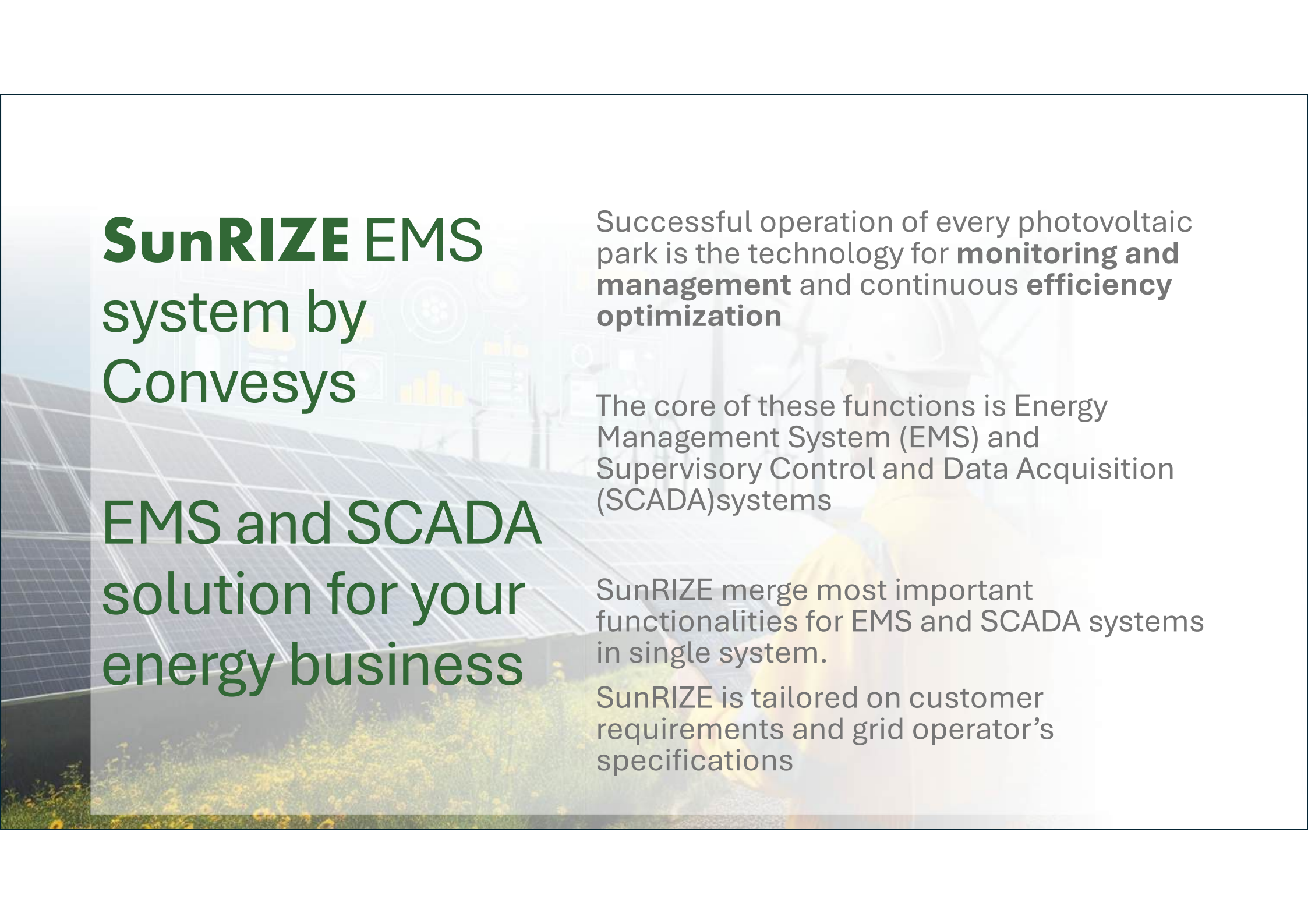


SunRIZE EMS system

- Business insights



SunRIZE EMS system by Convesys

EMS and SCADA solution for your energy business

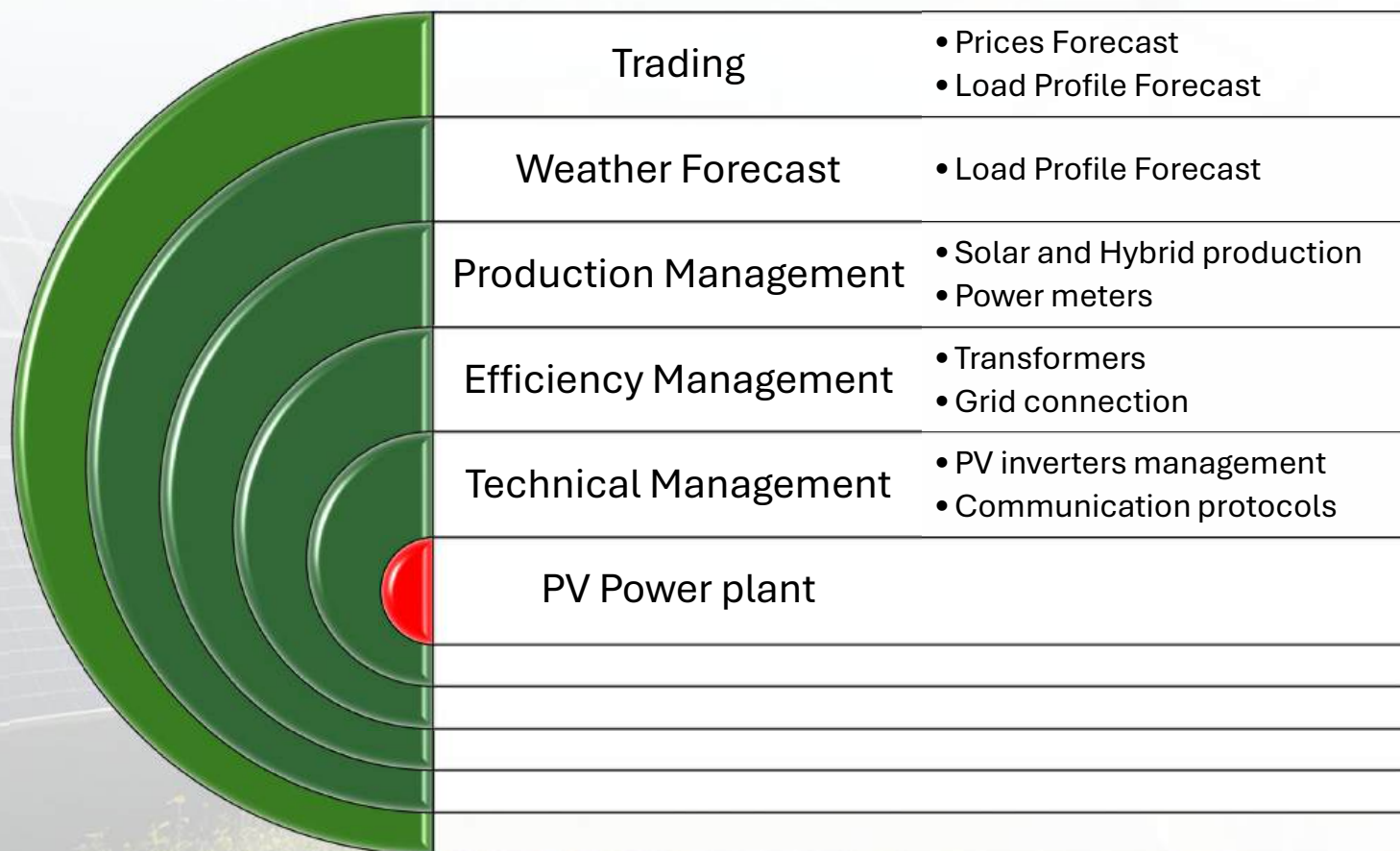
Successful operation of every photovoltaic park is the technology for **monitoring and management** and continuous **efficiency optimization**

The core of these functions is Energy Management System (EMS) and Supervisory Control and Data Acquisition (SCADA) systems

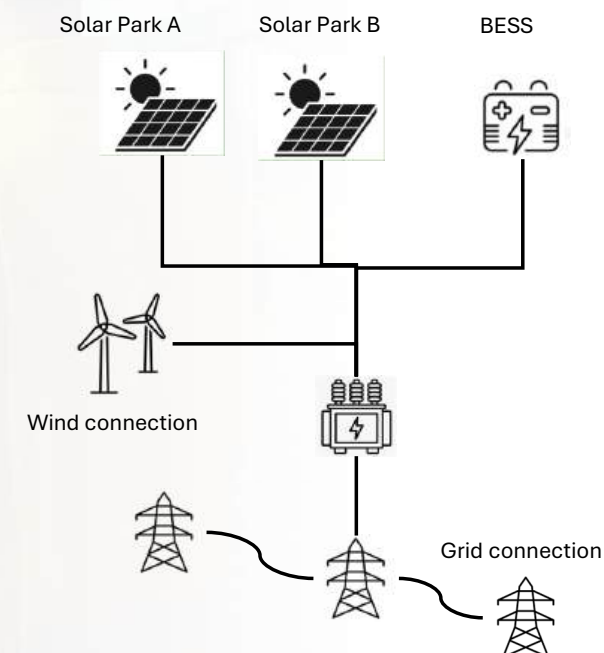
SunRIZE merge most important functionalities for EMS and SCADA systems in single system.

SunRIZE is tailored on customer requirements and grid operator's specifications

Solar Energy Production Challenges

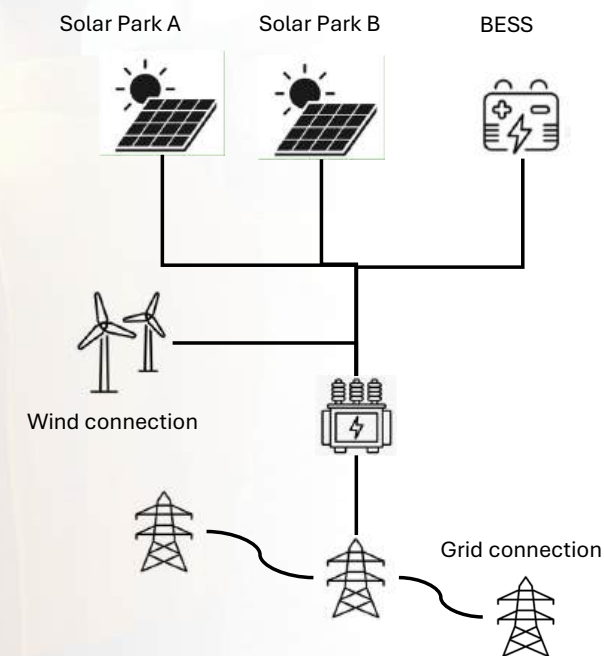
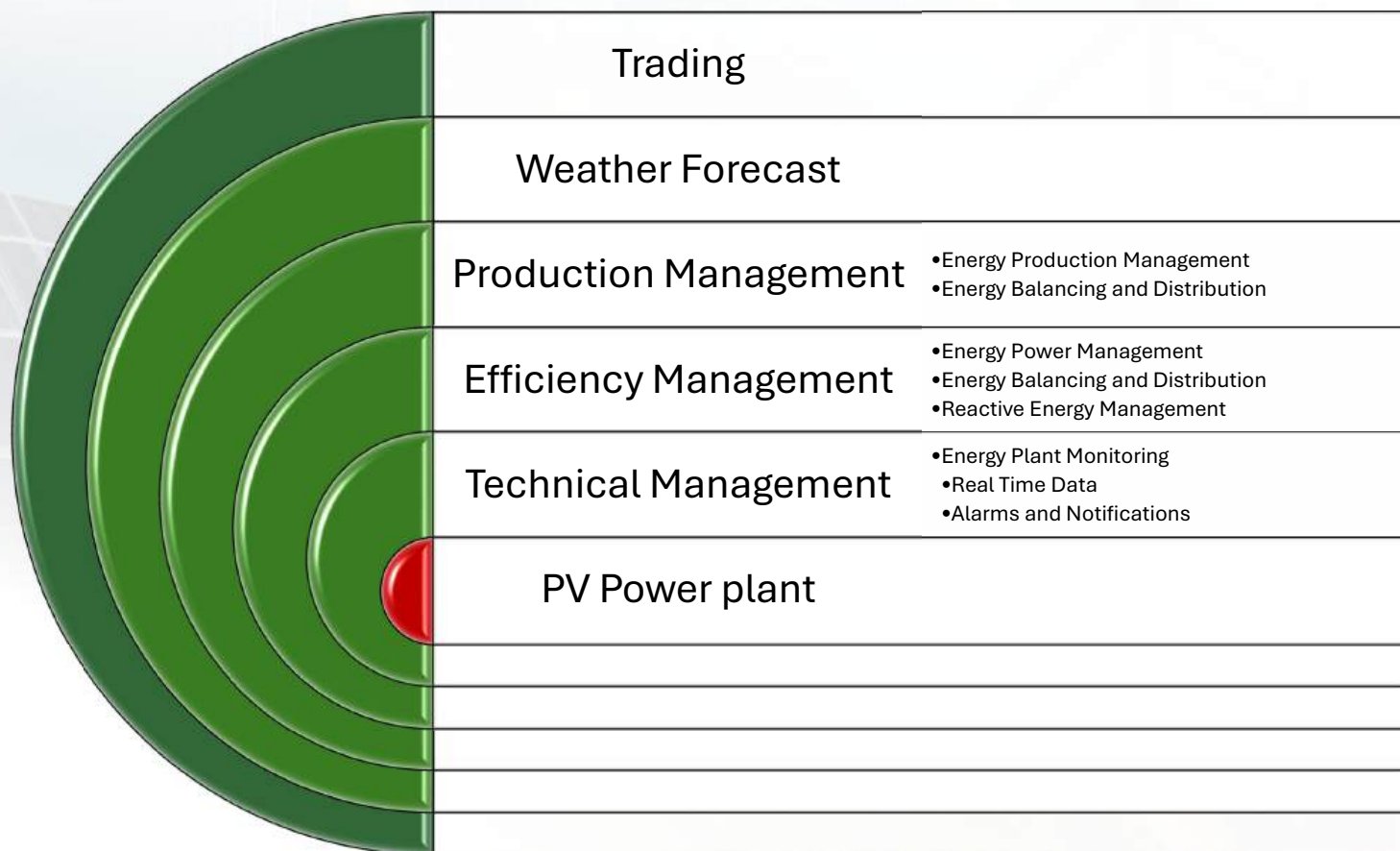


- PV production is part of the energy mix
- Naturally non-constant production
- Balancing is a challenge
- Monitoring and management is key importance
- BESS is adopted optimization strategy



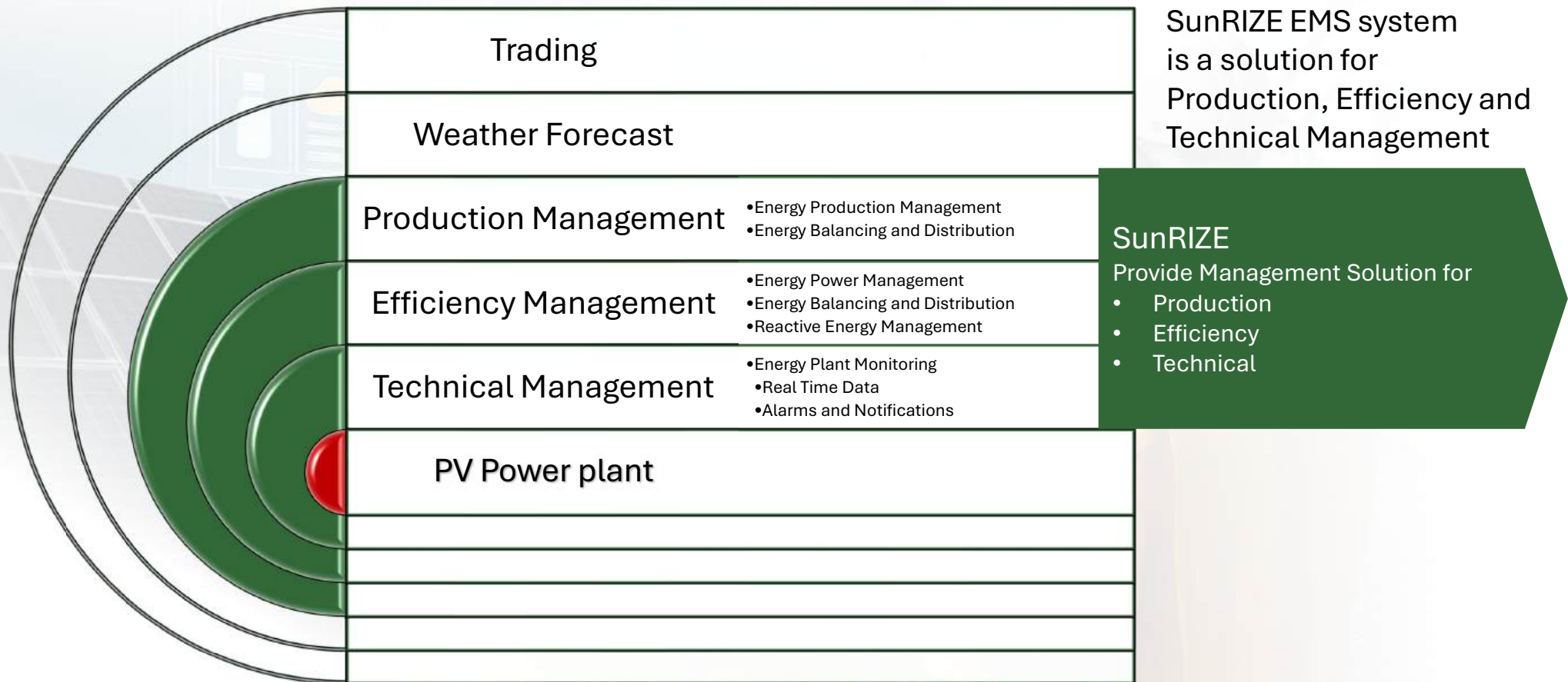
Solar Energy Production

SunRIZE Solution

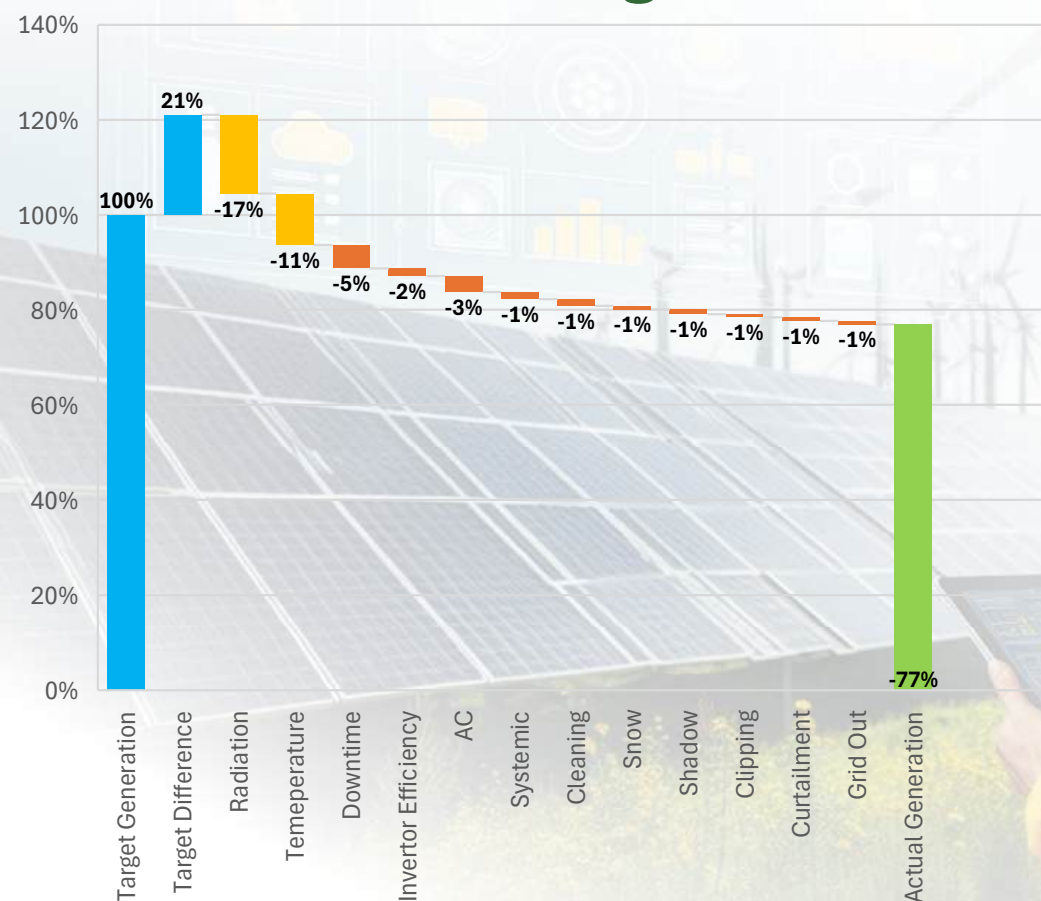


Solar Energy Production

SunRIZE Solution



Solar Energy Production Technical Challenges



SunRIZE EMS system
optimize production and efficiency
by addressing Controllable and
Partially Controllable challenges

Energy
Production
Challenges

Uncontrollable

Radiation
Temperature

Controllable

Downtime
Inverter Efficiency

Partially Controllable

AC

Systemic

Cleaning

Snow

Shadow

Clipping

Curtailment

Grid Out

Energy Plant
Monitoring

Energy Power
Management

Reactive Energy
Management

Energy Production
Management

Energy Balancing
and Distribution

SunRIZE EMS Outline



- Energy Production Management



- Energy Power Management



- Energy Plant Monitoring

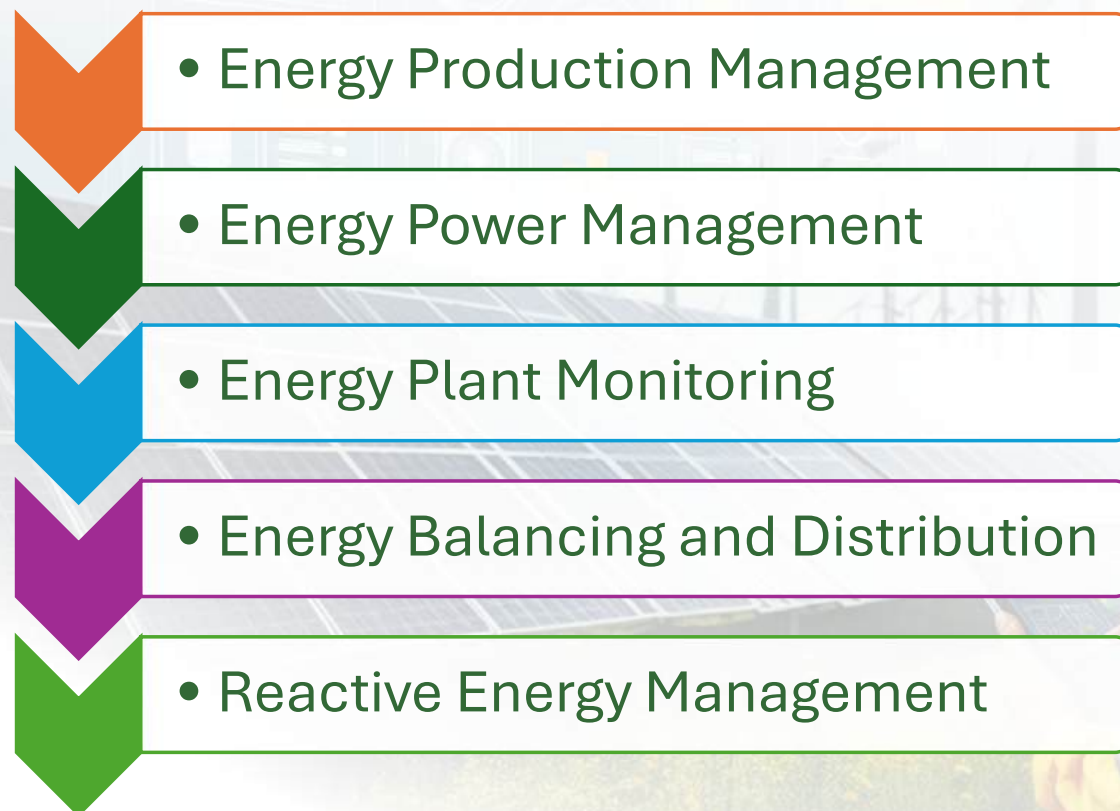


- Energy Balancing and Distribution



- Reactive Energy Management

SunRIZE EMS Outline



Production
management

- Achieve production targets
- Production balancing
- Hybrid solution
- Minimize non-balance costs
- Comprehensive visualization
- Secure remote access

SunRIZE EMS Outline



- Energy Production Management



- Energy Power Management



- Energy Plant Monitoring

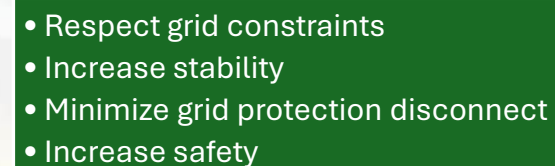


- Energy Balancing and Distribution

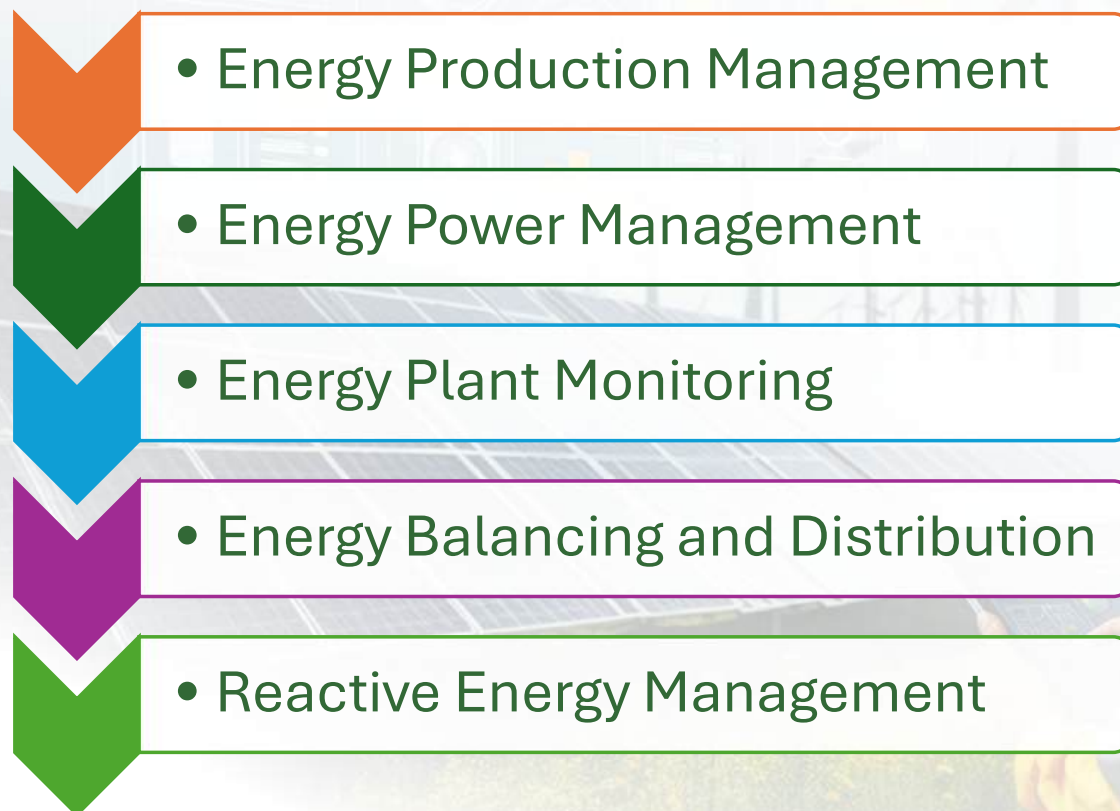


- Reactive Energy Management

Power
management

- 
- Respect grid constraints
 - Increase stability
 - Minimize grid protection disconnect
 - Increase safety

SunRIZE EMS Outline



Plant
monitoring

- Stabilizing the operation
- Real time KPIs
- Digitalization of processes
- Reliable monitoring
- Alarm management
- Event log
- Detailed view on plant, inverter and string level
- Data from transformer, meteorological station, pyranometer
- IoT gateway for cloud connection
- Secure remote access

SunRIZE EMS Outline



- Energy Production Management



- Energy Power Management



- Energy Plant Monitoring

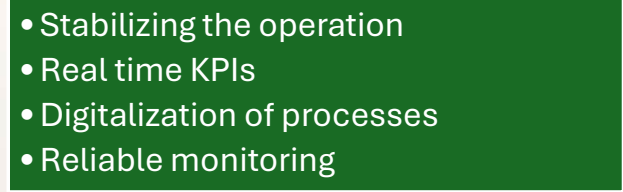


- Energy Balancing and Distribution



- Reactive Energy Management

Balancing
and
distribution

- 
- Stabilizing the operation
 - Real time KPIs
 - Digitalization of processes
 - Reliable monitoring

SunRIZE EMS Outline



- Energy Production Management



- Energy Power Management



- Energy Plant Monitoring

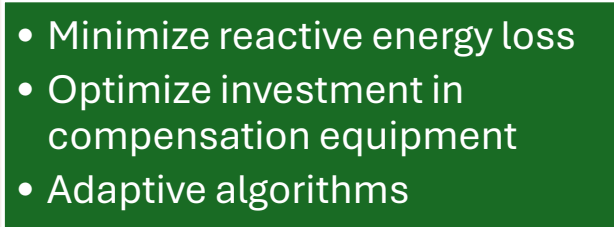


- Energy Balancing and Distribution



- Reactive Energy Management

Reactive
Energy

- 
- Minimize reactive energy loss
 - Optimize investment in compensation equipment
 - Adaptive algorithms

Sun RIZE EMS Information modules

Information module "Park Level"

- "Real-time active power from transformer stations" - real-time power and a calculated Performance ratio.
- "Total production for selected period" energy produced by the park for a time range.
- "Daily Production" daily energy produced a calculated Performance ratio.
- "History of active power" power generated, when each transformer station is activated

Information module "Transformer station level"

- "Total energy produced for a selected day"
- "Total production for selected period". energy produced by the inverters a given time range.
- "Inverters with error" shows which inverters are in error.
- "Operational status of the transformer station" how long has been operating for the day.

Information module "Plant Metrics"

- Plant Reactive Power
- Medium voltage
- High voltage
- Transformer substations (loggers)

Information module "Single-line diagram"

- Average voltage (Av.N)
- High voltage (HV)
- Huawei Smart Logger
- Weather data

Sun RIZE EMS Information modules

Information module “Park schema”

- Basic vision and functionality
- Schematic representation of the entire solar
- Dynamic interface
- Equipment status indicators
- Real-time telemetry with live data
- Additional modules/options
- Filters and layers
- Scalable structural organization
- Separation of the switchboard into fields and transformer stations
- Hierarchical view

Information module "Inverter level"

- Data recording and storage
- Time intervals
- All the information about an inverter
- Current parameters
- Historical data
- Historical charts of key metrics
- Energy and power
- String monitoring
- Detailed error information
- Status and error codes
- Counters and statistics

Information module “Analytics”

- Simultaneous visualization
- Flexible parameter selection
- Setting a time window and chart type
- Select time range
- Graphic type
- Zoom and Pan
- Tooltip and value highlighting
- Legend and layer management
- Statistics and aggregated data
- Percentage differences or comparative ratios
- Alarm/error integration
- Tying in with weather data and PR
- Connection to the "Level Inverter" module
- Optimized charging
- Quick search and filters

Sun RIZE EMS Information modules

Information module "Analytics - advanced"

- Grouping and selecting inverters

- o Dynamic grouping
- o Flexible filter

- Parallel visualization

- o Simultaneous graphs
- o Comparison over time

- Comparative statistics and metrics

- o Min/Max/Avg values
- o Percentage differences

- Identifying problematic inverters

- o Alarm indicators
- o Error analysis

- Advanced integration (optional)

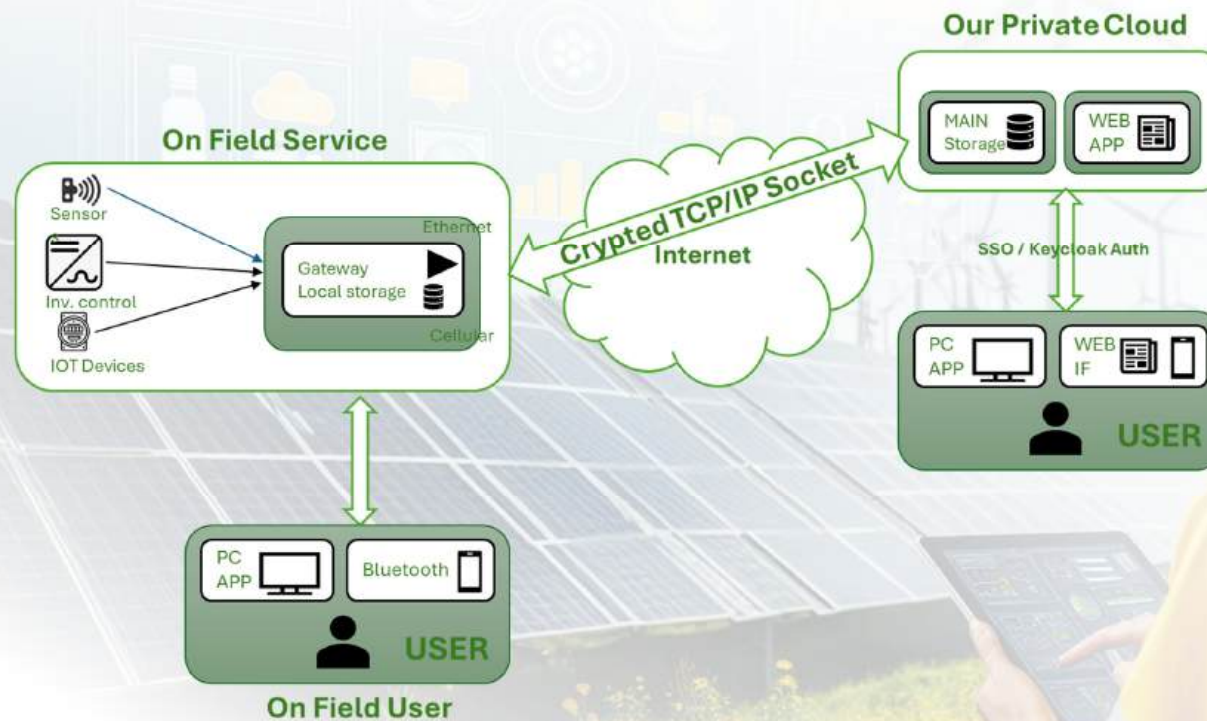
- o Meteorological data and PR

Information module " Digital Twin "

- A Digital Twin is a virtual representation of a physical system that allows for observation, simulation, and analysis

- By implementing a digital twin into the inverter control system, an environment is provided in which different scenarios can be simulated.

SunRIZE EMS Architecture



SunRIZE EMS system is based on hybrid-cloud solutions, enabling reliability, scalability and architecture advantage both for single site management and multiple sites management as single customer

SunRIZE Advantages

Manageability

- Full control on production profile
- Full control on inverter level
- Full control on power profile and equipment protection
- Scalable based on hybrid cloud technology

Information

- Real time dashboards
- Monitoring of critical parameters and events
- Alarms on performance
- Events analysis
- History of events
- Advanced analytics

Flexibility

- Multi vendor support
- Multi protocols support
- API integration to forecast and trading systems
- Support of multiple green energy technologies
- Listen to customer requirements
- Localize to grid operator specifications

Questions and Discussion

www.convesys.com



Thank you

Sun RIZE EMS Information modules

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Information module "Transformer station level"	· "Total energy produced for a selected day" · "Total production for selected period", energy produced by the inverters a given time range.
Information module "Plant Metrics"	· Plant Reactive Power · Medium voltage · High voltage
Information module "Single-line diagram"	· Average voltage (Av.N) · High voltage (HV)
Information module "Park schema"	· Basic vision and functionality · Schematic representation of the entire solar · Dynamic interface · Equipment status indicators · Real-time telemetry with live data · Additional modules/options · Filters and layers
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Information module "Analytics - advanced"	· Grouping and selecting inverters - o Dynamic grouping - o Flexible filter · Parallel visualization - o Simultaneous graphs - o Comparison over time · Comparative statistics and metrics - o Min/Max/Avg values - o Percentage differences
Information module "Digital Twin "	· A Digital Twin is a virtual representation of a physical system that allows for observation, simulation, and analysis

By implementing a Digital Twin into the inverter control system, an environment is provided in which different scenarios can be simulated.

o Historical data and PV

Sun RIZE EMS Information modules

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