

20 ALTERNATIVES

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The California Environmental Quality Act (CEQA) requires that an Environmental Impact Report (EIR) evaluate a reasonable range of feasible alternatives to a project that could potentially avoid or reduce a project's significant impacts and still achieve most of the basic objectives of the project.

This chapter summarizes the significant impacts of the Montezuma II Wind Energy Project. It also compares the impacts that would result from a range of alternatives to the impacts of the Project.

20.1 SELECTION OF ALTERNATIVES

The selection of the feasible alternatives first identified the objectives of the proposed Project and its significant impacts, then considered alternative sites, alternative technologies at the proposed site, and alternative development plans using the proposed project location and technology. The analysis dismissed alternatives that were not feasible or could not achieve the basic objectives of the project. The range of alternatives includes the No Project Alternative.

20.1.1 Montezuma II Wind Energy Project

As presented in Chapter 3, Project Description, the Applicant's objective is to develop a commercially viable wind energy facility that would deliver renewable energy to the PG&E/California Independent System Operator (CAISO) power grid to meet the State's Renewable Portfolio standard goals and help reduce greenhouse gas emissions pursuant to AB 32 and the County's General Plan. The Applicant has identified the following specific objectives for the Montezuma II project:

- Meet regional energy needs in an efficient and environmentally sound manner, as provided in the Energy Resources and Conservation section of the 2008 Solano County General Plan Resources Chapter, which encourages utilization of renewable energy resources.
- Promote the long-term economic viability of agricultural uses in the Montezuma Hills, including grazing and dry land farming.
- Assist California in meeting its target for the generation of renewable energy in the state under the state's Renewable Portfolio Standard (RPS) Program. Current state law requires that 20 percent of California's electricity come from renewable sources by 2010, and Executive Order S-14-08 establishes a target for all retail sellers of electricity to provide 33 percent of their power from renewable sources by the year 2020. The California Air Resources Board is working with the Public Utilities Commission, the California Energy Commission, and CAISO to develop regulations that implement this target.
- Fully utilize the wind resource area in the Montezuma Hills region of Solano County, thereby concentrating wind turbines in appropriate locations.
- Offset the need for additional electricity generated from fossil fuels (which emit more air pollutants than wind-generated electricity) and therefore assist the state in meeting its air quality goals and reducing greenhouse gases.
- Develop a wind project that would produce 78.2 MW of electricity.
- Result in an economically feasible wind energy project that would support commercially available financing.

The proposed Project would produce up to 250 million kilowatt hours (kWhrs) of electricity per year, based on a 37 percent capacity factor, as projected by the Applicant, more than seven times the average generation reported to the County for the enXco V turbines in the project area (Solano County 2009). This electricity would displace carbon-fueled generation, resulting in a net reduction of at least 2.3 million metric tons of carbon dioxide equivalent (CO₂ e) emissions over its 30-year lifetime and would help California meet its greenhouse gas emissions reductions goals enacted under Assembly Bill 32 (AB 32).

The proposed Project would result in the following impacts, which would be significant even after implementation of all feasible mitigation measures:

Aesthetic/Visual Resources

Impact AES-1: Degradation of Views from Collinsville and Impact AES-5: Degradation of the Visual Character of the Landscape from Public (County) Roads and Dispersed Rural Residences. Many of the proposed Project's turbines would be in the foreground distance zone and would affect the landscape visible from Collinsville Road, Birds Landing Road, Montezuma Hills Road, and dispersed rural residential viewpoints. Even given conformance with the Solano County setback, siting and design standards, the Project would significantly alter the visual appearance of the landscape in these areas when viewed in the foreground distance zone from dispersed rural residential viewpoints. Views of the turbines would similarly and significantly impact residents of the community of Collinsville.

Air Quality

Impact AIR-2: Temporary Increase in Fugitive Dust. The Project would result in significant impacts on air quality during construction due to the generation of dust (particulate matter [PM₁₀]) from trenching, grading, and other ground-disturbing activities.

Biological Resources

Impact BIO-8: Direct Mortality of Raptors, Other Avian Species, and Bats. The Project would result in the mortality of protected avian and bat species, a significant impact even with the incorporation of mitigation measures. Raptor species most likely to be affected by turbine operation are the American kestrel and red-tailed hawk. The golden eagle, white-tailed kite, and peregrine falcon, all fully protected species in California. The western red bat is the primary bat species that turbine operations could affect.

The Project would also result in significant impacts that would be mitigated to less than significance. These types of impacts consist of the remaining impacts to aesthetics, , air quality, and biology and all potentially significant impacts to agriculture, cultural resources, geology, hazards, land use, noise, public services, safety, and transportation.

20.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

While CEQA requires that an EIR describe all alternatives considered, it does not require a full analysis of alternatives that are infeasible, that do not meet the project objectives, or that do not potentially reduce environmental impacts. The following discusses alternatives that the report eliminated from further consideration for these reasons.

20.2.1 Off-Site Alternative

The Applicant could develop the Project at an alternative site at another wind resource area and still provide renewable energy to the CAISO grid and consumer market in California. The CEC has identified five primary wind energy regions in California: Solano, Altamont, San Geronimo, Tehachapi, and Pacheco. Only two of these regions are located in northern California: Solano and Altamont (CEC 2005). Additional development is already being planned in the four other resource areas. If the Applicant were to develop the Project at another wind resource area, it would potentially displace another project planned in that area and leave the Montezuma Hills area underdeveloped. Of the 2,688 acres in the proposed project area in the Montezuma Hills, 1,162 acres currently have no wind turbines, and 1,526 acres have obsolete wind turbines with low capacity factors and low energy production. The proposed project area is in the middle of a highly productive wind resource area, surrounding on three sides by modern producing wind projects. One of the objectives of the proposed project is to “fully utilize the wind resource area in the Montezuma Hills region of Solano County, thereby concentrating wind turbines in appropriate locations.” An off-site alternative would not achieve this objective.

If California is to achieve the current 20 percent Renewable Portfolio Standard and the planned 33 percent RPS, the state needs to develop viable wind energy projects in all resource areas. Leaving the project area underdeveloped would be inconsistent with the long-term goals of AB 32.

20.2.2 Other Types of Renewable Energy Projects in the Montezuma Hills

In addition to wind energy, the Applicant could potentially develop other renewable energy sources to provide energy to the consumer market in northern California, including solar, geothermal, and biomass energy. However, the resources used to power these types of renewable energy are not generally abundant in the project area. Projects powered by solar energy would require high annual solar incidence; geothermal projects would require concentrated levels of heat from the earth; biomass projects would require the availability of biomass feedstock such as corn and sugarcane.

None of these energy sources is as readily available as wind energy in the project area. The flow of cool air from the San Francisco Bay through the Carquinez Strait creates strong, sustained winds throughout the year. For this reason, Solano County considers the area as superior for wind energy development. Other types of renewable energy projects would be less feasible given the resources available in the Montezuma Hills region, and they would not meet the project objectives.

20.2.3 Non-Renewable Energy Projects

Alternative energy sources such as coal, oil, and natural gas are available and meet increased demands for energy in California. However, these resources are not renewable energy. Their

development would not meet the project's objective to deliver renewable energy to the PG&E/CAISO power grid to help meet California's 20 percent and 33 percent RPS goals and help meet the intent of AB 32 to reduce California's greenhouse gas emissions to 1990 levels by 2020.

Additionally, non-renewable generation sources such as coal, oil, and natural gas would likely result in increased pollutant emissions. Coal and oil emit relatively large amounts of particulate matter, sulfur dioxide, carbon monoxide, hydrocarbons, and non-criteria pollutants. Furthermore, the burning of coal is a major contributor to acid rain, which is an international ecological and economic problem. It is unlikely that the utilities in northern California would be able to burn coal or oil in order to generate electricity. The use of these fuels would not allow either existing power plants to operate within their air permit conditions or new plants to obtain air permits for use of these fuels because of the non-attainment status of the Bay Area and Sacramento Valley Air Basins.

Natural gas provides a cleaner burning alternative to oil and coal. When designed adequately, a natural gas plant produces a reduced amount of sulfur dioxide, nitrogen oxide, and particulate matter emissions. Additionally, extracting energy from natural gas is more efficient than extracting energy from other fuels because the absence of impurities in the fuel makes it clean burning and eliminates the need for energy-consuming auxiliary equipment. However, while natural gas facilities generally emit fewer pollutants than coal or oil, they typically emit more pollutants than wind energy generation facilities. A natural gas facility would result in greater emissions of particulate matter, sulfur dioxide, carbon monoxide, hydrocarbons, and non-criteria pollutants during start-up and normal operations, compared to a wind facility.

Because non-renewable energy projects would likely result in greater impacts on air quality and because they would not meet the project objectives, non-renewable alternatives were not carried forward for analysis.

20.2.4 Alternative Wind Turbine Models

The Applicant originally considered other wind turbine models. While there may be some differences between alternative turbine models, impacts on aesthetics, air quality, and biological resources would be similar for the proposed turbine model and these alternative turbine models considered. Use of these alternative turbine models would not reduce potentially significant impacts to less than significant levels.

Some projects in California have installed an alternative design option: vertical axis wind turbines (VAWT). The VAWT arrangement has the gearbox and generator located at ground level and can generate energy from wind blowing in any direction, saving the costs of towers and the equipment that turns the rotor into the wind. The VAWT design is inherently less efficient than that of horizontal axis wind turbines (HAWT), however, because as one blade catches the wind and turns the rotor, the opposite blade produces drag and loss of power. Furthermore, wind speeds are lower and more turbulent at ground level than they are at the height of the rotors for the proposed turbines, resulting in less power output and more stress on the machinery. Poor performance has caused developers in the Altamont Pass to remove previously installed VAWTs and replace them with HAWTs.

In addition, there are no reliable VAWT suppliers available today for large commercial wind facilities. No known, reputable manufacturers currently have the capability to produce the quantity and electrical generation capacity of turbines needed for the Project or to guarantee and warranty the equipment.

The turbine type considered for the Project is a three-blade HAWT mounted on a tubular pole. Development of the wind industry to date has found that this technology is the most cost-effective method of generating electricity from wind resources. The VAWT would not fully meet the primary objectives of the Project, which are to harness the wind energy at the Montezuma Hills in an efficient manner and to promote the long-term economic viability of the agricultural users in the Montezuma Hills.

20.3 ALTERNATIVES EVALUATED

The following section describes and evaluates project alternatives that may feasibly attain most of the basic objectives of the project while avoiding or substantially lessening any of the significant effects of the project.

20.3.1 No-Project Alternative

Under the No Project Alternative, the Project would not be constructed and the significant and unavoidable impacts on aesthetic/visual resources, air quality, and biological resources would be avoided and the significant and mitigated impacts to aesthetics/visual resource, air quality, biology, cultural resources, geology, hydrology, land use, noise, public services, and safety would not occur.

There are two possibilities for the project area under the No-Project Alternative. The enXco V turbines could be decommissioned and removed, as is currently planned, before the enXco V use permits expire in 2014 and 2015. Alternatively, Solano County could grant an extension to the use permits, allowing enXco to continue to operate the turbines in the project area.

No-Project Alternative 1: enXco V Removed

If the Project was not constructed and the enXco V turbines were removed, the project area would return to exclusively agricultural use. The owner of the enXco V project, enXco, would decommission the project, removing the turbines and foundations to three feet below the ground surface and reclaiming the pads, access roads, restoring the land to previous conditions. This analysis assumes that the substation and operations and maintenance (O&M) buildings would remain. The decommissioning activities would result in temporary disturbance of 17.7 acres and emissions of 0.1 tons of ROG, 0.8 tons of NO_x, 3.0 tons of PM₁₀, and 0.7 tons of PM_{2.5} (See Appendix B: Revised Air Quality Study for the Proposed Montezuma II Wind Project, Solano County, California). Vehicles and equipment used for decommissioning would cause temporary noise and traffic impacts. Ground disturbing activities associated with decommissioning would cause erosion impacts and risk of spills.

Once decommissioning was complete, the 17.7 acres of previously occupied by enXco V turbines would likely become productive agricultural land, and impacts on avian and bat species would no longer occur. The visual setting would return to its previous character once the enXco facilities were removed. Figure 20.3-1 simulates a view of the project area from Montezuma Hills Road with the

enXco V turbines removed. Chapter 5, Aesthetic/Visual Resources, describes the methodology for preparing simulated views.

The No Project Alternative would also avoid the noise impacts from the operation of the proposed Project and the potential land use and safety impacts of large turbines that would require landowner waivers. The noise in the project area would revert to the levels prior to development, presented in the High Winds EIR as 44-64 dBA, Leq. The alternative would avoid potential safety and fire risks and potential interference with communications systems for the proposed project.

The No Project Alternative, however, would have none of the benefits of the proposed Project. The Applicant would not be able to generate up to 250 million kilowatt hours (kWhr) of electricity per year from the wind in the area, leaving the wind resource area in the Montezuma Hills region underused. Utilities would not be able to obtain this additional energy for their Renewable Portfolio Standard (RPS) goals, and the state of California would have obtain the reduction in 79,452 metric tons of greenhouse gas emissions per year from other sources. The No-Project Alternative would significantly reduce the potential for the project area's wind resources to help achieve the AB 32 goals, adopted to address the long-term environmental impacts of climate change.

No Project Alternative 2: enXco V Operations Continue

If the No Project Alternative resulted in the enXco V turbines remaining on the site under an extension of the enXco V use permits from Solano County, significant short term and long term environmental impacts would be avoided. All of the short-term impacts associated with the decommissioning of the enXco V turbines and the construction of the proposed Project in the project area would not occur. The No Project Alternative of continuing enXco V operations would avoid up to 21.4 tons of total PM 10 emissions, 3.0 tons from the demotion of the enXco V project and 18.4 tons from the construction of the proposed Project, a significant level of short-term emissions. The alternative would also avoid less than significant emissions of criteria pollutants from construction equipment and vehicle exhaust. The alternative of continuing enXco V operations would avoid the erosion impacts and risks of spills associated with ground disturbing activities from the decommissioning of enXco V facilities on 17.7 acres and construction the proposed Project on up to 220.6 acres in the project area. This alternative would also avoid the noise and potential impacts to biological and cultural resources from these construction activities.

The continued operation of the enXco V project would also avoid the impact on aesthetic/visual resources from viewpoints along State Route 12, in Birds Landing, and in Pittsburg and Antioch because the existing KCS 56-100 turbines are not as tall as the proposed Siemens 2.3 MW turbines and would not be as visible at these distance points. As shown in Figure 5.4-4 in Chapter 5, Aesthetic/Visual Resources, the undulating topography would continue to obscure the views of the shorter enXco V turbines from Collinsville and Birds Landing residents. However, the greater number of enXco turbines and their proximity to roads would continue to have significant aesthetic/visual impacts on the views from the rural residences and county roads in the project area.



Sources : ICF International

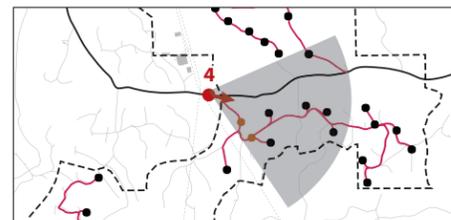


Figure 20.3-1
**VIEWPOINT 4: EXISTING AND SIMULATED
 VIEWS OF PROJECT FROM
 MONTEZUMA HILLS ROAD**
 Montezuma II Wind Energy Project
 Solano County, California

Figure 20.3-1 View from Montezuma Hills Road Placeholder

11x17 back

If enXco V turbines remained in operation in the project area, the Project's significant impacts on biological resources would be avoided. The existing impacts from the enXco V turbines would continue. Any mortality of special status species or interference with their movement is a significant impact on biological resources. As discussed in detail in Impact BIO-8 in Chapter 8, Biological Resources, the proposed Project would result in equivalent or up to 1.7 times higher raptor mortalities. The raptor mortalities per energy produced in the project area, however, would decrease from the current 0.83 raptors/MW/Yr to between 0.29 and 0.49 raptors/MW/Yr with the proposed Project.

The No Project Alternative would also avoid the noise impacts from the operation of the proposed Project and the potential land use and safety impacts of large turbines that would require landowner waivers. The noise levels would continue at 47 to 57 dBA levels described for the existing environment in Chapter 15, Noise. The alternative would avoid potential safety and fire risks and potential interference with communications systems associated with the proposed Project.

The No Project Alternative, however, would have none of the benefits of the proposed Project. Renewable generation from the project area would continue at an average of 40 million kilowatt hours (kWhr) per year and the Applicant would not be able to increase this amount to approximately 250 million kWhr per year. Utilities would not be able to obtain this additional energy for their RPS goals, and the state of California would have obtain the reduction in 67,513 metric tons of greenhouse gas emissions per year from other sources. While enXco V turbines would continue to generate approximately 21.6 MW of energy, the old-generation turbines used for enXco V generate energy less efficiently than modern turbines. Therefore, operation of enXco V under the No Project would result in an underdevelopment of the wind resource area. The No-Project Alternative would significantly reduce the potential for the project area's wind resources to help achieve the AB 32 goals, adopted to address the long-term environmental impacts of climate change.

20.3.2 Off-site Alternative – Cordelia Hills Wind Resource Area

The wind resource area in the Cordelia Hills region is the only area, other than the Montezuma Hills region, that Solano County has designated as suitable for wind development, and is considered an alternative project location for the Project. The Solano County General Plan, however, places restrictions in the Cordelia Hills region associated with setback requirements based on visual concerns associated with residential neighborhoods, areas planned for residential development, and I-80 and I-680 corridors, as required in Chapter 4 (Resources) of the General Plan. Further, Chapter 11 of the General Plan places additional restrictions associated with the Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation (Solano County Planning Services 2008).

The Cordelia Hills region was evaluated for wind project development; however, because of the constraints from an environmental and visual impact on residents and travelers, the area would likely result in environmental impacts greater than or equal to those of the Project. Development of this area would cause greater impacts on residents in the Cordelia Hills, where there are a greater number of sensitive receptors, than the project area. Development of a wind farm in the Cordelia Hills would also have similar impacts on raptor species because the area has a similar ecological and biological profile as the proposed project area. Impacts on air quality from emissions of criteria pollutants during construction would be the same as those impacts caused by construction of the

proposed Project. Finally, the land use in the Cordelia Hills region does not promote agricultural uses, which are compatible with wind turbine development, resulting in a less efficient use of land.

20.3.3 Reduced Project/Alternative Layout Alternative

The final alternative to the Project evaluated is reducing the number of turbines. A Reduced Project Alternative would involve construction of only half of the planned wind turbines and approximately two-thirds the planned length of access road, resulting in reductions of approximately 5.5 acres of permanent impacts and 47.7 acres of temporary impacts.

Although the Reduced Project Alternative would reduce the visual impact on travelers along county roads, residents in Birds Landing, Collinsville, and rural residents, it would not reduce the Project's overall impact on visual impacts to a less than significant level. Similarly, while the Reduced Project Alternative would lessen the magnitude of impact on raptors because there would be fewer turbines to potentially be encountered, it would not reduce the impacts to less than significant levels.

Reducing the number of turbines to be installed would decrease short-term impacts on air quality for PM10 because less ground disturbance would occur. However, the emissions are not likely to be reduced to below a level of significance.

Fewer turbines would substantially reduce the Project's power generation capacity (approximately 50% of capacity). Therefore, this alternative would not achieve the Project objective of producing 78.2 MW of electricity or fully utilizing the wind resource area. The Reduced Project Alternative would limit the Project's contribution to California's RPS goals and its GHG emission reduction goals and would not have as great a benefit to long-term air quality through generation of renewable energy.

20.4 REFERENCES

- California Independent System Operator (CAISO). 2009. *2009 California ISO Transmission Plan*. California Energy Commission (CEC). 2005. California Wind Resources.
- California Energy Commission (CEC). 2004. Repowering the APWRA: Forecasting and Minimizing Avian Mortality without Significant Loss of Power Generation.
- NextEra Energy Montezuma II Wind, LLC. 2010. Responses to information requests. September through December. Solano County Planning Services. 2008. Solano County General Plan. Prepared by: EDAW, Inc. and Englebright and Associates, Solano County, CA. December.