**STATE OF CALIFORNIA**

**Energy Resources Conservation and Development Commission**



| In the Matter of: | |
|---|---|
| APPLICATION FOR CERTIFICATION FOR THE HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM (SEGS) AND THE RIO MESA SOLAR ELECTRIC GENERATING FACILITY | DOCKET NO. 11-AFC-02<br>AND<br>DOCKET NO. 11-AFC-04 |

# INTERVENOR CENTER FOR BIOLOGICAL DIVERSITY'S FOLLOW-UP COMMENTS ON THE AUGUST 28, 2012 JOINT WORKSHOP FOR THE RIO MESA SOLAR ELECTRIC GENERATING FACILITY (11-AFC-04) AND THE HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM (11-AFC-02)

September 6, 2012

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**STATE OF CALIFORNIA**
**Energy Resources Conservation and Development Commission**

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| In the Matter of:<br><br>APPLICATION FOR CERTIFICATION FOR THE HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM (SEGS) AND RIO MESA SOLAR ELECTRIC GENERATING SYSTEM | DOCKET NO. 11-AFC-02<br>AND<br>DOCKET NO. 11-AFC-04 |

The Center for Biological Diversity ("Center") submits the following follow-up comments on the Joint Workshop for the Rio Mesa Solar Electric Generating Facility (11-AFC-04) and Hidden Hills Solar Electric Generating System (11-AFC-02) – Hidden Hills Solar Electric Generating System (HHSEGS).

Dated: September 6, 2012

Respectfully submitted,

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September 6, 2012

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**RE: Follow-up Comments on Joint Workshop for the Rio Mesa Solar Electric Generating Facility (11-AFC-04) and Hidden Hills Solar Electric Generating System (11-AFC-02)**

Dear Project Managers Martinez and Monasmith,

The Center for Biological Diversity appreciates the California Energy Commission (CEC) convening the August 28, 21012 workshop on the issue of solar "flux" and its potential impact on avian species pertinent to the power tower technology proposed in Hidden Hills and Rio Mesa projects. The data presented at the workshop by project proponent Bright Source was informative and is a good start at identifying impacts to avian species from the power tower flux zone. Based on the data presented at the workshop, we believe the CEC should continue to investigate the impacts to avian species on the following issues at minimum:

- The CEC should independently evaluate the "flux" levels at the Solar One project. The project proponent calculated that the flux value at the Solar One project was 1500 KW/$m^2$. We understand this to be at the receiver location, but are unclear what the "flux" level was at the "standby" points, which was noted in the McCrary et. al. study (1986) to "be high enough to burn feathers and small insects". Solar One utilized four standby points and it was also only 0.12 square miles in size (compared to 5.1 square miles for Hidden Hills and 5.8 square miles for Rio Mesa).
- The project proponent study utilized birds that are substantially larger than many of the birds of concern. For example, the federally and state endangered southwestern willow flycatcher weighs less than ½ ounce (12 grams)[1], while the smallest birds used in the project proponent's experiment were 40-45 grams. Indeed, in the McCrary study, all of birds that died from being burned were small birds (swallows, swifts, warblers and a sparrow), suggesting that smaller birds may be more vulnerable to flux impacts.
- Instead of defined "standby points", the project proponent proposes to focus the mirrors in a "halo" if they are not focused on the "receiver". However this "halo" is calculated by the project proponent to be approximately 150 KW/$m^2$,

[1] http://www.fws.gov/nevada/protected_species/birds/species/swwf.html

well above the 50 KW/m$^2$ that caused feather singeing and muscle tissue effects in the study birds. It is unclear how many hours per day this "halo" will be in place or if, for example, the "halo" could be dispersed to reduce the intensity of the radiation below levels that would physically damage avian species. These issues should be analyzed to minimize impacts.

- From the discussion on the avian ocular impacts, it was noted that
    - retinal damage, regardless of whether or not a bird is looking directly at the "receiver", would still occur;
    - birds with sharp eyesight (ex. golden eagles) may also be more vulnerable to ocular damage;
    - repeated exposures would be additive.

  We urge the CEC to further analyze the ocular impacts to avian species and the effects on species of concern for survival and ultimately reproductive success.
- Because the impact of the "flux" is both a factor of intensity and duration, serious concerns remain about the impact of the lower intensity "flux" radiation over a prolonged exposure time as birds make their way across the mirror fields (5.1 square miles for Hidden Hills and 5.8 square miles for Rio Mesa). Indeed flycatchers have been documented to fly from 10-17 miles per hour[2], potentially placing them in the "flux" zone for 15 -30 minutes – up to 60 times longer than the project proponents testing time.
- The project proponent presented information on 41 days of avian mortality monitoring using a USFWS monitoring protocol at the SEDC site in Israel's Negev desert and are continuing to monitor that site, with additional data being available at the end of the year. Scant information was provided regarding the size and layout of the SEDC project or other design features that would allow for analysis of this new data. In addition, references were made to Spain's GemaSolar and a two-day monitoring study by Pleguezuelos. However, no actual data was available from the GemaSolar site and little information was provided regarding the size, layout or design of these projects. In fact, unlike the McCrary study, none of these data have been published from either study site for review, much less in peer-reviewed journals.
- Because of bird's normally high basal temperature, the extra heat acquired by flying through the "flux" zone may impact the bird due to its inability to dissipate additional heat, which could result in harm, injury or even death to the species.
- No information was presented on the impact of the "flux" on invertebrates. Indeed no systematic surveys for invertebrates have been completed for either project to date. We subsequently provided information on several invertebrate databases, including for butterflies, to the POS list for both projects on August 31, 2012, in hopes that these issues can be more fully identified and analyzed.

[2] http://www.npwrc.usgs.gov/resource/birds/migratio/speed.htm

On August 30, 2012, the California Energy Commission (CEC) docketed a letter from the U.S. Fish and Wildlife Service (FWS) regarding potential impacts to avian species from the Hidden Hills and Rio Mesa proposed projects. This letter identified a number of important questions that were not answered at the workshop and suggested that the "Agencies limit the number of power tower projects that are considered for permitting and development until we obtain a more detailed understanding of this technology and its impacts, based on at least a couple years of scientifically robust monitoring". We provide that letter as Attachment 1 and concur with FWS' suggestions. The letter simply reconfirms the paucity of scientifically rigorous, peer-reviewed data pertaining to avian impacts from power tower technology and the suggestion that more information be gathered before additional projects of this type are approved is entirely reasonable and in keeping with the precautionary principle. Only rigorous monitoring and additional data collection can help inform the agencies of the impacts of this technology.

As the CEC is well aware, the only published, peer-reviewed study of power tower technology (McCrary et al. 1986) documents impacts to avian species from a 10 MW project with a single 86m (280_ft) tower – while the first three power towers now under construction for a 370MW project are each 137m (450 ft) in height. The next set of proposed power tower projects, now under consideration by the CEC would each be 500 MW and have two towers each all over 230 m (750 ft) in height. As a result the proposed power tower projects in California are 50[3] to 75[4] times the size of the facility studied in the 1986 peer-reviewed paper. We strongly urge the CEC to consider delaying any additional project approvals until monitoring results from the project currently under construction are implemented and evaluated. This approach is entirely reasonable and would clearly support a better understanding of the impacts of this technology on avian species in general, and listed, special status and rare species in particular.

Indeed the U.S. Fish and Wildlife Service's suggestion is also timely in considering alternatives to the proposed projects that would avoid significant impacts to the avian species. For example, the CEC's Hidden Hills PSA analyzed alternative solar technologies and concluded that solar PV technologies could likely achieve the same energy production on the same acreage as the power tower technology currently proposed while significantly lowering the environmental impacts to important resources including to water, fire risk, air quality, public health impacts, biological resources, and cultural resources among others[5].

Please feel free to contact us with any questions.

[3] http://www.energy.ca.gov/sitingcases/hiddenhills/index.html
[4] http://www.energy.ca.gov/sitingcases/riomesa/index.html
[5] http://www.energy.ca.gov/2012publications/CEC-700-2012-003/CEC-700-2012-003-PSA.pdf at pg. 6.1-62-68

ATTACHMENT 1



**From:** Pete_Sorensen@fws.gov
**To:** Martinez, Pierre@Energy; Watson, Carol@Energy;
**cc:** Nisa_Marks@fws.gov; Jody_Fraser@fws.gov; Joel_Pagel@fws.gov;
**Subject:** Rio Mesa
**Date:** Wednesday, August 29, 2012 1:32:04 PM
**Attachments:** 20120823_R8_Solar Power Tower questions compiled.docx

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Hi Pierre and Carol,

Could you please ensure that the attached is docketed for the Hidden Hills and Rio Mesa projects?

Attached is the list of questions the Service prepared for yesterday's flux workshop. We are concerned about the increasing number of power tower projects that are proposed or undergoing permitting review, given the outstanding questions about the impacts of utility-scale application of this technology. As such, it would be beneficial to the permitting process for pending and future projects, including Hidden Hills and Rio Mesa, to gather monitoring data that answer some of the questions about avian physiological tolerance and behavioral response to power towers, from already approved projects, before approving more projects. Increasing our knowledge about potential impacts from this technology would further our ability to complete science-based analyses of direct, indirect, and cumulative effects to the avian community, as required by our joint public trust responsibilities. Therefore, we suggest that the Agencies limit the number of power tower projects that are considered for permitting and development until we obtain a more detailed understanding of this technology and its impacts, based on at least a couple years of scientifically robust monitoring. Deploying technology of this scale in multiple places and on a short timeframe without such an understanding compromises our ability to make informed decisions on projects that would permanently and cumulatively impact species and the extensive tracts of desert habitat upon which they depend.

Thank you,

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Additional questions regarding power tower technology, solar flux and potential impacts to avian and bat species.

U.S. Fish and Wildlife Service, August 22, 2012 - Draft

From the information provided to date by BrightSource Energy, we have a basic understanding of how solar power tower technology will be applied at their proposed utility-scale facilities. The U.S. Fish and Wildlife Service (Service) currently understands that for the proposed projects (e.g., Hidden Hills and Rio Mesa), each power plant consists of approximately 85,000 heliostats (mirrors) surrounding a 750' tall tower. Incident solar rays reflect off the heliostats towards the top of the tower, where the concentrated radiant solar power, also known as flux, heats a working fluid to a temperature to power a steam-powered electrical generator. Impacts to avian and bat species from the increased flux levels that result from the concentration of solar energy remain uncertain in the absence of engineering and biological data. A more thorough understanding of the power tower technology is needed to identify whether there are injurious/lethal thresholds to species and additional studies are warranted to evaluate behavior within and around operating facilities.

The Service is concerned about the potential impacts of flux associated with solar power tower technology on species protected under the Endangered Species Act, Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act. We request that BrightSource provide sufficient and scientifically robust data to validate their assertion that avian and bat species will not be impacted by this technology. The flux model output provided on July 23, 2012, in response to Rio Mesa Data Request Set 2A #159, quantifies the area subject to elevated flux levels. However, data thus far provided by BrightSource are insufficient to assess project impacts on avian and bat species. Although we recognize that very little data are currently available, crucial questions remain about project engineering and avian and bat physiology and behavior that are needed to inform our assessment of project effects on avian and bat species. In addition to the information requests identified by the California Energy Commission (CEC) for the joint Rio Mesa and Hidden Hills solar flux workshop on August 28, 2012, (attached) the Service raises the following questions regarding the technology and impacts to species:

Technology and Operation:

1. Specific to Rio Mesa Data Request Set 2A #159, what assumptions were used to generate the flux model output provided?
2. How will levels of flux vary throughout an operational day (i.e., change according to time of day, sun angle, or time since plant startup)? What happens (in terms of reflected light off the heliostats and associated flux) at the end of daily operations?
3. Given that the heliostats are not 100% reflective; will there be localized convective heating of the air around the heliostats? If so, to what temperature, and how does this change through a 24-hour cycle? At what elevation and distance from an individual heliostat would the heat dissipate?

Physiological Tolerance:

1. When considering your responses to the exposure estimate questions identified by the CEC (questions 5-10) please include consideration for variables including an individual's size (e.g. 2-kg turkey vulture, 1-kg western gull, 10-g willow flycatcher) and feather color, and whether this would alter the identified temperature and exposure duration

level. Please provide answers for each of the questions 5-10 with respect to the fur and skin of a bat.

2. If mortality were to occur as a result of elevated flux, what is the likelihood that a carcass would be found on site, (i.e., is there a potential for the individual to incinerate before reaching the ground)?
3. What is the distribution of flux within the solar array? Are there particular areas with elevated potential for causing adverse physiological damage? Would you expect the area of concern to vary by species given your response to question 1 above?
4. What temperature and exposure duration could result in injuries such as temporary or permanent burns to skin, scarring to avian or bat corneas, or other forms of temporary or permanent blinding? Given that eye structure and placement varies between species, is there potential for this impact to be different between families of birds?

In addition to the above, the Service asserts that there are additional questions that will require research and monitoring at an operational power tower facility in order to more thoroughly assess impacts from this technology. These include but are not limited to:

a) What are avian and bat behavioral responses to zones of elevated flux, elevated heat, and the developed area (tower, heliostats)? Does this vary by species, age, sex, time of year, or resident status?
b) If birds and/or bats exhibit avoidance behavior at some time after entering the volume of airspace with elevated flux, when or how quickly does this behavior occur? Does the individual experience any damaging effects before it diverts from the airspace? Is the avoidance response triggered at a specific flux level and how might that vary between species?
c) At night, if a zone of heated air remains around the tower, do birds or bats exhibit a behavioral response to that air space that could increase their risk of collision with the tower or do they avoid the area?

Understanding the magnitude, extent, and types of effects power tower facilities may yield requires consideration of the technology as well as the projects' geographic location and the biological landscape (e.g. the diversity, abundance, and distribution species in the area, and their use of the project site throughout the year). Because the magnitude of impacts may vary based on site-specific biological conditions, it is important that rigorous, scientifically defensible preconstruction and post construction surveys commensurate with a project's location, scope, scale, and permanence on the landscape be conducted.

**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT**
**COMMISSION OF THE STATE OF CALIFORNIA**
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**1-800-822-6228 – WWW.ENERGY.CA.GOV**

***APPLICATION FOR CERTIFICATION FOR THE HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM***

Docket No. 11-AFC-02

**PROOF OF SERVICE**
**(Revised 8/27/12)**

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## DECLARATION OF SERVICE

I, Ileene Anderson declare that on 9/6, 2012, I served and filed copies of the attached comments: attachment, dated 9/10, 2012. This document is accompanied by the most recent Proof of Service list, located on the web page for this project at: www.energy.ca.gov/sitingcases/hiddenhills/index.html.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

***(Check all that Apply)***

**For service to all other parties:**

X Served electronically to all e-mail addresses on the Proof of Service list;

___ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses marked **"hard copy required"** or where no e-mail address is provided.

***AND***

**For filing with the Docket Unit at the Energy Commission:**

X by sending an electronic copy to the e-mail address below (preferred method); ***OR***

___ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

**CALIFORNIA ENERGY COMMISSION – DOCKET UNIT**
Attn: Docket No. 11-AFC-02
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***OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:***

___ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

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I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.