

# PROJECT DEVELOPMENT

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## 1. Project Development Stages

BANK PERSPECTIVE	MAIN ACTIVITIES (DEVELOPER)
<b>STAGE 1</b>	<b>SITE IDENTIFICATION/CONCEPT</b>
	<ul style="list-style-type: none"> <li>• Identification of potential site(s)</li> <li>• Funding of project development</li> <li>• Development of rough technical concept</li> </ul>
<b>STAGE 2</b>	<b>PRE-FEASIBILITY STUDY</b>
	<ul style="list-style-type: none"> <li>• Assessment of different technical options</li> <li>• Approximate cost/benefits</li> <li>• Permitting needs</li> <li>• Market assessment</li> </ul>
<b>STAGE 3</b>	<b>FEASIBILITY STUDY</b>
<b>First contact with project development</b>	<ul style="list-style-type: none"> <li>• Technical and financial evaluation of preferred option</li> <li>• Assessment of financing options</li> <li>• Initiation of permitting process</li> <li>• Development of rough technical concept</li> </ul>
<b>STATE 4</b>	<b>FINANCING/CONTRACTS</b>
<ul style="list-style-type: none"> <li>• Due diligence</li> <li>• Financing concept</li> </ul>	<ul style="list-style-type: none"> <li>• Permitting</li> <li>• Contracting strategy</li> <li>• Supplier selection and contract negotiation</li> <li>• Financing of project</li> </ul>
<b>STATE 5</b>	<b>DETAILED DESIGN</b>
<ul style="list-style-type: none"> <li>• Loan agreement</li> </ul>	<ul style="list-style-type: none"> <li>• Preparation of detailed design for all relevant lots</li> <li>• Preparation of project implementation schedule</li> <li>• Finalization of permitting process</li> </ul>
<b>STATE 6</b>	<b>CONSTRUCTION</b>
<ul style="list-style-type: none"> <li>• Independent review of construction</li> </ul>	<ul style="list-style-type: none"> <li>• Construction supervision</li> </ul>
<b>STATE 7</b>	<b>COMMISSIONING</b>
<ul style="list-style-type: none"> <li>• Independent review of commissioning</li> </ul>	<ul style="list-style-type: none"> <li>• Performance testing</li> <li>• Preparation of as build design (if required)</li> </ul>

## 2. Concept Stage Checklist

The checklist below covers key questions and factors the developer should consider when deciding whether to proceed to the next stage, which is to conduct a prefeasibility study.

Project structure outlined.

Does the country and power sector provide adequate risk-reward benefits to private investors?

Regulatory support and tariffs, especially the duration and timeline for any incentives for solar power.

Suitable site identified taking account of site constraints.

Grid access (proximity, capacity, and policy provisions for access).

Appropriate funds available to carry out the feasibility assessments.

Identification of off-taker and available infrastructure to take the power generated.

### 3. Prefeasibility Checklist

Below is a checklist of key considerations for the developer during the prefeasibility stage:

Assessment of the site and boundary areas including access permissions and restrictions.

Conceptual design completed including consideration of technology options and their financial impacts.

Approximate costs for land, equipment, delivery, construction, and operation identified along with predicted revenue.

Indicative energy yield completed.

Identification of anticipated electricity tariff to be received, and review of expected terms/conditions of PPAs in the relevant market.

High-level financial analysis completed.

Cost and likelihood of achieving grid connection in the required timescales identified.

Main environmental constraints identified along with other potential “deal breakers.”

Assessment of current and potential future regulatory environment completed.

An initial concept of the project’s legal/corporate structure.

Solutions to project challenges.

Permitting requirements/costs identified.

Preliminary project timeline/workflow showing spacing of key activities drafted.

### 4. Feasibility Checklist

Below is a checklist for developers with the key considerations that must be addressed during the feasibility stage.

Detailed site plan produced.

세부사이트 계획

Solar resource assessed including assessment of shading.

태양에너지 평가

Environmental characteristics that may affect performance identified.

성능에 영향을 줄수 있는 환경적 특성

Detailed review of environmental and social considerations conducted.

환경, 사회적인 고려사항에 대한 세부적인 검토

Detailed review of required permits and licences undertaken.

수행에 필요로하는 인허가, 면허의 세부적인 검토

Assessment of Capex for technology and supplier options; cost/benefit for options and project location completed.

기술, 공급자 옵션에 대한 평가; CAPEX 평가, 손익의 계산

Pre-application discussions with relevant consenting authority undertaken.

승인 관련기관 승인신청 및 협의

Initial consultations with key stakeholders including from the community completed.

지역사회 주요 이해 관계자와의 사전 협의

Grid connection assessment completed.

그리드의 연결 평가

Predicted energy yields established.

예측되는 에너지 생산량

Further assessment of anticipated electricity tariff undertaken.

PPA tariff에 대한 평가

Financial analysis carried out. Preliminary financing planned.

예비자금 조달에 계획, 재무분석

Project implementation plan developed.

프로젝트 수행 계획

Options agreements for land access (where required) secured.

토지 확보를 위한 옵션 계약

Evaluation and concept of the commercial structure of the project and project company(s) carried out.

SPC의 프로젝트 수행을 위한 상업적 구조 및 평가

## 5. Checklist for Permitting, Financing, and Contracts

Below is a checklist of critical issues that a developer needs to consider during the stage of project development that involves securing permitting, contracts, and financing.

Preparation and submission of relevant permit and license applications.

Environmental and social assessments (as required) completed.

Grid connection application prepared and submitted. Grid connection agreement signed.

Review of design and permit/consent conditions completed.

Contracting strategy approach determined.

Financing structure decided. Financing secured for the project.

Community or stakeholder engagement completed.

Solar PV tender documentation prepared.

Supplier selection and ranking undertaken.

PPA documentation prepared.

O&M concept and contracts prepared.

Owner's Engineer tender prepared.

Relevant insurance procured and contracted.

Lender's Engineer and Lender's Council tenders prepared.

Tendering and evaluation of bidders for all contracts carried out.

Contract negotiations completed.

Bank-grade energy yield completed.

Detailed bankable financial model completed.

Transportation analysis (if required) carried out.

All land and access agreements finalised.

Project risk analysis completed.

PPA finalised with off-taker.

Detailed project implementation plan finalised.

Technical and legal due diligence completed (if required).

## 6. Site Selection Checklist

The checklist below details the basic requirements and procedures to assist developers with the site selection process.

Suitable land area identified for the scale of development proposed.

Ownership of land determined.

Current land use identified (e.g., industrial/agricultural/brownfield).

Advice sought from regulatory authorities on land use restrictions.

Solar resource assessed.

Topographic characteristics obtained.

Proximity to international, national and local environmental designations determined.

Potential access routes to site assessed.

Geotechnical survey completed.

Grid connection assessed (capacity, proximity, right-of-way, stability and availability).

Soiling risks assessed.

Availability of water supply/ground water determined.

GIS assessment of constraints (optional).

Financial incentives identified.

## **7. Permitting, Licensing and Environmental and Social Considerations Checklist**

The checklist below details the basic requirements and procedures to assist developers with the permitting and licensing aspects of a project.

Land lease agreement obtained.

Advice sought on planning/consenting/permitting from local regulatory authorities and any environmental assessments required.

Initial Environmental Examination (IEE) completed.

Environmental and social assessments carried out (as required).

Relevant supporting documents for consent/licensing applications completed (including environmental assessment reports, access details, drawings and plans).

Community consultation undertaken.

Consents, licences and permit applications completed.

Grid connection application completed.

Electricity generation licence obtained.

## **8. EPC Contracting Checklist**

Below is a checklist of basic requirements that a developer may wish to consider during the EPC contracting process.

Legal and Technical Advisors engaged to advise on form of contract.

Scope of work drafted to include all engineering, procurement, construction, commissioning and testing tasks.

Proposed contractor able to provide security by way of performance bond or parent company guarantee. Security to remain in place until Final Acceptance (FA) is achieved.

Payment milestone profile drafted to be suitably protective; milestone amounts sized to accurately reflect works completed with sufficient funds held back until plant is taken over.

Contractor provides a defects warranty period of at least two years commencing on the date of provisional acceptance.

Defined terms, such as 'commissioning,' 'work completion,' 'provisional acceptance' and 'final acceptance' are clear and measurable.

Contract contains provision for PR testing at two to three stages during the contractor's warranty period.

Performance ratio (PR) test prior to provisional acceptance should be conducted over a period of at least five days.

Repeat PR tests at IAC and FAC to be over full 12-month periods.

Contract contains provision for obtaining LDs in event of delay or plant underperformance.

LDs sized to be a genuine pre-estimate of losses likely to be incurred.

## 9. Solar PV Project Interfaces

Item	Element	Organisations	Interface / Comments
1	Consents/Permits	<ul style="list-style-type: none"> <li>• All contractors</li> <li>• Landowner</li> <li>• Planning authority</li> </ul>	Monitoring of compliance with all consent conditions and permits.
2	Civil Works	<ul style="list-style-type: none"> <li>• Civil contractor</li> <li>• Mounting or tracking system supplier</li> <li>• Central inverter supplier</li> <li>• Electrical contractor</li> <li>• Grid connection contractor</li> <li>• Security contractor</li> <li>• Installation/crane contractor</li> </ul>	Site clearance. Layout and requirements for foundations, plinths, hardstandings, cable trenches, earthing, ducts, roads and access tracks.
3	Security	<ul style="list-style-type: none"> <li>• Civil contractor</li> <li>• Electrical contractor</li> <li>• Security contractor</li> <li>• Communications contractor</li> </ul>	Layout of the security system, including power cabling and communications to the central monitoring system.
4	Module Mounting or Tracking	<ul style="list-style-type: none"> <li>• Mounting or Tracking system supplier</li> </ul>	Foundations for the mounting or tracking system,
5	System	<ul style="list-style-type: none"> <li>• Civil contractor</li> <li>• Module supplier</li> <li>• Electrical contractor</li> </ul>	suitability for the module type and electrical connections, and security of the modules. Earthing and protection of the mounting or tracking system.
6	Inverter	<ul style="list-style-type: none"> <li>• Civil contractor (for central inverters)</li> <li>• Mounting system supplier (for string inverters)</li> <li>• Module supplier</li> <li>• Inverter supplier</li> <li>• Electrical contractor</li> <li>• Grid network operator</li> <li>• Communications contractor</li> </ul>	Foundations for larger central inverters, or suitability for the mounting system. Suitability of the module string design for the inverter. Interface with the communications for remote monitoring and input into the SCADA system. Many grid requirements or constraints can be managed within the design.
7	AC/DC and Communications	<ul style="list-style-type: none"> <li>• Electrical contractor</li> </ul>	Liaison with regard to cable redundancy, routes, sizes,
8	Cabling	<ul style="list-style-type: none"> <li>• Civil contractor</li> <li>• Communications contractor</li> <li>• Security contractor</li> <li>• Power purchase (off-taker) company</li> <li>• Grid network operator</li> </ul>	weights, attachments and strain relief requirements. Liaison with regards to the signalling requirements within the site and to be provided to external parties throughout operation.
9	Grid Interface	<ul style="list-style-type: none"> <li>• Civil contractor</li> <li>• Electrical contractor</li> <li>• Inverter supplier</li> <li>• Network operator</li> </ul>	Liaison with regard to required layout of building equipment and interface with site cabling installed by the site contractor. More interface outside the site boundary for the grid connection cable/line to the network operator's facilities.
10	Communications	<ul style="list-style-type: none"> <li>• Electrical contractor</li> <li>• Security contractor</li> <li>• Communications Contractor</li> </ul>	Interface between the security system, inverter system, central monitoring (SCADA), the monitoring company, and the owner or

	<ul style="list-style-type: none"> <li>• Owner and commercial operator</li> </ul>	commercial operator of the PV plant.
11 Commissioning	<ul style="list-style-type: none"> <li>• All contractors</li> </ul>	Commissioning of all systems will have several interface issues particularly if problems are encountered.

## 10. Construction Phase Checklist

Provided below is a checklist of basic required procedures in addition to a list of recommended actions. It is intended to assist solar PV power plant developers during the construction phase of a PV project.

### Required

- Contract, fully signed and reviewed by technical advisor covering all interfaces.
- Design documentation completed.
- Detailed programme of works completed.
- Quality plan completed.
- Health and safety plan completed.
- Monthly reporting in place.
- All consenting, permitting and financing requirements in place.
- Commissioning and testing plan agreed to by all parties, detailing requirements and any tests needing witnesses or sign-off.

### Recommended

- Interface matrix drawn up.
- Deliverables schedule prepared for all documentation.
- Weekly look-ahead programme in place.
- Risk register detailing all potential risks and any mitigation measures in place.
- Environmental plan completed.
- Monthly report structure completed.
- Matrix detailing the requirements and due dates prepared.

## 11. O&M Contracting Checklist

The checklist below sets out the basic requirements for the drafting of a strong solar PV power plant O&M contract.

- Legal and technical advisors engaged to advise on form of contract.
- The O&M contractor is suitably experienced on a similar scale plant and familiar with the technology.
- Performance guarantees included to allow owner to claim liquidated damages (LDs) in the event of low availability or PR.
- Payments are made to the contractor in arrears to allow for deduction of any LDs over the corresponding period.
- LDs sized to be a genuine pre-estimate of losses likely to be incurred.
- Rules for spare parts management are clearly defined.
- Contractor is responsible for replenishing stock and ensuring original level is maintained.
- Rules for subcontracting clearly defined to ensure principal contractor is fully responsible for all

sub-contractor works.

The O&M contract requires the contractor to maintain all equipment in line with manufacturer guidelines (to ensure that all equipment warranties remain valid).

Preventative maintenance regime defined in contract is comprehensive, helping to minimize the need for corrective maintenance.

## **12. Leveraging Financial Incentives Checklist**

The checklist below identifies key considerations for developers seeking to access support mechanisms for solar PV projects in any market.

Review structure of electricity market, dynamics of energy pricing, and potential for near-term changes in market prices.

Review energy generation regulations, including specific policies for renewables and evidence of application in current market.

Identify specific support mechanisms for utility-scale solar PV power projects, evidence of their utilization and government adherence to terms in the current market, as well as project qualification criteria, application cut-off dates, and other potential risks.

Understand the grid regulatory regime, including integration of regulatory and approval processes for new generation projects using renewables, specifically solar PV power projects.

Develop a PPA model based on best understanding of viable public incentives.

Mitigate policy risks by considering project economics without incentives, which may include hedging on marketbased instruments and/or political risk insurance.

## **13. Solar-Specific Power Purchase Agreement (PPA) Checklist**

The checklist below sets out some of the basic requirements that are specific to solar PV for drafting of a PPA.

PPA terms specify the expected installed capacity of the solar PV project (in MW) and the predicted annual electricity production in MWh.

PPA includes “take-or-pay” provision, or otherwise specifies volume of power to be transacted and penalties for failure to deliver.

PPA term meets or exceeds the term of debt repayment.

Conditions to commencement agreed with off-taker.

Metering arrangements in place that align with national code, including for installation and ownership.

Terms of loan agreement, grid connection agreement, EPC contract, and O&M contract are aligned with the terms of PPA.

Obligations for grid code compliance included in PPA.

PPA outlines clearly how curtailment will be addressed, including how liquidated damages will be calculated.

Assignment and step-in rights established.

PPA defines limits of liabilities, early termination events, and methods to calculate termination payments.

## **14. Steps to Securing Project Finance Checklist**

The checklist below sets out basic steps that developers and owners must complete if they are seeking project finance for solar PV projects.

Seek equity funding (if required).

Develop project to the point where it is ready for debt finance.

Prepare due diligence documentation.

Mitigate risks to reduce debt interest rates.

Work with investors and lenders to achieve financial close.

### **15. Financial Modelling Requirements/Procedures Checklist**

The checklist below is for developers, and sets out basic financial modelling requirements and procedures that investors in solar PV projects typically expect.

Independently verify key assumptions in the financial model, including EPC and O&M costs, energy yield, off-take pricing, and terms of financing.

Prepare financial model covering full lifecycle of the project.

Include stress tested results and scenario analysis for debt service for potential lenders and equity investors.

Clearly present cash flow analysis and relevant indicators, such as IRR, DSCR, CFADS, LLCR, MRA calculations, etc.

Provide a sensitivity analysis for key inputs on capex, opex, and financing costs.