



ULTRA LOW LOSS AMORPHOUS TRANSFORMER REPLACEMENT WITH OLTC

BACKGROUND

Dovecote Park Ltd, located in North Yorkshire, supply the very finest British beef, veal and venison for the retail, fine dining and food sectors nationwide. The company prides itself on maintaining the highest standards of animal welfare and husbandry and recognises the importance of a resilient infrastructure.

Poor power quality costs UK industry and commerce billions of pounds in lost revenue every year. These losses will almost certainly rise as instability is exacerbated by the electrification of vehicles and increasing utilisation of important renewable sources, such as wind and solar farms.

Although harmonic distortion and the associated heating effect on transformers are often the key focus of power quality studies, voltage dips are arguably the most common and troublesome characteristic for facility operators. In an ideal world, these emerging risks would be monitored and mitigation hardware implemented before costly events manifest.



ANNUAL CARBON SAVINGS
14.4 tCO2

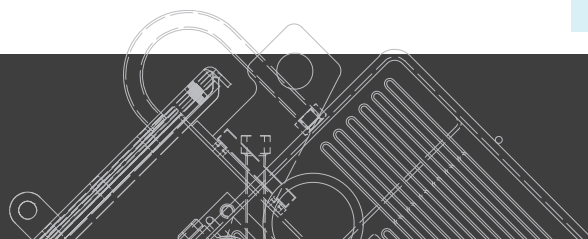


ANNUAL FINANCIAL SAVINGS
£12,316

Based on electricity costs of £0.18/kWh



ANNUAL SAVINGS
(TRANSFORMER LOSSES +
VOLTAGE MANAGEMENT)
68,426 kWh





The application of the Wilson E3+ transformer is considered as a triumph by the company. It has increased the stability of our infrastructure and our confidence is underpinned by the RPQ Reporting & Analytics Platform.

MICK FRASER - DOVECOTE PARK LTD.

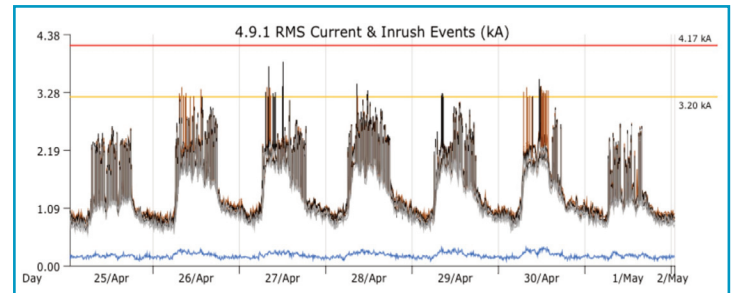
INSTALLATION BENEFITS AT A GLANCE

- 3 YEAR PAYBACK PERIOD
- 431 TC02 MITIGATED
- 30 YEARS LIFE EXPECTANCY
- REDUCING UNDER-VOLTAGE INCIDENTS
- 500,000 TAP-CHANGE OPERATIONS
- 3 SECOND GAP OPERATIONS CAPABILITY



THE CHALLENGE

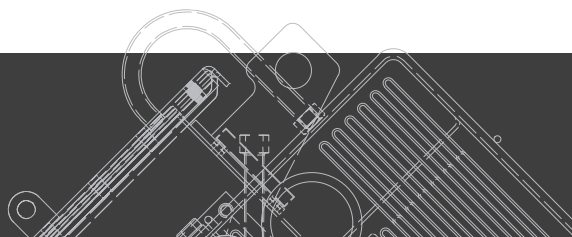
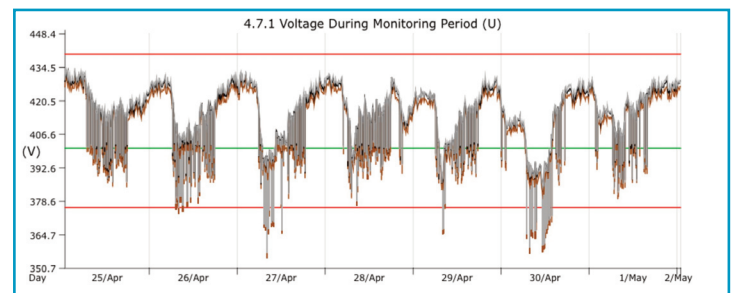
Mick Fraser of Dovecote Park Ltd, was one of the first facility operators in the UK to adopt the innovative Remote Power Quality Reporting & Analytics Platform. RPQ utilises fixed metering to enable low-cost monitoring, harmonic assessment, capacity analysis and energy saving metrics. remotepq.com



Inrush currents from motor loads were creating short-duration voltage dips on the low voltage network. Due to the proximity of a wind turbine on the 11kV network, the effect of these events was amplified, as the voltage level increased and decreased subject to the capacity of the generation.

The worst-case scenario at Dovecote Park therefore prevailed during typical peak demand periods, when the turbine was not generating power.

RPQ Alarms were echoing Dovecote's I.T system alerts, indicating under-voltage conditions. The dips in the following chart represent the most extreme voltage values and the duration of which was generally between 10 and 400ms.





THE SOLUTION

The RPQ Reporting & Analytics Platform identified the benefits of replacing the existing transformer with a 3MVA Wilson e3+ Ultra Low Loss Amorphous Transformer coupled with a 9-position on-load vacuum tap changer. The primary purpose being to reduce the grid swing and mitigate the risk of failure to critical plant and equipment from under-voltage.

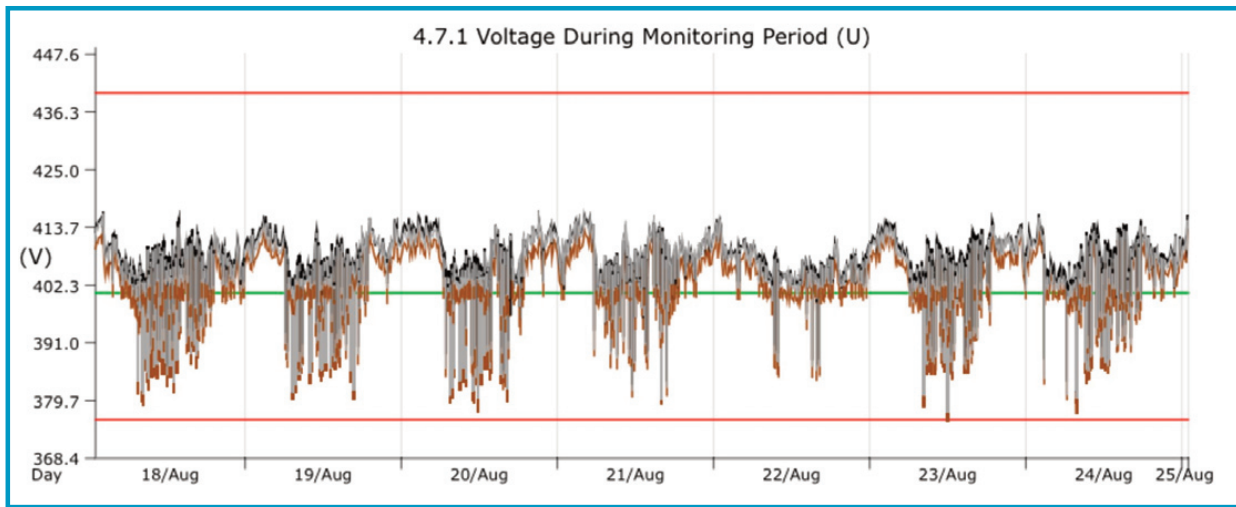
In the summer of 2021, Ipsum Power were engaged by the end user to remove the existing 2.5MVA CRGO transformer and commission the specified replacement. To complement site specific loads, the on-load tap changer was set to target a phase-to-phase voltage of around 406V (U).

An automatic adjustment in 1.5% increments would serve to improve the voltage management by reducing the grid swing, regardless of the site demand and/or the level of generation from the upstream wind turbine.

The following chart exhibits the improvement in voltage management following the application of the specified solution. Grid swing was reduced by 38V (U), the average value was reduced by 10V (U) and under-voltage events were mitigated to a satisfactory level.

This upgrade results in energy, financial and carbon savings providing Dovecote with a feasible solution to technical issue while helping them advance decarbonisation target.

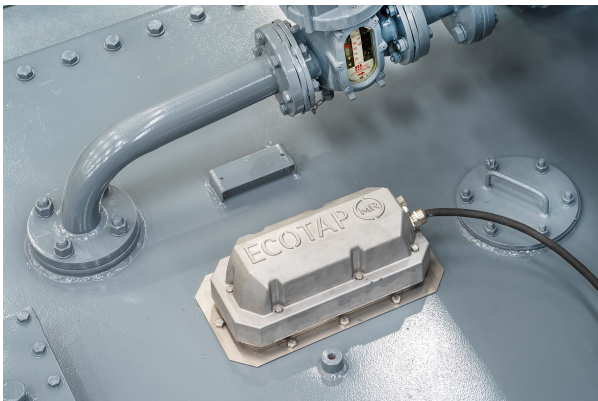
STEVE YOUNG - IPMC



GENERAL INFORMATION

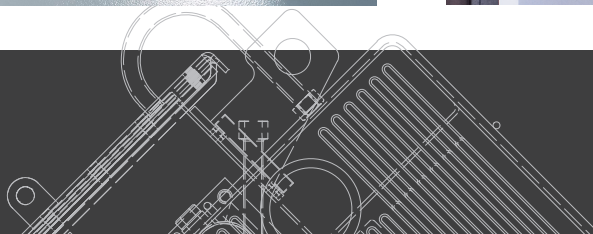
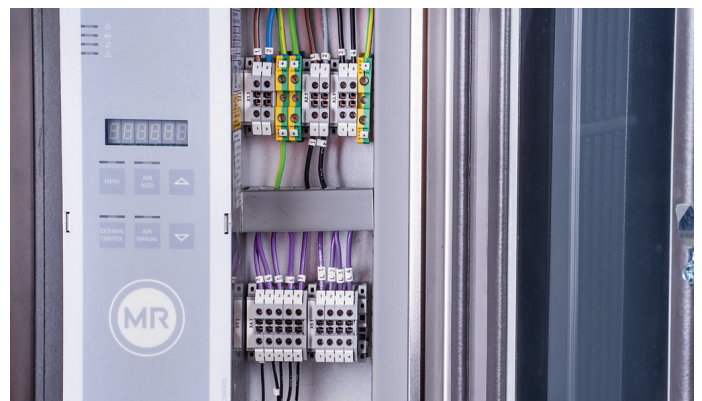
ON-LOAD TAP CHANGER

ECOTAP VPD On-Load Tap-Changer from MR is compact compared to older OLTC models. This OLTC vacuum solution prevents the contamination of the transformer oil allowing for 500,000 tap change operations without maintenance which allows the device to outlive the corresponding transformer.



WILSON E3+ TRANSFORMER

Wilson e3+ Ultra Low Loss Transformer is the UK's most energy efficient transformer. The transformer losses meet and exceed Tier 2 Ecodesign regulations that came into effect in July 2021. This upgrade results in the best energy, financial and carbon savings in the market to help Dovecote meet its decarbonisation targets.





SAVINGS

The financial benefits of successfully mitigating existing and emerging risks may be considerable but are difficult to determine due to production variables.

However, the approximate energy savings associated with this transformer upgrade have been calculated by the Remote Power Quality Reporting & Analytics Platform using site-specific load, network and profiling data resulting in the following findings:

Reduction in core losses (P.A):	16,281kWh
Reduction in winding losses (P.A):	22,252kWh
Voltage management reduction (P.A):	29,893kWh
Combined energy savings (P.A):	68,426kWh
Energy saved over (5 year period):	342,130kWh
Carbon savings* (5 year period):	71.9tCO2
Financial savings** (5 year period):	£61,583
Lifetime energy savings (30 years):	2,053MWh
Lifetime carbon saving* (30 years):	431tCO2
Lifetime financial savings*** (30 years):	£475,264

* Carbon calculation based on 0.21016 kg CO2 per kWh

** 18p/kWh used as an average all-in rate over the following 5-year period

*** Starting at 18p/kWh and increasing the electricity tariff by 2% per annum



In collaboration with:



Get in touch and find out how Wilson Power Solutions can help benefit your manufacturing business:

