Border Environment Cooperation Commission
FRV Tucson Solar Park in Picture Rocks, Arizona

1. General Criteria

1.a Project Type

Project Name: FRV Tucson Solar Park ("Project")

Project Sector: Clean and efficient energy

1.b Project Category

Category: Private-sector environmental infrastructure project

1.c Project Location and Community Profile

Communities: Pima County, Arizona

Location: Pima County, in the south-central region of Arizona, borders Cochise County to the east, Yuma County to the west, Maricopa and Pinal counties to the north, and the state of Sonora in Mexico to the south. The county has a total land area of approximately 9,186 square miles. The City of Tucson is the county seat. The proposed project will be located in the northern part of the county in the unincorporated community of Picture Rocks, northwest of the City of Tucson.

The project is located in a region with some of the highest levels of solar insolation in the continental US, according to the National Renewable Energy Laboratory (NREL), as seen in the figure below.

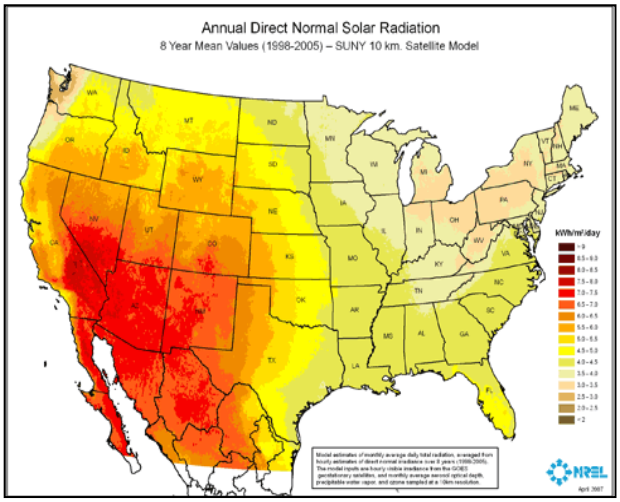

Figure 1. Annual Direct Normal Solar Radiation

Location within the border:	The project is located in Pima County, AZ, adjacent to the community of Picture Rocks, which straddles the 100 km of the US-Mexico border. The main urban area served by off-taker, Tucson Electric Power (TEP), is the City of Tucson. Although the 305 acre project site appears to lie slightly beyond the 100km border region, the majority of the population benefiting from the new clean power generation resides within the border region. Approximately 70% of the service area of TEP is located within the 100 km border region and an estimated 56% of the population of the TEP service area is within the 100 km region. In addition, residents in Santa Cruz County may receive a portion of their energy resource from this project, as TEP provides 25% of the portfolio of the local service provider, UniSource Energy.

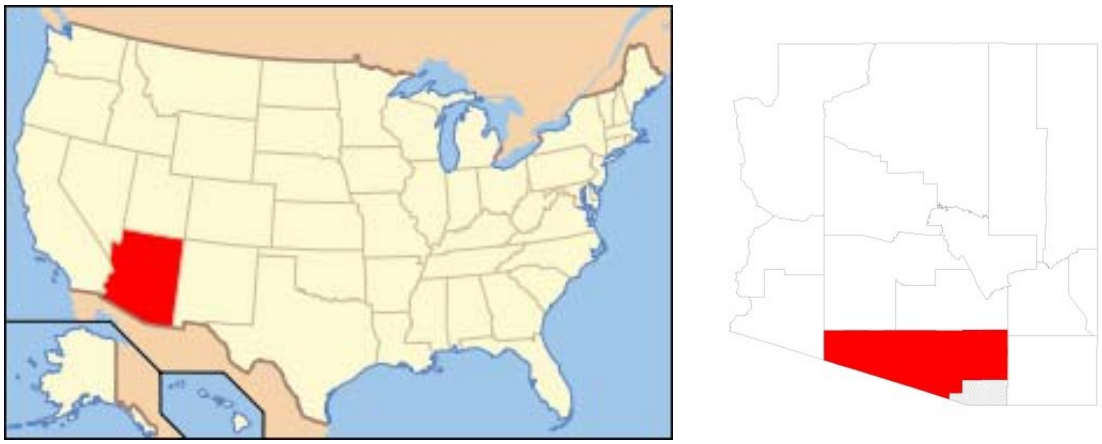

Figure 2. Location of Arizona in the US and Pima County within the State of Arizona.

Demographics:	
Current Population:	980,263 (2010 Pima County Population)
Growth Rate:	1.6 % annually from 2000 to 2010 (2010)
Primary Economic Activities:	Government; professional and business services; manufacturing; leisure; trade, transportation, and utilities (Pima Association of Governments 2010)
Labor Force:	477,578 (2005-2009 5-year estimate)
Per capita income:	$24,556 (2009 Inflation-adjusted)
Median household Income:	$45,885 (2009 Inflation-adjusted)
Occupied Housing Units:	370,264 (2005-2009 5-year estimate)
Total Housing Units:	419,647 (2005-2009 5-year estimate)
Average Household Size:	2.62 persons per household (2005-2009 5-year estimate)[1]

[1] U.S. Census Bureau 2010. State and County Quick Facts. Pima County;

Energy Generation and Consumption:

Figure 3 shows the locations of Arizona's electrical plants, renewable energy potential, and energy sources.[2]

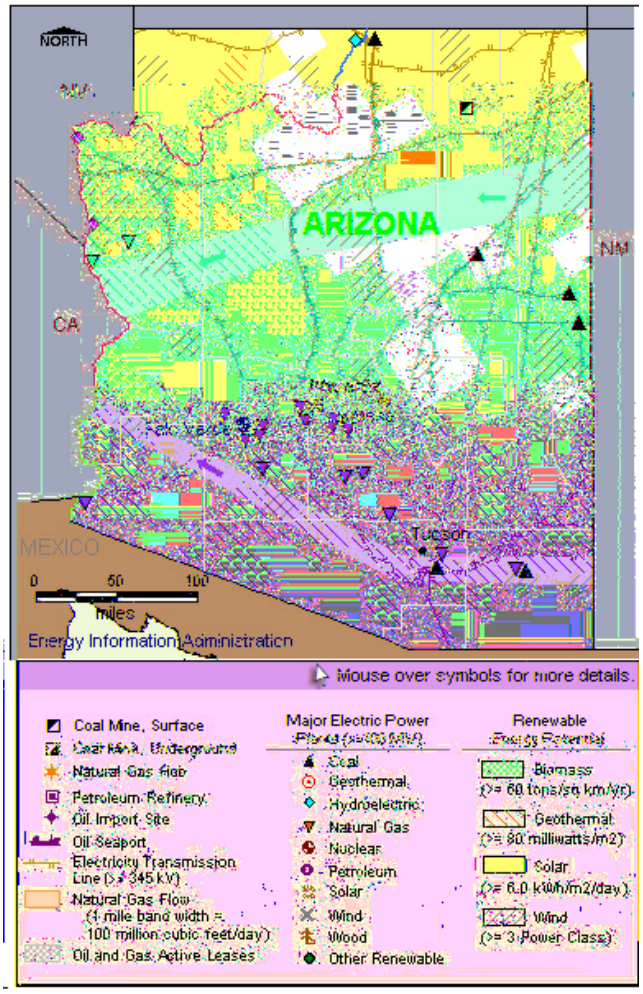

Figure 3. Location of electrical plants and potential renewable energy sites in the State of Arizona.

As of 2010, Arizona had more than 95 megawatts (MW) of solar generation[3]. It ranked fourth in the US in terms of solar installations installed in 2010 at 54MW of nameplate capacity; notably, it was only one of five states that installed more than 50MW in 2010. Additionally, it ranked third in concentrated solar power (CSP) installations in 2010, with 1.5 MW installed.[4]

2005-2009. American Community Survey 5-Year Estimates. Pima County.
[2] U.S. DOE, Energy Information Administration (EIA) 2009a. State Energy Profiles – Arizona.
[3] "2010 SEPA Utility Solar Rankings"; Solar Electric Power Association (SEPA), June 2011
[4] "US Solar Market Insight: 2010 Year in Review"; Solar Energy Industries Association & GTM Research, June 2011

The following table shows the net electricity generation for Arizona.

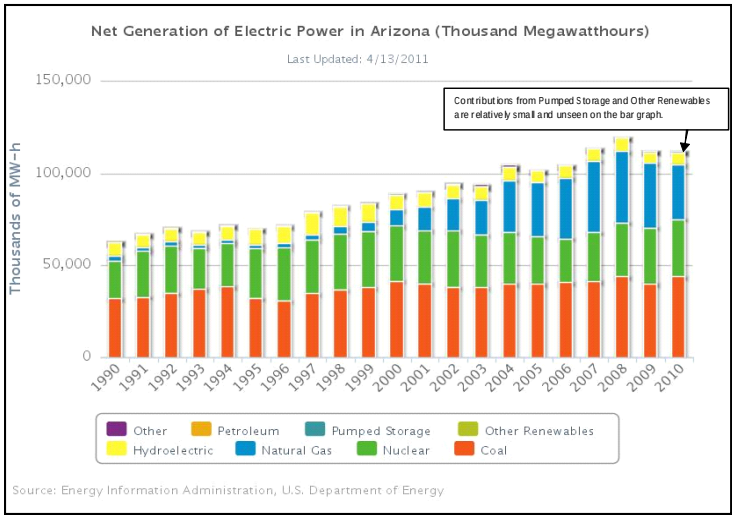

Figure 4. Arizona's Electrical Energy Generation.
Source: Arizona Indicators.

1.d Legal Authorities

Project Applicant:	FRV Tucson Solar, LLC
Legal Representative:	Steve Holman, Senior VP and General Counsel, FRV
Legal Instrument to Demonstrate Legal Authority:	State of Delaware, Limited Liability Company, Certificate of Formation File # 3 4723681 State of Arizona, Application for Registration of a Foreign limited liability company, File# R-15502760
Date of instrument:	Delaware Registration: August 24th, 2009 Arizona Registration: September 2nd, 2009
International Treaties and Agreements:	Not in conflict of any international treaties and agreements

1.e Project Summary

Project Description and Scope:	The Project consists of clean energy generated by solar photovoltaic (PV) panels. The Project will be located in an unincorporated area of Pima County, Arizona on approximately 305 acres of land. The Project is expected to comprise of approximately 93,312 polycrystalline photovoltaic panels, each with a 270-Watt capacity that will be set on a single-axis flat tracking system. The PV modules, which convert sunlight into low voltage electricity, will produce 20 MW alternating current (or AC) / 25 MW direct current (or DC) of electricity at peak capacity with a potential

annual electricity output of approximately 55,000 megawatt-hours (MWh) in the first year of operation. The electricity generated by the plant will be sold to Tucson Electric Power (TEP) under a 20-year fixed price Power Purchase Agreement (PPA) and will be delivered to the TEP distribution grid using an existing 46 Kilovolt (kV) TEP-owned distribution line.

The production of clean and emissions free electricity from the Project is expected to result in a displacement of over 35,000 metric tons of carbon dioxide (CO_2), 125 metric tons of nitrogen oxide (NO_x) and 200 metric tons of sulfur dioxide (SO_2) emissions per year[5].

Population Benefited: 980,263 (Pima County). The Project is expected to provide enough electricity for approximately 3,500 households.

Project Map: The following figure shows the location of the Project:

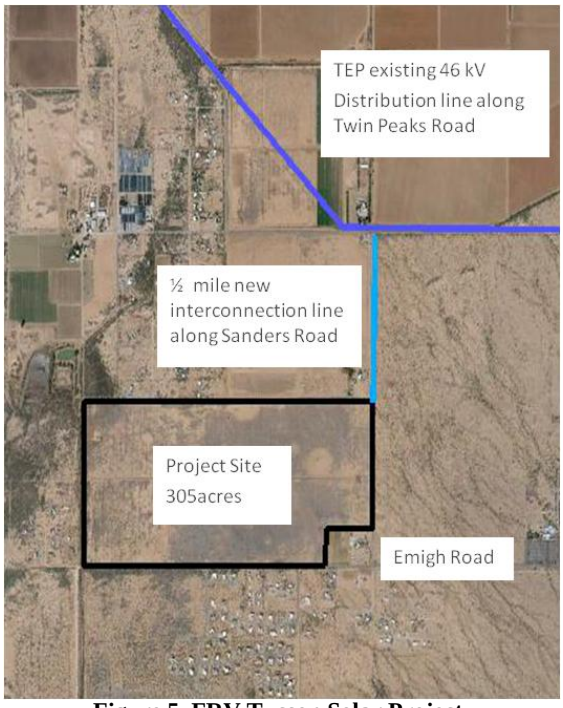

Figure 5. FRV Tucson Solar Project.

Project Justification: There is a need for affordable and environmentally beneficial alternatives to conventional fossil fuel-derived energy sources. Additionally, renewable energy projects create an opportunity to generate electricity without the same atmospheric emissions generated by fossil fuel fired plants or the use of scarce water resources for electricity production.

[5] Factors used for the calculation of annual CO_2, NOx, and SO_2 emissions were obtained from PV FAQs; The National Renewable Energy Laboratory for the U.S. Department of Energy; January 2004..

	The Project provides an opportunity to displace GHGs and other pollutants produced by traditional fossil-fuel based energy generation, while providing the residents of Pima County with a safe and reliable energy alternative. **The aggregated environmental impact for the expected life of the project over the next 20 years is estimated to be equivalent to a reduction of nearly 630,000 metric tons of CO_2.**
Project Need or Consequences of No Action or Alternative:	**In 2001, Arizona passed a renewable portfolio standard, known as the Environmental Portfolio Standard (EPS)**, which was designed to increase the delivery of renewable electricity with associated environmental benefits to the people of Arizona. The EPS initially required utilities to obtain about 1.1% of their energy sales from renewable resources, of which 60% was required to be supplied by solar energy.[6] In 2006, the Arizona Corporation Commission (ACC), as established by Title 40 Chapter 2 Article 1 Parts 201-209, approved the much more aggressive Renewable Energy Standard and Tariff (REST). The REST changed and expanded the EPS program by setting a higher renewable requirement and eliminating the specific solar energy supply requirements. **Under current regulations, the regulated public utilities must derive 15% of their energy sold from renewable resources by 2025.[7] At present just less than 11% of the electricity generated in Arizona is supplied by renewable sources including biomass, geothermal, hydroelectric, solar, and wind resources[8].** Of this mix, the primary renewable energy source is conventional hydrolectric energy. The Project will contribute to the fulfillment of Arizona's EPS, and specifically TEP's requirement to comply with the renewable energy supply percentage.

Pending Issues:

None.

Criterion Summary:

The Project meets all of the general requirements of the criterion.

[6] Arizona Corporation Commission 2006. "Commissioners Approve Rules Requiring 15 Percent of Energy From Renewables by 2025."
[7] Database of State Incentives for Renewables & Efficiency: www.dsireusa.org
[8] U.S. Energy Information Administration for Arizona

2. Human Health and Environment

2.a Compliance with Applicable Environmental and Cultural Resource Laws and Regulations

Environmental and Public Health Needs Addressed by the Proposed Project:

Historically the United States has depended to a great extent on fossil fuels for the generation of energy. This conventional energy development can affect the natural environment due to the harmful emissions related to the generation process, including the release of greenhouse gases (GHG) as well as other pollutants such as sulfur dioxide (SO_2) and nitrogen oxides (NOx).

The current generation of electricity for the residents of Arizona relies on a mix of energy production technologies with the largest source being coal (42.38%), nuclear (37.86%), hydroelectric (10.22%), natural gas (9.06%), other renewables (0.41%), and petroleum (0.07%). For TEP, energy production came primarily from coal, at nearly 70%, natural gas (30%), and less than 1% from renewables.

One crucial way to protect the natural environment and mitigate climate change is to develop energy from renewable resources, and thereby displace generation from GHG-intensive sources. According to the Appendix D of the Greenhouse Gas Emissions Inventory and Reference Case Projections, 1990-2020 (Center for Climate Strategies 2006), **combustion of fossil fuels in producing electricity and in transportation accounted for 80% of Arizona's greenhouse gas emissions during 2000. 11% of GHG emissions originated from the remaining uses of fossil fuels – natural gas, oil products, and coal in the residential, commercial, and industrial sectors (pg 44, 2007 AQ Report)**; see figure 6.

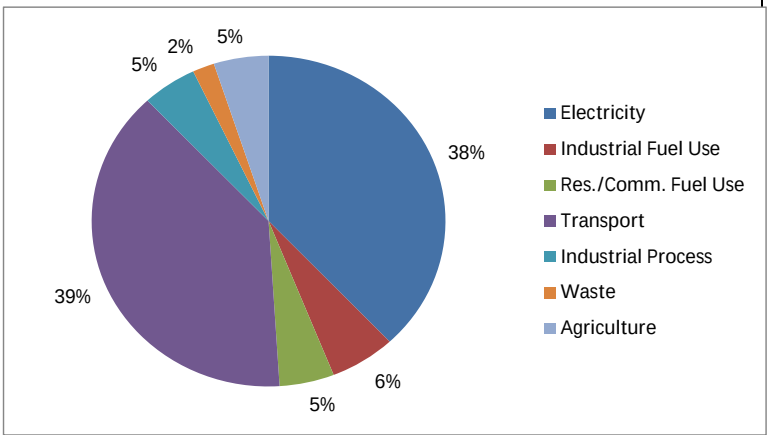

Figure 6. Arizona Greenhouse Gas Emissions by Source, 2000. Source: Pima Association of Governments: Air Quality Report 2007.

In April 2011, the Pima Association of Governments (PAG) published a Regional Greenhouse Gas Inventory for Eastern Pima County, City of Tucson, Pima County Government Operations and City of Tucson Government Operations. **This study concluded that there are two major sources of greenhouse emissions: energy use and transportation sectors. Approximately 57% of the energy emissions were from electricity use, since local energy generation is predominantly from coal-fired power plants (PAG 2011, pg 37).**

Total carbon dioxide production was estimated and allotted to six sources; see figure 7.

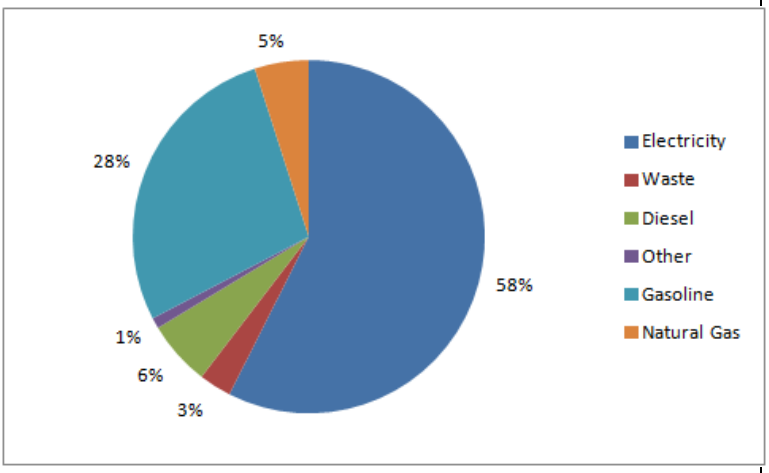

Figure 7. Tucson Greenhouse Gas Emissions by Source, 2008. Source: Pima Association of Governments: Regional GHG Inventory, April 2011.

As provided in Table 1, below, **based on nearly 112 million MWh net generation of electricity for 2009 in Arizona, more than 53 million metric tons of CO_2, 33 thousand metric tons of SO_2, and 62 thousand metric tons of NOx were emitted**. As shown in this table, the majority of carbon dioxide emissions are attributed to coal, almost 94% of nitrogen dioxide emissions are attributed to coal and all of the sulfur dioxide emissions come from coal burning.

Table 1. 2009 Arizona Electric Power Industry Emissions Estimates

The project will reduce the demand for fossil fuel fired electricity, and thus displace related harmful emissions. **For the next 20 years, the production of 20 MW of zero-carbon generation will contribute to avoid CO_2 emissions of nearly 630,000 metric e -1.9 to theat mspherheasl ch mated to the currentd CO**

Project Meets the Following Applicable Environmental Laws and Regulations:

On June 21, 2011, the Type II Conditional Use Permit to develop the Project was unanimously approved by Pima County. The Project will require a Fugitive Dust Activity Permit for land stripping and/or earthmoving activities, as well as an Arizona Pollutant Discharge Elimination System (AZPDES) Storm Water Construction General Permit for construction activities from the Arizona Department of Environmental Quality (ADEQ).

Additional permits include the right-of-way permits for both the site access and the interconnection line, as well as a grading permit, building permits (based on structural and electrical plans), and floodplain use permit. Additional information regarding these requirements is included in the technical chapter of this document.

The State of Arizona does not have a formal environmental authorization process for this project type.

2.b Human Health and Environmental Impacts

Health statistics:

Epidemiological research has shown that both, chronic and acute exposure to harmful emissions associated with fossil-fuel based energy production, can lead to serious respiratory problems. It is estimated that, at very least, prolonged exposure to excessive levels of pollutants can deteriorate the respiratory capacity of humans and greatly contribute to the increase incidence of cardiopulmonary diseases such as asthma, heart ailments, and lung cancer. The following table lists some of the human health and environmental impacts associated with pollutant emissions.

Emission	Problems	Impacts
SO_2, NO_x	Fine Particulates	- regional haze - lung and heart disease
NO_x, VOCs	Ozone Smog	- respiratory dis-ease, permanent lung damage
CO_2	Climate Change	- increases in global temperature - extreme weather
SO_2, NO_x	Acid Rain	- degradation of soil, foliage and water bodies

Table 2. Health and Environmental Impacts Associated with pollutants.

In summary, by substituting the demands of electrical power generation from conventional fossil fuel sources with renewable resources, the Project could help improve air quality

and the general environmental conditions affecting the health of residents, not just in the specific project location, but within the region and beyond.

Direct and Indirect Benefits: The Project will provide a clean energy alternative to the area by constructing a solar energy site, displacing emissions associated with conventional electricity generation. Minor environmental impacts are anticipated from the development of the different project phases, which have been documented in the project's environmental summary. The electricity provider for the region and project off-taker is working toward increasing the share of energy they derive from renewable sources; the energy added by the project would further reduce the carbon intensity of the fuel mix, increase the diversity of renewable sources, and lessen the strain on production and transmission as demand grows during peak hours.

Environmental Impacts: In the United States, greenhouse gas emissions come primarily from the combustion of fossil fuels in energy use. Energy-related carbon dioxide (CO_2) emissions, resulting from the combustion of petroleum, coal, and natural gas, for 2008 were measured at a total of 5,735.5 million metric tons of CO_2eq emissions. This represented close to 82 percent of the total U.S. anthropogenic (human-caused) GHG emissions in 2008.

Fossil fuels supply 85 percent of the primary energy consumed in the United States and are responsible for 98 percent of emissions of carbon dioxide.

Climate Change
When power plants burn fossil fuels to generate energy, emitted CO_2 accumulates in the atmosphere, trapping increasing amounts of heat on the Earth. Consequently, this contributes to potential climate warming conditions. In computer-based models, rising concentrations of GHGs produce an increase in the average surface temperature of the earth over time. Rising temperatures may, in turn, produce changes in precipitation patterns, storm severity, and sea level commonly referred to as "climate change."

The actual reduction in GHG emissions could be greater than the calculated average since solar production generally displaces peak energy, which is generally more GHG intensive than the average mix. The proposed project will decrease the amount of CO_2 and combat the rising global warming trends caused by CO_2 emissions produced during energy generation.

Acid Rain
Acid deposition, or acid rain, results from emissions of sulfur dioxide (SO_2) and nitrogen oxides (NOx), primarily from power plants, vehicles and industry. Further, acid rain created by increased levels of SO_2 and NOx in atmospheric precipitation can have harmful effects on crops and livestock, further endangering human populations.

Water Use
Water conservation will also be a benefit of the project, as the water used in large quantities for conventional energy production is not necessary for solar derived energy. The solar PV facility will use a limited amount of water during the construction period of the project, and will be limited to dust suppression and soil conditioning. The operation of the plant will require less than 2 acre-feet per year of water. This water use will be for PV module washing and domestic (potable) water uses.

Environmental Assessment
A Phase I Environmental Site Assessment was performed for the project. The assessment objective was to recognize environmental conditions with the site. The study found no evidence of recognized environmental conditions related to the site that would prohibit development, including a review of the following environmental issues:

- Radon – The property is located within the Federal EPA Radon Zone 2 for Pima County; therefore, radon levels within buildings are judged to be low.
- Wetlands and Streams – No indication of wetlands were noted during the site visit or found on the National Wetlands Inventory maps or lists.
- Endangered Species – The review of records did not reveal information indicating the potential presence of threatened or endangered species on the property.
- Historic Landmarks/Structure – According to a review of the list of National Historic Landmarks for Arizona and the National Register of Historic Places, the property is not located within a designated area.

Based on these findings, no additional assessments were considered necessary. However, although not an environmental regulatory requirement, as a requisite for the Type II Conditional Use Permit for the project, a Cultural Resources Inventory (CRI) and a Biological Impact Report (BIR) were developed.

Mitigation Measures:

The intent of the Sponsor is to construct and operate the Project in compliance with all applicable environmental standards by applying mitigation measures aimed at preventing the creation of significant adverse impacts. The consultant for the CRI recommended that none of the identified archaeological resources identified in the area are eligible for inclusion in the Arizona State or National Register of Historic Places and that the development of the solar project proceed without further archaeological work.

Based on the BIR, the Sponsor will not require an air emissions permit. However, the following environmental mitigation activities are proposed:

- The entire project area is mapped within a Biological core Management Area in the Conservation Lands System. The project will need to include at least 52 acres of property to be set aside for re-vegetation of native plantings.
- Due to the potential for the Western Burrowing Owl's presence in the area, FRV is preparing a Habitat Enhancement and Restoration Plan and a Monitoring Plan. FRV will also conduct a survey 30 days prior to construction of the Project to ensure no impact to the species.

In addition to these specific measures, as part of the permitting process in Pima County, a Stormwater Pollution Prevention Plan (SWPPP), a Spill Prevention Control Plan, and a Fugitive Dust Activity Control Plan were developed in accordance with local regulations. Because the project is located in the Rillito non-attainment area for PM_{10} and due to anticipated disturbance of particulate matter during construction, the following rules applicable to reducing dust during construction, demolition and earth moving activities must be considered:

- Arizona Administrative Code R18-2-604 through -607
- Arizona Administrative Code R18-2-804

The site has been designed with and will be constructed to include stormwater detention basins to control on-site and off-site erosion and flooding. The project sponsor will supervise the construction and maintenance of the necessary roads, buildings, fences, structural members, flood control installation of the photovoltaic modules and tracking systems and will manage the proper discarding of materials or components that have completed their useful life.

The environmental impact resulting from the project will be positive overall; since the project will aid in the reduction of

	harmful atmospheric emissions generated by fossil fuel fired electrical plants. Some temporary impacts will be produced during the construction and operation of the plant. Some of these impacts include elevated noise levels, vibration, visual intrusion, and dust. The impacts would be managed accordingly. Since Solar Photovoltaic (PV) energy power produces negligible carbon dioxide emissions, when compared to conventional fossil fuel derived methods, and since solar generated electricity is accomplished without the effects of emissions of NOx, and SOx during its production, the project can help decrease the associated harmful effects of these emissions by providing clean solar electrical power. In fact, most of the GHG emissions associated with a PV system lifespan are concentrated with the construction and installation phase of the components. Generally speaking, it will also conserve water resources as solar energy production requires minimal use of water if compared with other sources. In summary, solar power is one of the cleanest forms of energy and the implementation of the project in Pima County will benefit the region for years to come.
Transboundary Impacts:	No negative transboundary impacts are anticipated as a result of the development of the solar energy project, on the contrary, a beneficial effect is anticipated on the air quality due to the decreased demand on fossil fuel fired electrical plants. The project could benefit the communities contiguous to the project area, as the potential reduction in pollutants made possible by the project helps to improve the air quality across the airshed. Furthermore, the Project will aid in addressing and solving the larger environmental concerns about greenhouse gases and global warming targeted by international agendas.
Formal Environmental Authorization:	The State of Arizona does not have a formal environmental authorization process for this project type. Pima County is responsible for issuing land use approvals which include related environmental review tasks for consideration of activities that may cause a risk to the environment and to require mitigation measures to address such risks. The conditional land use approval was issued by the County on June 21, 2011. Required environmental condition mitigation measures are described above and any additional permits or actions necessary for the construction of the project are described in the technical chapter.

Assessment of Project Benefits: Project Results Matrix. Factor 3

Measurement of Project Results:

1.	**Reduce demands on traditional fossil-fuel based energy generation**	**Objectives and Indicators** Capacity RE installed/generated (Target = 20 MW_{AC}) (Target = 55,000 MWh – year one)
2.	**Reduce harmful emissions**	Displacement of CO_2 (Target ≥ 35,000 metric tons/year) (Baseline[9]: 4.14 million metric tons) Displacement of SO_2 (Target ≥ 200 metric tons/year) (Baseline: 23,667 metric tons) Displacement of NOx (Target ≥ 125 metric tons/year) (Baseline: 14,792 metric tons)

Pending Issues

None.

Criterion Summary:

The Project addresses human health and environmental issues.

[9] Baseline reflects the emissions related to the coal generated power in 2009 as reported by Unisource Energy Corporation. Emission factors for carbon dioxide, sulfur dioxide, and nitrogen oxides were obtained from the National Renewable Energy Laboratory.

3. Technical Feasibility

3.a Technical Aspects

Project Development Criteria

Design Criteria:

The Project will be located northwest of Tucson in a 305-acre property in Pima County Arizona. The Project will use polycrystalline PV modules made out of silicon that will be mounted on single-axis trackers. The electricity produced by the system will be fed into the Tucson Electric Power (TEP) grid. The PV module arrays were designed following engineering and design standards normally practiced by the PV industry. The Project design, including the plant hardware, was created using the appropriate standards for projects of this type and size, as well as by current industry design practices for engineering and construction of similar renewable energy infrastructure projects.

The general design criteria establishes that the plant design life will be 25 years, have a gross capacity of 20 MW_{AC} / $25MW_{DC}$, be designed for fully automatic unmanned operation during operating hours and able to accommodate the requirements for interconnection and transmission with TEP.

Project Components:

PV System Components

PV modules are the basic building blocks of solar electric power systems. The particular PV modules for the Project will be polycrystalline silicon (pSi) modules, or panels. Polycrystalline panels are the most common type of solar panel on the market with over 30 years of commercial track record. The rated efficiency for the modules is approximately 14%. Polycrystalline panels have higher efficiency than other photovoltaic technologies, such as CdTe thin film and as a result fewer panels are needed for a given output which reduces the total footprint of the plant and impact to the surroundings.

The modules include an aluminium frame to add structural rigidity and are supported on H-beam galvanized steel members and mounted on aluminium or corrosion resistant substructure frames. The modules will be combined to make arrays supported by ground mounted horizontal single axis tracking systems. The PV arrays are arranged in block systems. The systems include charge controllers and inverters, which will convert the direct current (DC) generated by the PV system into an alternating current (AC) – the type of electricity sold by utilities and required to run appliances and electronic devices.

The arrays are composed of parallel rows of modules which are spaced to provide a balance between array density and row-to-row shading on early winter mornings and late afternoons.

The tracker system is a mounting structure for the modules that automatically tracks the sun's path based on the sun's seasonal azimuth positioning. It is single axis and includes bearing assembly, torque tube, table interface bracket, actuator arm, linear actuator, and DC actuator motor and will include a backup power source. The tracker simple design, based on one torque generator and few bearings per tracker, is highly reliable and replacement parts are readily available. Each tracker unit accommodates between 972 to 1,140 modules and approximately 265 kilowatts (kW) (depending on dimensions and/or efficiency).

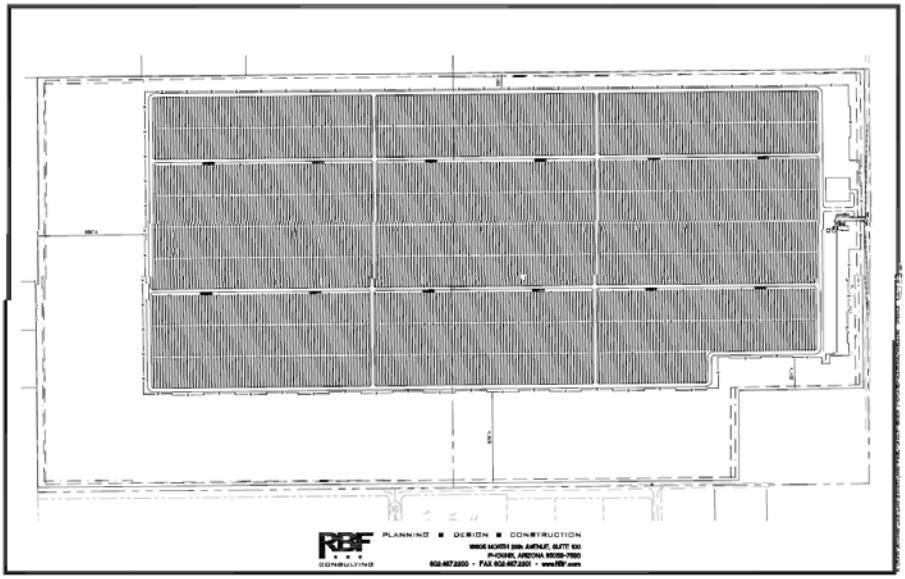

Figure 8. FRV 25 MW Solar Site

Other Project Components

The conceptual design of the pSi PV module system is based on 270 watt modules arranged in 12 blocks of 2,099 kW each. The inverter ensembles located in the center of each block collect the power from the modules in DC and convert it to AC. These ensembles consist of the power inverters, inverter shelter, inverter fuse boxes, switchgear, step-up transformers and associated cabling and grounding systems. Each ensemble will consist of two inverters and one inverter step up pad mounted transformer with an input voltage of 342 volts and 34.5 kV capacity.

The inverters are designed with a fail-safe relay that disconnects it from the power line in the event that the grid power fails. This is an important safety feature for utility workers performing maintenance on disconnected systems. All inverters are tested by Nationally Recognized Testing Laboratories in accordance with the protocols adopted by the Energy Commission. The inverters are tested for output power and efficiency based on the input voltage.

The ensemble feeds the energy to the switchgear and sends it into the interconnection substation, comprised of breakers, switches, and medium voltage equipment and a generator step up transformer of 34.5 kV and 46 kV capacity to connect into the electric grid at the interconnection facilities. The Project substation will contain a utility revenue grade meter acceptable to the transmission service provider and equipped with communication capabilities. The plant will have a SCADA system for remote monitoring and control of the plant. The system shall be able to display data in real time and record and log performance data. The data shall be directed through the internet for remote access, monitoring and data collection.

The following are some additional project components:

- Storm runoff control measures
- Shelter enclosures
- Fence/Wall
- Access roads
- Operations and maintenance building
- Onsite well

Other Design Criteria:

TEP has precise interconnection design and operational guidelines regarding the connection to the utility's system. The Project's interconnection requirements are established by TEP's Distributed Generation Interconnection Requirements (DGIR). Included in the requirements is the development of an Interconnection Feasibility Study. The results of the study have established the criteria for the selection of equipment and installation. In order to connect to the offered transmission line, all the equipment and installation must comply with existing IEEE design standards and testing procedures, including UL requirements and performance testing. Pima County does not have any additional requirements or minimum standards, other than those already stated. The county requires compliance with applicable fire code requirements and a building permit prior to construction of the plant.

Appropriate Technology

Assessment of Alternatives:

As part of the project development and technology selection review, several technology alternatives were analyzed. For each of these alternatives, the elements evaluated were modules, tracker systems, inverter ensembles and transformers. In addition, a solar resource assessment was conducted to determine the optimum specifications for the panel installation.

In addition to the ultimately selected pSi module technology, CdTe thin film was also evaluated as a commercial grade module technology for this project. Although thin film panels perform well under high temperatures, the combination of this technology and tracking systems has not yet been proven. Moreover, the project space limitations due to onsite mitigation requirements are not compatible with the lower MW/acre capacity of CdTe thin film.

Another component for which alternatives were reviewed is the tracking system. Tracker manufacturers were evaluated on the basis of technical characteristics, track record and compatibility with the project site. Although the trackers evaluated had similar technical features, the superior track and ability for the tracker to meet the Project's height limitations was critical in making a selection.

Solar Resource Assessment

As part of the evaluation of the different technology options, a solar resource assessment was conducted to support the energy production estimates. The study was self-performed by the Sponsor using publically available weather data sources near the site. Based on a preliminary analysis of distance, resource magnitudes and inter-annual variability, a dataset that best represents the solar resource at the site was chosen. The datasets evaluated for this project are:

- Solar Prospector specific to the site, created by the National Renewable Energy Laboratory (NREL).
- NREL's National Solar Radiation Database (NSRDB), from which Typical Meteorological Year (TMY) is produced.
- Arizona Meteorological Network (AZMET) provides meteorological data and weather-based information. AZMET possesses a station in Marana, AZ, located approximately 5 miles from the Project site.

In this case, the Sponsor selected the Solar Prospector as the most consistent and robust source of the three evaluated. Based on these datasets, the Sponsor's estimated average for the horizontal global irradiation is 2,086 kWh/m^2/yr.

Using the PV simulation software program PVSYST, developed by the University of Geneva and used recognized across the PV industry for its robustness and accuracy, the Sponsor develops a model that captures the configuration of the proposed system including the expected losses attributable to parameters such as module quality, module mismatch, module soiling, temperature or inverter efficiency. The result of the PVSYSTS simulation is later supplemented with additional losses due to transformers and wiring beyond the inverter to produce an accurate estimate of the energy production at the point of delivery.

The value for each of the losses is based on the Sponsor's design as well as on the input provided by Independent Engineers to similar projects the Sponsor has constructed.

Prior to the Project being constructed, the energy prediction values calculated by the Sponsor as well as technology selections will be vetted by an Independent Engineer for accuracy and related risks.

In the case of this Project, the energy production for the first year has been estimated at nearly 55,000 MWh.

Property and Right of Way Requirements

The Project will be installed on approximately 305 acres of unimproved land located in northern Pima County. More particularly the site is located on a parcel of land situated in the south half of Section 20, Township 12 South, Range 11 East, approximately 20 miles northwest of the City of Tucson. Furthermore, the Sponsor applied for a Type II Conditional Use Permit), submitted to Pima County in September 2010, which was unanimously approved by the county on June 21, 2011.

Access to the plant will be through Sanders Road via a private driveway. An additional easement will be necessary for access to TEP's 46 kV transmission line. The interconnection facilities will include a ½ mile 46 kV line extension that connects the Project to TEP's line. The interconnection will be located in an existing right-of-way along Sanders Road that runs north from the northeast corner of the Project site. TEP will construct and own the interconnection facilities. Final location of all easements is pending completion of full construction plans. All other easements related to access and right-of-way for TEP transmission lines and the substation site are already in place. Figure 9, below, depicts the location of the site, interconnection utility easements, and distribution line.

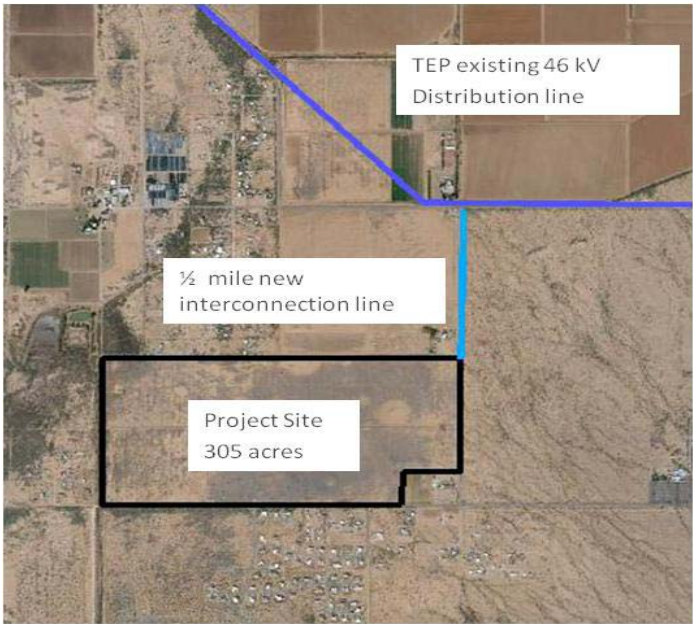

Figure 9. Project Easement Location Plan.

Project Tasks and Timelines

Project Timeline

Project construction is scheduled to start during the fourth quarter of 2011. The Project's target date for commercial operation is June 2012. Below, Table 3 shows the major milestones for the Project completion.

SCHEDULE MILESTONE	DATE
Execution of Engineering, Procurement, Construction(EPC)Agreement	10/3/2011
Building Permit Submission	10/20/2011
Building Permit Approval	10/26/2011
Full Notice to Proceed	11/1/2011
5% Posts Installed	12/31/2011
50% Modules Installed	4/1/2012
Interconnect Available for Power Export	6/15/2012
100% Modules Installed	6/15/2012

Table 3. Project Implementation Schedule.

3.b Management and Operations

Project Management

Resources:

The Sponsor, Fotowatio Renewable Ventures Inc. (FRV), brings vast experience, a fully developed technical program, and proven financial capacity to the Project. FRV was until recently the US division of the global Fotowatio Renewable

	Ventures. FRV was 100% acquired on August 3, 2011, by MEMC Electronic Materials, Inc. (NYSE: WFR) and its solar energy subsidiary, SunEdison. SunEdison has deployed more than 160 MW of solar capacity throughout the world, gaining valuable global experience in the industry. In addition, the new management will continue to be supported by the original project team, bringing a combined experience as a global solar power producer with over 1.4GW currently installed or under development throughout the world. FRV has successfully developed over 42MW of solar projects in the U.S., including the 14MW Nellis Air Force Base project. The management, administration and the operation of the Project will be the responsibility of FRV, now supported by its new parent company, MEMC-SunEdison.
Operation and Maintenance	
Organization:	The size and location of the Project requires that a two-person full-time team be assigned to the operation and maintenance tasks on site. The operations will be supervised by this FRV team from the Operation and Maintenance (O&M) building with support from the O&M staff in the headquarters which will also have direct control of the Project through the SCADA system. Washing crews will be called to the site approximately twice a year to perform panel washing to insure soiling has minimal impact to energy production. Lastly, private security will be subcontracted to monitor the integrity of the system.
Operation Plan:	The system design incorporates an O&M manual that includes the primary tasks needed to ensure proper operation of the system and to prevent breakdowns of the system. The purpose of the O&M Manual is to list the procedures necessary to carry out the activities related to quality control, facility operation, and prevention of system breakdowns. The manual also includes basic guidelines and schedules related to the maintenance of the modules, tracker, inverter ensembles, transformers, interconnection facilities and all other ancillary equipment. It describes the activities necessary for failures classified as unscheduled maintenance as well.
Permits, licenses, and Other Regulatory Requirements:	On November 14, 2006, the ACC adopted the new Renewable Energy Standard and Tariff (REST) rules (AAC R14-2-1801-1815), which were published in the Arizona Administrative Register. The REST rules require that public utilities satisfy an annual renewable energy requirement by obtaining renewable energy credits (RECs) from eligible renewable energy resources, as defined in the rules. The annual renewable production requirement is calculated by applying the required

	annual percentage to the kilowatt-hours (KWh) sold by the utility. The energy requirement for 2011 is established at 3.0% of the total portfolio and will increase gradually to 15% by 2025.[10] The Sponsor has agreed to sell the totality of the plant's production to TEP under a 20-year fixed price power purchase agreement. TEP in turn will report the energy purchased under the requirements to meet its REST requirements. The conditional land use approval was issued by the County on June 21, 2011. The flood hazard requirements will be addressed during the construction of the project. Other required permits or actions necessary for the construction of the project and expected to be obtained on or before October 2011 include: • Storm Water Pollution Prevention Plan • AZPDES Storm Water Construction General Permit • Grading permit • Right-of-way permits • Fugitive Dust Activity permit • Floodplain use permit • Building permits from Pima County • Compliance with the 2006 International Fire Code • Certificate of Occupancy
Reviewing Agencies:	Formal review requirements for the construction of solar energy generation plants in Arizona are minimal. However, the Sponsor has several contractual obligations that must be fulfilled with regards to transmission infrastructure. The following is a list of the reviewing agencies: • Pima County Development Services Department • BECC • NADB • TEP

Pending Issues:

None.

Criterion Summary:

The Project design and equipment complies with all applicable regulations and meets the

[10] Database of State Incentives for Renewables & Efficiency: www.dsireusa.org

technical requirements of the certification criteria.

4. Financial Feasibility

4.a Proof of Financial Feasibility

Financial Conditions

Information Submitted:	TEP Financial Statements and FRV Tucson financial projections.
Financial Analysis Results:	The Project's expected revenue from the sale of electricity, based on the credit risk analysis performed by NADB, will be sufficient to cover: a) scheduled O&M expenses, b) funding of any Debt Service Reserve, c) payment of NADB loans debt service and, d) retain cash for Debt Service Coverage Ratio covenant requirements, if necessary.

Project Scope

Item:	The scope of the Project is to design and build a 20 MW solar photovoltaic energy generation plant. The electricity generated will be bought by TEP through a Power Purchase Agreement with FRV Tucson.
NADB Loan Amount:	Up to $88.5 million

Dedicated Revenue Source

Source of Income:	Revenues from the sale of electricity to TEP through a Power Purchase Agreement.

4.b Legal Considerations

Project Management:	FRV Tucson will be the Borrower for the Project. FRV Tucson has the legal authority to contract loan obligations and will manage the Project through an EPC contract signed with a third party with ample experience and expertise in these types of projects.

Pending Issues:

None.

Criterion Summary:

The Project meets all applicable financial feasibility criteria.

5. Public Participation

5.a Private-sector Environmental Infrastructure Project

Project Classification:

The project is classified as a private sector environmental infrastructure project with exclusive impact. This category includes projects that intend to provide an environmental service. The impact of these projects is generally exclusive to the facilities, processes or services of the Sponsor, although an indirect benefit for the community may exist. These projects are not expected to require increased revenue generation to be supported by the community-at-large for project implementation or operation and maintenance.

Public Access to Project Information:

For this project category, the *General Public Comment Period* shall apply as a minimum requirement to satisfy this criterion. BECC will release the Project Certification Document (PCD) for a 30-day public comment period beginning September 2, 2011.

The project's information has been made available to the public for review and comment throughout the Conditional Use Permit (CUP) approval process.

Additional Outreach Activities:

Although a broad public participation effort was not required for the Project, various opportunities to provide formal public access to Project information occurred during the development of the Project including the following:

- Governing body meetings throughout late 2010 and 2011. Such meetings were conducted with the Pima County Development Services Department and the Pima County Board of Supervisors. FRV met with these agencies along with representatives from the Coalition for Sonoran Desert Protection, the Arizona Game and Fish Department, and the US Fish and Wildlife Service for input on the habitat enhancement and restoration efforts as well as the Western Burrowing Owl Monitoring Plan.
- Community Meetings on February 15, May 5, October 26 of 2010 and April 5 and 12 of 2011. In addition, FRV met with the community in July 2011 to solicit input on the Project's landscape plan.

The Project also received attention in local newspaper publications and local radio, such as the Arizona Daily Star, Inside Tucson Business, and the Arizona NPR, and was also mentioned on TEP's website. Articles are available upon request.

Pending Issues:

None.

Criterion Summary:

The Project meets the Public Participation requirements for certification of a private sector environmental infrastructure project with exclusive impact.

6. Sustainable Development

6.a Human and Institutional Capacity Building

Project Operation and Maintenance:	The Project's technical requirements, including design, appropriate operation and maintenance of the program systems will be overseen by FRV. The Project will generate power that will be sold to TEP under a 20-year, fixed price PPA.
Human and Institutional Capacity Building :	FRV brings vast experience, a fully developed program, and proven human, institutional and financial capacity to the program. Actions within the scope of the Project that contribute to institutional and human capacity building include: o Local labor which will be employed to perform routine maintenance and site security.

generated by fossil fuel fired electrical plants since solar electricity is generated without the emissions of CO_2, NOx, and SO_2. It will also save water resources as solar energy does not use water for its operation.

6.d Community Development

The completion of this Project will help in the development of the community. The Project will provide social and economic benefits to the county residents through investment, job creation and environmental improvement. The Project will create jobs during its installation and operation.

FRV, TEP, and TRICO will also assist the Marana Unified School District (MUSD) in developing a renewable energy technologies curriculum that incorporates visits to the Project site. This curriculum will enable MUSD students to learn about renewable energy, the different technologies that can be deployed, and the role of renewable energy in reducing greenhouse gas emissions. Students will also have the opportunity to understand the roles that utilities, developers, government, and technology companies play in putting such projects together. Coordination efforts to develop this curriculum are ongoing.

Pending Issues:

None.

Criterion Summary:

The Project meets sustainable development principles for certification.