



Welspun Renewables Energy Pvt. Ltd



Positive Impact of Solar PV Power Plant on Environment Including Climate Change

CASE STUDY

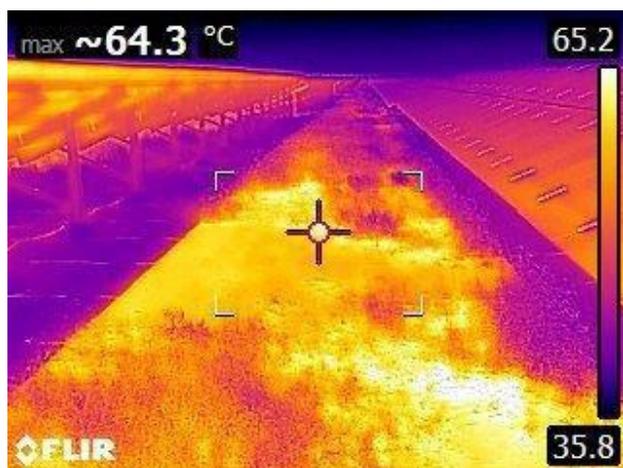


Figure 1: Soil Temperature of Area between Solar Panel Rows (Ranges between 64.3 °C to 69.8 °C in Summer Months)



Figure 2: Integrated Rain water Collection cum Harvesting Scheme

Summary

Field trials and experiments have been conducted at Welspun Solar AP Pvt. Ltd. 50 MW solar power plant near village Kanasar of Phalodi Tehsil in Jodhpur district of Rajasthan. Thermography study of the areas—(a) below the solar panels and (b) in between the solar panels rows was conducted. Because of the scarcity of the water in the area, 'rain water collection cum harvesting scheme' was developed to conserve rain water for module cleaning and reduce dependency on groundwater extraction. Plant species were grown below the solar panel for improving the green cover.

Findings:

- There is significant reduction in ambient temperature below the solar panels
- Temperature of soil below the solar panel has decreased



- Because of the presence of solar panels and large areas covered by solar array with huge RCC piling, soil erosion is minimized
- Rain water collection helps in conservation of water and increasing the water table
- Waste land has been converted into green area by successful plantation of Aloe vera species below the solar panel.

Objective of Intervention

- To identify the positive impact of solar PV plant on environment and climate change
- To Investigate and establish on scientific basis as to how installation and operation of PV plant helps in:
 - Reducing soil temperature
 - Reducing ambient temperature
 - Preventing soil erosion
 - Natural resource/ water conservation
 - Green development

Type of Intervention and Location

50 MW Welspun Solar AP Pvt. Ltd, Solar Power plant at Phalodi, Rajasthan

Description of Intervention

As a part of green, clean vision towards significant carbon reduction, Welspun Renewables, one of India's largest clean energy developers has aimed to reduce carbon footprint in pan India by developing 11 GW solar and wind projects by 2019. Company's emphasis on systems and processes has enabled the organization for flawless execution by consistently decreasing its on-ground development cycle. This has been instrumental in bringing the renewable tariffs closer to grid parity. At present, the company is operating nearly 500 MW solar and wind plants, in which 151 MW Solar Plant in Madhya Pradesh is one of Asia's largest projects.

The 50 MW solar power project of Welspun Solar AP (P) Ltd, one of the prestigious SPV of Welspun Renewables Power Pvt. Ltd is located near village Kanasar of Phalodi Tehsil, in Jodhpur district of Rajasthan in southeast direction of Kanasar village with total land of 437 acres and is based on thin film technology.

Plant location is in Jodhpur district, which forms part of the Great Thar Desert of Rajasthan. In this arid region, there are sand dunes, alluvial areas dotted with few hillocks and hill chains scattered in the area. Sand dunes occupy a major part of the district north of Vindhyan escarpment in northern



and northwestern part of the district. The sand dunes are transverse and longitudinal types formed due to aeolian action and overlie the denuded consolidated formations. Ridges and hillocks are common features in Bilara and Osian tehsils. Presence of boulder beds exhibit striking plain topography around Bap and similarly the low lying out-crops of limestone, shale and sandstone layers are also observed in northern part of the district near Phalodi, which is a real challenge for putting and operating a solar PV plant. Plant location experiences arid to semi-arid type of climate, which is hot and dry. The rainy days are limited to maximum 15 days in a year. Almost 80 per cent of the total annual rainfall is received during the southwest monsoon, which enters the district in the first week of July and withdraws in the mid of September. Drought analysis carried out by the Central Ground Water Board based on agriculture criteria indicates that the district is prone to mild and normal type of droughts. Occurrence of severe and very severe type of drought is very rare. Severe droughts occurred in the year 1974, 1985, 1986, and 1987.

With this background of the project, we have shortlisted this site for analysing the impact of solar PV projects on the surrounding environment—ambient air temperature, soil temperature, soil erosion, vegetation and how solar plants in general are going to contribute to ‘climate change’ at macro level.

TEST RESULTS FINDINGS

- There is significant reduction in ambient air temperature below the solar panels
- Temperature of soil below the solar panel has decreased
- Because of the presence of ‘solar panels’ and ‘large areas’ covered by solar array with huge RCC piling, soil erosion is minimized
- Rainwater collection has helped in conservation of water and increasing the water table
- Waste land has been converted into green area by successful plantation of Aloe vera species underneath the solar panel

Intangible or Tangible Benefit

Considering direct tangible benefits, the Government of India is addressing the urgent and critical concerns in a timely manner through a directional shift in the development pathway with an objective to reduce carbon emissions. To make this vision a reality, Welspun Renewables, one of India’s largest renewable energy developers has already ensured 1,158,462 tonnes of CO₂ reduction in which 50 MW AP Solar is contributing 58,111 tonnes of CO₂ emission reduction annually. Moreover, the intensive planning for green development would create significant carbon basin in and surrounding areas as an effective weapon to face global warming. Decreased temperature of soil and ambient air due to existence of vast areas covered by solar module would strengthen the need for future study in support of ‘micro-organism development’ and ‘soil fertility’. Optimum water utilization, practice for recharging, recycling, and reutilization of rain/storm water will create positive impact on water table. In Rajasthan, soil erosion is a key issue for environment degradation, which may be reduced by installing thin



film/crystalline PV solar plant.

About Welspun Renewable

Welspun Renewables is the pioneering organization to utilize the power of the sun and wind. We believe this is the technology for the future and is a priority area for Welspun Renewables. Our emphasis on systems and processes has enabled the organization for flawless execution. Within a short span of our existence, we have pioneered solar power solutions, both in terms of plant size and total installed capacity. In line with the Honourable Prime Minister Mr Narendra Modi's 175 GW renewable vision, we are committed to establish 11,001 MW of renewable capacities across the country. Towards this goal, in the next few years we will be setting up 5 GW capacities, and of this 1 GW will be commissioned well within 2015–16. Our recent achievements herald the beginning of our projects springing up across India. Located in high solar irradiation and wind velocity sites, our power plants are spread across Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Karnataka, Punjab, Tamil Nadu, and Andhra Pradesh. Our 151 MW (DC) Neemuch solar power plant is one of the world's largest projects.

Welspun Renewables is the foremost organization in the renewable energy sector to be ISO 9001:2008 certified, for aligning our business practices to key quality standards. This accreditation allows us to show differentiation on triad of success—world class people, process, and technology. We are the only corporate in India whose renewable energy programme has been registered with the United Nations Framework Convention on Climate Change (UNFCCC) as a Clean Development Mechanism (CDM) Programme of Activities. We have received an A+ certificate from Care Credit Ratings. The agency has rated the credit health of the Welspun Renewables projects as 'stable'.