

# SOLAR PARK, BHADLA, PHASE-II



**420 MW (70 MWX6), SOLAR POWER PROJECTS  
NSM PHASE II BATCH II TRANCHE I**

**Pre-Bid Meeting, 24.07.2015  
NTPC, Noida**

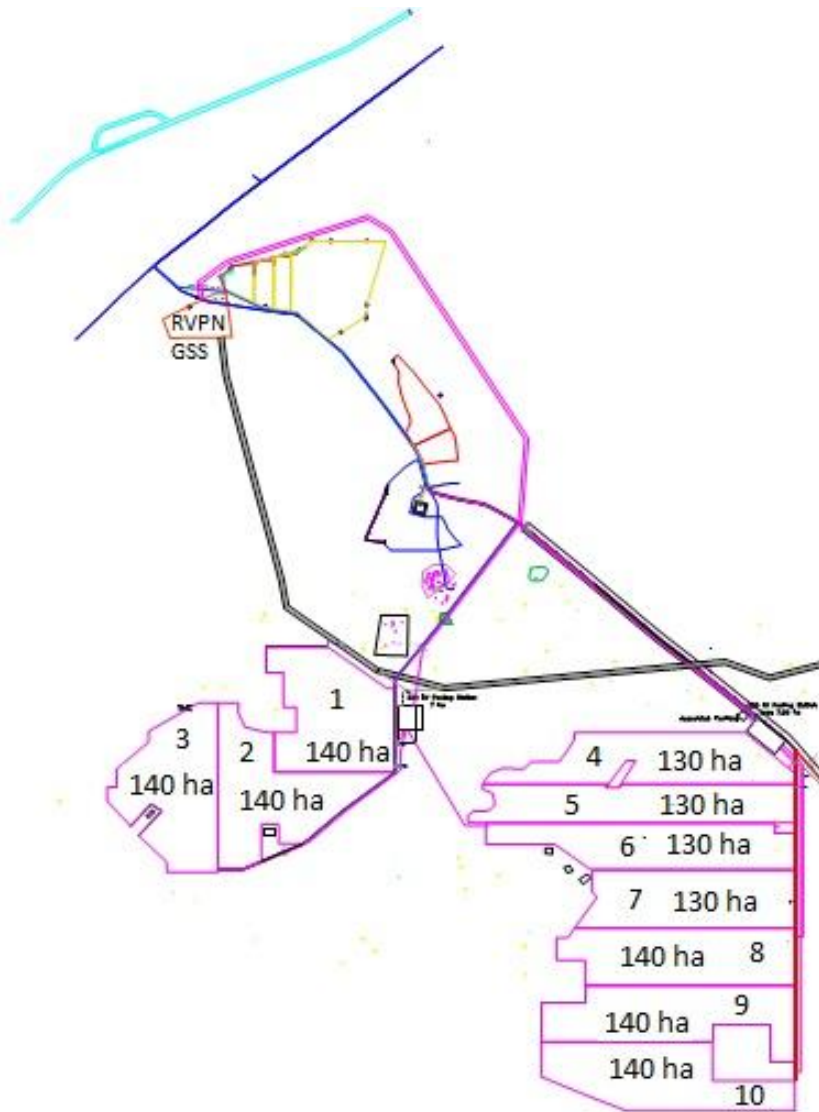
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**Government of Rajasthan  
Energy Department**

**Rajasthan Solarpark Development  
Company Limited**  
(A subsidiary company of RREC)

# BHADLA SOLAR PARK LOCATION

**227 km from Jodhpur Airport, 83 KM from Phalodi Railway Station, 520 km from Kandla Port.**



Data from IMD	Max	Min
Air Temperature (°C)	50	-3
Wind speed (m/s)	6.2	3.6
Relative humidity (%)	100	5
Rainfall (mm)	3.38	0.05

Plots	Latitude	Longitude
1	27°29'35.18"N	71°54'18.91"E
2	27°29'30.70"N	71°54'54.39"E
3	27°30'2.03"N	71°55'24.83"E
8	27°28'37.00"N	71°57'42.53"E
9	27°28'19.70"N	71°57'27.21"E
10	27°28'0.06"N	71°57'22.13"E

# BHADLA SOLAR PARK DESIGN

## Solar irradiation

- GHI is 2010 kWh/m<sup>2</sup> per year based on NIWE(CWET) data (nearest station: Bodana)

## Soil

- Soil survey, geophysical analysis, resistivity test report and topographic map available
- Land is feasible and the soil is good on the selected areas for development.
  - Sulphate content is slightly more than the permissible limits, open foundation (Isolated) is recommended at or below 1.50 m depth.

## Land allotment

- 1800 Ha Land has been leased to RSDCL for development of Bhadla Phase II
- Allotment of plots to successful bidders shall be done directly by RSDCL as per Rfs
- Plot marking of all the 10 Nos. Plots and 2 Nos. pooling stations are under progress
- 10 Plots with a total 680 MW capacity have been planned in Bhadla Solar Park Phase II
- A total of 420 MW comprising of plots no. 1,2,3,8,9 & 10 of 70 MW and 140 hectare each are available for this bidding

# BHADLA SOLAR PARK DESIGN

## Electrical facilities available

- Two pooling stations of 220 kV are planned to evacuate power from the solar plots at 132 kV, with 5 bays of 132 kV and 3 transformers of 160 MVA each.
- Two double circuit overhead 220 kV lines to Bhadla RVPN GSS planned
- Single and double circuit 132 kV overhead lines planned
- The Bhadla RVPN GSS is planned to be fully available:
  - 1500 MVA for 400 kV step-up by end of 2016.
  - 500 MW (AC) by December 2015 through the 400 kV line to Bikaner charged at 220 kV
  - 180 MW (AC) by December 2015 through the double circuit 220 kV line to Bap (linked to the load center of Aau).
- Separate bids for construction have been floated on turnkey basis for:
  - 220 kV and 132 kV lines
  - 2 Nos. 220/132 kV Pooling Stations

# BHADLA SOLAR PARK DESIGN

## Metering Plan

- Metering is planned at RVPN 400 kV Bhadla GSS on 220 kV Bays. Transmission loss from generating PV plots to 400 kV RVPN GSS shall be borne by developer.
  - 132 kV line maximum distance is 3,5 km
  - 220 kV line maximum distance is 9 km
- 2 Nos. of Meters shall be provided at 132 kV side of the pooling station (Main & Check) and 1 no. meter at plant side (Standby Meter) by the developers.
- 2 nos. of meters shall be provided at RVPN GSS (Main & Check) on each 220 kV circuit and 1 no. meter at pooling station no 220 kV (Standby Meter) side by RSDCL. The metering system cost to be charged to the developers on actual basis

# BHADLA SOLAR PARK DESIGN

## Road and access facilities available

- Two new internal 7 m wide roads (plus 1 m gravel shoulders on both sides) of around 5,2 and 3,5 km each are planned and will be made public. Following lateral corridors are planned:

- On the right side: 1 meter for the water pipeline
- On the left side and partially up to the GSS: 2,5 meters for the provision of overhead 11 kV lines to supply power during construction
- On the left side: 35 meters for an overhead 220 kV double circuit corridor

- 4,8 km of upgrade of the existing PWD road to 10 m wide (plus 1 m gravel shoulders on both sides) are planned. Following lateral corridors are planned:

- On the right side: 1 meter for the water pipeline
- On the right side: 2,5 meters for the provision of overhead 11 kV lines to supply power during construction
- On the right side: 35 meters for an overhead 220 kV double circuit corridor
- On the left side: 55 meters for future planning

- All roads will have street lighting

# BHADLA SOLAR PARK DESIGN

## Shading spacings

- Next to the plots and since the planned overhead lines and towers will cast shade to the neighbouring plots, different distances to the plots were used based on the height of the towers, the shortest day in winter (21st of December) and the latitude of the location (measured in east-west direction from the tower center location), where relevant:

- 220 kV – 82 m; 132 kV – 60 m; 11 kV – 22 m

## Green belt

- It is being planned a green belt for Bhadla solar park including phase II.

- To reduce the impact of erosion and stabilisation of sand dunes

- To arrest soil erosion at the embankment slopes and decrease soiling

- Climatic amelioration and to provide aesthetic enhancement of the project

- The recommendations are to plant:

- Acacia tortilis, at 5 x 5 m spacing – soil stabilization

- Cassia angustifolia (Sonamukhi or Senna) and cenchrus ciliaris - control of sand drift

# BHADLA SOLAR PARK DESIGN

## Water facilities available

- Indira Gandhi Nahar canal is passing through less than 7 km away from Bhadla phase II.
- A total of 58 cusec water is reserved by the Indira Gandhi Nahar Board for solar power plants.
- 22 km water pipeline is planned along the road from Bhadla to Nure Ki Burj for:
  - Drinking water supply to the local villagers (part of the CSR policy of the solar park)
  - Filtered water for washing provided to the solar plots
- The total quantum of water to be made available has been estimated based on several criteria:
  - Water in Rajasthan is scarce and thus its use must be rationalised.
  - Washing PV modules in the desert requires planning and cannot be seen as a monthly activity:
    - March to June: summer and dry season requiring a total of 2 to 3 cleanings.
    - July to September: monsoon season requiring no cleanings
    - October to February: winter and dry season: requiring a total of 1 to 2 cleanings
- Total planned of 500 m<sup>3</sup> per day with 350 m<sup>3</sup>/day dedicated to the PV plots @ Rs 16.5/kL (current rate)



# SCHEDULE OF MAIN ACTIVITIES

## Schedule for implementation:

- Civil works (roads) contracted by RSRDC (Rajasthan State Road Development )
  - Tender award and start of work – June 2015
  - Planned commissioning date - January 2016
- Water works (pipeline and drinking water stations) contracted by PHED (Public Health)
  - Tender award – July 2015
  - Planned commissioning date – March 2016
- Electrical works contracted by RREC
  - 220 kV and 132 kV lines
    - Tender award – July 2015
    - Planned commissioning date - June 2016
  - 220/132 kV pooling stations
    - Tender award – August 2015
    - Planned commissioning date - June 2016

# APPLICABLE CHARGES

## One Time:

- **Non-refundable processing fee of Rs. 10 lakhs per project plus service tax & other charges (as per the Rajasthan Solar policy)**
- **Land will be allotted to the developer on prevailing DLC rate at the time of executing of lease deed agreement, which is Rs. 32,873 per Bigha (Rs. 2,03,057 per Hectare )at present.**
- **Development Charges of Rs. 10 lakhs per hectare for the year 2015-16**
  - **Thereafter it shall escalate cumulatively @10% per annum**
- **Metering System Cost at 220 kV side will be charged on actual basis.**
- **Connectivity charges @ 2 Lakh/ MW (as per RERC)**

## Annually

- **Lease rent will be charged @5% of DLC rate for first 2 years and thereafter it will escalate for every year @5% per annum**
- **Annual O&M charges shall be @5% of development charges for the first year and thereafter will escalate cumulatively @10% per annum.**
- **Rs. 1 Lakh per MW every year for the entire life cycle of the project from the time of commissioning for the Rajasthan Renewable Energy Development Fund**

## Monthly

- **Water charges will be payable on actual consumption basis @ Rs 16.5/kL (at present current rate)**

**The charges above are payable with applicable taxes, wherever relevant**