

Making Energy Transition Sustainable at Solarge – Done Right with FabEagle®MES



"FabEagle®MES has been instrumental in improving our KPIs and is seamlessly integrated with our ERP. Its state-of-the-art features as well as Kontron AIS dedication to the project are highly appreciated by our team."

Joey Portier, Process Engineer,
Solarge Productions B.V.

solarge



FabEagle®MES

Solarge Productions B.V.
Weert, Netherlands

Platform:
FabEagle®MES,
FabEagle®Connect

Project:
MES for solar module factory with full traceability and equipment performance monitoring

Kontron AIS services:
Consulting, project management, software implementation, on site equipment integration, commissioning and remote support



Challenge

- Integration of FabEagle®MES in a turnkey line for solar modules with Solarge-specific customization
- Support for manual inspection and rework process steps
- Automation of module grading, sorting and packaging including ERP connectivity



Solution

- Implementation of OPC UA interfaces between MES and selected equipment
- Smart configurable workstations with visualization of all required information
- Bi-directional interface to packaging automation and ERP system



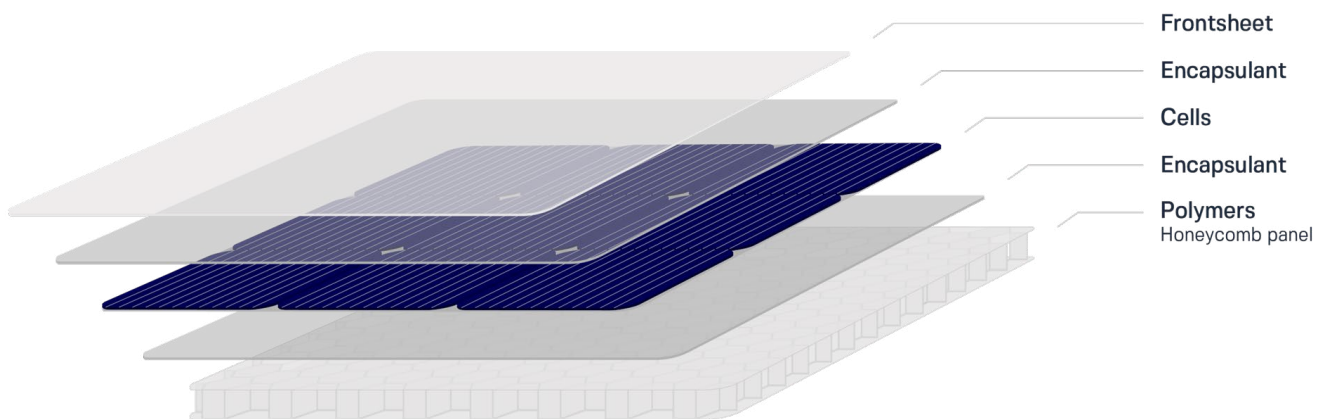
Result

- Usage of all MES features for production control and quality assurance
- Integration of MES stations for module inspection and rework with traceability for defects and rework material
- Configurable packaging area and module-specific ERP feedback about grading and sorting

Solarge makes the energy transition sustainable by bringing circular solar panels to the market in a fast and scalable way, going beyond the limits of conventional solar panels.

Solarge and Kontron AIS have completed the installation of an MES (Manufacturing Execution System) for 100 MW PV module production together with an established supplier of turnkey PV equipment. FabEagle®MES is used for this factory in Weert. It is one of the first production lines in the Netherlands to go live with a focus on a circular solar panel design. Compared to conventional panels, the front glass and aluminum framing are replaced by polymers to enable a 50 % lighter design with a 80 % lower carbon footprint.

The FabEagle®MES includes all functionalities to provide transparency, tracking and control of the production process to ensure quality, improve processes and save costs. Most of the relevant information is based on the data provided by the integrated shop floor equipment on a single product basis. To enable these features, the generic concepts of configurable production orders, work plans and material tracking capability were used together with features specific to solar module production, such as the support for the inspection and rework, grading and palletizing of modules.



Innovative polymer technology is making the difference at Solarge; © Solarge Productions B.V.

Requirements engineering and specification

At the beginning of the project the key requirements were defined to support the operation of the factory and help create value for the company.

- › Material traceability to meet IEC & ISO requirements
- › Production management for ease of administration
- › KPI monitoring and reporting for online performance visualization
- › SPC and data analytics for continuous improvement of processes and operations

Following the guideline of these main requirements, it was obvious that FabEagle®MES in its standard configuration could be used as a starting point. The main focus of the project then became equipment interfaces and adapting the existing FabEagle®MES functionality to the PV technology and processes specific to Solarge, as well as ERP integration.

Equipment integration

The FabEagle®MES with material tracking capability is part of the turnkey solution delivered to Solarge. The initial software installation of the virtualized MES server was completed in a short time. Kontron AIS engineers worked with the turnkey line vendor to specify an OPC UA interface to transfer the data needed to monitor, track and control the production processes. Factory equipment integration and on-site interface testing were performed as soon as each equipment became available with an installed MES interface. Due to the time constraints of the project plan, interface testing was not possible before the equipment was shipped from the vendor, resulting in much more time for integration and extensive collaboration with the vendor at the factory.

Roll-out of FabEagle®MES

While equipment integration was on-going, the Solarge and Kontron AIS team worked to install and set up MES functionality to meet all defined requirements:

- › Setup of MES commissioning stations for backsheets (polymer) and RFID labels. MES creates a unique Module Identity Code (Module ID), which is the basis for traceability.
- › Tracking of all additional BOM (Bill of Material) items with MES scan stations. Raw material IDs are scanned at MES workstations. MES alerts, if wrong material is scanned.
- › Support for inspection and rework of layouts. MES tracks defect reasons.
- › Evaluate module testing results for automated module grading and sorting by optical and electrical class. Grading criteria: combination of power output, defects and EL result.
- › Integration of the packaging for palletizing and label printing configurable in MES. MES inputs the final bin location to the sorter robot based on the user defined configuration in MES workstation.
- › ERP integration for consumption and output posting including all modules of a pallet with their grading and actual BOM information. Additionally, new items (raw materials/final products) created in the ERP are automatically transferred to the MES.



After the MES roll-out and equipment integration, tracking and acceptance tests confirmed the system's production readiness. Despite challenges that arouse during the project due to late availability of equipment interfaces and deviations from initial specifications, these issues were successfully mitigated. The ongoing support from Kontron AIS, combined with the proven FabEagle®MES product and efficient collaboration with Solarge and the equipment vendor, ensured the successful completion of the project.

Main benefits for Solarge

FabEagle®MES controls production and automatically collects material and process-related data from the production equipment. A selection of manually acquired data is added to the system on a regular basis. All material is tracked through the production line, allowing data to be correlated across multiple process steps and enabling the engineers to recognize process interdependencies. Material loss and defects are tracked with sophisticated reports. Typical defect reasons can be identified and eliminated much faster, resulting in higher production yields.

With all of these features, FabEagle®MES ensures high process and product quality. It also supports engineers in their efforts for further process improvements.



Traceability
to meet IEC and
ISO requirements



Production management
for ease of
administration



Data analytics
for continuous opera-
tional improvement



Monitoring and reporting
to visualize
performance data

About Solarge Productions B.V.

At Solarge, we have been driven by the mission to transform the energy transition with Dutch-grown technology since the beginning of 2018. In close collaboration with various disciplines, we have developed circular, lightweight solar panels. This innovation offers a fresh look at the construction and application of solar panels, using fiber-reinforced polymers and materials specially developed by SABIC.

These technologies not only form the basis for lightweight solar panels, but also create possibilities in the future due to the shape flexibility of the materials. This includes 'floating solar', custom-made solar roofs, or integrated roof solutions (BIPV).

For more information please visit: www.solarge.com

About Kontron AIS GmbH

We set the benchmark in industrial software – for more than 30 years and with an experienced team of over 250 employees. Our proven software products and customized digitalization solutions enable machine and equipment builders as well as factory operators to break new ground in automation and secure long-term competitive advantages. Together with our customers we implement worldwide cross-industry, intelligent digitalization strategies and solutions for the smart manufacturing of tomorrow.

As a subsidiary of the Kontron AG, we offer integrated, end-to-end IoT concepts consisting of hardware and software as well as worldwide project management, service, and support thanks to a global network.

For more information please visit: www.kontron-ais.com