ISSUE BRIEF

KENTUCKY ENERGY

2011 Kentucky Grade: B- Date: February 1, 2011

Kentucky has historically had one of the lowest energy costs in the country. This is one of the factors that have allowed the state to attract energy-intensive industries. Maintaining the infrastructure of this vital sector of our economy is imperative for the livelihood of citizens and the protection of the industrial base.

CURRENT CONDITIONS

The energy industry in Kentucky is currently at a crossroads. To date, electricity has primarily been provided by central station, coal-fired generation. Coal is used to generate 92 percent of Kentucky's electricity. Peaking power, which is electricity that is provided during times of high use, is generally provided by simple-cycle gas turbines. Residential heating in rural areas is provided by propane or electrical sources, although wood furnaces and stoves play a major role in rural residential markets. Natural gas is an alternative in urban areas.

The U.S. Environmental Protection Agency (EPA) has issued proposed rules for public comment and Congress is considering legislation that will further tighten emission limits for sulfur dioxide, nitrogen oxides and particulates. Additionally, the EPA is considering the regulation of fly ash from coal-fired power plants as a hazardous waste. Meanwhile, the issue of carbon dioxide regulation is continuing to confound decision-making in all sectors of the energy industry. In order to comply with these regulations, electric utilities are considering increasing usage of natural gas, biomass, and in some cases, investments in nuclear generation. Because Kentucky has a law that forbids issuing a permit to construct a nuclear power plant, nuclear energy would have to be imported unless legislation is passed to allow for the construction of nuclear facilities. Electric utilities are also focusing investments on conservation and energy-efficiency measures, thereby avoiding emissions and moderating the need for additional generation.

The economic conditions of the U.S., including those in Kentucky, have reduced growth in electricity demand. Although the state has been effective in attracting new industry and several companies have announced expansions of existing facilities, the resulting demand increase for that growth has not outpaced the reduction in demand due to the economic downturn. Over the years, Kentucky has benefited from industrial growth due to low electricity prices. If the EPA is successful in establishing lower limits on emissions of sulfur dioxide (SO2), nitrogen oxides (NOx) and particulates and successful in establishing carbon dioxide emission limits, energy prices in Kentucky could rise. Some industries have stated that they may leave the state if energy prices rise. Losing industries in the state would reduce demand further and delay the need for future generation.

East Kentucky Power Cooperative announced that the 278-megawatt fluidized bed unit planned for Clark County will be postponed. EKPC also announced that The Louisville Gas and Electric - Kentucky Utilities 750 MW Trimble Station Unit 2 recently came online in Trimble County. The Tennessee Valley Authority has issued an integrated resource plan that calls for the lay-up of 4,700 megawatts of coal-fired generation. This generation would be replaced with gas combined cycle, nuclear and renewable generation. Other utilities are exploring the joint construction of nuclear generation facilities outside the state in order to reduce their carbon footprint.

Utilities are also considering switching to either natural gas or biomass in order to reduce carbon emissions. There are five major gas pipelines operating in the state, bringing natural gas from the Gulf Coast and the Northeast. These pipelines are mainly used for interstate transport. Upgrades to the infrastructure would be required if the electric utilities switch to natural gas as a primary fuel source.

A large-scale fuel switch to biomass (a biological material of recent origin used for energy production) or a blended fuel of biomass and coal would require fuel processing/loading infrastructure that currently is not available at the level needed to supply central station power plants. Several biomass projects are in the planning stages, but without either an environmental requirement or funding incentives, the switch to biomass is cost-prohibitive and unlikely.

The disposal of coal byproducts is also under review by the EPA. After the failure of a TVA coal byproduct storage facility, the EPA issued a notice of proposed rules regarding the treatment of fly ash from power plants. The most restrictive of the proposals is to treat the waste as hazardous, which would require lined, hazardous-waste-quality landfills for ash storage. In addition, existing fly ash storage areas would require upgrades. If fly ash is deemed hazardous, combustion byproduct handling is not adequate as constructed today. New hazardous waste landfills and upgrades to existing landfills would be required.

Environmental regulations will require the construction of additional environmental control equipment for sulfur dioxide (SO2) and nitrogen oxides (NOx). If enacted, carbon legislation will create an immediate demand for construction of additional pollution-control equipment and possibly pipelines for transport of carbon dioxide to underground injection sites. If utilities choose to burn biomass to aid in their carbon dioxide compliance, the industry must prepare for growing, harvesting and transporting the biomass product. Wood or agriculture type biomass is handled adequately today, but not at the scale required if biomass is deemed a viable fuel source.

Kentucky's transmission system was originally constructed as separate utility company systems to deliver power within each utility service territory. Selected interconnection points allowed for minimal transfers between systems. With the deregulation of the wholesale power market, the transmission grid has been pushed to the limit to function as a conduit for large transfers of power from north to south. However, as these transfers do not directly benefit the consumers within Kentucky, utilities have been reluctant to construct transmission to alleviate the congestion caused by these north-south transactions, thus creating instability in the grid system.

In 2005, the Kentucky Public Service Commission (PSC) issued a report reviewing the transmission grid. The report concluded that the transmission system is aging and the current capacity is generally adequate for in-system and minimal off-system transfers of power.

However, large transfers are pushing the capacity and additional investment is needed to ensure the integrity of the system for intrastate transfers, as well as interstate transfers.

RECOMMENDATIONS SUPPORTED BY ASCE

The following recommendations are supported by ASCE:

- Continue energy conservation efforts to reduce the load on Kentucky's grid
- Continue research in alternative energy sources
- Anticipate changes in EPA regulations and prepare to invest in infrastructure to keep Kentucky in compliance with new regulations

GRADE

Kentucky's transmission grid currently meets the state's need to transmit power within the state. However, it is not adequate for large-scale, north-south transmission. Kentucky's power plants meet current EPA requirements, but proposed emission requirements could create the need for construction of additional scrubbers. In addition, proposed EPA regulations could classify coal combustion products as a hazardous waste, and landfills would have to meet new design requirements to handle those wastes. Utility companies are investigating alternative fuel sources and are focusing on reducing consumer demand to reduce the demand on the grid.

As a result, energy infrastructure is assigned a grade of B-.

KENTUCKY ENERGY SUB-COMMITTEE

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SOURCES

1. East Kentucky Power Cooperative, Press release, "East Kentucky Power Cooperative Cancels Power Plant", November 18, 2010

2. "Integrated Resource Plan, TVA's Environmental and Energy Future", Draft 1, September 2010.

3. Secretary Leonard K. Peters, Kentucky Energy and Environment Cabinet, Presentation to Governor's Conference on the Environment, October 20, 2010.

4. Kentucky's Electric Infrastructure: Present and Future, Kentucky Public service Commission, August 22, 2005.