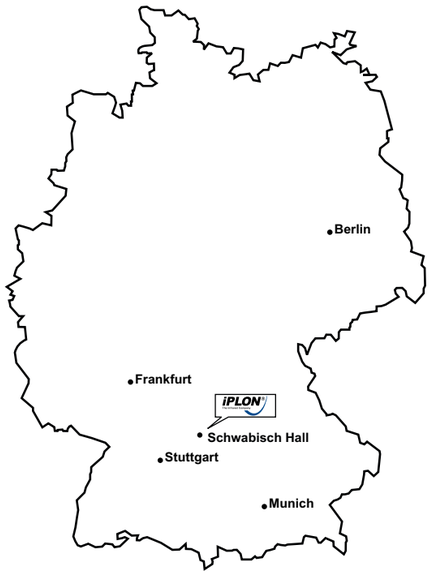

GERMANY

INDIA

- Head Office
- Partner Office
- Iplon Project Sites
- Planned Office

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The Infranet Company

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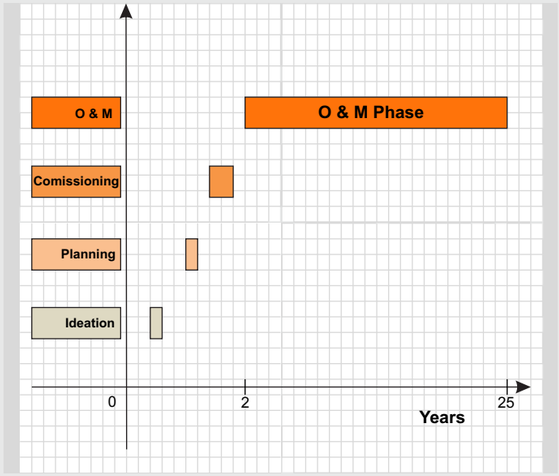
iPLON®
The Infranet Company

TOTAL LIFE CYCLE MANAGEMENT

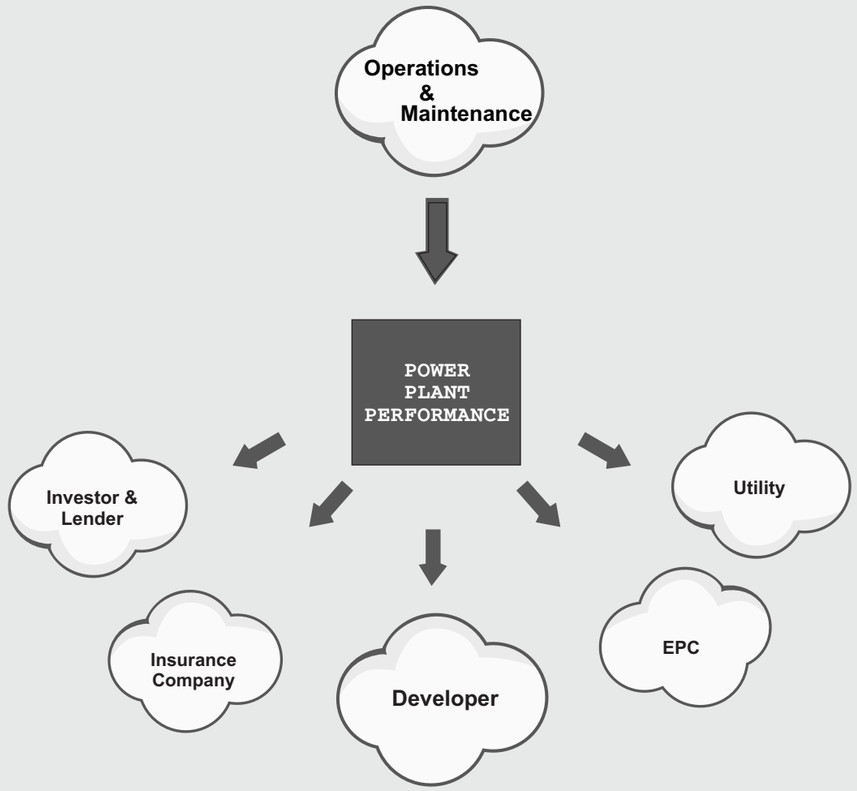
Operation & Maintenance of Solar PV Plants

Understanding Operations & Maintenance – The Key Factor for Solar Power Plant Performance

A commercially successful Solar PV plant is a product of multiple stages of intense effort by several stakeholders and collaborators. It starts with an idea that soon transforms into a plan. An approved plan initiates the process of procurement and in a matter of a few months the Solar PV plant is in operation. Although these power plants hardly take a couple of years from ideation to deployment, they are designed to perform consistently for at least 25 years. The financial returns of all stakeholders in the Solar PV power plant are dependent on its consistent performance for these two decades, of which more than 90% of the time the plant is under the direct supervision of the Operation & Maintenance Company.



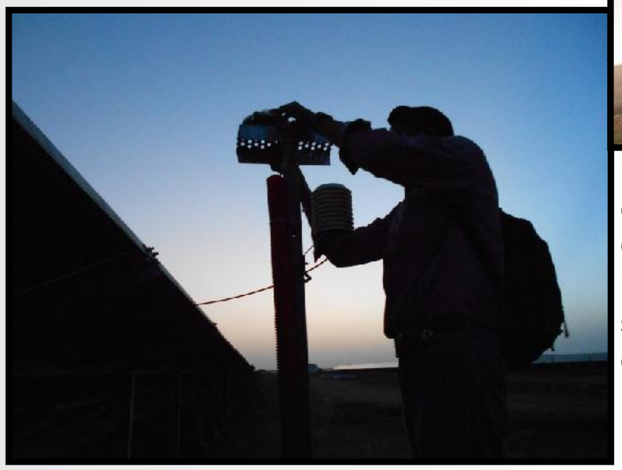
Role of Operation & Maintenance among the various stakeholders of a solar PV plant.



For a stakeholder, iPLON GmbH is the most reliable partner in the supply of Monitoring and Control System in the Operation & Management Phase. We understand the importance of power plant performance to you, and hence strive to ensure the best performance of the Solar PV plant for its entire life cycle.

iPLON Expertise in Total Life Cycle Management

iPLON is equipped with years of experience in performance monitoring and life cycle management of Solar PV power plants in various parts of the globe. Besides undertaking regular maintenance and planned performance checks, our expertise lies in swift identification of any underperformance through efficient monitoring and immediate corrective action to minimise loss.



iPLON is an independent, private company committed to the best interest of our clients. Our solutions are compatible with all makes of inverters, string boxes and sensors. Our team has specialised skills spread across various disciplines of engineering to undertake total life cycle management of Solar PV plants.

iPLON Skill Sets

Sensors, Calibration and Panel Technology
- Pyranometer, Silicon
- Ambient & Module Surface Temperature
- Wind Speed & Direction
- Other Weather Station Sensors
- Panel and String characteristics
- Thermography

Electrical Engineering
- String Monitoring Boxes
- Inverters
- DC LT Panels
- AC HT Panels
- Transformers Control room
- Switchyard

Electronic Engineering
- Dataloggers
- Field Device Networks and Protocols
- Fiber Optical Infrastructure

SCADA Systems (Local and Remote)
- Industry Embedded PC withTouch Screen
- Plant Overview
- Visualisation and Navigation
- Alarming & Trending
- Data logging and Scheduling
- Diagnostics
- Reporting and Exporting (Excel format)
- Interface to O&M (portal) System

O&M Portal based (Cloud Computing) Systems
- PR & Specific Yield
- Availability
- Benchmarking
- Due Diligence

Internet Connectivity
- GPRS / DSL modems
- Static / Dynamical IP addresses
- Network Security (Firewalls, VPN. Tunneling)

Operation & Maintenance

Our Passion and Core Business

iPLON Germany

Project Developer

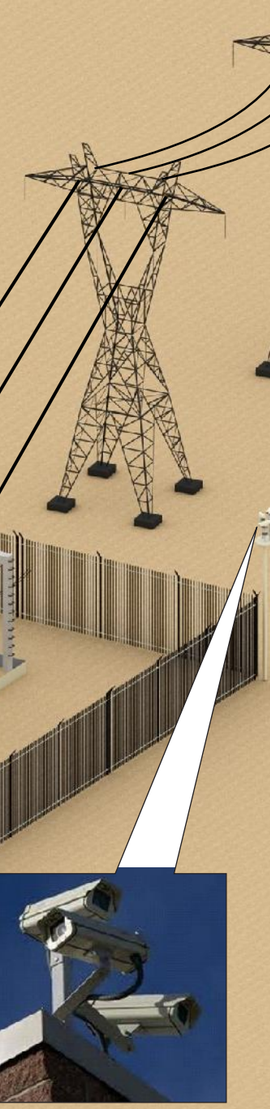
iPLON India

INTERNET CLOUD

EPC

Panel Cleaning

Weather Monitoring Station



String Monitoring Units

Inverter & LT Panel

Transformer & HT Switchgear

Control Room, SCADA, CRP,HT Panels, Auxiliary Power

Perimeter Security

iPLON Services

iPLON has installed monitoring systems for solar power plants in Europe and India. The rich experience of having worked with diverse clients across geographical zones has helped us understand this business very well. The knowledge has translated into our high class services in the Operation & Maintenance segment as well as other services like Technical Due Diligence and Testing.

iPLON Operation & Maintenance Services

Knowledge-based O&M Services through remote operation

iPLON enables very efficient remote management of Solar PV power plants through its state of the art monitoring system. The comprehensive performance coverage includes

- Analyzing the data on irradiation, module temperature, energy metering etc.
- Diagnosing abnormal behavior in the power plant
- Alarm Handling
  - Notification to Developer , EPC , Device supplier about faults and addressing the issues.
- Reporting
  - Periodical reporting on the performance of the plant and other parameters
  - On-demand reporting services
- Panel cleaning
  - Determining the panel cleaning time based on the Yield data, PR and the yearly behavior of the plant
  - Logging the Efficiency after panel cleaning

On-site Operation & Maintenance Services

iPLON synergises with its partners and highly skilled in-house engineers to provide the best operation and maintenance services at the site. Our broad understanding of the solar PV plant helps us extend the best of services in the following areas.

- Periodic Maintenance & Monitoring
  - Panel Yield
  - Electrical & Electronic sub-systems
  - Electrical , Fiber optical Infrastructure
- Preventive Maintenance
  - Cleaning panels
  - Clearing vegetation , bird drops
  - Checking electrical connections (thermal imaging) , loose connections , string current
  - Calibration : Sensors , SCADA, Monitoring systems
  - Inverter functionality
  - Corrective , reactive ,Ad-hoc Maintenance
  - Condition based maintenance
  - Diagnose through data mining (Monitoring system with data archive)
- Trainings and workshops

Consulting services in Operation & Maintenance

We provide high class consulting services in the area of Solar PV plant O&M. Our team of experts advise the clients on the basis of the years of experience and insights we have accrued through extensive research and collaborations.

EPC for O&M equipments like cables, fibre optics, OTRD measurement systems etc.

Other services of iPLON for Solar PV projects

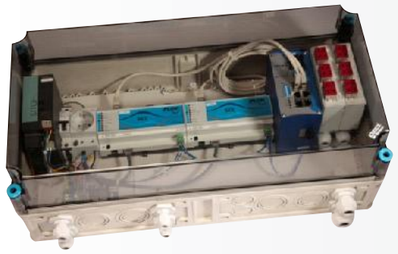
Technical Due Diligence

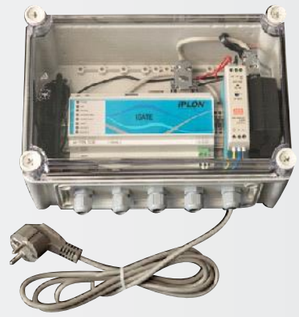
We support our clients with extensive Technical Due Diligence reports covering measurements of plant performance and availability, panels and string characteristics, thermography and sensor calibration to aid the process of decision-making.

Overall Testing Strategy

- **Provisional Acceptance Test (PAT)**
  After the PAT is successfully completed, a Provisional Acceptance Certificate (PAC) is issued and the O&M phase is entered into.
- **Intermediate/Mid Test (MT)**
  An Intermediate/Mid Test (MT) is conducted after 12 months from the date of PAC.
- **Final Acceptance Test (FAT)**
  A Final Acceptance Test (FAT) is conducted after 24 months from the PAC. Upon successful completion, a Final Acceptance Certificate (FAC) is issued.

iPLON Products






iPLON has developed and offers a wide range of embedded Devices , subsystem and system cabinets and Panels for Solar Plants. The pictures show the O&M (Hand Terminal) , the iGate (Distributed data logger), iBox (rooftop Applications) , iFT (intelligent Field Terminal: string monitoring) , iAT (intelligent Automation Terminal : Inverter room)and the iMT(intelligent Management terminal: Control room) units.

Some examples of iPLON functionality