

TABLE OF CONTENTS FOR DETAILED PROJECT REPORT FOR SOLAR PARK

1 EXECUTIVE SUMMARY

- Solar Power Park Developer and Ownership (Shareholders)
- Location & Approach Roads
- Size of the Land
- Total Solar Power Capacity to be Developed (MW_{AC})
- Plot Sizes and Capacity Planned as per plot sizes
- Transmission Infrastructures to be constructed
- Road infrastructures to be constructed
- Water source & infrastructures to be constructed
- Green belt to be planted
- Common facilities to be developed
- Corporate Social Responsibility (CSR) Activities
- Environmental (Endangered Fauna And Flora Being Affected) and Social Impacts (Displacement of people and livelihoods)
- Total cost of development of solar park envisaged
- Likely off-takers and/or under which scheme the park is going to be allotted
- Value requested as a grant Vs value permitted as grant /subsidy as per scheme, if any
- Onetime charges and annual charges to be levied on solar project developers
- Estimated cost of solar power (per kWh) in the park
- Time schedule for execution of the solar park (internal infrastructures, bidding, solar power developers, commissioning of the park and of the plants)
- Availability of transmission capacity up-to destinations for both within state and interstate. If any capacity augmentation activity in external network may be required and connectivity details
- Socio economic value (number of jobs to be created during the construction of the solar park and during operation & maintenance; number of jobs to be created during the construction of the solar plants and during the operation & maintenance; potential GDP impact of the project at the state level; avoided CO₂ emissions)

2. PURPOSE AND SCOPE OF REPORT

- Introduce the concept of solar park
- Brief description of the solar park being planned
- Purpose of the DPR

3. SOLAR SECTOR OVERVIEW

- Include briefly the PV technologies (2 pages)

3.1 INSTALLED SOLAR CAPACITY IN INDIA

- Capacity installed and under construction per state (may not be exhaustive)
- Schemes available and capacity per scheme

3.2 INSTALLED SOLAR CAPACITY IN THE STATE

- Capacity installed and under construction in the state
- Schemes being implemented
- RPO obligations and current status

3.3 SOLAR PARKS SCHEME IN INDIA AND THE RATIONALE FOR THE SOLAR PARK

- Briefly include the solar park scheme
- Include how the intended solar park meets the requirements

4. PROJECT DETAILS

- Land size
- Total power capacity (in AC) to be located within the park
- Number of solar plots envisaged
- Internal Transmission infrastructure requirements within park and up to the sub-station of STU / CTU.
- External Transmission infrastructure requirements, capacity already available, augmentation required up to target destinations.
- Road infrastructure requirements
- Water pipeline/supply/reticulation & recirculation requirements, if any
- Common facilities planned
- CSR activities

4.1 SOLAR PARK LOCATION AND LAND OWNERSHIP

- Location and Approach
- GPS coordinates (or UTM) of the boundaries of the land
- Proximity of rail, port, major highways and major cities
- Land nature (Government land, Private Land, Assigned land etc.)
- Land ownership status (data from the collector's office) including any land to be purchased or leased (clearly marked in the drawing with measurements and scales)
- Land Acquisition process
- Land allocation process to SPDs
- Google image with the boundaries
- AutoCAD or technical drawing with the topography

4.2 SOLAR IRRADIATION AND WEATHER DATA

- Include average monthly GHI from the nearest met station or the MNRE network of SRRAs stations or other reliable sources
- Include ambient temperature, wind speed, wind direction, humidity and rainfall

4.3 ANNUAL ENERGY YIELD ASSESSMENT

- Simulation using reputed PV software
- Orientation and tilt angle of solar PV modules

- Capacity Utilization Factor (CUF)
- Annual degradation

4.4 LAND ASSESSMENT

4.4.1 GEOTECHNICAL ASSESSMENT OF SITE

Main results of the geotechnical assessment including:

1. Geotechnical Analysis
 - a) Standard Penetration Test (tests to determine the capacity of the soil to bear the structures)
 - b) Laboratory Testing (testing of the extracted samples in terms of the composition of the soil until at least 3 to 4 meters deep)
 - c) Local Geologic Settings (description of the geological type of the ground and soil)
 - d) Seismic activity (what is the type of potential seismic activity of the area)
 - e) Groundwater (depth of the groundwater)
 - f) Geologic Hazards
 - i) Landslides (potential for a landslide in case of a natural disaster)
 - ii) Flooding and Erosion (proneness of the site to flooding and erosion)
 - iii) Subsidence (possibility of the soil collapsing downwards)
 - iv) Poor Soil Conditions
 - v) Primary Ground Rupture (possibility of such event in case of a major natural disaster, e.g. earthquake)
 - vi) Strong Ground Motion (whether the site is located in less than 50 km of earth faults)
 - vii) Liquefaction (potential for a soil to loose strength and stiffness and collapsing)
2. Foundations (what is required in depth of foundations for the PV mounting structures to hold)
3. Earthworks (how easy or difficult are earthworks, namely earth moving)
4. Soil resistivity analysis (level of corrosiveness of the ground)

4.4.2 TOPOGRAPHIC SURVEY

Provide the topographic survey for the identified land (assess the size of the land before gridding the land; the usual method will not work well for a large piece of land like 1000 hect or more: requires a preliminary study using google earth and identifying the flat areas over the non flat areas and thus inform the survey on the needs to reposition the gridding according to the results of the preliminary study)

4.4.3 HYDROLOGICAL STUDY

- Water requirements for the park (PV plants, park, green belt, common facilities, CSR activities)
- Water availability: if boreholes: ground extraction potential to be investigated; if canal, water allocation to be investigated; if other source to be stated.

4.4.4 LAND PREPARATION

- State if the land is ready to be used or requires flattening, removal of objects, soil reconditioning, rezoning, etc.
- Define the activities required for the land to be deemed suitable for solar power development: maximum, minimum and average slope of the land to be indicated
- If fencing is envisaged, provide the perimeter
- Indicate where the green belt will be placed and created

4.5 INFRASTRUCTURE DEVELOPMENTS

4.5.1 ELECTRICAL INFRASTRUCTURE

- Electrical interface point (scope of SPPD and SPD to be identified)
- Existing electrical infrastructure (load of existing substation and lines)
- Internal Transmission infrastructure: Laying of power cables at suitable voltage level for interconnection between individual solar projects with the pooling stations, New electrical infrastructure required (33/66 kV or 132 kV for solar plant evacuation; 132 or 220 kV pooling stations) and construction of transmission line for connection to STU/CTU
- External Transmission infrastructure requirements, capacity already available, augmentation required up to target destinations.

4.5.1.1 CONTROL INFRASTRUCTURE

- Facility for gathering data on monitoring, forecasting, scheduling & despatching (should monitor all solar plants) for submission to the load dispatch centre.
- Metering and connectivity arrangements as per CEA guidelines

4.5.2 ROAD INFRASTRUCTURE

- Existing and/or upgradation of road infrastructure required (impact during construction)
- New road infrastructure required (minimum 10 meters with shoulder for main access roads and 7.5 m for secondary roads)

4.5.3 WATER INFRASTRUCTURES

- Water supply provisions and needs (consider 2 to 3 liters per m² of modules to be installed; 1 washing per month, 12 months per year; for states/regions that are water starved or water depleted, reduction to the value above should be considered and described; higher number of washings must be thoroughly justified)
- Water interface point (scope of SPPD and SPD to be identified)
- Existing water sources (quantities and sustainability of the extraction potential)
- If extraction from public canal, allocation for power sector and solar power to be mentioned
- Planned water reticulation (this is always recommended and if not followed, it must be justified)
- Planned water harvesting, storage (if considered)

4.5.4 GREEN BELT

- Determination of prevailing winds (directions and speeds)
- Plan for the green belt (indicating its location, suitable types of trees, number of trees, water needs and maintenance needs)

4.5.5 COMMON FACILITIES

- Lighting (Required)
- Developing access road to each plot (required)
- Solar Radiation Resource Assessment station (should be installed immediately if no station is available within 10 km)
- Drainage System (required)
- Fencing (optional)
- Construction of offices, housing and common building infrastructure (optional)
- Security (optional)
- Telecommunication infrastructures (required)
- Medical facilities (optional)
- Warehouses (required)
- Waste disposal and liquid sewage treatment plant
- Solid waste collection, recycling and storage (required)
- Any other envisaged

4.6 CSR ACTIVITIES

- Proposed budget for CSR activities
- Scope for the CSR activities
- Impact in the local livelihoods
- Schedule of implementation

5. SOLAR PARK DEVELOPMENT

5.1 SOLAR POWER PARK DEVELOPER (SPPD)

- Details of SPPD
- Shareholders of the company
- Stakeholders involved

5.2 TIME SCHEDULE OF IMPLEMENTATION

Activity-Time Schedule to be provided in respect of the following milestones

- Preparation Detailed Project Report (DPR)
- Land acquisition
- Financial Closure
- Tender for the Electrical infrastructures
- Tender for the Road infrastructures
- Tender for the Water infrastructures
- Tender for the Telecommunication infrastructures

- Completion of all above works
- Tendering of solar projects inside solar park
- Allotment of the solar plots to the Solar Project Developers (SPDs)
- Commissioning of the solar plants

5.3 SOLAR PARK DEVELOPMENT FRAMEWORK

- How will the solar park be implemented?
- How will it be financed?
- How will it be rolled out (off takers, schemes etc.)

6. INDICATIVE ENVIRONMENTAL & SOCIAL IMPACTS

6.1 ENVIRONMENTAL SETTING (in and around the site-10 Km radius)

6.2 ENVIRONMENTAL IMPACTS (Positive and negative)

- Environmental positive impacts (on fauna and flora)
- Environmental negative impacts (on fauna and flora)

6.3 SOCIAL IMPACTS (Positive and negative)

- Social Impacts (positive)
- Social impacts (displacement of people and livelihoods)

6.4 MITIGATION MEASURES

- Environmental action/management plan for construction phase and operation phase
- Recommendations on Environmental Impact Assessment
- Social action/management plan
- Recommendations on Social Impact Assessment

7. STATUTORY & LEGAL FRAMEWORK

- Relevant solar policy from the State
- Compliance of the solar park with the solar policy
- All Statutory Clearances, Licenses, permissions required for development solar park and time frame (list them and the agencies issuing them)
- List of clearances/licenses/permissions to be obtained by SPDs and issuing agency

8. PROJECT FINANCIALS

Explain the methodology to be followed

8.1 SOLAR PARK- COST ESTIMATES

- Cost of the land
- Cost of the electrical infrastructure
- Cost of the road & drainage infrastructure
- Cost of the water infrastructure
- Cost of street light
- Cost of Admin Building and other infrastructure

- Cost of the green belt
 - Cost of the common facilities
 - Any other costs
- i) Summary of project cost under essential and optional activities heads
 - ii) Assumed equity returns for the solar park development
 - iii) Determination of the one-time charges, the yearly O&M charges, any other charges

8.2 FINANCIAL VIABILITY

- State policy initiative for solar promotion leading to bankability
- Equity participation of the JV company of the SPPD
- Solar Park Assumptions & Financing Assumptions
- Revenue & Expense Timelines
- Capital cost & Project IRR

8.3 PROJECTION OF THE COST OF SOLAR POWER IN THE SOLAR PARK

Projected costs of solar power inside solar park as per recent trends solar power tariff in the concerned state

8.4 SENSITIVITY ANALYSIS

9. SOCIAL-ECONOMIC IMPACT

- Estimates of the job creation potential during the solar park construction
- Estimates of the job creation potential during the solar park operation and maintenance
- Estimates of the job creation potential during the solar plants construction
- Estimates of the job creation potential during the solar plants operation and maintenance
- GDP impact in the state
- Estimated reduction of CO₂ emissions

Annexures

- General Lay Out Plan of Park
- Land Drawing (Google Map also)
- Infrastructure Details
- Internal Power Map
- Substation Drawing/Single Line Diagram
- External Transmission Link Drawing (Single Line Diagram)
- Power Evacuation System Design
- Power Map of State