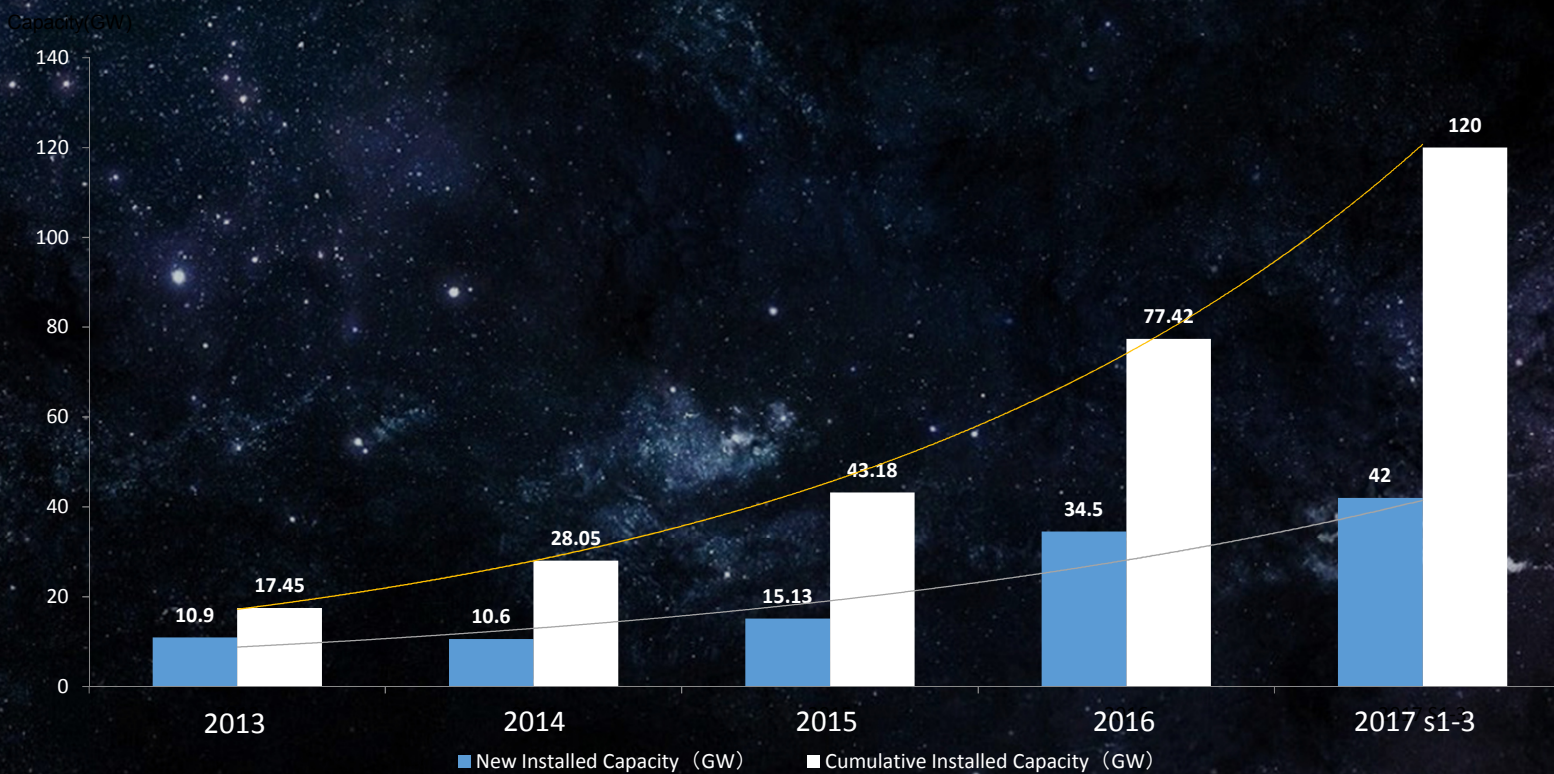


PV System: Quality Control, Test, Risk Evaluation and Management

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Evolution of the Installed PV Capacity in China



Solar Irradiance data

- ◆ Inaccurate
- ◆ Normally using data from NASA (Satellite data)
- ◆ No direct normal and diffused irradiance
- ◆ Annual solar irradiance variation
- ◆ Environmental variation

Design

- ◆ Do not fully consider local environment
- ◆ Flood prevention and consideration
- ◆ Rooftop load
- ◆ Surrounding environment and shading
- ◆ Wind load
- ◆ Tilt angle
- ◆ Open rack load
- ◆ Open rack space

Core Devices

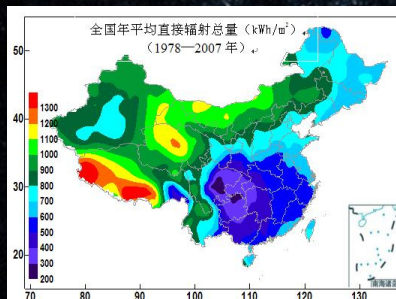
- ◆ Hot spot
- ◆ Invisible crack
- ◆ Power degradation

Construction&Installation

- ◆ Polarity reversed
- ◆ Connection terminal is not stable
- ◆ Improper installed method
- ◆ Unqualified insulation and corrosion prevention
- ◆ Insufficient wiring embedded depth
- ◆ Improper grounding

O&M

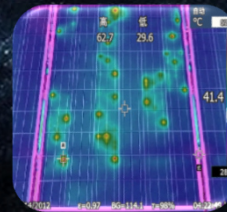
- ◆ Insufficient test method
- ◆ Do not detect fault in time
- ◆ Improper operation
- ◆ No periodic check, inspection



Rooftop load



Shading



Hot spot



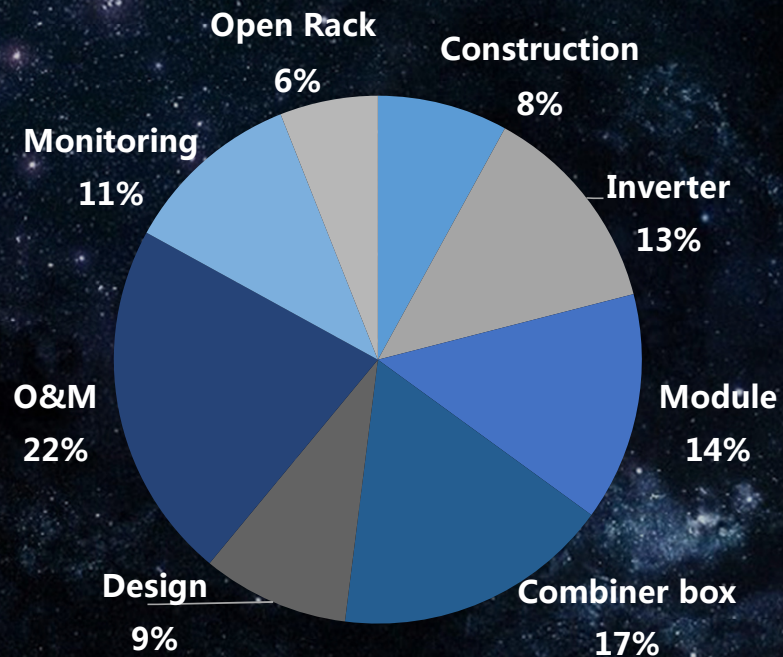
Crack



Instable Connection



Polluted module



Data is based on CGC case study

Root cause of such failures

- Improper design
- Unprofessional construction
- Careless management of installation
- Unprofessional supervision
- Unprofessional completion acceptance
- No specific standard requirements

Whole Process Quality Management

Product Certification

Production Oversight

Resource
EvaluationDesign
EvaluationCommissioning
Test

Monitoring

O&M
Evaluation

Products	Standards
PV Module	IEC61215, IEC61730
PV Combiner Box	CGC/GF 037
PV Inverter	IEC62109/NB/T32004, CGC-R46016, CGC-R46072
PV Fuse	GB/T13539.6/IEC60269-6
PV Circuit Breaker	GB14048.1, GB14048.2 , CGC-R46015
PV SPD	EN50539-11/GB/T18802.31
PV Junction Box	IEC62790
PV Connector	IEC62852
PV Cable	IEC62930
Solar Tracker	IEC62817



PV Module Evaluation item	PV Inverter Evaluation item
R&D	Efficiency
Manufacturing process, test	Reliability
Product quality	Corresponding and control ability
Quality assurance	Quality assurance
	Additional functions
CGC/GF 086:2017	CGC/GF 063:2017

Whole Process Quality Management

Production Oversight

- ◆ Preparation of equipment
- ◆ 24h monitoring
- ◆ Random sampling
- ◆ Production oversight

Resource Evaluation

- ◆ Field test
- ◆ Data Filtering
- ◆ Shading Simulation

Design Evaluation

- ◆ Array configuration evaluation
- ◆ System safety evaluation
- ◆ Components evaluation
- ◆ Performance evaluation
- ◆ Drawing evaluation

Commissioning Test

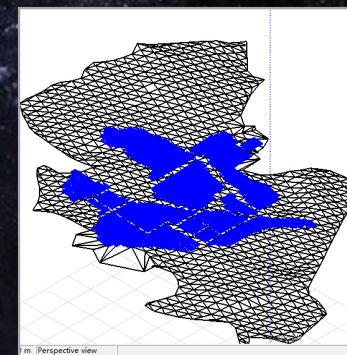
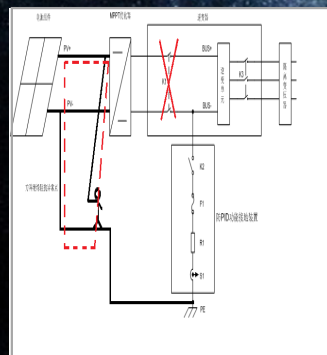
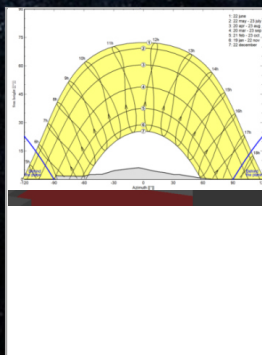
- ◆ Products quality measurement
- ◆ System safety measurement
- ◆ Power quality measurement
- ◆ PV System performance simulation and test (PPI)

Monitoring

- ◆ Real-time monitoring
- ◆ Project comparison on adjoining areas.

O&M Evaluation

- ◆ Quality assurance
- ◆ Comparison of planned and actual maintenance costs
- ◆ PV System performance simulation and test (EPI)



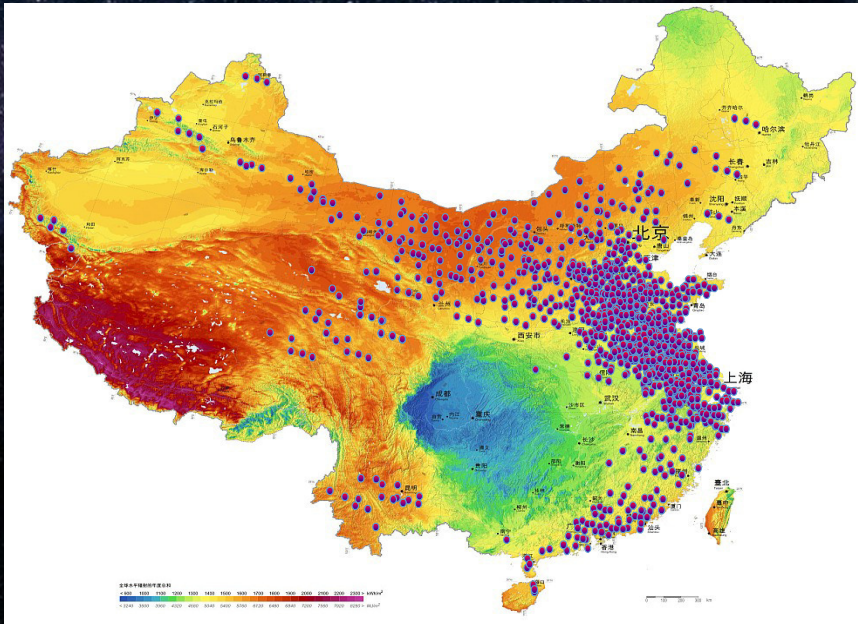


Certification Body



Inspection Body

Commissioned nearly 1000 PV projects



Authorized by National Energy Bureau, CGC undertook the commissioning of PV projects in electricity-free area



THANK YOU

FOR YOUR ATTENTION

