Energy & Air Quality Task Force
APPA

The State of Coal and Carbon Capture & Storage (CCS) in the Climate Change Debate

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CURC
COAL UTILIZATION RESEARCH COUNCIL℠

What is CURC?

- **Coal Utilization Research Council**
- **Based in Washington D.C.**
- **60+ members & Membership includes …..**
- **Focused upon coal related technology development and use**

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

- **Two topics:**

- Waxman/Markey CO_2 legislation related to carbon capture & storage (CCS)

- CURC proposed 5-point Coal w/CCS Program

Waxman/Markey CO_2 Proposal

- The American Clean Energy and Security Act of 2009 (ACES) 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_2 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_2 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_2 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_2 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_2 per MWh
- After 1/1/2020 + or < than 800 pounds of CO2 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_2 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_2; 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_2

Waxman/Markey CO_2 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

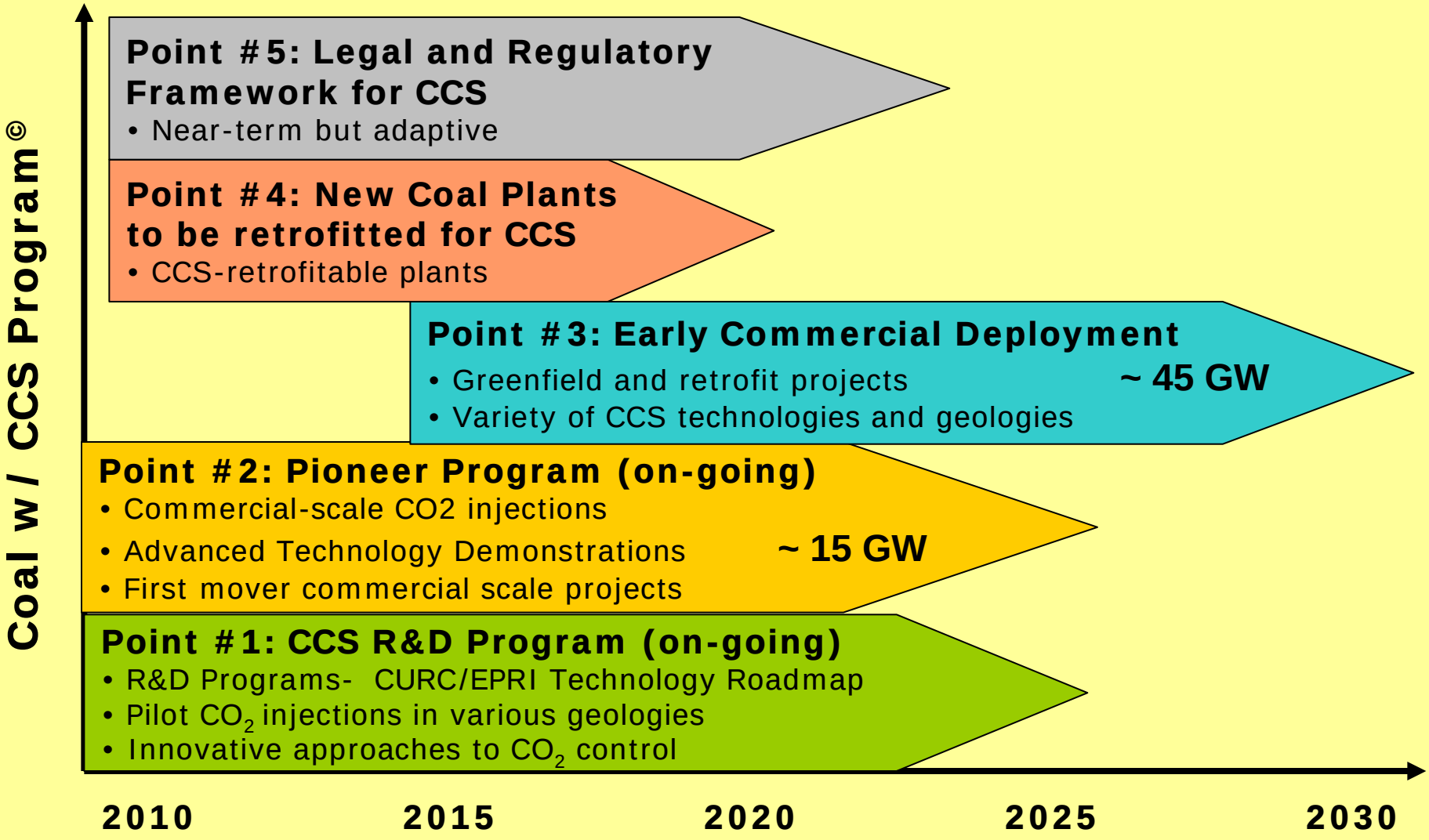
Description of the 5-Point Program

Timeline for Implementation

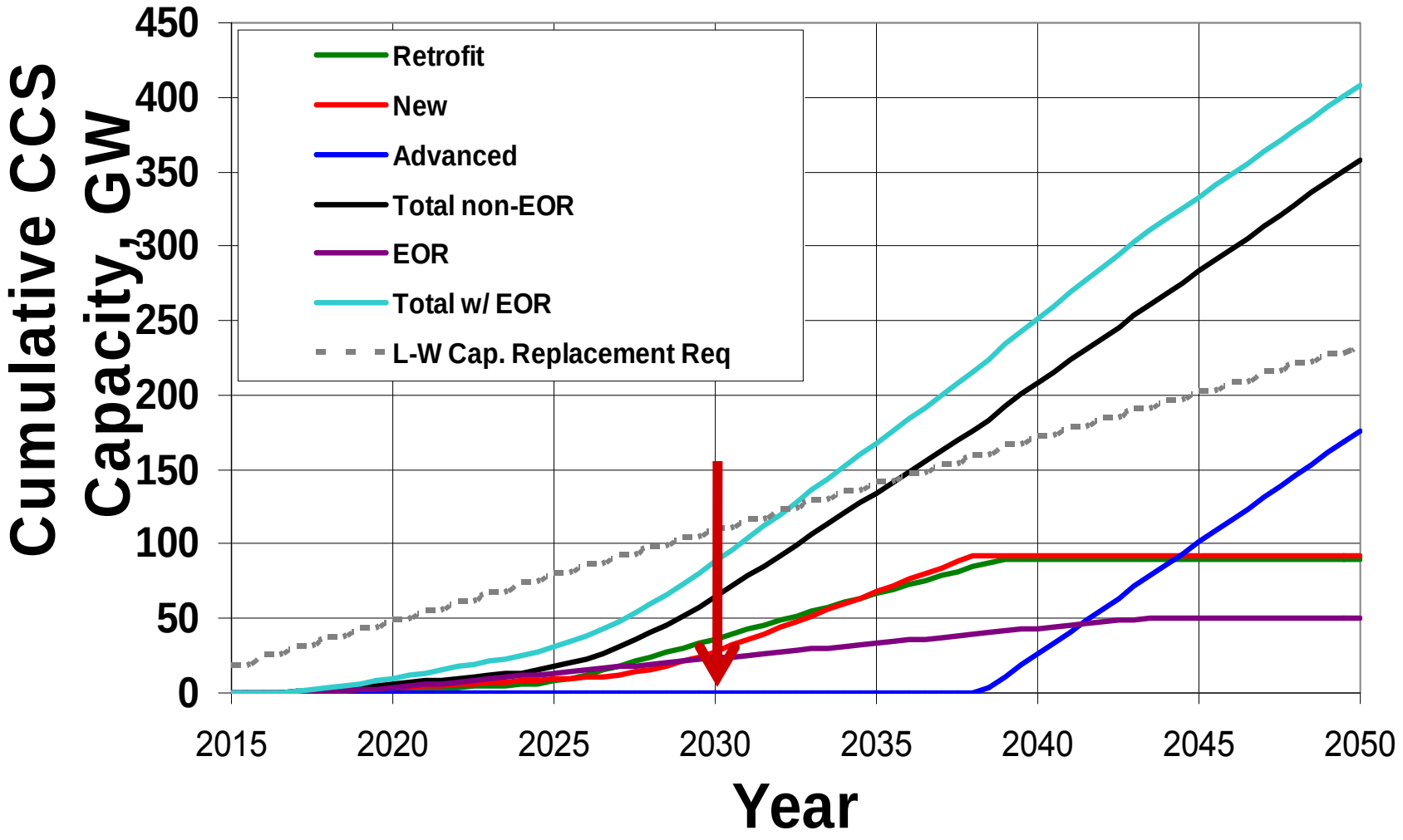
Acceleration of CCS deployment is needed to meet climate goals

- Most credible analyses conclude that CCS is an essential element of an aggressive climate change mitigation program.
- Ultimate cost reductions w/CCS could range from 35-40% of mitigation costs.
- But technology risk and high cost prevent immediate commercial deployment.
- Financial incentives can put CCS on the ground NOW, and accelerate the time when the technology is “self-deploying”.

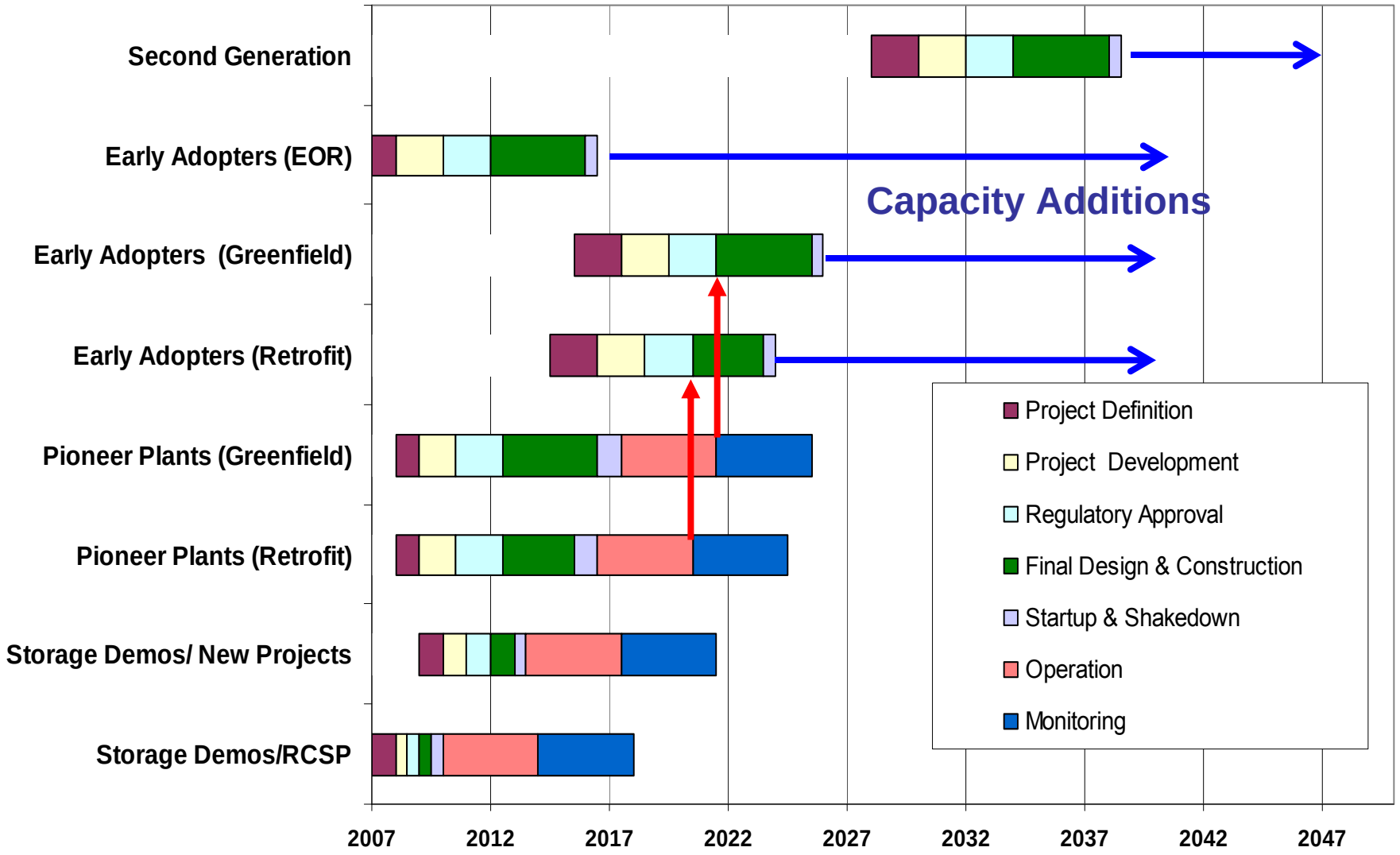
The Five-Point *Coal w/CCS Program ©*



CCS Capacity Addition



CCS Timeline



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

- Ongoing R&D should continue
- Pioneer Program
  - 5 GW (approximately) of demonstrations of current technology should be implemented now, along with independent (saline) CO_2 storage projects.
  - ~10 GW of "1st 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