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March 11, 2009

MEMORANDUM

TO: Power Committee

FROM: John Fazio, Senior Power Systems Analyst

SUBJECT: Status Report of Climate Change Analysis

The discussion at today's power committee meeting will focus on several topics:

1. A draft outline for the Sixth Power Plan's Chapter on climate change
2. A short review of major assumptions for CO₂ prices and tax credits
3. A list of the power committee's issues and questions
4. A proposed strategy for addressing those issues and the status of analyses
5. A strategy for dealing with potential physical impacts of climate change

Carbon allowance prices, tax credits and renewable energy credits present major uncertainties in the development of the Sixth Power Plan. They affect the cost of resources, electricity prices, electricity demand and levels of cost-effective conservation. For the plan, assumptions regarding expected average CO₂ prices over time are needed to forecast future electricity prices. A wide range of CO₂ prices over time along with a probability distribution for that range is required for the portfolio model in order to develop viable resource strategies. At last month's meeting, the committee was presented a set of proposed assumptions that will be used for these analyses.

Properly addressing climate change issues, impacts and mitigation strategies must be done in parallel with the development of the resource strategy in the Sixth Power Plan. As progress is made, updates to the analyses and results will periodically be brought to this committee for review. For today's discussion, staff is asking the committee for guidance on the outline of the chapter, and on the proposed strategy for dealing with physical impacts of climate change.

Status of Climate Change Analysis

Power Committee Meeting
Boise, Idaho

March 10-12, 2009



What are we talking about today?

- ✓ Outline for Climate Change Chapter
- ✓ Major Assumptions/Issues
- ✓ Status of Analyses for the 6th Plan
- ✓ Dealing with Potential Physical Impacts of Climate Change



Climate Change Chapter Outline

- A. **Background**
- B. Information on GHG sources in the region
- C. Policy initiatives affecting the region
- D. Meeting emission reduction goals
- E. Policy alternatives
- F. Least cost plan for meeting goals

Chapter VII Background Section

- 1. General discussion of green house gases, in particular CO₂
- 2. CO₂ emissions by sector
- 3. Role of power production
- 4. Potential CO₂ reduction sources
- 5. Electricity sector contribution for CO₂ emissions (national and regional)

Carbon Related Assumptions

	5 th Plan	6 th Plan
Average CO ₂ Price	\$7.85/ton	\$47.72/ton
High End CO ₂ Price	\$30/ton	\$100/ton
Futures with CO ₂ Price	67%	95%
PTC Range	\$0 to \$10	Under Review
Average REC	\$4	Drop from analysis

Issues

- What are the CO₂ emissions from each sector?
- What portion of CO₂ reduction should the electricity sector bear?
- What is the role of RPS requirements in developing a cost effective CO₂ reduction policy?
- How does a CO₂ price affect conservation supply curves and demand?
- How will revenues from a CO₂ price be used?
- How does the CO₂ price affect rate payers?
- What are the transmission effects?

Possible 6th Plan Analyses

1. **Least-cost plan given state RPS mandates:**
Use assumed CO₂ price and probability distribution – assess resulting CO₂ emission total.
2. **Least-cost plan achieving similar CO₂ production:**
Remove NW RPS, change CO₂ prices until CO₂ production approximates the total in Case 1 – compare cost.
3. **Least-cost path to achieve lower CO₂ production:**
Run multiple cases with increasing CO₂ prices to identify the least-cost path for the NW power system to achieve lower levels of CO₂ production, if needed. **Include a zero CO₂ price scenario**

Status of Studies Related to Climate Change

- AURORA
 - Zero CO₂ price
 - Average CO₂ price
 - High end CO₂ price
- Portfolio Model
 - Base case with current RPS mandates

Potential Physical Effects of Climate Change

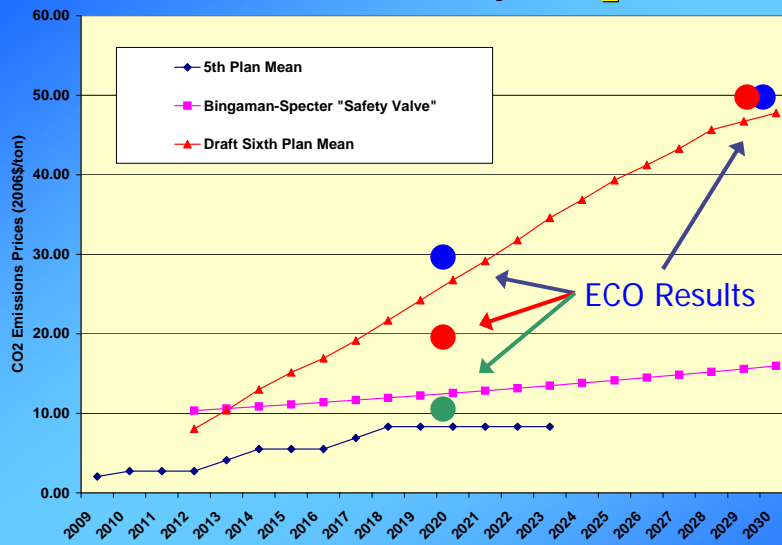
- 2007 – Wash Dept of Ecol contract with CIG to update data (39 scenarios)
- Council and BPA contributed, with expectation of getting revised data
- May 2008 – Received preliminary data for one scenario
 - Difficulties with temperature forecast
 - Worked out process to update rule curves
- Final data for 3 scenarios due in June 2009

Proposed for 6th Plan

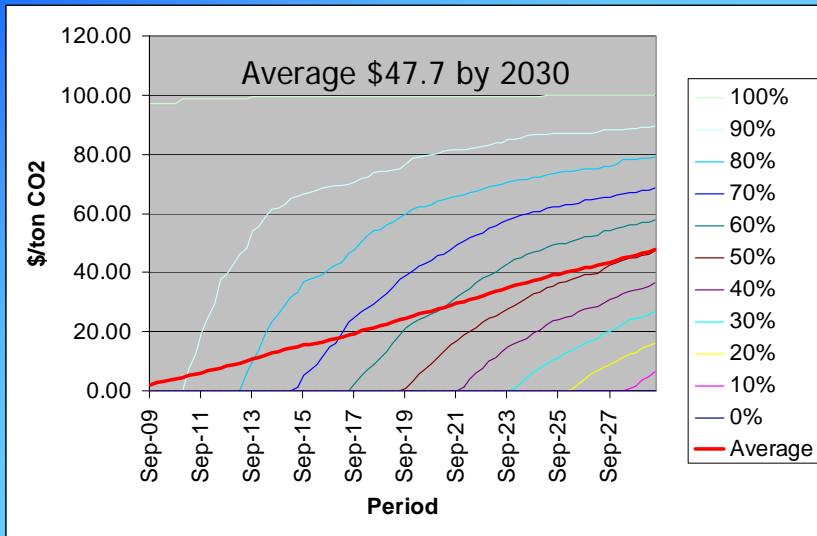
- Use preliminary data
- Report preliminary results in appendix
- Add an action item to complete analysis and report when final data ready

Additional Slides

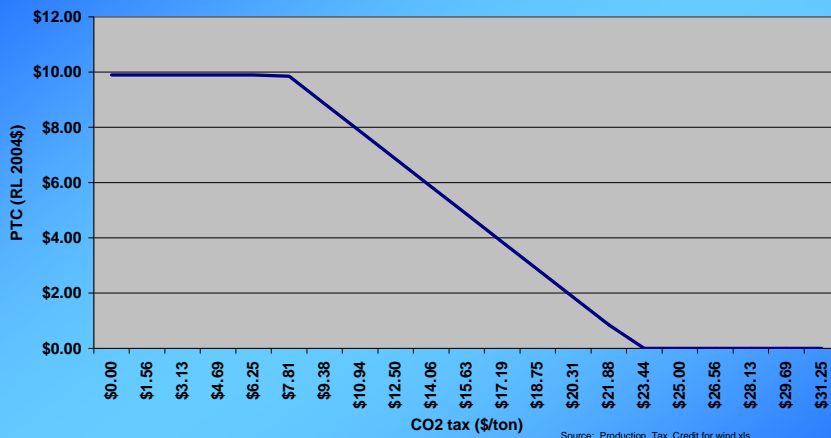
Central Tendency CO₂ Price



CO₂ Price Probabilities



PTC vs. CO₂ Price



Source: Production_Tax_Credit for wind.xls