From Insights to Action:
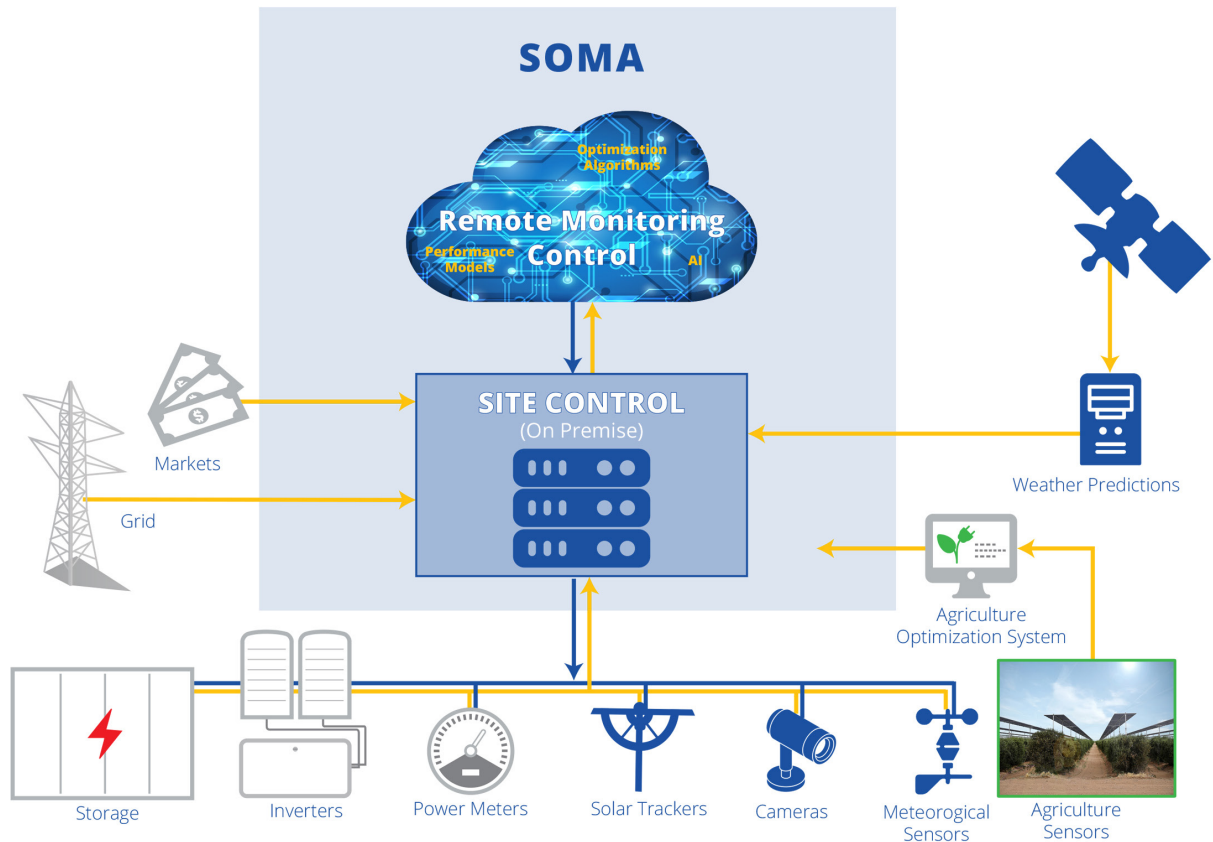## Centralized control of PV plants to increase profitability, flexibility and predictability

SOMA

Optimization Algorithms

Remote Monitoring Control

Performance Models   AI

Markets

Grid

SITE CONTROL
(On Premise)

Weather Predictions

Agriculture Optimization System

Storage | Inverters | Power Meters | Solar Trackers | Cameras | Meteorogical Sensors | Agriculture Sensors

For solar energy to become a true "baseload" player, it will need to provide dependability, predictability, and flexibility. This requires a solution that monitors, controls, and manages PV plants from end to end. For this to happen, each field component, (i.e. inverters, trackers, batteries) and external data points (agricultural sensors, weather forecasting, grid connection) must be plugged into a central optimization engine that provides real-time command and control based on a dynamically changing environment.

AGRI-PV

- incorporate agricultural sensors like soil and leaf moisture, humidity, temperature, etc.
- Integrate Crop Models that delineate the amount of sunlight, moisture, and temperature needed by specific crops
- Crop alarms – set thresholds that override energy generation and prioritize crops in extreme scenarios (e.g., overheating, lack of moisture)
- Crop Clipping™ - in the event of electrical clipping, panels are tilted to an angle that allows the sun to pass through without affecting electricity production
- Choose the right time of day, based on local grid conditions and weather forecasting, in which it is "cheaper" to allow the sunlight to pass through to the crops.

Sophisticated shading model for balancing sunlight utilization between crops and panels

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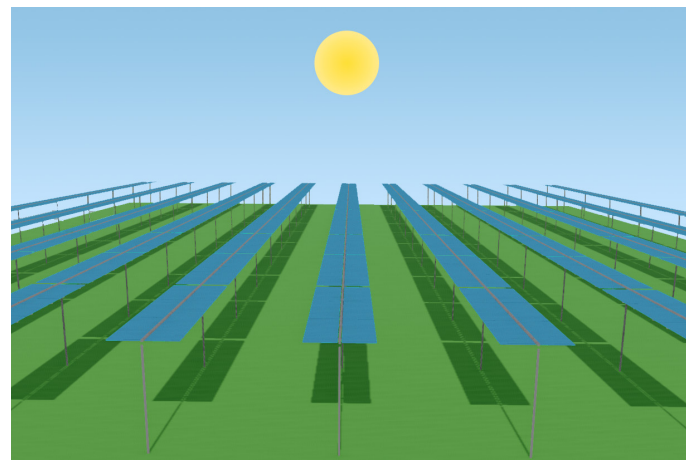
ONLINE MONITORING

- Tracker: status, panel performance, and other data in both graphic and data format
- Weather monitoring: snow, wind, irradiance, and other sensors data
- Inverter & power meter monitoring
- Storage system monitoring
- Overall site performance monitoring

OPERATION & MAINTENANCE

- User Control: operation, preventive and routine maintenance
- Automatic safety & Alerting services: automatic control to protect the panels against difficult weather conditions, alerts for operational or performance conditions
- Fault & Abnormality detection: including comparison between behavior of inverters and strings, out of range values, etc.
- Weather forecast: for long-term operational planning and maintenance scheduling

AUTOMATED CONTROL

- Automatic operation control: tracking, sleep, response to events and weather forecast
- Production optimization algorithms to improve performance
- Smart tracking algorithm based on weather, storage and other parameters
- Mechanical Clipping: shift tracker angle to reduce heating without changing electricity production
- Storage optimization: when to charge and discharge storage
- Optimized cleaning: maximize revenue with cleaning vs. generation payoff calculation

SUPPORTING SERVICES

- Historical Data storage for report generation, long-term analysis of performance, maintenance, and other parameters
- Performance data warehouse: all the data needed to study performance in depth

Ratio of actual DC performance to DC Potential

Ratio of DC production to panel capacity

Inverter AC output

Status of trackers, inverters, and wind sensors

Cumulative daily power output

Global Horizontal Irradiance

Tracker count, maintenance warnings, and average panel angle

Compares actual production (AC), max potential production, and production delineated in contract

For Agri-PV to successfully scale, it needs to balance the sunlight needs of crops and panels, while ensuring an LCOE that is competitive with regular PV projects. The SOMA fuses multiple data sources to make real-time decisions and create synergy between photovoltaics and agriculture.

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