

RENEWABLE. SUSTAINABLE. AFFORDABLE.



EXCELSIORTM
ENGINEERING SOLUTIONS



Excelsior Engineering Solutions (EES) is a Design, Engineering & System Integration company which delivers comprehensive and cost effective turnkey solar solutions to the solar power industry.

Since its inception in 2014, EES has successfully serviced over 3000MW worth of ground mount and roof-top projects across 18 states in India having delivered services to several esteemed Solar EPC companies, IPP's, System Integrators along with industrial and commercial end customers.

EES provides complete Engineering & Design services – right from conception & front end engineering, through development and optimization concepts, complete construction packages, management during construction, commissioning of projects and performance evaluation.

EES's engineering team possesses the expertise to offer technical services for implementing an entire project or any specific area within electrical, mechanical, structural, civil or automation aspect of a solar power project.

Driven by passion for innovation and clean energy, EES is committed to implement industry's best practices and believes in adopting each project as an opportunity to achieve something exemplary. Be it large MW projects or smaller KW power plants - the promise to provide a quality experience to its clients is a commitment, irrespective of the task at hand.

SERVICES:

With a spectrum of services ranging from turnkey project implementation to specific solutions, Excelsior Engineering Solutions experience has enabled it to develop services that are unique to the solar industry.



Design & Engineering



Project Management Consultancy



Owner's Engineering



Lender's Engineering



Plant Audit



System Integration

Rooftop Projects



920kW, Mumbai
Owner's Engineering



5500kW, Kochi
Lender's Engineering



7x1100kW, Bengaluru
PMC



100kW, Mumbai
Owner's Engineering



2400kW, Silvassa
System Integration



75kW, Mumbai
System Integration



45kW, Daman
System Integration



10kW, Kharghar
System Integration

Ground Mount Projects



15MW, Afghanistan
PMC & Site Supervision



300MW, Rajasthan
Design Engineering



178MW, Vietnam
3rd Party Vetting



10MW, Karnataka
Plant Audit



73.5MW, Karnataka
Plant Audit



60MW, Maharashtra
Design Engineering



5.5MW, Rajasthan
Plant Audit



85MW, Gujrat
Design Engineering



DESIGN & ENGINEERING

Providing a broad & diverse spectrum of high quality design & engineering solutions right from conceptual design, to creating detailed construction drawings for all aspects of the project life cycle.



**Design & Build Energy
System for Years to Come**



Excelsior Engineering Solutions (EES) is one of the leading firms in the renewable energy field providing design and engineering services for solar power. Our thorough engineering process ensures that the plant is designed with the latest technology that delivers the highest level of performance while retaining economic feasibility.

Analyzing existing data from current installations and studying local weather patterns to maximize generation at a given site enables us to create a collective sustainable design vision for the project.

Performing technical analysis and software simulations using sophisticated, next-generation tools like PV Syst, Staad Pro, Solidworks and Autocad Electrical allows us to pinpoint any shortcomings at the design stage itself.

Be it developing the entire power plant from grass root level or a project specific requirement, EES can skillfully integrate itself to be the technical backbone of any solar design requirements. We provide comprehensive construction drawings that are used for integration of the system, bid applications as well as for approval from local authorities.

Our Design & Engineering Services Primarily Include:

- ◇ Generation Analysis : Examining the irradiance received at proposed site and develop site specific alternatives for optimal generation
- ◇ Technology Selection : Detailed statistical analysis and guidance on the technology to be used, while verifying the track record of the vendor and its credibility to deliver
- ◇ DPR : Detailed project report includes a step by step documentation on the scope of the project, details of local & project specific pre-requisites, energy yield assessment, specifics of power purchase agreement and tentative project time line
- ◇ Engineering Calculations : Comprehensive electrical-DC & AC calculations to support project requirements, civil & structural calculations including sizing of specific equipments & components with respect to safety code compliance
- ◇ Design Drawings : Developing detailed design drawings inclusive of plant layout, equipment placement, wiring schematics and section details to assist with construction, bid compliance and the ease of plant maintenance
- ◇ Structure Design : Develop mounting structures as per prevailing local site conditions for ground mount projects as well as intricate solutions for different types of roofs; as per the requirement to maximize generation
- ◇ Civil Drawings : Design of inverter room, control room, switchyard equipment foundation and essential peripheral civil foundation details as per industry standard and site requirement's

For projects that are one of its kind and need specific technical expertise, our engineers can design and develop precise solutions that are tailor made for the developer's small scale kW requirements or utility scale MW power plants.



OWNER'S ENGINEERING

Advising owners on the risk profile and viability of Solar PV installations for all aspects of the entire project lifecycle.



**Master Project Complexity
and Mitigate Investment Risk**



As a part of advisory services, Excelsior Engineering Solutions, provide real-time assistance to developers in executing their projects. Delivering value added services at each stage by representing the owner's interests during design, development and construction with our unbiased & technology neutral approach. By ensuring that the work is executed as planned and adheres to prevailing industrial standards, we act as an advocate for the owner to apply due diligence and safeguard their interest.

With the exhaustive experience EES brings to the table, as your technical consultant; it is ensured that the EPC company adopts the best global standards in place. We are your eyes and ears on the ground during execution phase by constraining costs and time schedules; while identifying potential bottlenecks that may arise and work towards deriving the best solution.

Broadly segregated into two parts, Owner's Engineering Service is critical during:

Early Stage of Project

- ◇ Advising customer on participation in policy driven schemes & deliver superior insight, market trends and analysis
- ◇ Define and review the project scope
- ◇ Site identification and feasibility study
- ◇ Evaluate and identify the best technology
- ◇ Create design criteria for use in detailed engineering
- ◇ Bid evaluation and finalization of vendor/EPC
- ◇ Develop project schedules

During Project

- ◇ Approve all engineering documents
- ◇ Review and validate the design provided by vendors/contractors
- ◇ Oversee the work of contractors at site
- ◇ Monitor & control time schedules and budgets
- ◇ Inspecting services to provide quality control, witnessing of factory acceptance test and scrutiny of test certificates
- ◇ Assistance during start-up and commissioning activities
- ◇ Supervise project handover activities



LENDER'S ENGINEERING

Guiding investors and financial institutions using our technical expertise and detailed due diligence to minimize their investment risk.





Excelsior Engineering Solutions (EES) focuses primarily on safeguarding the interest of the investor by becoming their technological backbone and supervising each stage of project implementation. We work closely with International & National financial institutions, banks, corporate enterprises and private equity firms to verify the technical aspects and review the risk allocation of the project they are investing in.

A detailed assessment of the proposed project is carried out by EES's engineers, assuring its suitability and viability thereby ensuring that the risk of the lender is minimized. Our services ensure that the project development focuses on higher quality of construction and that all social aspects are taken into consideration - such as safety, health and environmental impact.

Lender's Engineering service includes :

- ◇ Project review and assessment of Technical Due Diligence
- ◇ Scrutiny of the yield analysis for generation output
- ◇ Evaluation of bids from EPC contractors
- ◇ Validation of system design
- ◇ Monitoring construction and ensuring timelines are implemented
- ◇ Assessment of plant start-up and performance testing
- ◇ Annual Operational review
- ◇ Liaisoning between the lender and the borrower
- ◇ Providing support in resolving disputes and mitigating all potential risks

Each stage of development is monitored so that the project achieves timely completion, while maintaining its budget, and ensuring quality of material and workmanship. During execution, EES engineers are dispatched for regular on-site reporting. Verification of the physical status of the work is done and checks on proper utilization of funds for solar energy projects are conducted.

The role of a lender's engineer is not only limited to the period of loan approval and project implementation but can also be put into action a year after project commissioning to check plant performance.



PROJECT MANAGEMENT CONSULTANCY

Guiding clients to achieve their investment objectives, right from project definition to operations by integrating activities of Engineering, Procurement, Construction and Commissioning.



**Realize Business Benefits &
Deliver Projects to Time, Cost & Perfection**



Excelsior Engineering Solutions (EES) aims at being the Project Management Consultancy (PMC) contractor of choice by supporting its customer's business objectives and consistently delivering projects with outstanding safety and superior performance. EES acts as an overall leader, coordinator, decision maker, problem solver and implementer, thereby allowing developers and owners to be in total control of the solar project development. As a trusted advisor, we provide services to support and catalyze planning and development of solar projects.

EES services are well structured through a value driven approach to establish an open and collaborative environment between all key parties that are involved in the project ensuring cost and schedule control while maintaining the highest quality standards. With strong industry relations and thorough understanding of solar policy, technology, project management and finance, our team aims to maximize client's return on investment and accelerate project execution.

Benefits of Our PMC Services:

- ◇ Guide established industries in setting up their own power plant
- ◇ Comprehensive assistance in all phases of the project
- ◇ Unbiased procurement assistance
- ◇ Assurance to compliance of technical & contractual requirements
- ◇ Inspection services to provide quality control
- ◇ Project start-up & commissioning
- ◇ Longer project lifecycle with uncompromised system performance
- ◇ Allows customer to be overall in charge of quality, schedule, material & project cost

Integrating design, engineering and project management; we deliver a transparent, highly regarded and industry best practice procurement regime that includes an extensive database of suppliers that ensures optimal solutions which are cost effective and sustainable. Our on-site team provides comprehensive supervision activities throughout the project life cycle thereby implementing quality workmanship and generating a timely status memo for key stakeholders.

EES plays a crucial role in startup of the plant by carrying out pre-commissioning performance checks of all components. During commissioning of the plant, our engineers test various system parameters for any anomalies before handing over the plant to the Operations team. This process ensures that systems are safe and high performing.

EES's PMC services have been used on many challenging projects. As a single point of contact with the customer, we apply industry's best practices and management skills to assist our customers establish a world class project.



PLANT AUDIT

Designed to obtain a complex technical and economic assessment of the project.

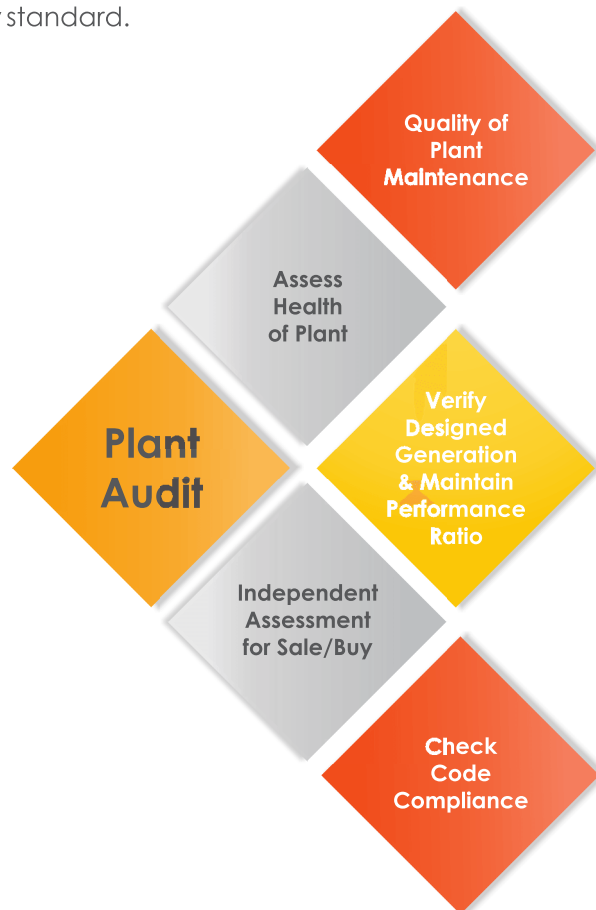




The vast expanse and silent working of a solar power plant makes it crucial to closely monitor operation for any irregularities. At Excelsior Engineering Solutions (EES) we recommend plant owners to carry out audits at scheduled intervals to assess the energy yield and avoid any unprecedented shutdowns. To achieve optimum generation and maintain a high performance ratio, it is critical to study the active performance of the system in reference with designed energy output to understand the health of the plant.

Our comprehensive plant audit services assist in finding the root cause of decline in generation, accelerated degradation of modules, frequent equipment breakdowns, abrasion of structures and suggest necessary corrective action. Thorough inspection ensures that the plant adheres to quality installation, code compliance and conformance to design and safety criteria.

An in-depth review of the condition of the equipment at site is carried out using advanced tools and techniques to test critical components and measure key plant performance indicators. A step-by-step inspection of the maintenance schedule and breakdown record quantifies the quality of O&M carried out and its adherence to industry standard.



EES also guides investors by providing a holistic third party assessment of the project that they are planning to invest in. Engineers develop a techno-commercial analysis to assess the true life expectancy of the plant based on the operational records, service life of equipment and highlight the investment risk based on the audit report.

Acting as an independent third party auditor, we provide a transparent and unbiased opinion on the condition of the plant. Based on proven experience with risk evaluation of technologies, on-site inspections and failure analysis of key components, EES can guide project owners to achieve investment security through risk minimization and increase project bankability.



SYSTEM INTEGRATION

Experienced and multi-disciplinary teams for providing turnkey integration solutions in installing and commissioning of Solar PV plants; right from panel DC output to grid connection.

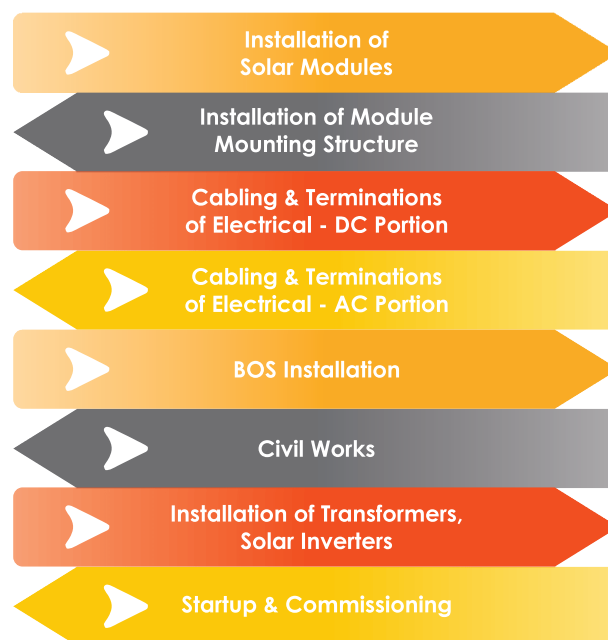




A Solar PV power plant is designed to have a service life of over 25 years. To achieve this milestone it is essential that all precautionary measures are taken during the execution phase. Excelsior Engineering Solutions provides a one stop solution for any and all needs of an individual or organization looking to set up a solar power plant. Our professional team of solar installers has extensive experience in setting up both ground mount and rooftop projects.

Providing complete turnkey solutions inclusive of design & engineering, procurement, installation and commissioning, we can execute projects smoothly in record breaking times, while adhering to industry codes and requisite safety norms. We also provide services to solar companies who wish to outsource entire or portions of system installation; undertaking projects with or without supply of materials.

Site engineers at EES work closely with the designers during project implementation to ensure that they leave no stone unturned to build a system of high standards.



Prior to breaking ground, it is ensured that a detail study is conducted of all approved designs and the same is shared with the ground staff to accommodate smooth working. In case there is any deviation from the approved designs, the same is duly noted and necessary action is taken to mitigate any hurdles that may arise.

EES conducts individual component testing and follows manufacturer's standard operating procedures before commissioning the plant. Operation is monitored for different system settings to ensure proper functionality before handing over the plant to the operational staff.

With our meticulous approach, successful track record of project execution and on time delivery, we have gained a commendable reputation in the industry and with our customers. By providing end to end service EES ensures that each activity carried out at site bares our quality mark and is guaranteed to stand the test of time.



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405 Technocity IT Premises, Plot X-5/3, Shil Phata- Mahape Road,
Mahape, Navi Mumbai- 400710

T.: 022-27783636
www.excleng.com

