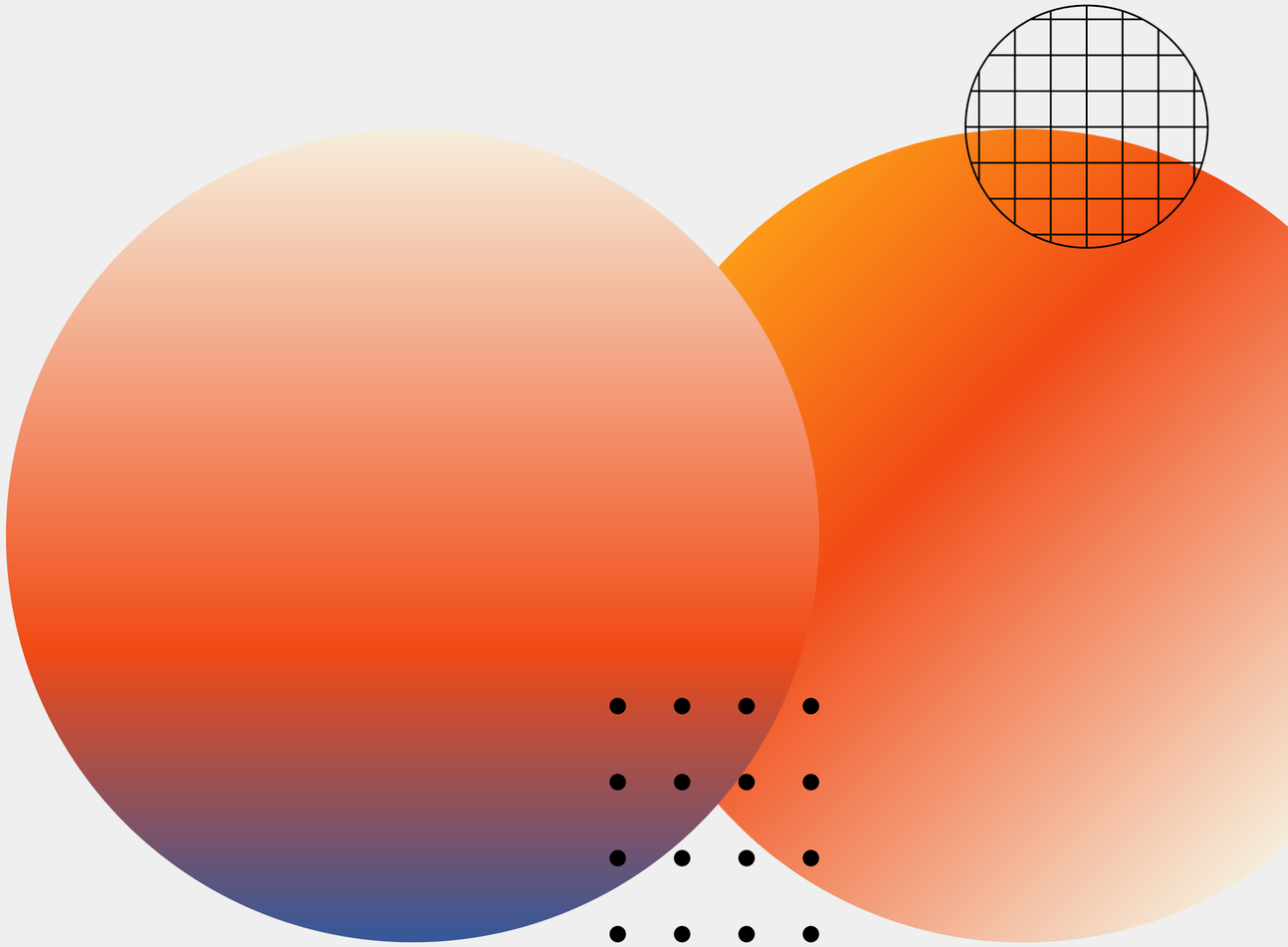
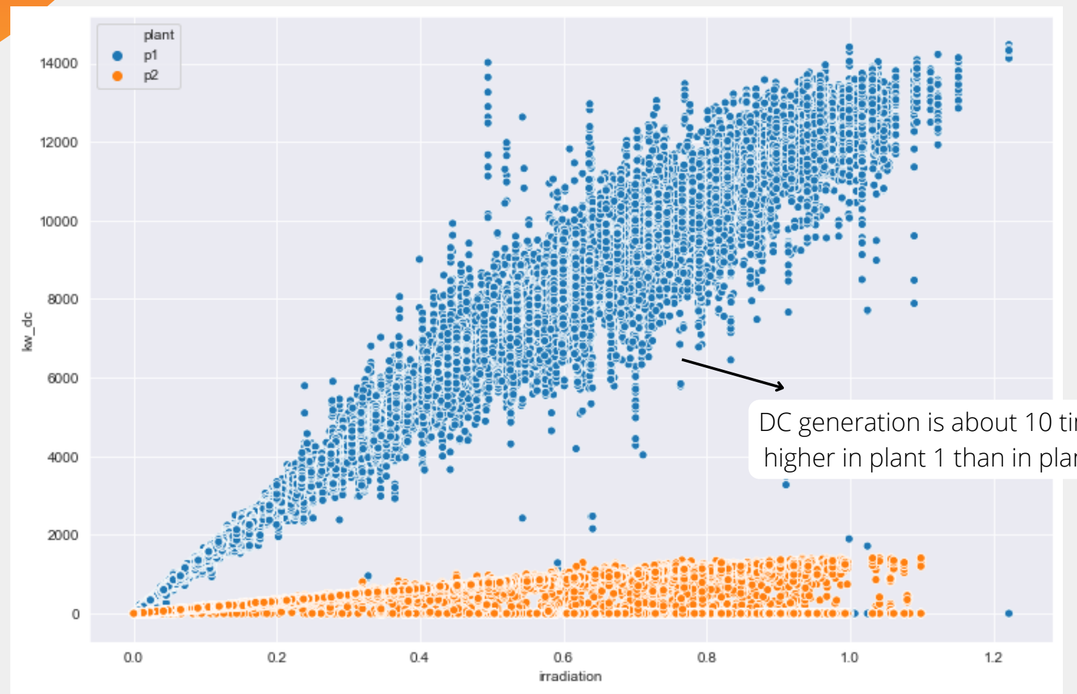
Detection of inefficiencies in a solar plant

Daniel Sánchez Gómez

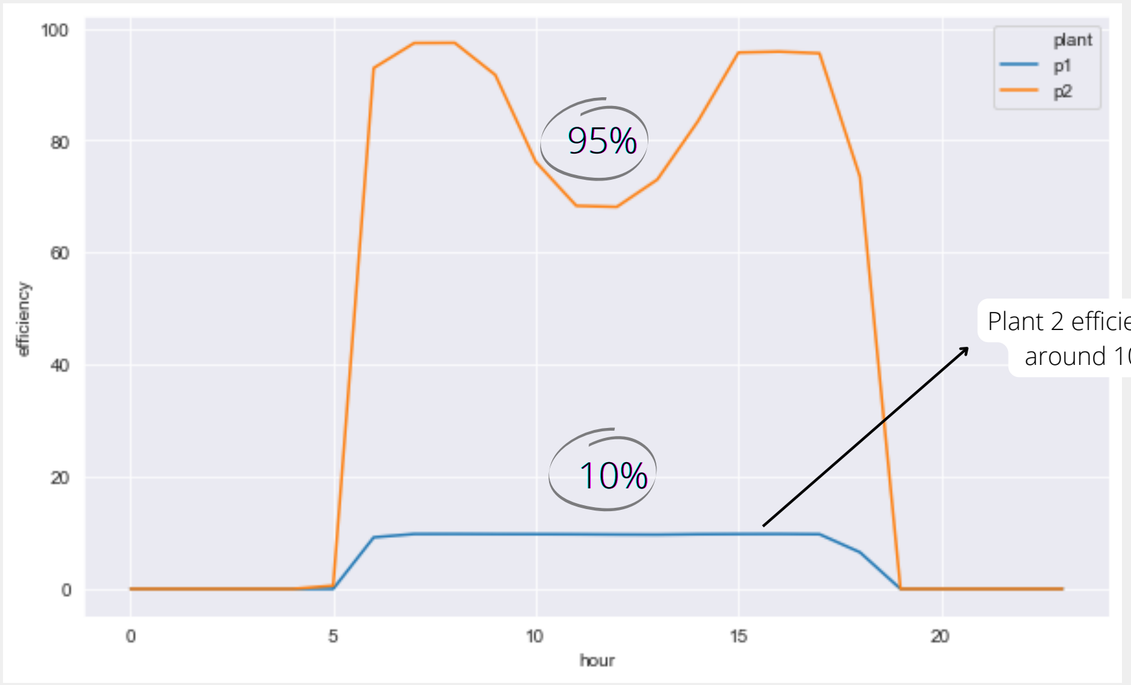


Data quality problems have been detected that suggest treating the conclusions to be presented as temporary.

Direct current (Kw) energy generated by plants



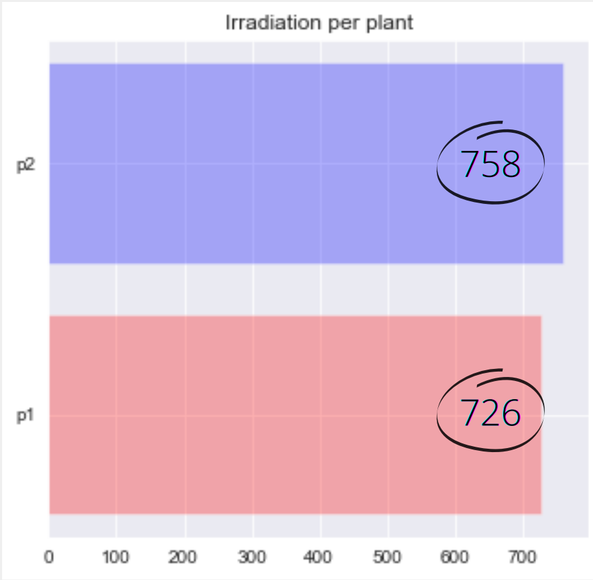
Efficiency of each plant (%)



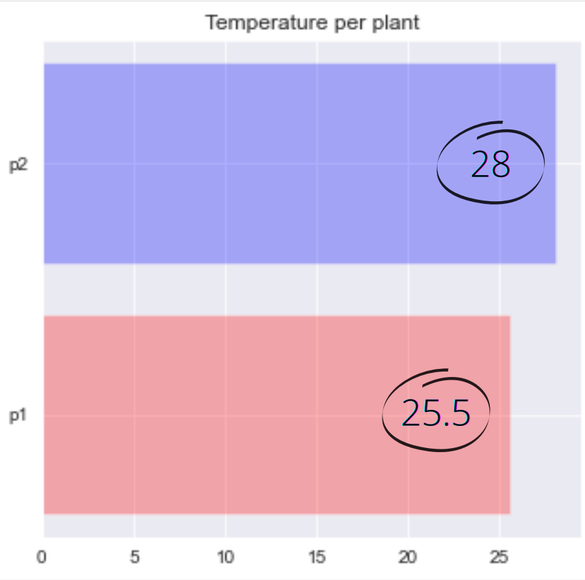
A new extraction of the data from the meters should be requested to check whether there may indeed have been data quality problems.

The two solar plants receive high and similar amounts of irradiation, with no evidence of a problem at this point.

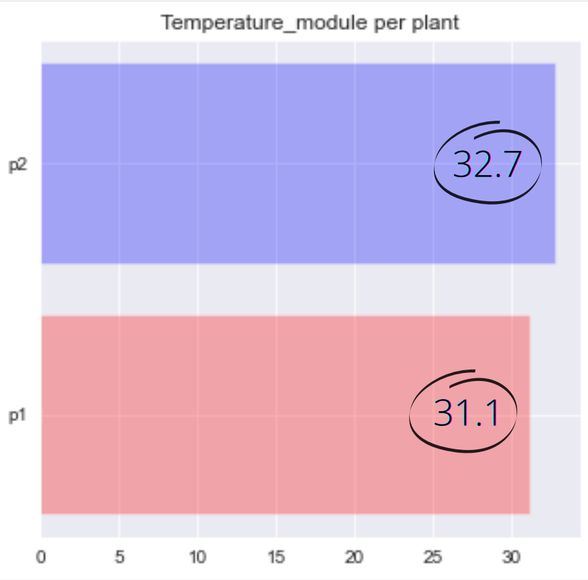
Irradiation per plant (Kw/m2)



Ambient temperature (°C)



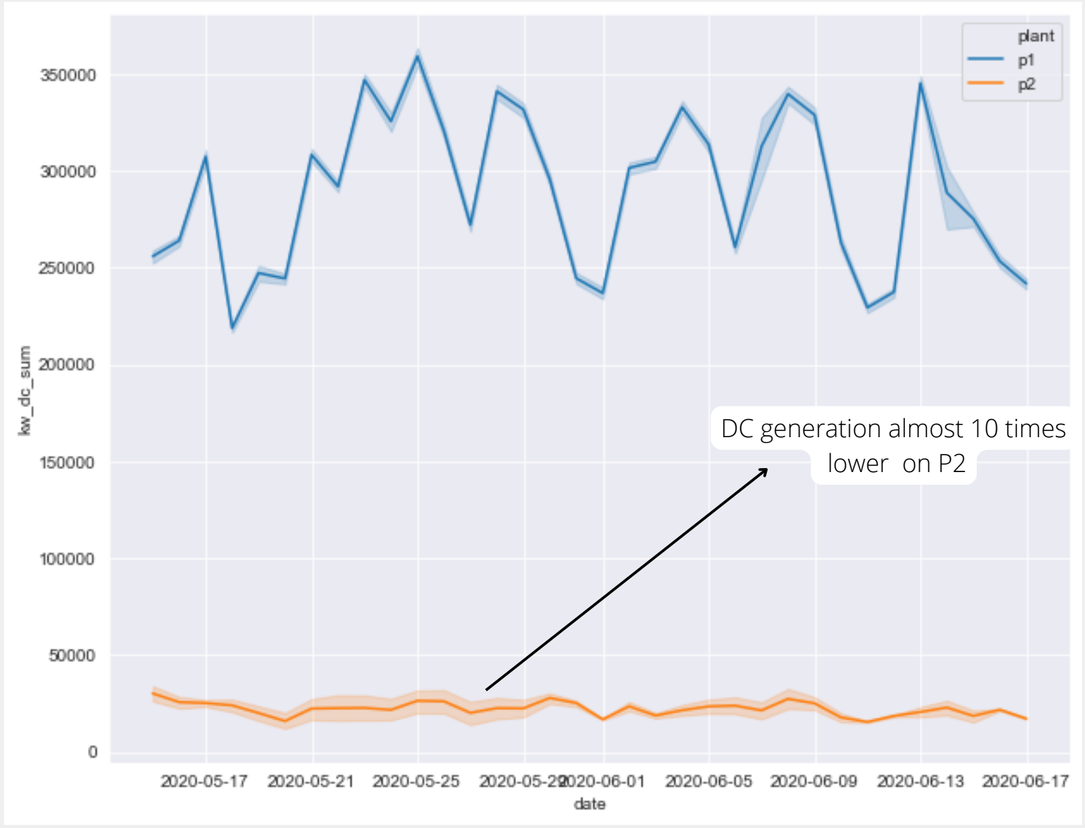
Module temperature (°C)



<u>The average differences found between the plants do not suggest that there are major differences in the capacity to generate direct current.</u>

DC generation of plant 1 is correct, modules seem to carry DC to inverters. DC generation of plant 2 does NOT work well, modules carry too little DC to inverters

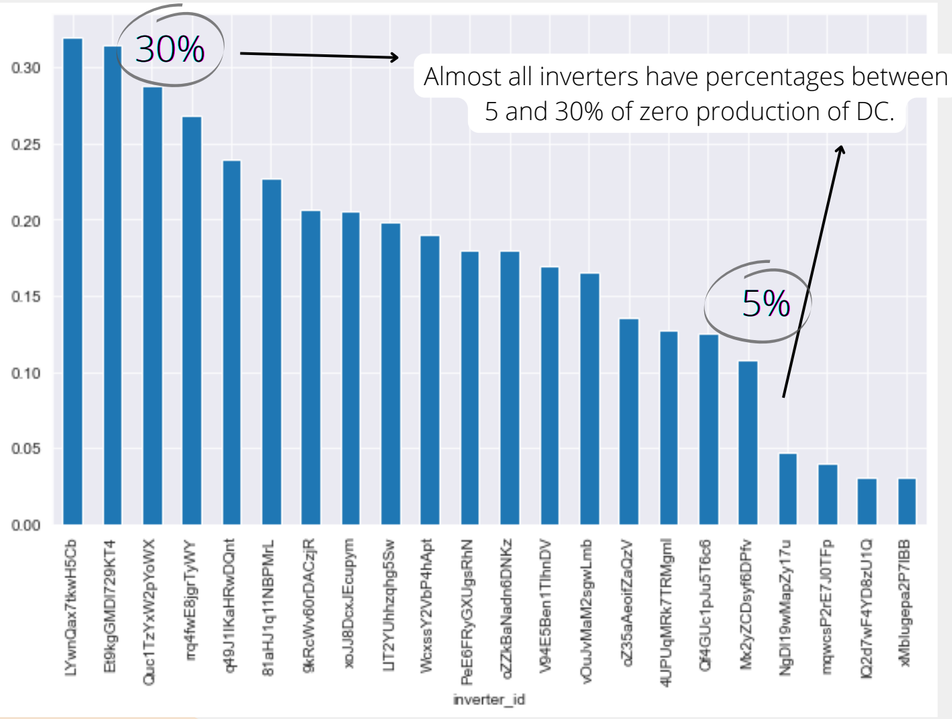
Generation of DC per plant (Kw/day)



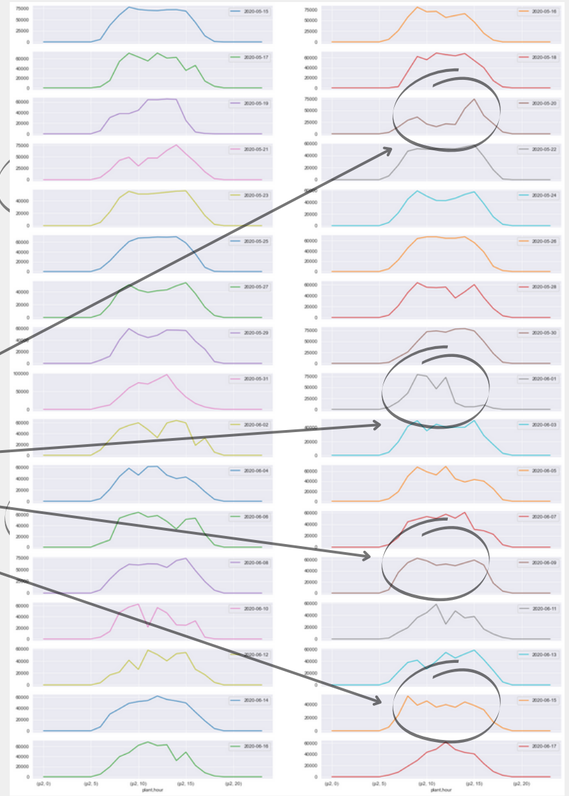
<u>A revision of the plant 2 modules, which are generating too little DC power, is recommended.</u>

In plant 2 there are several inverters that are not getting enough DC production, and therefore their modules need to be overhauled.

Percentage of zero DC production per inverter (%)



Average DC output (Kw/h) of the inverters per day

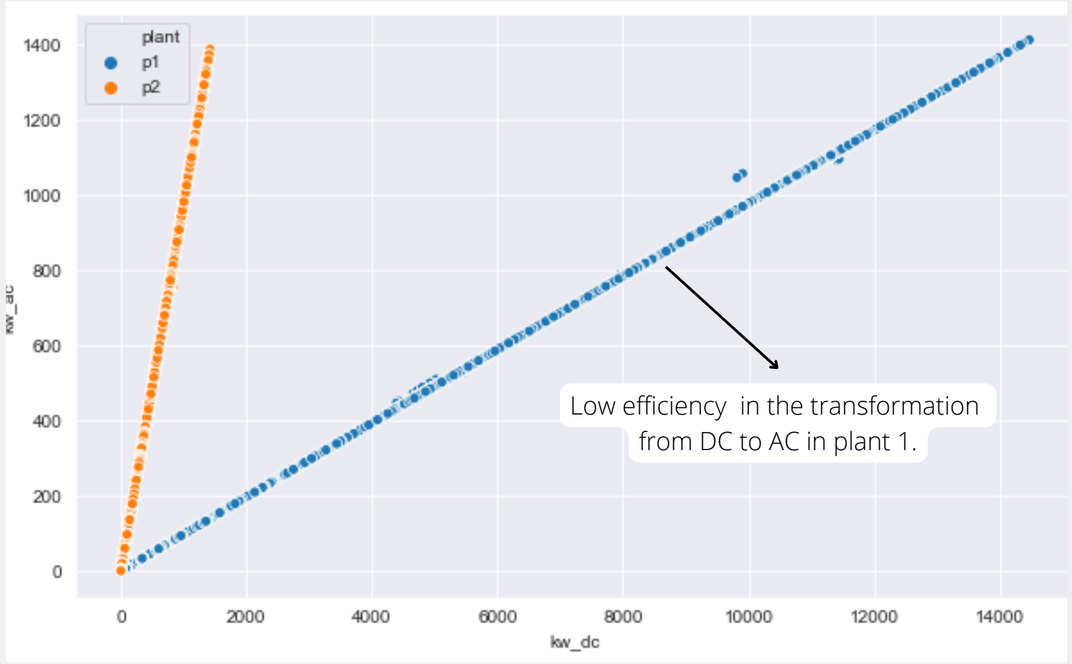


Modules carry little DC even at peak irradiation hours.

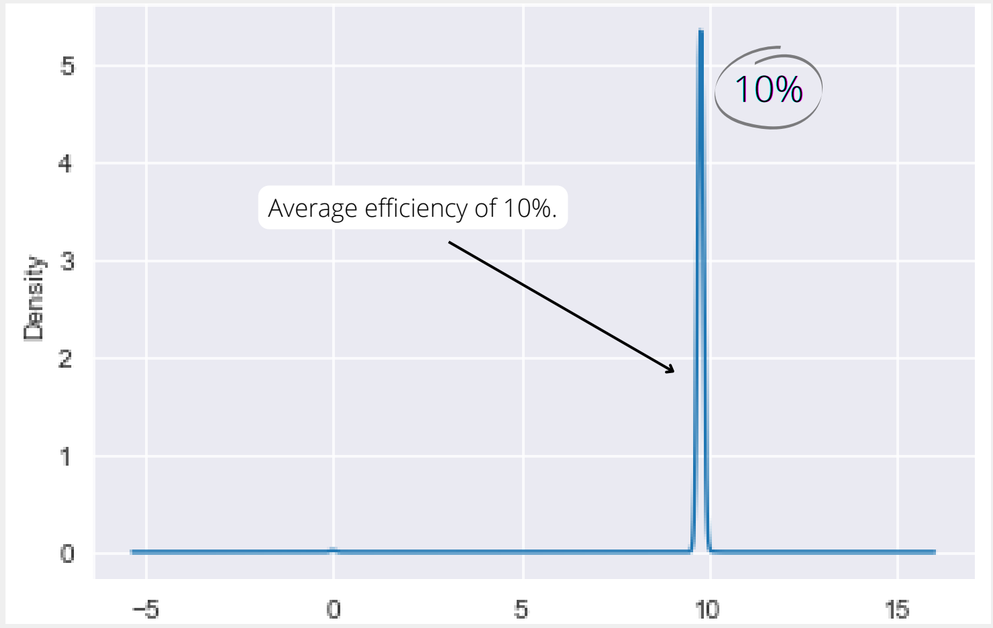
Inverters may be prioritized for review by those with the highest percentage of zero DC production.

A malfunction of the inverters in plant 1 has been detected, which only manage to transform around 10% of DC to AC.

DC to AC conversion rate per plant (Kw)

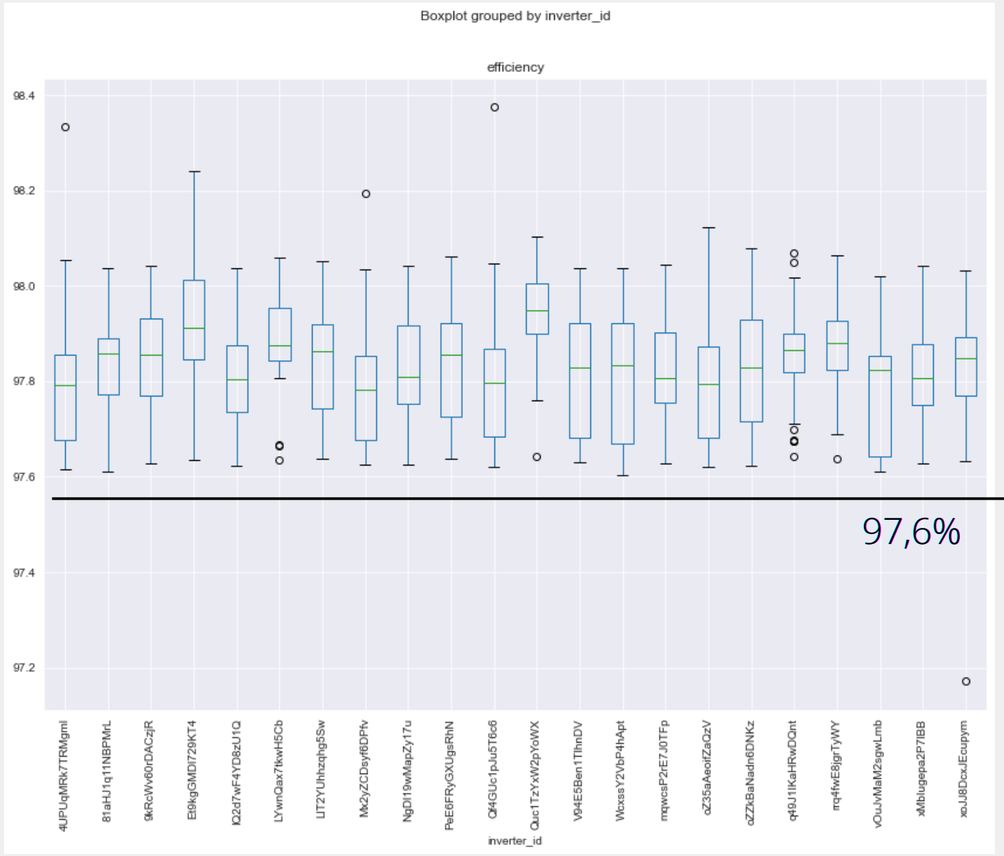


Efficiency of conversion plant 1 (%)



<u>The inverters of plant 1, which are used for DC to AC transformation, should be overhauled.</u>

The DC to AC transformation of plant 2 is correct, the inverters achieve an efficiency of more than 97%



Inverter efficiency of plant 2 (%)

97,6%

High efficiency of all inverters.

<u>Compare the features of the inverters of plant 2 with those of plant 1.</u>

Following the analysis, a 3-step action plan is recommended.

	Quality of data	Irradiation	DC generation	Inverters efficiency
Plant 1				
Plant 2				

ACTION #1: Comprehensive data quality improvement plan

ACTION #2: Revision of the inverter modules identified on plant 2

ACTION #3: Maintenance of all inverters in plant 1