

Packed with Power

- GoodWe leading the trends in Utility Scale solar projects

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How is the inverter industry coping with the trends and requirements of utility scale solar projects?



Prominent trends:

- String inverters are increasing their market share
- 1500V DC systems are becoming a de facto standard
- High-power modules (500Wp+) are on the rise
- Floating PV offers new opportunities
- Challenging geographic areas have become accessible for PV (e.g. hilly terrains)
- More and more old installations require revamping
- Grid operators require grid support functions

String inverters - Packed with Power



| | 2015~2016 | 2016~2017 | 2018~2019 | 2020 | 2021 |
|------------|---|---|---|---|---|
| Inverter | 17-25 kW | 50/60 kW | 70/80 kW | 100-136 kW | 250KW |
| MV station | 1 MVA | 1.6 MVA | 2 MVA | 3 / 6 MVA | 3 / 6 MVA |
| |  |  |  |  |  |

Benefits of increased power of string inverters



Typ. central inverter
Power density: ~0.2 W/l
Weight: 3400kg



GoodWe GW250K-HT
Power density: 1 W/l
Weight: 105kg

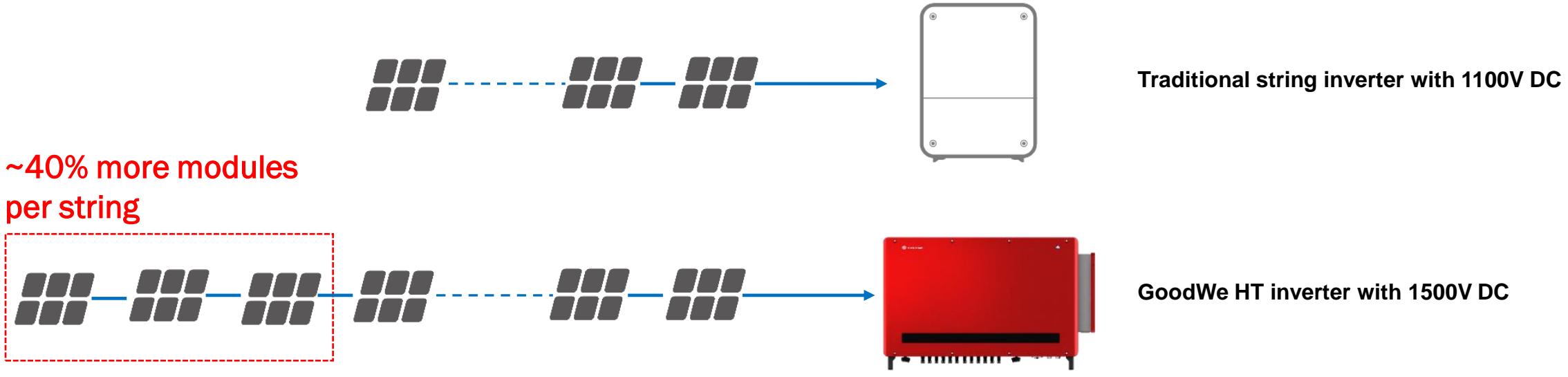
Shrinking CAPEX difference vs. central inverters:

- Fewer string inverters required compared to former generations
- Easier transportation, construction and installation
- No DC boxes
- Higher usage of ground surface

Increasing advantages for OPEX vs. central inverters:

- String level monitoring
- Remote O&M - IV curve diagnosis
- Easier maintenance and inverter replacement
- Higher failure detection capabilities
(AFCI, AC terminal temperature, internal humidity...)

1500V DC voltage does not only increase inverter power density...



1500V vs. 1100V

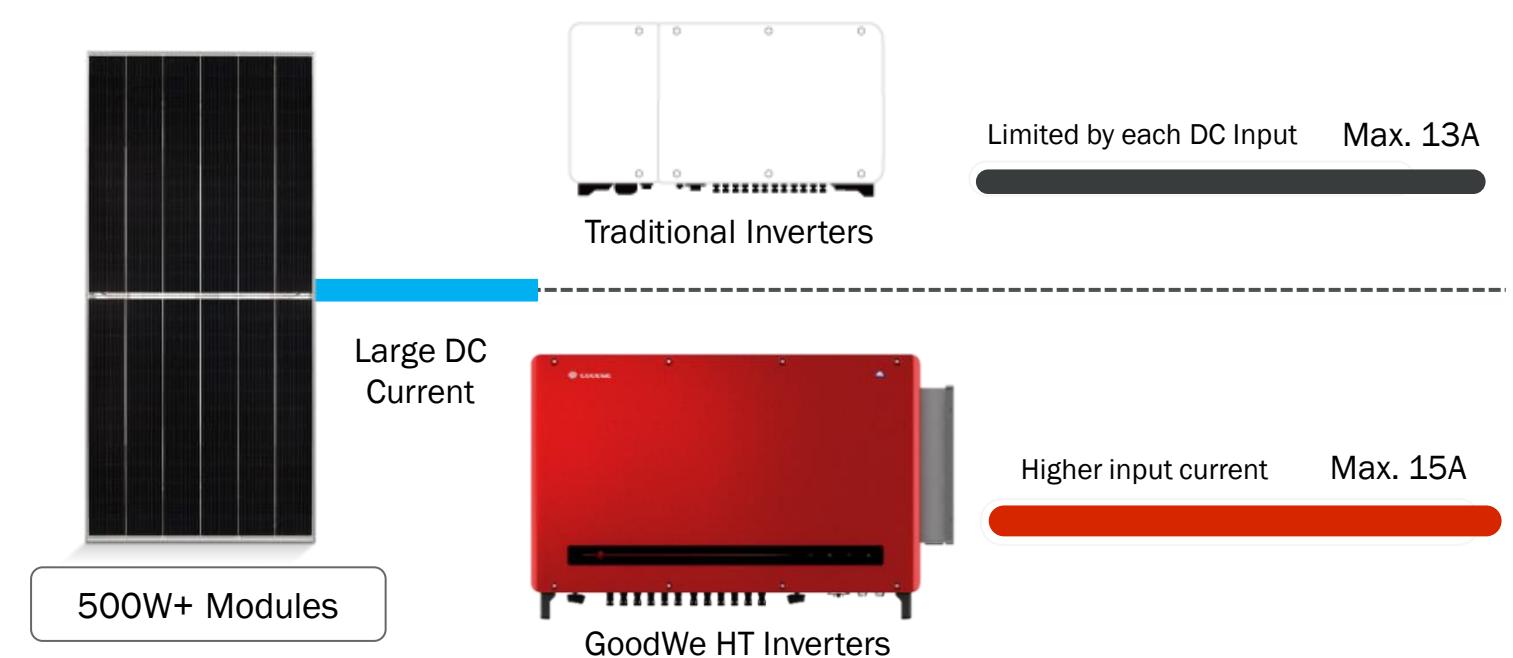
- Up to 40% savings of DC cabling costs
- 1%~2% increase of electricity generation
- Increased DC power density

HT Series matches the trend of High-power Modules



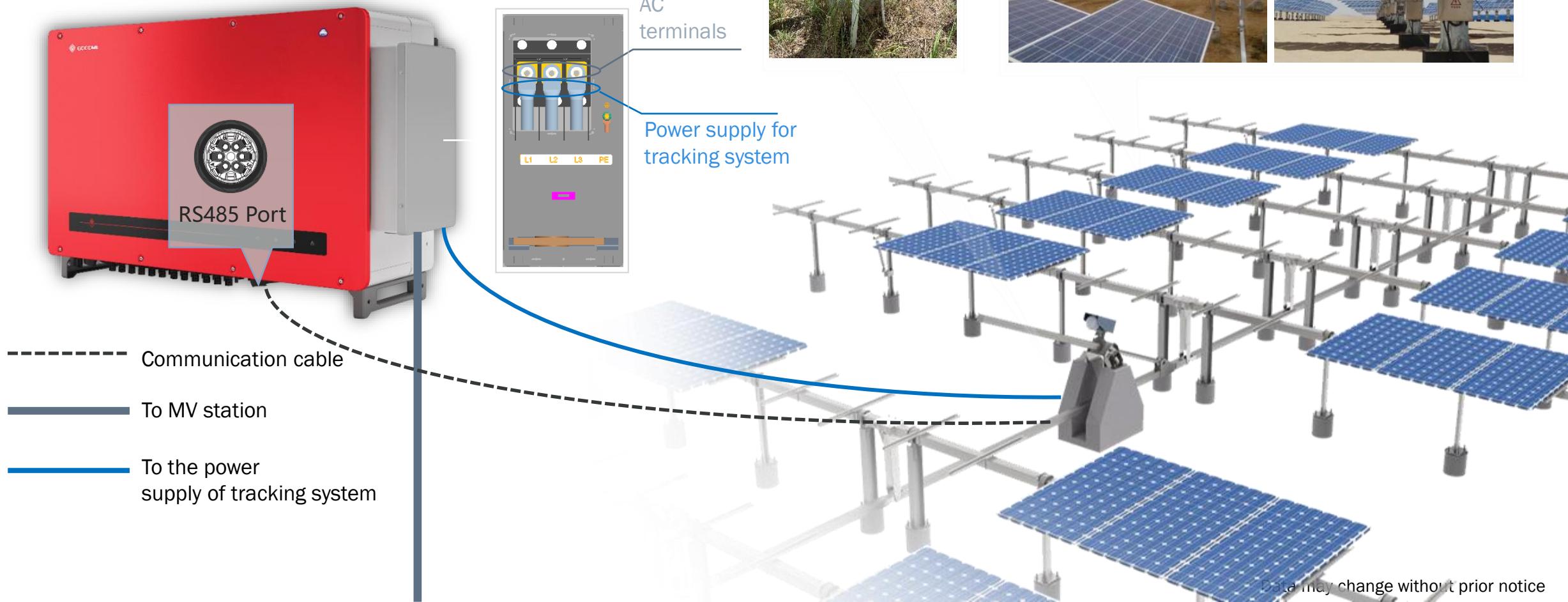
Max. DC input current of **15A** per string of **GoodWe HT** series is the highest among string inverters.

| Module Brand | Isc |
|--------------------------|-----------|
| ■ Jinko Tiger Pro | 14.1A |
| ■ JA Solar Deep Blue 3.0 | 13.72A |
| ■ Longi solar Hi-M05 | 13.85A |
| ■ Risen Titan | 12.5A |
| ■ Trina Vertex | 12.17A |
| ■ Canadian Solar HiKu6 | 13.75~14A |



Max. MPPT current **30A** allows for operation with ~18A modules with a high DC/AC ratio.

Integration of tracking systems with HT Series



String inverters solve multiple challenges of floating PV projects



  **CENTRALIZED CONCEPT**

 **SIMPLIFIED O&M**

HIGH FEATURE INTEGRATION LEVEL WITH STRING INVERTERS

Integrated PID-recovery board.
→ Restoration effect ~99%



IP66 protection for the whole inverter
IP68 protection for cooling fans

Internal humidity detection



PV is possible on challenging grounds thanks to multiple MPPT and IV curve diagnosis



3 MW sub-array with 144 MPPTs



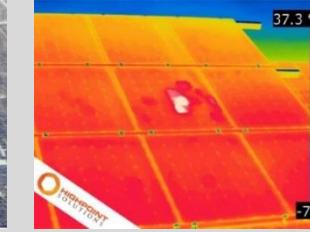
✗ Different tilt and azimuth



✗ Shading



✗ Dirt



✗ Module issues

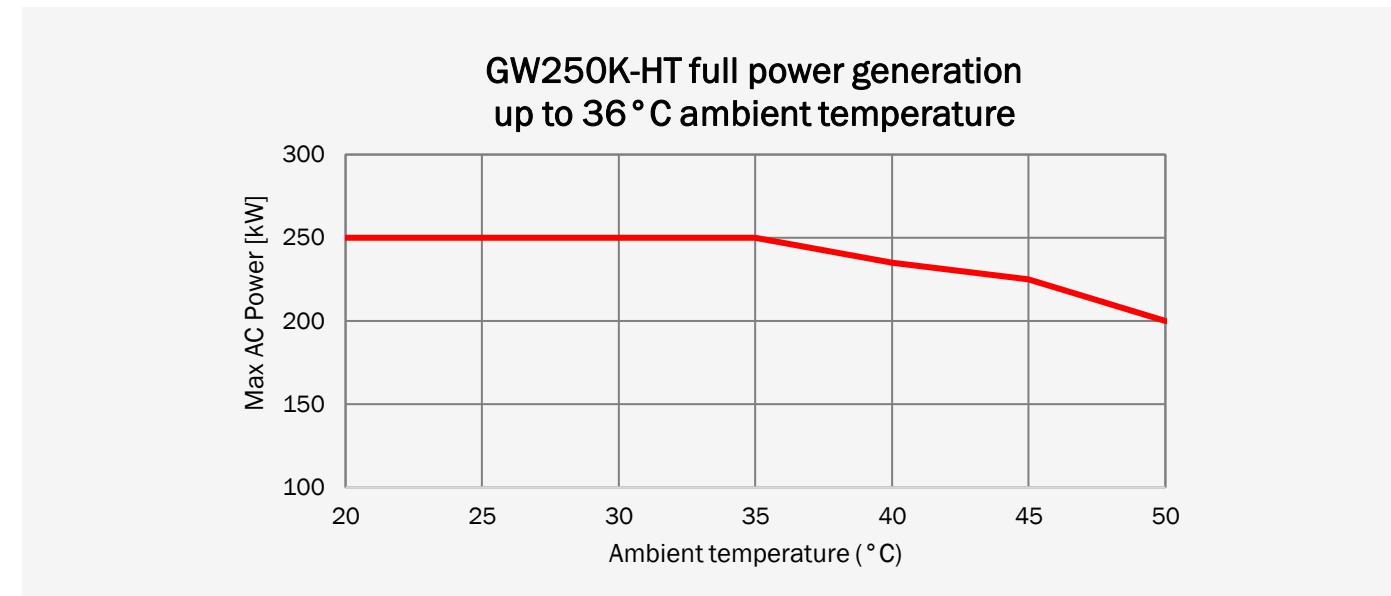
IV curve diagnosis

- Automated analysis of fault causes
- Automatic generation of analysis reports
- One-button start, saving cost of labour
- Online detection, no interruption of power generation
- 100 MW detection time < 30min



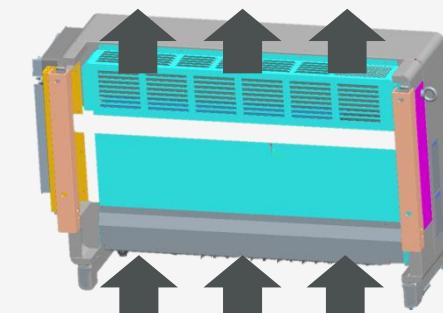
Data may change without prior notice

High temperature adaptability for operation in hot regions



Excellent heat control design brings:

- Higher power generation
- Extended lifetime of inverter



Optimized heat dissipation path



Set of 6 replaceable fans

Revamping projects come with challenges



- **Timing:**

Replace existing components (e.g. inverters, DC boxes) before they fail, but not too early

- **Inverter size:**

Today's inverters have a significantly different power compared to ~10 years ago

- **Plant design:**

Existing wiring might need to be reworked

- **Communication & monitoring:**

New inverters might not be compatible with old infrastructure

- String inverters offer high flexibility
- We help you find the right timing and concept to repower your project

GoodWe Product Portfolio



String inverters

Residential
0.7 – 15 kW

C&I
20 – 120 kW

Utility Scale
136 – 250 kW



Storage inverters

Hybrid
3 – 10 kW

AC coupled
1 – 50 kW



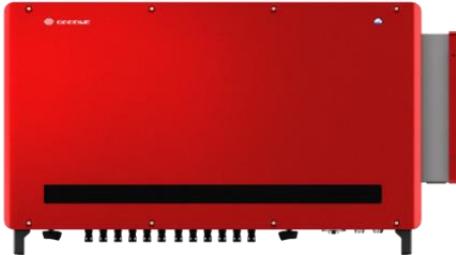
Battery storage

Battery
(LV & HV)

All-in-one
storage

Energy Management & Communications

Main new product launches in 2021



HT Series
100-250 kW inverters
C&I and utility scale



BTC Series
50 kW storage inverter
C&I



ESA Series
All-in-one storage system
Residential



LYNX Batteries
LV and HV batteries
Residential



EHB Series
1ph hybrid inverters
Residential
(South Africa)

THANK YOU

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