SP ENERGY NETWORKS

Wednesday 15th June 2022

SP Energy Networks
Preparing For Net Zero Conference
Electrification of Transport and Heat

Thank you for joining - this session will start at 14:00.

Develop a network that is ready for Net Zero

Be a trusted partner for customers, communities and stakeholders

Ready our business for a digital and sustainable future

AGENDA – Electrification of Transport and Heat

14:00 – Welcome, Housekeeping & Safety Contact

14:10 – Incentive for Connections Engagement Action Plan 2022/23

14:30 – Project CHARGE: ConnectMore Interactive Mapping Tool

15:15 – Heat Balance SIF Project: Show and Tell

15:30 - Flexible Heat: Show and Tell

15:45 – Net Zero Knowledge Forum and Partnerships Working

16:00 – Close

Develop a network that is ready for Net Zero

Be a trusted partner for customers, communities and stakeholders

Ready our business for a digital and sustainable future

Housekeeping

Thank you for taking the time to attend today.

- *This session is being recorded.*
  - *please let Louise know if you are not comfortable with this and we will take your comments in the Chat section*

- *Please try and keep background noise to a minimum by using the mute button when you are not speaking.*

- *We are keen for this to be an interactive session as your feedback is important.*
  - *please raise your hand electronically or use the chat function if you would like to ask questions to the speakers*

We value your opinions, and we are keen to generate an open session with opportunities to hear your feedback.

Safety/Environmental Contact

BBC NEWS

Home UK World Business Politics Tech Science Health Family & Education Entertainme

How easy is it to drive across Wales in an electric car?

By Tomos Morgan
Wales correspondent

20 May 2022

It's less than eight years before the sale of new petrol and diesel cars is banned in the UK - and sales of electric vehicles have been rising steeply.

Yet surveys suggest that concern over the state of the UK's charging infrastructure is now the number one reason stopping newer buyers from taking the plunge.

To see if those fears were justified, I attempted to drive up and down Wales in a standard electric car to see how easy it would be.

www.bbc.co.uk/news/uk-61505025.amp

SP ENERGY NETWORKS

Rachel Shorney, Stakeholder Engagement Manager

Incentive for Connections Engagement

Action Plan Overview

Develop a network that is ready for Net Zero

Be a trusted partner for customers, communities and stakeholders

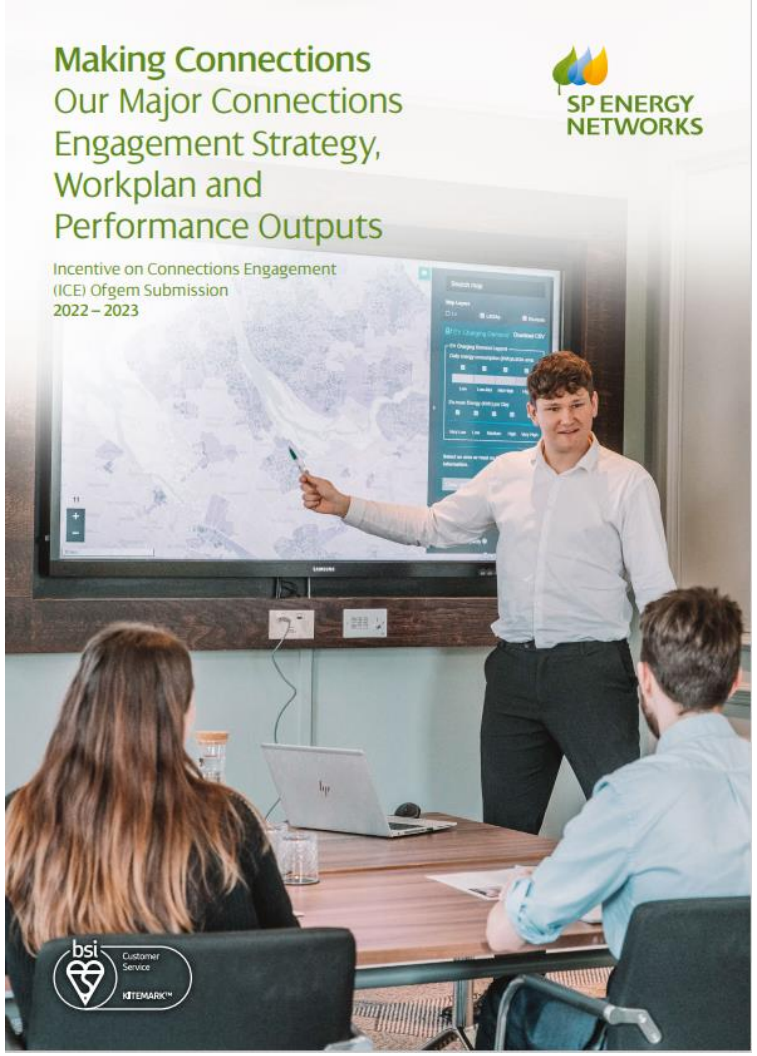
Ready our business for a digital and sustainable future

ICE

We are proud to publish our 2022/2023 ICE Plan to highlight the work we will be completing over the next 12 months: www.spenergynetworks.co.uk/pages/incentive_on_connections_engagement_ice_submission.aspx

Key topic areas include:

1. Policy Guidance
2. Communication
3. Customer Contact
4. ICP/IDNO Interface
5. Design Support
6. Land Rights
7. Project Management
8. Partnerships
9. Preparing for DSO
10. Project CHARGE



ICE - Policy Guidance

Policy Documents to be update in 2022/23 are:

- -ESDD-01-006: Standard LV Connection Arrangements
- -ESDD-02-003: LV connection arrangements in residential developments
- -ESDD-02-012: Framework for design & planning of LV housing developments
- -ESDD-02-007: Equipment ratings
- -ESDD-04-003: Service design for connection of residential properties

	kW Output
Average HH ADMD Standard	1.80
Total Feeder ADMD Standard	180.00
Average HH ADMD Cold Load	1.80
Total Feeder ADMD Cold Load	180.00

ADMD Calculator for 20+ Properties

Variables	Options / Ranges	User Input
Number of Customers on Feeder ?	20 to 100	100
How many have EV Chargers ?	0 to Number of Customers	0
How many have EV Chargers AND Heat Pumps ?	0 to Number of Customers	0
How many have Air Source Heat Pumps ?	0 to Number of Customers	0
Average size of ASHP? (kW Heat)	0, 5, 8 or 16	8
How many have Ground Source Heat Pumps ?	0 to Number of Customers	0
Average size of GSHP? (kW Heat)	0, 5, 8 or 16	16
How many have Hybrid Heat Pumps ?	0 to Number of Customers	0
Average size of HyHP? (kW Heat)	0, 5, 8 or 16	5

ICE - Customer Contact

Our newly formed ‘Customer Engagement Focus Group’ we developed to better understand our customer’s thoughts on our connections application systems and processes. This group has been instrumental in helping us to fully understand our stakeholder needs, and we plan to continue this engagement into 2022/23 as we make further improvements to our website to prepare for the expected increase in connection applications during the transition to net zero.

Our iDentify app has received excellent feedback from our customers and the wider industry, and we are proud to be publishing this simpler format of application for our customers.

The dates for the Customer Focus Group are:

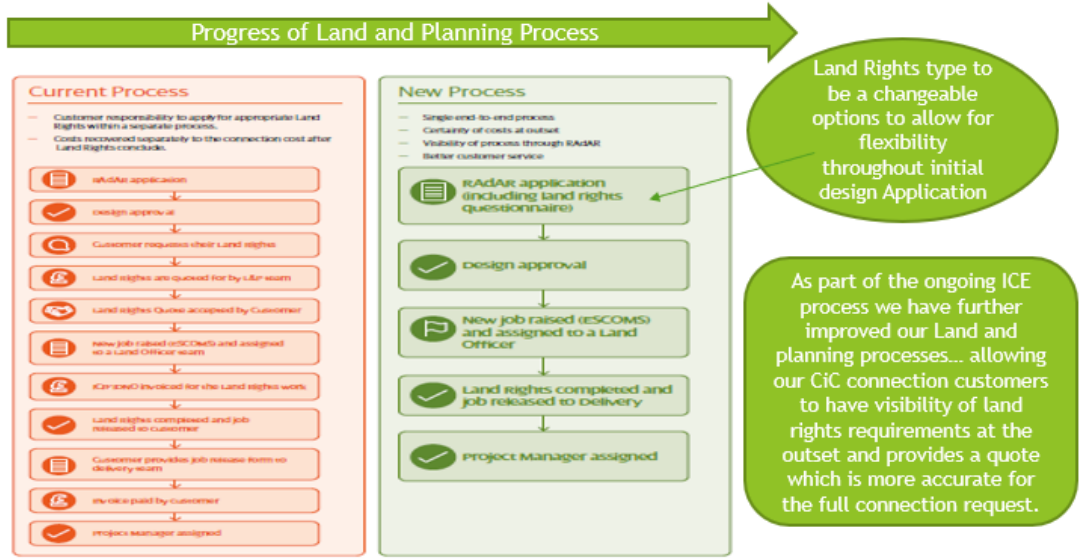
- Wednesday 3rd August 2022
- Wednesday 8th February 2023

ICE - ICP/ IDNO Interface

ICPs and IDNOs have told us that our RAdAR Working Group is a useful method of highlighting and developing the required improvements to our RAdAR application and design system, so we will be continuing to implement this engagement in 2022/23 as we further develop our application system and processes for our ICPs and IDNOs. We will use this Working Group to review all improvements we make to the application process and design / delivery workflow for our customers, as this group has shown positive feedback to other aspects of the connection interface such as the Self Service process, which is another area our ICPs and IDNOs are keen to investigate next steps and enhancements.

The dates for our RAdAR Working Groups are:

- Wednesday 17th August 2022
- Thursday 13th October 2022
- Wednesday 11th January 2023
- Wednesday 29th March 2023



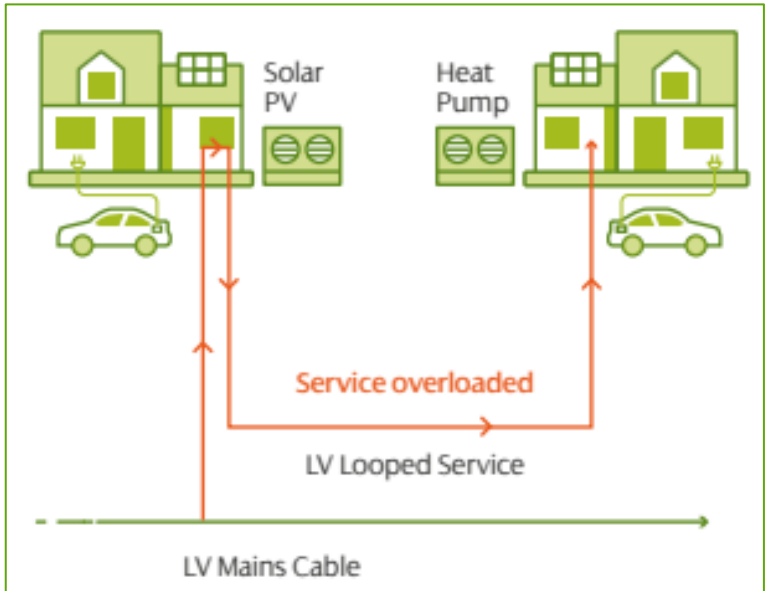
ICE – Design Support

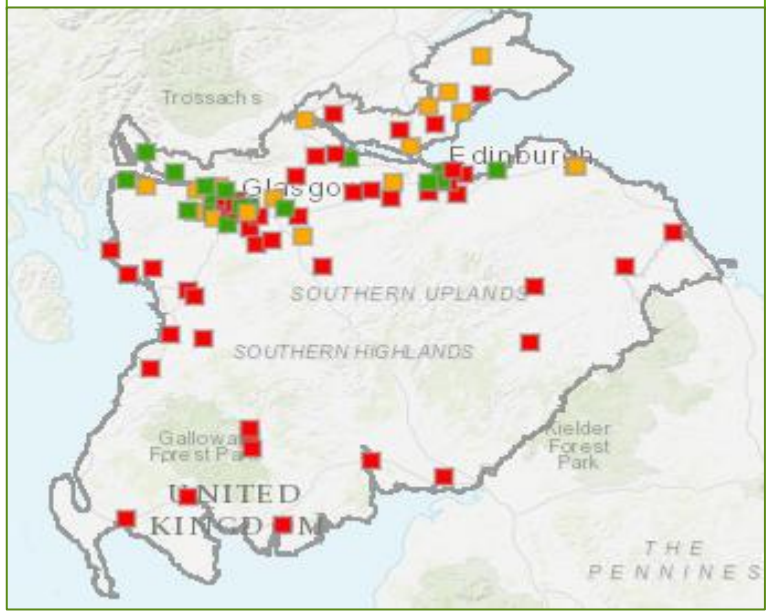
We will develop a Tactical Training Programme to equip our Design Teams with new and enhanced knowledge of technical network design and commercial considerations for differing types of new connections.

We will develop a Demand Self Service Design Tool to provide budget estimates and optioneering facilities for all HV and LV customers interested in connecting to our network.

We will develop a geographical layout version of the information within the NDP to show the available capacity information in an easy to understand and accessible format for our customers.

We will continue to provide access to our UMV Shape Files to help our customers view our network information using their own Geographical Information Systems. We will also create a formal application and registration process for our customers to access our SPEN Geographical Information System.





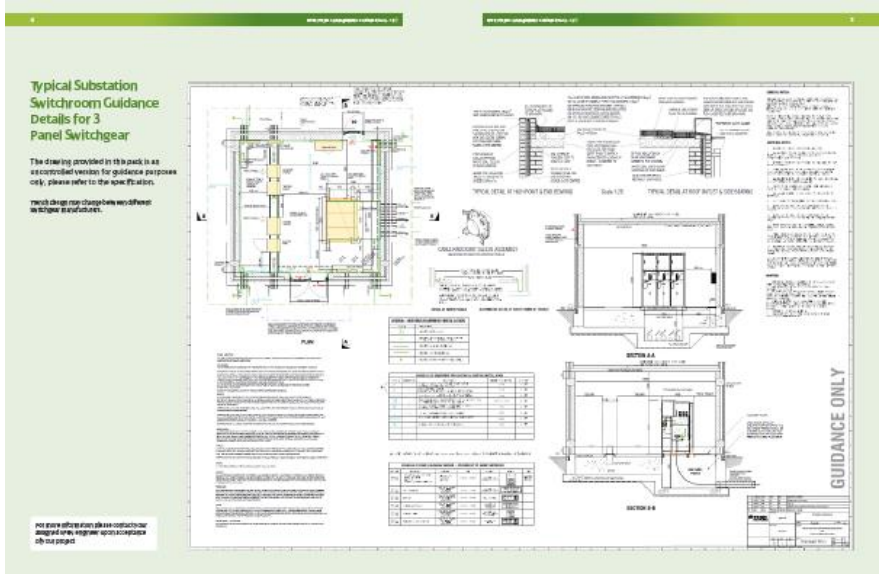
ICE – Project Management

We will continue our ‘in-house’ training for all connections project managers and delivery staff to integrate the learnings from our APM approved project management apprenticeship scheme and align with SPEN connections processes.

We are also developing a Project Management Guidance Pack that will be published externally for customer use.

This Guidance Pack will include:

- General
- Civil
- Electrical
- Iberdrola documents



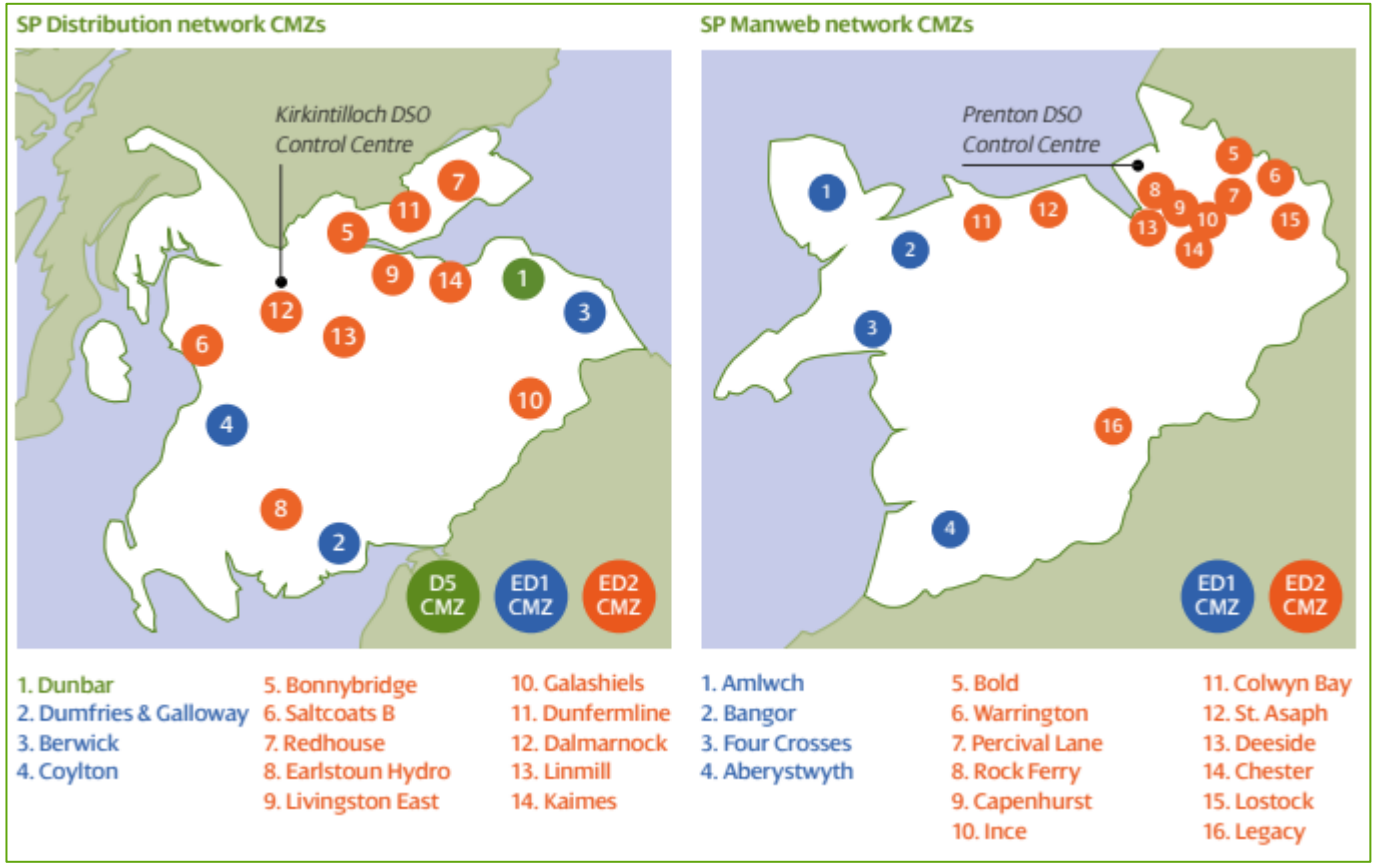
ICE – Preparing for DSO

We will promote the Active Network Management opportunities available to our customers.

We will identify the regions of our licence areas that have ANM opportunities on our SPEN Distributed Generation Heat Maps.

We will conduct a review of our recent Flexibility Services tenders and publish any findings and proposals for a longer term strategy.

We will continue to engage with our stakeholders to determine the level of interest in any future opportunities for flexibility services as we move into ED2.



SPEN Contact Details SPD Pages 40- 41

SP Distribution Licence Area
Areas of Responsibility & Key Contacts

Each of our six geographical districts across the SP Distribution licence area cover all connections activities at 33kV voltage level and below.

This Area of Responsibility List was created as a direct result of our stakeholders requesting information and access to our key contacts in our Districts and has been warmly welcomed.

Edinburgh & Borders

District General Manager – David Climie
david.climie@spenergynetworks.co.uk | 07753 623951
Head of Planning & Design – Sean Gavaghan
sean.gavaghan@spenergynetworks.co.uk | 07789 925327
Head of Delivery – Gerard McKeown
gmckeown@spenergynetworks.co.uk | 07753 624385
Head of Delivery – Trevor Weddell
trevor.weddell@spenergynetworks.co.uk | 07755625031

Ayrshire & Clyde South

District General Manager – Aileen Rourke
aileen.rourke@spenergynetworks.co.uk | 07918 197415
Head of Planning & Design – Karl Watson
karl.watson@spenergynetworks.co.uk | 07540 316029
Head of Delivery – Jack Evans
jaevans@spenergynetworks.co.uk | 07702 663981
Head of Delivery – Martin Maxwell
martin.maxwell@spenergynetworks.co.uk | 07894 604977

Central & Fife

District General Manager – Ross Galbraith
ross.galbraith@spenergynetworks.co.uk | 07753 622658
Head of Planning & Design – Craig Graham
craig.graham@spenergynetworks.co.uk | 07753 623669
Head of Delivery – Danny Barlow
daniel.barlow@spenergynetworks.co.uk | 07753 624163
Head of Delivery – Neil McDonald
neil.mcdonald@spenergynetworks.co.uk | 07736 555453

Dumfries & Galloway

District General Manager – Aileen Rourke
aileen.rourke@spenergynetworks.co.uk | 07918 197415
Head of Planning & Design – Kenny Bowie
kenny.bowie@spenergynetworks.co.uk | 07753 624570
Head of Delivery – Neil Carruthers
neil.carruthers@spenergynetworks.co.uk | 07753 624579
Head of Delivery – Craig Cottrill
craig.cottrill@spenergynetworks.co.uk | 07921 113104

Glasgow & Clyde North

District General Manager – Alistair Menzies
alistair.menzies@spenergynetworks.co.uk | 07753 624146
Head of Planning & Design – Rachel Donoghue
rdonoghue@spenergynetworks.co.uk | 07922 580788
Head of Delivery – Albert Santandreu
asantandreu@spenergynetworks.co.uk | 07702511613
Head of Delivery – Ricky Knight
ricky.knight@spenergynetworks.co.uk | 07753 622670

Lanarkshire

District General Manager – Alistair Graham
alistair.graham@spenergynetworks.co.uk | 07753 624888
Head of Planning & Design – Derek Jessamine
derek.jessamine@spenergynetworks.co.uk | 07918 661496
Head of Delivery – Derek Drummond
derek.drummond@spenergynetworks.co.uk | 07753 623790
Head of Delivery – Stephen Sichi
stephen.sichi@spenergynetworks.co.uk | 07834 575776

Other Contacts

Stakeholder Engagement Team

Stakeholder & Community Engagement Manager – Rachel Shorney
rachel.shorney@spenergynetworks.co.uk | 07753 623898
Customer Engagement Manager – Stuart Walker
stuart.walker@spenergynetworks.co.uk | 07800 953541
Customer Engagement Manager – Louise Taylor
louise.taylor@spenergynetworks.co.uk | 07753 624442
Customer Engagement Manager – Fay Morris
fay.morris@spenergynetworks.co.uk | 07753 624021

Land & Planning

Head of Land & Planning – Ross Baxter
ross.baxter@spenergynetworks.co.uk | 07753 623724
Distribution Land Manager – Suzy Killin
skillin@spenergynetworks.co.uk | 07548 707640
ICE & Net Zero Engagement Manager – Stuart Walker
stuart.walker@spenergynetworks.co.uk | 07800 953541

Low Carbon Technology Team

Low Carbon Technology Operations Senior Engineer – Ross Tierney
rtierney@spenergynetworks.co.uk | 07760 917989
For any Low Carbon Technology queries please contact:
lctapplicationnorth@spenergynetworks.co.uk

Desk Top Quote Team

Service Improvement Manager – Julie Carlton
julieps.carlton@spenergynetworks.co.uk | 07834 575777
Connections Services Manager – Steven Dunsmore
steven.dunsmore@spenergynetworks.co.uk | 07753 624226

New Connections

For all new Connections please contact:
gettingconnected@scottishpower.com or call 0845 270 0783

Unmetered Supplies

Project Support Team Leader – Alison Mcauring
amcauring@spenergynetworks.co.uk | 07834 126786
For any Street Lighting queries please contact:
slnorth@scottishpower.com

SPEN Contact Details SPM Pages 42 to 43

SP Manweb Licence Area
Areas of Responsibility & Key Contacts

Each of our five geographical districts across the SP Manweb licence area cover all connections activities at 33kV voltage level and below.

Our 132kV System Design team cover all 132kV connections queries for the whole of the SP Manweb licence area.

Dee Valley/ Mid Wales

District Manager – Sean Griffiths
sgriffiths@spenergynetworks.co.uk | 07502 774769
Head of Planning & Design – Eugene Kenny
eugene.kenny@spenergynetworks.co.uk | 07753624261
Head of Delivery Wales – Sean Kennedy
skennedy@spenergynetworks.co.uk | 07753 624400
For any Dee Valley / Mid Wales District queries please contact:
DesignNorthWales@spenergynetworks.co.uk

Merseyside

District Manager – Tom Walsh
twalsh@spenergynetworks.co.uk | 07753 624439
Head of Planning & Design – Neil Woodcock
neil.woodcock@spenergynetworks.co.uk | 07753 624072
Head of Delivery – Paul Thomas
paul.thomas@spenergynetworks.co.uk | 07501 221071
For any Merseyside District queries please contact:
DesignMersey@spenergynetworks.co.uk

Wirral

District Manager – Jonathan Hughes
jonathan.hughes@spenergynetworks.co.uk | 07753 624452
Head of Planning & Design – Ken Brassington
ken.brassington@spenergynetworks.co.uk | 07753 624053
Head of Delivery – John McWilliams
john.mcwilliams@spenergynetworks.co.uk | 07753 624329
For any Wirral District queries please contact:
wirralconnections@spenergynetworks.co.uk

Mid Cheshire

District Manager – Jane Wilkie
jane.wilkie@spenergynetworks.co.uk | 07702 152846
Head of Planning & Design – Ken Brassington
ken.brassington@spenergynetworks.co.uk | 07753 624053
Head of Delivery – Steve Matthias
steven.matthias@spenergynetworks.co.uk | 07725 410097
For any Mid Cheshire District queries please contact:
wirralconnections@spenergynetworks.co.uk

132kV System Design SP Manweb

Distribution Network Manager (SPM) – Steve Withell
steve.withell@spenergynetworks.co.uk | 07736088774
North Wales / Dee Valley and Mid Wales
Lead Engineer – Andy Beddoes
andy.beddoes@spenergynetworks.co.uk | 07753623822
Mersey Lead Engineer – Jon Mitchell
jonathan.mitchell@spenergynetworks.co.uk | 07753624101
Cheshire/Mersey / Wirral Cheshire/Wirral
Lead Engineer – Miles Buckley
miles.buckley@spenergynetworks.co.uk | 07753624271
For any 132kV System Design queries please contact:
SystemDesignConnectionsSouth@spenergynetworks.co.uk

North Wales

District Manager – Andy Churchman
andy.churchman@spenergynetworks.co.uk | 07841 865085
Head of Planning & Design – Eugene Kenny
eugene.kenny@spenergynetworks.co.uk | 07753624261
Head of Delivery Wales – Sean Kennedy
skennedy@spenergynetworks.co.uk | 07753 624400
For any North Wales District queries please contact:
DesignNorthWales@spenergynetworks.co.uk

132kV Business Delivery SP Manweb

Business General Manager – Mark Sobczak
mark.sobczak@spenergynetworks.co.uk | 07753 623715
132kV Programme Head of Delivery – Damian Cartwright
damian.cartwright@spenergynetworks.co.uk | 07753 622577

Other Engagement Contacts

Stakeholder Engagement Team

Stakeholder & Community Engagement Manager – Rachel Shorney
rachel.shorney@spenergynetworks.co.uk | 07753 623898
Customer Engagement Manager – Stuart Walker
stuart.walker@spenergynetworks.co.uk | 07800 953141
Customer Engagement Manager – Louise Taylor
louise.taylor@spenergynetworks.co.uk | 07753 624442
Customer Engagement Manager – Fay Morris
fay.morris@spenergynetworks.co.uk | 07753 624021
For any stakeholder engagement queries please contact:
gettingconnectedupdates@spenergynetworks.co.uk

Desk Top Quote Team

Service Improvement Manager – Julie Carlton
julieps.carlton@spenergynetworks.co.uk | 07834575777
Connections Services Manager – Greg Atkinson
gatkinson@spenergynetworks.co.uk | 07753 623724

New Connections

For all new Connections please contact:
gettingconnected@scottishpower.com or call 0845 270 0703

Land & Planning

Head of Land & Planning – Ross Baxter
ross.baxter@spenergynetworks.co.uk | 07753 623724
Distribution Land Manager – Suzy Killin
skillin@spenergynetworks.co.uk | 07548707840
Distribution Land Team Leader – Jo Stiles
jo.stiles@spenergynetworks.co.uk | 0141 614 5835 | 07753 483241

Unmetered Supplies

Street lighting enquiries:
street.lighting@spenergynetworks.co.uk
UMS Project Leader – Neil Flanagan
neil.flanagan@spenergynetworks.co.uk | 07702653933
Project Support Team Leader – Gill Steel
gill.steel@spenergynetworks.co.uk | 07854962403

Low Carbon Technology Team

Low Carbon Technology Applications – Stacey Rodgers
srodgers@spenergynetworks.co.uk | 07702664640
For any Low Carbon Technology queries please contact:
lctapplicationsouth@spenergynetworks.co.uk

Our Connections Engagement Planned in 2022/23

Dates for the diary in 2022/23:

15/06/22 - Preparing for Net Zero Conference

03/08/22 - Customer Contact Focus Group

17/08/22 - RAdAR Working Group

14/09/22 - Preparing for Net Zero Conference

13/10/22 - RAdAR Working Group

07/12/22 - Preparing for Net Zero Conference

11/01/22 - RAdAR Working Group

23/02/23 - ICP Safety Seminar

08/02/23 - Customer Contact Focus Group

08/03/23 - Preparing for Net Zero Conference

29/03/23 - RAdAR Working Group

Please help us to engage with you.

Register as a stakeholder:

spenergynetworks.co.uk/register

Based on what you tell us you are interested in when you register as a stakeholder - we will invite you to a range of engagement opportunities such as workshops, conferences, meetings and consultations.

We will continue to shape our engagement to our stakeholder requirements and we would like to encourage all stakeholders to provide updates on the engagement we provide to ensure we fully provide any improvements necessary

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John Orr, Project Manager, CHARGE

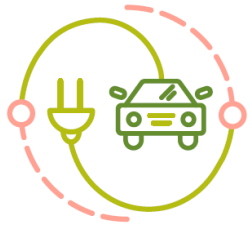
CHARGE Project

ConnectMore Interactive Mapping Tool

Develop a network that is ready for Net Zero

Be a trusted partner for customers, communities and stakeholders

Ready our business for a digital and sustainable future



CHARGE

- Strategic transport and network planning
- ConnectMore
- flexible solutions to support EV connections

Mobility Simulation

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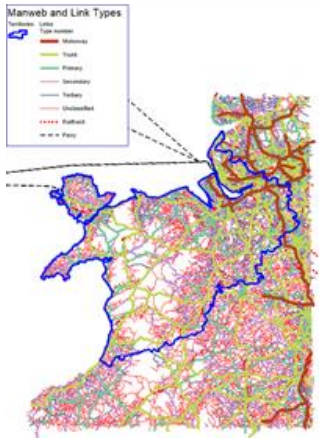
Road networks



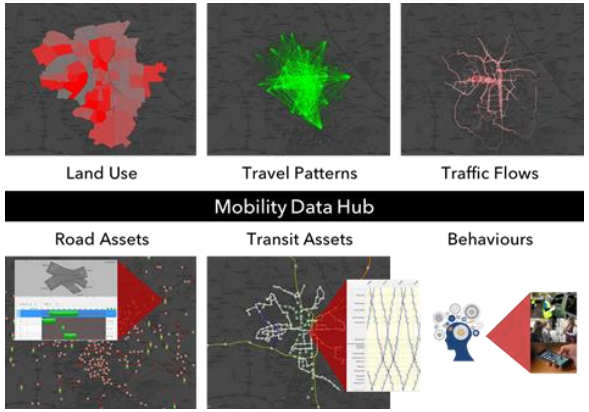
Census and OSM data

National Travel Survey

Model

PTV VISUM

Tour-based demand model



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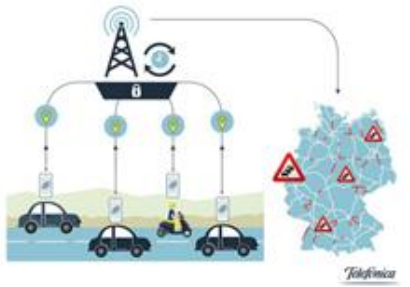
Movements data



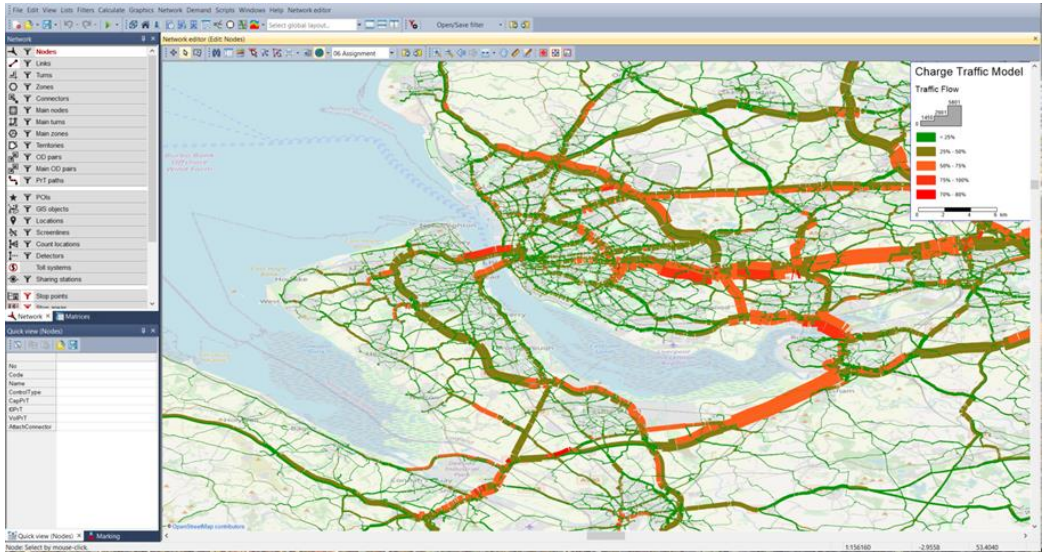
Traffic count data

Where are all the places you went today?	What time was it?	What did you do there?	How did you get there? (circle all that apply)

EV Modelling

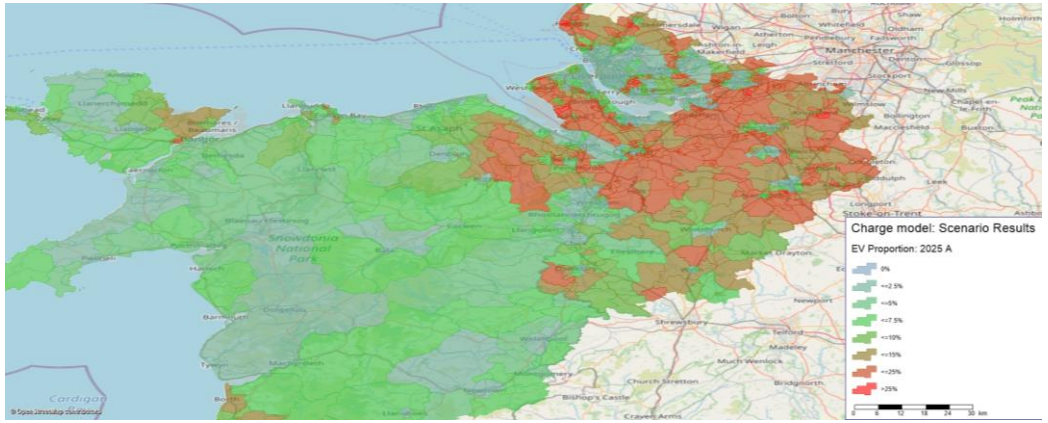
Model Characteristics:

- Full chains of activities modelled
- EV uptake modelled at individual level using geographic and demographic characteristics
- Charging behaviours simulated based on trip patterns and scenario factors

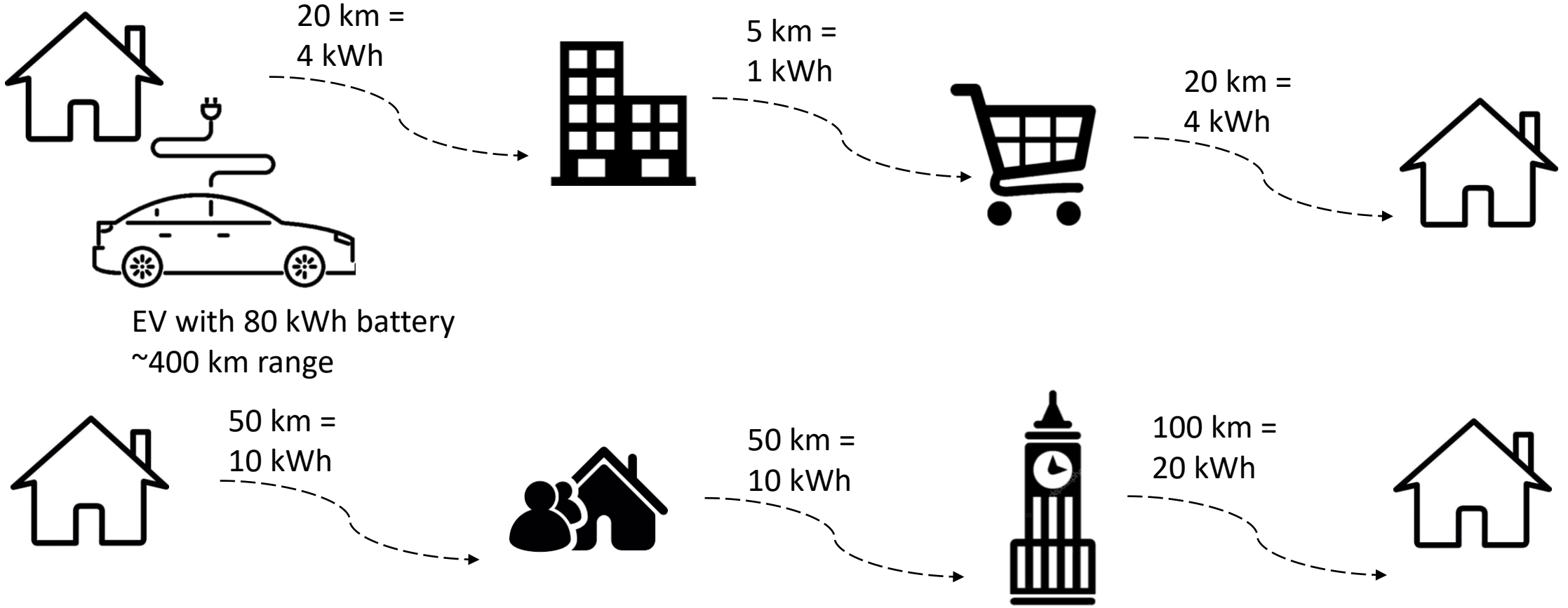


Modelled travel pattern data and distribution of EV ownership helps determine:

- **Where** EVs are likely to be driven and for what purpose
- **How far** they travel & energy consumed
- **When** and where they might require charging
- **How long** the car is parked and the electricity required to charge



Modelling EV Patterns



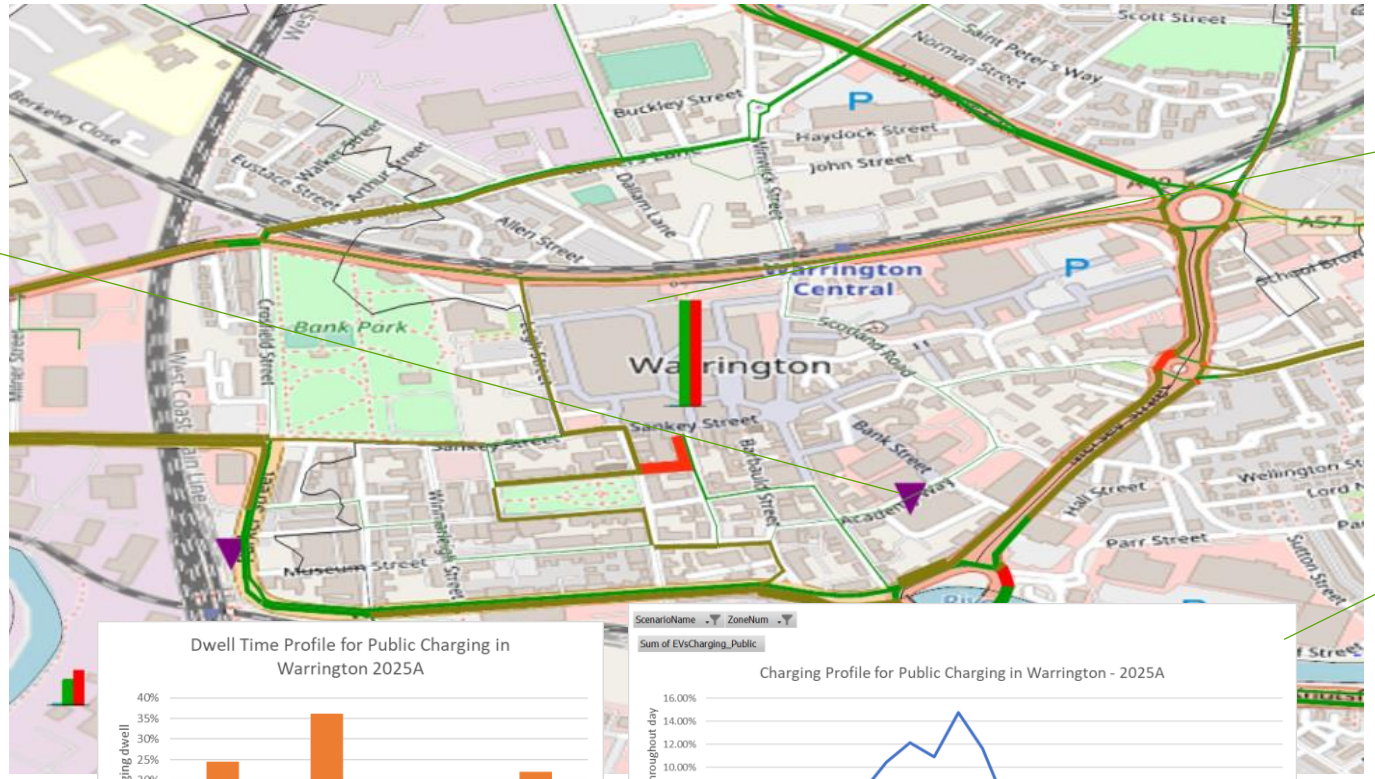
Use Cases: Destination Charging Demand

- Helps prioritise infrastructure / network investment

Current infrastructure:

30 x 2
7 kW chargers

Is there enough capacity to enable connection growth?



Based on ~10 % EV uptake in 2025, ~90-110 EVs arrive into this zone per day and want to charge

Equivalent to daily kWh:
580 – 780 kWh

Daily profile and dwell times suggest:

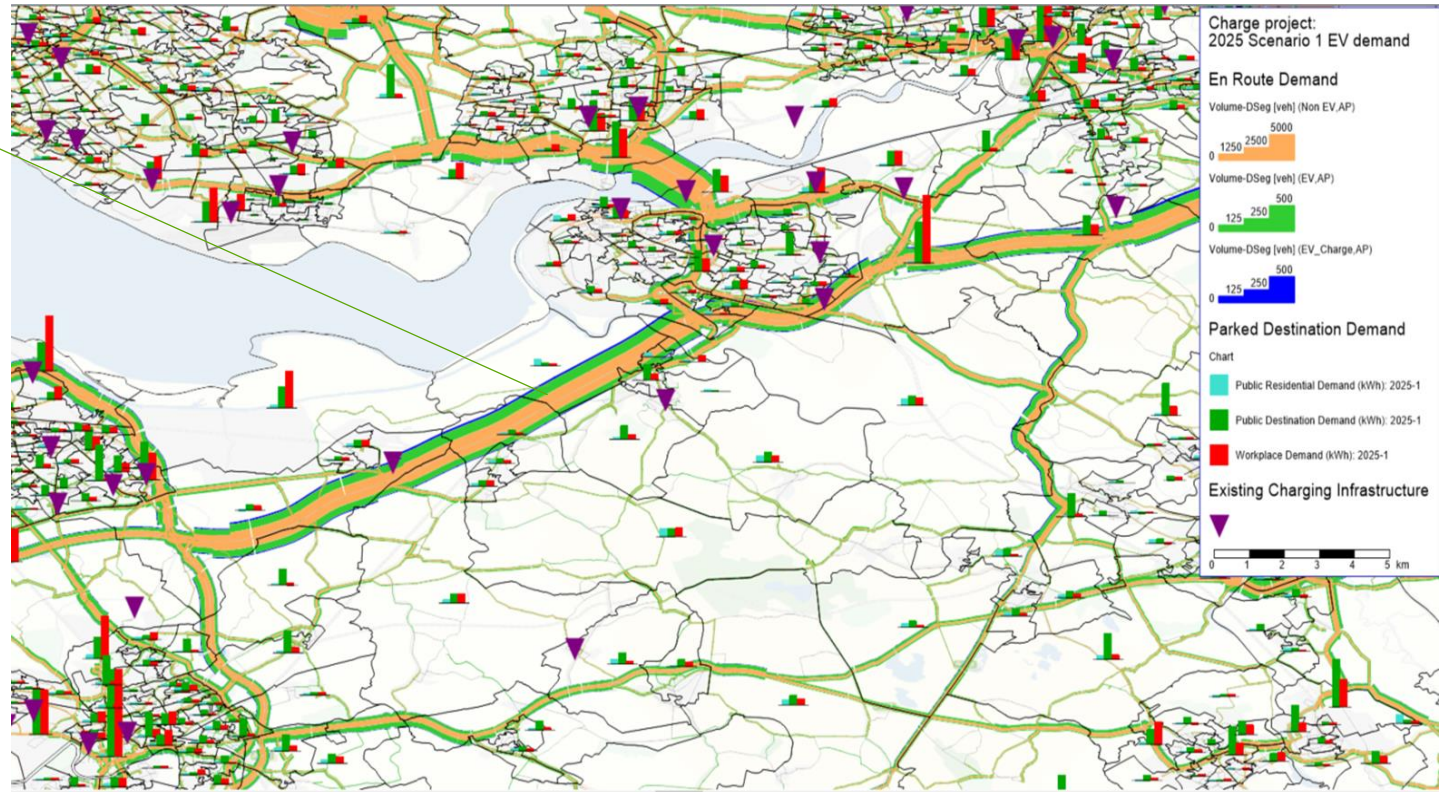
40 – 60 22 kW chargers &
5-10 50 kW+ chargers
/ ~1,800 kVA
required

Use Cases: Enroute / Rapid Demand

- Helps identify locations and potential utilisation

Where is demand for **rapid chargers** likely?

Is current coverage of chargers suitable?



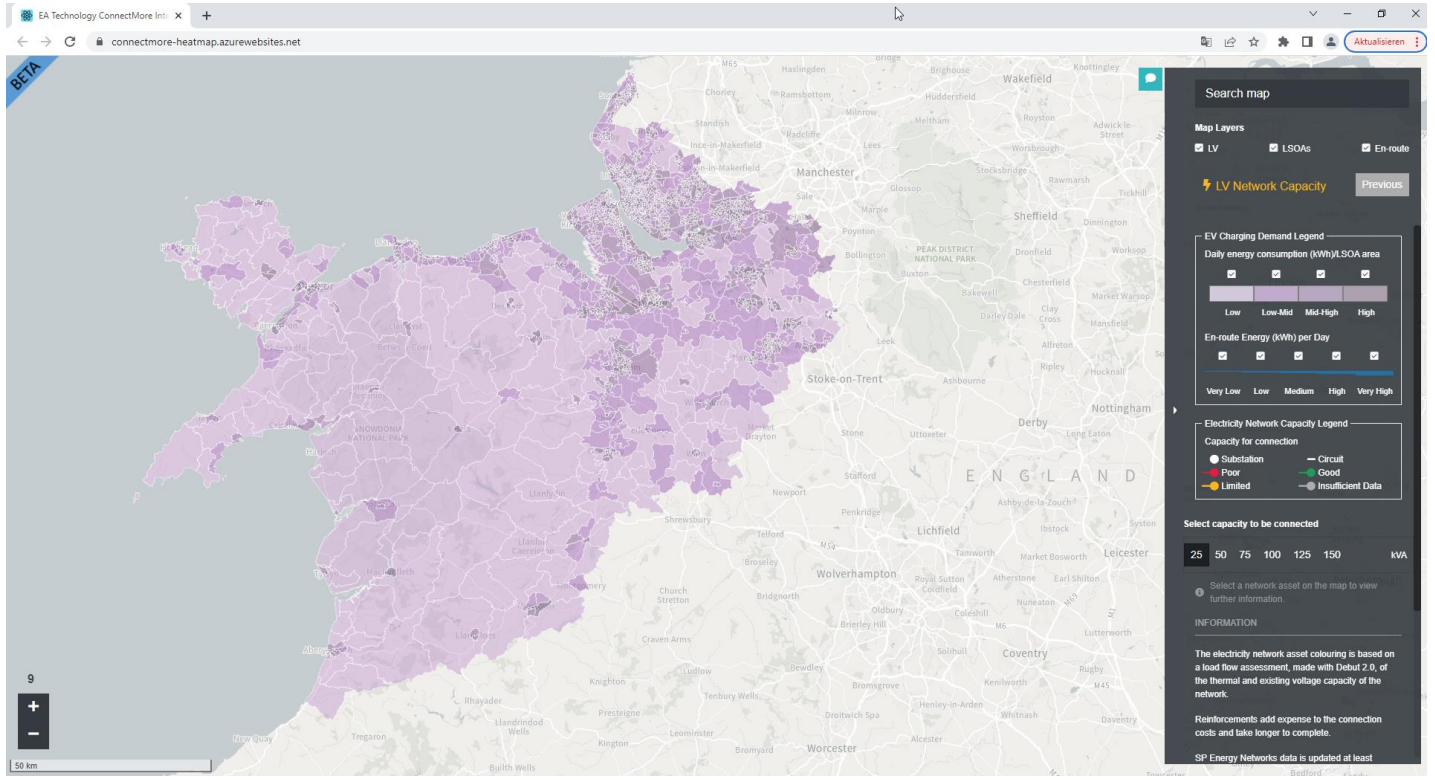
Location Optimiser tool can quantify and analyse sites that will serve the demand

Where are trips coming from and going to?

Who is likely to use these chargers and when?

Try it Yourself!

CHARGE



https://www.spenergynetworks.co.uk/pages/connectmore_interactive_map.aspx

CHARGE

Charge will merge transport and electricity network planning to create an overarching map of where EV charge points will be required and where they can be best accommodated by the electricity grid.

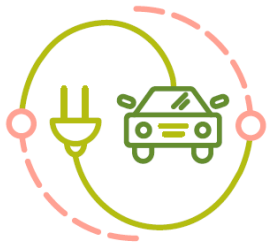
Read the project Fact Card

Timescale
January 2019 – December 2022

Project Status
In Progress

ConnectMore Interactive Map (England & Wales Only)

ConnectMore EV Connection Cost Estimator (England & Wales Only)



CHARGE

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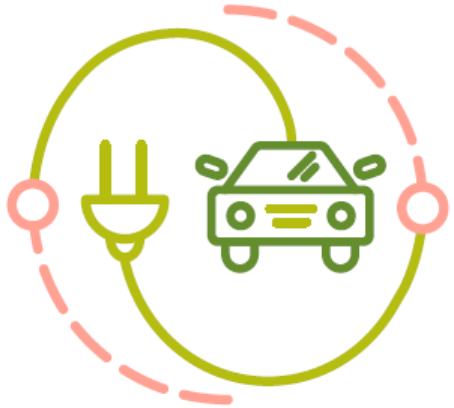
Questions



CHARGE

SP ENERGY NETWORKS

Watson Peat, Innovation Lead, Future Networks

Heat Balance SIF Project

Show and Tell

Develop a network that is ready for Net Zero

Be a trusted partner for customers, communities and stakeholders

Ready our business for a digital and sustainable future

The problem

Figure 1

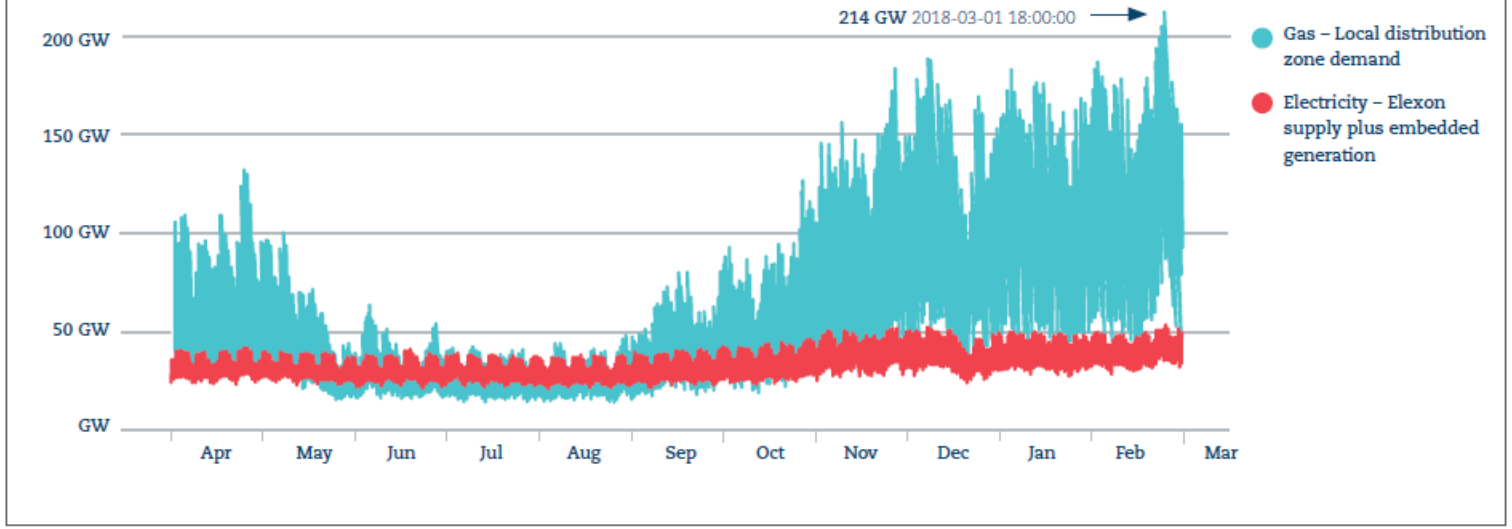


Figure 1: Britain's hourly local gas demand and electrical system supply, 2nd April 2017 - 6th March 2018.

Heat (gas) demand vs. electricity demand

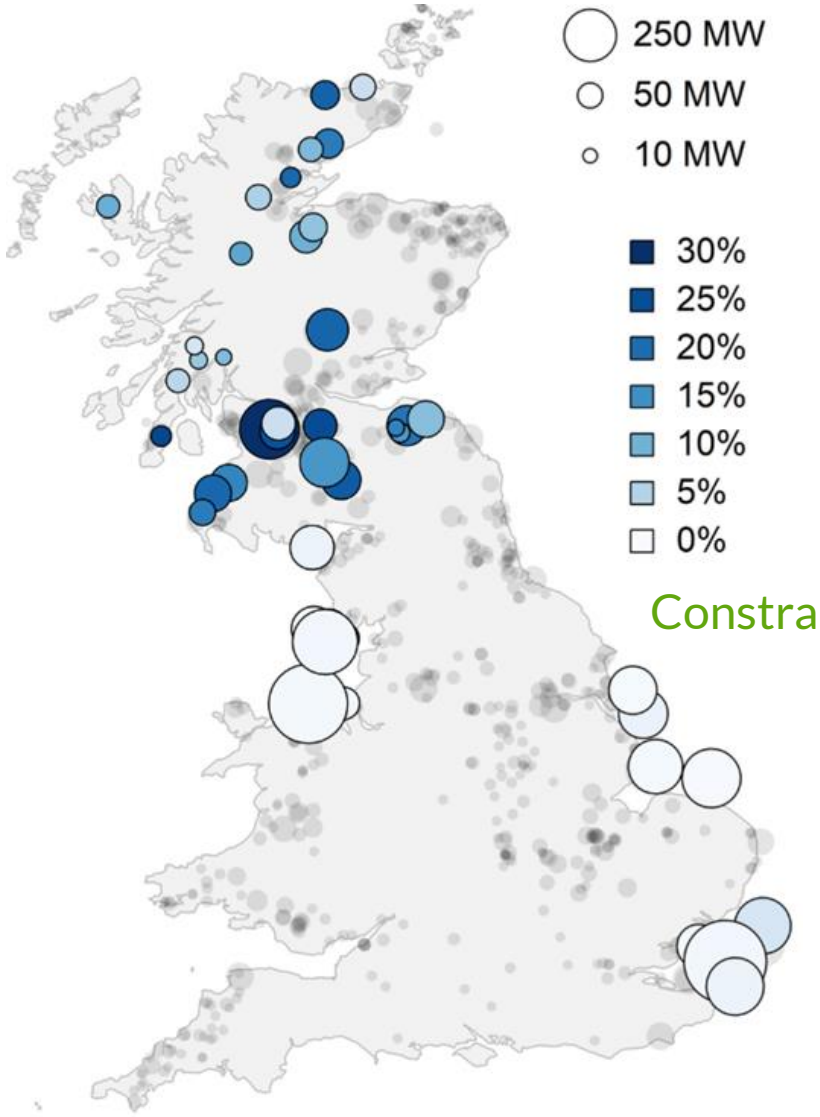
- The peak demand for heat is 4 times that of electricity
- There is a huge variation in heat demand between seasons as well as in-day
- There is a mis-match with non-dispatchable renewable generation

To smooth heat demand, large-scale long-term energy storage will be essential in the future energy system

The Problem

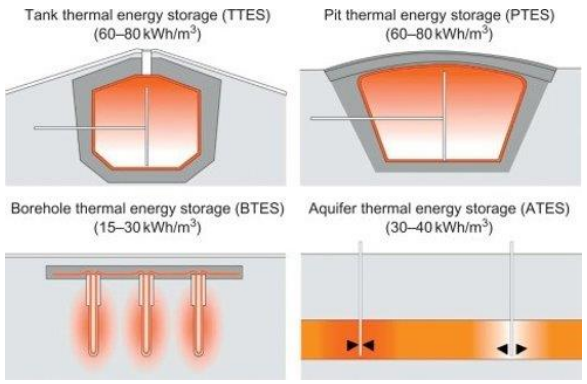
Wind constraints

- Transmission constraints are already an issue in Scotland
- Renewable generation needs to quadruple
- Constraint payments associated with SCOTEX boundary expected to peak at £1bn per year



Constraint map

Opportunity



- Utilising constrained wind to produce and store heat at a large Thermal Energy Storage Sites
- For Seasonal supply to Energy Centres and Heat Networks

Large thermal energy storage (LTES) is one of the lowest cost forms of storage

Project Overview

Technical Work Package

Investigate the different options for LTES and assess their compatibility with GB – geology, geography and demographics.

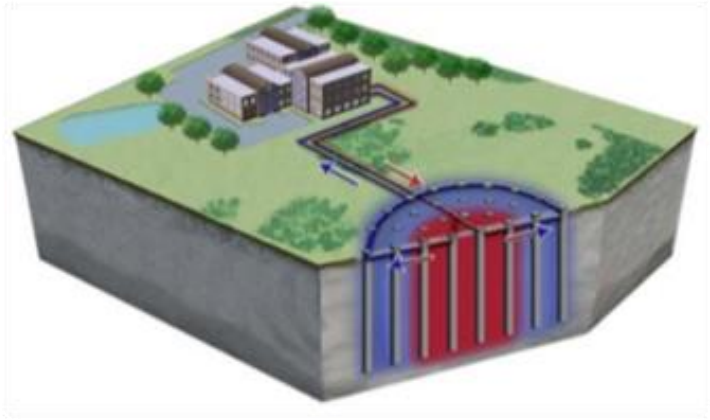
Commercial Work Package

Determine the benefits of LTES to the wider energy system including electricity transmission & distribution networks.

User Needs

LTES Developers/Heat Network Operators

- A clear pathway/guide to deployment
- An understanding of the business case
- Funding sources and return on investment.



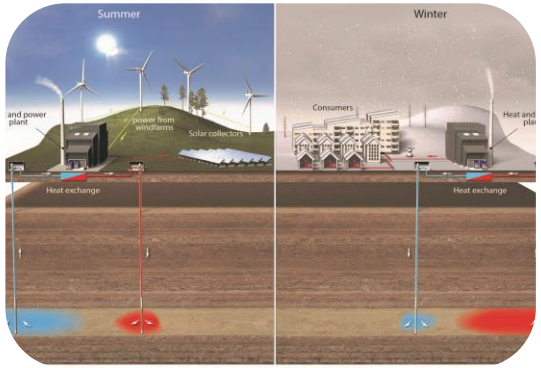
Electricity Networks

- Understanding of the potential flexibility
- How to help facilitate the solution
  - Commercial arrangements
  - Regulatory considerations

Large scale TES

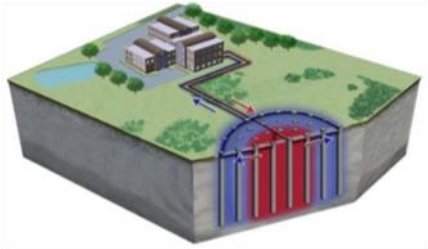
Energy storage compensates for the intermittent power generated from renewable power sources.

Allows this power to be stored when the wind is high and the power released and utilised during peak demand periods.

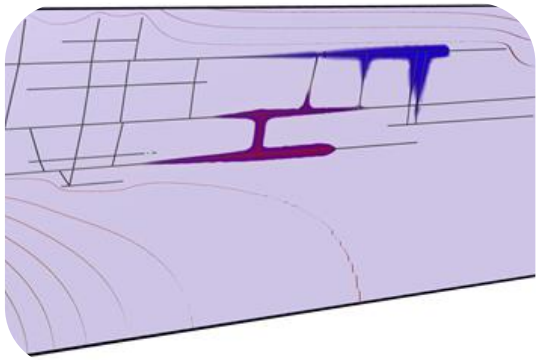


Aquifer Thermal Energy Storage

Pit Thermal Energy Storage



Borehole Thermal Energy Storage

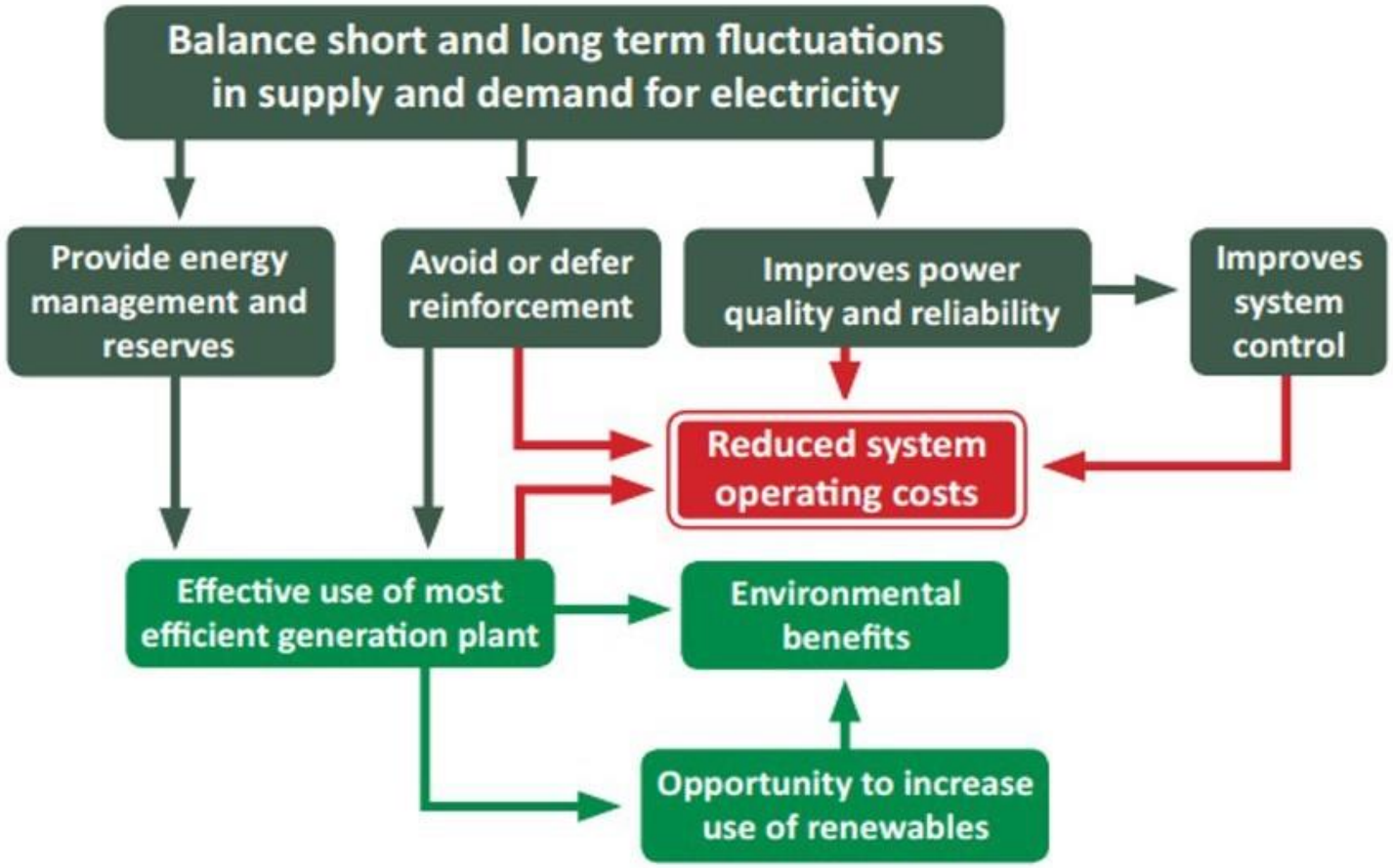


Mine Thermal Energy Storage

Technical Work Package – Findings

- In conjunction with heat production units, LTES can provide Electricity network services support such as frequency response and balancing (assuming there is storage capacity)
- Heat Pump based systems can have a COP of 4 or more
- UK has a significant proportion of high-quality aquifers suitable for ATES
  - Low Estimates of 16 ExoJoules or 4,000,000 GWhr
- Flooded mines also provide a significant opportunity for LTES
- Significant expansion in heat networks is planned in the UK with the Green Heat Network Fund
- Easter Bush campus modelled as a case study of LTES for seasonal storage

Commercial Work Package - Benefits

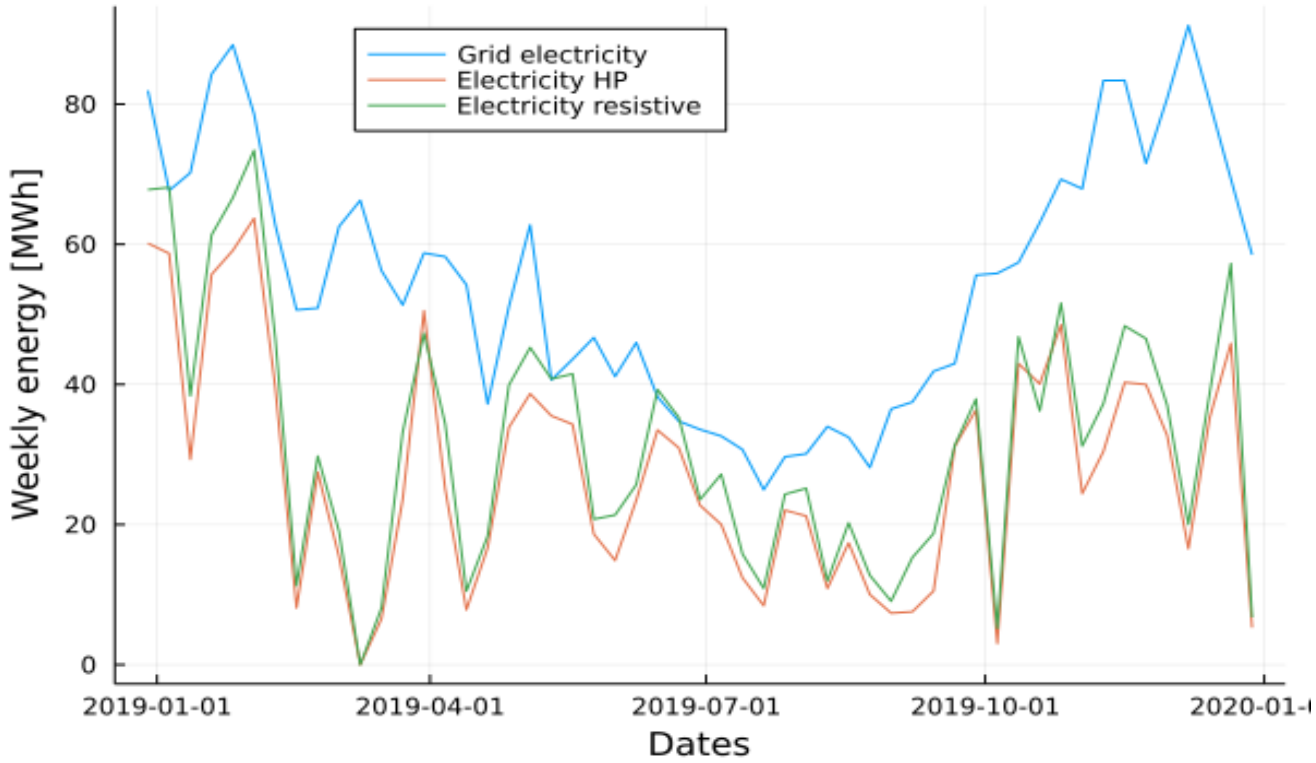


Financial benefits of LTES

- Use otherwise curtailed renewable generation
- Reduce electricity network reinforcement
- Can reduce size of heat provision systems by smoothing demand
- Shift energy purchase to low cost electricity periods
- Balancing and support for the electricity system

Potential benefit of £440m to electricity consumers by 2040

Commercial Work Package – Case Study



Weekly electricity demand provided by the grid for the base case as well as the HP and resistive heater cases for Kilgallioch wind farm

- Long term storage using borehole thermal energy storage (BTES)
- Using curtailed energy from local wind farms (e.g. Black Law & Kilgallioch)
- Positive IRR demonstrated
- Significant carbon reduction
- Significant reduction of non-curtailed electricity use during the winter period

Look Ahead

The technology exists but hasn't been implemented in GB. We need to address multiple stakeholder requirements:

- **A guide and evaluation matrix for potential LTES schemes**
- **Understand the socio-environmental factors**
- **Propose a commercial framework**
  - How can the benefits be stacked to fund the infrastructure investment?
- **Address any regulatory barriers**
  - Heat storage
  - Electricity network
- **Demonstration project to de-risk future schemes**

SP ENERGY NETWORKS

Watson Peat, Innovation Lead, Future Networks

Flexible Heat

Show and Tell

Develop a network that is ready for Net Zero

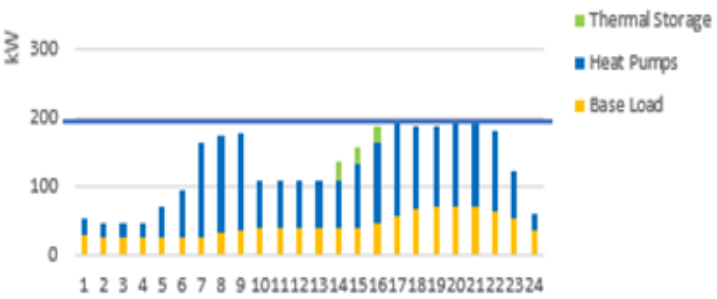
Be a trusted partner for customers, communities and stakeholders

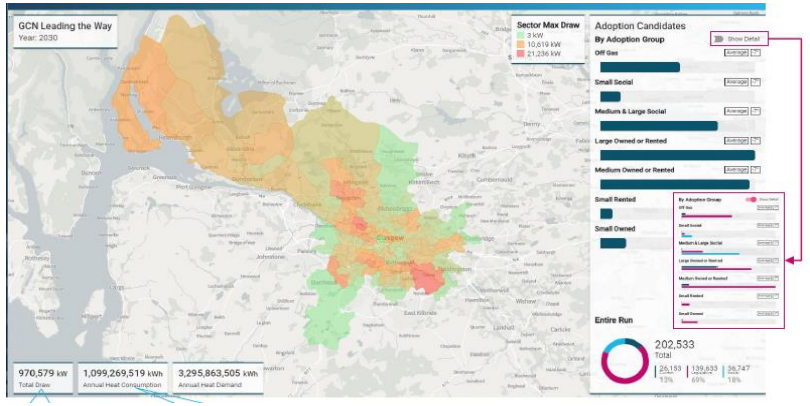
Ready our business for a digital and sustainable future

What is the Problem

Decarbonising heat is one of the biggest challenges we face on the journey to net zero. Heating and hot water are responsible for 21% of UK carbon emissions.

Electrification will be a key enabler however networks will be overloaded without intervention.





We must make heat flexible. This means shifting demand to reduce peak demand.

Project Overview

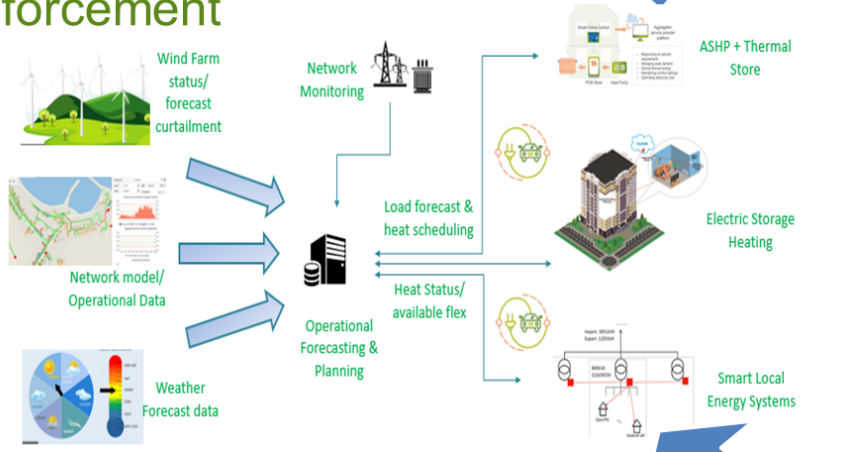
Flexible Heat - demonstrating smart control and domestic Thermal Energy Storage to unlock flexibility from heat.

We partnered with key players in the development, manufacture and deployment of innovative heating solutions and Thermal Energy Storage to deliver the project.

Opportunities

Technical Solutions: Alternatives to network reinforcement

Delivering the best value solutions



Meeting warmth and comfort needs

Commercial Analysis: Define benefits and routes to market

Accessing value from the whole system

Customer: Engaging all customers

User Needs

The main users of the Flexible Heat solution:

- Networks
  - ESO
  - DNOS/DSOs
- Domestic customers
  - end customer direct
  - aggregators/social landlords.

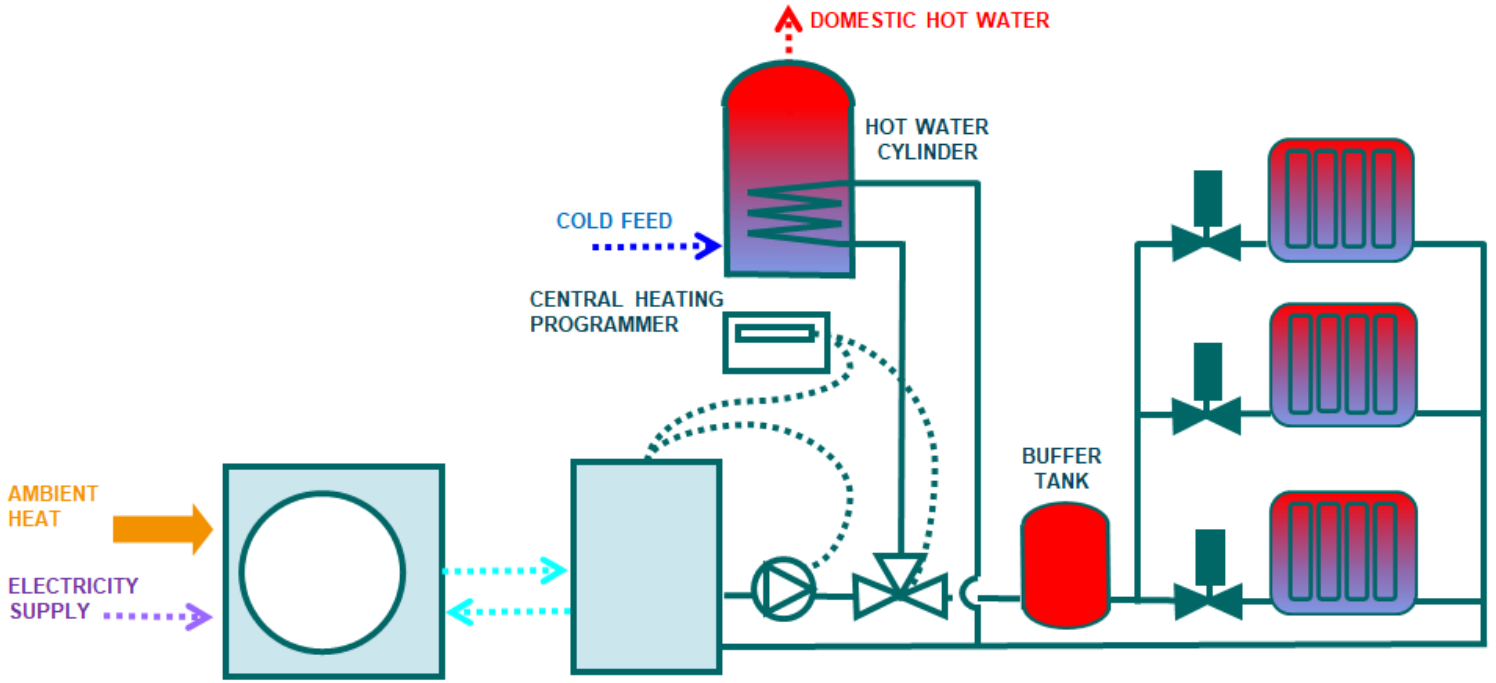
User Need	Recipient			
	End Customer	Networks TO/DNOs	Networks ESO/DSO	Wider Society
Deferring network reinforcement		X		
Minimising curtailment of renewable generation			X	X
Improve alignment of heat demand and electricity generation	X	X		
Increasing use of renewable generation			X	
Providing flexibility services to the energy system			X	
Reducing the carbon intensity of electric heat				X

WP1 Technical Solutions

Technology Review

We have explored a wide range of TES technologies at various stages of technology readiness (TRL). We have evaluated different solutions and the values they provide against their implementation costs including installation and operation. These include:

- Thermal inertia of building
- Hot water cylinders (HWC)
- Thermal buffers
- Primary thermal store (PTS)
- Electric storage heaters
- Phase change materials (PCM)
- Electric batteries (BESS)
- Complementary technologies
- Innovative technologies

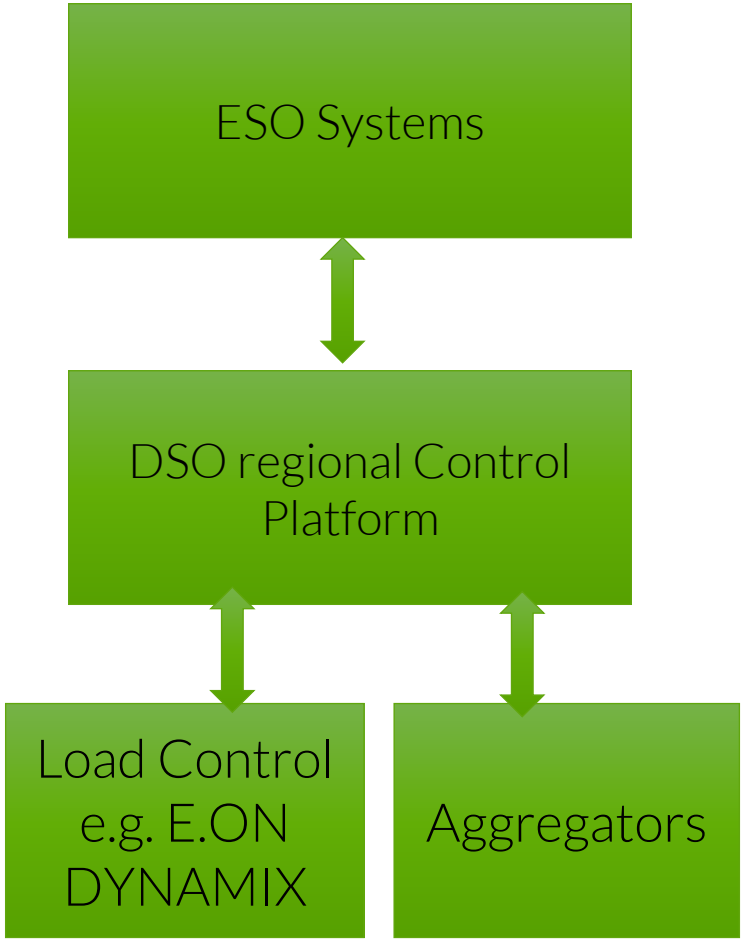


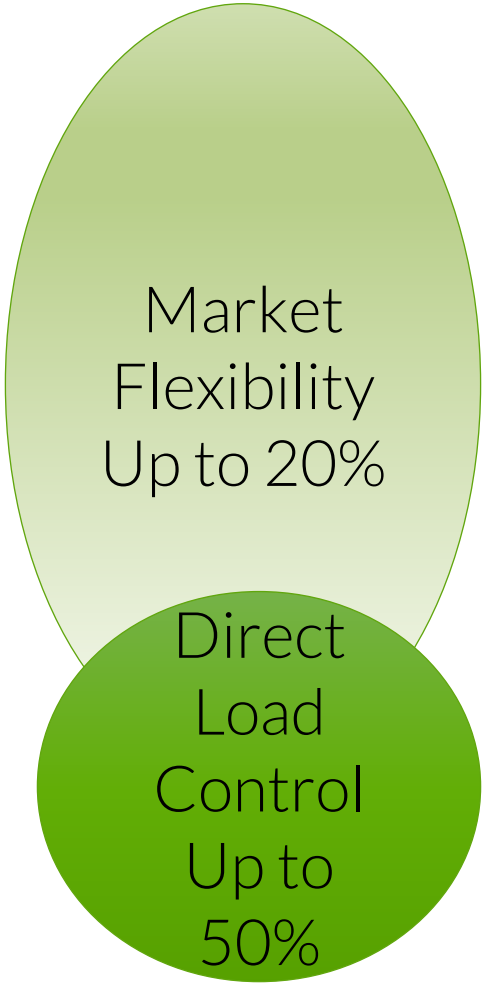
WP 1 Technical Control System Architecture

City

Neighbourhood

Street





System Architecture

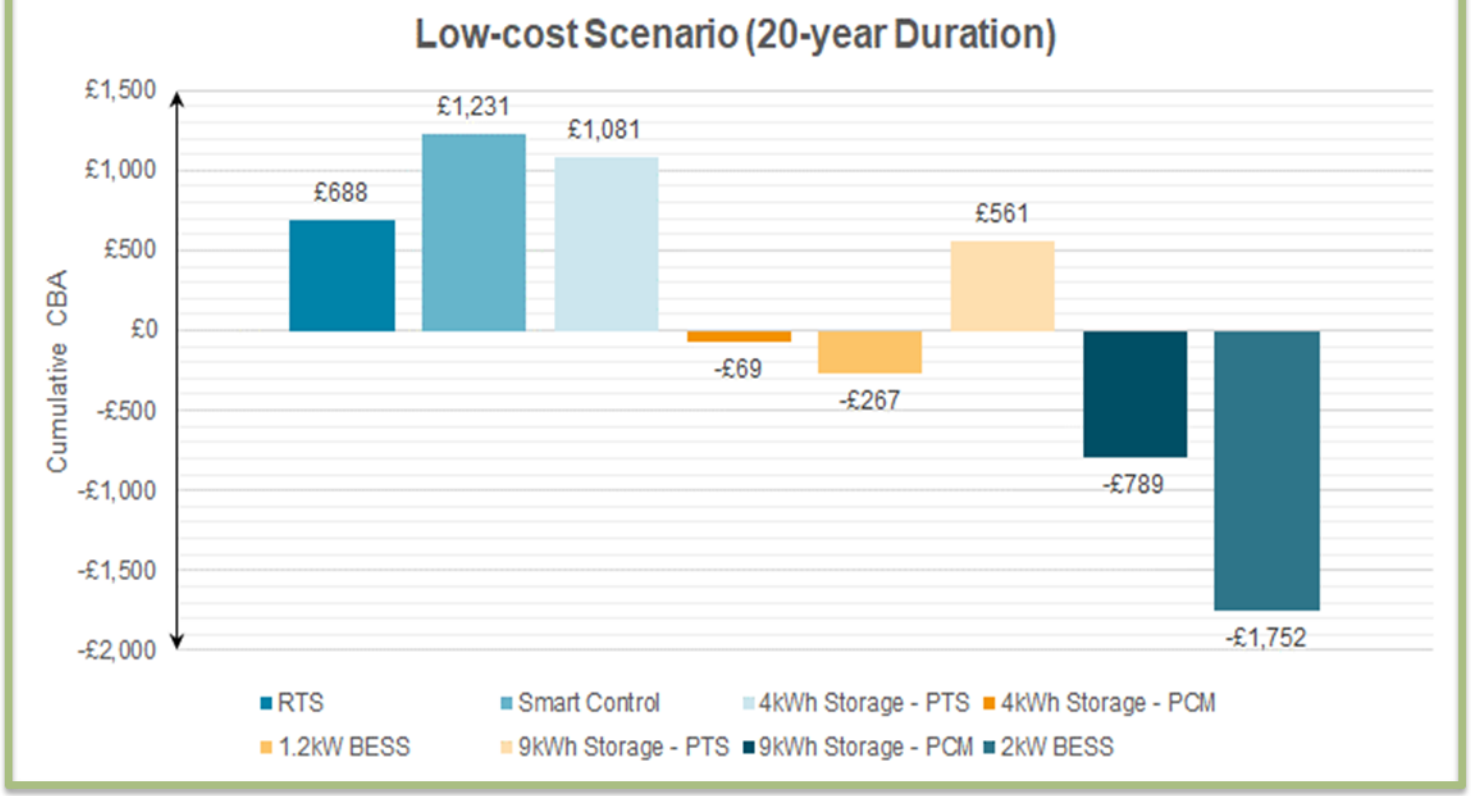
- Smart in-home control
- DSO regional controller Interfaces with internal and third party systems
- Combines commercial flexibility with direct load control

WP2 Commercial Analysis

TES can avoid or defer network investment facilitating incremental heat pump roll out

- Basic control using thermal inertia
  - does not fully avoid peak demand period
  - this can exacerbate peak
- Smart control using thermal inertia:
  - can fully avoid peak period for all days
  - may reduce thermal comfort
- Active TES (PTS) can maintain a higher level of thermal comfort
- More expensive TES technologies unlikely to deliver value for money, but may provide other benefits (e.g. require less space)

NPV per home of selected interventions



WP3 Customer

How do we avoid the mistakes of the last major electric heating roll-out?

- Ensure that customer comfort and cost is not compromised for the “greater good”
- Don’t assume that customers will embrace new technology
- Engage other stakeholders who represent customers – Wheatley Group for social housing and Warmworks for owner occupiers

Lessons learned during the project

- Workshop for partners focussed on sharing “what goes wrong” on customer engagement
- Wheatley and Warmworks shared from recent projects on batteries, solar, heat pumps, smart storage heating.
- Wheatley as Scotland’s largest landlord, will help identify potential trial sites

Look Ahead

- Alpha phase proposed with similar work packages

Technical

Develop regional & behind the meter control solutions

Case Study

Design a site trial to implement in Beta phase

Commercial & Regulatory

Set up working group and address challenges to bring benefits to customer

Customer

Engage with trial customers, gather insights to improve customer journey

SP ENERGY NETWORKS

Stuart Walker, Customer Engagement Manager

Incentive for Connections Engagement

Net Zero Knowledge Forum

Develop a network that is ready for Net Zero

Be a trusted partner for customers, communities and stakeholders

Ready our business for a digital and sustainable future

Knowledge Community – Governance Board

Governance Board Membership

1. *Utilities – Scottish Water, SPEN, SSEN, SGN, GTC*
2. *Academia - Strathclyde Uni., St Andrews Uni., Edinburgh Uni.*
3. *Business leads – EON innovation, Cala Homes, Various Consultants*
4. *Local Authorities – Fife, Edinburgh, East Ayrshire, Borders*
5. *Government Agencies – SoSE, Scot Ent, Catapult - LESSIN*

Progress Update

1. *1st Governance Board Held with 3 more in the diary*
2. *2 x Expert panels held on Heat pumps and Fuel poverty*
3. *New Membership involved*
4. *Funding in Progress for Dedicated resource – Research and Admin*
5. *Website home and net zero material partnership opportunity being explored*

Knowledge Community – Planned Outputs

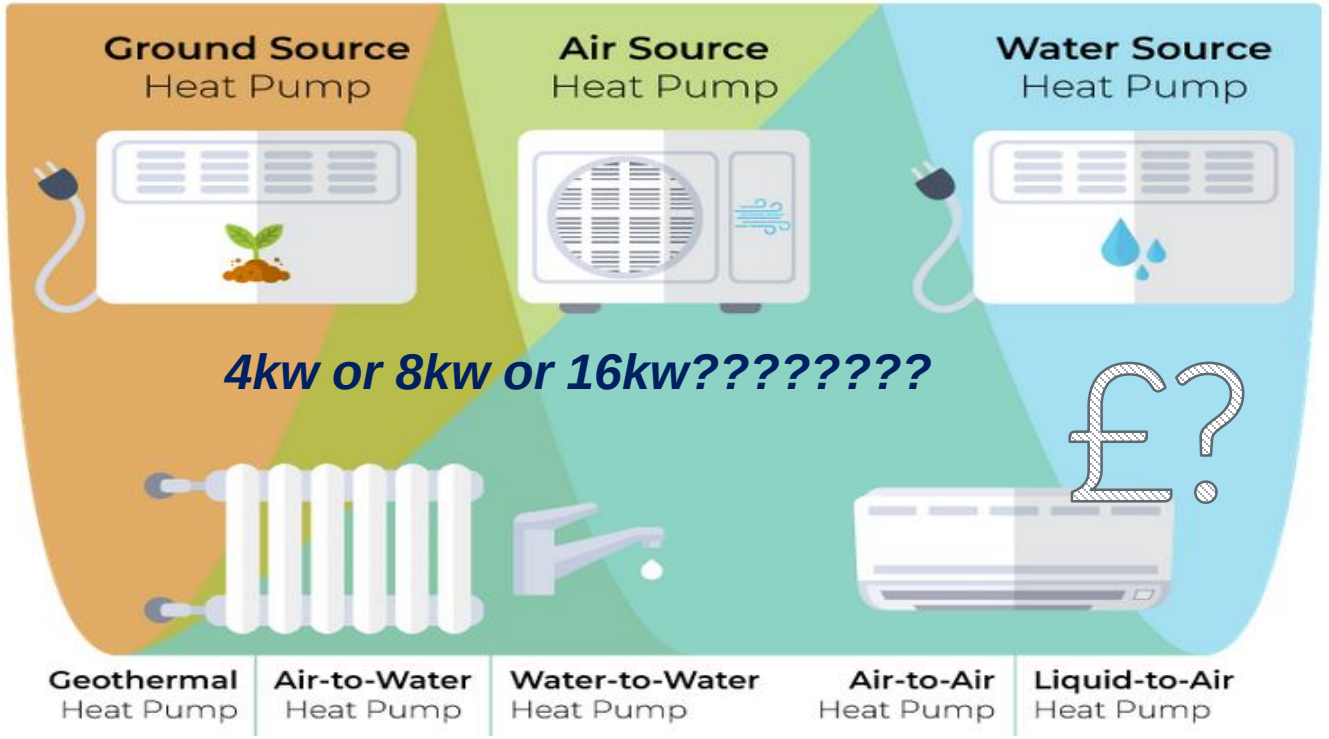
From Stakeholder feedback so far our focus will be on top 10 Products and 5 solutions – to be ratified at 1st Governance meeting

Net Zero Products (micro / macro)

1. *EV Chargers*
2. *Heat Pumps*
3. *Solar*
4. *Housing Fabric*
5. *Green Hydrogen*
6. *Energy Storage*
7. *Wind*
8. *Bio-Carbon Capture (Trees)*
9. *Hydro*
10. *Sustainability and Local Employment*

Net Zero Solutions

1. *Heat Pumps, Fuel Poverty*
2. *EV Parking, Solar, Storage vs Demand constraints*
3. *Wind, Solar, Storage vs Generation limitation*
4. *Housing Fabric vs Heat pumps*
5. *Green Hydrogen vs EV / Heat pumps*



Knowledge Community – Other Partnerships

SP Energy Networks are actively supporting Local Authorities in their Net Zero Master planning

Key Net Zero Local Authority Partnerships

1. *City of Edinburgh*
2. *East Ayrshire*
3. *Fife*
4. *Borders*
5. *Mid Lothian*
6. *West Lothian*
7. *East Lothian*
8. *Stirling*
9. *Clackmannan*
10. *Dumfries and Galloway*

Key Industry and Utility Partners

1. *Utilities – Scottish Water, SPEN, SSEN, SGN, GTC*
2. *Academia - Strathclyde Uni., St Andrews Uni., Edinburgh Uni., Heriot Watt Uni*
3. *Business leads – EON innovation, Cala Homes, Various Consultants ,*
4. *Associations - Scottish Solar Energy Association, Homes for Scotland, Local Authority Client Forum (Select)*
5. *Government Agencies – South of Scotland Enterprise, Scottish Enterprise, Catapult – LESSIN, Transport Scotland, Scot Gov.*

Knowledge Community – Key Activities

SP Energy Networks key areas and supporting activities

Key Net Zero Key Areas

1. ***Chair Board meetings on Heat and Energy Efficiency***
2. ***Facilitate Meeting – Housing developments, District Heating schemes, Generations and Demand Mapping etc***
3. ***LHEES – Technical and local support and Data sharing***
4. ***City Deals and NERDS – Facilitate meetings, technical support, local district engagement, support planning and costing***
5. ***Attendance at CEO Level Decision making boards***

Provide Key Supporting activity

1. ***Supporting letters to Aid Funding requests for Innovations***
2. ***Provide funding for Innovative projects with partners***
3. ***Share data down to house level***
4. ***Provide Technical, Regulatory, Investment and District advise and expertise***
5. ***Act as broker for consortiums and other Net Zero Partnerships***
6. ***Develop and share net work and net zero innovations.***

Rachel Shorney, Stakeholder Engagement Manager
Stuart Walker, Customer Engagement Manager

Incentive for Connections Engagement

Questions and Feedback

Develop a network that is ready for Net Zero

Be a trusted partner for customers, communities and stakeholders

Ready our business for a digital and sustainable future

ICE – Questions and Feedback

Website

We have recently updated our SP Energy Networks website to bring the work we do for our major connection customers into a more prominent position on the Getting Connected part of our website.

We plan to make further enhancements to our website over the next 6 months and would welcome feedback to help us shape a platform that is beneficial to all customers and stakeholders.

If you would like to make suggestions for any further improvements you feel would prove beneficial.

Please contact us on gettingconnectedupdates@spenergynetworks.co.uk

Open Door Policy

Due to the ongoing COVID-19 pandemic, we will be continuing our Open Door Policy via telephone or using MS Teams or Zoom.

We are keen to engage with any stakeholder and customer in any way they choose despite the lack of face to face meetings at present.

Please continue to contact our teams in both licence areas using the Areas of Responsibility information at the back of his document, or the Contact Us page of our website, which can be found at:

spenergynetworks.co.uk/contactconnections

Email Communications

We continue to look for new ways to communicate with our stakeholders, and we have increased our email communications to our registered stakeholders during the ongoing COVID-19 pandemic.

Stakeholders have told us that this increased communication has been appreciated, and we plan to deliver further communications in this manner.

Please register as a stakeholder with us if you would like to receive ongoing communications and updates in this format.

Register as a stakeholder: spenergynetworks.co.uk/register

Dates for the diary

Dates for the diary in 2022/23:

03/08/22
Customer Contact Focus Group

17/08/22
RAdAR Working Group

14/09/22
Preparing for Net Zero Conference

Please register for our next events at:

spenergynetworks.co.uk/stakeholderevents

Thank you for your time today.

Your feedback has been useful and we will incorporate your comments when planning our next engagements.

Please register as a stakeholder if your would like to receive further updates from us:

spenergynetworks.co.uk/register