Joint Rio Mesa / Hidden Hills Staff Workshop: Solar Flux
August 28, 2012

The following items are discussion topics and questions that Energy Commission staff would like the applicant's for the Rio Mesa and Hidden Hills solar projects to be prepared to elaborate on during the scheduled August 28, 2012 joint workshop.

Responses to data requests have identified areas of solar flux densities ranging from 5kW/m^2 to 500kW/m^2.

Technology & Modeling

1. Please be prepared to discuss the basis for asserting that the modeled flux densities are upper bound estimates.

The data responses state that confidence is limited for modeled flux under 10kW/m^2.

2. Please be prepared to discuss the difference in relative accuracy of results over 10kW/m^2 and results under this flux level.
3. Please be prepared to discuss options that might be available to independently validate the flux modeling results by direct measurements at an operating facility.
4. Staff had asked that flux be modeled down to 2.5kw/m^2. What is applicant's best qualitative estimation of the increase in area or volume of the solar field that would be above 2.5kW/m^2 as compared to the area or volume defined by the 5kw/m^2 areas provided?

Exposure Estimates

When birds or other flying biota pass through such areas of intensified flux they will experience increased temperatures on their outer surface. In the case of birds, this will be mostly feathers. It is necessary to evaluate how the flux will increase surface and tissue temperatures and how that will affect these feathers. Feathers are composed of mostly keratin, a fibrous protein in a sheet structure, and some loosely bound water. To establish an estimate of a safe level of exposure it will be necessary to define a level of exposure i.e. (flux density and duration) that that would not result in observable adverse effect on such structural proteins.

5. Please be prepared to provide an estimate of temperatures and exposure duration that result in dehydration of loosely bound water from exposed feathers.
6. Please be prepared to provide an estimate of the temperature and exposure duration that will cause denaturing of the keratin molecules in the exposed feathers.
7. Please be prepared to provide an estimate of the temperature and exposure duration that would result in pyrolysis of the keratin in the exposed feather.
8. Please be prepared to estimate the time required to raise the surface temperature of the exposed feathers to 70 ^oC, 100 ^oC, 150 ^oC, 200 ^oC, and 300 ^oC @ flux densities of 7.5KW/m^2, 17.5KW/m^2, 37.5KW/m^2, 75KW/m^2, 300KW/m^2, and 500KW/m^2.
9. Please include convective or other heat transfer mechanisms that might augment or minimize heat gain and temperature rise for given flux densities.

10. From this data please be prepared to provide an estimate of the duration of exposure that would preclude irreversible change in the keratin in the exposed feather at each of the above flux densities.

It would also be very helpful if you could provide revised copies of Figures 2 through 5 provided in response to data request 159 without color shading depicting only radiant flux isopleths.

Golden Eagle / Migratory Birds

In a recent workshop, BrightSource stated that a study of avian mortality would be initiated at the operating SEDC plant in Israel.

11. Please be prepared to discuss the status of the study and whether results of that study plan will be made available and used to prepare a monitoring protocol for HHSEGS/RMSEGF.

Responses to data requests have identified areas of solar flux densities ranging from 5kW/m^2 to 500kW/m^2. Please be prepared to discuss the following issues.

12. In establishing safe levels of exposure, and in consideration of effects of solar flux on keratin (Topics 5-10 above), please be prepared to discuss:
    a. the safe exposure level of golden eagle to solar flux;
    b. the safe ocular exposure levels and assumptions or data used to estimate exposure level; and
    c. The time criteria in exposure thresholds.

13. How do project owners intend to quantify avian mortality and/or injury?
    a. Is a risk assessment appropriate or feasible for HHSEGS?
    b. Is a risk assessment appropriate or feasible for RMSEGF?
    c. What approaches for risk assessment have been explored, and why were they rejected?

14. How many eagles does the project owner expect would be taken over the life of the project, and how was that number determined?
15. What onsite avoidance, minimization, or mitigation measures are feasible for golden eagles?
16. What offsite mitigation measures are feasible for golden eagles?
17. What onsite avoidance, minimization, or mitigation measures are feasible for migratory birds?
18. What offsite mitigation measures are feasible for migratory birds?
19. What monitoring regime for injury/mortality is feasible (would be implemented under the golden eagle, avian, and bat monitoring plan)?
    a. How often could biologists access the site to perform surveys and carcass searches necessary to track the effects of the project?
    b. What time of day could biologists access the site to perform surveys?
    c. What other constraints are there?

Insect Populations

20. Please be prepared to discuss the likely effect of flux exposure on indigenous insects.
21. Please be prepared to discuss the likely effect of loss of insect abundance on the environment, including mesquite thickets, and bat and avian populations adjacent to HHSEGS and RMSEF.
22. Please be prepared to discuss the how losses of indigenous pollinator species might be mitigated.