CALIFORNIA ENERGY COMMISSION
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08-AFC-13
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NOTICE OF RECEIPT OF AN APPLICATION FOR CERTIFICATION FOR THE STIRLING ENERGY SYSTEMS SOLAR ONE PROJECT (08-AFC-13)

On December 1, 2008, Stirling Energy Systems Solar Three, LLC and Stirling Energy Systems Solar Six, LLC, (SES Solar, LLC) submitted an Application for Certification (AFC) to the California Energy Commission to develop the Stirling Energy Systems Solar One Project (SES Solar One Project) on public land managed by the Bureau of Land Management (BLM) in San Bernardino County, California.

PROJECT LOCATION

The SES Solar One Project site is located on approximately 8,230 acres of public land in San Bernardino County managed by the BLM. The project site is along Interstate 40 (I-40) approximately 115 miles east of Los Angeles, 37 miles east of Barstow, 17 miles east of Newberry Springs, and 57 miles northeast of Victorville.

The following sections or portions of sections in Townships 8 and 9 of the San Bernardino Meridian identify the SES Solar One Project site and the proposed boundary for development of the project.

Within Township 8 North, Range 5 East of the San Bernardino Meridian defined by:

- the eastern half of Section 2,
- the portion of the northeast and northwest quarter sections and the northeast and southeast quarter-quarter sections of the south east quarter section of Section 8 south of the railroad right-of-way (ROW) and north of the I-40 ROW,
- the southwest, northeast, and southeast quarter of Section 10,
- the portion of Section 11 south of the railroad ROW and the portion of the northeast quarter section of Section 11 north of the railroad ROW,
- the portion of Section 12 north and south of the railroad ROW,
- the portion of Section 14 north of the I-40 ROW,
- the portion of Section 16 north of the I-40 ROW, and
- the portion of the northeast quarter-quarter section of the northeast quarter section of Section 17 north of the I-40 ROW.

Township 8 North, Range 6 East defined by:

- the portion of Section 4 west of the Southern California Edison (SCE) transmission ROW,
- all of Sections 5 and 6,

- the portions of Section 7 north and south of the railroad ROW,
- the portion of Section 8 west of the SCE transmission ROW,
- the portion of Section 9 west of the SCE transmission ROW,
- the portions of Section 17 west of the SCE transmission ROW and north and south of the railroad ROW, and
- the portions of Section 18 west of the SCE transmission ROW, south of the railroad ROW and north of the I-40 ROW.

Township 9 North, Range 5 East defined by:

- the eastern half of Section 35,

Township 9 North, Range 6 East defined by:

- all of Sections 31 and 32, and
- the northwest and southwest quarter sections and the northwest and southwest quarter-quarter sections of the northeast and southeast quarter sections of Section 33.

The proposed project would be constructed in a primarily open area of undeveloped land within the Mojave Desert. The SES Solar One site would be located south of the Cady Mountain Wilderness Study Area (WSA) and north of the Pisgah Crater, which is located within the BLM-designated Pisgah Area of Critical Environmental Concern (ACEC).

The routes of several project features, such as the off-site single-circuit generation interconnection transmission line, electric and communications services, and the temporary access road have yet to be clearly defined. Once the routes have been determined by the applicant, the existing environmental survey information will be added to the discussion of the individual linear facilities in a supplement to the AFC. The results of any incomplete environmental surveys will be provided by the applicant as a supplement to the AFC to provide staff and the public a complete view of the proposed impacts.

The off-site single-circuit generation interconnection transmission line would be constructed a distance of approximately 0.14 mile to connect the SES Solar One Project to the SCE Pisgah Substation. The currently undefined single-circuit transmission line route will be defined by a linear survey and would be routed through portions of Township 8 North, Range 6 East, Section 18. Electric and communications utility services for the Main Services Complex would be constructed in Township 8 North, Range 5 East in Section 15 to the overhead utility lines located on the south side of National Trails Highway. The applicant will define these currently undefined utility ROWs by linear surveys. A temporary site access road would be constructed from I-40 to the eastern boundary of the SES Solar One site. The temporary site access road would generally follow an existing road and would include new off-and-on ramps to the westbound lanes of I-40. The temporary site access road would be defined by a linear

survey, and would be routed through portions of Township 8 North, Range 6 East, Sections 17, 20 and 21.

PROJECT DESCRIPTION

The proposed SES Solar One Project would be a nominal 850-megawatt (MW) Solar Stirling Engine project, with construction planned to begin in either mid or late 2010. Although construction would take approximately 41 months to complete, power would be available to the grid as each of the 567 1.5-MW, three-phase, 60-hertz, 60-unit groups of Stirling Engine modules is completed. The primary equipment for the generating facility would include approximately 34,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Each SunCatcher consists of a solar receiver heat exchanger and a closed-cycle, high-efficiency Solar Stirling Engine specifically designed to convert solar power to rotary power then driving an electrical generator to produce electricity.

The project will be constructed in two phases. Phase I of the project will consist of up to 20,000 SunCatchers configured in 333 1.5-MW solar groups of 60 SunCatchers per group and have a net nominal generating capacity of 500 MW. Phase II will add approximately 14,000 SunCatchers, expanding the project to a total of approximately 34,000 SunCatchers configured in 567-1.5-MW solar groups with a total net generating capacity of 850 MW.

The 8,230-acre project site is located on public land managed by the Bureau of Land Management (BLM). The Applicant has applied for a ROW grant for the project site from the BLM California Desert District. Although the project is phased, it is being analyzed in this AFC as if all phases will be operational at the same time.

Within the project boundary, the SunCatchers in Phase I would require approximately 5,838 acres and those in Phase II would require approximately 2,392 acres. The total area required for both phases, including the area for the operation and administration building, the maintenance building, and the substation building, would be approximately 8,230 acres. A portion of the 220-kV transmission line that would be built for the SES Solar One Project would parallel the Burlington Northern Santa Fe (BNSF) Railroad ROW and the remaining portion will parallel the SCE transmission line within the Project boundary.

PROCESS DESCRIPTION

The SunCatcher is a 25-kilowatt-electrical (kWe) solar dish Stirling system designed to automatically track the sun and collect and focus solar energy onto a power conversion unit (PCU), which generates electricity. The system consists of a 38-foot-high by 40-foot-wide solar concentrator in a dish structure that supports an array of curved glass mirror facets. These mirrors collect and concentrate solar energy onto the solar receiver of the PCU.

The PCU converts the focused solar thermal energy into grid-quality electricity. The conversion process in the PCU involves a closed-cycle, four-cylinder, 35-horsepower reciprocating Solar Stirling Engine utilizing an internal working fluid of hydrogen gas that is recycled through the engine. The Solar Stirling Engine operates with heat input from the sun that is focused by the SunCatcher's dish assembly mirrors onto the PCU's solar receiver tubes, which contain hydrogen gas. The PCU solar receiver is an external heat exchanger that absorbs the incoming solar thermal energy. This heats and pressurizes the hydrogen gas in the heat exchanger tubing, and this gas in turn powers the Solar Stirling Engine.

A generator is connected to the Solar Stirling Engine; this generator produces the electrical output of the SunCatcher. Each generator is capable of producing 25 kWe at 575 volts alternating current (VAC)/60 hertz (Hz) of grid-quality electricity when operating with rated solar input. Waste heat from the engine is transferred to the ambient air via a radiator system similar to those used in automobiles.

The hydrogen gas is cooled by a standard glycol-water radiator system and is continually recycled within the engine during the power cycle. The conversion process does not consume water. The only water consumed by the SunCatcher is for washing of the mirrors to remove accumulated dust and replenishing small losses to the cooling system radiator in a 50-50 glycol-water coolant.

TRANSMISSION

The project would include the construction of a new 230-kV substation approximately in the center of the project site. This new substation would be connected to the existing SCE Pisgah Substation adjacent to the project site via approximately 2-miles (0.14-mile off-site) of single-circuit, 220-kV transmission line. Other than this interconnection transmission line that will be constructed by SES Solar, LLC, the proposed project would require SCE to expand and upgrade the existing 220-kV SCE Pisgah Substation to support the increase in voltage to 500-kV, loop the Eldorado-Lugo 500kV line into the SCE Pisgah Substation and demolish 65 miles of the existing Lugo-Pisgah No. 2 220-kV transmission and replace it with towers and conductor. In addition, modifications within the SCE Eldorado and Lugo substations will be required.

The Energy Commission staff will require additional environmental and engineering information on the proposed SCE system upgrades, including the substation upgrades, 65 miles of 220-kV transmission line demolition, and the 500-kV transmission line construction. Although the substation and transmission line upgrades will be permitted by the California Public Utilities Commission (CPUC), these upgrades must be evaluated as part of the joint Energy Commission/BLM review as reasonably foreseeable impacts. SCE will complete an environmental review and apply for a Certificate of Public Convenience and Necessity (CPCN) from the CPUC and the CPUC and BLM will conduct a California Environmental Quality Act (CEQA)/National Environmental Protection Act (NEPA) review for the transmission upgrade project separate from the SES Solar One Project. At this time there is uncertainty regarding

when SCE will file with the CPUC and the potential impact of any filing delay on the SES Solar One Project schedule.

WATER USE AND DISCHARGE

When completed, the Solar One Project will require a total of approximately 36.2 acre-feet of water per year. SunCatcher mirror washing and operations dust control under regular maintenance routines will require a daily average of approximately 25.8 gallons per minute of water, with a daily maximum requirement of approximately 43.7 gallons per minute of water during the summer peak months each year, when each SunCatcher receives a single mechanical wash. Each of the 34,000 SunCatchers would receive approximately eight normal washes each year, requiring approximately 14 gallons of demineralized water each time, and four scrub washes each year, taking approximately 42 gallons of demineralized water each time.

Water for Solar One Project SunCatcher mirror washing, fire water, and domestic use will be provided from wells drilled on-site. SunCatcher mirror washing requires the water to be demineralized to prevent mineral deposits forming on the SunCatcher mirrors. Processes available for demineralization are reverse osmosis (RO) and ion exchange, with RO being the preferred process. The appropriate technological process will be determined during the environmental review process.

The water treatment wastewater generated by the RO unit contains relatively high concentrations of total dissolved solids (TSD). Wastewater or brine generated by the RO unit will be discharged to a concrete-lined evaporation pond, or equivalent. After the brine has gone through the evaporation process, the solids that settle at the bottom of the evaporation pond will be tested by the applicant and disposed of in an appropriate non-hazardous waste disposal facility. Two ponds, sized to contain approximately 2 million gallons, would be constructed. The second pond would be utilized while the first pond is undergoing evaporation.

ENERGY COMMISSION AND BUREAU OF LAND MANAGEMENT JOINT REVIEW PROCESS

The BLM and the Energy Commission have executed a Memorandum of Understanding concerning their intent to conduct a joint environmental review of the project in a single National Environmental Policy Act (NEPA)/California Environmental Quality Act (CEQA) process. It is in the interest of the BLM and the Energy Commission to share in the preparation of a joint environmental analysis of the proposed project to avoid duplication of staff efforts, to share staff expertise and information, to promote intergovernmental coordination at the local, state, and federal levels, and to facilitate public review by providing a joint document and a more efficient environmental review process.

Under federal law, the BLM is responsible for processing requests for rights-of-way to authorize the proposed project and associated transmission lines and other facilities to be constructed and operated on land it manages. In processing applications, the BLM must comply with the requirements of NEPA, which requires that federal agencies

reviewing projects under their jurisdiction consider the environmental impacts associated with the proposed project construction and operation.

As the lead agency under CEQA, the Energy Commission is responsible for reviewing and ultimately approving or denying all applications to construct and operate thermal electric power plants, 50 MW and greater, in California. The Energy Commission's facility certification process carefully examines public health and safety, environmental impacts and engineering aspects of proposed power plants and all related facilities such as electric transmission lines and natural gas and water pipelines.

The first step in the Energy Commission's review process is for staff to determine whether or not the AFC contains all the information required by its regulations. When the Energy Commission determines the AFC is complete, staff will begin data discovery and issue analysis phases. At that time, a detailed examination of the issues will occur.

PUBLIC PARTICIPATION

Over the coming months, the Energy Commission and the BLM will conduct a number of public workshops, scoping meetings, and hearings on the proposal to determine whether the proposed project should be approved for construction and operation and under what set of conditions. These workshops and hearings will provide the public as well as local, state and federal agencies the opportunity to ask questions about, and provide input on, the proposed project. The Energy Commission will issue notices for these workshops and hearings at least 15 days prior to the meeting.

Please direct your technical or project schedule questions to Christopher Meyer, Energy Commission Project Manager, at (916) 653-1639, or by e-mail at cmeyer@energy.state.ca.us. If you desire information on participating in the Energy Commission's review of the project, please contact the Energy Commission's Associate Public Adviser, Loreen McMahon, at (916) 654-4489 or toll free in California, at (800) 822-6228. The Public Adviser can also be contacted via email at PublicAdviser@energy.state.ca.us. News media inquiries should be directed to the media office at (916) 654-4989 or via email at mediaoffice@energy.state.ca.us. The status of the proposed project, copies of notices, an electronic version of the AFC, and other relevant documents are also available on the Energy Commission's Internet web site at: http://www.energy.ca.gov/sitingcases/solarone.
You can also subscribe to receive e-mail notification of all notices at http://www.energy.ca.gov/listservers.

By being on the mailing list, you will receive notices of all project-related activities and notices when documents related to the proposed project's evaluation are available for review. If you want your name removed from the mailing list, please contact Hilarie Anderson, Project Secretary, at (916) 651-0479 or by email at handerso@energy.state.ca.us.

AVAILABILITY OF THE AFC DOCUMENT

Copies of the AFC are available for public inspection at the following public libraries:

San Bernardino County Library
Barstow Branch
304 East Buena Vista
Barstow, CA 92311

San Bernardino County Library
Needles Branch
1111 Bailey
Needles, CA 92363

Victorville Public Library
15011 Circle Drive
Victorville, CA 92395

Copies are also available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, and at California public libraries in Eureka, Fresno, San Francisco, Los Angeles, and San Diego. In addition, copies will be distributed to Bureau of Land Management, as well as those public agencies that would normally have jurisdiction except for the Energy Commission's exclusive authority to certify sites and related facilities.

Sincerely,

Date: _____

Eric Knight, Siting and Docket Office Manager
Siting, Transmission and Environmental
Protection Division