

BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF THE COMMISSION'S)
DETERMINATION OF THE REASONABLE) Utility Case No. 04-00253-UT
COST THRESHOLD FOR RENEWABLE)
ENERGY)

**DIRECT TESTIMONY OF BEN LUCE
ON BEHALF OF CCAE**

I. Introduction

Q. Please state your name and address.

A. My name is Ben Luce. My address is 2296A 36th Street, Los Alamos, NM 87544

Q. On whose behalf are you testifying in this proceeding?

A. I am testifying on behalf of the Coalition for Clean Affordable Energy, a coalition of environmental and consumer organizations.

Q. By whom are you employed and in what capacity?

A. I am the Policy Director for CCAE.

II. Analysis and Recommendations on the Reasonable Cost Threshold

Q. What is CCAE's proposal for a reasonable cost threshold?

A. CCAE proposes that the Commission adopt a \$0.05/kWh reasonable cost threshold for the total, blended cost of wind power, a \$0.10/kWh threshold for blended cost of biomass and geothermal power, and a \$0.15/kWh threshold for the blended costs of solar.

Q. Has CCAE conducted any analysis to support this recommendation?

A. Yes, on behalf of CCAE I conducted an analysis to estimate the impact of the RPS on rates under various scenarios. The results of that study are attached as Exhibit CCAE_BL-1.

III. Conclusion

Q. Does this conclude your testimony?

A. Yes.

Exhibit CCAE_BL-1

Case Study Cost Assumptions

CCAIE has conducted a series of year by year case studies, the results of which are given here, to estimate the impact of the RPS on rates under different portfolio scenarios, and to develop some estimates of the blended costs of different resources under these scenarios. These studies included calculation of the total incremental cost of adding renewable energy, including the base of cost of adding new renewables in each year, the costs of interconnection, transmission, and the cost of integration of renewable resources (including two tiers of costs for lower and higher levels of capacity). Reasonable escalation rates for all of these costs were also included. Avoided capacity savings are also included and assigned on a source dependent basis: For example, wind power is assigned an effective capacity of only 23.90% of its peak capacity, whereas biomass and geothermal receive 100% credit. These costs were calculated from the following assumptions:

| | Geothermal | Wind | Photovoltaics | Biomass | Commercial Solar |
|---|------------|----------|---------------|------------|------------------|
| Base yr for costs | 2004 | 2004 | 2004 | 2004 | 2004 |
| Base yr cost \$/kWh | \$0.0650 | \$0.0280 | \$0.1200 | \$0.0581 | \$0.1200 |
| Transmission cost \$/kW/yr | \$21.24 | \$21.24 | \$0.00 | \$21.24 | \$21.24 |
| Integration cost (low capacity) \$/mwh | \$0.00 | \$2.00 | \$2.00 | \$0.00 | \$2.00 |
| Integration cost (high capacity) \$/mwh | \$0.00 | \$6.00 | \$6.00 | \$0.00 | \$6.00 |
| MW at which capacity = high | Not needed | 500.00 | 100.00 | Not needed | 100.00 |
| Interconnection cost \$/kW/yr | \$2.90 | \$2.90 | \$0.00 | \$2.90 | \$2.90 |
| nominal escal rate (generation_ | 0.00% | 0.00% | -3.00% | 0.00% | 0.00% |
| nominal escal rate (other costs) | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% |
| capacity factor | 90.00% | 34.00% | 25.00% | 86.00% | 30.00% |
| capacity credit (% of capacity) | 100.00% | 23.90% | 70.00% | 100.00% | 70.00% |

Cost savings associated with emission reductions were also estimated according to the following assumptions:

| | |
|-------------------------|------------|
| SO2 rate coal lb/MWH | 5.15 |
| SO2 rate gas lb/MWH | 0.007 |
| NOx rate coal lb/MWH | 6.0 |
| NOx rate gas lb/MWH | 0.4555 |
| CO2 rate coal lb/MWH | 2254 |
| CO2 rate gas lb/MWH | 1500 |
| SO2 credit value \$/ton | \$170.00 |
| NOx credit value \$/ton | \$2,000.00 |
| CO2 credit value \$/ton | \$3.64 |

Also included are the savings from avoided conventional generation: It was assumed that avoided conventional generation is either physically avoided (not generated at all), or is otherwise sold such that it does not incur cost to ratepayers. The cost assumptions for calculating avoided generation savings, including the relative fractions of coal and gas avoided, were as follows:

| | |
|---|---------|
| coal units: % of time avoided with renewable generation | 91.10% |
| gas units: % of time avoided with renewable generation | 8.90% |
| marg coal unit heat rate btu/kwh | 10758 |
| marg gas unit heat rate but/kwh | 10095 |
| base year coal price \$/mmbtu | \$1.589 |
| base year gas price \$/mmbtu | \$4.92 |
| base year coal var O&M cost \$/MWH | \$1.00 |
| base year gas var O&M cost \$/MWH | \$1.00 |
| base year avoided capacity cost \$/kW/yr | \$74.43 |
| real coal price escl rate | -0.77% |
| real gas price escal rate | 3.00% |

Note that a very conservative assumption has been made here with respect to electricity generation in New Mexico: The relative fractions of coal versus gas avoided are based on the actual megawatt-hours produced in 2002 from these two types of sources – no additional allowance is made for the fact that natural gas fired generation can be manipulated more easily to firm renewable sources. Such an allowance would tend to increase the savings in avoided generation because natural gas fired electricity is presently, and for the foreseeable future, more costly than coal. Thus the cost impacts calculated are likely to be higher than the actual cost impacts that will occur.

For scenarios including non-wind sources, the credit multipliers proposed by the PRC in proposed Rule 572 for these sources were included in the calculation.

Finally, a baseline retail rate of \$.08/kWh was assumed for purposes of calculating the percentage impact to rates of the RPS under different scenarios. Note that it is easy, if desired, to translate estimated rate impacts under this assumption to other assumed baselines: To first order of approximation, if the baseline rate is decreased by some percentage D, then this translates into an increase in the estimated rate impact by the same percentage D. For example, suppose a rate impact of 1% is estimated for a baseline rate of \$.08/kWh. If \$.07/kWh is then assumed instead,

which is an 12.5% decrease in the baseline rate (i.e. $D=12.5\%$), then the estimated rate impact would approximately increase by the same percentage, i.e. 1% to 1.25% (12.5% higher than 1%).

Sources of information for the data above include FERC Form 1 documents for New Mexico utilities, New Mexico Energy Information Administration Annual Profiles, and the various other references: PacifiCorp, Integrated Resource Plan 2003; Electrotek Concepts, “We Energies Energy System Operations Impacts of Wind Generation Integration Study,” 2003; “Characterizing the Impacts of Significant Wind Generation Facilities on Bulk Power System Operations Planning,” 2003. M. Milligan et al.; California RPS Integration Study: Phase I Summary and Results, NREL/CP-500-35947, 2004; P. Smith, Value of Solar Thermal and Photovoltaic Power Plants to Arizona Public Service Company; ASME International Solar Energy Conference, 1994; Navigant Consulting, The Changing Face of Renewable Energy, 2003; Wisner and Langniss, The Renewables Portfolio Standard in Texas: An Early Assessment, LBL, 2001; C. Kutscher, The Status and Future of Geothermal Electric Power, NREL, 2000; Western Resource Advocates, A Balanced Energy Plan for the Interior West, 2004.

Case Study Results

These case studies and results are defined as follows:

- Case I: RPS is met with 100% wind power: In this case it is estimated that the RPS will actually save consumers money beginning in 2007. In particular:
 - The estimated rate impact without environmental credit savings included: +0.60% in 2006, rising to .80% in 2009, and declining thereafter.
 - The estimated rate impact with environmental credit savings included: +0.01% in 2006, declining to -.05% in 2007, -.53% in 2011.
- Case II: RPS is met with 80% wind power and 20% biomass (80% wind and 10% biomass in actual capacity terms when the two credit multiplier is included to biomass): In this case it is estimated that the RPS will save consumers money beginning in 2010:
 - The estimated rate impact without environmental credit savings included: +0.74% in 2006, rising to .98% in 2010, and declining thereafter.
 - The estimated rate impact with environmental credit savings included: +0.15% in 2006, declining to +.01% in 2009, -.08% in 2010, and becoming more negative thereafter.
- Case III: RPS is met with 75% wind power, 20% biomass and 5% photovoltaics:
 - The estimated rate impact without environmental credit savings included: +0.80% in 2006, rising to +1.11% in 2011, and declining thereafter.

- The estimated rate impact with environmental credit savings included: +0.24% in 2006, declining to +.07% in 2010, .02% in 2011, and becoming more negative thereafter.
- Case IV: RPS is met with 55% wind power, 20% biomass, 5% photovoltaics, and 20% commercial solar power:
 - The estimated rate impact without environmental credit savings included: +1.09% in 2006, rising to 1.75% in 2011, and declining thereafter.
 - The estimated rate impact with environmental credit savings included: +0.61% in 2006, increasing to +.68 in 2011, and declining thereafter.
- Case V: RPS with 55% wind power, 20% biomass, and 25% commercial solar power, where blended costs for biomass and solar power are increased to \$.10/kWh, and \$.15/kWh, respectively.

These results are further summarized as follows:

| Summary of Maximum Estimated Rate Impacts | Maximum rate impact, and year occurring, without environmental credits | Maximum rate impact, and year occurring, with environmental credits |
|--|--|---|
| Wind only | +0.80% (2009) | +0.01% (2006) |
| 80% Wind + 20% biomass | +0.98% (2010) | +0.15% (2006) |
| 75% Wind +20% biomass + 5% PV | +1.11% (2011) | +0.24% (2006) |
| 55% Wind + 20% biomass + 5% PV + 20% Commercial Solar | +1.75% (2011) | +0.68% (2011) |
| 55% Wind + 20% biomass + 25% Commercial Solar, with blended costs increased to \$.10/kWh for biomass | +2.6% (2011) | +1.65%(2011) |

| | | |
|-------------------------|--|--|
| and \$.15/kWh for solar | | |
|-------------------------|--|--|

Reasonable Cost Discussion and Recommendations

The blended costs of adding various resources, including facility, transmission, integration, and interconnection costs, were calculated for each scenario for each source. These costs are weakly dependent on the scenario (they tend to change plus or minus a few percent depending on the scenario). For Case IV (55% wind + 20% biomass + 5% photovoltaics + 20% commercial solar), the maximum blended cost per kilowatt-hour, for each resource, were as follows:

| | Peak cost/kWh |
|---------------|---------------|
| Wind | \$0.043 |
| Geothermal | \$0.067 |
| Photovoltaics | \$0.115 |
| Biomass | \$0.060 |
| Comm. Solar | \$0.127 |

These can be interpreted as rough, minimum estimates of what utilities would likely need to spend for each source, in total, to fully meet the RPS with a diverse combination of these sources (such as in Case IV).

In Case V, however, the impact of increasing the blended costs of biomass and solar to \$.10/kWh and \$.15/kWh was examined, and in even in this case it was found that the maximum estimated impact to rates, with environmental benefits counted, was still less than 2%. This is a direct consequence of the large multipliers for non-wind sources.

CCAIE feels it would be desirable, especially in the first five years of the RPS implementation, to set a reasonable cost threshold for these newer source types at these levels to more fully encourage their development. As the discussion above illustrates, the large multipliers for non-wind sources largely tempers the possible rate impacts of doing this.

Based on this, we suggest that the Commission adopt a \$.05/kWh reasonable cost threshold for the total, blended cost of wind power, a \$.10/kWh threshold for blended cost of biomass and geothermal power, and a \$.15/kWh threshold for the blended costs of solar. Note that in

this approach, the blended costs are scaled to reflect the credit multipliers associated with these sources.

Setting specific thresholds for different sources in this way will give utilities and developers certainty as to what can be spent for particular source types, without having to recalculate the costs of their entire portfolio each time a new project is considered. At the same time, scaling the blended cost thresholds to the credit multipliers helps insure that the addition of the more costly sources will not greatly increase rates.

My Commission Expires: