

CoalFleet for Tomorrow: General (Technical) Meeting

Status Report on Federal Government Programs

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Federal government CCS Incentives

- **Federal loan guarantee program (Title XVII)**
- **Federal tax incentives (§48A and §48B)**
- **FY 2009 DOE Appropriations request for coal**
- **S. 2191 Lieberman-Warner climate change bill**
- **Status of CURC's near-term program and the CURC-EPRI long-term RD&D clean coal technology Roadmap program**

TITLE XVII LOAN GUARANTEE

Program Update

Current Loan Guarantee Program

- DOE currently considering loan guarantee applications for \$9.0 billion in loan guarantees, including central station fossil fuel plants
- Also, DOE plans to issue two additional loan guarantee solicitations this summer (2008) for up to \$38.5 billion

Schedule for Issuance of Loan Guarantee Solicitations

- The second round of solicitations will be issued no later than June 2008
- The second round of solicitations will focus on:
 - Efficiency, renewable energy and electric transmission projects (up to \$10 billion);
 - Nuclear power facilities (up to \$18.5 billion); and
 - Nuclear facilities for the “front-end” of the nuclear fuel cycle, including uranium enrichment (up to \$2 billion).
- The third round of solicitations, planned for later in the summer will focus on advanced fossil energy projects (up to \$8 billion).

Federal Tax Incentives

Program Update

Current Tax Incentive Awards

- Tampa Electric IGCC project cancelled
- Duke Energy IGCC project proceeding
- Southern Company/Mississippi Power IGCC project proceeding
- E on Kentucky pulverized coal project proceeding
- Duke Energy pulverized coal project proceeding

Current Tax Incentive Awards

- Treasury and DOE will select projects for up to two sub bituminous IGCC, one lignite IGCC, and two advanced PC projects by the end of April, 2008
- With Tampa Electric withdrawal, another solicitation issued with applications for IGCC bituminous coal due by May 2, 2008

Additional tax credits may be provided in a new tax extender bill

- Senate Finance Committee sought to provide >\$6.0 billion in tax incentives for CCS projects in 2007
 - Tax extender package was filibustered
- Finance Committee considering renewed effort to provide tax credit extensions
 - BUT renewable tax credit was extended in the pending housing bill
- Perhaps \$1.0 billion in §48A and B tax credits will be provided

FY 2009 DOE Appropriations Request for Coal R&D Programs

Update

President's FY 2009 Budget Request & Enacted FY 2008 Appropriations Measure

Technology Program (All figures in \$Millions)	FY 2008 Omnibus ¹	President's FY09 Request	CURC-EPRI Roadmap
IGCC/Gasification	53.5	69.0	80.0
Advanced Combustion		0.0	45.0
Advanced Turbines	23.8	28.0	45.0
Existing Plants	36.0	40.0	35.0
Carbon Sequestration²	119.0	149.1	50.0
Advanced Research	37.2	26.6	-
Coal Fuels & Liquids	24.7	10.0	-
Fuel Cells	55.5	60.0	78.0
TOTAL R&D	349.8	382.7	333.0
CCPI	69.4	85.0	400.0
FutureGen	74.3	156.0	215.0
PROGRAM TOTAL	493.5	623.7	948.0

¹ The CURC Sequestration program differs from the DOE program in that it funds only R&D activities; funding for the DOE large scale injection tests is reflected in the roadmap demonstration funding (CCPI Program). The CURC Sequestration R&D program reflects activities only to support regional partnerships and to develop MMV tools and procedures, and does not reflect CO₂ capture activities, which is funded through the power plant technology lines.

² Costs for pilot scale activities reflected in demonstration program costs

FY 2009 Appropriations

- House on aggressive schedule; Committee has distributed 302(b) allocations
- Senate has not distributed 302(b) allocations
- Considerable Congressional politics around the proposal to restructure FutureGen

FY 2009 Appropriations

- Clean Coal Power Initiative
 - FY 2009 Request - \$85 million
 - \$224 million available for the 3rd solicitation
 - Focus on CCS projects
 - Solicitation originally scheduled to be released in December 2007, schedule now uncertain
 - Industry repayment no longer required; resolves federal taxation issues

FY 2009 Appropriations

- FutureGen Proposed Restructuring
 - DOE seeks to conduct multiple 300 MW scale IGCC-CCS demonstration projects
 - Projects would capture (90%) and sequester at least one million tons of CO₂ annually for storage in saline reservoirs
 - DOE would request \$1.3 billion through 2020 to fund the projects
 - DOE solicited industry comments & proposes a new solicitation as early as June 2008

CURC Positions re: FY '09 funding requests & program directions

- CURC seeks added funding for several DOE coal R&D programs
- CURC opposes the restructuring of the FutureGen program
- CURC supports **separate** and additional funding for a CCS installation program and
 - Include combustion-based systems
 - Reduce 90% capture requirement
 - Increase dollars

S.2191 Lieberman-Warner Climate Change Legislation

Update

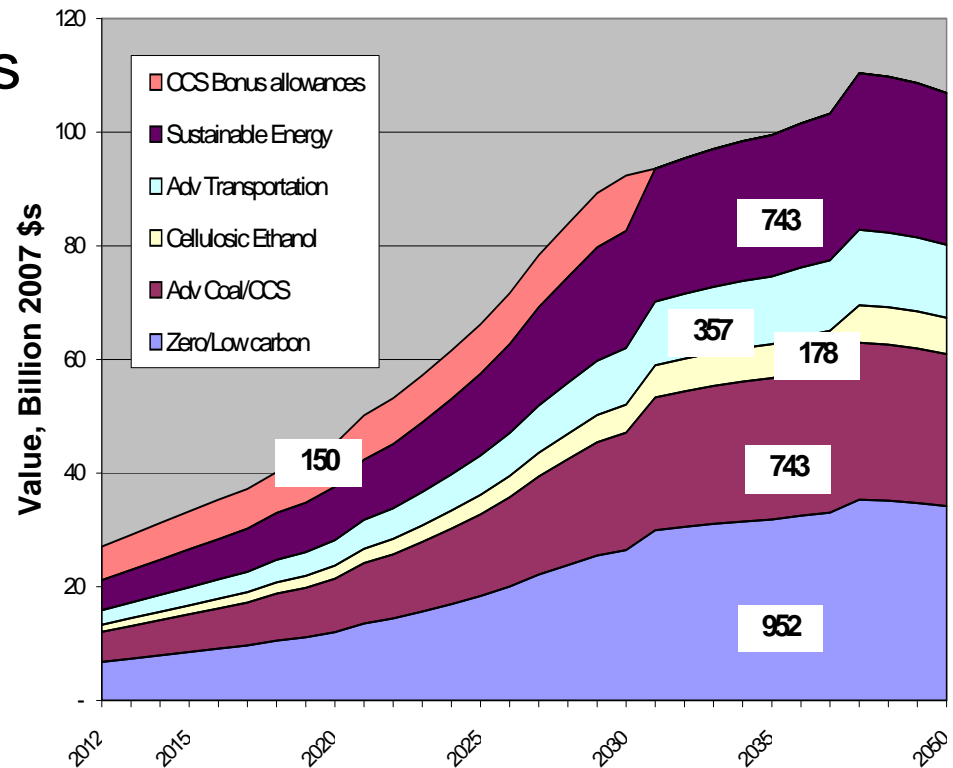
Current Status of Congressional Consideration of Climate Bills

- Senate scheduled to consider S. 2191 beginning June 2
- Uncertain whether Chairperson Boxer has 60 votes to override threatened filibuster
- House Energy and Commerce Committee still indicating that a bill will be developed later this year
 - Subcommittee Chairman Boucher looking for different approach from the Senate
- President Bush will discuss climate legislation today in a White House briefing

S.2191 has sufficient resources to fund advanced technology

- Bonus allowances and Advanced Coal incentives under §4403 total \$0.9 trillion, using EPA allowance values.
- But some technology issues remain.
- Coal doesn't need more money, just better management of funds.

S.2191 Technology Subsidies
(EPA Aclage model, 2006 scenario: Total = \$3.1 Trillion)



Identified Problems with CCS incentives in Lieberman-Warner – Focus on 1st Adopters

- **Timing of incentives (bonus allowances and funding from auctioned allowances)**
- **Eligibility criteria for incentives need to be relaxed**
- **§4403 funding “pools” must be modified**
- **Greater certainty (more specific terms/conditions) of eligibility for incentives required**
- **Funding for long-term RD&D needed**
- **Liability for stored CO₂ must be resolved**

Timeline for full-scale demonstration of an integrated CCS project (electricity + CCS)

2008 to 2012-15*	2012 to 2017	2017 to 2020	2020 to 2025
<p>5 to 7 years to plan, design, permit and construct a coal-fueled power plant equipped with hardware to capture CO₂ (assumes no opposition to proposed power plant)</p> <p>– timeline is reduced if planning, design or regulatory approvals for power plant construction already underway or completed</p>	<p>Power plant construction completed, initial power plant start-up & initiation of 5 year start up and testing program for CO₂ compression, transportation and storage (includes year one for CCS startup and commissioning, year two injection facility and well commissioning & years 3-5 for reservoir testing & stabilization</p>	<p>Design & permit power plants that are capable of capturing CO₂ emissions</p>	<p>Commence construction of power plants that will have CO₂ capture capability installed with CO₂ transportation and storage sites identified and under development</p>

*2012 date assumes a few plants are currently considering CCS options

Current CURC Activities related to S. 2191 and other climate legislation

- Promoting the two-part CURC CCS program
- Developing recommendations to address issues identified in S. 2191
- Organized CURC members into CO₂ working groups to collectively define status of CCS technology (meetings & May 22 workshop)
 - Combustion
 - Gasification
 - CO₂ sequestration

CURC Two-Part Program for CCS development and use

Update

IF CCS is the path forward to insure the continued use of coal then --

- What needs to be done?
- How long will it take?
- How much will it cost?
- How will it be paid for?

What needs to be done?

- Develop, demonstrate & deploy CCS technology
 - What is CCS technology?
 - CO₂ capture
 - CO₂ transportation
 - CO₂ injection & long-term storage
 - CO₂ monitoring & verification
- Increase the efficiency of coal-based power plants
 - The greater the efficiency in converting coal to useful energy the less CO₂ emitted
 - Each 1% increase in efficiency = ~2.5% decrease in CO₂
 - Increased efficiency = more energy/unit of coal

CURC's two-part program to develop & use technology to address CO₂

1. Longer term research, development and demonstration (RD&D) program
2. Near term CO₂ project (focuses on technology installation NOW)

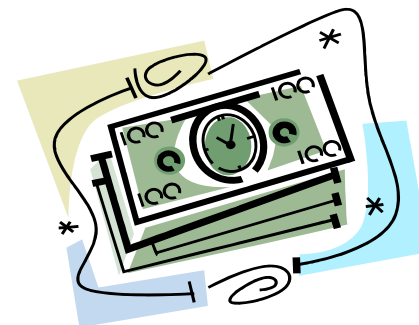
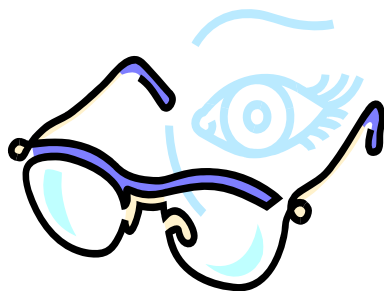
Summary of Long Term RD&D Recommendations

- Achieve emission reductions an “order of magnitude greater” than today’s best technology – SO₂, NO_x, PM, Hg and CO₂
- Energy conversion efficiency at coal fueled power plants of ~50% (today 35%)
- Advanced coal utilization power plants capable of capturing 90+% CO₂
- Long-term, safe and permanent storage of CO₂
- Affordable electricity

Summary of Near Term Recommendations

- Increase the efficiency of existing units and new advanced clean coal units
- Support “early adopters” who plan to demonstrate carbon capture & storage (CCS) projects
- Adopt legislation to create a predictable framework for CO₂ long term transport & storage (questions about risk & liability)

What's Needed to Achieve the Two-Part Plan?



How much time do we need?	Who must focus? Who's responsible?	How much \$\$\$ is needed?
<p><u>Long-Term RD&D:</u> Now through 2025</p>	<p>DOE supported and co-funded with industry participation</p>	<p><u>TOTAL RD&D: \$17.8 B</u> Federal - \$10.5 B Industry - \$7.3 B</p>
<p><u>Near-term CO₂ Program:</u> Now through 2023</p>	<p>Industry projects with federal tax incentives</p>	<p><u>TOTAL Near Term: \$37.8 B</u> Federal - \$15.4 B Industry - \$22.4 B</p>
<p style="text-align: center;"><u>TOTAL COST: \$56 B</u> Federal: ~ \$26 B Industry: ~ \$30 B</p>		

Coal Utilization Research Council

2008 Membership

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Alstom Power, Inc.
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Companies in red are Steering
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* Designates co-chairs of CURC

