

UU SPIRE 2 researchers working with Belfast Health and Social Care Trust (BHSCT) to assess the integration of MAN Energy's new Electro-thermal Energy Storage (ETES) system at Belfast City Hospital

SPIRE 2

Storage Platform for the Integration of Renewable Energy



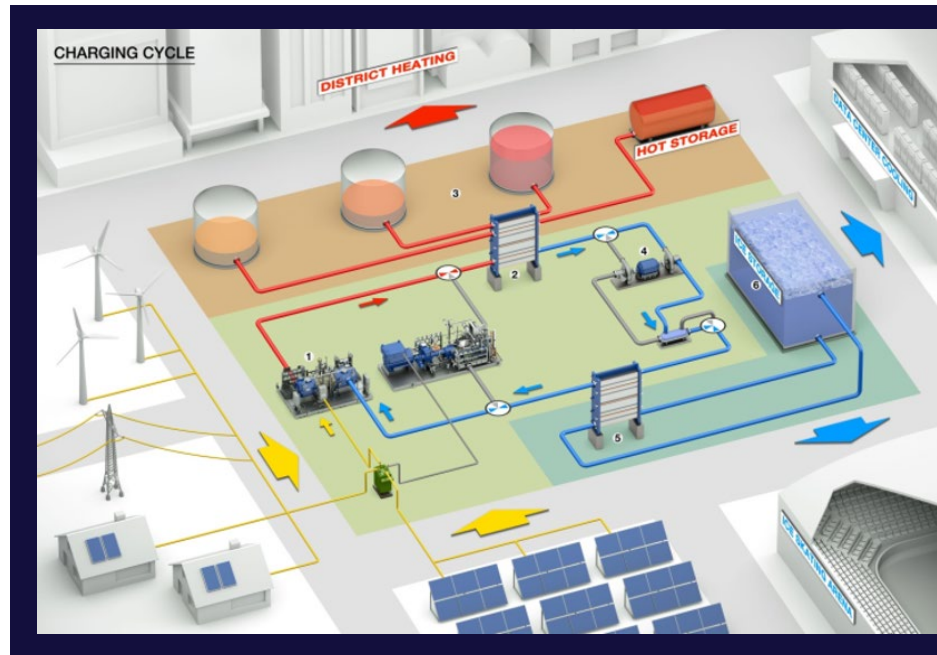
THE CHALLENGE

Belfast Health and Social Care Trust (BHSCT) is a public organization which is committed to addressing climate change and to reducing its greenhouse gas emissions. Belfast City Hospital currently has an outdated, fossil-based heating and cooling system that must be replaced with an efficient, low carbon alternative.

MAN Energy Solutions has developed a proposal to replace the old equipment with their new Electro Thermal Energy Storage (ETES) system to provide heating and cooling services with much lower CO² emissions. The proposed 8 MW, electrically powered system will displace polluting fossil fuels but will result in extra loading on the electricity network. Consequently, BHSCT also plans to add PV and a battery energy storage system (BESS) to the BCH site to offset the electrical load, optimize ETES operation and to increase the share of electricity from clean resources.

THE RESEARCH

Ulster University SPIRE 2 researchers are assessing the impact on the distribution network of adding the new electrical load, and investigating how to increase flexibility by smart management of the ETES. Researchers are also evaluating the mitigating effect of adding a combined battery and PV array to the system, to establish the net effect on the grid. The SPIRE 2 research team will additionally assess the potential for the system to participate in DS3 ancillary services markets, as well providing future flexibility services to the network operator.



THE CONCEPT

The study will include techno-economic assessments of a range of BESS capacities and their potential to provide arbitrage and DS3 services (arbitrage refers to the ability of BESS to exploit differentials between peak and off-peak power prices). This will include an economic assessment of the savings which could be made through maximising consumption of on-site PV generation/minimising consumption of peak electricity; as well as the potential for generating income through the provision of ancillary and network services. As well as techno-economics, researchers will assess how the ETES and BESS will reduce the hospital's CO2 footprint by displacing polluting fossil fuels.

THE IMPACT

SONI and NIE Networks operate the Transmission and Distribution systems in NI and are responsible for ensuring that the power system operates securely and efficiently, while facilitating higher levels of renewable energy. Both are working to obtain a range of system ancillary and flexibility services from as wide a pool of market participants as possible.

This research will demonstrate how flexibility provided by Belfast City Hospital could create system value by delivering both ancillary services to the existing DS3 market and future network services. There is huge potential for the project to establish how not just BHSCT, but the health sector throughout Northern Ireland, could reduce greenhouse gas emissions while also driving the development of a smarter, cleaner, consumer-led energy system.