




Co-op News from Wyrulec Company

Your Touchstone Energy[®] Cooperatives 
The power of human connections

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From your manager



Miller

This newsletter is dedicated to the issue of your affordable, reliable, plentiful electricity supply. We are taking this issue very seriously and we hope you will, too. This report is lengthy and informative but it is by no means exhaustive. If you have comments or additional questions, please don't hesitate to call.

A special report about the future of your affordable, reliable, plentiful electricity supply

It could be in danger.

The U.S. Congress is working on legislation to manage or reverse climate change. Toward the same end, the Environmental Protection Agency (EPA) is drawing up regulations to manage emissions of greenhouse gases. Without careful consideration, either entity is likely to dramatically change the way we live. And it's not necessary. Your electric cooperative and its suppliers are committed to continually improving all aspects of your electricity service. Those successful efforts have—for many years—included attention to the environment.

The board and management of Wyrulec Company want you to know that those efforts will continue, without sacrificing affordability or reliability. We encourage Congress, if they feel pressured to enact something, to enact a measured, cost-effective approach to environmental improvements.

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A special report about the future of your electricity supply

Your opinion counts. All constituencies should speak up. We urge you to share the information in this newsletter with everyone you know, especially those who live in other parts of the country, places where it's possible to be completely unaware of the contribution coal makes to this country's economic health.

Log onto OurEnergy.coop to let your congressional representatives know that you are concerned or stop by the Wyrulec office for some postcards to fill out. Encourage others to do the same. Regardless of where a person lives in the U.S., OurEnergy.coop is set up to help each person communicate with his or her respective congressional representatives based on the address entered. It's not too late to take action.

Electricity Supply

Will we have the power we need in the future?

How will we supply the power we need to grow the economy while at the same time curbing emissions of greenhouse gases, such as carbon dioxide, blamed for contributing to climate change?

In the 1960s and 1970s, the electric industry went through a period of expansion. For many years, the nation had excess baseload generation capacity. With the growth of the intervening years, that excess capacity is gone. Demand for electricity is expected to increase 26 percent by 2030. At the same time, the cost of building new generation has skyrocketed and funding available to make capital investments has shrunk. More of the cost of new generation will be passed on to the consumer, making electric power less affordable for many Americans. The North American Electric Reliability Corporation (NERC), the organization charged with protecting the reliability of the bulk power system, has warned that between now and 2015, some regions of the country may experience rolling blackouts unless we build new generation capacity.

Even assuming large investments in efficiency, electricity demand will continue to grow to meet the needs of 45 million new Americans by 2020 with 30 million more expected, totaling 75 million, by 2030. Without the near-term ability to build coal-based plants and with the unavailability of new nuclear plants, much of the new capacity—even with substantial new renewable capacity investments—will have to be fueled by natural gas. The natural gas will come increasingly from off-shore sources.

To complicate matters more, the current electric transmission system (the basic power delivery system) is not adequate to handle the new demands.

The United States now faces the globalization of demand for electricity infrastructure components, causing scarcity and high prices exactly when the United States needs to invest in both new capacity and efficiency infrastructure.

These forces are major challenges facing the electricity industry today. These exist regardless of whether or how carbon emissions are regulated. In other words,

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substantial difficulties lie ahead without even considering what Congress or the EPA are planning.

Electricity demand continues to grow

After revisions in consideration of the shrinking economy, the Energy Information Administration (EIA) still projects electricity needs will grow nationally 1.1 percent a year from 2006 through 2020, for a 17 percent increase requiring 118,000 megawatts (MW) of new generating capacity. EIA estimates demand will grow 30 percent by 2030, requiring a total of 264,000 new megawatts, unless extraordinary efficiency measures are adopted. This magnitude of increase is roughly analogous to adding 4 more Californias, 21 more Minnesotas, 2.5 more Texas, or 13 more Kentuckys.

Among electric cooperative consumers, demand growth is projected to be about double the national average. Why the difference? Often, co-ops serve energy-intensive agricultural sites. And, as the population grows and baby boomers retire, people are moving to exurban and rural areas where co-ops serve.

Standard and Poor's reports that annual household consumption has risen 8 percent in the last decade to 11,093 kilowatt hours in 2006 versus 10,275 in 1996, despite efficiency gains in appliances and other household items.

"Electricity fuel independence" is eroding due to our increasing need for baseload natural gas generation

For decades, the United States has relied on abundant domestic fuels to provide electric power. Currently, the electricity generation mix is 49 percent coal, 19 percent nuclear, 22 percent natural gas, 6 percent hydro, 2 percent petroleum, and 2.5 percent non-hydro renewable. The electricity sector's "electricity independence" has helped the economy and shielded consumers from economic shocks, like those experienced last year in the oil-dependent transportation sector.

Why is our fuel independence eroding in the electricity sector? The key reasons are a set of factors pushing electricity generation in the United States to the use of natural gas.

1. Soaring natural gas demand will be met by international markets

Natural gas has many important applications across our economy, as a home heating fuel and an integral part of industrial processes. Natural gas also is the default baseload electricity fuel when coal and nuclear aren't available. Electric baseload generation fueled by natural gas is poised to rise sharply over the next decade because it produces less than one-half the greenhouse gas emissions of traditional coal plants. The slow pace of nuclear generation construction, which is currently the other primary source of baseload generation capacity, adds to the forces shifting electricity generation capacity to natural gas. Gas is also the primary generation used to balance out wind's intermittency because gas units can be fired up quickly when the wind slows or stops.

Natural gas use in 2007 jumped 6.5 percent led by the 10.5 percent growth in the electricity sector. All future projections show that the United States will have to

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buy much more natural gas on the world market. We are outstripping our current, available supply.

Nearly all experts say America no longer has enough domestic natural gas to support its current growth needs. Canada, our largest international exporter, is lowering its export projections because it needs the gas for its own growth. This will likely leave the U.S. dependent on imported liquefied natural gas (LNG) to meet electricity demand over the next decade. Unfortunately, the largest natural gas reserves are located overseas, in some of the world's most politically unstable areas.

2. Energy efficiency measures are needed but are not enough

Many successful efficiency and conservation programs are currently available. Technology advances, aggressive consumer education, mandated standards for new buildings, upgraded electricity delivery systems, and upfront spending to lower electricity usage for moderate- and lower-income groups must be pursued now in order for efficiency to significantly impact demand reduction in the future. Investments in efficiency can reduce the need for new electricity generating capacity but these investments require spending by consumers, utilities, and governments to purchase efficient products and build efficient infrastructure.

The question is, how much new electricity capacity can be reduced by efficiency investments? Even if annual growth could be brought down to 0.75 percent a year, which the Electric Power Research Institute (EPRI) believes is possible with major investments in efficiency technology, new electricity capacity spending will be needed. This spending is in addition to efficiency spending. The next decade will require spending to meet current generation needs plus substantial spending to improve efficiency in order to lower electricity capacity needs in the future.

3. Growing opposition to coal removes a major generation option

America has more coal reserves than any other nation, with reserves projected to last more than 200 years. More than any other fuel, coal has been responsible for the low cost and solid reliability of our electricity supply. But because coal is carbon-intensive, baseload coal-fired power plants—even the most commercially advanced ones—are being blocked. As of March 2008, the Sierra Club claims to have stopped the construction of 63 coal power plants, with 15 more on the target list. According to all credible sources, carbon capture and sequestration technology will not be ready for commercial use until 2020 at the very earliest—and that date could slip if deep investments in research, development, and testing are not made.

4. New nuclear plants can't help meet electricity demand by 2020

The Electric Power Research Institute estimates four new plants will need to come on line each year from 2015 to 2020 for nuclear power to make the necessary carbon-emission-reducing contribution by 2030. This projection will not be met. The new fleet of baseload nuclear plants is progressing slowly, with virtually none expected to come online before 2020. These new plants also face opposition and

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substantial financial risks. In some cases, cost estimates for proposed plants match or exceed the entire value of the utilities proposing to build them. A 30-year U.S. hiatus from the business has resulted in suppliers, industry expertise, and work-force being largely located overseas.

Still, these plants are needed as soon as possible to achieve the triple goals of reliable power, affordable power, and reduced greenhouse gas emissions.

5. Even increasing renewable energy supplies can't meet electricity demand by 2020

The small amount of renewable generation in the current electricity fuel portfolio is welcome and needed. Including hydropower, renewable generation is 8 percent of the overall portfolio. Non-hydro renewable generation (primarily biomass and wind, with smaller contributions from solar and geothermal) is only 2.5 percent of the overall portfolio, up from 2.2 percent in 1995.

The growth percentages in non-hydro renewables are positive developments, but create misperceptions. Polls show that many mistakenly believe that renewable energy alone can satisfy increased demand for power and that currently non-hydro renewable energy is a large percentage of the nation's electricity generation. *Michael C. Leischner* Even wind generation, the primary source of recent renewable energy additions, is a tiny fraction of overall U.S. generation—0.6 percent in 2006 and an estimated 0.8 percent in 2007.

Like all electricity power sources, renewable energy generation growth faces large hurdles in the next decade. Without large federal subsidies, investment virtually stops. Transmission capacity is inadequate to deliver renewable power from remote areas where renewable resources are located to the population centers where power is needed. Construction costs, especially for wind, are rising rapidly and there are bottlenecks for equipment delivery—current wait times exceed two years. Since wind and solar are intermittent resources, current projects are only commercially viable where conventional resources, usually gas, are sufficient to back them up. Finally, public opposition to siting projects, such as offshore wind farms and farms on public land, has stopped many renewable developments.

Significant new transmission must be built

Electric transmission, the “interstate highway” system of lines carrying electrons across regions, is not adequate for future needs. Long lead times are required for major transmission development and siting. Lagging investment in transmission resources has been an ongoing concern for many years. More investment is required as each peak season puts more and more strain on the transmission system. NERC says that although several key transmission projects were completed in 2007, significant investment is still required in many areas of North America. In addition, new transmission projects continue to face opposition. Where regions are running out of generation supply, it is very difficult to transmit power from regions with extra power.

“A recent NERC survey of industry professionals ranked aging infrastructure and limited new construction as the *number one challenge to reliability*, both the likelihood of occurrences and severity.”

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International competition is making new U.S. electricity capacity investments expensive

Globalization has created in other countries, especially Asia, a high demand for the same quality of life that electricity has brought to the United States and Europe. The United States now competes with the rest of the world for the building components for new electricity capacity, from raw materials like concrete to components such as copper wire to nuclear power expertise. This competition and scarcity is raising the cost of balancing electricity supply with demand. Prices are up on all kinds of equipment, including gas turbines, nuclear reactors, wind turbines, and efficiency infrastructure equipment.

For example, China added 90,000 MW of capacity in 2006 alone. By comparison, in the 1990s, the U.S. built 200,000 MW in largely speculative gas peaking generation in anticipation of the volatile prices and market profits Enron-type marketers hoped restructuring would bring. Even then, U.S. generator investors did not face the kind of costs that are now a reality.

Technology

Will we have the technology we need to supply adequate power in a carbon-constrained world?

How does the country prioritize the limited funds for research and development and set a realistic timeframe for curbing carbon emissions without risking the supply of affordable, reliable electricity?

With technology now available, electric utilities have four options for baseload power generation: coal, gas, nuclear and, in some regions, large-scale hydroelectric. Most renewable resources such as wind or solar provide intermittent power unsuitable for baseload power generation. A report by the Massachusetts Institute of Technology (MIT) on the future of coal states categorically that "coal will continue to play a large and indispensable role in a greenhouse gas constrained world."

Since both coal and gas emit carbon dioxide, goals for reducing greenhouse gases blamed for global warming depend on (1) reducing the carbon emissions, (2) increasing efficiency and (3) remedying the problems that make alternative fuels unsuitable. *Betty I. Sheldon* Each of these approaches will require massive investments in new technology. And in the meantime, bridge technologies must be available so that cooperatives can meet rising demand.

Although cooperatives are not-for-profit and lack the capital necessary for large research projects, they are committing valuable resources to research and have partnered with the private sector, universities, and research institutions.

- Associated Electric Cooperative in Missouri is partnering with two local universities on research to develop a process for using the carbon dioxide in flue gas to grow algae which can then be converted to biodiesel.
- Basin Electric Power Cooperative in North Dakota has contracted with Power Span to conduct a commercial-scale demonstration project using the firm's CO₂ capture technology, ECO2®, at a 900 MW coal-based electrical generation facility.

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ty near Beulah, North Dakota.

- Basin Electric is also operating the largest North American carbon capture and storage (CCS) project at its Great Plains Synfuels Plant. About 49 percent of the CO₂ produced there is captured, compressed, and delivered through a pipeline to depleted Canadian oil fields for use in enhanced oil recovery.

Investments in clean coal technology are needed

Coal currently accounts for half of the U.S. electricity generation mix and about 62 percent of the generation consumed by electric cooperative consumers. The cooperative segment of the industry only owns 5 percent of the nation's electric generation. Cooperatives need to add over 22,000 MW of generating capacity in the next decade—a 50 percent increase over current capacity—to keep up with rising electricity demand. According to NERC, U.S. electricity use will grow more than twice as fast as committed resources over the next 10 years. NERC warns that the grid is being operated “at or near its limits more often than ever before.”¹

State-of-the-art coal-fired power plants that optimize environmental performance will be crucial for meeting increased capacity needs. EPRI has assessed the economic impact of reducing carbon emissions to 1990 levels by 2030, assuming the availability of different fuel portfolios.² *Ethel S. Long* EPRI emphasizes that new, advanced, clean-coal plants are a critical part of a resource mix needed to provide adequate electricity and achieve aggressive carbon reductions.

Based upon the EPRI analysis, if the U.S. adopts carbon reduction goals and builds new nuclear power plants as well as new, highly efficient coal plants equipped with CCS technology, utility rate increases attributable to a climate strategy would average about 10 percent in real dollars. Electric rates would nearly triple by 2050, however, if the U.S. relies solely on natural gas, renewables, and energy efficiency to meet capacity needs, and fails to invest in new nuclear and coal technologies.

To ensure that advanced clean coal will remain part of the nation's electricity fuel mix, a significant technology “push” is needed to make environmental technologies like CCS commercially feasible. Scientific experts agree that CCS will not be available until 2020 at the earliest—even with significant investments in research and development.

Co-ops want opportunities to build new, advanced, highly efficient coal-fired plants and have the experience to support this effort.

Affordability

Will reliable electricity become an unaffordable luxury for low-income Americans?

How do we meet national climate change goals without making electricity unaffordable?

In the last five years, utility bills have risen 30 percent. In California, Florida, Missouri, Oklahoma, Virginia, Texas, and elsewhere, consumers will be paying more for electricity. The rising cost of fuel, combined with the rising cost of build-

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ing new generation, means that electric rates will increase even if we do nothing to address climate change.

Times are hard for many Americans. The downturn in the economy will increase the number of Americans who cannot afford to pay their electric bills. In all of 2007, Excel Energy reported that 72,000 customers faced the prospect of having their electricity shut off for non-payment. The great achievement of Franklin Roosevelt's rural electrification program—affordable electricity for all Americans—is at risk.

The energy proposals being debated in Congress all further increase the cost of what has become a necessity in American life: reliable electricity.

- The price of coal—the fuel for over half of America's power plants—has doubled since last year while the cost of natural gas—another common fuel and currently the only reasonable alternative—is more expensive and volatile. *Larry B. Goyen* A growing reliance on more expensive unconventional sources and liquid natural gas, combined with higher natural gas demand from the electrical sector, will put increased stress on electric costs.
- The cost of building new power generation is rising. A \$1 billion plant built in 2000 would cost \$2 billion today.
- The typical household in America spends about \$1400 per year on electricity, or more than 2 percent of median annual income, and for lower income households it represents over 8 percent of income.

Electricity supply, affordability, and reliability are very important to the health of our economy. If you are interested in voicing your concern about congressional actions on this particular issue, please go to the OurEnergy.coop website and direct friends and neighbors in other states to log on also.

If you have any questions or comments please call Wyrulec Company Manager Rollie Miller at (307) 837-2225 or on his cell phone at (307) 575-2435. Only with all of our voices raised in concern will Congress take a measured approach to climate change solutions, crafting something that works, something we can afford, something safeguarding our future on every front.

¹North American Electric Reliability Council, "2007 Long-Term Assessment," October, 2007.

²Electric Power Research Institute, "The Power to Reduce CO₂ Emissions: The Full Portfolio," prepared for the 2007 Summer Seminar. *Sara A. Mathson*

❁ Don't stand around in the dark ❁

We have CFLs in stock that are 100-watt replacements. They will fit into any light fixture rated over 23 watts. They operate at 23 watts but provide light equal to a 100-watt incandescent. They are \$1.60 each. We have plenty.

Don't miss a word

Each month, we hide the names of five members, one from each district, in this newsletter. If you see your *name*, please call and we'll give you a \$25 bill credit.