Ulster University and Northern Ireland Housing Executive (NIHE) collaborate on SPIRE 2 - RULET (Rural-Led Energy Transition) initiative to seek to reduce or eliminate the risk of low-income households being left behind in the transition to clean, smart, integrated energy systems.

SPIRE 2
Storage Platform for the Integration of Renewable Energy

Ulster University

QUEEN'S UNIVERSITY BELFAST

University of Strathclyde

DUNDALK INSTITUTE OF TECHNOLOGY

arbarr

Sunamp

THE CHALLENGE

Northern Ireland has connected world-leading levels of wind generation to its power system, particularly in western counties. However, when wind generation exceeds electricity demand, the output from wind turbines is currently turned down. In 2019, 10.7% of NI's available wind energy, with a retail value of close to £50M, was dispatched down – effectively dumped. The declining costs of consumer-controlled flexible resources means that with new market arrangements, even moderately affluent households will be able to shift their energy consumption to off-peak/low-price periods and take advantage of cheap wind energy. This creates a risk that those who are unable to flex demand because they are not homeowners or have limited access to capital are disadvantaged.

ulster.ac.uk/spire2

THE RESEARCH

Project objective of the SPIRE 2 - RULET initiative aims to reduce or eliminate the risk of low-income households being left behind in the transition to clean, smart, integrated energy systems.

The SPIRE 2 - RULET initiative will quantify the system value which could be created by significant uptake of flexible electric heating in NI social housing. Lead partners Ulster SPIRE 2 and NIHE are assessing how energy efficiency upgrades, electrical heating systems, energy storage and smart control technologies could improve outcomes and create new business and ownership models for social housing tenants. The SPIRE 2 - RULET initiative will carry out field trials of domestic technologies provided by project partners Climote, Grant Boilers and Sunamp. In parallel with field trials, Energia/Power NI will trial new dynamic market arrangements, which will allow NIHE tenants to take advantage of cheap wholesale electricity prices. UU, NIE Networks and SONI are modelling the impacts of the extensive uptake of smart heating systems in NIHE dwellings; initially concentrating on off-gas grid homes in western counties of Northern Ireland.

THE CONCEPT

Electrification of heat and transport, along with the need for more renewable generation to meet the UK's Net Zero 2050 target, requires a significant increase in power system flexibility to complement output from renewables like wind and solar energy. Flexibility can be delivered by investor-owned, grid-scale resources like large battery systems. Alternatively, it can be delivered by flexible, consumer-owned resources (hot water storage tanks, rooftop PV, smart heat pumps with thermal/battery storage, and electric vehicles), enabled by new market arrangements and business models. Domestic electrical heating systems, combined with thermal storage and smart controls and operated at scale, have the potential to create significant value by managing high levels of wind energy.

THE IMPACT

Smart demand in NIHE-owned homes will provide flexible load to make use of low- or zero-cost wind energy (which would otherwise be dumped), creating value by;

- Reducing fuel poverty
- Empowering Social Housing Tenants
- Reducing NI's dependence on imported fossil fuels
- Reducing emissions of greenhouse gases and other pollutants
- Increasing System Efficiency
- Developing new, consumer-focussed market arrangements

Interreg Northern Ireland - Ireland - Scotland

SPIRE 2 is supported by the European Unions INTERREG VA Programme, managed by the Special EU programmes Body (SEUPB)

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