DAKOTA VALLEY ELECTRIC COOPERATIVE

Edgeley - Milnor

A Touchstone Energy® Cooperative

Electrical Generation - What will the future bring?

Our energy, our future,

The world uses 320 billion kilowatt-hours of energy each day. That's equivalent to 22 light bulbs burning nonstop for every person on the planet. What's more, it seems future demand will be much greater. The U.S. Energy Information Agency has projected that electricity demand will grow 30 percent by 2030 in the United States, requiring 264 gigawatts of electricity— 2.5 times the power now generated in the state of Texas.

Energy Source	Strengths	Weaknesses
Coal	• US has abundant 250-year supply. • Creates US jobs and industry. • Easy to recover. • Scrubber technology has made plants efficient and clean. • Technology allowing carbon capture looks promising.	• Negative public perception. • Creates emissions. • Cost to capture emissions is prohibitive. • Plant construction processes are lengthy, making final cost projections difficult.
Natural gas/oil*	• Public is accustomed to using for heating. • Burns relatively clean. • Technology is making it possible to convert fuel and coal to gas.	• Erratic price swings with supply and demand. • Creates emissions. • Limited US supply will last only 50 years. • Need for more distribution pipelines.
Hydo-electric	• Efficient, clean and cost efficient. • Very inexpensive once dams are built. • Government has invested heavily in dams in western US.	• Limited source. • Environmental concerns over impoundment and diversion. • Dependent on weather (rain and snow to fill reservoirs).
Wind	• Renewable and plentiful. • No emissions. • Generation and maintenance costs have decreased. • Creates US jobs and industry.	• Need 3 times the amount of installed generation to meet demand. • Cost of generation without government subsidies is formidable. • Energy is not "firm" during periods of no wind, must have backup system. • Demand for turbines is behind supply; turbine prices are escalating. • Environmental opposition to turbines. • Limited transmission capability that is expensive to build, difficult to site.
Nuclear	• No emissions. • Abundant supply. • Used successfully in France and other countries.	• Handling of emergency, containment, and radioactive waste adds to cost. • Radioactive waste disposal system not perfected. • Option to reprocess used or "waste" fuel from nuclear reactors results in plutonium, which can be used to make nuclear arms. • Some fear reprocessing would increase the ease of nuclear proliferation. • US reprocessing program would add to world stockpile of separated plutonium. • World uranium supply is limited and expected to last 50 years.
Solar	• No emissions. • "Thin film" solar cells may make future solar energy affordable.	• Energy must be stored during times of clouds or darkness. • Technology must perfect use of batteries for storage. • It would take 10,000 square miles of solar panels to meet US supply.
Biomass*	• No emissions. • Creates domestic opportunity in agriculture. • Creates US jobs and industry. • Ability to store carbon underground	• Industry is in its infancy. • Inefficient if small plants are used. • Could be contributor to global warming because fuel has low heat content. • Creates pressure on land use.

• "Power plant costs are for new plants initiated in 2007 and are from the most recent Annual Energy Outlook 2008 issued by the U.S. Department of Energy's Energy Information Administration. These costs are estimates, meant as only a basic guide for purpose of comparison. The actual price of 2008 generation will vary, depending on region, type of fuel, cost of materials and other costs.
• EIA bases its estimates in 2006 dollars, which do not reflect recent dramatic increases in the price of materials such as fuel and steel.
• " Cost to build" column excludes other costs associated with siting and constructing a commercial power plant, such as fuel costs, interest charges, and other ancillary costs.
• Natural gas/oil combined cycle plant.
• Biomass includes: biofuels, waste (landfill gas, MSW biogenic, and other biomass), wood and wood derived fuels.

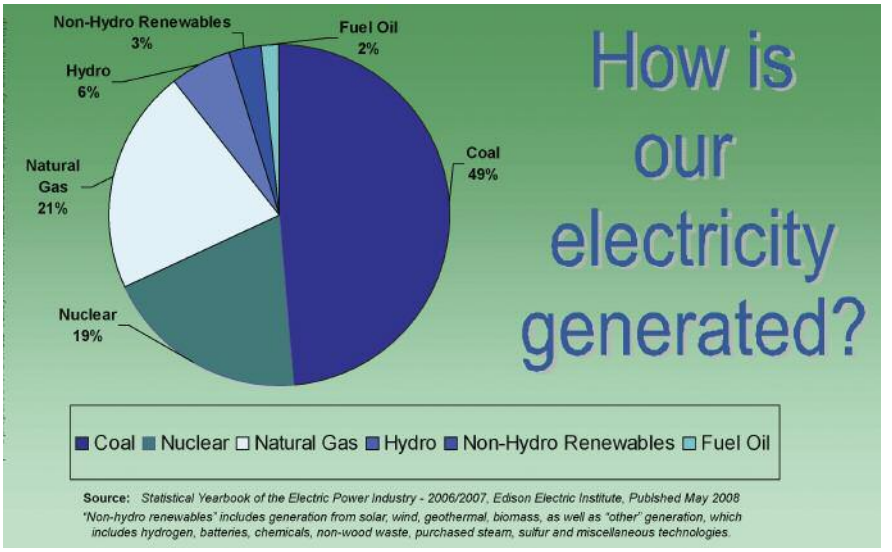
our options:

How will this growing demand for electricity be met? What is the most effective way of generating electricity? These are Million-Dollar Questions—and then some! It is the subject of much debate in the country. Here, in summary, are our options:

Cost to build plant (in $2006/kW)	Fixed operating cost (in $2006/kW)
1435-1535 (600 MW plant without ancillary expenses)	26.79
683-717 (250 MW gas/comb cycle)*	12.14
1410-1551 (500 MW plant)	13.59
1340-1440 (50 MW plant without allowance for backup source)	29.48
2143-2475 (1350 MW plant without cost of waste management)	66.05
3499-3744 (100 MW plant)	55.24
2490-2809 (80 MW plant)	62.70

Source: Energy Information Administration (EIA), Assumptions to the Annual Energy Outlook 2008

http://www.eia.doe.gov/oiaf/aeo/assumption/pdf/electricity.pdf



Did you know?

Wind-generated electricity increased by 45 percent between 2005 and 2006 and by 21 percent between 2006 and 2007, more than any other renewable source of generation in both years. These increases were due primarily to newly-constructed wind power plants.

Hydroelectric generation increased by 9 percent between 2005 and 2006, second only to wind power. However, between 2006 and 2007, hydroelectric generation decreased by 14 percent. These changes were primarily due to variation in the amounts of rainfall and snowfall occurring in watersheds where major hydroelectric dams are located.