

January 18, 2019

Sumitomo Electric Industries, Ltd.

This press release was originally published in Japanese on December 25, 2018.

Sumitomo Electric Develops AI-based Failure Detection System for Maximizing Output of Photovoltaic Power Plants

Sumitomo Electric Industries, Ltd. has developed a data storage and analysis system that quickly detects reduction of photovoltaic (PV) power output by using artificial intelligence (AI) working in conjunction with a string monitoring system for solar power generation plants. The system is available for sales from April 2019.

Most solar power generation plants currently being built in Japan are expected to operate for more than 20 years after installation. To maintain consistent output power for a long period of time, it is critical to quickly detect and restore failures that may cause reductions in generation output. To this end, a monitoring system to detect such failures is installed in each plant.

Conventional monitoring systems use threshold value, or critical value, to determine the reduction in power output. For instance, once the output underperforms the threshold, the system determines it as a failure and alerts the operator of the solar power generation plant. However, output power varies according to various factors such as season, time of day, installation area or surrounding environment, and therefore solely using threshold value lowers reliability, not to mention the need for additional human analysis and subsequent decision making, both of which require experience and greater effort.

Against this backdrop, Sumitomo Electric has developed a string monitoring system that uses AI to detect failures from the measured string power value and report the cause according to predefined emergency levels. In detecting a reduction in power, the system identifies its cause (such as failure of fuses or breakers, shadows from trees and grass or deterioration of solar panels), and reports the cause according to a predefined emergency level. Detection of failure is made on each string, the minimum unit of solar power generation system and the failed area is displayed on the plant's map in different colors classified

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according to emergency level, thus enabling easy identification of the failure area and the provision of precise instructions to workers.

Our monitoring system uses power line communication (PLC)*1 technology, which uses existing power lines for data communication, thus eliminating the need for additional installation of a communication line, enabling easy installation to existing plants already in operation. By using the recently developed failure detection and reporting system, failures are promptly and precisely detected and reported at an early stage, reducing operating costs of the solar power plant and loss of power generation.

The system is available for sales from April 2019. We look forward to your positive consideration for possible introduction of the system.

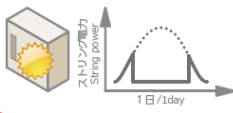
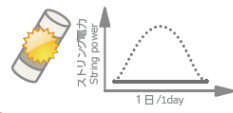
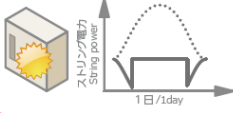
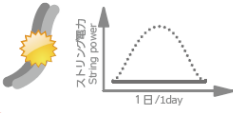

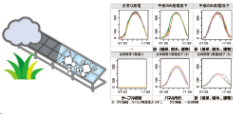
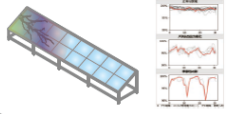


Features

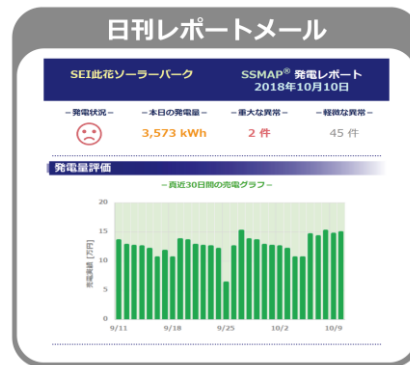
1. Advanced string current data analysis using AI classifies the cause of the failure into a maximum of seven categories and reports it according to a predefined emergency level.

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7種類の発電異常を見つけます。そして緊急性の高い異常から知らせます。
Our solution will detect seven kinds of abnormality and inform you with importance rating.

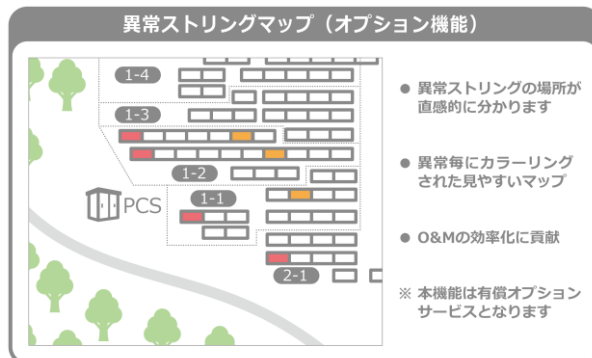
<p>① 正負極間短絡 Short circuit</p> 	<p>② ヒューズ断 Fuse tripped</p> 	<p>③ 逆流防止ダイオード短絡or開放 Blocking diode short or open fault</p> 	<p>④ ケーブル断線 Cable disconnection</p> 
<p>⑤ 接続箱の温度異常 Combiner box temperature abnormality</p> 	<p>⑥ 影、パネル汚れ Soiling</p> 	<p>⑦ 経年劣化 Degradation</p> 	<p>緊急性の高い異常 High importance abnormality</p> <p>緊急性の低い異常 Low importance abnormality</p>

2. Daily reports can be sent to designated e-mail addresses. In addition to any failures measured on the day, other information such as power generation output is visually displayed.



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3. String with failure occurring is overlaid on the power plant map. (Optional functions)



* The display layout shown here is still under development and may vary in the system available next April.

*1 Power Line Communication (PLC) is a technology to use existing power lines for data communication. Our product has adopted a low frequency PLC technique using 450 kHz and lower frequency, superimposing data measured from string current on DC lines.

■ Reference

Sumitomo Electric's Website

<https://sumitomoelectric.com/>