



CASE STORY

## High harmonic distortion at Recycling Plant along with power factor correction solved with panel-built ADF solution

» LOCATION

UK

» INDUSTRY

Recycling Facility

» INSTALLATION DATE

November 2024

### BACKGROUND

At a Recycling Centre in the UK, concerns were being raised about the amount of harmonic distortion being produced and the potential effect on the other connected load, as well as the wider effect on the Medium Voltage (MV) supply. Behind this concern was the proliferation of inverter loading at the site. In order to determine the level of harmonic distortion present and to monitor other power quality metrics, the end customer commissioned Comsys partner, PFC Engineering, to perform a two-week long Power Quality Analysis.

## CHALLENGE

The analysis also included general power consumption data presented in the form of active power (kW), reactive power (kVAr), apparent power (kVA) and operating power factor. It was clear that the load at the facility was operating with very high levels of harmonic distortion. High enough, in fact, to distort the voltage to the point where the levels of voltage harmonic distortion were exceeding the EREC G5/5 design recommendations.

Despite the very high levels of harmonics on this supply, it was determined that power factor correction could be operated at this site as it incorporates harmonic detuning reactors. The reactors are there to prevent overload damage to power factor correction capacitors operating under such conditions. However, with very little space available within the switch room, a stand-alone active harmonic filter would not be possible.



## SOLUTION

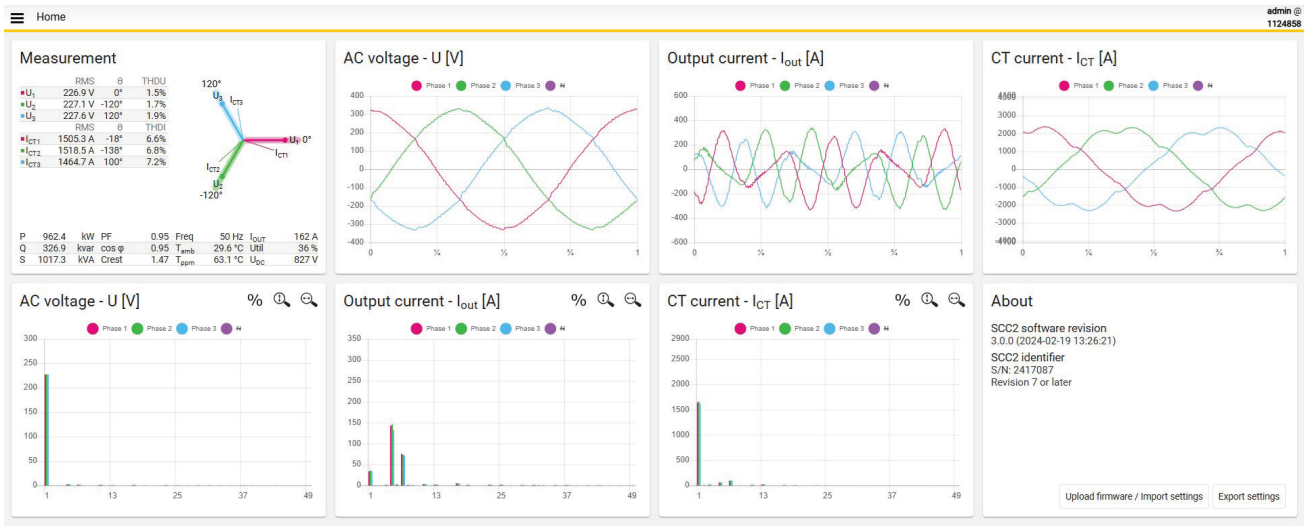
Fortunately, the space within the distribution board that had been allotted to power factor correction was generous enough to allow the installation of modules configured to simultaneously remove the load harmonic currents and correct the load operating power factor. Given all these factors, PFC Engineering suggested 2xPPM300-150/480 Active Dynamic Filters from Comsys installed inside of the existing LV panel along with 200 kVAr of fully detuned Power Factor Correction.

The layout of the new ADF system was custom designed at PFC Engineering's workshop where they fully assembled and pre-tested all components before installing and commissioning them on site. This saved time and made the most of the limited space.

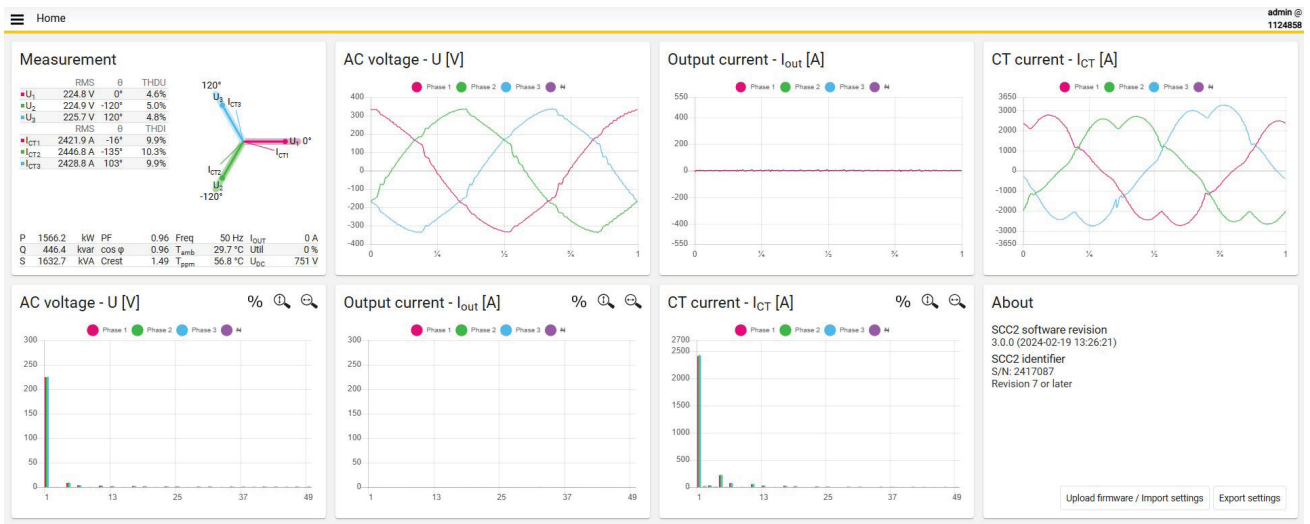
# RESULTS

All works and commissioning were carried out over the course of two days by two engineers from PFC Engineering without any interruption to the site's load. Most of the equipment had been pre-built and tested in PFC Engineering's workshop prior to installation. Since the startup in November 2024,

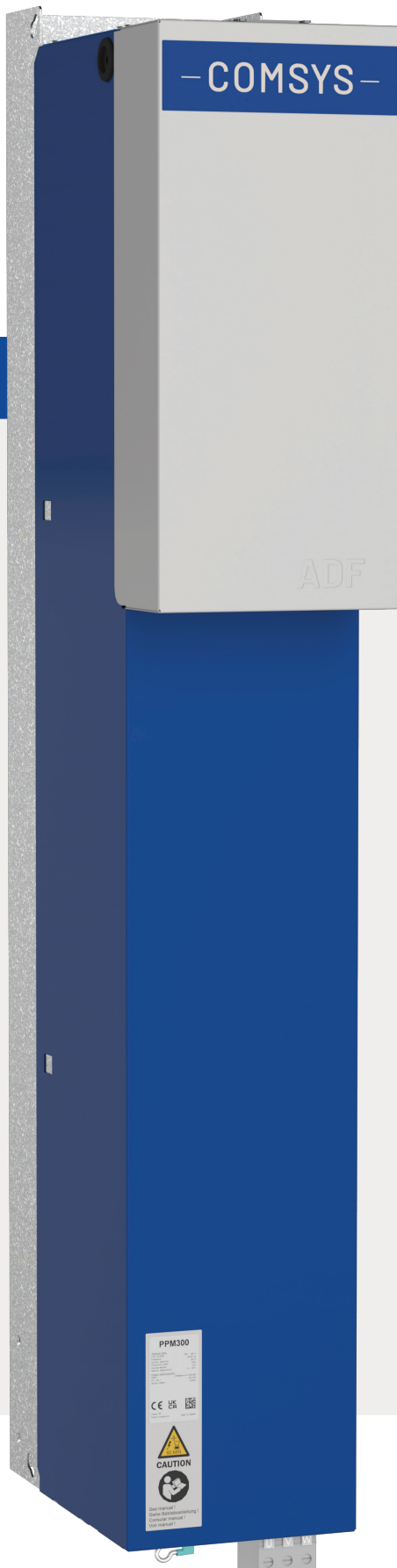
the harmonic distortion has been reduced from 5% VTHD to just 1.5%, and from 10% ITHD to 6.5%. The excellent result not only brings the system back to below the EREC G5/5 design requirements, but also helps to reduce both the losses on the transformer and the stresses on other site equipment.



## Measurements with ADF ON



## Measurements with ADF OFF



PRODUCT USED IN THIS CASE

## PPM300

- » MODULAR BUILDING BLOCK
- » HARMONIC ELIMINATION
- » AIR COOLING OR LIQUID COOLING
- » CLOSED LOOP, OPEN LOOP & SENSORLESS CONTROL
- » SYSTEM INTEGRATION READY
- » AVAILABLE AS UL/CUL LISTED COMPONENTS