

CASE STORY

All-in-one power quality solution secures crucial systems at large-scale infrastructure expansion in Qatar

» **LOCATION**
Doha, Qatar

» **INDUSTRY**
Infrastructure

» **INSTALLATION DATE**
2021-2025

BACKGROUND

As part of a large-scale infrastructure expansion in Doha, Qatar, a prestigious construction project required exceptional power quality management to support a wide range of modern electrical loads. The project unfolded in two phases and would require enough ADF units to optimise power quality across 24 transformers, supporting systems such as VFDs, LEDs, screens, CRAC units, HVAC, lifts, UPS, and rectifiers. Comsys, through its regional partner Power and Automation Control (PAC), played a central role in delivering a tailored and comprehensive power quality solution.

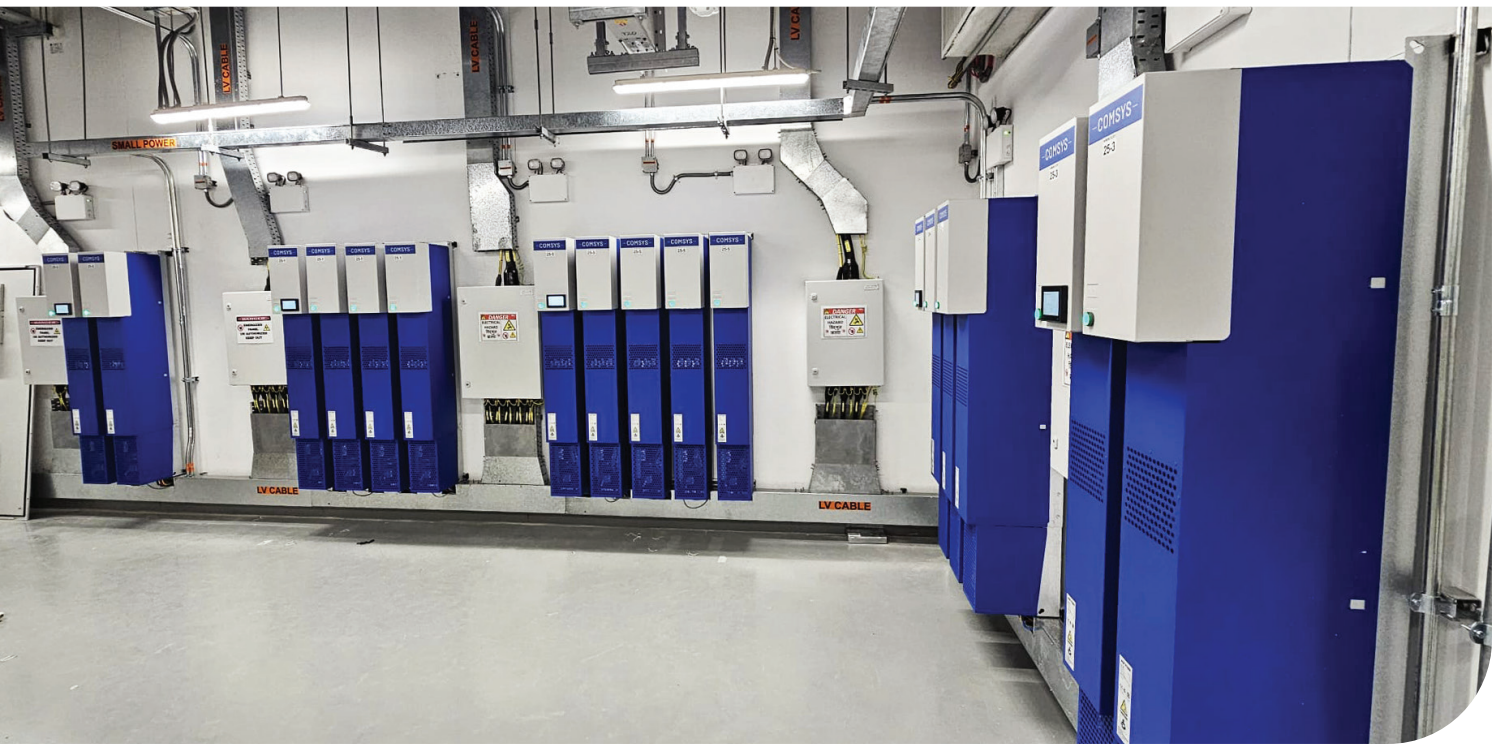
CHALLENGE

The main challenge was to ensure full compliance with IEEE 519 standards, which are critical in maintaining power quality in sensitive environments. With around 10 transformers powering Phase 1 alone, the system faced significant harmonic distortion and power factor issues, including one challenge that arose later on as described below.

SOLUTION

PAC, together with Comsys, implemented a full-scale solution for harmonic mitigation involving a total of 73 ADF (Active Dynamic Filter) units, carried out in two phases. For Phase 1 (2021–2023), 23 ADF P100N units and three ADF P100 were deployed, with an additional 47 ADF P100N units deployed in Phase 2 (2024–2025). For each transformer there was an ADF configured in Multi-Master mode, ensuring consistent performance, redundancy, and regulation aligned with IEEE 519 standards.





RESULTS

The ADF units from Comsys had been sized for harmonic correction, while capacitor banks had been sized for reactive power compensation. However, when the loads were energized during the commissioning of Phase 1, it was found that the PF was going into the capacitive direction. To handle this new challenge, the "power factor mode" available with the ADFs was activated, meaning the ADF units were now being used to mitigate not only the harmonics, but also the reactive power.

The solution enabled real-time filtering, power factor correction, and harmonic mitigation—allowing for capacitor banks to be safely deactivated. The installation has successfully brought the system into full compliance with IEEE 519 standards, while maintaining unity power factor (PF = 1) across the facility. With commissioning underway since 2022, the solution continues to deliver reliable, intelligent control over all aspects of power quality.

Comsys' technology stood out for its advanced software, robust design, and exclusive focus on power quality, making it the preferred choice over competing systems.

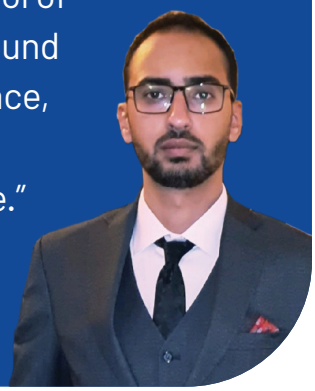
"Very happy to partner with Comsys."

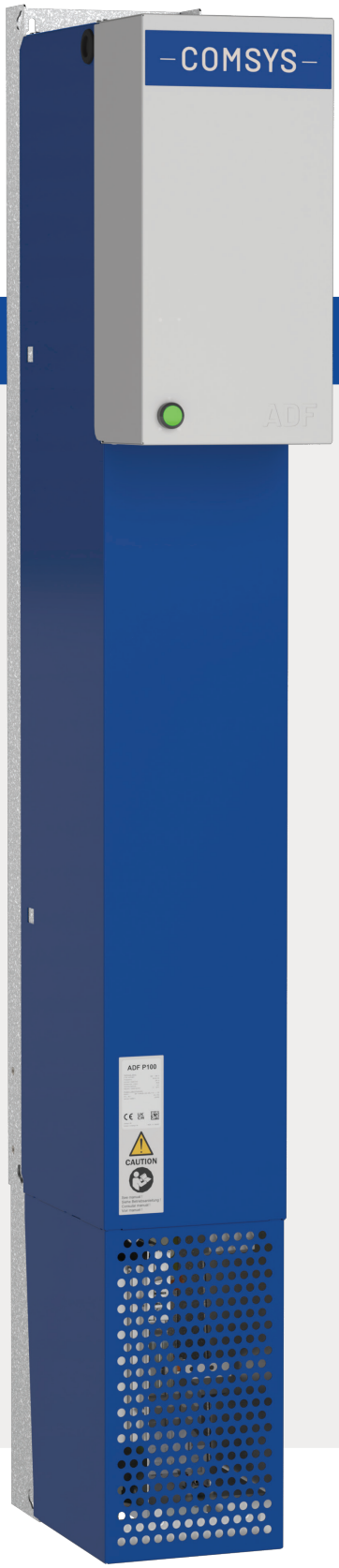
Ali Harb, Managing Director, PAC



"A great product and a great technology. The product is very robust, and the software is far advanced—it allows complete grid control of harmonics, background harmonics, resonance, power factor, and unbalance, all in one."

Jad Youssef, LV Division Manager, PAC





PRODUCT USED IN THIS CASE

ADF P100

- » HARMONIC ELIMINATION
- » LOAD BALANCING
- » DYNAMIC VAR COMPENSATION
- » MODULAR & SCALABLE DESIGN
- » LOW RESPONSE TIME
- » 208-415V NOMINAL VOLTAGE
- » SEVERAL ADF P100S CAN BE COMBINED FOR HIGHER POWER