SMART CAMPUS SIMULATION

A simulation based tool to understand energy consumption patterns
and behaviour cost reduction in large campuses.

OBJECTIVE

We conceptualised and campus as a socio-technical system and use design theory to look at adaptive approaches to improve energy utilisation. This work also explored approaches to convey the need to change energy usage patterns to address the issue of the campus's carbon footprint. Just as energy usage behaviour assumes energy to be ubiquitous, we planned to understand the use of technology to achieve responsible energy consumption ubiquitously as well.

Intended Audience
Campus administration,
Energy researchers, Architects

Keywords
Energy-consumption, Adaptive,
agent-based simulations,
Socio-technical system, Sensor
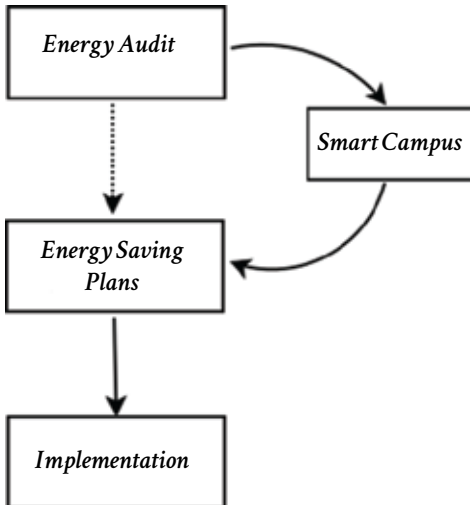*Deployment*
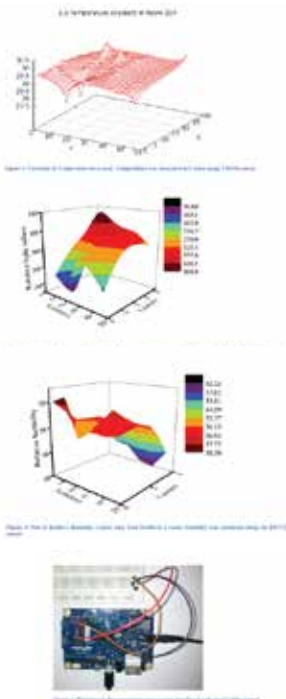
APPROACH

In order to model the socio-technical aspects of the campus, we collected data about the physical dimensions, the energy meter readings from its buildings, a catalogue of all the devices with their locations, campus operational policy, user behaviour and their preferences. We used IIIT - Bangalore as a case study.

We used FoV's Phoenix simulation platform to implement an agent based model for the campus along with additional information such as population, the current billing and tariffs, etc,. Using this model we create different scenarios of operations for the campus such as:

- How does the energy usage behaviour change with staggered work hours and changing course structures?

- What is the cost-benefit of deploying a new technology, for example, an adaptive sensor based device control, on the campus?

- How can we raise awareness about issues of climate change and energy responsible consumption with a dynamic campus population?

OUTPUT

- A multi-agent simulation tool for a smart energy campus.

- A specification for the sensors for long term deployment.

- A range of possible energy saving options based on different policies and scenarios.

- Research articles.
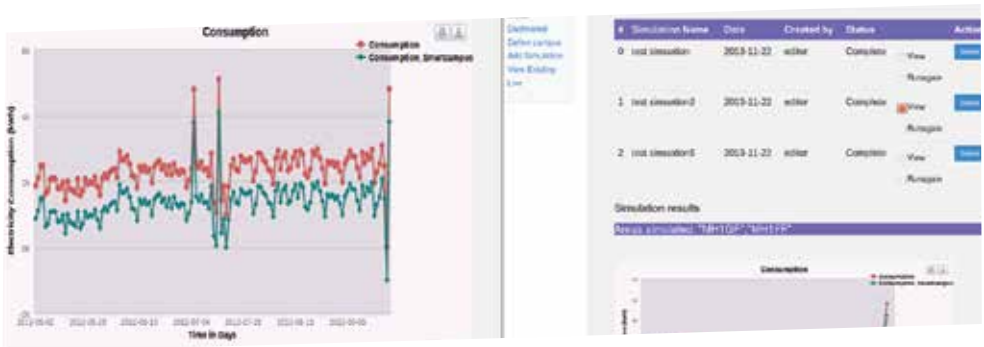
Publications
Harsha Krishna, Onkar Hoysala, Murali Krishna G., Bharath M. Palavalli and Eswaran Subrahmanian. (2014). Modelling technology, policy and behaviour to manage electricity consumption. Proceedings of the IEEE Region 10 Humanitarian Technology Conference, Chennai.

Smart Campus
Simulations at Fields of View

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