STANDARD OPERATIONAL PROCEDURES FOR SOLAR PARKS

VOL. I
DEVELOPMENT, IMPLEMENTATION, CONSTRUCTION, OPERATION AND MAINTENANCE OF SOLAR PARKS

THE EUROPEAN UNION'S FOREIGN POLICY INSTRUMENTS (FPI) PROGRAMME FOR INDIA

GOVERNMENT OF INDIA
MINISTRY OF NEW AND RENEWABLE ENERGY

SECI सूर्य सदैव SUN FOR EVER

This project is funded by the European Union

Content developed by: Agostinho Miguel Garcia.

“Standard operational procedures for solar parks” is a technical brochure developed by the consortium IBF International Consulting, EQO-NIXUS (OCA Global) and IDOM.

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of the consortium IBF International Consulting, EQO-NIXUS (OCA Global) and IDOM and do not necessarily reflect the views of the European Union.

IBF International Consulting, EQO-NIXUS (OCA Global) and IDOM

VOL. I

Standard operational procedures for solar parks

Table of contents

List of acronyms

BOCW	Building and Other Construction Workers
CAPEX	Capital expenditure
CRZ	Coast regulation zone
CSP	Concentrated Solar power (thermal)
CSR	Corporate Social Responsibility
DPR	Detailed project report
EIA	Environmental Impact Assessment
GDP	Gross Demand Product
GHI	Global Horizontal Irradiation
GIS	Geographical Information System
IMD	India Meteorological Department
JV	Joint venture
LAD	Local Area Development
LCOE	Levelized Cost of Electricity
MNRE	Ministry of New and Renewable Energy
O&M	Operation and maintenance
PSU	Public sector unit
PV	Photovoltaics
SECI	Solar Energy Corporation of India
SERC	State Electricity Regulator Commission
SIA	Social Impact Assessment
SLDC	State Load Dispatch Center
SLEC	State Level Empowered Committee
SPD	Solar plant developer
SPPD	Solar power park developer
SPV	Special purpose vehicle

INTRODUCTION

Introduction

This document provides a set of operational procedures to set up, develop, implement, operate and maintain solar parks. It intends to be used as a guidance for the development of solar parks in India.

The development of a solar park requires the identification of a managing entity that will develop, implement and manage the park. Such entity is designated by the Solar power park developer (SPPD). Several stages are envisaged: development, implementation and operation and maintenance.

The development of the park includes:

- 1. Setup of a solar park development company or nomination of an existing one.
- 2. Identification of the statutory and legal framework.
- 3. Identification of potential land, determine its suitability for solar power, land ownership and the acquisition or leasing process.
- 4. Analysis of the solar irradiation and weather data of the selected sites.
- 5. Assessment of the selected land: geotechnical survey, topographic survey and hydrological study.
- 6. Identification of whether the land must be prepared or if it is ready for development.
- 7. Assessment of the indicative environmental and social settings and potential mitigation measures.
- 8. Development of infrastructure for the solar park: electrical infrastructure, road infrastructure, water infrastructure, common facilities, green belt and others.
- 9. Definition of the solar park development framework: off-taker, potential bidding scheme, licenses/ permits/clearances to be obtained by the SPPD and the SPDs.
- 10. Financial analysis of the project: cost estimates, projection of the cost of solar power in the solar park and sensitivity analysis.
- 11. Assessment of the potential socio-economic development.
- 12. Determination of the time schedule for implementation.
- 13. Determine the CSR and LAD activities.
- 14. Preparation of the detailed project report (DPR).

The implementation of the park includes

- 1. Design, detailed layout and preparation of the tender process for the construction of the infrastructures in the solar park: electrical, civil, water, common facilities, green belt and others.

- 2. Preparation of the tender to allocate the solar plots to SPDs in coordination with the identified off-taker and also the rules setup by the SERC for solar projects.

- 3. Negotiation and award of the EPC contracts for the infrastructures and supervision of the construction and commissioning.

- 4. Construction and commissioning of all infra-structures in the solar park.

- 5. Award the solar plots to the SPDs and support to obtain all licenses/permits/clearances.

- 6. Collect the initial charges from the SPDs.

The operation and maintenance of the park includes:

- 1. Operate and maintain all infrastructures either through own capacity or with an O&M contract: electrical, civil, water, common facilities, green belt and others.

- 3. Support SPDs to solve any issues during the lifetime of the solar park.

- 4. Undertake the planned CSR and LAD activities.

- 5. Collect the annual charges and other charges from the SPDs.

The office memorandum from the Ministry of New and Renewable Energy F. No. 320/1412017-NSM dated 9th March 2019 issued modifications in the scheme for development of solar parks and ultra mega solar parks , by introducing a new mode 7 for the development of renewable energy parks (solar, wind or hybrid or other RE parks) through Solar Energy Corporation of India (SECI). The main changes for solar parks are:

- Only mode 7 is allowed for solar parks development starting after March 2019.

- Solar Energy Corporation of India (SECI) is the only SPPD for all solar parks.

- SECI will prepare the DPR for the solar parks as previously the SPPD was required to do.

- The external power evacuation infrastructure of the parks is to be developed by an external transmission development agency (ETDA) like CTU or STU. The ETDA will be entitled to full CFA of 30% of the total cost capped at 20 lakhs/MW. In addition 40% of the cost, subject to a minimum of Rs 10 lakh per MW (or the total cost if it is less than Rs 10 lakh per MW) and a maximum of Rs 30 lakh per MW would be borne by the SPDs. Remaining cost shall be socialised by the ETDA.

- The internal infrastructures of the solar park like internal power evacuation system, road access, water reticulation, land preparation (if applicable) and other facilities as mentioned in the solar park scheme and also battery storage if required would be done by the SPDs at its own cost and would be factored in the tariff to be bid. No funds from the central finance assistance (CFA) shall be used for the development of internal infrastructures.

- The states will identify land and make its right of use available to SECI. A facilitation charge of Rs 0.02 per unit of power being generated in these parks will be paid to the states in addition to any land cost in terms of outright sale or lease rent. No funds from CFA will be used for procurement of land.

- SECI as SPPD will make both government and private land available to be used by successful bidders for setting up solar power projects.

- A payment security mechanism will be set up by SECI to ensure continuous payment to the power developers and mitigate any payment risk due to default in payment by the DISCOMs in any month. A common dedicated payment security fund (PSF) for all projects in the solar parks shall be created by SECI by levying a charge of Rs. 0.02/unit from the SPDs in the solar parks.

- A lump sum estimated amount of CFA would be released to SECI in two installments for all solar park projects. The first installment of 50% of the anticipated expenditure under the scheme or allocated budget under the scheme whichever is less. SECI shall release the CFA to the ETDA as early as possible. The second installment would be released by MNRE only after SECI disbursed at least 75% of the fund released in first installment and upon submission of provisional statement of expenditure and utilization certificates for the previous year.

Mode 7 still applies the same principles as solar parks and as defined in these standard operational procedures:

- **The SPPD is responsible for the solar park development, implementation, operation and maintenance.**

- **The SPPD is responsible to collect the CFA, define the initial and annual costs for the SPDs to be in the park.**

- **The SPD is responsible to bid to enter the solar park, pay the solar park fees, sign the PPA with the offtaker and associated legal documents as well as finance, construct, commission, operate and maintain the solar plant.**

The ETDA is the agency responsible for the design and implementation of the evacuation infrastructure. The states are now incentivised to provide land with a premium fee per unit being provided by the SPDs through the sale of solar power.

The next chapters present these steps in more detail.

SOLAR PARK DEVELOPMENT

The development of the solar park is recommended to be done with the assistance of a consultant that is familiar with setting up solar projects including:

- Experience with medium and large scale solar power plants.
- Solar irradiation assessment.
- GIS analysis.
- Suitability of orientation, sizes, slopes, soil types, shadings.
- Needs in access roads: widths, consistency and quality of the road.
- Power evacuation and transmission infrastructures: proximity, rights of way.
- Water availability.
- Environmental and social scoping to identify major constraints.
- Previous experience with solar parks desired.

This will help the site selection and the retention of appropriate areas as well as mapping of the best areas for solar park development in the state rather than just and ad-hoc identification of some sites. Nonetheless readily available land should be analysed first as to assess the feasibility. The scheme for solar parks published by the Ministry of New and Renewable Energies should also be analysed in detail.

Setup of a solar park development company

Due to the mode 7 approved in March 2019 as mentioned above, only SECI can be the solar park development company.

Identification of the statutory and legal framework

Solar parks may require:

- Consent to establish from the state pollution control board for infrastructure development.
- NOC from Ministry of Environment and Forest regarding EIA for the solar park infrastructures.
- NOC from the State Forest department for felling of trees.
- State Electricity Regulator Commission (ERC): registration and payment of transmission feeds.
- Approval from the state ERC on the ceiling tariffs.

- State transmission company: permission for construction of transmission line.
- NOC from Archaeological Department of Government of India.
- Approval from district/municipal authority before removal of any earthworks.
- Approval from Central Ground Water Board for abstraction of ground water.
- Consent to operate from state pollution control board for emissions to the air and discharging of treated effluent from labour camps and construction activities.
- Authorization from the state pollution control board to carry out waste degregation and disposal.

The available frameworks to develop and implement the solar parks are the following:

- PPA signed with SECI where the value of the PPA is determined through competitive bidding.
- Agreement with NTPC or other interested national party, that is creditworthy for the purchase of power where SPDs bid for the tariffs.
- State Renewable Purchase Obligation (RPO) where the state discom purchases the power from the solar park and SPDs bid for tariffs.

It is also important to assess the renewable energy policy or any specific solar energy policy of the state and frame the development of solar parks. This may require changes in the existing policies that should be addressed prior to the implementation of the solar park. Issues as costs, permits, permissions, clearances, approvals, State Level Empowerment Committees (SLEC) for decision making and others should clearly be defined.

It is recommended to have a prior discussion with the Nodal agency or entity that prepared the renewable energy or solar policy to discuss the development and implementation of solar parks.

Identification of land and acquisition/leasing process

Tracts of public land available that are arid, barren, not used or with poor usage should be assessed immediately in terms of suitability. If no such land is available the identification of the sites should follow a GIS analysis that uses as minimum data:

- Solar irradiation.
- Weather data as temperature, wind speed, rainfall.
- Transmission infrastructures: lines and substations.
- Reserved areas and sensitive areas: environmental, social, military, agriculture, industrial, residential, urban, commercial, etc.
- Soil type.
- Slope of the land.
- Land ownership (if available).

Suitable areas should be identified, triggering site visits and inspections to determine final candidates. After that the land ownership should be assessed with a priority on government or public land, but not excluding the possibility to consider private land or a mix of both areas. It should be determined the way to acquire the land for the SPPD as well as for the SPD later on. As per mode 7, the states shall have an incentive to identify and make land available.

It is recommended to choose government land that is readily available and free of encumbrances. Land that fall into residence, urban, commercial and industrial zones should not be considered as well as agricultural, forest and land under CRZ. Discuss with the district collector the best way to lease/acquire the land and also how the land will then be leased by the SPDs. The SPDs should be able to obtain a lease agreement from the SPPD rather than through a separate entity of the state, as it will consume time. The boundaries of the land should be clearly determined with GPS/UTM coordinates. The State/UT Government may prioritize the use of government waste/non-agricultural land in order to speed up the acquisition process. It is preferred that most of the required land is Government owned and very little private land is to be acquired. The price of the land is to be kept as low as possible. If land cannot be made available in one location, then land in few locations in close vicinity may be considered.

Analysis of the solar irradiation and weather data

As a part of the earlier step or as a separate process, the solar irradiation, namely the Global Horizontal Irradiation (GHI), the Direct Normal Irradiation (DNI), if concentration solar technologies are envisaged, and the weather data as ambient temperature, wind speed and direction, relative humidity, rainfall and soiling/dust analysis, if available, should all be assessed from existing sources (satellite data, India Meteorological Department, the network of the Solar measurement stations of NIWE and other providers).

It is recommended to have a good assessment done as to be able to estimate adequately the costs of solar power and also to provide to SPDs the data to support their technical and financial analysis.

Assessment of the selected land

For the selected sites it is required that geotechnical, topographic and hydrological studies are carried out by specialized companies. It is very important to determine the geological and geographical characteristics of the soil, testing it to determine the capacity to retain structures for the plants and also to map the site regarding the boundaries, contours and existing features within the site. The hydrological study should identify the water availability and also determine the storm-water/flooding risks of the area and recommend actions.

It is recommended to carry out these studies as soon as land has been identified that it is suitable for solar power development, even if for a larger tract of the land than the final to be leased. These studies help identifying also the encumbrances of the land as well as the existing owners and features.

Land preparation

The selected land may require further work to make it viable for the solar park to be constructed. The need for such activities must be analysed and sites should be as large as possible in case sites without such needs are not available. Cleaning, removing bushes and small vegetation as well as small levelling works are not required to be done as SPDs will be having their machines at the site and will prepare the site themselves. Catchment areas, sites below flooding level, and forest areas should not be considered for setting up of solar parks.

It is recommended to avoid any land preparation and choose sites that are almost or fully ready for construction. Any sites that require land preparation must effectively justify the investment in terms of cost of solar power inside and outside the solar park. The mitigation of risk through the land preparation must also address the potential concerns of SPDs and lenders.

Indicative environment and social settings

The indicative environmental and social settings for environment and social should be determined by a specialized consultant. It is required that potential impacted livelihoods are analysed as well as fauna and flora to be impacted. The forest areas, areas where trees are required to be cut, areas with negative impact on livelihood, flora and fauna and land falling under industrial, commercial, urban, residential and agriculture should not be considered for setting up of solar parks. Air, water and noise must be analysed in terms of potential impacts.

It is recommended to do a social and environmental scoping to the site and a buffer of 5 to 10 km around the site. The major issues should be flagged and adequate mitigation measures determined and budgeted, if necessary. Full EIA and SIA should be commissioned after the award of the solar park to better determine what needs to be undertaken to mitigate potential environmental and social issues and also to better define the CSR and LAD activities to be undertaken namely regarding livelihood, gender, skills development, etc.

Development of infrastructures for the solar park

The infrastructures of the solar park to be developed are:

- Solar plots – square or rectangular shaped facing south with a minimum slope.
- Electrical – transmission lines and pooling stations.
- Roads – access to the solar park and internal roads to the solar plots.
- Water – pipelines, overhead tanks.
- Common facilities – solar park building, training institute, medical facilities, colony, guest houses, etc.
- Green belt.

It is important to increase the size of the solar plots to allow as much installed power as possible, 50 MW plots should be considered as a target and if possible even larger, which will by themselves reduce the needs for evacuation lines and the internal roads of the park as well as the water pipelines. A layout of the whole park should be developed in AutoCAD with all the details.

It is recommended:

- **Solar plots: target the largest possible and maximize them per transmission lines. Do not reduce plots and allow for merger of plots to be possible in case a SPD is awarded more than one project.**
- **Electrical infrastructures – consider the shadings of the transmission towers when placing the transmission corridors. Choose the voltage level of the lines proportional to the power to be evacuated and optimize/maximize it taking into consideration the losses over large distances – thumb roules that must be simulated for each site under the weather conditions:**
  - **Less than or equal to 30 MW - 33 kV single circuit.**
  - **30 to 50 MW – 33 kV double circuit.**
  - **60 to 80 MW – 132 kV single circuit.**
  - **140 to 160 MW – 132 kV double circuit.**
  - **160 to 200 MW – 220 kV single circuit.**
  - **320 to 400 MW – 220 kV double circuit.**
- **Road infrastructures – avoid any east to west roads between plots and rather have north to south roads. Main roads should be 10 meters wide including shoulders or the standard of each state for national highways. Secondary roads may be 7 meters wide including shoulders as they will be mostly used during construction.**
- **Water infrastructures – lay the pipelines next to the main and secondary roads. The diameter should be designed for the needs of the park and possible increments in the future as well as local population. Water is scarce and thus a maximum of 1 cleaning per month should be supplied. Maximum of 2 to 3 liters per m^2 of PV modules should be considered with 140W per m^2. Any higher requirements should be duly justified and lower quantity of water for washing per m^2 is encouraged as well as dry or hybrid cleaning methods including water recycling. Water should not be free in a solar park and no bore wells should be metered. Water extraction potential is to be studied and determined.**

- **Common facilities, which are optional:**
  - Solar park building with at least 2 floors with the main floor being designed to receive visitors and deliver presentations as well as host meetings. Second floor should be for offices and work spaces. An optional 3rd floor is also possible to serve as guest house for the solar park staff.
  - Medical facilities – solar parks are often located in remote areas, so consider building medical facilities for the solar park as well as for the local populations. Find a local NGO to run the clinic.
  - Training institute – the potential to teach solar power and train staff for the building as well as operation and maintenance phases is relevant and also to allow the local population to obtain jobs in the solar park and the solar plants.
  - Colony – as other main power generation facilities a solar park of 1000 MW will employ several hundreds of persons and also will provide opportunities to suppliers and many other visitors, a colony for residential purposes with supermarkets, restaurants, guest houses, warehouses, etc. is possible. This can be done on a leasing basis with a royalty for the SPPD.
  - Green belt – analyse the best flora to withstand the local weather and climatic conditions as well as soil with minimum or no watering needs that may grow up to 5 meters tall. Determine the predominant winds in terms of speed and direction and plant a belt or several belts in those directions. It is recommended that specialized firms or state departments are hired to support the development of the green belt. Survival rate should not be 100% and replanting after 5 to 10 years should be considered to decrease the upfront cost as well as to test the solution.

Definition of the solar park development framework

The solar park to be implemented successfully requires a framework that will lead to the purchase of solar power from the SPDs as well as the proper establishment of the solar plants. To that end the solar park should find offtaker(s) and a potential bidding scheme with SECI, NTPC or the state with an upfront requirement that the state discom(s) should take a part of the generated power (20%). If the State Government has agreed to buy more than 20% of power in one or more solar parks in the State, then purchase of lower capacity of power in subsequent parks is allowed so that solar power of at least 20% of the aggregate capacity of all the solar parks in the State is purchased by the State Government. The States which agree to buy a higher percentage of power will be given preference.

The solar projects may come up under any schemes/programmes of the Central/State/UT Government or can be for third party sale, captive use or merchant sale. The SPDs within the solar park shall enter into PPAs with Central Utilities/State Utilities/DISCOMs/Third Parties/Captive Users who are willing to buy power from the developer(s). The tariff for the sale of power through PPAs could be either based on the tariff determined by Central Electricity Regulatory Commission (CERC)/State Electricity Regulatory Commission (SERC) or as determined through bidding process.

It is also important to determine the licenses, permits and clearances required to be obtained by the SPPD and the SPD. This phase is intimately connected with the previous phase as the size of the solar plots, the phasing of the park and the capacities to be developed are to be agreed with the off-taker as well.

It is recommended that a single window clearance is created for SPDs regarding permits, licenses and clearances through the SPPD. Offtakers and PPA should be clearly identified and shared with the SPDs.

Determination of the time schedule for implementation

The schedule for the development and implementation of the solar park is to be clearly assessed aiming at:

- Having the development and implementation of the park linked with the off-taker agreement and potential signature of the PPA.
- The tender for the contractors to implement the park should be well prepared with time for clarifications and negotiations.
- The commissioning of the park, namely of the power evacuation infrastructure (which is the long lead activity), meeting the potential COD (commercial operation date) of the solar plants.
- The bidding for the allotment of the solar plots is to be adequately planned with a site visit, pre-bid meetings and time for selection and award. This should be linked with the off-taker.

It is recommended to start the technical development of the solar park prior to the engagement with the potential off-takers, but with a degree of freedom to be able to adapt and reach a common agreement. Vol.II Includes an indicative schedule.

Financial analysis of the project

The costing of the whole solar park should be done considering all infrastructures to be provided plus a bridge loan cost, if required, to construct the park until the cost is recovered from the SPDs. Local area development (LAD) activities should also be budgeted for with a clear aim as where the money is to be used. The management, supervision of the contracts for electricity, roads, water and others is also to be included as well as any preparatory work as DPR, topographic and geotechnical surveys. The potential return on equity investment is capped at 16%, but the potential return on equity investment by the SPPD should be aligned with the tariff regulation of CERC for solar PV project as determined by CERC from time to time.. A sensitivity analysis should be carried out on the main costs. It is also required that the LCOE on the solar park is to be estimated as to determine a potential tariff.

It is recommended that a basic package is determined with additional services being offered as an add-on.

Assessment of the potential socio-economic development

There is the need to determine the potential GDP impact and the creation of jobs with the solar park development and the solar plants during construction, operation and maintenance as well as the avoided GHG emissions. This should also be done by specialised consultants.

Determine the LAD activities

A solar park is an undertaking that requires some social responsibility and thus besides CSR activities local area development activities may be envisaged. Some examples are:

- drinking water for the local populations.
- schools and skills development.
- medical facilities.
- improvements in local accesses.
- development of gender related activities

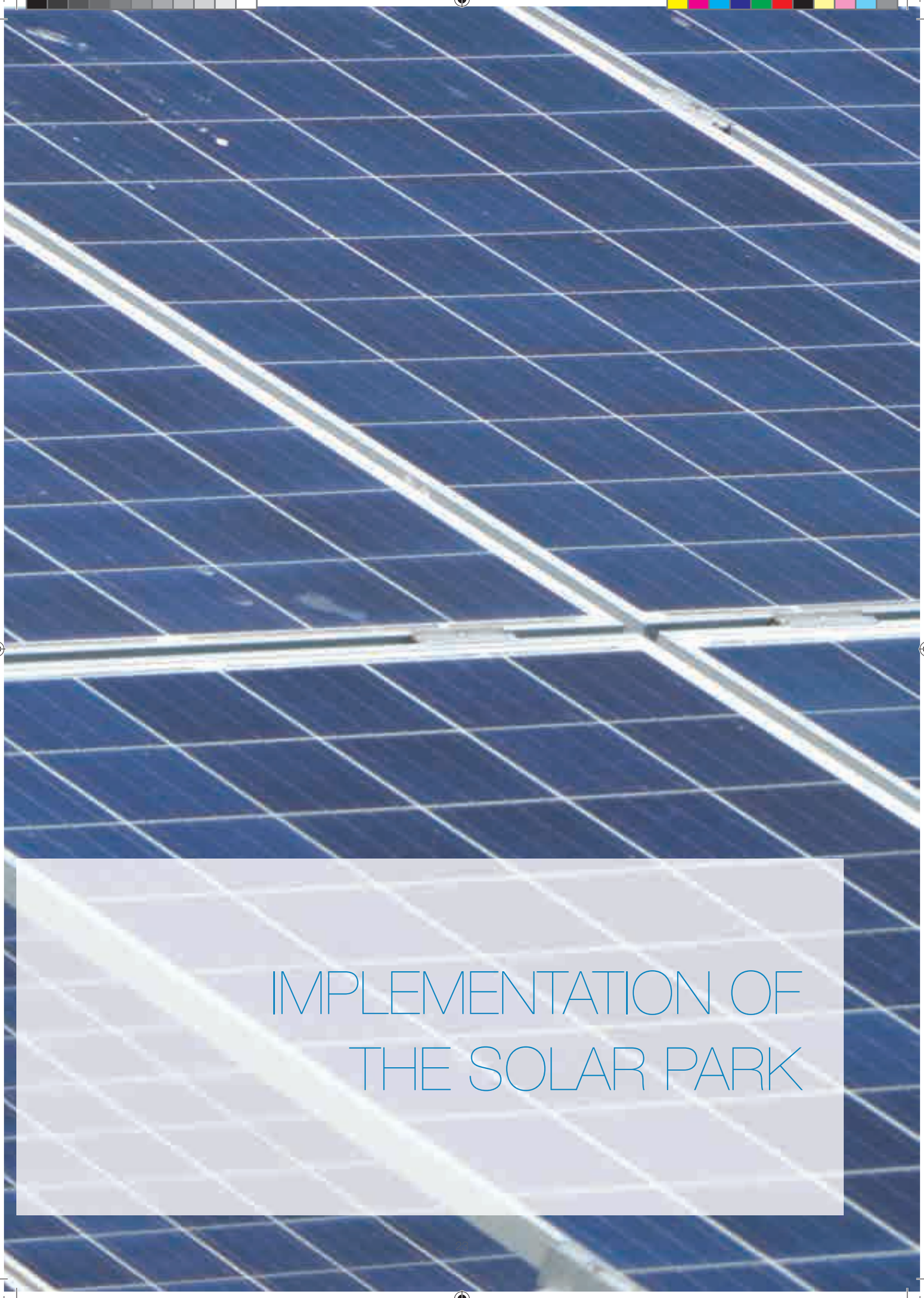
1 to 2% of the total cost of the park is recommended as LAD budget, but should be quantified and justified in the DPR.

Preparation and submission of the DPR

A detailed project report (DPR) should be prepared capturing all the issues described before. It should be prepared by an experienced consultant with the support from the SPPD.

A standard table of contents is included in volume II to provide a guidance for the execution of the document and which information to include.


IBF International Consulting, EQO-NIXUS (OCA Global) and IDOM.
Standard operational procedures for solar parks.



IMPLEMENTATION OF THE SOLAR PARK

To implement the solar park 3 phases are considered: construction, operation and maintenance. Under each phase there are activities to be undertaken that are described below.

Statutory and authorizations

During construction the following is required for the solar parks:

- Conduct monitoring and ensure that noise generation is within threshold according to the state pollution control board.
- Ensure all contractors have BOCW Registration as applicable according to the District Labour Commissioner and Buildings Inspector.

Tender for the construction of the solar park

A tender to award the contracts for the construction of the defined infrastructures of the solar park will follow the detailed project report with the costing. Separate tenders should be conducted for the substations, transmission lines, roads, water pipelines and overhead tanks, common facilities, green belt and others. Sufficient time must be considered to design, prepare, float, clarify, evaluate, select and negotiate the contract(s). This may also require relevant efforts from the SPPD.

It is recommended that for parks larger than 500 MW separate tenders are conducted while for less than that a single contract may be negotiated facilitating the management and supervision. In any case this should be analysed for each solar park. The SPPD should obtain support to manage the contract(s) and this is a relevant requirement that needs experienced persons. Road construction should be awarded first. A Health and safety manual has been prepared for the construction phase and for all the areas and can be found in Volume III.

Tender to allocate the solar plots to SPDs

A tender to allocate the solar plots to the SPDs in coordination with the identified off-taker should be prepared. For example SECI or NTPC have their own tender processes and thus the SPPD should be available to support, while if the state wishes to buy the solar power from the park a full tender process should be prepared taking into consideration the rules setup by the SERC for solar projects award. In the latter case sufficient time must be considered to design, prepare, float, clarify, evaluate, select and award the solar plots. This may require relevant efforts from the SPPD.

SECI or NTPC lead tender processes are recommended as to facilitate the whole process including the PPAs. The support after the tender to the SPDs regarding licenses, permits and clearances should be provided by the SPPD.

Construction and commissioning of the solar park

The construction and commissioning of all the infrastructures of the solar park will follow after award of the contracts and a close supervision must be assured by the SPPD to avoid delays.

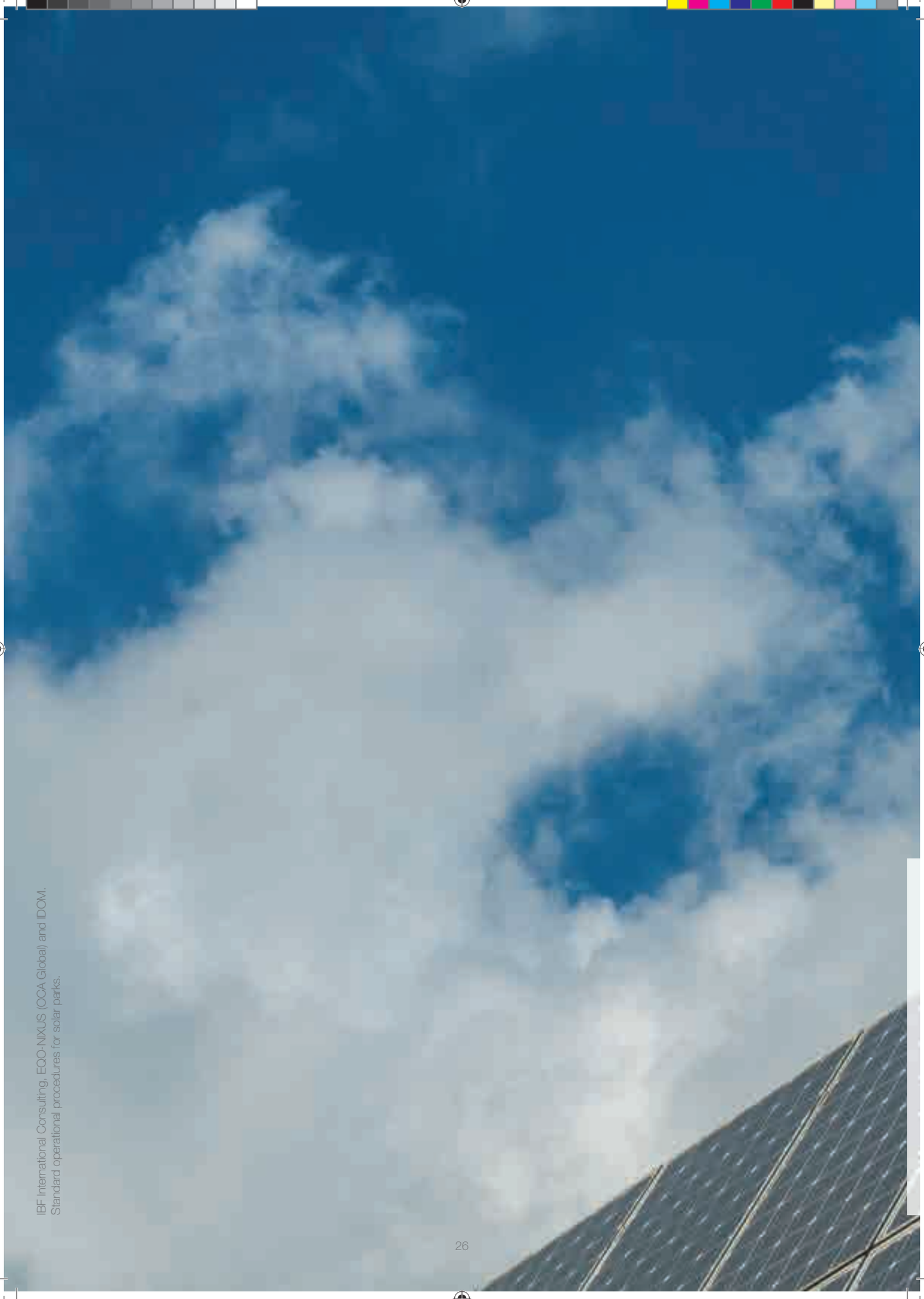
It is recommended that experienced persons are allocated full time to supervise the construction.

Collect the initial charges from the SPDs

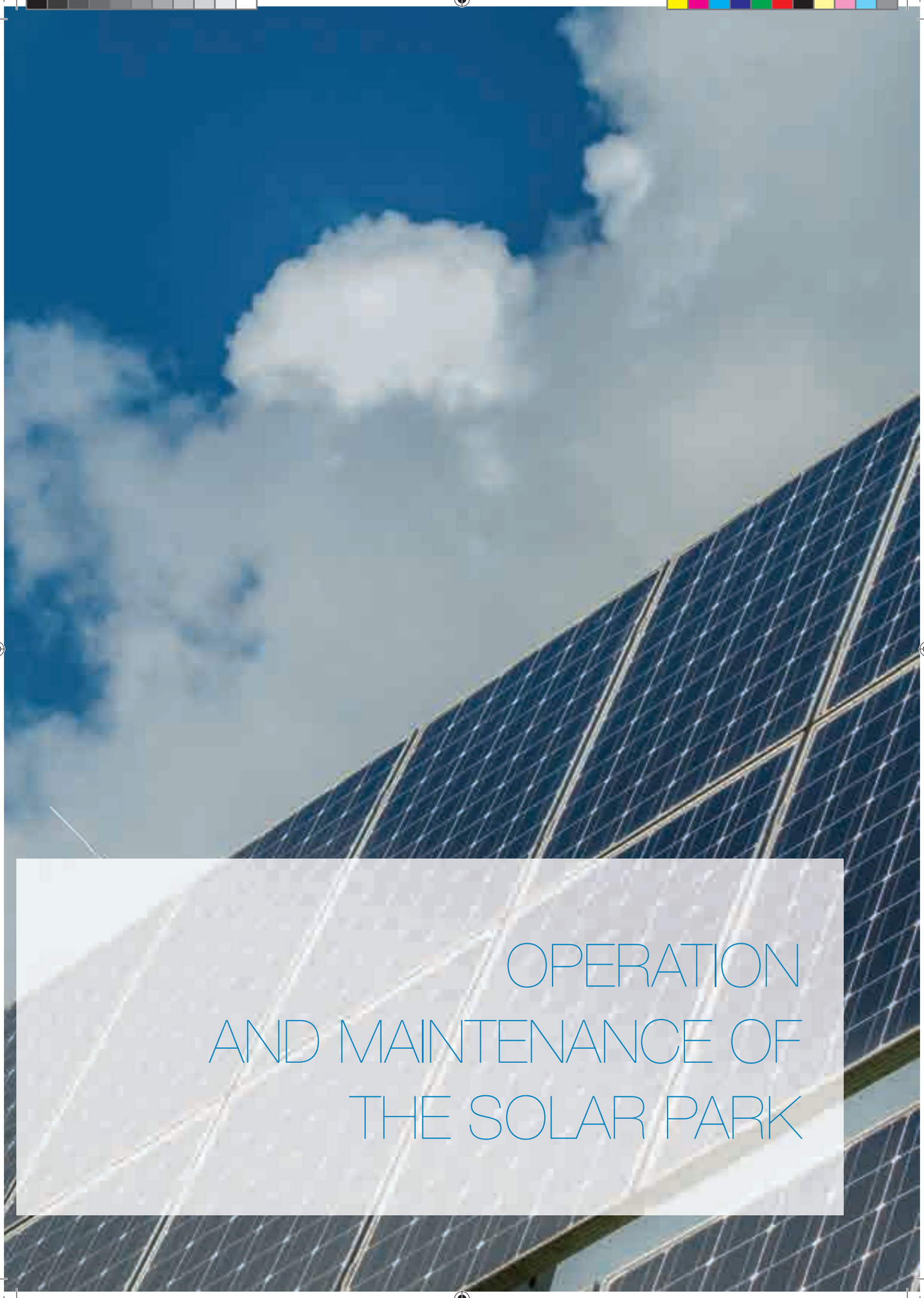
The initial charges from the SPDs should be collected by the SPPD based on the financial model. This process may be linked with any other licenses to generate or for solar parks that each state may have in place.

Construction and commissioning of the solar plants

The solar plants will start to be constructed along the timelines of the development of the solar park, namely of the power evacuation, and also the PPA expected COD dates. The solar plants will start construction after the award of the solar lots plus some time for the financial closure. The scheme for the solar parks defines the allowed times up to commissioning for the solar plants.



IBF International Consulting, EQO-NIXUS (OCA Global) and IDOM.
Standard operational procedures for solar parks.



OPERATION AND MAINTENANCE OF THE SOLAR PARK

The operation and maintenance of the solar park is the next phase during which the SPPD must look after all infrastructures constructed. It is noteworthy to point out that the operation of the solar park in terms of the transmission requires some capacity to monitor, the electrical infrastructures of the solar park, namely the pooling substations.

Statutory and authorizations

The following is required to be conducted yearly and during the lifetime of the project:

- Submission of Annual Environmental Statement to the state pollution control board.
- Maintain records of electronic and electrical waste generation and disposal and file annual returns to the state pollution control board.
- Follow requirements of CMV Rules such as PUC according to the motor vehicle department / RTO.
- Provide for payment of compensation by employers to their workmen employees for injury by accident i.e. personal injury or occupational disease, according to the District Labour Commissioner.
- Prohibit employment of children in certain specified hazardous occupations and processes and regulate the working conditions in others according to the District Labour Commissioner.

Operate and maintain all infrastructures of the solar park

Through an O&M contract or using the capacities of the SPPD, all infrastructure should be maintained, namely electrical, civil, water, common facilities, green belt and others.

It is recommended that lines and substations be maintained by the state transmission company, while roads should be maintained by the State road development company and the water infrastructure by the Public works department or specific entity for water infrastructures. The green belt should be maintained by the Forest department if a substantial area has been planted. The SPPD should be able to manage all these entities as well as the SPDs to make sure the level of O&M is appropriate. A manual with guidelines for the O&M of the solar park and also with recommendations for the solar plants has been prepared and is available in the Volume III.

Support to SPDs during the lifetime of the solar park

It is also the duty of the SPPD to be available to support the tenants of the solar park, the SPDs, during the life time of the solar park.

Undertake the planned LAD activities

The SPPD must implement the LAD activities planned earlier and make sure that the communication of these activities is effective and reaches the SPDs as well as the local community and the public in general.

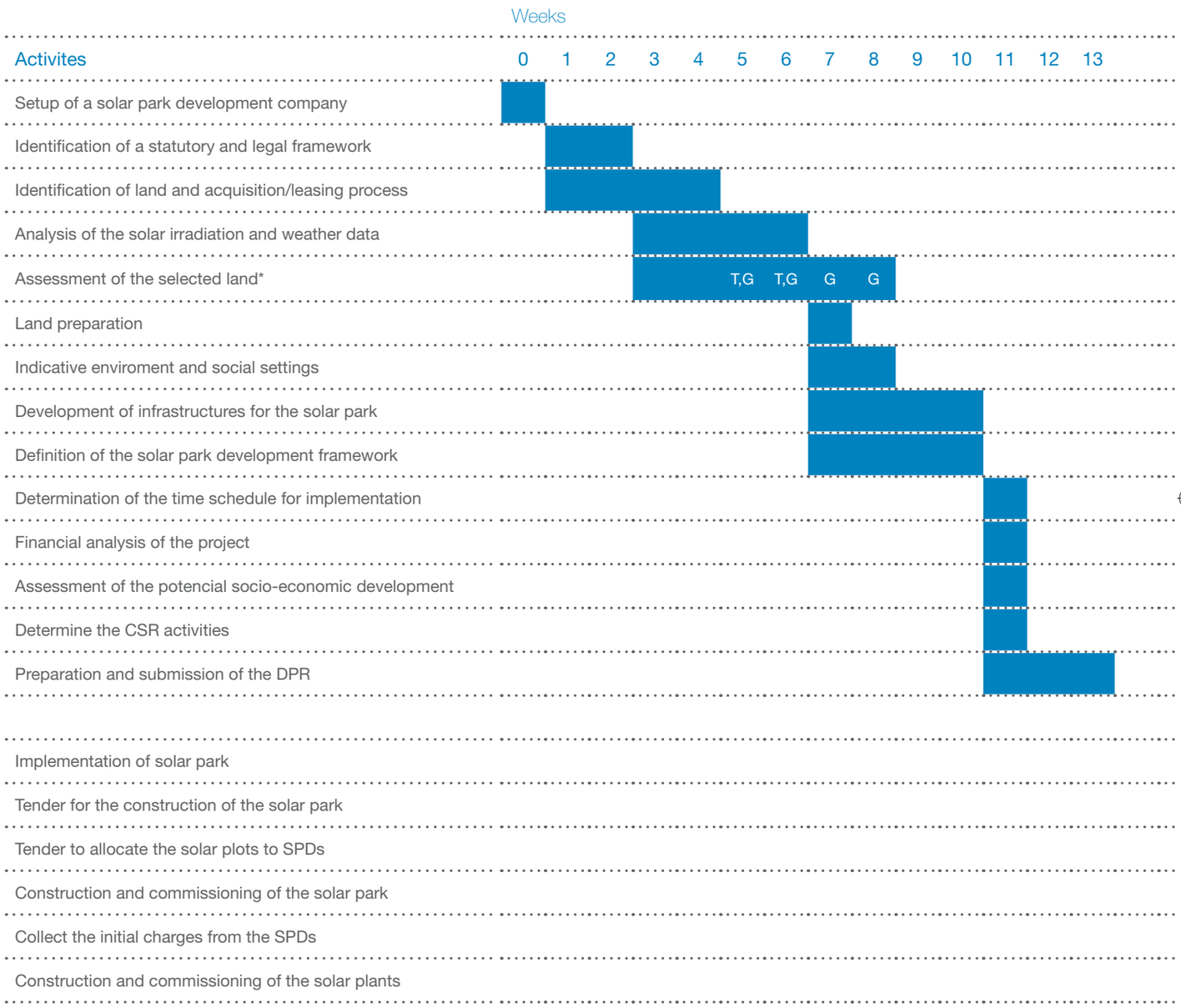
Collect the annual charges and other charges from the SPDs

The collection of the annual charges to be in the solar park and any other charges should be done by the SPPD. These charges should then be used for the payment of the maintenance contracts.

IBF International Consulting, EQO-NIXUS (OCA Global) and IDOM.
Standard operational procedures for solar parks.

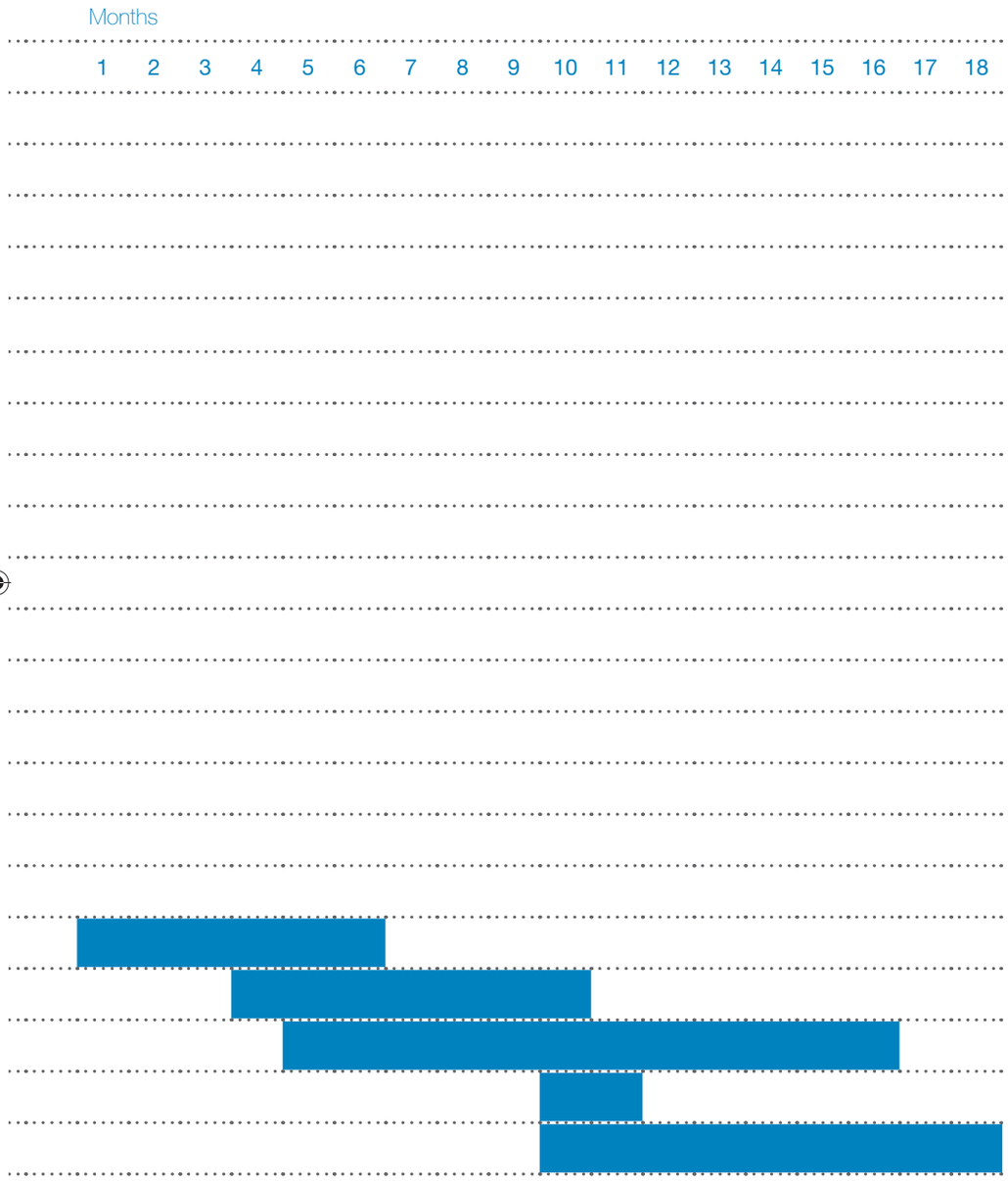
INDICATIVE SCHEDULE

The indicative schedule for the activities is provided below. It is assumed that full time dedication is given to the development of the solar parks by experienced persons including consultants and third party providers. Any internal delays in the SPPD will dictate delays on the whole schedule.



** Procurement time for the topographic and geotechnical surveys not included; T – Topographic survey; G – Geotechnical survey*

Under mode 7 the SPPD is SECI and land identification may be done by the states before hand. It is recommended to set deadlines and milestones. The task "*Identification of land and acquisition/ leasing process*" may take longer depending on availability of land and inspection visits. Task "*Tender to allocate the solar plots to SPDs*" may take longer if a very large GSS needs to be built as well as transmission lines (this may be relevant for parks with more than 1000 MW).


Months
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

The project is implemented by IBF International Consulting, EQO-NIXUS (OCA Global) and IDOM

This project is funded by
the European Union