

**Lauren Coartney**

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**From:** Carol Horton <CHorton@adamsbroadwell.com>  
**Sent:** Friday, March 04, 2011 2:37 PM  
**To:** ECOSUB; catulewind@blm.gov  
**Cc:** Robyn C. Purchia  
**Subject:** Comments DEIS and DEIR: East County Substation/Tule Wind/Energia Sierra Juarez Gen-Tie Projects  
**Attachments:** 2269-008d ABJC Comments on ESJ Gen-Tie \_3-4-11\_.pdf; Att A - The Zoological Society of San Diego Map of Condor Flight.pdf; Att B - Presence and Movement of California Condors Near Proposed Wind Turbines.pdf; Att C - San Diego Audobon Letter.pdf; Att D - USFWS and CDFG Letter.pdf; Att E - San Diego County Letter.pdf; Att F - Photographs of Penisular bighorn sheep.pdf; Att G - European Guideline - Wind turbines fire protection guideline.pdf

Good Afternoon Mr. Fischer and Mr. Thomsen,

Attached please find our comment letter and attachments on the Draft Environmental Impact Statement and Draft Environmental Impact Report for the East County Substation/Tule Wind/Energia Sierra Juarez Gen-Tie Projects. We are also sending a hard copy via overnight delivery.

Should either of you have any questions or comments, please direct them to Robyn C. Purchia.

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March 4, 2011

### **BY EMAIL AND OVERNIGHT MAIL**

Mr. Iain Fischer, CPUC and  
Mr. Greg Thomsen, BLM  
c/o Dudek  
605 Third Street  
Encinitas, CA 92024  
Email: ecosub@dudek.com  
catulewind@blm.gov

Re: Comments on the Draft Environmental Impact Statement and Draft Environmental Impact Report for the East County Substation/ Tule Wind/ Energia Sierra Juarez Gen-Tie Projects

Dear Mr. Fischer and Mr. Thomsen:

We are writing on behalf of the International Brotherhood of Electrical Workers, Local 569 (“Local 569”) and its members to comment on the Energia Sierra Juarez Gen-Tie (“ESJ Gen-Tie”) and connected Energia Sierra Juarez Wind Farms (“ESJ Wind Farms”) portion of the East County (“ECO”) Substation, Tule Wind and ESJ Gen-Tie Draft Environmental Impact Statement and Draft Environmental Impact Report (“Draft EIS/EIR”). The ESJ Gen-Tie and the ESJ Wind Farms together are referred to in this letter as the “Project.”

The ESJ Gen-Tie requires a Presidential Use Permit from the Department of Energy (“DOE”) and a Major Use Permit from San Diego County to connect the ESJ Wind Farms in northern Baja California, Mexico to the existing Southwest Power Link Transmission Line through the ECO Substation.<sup>1</sup> The ESJ Wind Farms were granted a conditional approval from Mexico’s environmental ministry, Secretaria de Medio Ambiente y Recursos Naturales (“SEMARNAT”). SEMARNAT’s approval of the ESJ Wind Farms may still be challenged administratively.

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<sup>1</sup> Dudek, Environmental Impact Report/Environmental Impact Statement for East County Substation, Tule Wind, and Energia Sierra Juarez Gen-Tie Projects (Dec. 2010), pp. A-13, A-19, A-20, B-9 (hereafter Draft EIS/EIR).

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Local 569 has an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for its members. Environmentally detrimental projects can jeopardize future jobs by making it more difficult and more expensive for business and industry to expand in the region, and by making it less desirable for businesses to locate and people to live there. Indeed, continued degradation can, and has, caused construction moratoriums and other restrictions on growth that, in turn, reduce future employment opportunities. In this case, the Project would also cause significant adverse socioeconomic impacts to Imperial and San Diego Counties and the southern California regional economy by facilitating the development of large-scale renewable energy projects in Mexico. These socioeconomic impacts, including the loss of employment opportunities, would in turn result in physical changes to the environment, such as urban decay and blight.

As explained more fully below, the Draft EIS/EIR does not comply with the National Environmental Policy Act (“NEPA”) or the California Environmental Quality Act (“CEQA”). A Draft EIS/EIR must include a description and analysis of connected actions that are part of the whole of the action. The ESJ Wind Farms are connected to and part of the ESJ Gen-Tie Project. Nevertheless, the Bureau of Land Management (“BLM”) and California Public Utilities Commission (“CPUC”) did not describe the ESJ Wind Farms in the Draft EIS/EIR, and, therefore, failed to alert the public and decision makers of the Wind Farms’ environmental consequences before they occur.

The BLM and the CPUC also failed to take a hard look or adequately analyze all of the potential impacts to the United States of the Project, as required by NEPA and CEQA. The Project may have significant impacts on biological resources, hazards associated with wildfires and socioeconomics in the United States that have not been disclosed or mitigated in the Draft EIS/EIR.

Finally, San Diego County and the DOE must rely on a single document to support their approvals of a Major Use Permit and Presidential Permit for the ESJ Gen-Tie. San Diego County’s reliance on the Draft EIS/EIR prepared by the BLM and CPUC and the DOE’s separate reliance on its own Draft EIS violates the express guidance of NEPA and CEQA. NEPA and CEQA strongly encourage State and federal agencies to prepare a single document to avoid duplication of materials and resources, as well as unnecessary delay.

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In this case, the separate environmental documents prepared for the Project demonstrate the need for a single analysis and illustrate the rationale for the NEPA and CEQA policies in favor of a single document. The Draft EIS/EIR prepared by the BLM and CPUC and the Draft EIS prepared by the DOE contain numerous inconsistencies and conflicting information and analysis. San Diego County and the DOE are not only duplicating resources and causing unnecessary delay, but potentially relying on inconsistent and conflicting alternatives and mitigation measures to minimize the ESJ Gen Tie's environmental impacts. This approach precludes a meaningful analysis of alternatives, impairs the enforceability of mitigation measures and undermines public disclosure and informed decision making.

For these reasons, the BLM and CPUC may not certify the Draft EIS/EIR without describing the ESJ Wind Farms, fully assessing all impacts of the proposed Project and recirculating a Revised Draft EIS/EIR to the public. San Diego County also may not rely on a deficient and inconsistent document to support its approval of a Major Use Permit for the ESJ Gen-Tie Project.

**I. THE DRAFT EIS/EIR DOES NOT COMPLY WITH NEPA OR CEQA BECAUSE IT DOES NOT INCLUDE A COMPLETE DESCRIPTION OF THE ESJ WIND FARMS**

To comply fully with NEPA and CEQA, the CPUC and BLM must describe the ESJ Wind Farms and disclose all potential impacts to the United States in a re-circulated EIS/EIR. Because the ESJ Wind Farms are "connected actions" to the ESJ Gen-Tie and part of the "whole of the action" under review, the CPUC and BLM have a legal duty to include a complete and accurate description of the ESJ Wind Farms component of the Project and to disclose and evaluate all potential impacts so that decision makers and the public are fully informed before harm is done to the environment.

**A. The ESJ Wind Farms are "connected actions" and part of the "whole of the action" within the meaning of NEPA and CEQA**

Under NEPA, proposals that are so closely related that they are, in effect, a single course of action must be reviewed in the same NEPA document.<sup>2</sup> Federal

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<sup>2</sup> 40 C.F.R. 1502.4, subd. (a).

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agencies may not chop or segment connected actions into small pieces to avoid application of NEPA, or avoid a more detailed assessment of a project's environmental impacts.<sup>3</sup>

Similarly, under CEQA, a "project" is defined broadly to encompass the "whole of an action."<sup>4</sup> As the Guidelines state, "the term 'project' has been interpreted to mean far more than the ordinary dictionary definition of the term."<sup>5</sup> Any activity "which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment" constitutes a "project" or the "whole of the action."<sup>6</sup> This includes, but is not limited to, "later phases of the project, and any secondary, support, or off-site features necessary for its implementation."<sup>7</sup>

In this case, the ESJ Gen-Tie is dependent on and connected to implementation of the ESJ Wind Farms in Mexico. The Draft EIS/EIR specifically states that the "primary objective" of the ESJ Gen-Tie is "to transmit approximately 1,200 MW of renewable energy from a wind farm project in northern Baja California, Mexico."<sup>8</sup> There is no other stated purpose for the ESJ Gen-Tie except to carry renewable energy generated in Mexico to the United States. Indeed, the BLM and CPUC expressly acknowledge the obligation to analyze impacts of the ESJ Wind Farms because they are connected to the proposed actions and part of the whole of the action.<sup>9</sup>

**B. Because the ESJ Wind Farms are "connected actions" and part of the "whole of the action," the Draft EIS/EIR must include an accurate and complete description of the ESJ Wind Farms**

An accurate, complete and consistent project description is necessary for the public and decision makers to understand the effects of the proposed action and its

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<sup>3</sup> 40 C.F.R. 1508.25, subd. (a).

<sup>4</sup> Pub. Resources Code, §§ 21065, 21080, subd. (a); 14 Cal. Code Regs. (hereinafter "CEQA Guidelines"), §§ 15002, subd. (d), 15003, subd. (h), 15165, 15378, Appendix G.

<sup>5</sup> CEQA Guidelines, § 15002, subd. (d).

<sup>6</sup> Pub. Resources Code, § 21065.

<sup>7</sup> CEQA Guidelines, Appendix G.

<sup>8</sup> Draft EIS/EIR, p. A-13.

<sup>9</sup> *Id.* at p. ES-11.

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alternatives.<sup>10</sup> “A clear description results in more focused and meaningful public input and [CPUC and] BLM participation, a more complete identification of issues, development of reasonable alternatives, sound analysis and interpretation of effects, focused analysis and a sound and supportable decision.”<sup>11</sup> “Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal’s benefit against its environmental cost . . . .”<sup>12</sup>

The courts interpreting NEPA have held that “[w]here the information in the initial EIS was so incomplete or misleading that the decisionmaker and the public could not make an informed comparison of the alternatives, revision of an EIS [was] necessary to provide a reasonable, good faith, and objective presentation of the subjects required by NEPA.”<sup>13</sup> Similarly, courts applying CEQA requirements have repeatedly held that “[a]n accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR.”<sup>14</sup>

The Draft EIS/EIR at issue here contains a cryptic and extremely generalized description of the ESJ Wind Farms. It simply states that ESJ U.S. Transmission, LLC, is proposing “several phases” of wind projects with buildout anticipated to generate approximately 1,250 MW.<sup>15</sup> In addition, the Draft EIS/EIR discloses that the ESJ Wind Farms are planned to interconnect with the ECO Substation through the ESJ Gen-Tie.<sup>16</sup> This vague description does not provide the public or decision makers with any of the information necessary to assess the Projects’ impacts. There is no information regarding the location of the ESJ Wind Farms, the height of the turbines, the design of the wind farms and mitigation measures that have been imposed by the Mexican government.

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<sup>10</sup> See 40 C.F.R. §§ 1502.4, 1502.15; see also *Laguna Greenbelt v. U.S. Dept. of Transportation* (1994) 42 F.3d 517, 528-29 (reviewing plaintiff’s claim that inconsistent definition resulted in misleading analysis of project’s positive and negative effects).

<sup>11</sup> Bur. of Land Management, National Environmental Policy Act Handbook, Jan. 2008, p. 43 (hereafter NEPA Handbook); see *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 192-93.

<sup>12</sup> *County of Inyo v. City of Los Angeles*, *supra*, 71 Cal.App.3d at 193.

<sup>13</sup> *Natural Resources Defense Council v. U.S. Forest Service* (9th Cir. 2005) 421 F.3d 797, 811 (citing *Animal Defense Council v. Hodel* (9th Cir. 1988) 840 F.2d 1432, 1439).

<sup>14</sup> *County of Inyo v. City of Los Angeles*, *supra*, 71 Cal.App.3d at 193.

<sup>15</sup> Draft EIS/EIR, p. F-5.

<sup>16</sup> *Id.* at pp. A-13, B-9.

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A more complete description of the ESJ Wind Farms is contained in the Recirculated Draft EIR/Supplemental Draft EIS (“RDEIR/SDEIS”) for the Sunrise Powerlink Project, even though the ESJ Wind Farms project was in an early planning stage at the time of the October 2008 Sunrise Powerlink document.<sup>17</sup> The Sunrise document stated that the ESJ Wind Farms would be installed on 7,500 acres along the eastern side of the Sierra de Juarez Mountains.<sup>18</sup> In addition, Ricardo Moreno, the Director of International Public Relations of Sempra Energy Mexico, stated the wind project would use 2.5 MW turbines for its first phase.<sup>19</sup> Because the ESJ Wind Farms project was in an early stage, however, the size and location of subsequent phases of the project had not been determined, nor had the specific design of the first phase been established.<sup>20</sup>

Because the ESJ Wind Farms have undergone environmental review and approval by SEMARNAT, more information regarding subsequent phases and the specific design of the Wind Farms should be available and must be included in the Draft EIS/EIR. Without information regarding the size and location of subsequent phases, as well as the specific design of the Wind Farms, the environmental impacts to sensitive biological resources, hazards related to wildfires and socioeconomics in the United States cannot be meaningfully assessed.

**C. The BLM and CPUC must describe the ESJ Wind Farms so that the public and decision makers can meaningfully assess all of the Project’s impacts**

An EIS and EIR are intended to inform decision makers and the public about the potential, significant environmental impacts of a project before harm is done to the environment.<sup>21</sup> Under CEQA, an EIR has been described as “an environmental ‘alarm bell’ whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return.”<sup>22</sup>

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<sup>17</sup> Cal. Public Utilities Com. and Bur. of Land Management, Recirculated Draft EIR/Supplemental Draft EIS Sunrise Powerlink Project, Oct. 2008, p. 2-4 (hereafter Sunrise Powerlink RDEIR/SDEIS).

<sup>18</sup> *Ibid.*

<sup>19</sup> *Ibid.*

<sup>20</sup> *Id.* at p. 2-8.

<sup>21</sup> CEQA Guidelines, § 15002, subd. (a)(1); *Berkeley Keep Jets Over the Bay Com. v. Bd. of Port Comrs. of the City of Oakland* (2001) 91 Cal.App.4th 1344, 1354 (hereafter *Berkeley Jets*); *County of Inyo v. Yorty* (1973) 32 Cal.App.3d 795, 810; *Robertson v. Methow Valley Citizens Council* (1989) 490 U.S. 332, 350; *Dubois v. U.S. Dept. of Agriculture* (1996) 102 F.3d 1273, 1284.

<sup>22</sup> *County of Inyo v. Yorty, supra*, 32 Cal.App.3d 795 at p. 810.

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Similarly, under NEPA, an EIS serves as a means of assessing “the environmental impact of proposed agency actions, rather than justifying decisions already made.”<sup>23</sup> To fulfill these functions, the discussion of impacts in a Draft EIS/EIR must be detailed, complete and reflect “a good faith effort at full disclosure.”<sup>24</sup>

The BLM and CPUC must provide an accurate and complete description of the ESJ Wind Farms component of the Project and must disclose all impacts associated with the ESJ Wind Farms if the agencies are to meet their legal obligation to consider the whole of the action under review. As discussed below, development of the ESJ Wind Farms may have numerous significant effects on sensitive biological species, impacts associated with wildfire hazards and socioeconomics in the United States that have not been adequately addressed.

## **II. THE DRAFT EIS/EIR DOES NOT CONTAIN A HARD LOOK OR ADEQUATELY ANALYZE ALL POTENTIAL PROJECT IMPACTS AS REQUIRED BY NEPA AND CEQA AND PROPOSE APPROPRIATE AND FEASIBLE MITIGATION MEASURES**

A meaningful analysis and evaluation of all potentially significant environmental effects of a project is central to the purposes behind NEPA and CEQA. NEPA requires that agencies take a “hard look” at the environmental consequences of a proposed action.<sup>25</sup> A hard look is defined as a “reasoned analysis containing quantitative or detailed qualitative information.”<sup>26</sup>

An EIS must provide a full and fair discussion of every significant impact, as well as inform decision makers and the public of reasonable alternatives which would avoid or minimize adverse impacts.<sup>27</sup> It should be “concise, clear, to the point, and supported by evidence that the agency has made the necessary environmental analyses.”<sup>28</sup> A concise and clear EIS that is supported by evidence ensures that federal agencies are informed of environmental consequences *before* making decisions and that the information is available to the public.<sup>29</sup> As the

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<sup>23</sup> 40 C.F.R. 1502.2, subd. (g).

<sup>24</sup> CEQA Guidelines, § 15151; 40 C.F.R. 1502.1.

<sup>25</sup> *Robertson v. Methow Valley Citizens Council*, *supra*, 490 U.S. at 350; *Dubois v. U.S. Dept. of Agriculture*, *supra*, 102 F.3d at 1284;

<sup>26</sup> NEPA Handbook, p. 55.

<sup>27</sup> 40 C.F.R. § 1502.1.

<sup>28</sup> *Ibid.*

<sup>29</sup> *Inland Empire Public Lands Council v. U.S. Forest Service* (1996) 88 F.3d 754, 758.



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Council on Environmental Quality explains in its regulations, “[e]nvironmental impact statements shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made.”<sup>30</sup>

CEQA is also designed to inform decision makers and the public about the potential, significant environmental effects of a project.<sup>31</sup> To fulfill this function, the discussion of impacts in an EIR must be detailed, complete and “reflect a good faith effort at full disclosure.”<sup>32</sup> An adequate EIR must contain facts and analysis, not just an agency’s conclusions.<sup>33</sup> CEQA requires an EIR to disclose all potential direct and indirect, significant environmental impacts of a project.<sup>34</sup>

As discussed in detail below, the analysis presented by the Draft EIS/EIR fails to meet NEPA and CEQA legal standards. The Draft EIS/EIR fails to disclose and evaluate all potentially significant environmental impacts of the Project. Specifically, the Draft EIS/EIR fails to analyze the impacts the ESJ Wind Farms may have on sensitive biological resources, risks associated with wildfires and socioeconomics in the United States.

**A. The Project may have significant impacts on sensitive biological resources in the United States**

**1. The Project may have significant impacts to California condors in the United States**

The California condor is both a federal and State-listed endangered species, a California fully-protected species and is protected under the Migratory Bird Treaty Act.<sup>35</sup> Prohibitions under the Migratory Bird Treaty Act apply to birds in Mexico under international conventions between the United States and Mexico. The BLM and CPUC have failed to assess the Project’s impacts to this highly-protected species and ensure compliance with the Endangered Species Act, the California Endangered Species Act and the Migratory Bird Treaty Act.

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<sup>30</sup> 40 C.F.R. § 1502.2, subd. (g).

<sup>31</sup> CEQA Guidelines, § 15002, subd. (a)(1).

<sup>32</sup> CEQA Guidelines, § 15151; *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 721-22.

<sup>33</sup> *Citizens of Goleta Valley v. Bd. of Supervisors* (1990) 52 Cal.3d 553, 568.

<sup>34</sup> Pub. Resources Code, § 21100, subd. (b)(1); CEQA Guidelines, § 15126.2, subd. (a).

<sup>35</sup> See Draft EIS/EIR, p. D.2-51.

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Development of the Project may impact California condors migrating to the United States from Baja California, Mexico. The Zoological Society of San Diego released a satellite map indicating the location fixes of a three-year-old female condor that was tracked moving north from the Baja release site across the United States/Mexico border.<sup>36</sup> The female condor was tracked in the area around La Rumorosa where the ESJ Wind Farms would be located, and entered the United States near the site of the ESJ Gen-Tie. This was the first record of a condor entering the United States from Baja California, and the first wild condor seen in San Diego County since 1910.<sup>37</sup>

Historically, California condors were found from British Columbia in the north to Baja California in the south.<sup>38</sup> As of March 31, 2010, there were only 169 California condors recorded in the wild.<sup>39</sup> If the population of California condors increases – as is the hope – the species could forage over the site during the lifetime of the ESJ Wind Farms. Operation of the ESJ Wind Farms and the ESJ Gen-Tie, however, may impede California condor viability.

Studies have shown that California condors may be vulnerable to turbine strikes.<sup>40</sup> California condors exhibit behavior and physical features that may put them at high risk for wind turbine-related mortality. For example, condors' flapping flight is very clumsy making them less maneuverable around objects on the landscape.<sup>41</sup> In addition, because California condors are scavengers, they exhibit pronounced curiosity for novel objects in their environment and may, therefore, be attracted to wind turbines.<sup>42</sup> The San Diego Audubon Society has stated that "there is a concern that these wind and transmission line projects would kill condors that are and will be re-colonizing the area."<sup>43</sup>

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<sup>36</sup> The Zoological Society of San Diego, 2008 (Attachment A).

<sup>37</sup> Draft EIS/DIER, p. D.2-52.

<sup>38</sup> H.T. Harvey and Associates, Presence and Movement of California Condors Near Proposed Wind Turbines, Ventana Wildlife Society, Nov. 15, 2007, p. 4 (hereafter HT Harvey and Associates, 2007) (Attachment B).

<sup>39</sup> Draft EIS/DEIR, p. D.2-52.

<sup>40</sup> HT Harvey and Associates, p. 5.

<sup>41</sup> *Ibid.*

<sup>42</sup> *Id.* at pp. 5-6.

<sup>43</sup> Letter from Shannon Dougherty, Conservation Chair, San Diego Audubon Society, to Dr. Jerry Pell, NEPA Document Manager, Office of Electricity Delivery and Energy Reliability, p. 2 (Attachment C).

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Despite the sensitivity of the species and its recorded occurrence over the sites of the ESJ Wind Farms and ESJ Gen-Tie, the Draft EIS/EIR does not contain any analysis of the Project's potential impacts, nor does it propose any specific mitigation measures for the species. In addition, there is no indication that the Mexican government has proposed any measures to avoid or mitigate impacts to California condors.

The CPUC and BLM must describe the location and design of the ESJ Wind Farms so that impacts to California condors may be disclosed and assessed by the public and decision makers. If SEMARNAT has imposed any mitigation measures during its approval process, this must also be disclosed in the Draft EIS/EIR. Currently, there is no information in the record to ensure that impacts from the Project to California condors will not be significant, or that the CPUC and BLM's approval of the Draft EIS/EIR for the ESJ Gen-Tie will comply with federal and State law. The BLM and CPUC must take a hard look at the ESJ Wind Farms' impacts to the California condor in a Revised Draft EIS/EIR.

## **2. The Project may have significant impacts to Peninsular bighorn sheep in the United States**

As the Draft EIS/EIR recognizes, Peninsular bighorn sheep are a federally-endangered and California State-threatened and fully-protected species.<sup>44</sup> The BLM and CPUC's failure to describe ESJ Wind Farms in the Draft EIS/EIR has led to a failure to assess the overall Project's impacts to Peninsular bighorn sheep moving between Baja California, Mexico and the United States.

According to the United States Fish & Wildlife Service and California Department of Fish and Game ("CDFG"), Peninsular bighorn sheep are known to occur in the Sierra de Juarez mountains where the ESJ Wind Farms would be located.<sup>45</sup> San Diego County has also stated that while the U.S. Border Fence is normally a barrier for wildlife movement, a portion of the Project parcels are located in the mountainous terrain where the border fence is not present. Thus, according to the County, this area "could be considered a wildlife corridor for Peninsular

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<sup>44</sup> Draft EIS/DEIR, p. D.2-56.

<sup>45</sup> Letter from Karen Goebel, Assistant Field Supervisor, U.S. Fish and Wildlife Service and Helen R. Birss, Environmental Program Manager, Cal. Dept. of Fish and Game, to Billie Blanchard, Cal. Public Utilities Com. and Lynda Kastoll, Bur. of Land Management, Aug. 25, 2008, Enclosure (Attachment D).

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Bighorn Sheep movement between the United States and Mexico.”<sup>46</sup> The Draft EIS/EIR itself acknowledges that Peninsular bighorn sheep migrate across the border to breed with other populations.<sup>47</sup>

Despite the clear evidence that Peninsular bighorn sheep may move from areas affected by the Project to the United States and the Draft EIS/EIR’s own recognition of that fact, the document fails to analyze all potential impacts on bighorn sheep, or propose any alternatives or measures that would mitigate such impacts. The Draft EIS/EIR must indicate what conditions SEMARNAT has imposed to reduce impacts to bighorn sheep from the ESJ Wind Farms component. Potential mitigation measures could include limiting construction activities outside of the lambing season and period of greatest water need.<sup>48</sup> The Draft EIS/EIR must also describe fencing on the ESJ Wind Farms site that could funnel or impede Peninsular bighorn sheep movement.

### **3. The Project may have significant impacts to Barefoot banded geckos in the United States**

The Barefoot banded gecko is a California-threatened species, as well as a BLM designated sensitive species.<sup>49</sup> This species is secretive and is not easily detected; however, it is known from the eastern edge of the Peninsular Ranges from Palms to Pines Highway State Route 74 to the Baja California, Mexico border.<sup>50</sup> While the Draft EIS/EIR states that the Barefoot banded gecko has low potential to occur on the ESJ Gen-Tie site, the species may occur on the ESJ Wind Farms site and migrate to the United States. For example, the Sunrise Powerlink Project RDEIR/SDEIS assumes that the Barefoot banded gecko is present on the ESJ Wind Farms site.<sup>51</sup>

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<sup>46</sup> Letter from Eric Gibson, Director, Dept. of Planning and Land Use, San Diego County, to Dr. Jerry Pell, Office of Electricity Deliverability and Energy Reliability, U.S. Dept. of Energy, Nov. 24, 2010, Attachment A, p. 3 (Attachment E); see also photographs of Bighorn sheep crossing rocky terrain in Attachment F.

<sup>47</sup> Draft EIS/EIR, p. D.2-59.

<sup>48</sup> See Sunrise Powerlink RDEIR/DEIS, Response to Comment Set F0006, F0006-2.

<sup>49</sup> See Draft EIS/EIR, p. D.2-40; Bur. of Land Management, Special Status Animals in Cal., Including BLM Designated Special Status Species <<http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pa/wildlife.Par.13499.File.dat/BLM%20Sensitive%20Animal%20Update%20SEP2006.pdf>> (as of Mar. 3, 2011).

<sup>50</sup> Draft EIS/EIR, pp. D.2-40, D.2-148.

<sup>51</sup> Sunrise Powerlink Project, RDEIR/SDEIS, p. 2-30.

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If Barefoot banded gecko are indeed present on the ESJ Wind Farms site, they could cross the border in the mountainous terrain that is not occupied by the border fence and move into the United States. The Draft EIS/EIR must, therefore, evaluate whether Project conditions on the ESJ Wind Farms site will impact the Barefoot banded gecko and impede cross-border movement. This evaluation may only be conducted, however, once a full description of the ESJ Wind Farms has been provided.

#### **4. The Project may have significant impacts to Golden eagles in the United States**

The Golden eagle is a State fully-protected species, a CDFG-listed sensitive species and on the CDFG watch list, and protected under the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act and the Lacey Act.<sup>52</sup> Sempra Energy contracted San Diego Zoo Conservation Research to conduct a full-scale survey and analysis of Golden eagle population characteristics, habitat use and movement behaviors throughout the planned ESJ Wind Farms site.<sup>53</sup> Researchers from San Diego Zoo Conservation Research surveyed the area for three days via helicopter.<sup>54</sup> During the survey four nests were observed along with several Golden eagles.<sup>55</sup>

Because Golden eagles and nests were observed on the ESJ Wind Farms site, development of the ESJ Wind Farm may significantly impact Golden eagles in Mexico, as well as Golden eagles that may forage over land in the United States. As the Draft EIS/EIR recognizes, it is unlikely that Golden eagles would nest within the immediate vicinity of wind turbines.<sup>56</sup> Construction of the ESJ Wind Farms could, therefore, lead to nest abandonment.

Construction of the wind turbines may also lead to direct mortality of Golden eagles. The propensity of Golden eagles to seek out strong winds to gain elevation without expending much flying effort can bring the birds into proximity with wind

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<sup>52</sup> See Draft EIS/EIR, p. D.2-149.

<sup>53</sup> James Sheppard, *Golden Eagle Helicopter Survey* (Mar. 23, 2009) <<http://blogarchives.sandiegozoo.org/blog/2009/03/23/golden-eagle-helicopter-survey/>> (as of Mar. 3, 2011) (hereafter Sheppard, 2009).

<sup>54</sup> *Ibid.*

<sup>55</sup> *Ibid.*

<sup>56</sup> Draft EIS/EIR, p. D.2-175.

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turbines.<sup>57</sup> Finally, because Golden eagles can range hundreds of miles while foraging for their food, nest abandonment and mortality caused by development of the ESJ Wind Farms, could impact Golden eagles that normally forage over the United States.<sup>58</sup>

It is unclear whether Sempra has released the findings of the Golden Eagle Helicopter Survey to the public and decision makers. A search of documents on the DOE, CPUC and Sempra Web sites did not reveal the Survey. It is also unclear whether SEMARNAT has imposed any conditions on the Applicant to reduce impacts to Golden eagles. This information must be provided in a Revised Draft EIS/EIR that is released to the public. The current Draft EIS/EIR prepared by BLM and the CPUC fails to adequately analyze the potential impacts to this species of the ESJ Wind Farms and the ESJ Gen-Tie.

#### **5. The Project may have significant impacts to the Quino checkerspot butterfly in the United States**

The Quino checkerspot butterfly is a federally-listed endangered species.<sup>59</sup> Although it is unclear whether focused, protocol-level surveys for this species were conducted on the ESJ Wind Farms site, the Sunrise Powerlink RDEIR/SDEIS concluded that Quino checkerspot butterfly may occur on the site.<sup>60</sup> In comments on the Sunrise Powerlink, the Center for Biological Diversity and the Sierra Club stated that the Quino checkerspot butterfly population in the United States is linked to the population in Mexico and may depend on it for its health.<sup>61</sup> Thus, impacts to Quino checkerspot butterfly populations in Mexico may indirectly impact populations in the United States. The Draft EIS/EIR must describe the ESJ Wind Farms and assess the likelihood that Quino checkerspot butterfly may occur on the site so that the public and decision makers can assess the impacts.

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<sup>57</sup> Sheppard, 2009.

<sup>58</sup> See *ibid.*

<sup>59</sup> Draft EIS/EIR, p. D.2-39.

<sup>60</sup> Sunrise Powerlink RDEIR/DEIS, p. 2-15.

<sup>61</sup> Letter from Steven Siegel, Staff Attorney, Center for Biological Diversity and Justin Augustine, Staff Attorney, Center for Biological Diversity, to CPUC/BLM re Recirculated draft environmental impact report/supplemental draft environmental impact statement for the Sunrise powerlink transmission project, Aug. 25, 2008, p. 4-810.

**6. The Project may have significant impacts on the goals of  
*Las Californias Binational Reserve Conservation  
Initiative***

The Nature Conservancy, the Conservation of Biology Institute and Pronatura prepared *Las Californias Binational Conservation Initiative* in 2004 to foster a shared conservation vision for the United States/Mexico border.<sup>62</sup> The border region is home to more than 400 endangered, threatened and sensitive species.<sup>63</sup> This sensitive area is being rapidly destroyed, however, by urbanization of the San Diego, Tijuana and Tecate regions and their adjacent suburbs.<sup>64</sup>

The *Initiative* and the importance of the area to biodiversity are not mentioned in the Draft EIS/EIR. Unchecked development of the Project may undermine the goals of *Las Californias Binational Conservation Initiative* and destroy biological resources in both the United States and Mexico. The BLM and CPUC must include a complete description of the Project and take a hard look at its potential impacts so that a complete picture of the Project's impacts to biodiversity can be understood.

**B. The Project may have potentially significant impacts to the  
United States associated with wildfire hazards**

The Draft EIS/EIR recognizes that wildfires caused by the wind turbines in Mexico could have significant impacts on resources in the United States.<sup>65</sup> It fails to describe, however, the location of the wind turbines and measures that will be taken to reduce potential fire risks from the turbines. The lack of information contained in the Draft EIS/EIR undermines a meaningful analysis of the Wind Farms' impacts.

There is a high risk of fire from wind turbine power generation. The Confederation of Fire Protection Associations ("CFPA") in Europe developed Guidelines to protect against wind turbine fires. In the Guidelines, CFPA states

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<sup>62</sup> See Pronatura, Conservation Biology Institute and the Nature Conservancy, *Las Californias Binational Conservation Initiative: A Vision for Habitat Conservation in the Border Region of California and Baja California*, Sept. 2004 (hereafter *Las Californias Binational Conservation Initiative*).

<sup>63</sup> *Id.* at p. 1.

<sup>64</sup> *Id.* at p. 3.

<sup>65</sup> Draft EIS/EIR, p. A-4.

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that fire damage may be caused by machinery breakdowns, electrical installations and resonant circuits.<sup>66</sup> The most frequent causes of wind turbine fires, however, are lightening strikes.<sup>67</sup> The risk of lightning strikes is elevated due to the exposed locations (often at a higher altitude) and the large height of the turbines.<sup>68</sup> If a turbine is struck by lightning it may cause damage to the turbine itself, secondary fires on the ground where the turbine is located and service interruption exposure.<sup>69</sup>

The ESJ Wind Farms would also be located in an area of high wildfire risk. In Mexico, wildfires can spread rapidly to the west and south, all the way to the Mexican coastal communities.<sup>70</sup> Despite the high risk of fire associated with the turbines themselves and due to the location of the ESJ Wind Farms, the Draft EIS/EIR only considers the impacts to Mexico from ignition caused by the Tule Wind turbines.<sup>71</sup> The Draft EIS/EIR does not assess whether ignition caused by the ESJ Wind Farms or other Project components could include loss of personal property, injury, or loss of life as well as environmental impacts in the United States.

The Draft EIS/EIR must describe the location of the turbines, any fire safety measures that have been imposed by SEMARNAT and any emergency response plans that are in place to avoid catastrophic wildfires. Without this information the BLM and CPUC cannot adequately analyze all impacts of the ESJ Wind Farms to the United States.

**C. Transmitting energy from the ESJ Wind Farms through the ESJ Gen-Tie may have potentially significant socioeconomic impacts to the United States**

The Draft EIS/EIR fails to address the socioeconomic impacts of developing large-scale renewable energy projects in Mexico rather than in the United States. The Draft EIS/EIR also fails to address the related socioeconomic effects caused by the ESJ Gen-Tie and East County Substation's facilitation of future renewable energy projects in Mexico, as opposed to development of this important burgeoning

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<sup>66</sup> CFPA Europe, European Guideline, Wind turbines fire protection guideline, Guideline No. 22:2010F, Apr. 19, 2010, pp. 7-9 (hereafter Wind Turbine Fire Guidelines) (Attachment G).

<sup>67</sup> *Id.* at p. 10.

<sup>68</sup> *Ibid.*

<sup>69</sup> *Id.* at pp. 6-7.

<sup>70</sup> Draft EIS/EIR, p. D.15-24.

<sup>71</sup> *Id.* at pp. D.15-24 to 25.



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industry in Southern California. The BLM and CPUC must revise the socioeconomic impact analysis in a Draft EIR/EIS that is recirculated to the public.

Under CEQA, an EIR must identify and focus on the significant environmental impacts of a project. Specifically, the “[d]irect and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects.”<sup>72</sup> Both direct and “reasonably foreseeable” indirect consequences must be considered when determining the significance of a project’s environmental effect.<sup>73</sup> When the economic or social effects of a project cause a physical change, this change is to be regarded as a significant effect in the same manner as any other physical change resulting from the project.<sup>74</sup>

NEPA’s requirement for analyzing socioeconomic impacts is similar to CEQA’s. Under NEPA, the federal agency preparing an EIS must analyze social and economic impacts if they are interrelated with physical impacts.<sup>75</sup> Federal agencies have the additional responsibility to analyze a project’s effects with respect to environmental justice.<sup>76</sup> Further, a Presidential Permit required for transmission must be “consistent with the public interest.”<sup>77</sup> Thus, federal agencies have a heightened duty to consider the socioeconomic impacts that would be caused by a proposed project.

Renewable energy development in Mexico may supplant renewable energy development in the United States. Because renewable energy jobs are critical to the health of San Diego and Imperial Counties’ economies, facilitating renewable energy development in northern Mexico may cause adverse physical changes to the environment in the United States, such as urban decay and blight. Because urban

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<sup>72</sup> CEQA Guidelines, § 15126.2, subd. (a).

<sup>73</sup> CEQA Guidelines, § 15064, subd. (d).

<sup>74</sup> CEQA Guidelines, § 15064, subd. (e); *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1205.

<sup>75</sup> See 40 C.F.R. § 1508.14; see also, e.g., *Rochester v. U.S. Postal Service* (1976) 541 F.2d 967 (placing postal service center outside urban core could cause increased commuting, loss of inner-city jobs and moving to suburbs, leading to economic and physical downtown deterioration and downtown post office abandonment, all contributing to urban decay and blight).

<sup>76</sup> See Exec. Order No. 12898, 59 Fed. Reg. 7629 (Feb. 16, 1994); see also Dept. of Justice, *Guidance Concerning Environmental Justice* <<http://www.justice.gov/archive/enrd/ejguide.html>> (as of Mar. 3, 2011).

<sup>77</sup> Exec. Order No. 10485, § 1, 18 Fed. Reg. 5397 (Sept. 3, 1953) (as amended by Exec. Order No. 12114, 44 Fed. Reg. 1957 (Jan. 4, 1979)).

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decay is a potentially significant physical change to the environment, the CPUC and BLM must analyze the socioeconomic impacts and propose any necessary mitigation measures.

### **1. Renewable energy development in northern Mexico may supplant development in California**

Both the federal government and California have adopted policies, provided incentives and established goals to increase renewable energy development in the United States. One of the purposes behind the push for renewable energy generation in the United States is to foster economic growth and create employment opportunities in the United States. Federally, renewable energy generation is facilitated through federal tax credits and the American Recovery and Reinvestment Act.

In California, the Renewables Portfolio Standard (“RPS”) sets some of the most ambitious renewable energy standards in the country. The RPS program, administered by the CPUC, the California Energy Commission and Air Resources Board, requires investor-owned utilities, electric service providers, publicly owned utilities and community choice aggregators to increase procurement from eligible renewable energy resources. In 2002, the Legislature established the original goal of 20% RPS by 2020 and in 2006 accelerated that goal. Since then, Governor Schwarzenegger increased that goal by Executive Order to 33% RPS by 2020. If enacted, pending legislation would codify the 33% RPS standard.<sup>78</sup>

Despite the federal incentives and State mandates, facilitating renewable energy development in Mexico may supplant renewable energy development in the United States. First, on average, renewable energy is significantly more expensive to generate than energy derived from conventional fossil-fuel production.<sup>79</sup> Utilities, therefore, only procure the renewable energy capacity they are required to by law. In California, the RPS allows utilities to pass the increased costs of

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<sup>78</sup> See Sen. Bill No. x1 2, as introduced Feb. 1, 2011 <[http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb\\_0001-0050/sbx1\\_2\\_bill\\_20110201\\_introduced.html](http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sbx1_2_bill_20110201_introduced.html)> (as of Mar. 3, 2011); see also Sen. Bill No. 23, as introduced Dec. 6, 2010 <[http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb\\_0001-0050/sb\\_23\\_bill\\_20101206\\_introduced.pdf](http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sb_23_bill_20101206_introduced.pdf)> (as of March 3, 2011).

<sup>79</sup> See Div. of Ratepayer Advocates, *Green Rush: Investor-Owned Utilities’ Compliance with the Renewables Portfolio Standard* (Feb. 2011), p. 7 <<http://www.dra.ca.gov/NR/rdonlyres/0CB0B986-E93B-462A-BA62-804EDAE43B82/0/DRAReportPUBLICVERSIONFeb2011.pdf>> (as of March 3, 2011).

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renewable energy along to retail consumers. Retailers do not have an incentive to procure renewable energy beyond the amount required to fulfill their RPS target. In this zero-sum game, the more renewable energy projects in Mexico deliver electricity to satisfy California's RPS, the less demand there will be for renewable energy development in California.

Further, transmission capacity in Southern California and in the Project area is limited, even with the recently approved Sunrise Powerlink. Thus, if more renewable and conventional energy projects built in Mexico use transmission in the United States, there will be less available transmission capacity for renewable energy development in the United States. The loss of domestic jobs to Mexico will adversely affect the regional economy in Imperial County and San Diego County.

## **2. Renewable energy jobs are critical to the future health of San Diego County and especially Imperial County**

As of December 2010, El Centro had the highest unemployment rate among American cities, at 28.3%.<sup>80</sup> Unemployment rates for Imperial County as a whole are similarly well above State and national averages.

Renewable energy development presents one of the few areas of opportunity for economic development in Imperial County. The CPUC has recognized the tremendous potential for renewable energy projects in Imperial County and has adopted multiple orders intended to facilitate that development.<sup>81</sup>

Developing renewable energy projects in Imperial County has great potential to address the demand for renewable energy created by the RPS goals.<sup>82</sup> The ESJ Wind Farms in Mexico and approval of the ESJ Gen-Tie threaten this development by facilitating renewable energy projects in Mexico, where less stringent and

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<sup>80</sup> See U.S. Bur. of Labor Statistics *Unemployment Rates for Metropolitan Areas* (Dec. 7, 2010) <<http://www.bls.gov/web/metro/laummtrk.htm>> (as of Mar. 3, 2011).

<sup>81</sup> See, e.g., Cal. Public Utilities Com., In the Matter of the Application of San Diego Gas & Electric Company (U 902 E) for a Certificate of Public Convenience and Necessity for the Sunrise Powerlink Transmission Project. Decision 08-12-058, pp. 63-68; see also Cal. Public Utilities Com., Decision Conditionally Accepting Procurement Plans for 2009 Renewables Portfolio Standard Solicitations and Integrated Resource Plan Supplements, Decision 09-06-018, §§ 4.1-4.2, 6.3.

<sup>82</sup> See Summit Blue Consulting, LLC, *Renewable Energy Feasibility Study* (Apr. 2008), pp. 14, 19-20, 22, 25 <[http://www.ivedc.com/CMS/Media/IIDRenewableEnergyStudy\\_08.pdf](http://www.ivedc.com/CMS/Media/IIDRenewableEnergyStudy_08.pdf)> (as of March 3, 2011).

protective environmental and labor standards may attract developers seeking to minimize costs.

**3. These adverse economic effects will result in blight and other physical changes in the environment**

Developing the ESJ Wind Farms and approving the ESJ Gen-Tie may well lead to a downward economic spiral in the United States. Investment in a region rich in solar and wind resources can be expected to continue as long as there is an expectation that renewable energy projects will continue to be proposed in the area. In addition, renewable energy development would indirectly stimulate local economies through the “economic multiplier effect.”<sup>83</sup>

If the ESJ Gen-Tie is approved and renewable energy development emerges in northern Mexico instead, market expectations will shift and investment may drop off sharply. With prolonged and potentially deepening economic conditions, city and county governments would receive less tax revenue with which to fund infrastructure maintenance and improvements and government services. Further, property values would continue to fall, among other economic impacts. These impacts would result in physical impacts, such as deteriorating roads, vacant neighborhoods and urban decay. The Draft EIR/EIS is required to consider these indirect physical changes that would result from the Project.

**D. The BLM and CPUC must develop and impose appropriate and feasible mitigation measures to reduce or avoid the Project’s impacts**

Both NEPA and CEQA require that lead agencies address all potentially significant impacts through the enforceability of alternatives and mitigation measures that will avoid or minimize such impacts. An EIS must provide a full and fair discussion of every significant impact, as well as inform decision makers and the public of reasonable alternatives which would avoid or minimize adverse impacts.<sup>84</sup> Under CEQA, an EIR must not only discuss measures to avoid or minimize adverse impacts, but must ensure that mitigation conditions are fully enforceable through permit conditions, agreements or other legally binding

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<sup>83</sup> *See id.* at pp. 26, 91.

<sup>84</sup> 40 C.F.R. § 1502.1.

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instruments.<sup>85</sup> A CEQA lead agency is precluded from making the required CEQA findings unless the record shows that all uncertainties regarding the mitigation of impacts have been resolved; an agency may not rely on mitigation measures of uncertain efficacy or feasibility.<sup>86</sup> This approach helps “insure the integrity of the process of decision by precluding stubborn problems or serious criticism from being swept under the rug.”<sup>87</sup>

As discussed above, the failure of the BLM and CPUC to describe the ESJ Wind Farms in the Draft EIS/EIR precluded a meaningful analysis of all of the Project’s impacts. The BLM and CPUC failed to take a hard look and appropriately analyze all of the Project’s impacts to biological resources, hazards associated with wildfires and socioeconomics in the United States. The Project’s impacts to the United States may be significant.

The BLM and CPUC must, therefore, identify all potentially significant impacts of the Project and impose measures to reduce or avoid the Project’s impacts to resources in the United States.

### **III. SAN DIEGO COUNTY AND THE DEPARTMENT OF ENERGY MUST RELY ON A JOINT ENVIRONMENTAL REVIEW DOCUMENT THAT SATISFIES THE REQUIREMENTS OF BOTH NEPA AND CEQA TO SUPPORT THEIR APPROVALS OF THE ESJ GEN-TIE PROJECT**

Under NEPA, if a project requires state approval, the federal agency must cooperate with state and local agencies “to the fullest extent possible to reduce duplication between NEPA and state and local requirements.”<sup>88</sup> This includes the preparation of a joint federal and state environmental review document so that one document will comply with all applicable laws.<sup>89</sup> Similarly, under CEQA, State and local agencies are encouraged to use a federal EIS, if the previously prepared EIS complies with CEQA.<sup>90</sup>

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<sup>85</sup> CEQA Guidelines, § 15126.4, subd. (a)(2).

<sup>86</sup> *Kings County Farm Bur. v. County of Hanford* (1990) 221 Cal.App.3d 692, 727-28 (groundwater purchase agreement found to be inadequate mitigation because there was no record evidence that replacement water was available.)

<sup>87</sup> *Concerned Citizens of Costa Mesa, Inc. v. 32nd Dist. Agricultural Assn.* (1986) 42 Cal.3d 929, 935.

<sup>88</sup> 40 C.F.R. § 1506.2, subd. (b).

<sup>89</sup> 40 C.F.R. § 1506.2, subd. (c).

<sup>90</sup> CEQA Guidelines, § 15221, subd. (a).

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The CPUC and San Diego County must ensure that DOE's Draft EIS incorporates CEQA's requirements so that one document will comply with all applicable laws. Preparation of a single Draft EIS/EIR is essential because the alternatives and mitigation measures proposed by the DOE's Draft EIS and BLM/CPUC's Draft EIS/EIR are inconsistent and in conflict. The inconsistencies between the two documents undermine the public review process because it is not apparent how the differences between the two documents will be reconciled. The CPUC/San Diego County and DOE may select for approval two conflicting alternatives or impose conflicting mitigation measures.

**1. The alternatives for the ESJ Gen-Tie proposed by the BLM and CPUC in the Draft EIS/EIR are inconsistent and contrary to the alternatives proposed by the DOE in its Draft EIS**

The BLM/CPUC and the DOE have proposed inconsistent and contrary alternatives to the proposed ESJ Gen-Tie. Under NEPA, the alternatives analysis is considered the "heart" of the EIS.<sup>91</sup> CEQA also requires that an EIR provide a discussion of project alternatives that allow meaningful analysis and informed public participation.<sup>92</sup> Evaluation of alternatives should present the proposed action and all the alternatives in comparative form, clearly define the issues and provide a clear basis for choice among the options.

Because the alternatives analyses at issue here are inconsistent, the public cannot meaningfully evaluate the various alternatives or understand the basis of the agencies' choices. San Diego County must work with the DOE to revise the proposed alternatives so that agency decision making is based on a single, consistent document. The County may not support its Major Use Permit for the ESJ Gen-Tie based on an analysis that is in conflict with DOE's review.

DOE only considered two action alternatives in its Draft EIS: a double-circuit 230-kV transmission line and a single-circuit 500-kV transmission line.<sup>93</sup> It dismissed an alternative transmission route from further analysis because the proposed location of the ECO Substation would make the distance of the route

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<sup>91</sup> 40 C.F.R. § 1502.14.

<sup>92</sup> *Laurel Heights Improvement Assn. v. Regents of Univ. of California* (1988) 47 Cal.3d 376, 403-04.

<sup>93</sup> U.S. Dept. of Energy, Energia Sierra Juarez U.S. Transmission Line Project, Draft Environmental Impact Statement, Aug. 2010, p. S-4 to S-6 (hereafter DOE DEIS).

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infeasible and impractical.<sup>94</sup> It also dismissed an underground transmission line alternative based on its determination that an underground failure can be more difficult to locate and repair, construction of an underground alternative would require greater ground disturbance and be more expensive and EMF exposure may be greater.<sup>95</sup> The 230-kV transmission line was identified as the preferred alternative.

The Draft EIS/EIR prepared by the BLM and CPUC proposed four alternatives, two of which included an underground transmission line and two of which included an overhead alternate route.<sup>96</sup> The overhead alternate route alternative was designated as the “environmentally superior alternative.”<sup>97</sup> The BLM-Preferred Alternative, however, was an underground alternate route alternative.<sup>98</sup>

The Draft EIS/EIR’s alternatives are alternatives that were expressly dismissed from further consideration by the DOE. In addition, each agency – San Diego County, the BLM and the DOE -- selected a potentially conflicting alternative. For example, it is possible that San Diego County could select a 500-kV overhead alternate alignment, the BLM could select a 500-kV underground alignment and the DOE could select a 230-kV overhead line. Because the DOE released the Draft EIS months before the BLM and CPUC released the Draft EIS/EIR, the agencies should have been on notice that these alternatives were considered infeasible by the DOE. Nowhere in the Draft EIS/EIR, however, is the inconsistency between the two alternatives analyses explained.

It is impossible for the public to assess whether the alternatives to the ESJ Gen-Tie proposed in the Draft EIS/EIR are actually feasible. It is also impossible for the public to understand the basis behind San Diego County, the BLM and the DOE’s choice of a preferred alternative. Because an adequate alternatives analysis is so critical to both a NEPA and CEQA analysis, the DOE and San Diego County must coordinate to produce a single alternatives analysis that will allow the public and decision makers to meaningfully evaluate alternatives to the proposed action.

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<sup>94</sup> *Id.* at p. S-11.

<sup>95</sup> *Id.* at pp. S-11 to 12.

<sup>96</sup> Draft EIS/EIR, p. C-26 to 27.

<sup>97</sup> *Id.* at pp. E-30, E-32.

<sup>98</sup> *Id.* at p. E-34.

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**2. The Mitigation Measures proposed by the BLM and CPUC in the Draft EIS/EIR are inconsistent and in conflict with the Mitigation Measures proposed by the DOE in its Draft EIS**

The BLM/CPUC and the DOE have proposed inconsistent and contrary mitigation measures in their environmental documents. Under NEPA, a Draft EIS must include a discussion of the “means to mitigate adverse environmental impacts.”<sup>99</sup> Mitigation measures must be discussed for all impacts, even those that by themselves would not be considered significant.<sup>100</sup> While NEPA does not require agencies to actually adopt these mitigation measures, CEQA does mandate that agencies adopt feasible mitigation measures to lessen or avoid otherwise significant adverse impacts.<sup>101</sup>

The mitigation measures discussed by the BLM and CPUC in the Draft EIS/EIR are inconsistent with the mitigation measures discussed by the DOE in its Draft EIS. As a result of the inconsistencies, it is impossible for the public to conclude which mitigation measure will be adopted for the ESJ Gen-Tie. San Diego County must work with the DOE to revise the proposed mitigation measures so that the agencies rely on a single, consistent document to support their actions. The possibility that the DOE and the County may both rely on inconsistent measures to mitigate the Project’s impacts creates a question about the enforceability of the measures. Under CEQA, a California agency may not rely on mitigation measures of questionable enforceability.

For example, while both the Draft EIS prepared by the DOE and the Draft EIS/EIR prepared by the BLM and CPUC propose acquisition of compensation land, the requirements for compensation land differs. The DOE states that to compensate for the loss of native scrub habitat that would be disturbed during construction, the Applicant would place a portion of the Project site under a conservation easement for preservation. According to the Draft EIS, the Applicant has proposed placing the easement on a portion of its property east of the

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<sup>99</sup> 40 C.F.R. § 1502.16, subd. (h).

<sup>100</sup> Council on Environmental Quality, Forty Most Asked Questions Concerning CEQ’s National Environmental Policy Act Regulations, Question 19(a).

<sup>101</sup> Pub. Resources Code, §§ 21002, 21081, subd. (a); CEQA Guidelines, §§ 15002, subd. (a)(3), 15021, subd. (a)(2), 15091, subd. (a)(1).



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transmission line that could be up to 15 acres in size.<sup>102</sup> The BLM and CPUC, however, state that to compensate for all permanent impacts to vegetation, combination habitat and restoration is required at a minimum of a 1:1 ratio or as required by the permitting agencies. The Draft EIS/EIR also requires that all habitat compensation and restoration on private lands include long-term management and legal protection assurances.<sup>103</sup>

From these two mitigation measures, it is clear that the Applicant must compensate for permanent impacts to native vegetation. It is not clear, however, whether the Applicant must compensate for impacts that only occur during construction or all permanent impacts, or where and how much land would be put into easement. There is also no provision in the Draft EIS prepared by the DOE that the compensation land will have long-term management and legal protection assurances.

Because CEQA requires agencies to rely on specific enforceable mitigation measures in their environmental review documents, San Diego County may not rely on these inconsistent mitigation measures to support its Major Use Permit. The Applicant and the public cannot know how much land must be compensated for if DOE only requires compensation land for construction impacts, but the BLM and CPUC require compensation land for all impacts. In addition, the Applicant cannot know whether to compensate land up to 15 acres or at a ratio of 1:1. If the Applicant's duties to mitigate are unclear, the public and the decision makers cannot meaningfully assess whether impacts to native vegetation have indeed been mitigated.

San Diego and the DOE must work together to produce a single document that properly lays out mitigation measures to reduce and avoid the impacts associated with the ESJ Gen-Tie.

#### **IV. CONCLUSION**

The BLM and CPUC have failed to produce an environmental review document that complies with NEPA and CEQA. The Draft EIS/EIR undermines public disclosure and informed decision making by failing to provide an accurate and complete description of the Project. The EIS/EIR also failed to take a hard look

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<sup>102</sup> DOE DEIS, p. S-20.

<sup>103</sup> Draft EIS/EIR, pp. D.2-129 to 130.

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or adequately analyze all of the Project's potential impacts to the United States and impose all feasible and appropriate mitigation measures. In addition, the inconsistencies between the Draft EIS/EIR prepared by the BLM and CPUC and the Draft EIS prepared by the DOE preclude a meaningful analysis. A revised Draft EIS/EIR must be prepared to correct these deficiencies and recirculated for public comment.

Local 569 and its members appreciate this opportunity to comment and appreciate the BLM and the CPUC considering our views.

Sincerely,



Robyn C. Purchia

RCP:cnh

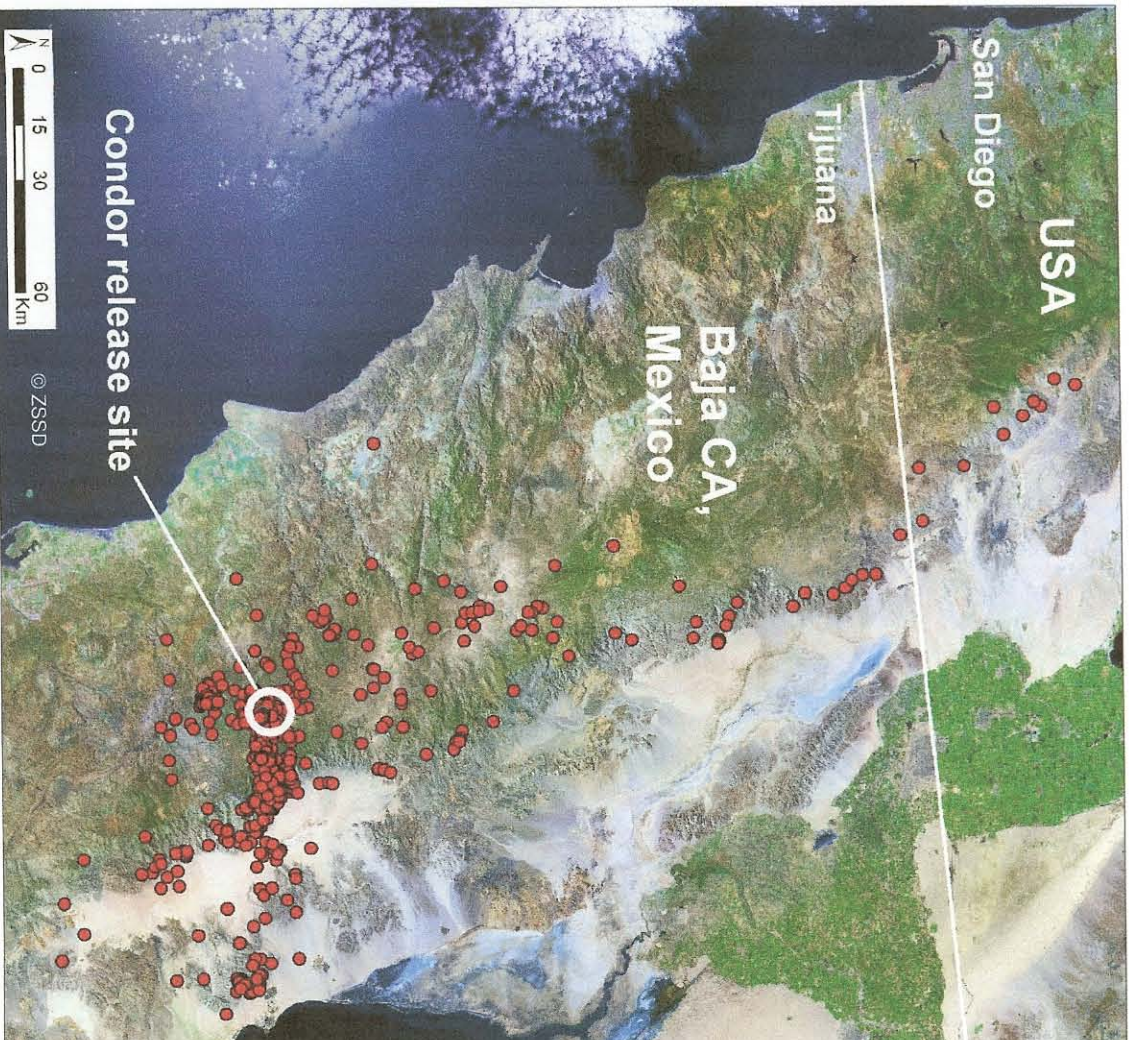
Attachments:

- Attachment A: The Zoological Society of San Diego Map of Condor Flight
- Attachment B: Presence and Movement of California Condors Near Proposed Wind Turbines
- Attachment C: San Diego Audubon Letter
- Attachment D: USFWS and CDFG Letter
- Attachment E: San Diego County Letter
- Attachment F: Photographs of Peninsular bighorn sheep
- Attachment G: European Guideline: Wind turbines fire protection guideline



**PLANET ACTION**  
Spot the impacts, engage in action

## Managing the conservation of the California condor and its ecosystem in a changing climate



Satellite map indicating the location of the condor reintroduction site in the Sierra San Pedro Martir region of Baja California, Mexico. The red dots indicate the GPS location fixes of a three-year-old female condor that was tracked making a large-scale exploratory return flight of 200 km, north from the Baja release site across the USA/Mexico border in April 2007 (each dot represents a separate location fix acquired from the bird). The GPS fixes indicate that the condor made intensive use of core areas within close proximity to the release site. High-resolution satellite imagery provided by Planet Action enables researchers to build an accurate picture of condor habitat use and preference. This valuable ecological information will allow managers to tailor the reintroduction programs to the specific habitat requirements of the birds and to predict and mitigate the effects of climate change on this important ecosystem.

# **PRESENCE AND MOVEMENTS OF CALIFORNIA CONDORS NEAR PROPOSED WIND TURBINES**

FINAL REPORT PREPARED FOR  
HT HARVEY AND ASSOCIATES  
15 November 2007



VENTANA WILDLIFE SOCIETY

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## EXECUTIVE SUMMARY

Wind energy poses particular hazards to birds with high wing loadings, large bodies and clumsy flight. California Condors, *Gymnogyps californianus*, a critically endangered species currently being reintroduced to central coastal California, may be at risk from wind turbines within their foraging range. In 2007, HT Harvey and Associates contracted the Ventana Wildlife Society to map the presence and movement patterns of California Condors near two proposed wind turbines at a winery near Gonzales CA, and to make recommendations regarding the potential risk posed to California Condors by the proposed turbines. Despite the proximity of Pinnacles National Monument, a rearing and release site for California Condors, only 417 detections occurred within a 25 km radius of the proposed wind turbines. No detections occurred closer than 3 km to the proposed wind turbine locations. Mean flight speed was 45.7 kph. Using flight speeds of 0 to 5 as our definition of perched birds, we determined that 151 detections were of perching events within 25 km of the proposed wind turbines. Condor flight headings were predominantly westerly within 25 km of the proposed wind area. Condor detections occurred most frequently over 31 to 40 degree slopes, and over northern and northwestern landscape aspects. The proximity of the Pinnacles rearing and release site indicates a potential risk situation for Condors in the vicinity of the proposed wind turbines, but given that the proposed project only calls for the installation of two turbines, and measures are taken to monitor and remove large carcasses in the area the proposed wind turbines pose only a minor risk to Condors in the area.

## BACKGROUND

Wind energy poses substantial risks to avian wildlife under certain circumstances (Dewitt and Langston 2006, Barrios and Rodriguez 2004, Erikson et al 2001). Birds with high wing loadings, clumsy flight patterns, and foraging habits that draw them into the vicinity of wind turbines are all at high risk for turbine-related injuries and mortalities (Barrios and Rodriguez 2004). Risk is also increased where wind energy projects intersect with migratory pathways, daily flight paths, and foraging and roosting grounds (Dewitt and Langston 2006). While many studies have found that overall turbine-related avian mortality is low compared to other anthropogenic sources of mortality, even low levels of mortality could significantly impact species with low productivity that take years to reach reproductive maturity (Dewitt and Langston 2006). Because many at-risk birds are endangered, threatened, or otherwise protected by federal laws, it is important that new wind energy projects of any scale assess the potential threats to wildlife, and minimize the risks posed by turbines and associated structures.

Parts of central coastal California are ideal for the production of wind energy at many different scales, but the central coast is also home to a growing population of reintroduced California Condors (*Gymnogyps californianus*), a critically endangered species since 1967 (Kiff et al. 1996). Historically, California Condors ranged from British Columbia in the north to Baja California in the south and were found as far east as the western slope of the Sierra Nevada (Snyder and Schmitt 2002), but were nearly

extirpated by the mid-1980's due to hunting, poisoning and habitat loss (Snyder and Schmitt 2002). In 1987 the remaining wild population was captured and housed in captive rearing facilities in southern California to act as a breeding population for the planned species recovery and reintroduction program. Condors were released back in to the wild in southern California starting in 1994 and in central coastal California starting in 1997. The first rearing and release facility on the central coast was located in the Ventana Wilderness on the western slope of the Santa Lucia Mountains near Big Sur, and has been active since the inception of the central California recovery effort in 1997. In 2003, a second central California rearing and release site was established at Pinnacles National Monument in the Gabilan Mountains. As of September 30, 2007, the total population of California Condors was 305, with 157 of those in captivity at Los Angeles Zoo, San Diego Wild Animal Park, Boise World Center for Birds of Prey, Oregon Zoo, Mexico Zoo, Mentor Birds in field pens, and pre-release birds in field pens. Of wild birds (148), there are currently 72 in California, 16 in Baja California, and 60 in Arizona. The free-flying population in the central California area currently totals 39 free-flying birds, with 27 birds in the Big Sur population and 12 birds in the Pinnacles population. The eldest birds in the Big Sur flock established two successful nests in 2007, and it is expected that the eldest birds in the Pinnacles flock will begin breeding in 2010-2012. Meanwhile, annual additions of captive-raised Condors continue to bolster both flocks, and the ultimate goal of the central coast reintroduction program is a flock of 75 free-flying birds.

Little is known about the susceptibility of California Condors to wind turbine-induced mortality. Studies of Griffon Vultures (*Gyps fulvus*), a European species ecologically similar to California Condors (Snyder and Schmitt 2002), have shown that in high concentrations, the birds are quite vulnerable to turbine strikes (Barrios and Rodriguez 2004). Raptors such as Red-tailed Hawks (*Buteo jamaicensis*), who rely on topographic features to generate preferred flight conditions and who forage in the types of habitat that characterize many wind turbines, also experience high mortality rates due to wind turbines (Hoover and Morrison 2005). Flight characteristics of Turkey Vultures (*Cathartes aura*) in the Altamont Pass Wind Turbines indicate that scavenging birds frequently fly within the height range of wind turbines used for large-scale power production, although the location of the turbines with respect to wind direction and slope curvature are important factors in determining mortality risk (Smallwood and Neher 2004). The possible impact of smaller-scale wind resource projects, including isolated towers powering small facilities, is largely unknown.

In conjunction with site-specific habitat features, behaviorally and physiologically, California Condors exhibit many features that may put them at a high risk for wind turbine-related mortality: (1) high wing loading; (2) social foraging; (3) curiosity for novel objects; (4) k-selected reproductive strategy; and (5) foraging preference for sloped grassland sites. Condors have extremely high wing loading, and their flapping flight is clumsy, making them less maneuverable around objects on the landscape. Condors routinely forage and roost in social groups, so that the presence of a single bird near wind turbines increases the risk of mortality not only for that individual, but for other individuals that may follow it. Because they are scavengers, Condors exhibit pronounced



curiosity for novel objects in their environment (J. Burnett, pers. comm.) such that the presence of new turbines might increase overall Condor activity at a site. Condors raise one chick every 2 years with significant parental investment, thus losses of even a few individuals have large impacts on the total population. In the case of Condors, a closely managed, primarily captive-bred species, losses are also costly.

In 2007, HT Harvey and Associates contracted the Ventana Wildlife Society to map the presence and movement patterns of California Condors within 25 km of two proposed wind turbines on a winery near Gonzales CA (figure 1), and to assess the potential risk posed to California Condors by the proposed turbines. This report presents presence, associated landscape characteristics, flight characteristics, and home ranges of California Condors detected within 25 km of the proposed wind turbines, and presents recommendations for wind turbine installation based on those findings.

## **METHODS**

### ***Condor locations and movements***

Twenty-seven free-flying, captive-reared Condors were tracked in central coastal California using solar powered, GPS Patagial PTT-100 transmitters (Microwave Telemetry, Inc., Columbia, MD) between 2 December 2003 and 31 March 2007. Transceivers were affixed directly to each bird's patagium in conjunction with an identification tag. The GPS receivers were programmed to collect a location fix (referred to as a "detection" in this report) every hour, 16 hours daily. In general, transceivers provide an average of 12 location fixes per day (16 possible) within 16 meters of the actual location, or, average location fixes 92% of the time. The built-in PTT transceivers transmitted stored GPS location data to Service ARGOS satellites each day.

Location data were downloaded daily via the Automatic Distribution Service administered by Service ARGOS. Data were then imported into a Microsoft Access database. Condor location fixes totaling 103,395 data points were examined for movement patterns and proximity to the two proposed wind turbines near Gonzales, CA. Error rates for flight speed (used to determine if a bird was perched or in flight when detected) were  $\pm 1$  km/hr at speeds above 40 km/hr (Microwave Telemetry, Inc, Columbia, MD). For the purposes of analysis, detections exhibiting flight speeds of greater than 5 kph, while detections exhibiting flight speeds of 0 through 5 were considered perching events.

### ***Mapping***

Condor location data including decimal-degree coordinates, speed, time and date were imported into an ArcGIS geodatabase. Each location fix, or data point, is referred to as a detection. The Condor data points, a Digital Elevation Model downloaded from the USGS Continuous Data Distribution Service, and an x,y data layer estimating the location of the two proposed wind turbines were plotted on a hillshade map of California.

ArcGIS Spatial Analyst tools were used to assess the proximity of Condor locations to the proposed wind turbines; landscape slope and aspect associated with Condor detections within the study area; and the flight behavior (“perched” or “flying”) of Condor detections within 25 km, 20 km, 10 km and 5 km of the proposed wind turbines. MCP home ranges of individual Condors were calculated using Hawth’s Tools, a free ArcGIS extension for assessing animal populations.

### Statistical Methods

Distribution of flight speed categories, flight headings, slope categories and landscape aspects associated with detections were assessed for divergence from expected values using Pearson  $\chi^2$  analysis (Zar 1999).

## RESULTS

### Proximity to Proposed Wind Turbines

417 Condor detections representing 13 individual birds occurred within 25 km of the proposed wind turbines from 2 December 2003 to 31 March 2007. 130 detections were within 20 km of the proposed wind turbines, 33 were within 15 km, 11 were within 10 km, and 3 were within 5 km (see Figure 2). No Condor detections occurred closer than 3 km to the proposed wind turbine locations. The detections within 5 km of the proposed wind turbines were attributable to 3 different individual Condors.

### Movement Patterns

266 flying bird detections occurred within 25 km of the proposed wind turbines; 88 flying birds were located within 20 km; 31 flying birds occurred within 15 km; 10 flying birds were located within 10 km; and 2 flying birds were located within 5 km (see Figure 3). The mean speed of flight within 25 km of the proposed wind turbines was 45.7 kph. The distribution of flight speeds within 25 km of the proposed wind area was significantly different from a random distribution ( $\chi^2 = 116.7$ ,  $df = 61$ ,  $P = 0.000$ ). The most frequently occurring flight speeds were between 31 and 40 kph (see Figure 4).

We used flight speed to identify perched birds: birds with flight speeds of 0 through 5 kph were designated as perched birds, while birds moving at 6 kph or faster were considered to be flying (see Figure 5). 151 perching events were located within 25 km of the proposed wind turbines; 42 perching events were located within 20 km; 2 perching events occurred within 15 km; 2 perching events were located within 10 km; and 1 perching event was located within 5 km (see Figure 6).

Within the 25 km study area, the distribution of flight headings was not significantly different from random, but detections that indicate a westerly orientation (44) were most frequent and detections with southerly orientation (20) were fewest.

### Landscape Associations

While visualization of the slope data indicated that slopes were fairly evenly distributed within 25 km of the proposed wind turbines (figure 7), the distribution of Condor detections over different landscape slope categories was significantly different than expected ( $\chi^2 = 279.8$ ,  $df = 69$ ,  $P=0.000$ ). Within the 25 km study area, condor detections were most frequent over landscapes with 51 to 60 degree slopes, and detections were fewest over landscapes with slopes less than 20 degrees (see Figure 8).

The landscape was evenly distributed across all aspect categories (see Figure 9), but the distribution of Condor detections over different landscape aspects within 25 km of the proposed wind turbines was significantly different than random ( $\chi^2 = 36.9$ ,  $df = 7$ ,  $P = 0.000$ ). More detections (138) occurred over landscapes with northern and northwestern aspects than over any other aspect. The fewest detections (24) occurred over the eastern aspect (figure 10).

### Home Ranges

Four individual Condors were determined to have home ranges encompassing the proposed wind turbine locations using the Minimum Convex Polygon technique (see Figure 11).

## IMPLICATIONS

- The proximity of the Pinnacles National Monument Condor release facility to the proposed wind turbines means that Condor activity is high throughout the Salinas Valley and across both slopes of the Coast Ranges and the Gabilan Mountains. This indicates a potential risk situation for Condors because the proposed wind turbines are within range of regular foraging flights for all members of the Pinnacles flock, as well as exploratory flights of some of the older Big Sur Condors who may be expanding their foraging range or looking for nesting locations. The proposed turbine locations also fall within the calculated home ranges of 4 Pinnacles Condors. However, the low overall detections indicate that the actual risk is low, since Condors do not appear to be using the area near the proposed wind turbines frequently.
- The low number of detections of perching events within 25 km of the proposed wind turbines indicates that the area has not provided constant or frequent foraging or roosting opportunities. Thus, the risk posed to Condors perching or taking flight near the proposed turbines is low.
- Because the proposed wind turbines are located in suitable foraging habitat for Condors, clearing carcasses within 5 km of the proposed wind turbines when detected could reduce the potential risk to Condors foraging in the area.
- The Condors represented in this report represent only a subset of the entire central coast Condor population. This is because not all of the Condors have GPS transmitters. Most of the Pinnacles flock is GPS-tagged, but a much smaller

proportion of the Big Sur flock is tracked using GPS. The values enumerated in the report, therefore, are likely smaller than actuality.

- Given that the proposed project only calls for the installation of two turbines and measures are taken to monitor and remove large carcasses in the area, the proposed wind turbines pose a minor risk to Condors in the area.
- Because this is a small, managed population of 35 individuals with a k-selected reproductive strategy in addition to being listed as endangered, any risk associated with their population should be given careful consideration.

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#### **PERSONAL COMMUNICATIONS**

Burnett, J. May 1, 2007. Senior Wildlife Biologist, Ventana Wildlife Society. 19045 Portola Dr., Ste F-1, Salinas, CA 93908, [joeburnett@ventanaws.org](mailto:joeburnett@ventanaws.org)

Figure 1. Proposed wind turbines near Gonzales in Monterey County, CA, and the project study area, defined by a 25 km radius around the proposed turbines.

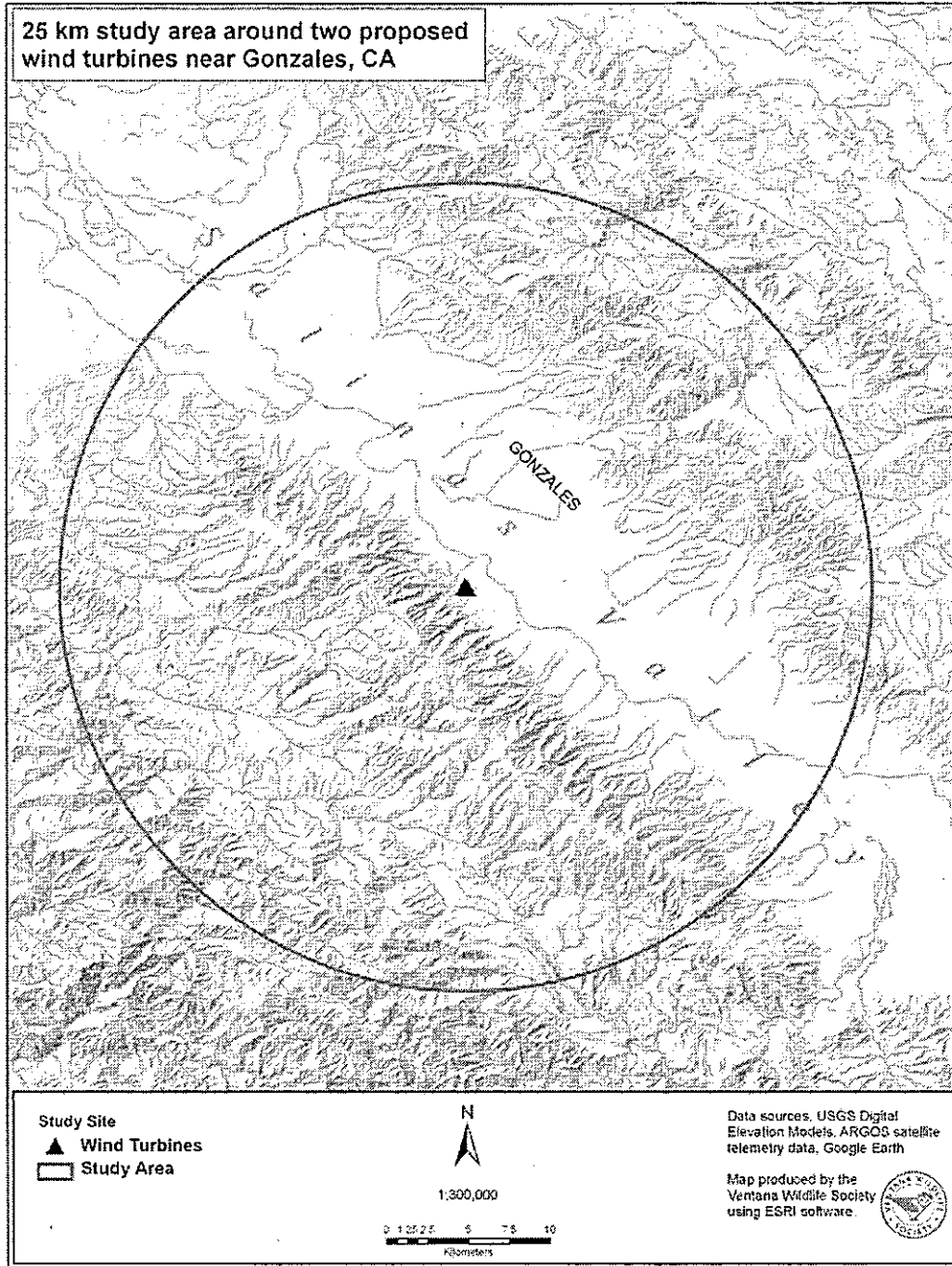


Figure 2. Proximity of Condor detections to the proposed wind turbines, Monterey County, CA, 2003-2007

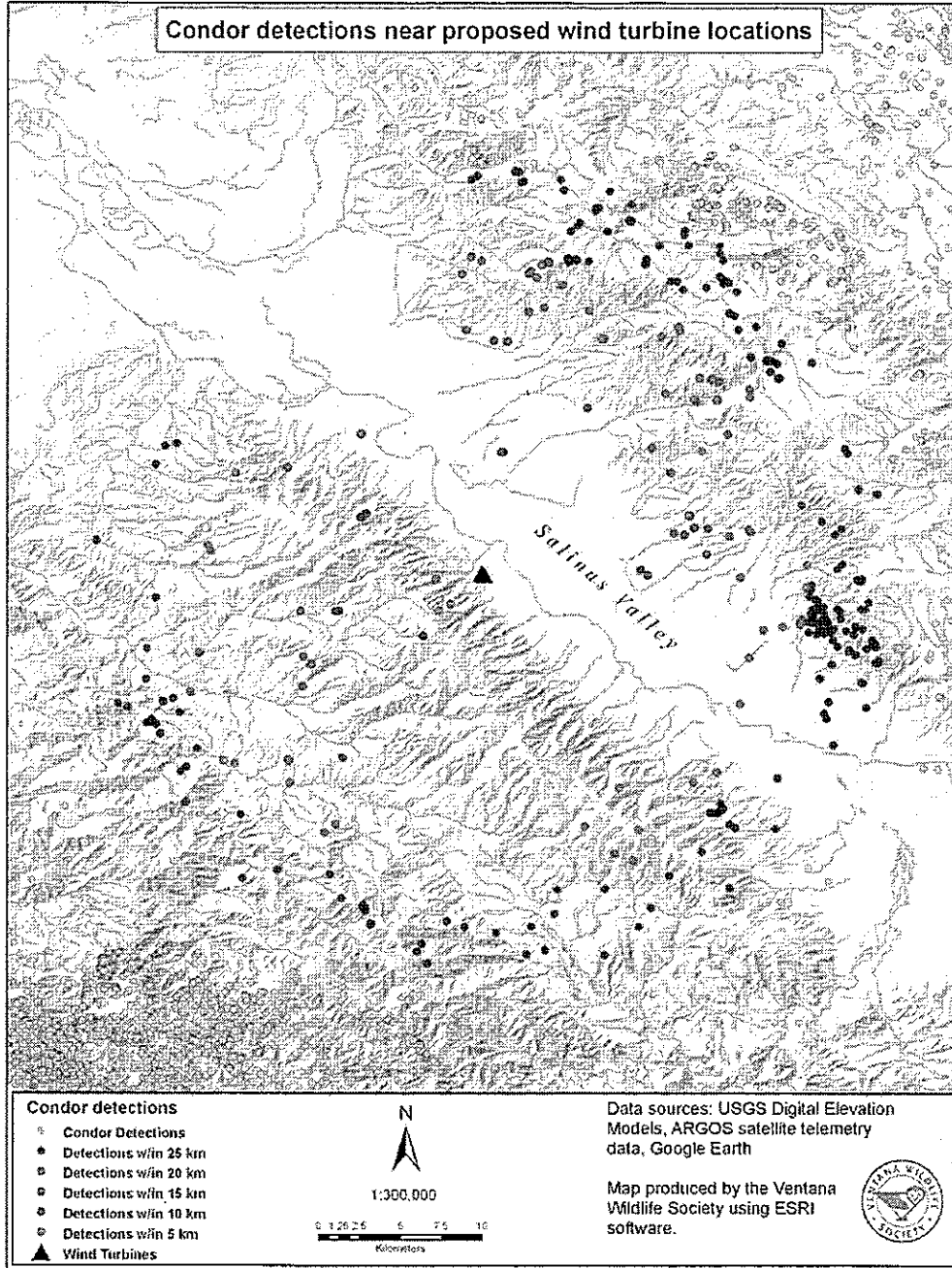


Figure 3. Proximity of in-flight Condor detections to the proposed wind turbines, Monterey County, CA, 2003-2007

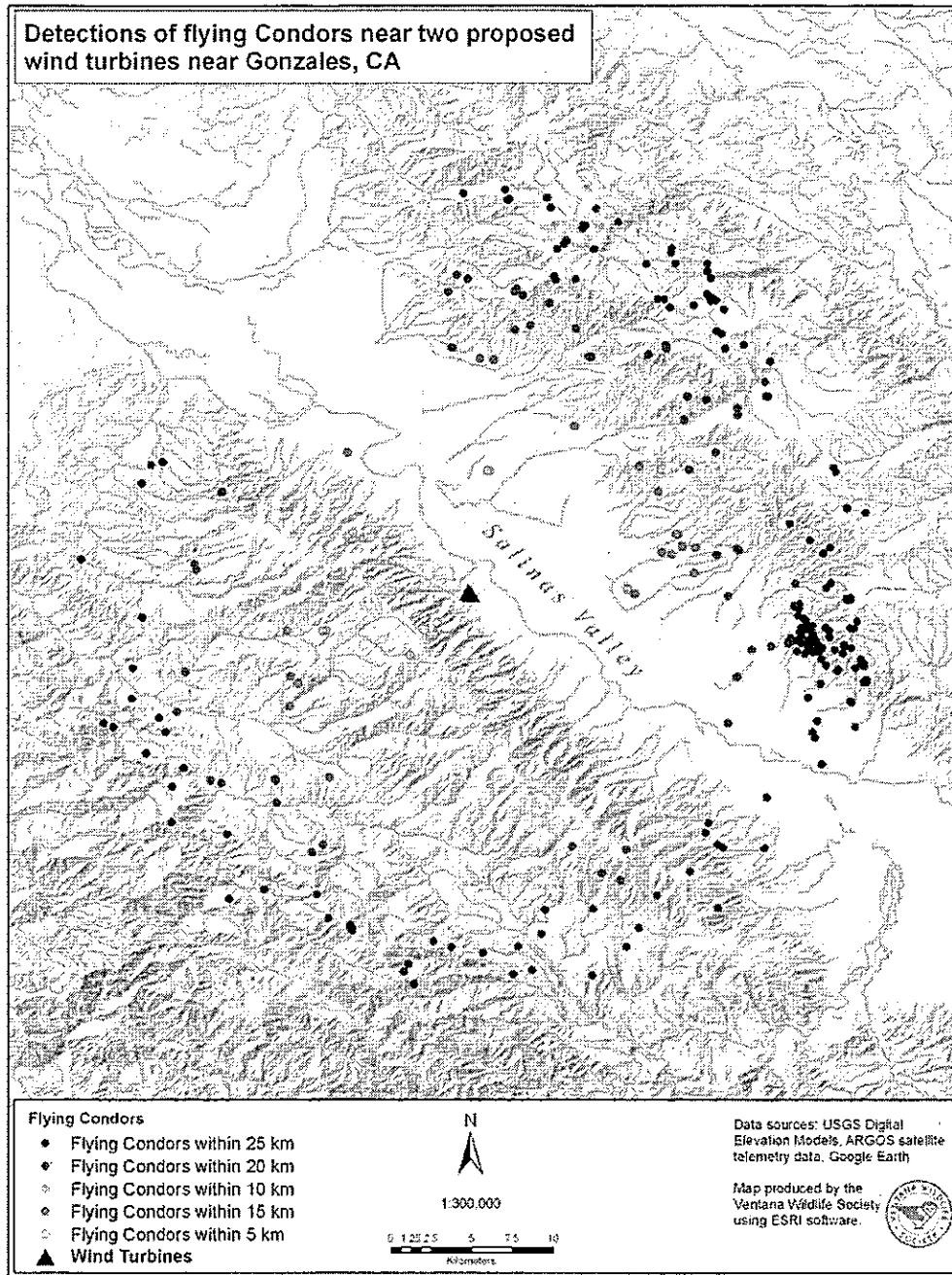




Figure 4. Frequency distribution of flight speeds of Condors detected within 25 km of the proposed wind turbines, Monterey County, CA, 2003-2007

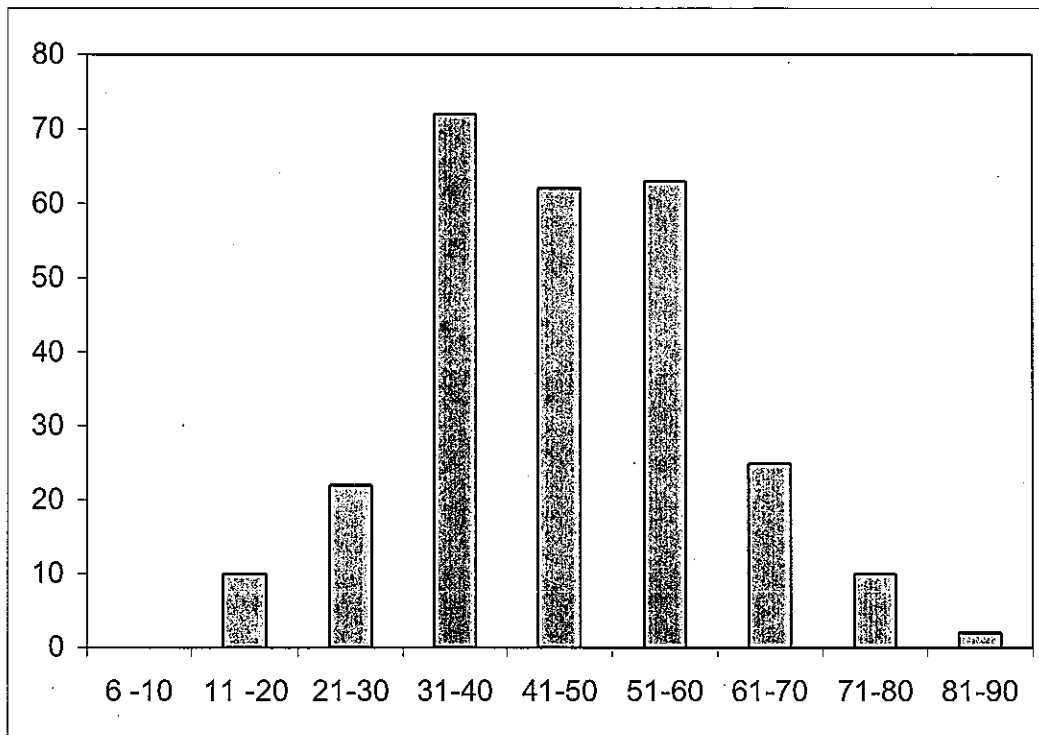


Figure 5. Detections of flying and perched Condors within 25 km of the proposed wind turbines, Monterey County, CA, 2003-2007

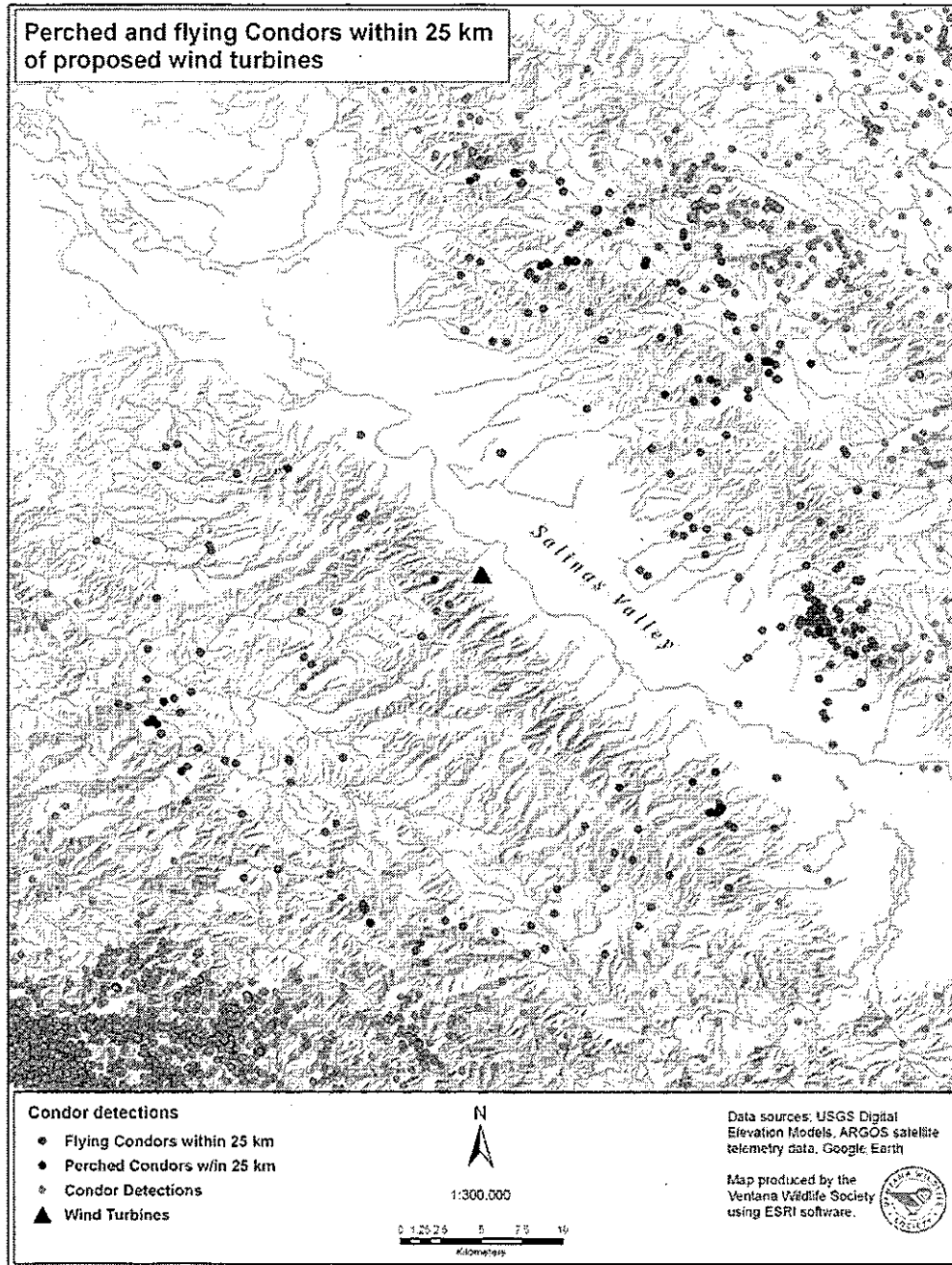


Figure 6. Proximity of perched Condor detections to the proposed wind turbines, Monterey County, CA, 2003-2007

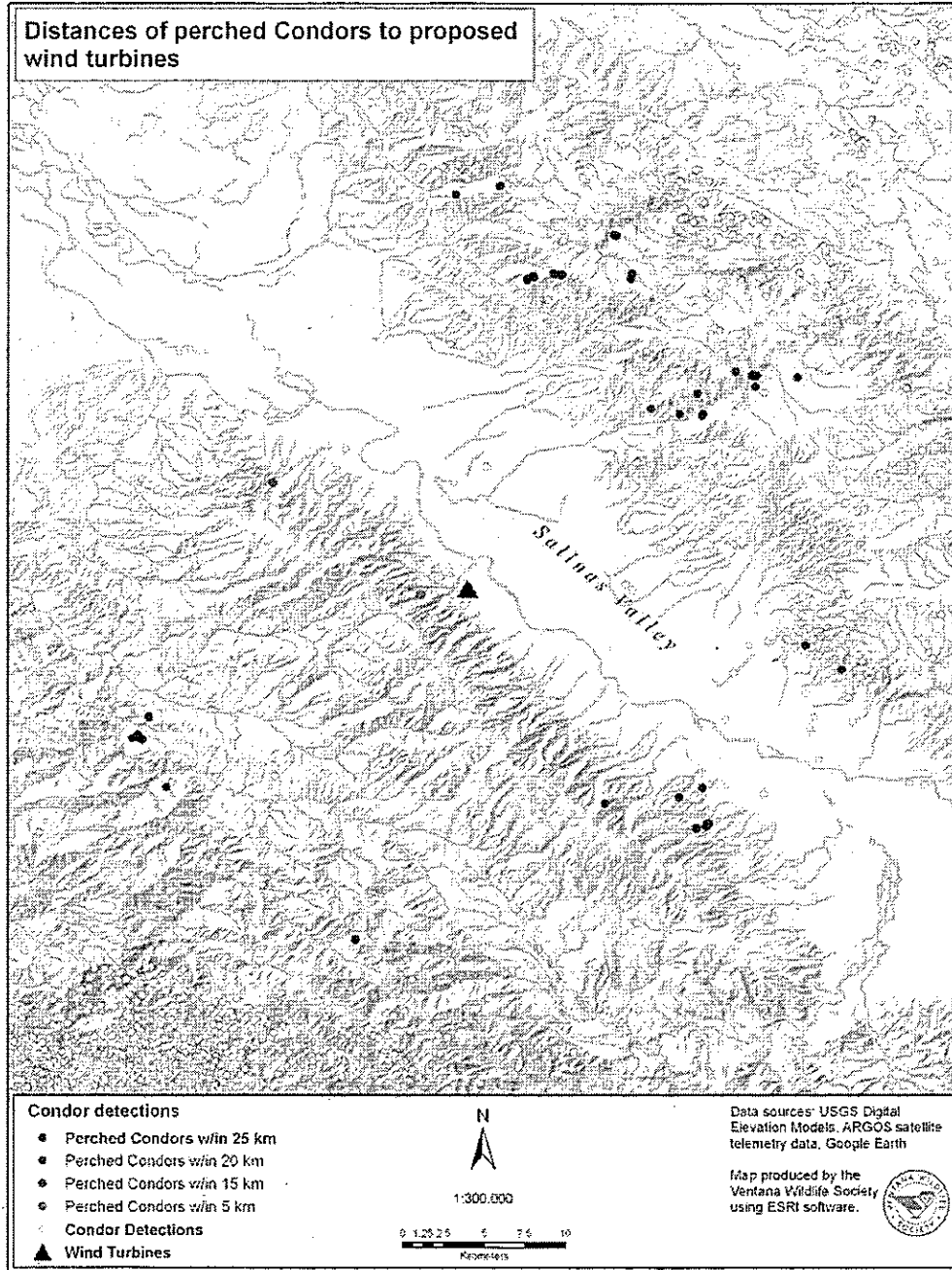


Figure 7. Landscape slopes associated with Condor detections within 25 km of the proposed wind turbines, Monterey County, CA, 2003-2007

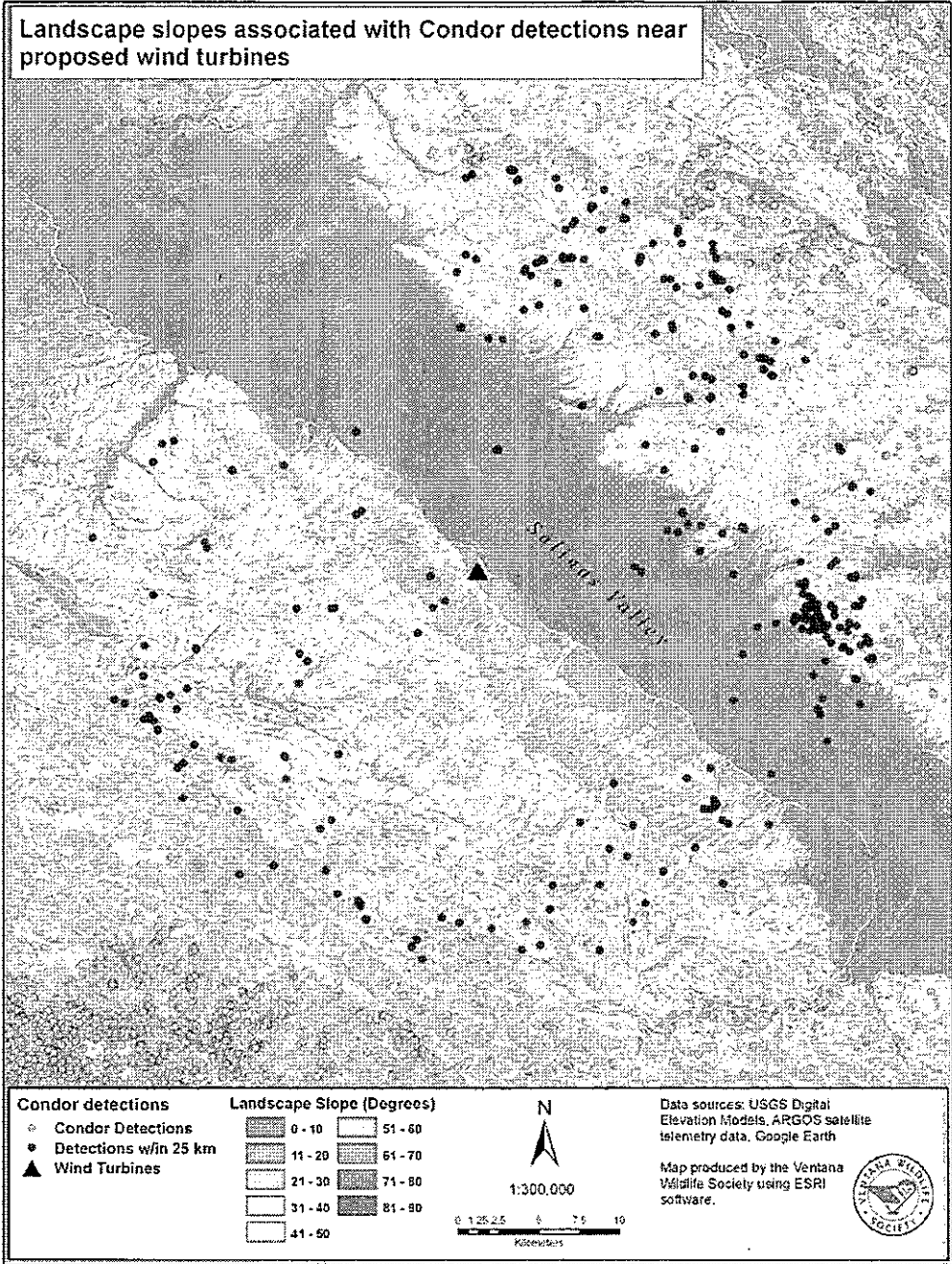


Figure 8. Distribution of landscape slope categories associated with Condor detections within 25 km of the proposed wind turbines, Monterey County, CA, 2003-2007

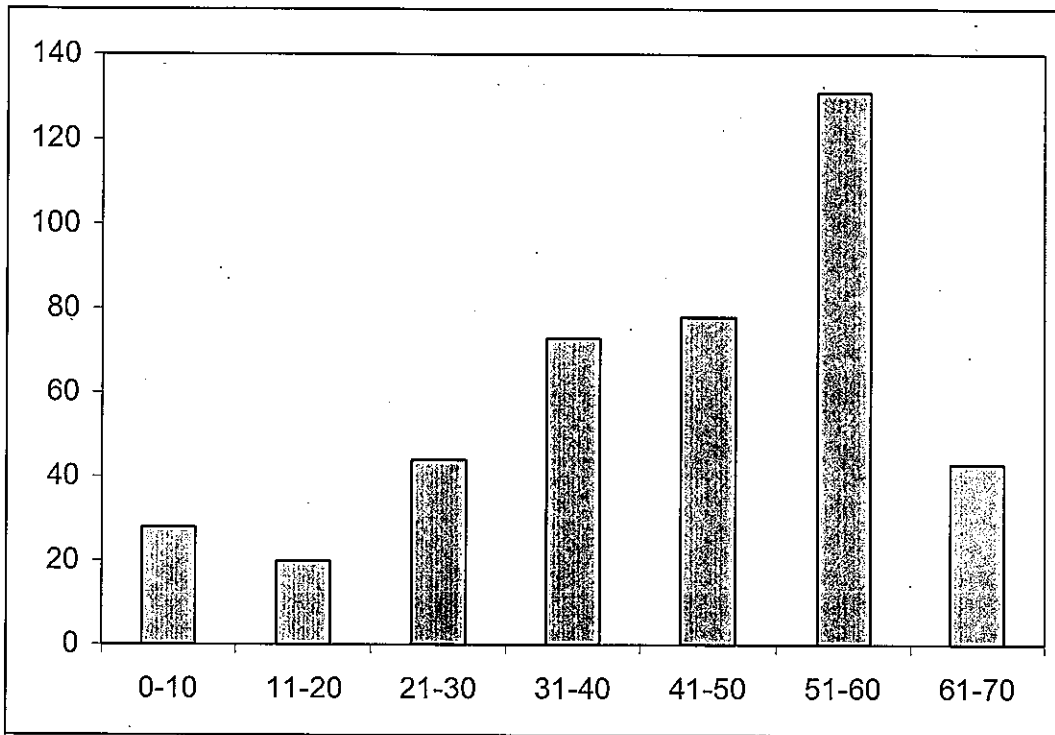


Figure 9. Landscape aspects associated with Condor detections within 25 km of the proposed wind turbines, Monterey County, CA, 2003-2007

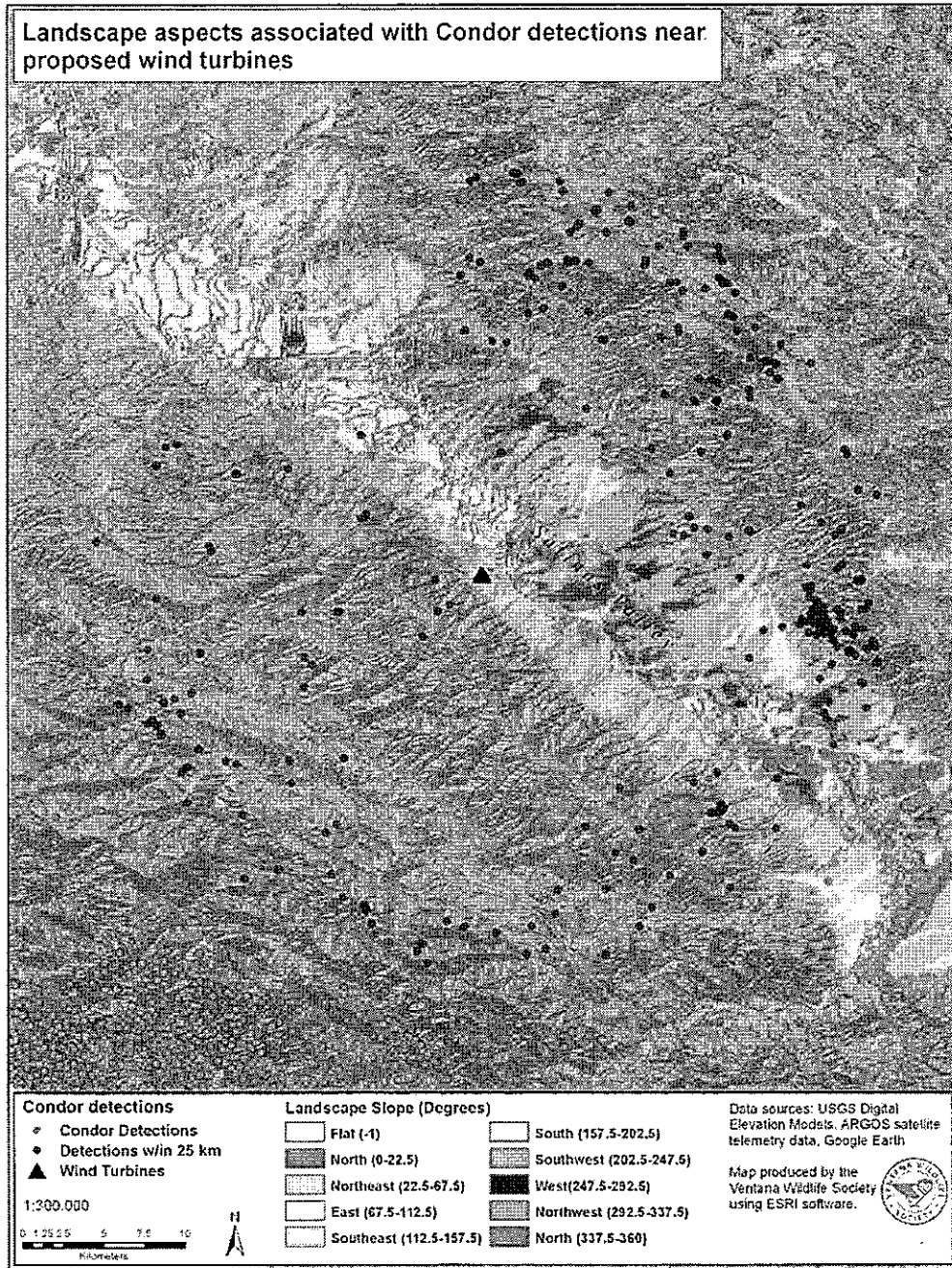


Figure 10. Distribution of landscape aspects associated with Condor detections within 25 km of the proposed wind turbines, Monterey County, CA, 2003-2007

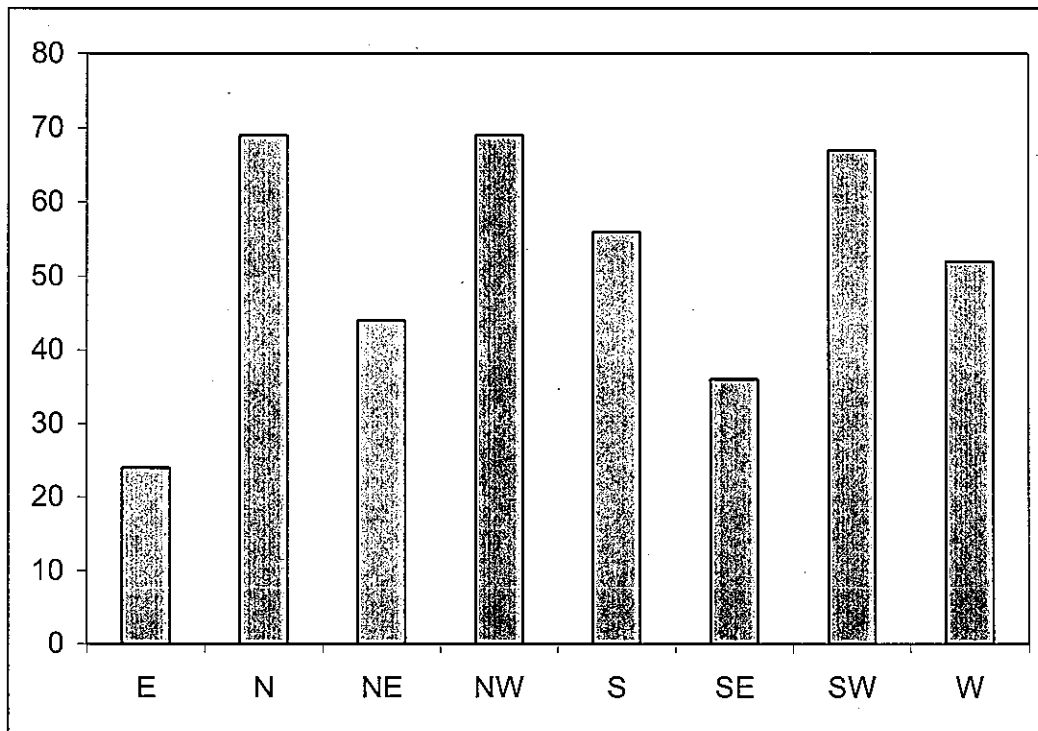
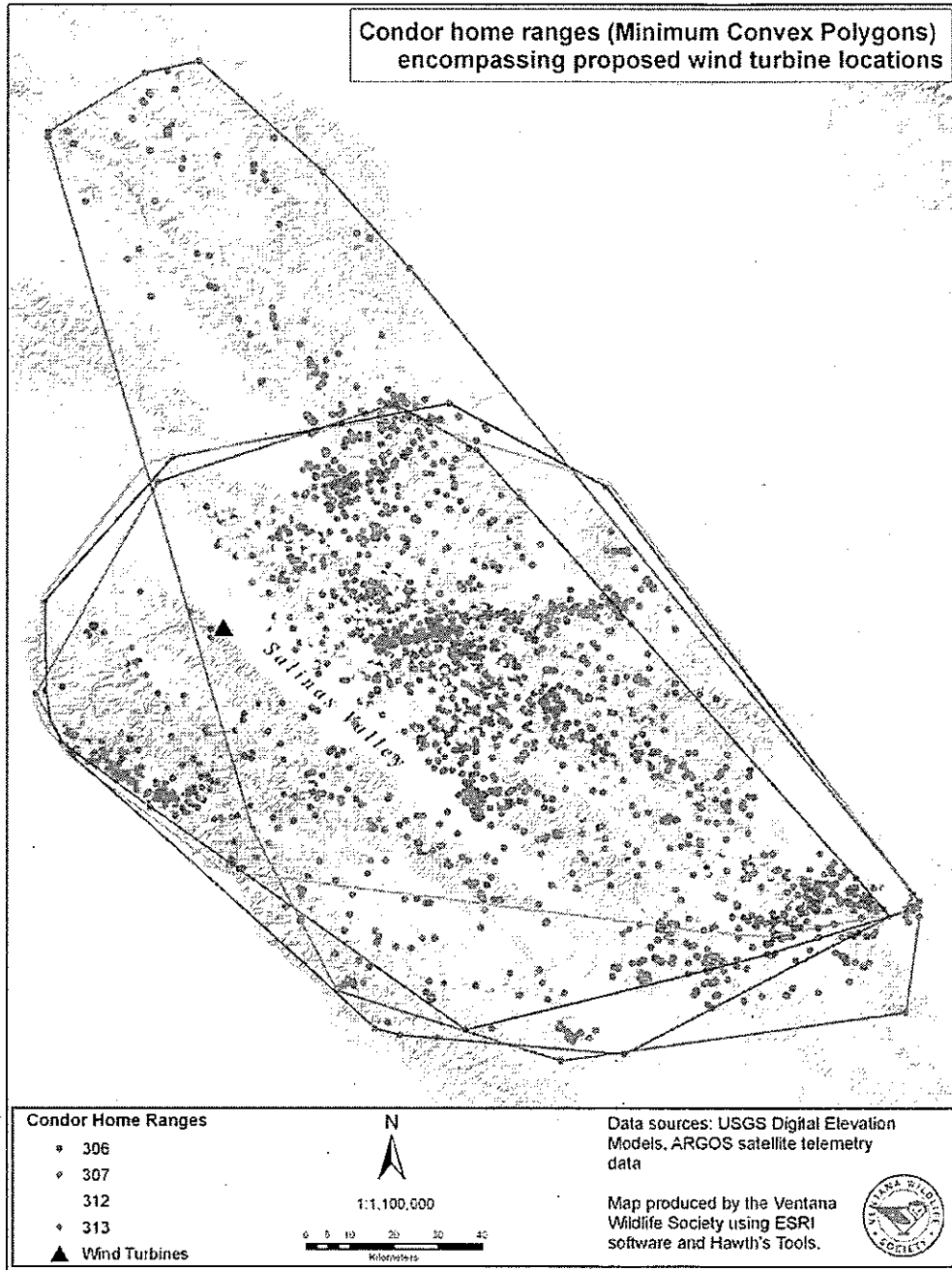


Figure 11. Condor Minimum Convex Polygon home ranges that encompass the proposed wind turbine locations, Monterey, CA







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*of birds, other wildlife and their habitats...*

Dr. Jerry Pell, NEPA Document Manager  
Office of Electricity Delivery and Energy Reliability, OE-20  
U.S. Department of Energy  
Washington, DC 20585

Via email: [Jerry.Pell@hq.doe.gov](mailto:Jerry.Pell@hq.doe.gov)

Dear Dr. Pell,

**SUBJECT: Comments on Energia Sierra Juarez U.S. Transmission Line Project DEIS (DOE/EIS-0414)**

The San Diego Audubon Society is supportive of the intention to increase the use of alternative energy sources such as solar and wind, but is concerned that the proposed project does not adequately consider impacts to wildlife as well as the cumulative impacts resulting from the various energy projects listed in Section 5 of the Draft Environmental Impact Statement. Specifically, we are concerned about impacts to migratory birds including raptors, neo-tropic migrants, and winter season avian visitors that may result from the construction of this transmission line and the construction and operation of the wind power facilities and power lines in Mexico that will be facilitated by this transmission line.

**Insufficient Biological Data**

We would like to see information detailing the survey methodology included in the final EIS and expect that a comprehensive survey approach is utilized including radar monitoring to assess nighttime migration and monitoring at different times of the year and day to capture seasonal variability in avian populations.

There is also a concern that this project site is located within an inland avian flyway. Because the transmission line project site is located between two important bird areas (Laguna Mountains and the Sierra de Juarez) that are characterized by high ridgelines, foraging raptors and other migrants may be severely impacted. Indeed, the project location is a potential and presumed avian corridor of birds moving from north to south along the cross-border ridgeline. In fact, according to observations by local ornithologists (SD Birds Yahoo Group), Jacumba and In-ko-pah villages are locally recognized migrant traps due to the presence of seasonal water resources, agricultural influences, and springtime wildflowers. For these reasons, we'd like the data that informed the determination that the project site is not located within a known migratory corridor or flyway to be made available in the Final EIS.



### **Impacts to Golden Eagles & Other Raptors**

We are concerned with impacts to raptors and specifically, Golden Eagles, since this project site is located within a known wintering location and is immediately adjacent (located within one mile) to at least one confirmed breeding location for this species (Unitt, 2004, San Diego County Bird Atlas). The Golden Eagle has the largest territory and the lowest population density of any San Diego County bird. Currently, electrocution on power lines is the largest source of mortality for this species. This project also encroaches onto foraging habitat and results in the loss of ten acres of foraging habitat that will not be re-vegetated after construction. Furthermore, this habitat loss will directly impact San Diego black-tailed jackrabbit populations, the principal prey of the eagles and whose numbers are already suppressed due to drought. Impacts to the Golden Eagle and appropriate mitigation are not mentioned in this document and we would therefore like to see detailed information on how these impacts will be mitigated in the final review document.

### **Connected Actions & Impacts to Migrating Wildlife**

We consider the Energia Sierra Juarez wind project to be an indirect impact of this project. We are concerned that construction of the proposed ESJ wind project and the associated transmission line will result in large numbers of deaths of raptors and migratory birds in Mexico. These birds migrate and/or forage on both sides of the border. Thus these losses in Mexico are likely to significantly impact local populations. For instance, studies show that Golden Eagle and Condor juveniles are often attracted to novel items placed in their range. Once these birds reach maturity their hunting patterns are fixed, but they are more likely to roam into unknown areas when they're young. For these reasons among others, the USFWS has recommended a minimum 6-mile buffer between Golden Eagle nests and turbines (USFWS Comments on Summit Ridge Wind project).

The transmission line project and the connected Energia Sierra Juarez wind project may impede use by Condors, who may re-colonize the area. According to the San Diego County Bird Atlas (Unitt, 2004), Condors could be seen regularly in San Diego County in the 1800s and nested in the County's foothills and mountains. The transmission line and the wind power projects are located within the historical breeding and foraging range of the California Condor and so there is a concern that these wind and transmission line projects would kill Condors that are and will be re-colonizing the area.

### **Cumulative Impacts Need to be Addressed**

The ESJ Transmission Line Project is one of seven (this number includes the ESJ wind project which is not included in this cumulative analysis but should be since it is a connected action that will have a significant effect on migratory wildlife) energy projects that have been developed or are proposed for development in the region of influence for migratory birds. This fact, coupled with the fact that we are still learning about the real



costs and impacts to wildlife that are caused by these industrial-scaled energy projects, necessitates the need for a rigorous analysis, monitoring program, and information sharing mechanism among projects. Therefore, we would like to see a protocol in place that would facilitate the sharing of monitoring data among projects considered in the cumulative effects analysis so that any cumulative impacts can be identified and addressed in a timely and effective manner. We are very concerned with the inadequate analysis that is being performed for the wind project on the Mexican side. Since the projects are interdependent, analysis of those impacts need to be fully identified as Indirect and Cumulative impacts of this project.

### **Mitigation**

Mitigation measures for biological resources are inadequate and inadequately described in the draft review document. A worker training that includes "protection measures for sensitive resources" will be carried out, but the DEIR does not identify what these measures of protection are – an implementation plan for these protection measures needs to be included in a final review document. Also, this document solely addresses mitigation measures to be taken during the construction phase and does not include any measures that would be taken during the operational phase of the project. For instance, if the line is found to significantly negatively impact raptors and other avian populations in the area, how will these impacts be reduced? A plan for minimizing risks to wildlife and biological resources throughout the life span of this project must be added to this document. There must be a protocol in place that monitors and identifies losses and ensures additional and adaptive mitigation measures will be devised and implemented should avian and other wildlife populations be negatively impacted during project operations. Quantitative thresholds should be identified for implementing those measures, reducing operations, or for removing the project if those thresholds cannot be met.

### **Alternatives**

Lastly, we urge that the Department of Energy fully considered the array of project alternatives that exist, on both sides of the border. It may make more sense economically, environmentally, and politically to re-string the Mexican 'Path 45' transmission line that runs from Mexicali to Tijuana with sufficient capacity to support current demands.

We also urge that the location of the wind turbines in Mexico be based on minimizing impacts to wildlife during construction and operation and not just on wind speed and ease of construction.

While we are very much in favor of alternative energy projects that lessen our dependence on fossil fuel sources and reduce greenhouse gas emissions, we are not supportive of fast-track projects that place our wildlife and shared natural heritage at risk.

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*of birds, other wildlife and their habitats...*

We hope that the final EIR will more fully consider these risks and if approved, utilize this project as a model for minimizing risks to wildlife.

Sincerely,

A handwritten signature in cursive script, which appears to read "Shannon Dougherty". The signature is written in dark ink and is positioned above the printed name.

Shannon Dougherty  
Conservation Coordinator

Comment Set F0006  
U.S. Fish & Wildlife Service and California Department of Fish & Game



U. S. Fish and Wildlife Service  
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In Reply Refer To:  
FWS/CDFG-2008B0423/2008TA0847

AUG 25 2008

Billie Blanchard, CPUC/Lynda Kastoll, BLM  
c/o Aspen Environmental Group  
235 Montgomery Street, Suite 935  
San Francisco, California 94104-3106

Subject: Comments on the Recirculated Draft Environmental Impact Report/  
Environmental Impact Statement for the Sunrise Powerlink Project, San Diego  
and Imperial Counties, California (SCH No. 2006091071)

Dear Ms. Blanchard and Ms. Kastoll:

The California Department of Fish and Game (Department) and U.S. Fish and Wildlife Service (Service), collectively the Wildlife Agencies, have reviewed the above-referenced recirculated draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the proposed Sunrise Powerlink (SRPL) Project. The comments provided herein are based on the information provided in the recirculated draft EIR/EIS, the original SRPL Project draft EIR/EIS, the Wildlife Agencies' knowledge of sensitive and declining vegetative communities, and our participation in regional conservation planning efforts. The Wildlife Agencies provided extensive comments on the initial Draft EIR/EIS in a letter dated April 11, 2008. All of our concerns addressed in that letter regarding potential "unmitigable" adverse impacts to federally and/or State-listed species, sensitive vegetation communities, and regional conservation plans remain.

The Department is a Trustee Agency and a Responsible Agency pursuant to the California Environmental Quality Act (CEQA), Sections 15386 and 15381 respectively. The Department is responsible for the conservation, protection, and management of the State's biological resources, including rare, threatened, and endangered plant and animal species, pursuant to the California Endangered Species Act (CESA), and administers the Natural Community Conservation Planning Program (NCCP). The primary concern and mandate of the Service is the protection of public fish and wildlife resources and their habitats. The Service has legal responsibility for the welfare of migratory birds, anadromous fish, and endangered animals and plants occurring in the United States. The Service is also responsible for administering the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.). The Proposed Project is the construction and operation of a 150-mile electric transmission line between the El Centro area of Imperial County and northwestern San Diego County.

Alternatives considered included alternative route alignments and other transmission alternatives, alternatives that could replace the Proposed Project as a whole, Non-Wire Alternatives, and the No Project/No Action Alternative.

TAKE PRIDE  
IN AMERICA 

F0006-1

Comment Set F0006, cont.  
U.S. Fish & Wildlife Service and California Department of Fish & Game

Ms. Blanchard and Ms. Kastoll (FWS-SD/CDFG-2008B0423/2008TA0847)

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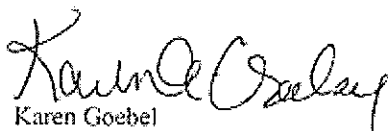
Additionally, there are four projects that are so closely related to the SRPL as to be considered "connected actions" under NEPA. These four projects are the Stirling Energy Systems solar facility, two components of the Imperial Irrigation District (IID) 230 kV transmission system upgrades, the Esmeralda-San Felipe Geothermal Project, and the Jacumba 230/500 kV Substation. One additional project, a wind project in northern Mexico's La Rumorosa area, under contract to meet Southern California Edison's renewable requirements, is defined in the Recirculated draft EIR/EIS as an "indirect effect" of the SRPL. The La Rumorosa wind project is being evaluated in the draft EIR/EIS because of the agreement that was signed between Sempra Generation and Southern California Edison in which Sempra Generation has agreed to sell SCE up to 250 MW of power from the La Rumorosa wind power facility under development, and the SRPL would be used to transmit the energy generated at the wind farm.

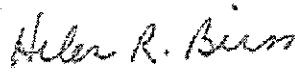
F0006-1 cont.

This letter provides comments regarding the components identified in the recirculated draft EIR/EIS dated July 2008. These components include a new and revised analysis of the La Rumorosa Wind Energy Project (RWEP) wind farm and transmission line route revisions. The RWEP has several project components, which include the following; a double circuit 230 kV or single circuit 500 kV transmission line from Mexico to the U.S., a 500/230/69 kV substation located east of the town of Jacumba (i.e., Jacumba substation), a 13.4 mile 69 kV transmission line connecting the Jacumba and Boulevard Substations, a 0.5 acre expansion of the Boulevard substation, and a communication facility. We offer recommendations and comments in the enclosure to further assist in avoidance and minimization of impacts to biological resources, and to ensure that the project is consistent with ongoing regional habitat conservation planning efforts.

We remain concerned the Proposed Project (and many of the alternatives) would have "unmitigable," significant impacts to listed plant and animal species. Because the Wildlife Agencies are mandated to protect and recover these resources, we recommend an alternative that can avoid and minimize significant adverse impacts to rare and sensitive biological resources, similar to the In-Area Renewable Generation Alternative but with additional localized generation capacity (e.g., commercial and residential rooftop solar systems) to eliminate or minimize the need to transport electricity from remote locations. If you have questions or comments regarding the contents of this letter, please contact Paul Schlitt of the Department at (858) 637-5510 or Felicia Sirechia of the Service at (760) 431-9440.

Sincerely,

  
Karen Goebel  
Assistant Field Supervisor  
U.S. Fish and Wildlife Service

  
Helen R. Birss  
Environmental Program Manager  
California Department of Fish and Game

Comment Set F0006, cont.

U.S. Fish & Wildlife Service and California Department of Fish & Game

ENCLOSURE  
WILDLIFE AGENCY  
COMMENTS AND RECOMMENDATIONS  
ON THE RECIRCULATED DRAFT ENVIRONMENTAL IMPACT  
REPORT/ENVIRONMENTAL IMPACT STATEMENT  
FOR THE SUNRISE POWERLINK PROJECT

Sempre La Rumorosa Wind Energy Project Wind Farm

1. The recirculated draft EIR/EIS concludes that impacts to wildlife movement from the Sempra La Rumorosa Wind Energy Project (RWEP) wind farm would be considered adverse but less than significant (page 2-54). However, an analysis of the biological impacts concerning general wildlife movement patterns through the (RWEP) wind farm site has not been conducted. Therefore, this impact should be adequately assessed in the final EIR/EIS, or the final EIR/EIS should acknowledge this deficiency in the analysis for impacts to wildlife movement. In addition, Peninsular bighorn sheep (PBS) are known to occur in the Sierra de Juarez mountains. However, there is no discussion on how the RWEP may impact PBS movement at that site. The final EIR/EIS should address this potential impact to PBS and provide a discussion as to how the applicant can avoid and minimize any impacts that are identified.
2. The recirculated draft EIR/EIS discusses the presence of PBS designated critical habitat (February 1, 2001) in the project area (U.S. portion only). However, although it does not appear that this portion of the project is within PBS proposed revised critical habitat (October 10, 2007), the presence of PBS proposed revised critical habitat in the vicinity of the project area should be discussed in the final EIR/EIS to ensure that potential edge effects (e.g., increased non-natives, fire, etc.) from the transmission line will not adversely affect the primary constituent elements in the adjacent critical habitat.
3. The draft EIR/EIS lacks the information necessary to accurately quantify the potential direct and indirect impacts of each project component on listed species and their habitat. The final EIR/EIS should include a series of maps that depict such features as the locations of the proposed temporary and permanent project components including associated facilities, construction roads, access roads, towers, transmission lines, and staging areas. These maps should, at a minimum, also include vegetation-type; federally-listed and candidate species known to occur or potentially occur in the project areas; and proposed and/or designated critical habitat areas. Information on vegetation types and species locations and potential habitat within the project areas should be based on best available database information as well as recent habitat and species surveys conducted by qualified and or permitted biologists.

F0006-2

F0006-3

F0006-4

Additionally, acreage impacts associated with the construction of each project component should be included in the baseline impact analysis. Impacts to sensitive vegetation

F0006-5



Comment Set F0006, cont.  
U.S. Fish & Wildlife Service and California Department of Fish & Game

Ms. Blanchard and Ms. Kastoll (FWS-SD/CDFG-2008B0423/2008TA0847)

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communities and special status plant and animal species should be quantified and adequately disclosed in the final EIR/EIS. This analysis should be provided in revised summary tables/and or a consolidated matrix per guidance that was provided in the Wildlife Agencies comment letter, dated April 11, 2008. This would facilitate comparison of the proposed project to the alternative designs allowing for the identification of a biologically preferred alternative, in accordance with CEQA mandates (CEQA Guideline §15126.6(b).

F0006-5 cont.

4. The recirculated draft EIR/EIS states that vegetation and plant species data is based on County of San Diego and CNDDB records, respectively, and subsequently states that no listed plant species occur in the project areas. However, information on vegetation types and plant species locations and potential habitat within the project area in the U.S. should be based on best available database information as well as recent habitat and species evaluations conducted by a qualified biologist/botanist familiar with local plant species in the project areas.

F0006-6

5. The final EIR/EIS should provide additional information concerning the preliminary site assessment surveys that were conducted during site selection of the RWEP wind farm. There is limited information provided in the recirculated draft EIR/EIS regarding the development of pre-permitting monitoring protocols that were considered to address bird and bat mortality (and that resulted in NEPA/CEQA baseline and impact determination in the recirculated EIR/EIS). It is important to use the pre-permitting impact assessment to determine the operations monitoring protocols that would be used to substantiate impact estimates. Furthermore, the final EIR/EIS needs to provide a discussion on the evaluation given between the level of anticipated impacts (i.e., bird and bat collisions with wind turbines) and the amount of compensatory mitigation proposed. In considering potential fatalities and risk to individual species and populations, the priority should be avoidance of impacts, and if that is not possible, minimization and mitigation measures should be developed that are effective in reducing and/or offsetting bird/bat fatalities. Additionally, although operational fatalities cannot be forecasted with certainty, more comprehensive baseline data should be collected and provided in the final EIR/EIS.

F0006-7

6. Table D.2.7 of the final EIR/EIS should be amended to reflect acreage impacts and corresponding mitigation acreage for the RWEP wind farm, Sempra Baja Wind Transmission Line, SDG&E Jacumba Substation, and SDG&E 69 kV transmission line.

F0006-8

7. Page 2-22, Section 2.2.1, Special Status Wildlife Species, states that, "Protocol-level surveys for QCB were conducted at the ECO Substation site (i.e., Jacumba substation) and surrounding areas in April 2008 (SDG&E, 2008a)." However, a copy of the survey report has not been received by the Service. We recommend that protocol-level surveys for the Quino be conducted in all project areas within the Service's recommended survey area for Quino and reports be submitted in a timely manner so that we may determine if they are adequate and impacts have been assessed correctly.

F0006-9

## Comment Set F0006, cont.

## U.S. Fish &amp; Wildlife Service and California Department of Fish &amp; Game

Ms. Blanchard and Ms. Kastoll (FWS-SD/CDFG-2008B0423/2008TA0847)

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8. The recirculated draft EIR/EIS discusses the potential presence of PBS, Quino, and Quino designated critical habitat along the 69kV Transmission Line. However, it appears that some portions of this project are also within Quino proposed revised critical habitat (January 17, 2008). Therefore, the potential impacts to Quino proposed revised critical habitat should be discussed in the final EIR/EIS. Additionally, it is not clear from the draft EIR/EIS if protocol-level surveys have been conducted along this transmission line and adjacent areas. If so, a copy of the survey report has not been received by the Service. **F0006-10**
9. The recirculated draft EIR/EIS states that the Boulevard Substation Expansion and Communication Facility are expected to occur on land that is already developed. However, it is not clear if "developed" means that these areas no longer contain any vegetation. Therefore, the term "developed" should be defined in the final EIR/EIS. Additionally, because these proposed projects are located within the U.S. Fish and Wildlife Service's Quino Survey Area 1, Quino may use these areas to move between adjacent habitat patches. Therefore, protocol-level surveys should be conducted in the project areas to determine if Quino are present. **F0006-11**
10. It is premature to identify mitigation ratios for jurisdictional areas when formal jurisdictional delineation has not been completed. For projects with impacts to jurisdictional lakes or streambeds, the Department emphasizes that alternatives and mitigation measures be addressed in CEQA certified documents prior to submittal of an application of a Streambed Alteration Agreement (SAA). Any information which is supplied to the Department after the CEQA process is complete will not have been subject to the public review requirements of CEQA. Therefore, please ensure all impacts to jurisdictional waters are described in the final EIR/EIS. **F0006-12**
11. The Biological Resources section in the final EIR/EIS should include a discussion of any riparian habitat occurring in the project areas and whether or not arroyo toad, southwestern willow flycatcher, and least Bell's vireo habitat may occur in those project areas. **F0006-13**

**Proposed and Alternative Transmission Line Routes**

1. The impact analysis for the 13 reroute proposals mentions that reroutes would either result in no effect or an increase/decrease of impacts to sensitive vegetation communities (e.g., "This reroute would result in greater impacts to the same types of sensitive vegetation communities"), without quantifying the extent of the impact. The final EIR/EIS should include revisions to all the corresponding tables that quantify impacts to vegetation communities for each alternative route proposed (e.g., a revision should be made to Table E.2.2-2 to correspond with an increase or decrease in permanent and temporary impacts associated with a reroute proposal identified in the recirculated draft EIR/EIS). **F0006-14**
2. Section 3.3.4.6 mentions that the Highway 67 Hansen Quarry Reroute would shift the transmission line route to the east from Hansen Aggregate property onto land owned by the **F0006-15**

**Comment Set F0006, cont.**

**U.S. Fish & Wildlife Service and California Department of Fish & Game**

Ms. Blanchard and Ms. Kastoll (FWS-SD/CDFG-2008B0423/2008TA0847)

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City of San Diego. This reroute would encroach into City of San Diego's Multiple Species Conservation Program cornerstone land holdings. A discussion regarding effects on land use impacts should be provided in the final EIR/EIS to address these concerns.

F0006-15 cont.

3. Impacts to vegetation communities that will result from additional workspace needs for the Interstate 8 Alternative (Table 4.1 of the recirculated draft EIR/EIS) should be incorporated in the Table E.1.2-4 of the final EIR/EIS.

F0006-16



**ERIC GIBSON**  
DIRECTOR

## County of San Diego

### DEPARTMENT OF PLANNING AND LAND USE

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November 24, 2010

Dr. Jerry Pell  
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U.S. Department of Energy  
1000 Independence Avenue, SW.  
Washington, DC 20585  
email: [Jerry.Pell@hq.doe.gov](mailto:Jerry.Pell@hq.doe.gov)  
facsimile: 202-318-7761

#### **Energia Sierra Juarez Transmission Line Environmental Impact Statement Comments (DOE/EIS-0414)**

Dear Dr. Pell:

The County of San Diego (County) has reviewed the Draft Environmental Impact Statement (EIS) published September 17, 2010 in the Federal Register. The County appreciates the Department of Energy's (DOE) request to participate as a Cooperating Agency and this opportunity to provide comments and make specific requests regarding the proposed development and environmental review. As you are aware, the County has a separate discretionary permitting and environmental review process currently underway that will address the specific issues of concern with the components of the project we have land use jurisdiction over. The comments provided in the attachment to this letter address the comments made by the County in previous letters, general deficiencies of the EIS, and potential conflicts with the ongoing environmental review that the County is partaking with the California Public Utilities Commission (CPUC), related to this project.

The Energía Sierra Juarez U.S. Transmission Line Project (ESJ) is required to comply with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), for the issuance of the County Major Use Permits and the DOE Presidential Permit. In accordance with CEQA Section 15221, the County should use this Environmental Impact Statement (EIS) in-lieu of preparing its own Environmental Impact Report (EIR). In order for this document to be adequate for the County to rely on for its discretionary actions, this EIS would have to comply with the

provisions of the State and County CEQA Guidelines. Because NEPA does not require separate discussion of mitigation measures or growth inducing impacts, these points of analysis would need to be added, supplemented, or identified before this EIS could be utilized by the County as an equivalent to an EIR.

The County of San Diego appreciates the opportunity to participate in the environmental review process for this project. We look forward to receiving future environmental documents related to this project or providing additional assistance at your request. If you have any questions regarding these comments, please contact the County Project Manager Patrick Brown at (858) 694-3011 or e-mail Patrick.Brown@sdcounty.ca.gov.

Sincerely,



ERIC GIBSON  
Director, Department of Planning and Land Use

Attachments: EIS Comment Spreadsheet

Email cc:

Alberto Abreu, Director Project Development, Sempra Generation, 101 Ash Street, HQ14A San Diego, CA 92101

Jeff, Murphy, Deputy Director, Department of Planning and Land Use M.S.O650

Patrick Brown, Project Manager, Department of Planning and Land Use, M.S. O650

LeAnn Carmichael, Planning Manager, Department of Planning and Land Use, M.S. O650

Section		Subsection Paragraph Sentence	Comment or Issue
1	Introduction	1.3 Pg. 1-8	The project objectives should be updated as follows, " stated objective is for the proposed transmission line is to transport <u>only renewable</u> electrical power generate by the ESJ Wind Power project in Mexico..."
2	General		As communicated during the NOI process, the County of San Diego, Land Use and Environmental Group, has developed Guidelines for Determining Significance (Guidelines) that are used to assist in determining environmental impacts in the unincorporated portions of the County. The current EIS incorporates these guidelines for only one resource area - Visual Resources. The County recommends the EIS utilize the Guidelines for each applicable resource area in order to adequately evaluate and mitigate for environmental impacts to the unincorporated County or County facilities.
3	Introduction	Pg. 1-13 and 14:	Sunrise Powerlink (SRPL) as a Connected Action: The response provided by Sempra doesn't answer the technical question as to how the project could be connected without the SRPL. The letter provided by Sempra makes unsubstantiated conclusion without any technical backup. The applicant should discuss the technical logic behind "Special Protection Schemes" and "Low Cost Incremental Generation," as it relates to the projects ability to interconnect to the existing Southwest Powerlink (SWPL).
4	Introduction	Pg. 1-13 and 14:	The EIS does not describe the Sempra Application for the Groundwater Extraction Major Use Permit in any detail. The Groundwater project is a connected action and should be fully discussed within this EIS.
5	Range of Alternatives	Pg. 2-1	The EIS does not present a reasonable range of alternatives. Pursuant to NEPA, a reasonable range would include alternatives, aside from the proposed action, that would both satisfy the purpose and need and avoid or minimize significant environmental impacts. The ESJ EIS includes three alternatives: Alternative 1, No Action Alternative; Alternative 2, Double Circuit 230-KV Transmission Line (designated as the Applicant's preferred project); and Alternative 3, Single-Circuit 500-KV Transmission Line. The EIS is flawed in that it treats the double circuit and the single circuit transmission lines as both an option under the proposed action and as alternatives to the proposed action. The Single-Circuit 500-KV Transmission Line Alternative does not meet the reasonable range standard as it is more impactful and would therefore have increased impacts over the Applicant's preferred project, the Double Circuit 230-KV Transmission Line. A reasonable range of alternatives would put forth alternatives that would <i>reduce</i> impacts rather than increase impacts under the proposed action ( <i>Roosevelt Campobello International Park Commission v. EPA</i> , 684 F 2d 1041 (1st Cir. 1982).
6	Range of Alternatives	Section 2.4-5 Pg. 2-1	CFR 1502.14 Alternatives including the proposed action: DOE is required to rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives, which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated. The EIS does not evaluate a reasonable range of alternatives, nor does the EIS provide a reasonable amount of alternatives that have been screened out. The EIS only screen out one alternative (The Undergrounding). The EIS should consider more alternatives and should provide a list of feasibility factors based on cost, logistics, technology, social, environmental, and legal factors. Also, the EIS does not include reasonable alternatives not within the jurisdiction of the lead agency DOE.

Section	Subsection, Paragraph, Sentence	Comment or Issue
7	Range of Alternatives Section 2.4-5 Pg. 2-1	<p>NEPA guidelines require the consideration of a reasonable range of alternatives, defined as alternatives that are realistic (not speculative) that may be feasibly carried out based on technical, economic, and environmental factors (40 CFR 1502.1 et seq.). NEPA requires that the EIS fully considered any alternative that has the potential to avoid or substantially lessen any of the significant environmental effects of the project. The following are alternatives that should be considered. The County is willing to work with DOE to consider the following Alternatives and a possible screening criteria.</p> <ol style="list-style-type: none"> <li>1. No Project Alternative:</li> <li>2. Monopole Alternative: No reductions to visual           <ul style="list-style-type: none"> <li>• 230kV Double Circuit, 500 kV Single Circuit</li> </ul> </li> <li>3. Lattice Tower Alternative: Reduces Visual impacts.           <ul style="list-style-type: none"> <li>• 230kV Double Circuit, 500kV Single Circuit</li> </ul> </li> <li>4. Underground Alternative: Reduces Fire, Biological, and Visual impacts           <ul style="list-style-type: none"> <li>• 230kV Double Circuit, 500kV Single Circuit</li> </ul> </li> <li>5. Alternative Locations: Unknown reductions           <ul style="list-style-type: none"> <li>• Mexico Reroute using existing infrastructure possibly an alternate location along US Mexico Border</li> </ul> </li> <li>6. ECO-Substation Shift 700' East: Reduces Cultural Resources           <ul style="list-style-type: none"> <li>• Same as indicated in alternatives 2-4</li> </ul> </li> </ol>
8	Alternatives Considered but Dismissed Subsection S.7.2, page S-11	<p>Underground Transmission Line. The EIS concludes the construction of an underground transmission line to not be a reasonable alternative and provides no further analysis. However, given the substantial benefit that would result from underground transmission lines to areas of public health and safety, community character, aesthetics, and fire and fuels management, the County requests a NEPA level cost-benefit analysis of this potential alternative. The EIS should not consider costs when evaluating impacts. The County would like DOE to reconsider the underground alternative.</p>
9	General: CEQA Compliance NA	<p>The ESJ project is required to comply with CEQA and NEPA for the issuance of the Major Use Permits and the Presidential Permit. In accordance with CEQA Section 15221, the County should use this EIS if it were certified before the East County Substation EIR/EIS. In order for this document to be adequate for the County to use for its discretionary actions, this EIS would have to comply with the provisions of the State and County CEQA Guidelines. Because NEPA does not require separate discussion of mitigation measures or growth inducing impacts, these points of analysis will need to be added, supplemented, or identified before this EIS could be used by the County as an EIR. The County does not intend to use the DOE EIS for its discretionary actions, but it appears that this EIS may be completed substantially sooner than the aforementioned East County Substation EIR/EIS. DOE and the applicant may consider revising or supplementing this EIS as mentioned, so the County could use the document. The County's comments in this letter do not construe the necessary changes that would be required to comply with CEQA Section 15221. A separate review and comment period would need to be provided to the County to complete such review.</p>
10	Mitigation Measures NA	<p>To ensure that environmental effects of the proposed action are fairly assessed, the EIS should discuss the probability of the mitigation measures being implemented by the Cooperating Agency (NEPA Section 1502.16(h)). The enforceability of mitigation measures is questionable. For example, the Air Quality mitigation measures described in Section 3.10.3 Air Quality # 3 is an inadequate mitigation measure because it is not a specific, tangible item that could be implemented. To encourage carpooling is to "strive" to achieve rather than actually resulting in a physical change. Revise all the mitigation measures to be adequate and feasible.</p>

Section		Subsection, Paragraph, Sentence	Comment or Issue
11	Project Operations	Section 2.4.3, page 2-10	The County recommends the EIS rectify the recommendations regarding the installation of lighting for the proposed towers. While the FAA has determined the height of the towers to be acceptable and would not require lighting, the EIS also states the U.S. Border Patrol may request lighting to be installed. The placement and use of lighting on the towers would potentially cause indirect impacts to wildlife. However, if lighting is not proposed, the towers may cause potential hazards to the U.S. Border Patrol operations. The EIS must clearly state and analyze whether or not the proposed towers would include lighting.
12	Biological Resources	Section 3.1.1.6 Special Status Wildlife Species	The County observed evidence and testimony in the Public Hearings that there is a potential for the Peninsular Bighorn Sheep, which is a federally-listed endangered and state-listed threatened/fully protected species to be present within the project site and area. The DOE should request US Fish and Wildlife Service to re-evaluate the possibility that the species' critical habitat may be shifting, the potential for presence on the project site, and any additional direct or indirect impacts this species.
13	Biological Resources	Section 3.1.1.7 Special Status Wildlife Species	The US Border Fence is a barrier for wildlife movement. A portion of the project parcels are located in the mountainous terrain that is not occupied by the border fence. Therefore, this area could be considered a wildlife corridor for Peninsular Bighorn Sheep movement between the United States and Mexico. The EIS should reevaluate the occurrence and movement of the species within the project area.
14	Biological Resources	Section 3.1.2, Environmental Impacts	The EIS does not adequately analyze impacts to avian species. The EIS based the lack of presence of major migration corridors on the general characteristics of the landforms and the absence of extensive wetlands and riparian areas. The presence of avian species and potential impacts to them should be based on accepted biological survey methods rather than assumptions regarding topography. Nonetheless, the EIS concluded the project would result in "direct mortality of cross-border migratory birds due to collisions with transmission lines and wind turbines" without providing potential mitigation measures. The EIS goes on to describe potential environmental protection measures under the authority of the Mexican government (the requirement of avian and bat monitoring studies). Merely performing studies does not reduce the effects of the project. The EIS should identify specific mitigation measures that would reduce the potential effects to the Migratory Birds and raptors. DOE should ensure that these measures are adequate and/or feasible.
15	Biological Resources	Section 3.1.3 Mitigation Measures	The following Biological Mitigation needs to be added to the project as indicated in the Biological Resource report provided by the County: (1) Provide for Mitigation of the direct biological impacts by either habitat compensation or conservation for the permanent impacts to native vegetation communities. (2) Conduct pre-construction nesting bird surveys, for the California Horned Lark and Loggerhead shrike, or any other bird subject to the MBTA. Implement all appropriate avoidance measures for identified nesting birds.
16	Visual	Section 3-58	Summary: The use of the lattice tower is preferable over a monopole design. The County prefers the lattice tower design. This design should be the preferred alternative for the DOE Records of Decision.
17	Visual	Section 3.2.3 Mitigation Measures	The lattice or monopole towers should be painted a light tan or desert color to blend with the topography better. This has been done on other desert transmission lines that can be seen from Interstate 15 north between Riverside and Barstow, CA.



Section	Subsection Paragraph Sentence	Comment or Issue
18	Land Use Section 3.3.2.3 Pg. 3-66-70	<p>Zoning and Planning Consistency: The General Plan Land Use Policy 2.4, Multiple Rural Use (18) states, "...that a public improvement project may be approved even when there are identified adverse environmental impacts if the County of San Diego decision-makers adopt findings that demonstrate that the adverse impacts have been mitigated to the greatest extent feasible and that the project is necessary to protect the public health and safety." The ESJ Project is not a Public Utility nor is it considered to be a public project. Sempra is a private entity. Adverse environmental impacts have been analyzed in the EIS; therefore the project is not consistent with this policy. Because the EIS identifies a conflict with land use plan or policies, then the lead agency must determine the significance of the conflict. Unless specifically precluded by other laws from causing or contributing to a conflict with this particular policy, the lead agency may proceed with the proposed action despite the potential conflict. However, the Record of Decision should reflect the issue, discuss the availability of mitigation measures (demonstrate mitigation has been proposed to the greatest extent feasible) and explain the lead agency's decision to override the land use plans or policies for the area.</p>
19	Land Use Section 3.3	<p>The Land Use Section does not discuss the County of San Diego General Plan Update, which has since been to the Board of Supervisors for two public hearings, and has been continued to December 8, 2010. The County requests that the Land Use Section incorporate an analysis of the General Plan Update to provide the DOE decisions makers a broad view of the proposed land use policies that may supersede the existing plan goals and policies. The General Plan Update may be in affect before the Record of Decision is made public.</p>
20	Cultural Resources Section 3.5.3 Mitigation Measures	<p>The EIS should require a cultural resource construction grading monitoring and potential data recovery program to be conducted by a County of San Diego Qualified consultant. The construction crew should not be responsible for monitoring for potential sensitive cultural resources. See the County of San Diego Guidelines for Determining Significance and the Report Format and Content requirements. <a href="http://www.sdcounty.ca.gov/dplu/docs/Cultural_Report_Format.pdf">http://www.sdcounty.ca.gov/dplu/docs/Cultural_Report_Format.pdf</a>. and <a href="http://www.sdcounty.ca.gov/dplu/docs/Cultural_Guidelines.pdf">http://www.sdcounty.ca.gov/dplu/docs/Cultural_Guidelines.pdf</a></p>
21	Noise Section 3.6.2.2 Environmental Impacts Pg. 3-97	<p>The Project does not analyze the potential impacts to the US from the Wind Turbine modulation and low frequency noise. The nearest sensitive receptor is .75 miles away from the nearest turbine located within the US. The EIR/EIS should provide noise analysis and quantifiable data to demonstrate that low frequency noise will not create a noise impact on existing sensitive receptors. The Following paper should be considered as a methodology for determining the impacts from the Baja Wind Project: ("The 'How To' Guide to siting Wind Turbines to Prevent Health Risks From Sound" Version 2.1 dated October 28, 2008 prepared by George W. Kamperman and Richard R. James). Additionally the American Wind Energy Association Method may be calculated in addition to the Kamperman Method.</p>
22	Transportation and Traffic Section 3.7	<p>The EIS should include the Traffic Control Plan (TCP) as an APM.</p>
23	Transportation Air Traffic Safety Section 3.7 Pg. 3-107	<p>The EIS mitigation T-1 should also include coordination with CALFIRE (The San Diego Rural Fire Protection District).</p>
24	Air Traffic Safety Section 3.7	<p>The EIS should address the potential impact from the wind tower/turbines built to up to 431 feet to airport operations in the U.S. Currently, the EIS addresses aviation impacts due to the development of the transmission lines, however is silent regarding impacts in the U.S. from related activities in Mexico (development of wind towers). Potential impacts could be the effects of the wind turbines on military and civilian radar or potential flight paths.</p>
25	Fire Safety Section 3.9.2	<p>The conclusions in the EIS that the introduction of the project would only be a minor to moderate impact on Fire Safety is not accurate. The portion of the unincorporated county that the project is proposed is considered to be Very High Fire hazard designation. The fire fighting infrastructure and man power is relatively low in comparison to other areas within the county. The introduction of this use within this high fire hazard area makes the risk to human life and safety an unavoidable major and permanent impact. Although mitigation has been proposed, the County does not agree that it lowers the level and significance of the effect.</p>

Section		Subsection, Paragraph, Sentence	Comment or Issue
26	Fire Safety	Section 3.9.3 Mitigation	The EIS should require as a mitigation measure, a Fire Service Development Agreement with the Rural Fire Protection District. This mitigation measure would ensure that the fire services would be available to adequately serve the project.
27	Air Quality and Climate Change	Section 3.10	Use of the Proposed Transmission Line for Non-Renewable Energy Projects: The applicant "Sempra Generation" indicated at the public hearings that they provided documentation to DOE that the proposed transmission line would only be used for transmitting renewable energy. The County concurs with Sempra that the lines should only be used for such purpose because it is foreseeable that the ESJ transmission line could be utilized to transport energy from other nonrenewable resources, such as natural gas. The Presidential Permit Record of Decision should specifically be conditioned to only be used for renewable energy, specifically wind energy from Northern Baja because all practicable means to avoid or minimize environmental harm should be considered (40 CFR 1505.2.c).
28	Air Quality and Climate Change	Section 10.2.3	The measures mention in this section should be made a mitigation measure to reduce the impacts from fugitive dust. Also, any soil stabilizer needs to be a permeable material.
29	Air Quality and Climate Change	Section 3.11	The EIS concludes the project would have a quantifiable positive effect on the environment over the long-term since greenhouse gas (GHG) and criteria emissions from fuel combustion would be avoided because the project would only transmit clean renewable energy (EIS, page 3-146). The EIS should identify that the project is to only transmit renewable energy as a mitigation measure. This would ensure that the GHG emissions would be mitigated by avoidance in accordance with 40 CFR 1508.20. Failure to implement this mitigation measure would not meet the objectives of the EIS and could result in increased impacts to the unincorporated county because the emissions from potential additional fossil fuel power plants in Mexico could increase greenhouse gas emissions, affect climate change, and adversely impact air quality and resources in the San Diego County. If not mitigated, the EIS should evaluate the resulting GHG emissions that could be created by a maximum of 1250 megawatts of fossil fuel based generation.
30	Water Resources	Section 3.11	Surface and groundwater hydrologic features do not cease at the international border. The Hydromodification Analysis should include the entire international drainage area to adequately analyze runoff and storm water flows from grading and construction in both the US and Mexico (see EIS Figure 3.11-1). Furthermore, the conclusions on page 3-158 (Impacts in the U.S. due to Related Activities in Mexico), do not account for potential impacts of flooding or flash flooding due to development of the proposed action in Mexico. The EIS states that "no surface water features traverse the U.S. Mexico border in the project area." However, there is no evidence that surveys were conducted across the border for development of the proposed action in Mexico. Figure 3.11-2 illustrates the survey boundaries, the extent of which end approximately 100 feet into Mexico.
31	Water Resources	3.11.1.2	The groundwater analysis does not analyze the direct effects to the Jacumba Valley Aquifer and groundwater basin because it does not consider the Groundwater extraction Major Use Permit (Connected Action) that the County is concurrently processing. The County can provide the groundwater investigation reports that conclude that there would be no impact to a minor impact to the water basis in Jacumba.
32	Minor Editorial Comment	Page 2-15	EIS inconsistently states the frequency of required fire clearing as both once per year and twice per year. The County recommends clarifying that this would occur twice per year as required by the Rural Fire Protection District, which is consistent with recommendations from the FPP letter report.
33	Minor Editorial Comment	Page 2-24	The EIS incorrectly references Figure 2-8 as providing a simulated view of the ECO Substation. Figure 2-8 does not provide a simulated view of the ECO Substation nor is there such a view in the EIS. The EIS should be corrected accordingly.
34	Minor Editorial Comment	Page 2-27	The EIS incorrectly references Figure 2-7 as providing a simulated view of the proposed wind towers.

Section		Subsection, Paragraph, Sentence	Comment or Issue
35	Cumulative Projects	NA	The DOE should update the project cumulative project list within the Counties of San Diego and Imperial. The cumulative list should also include all proposed renewable energy projects that are within the Bureau of Lands Management (BLM) jurisdiction. The County will provide an updated list to DOE.





# ***European Guideline***

**CFPA-E No 22:2010 F**

Wind turbines  
fire protection guideline



# **European Guideline**

## **FOREWORD**

The European fire protection associations have decided to produce common guidelines in order to achieve similar interpretation in European countries and to give examples of acceptable solutions, concepts and models. The Confederation of Fire Protection Associations in Europe (CFPA E) has the aim to facilitate and support fire protection work in European countries.

The market imposes new demands for quality and safety. Today, fire protection forms an integral part of a modern strategy for survival and competitiveness.

This guideline is primarily intended for those responsible for safety in companies and organisations. It is also addressed to the rescue services, consultants, safety companies etc. so that, in course of their work, they may be able to help companies and organisations to increase the levels of fire safety.

The proposals within this guideline have been produced by VdS Schadenverhütung and the author is Hardy Rusch from Germany.

This Guideline has been compiled by Guidelines Commission and adopted by all fire protection associations in the Confederation of Fire Protection Associations Europe.

These guidelines reflect best practice developed by the countries of CFPA Europe. Where the guidelines and national requirement conflict, national requirements must apply.

Zurich, 19 April 2010  
CFPA Europe

Dr. Hubert Rüegg  
Chairman

Stockholm, 19 April 2010  
Guidelines Commission

Tommy Arvidsson  
Chairman



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## 1 Introduction

With the politically declared objective to support renewable energy sources and to increase their share in the overall energy supply significantly, wind turbines have developed rapidly over the last few years. In addition to the expansion of locations, the development is characterized by a constant increase of wind turbines' dimensions (hub height, rotor diameter). and a constant performance increase to up to 6 MW today

The value increase coming along with the performance increase of wind turbines, and increasing requirements with respect to the availability of wind turbines as well as loss experiences made over the last few years have caused

- the German Insurance Association (GDV) and
  - Germanischer Lloyd Industrial Services GmbH, Business Segment Wind Energy (GL Wind)
- to prepare a VdS-guideline (VdS 3523) on fire protection for wind turbines. This guideline is used as the basis of the following CFPA-Guideline on the same topic.

This guideline will describe typical risks of fire given under the special conditions of the operation of wind turbines. Measures for loss prevention will be suggested as a result of the fire risk analysis. The objective is to minimize the incidence rate and the scope of a potential loss by fire at wind turbines. In addition to special fire protection measures for detecting, fighting and preventing fires, procedural safety measures and comprehensive control technologies/systems for monitoring procedural operations and conditions are required. It must be ensured that the wind turbine is being transferred to a safe state as a result of early detection of malfunctions of the system.

***Note:** Measures, which are in responsibility of the operator during operation of a wind turbine and other important facts for the operator, are marked in grey.*

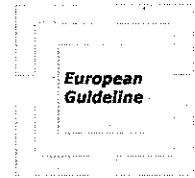
## 2 Scope of application

The present guideline refers to the planning and operation of wind turbines constructed as lattice mast or tower. The fire protection concept applies to individual wind turbines as well as to wind farms designed as onshore or off-shore installations.

Fire protection requirements on wind turbines refer to the overall system and take into account the system-specific main areas of risk at the rotor blades, in the nacelle (machine house), in the tower, or at the premises. Depending on the kind of risk, different fire protection measures might be required.

Fire protection measures are specifically designed for the operation and for servicing and maintenance activities resulting from the operational process. All fire protection measures should be ready for operation by the time the operation starts at the latest. Fire protection measures mentioned in this guideline do not take into account the assembly period.

This guideline basically applies to turbines that will be newly built. Existing turbines should be adjusted to the fire protection measures mentioned in this guideline as far as is feasible.



### 3 Risks

Wind turbines differ from traditional power generation systems in terms of the basically existing risk of total loss of the nacelle as a result of initial fire. Main features of risk include:

- High concentration of values within the nacelle
- Concentration of potential ignition sources within the nacelle, and increased risk of lightning strikes
- Unmanned operation
- No possibility of fighting the fire by fire brigades because it is too high
- Remote, sometimes difficult to reach locations of the wind turbines, which is the case with offshore installations in particular

The expenses for wind turbines and their components as well as the restoration costs after a fire increase with the increase of the installed capacity. In addition, the loss caused by service interruption increases with increasing capacity.

#### 3.1 Damage to property and follow-up costs

According to the insurers' loss experience, fires at wind turbines can cause significant damage to property and very high follow-up costs – as shown in the following examples – amongst others due to the downtime of the wind turbine and liability claims, etc.

##### 3.1.1 Property risk

Loss by fire in wind turbines may occur

- in the nacelle,
- in the tower,
- in the electric power substation of the wind turbine or the wind farm.

Today, in most new wind turbines,

- switchgear, inverter, control cabinets and
- transformer

are placed in the nacelle. Thus, the risk of fire increases significantly there. Due to the high density of technical equipment and combustible material in the nacelle, fire can spread rapidly. Moreover, there is the danger that the upper tower segment will also be damaged in addition. In case of a total loss of the nacelle, the restoration costs may well reach the original value of the wind turbine.

With respect to offshore wind turbines, significantly higher costs for required special ships, e.g., floating cranes or cable layers are to be expected. In the case of partial loss, in particular, this can significantly increase the overall loss expenses.



### 3.1.2 Service interruption exposure

Experience has shown that where wind turbines are damaged, service interruptions usually take some time. Interruptions of several months are not unusual. In the case of total damage to the nacelle, the time of service interruption may well last 9 to 12 months. Components with the longest delivery time include, amongst others, gearbox, generators, and transformers. In case of damages to offshore wind turbines, the dependency on the weather when trying to reach the turbines and the dependency on the availability of a crane/service ship cause additional difficulties.

If the damage is so severe that it would be sensible in economic terms to rebuild the turbine, the operator is subject to official obligations. The notice of approval for erecting a wind turbine usually specifies the type of the wind turbine. The operator does not have any possibility to erect a modified turbine at the site of the damaged wind turbine if

- the notice of approval does not apply any longer or
- there is no approval for repowering.

In both cases a new approval procedure is necessary, which might extend the time of service interruption.

If a wind farm's central electric power substation is damaged by fire, all connected plants are disconnected from the public power supply system at the same time. The loss of profits increases proportionally with the number of disconnected wind turbines. Central electric power substations of offshore wind farms represent a particularly high risk of service interruption since they

- comprise a large number of individual turbines each,
- are particularly efficient, which usually results in longer delivery times in case replacements are required, and
- might be difficult or impossible to reach at some times and depend on the availability of crane/service ships, like offshore wind turbines.

### 3.1.3 Forest fires

A fire in a wind turbine can lead to the situation, that burning elements, which fall down, can cause a secondary fire on the ground where the tower is located. These circumstances can result in a forest fire, difficult in some cases to be extinguished. Very often long distances between the wind energy plant and the fire station and the strong wind prevailing in these places are both factors that can promote the quickly spreading of forest fires.

In these cases the losses not only concern the direct costs for the burned forest, but more the unrecoverable damage to the environment.

## 3.2 Examples of damages

### 3.2.1 Fire damage caused by lightning strike

During a heavy summer thunderstorm, the blade of a 2 MW wind turbine was struck by lightning. The turbine was shut down automatically and the blades were pitched out of the wind.

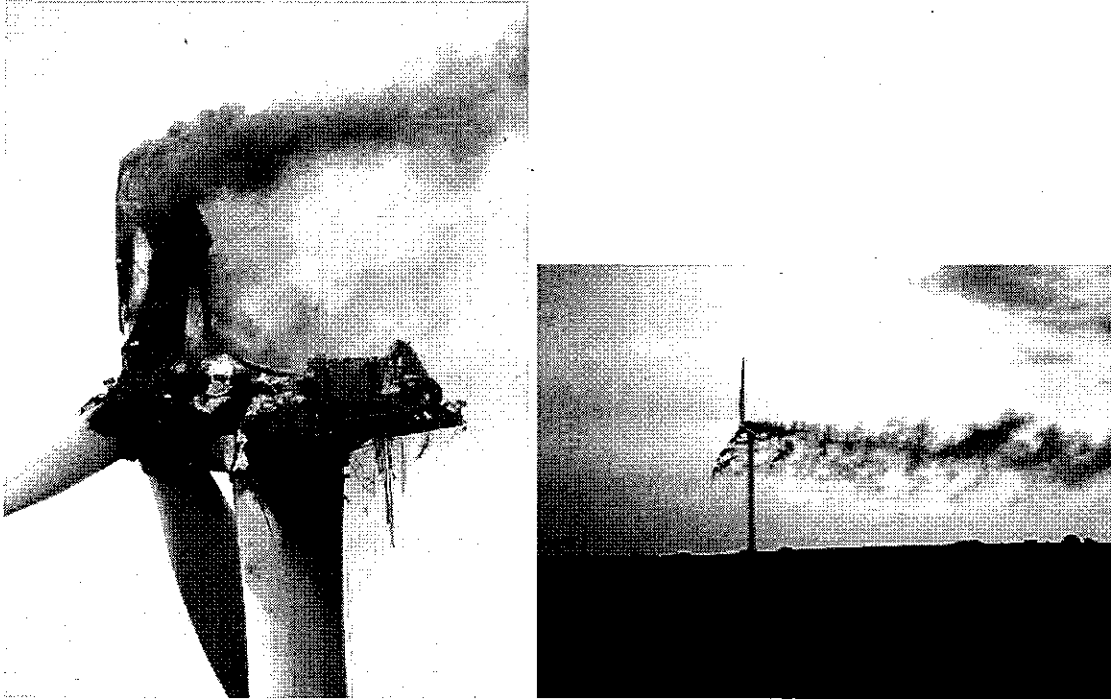


Fig. 1a+b: Fire after lightning struck a 2 MW wind turbine in 2004 (Image source: HDI/Gerling)

The burning blade stopped at an upright position and burned off completely little by little. Burning parts of the blades that fell down caused a secondary fire in the nacelle.

Investigation of the cause of the loss showed that the fire in the blade was caused by a bolted connection of the lightning protection system that was not correctly fixed. The electric arc between the arrester cable and the connection point led to fusion at the cable lug and to the ignition of residues of hydraulic oil in the rotor blades. The nacelle, including the rotor blades, had to be referred to as a total loss. The upper part of the tower had also been destroyed due to the high temperature.

Operations were interrupted for approximately 150 days; the total loss amounted to approximately EUR 2 million. Deficient lightning arrester installations in the rotor blades of wind turbines have already caused several fires.

### 3.2.2 Fire damage caused by machinery breakdown

The nacelle of a 1.5 MW wind turbine completely burned out after the slip ring fan of the double-fed induction generator had broken. Sparks that were generated by the rotating fan impeller first set the filter pad of the filter cabinet on fire and then the hood insulation. The damage to property amounted to EUR 800,000.

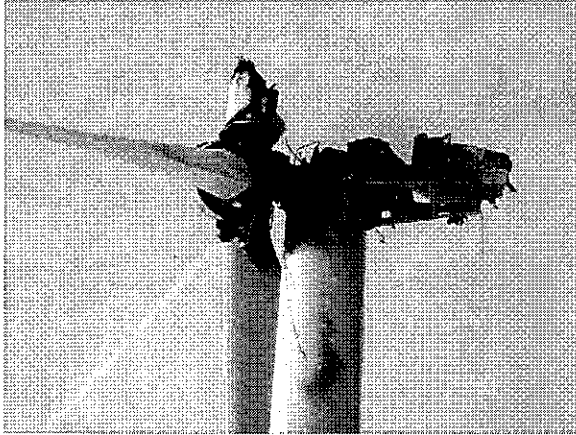


Fig. 2: Burnt down nacelle of a 1.5 MW wind turbine (Image source: Allianz)

### 3.2.3 Fire damage caused by failure in electrical installations

Low voltage switchgear was installed within the nacelle of a 1 MW wind turbine. The bolted connection at one of the input contacts of the low-voltage power switch was not sufficiently tightened. The high contact resistance resulted in a significant temperature increase at the junction and in the ignition of adjacent combustible material in the switchgear cabinet. The fuses situated in front did not respond until the thermal damage by the fire was very severe. Control, inverter and switchgear cabinets that were arranged next to each other suffered a total loss. The interior of the nacelle was full of soot. Despite the enormous heat in the area of the seat of fire, the fire was unable to spread across the metal nacelle casing. The damage to property amounted to EUR 500,000.

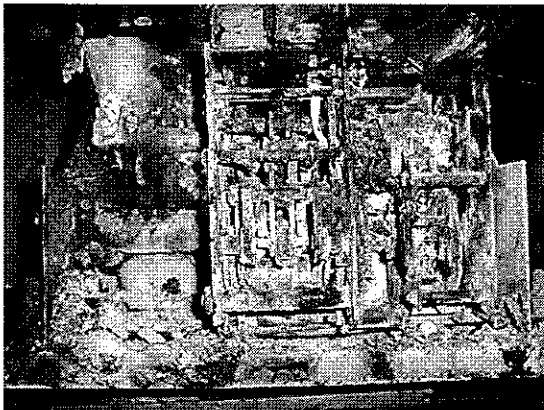


Fig. 3: Power switch of a 1 MW wind turbine – destroyed by fire (Image source: Allianz)

### 3.2.4 Fire damage caused by resonant circuits

Several areas of damage were caused by parallel resonant circuits existing of capacitors (reactive power compensation or line filters) and inductances (generator, turbine transformer, energy supply companies, power chokes, etc.) which had not been taken into account when designing the turbine. The resonant circuits were activated by harmonics. Resonance phenomena generated high currents which damaged capacitors. Breakdowns in the dielectric of the already damaged capacitors – usually caused by overvoltage events – resulted in an increase of power loss and in some cases in the bursting of the capacitor containers. The resulting fires caused total loss to the reactive power compensation or to the inverter. Protective circuits through discharge resistors and choking were not available in these cases.



Fig. 4: Burst pressure vessel of a line filter capacitor (Image source: Allianz)

### 3.3 Causes of loss by fire

Based on loss experiences of insurers, the following paragraphs will provide an overview of typical causes of an outbreak and spread of fire.

The causes of loss by fire are basically the same with offshore wind turbines and with onshore wind turbines. However, due to stronger exposure to environmental conditions and currently still quite limited experiences, the probability of technical defects and thus the risk of fire are probably higher with offshore wind turbines than with onshore wind turbines.



### 3.3.1 Increased risk of an outbreak of fire caused by lightning strike

A large number of cases of loss have shown that lightning strikes are among the most frequent causes of fire at wind turbines. The special risk of lightning strikes arises from the exposed locations (often located at a higher altitude) and the large height of the structure, amongst others.

The risk of fire increases particularly when the lightning protection system is not implemented and maintained properly. If the contact resistance of the lightning conductor path is too high, thermal damage is almost inevitable in case of lightning strike.

### 3.3.2 Electrical installations

Besides lightning strikes, failures in electrical installations of wind turbines are among the most common causes of fire. Fire is caused by overheating following overloading, earth fault/short circuit as well as arcs. Typical failures include the following:

- Technical defects or components in the power electronics (e.g., switchgear cabinet, inverter cabinet, transformer) that have the wrong dimensions
- Failure of power switches
- Failure of control electronics
- High contact resistance due to insufficient contacts with electrical connections, e.g., with bolted connections at contact bars
- Insufficient electrical protection concept with respect to the identification of insulation defects and selectivity of switch-off units
- No or no all-pole disconnection of the generator in case of failure/switch-off of the turbine
- Missing surge protection at the mean voltage side of the transformer
- Resonances within RC (resistor-capacitor) circuits (line filter, reactive power compensations)

### 3.3.3 Hot surfaces

If all aerodynamic brakes fail, mechanical brakes, which slow down the rotor, can reach temperatures that result in an ignition of combustible material. In case of such an emergency braking, flying sparks that are caused by mechanical brakes without covers also pose a high risk since flying sparks might also ignite combustible material that is further away. Defects at turbines or parts thereof, e.g., leakage of the oil systems and dirt, increase the risk of fire.

Other risks exist in case of overloading and poor lubrication of generator and gearbox mountings. In these cases the mountings get too hot. Combustible material and lubricants can ignite when they get in contact with hot surfaces. For example, if a failure at the mounting leads to rubbing of rotating components, the flying sparks resulting might cause a fire.

### 3.3.4 Work involving fire hazards

Work involving fire hazards relating to repair, assembling and disassembling work, e.g., welding, abrasive cutting, soldering and flame cutting, are a frequent cause of fire. Due to the high temperatures that occur during these activities, combustible material that is in the close or further environment of the working site may get on fire. Welding, cutting and grinding sparks are particularly dangerous since they can ignite combustible material that is at a distance of 10 m and more from the working site. Many fires break out several hours after the completion of work involving fire hazards.



### 3.3.5 Fire load

A wide variety of combustible materials that can cause an outbreak of fire and result in a fast spread of fire are being applied in the nacelles of wind turbines, e.g.,

- internal foam sound insulation of the nacelle, in parts contaminated by oil-containing deposits,
- plastic housing of the nacelle (e.g., GRP),
- oil in the hydraulic systems, e.g., for pitch adjustments, braking systems; if there are any damages or if the temperature is very high, high pressure in the hydraulic pipes can cause the hydraulic oil to escape finely nebulized, and this can cause an explosive spread of the fire,
- gearbox oil and other lubricants, e.g., for the generator bearings,
- transformer oil,
- electrical installations; cables, etc.

Hydraulic oils, oil-containing waste that has not been removed, and lubricants, which are stored in the nacelle are additional fire loads and not only increase the general risk of fire unnecessarily, but also increase the risk of a spread of fire.

### 3.3.6 Strongly limited accessibility for fire fighting

With the currently available means, fire brigades do not have any chance to fight a fire at wind turbines if the nacelles or rotors are affected. The fire brigade's turntable ladders do not reach the necessary height. Therefore, a nacelle that is on fire cannot be reached from the outside. The way towards the nacelle via ladder or elevator of a burning turbine is also perilous for fire fighters, and therefore, this is also not an option. Fire fighters are exposed to the risk of getting hurt by burning parts falling down even on the ground in the surroundings of the turbine. Due to the fact that there is an increasing trend to integrate transformers into the nacelle, fire fighters also have to pay attention to high-voltage power lines.

With respect to the fires that have occurred so far, the fire fighters' work has been restricted to the protection of the location of the fire and the prevention of secondary fires on the ground or at adjacent installations.

In case offshore wind turbines are affected by fire, manual fire fighting from the outside is not to be expected.

### 3.3.7 Restrictions with respect to maintenance (servicing, inspection and repair)

Due to the cramped confines in wind turbines and the limited accessibility of the turbines' components it is very difficult for the maintenance staff to conduct maintenance work appropriately and professionally. The quality of work might suffer from the difficult conditions.

## 4 Protection targets and protection concept

Experience has shown that in order to ensure the required fire safety it is always sensible to prepare a fire protection concept after consulting with all parties involved, the insurer in particular. According to this concept, all structural, turbine-specific and organizational protection measures shall supplement each other in terms of risk and protection targets, and any kind of mutual impairment of protection functions shall be excluded. The risks of an outbreak of fire shall be limited effectively by the following, amongst others:





- Use of non-combustible or difficult to ignite materials
- Early fire detection with automatic fire detection/alarm systems
- Frequent as well as professional maintenance
- Automatic switch-off of the turbines and complete disconnection from the power supply system in the case of fire risks being identified
- Training of employees with respect to handling dangerous situations, and in-house regulations with respect to work involving fire hazards, e.g., welding permit procedure.

In order to limit the risks of fire spread,

- early fire detection with automatic fire detection/alarm systems and
- fire fighting with automatic fire extinguishing systems

have proven to be effective in addition to the use of fire resistant components and shall be installed.

Moreover, an emergency plan in order to limit potential damages shall be prepared. The plan must be kept updated. Implementation of this plan should be ensured by means of staff training that take place on a regular basis.

Highly acknowledged rules of technology have been prepared for planning, implementation and operation of these fire precautions as well as for assuring their quality. The present European Guidelines shall be used, harmonised on the special boundary conditions of wind turbines (e.g. climate and temperatures in and outside of the nacelle, etc.).

In addition, changes of the conditions in the power train can be detected early on by means of condition monitoring systems (CMS), and thus the risk of an outbreak of fire due to such changes can be prevented (see also Germanischer Lloyd (GL), guideline for the certification of condition monitoring systems for wind turbines).

In case existing wind turbines shall be revised in terms of fire protection according to this guideline, it should be clarified in advance with authorities, the manufacturer of the turbine, the certifying body of the turbine, and the insurer, amongst others, whether a renewal of the official approval and certification of the turbines might be required due to retrofitting. It is generally sensible to grade the required scope of protection depending on the risk parameters. In doing so, the following have to be taken into account, e.g.,

- loss experiences with different types and components of turbines,
- capacity of the turbine in MW,
- structure of the wind turbine and arrangement of risk components,
- location of the turbine (onshore or offshore),
- amount insured, and
- amount of deductibles.

The required scope of protection for wind turbines may vary depending on the object-specific risk and the risks to be insured, which can also significantly determine the insurability according to the insurers' experience.



Table 1 shows an example of the grading of protection measures by means of so-called protection levels (independent from e.g. the location or capacity of the wind turbine because of the low influence out of that). It is possible to agree upon a different grading of protection measures after consulting with the insurer. Lightning and surge protection according to paragraph 5.1.1 as well as general electrical protection measures according to paragraph 5.1.2 are generally implied.

Thinking about losses due to business interruption, the protection level of a wind energy plant can vary depending on the fact, if the plant is part of wind energy park or if it is a single plant.

Moreover, in case the automatic early fire detection system which serves to monitor the installation is activated, the wind turbine shall be automatically shut down and disconnected completely from the power supply system.

Table 1: Examples of protection levels

Protection measures as modules	Protection levels			
	0	1	2	3
Fire detection system – installation and room monitoring	x	x	x	x
Fire extinguishing systems – installation protection				
Control, inverter and switchgear cabinets (LV/MV)		x	x	x
Transformer			x	x
Hydraulic system				x
Slip ring housing of the generator				x
Fire extinguishing systems – room protection				
Raised floors with oil sump and cable and electrical installation			x	x
Nacelle with generator, transformer, hydraulic systems, gearbox, brake, azimuth drive				x
Hub with pitch drive and generator, if applicable				x
Tower base/platform with existing installations, if applicable				x

Evidence of the effectiveness and reliability of turbine-specific fire precautions can be provided through use of components and systems approved by an independent third party certification body.

The overall fire protection concept for wind turbines shall be checked by an independent, acknowledged body after consultation with the insurer, if applicable, with respect to whether an adequate protection against risk is ensured for the respective wind turbine.



## 5 Protection measures

The following explanations represent an instruction for specifying fire precautions in the framework of a turbine-specific fire protection concept.

### 5.1 Reducing the risks of an outbreak of fire

Potential risks of fire and explosions should be identified and important aspects of fire protection should be taken into account during the planning and construction phase.

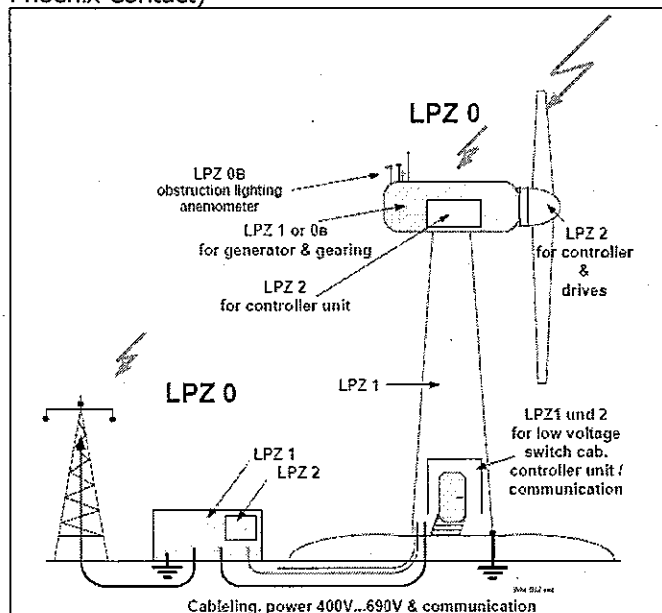
#### 5.1.1 Lightning and surge protection

Wind turbines have to be equipped with comprehensive lightning and surge protection that is adjusted to the individual type of turbine. Systems for lightning and surge protection have to be planned, build and operated like other components of the wind turbine according to the acknowledged rules of technology.

In order to plan systems for the purpose of lightning and surge protection it is necessary to do a risk evaluation or to assume the highest possible risk according to IEC 62305 (lightning protection level I = LPL I). When evaluating the risk, the possible lightning paths, e.g., from the rotor blade via hub, nacelle and tower to the foundation, have to be recorded and observed exactly.

Lightning and surge protection have to cover the nacelle and rotor blades, in particular, as well as any kind of electrical installations or equipment, including cable lines that are relevant for the operation and safety.

Fig. 5: Allocation of lightning protection zones (LPZ) at wind turbines with metal nacelle (Source: Phoenix Contact)



Attention has to be paid to the allocation of the wind turbines' components to individual lightning protection zones depending on the disturbance variable through partial lightning currents and switching surges that may be expected.



In order to design the turbines' components for lightning protection, the relevant protection level of the turbines has to be defined. In doing so, at least protection level II should be chosen for a comprehensive lightning protection system for wind turbines.

However, as is the case with high towers, low current lightning also poses a challenge to wind turbines. "Therefore, protection areas at the tower, nacelle, hub and rotors – also rotating – should be identified by means of the so-called rolling sphere method.

### 5.1.2 Minimizing the risk of electrical systems

The protection technology, which comprises any electrical installations as well as measures for identifying power system faults and other abnormal operating conditions at wind turbines and the associated peripheral systems, shall be state of the art and comply with current national standards. Its main task is to identify flaws selectively and to switch off faulty parts of the power system or individual electrical equipment, e.g., transformer, line, generator, immediately. There is currently no sufficient protection in most of the older wind turbines.

Graded protection concepts which create mutual reserve protection through the integration of the protection systems of adjacent equipment provide the best possible protection against fire. This applies to the overall system planned by the plant's manufacturer and the wind farm developer and for components which the planner creates on his own according to the plant manufacturer's requirements. For example, with the respective configuration, the risk of fire arising from an arc in a low-voltage switchgear can be prevented despite failure of the power switch. Appropriate arcing fault protection systems detect the fault and open the medium-voltage switch at the transformer's high-voltage side. Thus, the faulty component is being selectively disconnected from the power system. The same goes for high-resistance earth faults which emerge between low-voltage power switch and transformer.

The protection systems have to ensure immediate, controlled shutdown of the wind turbine with subsequent all-pole (medium-voltage side) disconnection from the power system. The activating of protection systems shall send a fault message to the remote control.

### 5.1.3 Minimizing combustible material

Hydraulic and lubricant oils should be chosen according to the following characteristics: in addition to their technical features required, they should preferably be non-combustible or have a high flash point which is significantly above the operating temperatures of the systems.

The application of combustible material, e.g., foamed plastics such as PUR (polyurethane) or PS (polystyrene) as insulating material or GRP (glass-reinforced plastics) for coverings and other components shall be avoided for fire protection reasons.

If the application of non-combustible material is impossible in individual cases, the material used shall at least be of low flammability. Moreover, closed-cell material with washable surface shall be used in order to avoid intrusion of impurities, oil leakage, etc., which otherwise would increase the risk of fire in the course of the operating time.

Cables and lines shall be used that preferably

- produce only slightly poisonous and corrosive decomposition products,
- do not cause much smoke and cause only little pollution of the rooms and content,
- do not support fire spread



when they burn.

When working with components that contain flammable liquids or oils, it must be made sure that leaking fluids are collected safely, e.g., by installing trays or by applying non-combustible oil binding agents. Leakages are to be removed immediately.

After the work has been completed, the collected fluids must be disposed properly, and contaminated oil binding agents must be removed from the system.

Combustible materials as well as auxiliary materials and operating materials are not allowed to be stored within the wind turbine.

#### **5.1.4 Avoidance of possible ignition sources**

Possible ignition sources include, e.g.:

- Lightning current
- Flying sparks occurring during the brake application of a mechanical brake
- Short circuit and arc as well as resonant circuits with electrical devices and systems
- Hot surfaces, e.g., bearings, brake disk
- Spontaneous ignition through dirty cleaning cloths (e.g., oil, solvents).

Components and the before mentioned possible ignition sources must be arranged and executed so that combustible material is not set on fire during normal operation or in case of malfunctions. In order to ensure this it is necessary to install coverings, baffle plates or the like that are made of non-combustible material. Electrical equipments shall be secluded.

Dirty cleaning cloths must be disposed when leaving the wind turbine.

#### **5.1.5 Work involving fire hazards**

Work involving fire hazards relating to repair, assembling or disassembling work shall be avoided. If this is impossible it must be checked whether so-called cold procedures (sawing, screwing, cold bonding, etc.) can be used instead.

If work involving fire hazards cannot be avoided it is mandatory to take fire precautions prior, during and after the work in order to avoid an outbreak of fire or to detect a fire early on, and to fight it effectively.

For more information on hot works see CFP A Guideline No 12:2006

#### **5.1.6 Maintenance (servicing, inspection and repair) of mechanical and electrical systems**

Fires caused by technical defects at electrical and mechanical systems represent the most frequent causes of loss. Means to reduce such kind of loss include regular maintenance according to the manufacturer's instructions (maintenance manual) and inspections of the systems as well as timely repair of identified deficiencies.

One tool serving this purpose, which is already available at many wind turbines, is systems that automatically monitor important operating parameters such as the pressure and temperature of mechanical and electrical systems such as transformer, generator winding, gearboxes, hydraulic

systems or bearings. If the limiting value is exceeded or is not reached, there must be some kind of alarm and finally an automatic shutdown of the wind turbine. In the course of type testing and certification processes of wind turbines, the monitoring of operating parameters is usually taken into account.

Electrical installations and monitoring systems in wind turbines have to be examined by experts on site on a regular basis. At least every five years the gas and oil of the transformer insulation liquid has to be analyzed.

The analysis allows drawing a conclusion on the quality of the insulating oil and provides insights with respect to possible electrical defects, thermal overloads of the transformer, and the condition of the paper dielectric. If there are any defects in the active component of oil transformers, there is the risk of an explosion due to large electrical currents in connection with the insulating oil as fire load resulting from rapidly increasing internal pressure in the boiler. With respect to drytype transformers, the surface has to be controlled annually, and it has to be cleaned if necessary. Additional safety is provided by installations that serve the optical detection of partial discharge (spark switch).

Recurring inspections of electrical installations shall take place every two years.

In addition to these inspections, thermography at the electrical installations shall be examined on a regular basis, e.g., in the following areas:

- Connection areas and, if possible, contacts of the LV HRC fuse switch disconnectors
- Clamping devices and terminal strips, respectively, in distribution boards as well as switch terminal blocks and control terminal blocks
- Connection areas and, if possible, contacts of bus bars, contactors, capacitors, etc.
- Connection areas and surfaces of transformers, converters, and engines
- Power cable and cable bundles, respectively
- Surfaces of equipment which may pose a risk in case of heating.

Thermography inspections must be conducted by an approved expert (or comparable for countries, where no certifying system exists) who disposes of the technical qualification and the required measuring instruments. For more information on thermography experts see CFP A Guideline No 3:2003.

Mobile devices which are applied in the course of maintenance and repair have to be inspected on a regular basis according to national requirements. Basically the recommended period is for that is semi-annually; with an unique annually period in maximum in between.

Lightning protection systems have to be inspected by an approved expert at regular intervals, the recommended period is in minimum annually. The inspection of the operability and condition of the lightning protection system includes a visual inspection of all air terminals and down conductors as well as measuring the contact resistance of the conduction path from the air terminals in the rotor blades to the ground terminal lug and measuring the ground resistance of the foundation.

The ground resistance of the foundation according to EN 62305-3 has to be measured in addition in the course of this recurring inspection.



The result of any maintenance activities must be documented in written form, e.g., in a maintenance specification sheet or a report book. Deficiencies that have been identified during maintenance or testing shall be fixed immediately. The correction of deficiencies has to be documented and reviewed.

#### **5.1.7 No smoking**

The entire area of the wind turbine must be declared a non-smoking area.

In order to ensure compliance with the ban on smoking, employees and external companies, if applicable, must be instructed accordingly, and sanctions shall be imposed in case of violation of the ban. "No Smoking" signs have to be put up clearly and permanently right at the entry areas of the wind turbine.

#### **5.1.8 Training**

Service staff and authorized external companies, if applicable, are to be instructed on the risks of fire at the wind turbine on a regular basis. Instructions may include, amongst others:

- Preventing risks of fire
- Functionality of fire protection systems and installations installed as well as how to handle them
- Correct behaviour in case of fire, e.g., alerting assisting bodies
- Correct use of fire extinguishers

It is recommended to conduct fire protection training, e.g., fire alarm tests, rehearsals for implementation of the emergency plan and evacuation of the nacelle, at regular intervals, and to involve the local fire brigade (for onshore wind turbines) into this training.

#### **5.1.9 Prevention of forest fires**

The possibility of the occurrence of a forest fire due to a fire in a wind turbine can be easily prevented by adopting the measures to clean up the area where the tower is located, so that its surroundings are free of all scrub and low bush that can contribute to the spread of fire in a strip of 25 m.

### **5.2 Fire detection and fire fighting**

Operating conditions, first of all environmental and weather conditions, for fire protection systems at wind turbines may vary significantly. The following, in particular, has to be taken into account, e.g.,

- effects of atmospheres containing salt (offshore wind turbines),
- significant fluctuations of temperature due to the change of day and night, e.g., cooling down significantly at night and intensive sun shining at day,
- vibrations,
- oil deposits,
- air change and flow conditions in the nacelle.
- 

Moreover, increased humidity, e.g., due to the location, and construction of the wind turbine may have an impact on the functionality of the turbine's technology.



Therefore, effects that may have an impact on the effectiveness and reliability of the fire protection technology have to be taken into account already in the planning phase of the turbine, and they have to be adjusted to the different techniques and constructions applied at wind turbines.

### 5.2.1 Fire detection

In order to effectively limit fire and consequential loss, fires at wind turbines shall also be detected early on by automatic fire detection systems, in particular, since wind turbines are usually operated without any on-site staff. Distinction is basically made between room and installation monitoring.

On the one hand, automatic fire detection serves to inform the control unit, and on the other hand, it serves to activate the extinguishing devices automatically plus to shut down the wind turbine automatically, if necessary.

#### Room monitoring

The nacelle and parts of the tower in which the wind turbine technology is installed as well as external transformer and electric power substations are to be monitored by an automatic fire detection system.

Raised floors and ceiling voids or the like with fire loads, e.g., cables and other lines, have to be included in the monitoring.

Fire detectors have to be qualified for the area to be monitored and for the fire characteristics to be expected. Special environmental conditions, e.g., temperature, humidity, and vibrations, have to be taken into account when selecting and operating fire detectors; detector heating may be applied, if applicable. Fire detectors with the characteristic "smoke" should preferably be applied for the monitoring in wind turbines.

#### Installation monitoring

Applications which are operated, e.g.,

- encapsulated,
- forced-air-cooled and
- in rooms with high air change rate,

e.g., switchgear and inverter cabinets, monitoring of installations is required in addition to the monitoring of rooms. Also for the monitoring of installations, "smoke" should preferably be used as fire characteristic.

The fire detectors' qualification is to be reviewed for each individual turbine depending on the respective operating conditions at the wind turbine and after consulting with the system's owner (manufacturer). Attention is to be paid to optimal fire detection and limitation of false alarms or nuisance alarms, in particular.

Mineral oil transformers shall be protected with so called "Buchholz" relays (pre-alarm and main alarm with shutdown) in addition to room monitoring fire detection and temperature monitoring.

Automatic early fire detection only makes sense if at least the following reactions are triggered in case of activation:

- Fire alarm with alarm signal being forwarded to a continuously manned post
- Shutdown of the wind turbine and complete disconnection from the power supply system



- Activation of the installation and room protection extinguishing system with two-detector dependency (according to EN 54, type B)

Detection systems that allow different alarm thresholds offer the possibility to induce gradual reactions depending on the alarm thresholds, e.g., pre-alarm, main alarm, etc..

When selecting a fire detection system it is important to pay attention to the fact that the maintenance required can be ensured in a feasible way given the location and the little space in the nacelle.

Table 2: Support information on the selection of fire detectors for monitoring rooms and installations

Type of detector	Smoke detector			Heat detector (index "R" according to DIN EN 54-5)		Flame detector		Multi-sensor smoke detector	
	Point- shaped	Multi- point- shaped	Linear	Point- shaped	Linear	IR	UV	Smoke and heat	Smoke and CO
	Scat- tered light	Aspirat- ing	Light beam						
Room/Installation									
Nacelle with transformer, including hub and raised floors	-	+	-	-	-	-	-	-	-
Central electric power substation, switch cabinet rooms	+	+	+	+	+	-	-	+	+
Tower base/platform with available installations, if applicable	-	+	-	+	-	-	-	-	-
Switchgear cabinets	+	+	-	-	-	-	-	+	-
Hydraulic systems	-	+	-	+	-	-	-	-	-
Transformer	-	+	-	Buchholz relay		-	-	-	-
<p>+ basically suitable - not likely suitable</p> <p>The data in this table refers to the basic suitability of several types of detectors with respect to functionality and general application conditions in the respective area of the wind turbine's system; <u>it serves as orientation guide and does not replace the required proof of suitability</u> as well as the object-specific technical planning by appropriate specialist planners, e.g., certified installers. Type-specific characteristics of wind turbines and fire detection systems have to be taken into account after consulting with the insurer (e.g., Insurer engineering department) as well as the certifying body for wind turbines, if applicable (for more information on detection systems see also CEA-Specifications for the planning and installation of fire detection systems at <a href="http://www.cea.eu">www.cea.eu</a>).</p>									



### 5.2.2 Fire fighting

Due to the fact that wind turbines are usually operated without any on-site staff and due to the time-consuming accessibility (in case of offshore wind turbines, in particular) and the strongly limited accessibility for fire fighters, effective fire fighting and thus limitation of loss can be ensured by automatic fire extinguishing systems.

#### Fire extinguishing systems

For the purpose of effective fire protection of wind turbines, automatic, stationary fire extinguishing systems shall be installed. Gas extinguishing systems as well as fine water spray systems are suitable (taking into account the special conditions given and the personal safety for the staff). These fire extinguishing systems can be used as installation- or room protection systems or as a combination of both. Installation protection systems have a selective effect on the device or component to be protected.

Before the fire extinguishing system is activated, the air-conditioning or ventilation system must be switched off automatically.

With respect to the application at wind turbines, extinguishing agents that are as residue-free, non-corrosive and non-electro conductive as possible, and which are suitable with respect to the prevalent environmental conditions at wind turbines (temperature, weather, impermeability of the installations and rooms to be protected) and the fire loads would be desirable. The following systems can be applied at wind turbines, depending on the intended type of application:

- Carbon dioxide (CO<sub>2</sub>) fire extinguishing systems
- Inert gas extinguishing systems
- Fine water spray systems (water mist systems)
- Water spray systems (transformer and electric power substation, respectively).

Foam extinguishing systems can be used with every allowed kind of foam expansion.

Powder extinguishing systems as well as aerosol extinguishing systems cannot be recommended for application at wind turbines since they may cause consequential loss.

Suitability of automatic fire extinguishing systems for the purpose of room and installation protection is to be reviewed for each individual turbine by taking into account the respective operating conditions at the wind turbine and by consulting with the manufacturer. The following aspects, in particular, have to be taken into account:

- Effectiveness of extinguishing
  - Required extinguishing gas concentration and impingement of water, respectively
  - Application (residence) time for gas extinguishing systems (taking into account possible reignition)
  - Operating time of water extinguishing systems (taking into account an effective extinguishing success)
  - Impermeability of the room/pressure relief
- Storing of extinguishing agents (required quantity, weight, etc.)



- Volume/Required space
- Installation/Approval, implementation
- Maintenance
- Reliability (robustness of the systems with respect to susceptibility to failure in order to limit maintenance and inspection intervals)
- Cost

In order to ensure the effectiveness of gas extinguishing systems it is necessary to pay special attention to the planning requirements in connection with the pressure relief openings that will have to be provided. Moreover, attention should be paid to the required protection regulations with respect to the safety of persons when applying gas extinguishing systems.

Each extinguishing system has certain limits of applicability or advantages and disadvantages, respectively. Therefore, the suitability of the chosen extinguishing system has to be reviewed for each individual application because of the large number of possible parameters and the given conditions that are to be adhered to in order to ensure the effectiveness of extinguishing.

Fire detection, alarm, alarm control, triggering of a fire extinguishing system and its monitoring is usually done by a fire detection system approved for this purpose (see paragraph 5.2.1).

#### **Fire extinguishers**

In order to fight initial fires it is necessary to provide a sufficient number of appropriate and operational fire extinguishers in accordance with national standards. They shall be available in all rooms in which a fire may occur, amongst others in the nacelle, in the tower base and in the electric power substation which might be arranged externally.

The extinguishing agent is to be adjusted to the existing fire loads. Due to the negative impacts of extinguishing powder on electrical and electronic equipment it is recommended to refrain from using powder extinguishers if possible.

At least one 6 kg CO<sub>2</sub> fire extinguisher and one 9 l foam fire extinguisher must be installed in the nacelle (paying attention to the risk of frost). And at least one 6 kg CO<sub>2</sub> fire extinguisher must be installed at the intermediate levels and at the tower base in the area of the electrical installations each.

Fire extinguishers have to be inspected by an expert at regular intervals, at least every two years. In case the extinguisher is subject to high stress, e.g., due to environmental impacts, shorter time intervals might be required as determined by a risk assessment.

Table 3: Support information on the selection of fire extinguishing systems for room and installation protection

Extinguishing systems (extinguishing agents)	Gas extinguishing systems		Water extinguishing systems				Other extinguishing systems	
	CO <sub>2</sub> (high pressure)	Inert gases	Sprinkler	Water spray	Fine spray	Foam	Powder	Aerosol <sup>1)</sup>
<b>Room/Installation wind turbine</b>								
<b>Room protection, e.g.,</b>								
Nacelle with generator, transformer, hydraulic systems, gearbox, brake, azimuth drive	+	+	+	+	+	-	-	-
Hub with pitch drive and generator, if applicable	+	+	+	+	+	-	-	-
Raised floors with oil sump and cable and electrical installations	+	-	+	+	+	+	-	-
Central electric power substation, switchgear rooms (without transformer)	+	+	-	-	+	-	-	-
Tower base/platform with available installations, if applicable	+	+	+	+	+	-	-	-
<b>Installation protection, e.g.,</b>								
Control, inverter, switchgear cabinets (LV/MV), closed	+	+	-	-	+	-	-	-
Transformer	+	-	-	+	+	-	-	-
Control, inverter, switchgear cabinets (LV/MV), open	+	-	-	-	+	-	-	-
Hydraulic system, open	+	-	+	+	+	+	-	-
<p>+ basically suitable    - not likely suitable</p> <p>The data in this table refers to the basic suitability of several fire extinguishing systems with respect to their functionality and general application conditions in the respective area of the wind turbine's system; <u>it serves as a first orientation guide and does not replace the required proof of suitability</u> as well as the object-specific technical planning by appropriate specialist planners, e.g., certified installers. Type-specific characteristics of wind turbines and fire extinguishing systems have to be taken into account after consulting with the insurer (e.g., Insurer engineering department) as well as the certifying body for wind turbines, if applicable (for more information on fire fighting systems see also CEA-Specifications for the planning and installation of the respective fire extinguishing systems at <a href="http://www.cea.eu">www.cea.eu</a>).</p>								
<p><sup>1)</sup> There is currently no empirical information available on the reliability and effectiveness concerning the application of aerosol extinguishing systems</p>								

### 5.2.3 Fault monitoring

Fire detection systems and fire extinguishing systems have to be monitored constantly in order to ensure their operational reliability.

Failures with traditional fire protection systems, e.g., failure of individual fire detectors or leakage at the extinguishing agent stock or shrinkage of the extinguishing agent supply will be displayed directly at the fire protection system by means of an error message. Due to the operation without on-site staff and the remote location of wind turbines and the resulting non-identification of possible failures at the fire protection system on site, forwarding of all error messages to a permanently manned post (control post) is required. This control post will then initiate immediate recovery of the unlimited operational readiness of the fire protection system.

Any events have to be documented in the report book.

### 5.2.4 Deactivation of safety installations

Fire protection systems may only be deactivated for a short period of time after consulting with the persons in charge in case of compelling requirements.

When deactivating a fire protection system it must always be checked whether there is any obligation to inform the insurer because of the increase of risk.

Sufficient backup measures must be provided for the duration of the deactivation, e.g.,

- ensuring fire alarm/call,
- providing suitable fire fighting equipment (see also paragraph 5.2.2).

After completion of the work all safety and fire protection installations that had been deactivated have to be set in operation again. The operating condition of the systems must be visible at the entrance area of the wind turbine and at the primary control unit.

## 5.3 Measures for limiting loss

Experience has shown that it is sensible to prepare an emergency plan for the case of fire. This plan shall in particular include the following specifications:

- Determination of the personnel that is on standby in the internal work schedule for the existing wind turbines (ensuring "twenty-four-seven" standby of the control post)
- Preparation and introduction of an internal, written schedule in case of fire in which any immediate measures to be taken by the employee in charge are included. The schedule should include the following issues:
  - Provision of local emergency telephone codes
  - Notification of fire brigade and police
  - On-site support by fire brigade and police
  - Shutdown of the wind turbine and disconnection from the power supply system, if required
  - Reporting fire damage immediately to the insurer

- Preparation of an emergency plan for the case of fire after consulting with fire brigades and police offices in charge and with the insurer, if applicable. The following issues should be included in an emergency concept:
  - Leave internal standby schedule and a respective standby telephone number with the police and fire brigade
  - Information and briefing, if applicable, of the competent rescue forces (fire brigade, police) on:
    - Structure of the wind turbine
    - High-voltage components and combustible materials within the wind turbine
    - Route description and access to the wind turbine
  - Specification of immediate measures that have to be taken in case of a fire alarm/call, e.g., disconnection of the wind turbine from the power supply system
  - Information on the preparation of an emergency concept in case of fire for each wind turbine, e.g., appropriate emergency vehicles and necessary protective clothing as well as protection zone around the wind turbine affected

The following information shall be easily accessible by everyone at the wind turbine:

- Identification number and emergency telephone number
- Code of conduct in case of fire at the wind turbine, e.g., notification of the fire brigade and seeking shelter as well as observing other safety instructions.

With respect to offshore wind farms alternative or supplementary measures might be required for emergency planning due to special conditions.

#### 5.4 Quality assurance

Experience has shown that the functions of technical installations, of safety-related installations, in particular, can be ensured for their period of operation or service life if appropriate measures for the purpose of quality assurance have been taken with respect to planning, installation and operation. This includes, amongst others:

- Generally accepted standards of technology as fundamentals of planning
- Application of products and systems with proven quality, which might be subject to internal controls and external monitoring, if applicable
- Qualification of specialist planners and installation experts
- Acceptance inspection and recurring inspections by approved experts
- Regular and proper maintenance by specialist companies and trained in-house specialized staff, respectively
- Documentation and monitoring of the maintenance to be performed

These measures shall also be considered and reviewed in the course of type testing or certification of the wind turbine by independent approval bodies.



## 6 Guidelines

- Guideline No 1:2002 F - Internal fire protection control
- Guideline No 2:2007 F - Panic & emergency exit devices
- Guideline No 3:2003 F - Certification of thermographers
- Guideline No 4:2003 F - Introduction to qualitative fire risk assessment
- Guideline No 5:2003 F - Guidance signs, emergency lighting and general lighting
- Guideline No 6:2004 F - Fire safety in residential homes for the elderly
- Guideline No 7:2005 F - Safety distance between waste containers and buildings
- Guideline No 8:2004 F - Preventing arson – information to young people
- Guideline No 9:2005 F - Fire safety in restaurants
- Guideline No 10:2008 F - Smoke alarms in the home
- Guideline No 11:2005 F - Recommended numbers of fire protection trained staff
- Guideline No 12:2006 F - Fire safety basics for hot work operatives
- Guideline No 13:2006 F - Fire protection documentation
- Guideline No 14:2007 F - Fire protection in information technology facilities
- Guideline No 15:2010 F - Fire safety in guest harbours and marinas
- Guideline No 16:2008 F - Fire protection in offices
- Guideline No 17:2008 F - Fire safety in farm buildings
- Guideline No 18:2008 F - Fire protection on chemical manufacturing sites
- Guideline No 19:2008 F - Fire safety engineering concerning evacuation from buildings
- Guideline No 20:2009 F - Fire safety in camping sites
- Guideline No 21:2010 F - Fire prevention on construction sites
- Guideline No 22:2010 F - Wind turbines – Fire protection guideline
- Guideline No 23:2010 F - Securing the operational readiness of fire control system
- Guideline No 24:2010 F - Fire safe homes