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Evidence of strong near-ground winds in the Altamont and Solano Passes

Additional submitted attachment is included below.

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Evidence of strong near-ground winds in the Altamont and Solano Passes

To support of my recent postÂ â€œRepower California wind farms by adding layers of turbines without causing harm to wildlife,â€ Â Â I have asked meteorologist to send me information about the near-ground wind resources in CA wind farms. Â
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The attached outline and executive summary for â€œWind Energy Prospecting in Alameda and Solano Countiesâ€ Â is attached. It comes from a paper written by PG&E for the CEC in 1980 regarding the near-ground wind resource (30â€™Â above ground level) of the Altamont Pass in Alameda County and the Carquinez Straits in Solano County.Â Here are the key sentences explaining the high value of the near-ground wind resource.
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â€œStrong persistent westerly winds were measured in the two areas. Several sites averaged over 16 mph for the ten-month period. Each area had sites with average wind speed over 20 mph from May through August 1979.â€ Â Â
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This near-ground wind resource is impressive. The data shows how valuable adding capacity to these wind resource areas would be to help meet summer electrical demand, including after the sun sets.Â

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Additional submitted attachment is included below.

Wind Energy Prospecting in Alameda and Solano Counties

CONSULTANT REPORT

Volume I

MAY 1980

CALIFORNIA ENERGY COMMISSION

P500-80-054

WIND ENERGY PROSPECTING IN ALAMEDA AND SOLANO COUNTIES

VOLUME I

MAY 1980

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WIND ENERGY PROSPECTING

IN

ALAMEDA AND SOLANO COUNTIES

Volume I

May 1980

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California Energy Resource Conservation and Development Commission - Agreement No. 500-133 (7/8)

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ABSTRACT

The Pacific Gas and Electric Company and the California Energy Commission conducted a wind energy prospecting program in Northern California. Eight candidate areas were initially considered and qualitatively evaluated; two areas in the San Francisco Bay Area were selected for study. A total of 23 sites were instrumented at the 30-ft level. Data were collected and analyzed for the ten-month period of March through December, 1979.

The procedures used to define candidate measuring sites are discussed. Final site selection reflected the initial desired network configuration and the reality of access, land use and representativeness of individual sites.

Strong persistent westerly winds were measured in the two areas. Several sites averaged over 16 mph for the ten-month period. Each area had sites with average wind speeds well over 20 mph from May through August 1979.

Typical hourly mean wind speeds and other data are presented for each area. A wind turbine generator simulator program was used to estimate the energy that could be produced from representative sites. Analyses of the data indicate there is sufficient wind energy potential in the two areas to warrant a more comprehensive wind measurement program.

EXECUTIVE SUMMARY

The Pacific Gas and Electric Company (PGandE) and the California Energy Commission (CEC) agreed in 1978 to initiate a wind energy prospecting program in Northern California. Since there was limited experience at that time in wind energy prospecting, the program would be a valuable learning process and provide some quantitative data for areas of high wind energy potential.

Previous studies indicated that several areas in Northern California have a high wind energy potential. A set of gross area screening criteria was defined and qualitatively applied to eight candidate areas. The Carquinez Straits area in Solano County and the Altamont Pass area in Alameda County were selected to be studied. A strong factor in selecting these areas was the favorable historical wind data applicable to the areas. Previous data and analyses indicated there could be wind speeds of interest for wind energy conversion, especially during the summer months. Other supporting factors for these areas were the favorable terrain and weather conditions when compared to some of the other sites, and their proximity to San Francisco.

An initial budget of $60,000 was set for the program, with the CEC to provide $25,000 and PGandE the remaining $35,000. The decision was made to use a relatively large number of low cost wind sensors to obtain estimates of the wind speeds over as much of the two areas as possible.

The sensor site selection process began with a study of the topographical maps, wind data and climatology of the areas. Candidate sensor sites were identified and then evaluated in the field. This process included current and planned land use, such as housing and commerical development. Candidate sites were constrained to be accessible throughout the year and have no cost

to this program for access or land use. This meant that the sites had to be within one-quarter mile of all-weather access roads to make site visits possible during the rainy season.

Land owners were contacted to obtain permission to establish monitoring sites on their property. Almost all of the sites were owned by a different person or corporation, and obtaining permission proved to be a time consuming process.

As permission was granted or denied for sites, it was usually necessary to adjust the remaining candidate sites to maintain preferred areas and representative terrain features. Adjustments were made to the network of sites during the program as the wind speed at some sites was consistently lower than the speeds at other sites.

The program was plagued with equipment operation problems. A mix of recording Climatronics sensors and Sencenbaugh wind run devices were used. Recorder failures in the Climatronics units caused the loss of substantial data. The wind run devices required close field monitoring to insure proper operation of their counting circuitry. Nevertheless, a reasonably complete record of hourly wind speed and wind direction was obtained at one key site in each area.

Analysis of hourly and monthly mean wind speeds shows distinct diurnal and seasonal patterns. Spatial evaluation of the data indicates there are definite areas of high and low wind speeds. Average wind speeds of 25 to 30 mph were measured generally 12 hours each day from May through August 1979. A significant decrease in monthly mean wind speeds occurred in November and December 1979. However, the indications are that high wind speeds occur over most of the two areas from April to September. High wind speeds during the other months of the year are related to site elevation, exposure and large-scale storm conditions.

A number of factors were not investigated in the program. The most important is the change in wind speed with height (shear) in the layer swept by a wind turbine generator blade, since all measurements were made at the 30-foot level. The wind speed shear in this layer, and the total depth of the high wind speed layer are critical factors in determining the value of a site for turbine installation. Wind turbulence was not measured and is another important factor in site evaluation. However, much was learned from the program and PGandE is currently installing a much more comprehensive wind measurement program for both areas. The new data will be used to determine the suitability of the areas for wind farm development.