

ENERGY REALITY CHECK

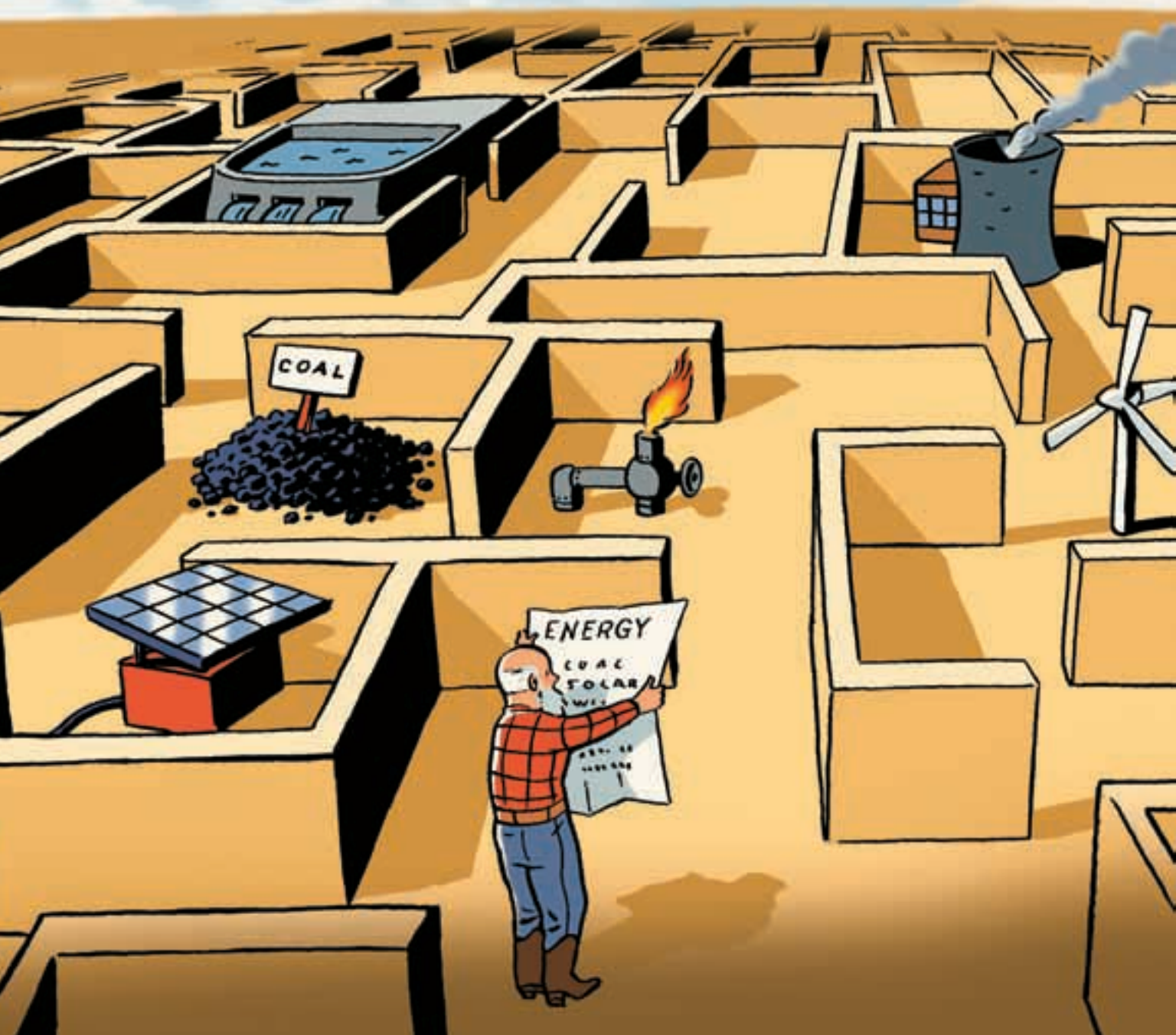


A Publication of Texas Electric Cooperatives

Energy consumers want the lights to come on when they flip a switch, but with rising prices, increasing demand and shrinking reserves, the future of electricity supply is not as clear as it used to be. This Energy Reality Check was published by Texas Electric Cooperatives to educate electric cooperative members about options for energy generation today and into the future.

Although there is no shortage of opinion on the subject of energy generation and its impact on climate change, there is very little discussion that involves “just the facts.” In this publication, you will find factual, unbiased information about traditional energy generation as well as renewable sources of energy.

The text of this publication originally appeared as the two-part “Energy Reality Check” series in the October and November 2007 issues of *Texas Co-op Power*. Kaye Northcott, *Texas Co-op Power* editor, and business writer Roxane Richter collaborated on the story about traditional, nonrenewable sources of energy generation, including natural gas, coal and nuclear. Northcott wrote the article about renewables. Illustrations are by A.J. Garcés.



REALITY CHECK: TRADITIONAL ENERGY RESOURCES

Demand for electricity at home and around the world is increasing at the same time that energy costs are rising and the climate change debate intensifies. What's the future for traditional methods of energy generation? We'll take a look at the most commonly used fuel sources and the pros and cons of each.



Our story begins with the fundamental ingredient for producing electricity: fuel. That fuel can come from many sources, as we will explore later. There are many types of electricity generation, but basically a fuel source, such as natural gas or coal, is burned to create steam that turns turbines for electric generators. Texas cooperatives make individual arrangements to acquire electricity either from cooperative generation and transmission facilities, called G&Ts, or other power providers. G&Ts, such as Golden Spread Electric in West Texas and the Panhandle, Brazos Electric Power in Central Texas, and South Texas Electric, are owned by the cooperatives they serve. Cooperatives may also contract with other sources for energy, including the Lower Colorado River Authority and investor-owned utilities.

Co-ops typically supply base-load needs (that portion of the electrical demand that is present at all times) from units burning natural gas or coal. Intermediate and peaking loads, needed to satisfy high demand, are generally served using natural gas-fired power plants. Renewable energies such as water (hydropower), wind and biomass can supplement power supplies, reduce our dependence on fossil fuels and reduce power plant emissions. Co-ops strive to use the most efficient, lowest-cost generating resources first. Other resources are blended during higher load periods, with the objective of minimizing both cost and emissions. Your co-op's future energy needs must be planned and contracted for years in advance.

Historically, natural gas was relatively inexpensive, so long-term gas contracts were thought to assure low electricity costs for a long time to come. But the market changed. Gas prices went up. Today's electricity bills reflect the higher fuel costs.

Along with costlier fuel comes a big growth spurt in Texas and an increased demand for electricity. The state has a goal of keeping a reserve power production capability of 12.5 percent. But industry experts say reserve capacity is rapidly diminishing. In fact, officials with the Electric Reliability Council of Texas (ERCOT) grid, which handles 85 percent of the state's electricity load, predict that the generation reserve margin (available electricity during peak demand times) will fall to nearly 10 percent by 2012. The long lead times needed to obtain environmental permits and to construct new generating plants have caused some to predict future electricity shortages.

And this is happening in the midst of a serious national debate about climate change and a focus on renewable energy sources. Wind power is being hailed as a cheap, renewable source of electricity, especially in Texas, with wind farms cropping up all over the western part of the state. But wind doesn't blow on demand. And electricity cannot be stored. When you flip the light switch, you're getting "fresh" power.

Our reality check tells us that wind and other renewables are only part of the solution for the future. No one source can supply our growing electricity needs. Nor can conservation alone suffice. Instead of a silver bullet, there are a multitude of silver pellets. We must look to a variety of energy sources and make a major commitment to researching and developing improved technologies, efficiencies and conservation.

Beginning on page 9, we talk about renewable energies and their great promise for the future. But first, we will discuss Texas' dominant, conventional fuels.



GONE TO CYBERSPACE

In 2004, according to the EPA's Energy Star program, home electronics accounted for about 15 percent of all residential electricity consumed. That's a 200 percent increase since 1980.



NATURAL GAS

This fuel once was cheap and abundant. But wells started drying up, and prices started heading up. It burns clean, but is there enough to go around?

Within ERCOT, natural gas generated almost half of the electricity consumed last year.

It's cleaner burning than other carbon-based fuels, such as coal. For example, according to the U.S. Environmental Protection Agency, on average in the United States, coal emits 2,249 pounds of carbon dioxide for every 1,000 kilowatt-hours (kWh) of generation, whereas natural gas emits 1,135 pounds for every 1,000 kWh.

Texas co-ops located outside of ERCOT also rely heavily on power generated by natural gas. These include co-ops within the Southwest Power Pool (SPP), the Southeastern Electric Reliability Council (SERC) and the Western Electricity Coordinating Council (WECC).

The fact that the cost of natural gas has tripled since 2002, taking electricity prices up accordingly, has cooperatives rethinking what fuels to use in the future. Although the cost of natural gas has moderated, it is no longer a low-cost fuel source,

and prices can be volatile.

Texas' current supply of natural gas is adequate for the near future, but the easiest gas to get has been got, so to speak. Extraction from remaining domestic gas fields, such as the Barnett Shale in North Texas, requires expensive new drilling techniques. The Independence Hub, a major new underwater gas field in the Gulf of Mexico some 120 miles from Biloxi, Mississippi, has begun producing. It was expected to increase the nation's natural gas production by 2 percent by the end of 2007. But, again, this high-tech extraction process—from a platform with living quar-

WHAT IS ERCOT?

The Electric Reliability Council of Texas, an electric grid manager, is one of eight Independent System Operators in North America. ERCOT is the traffic cop for a major portion of the Texas electric grid. If a hot afternoon prompts millions to crank up their air conditioners simultaneously, ERCOT can direct more power where it is needed by asking more generation plants to go online. Three similar power pools control the remainder of the state's electric network.



Texas' natural gas resources are getting harder and harder to tap, and the more work it takes to get them, the higher the cost to the consumer.

ters for 16 probing for gas 8,000 feet deep—is costly.

It's possible to import gas, but it must first be turned into a liquid. An overseas facility creates liquefied natural gas (LNG), then ships it in specially built vessels to the U.S. Here, the LNG goes to a docking and conversion station where it's re-gasified and injected into pipelines for distribution. While some stations already exist in the U.S., a fair amount of the ultimate supply of gas will depend on stations that are still being planned or built.

NATURAL GAS

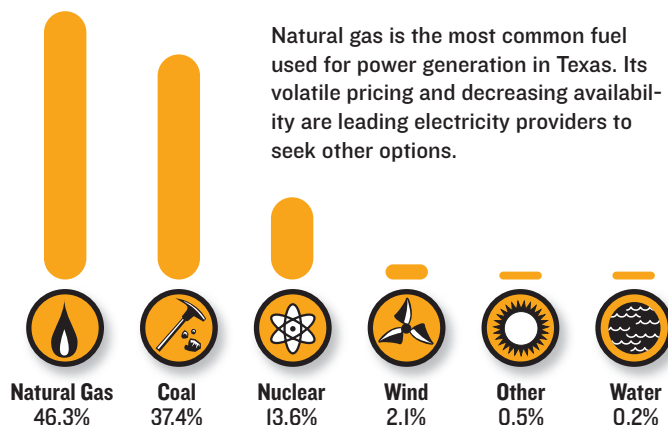
PROS: Burns clean, can be carried by pipeline.

CONS: The easy-to-tap reserves are tapped out, and supplies are expensive; U.S. reliance on imports is growing.

OUTLOOK: Construction of liquid petroleum gas sea terminals and on-shore re-gasification plants will make imports available. Explorers are looking for new pockets of gas and ways to extract it.



FUELS USED TO GENERATE ELECTRICITY IN ERCOT (2006)



COAL

Our most plentiful fuel attracts attention, but not in a positive way.

Environmental advocates don't like its emissions, but by necessity, it will likely remain a generation mainstay. Will technology provide the answer?

Power plants emit 39 percent of all U.S. carbon dioxide emissions, according to the Natural Resources Defense Council. When Texas Utilities (TXU) announced plans in 2007 to build 11 new coal plants in Texas, it ignited a firestorm of opposition from people who said the emissions would make air quality worse in many small towns and force some cities to further curtail vehicle emissions to offset those from the coal plants. TXU subsequently agreed to drop or postpone eight of the plants and arranged to sell its holdings to a private partnership, which pledges to be a better environmental steward.

Sid Long, executive vice president and CEO at Concho Valley Electric Cooperative, sums up the coal challenge this way: "Obviously, the environmental issue must be resolved in order to use our most abundant resource for electrical generation. Without

coal generation, we can expect to pay much more for our electric energy in the near future."

Coal is the most abundant fossil fuel in the United States, with some estimates projecting a 250-year supply available if consumed at the current rate. Texas has an estimated 200-plus years of lignite, a brownish substance that is lower quality than higher-burning bituminous coal. Lignite occurs in deposits in East and Central Texas and along the Texas Coastal Plain. Some G&T cooperatives already use lignite, which has the advantage of proximity. Higher-quality coals must be imported by rail, adding significant costs and risk of supply disruption. The cost of using coal goes even higher if the negative effect on the environment is computed. Although nitrous oxides and sulphur oxides are relatively easy to scrub from coal plant emissions, carbon dioxide



Coal is relatively cheap and plentiful in Texas, but the price to the environment is a growing concern.



WHY SWITCH TO COMPACT FLUORESCENT LIGHT BULBS?

There are 45 light bulbs in the average American home. Reducing that number by just one would be equivalent to removing nearly a million automobiles from the road.

The New Yorker, May 14, 2007

and mercury are not. Newer coal plants will have improved emission-control technology.

But even as new plants are designed for cleaner emissions, some in the government are supporting taxes on coal itself as well as carbon dioxide emissions.

Most technologies for reducing carbon dioxide from coal plants are costly. In fact, most are experimental. For example, coal gasification, which turns coal or lignite into a gas used to power jet turbines, increases the cost of producing electricity by about 50 percent. Only recently, the Texas-based Tondur Corp. canceled plans to build a coal gasification plant in Corpus Christi because the technology turned out to be too expensive.

Still, there are innovations on the horizon. FutureGen Industrial Alliance Inc., a nonprofit

industrial consortium, is planning to build the world's first integrated gasification combined-cycle coal-fired plant with near zero emissions. Two sites in Texas were among the four finalists for the plant, scheduled to open in 2012. The winning site was Mattoon, Illinois.

An April 2007 *New York Times* poll indicated that 69 percent of Americans polled would approve building advanced coal plants that produce less air pollution even if they had to pay more for their electricity.

LIGNITE

PROS: Texas has lots; it's easy to dig up and doesn't require expensive rail transportation.

CONS: Requires heavy emissions cleanup. Carbon dioxide and mercury emission reduction processes are still being developed.

OUTLOOK: Long-term supply available. Technology improvements expected.



NUCLEAR

A renaissance of interest in this energy source has been sparked by the fact that it produces no greenhouse gases. Technological advances have made plants safer, but what to do with that waste?

Texas G&Ts do not produce nuclear power, but they could invest in nuclear power in the future. Government statistics for 2005 show that nuclear energy accounted for 11 percent of Texas' electricity, compared to about 19 percent nationwide and 16 percent worldwide. After a three-decade-long hiatus in U.S. construction, nuclear plants are again being planned. The plants are very expensive to build—as much as \$2,000 or more per kilowatt—and require an average of seven to nine years for construction, following a lengthy permitting process. (It would cost less than a third of that per kilowatt and take just two years for construction of a natural gas turbine.)

Once a nuclear plant is in operation, its variable cost of energy production is about the same as a coal plant. Nuclear power could supply about half the state's expected growth in electricity and displace about 80 million tons of carbon dioxide emitted by coal-burning plants. But while nuclear plants do not emit carbon, their radioactive waste will have to be stored and monitored longer than any civilization has ever existed. Plutonium, a radioac-

tive by-product of power reactors, has a half-life of 24,000 years. The planned Yucca Mountain Repository in Nevada, a project of the U.S. Department of Energy, is slated to begin accepting the nation's nuclear waste in 2017. However, many question mankind's ability to safeguard such a concentration of nuclear waste for the thousands of years it would remain hazardous.

A *New York Times* poll June 1 showed 51 percent of Americans sampled approved building more nuclear power plants, but 55 percent disapproved of having nuclear power plants built in their communities.

NUCLEAR

PROS: Power with no air pollution, at approximately the same cost as coal.

CONS: Plants are expensive to build and retire. Radioactive waste is with us for thousands of years.

OUTLOOK: New technologies are making plants safer and more efficient, but permitting and construction take years.



Nuclear energy is being touted even by environmentalists these days, but no one yet has a good answer for what to do with radioactive waste, which will be around for hundreds of generations to come.



ENERGY MANAGEMENT AND EFFICIENCY

Cutting electricity usage and waste could stretch our supply. But will enough people embrace this less-is-more philosophy?

When all is said and done, progress in the electric power industry for the near future may be measured not in kWh sold but in kWh saved. Certainly that is the case in Texas. As pointed out by Ray Beavers, CEO of United Cooperative Services and vice chair of Texas Electric Cooperatives (TEC), the co-ops' statewide association, "There just isn't enough time to site, plan and construct new power plants by the time ERCOT predicts Texans may experience electricity shortfalls starting in 2009-10." However, according to Beavers' calculations, "If Texas consumers reduced their peak energy use by

10 percent, they would save 7,000 megawatts of generating capacity, or almost the same generating capacity TXU's 11 plants would have provided—without pollution, transmission and utility debt."

Electricity shortages could well produce rolling blackouts when the temperature reaches 100-plus and the whole household is busy making the electric meter spin, for example, or when a key plant has to go off line for maintenance during a period of high demand. A

cooperative's base-load electricity resources will be producing at their maximum. Those peak-energy consumption times are handled by "peaking" units. Beavers thinks one key strategy for getting through the coming crunch is for co-op members to dedicate themselves as never before to energy efficiency.

If "peak" demand can be reduced, the demand for new electricity generating plants can also be

reduced, thus buying time for improved technology to come on line.

Conservation and technology go hand in hand. Electric cooperatives across the country are investing millions in new technologies. But research needs to be done on such a massive scale that it can only be accomplished through a national commitment. "The federal government should go into hyperdrive to fund energy research," said Greg Jones, chair of the TEC board and general manager of Cherokee County Electric Cooperative. "If the government will work in partnership with the electric industry rather than mandating what may turn out to be impossible goals, we will arrive more quickly at our mutual goal of making electricity generation cleaner and more efficient."

The old energy philosophy, "Use as much as you want. We'll make more," is no longer applicable.

Co-ops and cooperative members are an integral part of the debate over how much money and effort we are willing to spend to keep up with demands for more and cleaner power. Co-op by co-op, we will have the opportunity to consider what technologies are best for the future.

SIZE MATTERS

The average single-family home had 769 more square feet in 2006 than it did in 1976, census figures show. Thirty-nine percent of homes have four or more bedrooms, double the rate of 20 years ago. And 26 percent have three or more bathrooms, almost three times the rate from 1986.



ENERGY MANAGEMENT & EFFICIENCY

PROS: An area where YOU can make a difference; reduces the need to invest in costly new generating plants; minimizes CO₂ emissions; and saves you money.

CONS: May involve personal sacrifice and changes in both personal and work habits related to energy usage.

OUTLOOK: Technological advances will make appliances even more efficient and utilities better able to manage supply and demand in partnership with consumers.

REALITY CHECK: GREEN POWER

The escalating cost of electricity and predictions of shortages and blackouts, the future of renewable energy, climate change, pollution reduction ... these subjects are on consumers' minds more than ever before.



For all of its promise, renewable energy has made little headway onto our nation's or Texas' power grids. Texas receives about 2 percent of its electricity from wind turbines. And that's the state's renewable powerhouse, so to speak. All other renewable sources—hydropower, biomass, geothermal and solar—account for less than 1 percent combined.

The Electric Reliability Council of Texas (ERCOT), the grid manager that handles 85 percent of the state's electricity load, strives to have a reserve power production capacity of 12.5 percent. This ensures that on our hottest days and coldest nights, or when a power plant is out of service, Texans still have power flowing. That capacity is expected to fall below 10 percent by 2012. Considering how long it takes to build new power plants, 2012 is just around the corner. And construction of transmission lines, particularly to bring wind power generated in West Texas to power-hungry major metro

areas, is also in a time crunch.

On the previous pages, we discussed gas, coal and nuclear power—the fuels used to generate about 97 percent of Texas' electricity. We explained that these “base-load” fuels, the ones that supply continuous power, couldn't be completely replaced by renewable energy. However, the promise of “green” energy is very exciting. Our reality check now focuses on renewable energy and the present distance between expectations and capabilities.

As for the cooperatives' position on renewables, General Manager Greg Jones of Cherokee County Electric Cooperative, who is chairman of the board of Texas Electric Cooperatives (TEC), the statewide association, says, “We support achievable goals that will reduce dependence on foreign oil, foster economic opportunity and reduce our impact on the environment. That covers every renewable idea being discussed these days.”



WIND

As long as the wind is blowing, the turbines hum and electricity flows. But since the wind doesn't blow all the time, a backup source of power such as natural gas or coal is always needed.

Texans are clamoring for more electricity from wind power. The state is, after all, big and blustery. Texas leads the nation in wind-power production with more than 2,000 turbines and an annual maximum capacity of 2,768 megawatts (MW). That's enough electricity from wind to help serve 600,000 average homes. The operative word is "help" because wind doesn't blow all the time. Virtually every kilowatt of wind generation must be backed up by some other type of generation (like gas or coal plants). Although 600,000 homes sounds like a lot, the state has approximately 9 million housing units in need of electricity, along with churches, town halls, offices, factories and all the public amenities citizens have grown to expect.

"The wind as a 'fuel' is free, but harnessing it with an electric dynamo and transmitting it to a market where it is needed can be very expensive," says Bill Harbin, general manager of Lighthouse Electric Cooperative in windy West Texas. "An additional cost is for transmission lines to deliver the power to a market where it can be

used." He also said, "The variable output that accompanies strong gusts followed by light breezes would create challenges for grid stability. That's because natural gas and coal-fired generators and hydroelectric plants must increase or decrease their output to keep total generation in balance with consumers' electrical loads."

The Public Utility Commission of Texas directed ERCOT to plan for transmission of at least 10,000 more MW of wind power by 2012.

So wind power is just part of the future energy mix. And even this source of power, seemingly benign, has its downsides. The giant rotors endanger birds and bats. And then there's the issue of siting. Not everyone likes to see massive turbines or high-voltage lines on the horizon.

LARGEST WIND FARM

Royal Dutch Shell is planning the world's largest wind farm in Briscoe County. Designed to produce 2,000 megawatts of power, the farm in the Texas Panhandle would cover an area more than five times the size of Manhattan.

—Wall Street Journal

WIND

PROS: Clean, sustainable, cheap "fuel" source.

CONS: When the wind doesn't blow, electricity doesn't flow. Turbine rotors kill birds and bats. Some call turbines an eyesore. Construction of more transmission lines to carry power from West Texas to major urban areas is costly.

OUTLOOK: West Texas wind farms will continue to proliferate; plans are in the works to address transmission issues.



TAPPING THE EARTH

Texas hydropower is mature; geothermal potential remains largely undeveloped.

The largest source of hydropower in Texas comes from the Highland Lakes, the six lakes dammed for flood control starting in the 1930s. The Lower Colorado River Authority, which controls the lakes, releases water through turbines to produce wholesale power for 1 million people, including 43 electric cooperatives and city-owned utilities. But hydropower, which provided a large portion of Texas' electricity generation in the early days of the industry, accounts for less than half a percent of the total today.

The State Energy Conservation Office estimates that Texas has 1,000 MW of untapped potential hydropower resources. But land acquisition and environmental questions would likely make their development troublesome.

The use of wave or ocean energy to generate power is limited in the relatively placid Gulf of Mexico, and technologies for generating wave energy are still immature. But salinity-gradient solar technology is being studied at the University of Texas at El Paso. It involves using pools of salty water to absorb heat from sunlight that is effectively locked in the pool. The heat can be used for electricity production.

Geothermal energy is a promising source of electricity in Texas because it is reliable and non-

polluting. In this technology, the earth's heat is tapped to produce steam for conversion to electricity. In fact, in February, Texas sold the state's first geothermal lease to Ormat Technologies, which paid \$55,645 for the right to explore over 11,000 acres of submerged land in the coastal counties of Jefferson, Galveston, Chambers, Calhoun, Jackson, Nueces and Kleberg.

The downside to geothermal energy is that these hot temperatures exist 4,000 to 6,000 feet below the earth's surface, and substantial investments must be made to locate any potential geothermal pockets.

Geothermal heat pumps for home air conditioning and heating take advantage of constant soil temperatures underground.

HYDROPOWER AND GEOTHERMAL

PROS: Dams already produce nonpolluting power. Texas also has potential for wave power, saline ponds and geothermal heat.

CONS: Public opposition may prevent more development of dams. Drought dries up hydroelectricity production.

OUTLOOK: The Gulf of Mexico is a weak candidate for wave-powered generation, but saline water deposits in West Texas may be used as solar storage.





BIOMASS

The state has lots of room to grow this energy source, which could provide plenty of fuel for electricity production. Converting crops to energy enjoys wide political support.

Anyone who has a compost heap understands the concept of biomass. One can feel the heat as yard and table scraps “cook” to form mulch or soil amendments. Similarly, methane gas generated from animal waste or captured from landfills is an up-and-coming source of biopower electricity but does not account for many megawatts in Texas at present.

Biomass can be used to create fuels such as ethanol and biodiesel. Corn-based ethanol in particular seems to be riding a wave of popularity, spurred by political support from corn-producing states. Unfortunately, the growing use of corn for fuel has already increased the cost of some foods. As the joke goes, it is already eating America’s lunch.

Here at home, Texas A&M University is experimenting with fuel made from grain sorghum. Texas

foresters are recycling wood waste for energy, and sugar producers are making energy from sugar cane. Other states are studying poplar trees, switchgrass and cornstalks as potential fuel sources.

BIOMASS

PROS: Crop wastes, methane and other raw materials can be used to make fuels or electricity.

CONS: Food costs rise when grain is converted to energy; water and land are diverted to new uses; burning organic matter releases carbon dioxide.

OUTLOOK: Because Texas has so much land under cultivation, it may be able to accommodate farming for both food and biomass fuel sources; crops with high energy potential are being bred.



SOLAR

The technology to turn sunlight into electricity has been around for years. It has many upsides but can be an expensive proposition. Like wind, solar requires a backup source of power.

The Texas climate lends itself to photovoltaic (solar cell) technologies for harnessing the power of sunlight to create electricity. But like wind power, large-scale solar power is subject to the laws of nature. Solar potential depends on the time of day and angle of the sun. Large amounts of it can't be stored, so it can't be used for a guaranteed day-in, day-out source of electricity. And though the price of equipment has come down in recent years, the energy produced still costs several times that of utility-supplied energy.

The most frequent use of solar power in rural Texas is to pump water to remote stock tanks, where stringing electric lines is relatively costly. Solar equipment can also be used for swimming pool heating and water heaters. Photovoltaic sys-

tems are most commonly installed on the roofs of homes, garages, carports, greenhouses and other structures. But they can also be installed vertically against a wall of a home, as part of an awning or near the ground as a freestanding structure.

SOLAR

PROS: Time-tested technology; sunshine is abundant, non-polluting.

CONS: High upfront costs; power dependent on level of sunshine.

OUTLOOK: Costs are coming down; new ideas include flexible photovoltaic panels, concentrating heat to make steam for turbines.



ENERGY MANAGEMENT AND CONSERVATION

New technologies can help consumers wield their power more wisely.

Renewable energy's role in providing electricity will grow because the public is demanding it, utilities see advantage in it, and government is mandating it. Nationally, electric cooperatives are participating in a group called 25x25, which aims to use renewable sources for 25 percent of electricity by 2025. The group is encouraging federal energy policy that provides incentives rather than mandates for such a goal. Cooperatives are also looking at a strategy put together by the Electric Power Research Institute to bring CO₂ pollution back to 1990 levels by 2020.

Renewable energy technologies are in various stages of development. As we have acknowledged, renewables cannot replace generation from traditional fuel sources such as natural gas and coal. But the technologies can supplement available supplies of traditional fuels. If the cost of traditional fuels continues to increase as expected, renewable alternatives should also become more cost effective.

The electric cooperatives' jobs are to manage energy resources efficiently, press for technological improvements and supply a steady source of reliable, affordable electricity. Unfortunately, the definition of "affordable" is changing as traditional fuel sources become

more expensive. That's why conservation by consumers is the most important renewable of all.

Fortunately, cooperatives are leaders in demand-side management, a practice that offers great potential for co-op/consumer partnerships.

Market prices for wholesale power are, in some cases, set a day in advance, usually on an hour-by-hour or even on a quarter-hour basis. Traditional

electrical meters measure total consumption and provide no information as to when the energy was consumed. Rates are usually blended for a single monthly bill. New "smart" meters measure time-of-day use. This sort of pricing has been in place on large loads—factories, for example—at many co-ops. Some Texas co-ops are now replacing all their standard dial meters with residential smart meters as well. With that capability, co-ops impose varying prices for consumption. They can be based on the time of day and the season to reflect the market price of wholesale energy.

Smart metering enables cooperatives and their members to work in partnership to lessen costly peak loads. Smart meters can also give consumers information on their electricity usage patterns, helping them to adjust some practices—for example, running the dishwasher or clothes dryer during off-peak times to use electricity when the rates are lower.

In the future, more cooperatives will offer rate incentives to members in exchange for the right to shut appliances off at peak times or during emergency situations when the system is straining under a heavy load. Turning the water heater or the A/C off for a few minutes across a service area may avert the need for an expensive "peaking" plant to be pulled into service. The more we avoid building or using peaking plants, the more reasonable the cost of electricity will be.

"Conservation must become second nature to all of us," says Ray Beavers, CEO of United Cooperative Services and vice chairman of the board of TEC. "Cooperatives can help member-consumers find ways to trim electricity costs. And the good news is, co-ops and their members have an advantage over for-profit electricity suppliers because our mutual goal is reliable and reasonably priced electricity. In partnership with consumers, Texas cooperatives have a hopeful handle on our energy future."



LOAD SHIFTING

Carnegie Mellon University research indicates that American consumers could save nearly \$23 billion a year if they shifted just 7 percent of their electricity usage during peak periods to less costly times. This is the equivalent of the entire nation getting a free month of power every year.

ADDITIONAL RESOURCES

The following resources provide more in-depth information on various aspects of energy generation and climate change.

THE NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION provides information about various fuel types used by the nation's generation co-ops: www.nreca.org/PublicPolicy/ElectricIndustry/FuelDiversity.htm

THE TEXAS STATE ENERGY CONSERVATION OFFICE offers information on renewable energy events and news as well as energy efficiency: www.infinitepower.org/index.htm

THE ALLIANCE TO SAVE ENERGY lists no-cost and low-cost ways to cut your electricity usage among other information: www.ase.org

THE U.S. ENVIRONMENTAL PROTECTION AGENCY AND THE ENERGY DEPARTMENT have created the Energy Star program to give consumers the latest information on energy-efficient appliances and practices: <http://energystar.gov/>

CONSUMER ADVOCATE MICHAEL BLUEJAY offers some basic information about electricity and ways to make your home more efficient: <http://michaelbluejay.com/electricity/>

THE ROCKY MOUNTAIN INSTITUTE is a nonprofit organization focused on using energy resources in an efficient manner: www.rmi.org

THE U.S. DEPARTMENT OF ENERGY provides in-depth analysis of different forms of renewable energy including solar, wind and hydropower: www.eere.energy.gov

THE AMERICAN SOLAR ENERGY SOCIETY offers information about the future of solar power: www.ases.org

THE ELECTRIC POWER RESEARCH INSTITUTE works to combat potential future energy challenges: <http://my.epri.com>

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