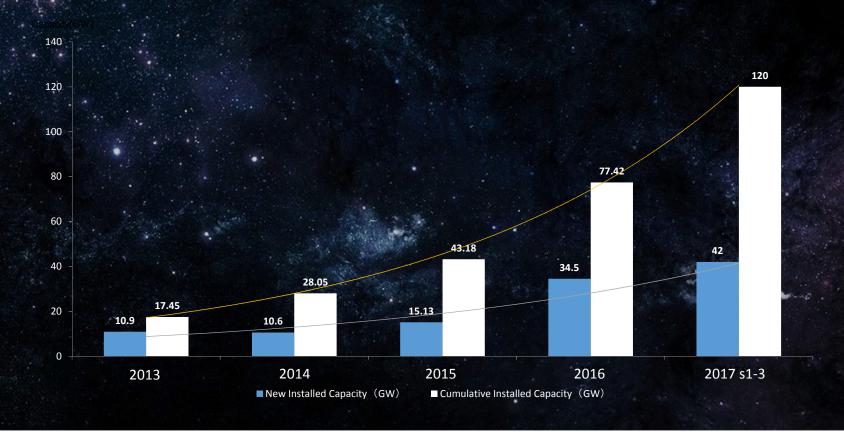
PV System: Quality Control, Test, Risk Evaluation and Management

Hui Yu on 8th June 2018 @ Manila China General Certification Center yuhui@cgc.org.cn





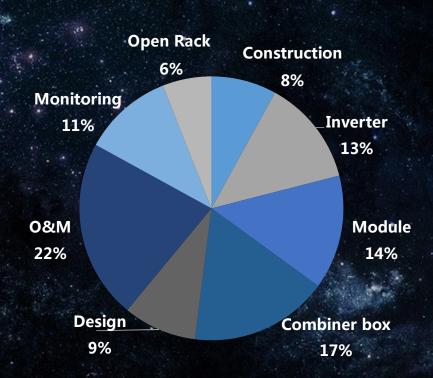
Evolution of the Installed PV Capacity in China





Solar Irradiance data	Design	Core Devices	Construction&Installation	O&M	
 ◆ Inaccurate ◆ Normally using data from NASA (Satellite data) ◆ No direct normal and diffused irradiance ◆ Annual solar irradiance variation ◆ Environmental variation 	 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 	 ◆ Hot spot ◆ Invisible crack ◆ Power degradation 	 Polarity reversed Connection terminal is not stable Improper installed method Unqualified insulation and corrosion prevention Insufficient wiring embedded depth Improper grounding 	 Insufficient test method Do not detect fault in time Improper operation No periodic check, inspection 	
全国年平均直接辐射总量(kWh/m)) (1978—2007 年)。 30 100 30 50 50 50 50 50 50 50 50	Rooftop load Sha	ading Hot spot	Crack Instable Conne	ction 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 **Evaluation**

Design **Evaluation** Commissioning Test

Monitoring

0&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				
	STATE OF THE STATE				



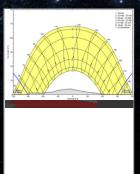
PV Module Evaluation item	PV Inverter Evaluation item	
R&D	Efficiency	
Manufacturing process, test	Reliability	
Product quality	Corresponding and control ability	
Quality assurance	Quality assurance	
	Additional functions	
CGC/GF 086:2017	CGC/GF 063:2017	

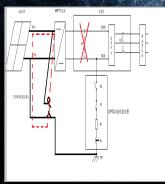


Whole Process Quality Management

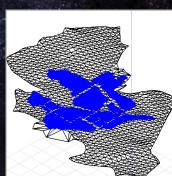
Production Oversight	Resource Evaluation	Design Evaluation	Commissioning Test	Monitoring	O&M Evaluation
 Preparation of equipment 24h monitoring Random sampling Production oversight 	 Field test Data Filtering Shading Simulation 	 Array configuration evaluation System safety evaluation Components evaluation Performance evaluation Drawing evaluation 	measurement System safety measurement Power quality measurement PV System performance	 Real-time monitoring Project comparison on adjoining areas. 	
驻广监造		13.00 WFGCS 255	IEC 62446-1	全国光伏电站状态监測和评价分析 ***********************************	万系统











06 Mutual Recognition





Certificate of Acceptance

in the IECRE - IEC System for Certification to Standards relating to Equipment for use In Renewable Energy Applications

China General Certification Center (CGC)

Room 1108 Yiheng Building, No.28 North 3rd Ring Road East, Chaoyang District, Beijing, 100013, P.R.China

has been assessed and determined to fully comply with the requirements of ISO/IEC 17065: 2012, The Rules and Procedures of the IECRE System.

China General Certification Center (CGC)

is therefore entitled to operate as a Chinese Certification Body within the IECRE the Scope and Standard(s) as listed in the relevant part of the IECRE Web Site at www.iecre.org, and is subject to all other terms as set forth in the IFCRF Basic Rules and Rules of Procedure.

This certificate remains valid until March 10th 2020, at which time it will be reissued by the IECRE Executive Secretary upon successful completion of the normally scheduled 3-year Reassessment Programme

Geneva, Switzerland, April 2017





Certificate of Acceptance

in the IECRE - IEC System for Certification to Standards relating to Equipment for use In Renewable Energy Applications

China General Certification Center (CGC)

Room 1108 Yiheng Building, No.28 North 3rd Ring Road East, Chaoyang District, Beijing, 100013, P.R.China

has been assessed and determined to fully comply with the requirements of ISO/IEC 17020: 2012, The Rules and Procedures of the IECRE System.

China General Certification Center (CGC)

is therefore entitled to operate as a Chinese Inspection Body within the IECRE the Scope and Standard(s) as listed in the relevant part of the IECRE Web Site at www.iecre.org, and is subject to all other terms as set forth in the IECRE Basic Rules and Rules of Procedure.

This certificate remains valid until April 14th 2020, at which time it will be reissued by the IECRE Executive Secretary upon successful completion of the normally scheduled 3-year Reassessment Programme administered by the IECRE.

Geneva, Switzerland, August 2017



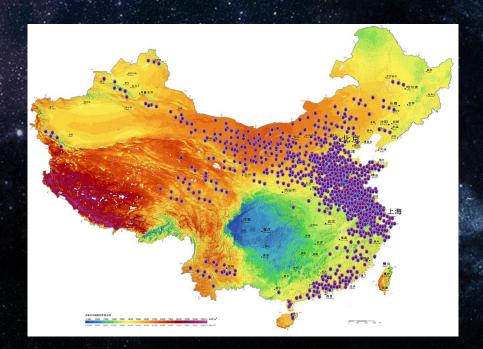
IECRE Executive Secretary

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

