

# **CoalFleet for Tomorrow: General (Technical) Meeting**

## **Federal Coal-Related RD&D and Implementation of EPA Act and American Recovery & Reinvestment Act Programs**

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Houston, Texas**

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# Status of Coal-based Power

- In 2008
  - 28 coal-based projects representing 12,572 MW were cancelled;
  - 4 projects were added representing 1,390 MW; and
  - 6,424 MW (10 projects) were announced.
- With respect to the status of new coal capacity projects
  - 30 projects representing 13,353 MW are in the early permitting stage;
  - ~33 projects representing 17,883 MW have been approved;
  - 11 projects have been permitted representing 5,000 MW; and
  - 40 projects have advanced representing 18,881 MW (as of the end of January, 2009).

# Focus of Discussion

## **I. Funding sources for CCT & CCS:**

- 1. FY 2009 & FY 2010 DOE fossil energy appropriations**
- 2. Clean Coal Power Initiative (CCPI)**
- 3. Loan Guarantee (Title XVII) program**
- 4. Tax credits (§§48A, 48B and 45Q) for CCS**

## **II. Waxman/Markey CO<sub>2</sub> legislation related to carbon capture & storage (CCS)**

## **III. CURC proposed 5-point *Coal w/CCS Program*©**

# Funding Sources for CCS

## DOE fossil energy appropriations

- March, 2009 Congress passed the FY 2009 Omnibus Appropriations bill
- President Obama submitted a FY 2010 budget request -- no specific levels per Executive Branch department
  - Democratic Congress passed a “budget resolution” that retained the majority of the President’s request but without the funds from a CO2 cap & trade bill
- President will order his Cabinet to reduce the federal budget by \$100 million

# Funding Sources for CCS

## Clean Coal Power Initiative (CCPI)

- Original application due date January 15, 2009
- Economic stimulus bill added \$800 million – new total for CCPI III (current solicitation) = \$1.5 B
- DOE intends to issue a 3 month extension
- Funds must be obligated (projects selected) by September 30, 2010
- Projects must
  - Capture 50% & sequester 300K tpy of CO<sub>2</sub>
  - No 70/30 split & no minimum//maximum per project
  - 75% US coal input & at least 50% of energy output for electricity

# Energy & Water Appropriations: FY 2009 Coal Program Budget

Technology Program (All figures in \$Millions)	FY 2008 Omnibus	FY 2009 Request	CURC-EPRI Roadmap	House Committee	Senate Committee	FY 2009 Omnibus
IGCC/Gasification	53.5	69.0	80.0	60.0	63.0	65.2
Advanced Combustion	-	0.0	45.0	-	-	-
Advanced Turbines	23.8	28.0	45.0	24.0	30.0	28.0
Existing Plants	36.0	40.0	32.0	40.0	50.0	50.0
Carbon Sequestration R&D Program <sup>1</sup>	119.0	149.1	50.0	220.0	149.1	150.0
Carbon Sequestration Injection Tests			110.0			
Advanced Research	37.2	26.6	-	26.6	30.0	28.0
Coal Fuels & Liquids	24.7	10.0	-	10.0	30.0	25.0
Fuel Cells	55.5	60.0	78.0	60.0	60.0	58.0
<b>TOTAL R&amp;D</b>	<b>349.8</b>	<b>382.7</b>	<b>440.0</b>	<b>440.6</b>	<b>412.1</b>	<b>404.2</b>
<b>CCPI (Demonstrations) <sup>2</sup></b>	<b>69.4</b>	<b>85.0</b>	<b>325.0</b>	<b>241.0</b>	<b>232.3</b>	<b>288.2</b>
<b>FutureGen <sup>3</sup></b>	<b>74.3</b>	<b>156.0</b>	<b>215.0</b>		-	-
<b>PROGRAM TOTAL</b>	<b>493.5</b>	<b>623.7</b>	<b>980.0</b>	<b>681.6</b>	<b>644.4</b>	<b>692.4</b>

1 CURC separately identifies specific programmatic activities and funding for R&D and CO<sub>2</sub> injection tests

2 The House Appropriations Committee recommends combining funding for the Clean Coal Power Initiative (CCPI) and FutureGen programs to establish a new Carbon Capture Demonstration Initiative (CCDI) which would be a new CCS demonstration program for FY 2009.

3 The Omnibus provides no new funds for FutureGen, but leaves \$73 million of unobligated balances in the FutureGen account for the Administration to determine how to expend.

# DOE Secretary Chu's view on CCS and Coal

- Chu noted , "Even if the United States turns its back on coal, China and India will not, and so, given the state of affairs, I would prefer to say let's try to develop technologies that can get a large fraction of the carbon dioxide out of coal. Start with 70, 80 percent, and build up to over 90 percent, but start now, and try to get it out."

# Funding Sources for CCS

## Loan Guarantee (Title XVII) Program

- **Round I Three coal projects under consideration by DOE (\$4.0 B available but other projects also selected for consideration)**
- **Round II \$8.0 B available for coal-based projects**
  - **6 projects selected to submit (March 23, 2009) final applications**
- **Additional information:**
  - **\$6B appropriated & ~\$60B in NEW authority for renewables and transmission project (APPA)**
  - **Congress (Democratic leadership) rejected proposal for \$5B of appropriations & ~\$50 B in authority for nuclear and coal projects**

# Funding Sources for CCS

## Tax credits (§§48A, 48B and 45Q) for CCS

- **\$1.25B available for §48A investment tax credits**
  - 30% ITC
  - Eligible projects: IGCC and advanced combustion that achieves 8530 Btu/KWh heat rate and retrofits
  - Minimum capacity: 400 MW
  - 65% CO<sub>2</sub> capture
- **\$250M available for §48B industrial gasification tax credits**
  - 30% ITC
  - Listed eligible industries or fuel inputs (e.g petcoke)
  - 75% CO<sub>2</sub> capture

# Funding Sources for CCS

## Tax credits (§§48A, 48B and 45Q) for CCS

- **Section 45Q Carbon Sequestration Credit**
  - \$10/metric ton of CO<sub>2</sub> used for EOR
  - \$20/metric ton for CO<sub>2</sub> stored in “secure geologic storage”
  - Limited to 75 million metric tons
- **Additional information:**
  - IRS expected to issue “guidance” (implementation rules) shortly
  - “1<sup>st</sup> come 1<sup>st</sup> served” is a problem
- **New section 48C Advanced Energy Project Credit**
  - 30% manufacturer’s credit includes CCS

# **American Recovery and Reinvestment Act of 2009 (HR 1)**

## **Funding provided for coal in HR 1**

- **\$1.0B for DOE coal R&D (a.k.a. FutureGen?)**
- **\$1.5B for an “industrial carbon capture program”**
  - **Industrial carbon capture & energy efficiency improvement projects and beneficial CO2 reuse**
- **\$800M for CCPI (total \$1.5B CCPI III program)**
- **Miscellaneous programs:**
  - **CO2 reservoir storage evaluation**
  - **Education and training**

# Waxman/Markey CO<sub>2</sub> Proposal

- The American Clean Energy and Security Act of 2009 (ACES) has four titles
  - Encourage clean energy development
  - Promote energy efficiency
  - Establish a U.S. cap and trade program, and
  - Provide support programs to ease the transition under a cap and trade program
- Subtitle B of Title I focuses on deployment of carbon capture and sequestration (CCS) technology. Provisions to –
  - Regulate geologic sequestration sites,
  - Address legal/regulatory frameworks for permitting geologic sequestration sites,
  - Assess constraints for carbon dioxide pipeline construction,
  - Provide incentives for demonstration and deployment of CCS technology, and
  - Establish performance standards for new and existing coal fired power plants.

# Waxman/Markey CO<sub>2</sub> Proposal

– Legislation provides incentives for demonstration and deployment of CCS technology

- **Carbon Capture and Sequestration Demonstration and Early Deployment Program**
  - Reflects bill introduced by Congressman Rick Boucher (D-VA), H.R. 1689
  - Authorizes utility referendum to conduct an assessment on fossil fuel generation
  - Proposes collection of fees from ratepayers for a source of funding to support large scale carbon capture and sequestration demonstration projects
  - Specified fee would be assessed for a 10 year period and would generate approximately \$1.0 billion per year

# Waxman/Markey CO<sub>2</sub> Proposal

– Legislation provides incentives for demonstration and deployment of CCS technology

- Commercial deployment of CCS – subsidy program:
  - Authorizes funding, subject to appropriations, for commercial deployment of CCS
  - Successive funding “tranches” for specified quantity of generating capacity
  - Payment per ton of CO<sub>2</sub> captured and sequestered, EPA determines payment level/amount of capacity per tranche
  - Payment covers incremental capital and operating costs taking into account allowance costs under cap and trade program
- Draft legislation does not specify –
  - length of time for payments to a project
  - total cap on the program (e.g. number of gigawatts of electric generating capacity with CCS authorized for funding)

# Waxman/Markey CO<sub>2</sub> Proposal

- Legislation establishes performance standards for new and existing coal power plants

## Power plant Performance Standards

### New Units:

- After 1/1/2015 = or < than 1,100 pounds of CO<sub>2</sub> per MWh
- After 1/1/2020 + or < than 800 pounds of CO<sub>2</sub> per MWh or meet more stringent standards as the EPA Administrator may establish

### Units Permitted after 1/1/2009 and before 1/1/2015

- Must emit no more than 1,100 pounds of CO<sub>2</sub> per MWh by the date established through the earliest of either --
- Four years after EPA determines that there are 2.5 GW of CCS nameplate generating capacity in commercial operation in the US capturing and sequestering at least 5 MTPY of CO<sub>2</sub>; or
- Four years after EPA determines that there are in 5 GW of CCS nameplate generating capacity in commercial operation worldwide that are capturing and sequestering at least 10 MTPY of CO<sub>2</sub>

# Waxman/Markey CO<sub>2</sub> Proposal

## Announced schedule for Climate Legislation

- Full Energy & Commerce Committee hearings week of April 20, 2009
- Subcommittee markup week of April 27, 2009
- Full committee markup week of May 11, 2009
- Reported out of E&C Committee before Memorial Day (May 22, 2009)

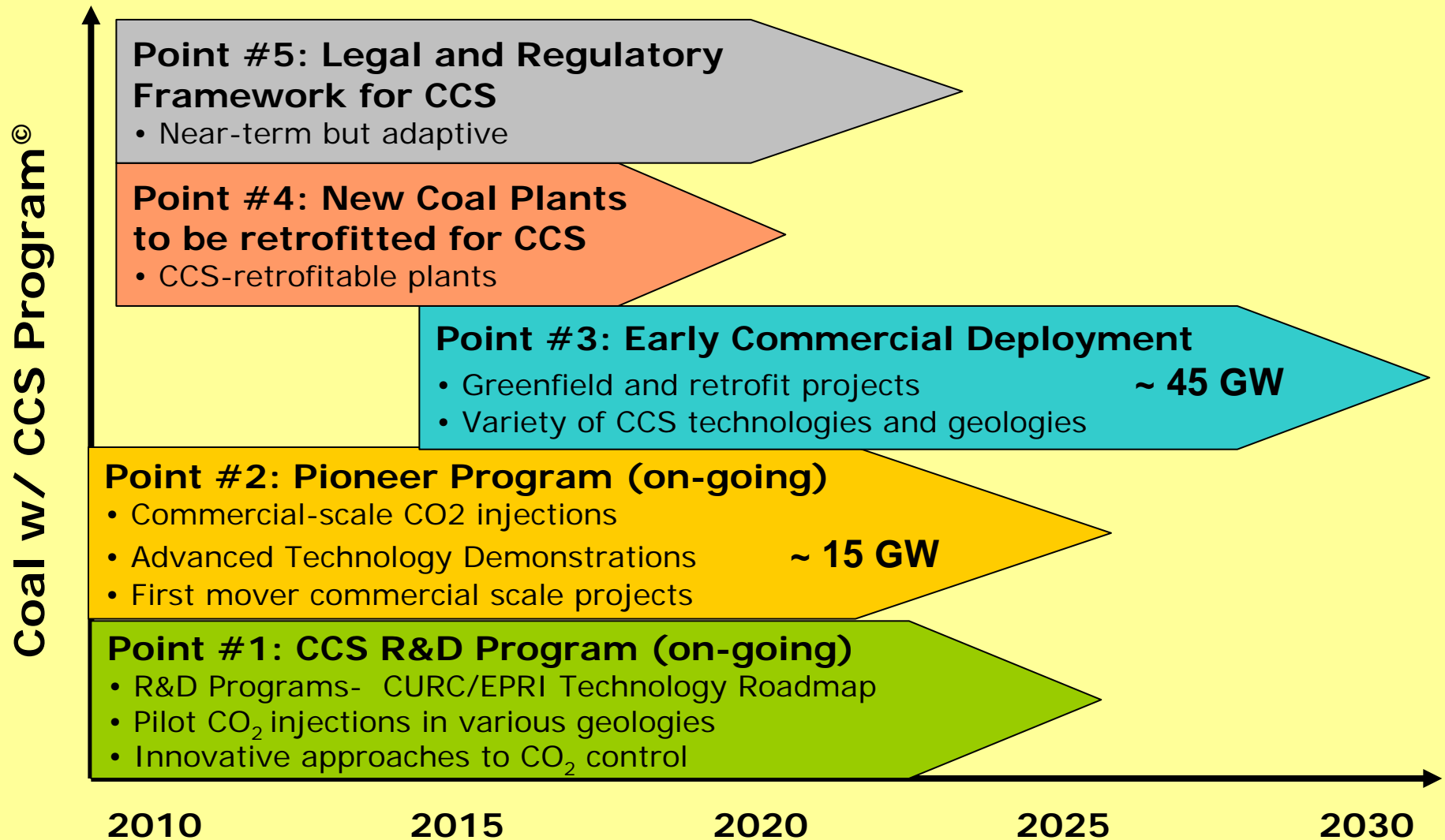
# CCS Demonstration & Deployment

**Elements of the 5-Point Program to Address CCS**

**Description of the 5-Point Program**

**Timeline for Implementation**

# The Five-Point Coal w/CCS Program ©



# A Mix of Actions Taken in Parallel Will Achieve the Fastest Results

- Ongoing R&D should continue
- **5 GW** (approximately) of demonstrations of current technology should be implemented now, along with independent (saline) CO<sub>2</sub> storage projects.
- **~10 GW** of “1<sup>st</sup> Movers” (commercially operated systems, not “test platforms”) should receive incentives (less so for EOR systems)
- **45 GW** of “Early Adopters” (technical problems solved; economic help still needed) should receive support, possibly via a “bonus allowance” or financial hedge approach.
- Total Program = **60 GW** of CCS; all but the final category (Early Adopter program) can start now

Pioneer Program