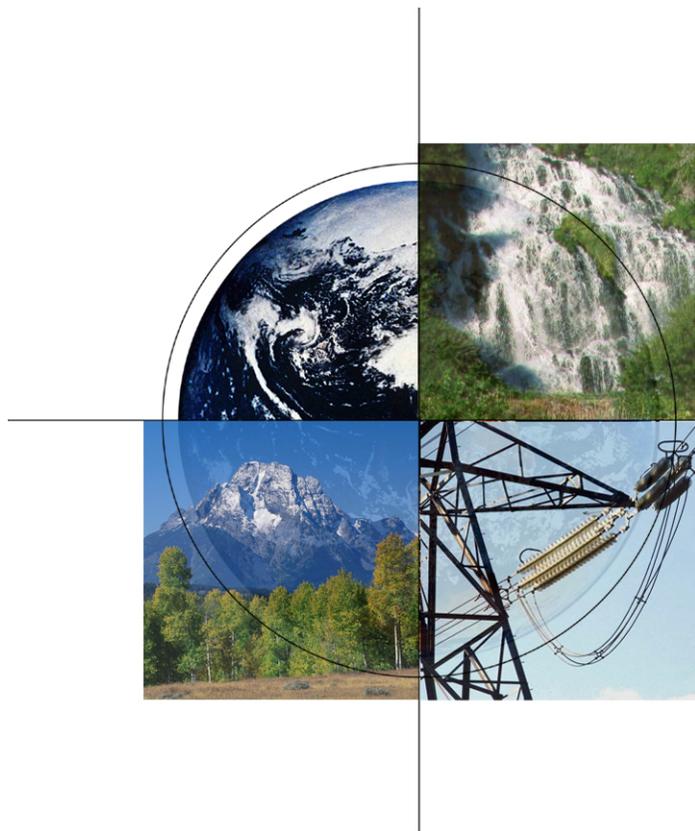


The DOE-NETL Mercury R&D Program



Mercury Control Technology R&D Program Review Meeting

*July 14-15, 2004
Pittsburgh, PA*

*Joseph P. Strakey
Associate Director, NETL*

National Energy Technology Laboratory



Innovations for Existing Plants

Program Components

- **R&D Activities**

- **Mercury control**
- NO_x control
- Particulate matter control
- Air quality research
- **Coal utilization by-products**
- Water management



DOE-NETL Mercury R&D Program

- Driven by pending mercury regulations and policy decisions
- Develop advanced cost-effective control technologies
- Provide sound science and technical knowledge



Skating to where the puck is going...

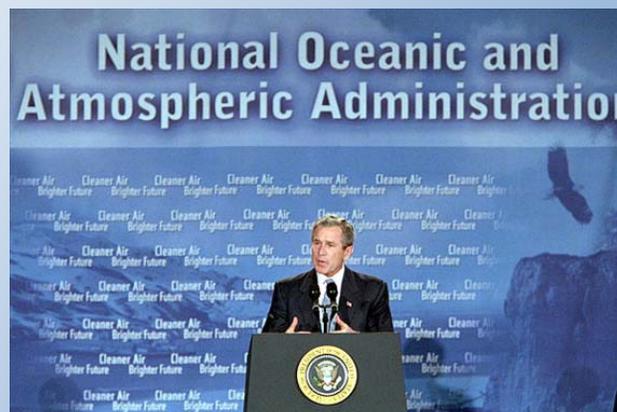
Mercury Regulation or Legislation

Regulation:

- EPA proposal issued 12/15/03
- Several alternatives for control offered for comment
- **Maximum Achievable Control Technology (MACT)**
 - Plant-by-plant – no trading
 - Approx. 29% reduction to 34 ton by 2007/08
- **Cap & Trade**
 - FGD/SCR co-benefit (29% reduction to 34 ton [est.] by 2010)
 - 15 ton cap (69% reduction) by 2018

Legislation:

- **Clear Skies Act of 2003**
 - Cap & trade
 - 34 ton cap (29% reduction) by 2010
 - 15 ton cap (69% reduction) by 2018



President Bush Announcing Clear Skies Initiative February 14, 2002

Reactions to Mercury Rule

New Mercury Rules Get Heavy Response

By THE NEW YORK TIMES

Published: June 29, 2004

Hearing attacks mercury proposal

Libby George, Star Tribune Washington Bureau Correspondent
July 10, 2004

Mercury rule a test for Leavitt

By Christopher Smith
The Salt Lake Tribune

EPA Must Deliver More Stringent Mercury Rule, Says NRDC

EPA Mercury Reduction Proposal Penalizes Pennsylvania Coal; Plan Harms State Economy by Favoring Western Coal

PR Newswire, 06.30.04, 2:39 PM ET

MERCURY RISING

EPA needs tougher rules on emissions
Newsday.com, July 8, 2004

Interest in mercury rises

Flood of public comment should prompt emission controls

www.heraldtribune.com Article published Jul 6, 2004

Reduce mercury in every state

DenverPost.com, July 8, 2004

The top command at the U.S. Environmental Protection Agency may need to don flak jackets and helmets: The EPA has been bombarded with 600,000 public comments about its proposed rules on mercury pollution

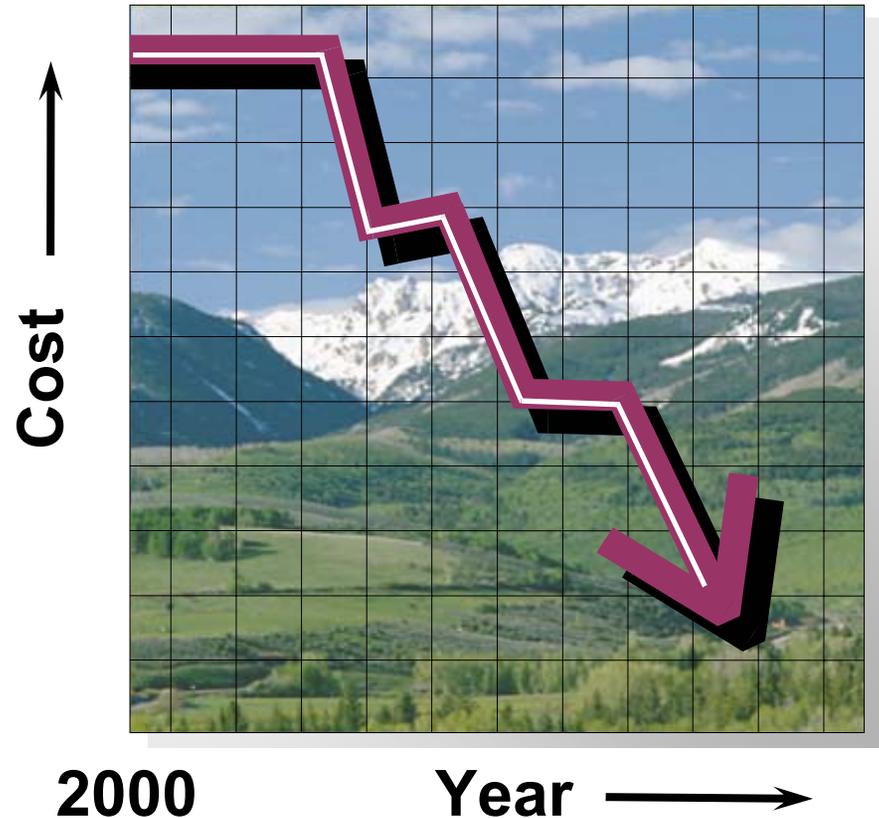


DOE-NETL Mercury Control Program

R&D Goals

Have control technologies ready for commercial demonstration:

- **Near-term, reduce emissions 50-70%**
 - By 2005 for bituminous coal
 - By 2007 for low-rank coal
- **Long-term, reduce emissions 90% by 2010**
- **Cost 25-50% less than current estimates**



Baseline Costs: \$50,000 - \$70,000 / lb Hg Removed



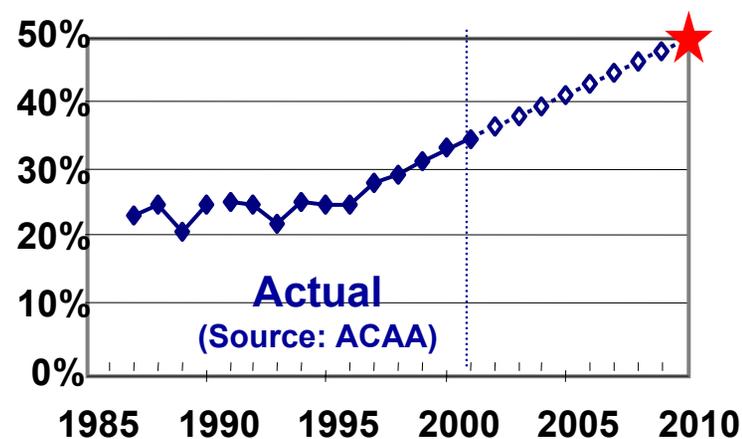
DOE/NETL's Coal Utilization By-Products *R&D Goals*

- Goal is to increase CUB beneficial use to 50% by 2010

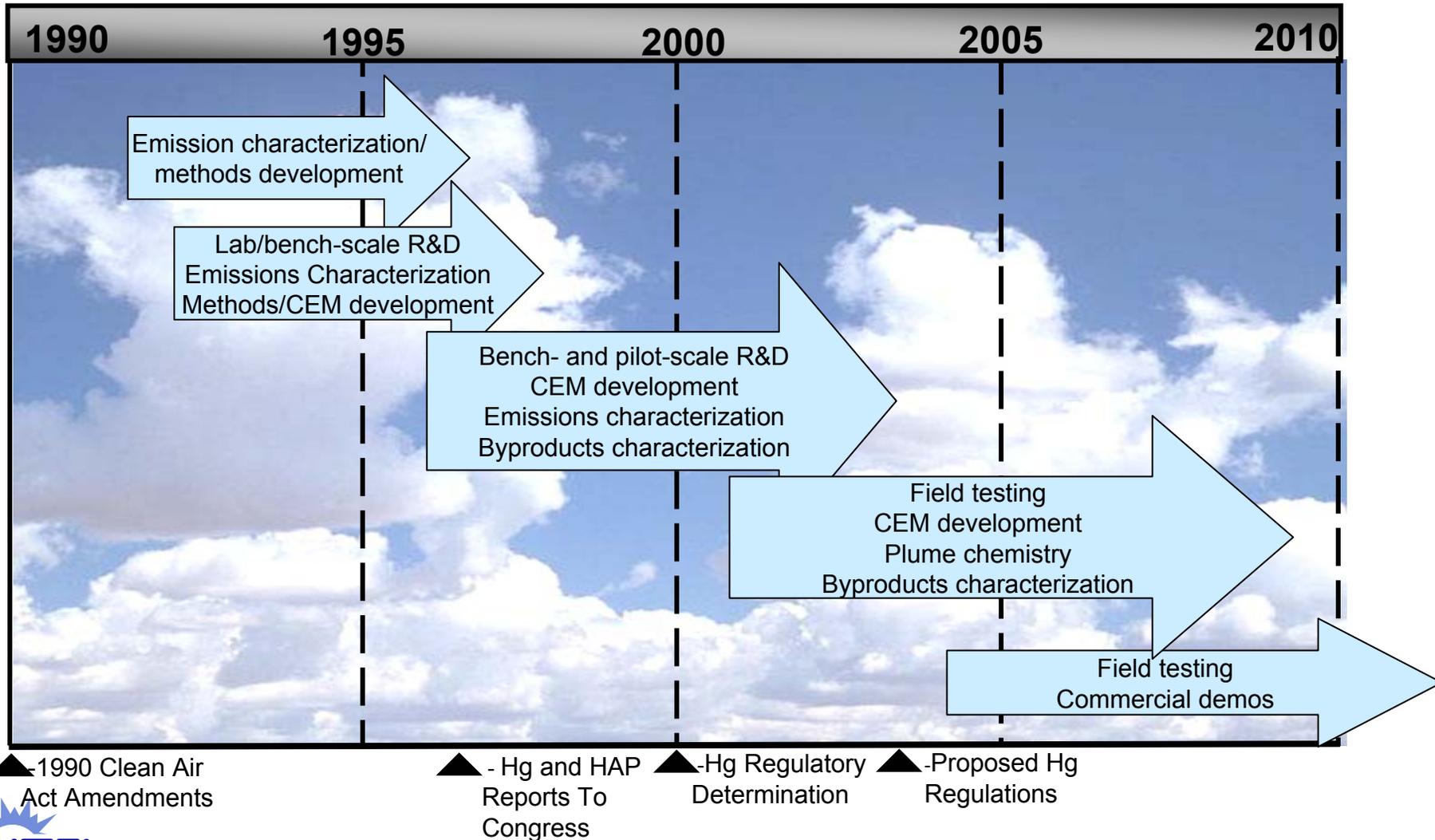
- Program components

- Evaluating leaching and volatilization characteristics of Hg and other metals
- Demonstrating reuse applications
- Developing carbon-fly ash beneficiation technologies

- Research includes products from advanced coal gasification and FBC technologies

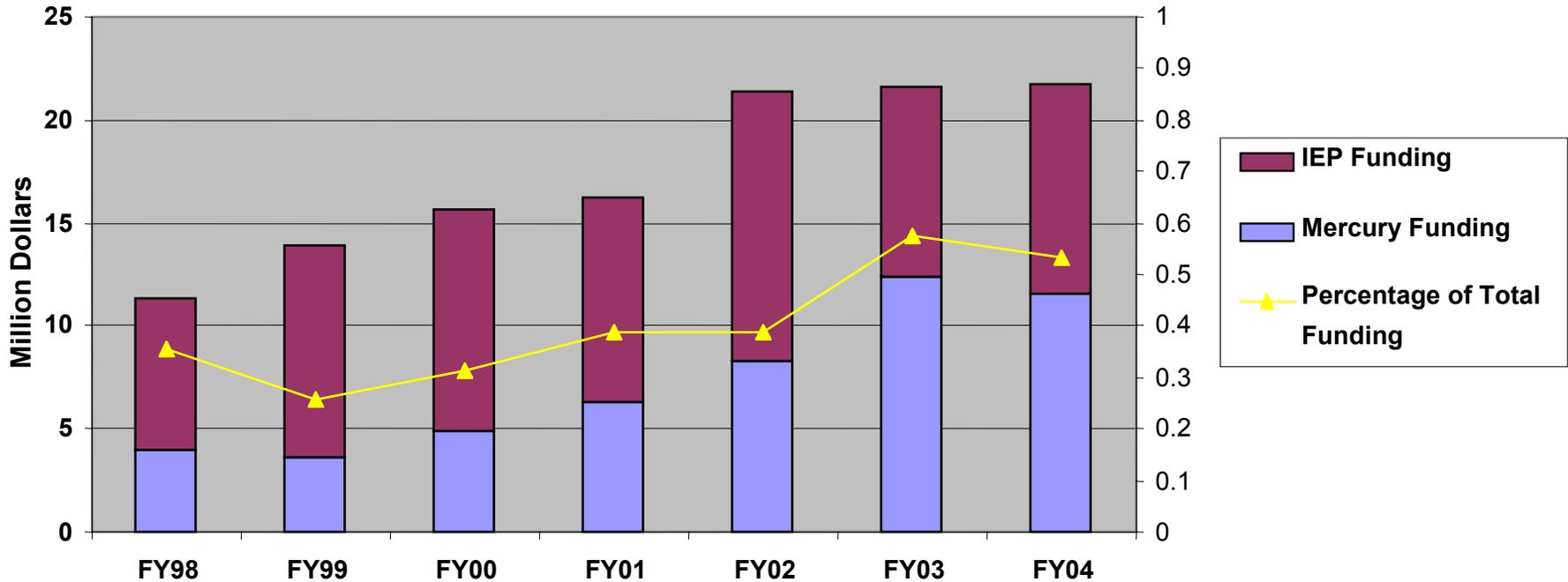


Over a Decade of DOE/NETL Hg R&D



DOE/NETL Funding for Hg R&D

Fiscal Year Mercury Funding



Over \$52.5 million spent on mercury R&D over the past seven years



DOE/NETL New Phase II, Round 1 *Mercury Control Field Test Projects*

- Eight new projects selected in September 2003
- Focus on longer-term, large-scale field testing
- Broad range of coal-rank and air pollution control device configurations
- Sorbent injection & mercury oxidation control technologies



DOE/NETL New Phase II, Round 2 *Mercury Control Field Test Projects*

- **Proposals received end of April 2004**
- **Focus on technologies for plants that burn low-rank coal**
 - Powder River Basin
 - Texas Lignite
 - Coal blends



CCPI Priority Technologies

Future CCPI Rounds

- **Emission control**
 - Mercury
 - NO_x

- **Advanced Power Technologies**
 - Improved efficiency/lower capital cost
 - Sequestration friendly
- **Sequestration**

Round 2

Round 3

Round 4

**Technologies
for Clear
Skies
Compliance**

**Technologies
For Zero-
Carbon
Emission
Plants**

**Program
Goals**



EPRI's TOXECON™ Retrofit for Mercury and Multi-Pollutant Control

- **DOE/NETL CCPI Demonstration Project**
 - Multi-pollutant control with PRB coal
 - 90% Hg reduction
 - 70% SO₂ reduction
 - 30% NO_x reduction
- **Latest CCPI solicitation proposals received June 2004**
 - Mercury control
 - Gasification

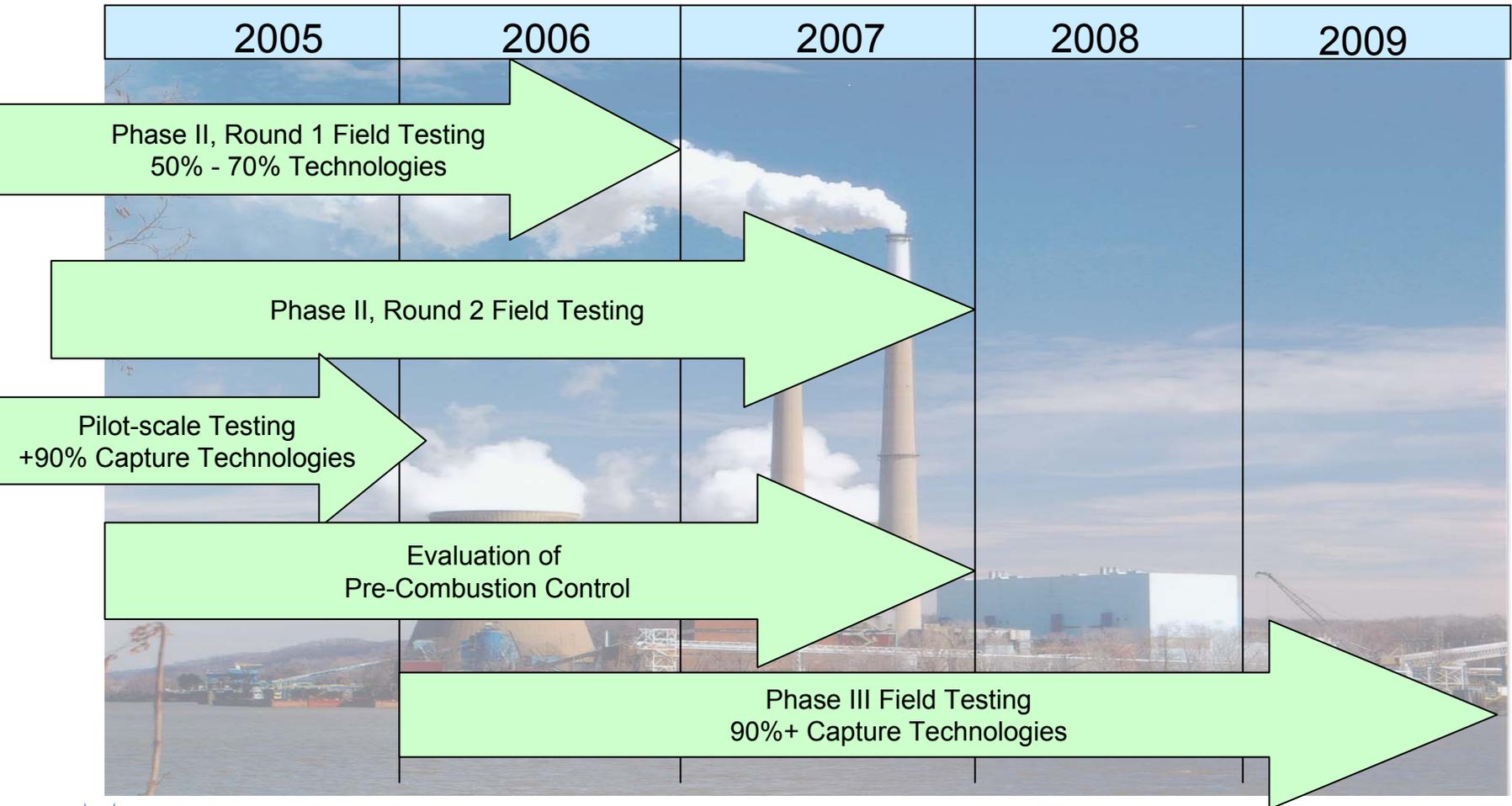


*We Energies Presque Isle
Power Plant*



DOE/NETL Mercury Control Technology R&D

Future Plans - 5-Year Horizon



DOE/NETL Environmental and Water Resources *Innovations for Existing Plants Program*

NETL - Environmental & Water Resources - Microsoft Internet Explorer

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NATIONAL ENERGY TECHNOLOGY LABORATORY
ENVIRONMENTAL & WATER RESOURCES WEBSITE

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July 13, 2004

Environmental and Water Resources
Innovations for Existing Plants

Leading the way in the development of environmental science and technology

The Environmental and Water Resources Product Line is focused on the development of environmental control technologies for retrofitting to existing power plants, with application to new plants as well. The Technology Line also provides key scientific and technical data on emerging environmental regulatory and policy issues.

Mercury Emissions Control
Coal Utilization By-Products
Air Quality Research
PM Emissions Control
Advanced NOx Emissions Control
Water - Energy Interface

NEWS:

- A comprehensive summary [PDF-207KB] of NETL's research directed at the environmental characterization of coal utilization byproducts, with a focus on the fate of mercury, is now available.
- "DOE-NETL's Mercury Control Technology R&D Program for Coal-Fired Power Plants" [PDF-3.5MB] presented June 23, 2003 at the AWMA 97th Annual Conference & Exhibition Mercury and Power Generation Panel.
- Power Engineering Magazine Features NETL Invention - Power Engineering magazine, in the May 2004 issue, contained an article about a technology that uses ultraviolet light to oxidize and remove mercury from coal-fired power plants. The technology was invented by researchers at NETL. It has been licensed for commercial development.
- A new study, "Estimating Freshwater Needs to Meet 2025 Electricity Generating Capacity Forecasts" [PDF-158KB] has been posted.

www.netl.doe.gov/coalpower/environment

