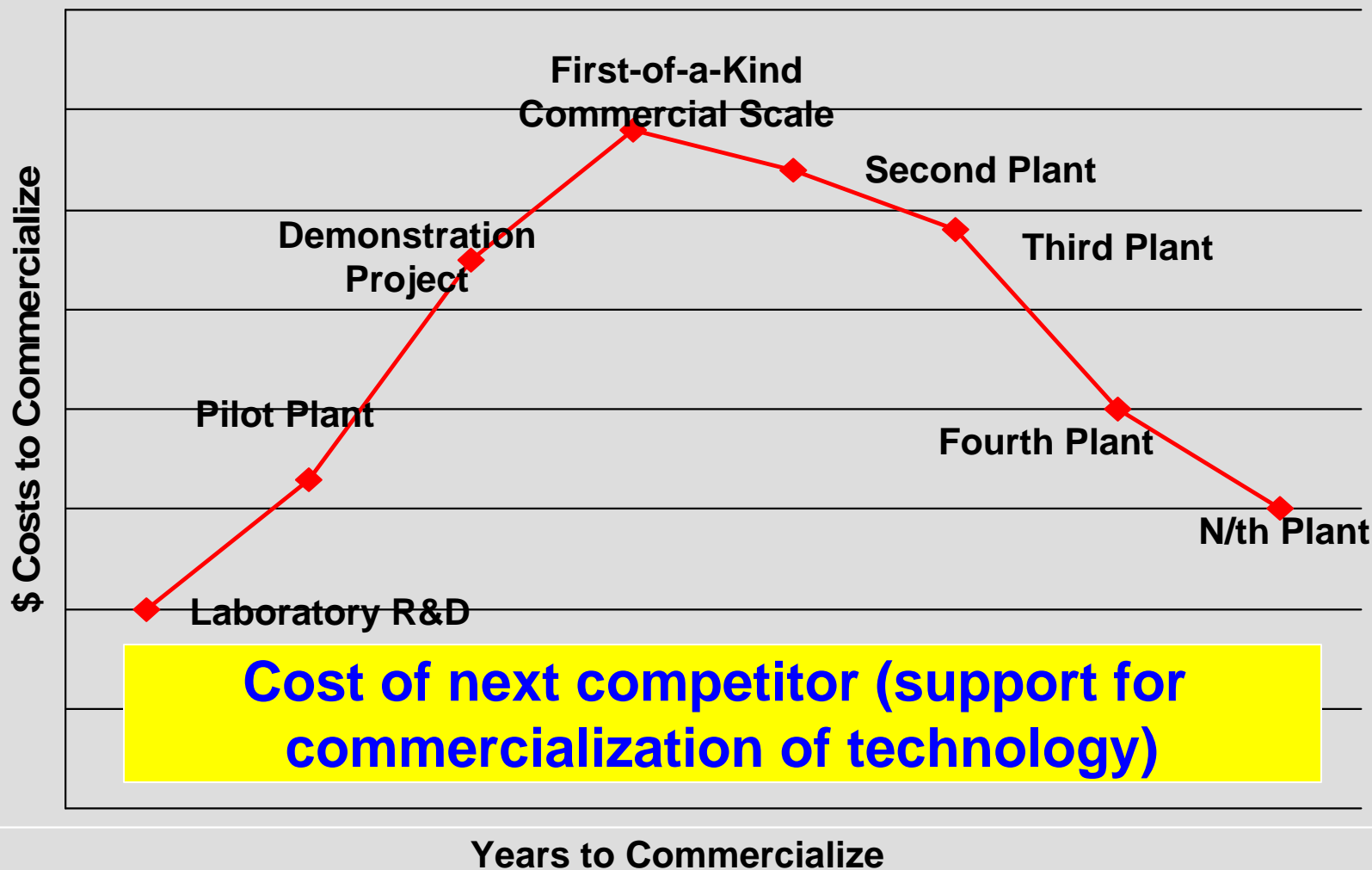
Department of Energy, the Electric Power Research Institute,
and the Coal Utilization Research Council

<http://www.netl.doe.gov/coalpower/ccpi/pubs/CCT-Roadmap.pdf>

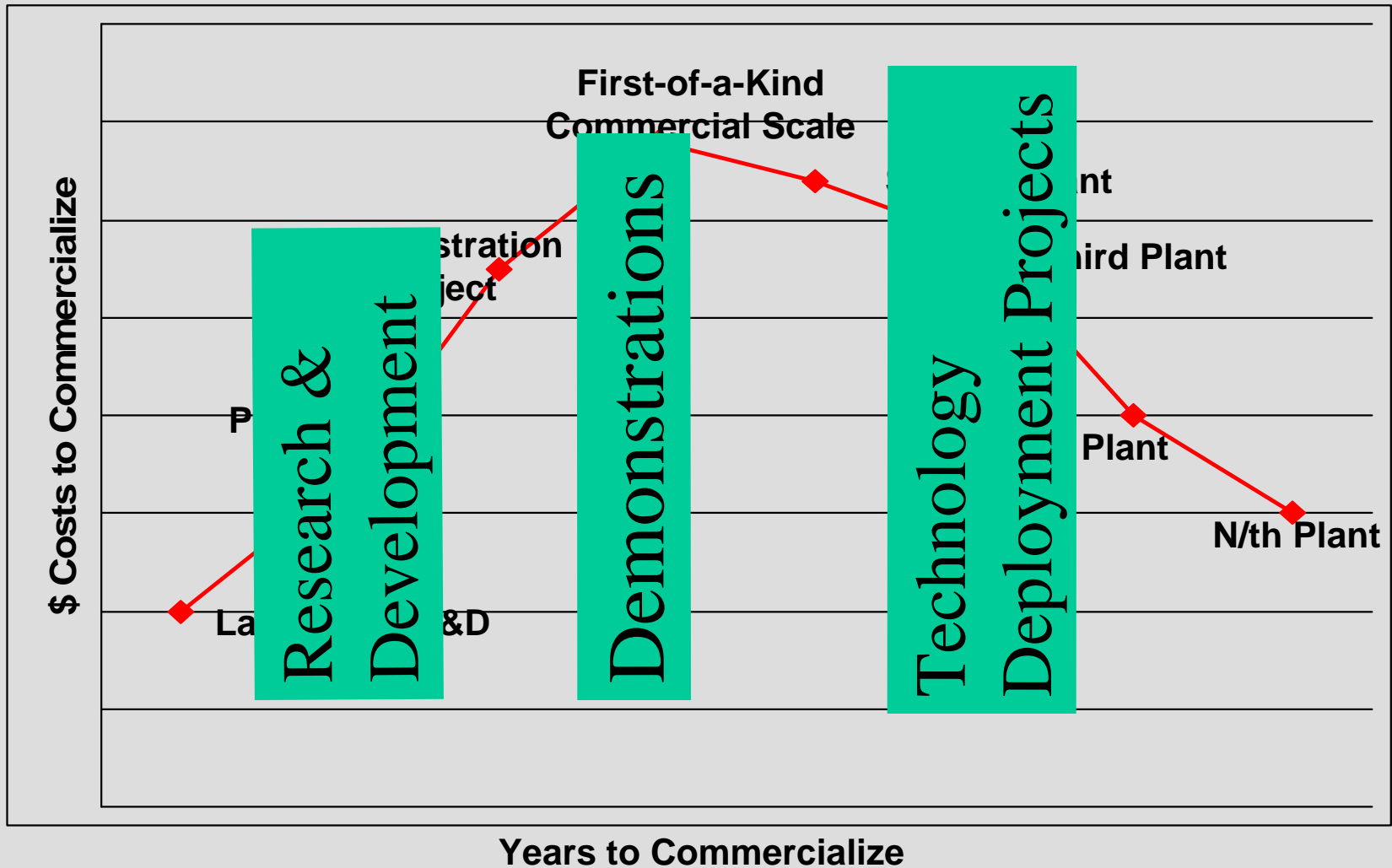
The existing Roadmap is
on DOE/NETL website
and at www.coal.org

- A “Roadmap” can establish clear goals and a pathway to achieve them.
- CURC, EPRI, and DOE collaborated to create a roadmap for coal-based technologies.
- Technology Goals: Cleaner, more efficient, cheaper.
- An update is now being developed by CURC/EPRI to reevaluate development costs.

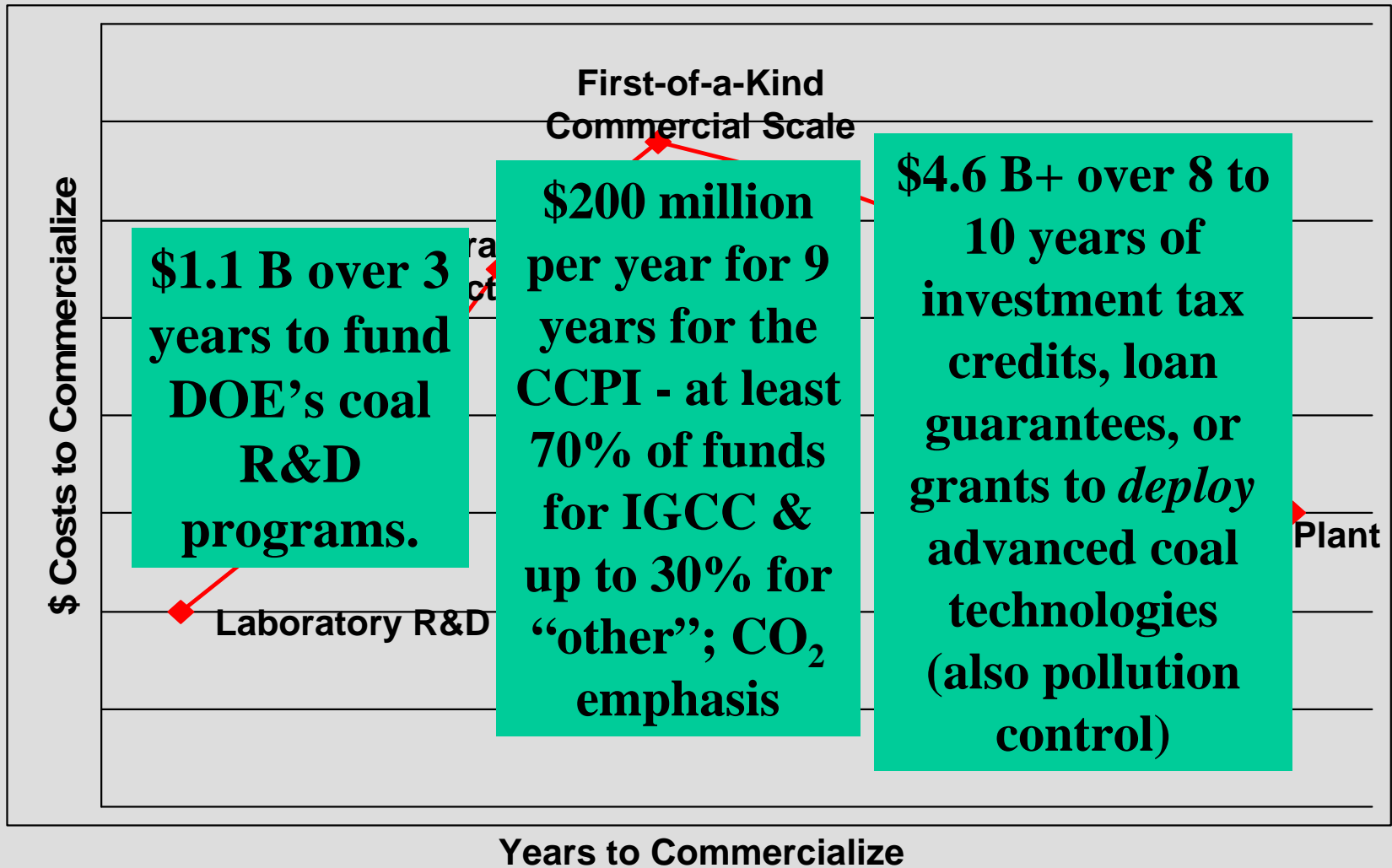
Frame of reference for consideration of coal technology development



Technology Development Path



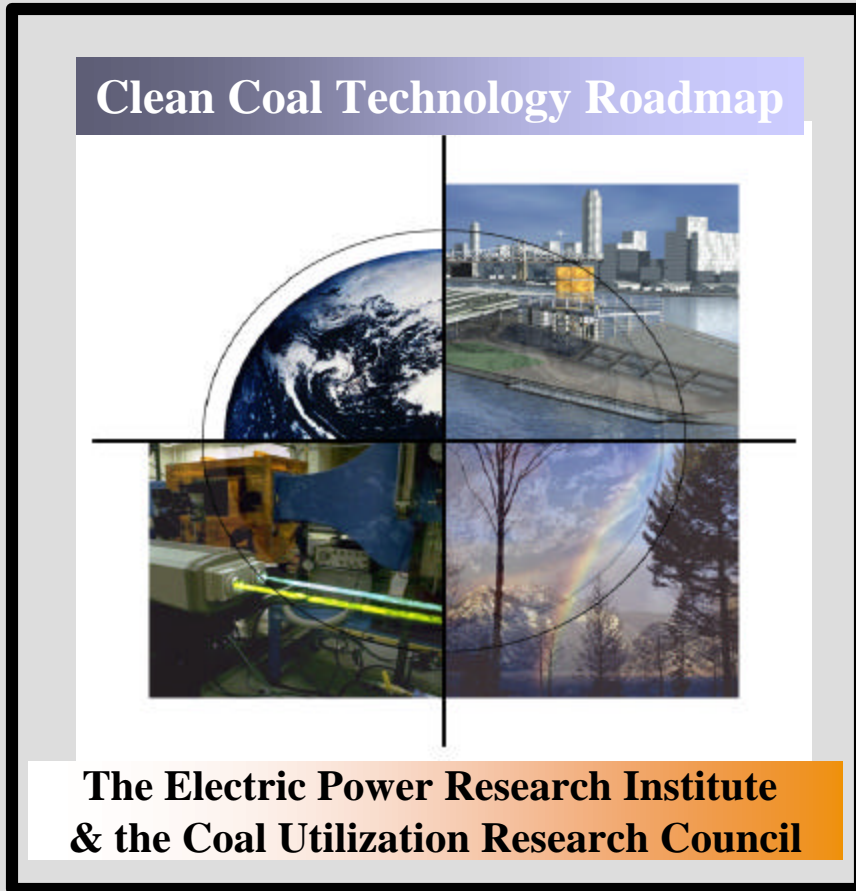
Technology Development Path



What was included in EPA Act'05 for clean coal?

- **Coal technology R&D programs**
- **Clean coal technology demonstrations (CCPI)**
- **Investment tax credits for advanced coal-based generation technology (IGCC & advanced combustion)**
- **Loan guarantees for technologies to prevent, capture, sequester CO₂ and GHG**

EPAct Authorizations for Coal R&D



- CURC/EPRI Roadmap
~\$380 million/year
- Section 962 of EPAct provides \$1.1 billion over three years – FY 2007 \$367 million
- DOE FY 2007 budget request -- \$271 million

EPAct Authorizations for Coal

CURRENT STATUS

\$380 million/year needed

vs.

\$367 million/year authorized

vs.

\$271 million requested



The Electric Power Research Institute
& the Coal Utilization Research Council

PRI Roadmap

million/year

62 of EPAct

es \$1.1 billion

er three years – FY

2007 **\$367 million**

- DOE FY 2007 budget request -- **\$271 million**

Cooperative Agreements for clean coal demonstration projects (CCPI)

- **Clean Coal Power Initiative (CCPI)**
- **9 years, \$200 million (US) per year**
- **70% of funds for IGCC or CO₂ capture projects**
- **Accommodates coal ranks, site elevation**
- **FY 2007 Budget Request for CCPI program -- \$5.0 million (funding level is totally inadequate)**

CURC efforts to increase CCPI funding

- **CURC is seeking a 3rd CCPI solicitation in CY 2006-2007**
- **DOE will require \$250 to \$300 million to conduct a 3rd solicitation**
- **\$74.0 million currently available**
- **Additional \$50+ million potentially available from other CCT projects**
- **CURC's FY 2007 budget request: \$150 million**
- **Without the demonstration program (CCPI) carbon capture technologies will not be developed**

Tax Incentives for the Power Generation Sector in EPAct 2005 (Code Section 48A)

- **10 year program**
- **\$800 million (US) for IGCC (5 to 6 plants)**
 - **20% tax credit for gasification property**
- **\$500 million (US) for advanced PC (3 to 5 plants)**
 - **15% tax credit for entire facility**
- **Program implemented – Feb. 21, 2006**
- **Variety of clarifying questions from CURC regarding program requirements**

Tax Incentives for Industrial Gasification in EPAct 2005 (Code Sec. 48B)

- **10 year program**
- **\$350 million (US) for qualifying fuels (including coal, pet coke, biomass, other)**
- **20% investment tax credit (maximum \$130 million per project)**
- **Program implemented by Feb 21, 2006**

Section 48(A) Tax Credit Application & Certification Process for CY 2006 (Initial Round) From February 21, 2006 to October 2, 2006

Project Proposer must submit two applications
(1) Application for DOE certification
– submitted by June 30, 2006
(2) Application for IRS certification
under §48A

Step 1

DOE accepts/rejects application, and if accepts, provides certification to IRS by October 1, 2006

Step 2

IRS notifies taxpayer applicant by November 30, 2006 whether accepts or rejects IRS application for certification under §48A

- If accepted, IRS will state amount of credit allocated to the project

Step 3

- Taxpayer must execute a “closing agreement” with IRS by January 31, 2007. A “successor in interest” must execute a separate closing agreement if project transfers or their credit is forfeited.
- Taxpayer has 2 years from date of IRS acceptance of §48A application to evidence environmental authorizations and steam turbine purchase, except for retrofit or repower.
- Project is certified (to receive credits) after IRS is notified that the taxpayer has complied with above 2 requirements.

Step 4

Project must be placed in service within 5 years of receiving certification

CURC Questions & Comments

Regarding the IRS Notice

- **Variety of questions & concerns raised by CURC members:**
 - Nameplate capacity
 - Definition of “project”
 - Coal (and other) feedstock input
 - Prioritization and Policy Considerations
 - Certification process
 - Treatment of confidential information
- **DOE responses:**

http://www.netl.doe.gov/business/faq/tax_credit.html

Senate bill 2401: additional tax incentives for IGCC & industrial gasification

- **Chairman Chuck Grassley & Ranking Democrat Max Baucus introduced the legislation**
- **\$500 million for IGCC & \$500 million for industrial gasification**
- **Significant because the Senate Finance Committee Chairman and the Ranking Democrat introduced**
- **If opportunity presents itself, they may act; uncertain what the House Ways and Means Committee would do**

Loan Guarantee program in EPOct 2005

- **Loan guarantees for “innovative energy technologies” that avoid, reduce or sequester air pollutants or GHGs**
- **Applies to coal, pet coke, biomass, nuclear, carbon sequestration, renewables**
- **No cap on the amount of project debt to be guaranteed**
- **Full, faith and credit of the U.S. government on up to 80% of total project cost**
- **Funded through government dollars or *project funds***
- **DOE now considering elements of implementation**

DOE's Loan Guarantee program & CURC's Current activities

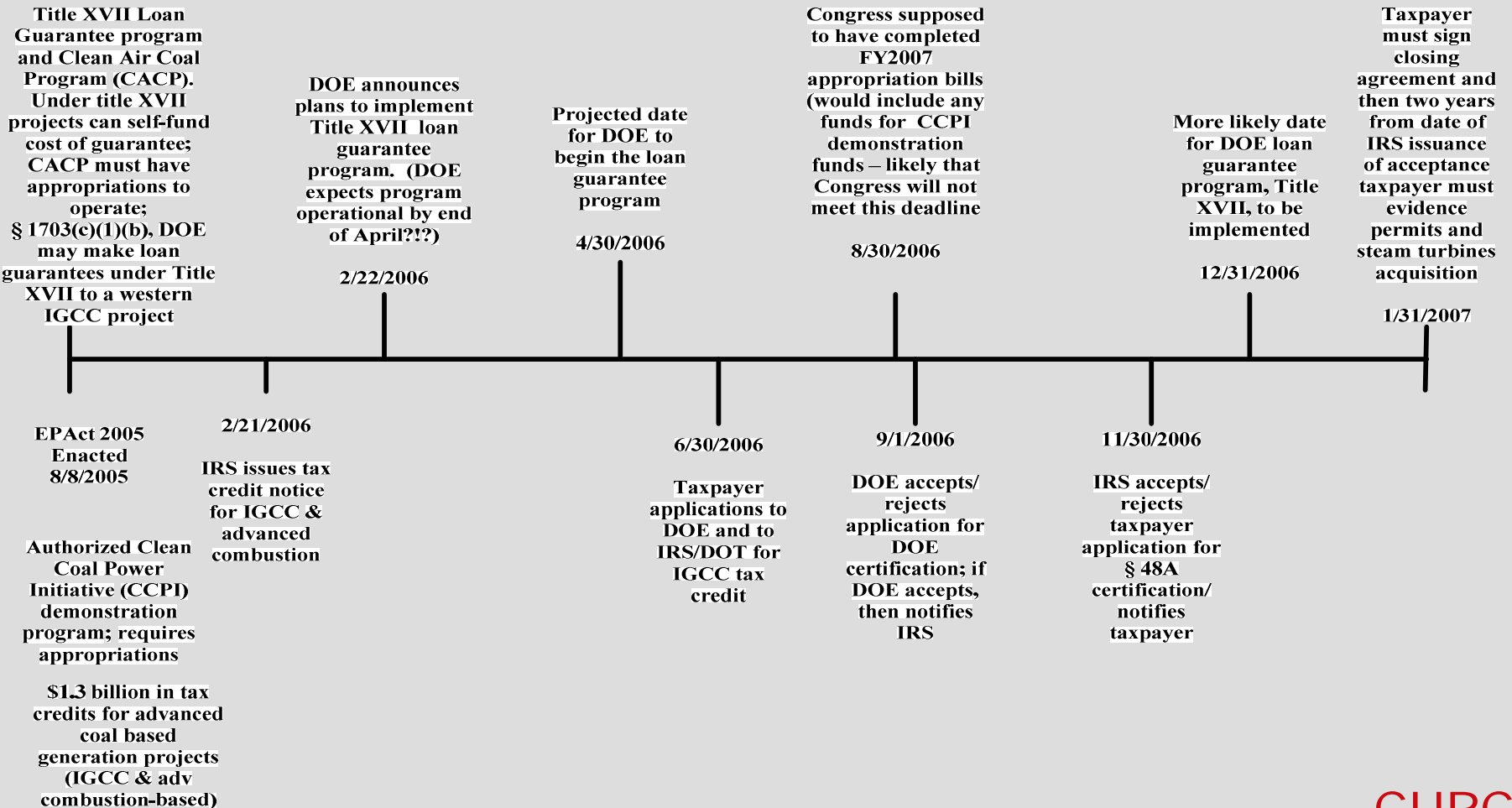
- **DOE has established a loan guarantee office**
 - **Seeking funds to operate**
- **Intend to launch the loan guarantee program by early Fall, 2006 (or sooner)**
 - **Negotiating loan guarantees in 2007??**
- **CURC and NEI are have developed a list of issues/concerns relating to the organization/structure of a loan guarantee program**

Concerns about Potential Elements of the Loan Guarantee Program

- **Will the loan guarantee program be limited to first-of-a-kind commercial-scale project?**
- **Will an appropriation of federal dollars be required to initiate the program?**
- **How much project debt will the loan guarantee cover? (lender risk?)**
- **What portion of a project will the loan guarantee cover? (“tranches” of risk?)**
- **How will probability of default be decided?**

Advanced Clean Coal Project Timeline:

Critical calendar year 2006 dates to apply for or to consider with respect to federal government financial incentive programs



Climate Change Legislation

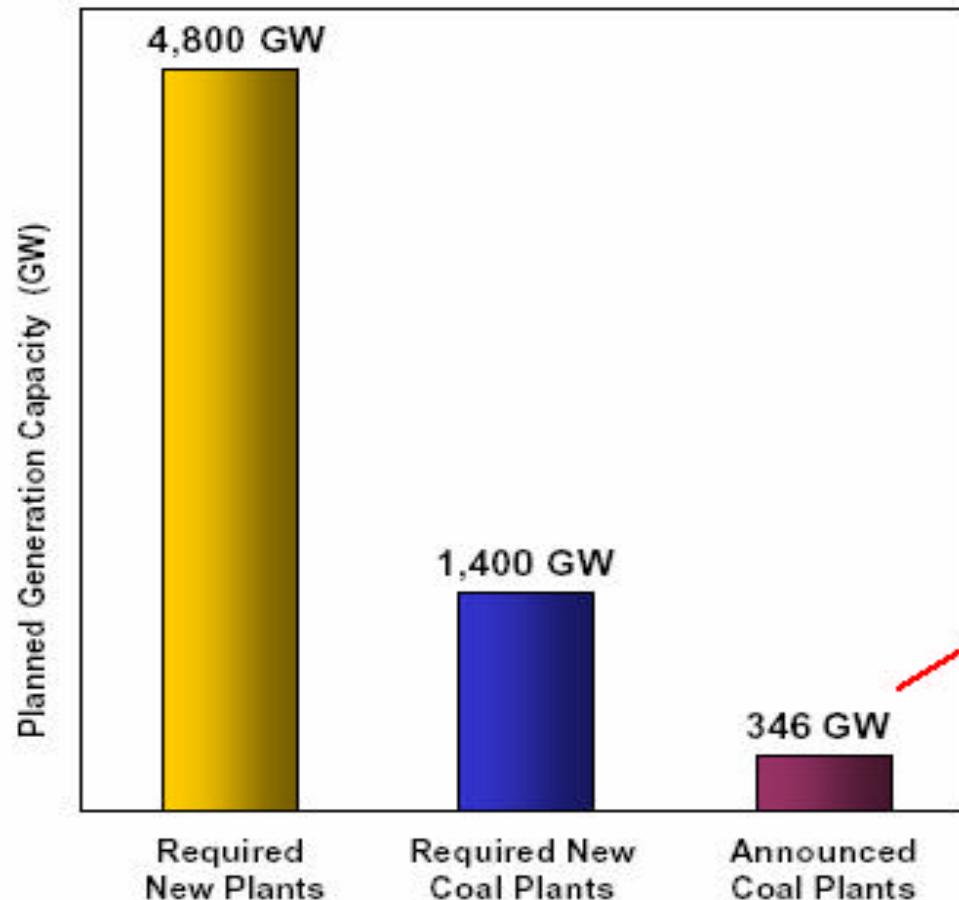
- **Where is GHG legislation going in 2006?**
 - **Probably, no where**
- **Is Congress likely to enact a mandatory program to regulate carbon?**
 - **Maybe, in the future, and as early as post-President Bush & if the House turns Democratic**

External Pressures for response to perceived changes in the climate

- **Pressure continues to build on corporations through shareholder demands**
- **Ceres, Boston-based coalition of investment funds and environmental organizations ranking companies re: financial risks and opportunities from climate change**
- **Bernstein Research report on CO2 regulation projects**
 - **next five years enactment**
 - **utility winners and losers (nuclear vs coal)**

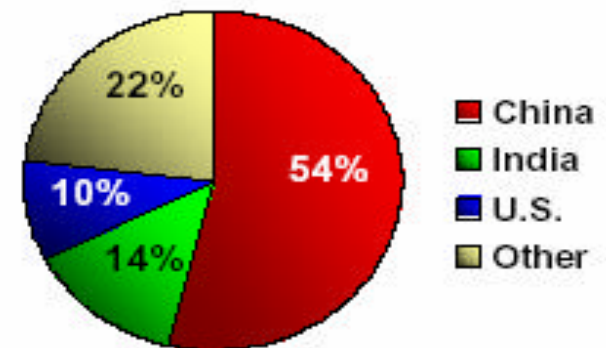
A Global Build-Out of New Generation Has Begun

Planned Global Electricity Generation Capacity



- The world requires 4,800 GW of generating plants by 2030
- 1,400 GW of new coal plants projected
- Just one-quarter of this has been announced
- 346 GW requires 1.2 billion tons per year of coal

78% of Announced Plants are in China, India & U.S.



Source: International Energy Outlook & Platts Database.

Is Technology the Answer?

- **What happens to technology -- development and deployment -- if a mandatory program is installed?**
- **Is coal-based technology a reasonable solution?**
 - **Costs?**
 - **China & India?**
- **Will industry compliance strategies include the adoption of new coal-based technologies?**
- **What about the existing fleet?**
- **Whose going to pay for development and deployment? Do we have enough time?**