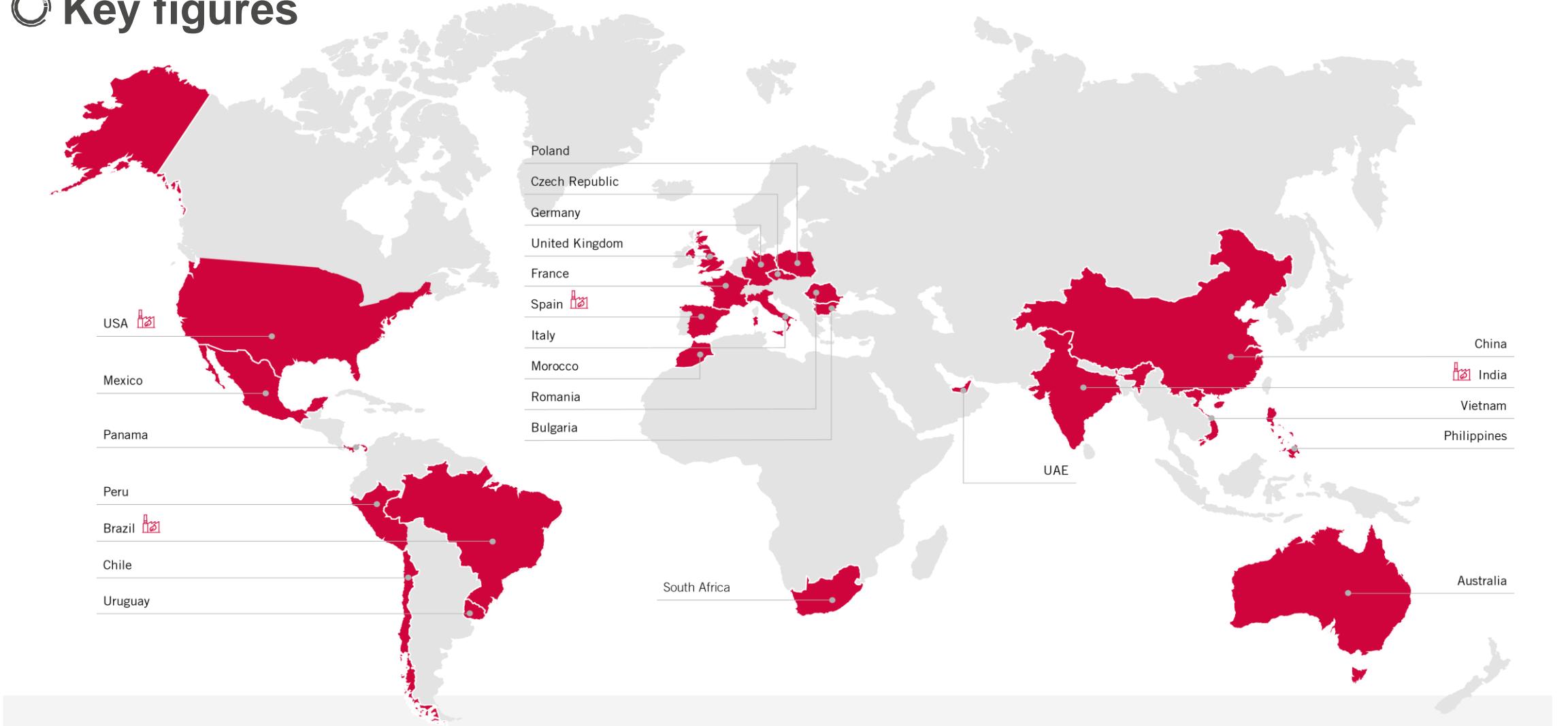


# Ingeteam

READY FOR YOUR CHALLENGES

[www.ingeteam.com](http://www.ingeteam.com)

# Key figures



**24** PRESENCE  
IN NUMBER  
OF COUNTRIES

**4,108** EMPLOYEES



**+75** YEARS IN  
THE ELECTRICAL  
SECTOR



**5%** ANNUAL  
INVESTMENT OF  
TURNOVER IN R&D



**22** YEARS OF  
EXPERIENCE IN  
THE SOLAR INDUSTRY



**22 GW** INSTALLED SOLAR  
POWER CAPACITY  
WORLDWIDE



**17.3 GW** O&M PROJECTS  
WORLDWIDE

**Ingeteam**  
READY FOR YOUR CHALLENGES

○ Diversified business in different sectors

## A BANKABLE COMPANY



Wind  
Power



Marine  
& Ports



O&M Service



Solar PV  
Power



Railway  
Traction



e-Mobility



Energy  
Storage



Power  
Transmission  
& Distribution



Industry



Hydro  
Power



Mining



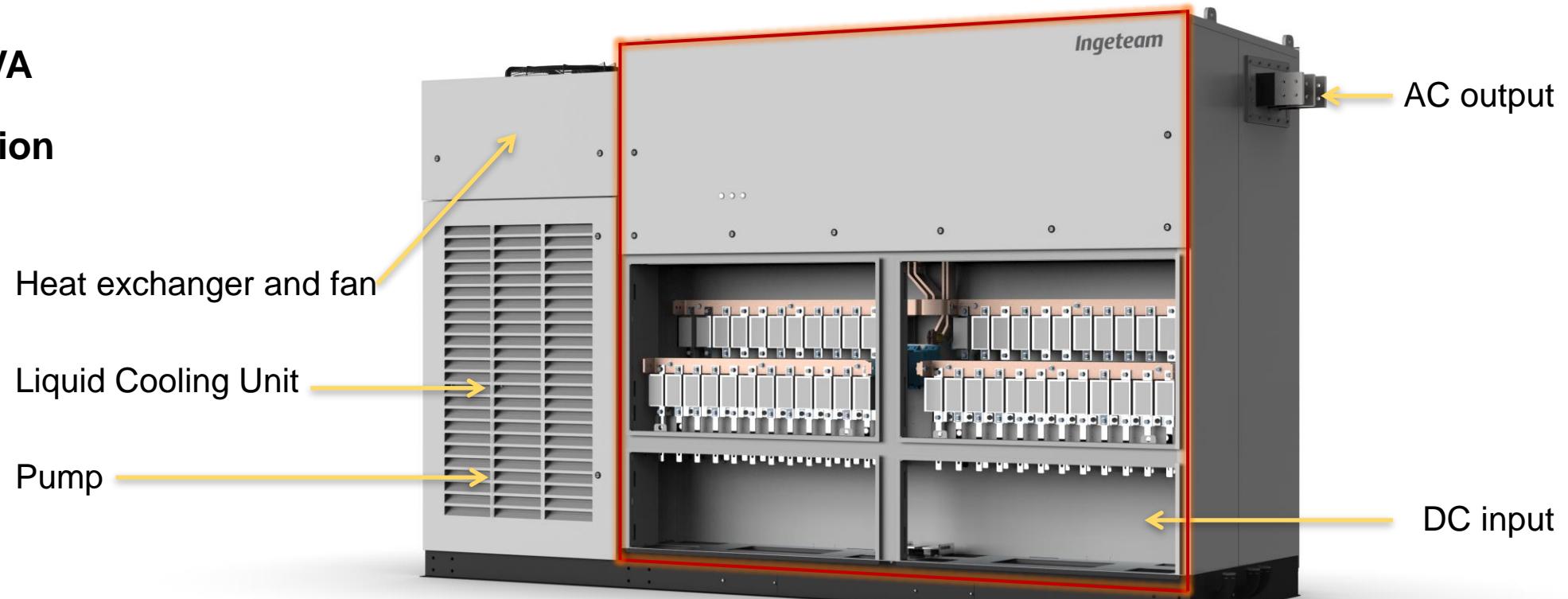
Green  
Hydrogen

# INGECON SUN 3Power C Series

1,500  
Vdc

## The most powerful power stack

- Liquid-cooled inverter
- Up to 3.7 MVA
- IP65 protection



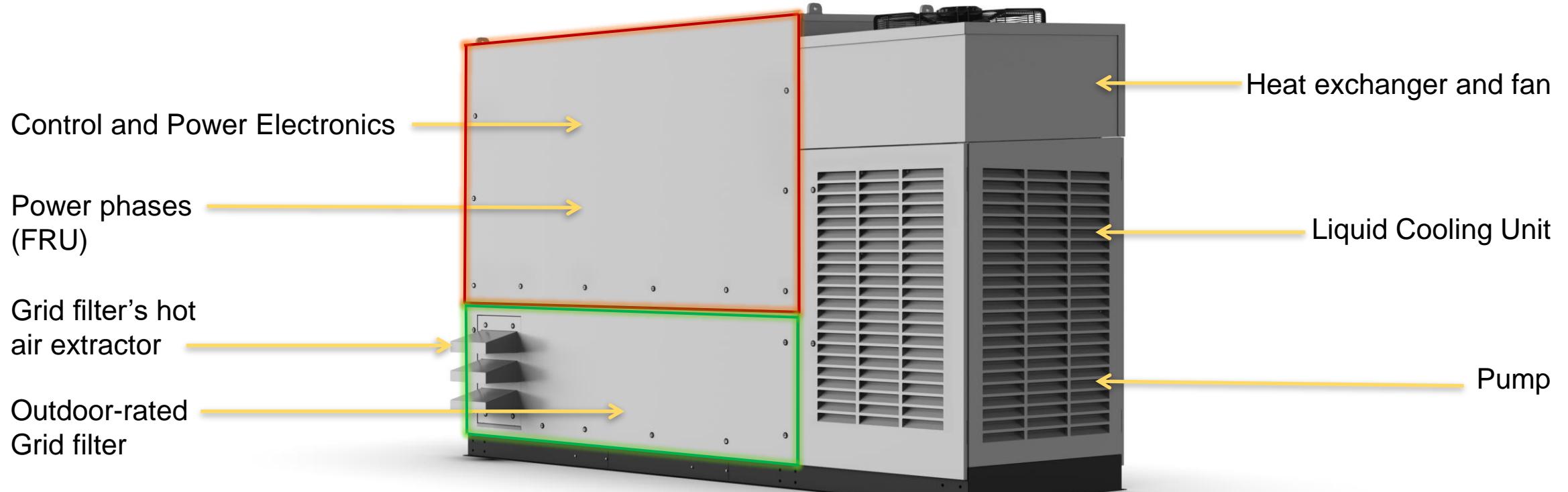
 IP65 compartment.

Front view

# CONSTRUCTION OVERVIEW



## The most powerful power stack



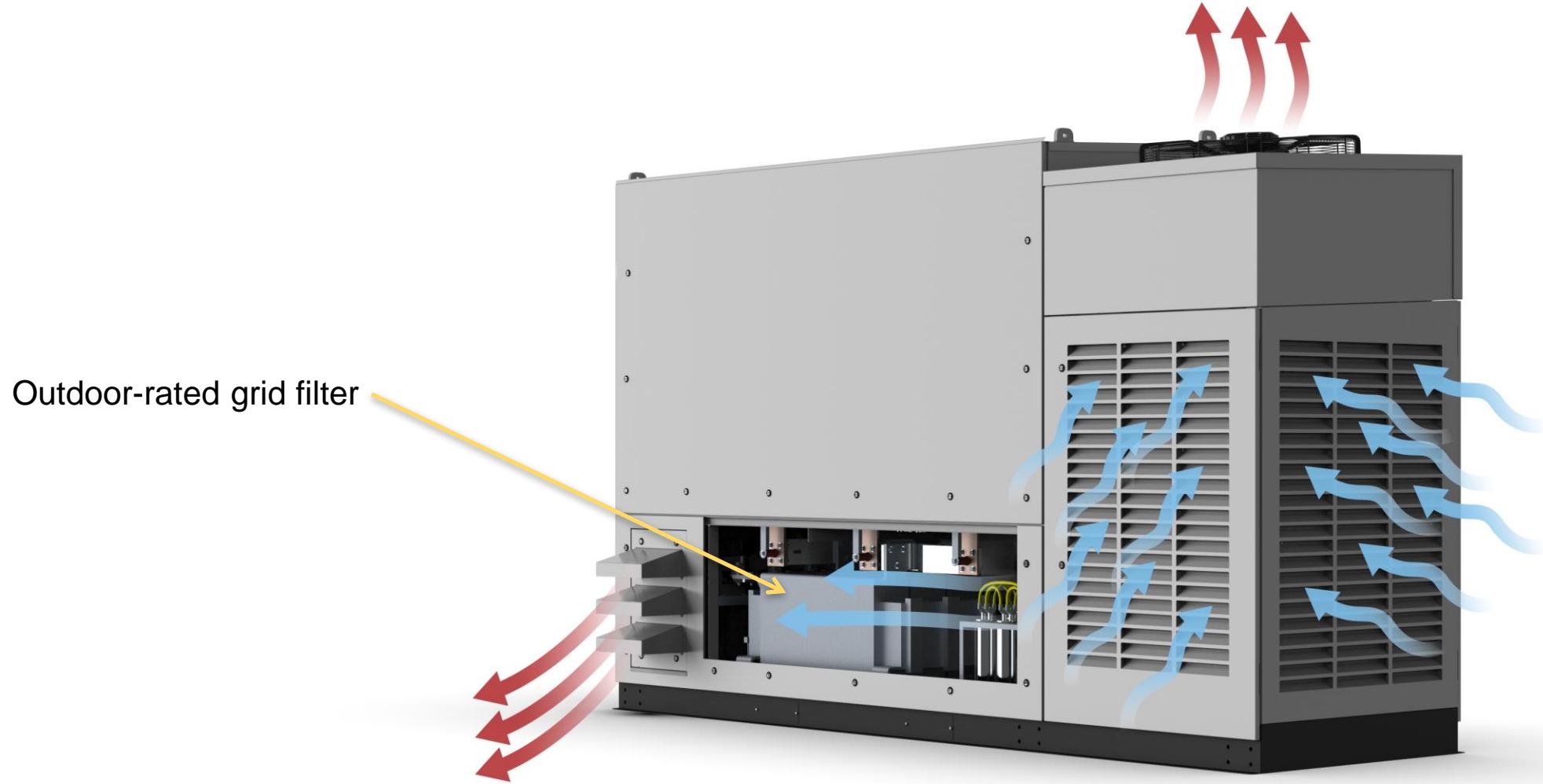
- IP65 compartment.
- IP54 compartment.

Rear view

# CONSTRUCTION OVERVIEW

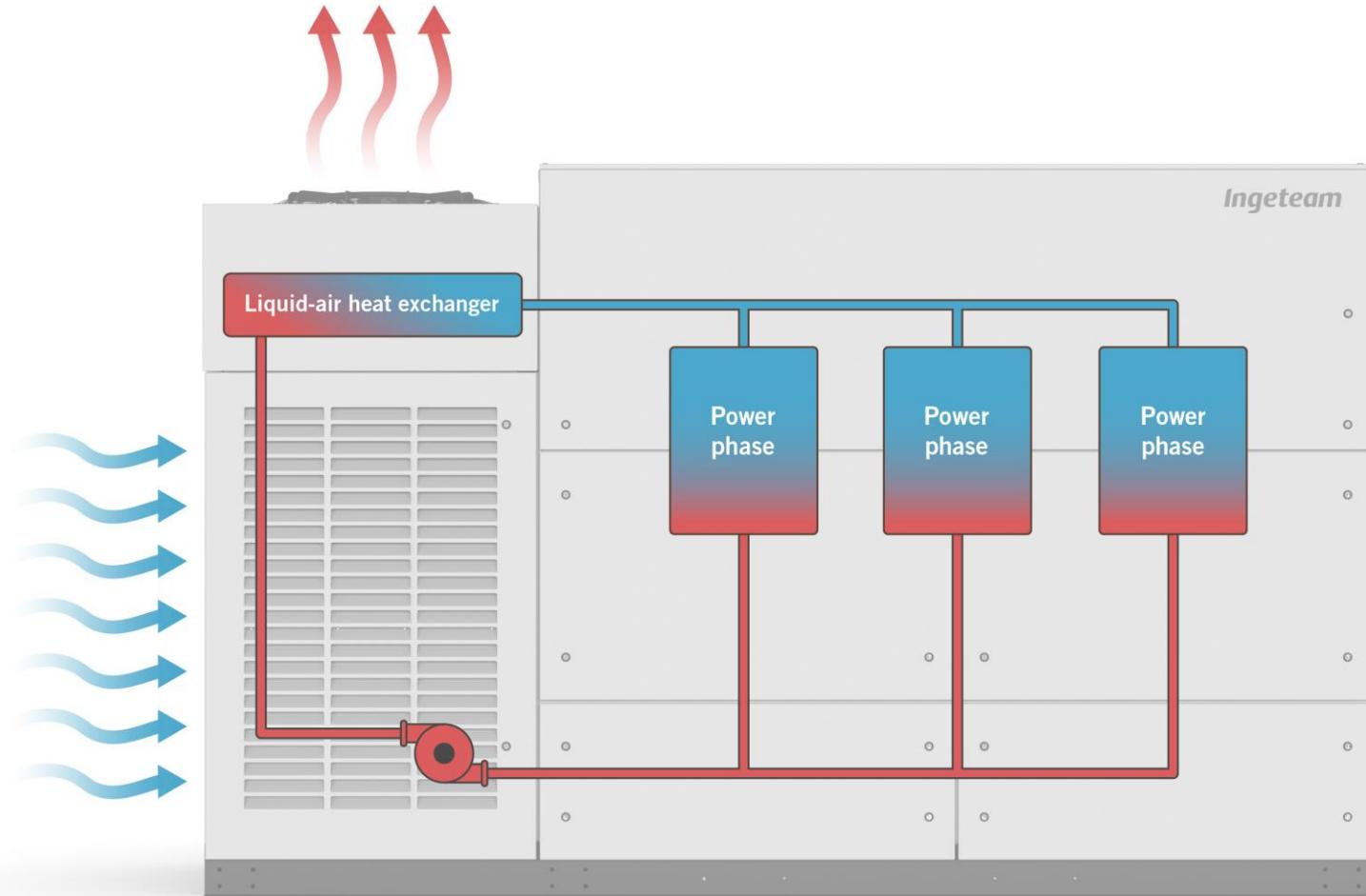


## Forced Air Ventilation



# CONSTRUCTION OVERVIEW

 Total airtightness thanks to its liquid cooling system



# GRID SUPPORT



## Advanced functionalities



Low Voltage Ride Through



Fast Frequency Regulation



Reactive Power at Night



Voltage Droop Control



Active Power Reserve Without Batteries



Grid Following & Grid Forming



Black Start Capability



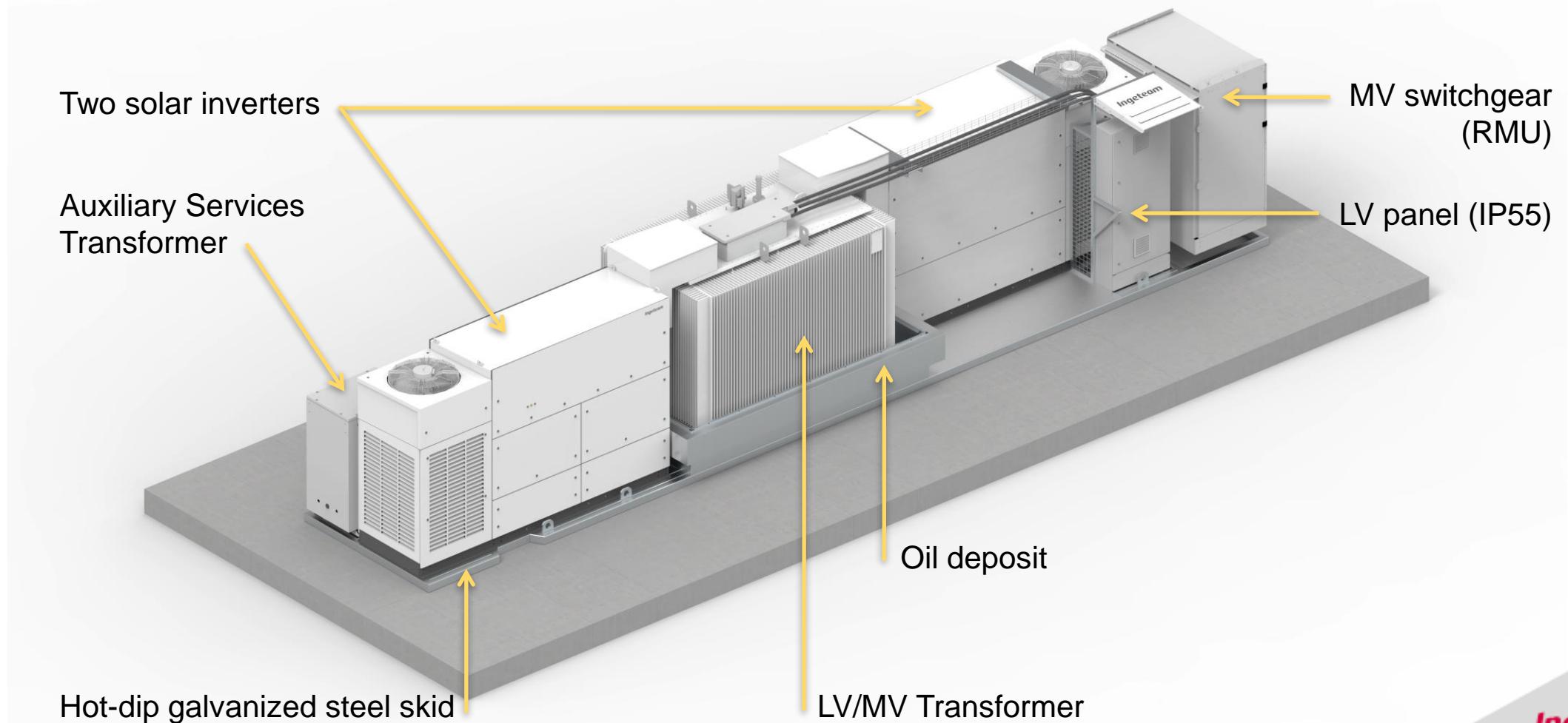
Automatic Voltage Regulation

# DATA ANALYSIS



# Integration Into a Full Skid Solution

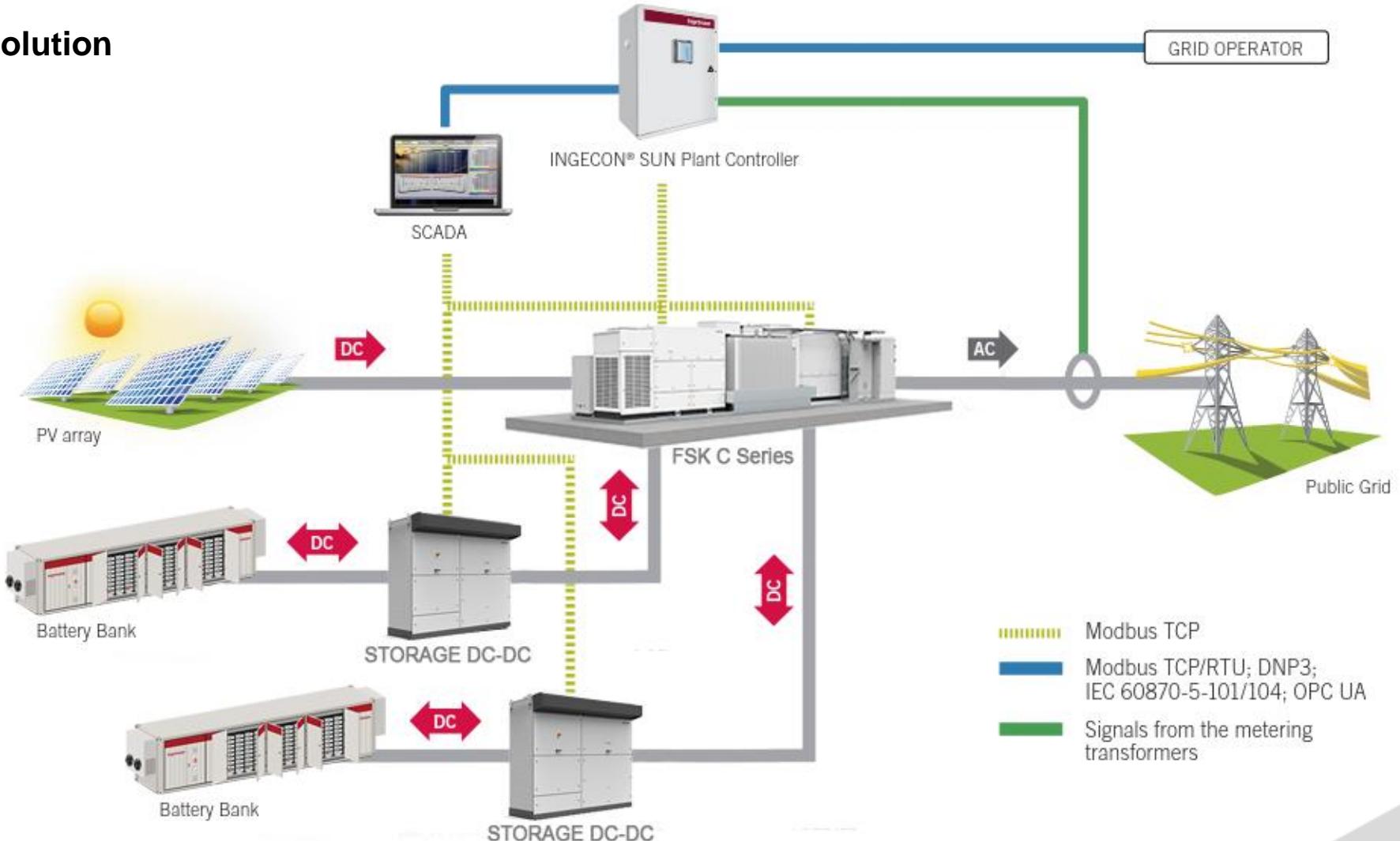
 Medium-voltage turnkey power station up to 7.4 MVA



# BESS-READY

 Fully integrable with energy storage systems, DC and AC coupled

DC Coupling solution



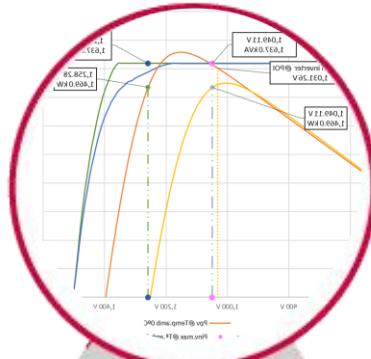


# Key Technological Partner

# IN ALL THE PROJECT PHASES

## 1. DEVELOPMENT

- ❑ Models
- ❑ Simulations
- ❑ Engineering support
- ❑ Dimensioning of the PV plant



### 3. OPERATION

- After sales service
- Warranty
- Spare parts
- Power plant audit
- Service level agreement with availability



## Minimising risks; Controlling the LCOE

## 2. CONSTRUCTION

- Supervision
- Commissioning
- Grid Code compliance
- Technical training



# SOME BENEFITS OF THE NEW CENTRAL INVERTER IN TERMS OF O&M:

## 1. Fully sealed Water Cooling System

- IP65
- No air filters in the electronic phase
- Ingeteam has a large know-how and experience in the maintenance of water cooling systems thanks to years of experience in the wind energy industry

## 2. Remote monitoring of the inverter

- Fans monitoring (this will allow to predict future failures on the ventilation system)
- Information of the inverter performance on the cloud getting a proper traceability on the performance of the inverter, alarms, upgrades,...

## 3. General benefits

- Better efficiency
- Option of remote assistance
- OPEX reduction: less consumables, less spares
- Reduction of O&M times.

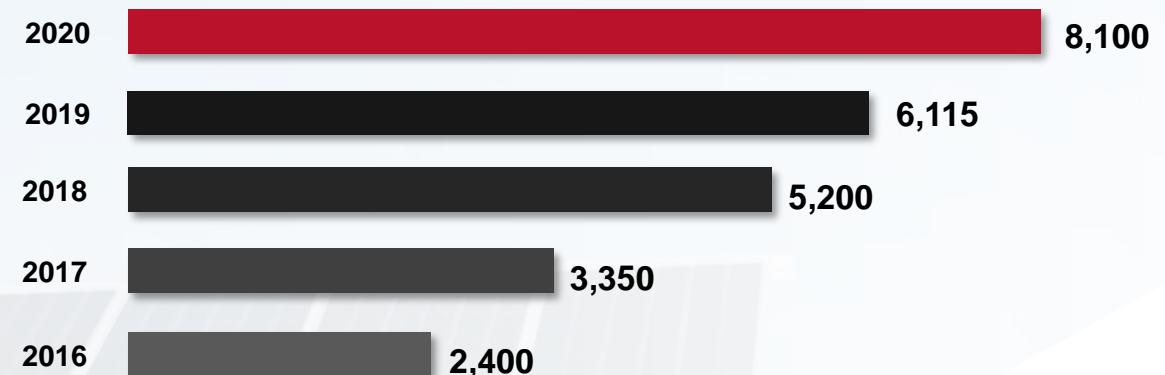
# OPERATION AND MAINTENANCE



**568**  
PLANTS MANTAINED  
throughout the world

**8.1 GW**

Mantained Solar PV Power (MW)



# SERVICES

## OPERATIONAL PHASE

- 1 EXPERT SUPPORT ON TECHNICAL PROCESS MANAGEMENT
- 2 MONITORING AND REPORTING
- 3 SPARES MANAGEMENT
- 4 MAJOR CORRECTIVE
- 5 HV SERVICES
- 6 RETROFITS
- 7 MAINTENANCE, ENGINEERING & MANAGEMENT
- 8 INGEBOARDS®
- 9 REPOWERING / UP-GRADE / REVAMPING



# INGETEAM INVOLVED IN THE DIFFERENT STEPS OF A PROJECT:

Ingeteam will support during the different phases of the Project:

Design during the elaboration of the Execution Project Documents of the PV site



## EPC phase:

- Assembly and installation of the Skids (if Ingeteam product applies)
- Prior Audit – EPC defects punch list
- Pre-Operation and Maintenance (during end of the Construction phase)

## Operation & Maintenance



Improvements or upgrades of the PV site (revamping's, retrofits, ...)

# STEP 1

## Design:

- Ingeteam will support the Customer with the information needed for the market model with all technical information related to the product
- Ingeteam can provide any prior support to understand needs and costs during the O&M phase
- Ingeteam can advise from a technical point of view in terms of O&M standard preventive maintenance (for inverters and any other device of the site)



# O&M Phase

## STEP 2

### EPC Phase:

- Assembly of the Ingeteam equipment (Skids, inverters, ...). It can be done by the future O&M team, giving a proper training for the O&M activities.
- Prior Audit – EPC Defects: Ingeteam can support to the Customer with the Punch List and with this, O&M provider and Owner
- Pre-Operation and Maintenance



## STEP 3

### *Proactivity*

We constantly analyze  
each plant from our  
**CONTROL CENTER**



### *Adaptability*

The inventory sizing  
needs at your plant  
**ARE OUR PRIORITY**

### *In our hands*

We apply the most demanding  
standards to guarantee  
**THE CORRECT OPERATION  
OF YOUR INSTALLATION**

### *Committed*

Our commitment  
is to ensure a  
**RETURN ON INVESTMENT**

## STEP 4

**Improvements or upgrades of the PV site  
(revamping's, retrofits, life extension...),  
with many benefits:**

- New components more efficient and cheaper
- Return of investment
- Cost reduction in Maintenance
- New warranties
- The replaced equipment can be dismantled in order to use its components as spare parts for the rest of the PV plant
- Spare parts availability, software, reliability and H&S improvements



**Thank you for your attention!!**

**Ingeteam**

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