

**KEC Electricity Committee Meeting Notes  
March 12, 2008**

**KEC Electricity Committee Members Attending:** Stuart Lowry, Committee Chair, Rick Anderson, Sarah Dean, Steve Dillard, Carl Holmes, Steve Johnson, Mark Parkinson, Mark Schreiber, Tom Sloan, Dave Springe, Michael Volker

**KEC Staff:** Liz Brosius, Corey Mohn, Jennifer Knorr

**Opening remarks**

Committee Chair Stuart Lowry welcomed the committee members and thanked Westar for hosting the meeting.

**Westar Energy presentation: Planning for New Generation**

Natalie Rolph, Black and Veatch, began a presentation entitled “Planning for Growing Electric Generation Demands” (available on the KEC web site, under the March 12<sup>th</sup> meeting heading: <http://www.kec.kansas.gov/electricity/index.htm>). She stated that utilities start with a load forecast and then identify different types of generation to meet the demand.

Rick Anderson asked how much lead time is given for each type of project. Rolph indicated that they are looking at six or more years for coal, more time for nuclear, a little less time for combined cycle projects.

Utility planning includes a financial forecast that will lead to power purchase agreement negotiations and eventually a final supply plan. Environmental considerations are also taken into account given New Source Reviews. A comparison is done of load and capability, specifically looking at when existing plants will be taken offline. Because of hourly patterns of electric use, there are needs for different types of generation (baseload, intermediate, and peaking). Baseload needs to be met by generators that run as efficiently as possible at the lowest cost.

Tom Sloan asked if the formula changes if you can pass through all costs to the ratepayers. Rolph responded that all utilities are looking out for the ratepayers and therefore always planning for the lowest cost options. She discussed a slide showing comparative costs of baseload, intermediate, and peaking, noting that the fixed cost of baseload is around \$450/kWh for 235 MW of pulverized coal (out of a 600 MW plant). Intermediate and peaking have lower fixed capital costs but significantly higher operating costs. Rolph noted that the slide showing 20-year levelized busbar costs shows which type of generation is most cost-effective depending on the shape of the demand curve.

Another slide projected busbar costs of different baseload generation at different carbon tax rates. Coal becomes most expensive at \$30+/ton price. Anderson asked for a definition of biomass generation and why, if burning wood releases CO<sub>2</sub>, wouldn't that emission level be the same as coal? Rolph said that biomass includes waste wood, crop

residue, etc. and that CO<sub>2</sub> emissions for biomass were deemed neutral because the biomass would decay and release CO<sub>2</sub> anyway after decay.

Carl Holmes indicated he would like to see the fuel prices that used in the calculations offered, noting that the U.S. Department of Energy has done a poor job of projecting energy prices in the past.

Rolph continued by stating significant investment in transmission will likely be part of the picture. Utilities will consider new generation that complements their existing portfolio (load duration curves help utilities determine the alternatives available for power supply). Looking at various scenarios helps to mitigate risk.

The presentation then continued with Black & Veatch engineer Sam Scupham giving an overview of the different conventional (non-nuclear) power supply options and their advantages and disadvantages (see slides entitled “Comparison of Conventional Technologies” for more details). Simple cycle combustion turbines (SCCT) are essentially jet engines, fueled by natural gas or fuel oil, and used as peaking generation. Combined cycle combustion turbines (CCCT) are natural-gas fueled and dispatched as intermediate generation. Pulverized coal is the most mature coal-burning technology and is dispatched as baseload generation; plant sizes range from 200 to 1,300 MW per unit, allowing economies of scale to reduce busbar costs. Circulating fluidized bed (CFB) units can burn a wide variety of fuels but are typically less efficient than PC. Integrated gasification combined cycle (IGCC), in which fuel is converted to syngas and then combusted in modified gas turbines, can reduce emissions (SO<sub>2</sub>, mercury) but has high capital and operating costs.

Scupham noted that all of the fossil fuel options emit CO<sub>2</sub> and discussed a chart comparing the emissions levels of NO<sub>x</sub>, SO<sub>2</sub>, particulates, and CO<sub>2</sub> for different conventional technologies. IGCC offers promise in terms of lower emissions, but the cost is much higher and reliability is low.

Holmes asked if a similar comparison was available showing tons/MWh (as opposed to lb/MBtu), and the Black and Veatch presenters said that it could be produced.

Nuclear power is estimated to take 8 to 10 years to develop currently, but the timeframe may increase after the first four plants are built due to supply issues.

With respect to renewable generation—wind, biomass, landfill gas, and solar—Anderson asked about O&M costs and wondered if Black and Veatch had a life-cycle cost for wind projects? They said they do have this information, but didn't have it with them for this presentation.

Defining biomass as any organic material of recent origin, Scupham said it is another option for power generation and is similar to coal in setup, but the maximum capacity would be small (around 20 MW). Mark Parkinson asked if Black and Veatch was seeing the market moving to biomass. In the eastern U.S., there are significant projects moving

forward, up to 100 MW capacity. Landfill gas is another option which is cheap, but typically low in supply (at most 5 MW capacity in Kansas for each stand-alone).

Solar thermal is a bit of an outlier for Kansas, though perhaps possible in southwest Kansas, though with very high costs. Solar photovoltaic is currently much less optimal than solar thermal pricewise.

John Achenbach, Black & Veatch, provided the presentation on nuclear reactor technology. He noted that nuclear power's main advantage is the absence of emissions and the relatively low fuel costs. The disadvantage is the enormously high capital costs (probably 50% more expensive than coal) and bad public image. He pointed out that the 2005 Energy Policy Act established a production tax credit for nuclear (for plants that apply for a license in 2008) and other incentives. The regulatory system has been streamlined to have a pre-approval of technologies and a cloning of plants (designs cannot be custom jobs).

Parkinson asked where the market was on nuclear, Achenbach said we are likely to see 2 to 4 of the currently planned projects built, with the first coming online in 2016. A future pullback of incentives should not dampen this.

Holmes asked whether delays in moving equipment from Japan would slow the timeframe. Black and Veatch does not believe this will hinder projects now because of the three-year time for getting licensing, etc., completed.

Rolph emphasized that generation planning must take into account increasing capital costs; long lead times; concerns of ratepayers, stockholders, and Wall Street; and recognize risk by developing contingency plans that value flexibility.

Sarah Dean noted that the presentation outlined a generic process and wondered, for a specific utility, which sources of power offered the most flexibility? Rolph answered that not all options apply to every utility. Dean asked which power source offered the most flexibility, and Rolph noted that smaller units or smaller PPA's probably provided more flexibility than larger units (but provide less economies of scale).

Steve Johnson asked what was happening in the world of distributed generation, and Rolph said there was not much push in this area.

Ken Frahm wondered if we might see a consortium of utilities to help develop nuclear facilities. Black and Veatch said that most utilities moving forward are sharing risks. Holmes stated he thought there was a law against foreign investment in nuclear. Black and Veatch said they thought this law limits investment to 49 percent.

Michael Volker asked if the increase in the price of natural gas was due to the utility buildup, and the presenters said that it was more a result of the lack of production capability (harder and more expensive to find gas reserves). Frahm referenced the slide entitled "Baseload Resource Screening with CO2 Costs" and asked how Black and

Veatch clients are dealing with the potential for a CO2 tax. Rolphs answered that you look at lots of contingency plans.

Sloan commented that prices will rise for everyone; Black and Veatch agreed, saying that for Warner-Lieberman standards to be met by 2030, we will have to stop all new coal, use more gas, more wind and have some form of carbon capture, all of which will be more expensive.

Anderson asked if RPS policies have had any benefit to utilities from an engineering point of view? The answer was no. Volker suggested that there is an advantage to having a diversity of fuel supply.

Jim Ludwig, Westar Energy, began his overview of Westar's strategic plan by stating that the thing he could say with the most confidence was that our projections will be wrong because we have to make assumptions about variables such as the price of natural gas. He noted that each utility's resource planning is unique. Because of Westar's relatively high reliance on baseload coal generation and their long-term contracts for coal, their customers are shielded from the impact of rising coal prices. He also noted that Westar does not need to build new generation right now.

Ludwig said that it is important to maintain flexibility going forward. As an example of this, he recounted Westar's recent history: in spring of 2005, they were looking for a site for 2 new coal plants, and they received no comments with respect to carbon emissions. By the end of 2006, the projected costs of building the new plants had nearly doubled (1.1 billion in 2005 increasing to 2 billion in 2008). Because Westar has ample existing baseload capacity, the company looked at the possibility of pairing new wind capacity with new natural-gas generation.

He referred to Figure 10, page 58 of the strategic plan, noting that the focus should be on the near-term part of the graph (up through 2010). Between 2007 and 2010, Westar expects to spend \$613 million on transmission and \$355 million on the Emporia Peaking Plant. Westar will have 300 MW of wind in their portfolio and will own half of this. Normal capital expense rates for Westar are \$150 to \$250 million/year. Between 2007 and 2010, that will skyrocket to between \$750 and \$900 million/year.

Ludwig said it's essential to communicate the rate implications of increased expenditures/investments to consumers, though Westar customers pay the lowest rate in the state and well below the national average.

Westar has traditionally focused their demand-side management (DSM) on large industrial who pay discounted rates for interruptible service. On the residential side, however, despite consumer endorsement of energy efficiency, residential usage continues to grow, which leads them to believe that rates have increased.

David Springe asked if a future rate had been developed for additional investments. Ludwig said no, they do not know yet. Volker noted that the Southwest Power Pool (SPP) could mandate upgrades in transmission.

Dean asked where Westar would go to reduce CO<sub>2</sub> emissions? Ludwig prioritized options as follows: extend operating license for Wolf Creek, pursue energy efficiency as the next most cost-effective option, invest in wind (though there is CO<sub>2</sub> associated with natural gas combustion), and continue to explore carbon capture and storage (though it is not expected to be commercially viable until 2018). A \$20 carbon tax add \$500 million/year to Westar's costs. Warner-Lieberman would cause utilities to back off coal plants, including existing production. Sloan asked how soon retirements of coal plants would happen, and Ludwig said the imposition of Warner-Lieberman would hasten retirements.

Holmes asked where the supply of gas will come from if we move away from coal? His feeling is there is not enough supply and that gas-fired plants are not set up to run 24/7. Mr. Ludwig answered that gas prices would increase and he is not sure the political will exists to deal with increased prices.

Frahm asked if the silting of reservoirs was a concern at Wolf Creek and Ludwig said it is not a concern for the current units.

#### **Overview of KCC staff wind study**

Bob Glass, KCC economist and co-author of the Benefit Cost Study of the Governor's 2015 Wind Challenge, gave a PowerPoint presentation on the study's main conclusions (available on the KEC web site, under the March 12<sup>th</sup> meeting heading: <http://www.kec.kansas.gov/electricity/index.htm>). Glass noted that the study used a net present value (NPV) approach to evaluate the net benefit of the investment to Kansas ratepayers, both with and without a consideration of the external costs that would be avoided by the wind investment (e.g., health impacts from traditional emissions).

Glass noted that wind was neither controllable or dispatchable and was best viewed as a substitute for a utility's fuel mix.

The study's key results are (1) wind-based electricity will cost Kansas ratepayers more than conventional generation (\$28 more per MWh if acquired through a typical PPA, and \$51/MWh more if acquired through utility investment); (2) external cost savings may make wind affordable; (3) it is cheaper for ratepayers if wind is bought rather than built; and (4) retail rates are likely to increase by \$0.98/MWh if met with power purchase agreements and by \$1.90/MWh if met with utility investment.

A threshold level for external costs was established to give policy makers a benchmark to use in discussions of wind investment. The threshold level is the amount of external costs savings (from avoided emissions-related damages) needed to make wind break even (or have a net-zero NPV).

Holmes asked if residential rates were broken out of the analysis, and Glass said the study assumed that the rates were allocated evenly among all ratepayer groups. If the traditional approach holds, then ratepayers would pay even more for wind. Volker added that residential customers would likely see an \$8 to \$10 increase in rates/month to hit net-zero.

Dean asked if the study's conclusions compared wind to new or old coal? Glass said that the assumption was that the fuel mix remained relatively constant going forward (because it is an intermittent source, wind doesn't substitute for new capacity). Volker noted that the study did not look at lost economic development.

In response to a question from Sloan, Glass noted that the \$20/MWh value attributed to avoided external costs was based on the EPA's analysis of the avoided costs for Kansas under the Clear Skies Proposal, which focused primarily on NO<sub>x</sub> and mercury emissions (see Appendix E of the Study for more information). Glass added that you need \$27 to \$52/MWh in external costs for an investment in 1,000 MW of wind by 2015 to break even.

Springe and Ludwig conversed over which approach (build vs. buy) was more cost-effective for ratepayers. Dean disputed premise that wind generation has high O&M costs, pointing out that all forms of energy generators require maintenance, including coal plants. Lowry asked if this study should be presented to the full Kansas Energy Council. Sloan argued that whatever is released in a public setting be simple and easy for the press to report on favorably. Dean asserted that we should not rely on one study but should look for other studies with different points of view. Holmes countered that this is the only Kansas-specific study at this time.

### **Summary of existing state generation facilities**

Liz Brosius noted that the Committee had received the draft copy of the power plant summary in February and that the current version incorporated feedback she had received from utility representatives. She encouraged all the utility members to scrutinize the handout entitled "Kansas Electric Generation: Summary of Existing Power Plants" and send her additional feedback.

### **Committee objectives and timelines, direction to staff**

Lowry pointed out that two dates had been set for future meetings but that these may need to be changed to accommodate legislators. Mark Schreiber mentioned that April 10 is a possibility and Westar could host. Johnson requested that the next utility presentation walk the committee through how utilities get to a demand forecast. Holmes asked Brosius to coordinate with Mary Galligan in regards to the tons of CO<sub>2</sub> emitted per plant to make sure the numbers were similar.

The meeting was adjourned at 5:00 p.m.