

Initiation of Reliability Studies At GREEN-IPUC/PUCMINAS, Brasil

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PUC Minas



Introduction

The GREEN-IPUC (*Grupo de Estudos em Energia-Instituto Politécnico da PUC Minas*) is a technical laboratory that belongs to the Polytechnical Institute of the Pontifical Catholic University of Minas Gerais, located in Belo Horizonte, Minas Gerais, Brasil.

Its activities are centered in research, deployment, and qualification assurance of **solar photovoltaic** and **solar thermal** technologies and distributed generation deployment with renewables. An important area of GREEN solar is testing photovoltaic BOS and solar heating water systems for the Brazilian Labeling Program - PBE / INMETRO (with which GREEN has been involved since 2004).



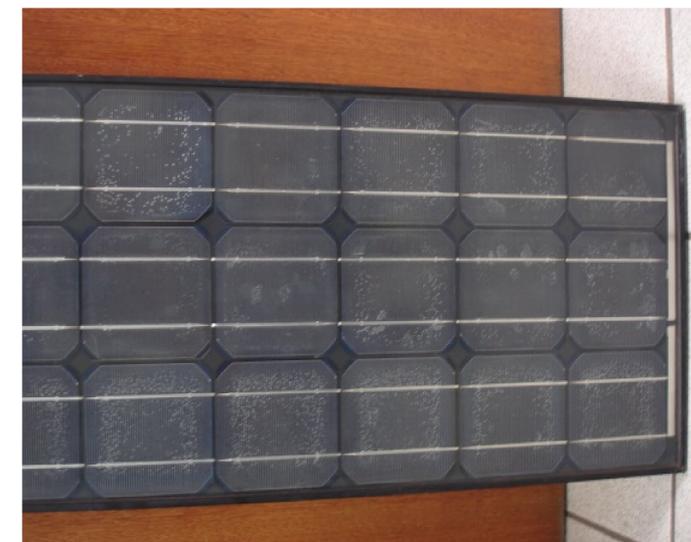
Examples: PV Module Degradation



Browning



Encapsulant
Delamination



Reliability Studies at GREEN-IPUC

The PV reliability research started at GREEN Solar in 2013, with a project in this new PV area named “Evaluation of Field Failure and Degradation Rate of Installed PV Modules and Systems in Minas Gerais, Brasil” and funded by the Minas Gerais State Science Foundation – FAPEMIG, and PUCMINAS. The **objective** of the project is to evaluate field performance and degradation of PV modules, and isolated and small-scale grid-connected PV systems installed in Minas Gerais by CEMIG (Energetic Company of Minas Gerais).

In the first-phase of the project, **visual inspections** of the PV modules and systems were undertaken. Initial results have shown that the main failure modes found in PV modules are: *light corrosion, encapsulant delamination, broken glass, hotspots, and junction box and connector failures*—indicated the the “Examples” on this poster.

Additionally, **improper storage** had led to CEMIG’s loss of 2000 PV modules because the glue cardboard packing adhered to front glass. In the PV systems area, a major inverter failure source was identified and corrected. This was associated with higher than expected temperatures internal to the installation cabinets and the lack of adequate forced ventilation for the inverters.

Summary

PV reliability research was initiated at GREEN Solar in 2013, complementing the solar-thermal testing/labeling program. This PV research enhances the capabilities of the Laboratory and is important for the bankability of PV projects as Brasil expands its PV investments.
(This presentation contains no proprietary information)