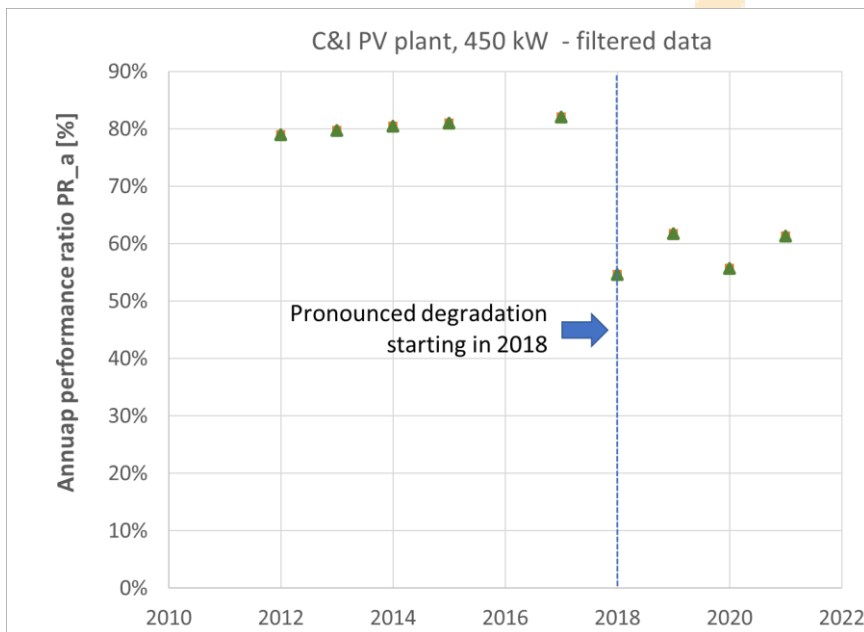


Business case #1 Commercial & industrial PV plant

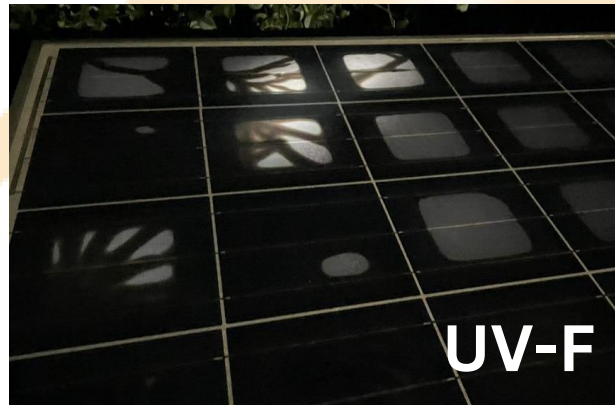
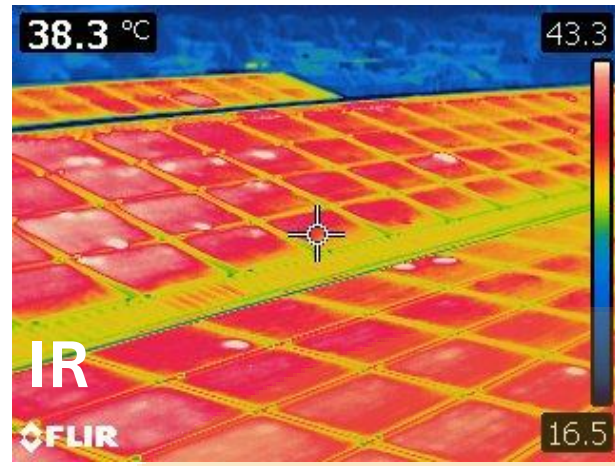
1. Analysis of monitoring data

The annual performance ratio **PR** of the PV plant is stable for the first 5 years of operation, followed by a sharp drop (-25%) in 2018. The loss in performance went nearly unnoticed by the plant owner for nearly 3 years.



2. Diagnosis

Thermography highlighted the presence of **hot-spots** in solar cells, that could be correlated to the presence of severe cracks by performing UV-F (UV-Fluorescence) imaging. Likely the presence of cracked cells can be traced back to a **severe hail event** happened in summer 2018 (please note that none of the modules had broken glass covers). The plant's underperformance went long unnoticed, leading to **~25% lower annual revenues**. The on-site inspection was first performed in 2021.



Plant details

- Location: N of Milan (45°N, 9° E)
- Plant description: **450 kWp on commercial warehouse, building-integrated PV (BIPV) plant.**
- Connection to the grid: 2011
- Business model: Italian's feed-in tariff from 2011 (4th Conto-Energia): 0-43 €/kWh (for building integrated systems)



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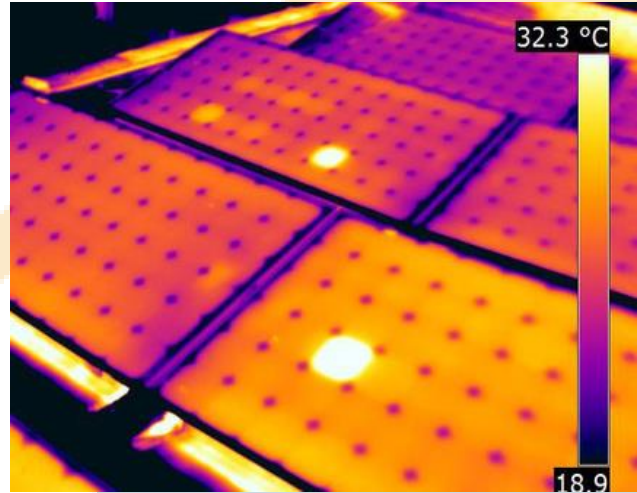
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3. Proposed interventions

- Full repowering** restoring the initial nominal power (i.e. 450 kWp).
- Full module substitution with newer technology **reducing the occupancy** of the plant by 25%. The freed space has been used to install more PV increasing self-consumption.
- The generous feed-in tariff (0.43 €/kWh) and the time left for the incentives (9 years) fully justified economically the intervention.
- No legal claim** was started against the manufacturer for the damaged modules and the non-compliance with warranties. The module manufacturer was not existing any longer.
- To much time had passed for filing a claim with the insurance company.

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Lessons learnt

- **Check monitoring** data regularly.
- After a **severe hail event** check the modules and the PV plant.
- If the PV plant is **insured**, respect the timeframe for filing a claim with the insurance company.



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