BURNT BREAKERS

Case Study: How to Protect Solar Systems from Rising Summer Heat

energy SUPPORT SERVICES
A NEW ENERGY EQUITY COMPANY

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THE PROBLEM

Although every season brings opportunities and challenges, the high temperatures of summer are often a recurring problem with keeping solar systems operating efficiently and safely. Sometimes, equipment doesn't operate as originally designed. The intense heat can cause breakers in the accumulation panels to fail, a widespread thermal event that can impact many Solar industry Stakeholders (EPC, Owner, Distributors, and O&M Service Providers).

Asset management is driven by availability. Conversely, when systems are down, it results in revenue reduction. In this instance, the tripping Siemens LGB 100 AMP breakers were compounded by occurring during the summer when most solar energy is captured in Minnesota. Considering availability is the biggest driver of asset performance, if equipment is down, the system is losing availability and crucial time that could be generating solar and revenue. Furthermore, increased O&M costs are incurred in the process of addressing the problem.

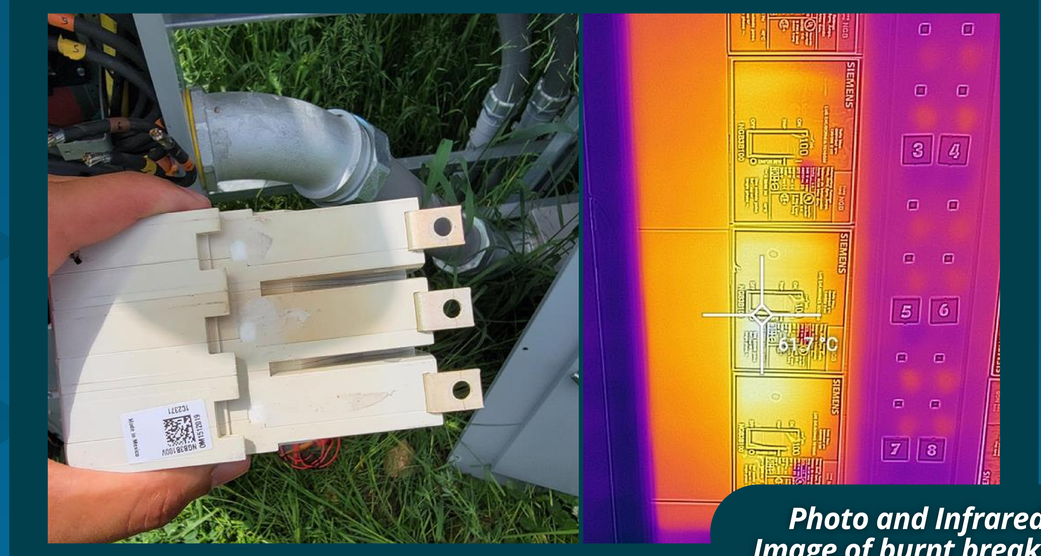

Photo and Infrared Image of burnt breakers

THE SOLUTION

After identifying the failing breakers, Energy Support Services worked with the distributor to conduct in-field testing and create several possible immediate solutions, while waiting for the manufacturer to address the root cause.

1.<u>PAINT</u>: Painting the cabinet white would attract less sunlight to the breaker, thus lowering its temperature and fostering a more conducive environment for the breakers to operate without incident. However, would painting the cabinet effectively require it to be scuffed prior to painting? And if so, how would that effect the cabinet's UL listed rating and warranty?

2.<u>SHADE</u>: Another option was to build a protective shade structure above each panel box to deflect direct sun heat and lower the ambient temperature inside the panel. This would avoid any additional work and unintentional repercussions, that the paint option may require.

3.<u>MOVE</u>: A third consideration was to move the breaker, if there was adequate space within the cabinet to do so, in hopes that it could be relocated to a cooler area allowing it to remain operational.

Ultimately, the most obvious, most safe, least invasive, and least expensive solution was to shade the panels, which successfully lowered the temperature and resolved the immediate failures, returning the system to full functionality in short order.

Shaded structures built to decrease ambient temperatures

THE RESEARCH

When the issue was first discovered, it was reported through the logical channels to report and request support. The Siemens LGB 100 AMP Breaker, which has been discontinued, had been sold through a distributor. Energy Support Services originally ran their findings and warranty request through the distributor when this issue first was discovered, which were then run to Siemens by the distributor.

Multiple systems and owners were impacted as it was discovered that the breaker issue was not an isolated incident. Energy Support Services put the solar ring in the air to determine who else was having a similar issue. As it turns out, system and asset owners, O&M managers and technicians, service providers, distributors, and more within the supply chain were affected. This wide spread problem provided a unique opportunity to tap into varying experience and relationships to mitigate this manufacturing issue for a timely resolution. While system owners did not have a direct relationship with the equipment distributor, the EPCs did and leveraged it to aid with troubleshooting. Furthermore, the coordination of various parties demonstrated the value of creating, albeit informally, a special interest lobbying group to generate a positive feedback loop to gather information and initiate problem solving.

LOOKING AHEAD

The short-term learnings of this case study demonstrate how having Operations & Maintenance experts involved earlier in the project management process of solar development could save thousands of dollars, if not more, in remediation. Planning ahead in this way would save time, resources, and over all, set solar development and maintenance up for greater success with less down time.

In a long-term view, this case study raises the question of how are we planning ahead to ensure these equipment issues don't become more frequent and widespread? With temperatures increasing due to climate change, engineering and design assumptions may need to be more robust to accommodate rising ambient temperatures to ensure equipment can withstand environmental changes over the next 25-40 years.