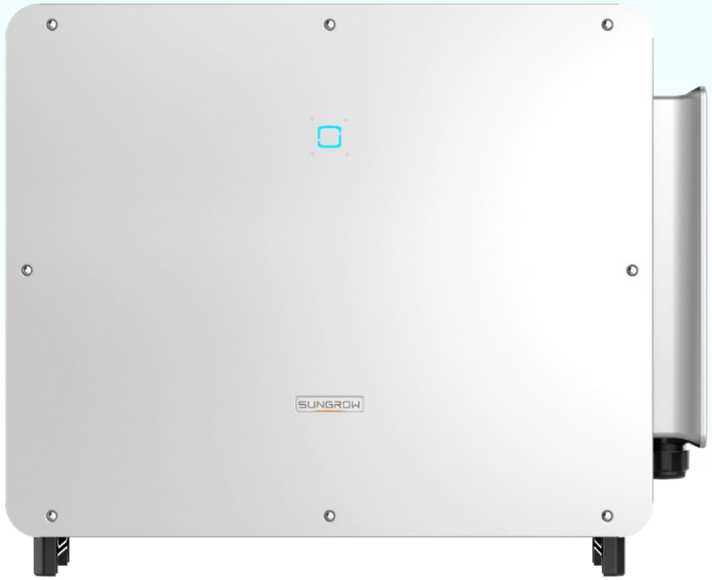
Ultra Powerful String Inverter SG320HX



Lecturer: Sungrow Date: 202109 Confidential

SUNGROW

Challenges

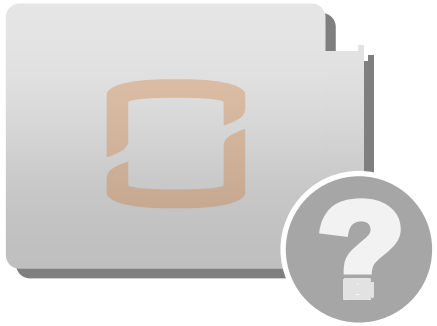
2019

15GW+ inverter installed，40+ countries

SG250HX

- The global electricity price is about 1.7 cents/kWh
- Inverter: efficient heat dissipation, protection level
- Power grid: reactive power capacity, HVRT&LVRT
- Bifacial module, tracking bracket power supply and communication interface

2021



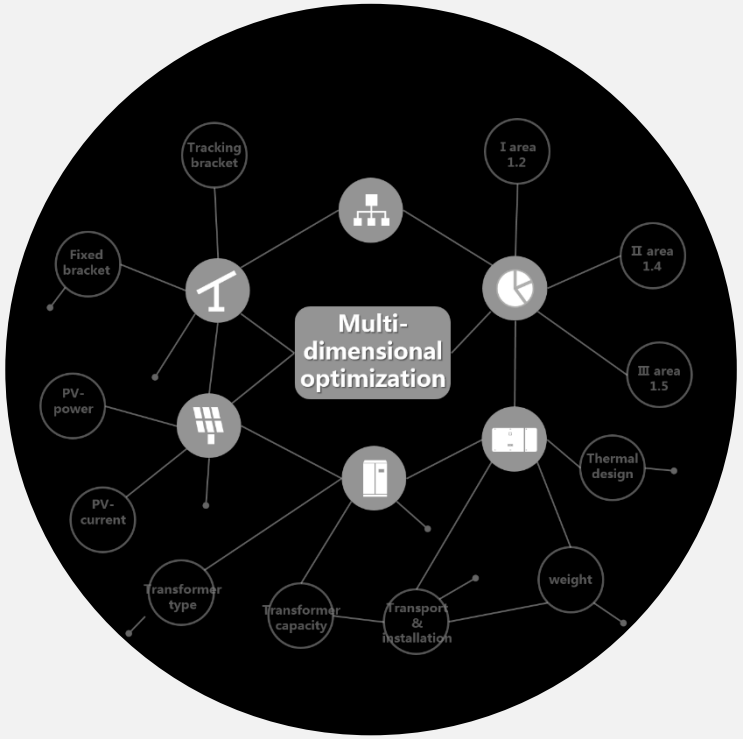
New challenges

• The world's lowest electricity price 1.04 cents/kWh	How to guarantee IRR
• Safety: module current increases	How to improve the protection level
• High penetration rate, UHV AC/DC transmission	How to meet the power system requirements
• High power module + bracket + cleaning	How to increase power generation

Optimal String Solution: 295kW Inverter & 8.85MW Block

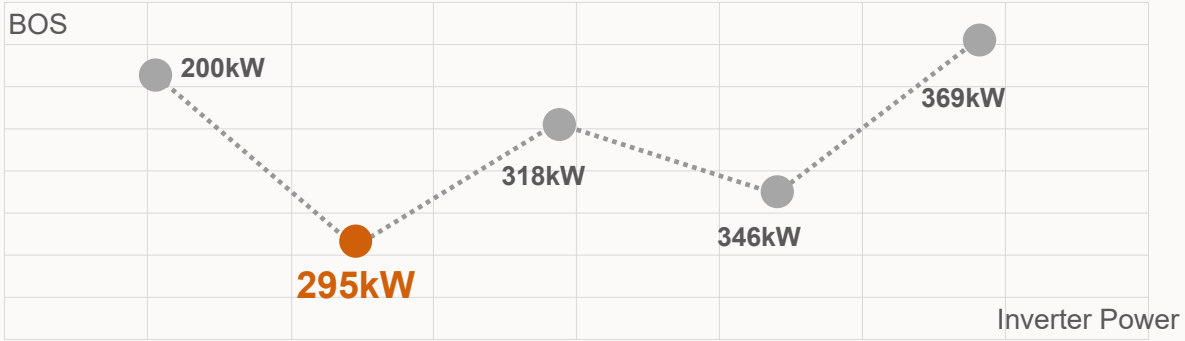
Multi-dimensional, multi-variable optimization

PV module, bracket, MV station..... DC/AC ratio, block design, etc



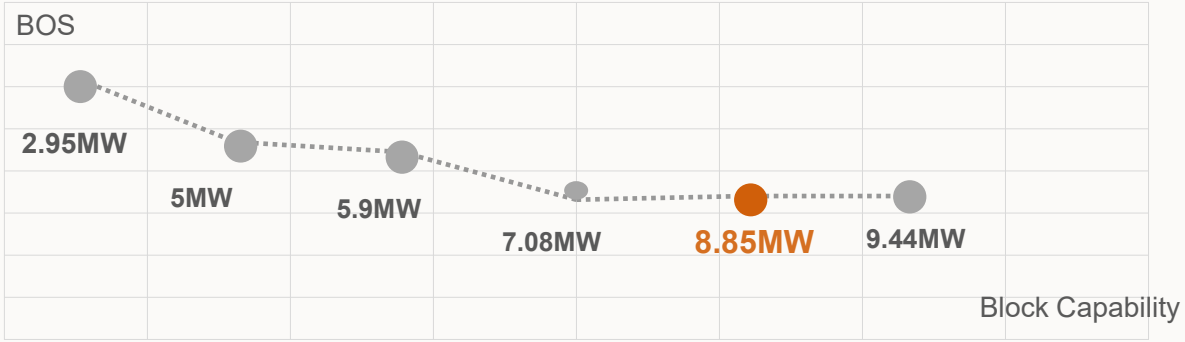
Inverter power optimization

295kW@50℃ power, lowest BOS



Block capacity optimization

8.85MW block, optimal



System Solution

Lower LCOE

Saves 1.8 million $/100MW

More Safety

Active breaking fault
Redundant protection design

Multi-dimensional integration

High power module, tracking, cleaning
Yield increased by 2%

Grid support

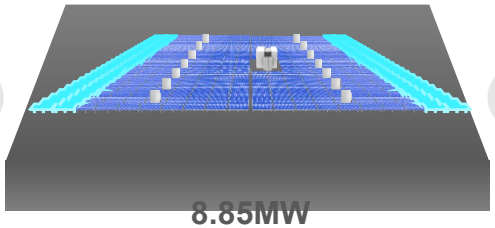
Multiple industry firsts
Grid connection friendly

High Power + Large Block + Q at Night, Committed to LCOE

High power

Save 0.3 million $

Large block

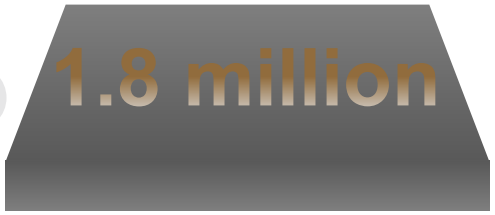


Save 0.3 million $

Q at night

Save 1.2 million $

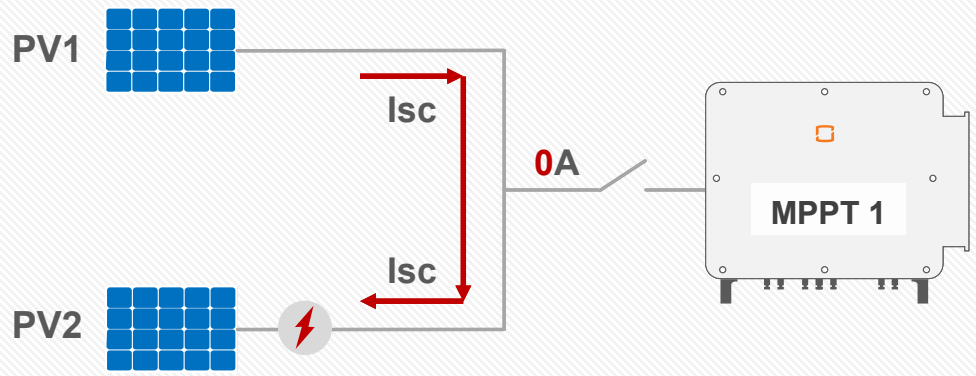
Lower LCOE



Save 1.8 million $

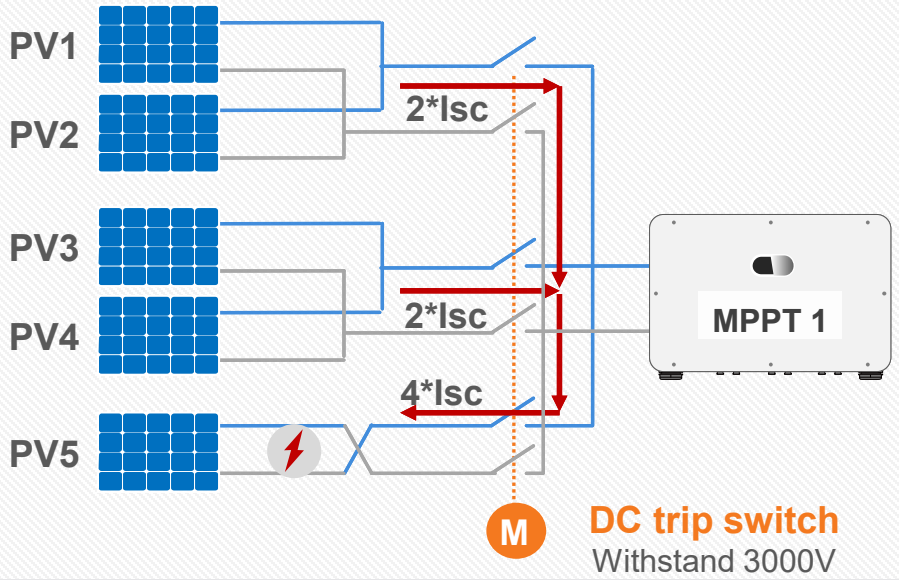
2 Strings per MPPT, No Fear of String Short Circuit or Reverse Connection

2 strings connected to 1 MPPT design



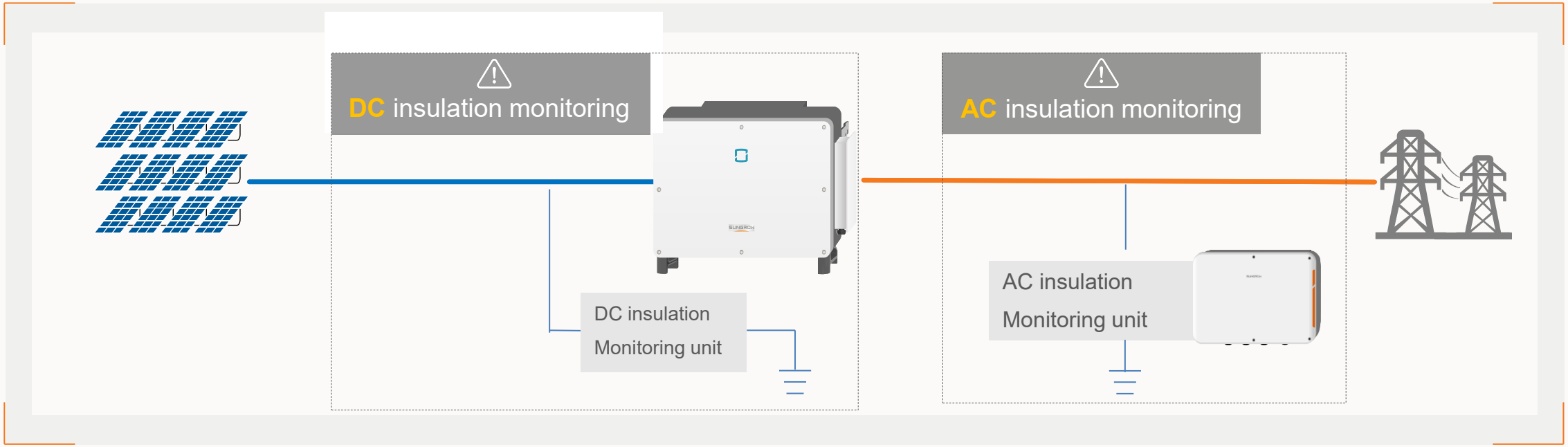
- Cables and PV modules only withstand 1*Isc within the cables and PV modules tolerance even if the string is reversed. **No need to configure overcurrent protection devices.**

5 strings connected to 1 MPPT design



- IEC 62548： Over-current protection device is demanded when 5 strings connected to 1 MPPT.
- IEC60364-7-712： DC overcurrent protection device must be fuses or circuit breaker; **DC trip switch can't be used as over-current protection device.**
- Once control system fails, the fault string PV5 **withstand 4*Isc current, there is a risk of burnout.**
- DC switch will bear 4*Isc=**80A** and DC **3000V** at the break point when the PV5 string is reversed. The switch cannot be disconnected at this condition.

24h Real-time AC and DC Insulation Monitoring



- **Flexible setting**: Threshold can be set, suitable for different application scenarios.
- **Real-time alarm**: Real time upload of alarm + impedance value, fault early detection

- **Prevent risks**: Impedance value analysis and prediction, early warning.
- **Efficient O&M**: Quickly locate faults, improve O&M efficiency.

Perfectly Match with 182/210 PV Module, Higher DC/AC Ratio

How to design the inverter to balance cost and access capability?

How to match the inverter to ensure the optimal capacity ratio?

15A
500Wp+

182 PV module

20A
600Wp+

210 PV module

Two version design
DC/AC ratio **1.3~1.8**

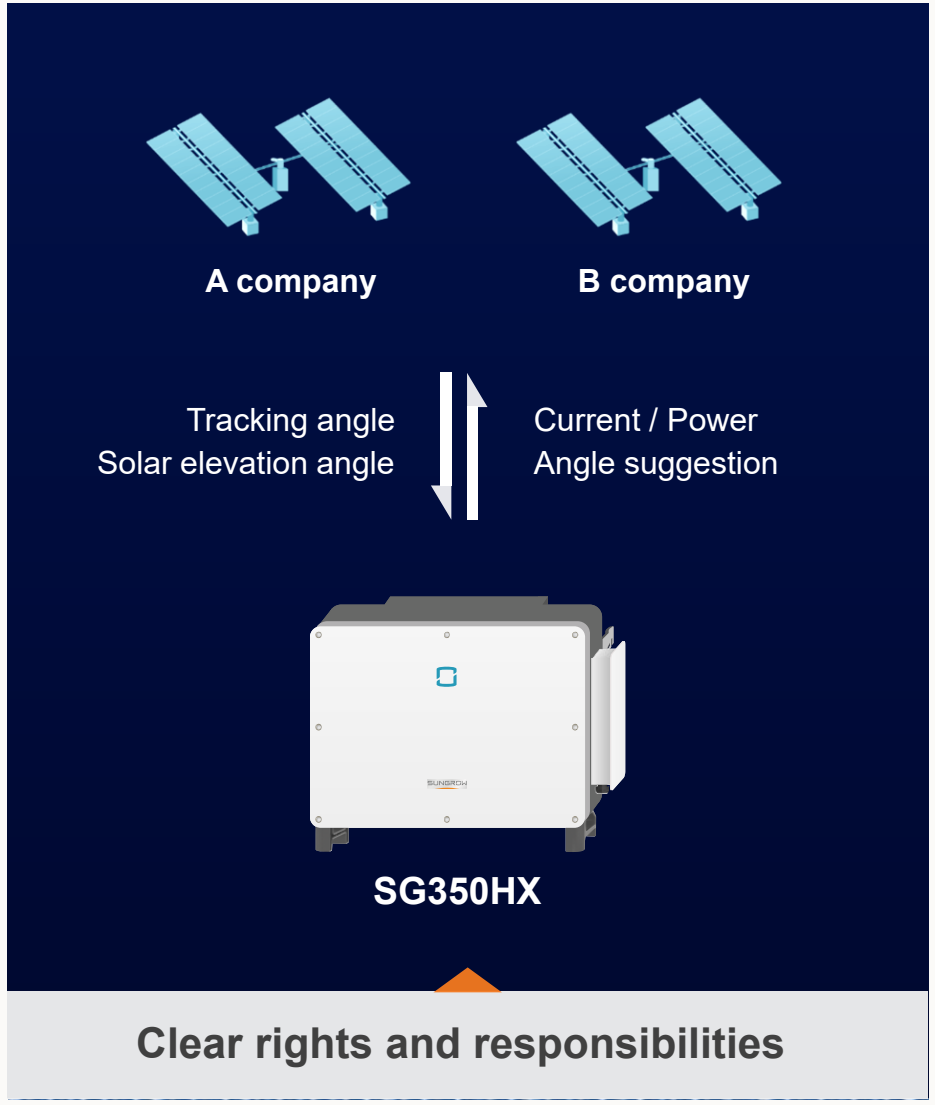
Match 182 module

15A/string, **16** MPPTs

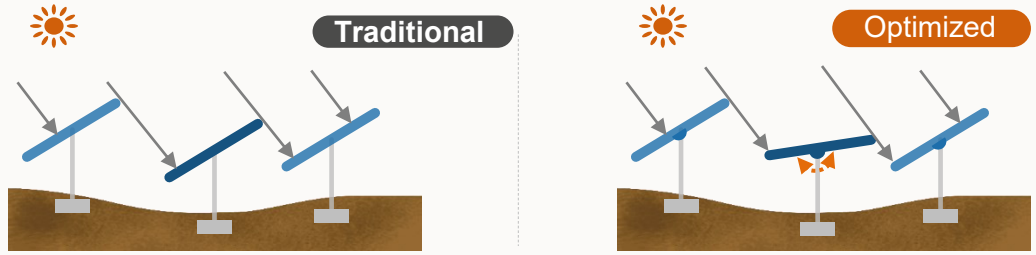
Match 210 module

20A/string, **12** MPPTs

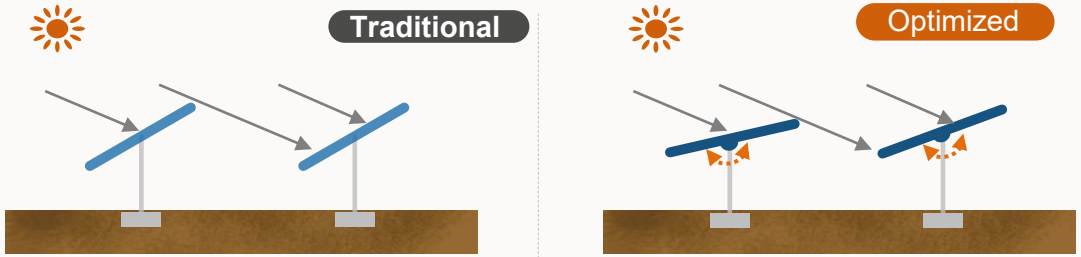
Open Platform, Close-loop Control, Yield Increased by 1%



Avoid occlusion in complex terrain



Avoid occlusion in morning and evening



Multiple scene/mode, different angle in different scene

IV Scanning + Intelligent Cleaning to Increase Power Generation

Third party Level 4 certification， accuracy ≥90%
Complex terrain, bifacial module, tracking etc. scenarios

IV diagnosis and identification, intelligent cleaning
Increase power generation and prolong the life of cleaning robots

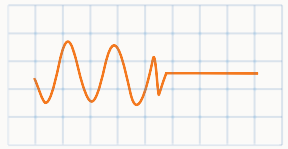
For China Lingbi 120MW power plant, IV + intelligent cleaning has increased the power generation by more than 2%

Actively Support the Grid to Meet the Requirements of New Power Systems

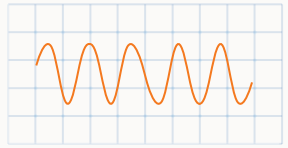
SCR=1.16 weak grid stable operation

Dynamic impedance remodeling and transient overvoltage suppression

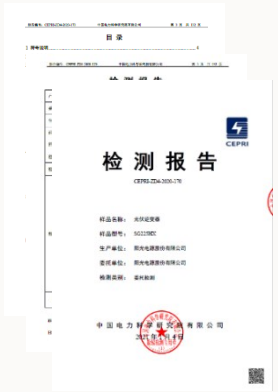
Authoritative test of China Electric Power Research Institute



Oscillation shutdown without this technology



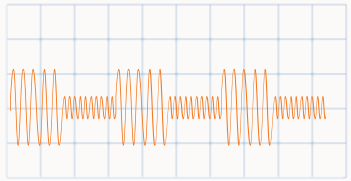
Using this technology, stable grid connection

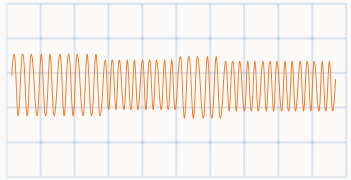


UHV continuous H/L ride through

Software upgrade, no need to replace hardware equipment

The first company to pass the Qingyu UHV test





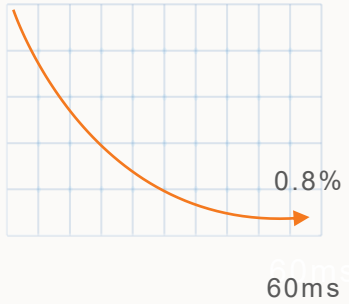
Continuous H/L ride through, stable operation

Quick response to grid dispatch

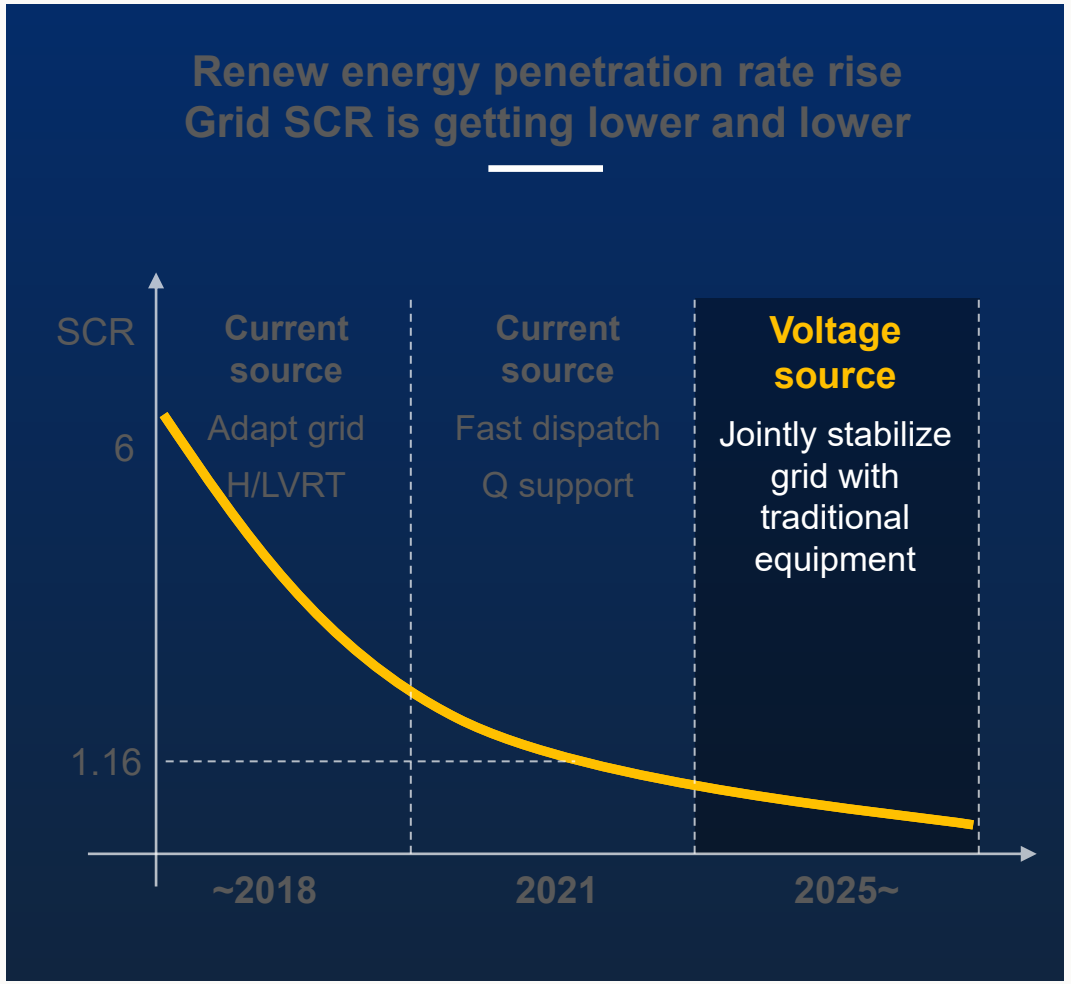
Reactive power response ≤30ms, active power 60ms reduced to below 1%

The only dispatching case through China Southern Power Grid

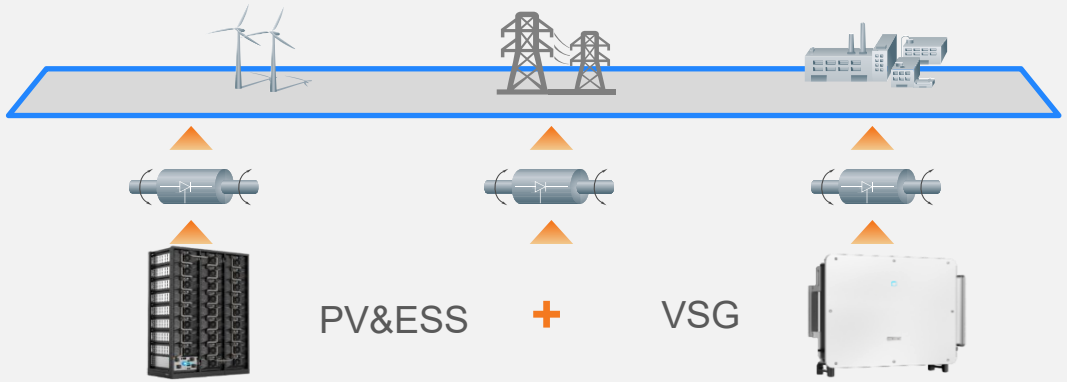
China Zhenliang 150MW power plant



PV+ESS & VSG, Jointly Stabilize Grid with Traditional Generation Equipment



Voltage source mode, grid support



Tibet Coqin: VSG inverters actively support the grid

New Upgrade for Lower LCOE, Stronger Grid Support and More Safety

SG320HX

Lower LCOE	• High power, large block, save 0.6 million $/100MW • Q at night function, save 1.2 million $/100MW
More Safety	• 2 strings per MPPT, no fear of string short circuit and reverse connection • 24h real-time AC and DC insulation monitoring
Multi-dimensional Integration	• Perfectly match with 182/210 PV module, DC/AC ratio 1.3~1.8 • Open platform, coordinate control, yield increased by 1% • Online IV scanning, intelligent cleaning, active O&M
Grid Support	• SCR=1.16 stable operation in extremely weak grid • PV+ESS & VSG technology • Reactive power response time <30ms, active power derating <60ms

THANK YOU!