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San Bernardino County Board of Supervisors
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Respected Supervisors:

We are professional and university scientists who have dedicated much of our careers to the study of the ecosystems of the Desert Southwest. Our research contributes to an understanding of natural desert systems, and forms a foundation of science to guide public policy. We stand united in opposition to the proposed Soda Mountain Solar Project because of significant impacts that cannot be avoided or properly mitigated on desert ecosystems and functions at this important location.

Modern Distributed Energy Resources (DERs) such as rooftop solar plus storage with micro-grid interconnection can more than offset the need to disturb desert ecosystems with new utility-scale solar projects. We request you preserve this area as important natural buffer land for the scenic and popular Mojave National Preserve.

Significant Impacts of the Soda Mountain Solar Project

Some of the significant impacts this proposed energy development would have on the Mojave Desert at this location include the following:

1. **Desert bighorn sheep (*Ovis canadensis nelsoni*).** Biologists have reported that the South Soda Mountain Connection is the most important restorable corridor for long-term demographic potential across the entire southeastern Mojave Desert of California. It would provide the best opportunity for movement of bighorn populations between the Mojave National Preserve and the large complex of populations to the north of Interstate 15. This area would facilitate gene flow as well as preserve long term connections with bighorn sheep populations in Death Valley National Park (Epps et al, 2013). Unfortunately, this is exactly the area of the proposed Soda Mountain Solar Project.

The proposed Soda Mountain Solar Project would cover areas between the north and south Soda Mountains on the northwestern edge of the Mojave National Preserve, pinching off the best location to reestablish important bighorn sheep movements that have been severed by Interstate 15. The proposed development, which would include solar arrays, infrastructure, and roads, would likely prevent bighorn from moving through the project area (Wehausen and Epps 2015). The California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California (Spencer et al. 2010)

specifically states: "Essential Connectivity Areas are placeholder polygons that can inform land-planning efforts, but that should eventually be replaced by more detailed Linkage Designs, developed at finer resolution based on the needs of particular species and ecological processes."

The draft Desert Renewable Energy Conservation Plan (DRECP) stressed the need for a bighorn sheep crossing at Interstate 15 between the Soda Mountains and Cronese mountains to restore bighorn sheep habitat connectivity (DRECP, Appendix C, pages 9, and 38-39). The proposed Soda Mountain Solar Project site was designated as a Plan-wide Conservation Area with High Biological Sensitivity within the plan-wide biological reserve. This high biological sensitivity designation indicates that the area contains biological resources that are sensitive to perturbation, high concentrations of biological resources, or highly sensitive biological resources. The DRECP does not place this area in a Development Focus Area due to its high biological resource value (it is classified as unallocated lands), and we agree that it should not be designated as a solar development area. Instead, this area should be protected from further development as an Area of Critical Environmental Concern for wildlife connectivity value.

2. **Desert tortoise (*Gopherus agassizii).*** Desert tortoises are declining range-wide and especially in the western Mojave where populations have been crashing recently. All areas that represent important genetic connectivity linkages should be conserved. If the solar project were to be developed here, all tortoises inhabiting the site would be removed and translocated as per US Fish and Wildlife Service guidelines. But the Independent Science Advisors to the DRECP recommends: "As with the Mohave ground squirrel, and as justified in Section 4.4.2, the advisors do ***not*** recommend translocation of desert tortoise as effective mitigation or conservation action, in part because translocated tortoises suffer high mortality rates." (Section 5.2, http://www.energy.ca.gov/2010publications/DRECP-1000-2010-008/DRECP-1000-2010-008-F.PDF). Yet tortoise translocation has been adopted on all major solar projects to date where this Federally Threatened species is present.

The well-researched Mojave Desert Blog has an excellent summary of tortoise biology concerning declining populations, genetic connectivity, and the value of conservation efforts, with references: http://www.mojavedesertblog.com/2016/08/road-to-recovery-for-declining-tortoise.html.

3. **Desert ecosystem biodiversity, fragmentation and connectivity.** As scientists, we believe that the Mojave National Preserve is a critical ecological anchor for the California Desert, connecting prized national park and Bureau of Land Management landscapes that stretch from Joshua Tree to Death Valley. Maintaining landscape level connectivity is the best defense against a rapidly changing climate and should be a top priority.

The Soda Mountain Solar Project would destroy and degrade functioning Mojave Desert scrub communities with associated kit fox (*Vulpes macrotis*), burrowing owl (*Athene cunicularia),* potential and adjacent Mojave fringe-toed lizard (*Uma scoparia*), and desert tortoise habitat. Trans-boundary effects would degrade neighboring habitat and metapopulation dynamics as well.

Research by ecologist Rebecca Hernandez underscores the role that proximity of threats to protected areas plays in meeting conservation goals. Protected areas may preclude habitat loss within boundaries; however, a prevailing cause of degradation within protected areas is land use and land cover change in surrounding areas. Specifically, protected areas are effective when land use nearby does not obstruct corridor use, dispersion capabilities, gene flow, pollinator guilds, nor facilitate invasions of nonnative

species through habitat loss, fragmentation, and isolation—including those caused by renewable energy development (Hernandez et al. 2015).

Offsite impacts of large-scale solar projects can include road-building, increased transportation of construction materials, toxic accumulation, invasive weed colonization, well water consumption, stormwater runoff and alteration of surface hydrology, noise effects, pollution from spills, and night sky light pollution in wildland areas (see Lovich and Ennen 2011 for discussion of these impacts).

California's deserts represent a globally renowned biodiversity hot spot, supporting high levels of species richness, rarity and endemism. More than 180 species of plants have been discovered by scientists in the California deserts in just the past two decades. And recent estimates (Andre 2014) suggest that 15% of the plant species have yet to be catalogued. In a biologically rich area such as this, where we have so little understanding for the basic biology and taxonomy of the organisms, widespread impacts will significantly diminish critical ecological processes, while greatly increasing the probability for extinctions.

4. **Groundwater.** Groundwater pumping for construction and project operation would potentially threaten water levels at the Soda Springs complex which are some of the last remaining refugia for the Federally Endangered Mohave tui chub (*Gila bicolor mohavensis*), the only fish native to the Mojave River area. The construction phase of the project would use over 300,000 gallons of water per day. The project would also use a large amount of groundwater for dust mitigation during construction and additional water for panel cleaning during the project lifespan. A solar project of this size traditionally uses 1,000 to 2,000 acre-feet/year (afy) of water during construction and this one could use over 40 afy for solar panel washing. The aquifer is poorly understood and the lack of higher mountains in the area indicates that there is little recharge from precipitation. Desert aquifers are delicate and irreplaceable. This water supplies the Soda Springs complex and if it is removed, the Mohave tui chub could be threatened with decline. See also Allen and McHughen (2011) for more on groundwater impacts.

5. **Carbon sequestration.** The Mojave Desert should be recognized for its role in sequestering carbon. The caliche or calcium carbonate contained in the soils play a role in storing carbon. That combined with old-growth desert plants and biological soil crusts make preservation of the Soda Mountain site an important element for managing climate change. Recent studies by Allen et al. (2013), Allen and McHughen (2011), and Wessel et al. (2004) explain the significance of arid desert and semiarid shrubland roles in sequestering carbon. Despite the popular belief that the project will reduce GHG emissions, carbon budgets and net carbon loss are areas of study that need much more research.

6. **Avian-solar interaction.** Birds have been observed to be injured or killed at large-scale solar projects in the desert, potentially attracted to a "lake effect" created by thousands of solar panels clustered together. This is likely to continue at the Soda Mountains Solar Project that would be built just 8 km from the large complex of wetlands and springs in the nearby Zzyzx area. From April 2012 to April 2016, the US Fish and Wildlife Service concluded that 3,545 avian mortalities from 183 species were reported from recently constructed large-scale solar projects in California. (http://blmsolar.anl.gov/program/avian-solar/docs/Avian-Solar_CWG_May_2016_Workshop_Slides.pdf). Many of the mortalities were found incidentally. Field surveys covering entire solar projects are problematic in that they greatly underestimate mortalities. The Independent Science Advisors for the DRECP recommended mitigating the polarized glare of photovoltaic projects to decrease avian mortality, and yet this has not been proposed for the Soda Mountain Solar project.

7. **Air quality.** Utility-scale solar projects transform the landscape substantially through site preparation, including the construction of roads and other infrastructure. Solar facilities require vegetation removal and grading. These construction activities produce dust emissions, especially in arid lands. Dust can have dramatic effects on ecological processes at all scales. To combat dust, solar energy facilities apply various dust suppressants to surfaces with exposed soil, and these have impacts as well to soil runoff potential and hydrology (Lovich and Ennen 2011).

8. **Scenic view sheds.** The project is slated to be developed less than one quarter mile away from the boundary of the Mojave National Preserve, our third largest national park unit in the lower forty eight states. Construction scrapes, transmission gen-tie lines, glaring solar fields, new roads, and substations will be visible from the Soda Mountains, Devil's Playground, Kelso Dunes and Granite and Providence Mountains in the Mojave National Preserve, needlessly jeopardizing a world-class national park unit.

A Distributed Energy Resource Alternative is Viable

A Distributed Energy Resource Alternative is a viable alternative to this destructive project. US Department of Energy's National Renewable Energy Laboratory (NREL) released a report in March 2016 *Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment*, which says 1,118 GW of capacity and 1,432 TWh of annual energy generation was possible, equivalent to 39% of current US electricity sales. This is almost double the previous analysis undertaken and reported in 2008. The significant difference was said to be attributed to increases in photovoltaic (PV) module power density, improved estimation of building suitability, higher estimates of the total number of buildings, and improvements in PV performance simulation tools that previously tended to underestimated production.

NREL reports that California has the greatest potential to offset electricity use - its rooftop PV could generate 74% of the electricity sold by its utilities in 2023. California small and large rooftops have the potential to generate 131.8 GW of solar (http://www.nrel.gov/docs/fy16osti/65298.pdf). Los Angeles alone has the rooftop potential for 9,000 MW of solar (ibid. page 19). Over 39,000 MW of solar PV can be utilized on parking lot structures alone.

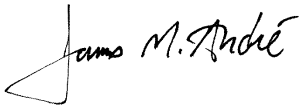
This Distributed Energy Resource alternative is more than enough to conserve this world-class desert ecosystem while efficiently providing California with renewable energy in the built environment and near load centers.

Conclusion

Our point is simple: scientific data should form the backbone of public policy, but to date, in the case of the Soda Mountain Solar Project we believe that it has taken a backseat to political interests. Now is the time to chart the course for a scientifically defensible renewable energy program that avoids harmful utility-scale projects on pristine and ecologically important public lands. We urge the San Bernardino County Board of Supervisors to take the first step, to set the record straight and protect the public trust by rejecting the well permit for the Soda Mountain Project and refusing to certify it under the California Environmental Quality Act.

As concerned scientists we ask that San Bernardino County lead the state in upholding scientific standards for conserving important desert landscapes and values, while maximizing current trends that favor sustainable Distributed Energy Resources in the built environment.

Sincerely,



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