

SP Energy Networks Preparing for Net Zero Conference Wednesday 1st December 2021

Preparing for EV, Heat Pumps and Heat Networks



SPEN Preparing for Net Zero Conference

Wednesday 1st December 2021



Agenda

Preparing for Low Carbon Technologies:
Electric Vehicles and Heat

*Thank you for taking the time to attend
today.*

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

13:30 – Welcome, Housekeeping & Safety Contact

13:40 – SPEN Website Improvements

14:00 – Project CHARGE & ConnectMore Tool

15:00 – Break

15:05 - Heat Up Innovation Projects

15:25 – Net Zero Knowledge Forum

15:45 – ICE Update and Feedback

16:00 – Close

SPEN Preparing for Net Zero Conference

Wednesday 1st December 2021



Housekeeping

Preparing for Low Carbon Technologies:
Electric Vehicles and Heat

Thank you for taking the time to attend today.

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

- *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*

Safety Contact - SPEN Storm Response



Frank Mitchell

CEO
SP Energy Networks

I'm Frank Mitchell,
I'm the CEO of SP Energy Networks

www.spenergynetworks.co.uk/pages/severe_weather_update.aspx

SPEN Website Form Updates

- ▶ Michael Alexander
- ▶ SPEN Business Improvement Lead

Project Charge Update & ConnectMore Tool

- ▶ Geoff Murphy
- ▶ SPEN LCT Manager

- ▶ Ana Duran
- ▶ Senior Consultant, EA Technology

SPEN Preparing for Net Zero Conference

Wednesday 1st December 2021

Preparing for Low Carbon Technologies:
Electric Vehicles and Heat

Break

We will resume at 15:05

Heat Up

- ▶ Watson Peat
- ▶ SPEN Future Networks Lead Engineer

Peak Heat Demand

- Peak demand is biggest concern for electricity networks

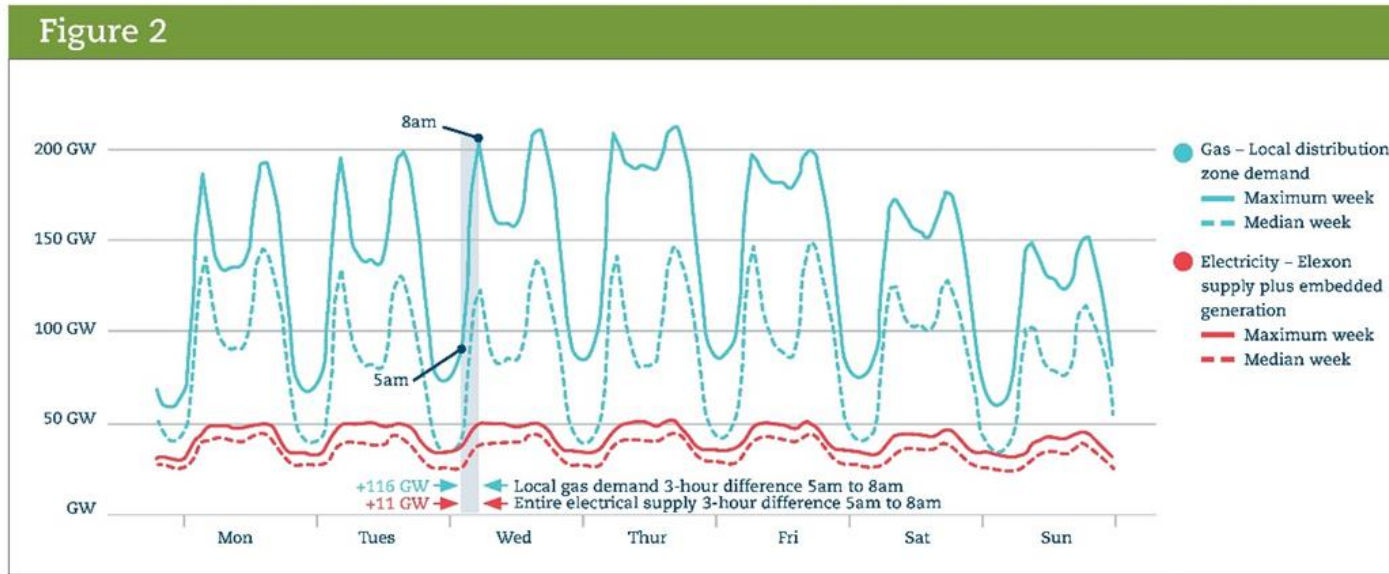


Figure 2: Britain's local gas demand and electrical system supply - median and maximum demand weeks. The week dating 22nd to 28th January is the median demand week for the 2017–2018 heating season. The week dating 26th February to 5th March represents the maximum demand week of the 2017–2018 heating season.

- Gas peak daily energy demand **4-times** that of electricity
- Mitigated peak electricity demand could increase to 300%

Forecasts – the foundation of our plan

Our **Distribution Future Energy Scenarios** show the scale of activity is greater than ever before

Electrification of transport

1.0m - 1.5m new EVs by 2030



Electrification of heating

0.6m - 0.9m new heat pumps by 2030.



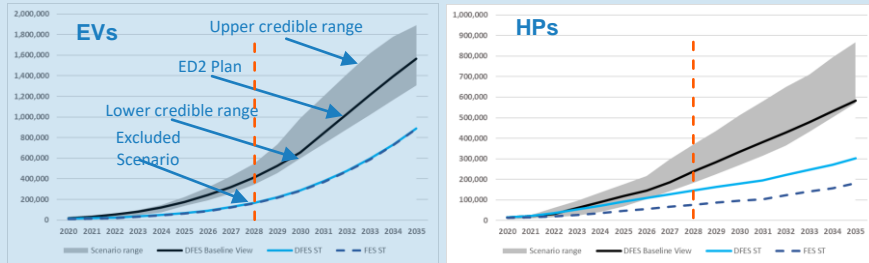
Distributed generation

+6GW to +7GW of additional generation by 2030. (2.5 x current levels)

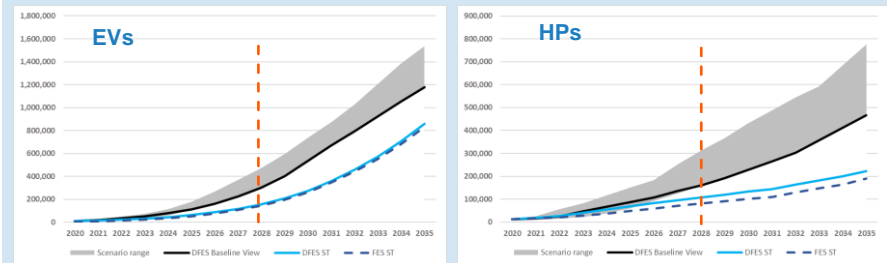


Developed our **Baseline scenario** using DFES, ESO, and Climate Change Committee projections

SP Distribution



SP Manweb

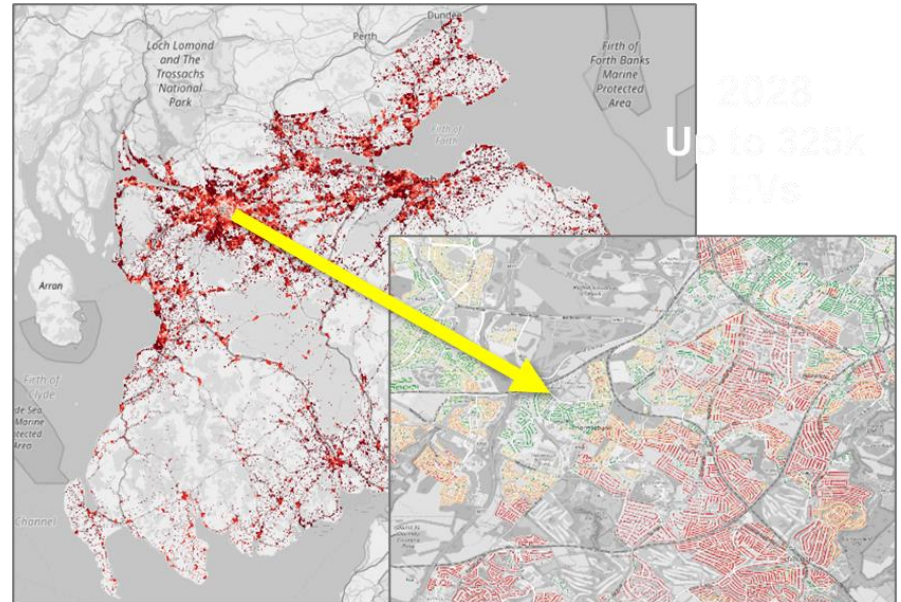


Our plan will facilitate all credible Net Zero pathways with our delivery strategy flexing accordingly

Enhanced Forecasts – taking our forecasting further

We need to understand what is happening at a granular level **heat pumps**.

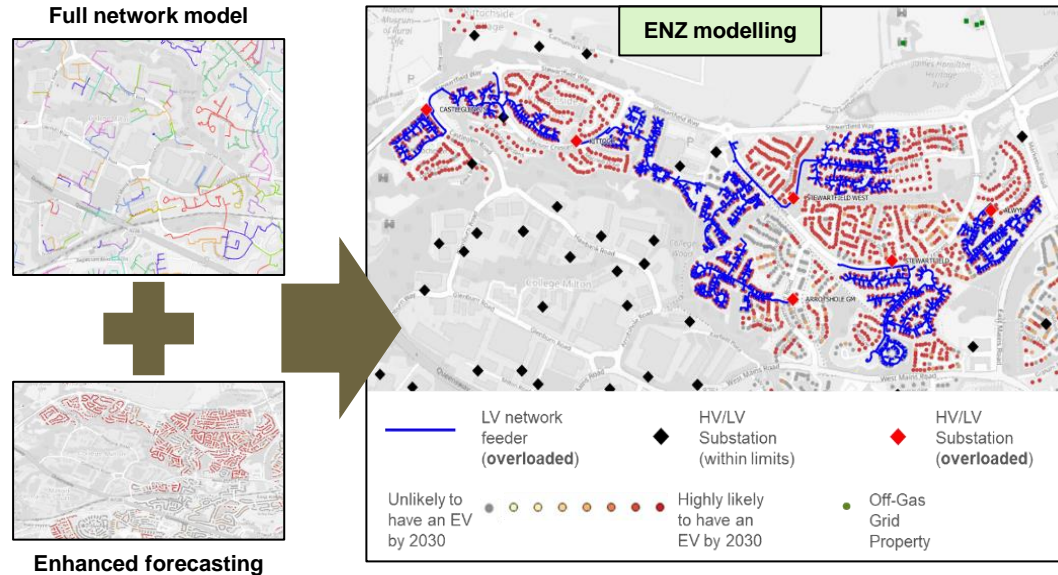
- **Heat-Up** forecasts heat pump uptake for every customer we serve.
- Developed through RIIO-ED1 innovation, they do this using spatial, demographic, and socioeconomic data.
- Complementary to macro scenarios – it shows, for any macro scenario, which customers will get heat pumps and in what timescales.



Enhanced forecasting helps us identify precisely where and when our customers need capacity

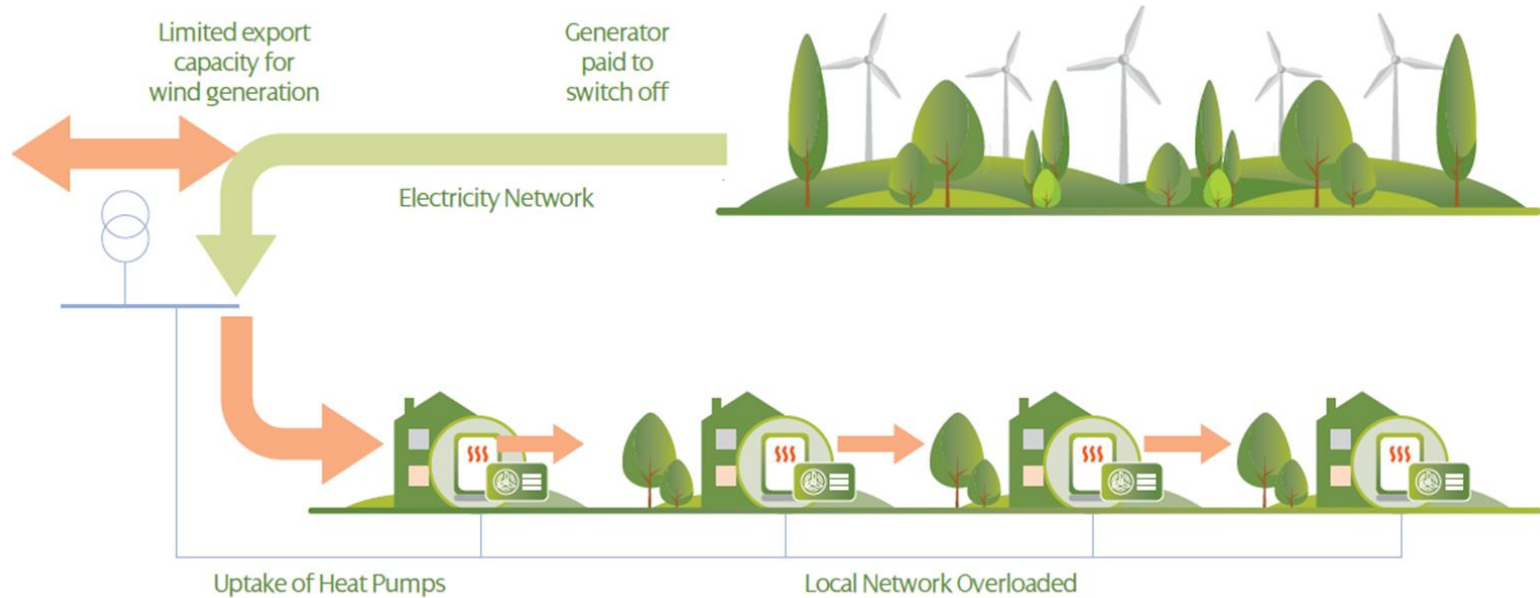
Comprehensive modelling to assess capacity need

We combined detailed modelling of our entire network with enhanced forecasting, to **systematically identify the location, magnitude, and timing of every network constraint** in RIIO-ED2.



Our comprehensive approach means we could test for flexibility for every constraint – our plan is built to address **individually known solutions** using **market tested solutions**

Challenges for the electricity network



Challenge 1: Electrified heat will overload our networks
Challenge 2: Renewable generation is being constrained

Thermal Storage



- ▶ **Thermal Energy Storage (TES) devices installed alongside heat pumps could reduce peak electricity demand from heating by 35% in the Leading the Way scenario.**



Possible flexibility available from Thermal Energy Storage (TES) is estimated at 900GWh.

'it is important to build flexibility into technologies and service offerings right from the start rather than retrofit in the future which could make it prohibitive. Examples of such integration includes ... with heat pumps in domestic and non-domestic buildings...'

Domestic Thermal Storage

1. Existing and presently under-utilised storage

- ▶ Building thermal inertia,
- ▶ Storage heaters,
- ▶ Hot water tanks.

2. Market ready storage, but not yet widely deployed

- ▶ Phase Change Material (PCM) systems.
- ▶ Smart water cylinders

3. New and developing technologies

- ▶ Flexible heat pumps,
- ▶ Thermochemical heat stores.



Sunamp heat battery



Strategic Innovation Fund (SIF) Application

Project: Flexible Heat

Domestic Thermal Storage

Heat Pumps & PCM Thermal Stores

- **Re-heat** will trial in ~**150 homes** across East Ayrshire, East Dunbartonshire and Highland council areas
- Keep load within network limits while maintaining customer comfort
- Customer bill savings of up to **£136 per annum are expected** by making heat load flexible
- Solution rollout could avoid or defer reinforcement in 606 clusters across SPD saving **£54m** by 2040

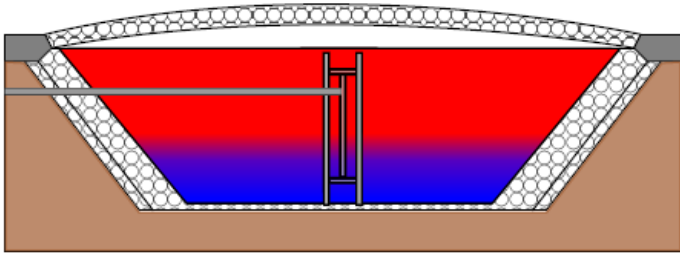


Storage Heating

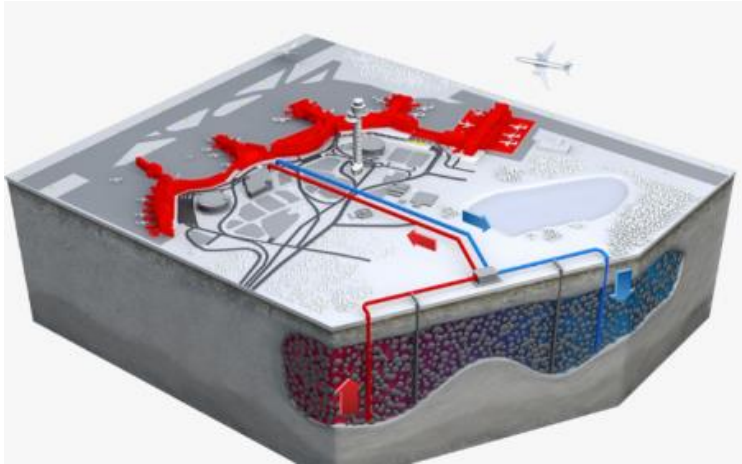
- **4D Heat** project looked at how storage heating charging could be better aligned with renewable generation
- Estimated benefits of **£24m** per year through avoiding payments to curtail wind farms
- Our **Flexible Tower** project is demonstrating through trial how storage heaters in tower blocks can support flexibility markets
- In addition to network, customers will benefit through additional revenue streams



Large-scale Thermal Storage

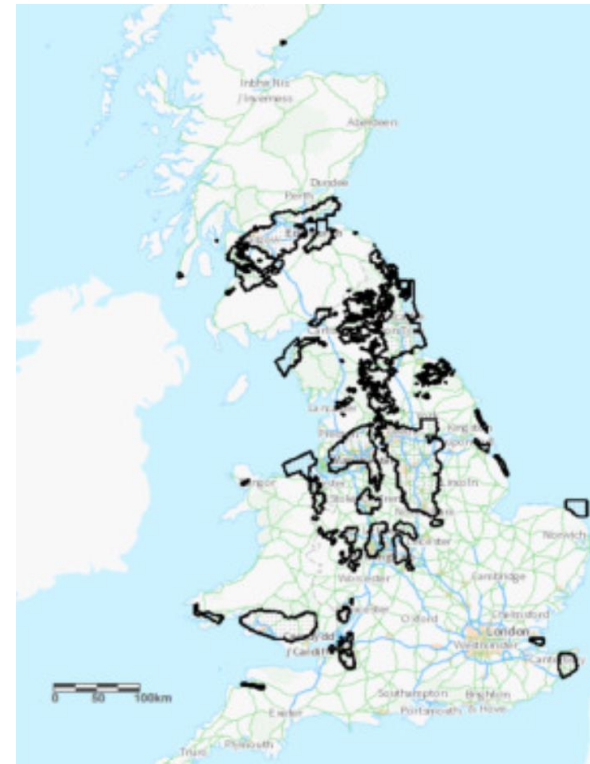


Pit-thermal energy storage



Aquifer-thermal energy storage

- Large systems achieve very low costs
- What is the effect on the whole energy system?



Mine workings in GB

Strategic Innovation Fund (SIF) Application
Project: Heat Balance

Knowledge Forum

- ▶ Stuart Walker
- ▶ SPD ICE Engagement Manager

Knowledge Community - Purpose

To provide information and support for all stakeholders in facilitating the UK, Welsh and Scottish Governments net zero targets

The Ten Point Plan for a Green Industrial Revolution

Point 1: Advancing Offshore Wind

Point 2: Driving the Growth of Low Carbon Hydrogen

Point 3: Delivering New and Advanced Nuclear Power

Point 4: Accelerating the Shift to Zero Emission Vehicles

Point 5: Green Public Transport, Cycling and Walking

Point 6: Jet Zero and Green Ships

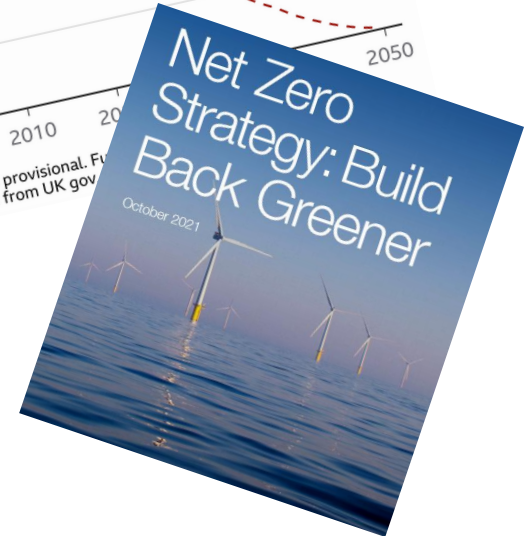
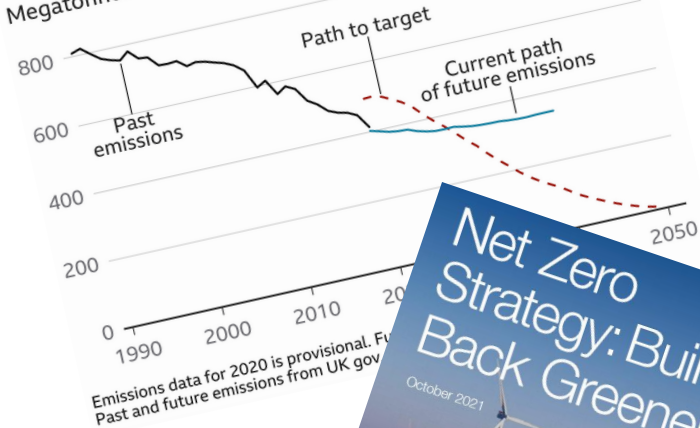
Point 7: Greener Buildings

Point 8: Investing in Carbon Capture, Usage and Storage

Point 9: Protecting Our Natural Environment

Point 10: Green Finance and Innovation

UK will miss targets without more action
Megatonnes of greenhouse gas emissions a year



Knowledge Community - Governance

Good Governance to ensure we create a knowledge community that is timely, effective, efficient and fair to all

Governance Hierarchy

1. **Governance Board – Utilities, Academia, Business leads – 12 max**
2. **Expert Panel – Product and solutions Experts – 30 max**
3. **Contributor Forum – Local authority strategy partners, development associations, connection stakeholders – 100+**
4. **User group to benefit from information - 1000+**

Choose top 10 products and 5 solutions

Full life cycle expertise and business cases

Use info to accelerate net zero solutions

Endorse process and provide key net zero needs

Knowledge Community – Progress Stages

*Progress
so Far*



Knowledge Community – Potential Outputs

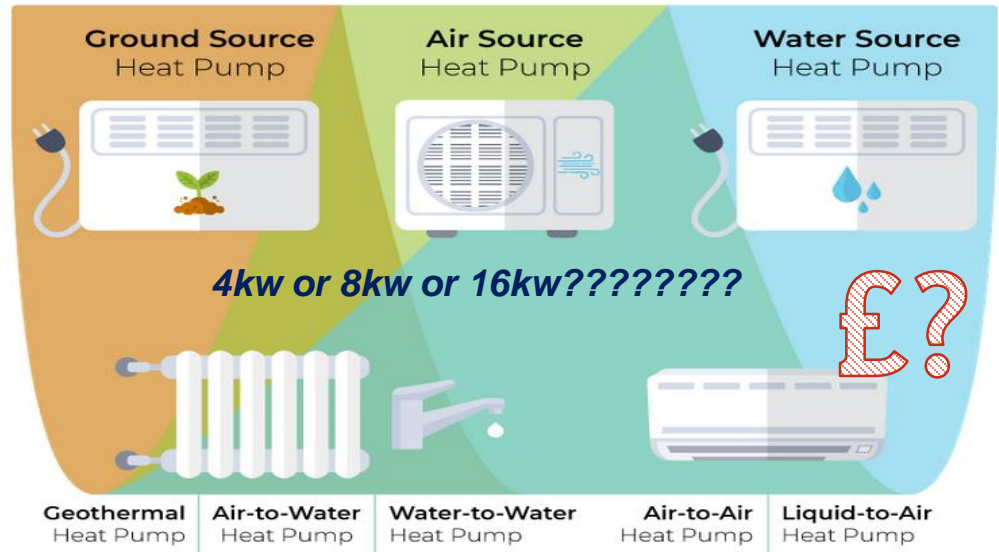
From Stakeholder feedback so far our focus will be on top 10 Products and 5 solutions

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 Solution

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**

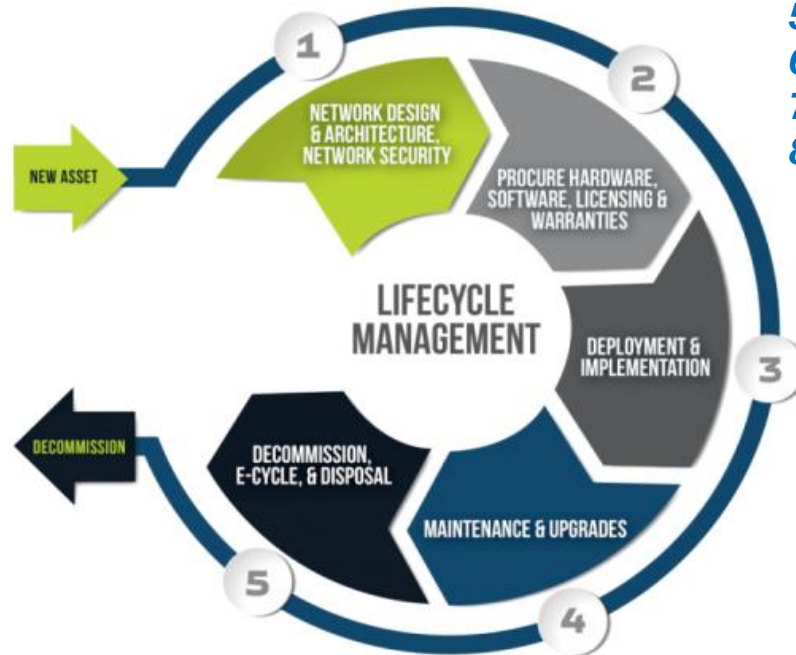


Knowledge Community – Lifecycle Management

Focus will be on the full life cycle of the net zero product or solution

Cradle to grave approach to answer all key questions

- 1. Cost**
 - Purchase
 - Install
 - Commission
 - Run
 - Maintain
 - Decommission
 - Disposal
- 2. Benefits & risks**
- 3. Impact**
 - Network
 - User
 - Community



- 4. Timescales**
- 5. Case study examples**
- 6. Investment payback**
- 7. Net zero benefit**
- 8. Comparison with other solutions / products**

Knowledge Community – Book of Knowledge

Key output will be a Net Zero Book of Knowledge with the lifecycle Information for the top 10 Products and 5 solutions from March 2022 through to October 2023 in 4 tranches

The Net Zero Book of Knowledge seeks to be the foundation of the Information required for Net Zero decision making, assuming a zero base starting point for the audience.

In this way accelerating the installation of effective, efficient and timely net zero solutions that fit the need of the user group.

Eliminating in the process costly and timely mistakes made through inexperience decision making.

Effectively accelerating the knowledge base of the UK Net zero community

Knowledge Community – Next Steps

- 1. Governance Board to confirm members and hold first Board by Dec*
- 2. Newsletter to communicate Governance Boards plan for next 22 months*
- 3. Expert Panel to hold first meeting and commit to authoring their key net zero area.... Jan 2022*
- 4. Contributor Forum to Endorse product and solution offering and governance process... Feb 2022*
- 5. Expert Panel to produce first tranche of products and solutions for review... March 2022*
- 6. User Group event - Views and improvement suggestions capture in ICE submission for 2022 / 23*
- 7. Repeat of process until all 4 tranches are completed and top 10 products and 5 solutions are capture in the first Net zero Book of Knowledge*

We will try to combine staged early releases of these tranches with pragmatic robust of information that can have immediate benefit while we close out each product and solution

Knowledge Community – Questions



ICE

- ▶ Rachel Shorney
- ▶ SPM Stakeholder Engagement Manager

- ▶ Stuart Walker
- ▶ SPD ICE Engagement Manager

Policy Updates

Our SPEN policy documents can be found at - www.spenergynetworks.co.uk

1. Getting Connected
 - Document Library

2. About Us
 - Document Library

We have recently issued 3 new Policy Documents:

1. Equipment Ratings ESDD-02-007 re-issued March 21
2. Inspection and Monitoring of Networks Constructed by Independent Connection Providers ASSET-04-020 re-issued April 21
3. Ratings and General Requirements for Plant and Apparatus for Connection to The Company's System EPS-03-033 re-issued August 21

We are continually updating our Policies and Standard Documents.

Please send any requests or queries to our stakeholder team so that we can incorporate your requirements into our programme of updates:

- gettingconnectedupdates@spenergynetworks.co.uk

Customer Focus Group

Changes to the application webforms - why the need?

LCT equipment size and location information will enable SPEN to make informed decisions on where reinforcement of the network is required. The webforms will be changed to collect this information.

What's changing?

- Modernised look and feel – mobile friendly
- User experience improved with intuitive flow
- Follows common websites structure
- Simple to answer questions – less jargon
- Progress meter
- Add load calculator

Which forms?

- New Supply – information gathered and used on “energisation”
- Alteration to point of supply – information gathered and transferred to system
- Additional Load – information of existing devices gathered and transferred to system

Next Steps

- Next session Wednesday 12th January 2022

RAdAR- Improvements & Proposed Solutions

Improvements discussed and proposed for progression to IT Design at our last meeting.

SPEN are hopeful that all of these will be approved for implementation:

1. Recommended file size to be uploaded – proposed increase to 100MB
2. POC Expected Offer Date to shown on the POC Registration page
3. Design Approval Date shown against the list of live applications on Design Approval page
4. Improved Search Function for SPEN Staff Contact Details

Additional Improvements that may also be delivered – pending IT Design Review:

1. RAdAR time out to be increased from the existing 5 minutes to 45 minutes
2. Multiple Applications Section for the same site... rather than 3 separate applications
3. Auto Charging for Self Connect – is it possible to end the automatic function?

RAdAR- Suggested Behavioural and Process Improvements

Behavioural Improvements – to be addressed and improved during 2021/22 ICE Plan

1. Improved verbal communication
2. Improved / standardised written communication
3. Improved / standardised flexibility in approach across both SPD and SPM licence
4. Greater responsibility to communicate in a timely manner on complex projects

Process Improvements – to be reviewed with possible implementation in 2022/23 ICE Plan

1. Introduce SLA for non-guaranteed standards items such as Earthing and Diversions etc.
 - Investigate and agree a standard timescale for such requirements
2. Determine an agreed expectation of communication for Design, Land Rights and Delivery
 - Determine best methods across SPD and SPM and agree a standard approach for each activity

Feedback and Q&A Session

- ▶ Rachel Shorney
- ▶ SPM Stakeholder Engagement Manager

- ▶ Stuart Walker
- ▶ SPD ICE Engagement Manager

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Thank you for your time today.

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

Upcoming events for the calendar:

Preparing for Net Zero Conference

Wednesday 9th March 2022

- 09:30 to 12:00
 - Preparing for Whole System Approach
- 13:30 to 16:00
 - Preparing for EV and Heat