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**DRAFT MEETING SUMMARY  
ES Policy Working Group (PWG)  
Call #7, July 18, 2007**

**PWG Members and Alternates Attending:**

Vicki Card	Dianna Orf
Craig Cox	Isaac Silverman
Michael Dowling	Richard Smart
Chuck Kutscher	Randy Udall
Ron Lehr	Kate Zimmerman
Tom McKinnon	John Bleem
John Nielsen	

**Governmental agency liaisons:** none

**Rocky Mountain Climate Organization:** Stephen Saunders, Tom Easley

**Center for Climate Strategies:** Ezra Hausman, Alice Napoleon, Geoff Keith, Kenji Takahashi

**Members of the public:** none

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

**Agenda Item #2: Review and approval of draft summaries of Policy Work Group (PWG) Calls #5 & #6**

There were no objections to the #5 call notes. The summary of meeting #5 was approved.

The summary of Call #6 was not available in advance of the teleconference. Approval of these meeting notes was deferred until Call #7.

**Agenda Item #3: Review Process and Objectives for Today's Meeting**

Ezra described the objectives for the current meeting, including reviewing the assumptions and results of the preliminary quantification of costs & benefits of the policy options, answering questions, and discussing objections to be raised with the CAP.

Stephen Saunders noted that this is the last PWG meeting before the Aug 1 CAP meeting, at which it will go through each option & take objections. If there are none, the option will be in the final report. If there are objections, then it will be deferred for further work by the PWG

and further consideration at the Sept. 12 CAP meeting. Stephen asked the group to consider whether the policies are ready to be adopted by the CAP.

Ezra noted that in addition to comments during the current meeting, he would accept comments via e-mail through Sunday, July 22, to be given to the CAP.

Ezra explained that fleshing out implementation mechanisms is next; he would like draft implementation mechanisms from the original policy volunteers as needed.

#### **Agenda Item #4: Discussion of preliminary quantification of impacts and other portions of the Policy Option Template**

##### ES-1 – Renewable Energy Incentives including Waste to Energy

- CCS is not proposing to do a quantitative analysis for this option, because there is no obvious way to do an independent analysis from ES-2.
- Policy template write-up includes discussion of financing RE under EPAct.

##### ES-2 – Mandated Portfolio Standards (discussed before ES-1 in meeting)

- Geoff Keith described the analytical approach: grow the generation mix (shown in the table on p 8 of the policy document) from current to the level in the policy goal. Fossil resources were backed off of the system, either avoided new generating plants or avoided output from existing plants. Vicki Card asked why the cost/ton isn't closer to cost of wind (\$50); Ezra explained that the cost/ton reflects avoided energy cost, which is \$56/MWh based on 75/25 coal/gas split.
  - Geoff noted one of the key assumptions, that 10% of hydroelectric power is small enough to be eligible.
  - The group discussed the wind integration costs used in the analysis, which were based on NREL/LB integration studies. Ron Lehr clarified that, from systems perspective, it is incorrect to say that wind is "firmed up". John Bleem noted that Platte River is paying more than \$5, and that the systems in those studies are different from Platte. Integration costs are system specific. Is \$50/MW cost (including PTC) for wind reasonable?
  - Chuck Kutscher noted that there are falling prices for solar thermal, but not for wind; we'll be lucky if wind prices stay flat over the next 13 yrs.
  - Ezra noted that the mix of eligible resources drives cost. The current goal is 3% by geothermal, effectively 34 MW, with an assumed capacity factor of 90%. Is that reasonable? Chuck Kutscher thought this was possible.
  - There is a wide variety of costs for hydro. Richard Smart recommended creating a conservative cost curve.
  - Chuck thought that some of the costs for renewable technologies were high, e.g., PV might be as low as 25 cents/kwh. Geoff explained that the assumption is that these are distributed resources. Xcel pays 22-24 cents/kwh for solar RECs. Chuck will ask NREL for costs.
  - Chuck recommended that CCS check the WGA and Black & Veatch report for costs of solar thermal (assumed to be parabolic trough).

- It was noted that energy efficiency is cheaper than any of these technologies—is it included? Ezra responded that it is not, that this is covered by the RCI group, and that the combined analysis to be provided to the CAP on 8/1 will include these resources.
- Vicki Card asked how transmission costs are handled. CCS responded that they are not included, on either side of the analysis (new transmission for renewables, or avoided transmission for fossil fired plants.)

ES-2a – Clean Energy Portfolio Standards

- CCS will summarize an EIA study for this option.
- There were no comments on this option.

ES-3 – Transmission Infrastructure for Renewables

- Based on a review of various studies, Kenji Takahashi found that transmission lines cost \$1000-\$2000 per kw-mile of line. Other states, including California and Texas, have been expanding transmission to support wind resource development. While more research is needed, Kenji said that this option would be difficult to quantify without a lot more information on where the resources are and interconnection issues.
- Ezra asked how the implementation mechanisms could be developed. John Bleem indicated that joint planning is the main thing Brian Moeck and Ron Lehr were talking about, but their ideas were not far enough down the road for John to be more specific.
- Craig Cox said that the original intent of SB-100 was to include all utilities in the state, but munis & coops were exempted. WAPA & Tristate are not included. There is a need for more coordination. Colorado Springs needs to take part in state planning.
- The question of how this policy would be different from SB100 was raised. Ezra said he understands the policy to restore the original intent of SB 100 (coverage of all utilities in state). John Bleem said that Platte River does not want any PUC authority over munis. There has been joint planning for years, but there is room for improved renewable energy planning. There was a motion to frame the policy in terms of joint planning; it received no objections.

ES-4 – Cost for CO<sub>2</sub> Emissions (Cap and Trade or Tax)

- CCS indicated that it won't have a specific policy to propose to the group. The text is still work in progress, but it will include possible cost ranges and policy designs.
- Tom McKinnon said he would send materials from the Colorado CO<sub>2</sub> Reduction Initiative to CCS.

ES-5 – PBC

- Ezra described the comparison CCS did of SBC and RPS. He explained that it is difficult to go from an amount of funding to reduced emissions, that effectiveness of funding approach will vary greatly by region. Kenji added that the goal overlaps with the RPS, and it should be left as qualitative.

- Diana Orf raised an objection to the either RPS policy option, because it is not clear how it will come to pass given the existing 20% RPS. John Bleem and Vicki Card voiced similar concerns. How will minority opinion be reflected? Ezra said that the CAP will vote given the PWG's objections.

#### ES-6 - Incentives for CHP, DG

- Kenji described some key assumptions for the analysis of ES-6: a ramp-up to 1%; a 60% capacity factor for CHP; the mix of technologies adopted (the allocation is somewhat arbitrary as there was no specification in the policy design). Kenji noted that the capital costs of CHP was based on EIA 2007, and projected to decrease 20% by 2020. The cost of this policy includes both avoided electricity & avoided heating.
- John Bleem noted that there are only a few hundred kW of potential on Platte's system, but Platte is only 5% of CO. Xcel just bought 3 MW.
- HB 1228 requires the PUC to investigate an incentive for renewable energy (the docket is now open).
- Fuel cells were not included due to their cost.

#### ES-7 - CO2 Capture & Transport

- Ezra indicated that this policy was not conducive to analysis.
- There were no objections to sending this option to the CAP as is.

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

- Ezra noted an error on table in the front of the policy document – ES-9 should read, “R&D for Carbon Emissions Reducing Generating Technology”
- CCS did some research, but a lot of benefits are in economic development. The PWG can recommend anyway even if it doesn't quantify the benefits.
- Vicki Card brought up that the policy would probably need to be taken to the voters. This will be noted as a feasibility consideration.

#### ES-10 - Advanced Fossil Fuel Generation

- Chuck Kutscher commented on the need for mapping of potential sequestration sights. Ezra responded that Dag Nummndal sent paper on sequestration associated with enhanced oil & gas recovery, but not on overall potential.
- Chuck noted that sequestration (for enhanced oil recovery) creates economic value for CO<sub>2</sub>, but there needs to be a lot more sequestering than just for EOR to meet emission reduction needs.
- Tom McKinnon noted his support for the policy, but said that there should be some requirement for CO<sub>2</sub> intensity (tons emitted per MWh), so that we don't build a lot of coal and only sequester a small % of the emissions.
- Members expressed general enthusiasm for the policy.

ES-11 - Small New Hydro and Other Small Renewables

- Ezra described the broad range in both potential cost and capacity factor (CF) for small hydro sites, but said that CCS has no basis for building a supply curve with numbers. Randy Udall confirmed the uncertainty, but said that there is a lot more potential than people recognize. For example, Boulder installed 11 MW of capacity for just over \$1000/kw, running at a 50% capacity factor. John Bleem said that the Platte system had no potential in the \$1000-2000 range. Randy noted that a 70%-90% CF is too high. Ezra said CCS used \$3000/kW, at 35% CF. A member mentioned the ongoing efforts of the task force created under SB 91 for mapping renewable energy resources.
- John Bleem noted an error in the table – costs should be in \$/kW, not in \$/kwh.
- Chuck commented that the proposal might use pumped hydro storage to firm up wind. There are 200 MW of pumped storage already installed. Pumped storage can lower the cost of wind integration. The policy should include more on hydro's ancillary benefits & system integration potential. Ron Lehr noted an information resource on the PUCs website (regarding Xcel)—he may send a link to CCS.

ES-12 - Nuclear Energy

- Ezra noted that the literature review is not complete.
- Chuck and Tom recalled that the group just didn't want to be accused of not considering it, but there was limited enthusiasm for this policy.

ES-13 - Efficiency Improvements for Existing Generators

- CCS had not gotten to the quantitative analysis. ES-13 may be quantified but not in time for the presentation to the CAP on 8/1.
- John Bleem asked how the new 5% goal was arrived at. This was a PWG decision.

ES-14 - Oil and Gas Operations

- Kenji described the objective of ES-14 – to reduce 35% of CH<sub>4</sub> emissions relative to 2004 levels. (He noted an error in the policy document – it should read 2004, not 3004). Chris Williams provided Kenji with data, but only on VOC emissions (which are related to CH<sub>4</sub> emissions). EPA's Natural Gas Star program is the source of the cost of saved methane. Kate Zimmerman said that the EPA data are the best she could find.
- There were no objections to sending this policy to the CAP as a recommendation.

ES-15 - CO2 Emissions Standards for Power Plants

- Ezra mentioned potential issues with the Interstate Commerce clause, but noted that there is precedent: California has a similar standard.
- The basic analytical approach was to replace coal with gas capacity. The analysis found that the policy comes out a wash: close to \$1/ton (levelized) for either new resource.

- There were some concerns raised about the results of the analysis. Ezra said that CCS would check its #s.
- Vicki Card noted that the cost of fuel per BTU is six times higher for natural gas. This is offset by the higher capital costs of new coal plants.
- It was noted that the AEO has an “abysmal” record for accuracy of its price forecasts. Also, new cost of capacity is going up a lot for coal plants. Ezra agreed with the problems with AEO, but it’s what we have. Randy Udall said that the NEMS model is “ridiculous” and that this discussion should be before the CAP.
- Avoided cost: Vicki thought that \$56/mwh is too high; it should be around \$40/mwh for Colorado Springs. She cited the Draft for Avoided Cost of New generation (a document that has been provided to members). John Bleem noted that avoided cost will vary, as Xcel has 50% gas, while Platte only has 1%. He thought the cost would be in the range of \$56, \$60, \$80/MWh. Randy noted that coal capacity is going to be more expensive than utilities anticipate when they try to add it.
- Chuck further noted that, given that the cost of building new plants is going up, Colorado needs a policy to prevent building new pulverized coal. Diana Orf responded that gas availability would be a problem, and that it would squeeze out alternate uses for gas (e.g. fertilizer) and jobs would migrate off-shore.

**Agenda Item #5: Discussion of recommended change to forecast (covered 4<sup>th</sup> in meeting)**

- Ezra described the suggested change to the forecast to account for the 20% RPS.
- John Bleem (Platte River) raised the issue of peaking capacity – CCS said no new fossil would be needed, but in 7 out of the past 10 years Colorado didn’t have wind during peak. Ezra pointed out that the RPS is on an energy (GWh) basis, not capacity. Geoff explained that he looked at effective capacity, and a lot of gas capacity is being used at a low capacity factor (although he did not look at generation type, e.g. combined cycle). John Bleem noted that studies show the need for 400 to 500 MW of new peaking capacity, and that two issues must be addressed: 1. how much new capacity is needed to handle load growth, and 2. how much dispatchable fossil capacity is needed?
- John Nielson asked whether new facilities slated to come online – e.g., Comanche, Pueblo - are included. Geoff clarified that units included in the existing forecast are accounted for.
- Demand reductions under HB07-1037 and their effect on the RPS goal were discussed.
- It was pointed out that the existing RPS is not really 20% of energy, because munis & coops do not have the same requirements as IOUs (10% for munis & coops, and 20% for IOUs.) Roughly, that works out to be 12% (energy basis).
- There were no objections to recommending these additions to the forecast to the CAP.

**Agenda Item #6: Next Meeting for the PWG**

The next two meetings of the PWG will cover key uncertainties. The next call is scheduled for Wednesday, August 15, 2007, from 1:00 PM to 4:00 PM, MDT.

**Agenda Item #7: Public Input and Announcements**  
None.