

UNIVERSITY OF EAST ANGLIA



BACKGROUND

“
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”

University of East Anglia [UEA] is one of the UK's top 15 Universities and part of the top 200 Universities globally. It is a campus University of about 300 hectares and 90 buildings and on a “normal” day frequented by around 20,000 humans and about 5700 other species, according to a recent biodiversity study.

Being a centre of excellence in environmental sciences and climate research, UEA launched a comprehensive energy and carbon reduction programme (ECRP) in 2015.

Sustainable development at UEA means that the University is trying to balance the ‘three pillars’ of environmental, economic and social elements.

UEA achieve this by challenging their environmental impact through reducing their reliance on grid electricity and therefore fossil fuels, as well as promoting recycling and ‘eco’ products such as biological cleaning materials. UEA champions local suppliers and ethical causes and, importantly in the context of capital programmes, seeks to ensure value for money in a holistic, whole-life costing sense.

Given its very diverse building stock this is no mean feat. Having some of the highest performing buildings in the UK such as The Enterprise Centre (built in 2015 to Passivhaus standards) alongside poorly performing buildings including original 1960's science and other faculty buildings and residences like the Ziggurats.

Infrastructure includes 5.7 MWe of gas CHP generating 70% of heat and power as well as cooling via tri-generation with extensive district heating and cooling and a wholly owned 11kV network with 22 substations and 26 supply transformers.

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”

UEA's diverse building stock



Ziggurats



Science faculty 1960's

DESIGN GUIDE

To achieve best practice and help avoid blinkered "value engineering" approaches that all too often lead to higher operating costs in the long run, the University has developed a "Design Guide" that serves as a procurement and specification guide across its estate.

The guide is structured into specific sections /disciplines or area of design responsibility and is available freely to download from the University's website portal.uea.ac.uk/estates/building-design-guide.



The Enterprise Centre, Passivhaus standard



Sainsbury Centre for Visual Arts

UEA'S UTILITIES COST OVER £3.6 MILLION PER YEAR; £900K OF THAT ARE ELECTRICITY.

ENERGY SAVINGS BEYOND THE LOW HANGING FRUIT

Supply transformers –New build

UEA's total utilities cost is over over £3.6 million per year, £900k of that are electricity. About 687 MWh of this are estimated to be due to transformer losses (see diagram on next page) across the University Estate's 22 substations.

With transformer losses on the radar of the University's engineering, utilities and maintenance teams, UEA's Design Guide specified "super low loss amorphous transformers" since 2016 to help address this unnecessary energy wastage. Part 6 of UEA's Design Guide deals with electrical systems and can be found here:

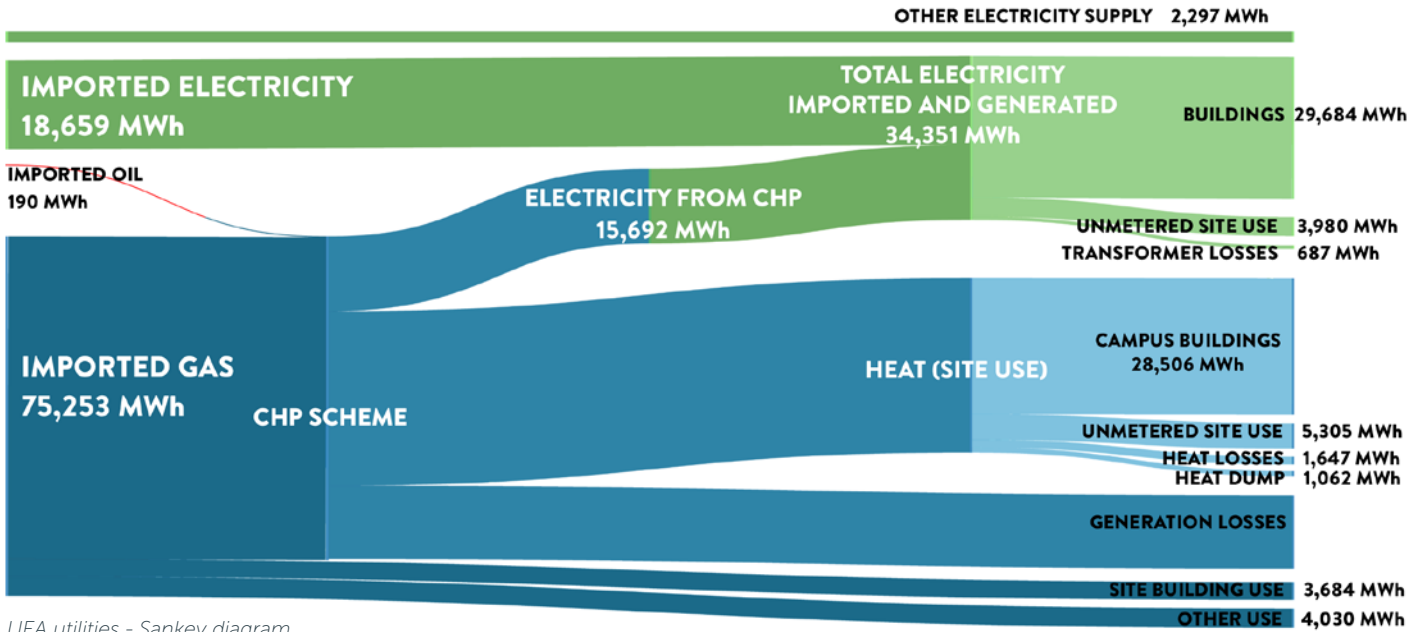
portal.uea.ac.uk/estates/building-design-guide/part-6

Super low loss amorphous transformers (such as the Wilson e2) already exceed strict new EU Eco

Design requirements (Tier2) due to come into force in 2021 thus providing significant whole lifecycle savings.

This means that new build projects such as the Barton & Hickling residences and currently under construction "Building 60", a new 6000sqm combined science teaching building are powered by highly efficient supply transformers that cost more upfront (higher capital cost) but achieve significant lifetime energy efficiency savings (better operational costs).

With typical lifetime savings of over £50,000 for a single 1MVA transformer, this infrastructure decision will save the University hundreds of thousands of pounds to re-invest into its estate over years to come.



UEA utilities - Sankey diagram

ENERGY SAVINGS BEYOND THE LOW HANGING FRUIT

Supply transformer replacement opportunities

One area of energy efficiency improvements that UEA hasn't benefited from thus far is the replacement of aged supply transformers. Inspired by a recent transformer replacement viability study at a large hospital near Dundee that will save the trust over £7,300 pa in electricity costs on one transformer replacement alone, the University is planning to carry out its own load profiling and power quality analysis project with a view to highlight similar opportunities in its 22 substations on site.

First candidates from an admittedly low key exterior inspection: A 1961 South Wales Switchgear 750kVA unit in the Sciences HV Substation and a 1960 South Wales Switchgear 1000kVA unit at Waveney. Watch this space!

“ WITH TYPICAL LIFETIME SAVINGS OF OVER £50,000 FOR A SINGLE 1MVA TRANSFORMER, THIS INFRASTRUCTURE DECISION WILL SAVE THE UNIVERSITY HUNDREDS OF THOUSANDS OF POUNDS TO RE-INVEST INTO ITS ESTATE OVER YEARS TO COME. ”



1000kVA Wilson e2 transformers in the Barton & Hickling Residences Substation



1000kVA South Wales Switchgear Transformer from 1960



WILSON E2 FEATURES

- Exceeding Tier 2 EU Eco Design Specifications (due in 2021)
- Significant operational savings
- Tried and tested technology - Over 750 installs across UK
- Specified by leading UK Universities



Wilson e2 transformer locations in East Anglia

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

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