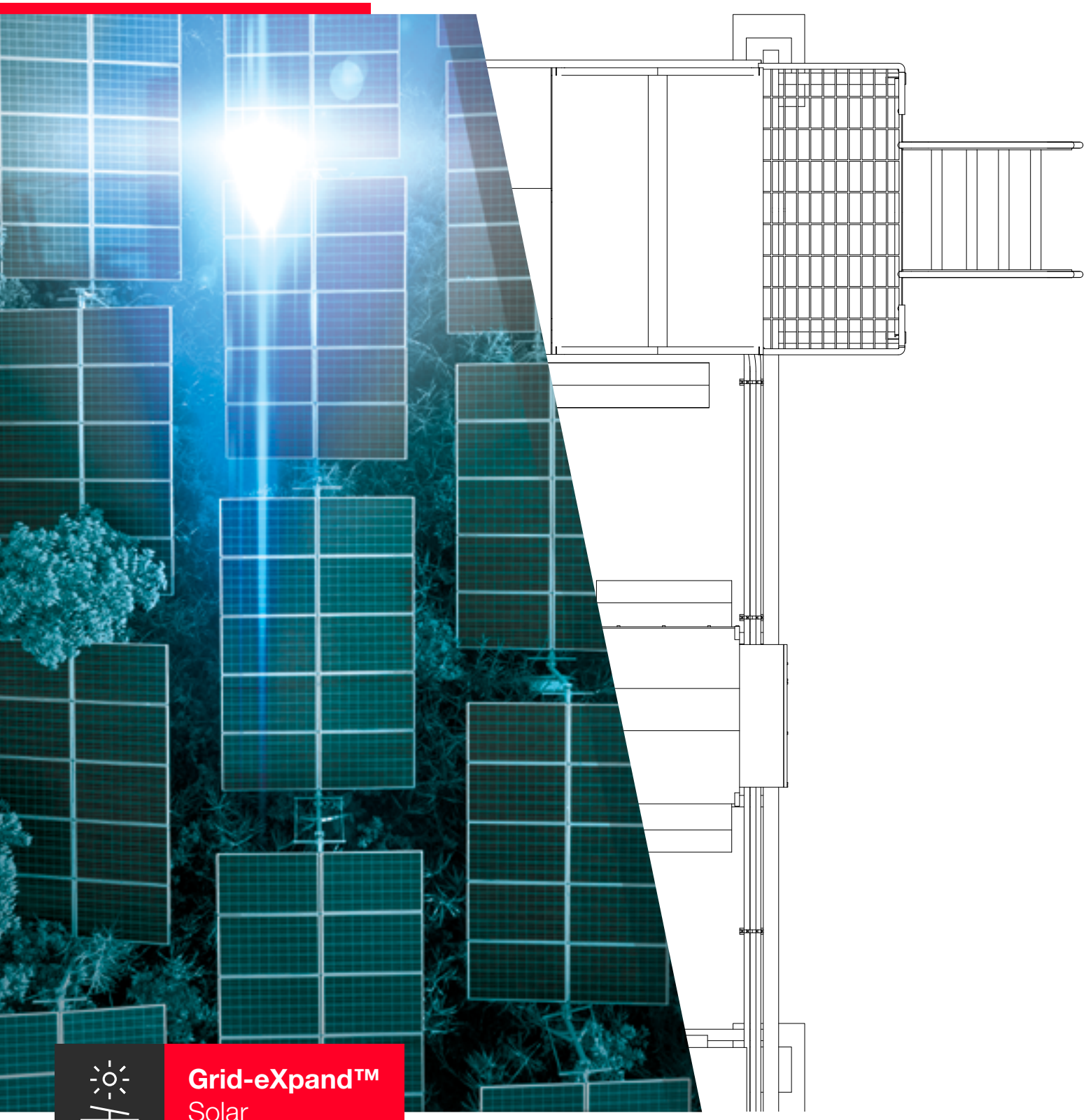
GRID SOLUTIONS

PV power collection packages for large solar PV plants

Complete power collection and grid connection solution



Grid-eXpand™
Solar

Every year we connect around 3 gigawatts of renewable energy plants to power grids worldwide. As the world's market and technology leader in grid integration, we have unrivalled experience in collecting and connecting solar power efficiently, reliably and safely globally.

3 GW
renewable energy plants connected

Our power collection packages complement our comprehensive range of **prefabricated modular substations** for connecting utility-scale solar PV plants to the power grid. Fully scalable, the packages are available for any size of solar PV plant, from 1 megawatt to several hundred megawatts.
This complete, well-proven power collection solution shifts assembly, installation and testing from the solar site to one of our global network of factories and integration yards, where the work is done in advance of delivery. This brings huge benefits for our customers in terms of time, cost, risk mitigation, safety and repeatability.

Package contents

The PV power collection packages comprise:
- medium and low voltage switchgear in transclosures;
- inverters (as an option);
- gateway to connect to the SCADA system;
- all ancillary equipment;
- the inverter transformer.

These pre-assembled and pretested modules are mounted on a steel frame skid and shipped as prefabricated units, ready for speedy erection and energization on-site anywhere in the world.

Power collection packages

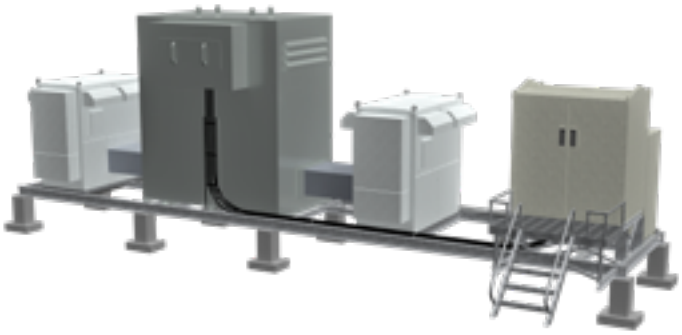
Thanks to their modularity, the power collection packages are **customizable and repeatable, providing exceptional flexibility**. With a cascaded system topology, they cover all usual AC voltage levels and power ratings (up to 12 MVA, including one or two inverters).

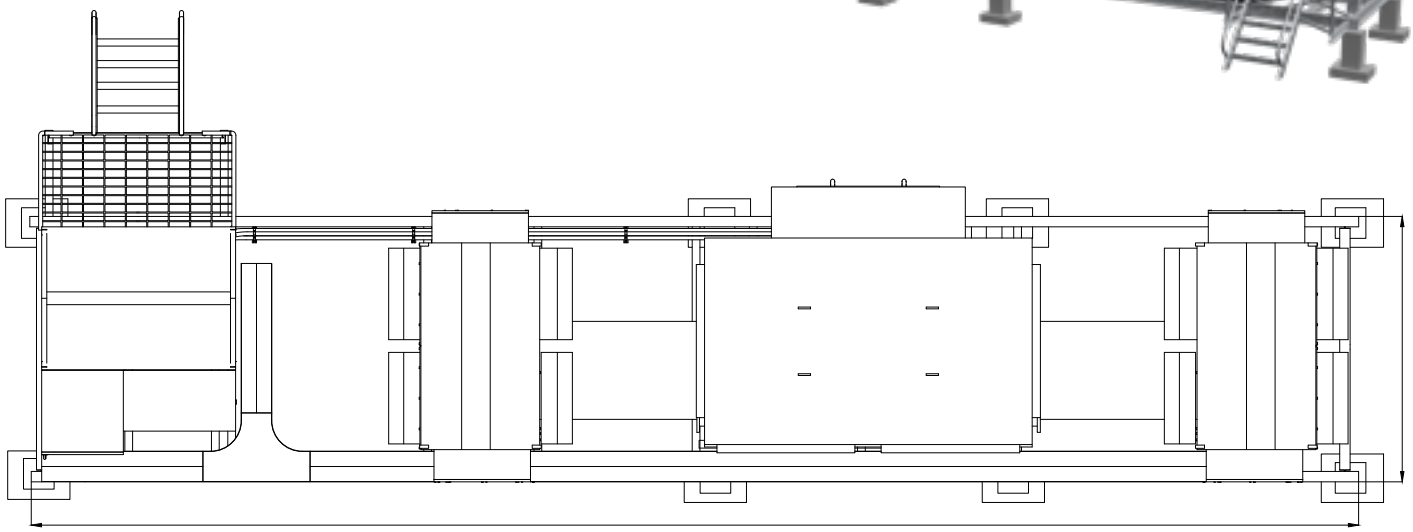
Our vast experience in grid code compliance worldwide and advanced grid control solutions enable us to integrate the packages with the power plant controller, if required by the customer.

Once on-site, the modules require minimal civil works and are fast and easy to install. This reduces site activity, risk and environmental impact and enhances efficiency for operations and maintenance.

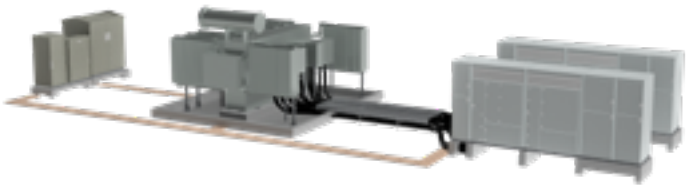
Crucially, the packages are part of the same grid integration platform as our prefabricated substations, which typically **reduce project lead times by up to 40 %** compared to conventionally built substations.

01 Power Collection Skid

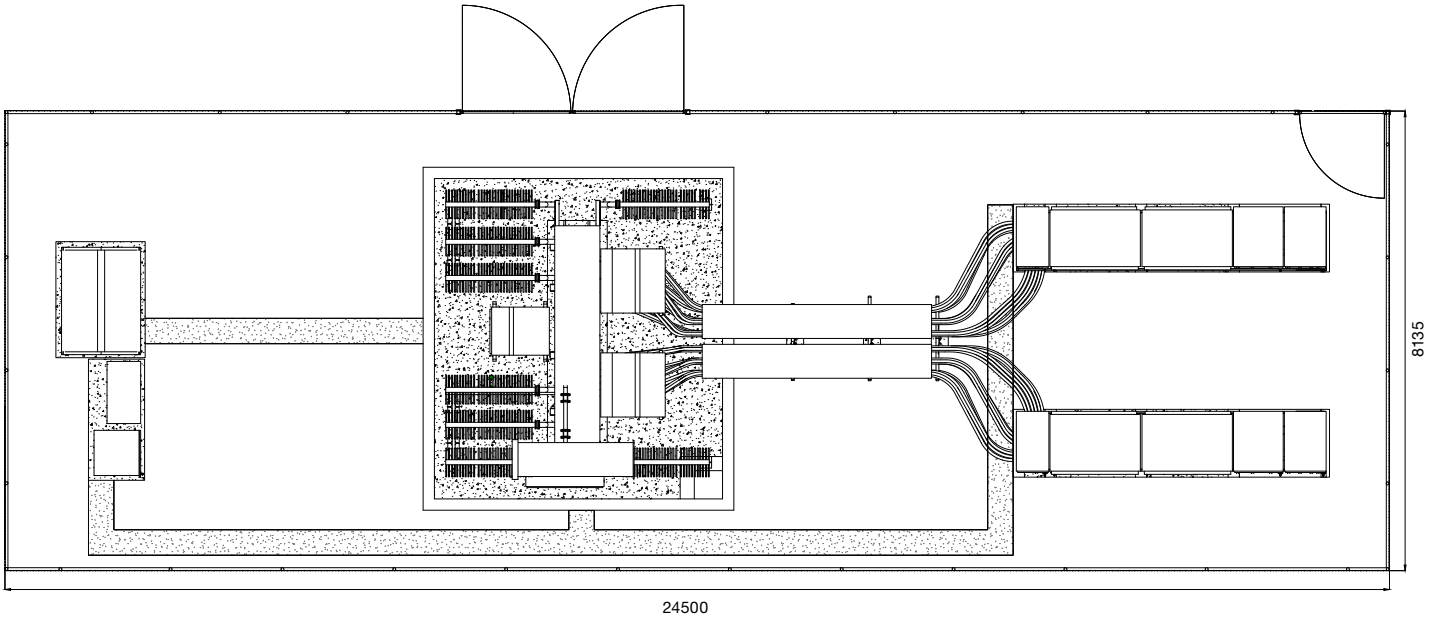




For sites that are difficult to access due to narrow roads or steep inclines, we offer a modular kit-based solution for installation on reinforced cement concrete foundations or similar. The kits are pre-engineered and pretested, ready for easy plug-and-play assembly on-site.



04 Modular Equipment Kit (MEK)



05 Modular equipment kit installed on pad foundations

Benefits and added value

Gain peace of mind from a global partner in the plan, build, operate and maintain life cycle.

- We know how to integrate renewable generation with power grids. We develop more than 30 installations a year with a combined generating capacity of more than 3 GW. And we have extensive experience in meeting grid codes worldwide.
- We support our customers with a global network of 35 service centers.
- We reduce project risk by pre-engineering, pre-assembling and pretesting the packages and by reducing the number of equipment and supplier interfaces.

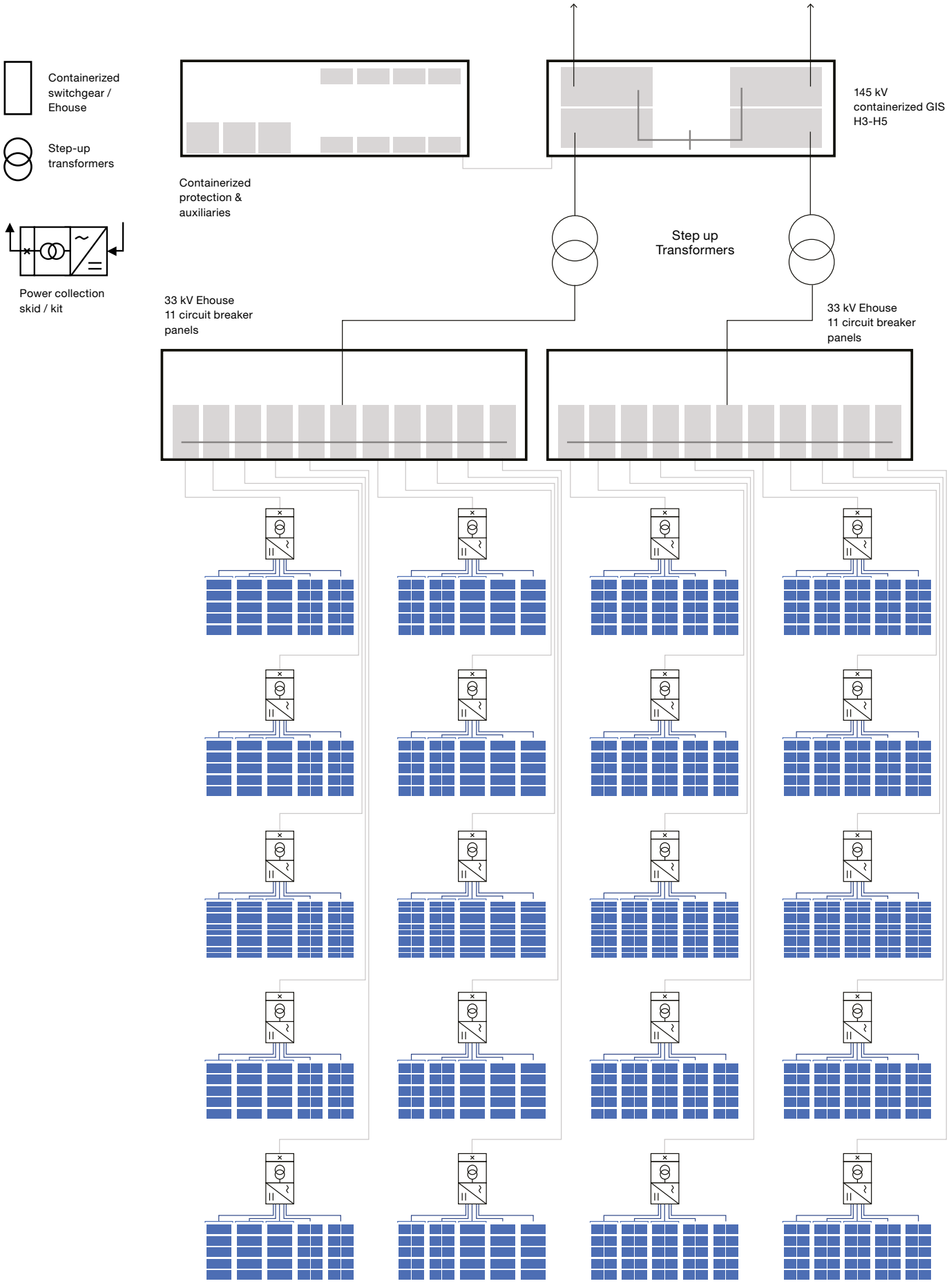
Enable a future-proof asset

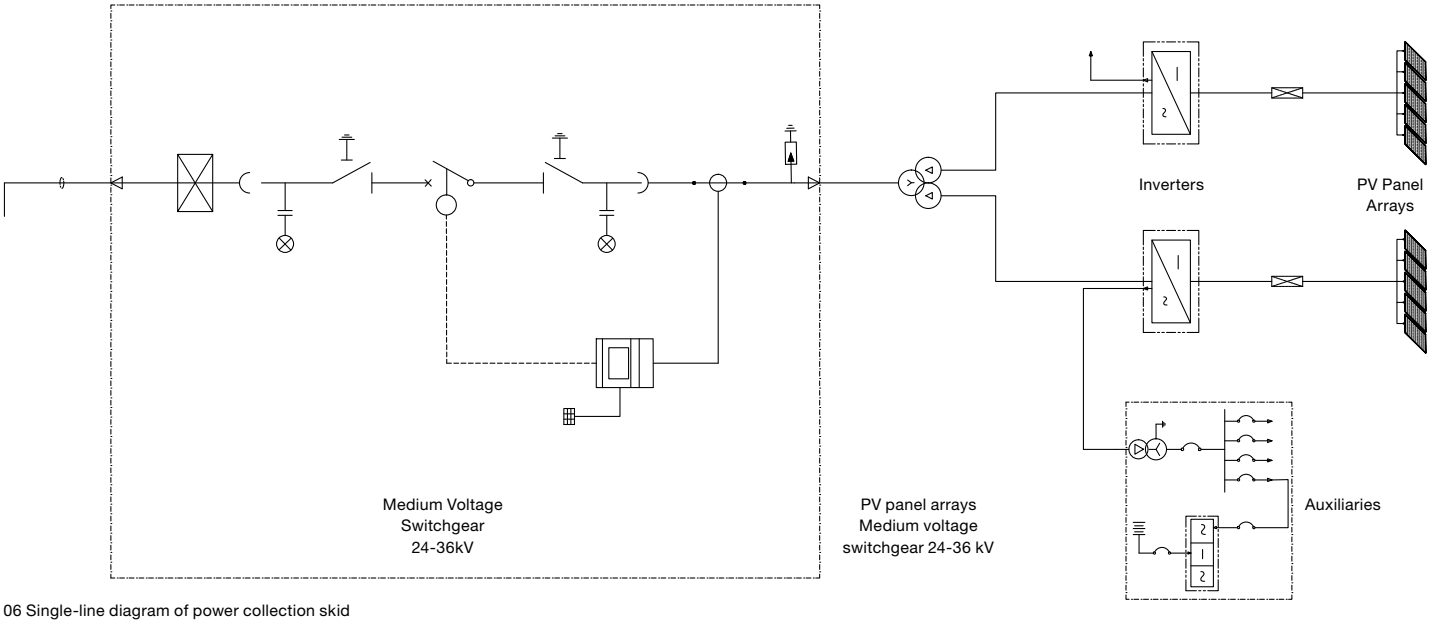
Adding an over-arching digital control system to the inverter as well as the switchgear, we can ensure compliance to both present and future grid codes.

Our digital control system and equipment monitoring at power collection level contributes to an optimal system availability.

40%

less installation time at site


Containerized switchgear / Ehouse
Step-up transformers
Power collection skid / kit
Containerized protection & auxiliaries
145 kV containerized GIS H3-H5
Step up Transformers
33 kV Ehouse 11 circuit breaker panels
33 kV Ehouse 11 circuit breaker panels



06 Single-line diagram of power collection skid

PV Power collection packages

Arrangement type	Skid [1]	Skid [1]	AC-Skid [2]	MEK [3]	MEK [3]	MEK [3]
MV switchgear: ring main unit (RMU)						
Nominal voltage [4] [kV]			22-33			
Rated voltage [4] [kV]			24-36			
Lightning impulse withstand level [4] [kV]			125-170			
Rated current [A]			630			
Rated short time withstand current [kA]			25			
Rated short-circuit time duration [s]			1			
Available single-line diagram of units [5 6]			CV-CVV-CCV			
Inverter transformer						
Maximum power rating [MVA]	5	6.5	6.5	5	10	12.5
Nominal primary voltage [4] [kV]					22-33	
Nominal secondary voltage [7] [V]	690	630	630	690	690	630
Number of windings	2	3	2	2	3	5
Insulation	Dry type	Dry type	Dry type	Oil filled	Oil filled	Oil filled
MV side connection	Cable	Cable	Cable	Cable	Cable	Cable
LV side connection	Busduct	Busduct	Busduct	Cable box	Cable box	Cable box
Inverters (option)						
Inverter type			Central			
Number of inverters	1	2	2	1	2	4
Maximum output DC voltage [V]			≤ 1500			

1) Skid-mounted package
2) RMU and transformer on a skid; the inverter is installed on its own foundations
3) Modular equipment kit
4) Other voltages on request
5) C unit: cable Incoming/outgoing with load-break switch disconnecter
6) C unit: cable Incoming/outgoing with vacuum circuit breaker
7) Other voltages available, according to inverter features

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