

# Power Supply Planning at CVEA

The Copper Valley Electric Association (CVEA) Board of Directors has had an ongoing dialog about the impacts of high oil prices on electric bills for the past two years. In an effort to communicate the substance of these discussions to the membership, CVEA published a Strategic Issues Discussion Paper (available at [www.cvea.org](http://www.cvea.org)) in September 2006. The paper included a review of how CVEA makes electricity; information about the impacts of high oil prices and what CVEA has been doing about it; alternatives to burning diesel fuel to generate electricity; as well as other issues that could affect power costs, including the potential for generating electricity with renewable technologies. CVEA's investigation into alternatives to lower electric rates did not identify near-term opportunities.

As a follow up to the Strategic Issues Paper, CVEA retained the Financial Engineering Company to provide an independent review of what generation options might provide lower costs to CVEA members. The primary goal of the study was to determine whether the high fuel cost associated with the diesel plants could be displaced with another, less expensive, generation alternative. The resulting report, entitled *Alternative Generation Review* (available at [www.cvea.org](http://www.cvea.org)), evaluated a number of generation alternatives while taking into account the contractual and seasonal limitations of producing power on CVEA's system.

It is important to note this study was a reconnaissance level investigation of what alternatives to oil-fired generation might make preliminary sense. Detailed engineering has not been performed on any of the alternatives, and construction and operating costs are based on industry experience from other utilities in the state.

The study reviewed a number of generation resources, including geothermal, fuel cells, solar-photovoltaic, wind, coal, hydro and other potential alternative resources. The analysis did not assume natural gas would be available in the CVEA service area. The entire 29-page report, including the economic analysis, can be viewed on our Web site at [www.cvea.org](http://www.cvea.org). A brief summary of the technologies discussed in the report follows.

### **Geothermal Energy**

Geothermal resource maps indicate potential sites east of Glennallen in the Wrangell-St. Elias National Park and Preserve. The availability and temperature of geothermal fluid at these locations is unknown. The site location, the field development risks, the unknown quality of the resource all indicate developing a geothermal project is high risk.

The study estimates the first-year cost of a 5-megawatt geothermal project to be 18.3¢ per kilowatt-hour (kwh).

### **Fuel Cell Technology**

Fuel cells have been in existence and used for a number of years,

particularly in the space program. However, commercial power applications are limited and, in Alaska's case, unsuccessful. A number of drawbacks to fuel cells exist, including unproven technology, dependence on fossil fuels, high capital costs, high operations and maintenance costs and less than acceptable reliability.

The study estimates the first-year cost of a 200-kilowatt fuel cell project to be 32.8¢ per kwh.

### **Solar Photovoltaic**

Solar capital costs have continued to decrease in recent years, however, costs remain considerably higher than other alternative energy sources. Besides the obvious limitation of requiring sunlight, one of the disadvantages of solar panels is current efficiencies in converting sunlight to energy are low. These low efficiencies create large space requirements for utility-scale applications.

The study estimates the first year cost of a 385-kilowatt solar photovoltaic project to be 89.6¢ per kwh.

### **Wind Energy**

Installation of new wind generation in the United States has been unparalleled in the past decade. Technological advances in equipment, tax credits, other financial incentives and high fuel prices have all supported this investment.

In Alaska, a number of small scale wind turbines have been installed in recent years, with most financed or supported by federal grant funds. For this reason, the true economics



*The Four Dam Pool Power Agency's Solomon Gulch Project provides approximately 60 percent of CVEA's annual generation requirements.*

of wind projects in rural Alaska are difficult to ascertain. Site selection is important, and one or more years of wind monitoring are typically performed at sites prior to installing a turbine. Such detailed monitoring has not been performed at potential sites in the CVEA system. Historical data at federal weather stations is available in some locations, but this data is typically insufficient to fully evaluate the wind resource for power generation purposes.

CVEA's service area includes a number of potential sites, where average wind speed appears interesting. However, preliminary on-site review indicates none are ideal and each has one or more complications that could make project develop-

ment difficult and expensive. Some of those complications include gusting wind, wind changing direction, wind shear caused by proximity to mountains or uneven terrain, icing, heavy snow, distance from the CVEA transmission system, lack of road access and other conditions not suitable for a commercial wind project. The independent engineer concurred with the conclusions drawn by wind prospectors that visited the CVEA system in August 2006.

The study estimates the first-year cost of a wind project with four 250-kilowatt wind turbines to range from 22.6¢ to 30.2¢ per kwh.

#### **Hydroelectric**

Several potential hydroelectric

resources have been investigated in the CVEA area. Typically hydro resources are capital intensive, with relatively low operating costs. Thus a potential resource may be expected to be economically viable during the life of the project, but costs in the early years can be prohibitively expensive. The relative remoteness of potential sites adds to the capital cost.

Another factor to consider is that most hydroelectric generation in the area would produce power during the summer, when Solomon Gulch is meeting CVEA's system requirements. Therefore, a new hydro resource must have significant amounts of generation during the winter for it to have any effect on displacing significant amounts of oil-fired generation.

Please refer to the Alternative Generation Review study at [www.cvea.org](http://www.cvea.org) for a detailed discussion of hydro alternatives.

#### **Other**

Economics of coal-fired resources favor large-scale plants with operations at full output at all times; small projects or low-use energy projects are rarely economical.

Tidal power is not considered to be a viable alternative because it is still in its infancy and in the research and development stage. Such resources carry a high degree of risk and should not be undertaken by small utilities such as CVEA.

The consultant concluded that similar to many utilities throughout the state, there are relatively few options CVEA can pursue to displace diesel-fired generation, and it is evident no options would provide short-term reduction in electricity costs to the membership.

Despite the lack of cost-effective options, CVEA will continue to monitor opportunities to lower power costs while maintaining the financial health of the cooperative. ■

*More information, including copies of the Strategic Issues Paper and Alternative Generation Review, is available at [www.cvea.org](http://www.cvea.org) or by contacting either office.*