FORTRESS

Flexibility and Optimisation for Resilience in Energy Systems

Scottish & Southern Electricity Networks

Please note:

Todays session will be recorded.

Mics on mute

Please stay on mute.

Questions

We will have time at the end of the presentation for Q&A.

Interaction

There will be some questions for you to answer at the end of the presentation

NHS SCOTLAND

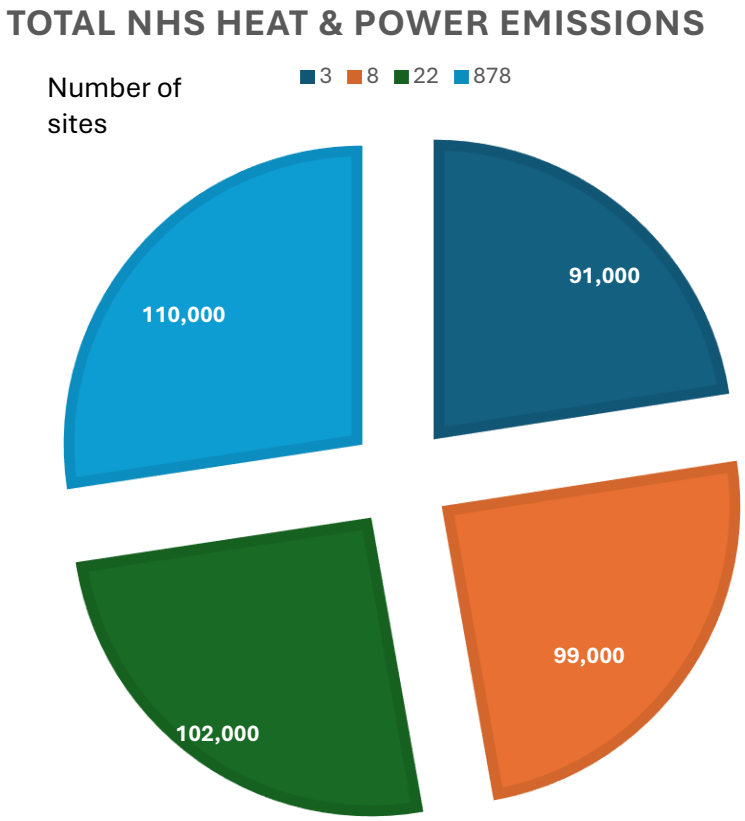
Scottish & Southern Electricity Networks

NHS Scotland Energy Transition

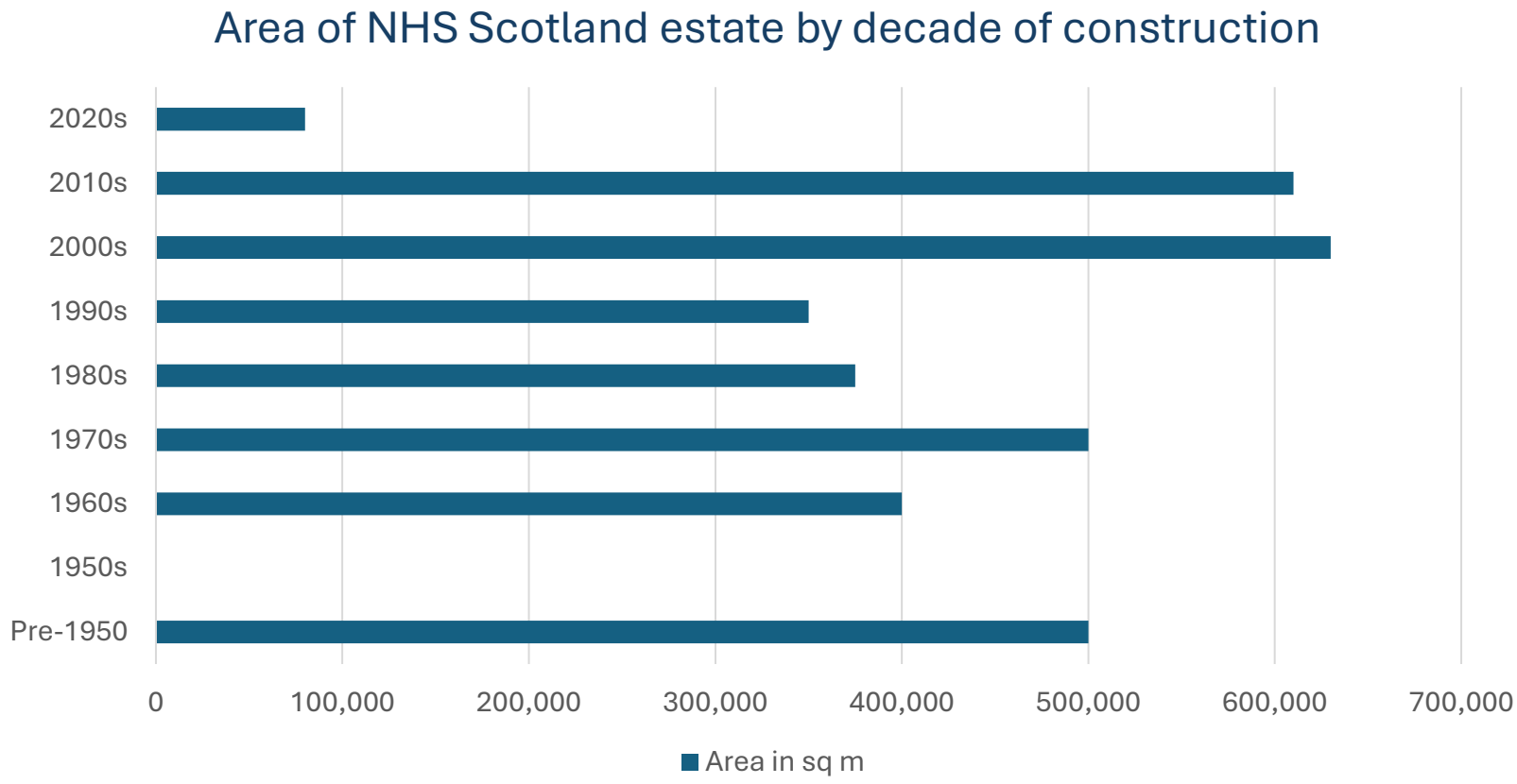
- 2040 Net zero target
- Building energy emissions down by 31.88% since 2015/16
- Emission from stationary combustion – around 300,000 tCO2e

The Estate

- Around 900 sites
- 20 produce 60% of emissions



The Estate - Age



Challenges

- Enabling works – capital cost, time and disruption
- Renewable heating systems – capital cost
- Higher revenue costs of electricity v gas
- Electrical supply constraints and costs

Funding & Priorities

- Planning assumption - £20 million baseline from 26/27
- Decarbonisation plans for major sites
- Develop pipeline of projects

FORTRESS

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Scottish & Southern Electricity Networks

WELCOME AND INTRODUCTIONS

SSEN DISTRIBUTION

SSEN DISTRIBUTION
NETWORK AT A GLANCE

North of Scotland
SSEH/SHEPD LICENCE AREA

Nearly **4 million** homes and businesses

Over **128,000km** of overhead lines and underground cables

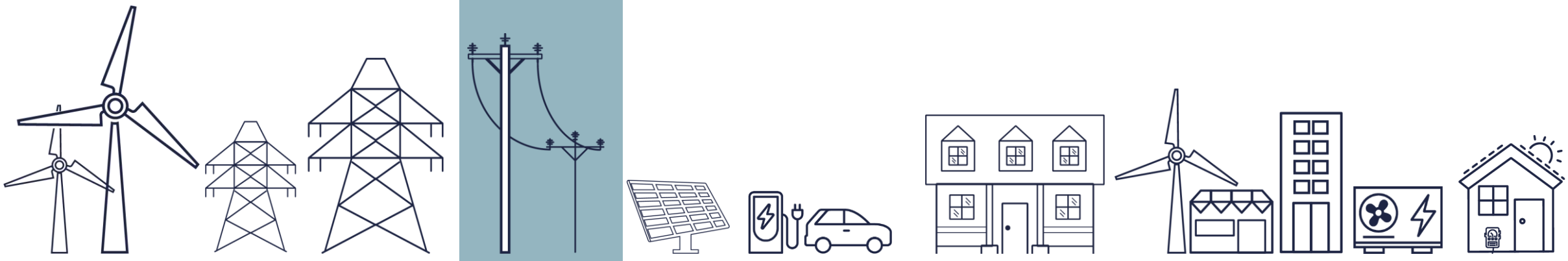
Over **460km** of subsea cables powering our island communities

Over **4,400** employees across the country

Central Southern England
SSES/SEPD LICENCE AREA

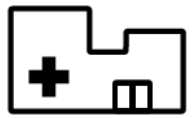
OUR ROLE IN THE ENERGY SYSTEM

As a Distribution Network Operator, our role in the energy system is to carry electricity from the high voltage transmission grid to industrial, commercial and domestic users via a network of cables and poles.



FORTRESS – THEORY AT THE START OF DISCOVERY

Example Protected Sites



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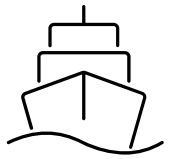


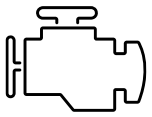
Ports

Airports

MOD

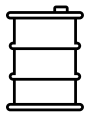
Example Energy Mix

Existing grid demand



Heat and Electricity from CHP

Heat from gas boilers



Resilience from Oil

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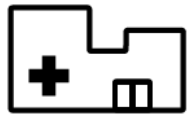
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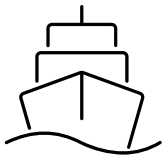
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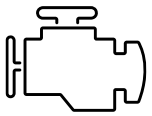
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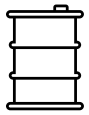
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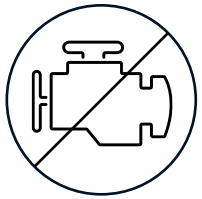
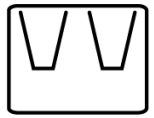
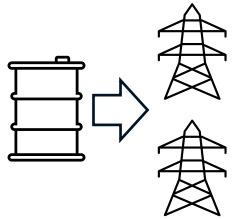
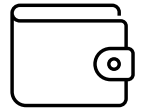
BAU – Without FORTRESS


Limited DSO visibility of changing demand


Heat electrified without flexibility


Resilience for whole site demand


Grid upgrades increase costs for sites and consumers

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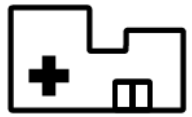
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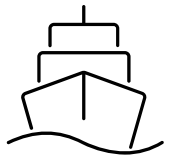
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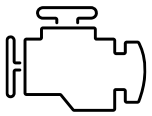
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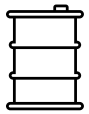
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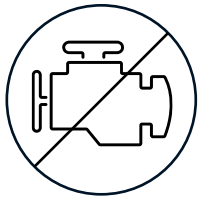
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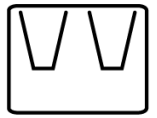
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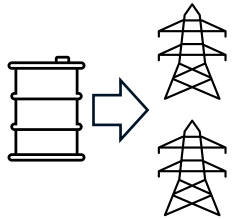
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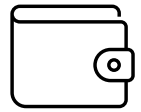
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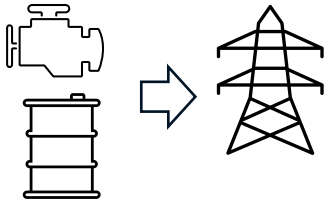
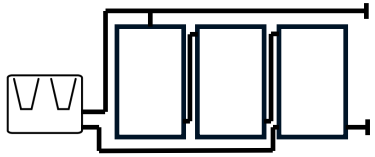
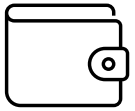

Site information sharing enables DNO forecasting, informing network planning


Commercial models which allow increased flexibility


Sites design for flexibility, distinguishing resilient and non-resilient loads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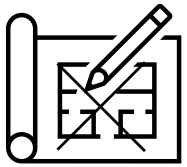
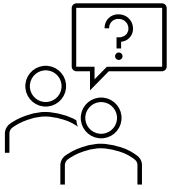
PROBLEM AND PROPOSED SOLUTION - WHAT WE FOUND

BAU



Challenges with site planning and available capital for enabling works



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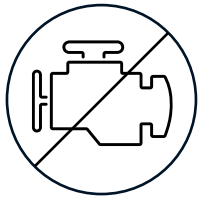

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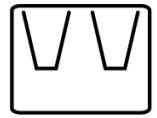

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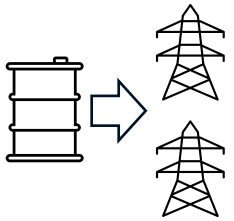

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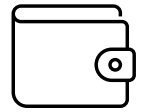

Grid upgrades increase costs for sites and consumers

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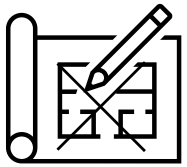

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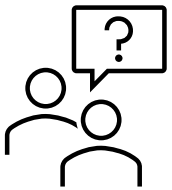

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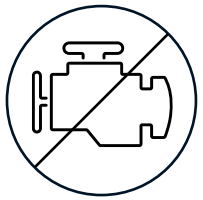

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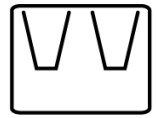

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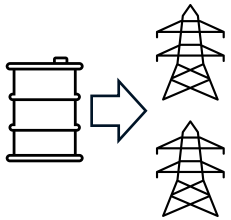

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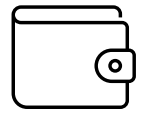


Grid upgrades increase costs for sites and consumers

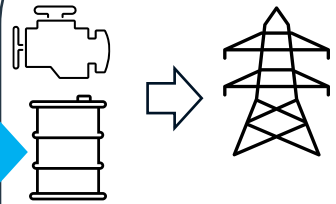
NHS barriers

Resourcing for site planning

Funding for enablement works and guidance on alternative finance models

Technical guidance (HTM/SHTM) updates enable flexibility and encourage new plant be LTHW

How FORTRESS can help



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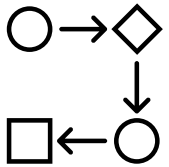
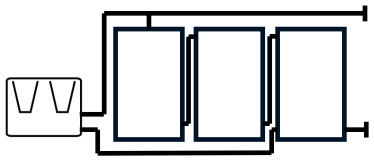
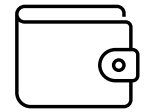


Enabling works carried out in a planned way over time

Demonstrator projects de-risk flexibility while maintaining resilience



Sites decarbonise using efficient technologies, including heat pumps incorporating flexibility



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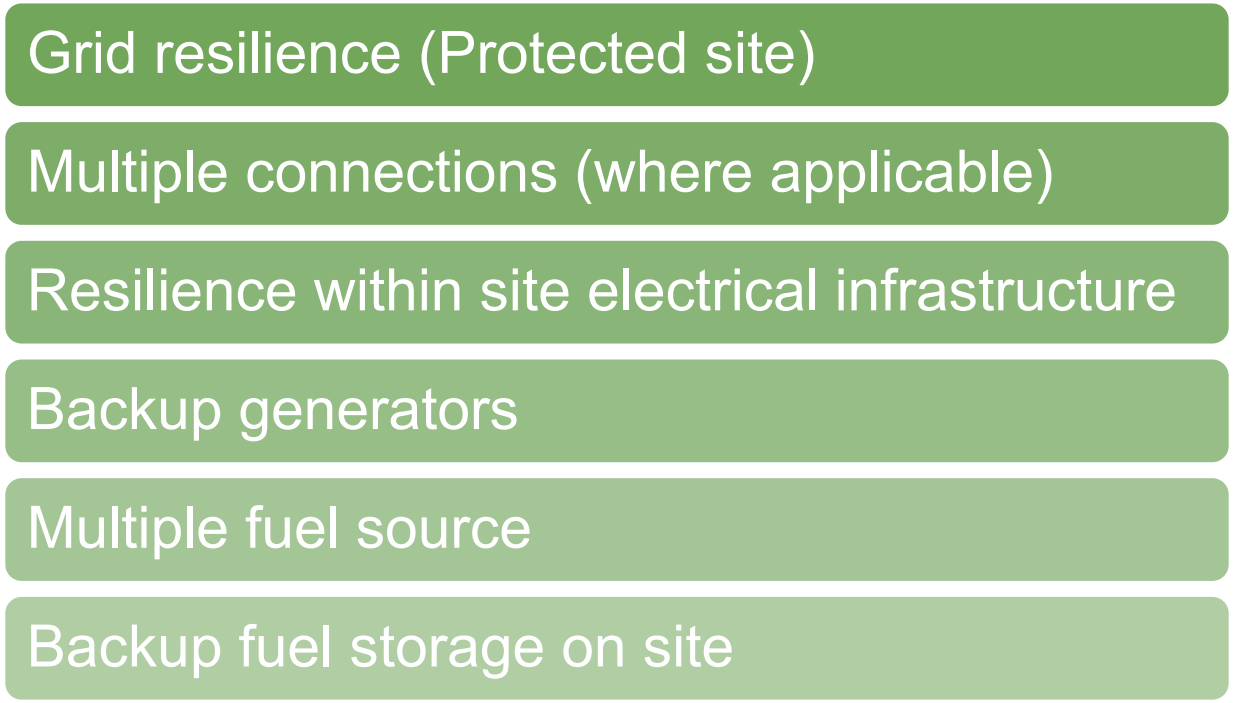
ENERGY AND RESILIENCE REQUIREMENTS

- Based on clinical need;
- Recovery Time Objectives;
- Scottish Health Memorandum.

Services	Time	Tier
Maternity Services	<1hour	1
Cancer Services	<1hour	1
Renal Services	<1hour	1
Children's Medical & Surgical Services	<1hour	1
Emergency Medical & Surgical Services	<1hour	1
Emergency Diagnostic Services	<1hour	1
Statutory Mental Health Services	<1hour	1
Health Protection	<1hour	1
Medical Physics	<1hour	1
Digital Directorate	<1hour	1
Laboratory/Diagnostic Services	<4 hours	2
Analogue/IP Telephony	<4 hours	2
Prisoner Healthcare Services	1 - 24 hours	2
Pharmacy Services	1 - 24 hours	2
Primary Care Services	1 - 24 hours	2
Hard/Soft FM Functions	1 - 24 hours	2
Payroll	1-7days	3

RESILIENCE IS A COMPLEX ISSUE, WITH CHALLENGES AT VARIOUS LEVELS

- Resilience on acute hospitals is a complex issue involving many layers of resilience
- These are set out in Health Technical Memoranda and Scottish Health Technical Memoranda
- For example, includes guidance on number of grid connections to site, number of transformers, generators and fuel storage
- While some loads on site have different resilience needs from others, they often share infrastructure making disaggregating them challenging
- It is important to develop standard ways of designing and operating if flexibility is going to be allowed
- FOAK trial is important to demonstrate flex is possible on resilient sites



DECARBONISING NINEWELLS HOSPITAL – THERE IS A LOT TO DO BUT IT CAN BE DONE

Moving to Low Temperature Hot Water would enable a transition to heat pumps or district heating

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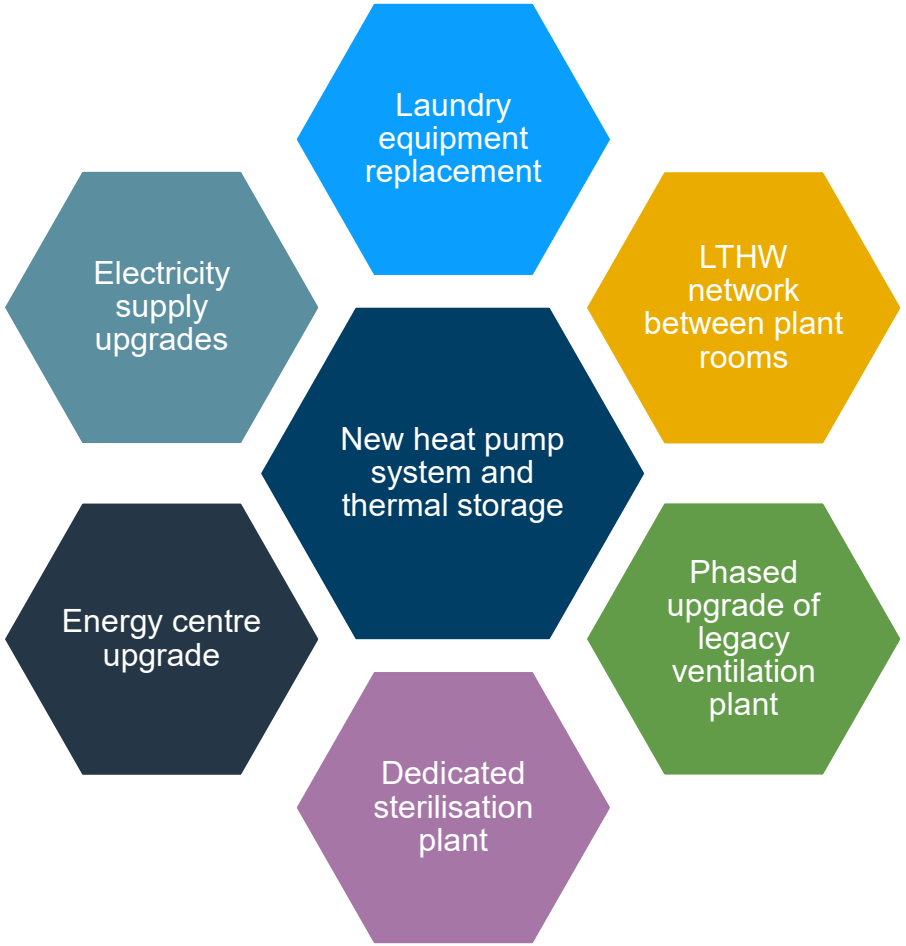
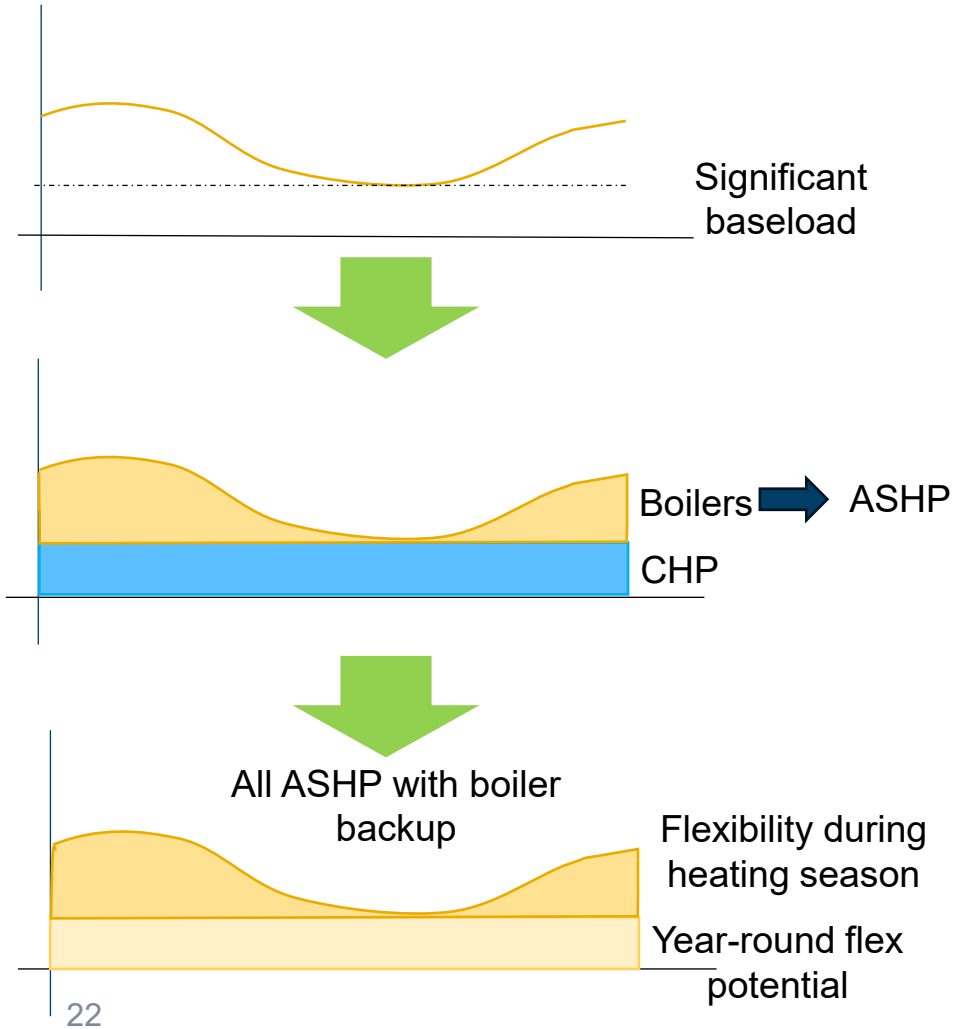


DEMAND SUITABILITY AND TECHNOLOGY SOLUTIONS TO DELIVER FLEXIBILITY

Annual energy demand



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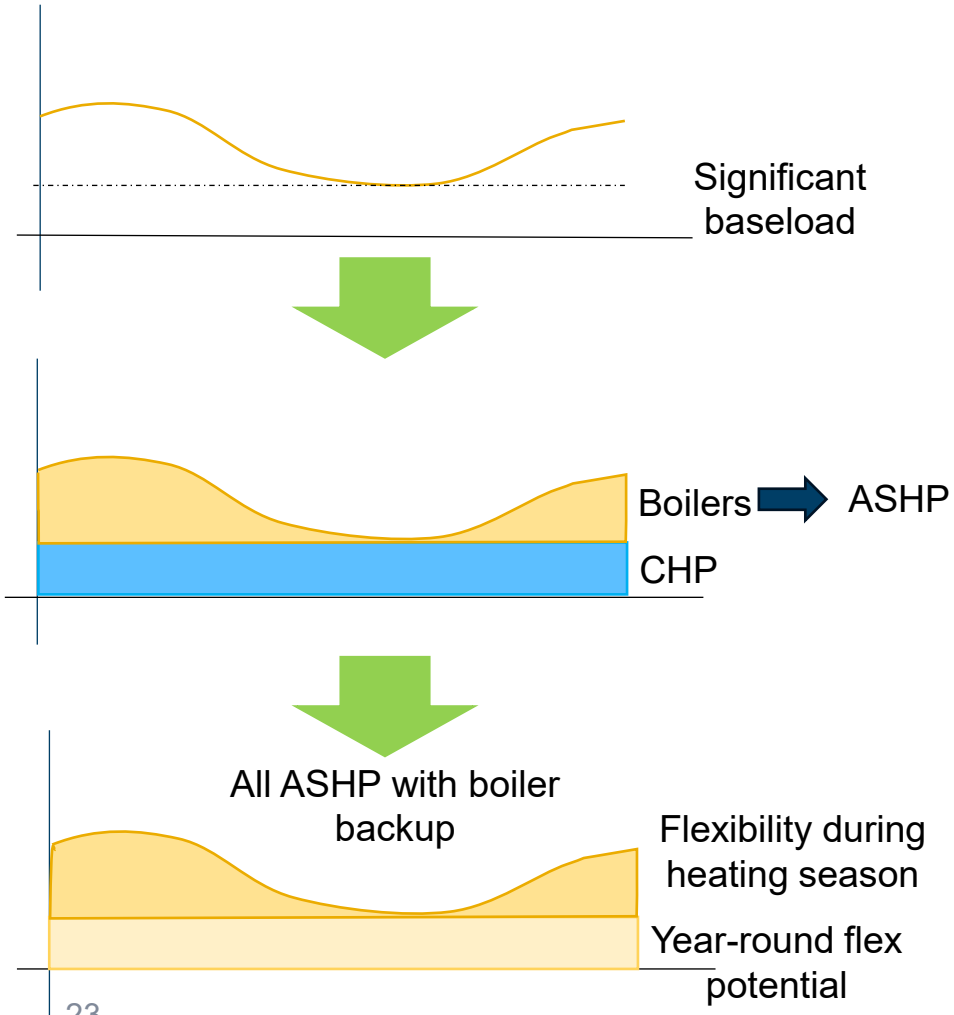
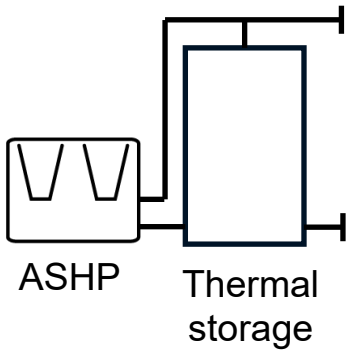
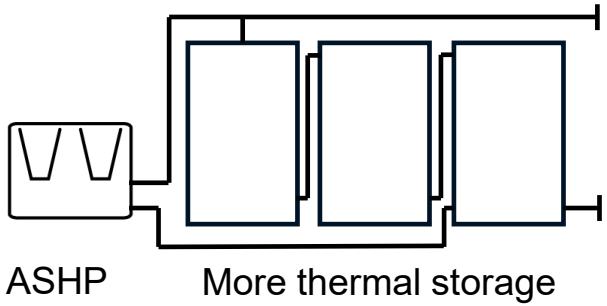
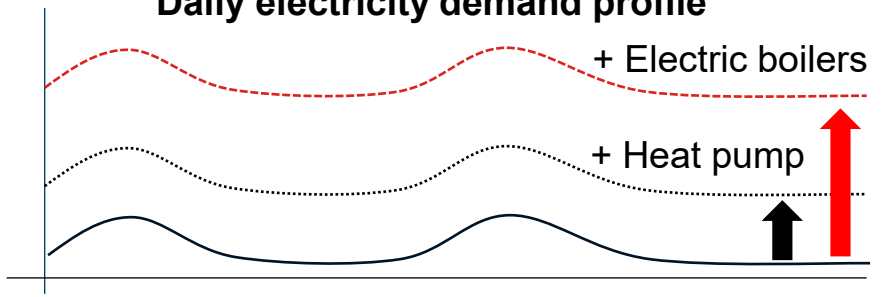
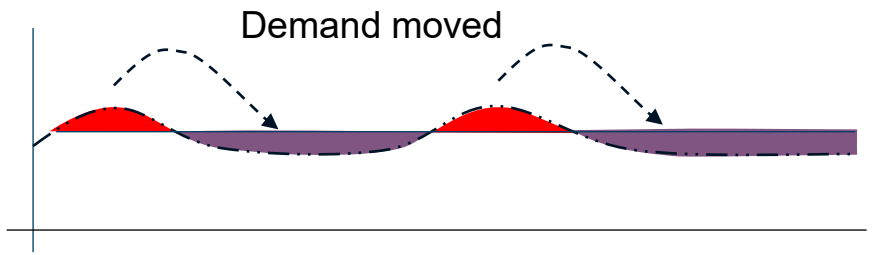


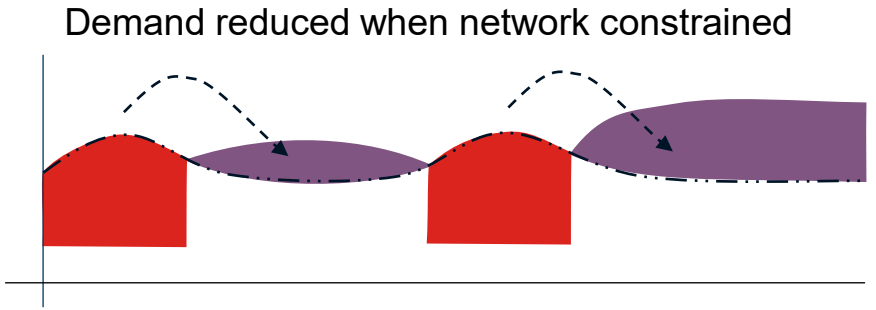




Daily electricity demand profile







GRID IMPACTS

Holistic Transition					DFES Scenarios			
Energy Scenarios	Total grid capacity required (MW)	Output (MW)	Additional peak grid load (MW)		2025- 2028	2028 - 2032	2032 - 2040	2040 - 2050
Business as usual	3.96	3.96	0					
Steam Baseline (Electric Boiler)	17.75	14.8	14.8					
Heat pump + energy storage	12.86	14.8	4.4					
Electric Boiler + energy storage	15.25	14.8	9.5					

GET IN TOUCH

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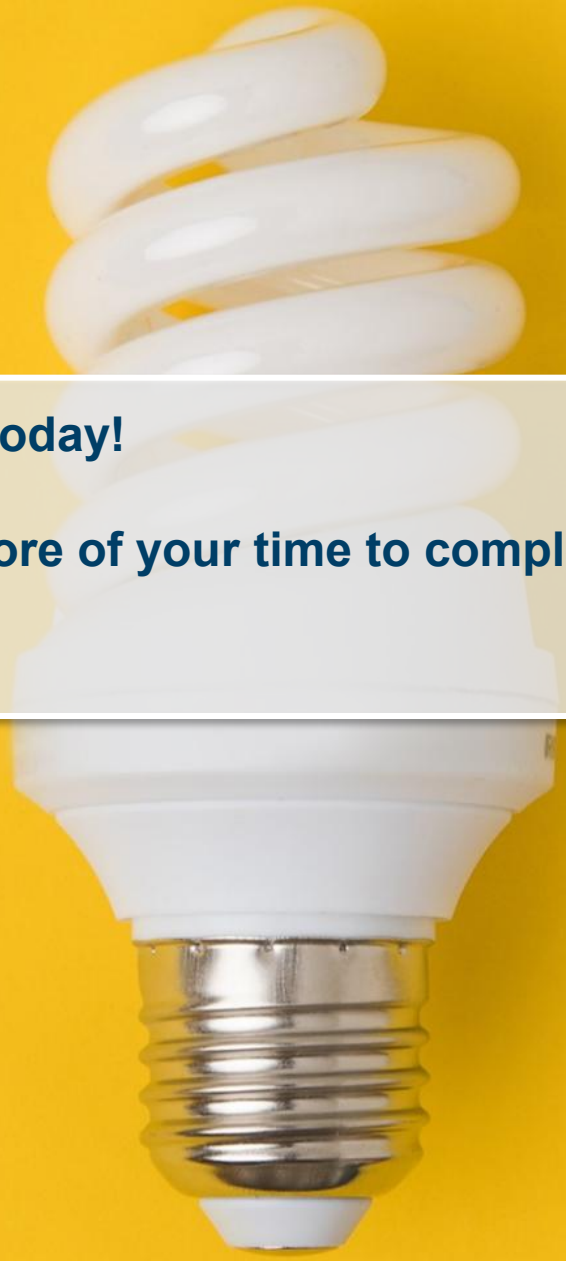
ANY QUESTIONS?

THANK YOU



Thank you for your time and interest today!

We would be grateful for 5 minutes more of your time to complete a short survey to help us improve.

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