



Huawei using Artificial Intelligence (AI):
Reshaping the PV Industry with smart inverters

SOLAR

P R E S E N T A T I O N

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43 YEARS

IN POWER SOLUTIONS

10 Countries

3 Manufacturing
Plants

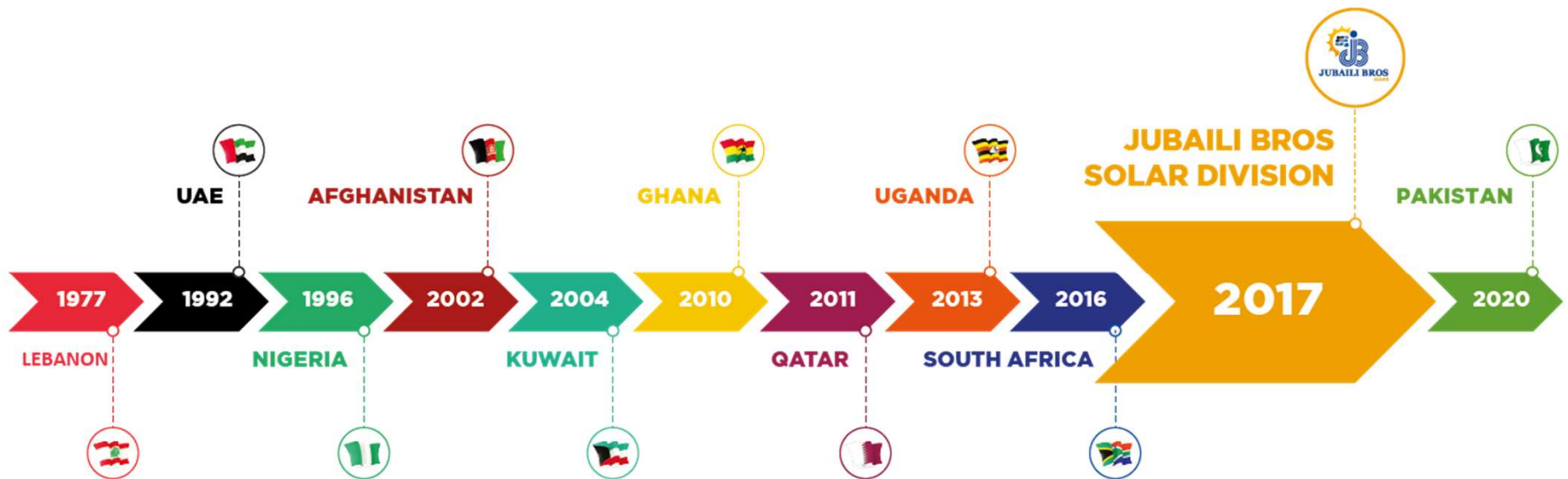
29 Branches &
Service Centers

1341 Employees

70 Dealers &
Distributors

ABOUT US

Jubaili Bros Solar is a division of Jubaili Bros, a leading provider of power solutions in the Middle East and Africa. Jubaili Bros Solar was established in 2017, marking the 40 years anniversary of Jubaili Bros. There are currently Jubaili Bros Solar representatives in the UAE, South Africa, Pakistan, Kenya, Ghana, Lebanon and Nigeria as well as distributors and sister company locations throughout Africa and the Middle East. Our aim is to provide solar EPCs in these regions with leads, training, engineering support, product supply, referral to available finance and technical support in the field.



6 KEY PILLARS FOR SUPPORTING OUR EPC CUSTOMERS

PRODUCT SUPPLY

From our own and our distributors' warehouses throughout the Middle East and Africa, we are able to provide quick delivery.

TRAINING

One of our key initiatives for our clients is to provide them with technical knowledge in design, installation, commissioning and maintenance of solar plants.

ENGINEERING SUPPORT

Our engineers are specialized in designing and installing solar systems. They are available to validate solar system designs and for larger solar projects provide end to end engineering support to reduce LCOE costs.

LEADS

Through our vast connections in the markets we are in we are able to identify and pass along opportunities to our EPCs customers.

REFERRAL TO AVAILABLE FINANCE

Through our strong relationships with finance institutions, we are able to help our EPCs find finance for their customer solar systems.

AFTERSALES SUPPORT

Our engineers can assist you with site support for commissioning of the solar systems, after sale maintenance and timely warranty support.




HUAWEI

Huawei
FusionSolar
Inverters &
Accessories


Lumax

Lumax
Mounting
Structures



Tier 1 Solar
Modules



PV Diesel
Hybrid
Controller

COMPLETE SOLAR SOLUTION

What is the use of AI

1. Efficiency – Power generation and O&M
2. Accuracy – Highly accurate recognition of fault events
3. Speed – Analyze data quickly
4. Cost – Reduce labor
5. Higher yield – Increase plant availability

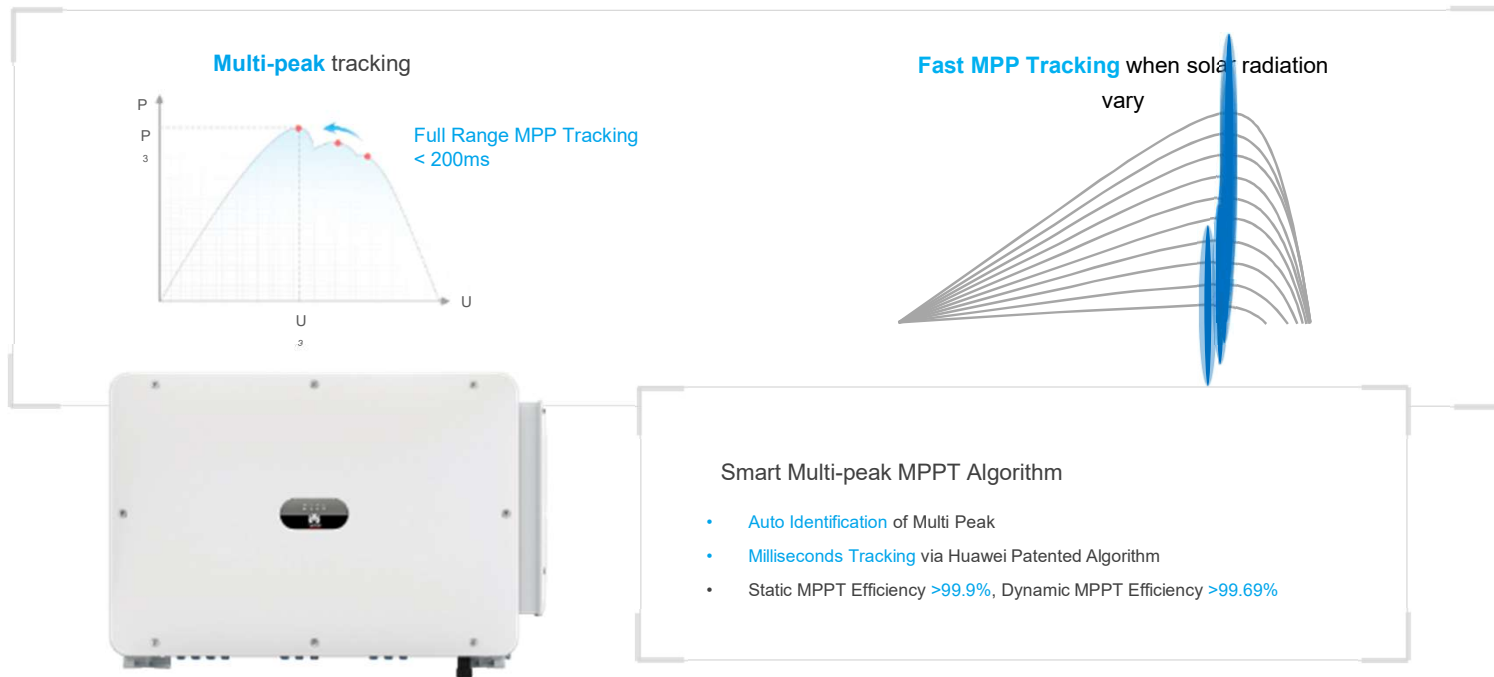
Integrated AI with Huawei Inverters

1. MPPT Technology
2. Fire protection – AFCI
3. String Health Analysis – IV Curve Diagnosis

1- MPPT Technology

Smart MPP Tracking Algorithm

Smarter & Faster Multi-peak Tracking for Higher Yields



2- Huawei AI powered AFCI feature

AI Powered Active Arcing Protection

What is AI Powered AFCI?

- HUAWEI inverter keeps self-learning new arc feature to accurately protect system from arc fault, even under complex noise



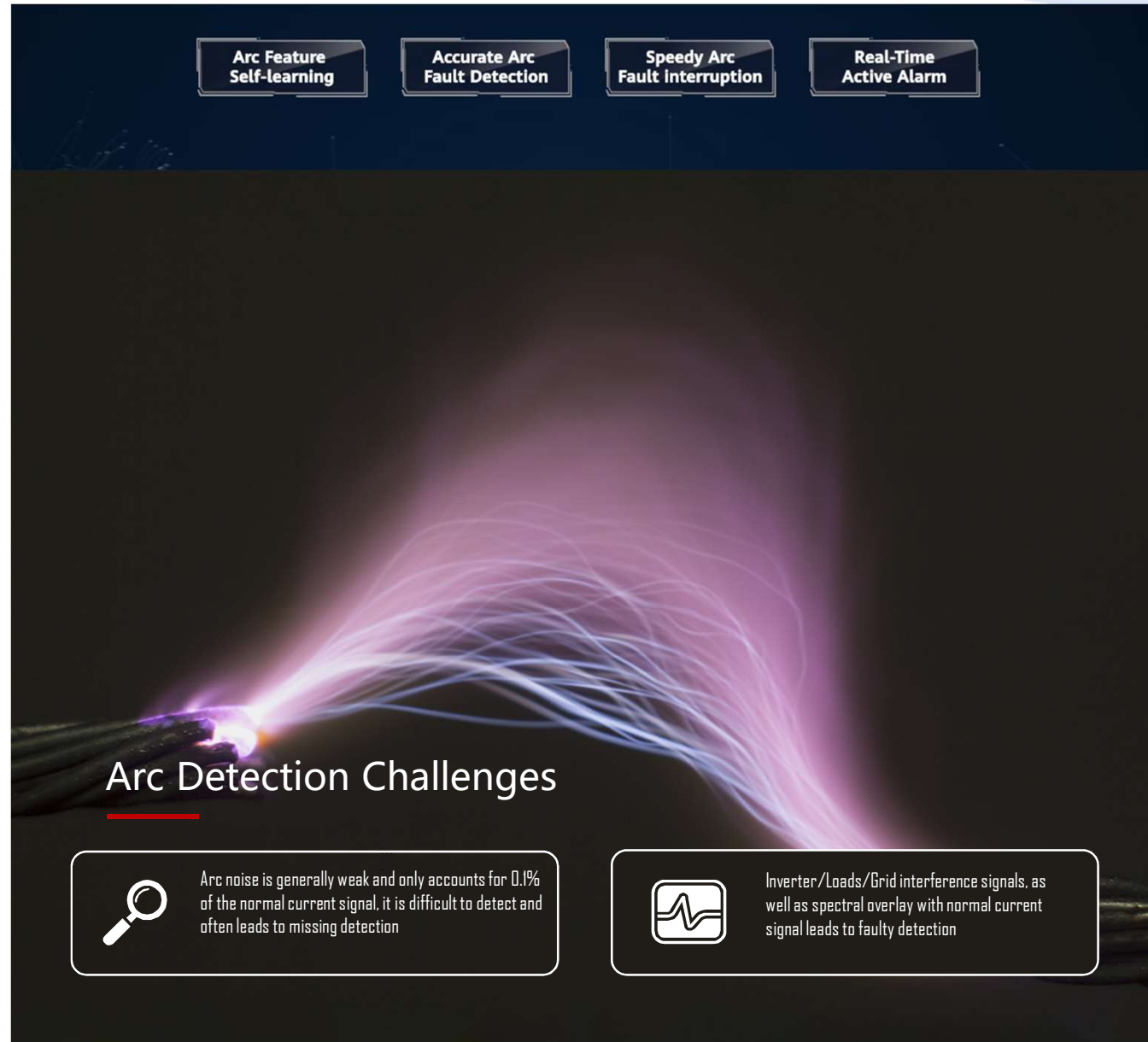
Self-learning new arc features
with AI model



Accurate arc fault detection via
local neural network algorithm



Speedy arc fault protection by
inverter shutdown in 2.5s



The graphic features a dark background with a bright, glowing arc fault at the bottom left. Four feature boxes are at the top, and two challenge boxes are at the bottom.


Arc Feature Self-learning

Accurate Arc Fault Detection


Speedy Arc Fault Interruption

Real-Time Active Alarm

Arc Detection Challenges

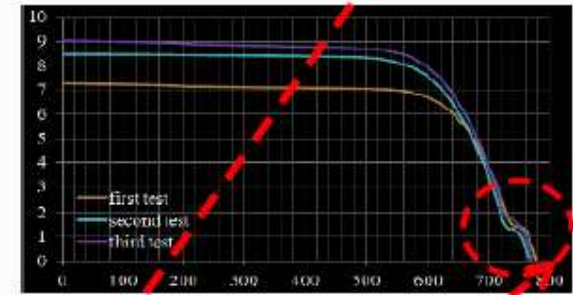
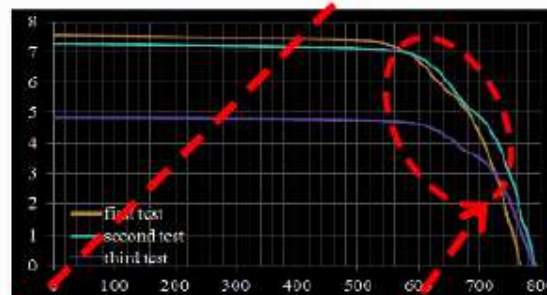
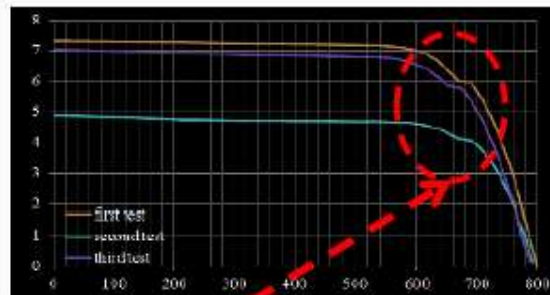
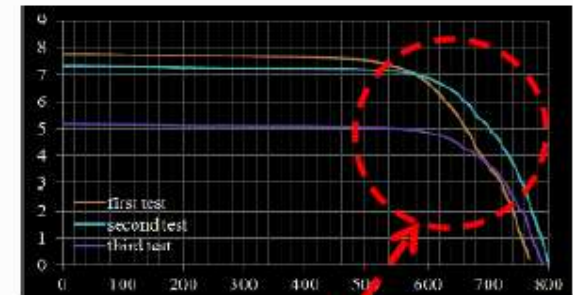
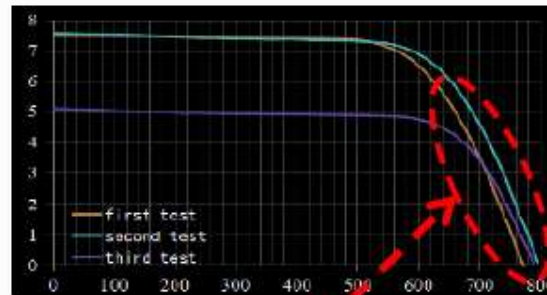
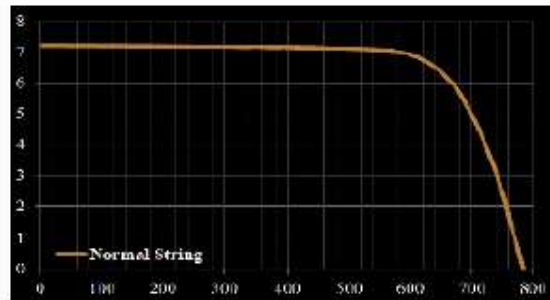


Arc noise is generally weak and only accounts for 0.1% of the normal current signal, it is difficult to detect and often leads to missing detection



Inverter/Loads/Grid interference signals, as well as spectral overlay with normal current signal leads to faulty detection

Typical failure patterns detected in the field



dirt-cover



high string-resistance



glass breakage



hidden cracks



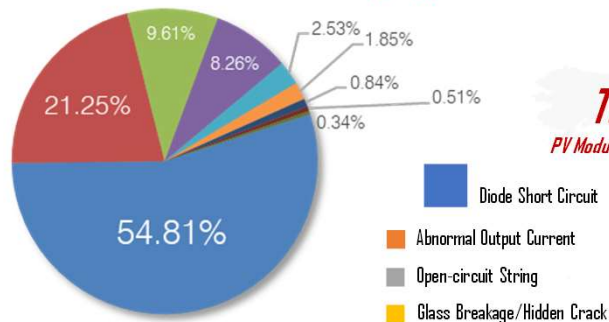
partial shadowing



Smart I-V Curve Diagnosis 5 GW+ Application Worldwide for Elevated O&M Efficiency

Accurate Failure Diagnosis &

Recovery Suggestions Provided



Top 4
PV Module Failure



How to Solve Diode Short Circuit

Step 1 - Inspect modules.
Step 2 - If burning happens in connection points, replace the module.
Step 3 - If not, use IR camera to find internal failures.
...

How to Solve Abnormal Output Current

Step 1 - Inspect modules. If there are shades, eliminate them.
Step 2 - If not, check if there is dirt on the surface
Step 3 - If not, check if any module has a broken glass panel.
...

14.5 MW — Failure Rate **0.74%**

Portfolios of PMGD projects in Chile



40 MW — Failure Rate **1.42%**

Ground-mounted PV Plant in Golmud



Ground-mounted PV Plant in Malaysia

49 MW — Failure Rate **12.1%**



Ground-mounted PV Plant in Turkey

4 MW — Failure Rate **3%**

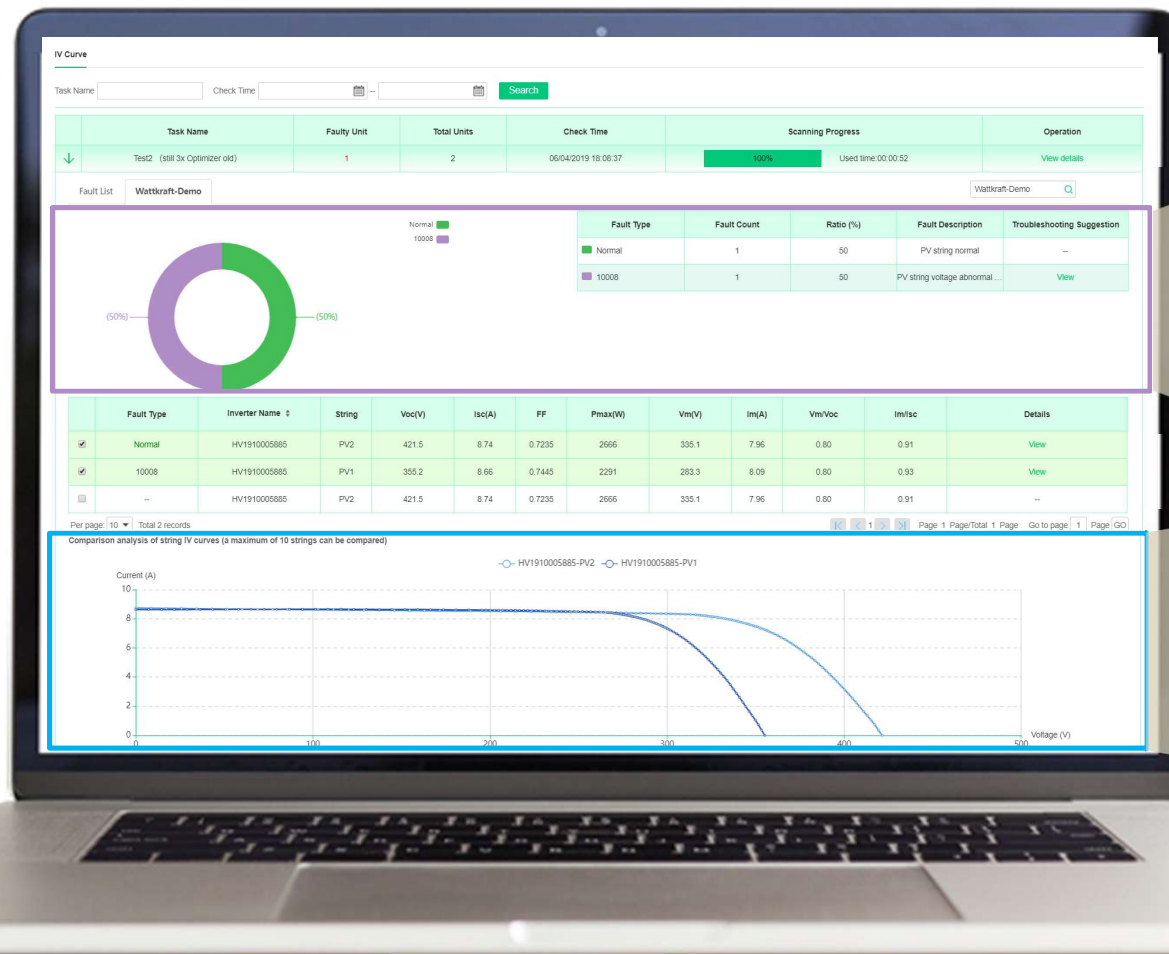
I-V Curve diagnosis Report

Diagnosis Result Overview

1. Displays the Faulty type, description troubleshooting suggestion of each string
2. 14 types of faulty can be diagnosed

Comparison Analysis of I-V Curve

1. IV curve scans 128 sample points of inverter strings for analysis which is more than TUV requirement



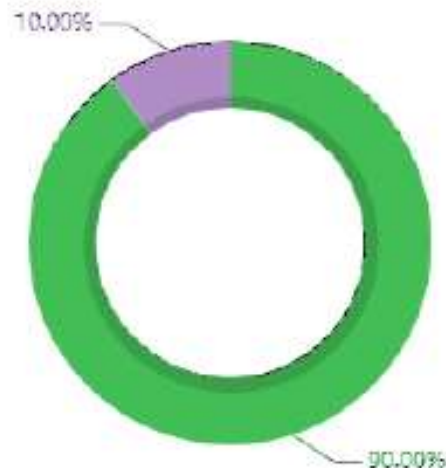
Case Study of Smart IV Curve Diagnosis – Jubaili Bros PV plant, Jebel Ali Freezone

Jubaili Office Rooftop PV Project IV Curve Diagnosis Report

1. Task Information

Task Name	JB Rooftop Project _ IV Analysis 2	Creation Time	15/11/2020
Plant location	Jubaili Bros SAL - Perkins Powered Generators Supplier - 1312nd Street - Dubai - United Arab Emirates	Cleaning status	Cleaned
Total number of strings	20	Number of faulty strings	2
Irradiance (W/m2)	661.76(Predictive value)	Module temperature (°C)	52.6(Predictive value)

2. String Diagnosis Overview



Legend	No.	Quantity	Percentage	Description
■	10000	18	90.00%	PV string normal
■	10008	2	10.00%	PV string voltage abnormal (diode short circuit/PV module invalid/PV module quantity incorrect)

Note: For troubleshooting, please refer to the suggestions in the Excel file.

Remedy Suggestion to clear the fault

Plant Name	Plant Location	Inverter Name	String	Fault Description	Suggestion
Jubaili Bros	Dubai	INV 1	PV5	PV string voltage abnormal (diode short circuit/PV module invalid/PV module quantity incorrect)	<p>Step 1: Check whether the number of PV modules connected to the PV string is correct.</p> <p>Step 2: Observe whether there are traces of burning at the interconnection strip, backsheet, and wiring box. If so, replace the PV module with the same model.</p> <p>Step 3: If none of the above exists, please use IR camera to check if there is short circuited diode or broken ribbon for interconnection.</p> <p>Step 4: If there is no abnormal found on the module with IR camera, please use voltage meter to check the voltage of the strings (from same MPPT), to see if it is too low. If yes, please measure the temperature of panels in string to check whether there is abnormal temperature distribution.</p>
Jubaili Bros	Dubai	INV 2	PV6	PV string voltage abnormal (diode short circuit/PV module invalid/PV module quantity incorrect)	<p>Step 1: Check whether the number of PV modules connected to the PV string is correct.</p> <p>Step 2: Observe whether there are traces of burning at the interconnection strip, backsheet, and wiring box. If so, replace the PV module with the same model.</p> <p>Step 3: If none of the above exists, please use IR camera to check if there is short circuited diode or broken ribbon for interconnection.</p> <p>Step 4: If there is no abnormal found on the module with IR camera, please use voltage meter to check the voltage of the strings (from same MPPT), to see if it is too low. If yes, please measure the temperature of panels in string to check whether there is abnormal temperature distribution.</p>



Prospective AI features upcoming

1. Passive technology leads to peace of mind
2. IV Curve diagnostics is an underutilized solution
3. AI helping to make solar the #1 choice for power generation in our regions

Thank you !