

University of East Anglia Technical Innovation for Sustainability Building a demand-side power station

Section 1 About the project

Summary

UEA is helping to build a demand-side power station, turning energy-intensive equipment across its campus into smart devices which can automatically adjust their energy use to help balance electricity supply and demand across the UK without impacting their performance. As a result, this equipment is now generating revenue for UEA, and in the process it is helping the UK to “keep the lights on” and save carbon.

Project partners

Open Energi

Section 2 The results

The problem

Electricity cannot be stored, it has to be generated at the time it needs to be used. National Grid has to balance the supply and demand of electricity, second by second, minute by minute, hour by hour, day by day. Electricity must be delivered at a frequency of 50Hz, with serious consequences if it is too high or too low. If demand is greater than supply we could face blackouts, if supply is greater than demand equipment could fail. Currently National Grid achieves this balance by adjusting the supply of electricity up or down to meet demand, but as more of our energy comes from less predictable renewable sources it urgently needs a more responsive demand-side.

The approach

Open Energi has developed a unique form of demand response called Dynamic Demand which aggregates the energy demand of energy-intensive equipment from across its customers' sites and makes subtle adjustments to their electricity consumption in response to changes in grid frequency. Effectively it acts as a demand-side power station, adjusting our demand for electricity to meet available supply, rather than the other way around.

UEA is the first university in the country to install Dynamic Demand across its campus. As part of the initial rollout air handling units (AHUs) totalling up to 1MW have been equipped with the solution and are now



University of East Anglia

Profile

- HE
- 14,218 students (includes full and part time students)
- 2700 staff
- Edge of City

Category supported by



Working together

Finalist's case study

adjusting their energy demand automatically to help National Grid balance electricity supply and demand on a second-by-second basis. The second phase of the rollout is underway and will see the solution added to chillers and student accommodation blocks.

Our goals

- Generate revenue to fund energy efficiency initiatives on campus
- Improve the UK's security of electricity supply and support our transition to a clean energy economy
- Reduce CO2 emissions from power stations

Performance and results

- Air Handling Units across 8 buildings equipped with Dynamic Demand – integrated with Trend Building Management System
- Installed in Feb/Mar 2014
- UEA is expected to earn revenues of £111,000 over the first three years
- Phase 1 providing around 400kW of availability, phase 2 rollout (to incorporate additional buildings and chillers) should deliver 1MW in total
- Helping to reduce UK CO2 emissions by over 2,000 tonnes a year

Section 3 The future

Lessons learned

- 1 You can earn money by helping National Grid, the country, and the environment and get improved information on your equipment
- 2 Ensure you understand your systems and are clear what this technology is suitable for and what it isn't
- 3 Ensure you have a close relationship with the provider and have ultimate control to disable Dynamic Demand if necessary

Sharing our project

We have worked with Open Energi on a number of projects designed to communicate the benefits of this project to other universities and the wider energy management community. This has included a video case study, PR, speaking at events and holding a workshop and site visit at our Norwich campus so other universities could see the technology installed.

This project has demonstrated that universities have equipment that can provide a service to National Grid without impacting staff or students, in turn providing a source of income which can be reinvested to support wider energy efficiency goals.

What has it meant to your institution to be a Green Gown Award finalist?

“UEA has a top-rated School of Environmental Sciences and we are committed to replicating this success in the sustainability of our campus. Adopting more intelligent ways of managing our electricity demand supports this goal and we would be thrilled to win a Green Gown award for our work with Open Energi.”

Professor Edward Acton, Vice Chancellor



AWARDING SUSTAINABILITY EXCELLENCE FOR 10 YEARS

Finalist's case study



Dissemination supported by:



Further information

Martyn Newton, Assistant Director of Estates

m.newton@uea.ac.uk, 01603 592052 / 07889 111907

Facebook: <https://www.facebook.com/ueaofficial>

Twitter: @uniofeastanglia