SECTION 2 DESCRIPTION OF PROJECT AMENDMENT

This Section provides a description of the modifications to the approved CSP that are proposed by K Road Calico Solar, LLC. The Final Decision describes the CSP as a solar thermal project using SunCatchers. The SunCatchers will be eliminated and the CSP reconfigured to utilize PV technology only. This section is organized to outline the modifications to the description of the CSP contained in the Final Decision as well as to provide a complete description of the PV project as proposed in this Petition. For convenience, the term “Approved Project” refers to the CSP as described in the Final Decision. The term “Project Modifications” refers to the CSP as proposed in this Petition.

2.1 GENERAL PROJECT DESCRIPTION

2.1.1 Description of Approved Project

Phase 1 of the Approved Project was to be located primarily north of the railroad, was to include approximately 1,876 acres (as shown on Figure 2-1), and included the following elements:

- main access road;
- bridge constructed over the railroad;
- main services complex (including temporary lay down area);
- on-site substation and two-mile transmission line to the Pisgah Substation;
- water well and an approximately one-mile waterline to the main services complex;
- solar field comprised of SunCatchers producing up to 275 MW; and
- hydrogen generation, storage, and distribution system for SunCatchers located north of the railroad.

Phase 2 of the Approved Project, was to be located south of the railroad and north of Phase 1, would have comprised of 2,737 acres (as shown on Figure 2-1), and included the following elements:

- solar field comprised of SunCatchers producing up to 388.5 MW; and
- hydrogen generation, storage, and distribution system for the SunCatchers located south of the railroad.

2.1.2 Description of Modified Project

K Road Calico Solar, LLC proposes changes to the site footprint, layout and electrical generation technology associated with the Approved Project. The primary changes include:

- The proposed technology to be utilized for the Modified Project would be PV modules mounted on (1) horizontal single-axis trackers or (2) a fixed tilt racking system. Fixed tilt PV panels may also be used on the site where terrain or other site constraints preclude the use of single-axis trackers.
- The Modified Project would still be constructed in two phases, but the phases have been modified. Now Phase 1 would be located primarily south of the BNSF railroad, in the poorest quality habitat, and Phase 2 would be located primarily north of the railroad.
- A new access route to the portion of the Modified Project located in Township 8N, Range 5E, Section 8. The new access road will be located on private land within APN: 0529-201-13-000 within rights provided under an access agreement executed on November 1, 2010.

In addition to changing the technology, K Road Calico Solar reconfigured the project layout to further address environmental concerns raised by Interveners. Specifically, the Modified Project reduces the project footprint from 4,613 acres to 3,855 acres and provides the following environmental benefits:

- Highest quality desert tortoise habitat is avoided
- Allows for a wildlife movement corridor through the center of the Project
- Reduces impacts to the White-Margined Beardtongue from four (4) distinct areas to one (1)
- Excludes 69 acres of Mojave Fringe Toed Lizard habitat. This total acreage includes 17 acres of the 21.4 total acres of high quality breeding habitat.
- Excludes the donated lands (Catellus Lands) within Section 17 from the site.

A layout of the Modified Project is shown on Figure 2-2.

Phase 1 of the Modified Project will encompass approximately 2,042 acres and will consist of the following components:

- Relocated main access road;
- Relocated main services complex (including temporary lay down area);
- Relocated on-site substation and shortened transmission line to the Pisgah Substation;
- Water well located north of the railroad, and waterline to the main services complex (same source and well location, with a longer waterline crossing under the railroad); and
- Solar field comprised of PV modules producing up to 294 MW using today's efficiency numbers and preliminary layouts.

Phase 2 of the Modified Project will be constructed after Phase 1, and will encompass approximately 1,814 acres and consist of the following components:

- Bridge constructed over the railroad;
- Continuation of the main access road north of railroad; and
- Solar field comprised of up to 324 MW of PV modules using today's efficiency numbers and preliminary layouts.

2.2 TECHNOLOGY

The following sections describe the electrical generation technology proposed for the Modified Project. It should be noted that PV efficiencies are advancing rapidly. It is possible that with the simple improvements in efficiency, additional power generation can be achieved without any change in layout or increase in the project footprint. K Road Calico Solar LLC's LGIA currently allows for up to 850 MW to be delivered to the CAISO grid. K Road Calico Solar LLC anticipates that it can generate at least 275 MW from Phase I with the potential to generate up to 294 MW using with current technology and preliminary layouts. Similarly, using the current technology and preliminary layout Phase II can generate up to 324 MW.

However, by the time all of Phase I is constructed and Phase II is beginning, it is very likely that using the same layout, the advances in PV panel efficiency can increase the output from the plant. K Road Calico Solar LLC is informing the Commission about this possibility now in order to request that the License be amended to allow for this increase in generation due to efficiency. K Road Calico Solar LLC acknowledges that the current Commission statutory authority would require the filing of a new AFC should the generation output of a facility be increased by 50 MW or more. To that end, K Road Calico Solar LLC in informing the Commission now in order to avoid having to amend the License again in the future (or filing of a new AFC) solely because the panels themselves are capable of producing additional energy. For purposes of this amendment, using the layout proposed herein and the current efficiencies, K Road Calico Solar LLC estimates that Phase I and Phase II can generate up to 618 MW.

2.2.1 Photovoltaic Technology

K Road Calico Solar is proposing to use PV technology to produce up to up to 618 MW of installed electrical generation capacity for the Modified Project. The SunCatcher technology is no longer a viable technology for use on the site, thereby necessitating the change.

The Inverter Block is the basic building block of the PV arrays. Each basic Inverter Block would be similar in configuration and capability. Two possible arrangements are described below, each for a 1.52 MW-ac Inverter Block: (1) horizontal single-axis trackers (Tracker System), (2) fixed tilt racking system (Fixed Tilt System). In the Tracker System the rows of PV modules are controlled by a tracker motor and control system which rotates all of the modules in unison around a north-south axis as they follow the daily movement of the sun from east to west. In the Fixed Tilt System the rows of modules run east-west and the modules are installed at a fixed tilt orientation facing south.

Tracker System

One currently available tracker system is the Oasis system by SunPower. Based on SunPower's latest 435 W-dc modules, in this Tracker System configuration, each 1.52 MW-ac Inverter Block is made up of approximately 36 rows containing approximately 40 PV modules per row, totaling about 2160 modules per Inverter Block. A basic Inverter Block for this tracker system will measure approximately 644 feet by 481 feet and occupy a space of approximately 7.1 acres. Inverter Blocks may be reduced as required by site characteristics such as boundaries, roads, topography, or similar constraints (Figures 2-3A through O).

A row consists of 40 PV modules attached to a horizontal steel shaft. These shafts are supported by vertical steel posts that are spaced up to 18 feet apart. The steel shafts are connected by a main drive shaft, which is supported by steel posts. The support posts generally project 5 to 6 feet above the ground and are vibrated to a roughly equivalent depth into the ground. To account for minor ground surface differences, and minimize grading, the steel posts may vary in height above the ground surface more than the 5 to 6 feet mentioned above in order to maintain the axis of the tracking system in a horizontal orientation. The maximum height of the structure will be approximately 9 feet when the modules are at their maximum tilt angle (as shown in Figure 2-3C).

Fixed Tilt System

In a Fixed Tilt System based on First Solar 90 W-dc modules using a 1.52 MW-ac Inverter Block size, modules are installed on a fixed racking system 5 modules high in a landscape orientation, with 50 modules per rack and 414 racks per Inverter Block, a total of 20,700 modules per Inverter Block. This Inverter Block for this fixed tilt system will measure approximately 679 feet by 520 feet and occupy a space of approximately 8.1 acres. Inverter Blocks may be reduced as required by site characteristics such as boundaries, roads, topography, or similar constraints (Figures 2-4A through S).

A fixed tilt racking system is supported by vertical steel posts that are spaced about 12 feet apart. The support table to which the modules are attached is set at a fixed tilt angle, typically 20 to 30 degrees from horizontal, and facing south. The support posts generally project 5 to 6 feet above the ground and are vibrated to a roughly equivalent depth into the ground. A fixed tilt system can follow the terrain and to account for ground surface differences, which may reduce the amount of grading required. The support posts may vary in height above the ground surface more than the 5 to 6 feet mentioned. The maximum height of the structure will be approximately 9 feet depending on the tilt angle selected (as shown in Figure 2-4C

The PV modules that make up the Inverter Blocks have the capability to convert the sun's energy into direct current (DC) electricity, each producing a relatively small amount of electricity, about several hundred watts each at rated conditions. Modules are

electrically connected in series and parallel arrangements. A series arrangement increases the collective output voltage and a parallel arrangement increases the current to the desired levels for the DC collection system.

The modules being considered for this Modified Project are produced by a number of world-class companies that have excelled in this industry. Among them are SunPower, Suntech, Yingli, Q-Cells, Trina, First Solar, and other manufacturers of silicon crystalline and thin film modules. For reasons of availability to support the Modified Project delivery requirements, multiple sources might be utilized. This is a common practice in the industry. Modules are generally quite similar in their physical and performance characteristics. Each module is encapsulated with tempered glass (or similar transparent material) on the front surface, with a protective and waterproof material on the back. The edges are sealed for weatherproofing, and there is often an aluminum frame holding everything together in a mountable unit. On the back of the module, there is a junction box, or wire leads, providing electrical connections.

Inverters, Collection System and On-site Substation

The energy produced by the modules are directed to the plant inverters. Eight hundred thirteen i0.76 MW-ac inverters will be used to achieve the plant capacity of 618 MW-ac. The inverters are typically installed on pre-cast concrete inverter pads, each with two inverters, a step-up transformer raising the voltage to 34.5 kV, and one main line distribution switchboard mounted on a foundation. As a result of the recent increases in the size of PV projects, inverter suppliers are actively developing larger units to allow fewer inverters per MW. The inverter pads have been selected to take advantage of this trend. The inverters not only convert the DC energy from the modules to 60 Hz but they also provide the power quality functions of voltage regulation, power factor control, low-voltage ride through (LVRT), and supervisory control function, in accordance with SCE system and California Independent System Operator (CAISO)[2] requirements. From the inverter pads, the electricity runs through underground wires and on posts to the on-site substation where it is stepped up to the 230 kV required for the SCE interconnection. The collection system would be very similar to the Approved Project's mid-range collection system used with the SunCatcher.

As discussed above, K Road Calico Solar has not selected the specific PV modules nor has it decided on whether a Tracker System, Fixed Tilt System, or combination of the two systems will be installed. As described in Sections 3, 4, 5, and 6 the potential effects from each system is analyzed and K Road Calico Solar is requesting the Final

[2] The CAISO is a non-profit public benefit corporation charged with operating the majority of California's high-voltage wholesale power grid.

Decision be amended in such a way as to allow the specific combination of technologies to be selected prior to construction without the need for filing another amendment.

2.3 PROJECT CONSTRUCTION AND OPERATION

The following paragraphs describe the construction activities and methods associated with the Modified Project, as well as the operation of the Modified Project.

2.3.1 Construction Activities and Methods of the Modified Project

While the construction activities and methods proposed for the Modified Project would be similar to those described under the Approved Project in the Commission Decision, the intensity of the construction activities would be reduced under the Modified Project. Installation of steel posts to support PV modules would not require the same heavy equipment as would have been required for SunCatcher pedestal and dish installation. Also, because PV technology does not require intense on-site assembly, the size of the workforce required during construction of the Modified Project would be reduced from the workforce required under the Approved Project. As a result, fewer construction vehicles would be needed for the Modified Project. The construction of the Modified Project is expected to take approximately four years, however, power could be available to Pisgah Substation as each Inverter Block is completed. As with the Approved Project, temporary power would be supplied by generators during construction of the Modified Project.

K Road Calico Solar would access Phase 1 Project features north of the railroad at the private crossing located at the extension of Hector Road, as granted by the CPUC. K Road Calico Solar is currently in negotiation with BNSF to obtain all necessary approvals for this proposed access. After completion of the bridge, the bridge would provide the permanent access point to the Modified Project area north of the railroad for completion of Phase 2 construction activities, as well as during operation of the facility.

2.3.2 Summary of Modified Project Operations

The Modified Project would operate 7 days per week, generating electricity during normal daylight hours when the solar energy is available. PV technology requires significantly lower maintenance (e.g., fewer moving parts and fewer periodic replacements of parts) and less washing than the SunCatcher technology. Therefore, the Modified Project would employ a reduced permanent workforce during operations. Under the Approved Project, the height of SunCatchers (approximately 40 feet above the ground surface) and the frequency of washings (monthly), would necessitate washing trucks with a mounted boom travelling and improved SunCatcher maintenance

roads treated with soil stabilizer were contemplated between every other row of SunCatcher roads. Under the Modified Project, the SunCatcher operations and maintenance would be eliminated. For the operation and maintenance of the PV field in the Modified Project, no roads within the Inverter Blocks would be needed other than the main access road that provides access to each inverter pad. Instead, up to four times a year, small vehicles would travel on unimproved module access points that would alternate with areas of native soil between every other row of PV modules.

Table 2-1, below, compares the list of significant structures and equipment for the Approved Project to those of the Modified Project.

TABLE 2-1 SIGNIFICANT STRUCTURES COMPARISON AND EQUIPMENT DESCRIPTION

Table 2-1 Significant Structures and Equipment Description	Permitted Qty	Modified Qty	Length (feet)	Width (feet)	Height (feet)	Change
Main Services Complex administration building	1	1	60	70	17	Relocated
Inverters	--	813	N/A	N/A	9	Added
PV Modules	--	1,756,080	6.8	3.4	0..1	Added
Main Services Complex maintenance building	1	1	70	70	17	Relocated
Well and Fire Water storage tank 175,000 gallons	1	1	40 diameter		25[1]	None
Demineralized water tank, 17,000 gallons[1]	2	2	18 diameter		10	None
Potable Water Tank, 5,000 gallons	1	1	10 diameter		10[1]	None
230 kV transmission line towers, double circuit with upswept arms	12 to 15	0 to 3	--	32	90 to 110	Quantity Reduced
230 kV dead-end structure	1	1	--	100	90	None
Open bus switch rack, 35 kV, 7 bay with seven 35 kV, 600-A, 40 kVA INT, circuit breakers, insulators, switches, and bus work (6 for PV)	6	6	105	20	30	None
DVAR compensation system in coordination with shunt capacitor banks – size to be determined by studies	1	2	60	12	16	(ADDED) IN 2 PHASES
Disconnect switch, 35 kV, 3,000 A, 200 kV BIL, group-operated	6	6	3	11	16	NONE
Power transformer, three phase, 100/133/167 MVA, 230/132.8-34.5/19.9 kV, 750 kV BIL, oil filled	6	6	15	35	23	None
Power circuit breaker, 242 kV, 2000A, 40 kA interrupting capacity & 230 kV Buss Work	7	6	12	20	16	Quantity Reduced
Coupling capacitor voltage transformer for metering,	6	3	1	1	25	Quantity Reduced

Table 2-1 Significant Structures and Equipment Description	Permitted Qty	Modified Qty	Length (feet)	Width (feet)	Height (feet)	Change
242 kV, 900 kV BIL, 60 Hertz, Potential Transformer ratio 1,200/2,000:1						
Disconnect switch, 242 kV, 1000 A	9	8	10	25	25	Quantity Reduced
Collector Group transformer 1.5 MVA, 34.5 kV - 342 V - 342 V	4431	429	6.67	7.5	6.67	Quantity Reduced
Shunt capacitor bank	6	6	15	8	20	None

Notes:

1 = The Commission Decision reflected discrepancies in these numbers. These numbers have been correct here for consistency.

A = ampere (amp), BIL = basic impulse level, DVAR = Dynamic VAR, gpd = gallon per day, generator step-up unit (GSU), HP = horsepower, Hz = hertz, INT = international, kA = kilo amps, kV = kilovolt, kVA = kilovolt amps, Kvar = kilo amp reactive, kW = kilowatt, kWe = kilowatt-electric, MVA = megavolt amps, MVAR = megavolt amp reactive, MW = megawatts, QTY = quantity, V = volts, VAR = volt amp reactive, W = watts, -- = not applicable

2.3.3 Site Grading and Drainage

Except for the initial pre-construction brush trimming (described below), the site preparation and maintenance parameters for the Modified Project, including operational brush trimming, blading, grading and other ground disturbance, would create no greater disturbance than would the Approved Project. Site grading and drainage for the Modified Project would be consistent with the permitted methodology described in the Approved Project and would meet the same standards set for the Approved Project.

Prior to construction of each phase of the Modified Project, the brush would be trimmed to a minimum height of 3 inches above ground, leaving the existing native plant root system in place to minimize soil erosion. After this initial trimming, the areas between PV rows would alternate between undisturbed areas and areas to be used as unimproved module access points, which would be accessed up to four times a year. Installation of the PV Inverter Blocks would be completed in such a way as to reduce the need for site grading and would not be more than was contemplated under the Approved Project.

Under the Modified Project, the proposed design, grading, and treatment methods proposed for the paved main access road and other surface-treated roads would not change. However, in the Modified Project, the SunCatcher maintenance roads will be eliminated with the replacement of SunCatchers with PV modules. These surface-treated roads would be replaced in the Modified Project with unimproved module access points. The areas developed using PV technology have surface-treated access roads where inverter pads are located. All other access to the PV technology would be via unimproved module access points.

A preliminary grading plan is included in Appendix A.

2.3.4 Buildings

The Modified Project would relocate the main services complex within the Project site in the new location of Phase 1, south of the railroad, to a central location that provides for efficient access routes for maintenance vehicles servicing the entire solar field. The locations of the buildings within the main services complex would be reconfigured (Figure 2-5) and the SunCatcher assembly buildings would be eliminated. However, the size, design, and functionality of the remaining buildings would remain the same in the Modified Project as under the Approved Project.

2.3.5 Water Supply and Treatment

The water usage rates for the operations phase would not increase under the Modified Project. Water usage requirements would be reduced slightly, as shown in Table 2-2, and would conform to the usage limits contained in the Final Decision. The length of the water line would increase from 0.51 mile to 2.32 miles and would be constructed under the railroad using jack and bore techniques.

TABLE 2-2
WATER USAGE RATES FOR FACILITY OPERATION UNDER MODIFIED PROJECT

Water Use	Daily Average (gallons per minute)	Daily Maximum (gallons per minute)	Annual Usage (acre feet)
Equipment Water Requirements			
PV Panel Washing	6.6	23.2	10.7
Water Treatment System Discharge			
Brine to Evaporation Ponds	2.7	14.6(1)	4.3
Potable Water Use			
For drinking and sanitary water requirements	0.43(2)	1.1	0.7
Soil Stabilizer			
Water mixed with Soiltac for dust control	2.5	8.8(3)	4.0(4)
Totals	**12.23**	**47.7**	**19.7**

1 Based on the maximum amount of demineralized water required for panel washing and assumes a decrease in raw water quality requiring an additional 40 percent of system discharge.
2 Assumes 30 gallons per person per day for 30 people.
Assumes a six-day work week and average daily usage.
3 Based on filling a 2,000 gallon tanker truck 6/7 full of water over 1 hour.
2 Assumes 6:1 mix of water to Soiltac applied to 1,245 acres of road every 2 years.

2.3.6 Wastewater and Waste Management

The only wastewater and waste-related change resulting from the Modified Project is a reduction in wastewater. Daily sanitary flows are estimated to decrease from the peak 6,600 gallons per day for the Approved Project to about 1,400 gallons per day for the Modified Project.

Under the Modified Project, the wastewater discharge would be similar to that of the Approved Project. Demineralized water will be used for PV module washing. However, sanitary wastewater would be reduced due to the reduction in workforce. Otherwise, handling and treatment of wastewater under the Modified Project would be the same as under the Approved Project.

2.3.7 Hazardous Waste Management

Hazardous materials associated with the construction and operation of the SunCatcher technology would be eliminated for the Modified Project. For example, as discussed below, hydrogen would be eliminated with the conversion of the technology to PV. Hazardous materials generated during construction and operation would still include paints, epoxies, grease, transformer oil, caustic electrolytes (battery fluid), and products that would be generated by the construction equipment, such as waste fuel and waste oil. Several methods would be used to properly manage and dispose of hazardous materials and wastes. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Chemicals would be stored in appropriate chemical storage facilities. Bulk chemicals would be stored in large storage tanks, while most other chemicals would be stored in smaller returnable delivery containers. All chemical storage areas would be designed with concrete containment areas to contain leaks and spills and would meet all applicable LORS. Estimated quantities of hazardous waste generated are expected to be the same as described in the Final Decision, with the exception of hydrogen-related wastes. Waste materials as well as their handling will be further described in the Construction Waste Management Plan as required in Condition of Certification (COC) Waste 3 in the Final Decision, as well as the Operations Waste Management Plan to be provided as required in the Final Decision under COC Waste 6.

The principal materials incorporated into the PV arrays include glass, steel, and various semiconductor metals. The module production process is designed to minimize waste generation and maximize the recyclability and reusability of component materials. Some manufacturers employ the compound CdTe as the semiconductor material. Cadmium telluride is a stable compound of cadmium (Cd) and tellurium (Te). Cadmium, Cd, produced primarily as a byproduct of zinc refining, is a human carcinogen as an independent element, but when combined with Te, a byproduct of copper refining, forms the stable, non-hazardous compound CdTe. In module manufacturing Cd, a hazardous material, is safely sequestered in the form of CdTe in a module for the over 30-year lifetime of the module, after which it is recycled for use in new solar modules or other new products. An analysis of CdTe is included in Section 4.5 of this Petition.

2.3.8 Hydrogen System

The Approved Project utilized a hydrogen system to generate electrical energy. That system was unique to the Stirling Engine and will be eliminated by the Modified Project.

2.3.9 Transmission System Interconnection and Upgrades

The Modified Project changes would involve relocating the on-site substation south of the railroad on the eastern side of the new Phase 1 area, adjacent to the Pisgah substation. The layout of the planned on-site substation would not change from the design approved by the Final Decision. The single-circuit transmission line between the on-site substation and Pisgah Substation would be reduced to approximately 500 feet in length, requiring only up to three towers. Otherwise, the transmission system interconnection for the Modified Project would be the same as for the Approved Project. The CAISO has previously determined that the conversion from SunCatcher to PV technology would not be a material change to the existing LGIA.

A one-line diagram of the Modified Project will be provided under separate cover.

2.4 FACILITY CLOSURE

For the Modified Project, the standards applied to closure of the facility would not be different than those of the Approved Project.