NINES
Northern Isles New Energy Solutions
Future Networks and Policy Team

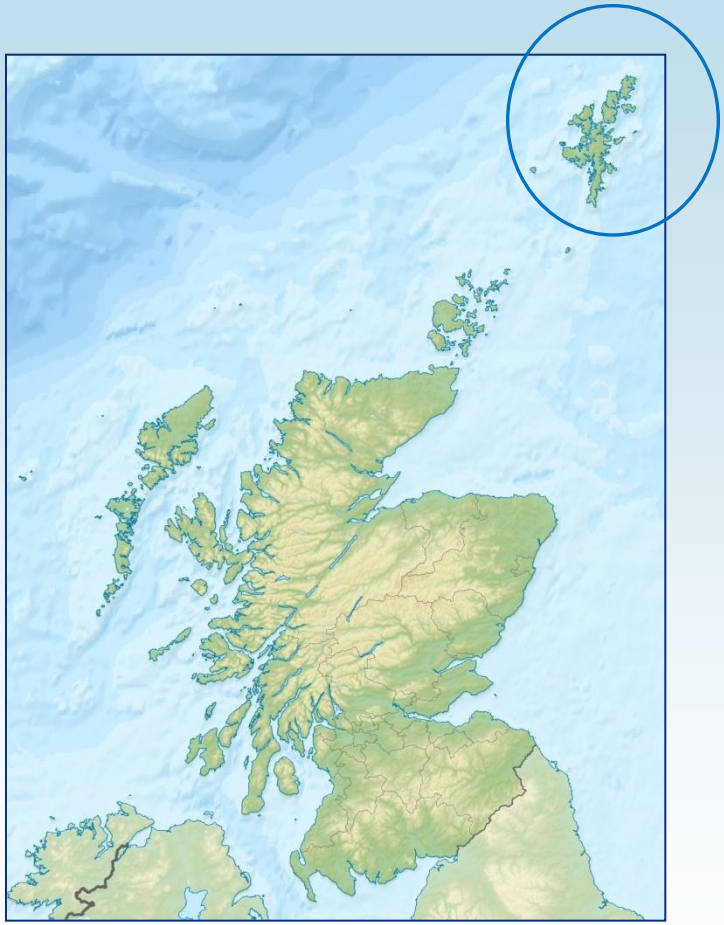
Scottish and Southern Energy
Power Distribution

Shetland: An energy island

Shetland is not connected to the UK electricity network

Viking Wind Farm proposal (103 turbines, 370 MW) may bring link to UK grid if connected - this could be available in 2016

For now, Shetland remains an energy island



Matching generation and demand

As an energy island, the maximum amount of energy used on Shetland each year sets a limit for the maximum amount of energy that can be generated in each year:

Shetland annual electricity consumption	**215GWh**

The island's energy use also sets a limit for the maximum that can be generated at any moment in time:

Winter maximum demand	**47MW**
Summer minimum demand	**10MW**

NINES: Supporting a sustainable future

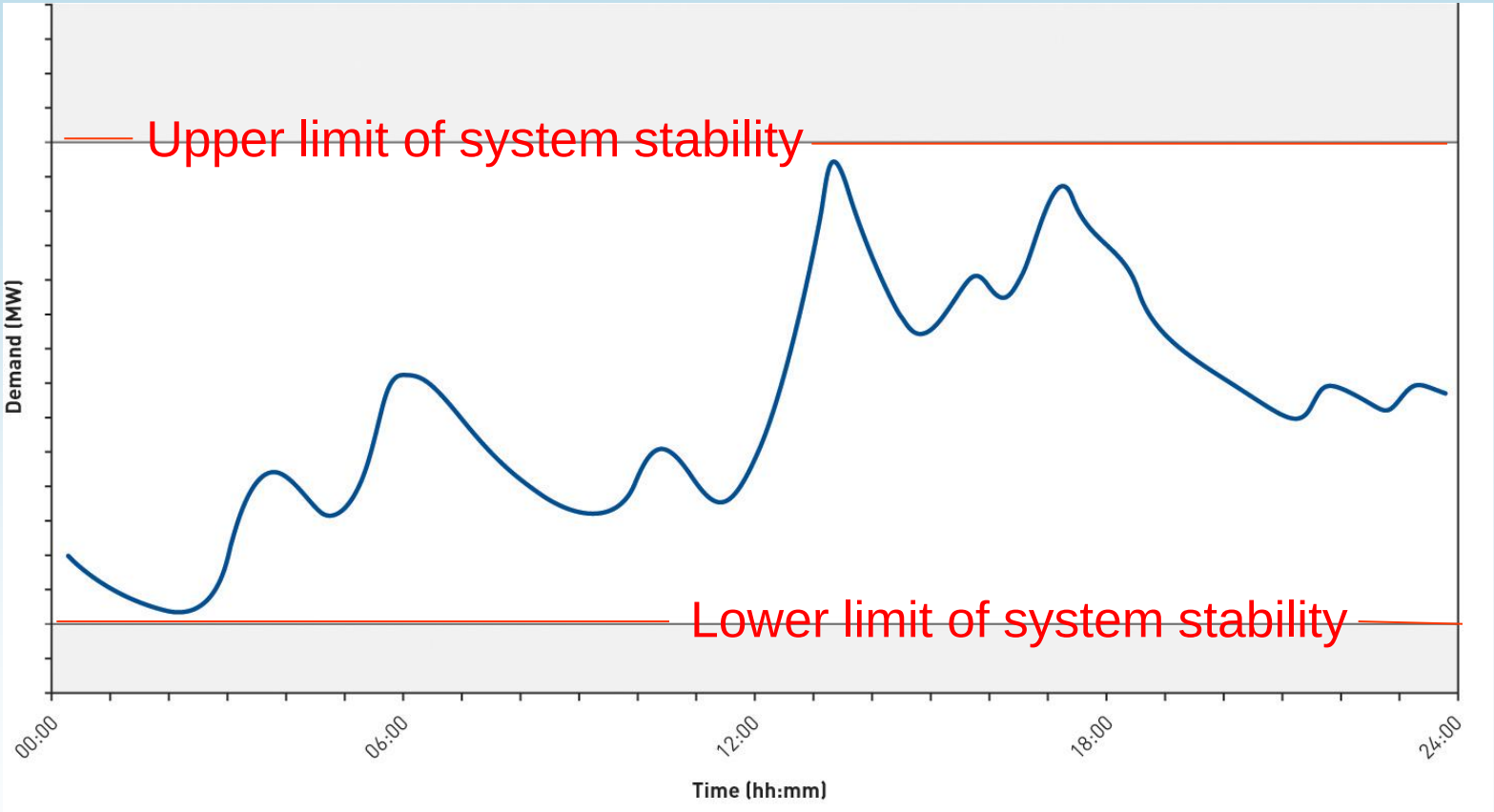
Despite massive renewable resources, just 7% of energy is from renewables

Most generation on Shetland is from fossil fuels

Opportunity for change - Lerwick Power Station needs to be replaced

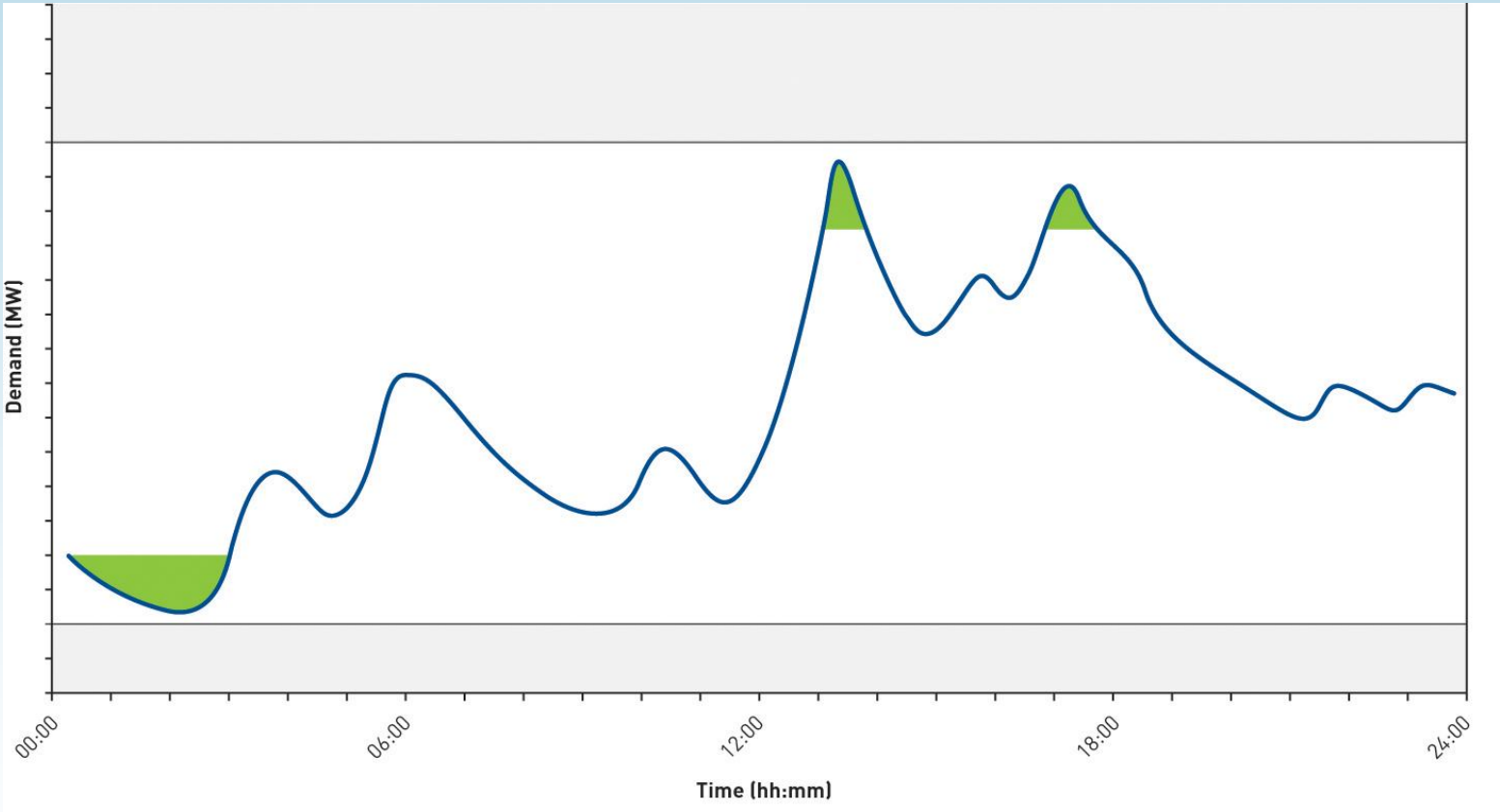
NINES – innovation to allow more renewables to connect to network, reduce reliance on fossil fuels and reduce carbon emissions

Shetland daily demand



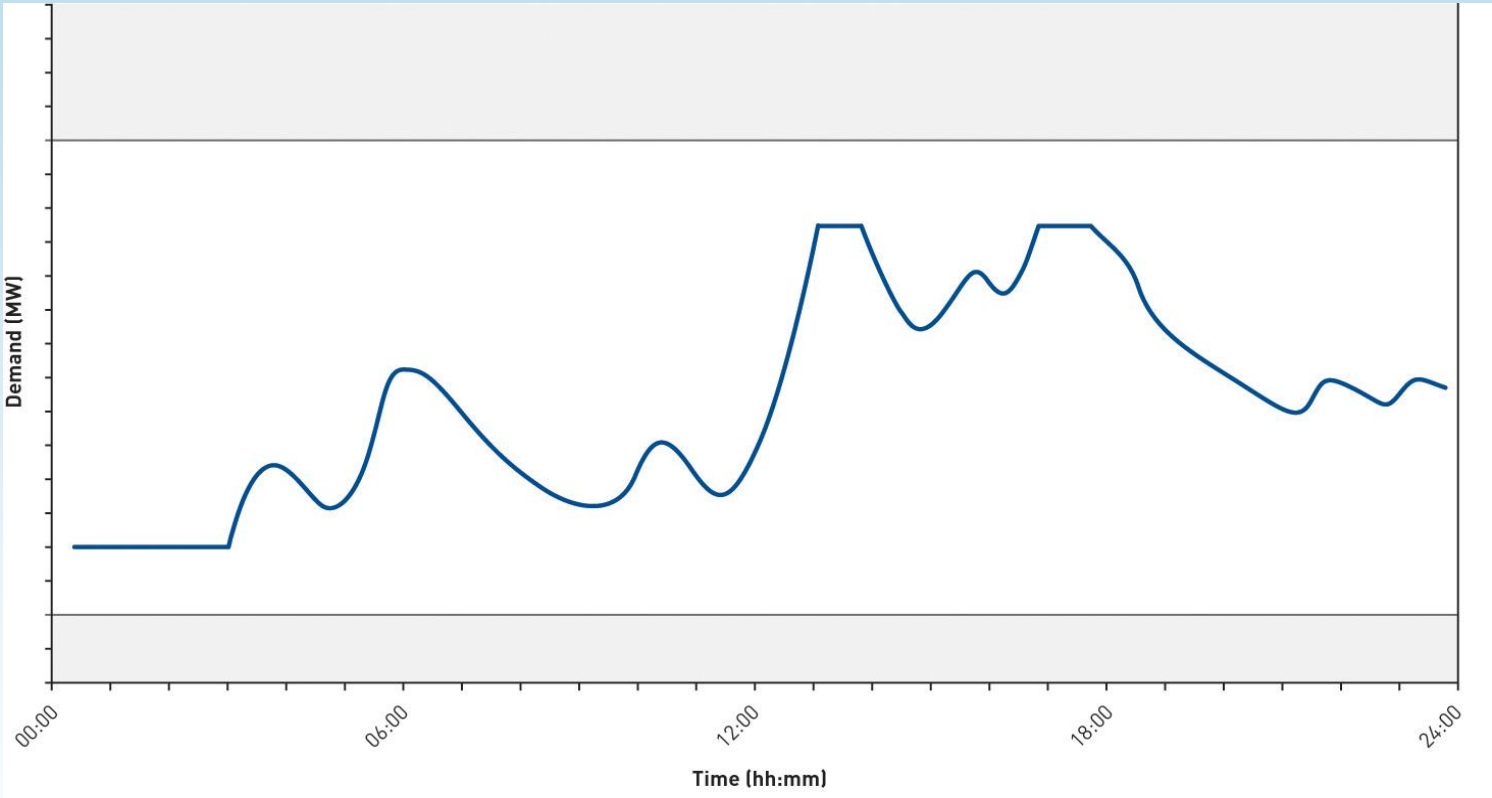
Why only 7% renewables? The system is full - current demand approaching limits of stability. Extra renewable generation could exceed system limits

Shetland daily demand: peaks and troughs



We need to make more room on system – reduce the peaks of demand and shift that demand to a quieter time

Shetland daily demand: lopped



This would give more headroom – allow new renewables to connect
How? – build energy storage to store renewables when surplus and release when needed

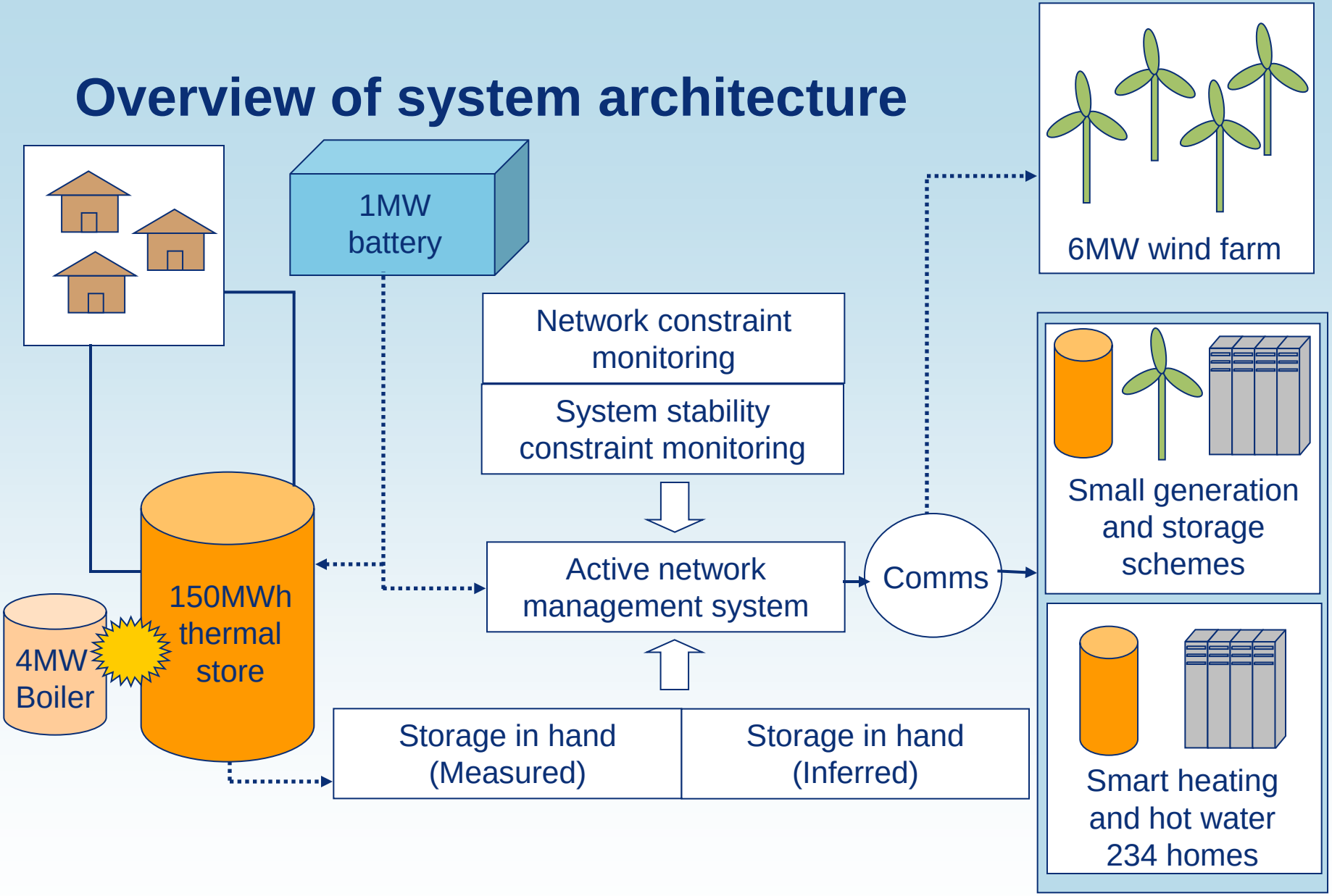
Creating controllable demand

Thermal store – hot water tank to extend existing district heating

Electrical store - 1 MW battery

Domestic electric storage and water heating – more controllable for customers, also balances system

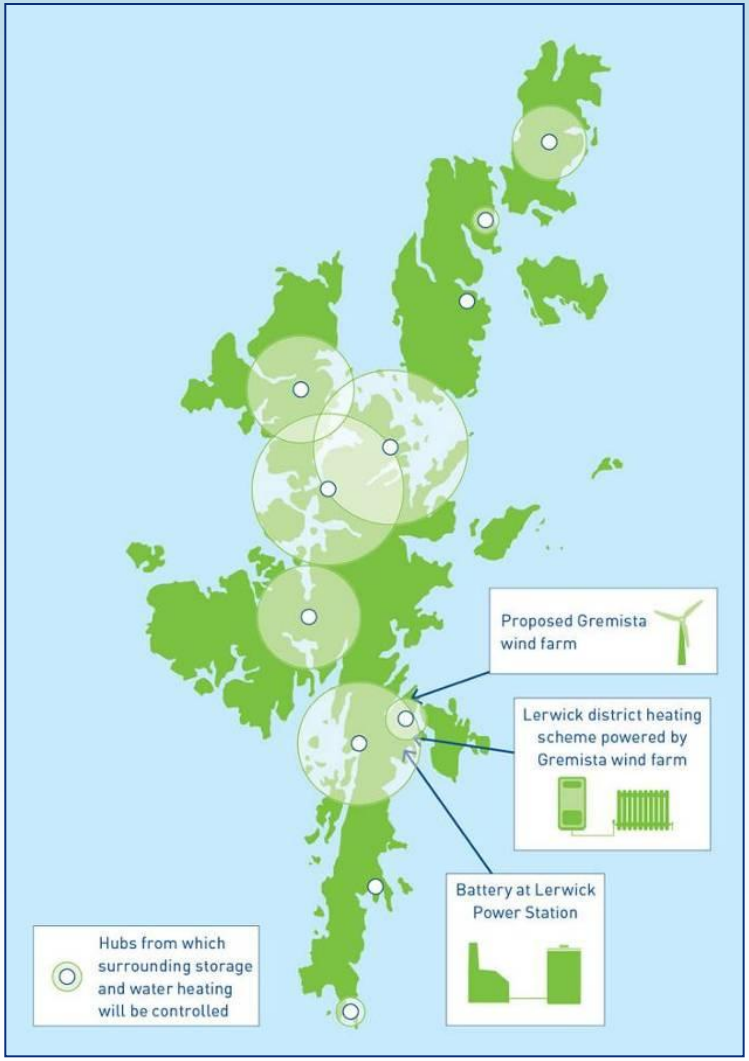
Overview of system architecture



Shetland-wide distribution

Lerwick: battery and thermal store for district heating system, with new wind power

Throughout Shetland: 234 domestic storage and water heaters - circles show areas where main concentrations will be



Managed connections

Extra network capacity released by using storage to shift demand can be used by new small and medium sized renewable energy generators

‘Managed’ connections will be offered – when plenty of space on system, no limits on generation, but when system limits approached, generators will have to turn down output

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