CASE STUDY

RECORD BREAKING ON-SITE EL IMAGING TEST IDENTIFIES CAUSES OF SIX FIGURE LOSSES FOR MAJOR O&M

SUMMARY: In 2018, Clean Energy Associates was engaged by a large Operations and Management (O&M) provider to conduct EL (electroluminescence) imaging at a 56.49 MW project in England. The O&M had previously discovered a decrease in power output that was resulting in six figure losses but it lacked the ability to conduct EL imaging on a project of this size. As part of the largest nighttime on-site test ever conducted, CEA inspected 90% of the modules over a three-month period. While the situation could have been averted had CEA carried out quality assurance during manufacturing, the test identified two main types of defects in 3 MW of the modules and the O&M was given recommendations to rectify the issues.

This location accounts for almost 19 MW of the project's total output. EL imaging tests conducted by CEA revealed 80% of the modules were affected by cold soldering issues or microcracks.

COMPLETE DETAILS:

CLIENT OVERVIEW: A large-scale provider of Operations and Management services to the renewable energy sector in the United Kingdom

SUPPLIER OVERVIEW: A Tier 1 Chinese supplier that has delivered more than 20 GW of solar modules to customers in more than 90 countries

PROJECT SIZE: 56.49 MW (three locations)

PROJECT LOCATION: United Kingdom

2806 N Speer Boulevard Denver, CO 80211 | www.CEA3.com | Email: info@CEA3.com

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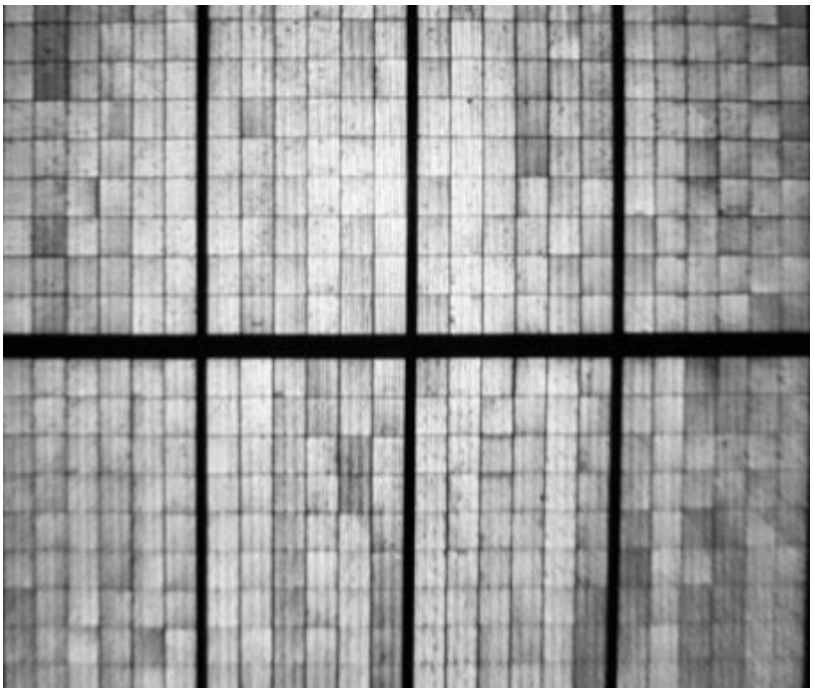
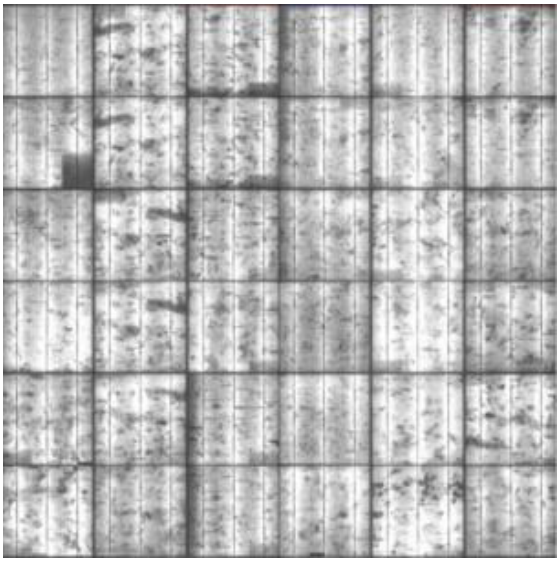
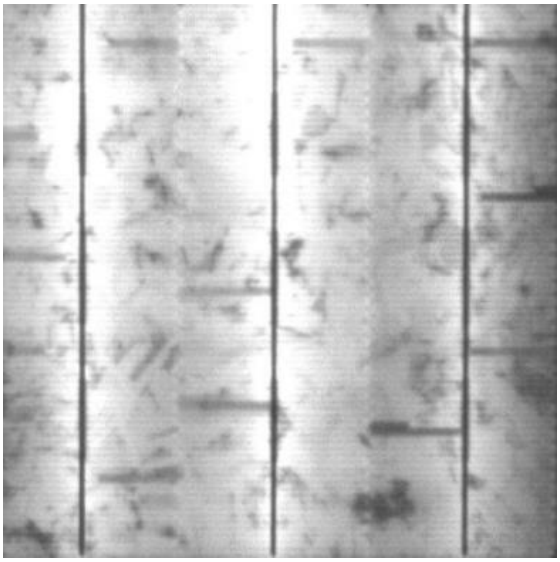
SCOPE OF WORK: After a routine inspection uncovered significant power output reductions at a 56.49 MW project in southern England, CEA was engaged by the O&M provider to carry out EL imaging at all three of the project's locations. Over a period of three months, CEA tested more than 180,000 modules in what was the largest EL imaging test ever conducted at night anywhere in the world. The testing was carried out at night because it is optimal for bypass diode testing using EL imaging. Following the on-site testing, CEA analyzed the results and identified two main defects in a large number of the modules. Those defects fell into two categories: Type 1 (cold soldering issues) and Type 2 (microcracks).



An example of a defect-free module.



Defect Type 1: A cell with all grid fingers not connected between bus bars.



Defect Type 2: Modules with cracked cells and cells with microcracks.

AFFECTED MODULES: 3 MW

RECOMMENDATION: CEA recommended the O&M provider prioritize the replacement of modules with Type 1 defects as they were the main cause of the reduced power output. The less urgent replacement of modules with Type 2 defects was also recommended. Additionally, CEA informed the client a significant number of modules had failures in their bypass diodes.

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