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**DRAFT MEETING SUMMARY**
**ES Policy Working Group (PWG)**
**Call #8, August 15, 2007**

**PWG Members and Alternates Attending:**

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| Joe Broz | Isaac Silverman |
| Chuck Kutscher | Kate Zimmerman |
| Tom McKinnon | Jack Ihle |
| Brian Moeck | Dianna Orf |

**Governmental agency liaisons:** Lori Bird
**Rocky Mountain Climate Organization:** Stephen Saunders, Tom Easley
**Center for Climate Strategies:** Ezra Hausman, Alice Napoleon, Geoff Keith, Kenji Takahashi, David White
**Members of the public:** Brett Oakley (Xcel Energy)

**Agenda Item #1: Introductions and Roll Call**

**Agenda Item #2: Review and approval of draft summaries of Policy Work Group (PWG) Calls #6 and #7**

The summaries of Calls #6 and #7 were not available in time for the teleconference. Approval of the meeting notes was deferred until Call #9.

**Agenda Item #3: Review of process and objectives for today's meeting**

This meeting would be the 2nd to last meeting of the Energy Supply PWG. Ezra noted that the PWG's job is to address the issues sent back from the CAP. CCS would not be able to take on new research tasks on underlying assumptions—all key issues would be resolved in this meeting.

**Agenda Item #4: Review of CAP Meeting on August 1, 2007**

Ezra Hausman noted that the CAP approved the recommended change to the forecast for the Increase in the Renewable Energy standard to 20% (HB07-1281). The CAP also asked that the PWGs consider the affect of HB-1037. This will be dealt with in the RCI PWG.

**Agenda Item #5: Discuss current status of Policy Options document and work to finalize**

Ezra noted the three documents that members would need for this meeting, which were distributed via email on August 14, 2007:

1. ES Policy Option Document
2. Memo on Renewable Energy Cost Assumptions
3. Memo on Alternative Scenarios & Minor Adjustments

ES-2 – Mandated Portfolio Standards

- Geoff Keith (CCS) discussed a memo on renewable energy cost assumptions that was presented to the PWG. These cost assumptions were based on information provided by Tom McKinnon and CCS's review of project proposals.
- Jack asked whether the analysis had individual inputs for O&M, capital cost, etc. Geoff responded that the referenced studies only provide aggregated generic costs, but that whatever loss in accuracy is well within a reasonable margin of error. The analysis is presented in 2005 dollars.
- Investment Tax Credit (ITC) and Production Tax Credit (PTC)
    - Geoff noted that the analysis omitted the impact of the Investment Tax Credit (ITC) for solar PV, and that the continuation of a 10% or 30% ITC through the study period was uncertain.
    - Jack Ihle asked whether the 30% ITC was assumed through 2020. Geoff indicated that the analysis based on 10% ITC across the board, but that the group needs to decide what ITC to assume going forward. Geoff doesn't think the 30% ITC will go away. Jack noted that the ITC is not costing the government much (and so is likely to continue).
    - Lori Bird also noted that the Production Tax Credit is unlikely to go away in the short run.
    - HB 2776, passed by the US House on August 8, extends the ITC another 8 years.
    - Final assumptions: PTC for 5 yrs (for wind, geothermal, etc.); ITC 30% through the period of analysis. Lori will email CCS the DSIRE database for PTC & ITC applicability.
- Concentrating Solar
    - Chuck Kutscher noted that updated costs for Concentrating Solar look good. He also suggested not using costs from the Sargent & Lundy study, because it is too old and doesn't reflect recent increases in the price of steel.
- Wind Integration
    - Geoff mentioned that Randy Udall had previously expressed concerns about wind numbers being too low.
    - Brett Oakley (Xcel Energy wind expert) noted that 40% capacity is well off the chart for any region of the US.
    - Ezra noted that the integration costs with increasing penetration were originally assumed to be costs for the marginal resource, but they now are

applied as cost for all wind on system. Brett noted that once a level is reached, all wind is contributing to cost of integration, and all would be charged for those costs.
    - Ezra noted that some wind could be combined with hydro storage, for example, which would mitigate against high integration cost for that resource.
    - It was clarified that integration costs are on top of energy costs. They include regulation, load loading & day ahead forecasting. The two highlighted studies are market studies, with large geographic areas.
    - Final determination was to have Jack Ihle work with NREL to come up with costs deemed reasonable by both NREL and Xcel.

- PV
    - PV cost assumptions are shown in the table on the bottom of p. 3 of the renewables cost memo. $8500/kw was the original proposal. The new proposal is for $6000/kw in 2015 and thereafter.
    - Joe Broz noted that John Thornton ("Mr. PV") costed out a recent project in Mexico (originating in the US) at $7/watt (US dollars) in April 2007. For large-scale installations, the costs would go down.
    - It was noted that costs may be going down, but prices are not in the short run due to high demand for turbines worldwide.
    - Lori Bird expressed concern that the cost assumptions in the later years of the analysis are too high. Lori and Chuck Kutscher had contacted experts within NREL but didn't get any responses. However, Chuck noted that ASES report projected costs at $8/watt in 2005, $5/watt in 2010, and $3/watt in 2015. There was some concern that these projections were too low.
    - Lori cited a Solar America report, which projects PV will cost $3300/kw by 2015 (installed, without PTC).
    - Geoff noted that $4500/kw is being used for the NEMS model.
    - Final assumptions: $7,000/kw in 2008, $6,000/kw in 2010, $4,000/kw in 2015, and $3,000/kw in 2020 (before ITC)
- Avoided cost
    - The current assumption is to back off existing generation at the ratio of 75% coal/25% gas. Jack noted that this policy may be avoiding too much lower cost coal O&M. Geoff suggested that there be 4 factors: new coal, old coal, new gas, and old gas. However, $56 for new non-renewable resources was said to be acceptable.
    - Geoff suggested using all-in EIA costs for new coal and new gas, and using marginal cost for existing coal & gas. He suggested a range of $20-25/MWh variable for existing coal.
    - An appropriate heat rate for coal plants was discussed. Geoff suggested 12.5K, or 13K.

    - Placeholder assumptions, pending additional information from Jack Ihle: $60/MWh for existing gas, $23/MWh for existing coal (includes fuel & variable O&M)
- Limit on amount of wind that can be used to satisfy the RES
    - Jack noted that Xcel wants flexibility, and the 3% allocations to different technologies are inflexible. He thought that the cap on wind was for analysis purposes only. There was a suggestion to strike the language that no more than 85% of energy to meet the standard could come from big wind.
    - Isaac Silverman noted that the original language sought to encourage a range of renewables. He supports some sort of carve out. Chuck Kutscher noted that the solar carve-out has stimulated the industry, and that it is inexpensive to add storage to a concentrating solar power (CSP) plant to address some of the concerns about flexibility and intermittence. Costs do drop as big plants get built, and other parabolic trough plants are being built. It was suggested that in reality, CSP could get a higher percentage in the policy (maybe 6% of renewables requirement), and that this is a window of opportunity for Colorado to be an exporter of CSP electricity.
    - Ezra suggested that this may be something for the CAP to decide, but that the PWG can suggest that the policy not be so prescriptive. Isaac suggested softer language, such as the policy "should also encourage other renewables than big wind."
    - Decision was to leave the "no more than 85% big wind" requirement, but to use the other requirements for analytical purposes only.
- Feasibility/overall goal
    - In response to concern about the feasibility of the 30% goal statewide, Ezra noted that Renewable Energy Credits would be statewide. However, a member thought that statewide tradable RECs wouldn't help munis & coops.
    - Brain Moeck said that 30% is a huge obligation for Platt River. Other language to delay requirements, or assist munis & coops in complying with the goal was discussed. If there is a reluctance to reduce the goal (30%), then other language would be helpful.
    - Jack Ihle noted that Xcel supported a 30% RPS in Minnesota, but the market is different in Colorado.
    - It was proposed that the goal for munis & coops reflect a similar % increase in the standards (15%, up from 10%) to IOU's (30%, up from 20%). This would reduce the goal to about 23% statewide by 2020. Diana Orf objected to the revised goal 23%. There were no other objections.

ES-5 Public Benefit Charge Funds

- Ezra explained the difficulties CCS experienced in trying to quantify ES-5, e.g. that some of funds in California didn't go to projects. Ezra proposed to stick with a written description and not quantify the costs and benefits of this policy.
- A member commented on the variability in $/ton achieved by different PBC programs, as shown in the memo. Is a reasonable average $15/ton? It was noted that there is much variability in technologies. Kenji pointed out that ES-5 has a very high funding level compared to the other states with PBCs.
- For the SBC table on p 21, it should be noted that the funds include only utility scale, non-PV projects, and are not totals for the state.
- Lori asked if the group would be willing to say what funds would go to? Ezra said that CCS can do an analysis based on funding allocations, but that a decision by the group is needed now given the late stage of the process. Lori will look at other studies about what can be done with these funds.
- There were no objections to not quantifying this option.

ES-2a – Clean Energy Portfolio Standard

- Isaac Silverman stated an objection to the policy in general and stated his intent to oppose it regardless of any changes made by the group. He felt that adding nuclear to the national bill was a poison pill.
- Jack Ihle noted that Xcel opposes clean energy portfolio standards on the state level. He recommends that the implementation mechanism say, the Governor or legislature should consider support for clean energy port standards at the national level.
- No other objections were raised.

ES-3 Transmission Infrastructure for Renewables

- ES-3 was accepted as final by the CAP.

ES-4 Cost for $CO_2$ Emissions (Cap and Trade or Tax)

- Isaac commented that he thought the policy would involve joining the Western Regional Climate Action Initiative. The implementation mechanism could say, the Governor should consider joining the WRCAI.
- Diana Orf raised her objection to anything [cap & trade or tax] except a national policy.
- No other objections were raised.

ES-6 Incentives for CHP, DG, Smart Grid –

- Ezra noted that there were some corrections made to the analysis, as detailed in the memo.
- An implementation mechanism is needed. No suggestions were raised, except to follow the WGA proposals as delineated in the RCI CHP proposal.
- Chuck Kutscher noted that the policy should encourage investigation of bottoming cycle and the possibility of co-locating waste heat.

- Jack Ihle noted that Xcel might want to get into the market and has no specific position on the policy.

ES-7 Carbon Capture & Transport Infrastructure

- ES-7 was accepted as final by the CAP.

ES-9 R&D for Carbon Emissions Reducing Generating Technology

- The CAP suggested the addition of language on jobs benefits. Joe Broz noted that there are no actual studies on R&D impact on employment, but some on overall renewable energy job impacts. Joe to provided some language on these benefits, which will be included in the additional benefits section. (As it was not provided prior to the call, it was agreed that it would be included but could be stricken later if PWG members object to it.) The figure of $3.1 million is just from renewables, & just the mid range benefit.
- Chuck Kutscher mentioned that the ASES report would have data but is still under review.
- There were no objections to provisionally including language.

ES-10 Promote Advanced Fossil Fuel Generation with Carbon Capture, Including IGCC

- ES-10 was accepted as final by the CAP.

ES-11 Small New Hydro and Efficiency Improvements at Existing Hydro, Identifying Other Small Renewables and Removing Barriers Thereto

- ES-11 was accepted as final by the CAP.

ES-12 Nuclear Energy

- Ezra received some language from Randy Udall and said that he would insert the language into the policy option description, to supplement or replace the existing language. There were no objections to this approach.

ES-13 Efficiency Improvements for Existing Generators (Includes Heat Recovery)

- David White (CCS) explained that there is very little opportunity to improve the efficiency of existing plants; there are effectively only two options – CHP applications, or replace existing coal generation with gas. David thought that a 1-2% improvement in efficiency is probably doable with existing plants. Ezra laid out the options to the group – strike policy, change the goal, or come up with implementation mechanism to meet the existing policy.
- Brian Moeck commented that a recent study on found that Pre-drying coal would improve efficiency. If the policy is just to shut down coal plants, then he would need to object. Diana Orf noted that the availability of gas is a concern that would need to be looked at, if shutting down coal was the object. Under the initial policy design, David White found a substantial increase in demand for gas.

- Diana Orf said that the policy should encourage the Governor to work through the WGA with the [federal] EPA to get some sort of Congressional release from New Source Review (NSR).
- Jack Ihle thought that 2% is more achievable than the existing goal. There were no objections to changing the goal to 2% improvement in efficiency of all existing plants, fleet-wide. Consideration can be given to credit for prior actions.

ES-14 Oil and Gas Operations

- ES-14 was accepted as final by the CAP.

ES-15 $CO_2$ Emission Standards for Power Plants

- Diana Orf stated that this policy conflicts with other movements in the state—there has been a backlash against more drilling for natural gas. You can't have it both ways.
- Jack Ihle asked to see capital costs, O&M, etc. that was used in the analysis. He is uncomfortable with the results of the analysis. Ezra noted that on an energy basis little new coal & gas capacity would be needed, so the cost doesn't go up too much.
- Brian noted that the analysis doesn't account for the very low costs to keep running old coal. Ezra said that the analysis didn't consider retirements, because there was no basis to do so.
- A member asked that offsets be mentioned in the implementation mechanisms section. It was noted that Oregon policy has offsets, so there is precedent (the Climate Trust does the transactions.) Isaac asked whether the offsets would be in state, or anywhere? – they are less meaningful if out of state offsets are allowed, and there are more likely to be problems with double counting.
- A limit on how much of a plant's emission can be offset was suggested, e.g, 1200 lbs, with 100 lbs in offsets? A member thought that if the goal is to prevent new pulverized coal, then the policy should just say it. However, there was support for leaving flexibility for the future, should other coal applications become less carbon intensive. There was a suggestion to add language acknowledging that new coal couldn't be built or operated under this policy unless it could achieve the emissions standard, through carbon capture or some other mechanism..
- It was noted that all of the things that would qualify for offsets (e.g., coal mine methane, which would be cheap) need to be done anyway to avoid dangerous climate change.
- Offsets will not be included (1 in favor of including offsets, 3 in favor of not including offsets)

**Agenda Item #6: Agenda, time, and date for next call**

The final meeting of the ES PWG will be held on Thursday, August 30, from 1:00 – 4:00 PM MT. During that call, the PWG will review the final policy options quantification and complete all necessary sections of document.

**Agenda Item #7: Public Input and Announcements**

None.