



NEW DELHI CENTRE  
World Water Council



*Best Practices Study Tour-cum-Training and Capacity Building Programme*  
**Knowledge Management and Outreach Workshop on**

# **Agro PV Plants and RE Grid Integration**

**17–19 March 2020 (Tuesday to Thursday)**  
**Jodhpur, Rajasthan**



Supported by



JODHPUR VIDYUT  
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## INTRODUCTION AND ABOUT THE PROJECT

Government of India has set a target of producing 175 GW of Renewable Energy by 2022 comprising 100 GW from Solar, 60 GW from Wind, 10 GW from Bio-power and 5 GW from Small Hydro Power. The country is progressing as per the policies declared. As on date around 83 GW RE projects have been commissioned in different parts of the country.

To reach the targets, the progress noted so far is not sufficient and requires intensive efforts by all stakeholders. However, one of the biggest challenges facing this large scale capacity addition in solar is the availability of land for the development of large ground mounted solar projects. Till now, India has added more than 90 percent of its solar capacity through ground mounted solar plants. With more capacity addition of solar and increasing demand for land from multiple sectors, the availability of land for solar is likely to become more challenging in the years to come. This seems particularly relevant in the context of India's high population density and - in several regions - its respective scarcity of land. Locating and acquiring a project site that is suitable, affordable and socially acceptable is becoming more and more difficult task as many suitable sites for ground mounted solar PV have already been allocated to earlier projects. 'Kisan Urja Suraksha evam Utthaan Mahabhiyan (KUSUM)' - the flagship Scheme of MNRE has provision for the decentralized renewable energy plants, Solar agriculture water pumps and solarization of existing Grid connected Agriculture pumps.

Design and implementation of these types of new and innovative solar projects requires understanding of the technology, business models, costs and benefits and substantial coordination across several stakeholders, viz. policy makers, regulatory commissions, DISCOMs, agriculture department, district administration, state nodal agencies, banks, as well as Developers/ EPC Contractors and farmers.

The proposed study tour to ICAR - Central Arid Zone Research Institute, Jodhpur will provide an opportunity to the delegates on the importance and significance for reconciling agricultural activities with the generation of solar PV power on the same land area - by growing food crops as well as harvesting energy through solar PV installations. Under this approach a number of opportunities come to the fore: From a significant increase in land use efficiency and increased added value for land in rural areas close to urban energy demand centers, to opportunities for new farming practices and increased plant growth besides increase in the income of the farmers.

Over the last 20-25 years, India has managed a remarkable development of its agricultural sector and its energy sector. However, challenges remain in both sectors. Low productivity, a lack of market development and communication as well as pressure on the income security of farmers are persisting challenges in the agricultural sector. Furthermore, climate change poses an ever-increasing threat to agriculture production, necessitating the development of more renewable energy sources in the sector to reduce its Greenhouse Gas emissions.

- Recently, a new challenge has arisen at the nexus of both sectors, involving land-use conflicts caused by the increasing influx of wind and solar energy investments. India's renewable energy resources are vast and largely untapped.
- The already large and growing number of new solar PV investment projects in particular has raised concerns particularly with regard to potential land-use conflicts.
- Solar PV dual-use or agri-voltaic concepts can resolve this land-use conflicts between energy and agriculture production, by combining both on the same site. Developed in the early 1980's in Germany, the concept has been implemented in a number of countries with hundreds of (mainly small scale) projects and applications. Recently, a growing number of larger, commercial projects have been implemented in countries such as China, Japan, Italy and France.
- Solar dual-use provides multiple socio-economic benefits that are mainly based on the key concept of the increased land productivity of the combined system, compared to the single use of the same area of land. The increase of this Land Equivalent Ratio (LER) through dual-use applications has been proven by pilot projects in deferent countries.
- Further benefits of solar dual-use for farmers and the public include energy cost savings (solar self-consumption), additional income of local farmers with potentially higher investments and tax revenues, improved marketing opportunities and competitiveness (sustainable production/supply chain), potentially improved agricultural



practices, the reduction of (peak) energy demand, a reduction of CO<sub>2</sub> and hazardous local emissions from conventional thermal power plants (such as coal), and the development of a more competitive sustainable agricultural sector in general (for domestic and export markets).

The pilot project consisted of two locations: ICAR - Central Arid Zone Research Institute, Jodhpur and the organization's regional research station at Bhuj. At Jodhpur, a 105 kWp, one-acre system comprised three 28 m<sup>2</sup> blocks of panels plus a rainwater harvesting tank. The 25 kWp system at Bhuj occupied 666 m<sup>2</sup>.

The pilot has proved such a success it has been replicated by Junagarh Agriculture University and Sardar Kushinagar Dantiwara Agriculture University, both in Gujarat; by Amity University in Noida; by Banda Agricultural University, in Madhya Pradesh; as a 'solar tree' concept at Bihar Agriculture University; and by the Central Electronics Engineering Research Institute Pilani, in Rajasthan.

## ANNOUNCEMENT

The Indo-German Energy Forum (IGEF), New Delhi Centre - World Water Council (NDC-WWC) and the Central Board of Irrigation and Power (CBIP) has taken a joint initiative of organizing a Best Practices Study Tour-cum-Training and Capacity Building Programme on Knowledge Management and Outreach Workshop on Agro PV Plants and RE Grid Integration during 17-19 March 2020 at Jodhpur. The Study tour will be beneficial for the participants to enhance their knowledge on Agro PV Plants and RE Grid Integration - its benefit and challenges.

The programme is expected to be attended by the participants drawn from State Transmission Utilities, (STUs), State and Regional Load Dispatch Centers, POWERGRID, POSOCO, State Renewable Energy Departments, State Electricity Regulators, Agriculture Departments, Water organizations other relevant stakeholders.

## OBJECTIVE OF STUDY TOUR

The objectives of the three-day study tour scheduled from the 17-19 March 2020 are to:

- Provide the DISCOMS/Developers/STUs and other stakeholders an opportunity to share their experiences/ Success stories and also learn from the experiences of others
- Discuss the important issues faced by the EPC contractors of agro-PV management and agro products and services, yields and productivity.
- Discuss the regulatory and financial mechanisms required to provide impetus of Agro-PV
- Provide a platform to showcase the latest technologies.
- Create a network of professionals working in the "integration of agro PV renewable energy in the Grid" domain.

## PRESENTATIONS BY EXPERTS

Experts who desires to make presentations/case studies on the above subject are requested to furnish the write-ups to reach CBIP office latest by 29th February 2020.

## PROGRAMME SCHEDULE

<b>Date : Tuesday 17<sup>th</sup> March 2020</b>	
<b>Venue : Jodhpur at Fairfield by Marriott Hotel, Jodhpur, Opposite New High Court, Near Shatabdi Circle, Vijay Raje Nagar, Jodhpur, 342 013, Rajasthan, Phone : 0291 7112236</b>	
<b>Time</b>	<b>Description</b>
18:00 – 19:00	Reporting of participants at the Hotel and Registration
19:00 – 20:00	Tea/Coffee with introduction of participants and briefing on the program
20:00 on wards	Networking dinner
<b>Date: Wednesday 18<sup>th</sup> March 2020</b>	
<b>Venue : Visit to 100 KwP Agro PV Pilot Plant in the ICAR – Central Arid Zone Research Institute, Jodhpur and Discussions with the Scientists at ICAR – Central Arid Zone Research Institute on Technical issues of Energy and Agriculture</b>	
08.00 – 9.00 hrs	Breakfast at hotel
09.00 – 12.30 hrs	<b>Visit to 100 KwP Agro PV Pilot Plant in the ICAR – Central Arid Zone Research Institute, Jodhpur and Discussions with the Scientists at ICAR – Central Arid Zone Research Institute on Technical issues of Energy and Agriculture</b>



12.30 – 13.00 hrs	ICAR – Central Arid Zone Research Institute Agro PV Plant to Marriot Hotel
13.00 – 14.00 hrs	Net working Lunch at Hotel
14.00 – 17.00 hrs	Local visit (Ummaid Palace, Mehrangarh Fort and Kaylana Lake
17.00 – 17.30 hrs	Kaylana Lake to back in Marriott Hotel
18.00 – 18.30 hrs	Tea/Coffee at Hotel
19.00 – 20.00 hrs	Net working Dinner
<b>Date : Thursday 19<sup>th</sup> March 2020</b>	
<b>Venue: Jodhpur at Fairfield by Marriott Hotel, Jodhpur, Opposite New High Court, Near Shatabdi Circle, Vijay Raje Nagar, Jodhpur, 342 013, Rajasthan</b>	
08.00 – 09:00 hrs	Breakfast at Hotel
09.00 - 10.30 hrs	<b>Inaugural Session of International Technical Workshop on Opportunities and Challenges in Large Scale Agro PV projects in India—Experiences sharing and Learning's from pilots</b>
10.30 – 11.00 hrs	Tea/ coffee break
11:00 – 13.00 hrs	Technical Session and followed by Presentations
13:00 – 14.00 hrs	Networking Lunch
14:00 – 14.30 hrs	Wrap up session including feedback from all the participants and distribution of Certificates to the participants
14:30 – 19.00 hrs	OSIAN visit (Temple and Sand Dunes)
19.00 – 20.00 hrs	OSIAN to Hotel
20:00 – 22.00 hrs	Networking Dinner at Hotel

**Note:**

1. Check-out time up to 12 Noon on Friday (20 March 2020)
2. Seats are very limited and on first come first served basis. All interested participants are requested to confirm well in advance inclusive payments.
3. If any participants are interested to come with spouse kindly intimate us well in advance
4. If any candidate like to stay more days (before 17 March or after 20 March 2020 kindly intimate us and book the venue hotel well in advance at bulk and negotiated rates
5. Flights are available from Delhi, Bangalore, Mumbai and Kolkata to Jodhpur and back it is well connected by train, car, share taxi and bus.

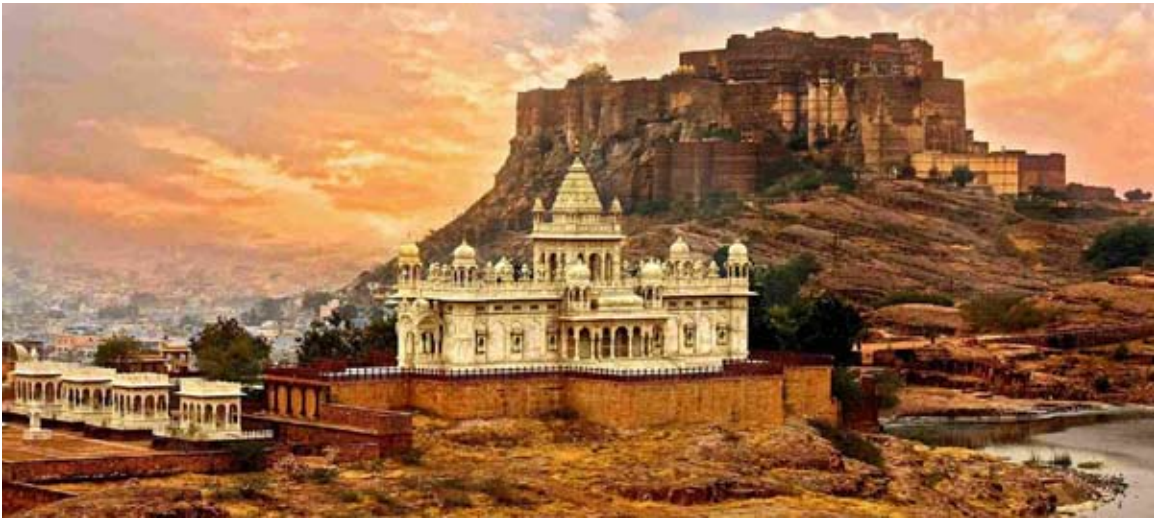
**The delegation package includes:**

- Hotels Accommodation on single occupancy basis - 4 star
- Briefing of delegation prior to travel
- Full boarding and lodging for only three nights (17<sup>th</sup> March 2020 afternoon till – 19<sup>th</sup> March 2020)
- Official tour for all transfers mentioned in the agenda
- Professional guided tours facilities Workshop on Agro PV plants and RE Grid Integration.
- Technical field visits to ICAR – Central Arid Zone Research Institute and Workshop and visit to some tourist places
- All course materials and background information
- Accompanied by professional coordinators and technical experts

**The delegation package DOES NOT include:**

- Transfers to and from Jodhpur Airport to Jodhpur hotel and back to Jodhpur Airport – on the first and last day 17<sup>th</sup> March and 20<sup>th</sup> March 2020.
- Flights
- Cost for additional nights before 17<sup>th</sup> March and after 20<sup>th</sup> March 2020.
- Other expenses (e.g. additional meals, private consumption at the hotel, phone calls, laundry service, personal shopping, others etc.)

## Important Tourist Places in Jodhpur



### MEHRANGARH FORT

Mehrangarh Fort located in Jodhpur, Rajasthan, is one of the largest forts in India. Built in around 1459 by Rao Jodha, the fort is situated 410 feet (125 m) above the city and is enclosed by imposing thick walls. Inside its boundaries there are several palaces known for their intricate carvings and expansive courtyards. A winding road leads to and from the city below. The imprints of the impact of cannonballs fired by attacking armies of Jaipur can still be seen on the second gate. To the left of the fort is the chhatra of Kirat Singh Soda, a soldier who fell on the spot defending Mehrangarh.

There are seven gates, which include Jayapol (meaning 'victory gate'), built by Maharaja Man Singh to commemorate his victories over Jaipur and Bikaner armies. There is also a Fattehpol (also meaning 'victory gate'), which commemorates Maharaja Ajit Singhji victory over Mughals.

The museum in the Mehrangarh fort is one of the most well-stocked museums in Rajasthan. In one section of the fort museum, there is a selection of old royal palanquins, including the elaborate domed gilt Mahadol palanquin which was won in a battle from the Governor of Gujarat in 1730. The museum exhibits the heritage of the Rathores in arms, costumes, paintings and decorated period.

### KAYLANA LAKE

Kaylana Lake is located 8 km west of Jodhpur in Rajasthan, India. It is an artificial lake, built by Pratap Singh in 1872. The lake spreads over an area of 84 km<sup>2</sup>. In ancient times this region had palaces and gardens made by two rulers of Jodhpur - Bhim Singh and Takhat Singh. These were destroyed to make Kaylana Lake.



The lake is situated between igneous rock land formations. It receives its water from Hati Nehar (translation: elephant canal), which is further connected to the Indra Gandhi canal. The natural vegetation here mostly consists

of Babool trees (*Acacia nilotica*), and various migratory birds such as Siberian cranes are seen here in the winter season. The city of Jodhpur and all the surrounding towns and villages depend on Kaylana lake as a source of drinking water.

## REGISTRATION FORM

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**Knowledge Management and Outreach Workshop on**

**Agro PV Plants and RE Grid Integration**

**17-19 March 2020 (Tuesday to Thursday), Jodhpur, Rajasthan**

**Fairfield by Marriott Hotel, Jodhpur, 342 013, Rajasthan**

**Phone : 0291 7112236, E-mail manish.thakur@fairfieldinn.com**

We are proud to offer a complete special delegation package for your participation in the technical workshops study tour to Jodhpur, Rajasthan. Please complete the following registration form to guarantee participation.

<b>Data of Participant</b>	
Name	
Designation	
Organization	
Address	
Telephone	
Mobile	
E-mail	
Website	
Date of Birth	
Company	Public Ltd. <input type="checkbox"/> Govt <input type="checkbox"/> Other <input type="checkbox"/>
<b>Working area of organization</b>	
<b>What are your expectations and special interest in this study tour?</b>	
<b>Package option</b>	
Delegation package INR 30,000/- Plus 18% tax (GST)	
Accompanying Person charges @ Rs. INR 12,000/- Plus 18% tax (GST) in double occupancy basis and should be wife/ son/daughter normally residing with the participants	
<b>Payment options</b>	
Cheque / DD in favour of: <b>“Central Board of Irrigation and Power”</b> New Delhi	
Send to : Central Board of Irrigation and Power, Plot No-4, Malcha Marg, Chanakyapuri, New Delhi 110 021	
<b>Or Via Bank Transfer to:</b>	
Account holder name	Central Board of Irrigation and Power
Bank Name	HDFC Bank
Branch & Address	209-214, Kailash Building, K.G. Marg, New Delhi 110001
Saving Bank Account No	00031110004411
Branch/RTG/NEFTIFSC	HDFC 0000003
MICR Code	110240001
Swift Code	HDFCINBBDEL
GST No.	07AAAJC0237F1ZU
<b>Cancellation Policy:</b> Understand that in case I cancel my participation after, 3rd March 2020, the entire delegate fees will be non-refundable.	

**Any Further Clarifications please feel free to Contact :**

**Shri B. Dasgupta**

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**Disclaimer :** By filling this registration form, you consent to its storage and use by IGEF and CBIP for further communication related to study tour and other important developments in Indo-German Energy scenario.