



Government of India
Ministry of New and Renewable Energy

A large, stylized background graphic of a solar panel array, consisting of a grid of rectangular cells with a central cross in each cell, rendered in a light gray, wireframe style.

DUE DILIGENCE GUIDELINES FOR PROJECT EVALUATION / APPROVAL

Prepared for

MNRE-GEF-UNIDO Project

'Promoting Business Models for Increasing Penetration and Scaling Up of Solar Energy'

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I. Introduction

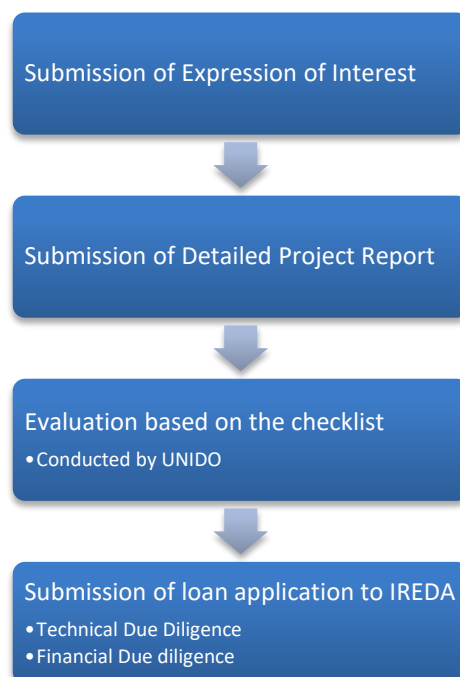
The United Nations Industrial Development Organization (UNIDO) in association with the Ministry of New and Renewable Energy (MNRE), Government of India is implementing the project titled “Promoting Business Models for Increasing Penetration and Scaling up of Solar Thermal Energy” in India. The project is designed to complement MNRE’s programme on Concentrated Solar Thermal (CST) through innovative financial and technical support aimed at removing barriers associated with the technology, its awareness, capacity building, market and finance barriers.

Different concentrating solar technologies have been developed or are currently employed for various commercial and industrial applications for heating, cooling and tri-generation. Applications of solar heat at such medium and high temperatures would be considered in the selected industrial sectors.

To support commercialization of solar technologies, the project will facilitate the installation of Concentrating Solar Collector systems for use in heating and cooling applications in the industrial process applications through demonstration and replication projects. For this purpose, a soft-loan scheme has been launched jointly with Indian Renewable Energy Development Agency and Ministry of New and Renewable Energy (MNRE).

The loan scheme developed under the framework of this project focuses on promotion of CST system for process heating and cooling applications in selected industrial sectors to reduce greenhouse gas (CHG) emissions. CST equipment manufacturing and other CST ancillary activities may also be supported under this scheme. The Loan scheme aims to provide upfront financial assistance to beneficiaries to overcome the financial constraints faced in the adoption and penetration of CST technologies. Under this scheme, financial assistance is available for up to 75 % of the CST project costs. More details of the soft loan scheme of UNIDO can be seen at

The due diligence process has been established to assess the suitability of the potential projects in terms of their technical and financial viability and involves the following steps. Each step would involve a close hand holding support offered by UNIDO:-



The above mentioned due diligence process has been created to ensure that project assessment and evaluation leads to selection of demonstration projects.

Step 1. Submission of Expression of Interest (EOI)

This serves as the first step for the project due diligence. The EOI is to be submitted by the beneficiary to UNIDO indicating interest in adoption of CST technology in their facility to meet the heating/ cooling needs of the process/ facility. The EOI will help the project to determine the initial assessment of the beneficiary towards integration of CST in their facility.

Selection Criteria:

- a. Size of the project – *while there is no maximum or minimum size of the project. Projects should be a minimum of 300 square meter to be eligible for the soft loan.*
- b. Temperature required in the process - *the CST technologies can be applicable for temperature ranges in between 80 – 300 degree Celsius.*
- c. Space available – *the available space in the industrial facility to install a CST system*

Step 2. Submission of Detailed Project Report (DPR)

This preparation of the DPR would be conducted by UNIDO and is an important part to provide practical standardized procedures for identifying the viability of potential projects, determining the optimal project specific parameters and managing environmental impacts associated with investments in CST technologies. This task will include stakeholder consultation and benchmarking of due diligence procedures for CST projects in India. The guidelines will include guidance on the technical, financial and operational aspects of potential projects.

Selection Criteria:

- a. Payback period of the project – *the payback depends on the cost of the fuel substituted and the technology selected for installation.*
- b. Project financials – *total cost of the project*
- c. Approved size of the project by beneficiary – *final size of the project as approved by the beneficiary.*
- d. Suitability of selected CST technology to the process requirement of industry

Step 3. Evaluation based on the checklist

A complete checklist to ensure all major information has been collected from the beneficiary. For beneficiaries willing to proceed with the project on their own equity, this would be the final step of the due diligence of the project. UNIDO will facilitate connecting the beneficiary with the respective state nodal agencies and preparation of tender documents for selection of the manufacturers/ channel partners.

Beneficiaries interested in the loan facility which allows financing options for 75 % of the project cost at the start of the project would proceed with the next step.

Step 4. Submission of loan application to IREDA

This step would be conducted jointly by IREDA and UNIDO. This would include both technical and financial due diligence of the beneficiary. Upon the financial and technical due diligence the projects might be forwarded for sanctioning and approval of central financial assistance from MNRE.

Beneficiaries would be regularly informed of the required documents during the process. However a general summary of the documents needed are provided on Page No. 23.

The templates for each of the abovementioned steps are provided in this report and include:-

- 1) Template for Expression of Interest (EOI).
- 2) Template for Detailed Project Reports (DPR)
- 3) Checklist for submission of project. This step just confirms the information collected in the previous two steps.
- 4) As a part of the Loan application - Template for Technical due diligence and Financial due diligence & list of documents needed.

II. Template for Expression of Interest/ Feasibility

The industry/unit is requested to provide the information required in the Expression of Interest (EOI) format below.

EOI Information Template		
1.	Name of establishment with complete postal address, telephone/Mobile, fax number and e-mail address for correspondence purpose	
2.	Type of Industry	
3.	Application for which CST technologies are being considered – provide brief description of the process and the related energy flow arrangement	<i>Example: Cooling, heating, process heat, distillation, etc.</i>
4.	Present arrangement for meeting that energy requirement in the application mentioned under “2”	<i>Example: (Boiler/LPG or PNG burners/any other)</i>
5.	Type of fuel currently in use	<i>Example: FO, HSD, Coal, diesel, LPG, Propane</i>
6.	Current fuel consumption per year (in standard energy units like tons of oil equivalent)	
7.	Energy related parameter:	
7(i)	Load Requirement:	
	<ul style="list-style-type: none"> - Steam application (Process description): - Requirement of steam (kg/day) or hot water (ltr/day) - Pressure (bar) : - Temperature (°C) : - Condensate temperature (°C), if any: 	
7(ii)	Steam Boiler :	
	<ul style="list-style-type: none"> - Type (Coal, Diesel etc.) - Total Capacity/ flow rate (TPH) - Operation hours (hrs./day) - Working cycle (e.g. 10am - 1 pm, 2pm – 5 pm) - Operation in day & year - Boiler output graph - Seasonal Variation - Fuel Consumption (Ltr/day) - Rate of fuel (Rs/Ltr) 	
7(iii)	Feed water Tank:	
	<ul style="list-style-type: none"> - Capacity (m³) - Feed water temperature (°C) - Feed water heating scheme - Feed water heating fuel rate (Rs/unit) 	

8.	Space required for installation of solar system, and whether the shadow free space (land or roof area) – state the tentative identification of space for CST technology installation	<p><i>This section will include the following:</i></p> <ul style="list-style-type: none"> • <i>Free space available during 9 AM to 4 PM for installation of solar system</i> • <i>Space available on terrace or ground</i>
9.	Interest in availing loan from IREDA at subsidized interest rate under UNIDO scheme	YES/NO
10.	<p>Any other commitments from the industry, including earmarking of capital (typical commitments to include the following):</p> <ul style="list-style-type: none"> ▶ We will bear the remaining cost apart from the MNRE support as per details given above. ▶ We will not dismantle the system at any stage without prior written permission of MNRE. ▶ We will regularly use and properly maintain the system and submit quarterly performance report for a minimum period of one year from the date of installation through implementing agency. ▶ We will take Annual Maintenance contract for a period of at least 5 years after completion of the warranty period from manufacturers and get our staff trained for successful functioning of the systems after the completion of the Annual Maintenance period. 	

Date:

Signature

Complete designation, address and seal:

.....
.....
.....
.....

Tel. ; Fax Mobile

Email

Website.....

III. Template for Detailed Project Report (DPR)

This format elaborates on the templates of DPR that may be used by industrial enterprises for submission of their concentrating solar thermal (CST) project applications to the Ministry of New and Renewable Energy, India or Indian Renewable Energy Development Agency (IREDA). The information provided in the DPR will play a critical role in the selection of appropriate CST technology and its optimization for the proposed demonstration project (please also see the format for Expression of Interest which has to be submitted to UNIDO prior to preparation of a DPR).

The industries shortlisted from the Expression of Interest stage (EoI) stage will have to prepare and submit a Detailed Project Report (DPR). The DPR will comprise of the following sections.

1. Introduction
2. Energy Demand
3. Concentrated Solar Thermal Technology Solution
4. Detailed Technical and Financial feasibility of the application
5. Plant Operation and Maintenance
6. Project scheduling and implementation
7. Supply chain options
8. Construction requirement
9. Risks and benefits

The information furnished in the above section will facilitate our reviewers to finalize and shortlist industries that will be responsible for carrying out the demonstration projects. Funds will be allocated to the respective industries based on the above assessment.

1) Introduction

This section will help the reviewer in accessing all the relevant details that will be required to assess the necessary background details, current financial position of the company, market penetrability of the company's products, type of operations and how suitable these operations are to concentrated solar heating/thermal technology.

This section will include the following sub-headings:

GENERAL INFORMATION ABOUT THE COMPANY	
1.1. Name of Company	
1.2. Sector of the Company	
1.3. Address of Registered Office	
1.4. Contact Details	Website: Telephone : Email: Fax:
1.5. Contact Details of Chief Executive	Name: Designation : Telephone: Email: Fax:
1.6. Company Profile	<i>Provide a brief overview of company's history and existing operations (within 500 words)</i>
1.7. List of Products	

FINANCIAL INFORMATION ABOUT THE COMPANY		
1.8. Financial Performance of the Company over the last three years		
	Year 2	Year 3
a) Equity		
b) Reserve and Surplus		
c) Net Worth		
d) Sales Turnover		
e) PBDT		
f) Net Profit		
g) Loan (Term Loan)		
h) Fixed Asset		
i) Dividend (%)		
j) Debt-Equity Ratio		
k) Capital Employed		
<i>Credit rating from CRISIL/ CARE, if any</i>		

Separate application to be used for loan under a special UNIDO/IREDA scheme.

2) Energy Demand

This section will give a detailed overview of the energy demand and generation of the industry. Our reviewers on reviewing this section will have a clear portrayal of the complete energy profile of the industry. This section will comprise of the month wise steam and heat generation profile, hourly heat/steam generation profile and cost of steam and heat generation. On reviewing the above parameters, the reviewers can assess the impact that concentrated solar heat/thermal installations can generate in that particular industry.

2.1. Thermal/ Electrical Energy Demand

This section will include an introduction of the energy requirement of various processes and the subsections will show case the following seasonal and daily variation of thermal and electrical energy requirements of the plant and the cost of generating the same.

This section will help the reviewer to understand the overall energy requirement and heat requirement of the industry

2.1.1 Month wise steam/heat generation profile

This section will include the month wise steam and heat generation profile of the operations. The below table illustrates the month wise steam/heat generation profile. A graphical representation of the same can also be provided.

Figure 1: Month wise steam/heat generation profile

Months:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat/steam generation profile (kCal/day)												

This section will portray a monthly and yearly overview of the typical energy profile of the industry

2.1.2 Hourly steam/heat generation profile of a typical day

The below table illustrates the hourly steam/heat generation profile. A graphical representation of the same can also be provided.

Figure 2: Hourly steam/heat generation profile of a typical day

Time of the Day (hour)												
Heat/steam generation profile(kCal/hr)	xxx	xxx	xxx	xxx	xxx	xxx	xxx	Xxx	xxx	xxx	xxx	xxx

This subsection will help the reviewer to assess the energy requirement of the industry on a typical day.

2.1.3 Month wise electrical energy requirement from conventional sources

On reviewing this section, our reviewer will get an overview of the industry's monthly electricity consumption generated from conventional sources by the processes

2.1.4 Boiler

Type	Capacity	Temperature range	Pressure range	Operating pressure	Fuel	Operational hour	No of operating days in a year

In addition to above, Industry may provide boiler output graph.

2.1.5 Cost of steam/heat generation

This section will include an estimate of the heat/steam generation cost for existing facility are calculated on actual. This section will help our reviewer to understand the current cost that the industry is bearing behind conventional sources of fuel like coal, diesel, LPG

3) Concentrated Solar Thermal (CST) Technology Solution

This section will include site assessment, identification and listing of appropriate concentrated solar heating/thermal technologies options and a detailed technical and financial feasibility report.

On reviewing this section our reviewers will be in a position to assess the feasibility and the of the demonstration project.

3.1. Site Assessment

This section will include a detailed assessment of the industrial site where the demonstration projects are proposed to launch. This section will include the following sections.

On assessment of this section, our reviewers will have a clear insight about the spatial and climatic conditions/variations of the concerned industrial zone. This section will also enlist the concentrated solar technology options that the industry will propose.

3.1.1 Area available for Solar System:

Selection of area for installation of solar applications is presented here in discussion with the plant management. The criteria for selection of the site are:-

- ▶ *Free of shadow area*
- ▶ *No future expansion plans in that area*
- ▶ *Minimal distance from the usage point*
- ▶ *Ability to sustain structural load*
- ▶ *Convenience to the management.*

Area calculation should be provided here. If possible photographs and images should be provided out here.

The area available will help the reviewers to assess the scale and the amount of heat that can be generated through Concentrated Solar Heating/Thermal applications

Project location and Site description

- ▶ Brief description of project area/region, type of project lands
- ▶ Placement of solar power plant
- ▶ Site Parameters
- ▶ Obstacles/Shadow
- ▶ Approach road to site/ connectivity by road
- ▶ Air (Pollution/corrosion)
- ▶ Levelling degree
- ▶ Soil test report
- ▶ Availability of water
- ▶ Quality of water

3.1.2 Solar Resource Assessment

Ambient temperature profile: The ambient temperature profile can be taken from meteorological websites and other similar sources. The below table illustrates the month wise maximum and minimum ambient temperature profile of the region. A graphical representation of the same can also be provided.

Figure 3: month wise maximum and minimum ambient temperature profile

Months:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (Av. Min.) °C												
Temperature (Av. max.) °C												

Solar Radiation Profile: Data of monthly avg. solar radiation is taken from solar maps and reported here as per sample format below. The below tables illustrates the monthly average DNI and GHI of the region. A graphical representation of the same can also be provided.

Figure 4: Monthly average DNI and GHI of the region

Months:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Av. DNI (Direct Normal Irradiance) kWh/m ²												
Global Horizontal Irradiation (GHI) kWh/m ²												

The data furnished in this section will project the climatic profile of the region where the industry is located. Based on the climatic profile the reviewers will be able to assess the implementation and operational barriers that the demonstration project might face.

3.1.3 Identification of feasible CST technologies intervention

In this section the industry will identify the Concentrated Solar heating/thermal application that is desired to meet the energy demand discussed in section 2

3.1.4 Concentrated Solar Heating/thermal technology selection flowchart

Detailed process integration with P&I diagram methodologies for selection of Concentrated Solar Heating technology will be presented here.

This section will portray a clear picture of the mode and criterion for selection of the concentrated solar heating/thermal technology options.

3.1.5 List of Identified Applications

This section will include all the identified application.

- ▶ Option A
- ▶ Option B
- ▶ Option C

4) Detailed Technical and financial feasibility study of the applications

This section will give a detailed project scenario where both the technical and financial parameters can be assessed. Based on this section the reviewers will be in a position to select the industries where the demonstration projects will be carried out. Similarly, this study will form a basis to determine the amount of grant that will be allocated to the selected industry.

This section will include a detailed technical and financial feasibility study of all the concentrated solar heating/thermal options identified in the above sub section.

A format of the technical and financial feasibility study is illustrated below.

4.2.1. Option A

I. About the technology

This section will include a general introduction about the technology. Reasons for its selections can be highlighted in this section.

This section will help the reviewers understand the reason for selection of that particular technology.

II. Salient features

III. Technical Specification

The table below illustrates a sample technical feasibility report.

Figure 5: sample technical feasibility report.

Types of Technology	
Aperture Area	
Collector Area	
Receiver	
Reflector	
Tracking	
Clear (shadow free) area required for installation	
Heat/steam generation	
IBR certification	
Dead load	
Wind speed	

The above illustrative will give our reviewers a detailed overview of the suggested technology. The reviewers will also be able to assess the suitability of the selected technologies.

III. Proposed System

- System sizing calculation is provided here
- System Integration with existing system is to be provided here with PI diagram

On reviewing the above information the reviewers will be able to understand the technical adequacy of the process. The **system sizing calculation** and the **technical suitability for system integration** will play a vital role in assessing the feasibility of the demonstration project.

IV. System Performance

System performance will be highlighted here based on detailed analysis & simulation of the proposed system

- ▶ Performance (Basis of simulation and output determination)
 - Incidence angle modifier
 - Effective length
 - Solar field net/effective area
 - Efficiency's
 - Solar-weighted specular reflectivity (clean reflector)
 - HCE envelope transmittance
 - HCE tube absorbance
 - Bellows shading
 - Cleanliness factor
 - Optical efficiency

Thermal losses (receiver tube, piping, shadow, steam generator)

- ▶ *Power Potential studies & Simulation results*
 - Determined Energy generation and its basis of calculations
 - Description of performance prediction tool
 - Weather data used in Simulation
- ▶ *Technical input data performance Tool*
 - Mode of Performance measurement (energy meters, Thermal oil side, Steam side)
 - CST plant design and System Integration
 - Design of the solar field Foundation layout
- ▶ *Definition of position and angles (stow east, stow west, stow survival, mirror exchange and cleaning)*
- ▶ *Schematic diagram and brief description of each component*
- ▶ *Boiler specification and description (Arrangement, power Distribution, Scope of the steam side)*
 - Schematic P&ID Drawing
 - Quality and Safety

v. Financial Analysis

Financial Analysis will include the following

- Summary of financial parameters for the project option
- Sensitivity Analysis with respect to system performance of the project option

Summary of financial parameters for the project option

The summary of financial parameters will elaborate on the key estimated financial performance metrics for the project option. The following illustrates some of the indicative parameters:

- a) Project Internal Rate of Return (IRR):
- b) Average debt service coverage ratio (DSCR):
- c) Payback period:
- d) Break-even point:

Sensitivity Analysis with respect to system performance

The below table illustrate a sample sensitivity analysis report.

Figure 6: sample sensitivity analysis report.

Change in expected system performances	Pay back Perios (year)
5% less	As per calculation
10% less	As per calculation

15% less	As per calculation
20% less	As per calculation

The financial analysis will help the reviewer to understand the financial feasibility of the project. Selection of industries for allocation of grants will be based on the assessment of the financial feasibility report.

4.2.2 Option B

I. About the technology

Same as above

II. Technical Specification

Same as above

III. Proposed System

Same as above

IV. System Performance

Same as above

V. Financial Analysis

Same as above

4.3.3 Option C

I. About the technology

Same as above

II. Technical Specification

Same as above

III. Proposed System

Same as above

IV. System Performance

Same as above

V. Financial Analysis

Same as above

5) Plant Operation & Maintenance

The following subsections will be included in this section

5.1 Plant operation philosophy

This section will include mission, vision and guiding principles which are followed in the plant.

In this section the reviewer will gain a keen insight on the plant operation philosophy.

5.2 Basic structure of O&M team

Operational and Maintenance structure will be included in this section.

The reviewer will gain an insight on the basic structure of the O&M of the industry. This section will also include plant operation philosophy or guiding principles. This section will help the reviewer to assess the efficiency of the Operation and maintenance structure of the industry.

6) Project Scheduling and Implementation

The project scheduling and implementation section will have a detailed representation of the following subsections

5.1. *Project Schedule*

5.2. *Project Development Phases*

5.3. *Activity chart*

This section will help the reviewer to assess the structure of the project schedule, the development phases, time allocation for redressal of any constraints and the detailed time bound activity chart.

7) Supply Chain options

This section will include the list of possible suppliers of main components – Indian & Foreign. Company profile and contact details of the suppliers will be provided in this section

The reviewer will assess the reliability of the suppliers selected by the industry.

8) Construction Requirement

This section will include the Infrastructure facility requirements.

The reviewer will assess the infrastructural facility required for the installation of the project. This assessment will help the reviewer to understand the amount of funds and time the industry requires to launch the demonstration project.

9) Risks and Benefits

This section will conclude the DPR by highlighting the potential benefits and perceived risks from installation of the CST technology at the company. The following templates will be used to furnish the requisite information.

Benefits	Value
In terms of end-products	
Foreign Exchange Savings	
Import Substitution	
Direct Revenue in terms of excise duty & sales tax to National Exchequer	
Indirect revenue <ul style="list-style-type: none"> • Effect on per capita in the region • Creation of Ancillary Industries 	
Any Other (Specify)	

EMPLOYMENT GENERATION			
#	Category	Direct	Indirect
1.	Managerial & Supervisory		
2.	Skilled		
3.	Semi-skilled		
4.	Unskilled		
5.	Others (please specify)		

PERCEIVED RISKS
<p><i>Please indicate list of risk factors in the project as perceived by the applicant as Project Promoter and mitigation measures proposed to be undertaken.</i></p>

List of:

- Annexures

- Abbreviations
- Figures
- Tables

IV. CST technical and financial evaluation checklist

The project feasibility is evaluated against the parameters mentioned in the checklist below.

<i>CONCENTRATED SOLAR THERMAL EVALUATION CHECKLIST</i>			
1. GENERAL INFORMATION ABOUT THE COMPANY			
1.1	Name of the company		Comments
1.2	Sector		
1.3	Company profile (History of operations)		
1.4	Products		
Financial performance of the company (over three years)		Satisfactory	Unsatisfactory
1.5	Net profit		
	Debt-Equity Ratio		
	Capital employed		
1.6	Credit rating, if any		
2. ENERGY DEMAND AND OTHER DETAILS			
2.1	Cost of heat/ steam generation	Specify	
2.2	Source of steam/heat	Specify	
3. STRUCTURE AND SAFETY CONSIDERATIONS			
3.1	Space for installation (Sq.m)	Specify	
3.2	Floor slab type (from NBC guidelines)		
3.3	Roof slab type (from NBC guidelines)		
3.4	Buffer space for future solar installations		
3.5	Building code compliance documentation submitted		
3.6	Shade study documentation, if any		
4. DETAILED TECHNICAL FEASIBILITY			
4.1	CST Technology selected	Specify technology	
4.2	Applications (heating/cooling)		
	Aperture area		
	Collector area		
	Automated tracking		
	Heat/steam generation		
4.3	IBR Certification (after inspection)	Received	Not received
System performance		Satisfactory	Unsatisfactory
4.4	Net solar effective area		
	Reflectivity		
	HCE envelope transmittance		

	HCE tube absorbance		
	Optical efficiency		
	Thermal losses		
4.5	Total energy generation capacity		
4.6	Boiler quality and safety	Status specify	
5. FINANCIAL FEASIBILITY			
Financial parameters		Feasible	Not feasible
5.1	Project IRR		
	Average Debt Service Coverage Ratio (DSCR)		
	Payback period		
Sensitivity analysis			
5.2	Sensitivity analysis report	Status	
6. PROJECT SCHEDULING			
6.1	Project timeline report	Status	
6.2	Development phases (break-up)	Specify number	
7. CONSTRUCTION REQUIREMENT			
7.1	Construction timeline		
7.2	Construction costs		
8. BENEFITS OF THE PROJECT			
8.2	FOREX savings	Satisfactory	Unsatisfactory
8.3	Effect on per capita in the region	Positive	Negative
8.4	Employment generation		
	<i>Direct</i>	Specify	
	<i>Indirect</i>	Specify	
8.5	Perceived risks, if any, and mitigation measures	Documented	Not documented
9. INNOVATION			
9.1	Effort (INR) spent on concept development		
9.2	Are there new learning arising from the project and what are its implications for future directions?		
9.3	How much have the users reduced their cost due to use of your technology?		

V. Template of the Loan Application form

1.0 GENERAL

1.1 Proposed Installed thermal Capacity :
of the CST Project

1.2 Proposed location of the Project :
Village :
Taluk :
District :
State :
Telephone/Fax

1.3 Accessibility to proposed location of the Project

Particulars	Name	Distance from Project Site (km)
Nearest Tehsil/Block HQ		
Nearest Road Head		
Nearest Railway Station		
Nearest Airport		
Nearest Grid/Substation		

1.4 Special Category if any – Location based (Tick as applicable)

NE States & Sikkim	Islands & Estuaries	Hilly Area	Jammu & Kashmir	Deserts	Newly formed states	Not applicable

1.5 Details of proposed Project Land (Please tick appropriate)

1.5.1 Land Nature

Particular	Area	Acquired (Likely date of acquiring in case it is to acquired)	Whether land is Mortgageable (yes/no)
Govt. land			
Pvt. Land			
Forest land			
Other Specify			
Total			

(In case Govt. Land is not mortgageable, please enclose letter from the concerned Govt. Authority)

1.5.2 Land Status:

- a) Nature of the Land
 - Urban /rural/Industrial/Agricultural :
- b) Land area
 - Required/obtained :
- c) Owner of the land as the title of the land :
- d) Whether the land has been purchased or on long term lease (minimum of 20 years) or allotted by the State Government?
- e) Whether all legal clearances obtained for possession of land and its use for setting up a Solar Thermal Plant?
- f) Actual date of possession of land
- g) Access to the site
 - Railhead
 - Road

2.0 TECHNICAL

2.A SOLAR Thermal Off Grid Project

Meteorological parameters for the site:

2.A1 (Full details and source of data to be provided in DPR)

- Height above sea level
- Solar Radiation data
- Temperature data
- Wind data

2.A2 **Type of Solar Thermal Collector:**

(Please mention the technology used to make thermal collectors)

Whether Indian/International certification obtained for Solar Collectors
(Please enclose recent copy of certificate)

2.A3 **Technical Details of Concentrating Solar Thermal Collector:**

- Technical specification Solar Collector as per data sheet
- CST Collector output (thermal units)
- Dimensions of a single collector
- Total no. of collectors to be used
- Total CST system capacity

- Details of series/parallel combinations
- Point of Integration of thermal output of CST System:
- Boiler specifications (capacity, make etc.)

2.A4 **Details of mounting arrangement:**

- Proposed tilt angle
- Tracking arrangements with a detailed description of Tracking
- Estimated power losses at various stages and system design details
-

2.A5 **Details of monitoring and data:**

Logging instruments to be installed at the project site

(Please give item wise details)

Provide description of System measuring steam in kg/ hour or tonne/ hour along with temperature and pressure

2.A6 Any other salient features of the Off grid CST system:

2.A7 Whether the project will be implemented directly or through other agency (please provide details)

2.A8 Details of existing energy / steam generating facility

Existing Fuel

Total capacity

Cost per Kg of steam or KWh of

3.0 Procurement Procedure:

3.1 Details of Procurement Procedure followed : Single Quotation RFQ Procedure
 Limited Tender Published Tender
 Any Other

3.2 Detailed Quotation Evaluation Report : Enclosed/ Not enclosed

3.3 Note on procurement with justification for choosing the supplier and item-wise project cost : Enclosed/ Not enclosed

3.4 Mode of implementation of the Project

4.0 COMMERCIAL

4.1 Proposed Project cost Estimates:

Particulars	unit cost (Rs. in lakhs)	Total Amount (Rs. in lakhs)	Reference of purchase orders & invoices
a) Land (acres)			
b) Site Development			
c) Equipment <ul style="list-style-type: none"> • CST Collectors and accessories • Receiver • Steam/ Water storage tanks • Heat Exchangers • Piping • Pumps • Transportation • Installation, testing & commissioning • Civil works for foundation • Any other (please specify) 			
d) Other Civil Works not included in the cost of Plant & machinery (Please specify)			
e) Other Electrical / thermal / mechanical items not included at in the cost of Plant & machinery (Please specify)			
f) Charges payable to State nodal agencies, if any and not included in the cost of Plant & machinery			
g) Statutory expenses service Tax etc., if any and not included in the cost of Plant & machinery			
h) Preliminary & Pre-operative expenses <ul style="list-style-type: none"> • Registration & Front-ends fee • Stamp duty • Any other (Please specify) 			
i) Margin Money for Bank Guarantee/Fixed Deposit Receipt (FDR)			
j) Others, if any (please Specify)			

Total Project Cost			
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Copies of Purchase Orders & Invoices if raised enclosed (Invoices are required to be submitted along with the Loan Application for already commissioned projects)	
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4.2 PROPOSED MEANS OF FINANCING	
	AMOUNT (RS. IN LACS)
PARTICULARS	
A) Promoter's contribution	
Equity Share Capital	
Internal Accruals	
Unsecured Loan from Promoters, friends, relatives & their associates	
Others, if any – specify	
SUB TOTAL (A)	
B) Term Loan Proposed	
From IREDA	
From Others (FI/Bank)	
*Subsidy, if any	
Sub Total (B)	
Total Project Cost (A+B)	

* (Capital subsidy if available will reduce IREDA's loan)

4.3 Status of S.RC approved EPA (Energy Purchase Agreement) in case of sale to SEB / Third party

- a) Date of signing : _____
- b) Period of EPA (Energy Purchase : Agreement) : _____
- c) Tariff Rate : _____
- d) Rate of Escalation : _____
- e) Discount/ penalty clause : _____

4.4 In case of Captive Consumption

- a) Connected Power (MW) OR Steam Generation Capacity (Tonnes/hour) : _____ Current
- b) Annual steam / thermal energy consumption (Average) : _____

- c) Copies of Electricity Bills for last 12 months and Summary : Yes/ No
(If not enclosed, please indicate reasons)

OR

Detailed Fuel Cost Analysis (For last 3 years)

4.5

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4.6 Implementation Period:

4.7 Assumptions taken for Performance Indicators :

- a) Installed Capacity (MW) or MW_{th} :
- b) Rate of Interest for proposed loan from IREDA :
- c) Repayment period :
- d) Grace Period :
- e) Direct Normal Irradiation (DNI) : Kwh/day or KW_{th}
- f) Average Solar day days/year
- g) Annual O & M Charges :
- h) Annual escalation of O & M Charges :
- i) Electricity consumption of the CST system per annum
- j) Any other (Please Specify) :

4.8 Performance Indicators

- a) IRR (Financial) :
- b) DSCR (Average) :
- c) Pay Back Period :

5.0 ENVIRONMENTAL IMPACT:

5.1	Provide details of environmental benefits expected by putting up Off Grid CST System	

5.2 ANY OTHER SECTOR SPECIFIC INFORMATION:

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5.3 SECTOR SPECIFIC APPROVALS

S. No.	Documents/Papers	Enclosed (PI indicate Annexure No.)	Remarks
I	Indian Boiler Regulations (IBR) certificate, if applicable		
II	Copy of Sale/Lease Deed		
III	Copy of site map		
IV	Copy of Connectivity Diagram		
VI	Note on Procurement justifying selection of particular supplier		
VII	Copies of Quotation/Purchase Orders and Invoices		
VIII	Copies of Invoices along with the Money receipts from the suppliers		
IX	Detailed cash-flow statements if the same are not annexed with the DPR		
X	Other Clearances (Please Specify)		

CHECKLIST OF DOCUMENTS REQUIRED

1	IREDA Loan Application Forms
2	Application Registration Fee (non-refundable)
3	Certified true copy of Memorandum & Articles of Association, Certificate of Incorporation and Commencement of Business of applicant
4	Board Resolution to undertake project
5	Audited Annual reports for the past three years of the applicant company
6	Audited Annual reports of the promoter company(s)/ Guarantor company of applicant for last three years
7	Provisional Balance Sheet of the company/Promoter company(s), if last audited balance sheet is more than six months old
8	Authorised letter to bankers of applicant company to provide information to IREDA
9	Letter from their existing bank (s) / Financial institutions regarding status of loan accounts
10	Particulars of existing debentures & secured loans of applicant company
11	Letter authorizing dealing officer(s) & their attested specimen signatures
12	Proposed shareholding pattern of the applicant company certified by competent authority
13	Net worth certificate in respect of the applicant company/ Promoter Company & Guarantor duly certified by the Chartered Accountant
14	Copy of Income tax & wealth tax return in respect of applicant company/ promoter(s)/Guarantor(s) for last three years.
15	Project related documents
16	Detail Company profiles of applicant/holding/guarantor and core business activities
17	Pollution Control Board clearance (if applicable)
18	Finance and Sources of Finance for the project
19	Present shareholding pattern of applicant Company
20	KYC Documents of applicant company
21	Copy of PAN Card