



Advanced Coal Technology Work Group

**Update for CAAAC
September 20, 2007**

Purpose of briefing

- ▶ Review Work Group background
- ▶ Discuss Interim Report and Subcommittee feedback
- ▶ Update on Work Group progress
- ▶ Discussion

ACT Work Group

- ▶ CAAAC agreed to establish Work Group in September 2006 (under Subcommittee on Economic Incentives and Regulatory Innovation)
- ▶ First WG meeting: Jan. 2007
- ▶ Original charge:
 - ▶ Discuss and identify the potential barriers and opportunities to create incentives under the Clean Air Act for the development and deployment of ACTs, including technology to capture and store CO₂.
- ▶ Based on discussion, Work Group determined it appropriate and useful to examine opportunities outside the Clean Air Act.

ACT Work Group

- ▶ If additional 145GW of coal-fired capacity added by 2030, resulting CO2 emissions would equal 42% of emissions from all existing coal-fired plants in U.S.
- ▶ A fast-changing environment
 - ▶ Coal-fired power plants in OK, FL
 - ▶ Legal developments
 - ▶ Studies
 - ▶ Legislation
- ▶ A uniquely positioned group

ACT Work Group

- ▶ Wide spectrum of participants in a collaborative process
- ▶ Development of a set of recommendations and complementary actions to be undertaken by different stakeholders will provide greatest potential to accelerate the use of ACTs
- ▶ ACTs: suite of innovative processes and technologies designed to substantially reduce or eliminate the environmental footprint of coal-based energy production processes



Interim Report

Adv. Coal Technology Work Group

Interim Report

- ▶ Finalized and distributed to Subcommittee members in late June
- ▶ Interim Report Process:
 - ▶ Small teams prepared one-pagers on recommendation areas
 - ▶ Co-chairs assembled first draft of complete report
 - ▶ Multiple conference calls to discuss drafts
 - ▶ Finalized at June 5th WG meeting
- ▶ Substantial consensus

Interim Report: Recommendations (1)

- ▶ Mechanisms to enhance, expand, develop and coordinate existing and new **incentives** to encourage early **commercial** use of ACTs should be implemented.
- ▶ **Legislative and regulatory drivers** should be utilized to accelerate the near- and long-term deployment of ACTs.
- ▶ **Risk characterization, risk management, and liability mechanisms** should be developed to enable the accelerated deployment of CCS technologies.

Interim Report: Recommendations (2)

- ▶ **Research, development, and demonstration (RD&D) programs** focusing on ACTs should be expanded and strengthened to accelerate commercial deployment at new and existing facilities.
- ▶ Mechanisms to address the uncertainty and delay associated with **permitting** should be developed for ACT projects.
- ▶ The importance of, and basic information about, ACTs should be effectively **communicated to the public**, policymakers and other key stakeholders.

Feedback: July 30 Subcommittee call (1)

- ▶ Impressed by scope of report, done on time
- ▶ Make recommendations more useful
 - ▶ What would be top 5 things Senator, PUC, etc. would need to do? Where should they start?
 - ▶ Prioritize issues

Feedback: July 30 Subcommittee call (2)

- ▶ Fundamental definitional issue exists
 - ▶ Environmental group representative stated that ACT must include CCS; EE and general perf. improvements inadequate
- ▶ Need for candor in final report concerning areas of disagreement, esp. re: definition

Feedback: July 30 Subcommittee call (3)

- ▶ Lifecycle analysis
- ▶ Recommendations focus on new power plants; more attention needed re: retrofits
- ▶ Potential for offsets
- ▶ Issue of scalability

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Work Group progress

Current progress

- ▶ August and September meetings: developed and reaffirmed direction and methods for a successful work product
- ▶ Areas of focus
 - ▶ CCS issues
 - ▶ Financial incentives
 - ▶ Regulatory drivers
 - ▶ Education/outreach
- ▶ Roadmap
 - ▶ Way to integrate information
 - ▶ Introduce relative time sequence and dependencies

Next three months

- ▶ In-depth focus on options
- ▶ Example: CCS Issues
 - ▶ Rapid deployment model
 - ▶ Early action accounting and credit methods for state or federal use
 - ▶ Specifications for commodity-quality CO₂
 - ▶ Criteria/considerations for developing model CCS provisions

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Observations and discussion

Observations from first six months (1)

- ▶ Strong, consistent recognition of critical importance of developing and deploying carbon capture and storage (CCS) technologies
- ▶ CCS readiness: while technologies have been successful at some scale, yet to see full-scale, fully integrated systems
- ▶ Technical and cost-related concerns exist
- ▶ CCS deployment could be accelerated by development of policy/regulatory frameworks

Observations from first six months (2)

- ▶ Range of perspectives on *which* advanced coal technologies should be given incentives, over *what time frame*
 - ▶ Broad agreement that CCS for all technologies should be prioritized in near term
- ▶ States and PUCs are heavily involved in direction and development of ACTs
- ▶ Desire for certainty: need some type of sustained signal (e.g., market price of carbon) to spur technological transformation

Some interesting ideas

- ▶ New Mexico requires modeling of CO2 costs of \$8, \$20 and \$40 in all resource planning efforts
- ▶ NM Advanced Energy Tax Credit: 6% up to \$60 million over up to 5 years
- ▶ Panel on coal-to-liquids creates debate: CO2 emissions versus national security
- ▶ Funding ideas
- ▶ Lifecycle analysis

Environmental Impact Profile*

Mt. Shasta Biomass Power Station

Impact Levels Per 1000 Gwh

Nutrition Facts

Serving Size 1 cup (236ml)

Servings Per Container 1

Amount Per Serving		
Calories	80	Calories from Fat 0
		% Daily Value*
Total Fat	0g	0%
Saturated Fat	0g	0%
Trans Fat	0g	
Cholesterol	Less than 5mg	0%
Sodium	120mg	5%
Total Carbohydrate	11g	4%
Dietary Fiber	0g	0%
Sugars	11g	
Protein	9g	17%
Vitamin A	10%	Vitamin C 4%
Calcium	30%	Iron 0% • Vitamin D 25%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Depletion of Natural Resources

Impact Levels

Non-Renewable Energy	12,000 barrels of oil
Water	--
Strategic Metals	--
Terrestrial Habitats	14,000 hectares
Wetland Habitats	1,200 hectares
Lake Habitats	--
River Habitats	--
Key Species	50 % loss

Impacts from Emission Loadings

Cumulative Greenhouse Gases	12,000,000	tons CO ₂
Oceanic Acidification	149,000	tons CO ₂
Acid Rain	96	tons SO ₂
Smog	33,000	exposures
Soot (PM 2.5)	87,000	exposures
Neurotoxicity	--	
Systemic Chemical Toxicity	--	
Eco-Toxicity	106	kg TCDD

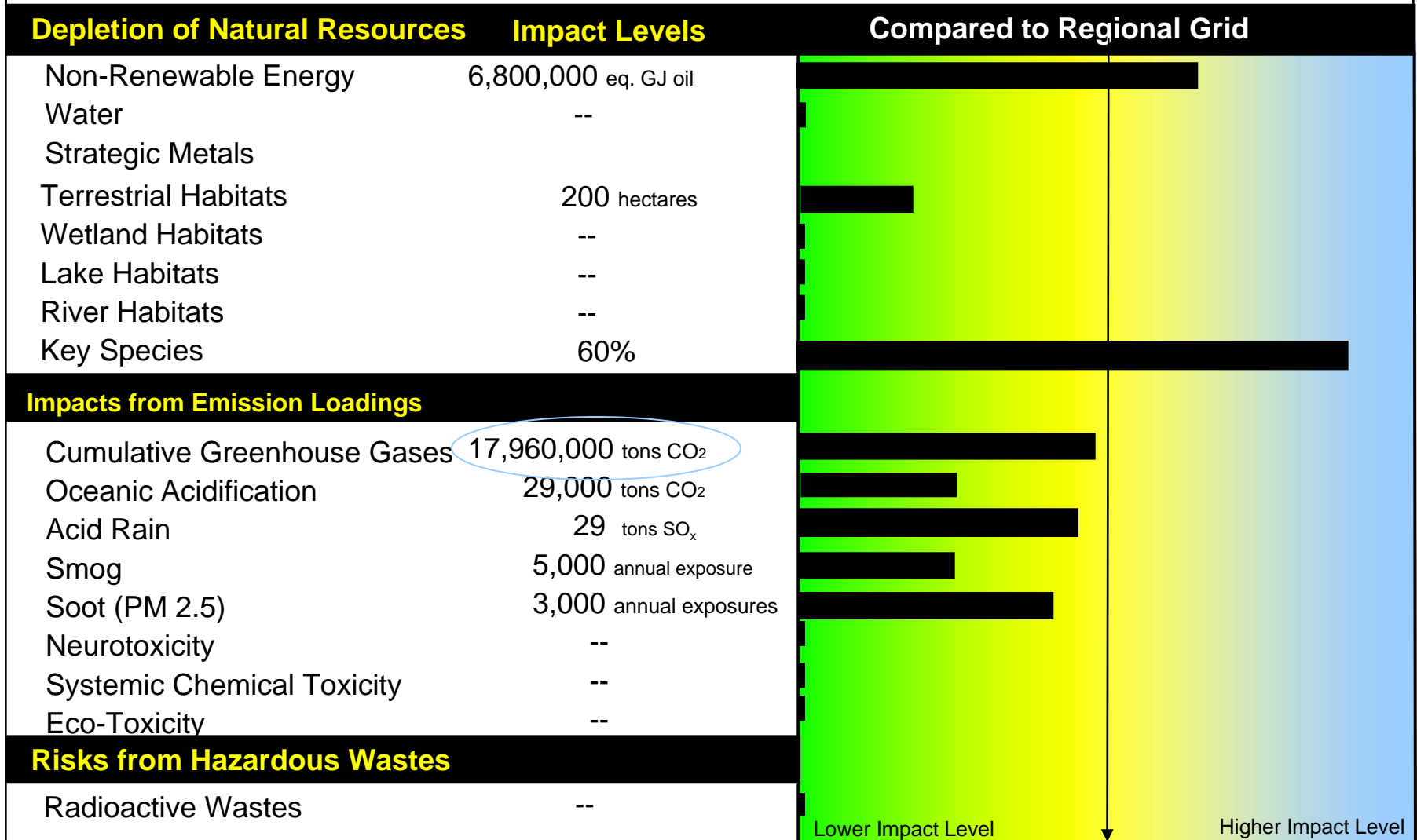
Risks from Hazardous Wastes

Radioactive Wastes	--
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* Based Upon Life-Cycle Impact Assessment

Environmental Impact Profile*

Altamont Wind Power Station/Natural Gas LVRT
Impact Levels Per 1000 Gwh



* Based Upon Life-Cycle Impact Assessment

Average Impact level
of Regional Grid

CAAAC Discussion

- ▶ Questions on the issues raised
- ▶ Questions on the technologies we've discussed
- ▶ Questions on the process used to create interim report
- ▶ Advice from CAAAC to Work Group:
 - ▶ Things missed
 - ▶ Areas recommended for more focus
 - ▶ How to make final report more "useful"
 - ▶ Who is our most important audience
- ▶ Next steps

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