Comments on Colorado Springs Utilities' (SU) 2008 EIRP Draft

From: Named Members of CAG/TAG Who Actively Served on 2007-2008 EIRP Discussions:

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Introduction

The named responders wish to thank SU (Springs Utilities) for allowing the opportunity to comment on the 2008 EIRP (Electric Integrated Resource Plan). However, the comment period is unusually short, given the elapsed time since the EIRP process was started. Overall SU has given much greater lip service, at least, to climate change, renewables, DSM (demand-side management), etc. However, this EIRP as well as certain public statements, indicate that SU is still in the "business as usual" mode. This document serves to support our concerns. Our comments will be broken into headings and subheadings in order to facilitate reading.

Community and CAG/TAG Involvement

SU did provide many opportunities for public comment, including meetings with members of the SU-selected Content and Technical Advisory Groups (CAG/TAG). SU is specifically to be commended for challenging the CAG/TAG to provide inputs to portfolios for evaluation, based on the direction its members thought that SU should take for electrical production.

The CAG/TAG input to the portfolios occurred in April/May 2007. One more CAG/TAG meeting was held in September to discuss preliminary results of the portfolios. After that, virtually all contact of SU with CAG/TAG stopped.

There was a meeting in fall 2008 that was rather uninformative about the progress of SU's DSM study. Even though various members of the CAG/TAG asked for additional EIRP meetings, review of wind RFPs, and more involvement in the DSM study, nothing more happened. Howard Geller, founder of SWEEP (Southwest Energy Efficiency Project) offered his help and input, but to no avail. (Howard was actively involved on the TAG during the 2004 EIRP process). It is not entirely clear why SU stopped meeting with the CAG/TAG. While one can speculate about reasons, what seems clear is that public input was not as rosy as indicated in the EIRP.

Climate Change

Climate change is at the heart of most of the concerns about coal-fired electrical generation. Of course, there are other environmental issues associated with burning coal, but they are, comparatively speaking, easier to mitigate. Since much of what follows has, at its core, this issue, some discussion of it is necessary before continuing.

There is virtually no doubt in the scientific community that anthropogenic climate change is occurring, and the central cause is increased greenhouse gases (GHG) concentrations in the atmosphere as result of human activity. The dominant GHG is carbon dioxide (CO_2) produced as a result of the burning of fossil fuels, thereby releasing carbon that had been sequestered for millions to hundreds of millions of years. Coal is the worst offender in this regard, producing approximately twice as much CO_2/Btu as natural gas (gasoline and diesel falls in between). The fourth assessment of the International Panel on Climate Change (IPCC) has indicated that the world must decrease CO_2 release by 4%/year starting in 2010, resulting in an 80% reduction by 2050, in order to avert catastrophic climate change.

Dr. James Hansen, an eminent climate modeler who directs NASA's Goddard Institute for Space Studies, goes even further and indicates that CO_2 concentration in the atmosphere must be decreased from the present 385 ppm to a maximum of 350 ppm, and perhaps further. Hansen also notes that carbon concentrations in the atmosphere are already too high to prevent runaway greenhouse warming (cf. "President 'has four years to save earth' – US must take lead to avert eco-disaster," *The Guardian,* 18 January 2009).

A particularly sobering recent article on the subject is "Irreversible Climate Change because of Carbon Dioxide Emissions" by Susan Solomon, et. al. published in the Proceedings of the National Academy of Science (http://www.pnas.org/content/early/2009/01/28/0812721106.abstract).

Yet CO_2 concentration in the atmosphere continues to increase due primarily to increased fossil fuel burning and forest fires. Burning coal (primarily for electrical generation) is presently responsible for approximately 40% of the annual anthropogenic CO_2 release. As such, new coal-fired electrical generation should not be built without carbon capture and sequestration (CCS), and old coal-fired generation should be phased out or modified for CCS as rapidly as possible. The economic and technical viability of CCS is controversial, and it is not clear that it will be effective (cf. Worldwatch Institute, *State of the World, 2009*, W.W. Norton and Company, New York, 2009, pp. 99-102).

Continuing to plan for coal-fired generation can be fairly said to be contrary to the announced climate change policies of the US government, and the adopted policies of the vast majority of governments in the world (by virtue of their having signed the Kyoto Protocol treaty). The climate policy webpage of the US EPA states, "Across the Federal government, partnerships and programs promote opportunities to conserve fossil fuels, improve energy efficiency, recover methane and sequester carbon. In February 2003,

several major industrial sectors (including electricity generation) and the membership of the Business Roundtable committed to work with four US government agencies to reduce greenhouse gas emissions in the next decade (through the Climate Vision Partnership)."

The campaign of President Obama called for reducing US greenhouse gas emissions 80% by 2050 and ensuring that 25% of US electricity generation comes from renewable sources by 2025 (see campaign webpage at http://my.barackobama.com/page/content/newenergy).

President Obama's Science Advisor selection, Dr. John Holdren, was selected because, according to the President, he is "one of the most passionate and consistent voices of our time about the growing threat of climate change." (cf. Physics Today website http://blogs.physicstoday.org/politics08/2009/01/holdren_appointment_confirms_o.html). President Obama called for a national cap and trade program through climate legislation in his first address to a joint session of Congress on 24 February 2009 (cf. Environmental and Energy Study Institute, *Climate Change News*, 27 February 2009, at http://www.eesi.org/ccn_022709).

The implications for coal-fired generation are clear: phasing out is both patriotic and desirable from a risk-mitigation standpoint.

SU, in this EIRP, acknowledges that CO2 may be a problem, but still plans on building a circulating fluidized bed (CFB) coal plant, despite possible viable alternatives (see below). The plant will not be easily or economically amenable to CCS retrofit, even if the technology is shown to be viable (cf. Howard Herzog, James Katzer, "The Future of Coal in a Greenhouse Gas Constrained World," p. 3, GHGT8_Herzog_Katzer.pdf).

SU is well aware that continuing to provide coal-fired electricity is contrary to the wishes of major customers, and threatens the economic development prospects of its service territory. Since 2002, SU's largest customer, USAG Fort Carson, has had a goal of achieving 100% renewable energy by 2027, and is actively engaged with SU regarding wind energy purchases. Other federal government installations in the SU service territory are subject to government goals, policies, and strategies that call for addressing climate change and purchasing renewables (namely the EO13423, 2007 and the Energy Independence and Security Act of 2007). More are expected this year.

Other existing or potential major customers seek to purchase renewable energy. Research by the CAG/TAG presented to SU in 2007 noted that:

- The US Air Force was the largest purchaser of wind power in the Federal Government;
- Organizations besides Fort Carson that have pledged to achieve 100% renewable energy or zero greenhouse gas emissions include Wal-Mart, HSBC and Colorado State University;

- An EPA list of 100% green power purchasers by 2007 (through offsets) included PepsiCo, Whole Foods, White Wave Foods, TetraPak, Kettle Foods, Clif Bar Co., Curtis Packaging and New Belgium Brewing.
- A number of Fortune 500 companies have active green power purchasing efforts including Wells Fargo, Johnson & Johnson, Starbucks, Cisco, DuPont, Staples, IBM, Sprint, Nextel, Safeway, Kohls, Nike, Office Depot, and FedEx.

Further, Deloitte Consulting principal Chris Park, who leads its Sustainability, Corporate Responsibility and Climate Change practice in the US, has written that:

> Already, companies are basing their sourcing decisions at least partially on sustainability; as the carbon-constrained economy gains momentum, it will push companies to consider the carbon implications of many more activities. Where a company today might decide where to put a data center primarily on real estate and labor costs, for example, a carbon-constrained view of the same decision might also consider factors such as local climate (cooler temperatures help dissipate waste heat), access to clean energy (to reduce the data center's carbon footprint) and the availability of backup power (to mitigate the risk of blackouts).

(cf. Chris Park, "Preparing for Success in the Carbon-Constrained Economy," *CRO* magazine, Sept/Oct 2008.)

The CAG/TAG and other signatories to this document urge SU and its governing board, Colorado Springs City Council, to better integrate economic development goals and concerns into the EIRP.

It is nothing short of a travesty that a municipal utility would "silo" economic development. Such future energy strategies ignore the implications for existing and potential customers, and ignore the economic development implications of various means of fulfilling the region's power needs, including indicators such as regional job intensity per BTU consumed, and cost-effectiveness of energy conservation initiatives at holding down utility rates.

Fuel Costs

On p. 37 of the EIRP, graphs show the projected costs of natural gas during the 20-year period covered by the EIRP. Curiously and inappropriately, there are no cost projections for coal, even though SU's long-term coal contracts expire in 2009 and 2010. In fact, there is no mention of these coal contracts expiring, though prices are expected to rise. In addition, the cost of coal is apparently not considered a risk in the risk analysis (pp. 50-57).

According to the EIA (Energy Information Agency), coal prices have shown similar volatility to that of oil and gas (at least in curve shape) in the past 3 years (c.f.:

http://www.eia.doe.gov/cneaf/coal/page/coalnews/coalmar.html To be fair, Powder River Basin coal prices did not show the price volatility of the other coal sources in the time frame of the EIA study. However, SU also uses coal from sources other than the Powder River Basin. Interestingly, an editorial in *The Gazette* newspaper dated 22 September 2008 cited the announcement by SU that steep increases are expected with a 72% increase in total utilities in the next 10 years.

It is particularly inappropriate that SU does not report coal price projections in the EIRP just as they do natural gas. At a minimum SU should explain why such projections are not necessary.

Discussion of Portfolios

Significant discussion in the EIRP addresses the large number of portfolios that were considered by SU - why some were rejected, and why more were added. It was noted that the evaluation method was primarily least cost, but other considerations were used as well. Ultimately, SU carried seven portfolios forward. In addition, the preferred portfolio, P6 (portfolio B) was also evaluated, substituting the LMS100 gas turbine for the CFB coal unit.

SU invited CAG/TAG in April 2007 to create a possible scenario, which it did. The scenario was analyzed using the same methodology as other SU-developed scenarios. This scenario resulted in an 80% reduction in greenhouse gas emissions from future power generation, while increasing consumer costs less than 5%. CAG/TAG aimed for this figure, given that SU surveys show that SU customers are willing to pay higher electric utility bills for renewable sources.

Specifically, SU's surveys showed that:

- For commercial/industrial electrical customers:
  - The average (statistical mean) willingness to pay for commercial/industrial customers was $25 per month;
  - 80% of businesses with less than $500 per month electrical bills were willing to pay up to $25 per month;
  - 85% of businesses with bills from $1000 to $5000 per month were willing to pay up to 1% additional (ie from $10 to 50 per month)
  - 50% of businesses with bills >$5,000 per month were willing to pay 1% more for renewables, ie $50 or more per month.
  - The CAG/TAG concluded from these results that "A majority of commercial customers are willing to pay more than 2% extra for renewables."

- For residential customers:

- More than 90% with monthly bills <$50/month were willing to pay 5% more for renewables;
- 80% of customers paying $50-100 per month were willing to pay 5% more for renewables;
- 74% of those with monthly bills >$100 per month were willing to pay 5% more.
- From these results, the CAG/TAG concluded that more than 73% of SU residential customers were willing to pay 5% more for renewables.

Initially, three levels of the cost of carbon were considered – a zero dollar ($0) cost adder, a $9/ton of CO2 adder, and a $30/ton CO2 adder. In the latter two cases, the costs were escalated by 2.5%/year. Ultimately the zero adder was dropped, both because of public input and the realization that there was probably going to be some sort of carbon cost in the near future. SU also assumed that 3.7 million tons of CO_2 would be grandfathered. In effect, this means the Nixon and Drake plants would not have to ever consider reducing emissions. While it is not clear what will ultimately be required, it seems doubtful that such would be the case if CO_2 emissions are reduced by 80% compared to the present.

In fact, the EPA is already raising the barriers to coal-fired power (c.f.: Solar Today, March 2009, p. 14). The Environmental Appeals Board of the EPA overturned the EPA's initial decision to allow an air permit for Deseret Power's proposed Bonanza coal-fired power plant in Utah. The decision was based on the finding that the EPA had not provided a rational reason why the emitted greenhouse gases should not be subject to "Best Available Control Technology." This occurred in November 2008, at the end of the Bush Administration.

We will focus mostly on four portfolios: P6, P6 with the LSM100 turbine, and the CAG/TAG portfolios, because they are the most relevant to our concerns.

Portfolio 6 (Portfolio B) – P6 is the preferred case in the EIRP, but not the least cost option (P5 was least cost). Primary features are: 100 MW of wind in 2010, high DSM (demand-side management), medium RPS (renewable portfolio standard) and emissions costs, seasonal purchases of 25 MW in 2014 and 50 MW in 2015, a 150 MW CFB with 20% biomass in 2016, 7 MW of hydro in 2017, and 233 MW of wind in 2022-2025. P6 portfolio's projected cost is $3.45 billion, which is $53 million more than the least cost P5 (these are net present value costs levelized over 20 years. Since P6 was the preferred case, all other portfolio costs were compared to it.

Our major concerns with P6 are discussed in the following paragraphs:

DSM. High DSM is defined as 0.6% energy savings/year. From our point of view, this is low, and does not come close to the 4% required to by the IPCC to avoid severe climate disruption. Howard Geller of SWEEP has indicated that 1-1.2% energy

savings/year can be expected using the sorts of voluntary and incentive-based DSM that might be contemplated by SU. SU assumed $30/MWh for the very high DSM (1% savings/year). In a SWEEP analysis for Utah (UT_Energy_Efficiency_Strategy.pdf, p. 7) DSM costs for 1% energy savings/year were shown to be $20-$30/MWh, for a combination of utility-plus-participant costs, and not utility costs alone. From this analysis, SU assumptions of its costs for DSM are too high, making DSM the clear least cost option. SU should not aim so low.

In addition, SU has conducted a DSM potential study that was supposed to be finished in late-early 2009. While the date of final selection for the preferred portfolios was September 2007 (EIRP, p.32), there is a significant time interval between this selection and final presentation of the EIRP (April, 2009?). Given the importance of DSM, it would seem that SU should discuss at least preliminary results of that study. Mechanisms for more dramatic decreases in electrical usage may not properly be a part of this particular EIRP, but they certainly should be being discussed within SU.

Wind and Renewables. Portfolio 6 indicates addition of 100 MW of wind power in 2010. RFPs for 10-100 MW of wind have apparently been sent out, and responses have presumably have been received. However, SU will discuss neither how much nor when wind will be added. Again, by the time the EIRP is issued, 2010 will not be far off.

Emissions Adder. Portfolio 6 assumes a medium emissions adder for CO2, e.g., $9/ton of CO2 emitted (after about 3.7 million tons being grandfathered). From our perspective, $9/ton is too low. Even with escalation at 2.5%/year, the adder would only be about $30/ton after 50 years (expected life of a coal plant). We realize that this is a judgment call, but given the potential severity of climate change, we suspect that the cost of carbon emissions will be much higher, with a reasonable likelihood of required shutdown of coal plants if CCS is not successful.

CAG/TAG Portfolios – CAG/TAG Portfolio #2 was based on adding an IGCC (Integrated Gasification Combined Cycle) coal unit, given that IGCC appeared to be a viable option at the time. Subsequently, planned IGCC plants have been shelved because of high cost. This option will not be discussed in detail. However, it does have some interesting aspects. It is the only portfolio in which the carbon adder was assumed to be $30/ton (high emissions costs). If the adder had been set at $9/ton as in the other cases, its price may have been quite close to that of P6. Conversely, setting the emissions adder at $30/ton would have made P6 much more expensive. The point is that a "level playing field" should have been used in order to make fair comparisons.

CAG/TAG #1 (P1) was developed with very high (1%) DSM, high RPS, medium emissions cost (so as not to be penalized by other portfolios), significant wind resources, and no coal units. It should be clarified that the CAG/TAG did not actually develop the portfolio. We specified the above conditions, and a computer simulation selected the resources and timing. The results of that portfolio show the levelized cost (after 20 years) to be $94 million more expensive than P6.

Such numbers seem quite large when presented to the public. Many attempts were made – all unsuccessful – to present these numbers in a manner more understandable to the public, e.g., presented as a cost/kWh. Because the numbers are levelized over 20 years, $94 million can be divided by 20 to obtain the yearly cost. This can further be divided by approximately 5 billion kWh to obtain an approximate cost/kWh.

The result is an impact of 0.094 cents/kWh or 56 cents to the bill of the average residence that consumes 600 kWh/month. This is well below the $1-2 more per month that 75% of the randomly surveyed customers were willing to pay to provide more renewables to SU's resource mix (EIRP p. 63 and comments above).

Another way of looking at the numbers is that P1 is only 2.7% more costly than P6 while providing about 80% reduction in added CO_2 emissions when compared to P6. **P1 scenario demonstrates that it is possible to meet electrical demand without coal-fired power generation, with much lower CO_2 production than other portfolio scenarios, and for a relatively small increased cost. In fact 56 cents added to the average residential bill would hardly be noticed and would be equivalent to using an extra 8 kWh or so for a given month at present costs.**

In addition, 57% of randomly surveyed customers thought that any increased costs should be integrated into the rate structure (EIRP, p.63) and not be separated, as currently planned by SU. SU apparently has no intention of doing so.

What seems clear is that SU does not view wind power (or solar) as an integral part of electrical generation. SU apparently still plans to charge an extreme premium for wind for those who want it. It would be much better to recognize that wind is going to become an integral part of the resource mix, and sort out how it can be integrated into the system and how much can be integrated. Such studies are apparently being conducted, but, again, SU has not shared the information. Neither has SU discussed geographic diversity of wind resources to improve firm power or installing significant PV for the same purpose.

There is no better example than the above that SU is not particularly interested in openness to its customers, even though its spokesmen are fond of telling SU's customers that they own the utility. The CAG/TAG insisted that numbers be presented in an understandable fashion. Perhaps this is one reason why SU reduced its contact with the CAG/TAG.

We wish to make it clear that we know that CAG/TAG #1 (P1) was a computer simulation, and it may not perform as well in reality as the simulation would indicate. However, the simulation clearly shows that it is possible to meet electrical demand without a coal-fired generation and at much lower CO_2 production. P1 produces only 15-20% of added CO_2 emissions, compared to P6**.** Remember, the CAG/TAG made specific recommendations about the portfolio, including large additions of wind and no coal units. The computer simulation picked the resources and timing to meet the presumed demand.

Therefore, some natural gas generation was picked and that is why there are still increase CO_2 emissions, but still only about 20% of P6.

Certainly geographic distribution of wind would allow more firm power from wind. Combining PV with wind in our area would probably lead to further improved firm power. Ultimately, storage for electricity will be needed and this is beyond the scope of SU's business. However, at the present time, wind and solar integration should begin as storage methods are developed and refined. An enlightened utility would be considering these options.

There is one final note about PV that should be made in this section. While PV is presently expensive, a Navigant study for Arizona (az_solar_electric_roadmap_study_full_reportJan 2007.pdf) indicates that PV electric costs will be equivalent to conventionally produced electricity in Arizona by 2025 (and probably sooner). An article in Solar Today (March 2009, pp. 22-23) indicates that Arizona is not waiting and is installing significant PV electrical production. Our area does not have the same solar resources as Arizona, but it is close. Again, enlightened utilities would be hedging their bets and diversify away from coal.

P6 with LMS100 Gas Turbine Substituted for the CFB Unit – One simulation was made as stated in the header. The LMS 100 has a slightly lower heat rate than the CFB (9,100 vs. 10,175 Btu/kWh). With natural gas as the feed and the lower heat rate, about half the CO_2/kWh would be produced. The projected cost is only about 1.5% higher or 0.05 cents/kWh. If SU requires firm power as a bridge until issues surrounding CO_2 emission, CCS, and cost of carbon are better defined, this option may be worth considering. Because the U.S. has only about 3% of the world's reserves of natural gas, but consumes 25%, it is wise to be hesitant about relying on natural gas. However, in our view this is no more risky than betting that a CFB can be run for its full 50-year life.

Miscellaneous Errors and Omissions

There are several other errors and omissions in the EIRP that should be mentioned.

- In the first paragraph of the Introduction on p. 1, the Energy Policy Act of 1992 (ERAct) was cited. That act was updated in 2005 so ERAct 2005 should replace the earlier version.

- On p.19 of the EIRP it was stated that The Federal Production Tax Credit (PTC) was updated until December 31, 2008. The PTC has been updated to extend through 2012, not 2008.

- We could find no references to the Energy Independence and Security Act of 2007 (EISA). Yet this act is highly important for SU because of the large

military presence in its service area and the impact these requirements have on the military's energy production/consumption. For example, Section 431 of EISA 2007 increased the federal energy reduction goal from 2% per year (as established by EPAct 2005) to 3% per year, with a new target of 30% greater efficiency by 2015.

Final Comments

When the first EIRP meeting was held in January 2007, it was quite clear that SU planned a "business as usual" strategy and did not expect the public disagreement with this strategy that occurred. SU somewhat adjusted to the public disagreement and is to be commended in at least considering alternative possibilities. However, it became clear in time that SU was committed to a CFB coal unit, and it was not going to be deterred from that position. CEO Jerry Forte made this stance quite clear in "monologs" at an Environmental Stewardship meeting in the spring of 2008, and again at a recent Utility Board Meeting.

Such a strategy ignores the real problems of climate change and puts the citizen owners of SU at considerable risk. Within the lifetime of a coal-fired power plant, there are likely be significant changes of how energy production is viewed. This will most certainly lead to quite limited CO_2 release from burning of fossil fuels. It is certainly conceivable that coal-fired power plants could become stranded assets.

We strongly urge that SU not make any decisions based on this EIRP until the requirements for carbon reduction are understood, and DSM is seriously considered. The present economic situation makes demand forecasts even murkier. The nation and the world are on the cusp of extreme change. SU would do well to work hard to reduce consumption and move determinedly toward renewables, while the future direction of energy production is sorted out.