CENTER FOR SOLAR ENERGY [CSE]

Overview, Strengths, Service, Key Projects & Clients

Brief Overview

- Catalyzing growth of solar power in India since 2006
- Objective is to facilitate holistic development of the solar energy sector in India
- In-house expertise and software for solar energy assessment and concept to commissioning support: pre-feasibility, feasibility, bankable detailed project report
- Documentation of global best practice in solar energy policy and technology deployment and assessment of suitability to India conditions
- Provide consultancy services, policy advisory, strategic market studies, training & capacity development, research studies
- Supporting corporates, PSUs, government agencies, international agencies and investors

CSE's Strengths

- Facilitated the development of 404 MW solar power projects
  - 275 MW of solar thermal (CSP) and 129 MW of solar photovoltaic (SPV)
- Carried out lender's engineer's work for more than 225 MW of solar power projects
- Carried out more than 10 advisory projects for techno-economic assessment, resource assessment, solar road map, incentive structure, model tariff and policy interventions
- Organized first widely recognized international conference on solar energy in India - Solar India Conference
- Carried out widely recognized study – Comparative Assessment of Crystalline And Thin Film PV Technologies in India

Services

- Core Consultancy
- Lender's Engineer
- Owner's Engineer
- Policy & Regulation Advisory
- Research & Market Studies
- Peer Review
- Training & Development

Core Consultancy - Services

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- Solar resource assessment and energy generation estimations using advance software and in-house expertise
- Site feasibility analysis
- Selection of appropriate technology and technology configuration
- Estimates of energy generation with supporting data & calculations
- Site specific solar power project typical layout
- Electrical single line diagram from DC block to power evacuation
- Project cost estimation, financial modeling, sensitivity analysis as per prevailing market condition

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- Preparation of enquiry/tender document for inviting quotes for planning, design, construction, development, operation and maintenance
- Evaluate offers from vendors on the basis of technical and financial criteria and participate in negotiation in selection of vendor and EPC contractor
- Preparation of Letter of Intent, Contract Agreement and work order
- Preparation of project implementation schedule
- Visits to the site for inspection during various construction stages of the project
- Technical assistance for performance guarantee test

Lender's Engineers - Services

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- Due Diligence (Pre Financial Closure) - Critical review of project system design and agreements:
  - Conceptual design, solar irradiation estimate, system design and arrangements, performance calculations
  - Infrastructure availability, construction schedule, adequacy of power evacuations and arrangements
  - Project cost breakup, drawdown schedule
  - PPA, turnkey /package / sub package contracts including non-EPC items for engineering, procurement, construction, startup
  - Permits, approvals, clearances, insurance
- Review and acceptance of disbursement schedule

Lender's Engineers - Services

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- Implementation (Post Financial Closure)
  - Monitoring of physical progress, identification of hurdles and suggestions
  - Scrutinizing of Efficiency Test Certificate
  - Issue drawdown certificates
  - Witness site performance and efficiency tests and to certify their compliance with the guaranteed parameters
  - Review of O&M plans

Lender's Engineers - Services

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- Post Commissioning
  - Issue Project Completion Certificate
  - Performance assessment report of the project till 2nd year of operation
  - Monitoring of punch list rectification and warranty defects
  - Monitoring of physical condition of solar plant at project site during operation on annual basis

Owner's Engineers - Services

- Core Consultancy
- Lender's Engineers
- **Owner's Engineers**
- Policy & Regulation Advisory
- Peer Review
- Research & Market Studies
- Training & Development

- Prepare detailed tender document for setting up solar power project
- Attend pre-bid meeting with bidders for providing clarifications to bidders and modifying the tender conditions
- Energy estimation and validation of the data proposed by the bidder
- Bid evaluation of the techno-commercial offers and provide recommendation for award of tender
- Assist developer in finalizing the site
- Finalizing the contract agreement between the successful bidder and developer
- Review DPR submitted by the successful bidder

Owner's Engineers - Services

- Core Consultancy
- Lender's Engineers
- **Owner's Engineers**
- Policy & Regulation Advisory
- Peer Review
- Research & Market Studies
- Training & Development

- Scrutiny of electromechanical, electrical machinery and equipment and clearance thereon for implementation
- Inspection of material and equipment during manufacturing and acceptance tests at vendor's site of various equipment and supply items
- Visit to site during construction stage for overall checks on implementation, construction, supervision, quality checks and suggestions for corrective measures
- Progress monitoring as per construction bar chart/PERT, follow up with vendors/suppliers and co-ordination with different agencies during execution, checking, measurements, billing and regulating contract payments

Policy & Regulation Advisory Areas

- Core Consultancy
- Lender's Engineers
- Owner's Engineers
- **Policy & Regulation Advisory**
- Peer Review
- Research & Market Studies
- Training & Development

- Advisory support to Ministries, state nodal agencies and other entities on:
  - Preparation of State Solar Plan and road-maps
  - Formulation of Central and State Solar level policies
  - Support regulators in finalizing solar tariff and Solar Purchase Obligations (SPO)
  - Creation of Green Energy Fund by imposing green cess through amendment in prevailing Acts
  - Strengthening and capacity building of State Nodal Agencies
- Support to developers and lenders on policy and regulatory issues and tariff fixation

Peer Review

- Core Consultancy
- Lender's Engineers
- Owner's Engineers
- Policy & Regulation Advisory
- **Peer Review**
- Research & Market Studies
- Training & Development

- Review of the reports prepared by other consultants to provide second opinion to

Developers	Investors
Financial Institutions	Banks

Research & Market Study Areas

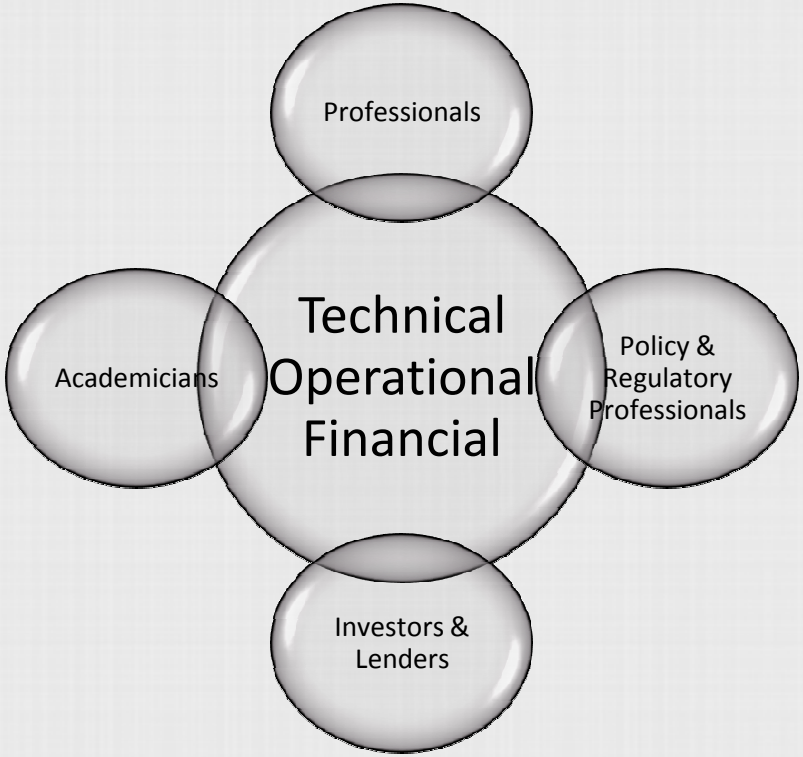
- Core Consultancy
- Lender's Engineers
- Owner's Engineers
- Policy & Regulation Advisory
- Peer Review
- **Research & Market Studies**
- Training & Development

- Conduct market studies and research report on:
  - Techno-economic assessment of various solar technologies
  - Medium and long term market size assessment
  - Market development strategy for various solar technologies
  - Technology due diligence for investors
  - Assistance in technology tie-ups

Training & Development

- Core Consultancy
- Lender's Engineers
- Owner's Engineers
- Policy & Regulation Advisory
- Peer Review
- Research & Market Studies
- Training & Development

- Short term and long term training programs in solar power for technicians, professionals, academicians, policy makers, regulators, investors and lenders



Past Key Projects - Lender's Engineer

- 100 MW solar thermal power plant in Rajasthan
  - Client: Power Finance Corporation Ltd.
  - Developer: DSPL
- 100 MW solar thermal power plant in Rajasthan
  - Client: Power Finance Corporation Ltd.
  - Developer: KEVPL
- 25 MW solar PV power project in Gujarat
  - Client: Power Finance Corporation Ltd.
  - Developer: Responsive

Past Key Projects - DPR

Project	Client
50 MW solar thermal power project at Morwada in Gujarat	NTPC Ltd.
50 MW Solar PV project in UAE	Deccan Water Treatment Plant
24 MW grid connected solar PV power plant at Mukhiguda in Odisha	Odisha Hydro Power Corporation Ltd.
10 MW Solar Farm in Gujarat	Suzlon Infrastructure Services Ltd.
5 MW solar PV power plant at West Champaran in Bihar	Beltron Telecommunication Ltd.

Past Key Projects - Feasibility Studies

Project	Client
25 MW solar thermal power plant at Singrauli & Rihand in Madhya Pradesh, India	NTPC Ltd.
5 MW solar power project at Sautada, Beed in Maharashtra, included preparation of DPR, financial model, EoI /tender document and analysis thereof for setting up of grid connected demonstration	Maharashtra Energy Development Agency
10 MW solar power project in Rajasthan	PDCORE Limited

Brief overview of Research Reports and Studies

- Techno-economic evaluation of solar power generation technologies for determination of model tariffs and other incentives in India
- Preparation of policy map for accelerated solar power development in India
- Technology & resource assessment and development of framework for grid interfaced solar power projects in Maharashtra, India
- Preparation of roadmap for solar energy development in Tamil Nadu and Karnataka
- Consultancy for 'Effective Implementation of GOs/Building by-laws in States Municipal Corporations for mandatory installation of solar water heating systems in functional for Southern & Western Regions of the country (India).'
- Market development of concentrated solar technologies (CSTs) for mass cooking, cooling and laundry applications in hospitals and hospitality sectors

Major Clients

NTPC

CII

Suzlon Energy Limited

MAHAGENCO

Power Finance Corporation

GVK

PDCOR Limited

Karnataka Renewable Energy Development Ltd

Odisha Hydro Power Corporation

SABR Control Pvt. Ltd

Deccan Water Treatment Pvt. Limited

Maharashtra Energy Development Agency (MEDA)

ABOUT WISE

Overview, Key Initiatives, Clients and Partners

Overview

- Promoting sustainable energy and sustainable development since 2004
- Have facilitated the development of more than 404 MW of solar and 260 MW of wind power projects
- Seven Centers of Excellence to cater to different needs of the sector

Center for Solar Energy

Center for Wind Power

Center for Renewable Regulation and Policy

Center for Climate and Sustainable Policy

Center for Training and Conference

Center for Coordination and Communications

WISE Press

Key Initiatives

- Draft model Renewable Energy Law for India and its advocacy
- Nation-wise research projects/papers on:
  - Achieving 15% Green Electricity by 2020
  - State-Level Action Plans for Clean Energy Technologies for Climate Mitigation for Rajasthan, Maharashtra and Karnataka
  - Comparative Public Cost of Conventional Electricity Generation in India
  - Future of Coal Electricity in India and Sustainable Alternatives
  - Comparative Evaluation of Incentives to RE-based Grid and Off-grid Systems and Evolving Normative Guidelines for Revised Incentives for Off-grid Systems
  - Human Resource Needs of the Renewable Energy Sector up-to 2015'
  - Transition to Clean Energy System Using Conventional Fuels As Bridge Technologies [Ongoing]

Key Initiatives

- Major public policy initiatives:
  - Introduction of Renewable Energy Certificates (REC)
  - Development of an innovative Solar Energy Policy for India
  - Preparation of long-term RE vision documents for various state governments
  - Research into repowering of old wind farms in India
- Sensitizing and training for media, financial institutions and academia
- Organizing international conferences and exhibitions:
  - Wind Power India: Largest biennial conference on wind power sector in India
  - Solar India: First ever widely organized conference on solar power in India in 2007
  - RE Regulation India: First ever conference on RE regulations in India conducted in 2010

Major InterNational Partners

Global Wind Energy Council

Sierra Club, USA

UN-ESCAP

GL-Garrad Hassan

Baker and Mackenzie, Australia

New Energy Foundation, Japan

UNDP

Major National Partners

Ministry of New and Renewable Energy

Greenpeace

Shakti Sustainable Energy Foundation

USAID, India

World Bank

ICF International

Indian Wind Energy Association

Maharashtra Energy Regulatory Commission

Gujarat Energy Regulatory Commission

Centre for Wind Energy Technology

IWTAM

Vasudha Foundation

WWF

UKFCO

Orissa Energy Regulatory Commission

Indian Wind Power Association

Steps Ahead

THANK YOU
FOR YOUR TIME

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