

NINEWELLS HOSPITAL & MEDICAL SCHOOL



BACKGROUND

“
RESEARCH TELLS US THAT THE AVERAGE AGE OF A HV TRANSFORMER IN THE UK IS 64 YEARS OLD.
”

Renowned for introducing laparoscopic surgery to the UK, Ninewells Hospital, NHS Tayside is internationally recognised as a leading centre in developing medical genetics and robotic surgery. Like many public-sector organisations, the age of NHS Tayside’s hospitals present a greater challenge when meeting tough carbon emission targets. Justifying investment in new assets and energy saving technology must demonstrate a return on investment and improvements to the healthcare service.

NHS Tayside’s proactive approach to sustainability ensures they have an informed understanding of where and how to invest in energy saving initiatives.

REALISING ANNUAL COST SAVINGS OF £7,300 FOR A SINGLE TRANSFORMER REPLACEMENT

Critical energy supply

Upgrading the high voltage assets at the Ninewells Hospital to state-of-the-art, super low loss amorphous transformers was one such opportunity that would present the hospital with multi-benefits.

Besides delivering energy and carbon savings, the hospital will increase the resilience of the hospitals critical power network in line with the business continuity management programme.

Without interruption

The molecular sciences transformer room at Ninewells housed three transformers of a similar age, presenting the hospital with the prospect to significantly reduce their energy and carbon.

Once sanctioned, attention turned to the project management, which would require meticulous planning to remove the old assets before the new could be installed avoiding any downtime or interruption to the hospital’s energy supply.



LASTING BENEFITS

The transformer replacement project at Ninewells Hospital will save NHS Tayside approximately 60,800 kWh per annum per transformer. Each transformer will thus provide carbon savings of 27,113kgs and energy cost savings of over £7,300 a year.

The project is forecast to provide energy savings over a 5-year period of 304,000kWh, approximately 1.79% of the total electrical energy consumption at T1. This, in turn, equates to a reduction in carbon of approximately 135,564kg over the same 5-year period (total) and an energy cost saving of over £143,000.

Furthermore, the hospital will benefit from reinforcing its business continuity management programme by increasing its network resilience through the new transformers. This project is part of a five year HV infrastructure investment initiative that will deliver significant carbon and cost savings alongside significantly improved site resilience for NHS Tayside’s critical supply requirements.

“ BY REPLACING OLD HIGH VOLTAGE TRANSFORMERS THAT ARE RESPONSIBLE FOR CONSUMING LARGE AMOUNTS OF ENERGY, THE HOSPITAL ARE SET TO SIGNIFICANTLY REDUCE CARBON EMISSIONS AND ENERGY COSTS. ”

TRANSFORMER REPLACEMENT STUDY

The following section provides an overview of the findings from the independent viability study into Ninewells Hospital transformer replacement project in Dundee, Scotland.

Calculated savings are based on the replacement of the original 51 year old transformer (1967) with a super low loss amorphous Wilson e2 transformer of the same rating. Combined annual savings are a result of reduced transformer losses and voltage management.



EXECUTIVE SUMMARY

Independent Power Quality Survey

Super Low Loss Transformer

By replacing the existing 11kV:433V unit with a 11kV:415V Wilson e2 transformer of the same capacity (on +2.5%HV tap), combined energy savings of approximately **60,862kWh** per annum will be realised.

Using an average rate of 12p/kWh over a 5-year period, this equates to **around £7,300** pa or £36,500 over the 5-year period. Subject to the current supply agreement, additional savings may be exhibited from CCL and other government imposed charges, although this cannot be confirmed at this juncture.

The following table summarises compliance against the relevant standards, and the engineering solutions identified, as required. However, based on the data gathered and associated calculations, the estimated energy savings over a 5-year period would be around 304,000kWh, which is approximately 1.79% of the total electrical energy consumption at T1. This, in turn, equates to a reduction in carbon of approximately 135,564kg over the same 5-year period (total).

“ IF EVERY TRANSFORMER IN EUROPE OVER 40 YEARS OLD WAS REPLACED WITH A NEW SUPER LOW-LOSS WE WOULD SAVE ENOUGH ENERGY TO POWER DENMARK FOR THREE YEARS. ”

REFERENCE STANDARD/ SUPPLY & SECTION	ESQCR REGULATIONS	EN 50160	EN GS/4-1 LV LIMITS	EN GS/4-1 TRANSPOSED HV LIMITS	RECOMMENDATION
T1- SECTION 6	Yes	Yes	Minor non compliance	Yes	No mitigation equipment required. Switch off PFC banks as not required.

Power Quality & Power Factor Correction

The power quality study found that mitigation equipment is NOT required on site. As a result PFC banks can be switched off generating additional savings and reducing maintenance requirements.



WILSON E2 FEATURES

- Exceeding Tier 2 EU Eco Design Specifications (due in 2021)
- Significant operational savings
- Tried and tested technology - Over 800 installs across UK
- Specified by leading UK Hospitals



Wilson e2 transformer locations in the East of Scotland.

Get in touch and find out how Wilson Power Solutions can help benefit your hospital's estate:

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