

# Carbon costs

## Associated Electric Cooperative Inc.

A Touchstone Energy® Cooperative 



### Power supply facts

## Controlling carbon will increase your cost of electricity

Associated Electric Cooperative, our wholesale power supplier, has invested in environmental controls and researched lower-cost technologies to achieve 90 percent reductions in nitrogen oxides and sulfur dioxide emissions, as well as reduced mercury emissions. Those investments cost Associated about \$167,000 per day – or \$61 million a year – in 2012. This translates to roughly \$40 a year for the average retail member.

Those costs will increase as your wholesale power generator works to meet additional environmental regulations on air emissions, water quality and coal ash handling and storage – and those costs do not include reducing carbon emissions.

Uncertainty on carbon reductions makes compliance and costs unpredictable, especially as the Environmental Protection Agency has moved ahead to regulate carbon under the Clean Air Act despite proposed bills by Congress to rein in EPA.

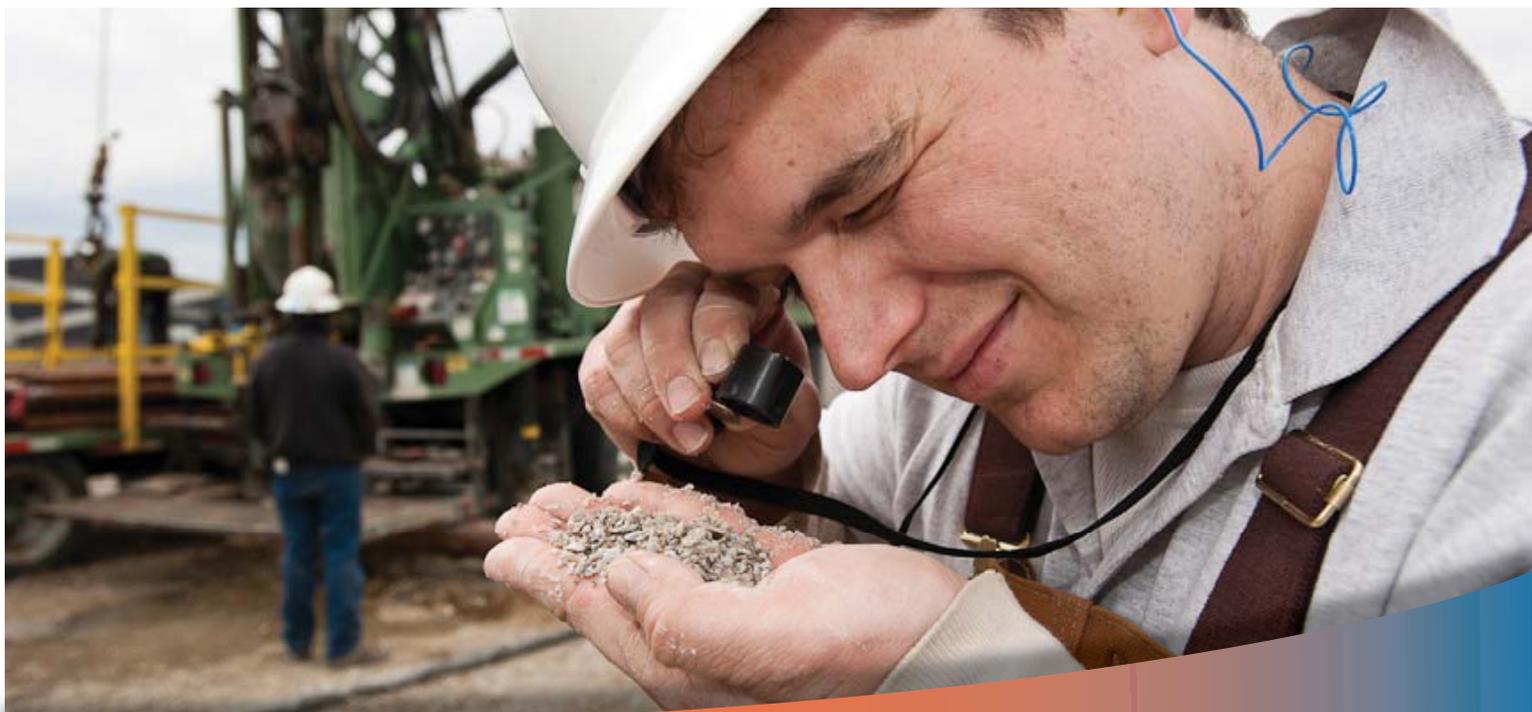
EPA's Greenhouse Gas Tailoring Rule, effective for utilities in 2011, requires AECEI to report and monitor carbon emissions before and after projects to determine whether significant increases in emissions are probable. The rule also requires permitting and submission of a best achievable control technology analysis, which will become more stringent over time, making compliance strategies and costs unpredictable.

EPA also proposed its first carbon emissions standard March 27, 2012, with limits that halve the CO<sub>2</sub> emissions on new coal plants – requiring their carbon emissions be about the same as today's combined-cycle natural gas plants. No carbon limits were included for existing coal plants.

### Reducing our carbon footprint

While uncertainty continues, Associated works proactively to manage its carbon footprint. It has diversified its generating mix, adding lower-emissions natural gas plants, carbon-free wind power and energy efficiency to its coal, gas and hydropower resources, and it continues to participate in carbon capture and storage research.

▼ *Missouri Department of Natural Resources geologist John Pate examines cuttings to determine what bedrock the drilling has reached from the carbon storage research project supported by AECEI and others that is under way at Thomas Hill Energy Center.*



# Core carbon points

The Environmental Protection Agency marches ahead to regulate greenhouse gases, enacting its Greenhouse Gas Tailoring Rule in 2011 and issuing a proposed standard March 27, 2012, for carbon emissions from new fossil-fueled power plants.

Uncertainties on carbon regulations make compliance strategies and costs unpredictable; however, Associated continues to manage its carbon footprint by:

- Diversifying its generating resource mix, which includes energy efficiency;
- Taking a lead in renewable wind power;
- Researching technologies such as the carbon storage project at Thomas Hill Energy Center.

## Take Control & Save energy efficiency program

The Take Control & Save energy efficiency program is seeing results since its launch in 2008. To date, your wholesale power supplier has invested \$28 million in the program that will achieve an estimated cumulative lifetime savings of 952,000,000 kilowatt-hours – enough electricity to run about 65,000 member households for a year.

While the program helps members reduce their electric bills, it reduces generation, which reduces carbon emissions.

## Wind generation

AECI and rural electric cooperatives took the lead in carbon-free wind power when they teamed up with Wind Capital Group to bring the first utility-scale wind farms to Missouri. The four farms amount to 300,000 kilowatts and can supply enough electricity for about 53,000 member households when considering the nature of wind power and the varying ways members use electricity.

AECI also has signed long-term power purchase agreements for an additional 300,000 kilowatts from the Flat Ridge 2 Wind Farm operating in Kansas and for 150,000 kW from a farm under development in Oklahoma. The contracts lock in fixed wind power costs while adding geographic diversity to AECI's wind power resources.

## Renewable hydropower

Hydropower from federal dams in Missouri, Oklahoma and Arkansas is another major renewable generating resource. While hydropower is one of our lowest-cost resources, it is a limited commodity dependent on rainfall and the capacity of lakes and dams to store the water.

## Carbon capture and storage research

AECI is dedicated to representing its members' interests and fulfilling its mission of providing an economical and reliable power supply to our members. As a result, AECI participates in research to find ways of reducing the amount of carbon dioxide reaching the atmosphere.

AECI is partnering with other Missouri utilities and the U.S. Department of Energy in a three-year project to determine the feasibility of storing CO<sub>2</sub> in a saline aquifer in Missouri. Testing is under way in north-central Missouri at AECI's Thomas Hill Energy Center.

AECI and Central Electric Power Cooperative have supported research by Lincoln University and Missouri University of Science and Technology to test the viability of algae at Central Electric's Chamois Power Plant to feed on CO<sub>2</sub> emissions from the plant's flue gas.

## Biomass

Since 2003, research to produce green power from biomass has been conducted at Central Electric Power Cooperative's Chamois Power Plant. Experiments like these help identify the most efficient form of biomass to reduce coal in electricity generation, reducing carbon emissions.

