

PROJECT DESCRIPTION

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INTRODUCTION

On August 31, 2007, Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; Solar Partners VIII, LLC (Solar Partners or Applicant), a subsidiary of BrightSource Energy, Inc., filed an Application for Certification (AFC) seeking approval from the California Energy Commission (Energy Commission) to develop the Ivanpah Solar Electric Generating System (ISEGS) project. On October 31, 2007, the Energy Commission accepted the AFC as complete, thus starting the Energy Commissions' and Bureau of Land Managements' formal review of the proposed ISEGS project.

PURPOSE OF PROJECT

The ISEGS project will assist California in repositioning its generation asset portfolio to use more renewable energy and reduce greenhouse gas emissions in conformance with state policies as set forth in SB 1078 and AB 32. It will help diversify the state's electricity sources, reducing its dependence on natural gas-fired power plants.

PROJECT LOCATION

The proposed ISEGS would be located in southern California's Mojave Desert, near the Nevada border, to the west of Ivanpah Dry Lake (see Figures 1 and 3) and 0.5 mile west of the Primm Valley Golf Club. The Colosseum Road passes through the site. The Assessor Parcel Numbers by plants site are: a) Ivanpah 1: 0573-101-0,0573-101-05,0573-101-09 and 0573-101-10, b) Ivanpah 2: 0573-161-09, 0573-161-10, 05-161-15, and 0573-161-16, c) Ivanpah 3: 0573-161-02, 0573-161-03, 0573-161-09 0573-161-10, and 0573-161-11, d) Shared facilities: 0573-171-12, 0573-161-03, 0573-161-10, 0573-161-15, 0573-161-16, 0573-101-03, and 0573-101-04. The project would be located in San Bernardino County, California, on federal land managed by the Bureau of Land Management (BLM). The proposed project would affected lands within the following legal description: T. 16 N., R. 14 E., San Bernardino Meridian Secs. 2, 3, 4, 9, 10 and 11, Secs. 17, 20, 21, 22, 27, 28, 29, 32, 33 and 34.

PROJECT DESCRIPTION

The ISEGS would be constructed in three phases and would provide a combined 400-megawatts (MW) of electricity: two 100-MW phases known as Ivanpah 1 and 2 and a 200-MW phase known as Ivanpah 3 (see Figure 2). The phasing would be planned so that Ivanpah 1 (the southern-most site owned by Solar Partners II, LLC.) would be constructed first, followed by Ivanpah 2 (the middle site, owned by Solar Partners I, LLC.), then Ivanpah 3 (the 200-MW plant on the north owned by Solar Partners VIII, LLC.), though the order of construction may change (see table 1). The proposed solar facilities would share an Administration Building, Operations and Maintenance building and substation for all three phases. Each 100-MW site requires about 850 acres (or 1.3 square miles); the 200-MW site would be about 1,660 acres (or about 2.6 square

miles). The total area required for all three phases, including the Administration Building/Operations and Maintenance building and substation, would be approximately 3,400 acres.

TABLE 1
PRIMARY PROJECT PARAMETERS NUMBERS

| Plant | Capacity, Net MW | No. of Heliostats (approx.) | Annual Production, MWH | Utility Interconnection |
|--------------|------------------|-----------------------------|------------------------|-------------------------|
| Ivanpah 1 | 100 MW | 68,000 | 240,000 | SCE 115 kV |
| Ivanpah 2 | 100 MW | 68,000 | 240,000 | SCE 115 kV |
| Ivanpah 3 | 200 MW | 136,000 | 480,000 | SCE 115 kV |
| TOTAL | 400 MW | 272,000 | 960,000 | SCE 115 kV |

SOLAR POWER PLANT PROCESS AND EQUIPMENT

In each solar plant, one Rankine-cycle reheat steam turbine receives live steam from the solar boilers and reheat steam from one solar reheater located in the power block at the top of its own tower (see Figures 3a, 3b, 4a, 4 b, and 5a, 5b). The reheat tower would be located adjacent to the turbine. Additional heliostats (mirrors) would be located outside the power block perimeter road, focusing on the reheat tower. The solar field and power generation equipment would be started each morning after sunrise and insolation build-up, and shut down in the evening when insolation drops below the level required to keep the turbine online.

Each plant also includes a partial-load steam boiler, which would be used for thermal input to the turbine during the morning start-up cycle to assist the plant in coming up to operating temperature more quickly. The boiler would also be operated during transient cloudy conditions, in order to maintain the turbine on-line and ready to resume production from solar thermal input, after the clouds pass. After the clouds pass and solar thermal input resumes, the turbine would be returned to full solar production.

Each plant uses an air-cooled condenser or “dry cooling,” to minimize water usage in the site’s desert environment. Water consumption would, therefore, be mainly to provide water for washing heliostats. Auxiliary equipment at each plant includes feed water heaters, a deaerator, an emergency diesel generator, and a diesel fire pump.

Each solar development phase would include:

- a natural gas-fired start-up boiler to provide heat for plant start-up and during temporary cloud cover;
- an air-cooled condenser or “dry cooling,” to minimize water usage in the site’s desert environment;

- one Rankine-cycle reheat steam turbine that receives live steam from the solar boilers and reheat steam from one solar reheater located in the power block at the top of its own tower adjacent to the turbine; and
- a raw water tank with a 250,000 gallon capacity of which only a portion would be used for the plant.
- a small onsite wastewater plant located in the power block that treats wastewater from domestic waste streams such as showers and toilets;
- auxiliary equipment including feed water heaters, a deaerator, an emergency diesel generator, and a diesel fire pump.

AIR EMISSION CONTROL

Air emission from the combustion of natural gas in the start-up boiler will be controlled using best available control technology. To ensure that the systems perform correctly, continuous emission monitoring for NO_x and CO will be performed. Boiler use will not exceed four hours on any given day and average boiler use will be less than one hour per operating day.

HAZARDOUS WASTE MANAGEMENT

Several methods will be used to properly manage and dispose of hazardous wastes. Waste lubricating oil will be recovered and recycled by a waste oil-recycling contractor. Chemical will be stored in appropriate chemical storage facilities. Bulk chemicals will be stored in large storage tanks while most other chemicals will be stored in smaller returnable delivery containers. All chemical storage areas will be designed to contain leaks and spills in concrete containment areas.

NATURAL GAS

Natural gas supply for ISEG would connect to the Kern River Gas Transmission Company (KRG T) pipeline about 0.5 miles north of the Ivanpah 3 site.

TRANSMISSION

Ivanpah 1, 2 and 3 would be interconnected to the Southern California Edison (SCE) grid through upgrades to SCE's 115-kV line passing through the site on a northeast-southwest right-of-way. Upgrades would include a new 220/115-kV breaker-and-a-half substation between the Ivanpah 1 and 2 project sites. The existing 115-kV transmission line from the El Dorado substation would be replaced with a double-circuit 220-kV overhead line that would be interconnected to the new substation. Power from Ivanpah 1, 2 and 3 would be transmitted at 115-kV to the new substation.

WASTEWATER COLLECTION

The primary wastewater collection system will collect plant process wastewater from all of the plant equipment and will be recycled to the extent practicable. Each solar plant will include a small packaged sewage system for potable water streams, including showers and toilets. Treated wastewater from potable streams will be used for landscape irrigation. Sewage sludge will be collected in holding tanks and removed from the site by a sanitary service provider.

WATER USE AND DISCHARGE

Raw water would be drawn from one of two wells, located east of Ivanpah 2, which would provide water to all three plants. Each well would have sufficient capacity to supply water for all three phases. Actual water is not expected to exceed 100 acre feet per year for all three plants. Groundwater would go through a treatment system for use as boiler make-up water and to wash the heliostats. No wastewater would be generated by the system, except for a small stream that would be treated and used for landscape irrigation.

REFERENCES

BSE2007a – Bright Source Energy/ Solar Partners I, LLC/ J. Woolard (tn: 42174). Application for Certification, Volumes I and II, for the Ivanpah Solar Electric Generating System. Submitted to CEC/Docket Unit on 8/31/2007.