Section 8.4 Policy and Program Recommendations

1. Encourage federal funding of research and development of all technologies that can provide base-load power while achieving reduced CO_2 emissions.

Description

Base-load units produce electricity at an essentially constant rate and run continuously; they are operated to maximize system mechanical and thermal efficiency and minimize system operating costs.

A recent report—prepared by the Electric Power Research Institute (EPRI), Energy Technology Assessment Center—suggests that the U.S. electrical power industry has the potential to reduce annual CO_2 emissions by roughly 45% by the year 2030 (relative to projection in the Energy Information Administration's *2007 Annual Energy Outlook*). According to this report, achieving these reductions will require an aggressive implementation of a diverse portfolio of advanced technologies, which include end-use energy efficiency, renewable energy sources, advanced nuclear technologies, advanced coal (including pulverized and gasification technologies), CO_2 capture and sequestration, plug-in hybrids and utilization of distributed energy resources. According to the EPRI report, development of this group of technologies will require significantly expanded research and development (R&D) efforts. The report estimates funding to be on the order of $1.4 to $2 billion annually through 2030.[1]

Currently, the federal government spends roughly $6.7 billion annually (41% of total energy subsidies) on electricity production. Electricity production subsidies and support per unit of production vary widely by fuel type; refined coal, solar, and wind power receive by far the highest amount of subsides, ranging from $23 to $30 per megawatt hour (MWh).[2]

In addition to implementing a federal cap-and-trade policy or carbon tax, the federal government can play a role in reducing emissions of CO_2 and other greenhouse gas by subsidizing invention, innovation, and education. Given the value of developing low-cost technological breakthroughs, federal funding of research and development is appropriate.[3]

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[1] EPRI Energy Technology Assessment Center, 2007, The Power to Reduce CO2 Emissions: The Full Portfolio: www.epri.com (under product number 1015461).
[2] EIA, 2007, Federal Financial Interventions and Subsidies in Energy Markets: Executive Summary: http://www.eia.doe.gov/oiaf/servicerpt/subsidy2/index.html (accessed July 2008).
[3] As Yale economist William Nordhaus points out, "the economic benefits of a low-cost and environmentally benign backstop technology are huge in terms of net impacts, averted costs, averted damages, and benefit-cost ration. We estimate that a low-cost technological solution would have a net present value of around $17 trillion." See Nordhaus, 2008, p. 199.

Recommended Actions

a. Responsible parties

The Governor and Legislative leaders should send letters to the Kansas Congressional delegation and other key federal policymakers.

b. Legislative action

Legislators should consider adoption of a resolution in support of this recommendation.

c. Budget requirements

No additional funding required.

d. Implementation timeline

Letters to the Congressional delegation should be delivered on or before January 31, 2009.

Implications of Proposal

a. Pros

i. May result in development of low-cost alternative technologies that will have a great benefit to society.

ii. May spur innovation and invention.

b. Cons

i. Will likely require additional taxpayer funding (or reduce tax revenues).

ii. May divert resources from other types of research and development.

ii. May promote inefficient subsidies of specific technologies.

[Section 8.4 Policy and Program Recommendations, continued]

2. Encourage the Kansas Bioscience Authority to allocate some of their funds to research and development related to biomass-fueled electric generation, including the analysis of carbon footprint.

Description

In Kansas, seventy-five percent of the electricity generated between July 2006 and July 2007 came from coal-fired power plants (though, of course, generating units using other fossil fuels, gas or diesel, also release CO_2 into the atmosphere).[4] In 2007, the total greenhouse gas emissions in Kansas associated with electricity generation was 43,250,899 tons of carbon dioxide equivalent.[5]

Co-firing of electric power plants with biomass waste materials may be a cost-effective state-level strategy to reduce emissions of CO_2. Biomass waste, as defined by the U.S. Department of Energy, Energy Information Administration (EIA), is organic non-fossil material of biological origin that is a byproduct or a discarded product. This includes municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural crop byproducts, straw, and other biomass solids, liquids, and gases. This does not include wood and wood-derived fuels (including black liquor), biofuels feedstock, biodiesel, and fuel ethanol. According to EIA, energy crops grown specifically for energy production are also included in their "biomass waste" data.[6] The use of biomass as a fuel in electric generation is considered "carbon neutral" so long as the same quantity of fuel consumed is replanted.

The Kansas Bioscience Authority (KBA), created by the Kansas Economic Growth Act (KEGA) in 2004, provides research and development funding to government and private organizations investing in Kansas bioscience.[7] With funding of $580 million over fifteen years, the KBA administers programs providing funding for researchers at research institutions as well as programs giving tax incentives and other help to bioscience companies in Kansas.[8]

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[4] KEC, 2008, Kansas Net Electrical Generation, Kansas Energy Chart Book: http://www.kec.kansas.gov/chart_book/ (accessed September 2008).
[5] Will Stone, KDHE Bureau of Air and Radiation, personal communication, December 8, 2008; based on KDHE's voluntary survey of electric generating utilities.
[6] EIA, 2008, Glossary: http://www.eia.doe.gov/glossary/glossary_b.htm.
[7] Kansas Bioscience Authority, 2008, KBA web site (http://www.kansasbioauthority.org/).
[8] KBA currently administers four programs relevant to electrical generation: (1) Heartland BioVentures, which facilitates risk capital investment in Kansas bioscience companies; (2) Kansas R&D Voucher Program, which provides funding of research and development programs within Kansas bioscience companies; (3) Kansas Bioscience Attraction and Retention Program, which helps bioscience companies retain and expand bioscience job opportunities within Kansas; and (4) Bioscience Tax Investment Incentive Program, which helps reduce start-up costs by giving direct payments in the amount of 50 percent of a bioscience company's net operating loss within the state, up to $1 million annually.

Recommended Actions

a. Responsible parties

The Governor and Legislative leaders should send letters to the KBA.

b. Legislative action

Legislators may consider whether additional legislation is needed.

c. Budget requirements

No additional funding required.

d. Implementation timeline

Letters to the KBA should be delivered on or before January 31, 2009.

Implications of Proposal

a. Pros

i. May result in development of low-cost biomass co-firing technologies resulting in reduced emissions of CO_2.

ii. May spur innovation and invention in general.

b. Cons

i. May divert research and development from other KBA programs and priorities.

ii. May promote inefficient subsidies of specific technologies.

iii. May be resisted by KBA.

[Section 8.4 Policy and Program Recommendations, continued]

3. Endorse collaborative development of advanced generation technologies in Kansas that can provide base-load power while reducing greenhouse gas emissions. Such collaboration could be between Kansas utilities, between Kansas utilities and regional utilities, or between Kansas utilities and other stakeholders.

Description

In Kansas, electrical demand is projected to grow at an average rate of roughly 1.5% to 2% annually for the next 20 years.[9] To meet expected demand, Kansas utilities will have to build new base-load power plants or purchase capacity. Moreover, some of the state's existing generation capacity will be need to be replaced by 2028. Although base-load power plants generally are less expensive to operate than peaking and intermediate plants (see Chapter 8, Overview), they cost more to build and require years of planning and construction.[10]

Given the state's current dependence on coal-based generation (roughly 75% of current production), it is likely that Kansas will need to transition to lower-carbon technologies in the coming decades. Nationally, the electricity sector accounts for roughly 40% of U.S. CO_2 emissions.[11]

Kansas utilities, like utilities across the nation, may have difficulty building new base-load generation on their own. They may not be able to mobilize the necessary capital to support such a large project. Moreover, since it has been a long time since major generation projects were undertaken, many utilities may have lost expertise managing such projects.[12] Utility collaboration with other utilities or stakeholders may overcome some of the obstacles to building new base-load capacity.

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[9] Based on preliminary data compiled by KEC staff for forecast load and capacity summaries. Finalized versions will be posted on the web site in coming months. According to the EIA, overall U.S. demand is expected to increase 1.1% annually: Annual Energy Outlook with Projections to 2030: http://www.eia.doe.gov/oiaf/aeo/electricity.html (accessed September 2008).

[10] Base-load units produce electricity at an essentially constant rate and run continuously; they are operated to maximize system mechanical and thermal efficiency and minimize system operating costs. Peaking units are normally reserved for operation during the hours of highest daily, weekly, or seasonal loads. Intermediate units, another type of power plant, serve the load in between base load and peak load. Definitions from EIA's Energy Glossary: http://www.eia.doe.gov/glossary/glossary_i.htm; accessed May 2008.

[11] Joskow, 2008.

[12] "This increases the likelihood that absent appropriate incentives to control costs, regulated generation projects will be excessively costly and that the cost overruns will be largely borne by consumers." See Joskow, 2008, p. 16.

Recommended Actions

a. Responsible parties

The Governor is encouraged to use the "bully pulpit" to endorse this recommendation. In addition, the KCC should consider whether a docket should be opened in this matter.

b. Legislative action

The Legislature should consider whether legislative action is required.

c. Budget requirements

No additional funding required.

d. Implementation timeline

Recommended actions should be undertaken during the first half of 2009.

Implications of Proposal

a. Pros

i. May spur development of new base-load capacity for Kansas customers.

ii. May result in more cost-effective construction.

iii. May result in smaller increases in customer rates.

b. Cons

i. May encounter regulatory complications, if built by regulated utilities.

ii. May encounter opposition from regulated utilities in Kansas, if generation is built by someone else.