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Success Story | Power Quality:

Major Coal Mining Site, Kalimantan

> *Harmonics caused an electrical fire. The PQactiF put it out — permanently.*

70% → 5%	0.98	IEEE 519
THDi Reduction	Power Factor	2014 Compliant

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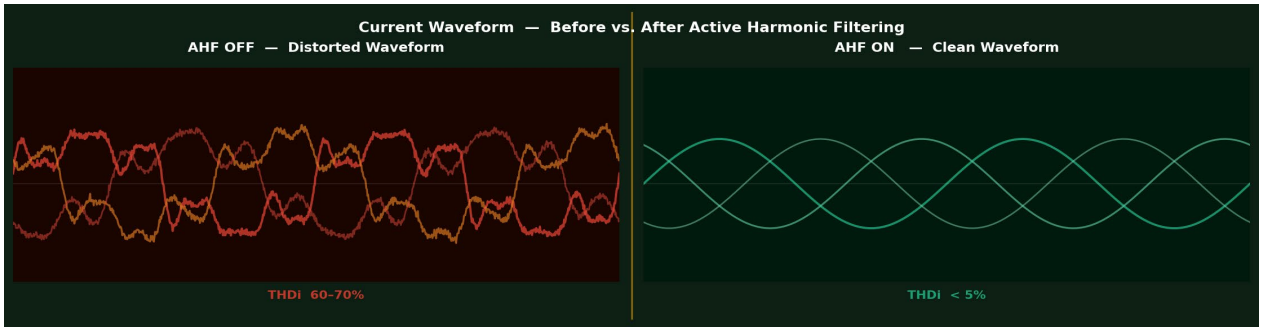
Client profile and key challenges

This project was carried out at the Water Treatment Plant (WTP) of a major coal mining operation in Kalimantan, Indonesia — one of the most critical utility assets on site. The WTP supplies clean water around the clock to the entire mining camp and processing operations, meaning any disruption to its electrical system carries immediate operational and safety consequences.

The plant's distribution system is dominated by motor-driven pump loads controlled by Variable Speed Drives (VSDs). While VSDs deliver significant benefits in energy efficiency and process control, they are inherently nonlinear — drawing current in pulses rather than smooth sinusoidal waves. Over time, the harmonic currents generated by these drives accumulated to dangerous levels, with Total Harmonic Distortion current (THDi) on the SDP WTP panel reaching 60–70% across all three phases.

The consequences were not theoretical. The harmonic-induced overheating in cables, busbars, and insulation had already resulted in an **electrical fire** in the distribution panel — a serious safety incident that underscored the urgency of a permanent power quality solution. Beyond the fire, the site was also experiencing a persistently low power factor of below 0.80, compounding energy losses and creating thermal stress across the electrical infrastructure.



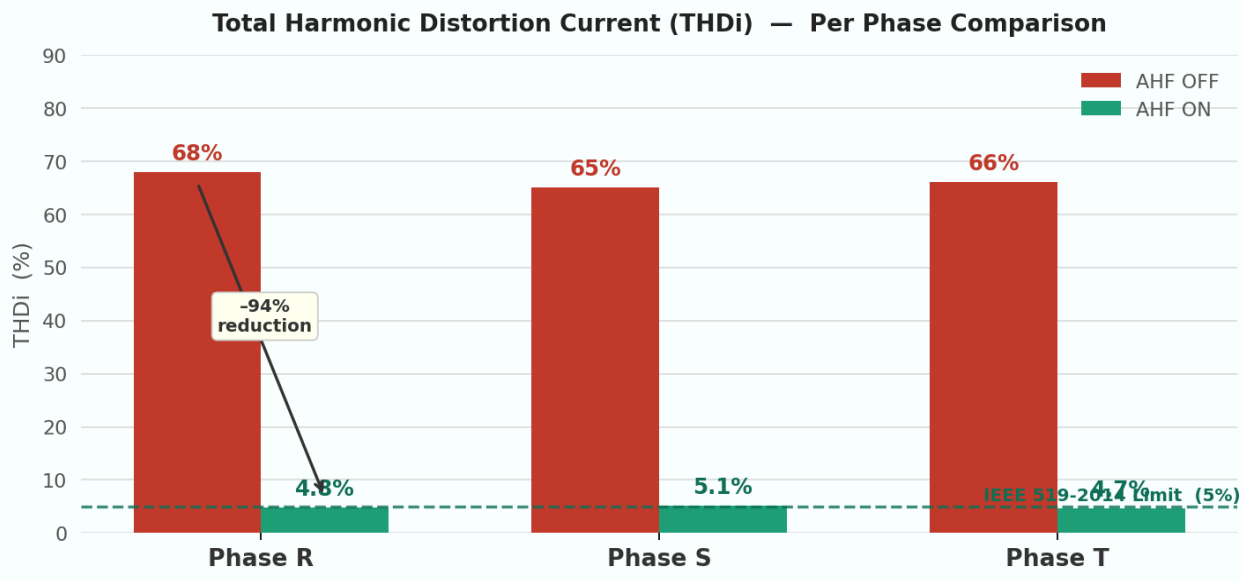
Current waveform comparison — Before (AHF OFF, THDi 60–70%) vs. After (AHF ON, THDi <5%). Measured using MIRO PQ45 Class A Analyser.

Solution

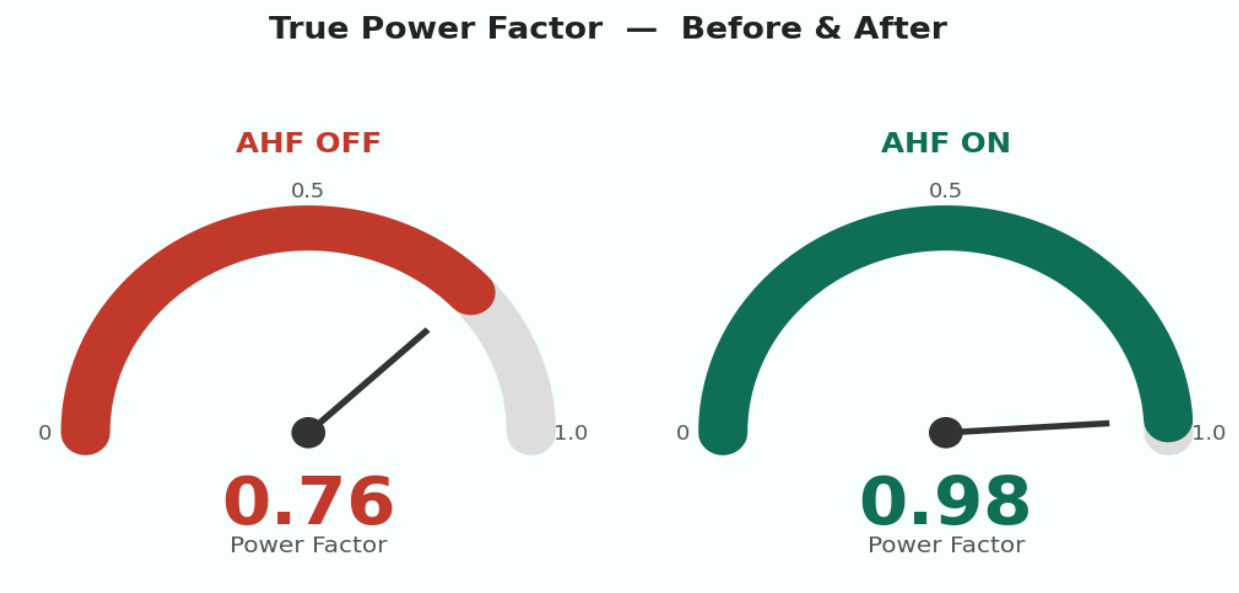
PT. Oscorp Elektrik Indonesia was engaged as the power quality contractor to deliver a complete end-to-end solution. Following a detailed harmonic audit using a **MIRO PQ45 Class A Power Quality Analyser**, the team specified and deployed the **Hitachi Energy PQactiF Active Harmonic Filter — 80A (2 × 40A modules)** on the SDP WTP line.

The PQactiF system was configured for 3-phase 4-wire operation on the 400VAC, 50Hz network, with closed-loop CT sensing (100/5A) targeting harmonic orders H3 through H41 simultaneously. Reactive power compensation was set to dynamic capacitive mode with a target power factor of 0.98, and load balancing across all three phases was enabled. The full project scope — from site survey and procurement through panel fabrication, mobilisation, installation, commissioning, and post-commissioning PQ measurement — was executed entirely by the Oscorp team, with all modules procured directly from Hitachi Energy's manufacturing facility in Belgium.

The results were immediate and measurable. Upon energisation, THDi across all three phases dropped from **60–70% to below 5%**, achieving full compliance with IEEE 519-2014 harmonic standards. The True Power Factor improved from under 0.80 to **0.98**, and the current waveform — previously highly distorted with visible harmonic spikes — became near-sinusoidal. The electrical fire risk was permanently eliminated, and the WTP electrical system now operates in a stable, thermally safe, and compliant condition.



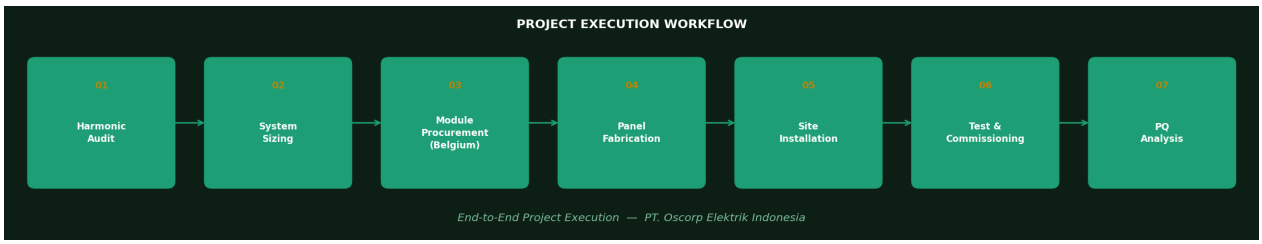
THDi per phase before vs. after AHF installation. IEEE 519-2014 limit line at 5% shown.



True Power Factor before (< 0.80) and after (0.98) AHF installation.

MEASURED RESULTS — AHF ON

70% → 5%	0.98	IEEE 519
THDi Reduction	Power Factor	2014 Compliant



End-to-end project execution: Harmonic Audit → Sizing → Procurement → Fabrication → Installation → Commissioning → PQ Analysis

Solution specification & operational benefits

Hitachi Energy PQactiF AHF 80A	
Filter Rating	80A (2 × 40A modules)
Connection	3-Phase 4-Wire | 400VAC 50Hz
Harmonic Range	H3 to H41 (up to 20 orders)
THDi Attenuation	> 97% at nominal load
Reaction Time	27 µs
PF Correction	Dyn. Cap. | Target cos φ = 0.98
Load Balancing	L-L & L-N (active balancing)
CT Ratio	100/5A closed-loop
Monitoring	Wi-Fi | Modbus TCP/IP | HMI
Certification	CE | EN 62477-1 | IEEE 519

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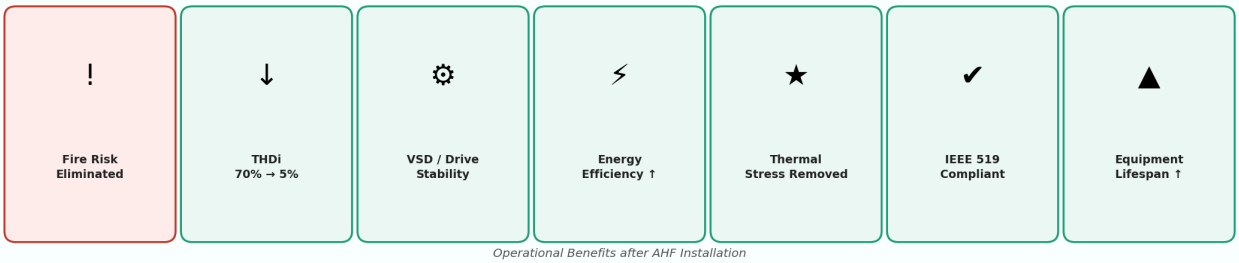
Operational benefits

- ⚡ Electrical fire risk permanently eliminated
- ✓ THDi reduced from 60–70% to below 5%
- ✓ Power factor improved to 0.98
- ✓ VSD / pump drive stability restored
- ✓ Cable and busbar thermal stress removed
- ✓ IEEE 519-2014 and SPLN D5.004-1 compliant
- ✓ Equipment lifespan extended
- ✓ Energy losses reduced



Operational benefits after Active Harmonic Filter installation

For inquiries, product demonstrations, or to discuss your power quality needs, please don't hesitate to contact us.

PT. Oscorp Elektrik Indonesia — Hitachi Energy PQactiF Channel Partner & Power Quality Specialist, Indonesia

Is your facility at risk? VFDs, pumps, HVAC inverters and nonlinear loads generate harmonics. Don't wait for a failure to act — contact us for a complimentary harmonic audit.

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