

WELCOME

SSEN Future Networks
FastTrack and 3D-AR Webinar

Thursday, 4 June 2026



Scottish & Southern
Electricity Networks



HOUSEKEEPING

- Please ask questions throughout the session using the Q&A function
- Today's session will be recorded and will be made available after the event, along with the slides. Q&A sessions will not be published.



Video/webcams off

Please only turn your
video on for the Q&A
Section



Mics on mute

Please stay on mute
unless you are asking
a question



Technical queries

If you have any
technical questions
let us know



AGENDA

**WELCOME AND
INTRODUCTION**

FASTTRACK

Q&A

3D-AR

Q&A

CLOSE



SSEN DISTRIBUTION

WHO WE ARE

We're Scottish and Southern Electricity Networks (SSEN) Distribution. We're the Distribution Network Operator (DNO) responsible for delivering power to almost 4 million homes and businesses across central southern England and the north of Scotland.

We serve some of the UK's most remote communities - and some of the most densely populated. Our two networks cover the greatest land mass of any UK DNO, covering 72 local authority areas and 75,000km² of extremely diverse terrain.

We're also at the forefront of delivering the decarbonised electricity system of the future, connecting new low-carbon technologies to the network. Through this, we're helping support sustainable economic growth for decades to come.

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



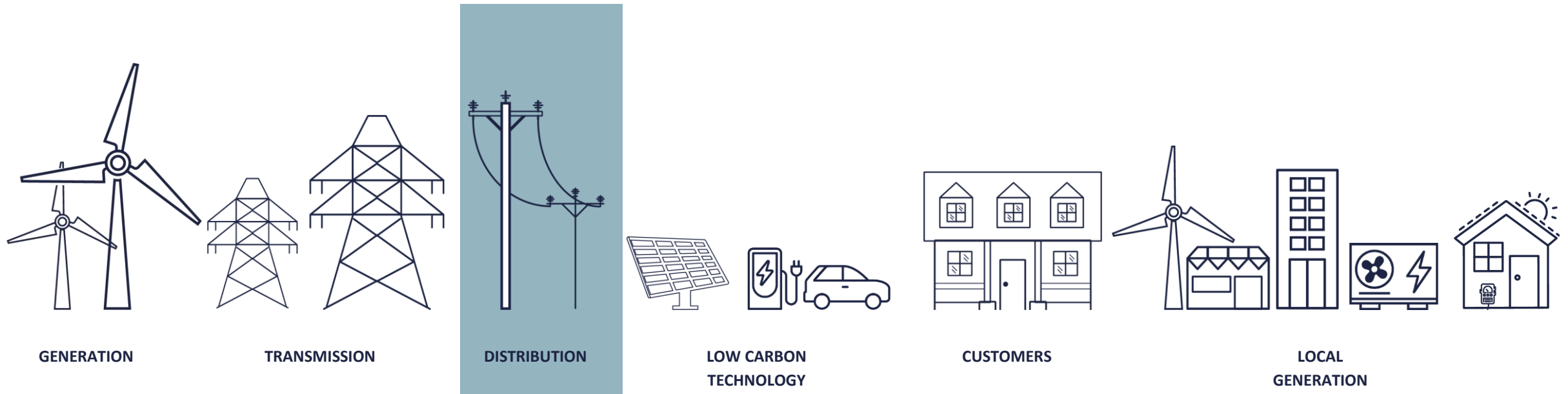
Central Southern England
SSES/SEPD LICENCE AREA



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.

We provide this service for every home and business in the north of Scotland and central southern England regardless of who you pay your energy bills to.



We are regulated by Ofgem, the energy regulator, through a 5-year price control cycle. Our latest business plan, for RIIO-ED2, runs until March 2028, and we are currently developing our business plan for the 5-year ED3 period which runs from April 28 until March 33.



FASTTRACK

Gemma Ennis, SSEN

Birgit Burk & Aoife Gregg, Faculty AI



Scottish & Southern
Electricity Networks



OVERVIEW OF THE PROJECT



DNOs urgently need mechanisms to streamline and increase visibility within the connections queue, to safely maximise the use of existing network capacity.



SSEN are looking to develop the tools to improve the visibility and understanding of assets in the queue to understand the implication of the design of interventions such as network reinforcement.

The aim is to create a solution that helps System Planners make better decisions on planned interventions and network design, by providing conclusions such as ' what is the likely impact of the queue on my assets', 'how can I connect the customers ahead of their planned reinforcement date', etc.



ALPHA DELIVERABLES



Stakeholders

User research and needs
Individuals identified and engaged

Wireframes User Testing
Key for Beta

Steering Committee
User and Senior Management engagement and feedback.

Wider Engagement
Including other DNOs



Technical

Front End Wireframes
Test solution

Deployment and Security
Includes infosec, governance, access requests

Access Products
Initial solution design

Roll-up to BSP/GSP
High-level plans

CBA and Commercialisation plan



Project Management

Team Meetings
Online and in person

PM Book (Including RR)
Review and Update

Mid- and End-Point Review
Content and slides

Show and Tell
Plus other results dissemination



KEY PAIN POINTS ACROSS THE CONNECTIONS PROCESS

Overestimation of load

Systematic use of worst-case assumptions lacks modelling for attrition and real customer behaviour

High churn and uncertainty

Speculative applications and delayed cancellation notifications create planning blind spots

Limited transparency

Absence of linkage between contracted load and actual metered demand obscures true headroom

Connection speed

Planners struggle to evidence risks taken to connect customers ahead of major reinforcement

Probabilistic needs

Strong demand for granular, transparent forecasting that provides confidence levels

Underutilisation gap

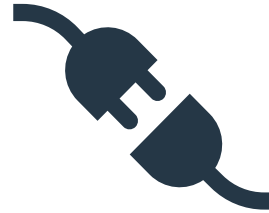
Evidence suggests many connections use less than 10% of their maximum assigned capacity



OBJECTIVES OF FASTTRACK



FastTrack aims to standardise and speed up how System Planners do their planning and analysis



The FastTrack tool is designed to be a 'one-stop-shop' for managing and visualising everything connections-related



It is how we envisage the System Planners interacting with the Modelling Team



DEMO OF THE FASTTRACK TOOL

FastTrack Tool | Map View | Connections Summary | **Load Forecast Breakdown** | Connections Management | Connections Acceleration via flex | Direct Metering

Select a GSP: GSP BASINGSTOKE | Select a BSP: BSP READING | Select a primary substation: ALDRESHOT

Load Forecast Breakdown

Export to CSV

Season: Winter 2025/2026

Baseline Forecast

Worst case scenario baseline

Probabilistic baseline (with 99.75% confidence interval)

Legend: ↳ Upper Confidence Boundary ↳ Probabilistic Baseline (Median) ↳ Lower Confidence Boundary

Data Sources: PROMIS, Processed PJNeRDA

Connections Forecast

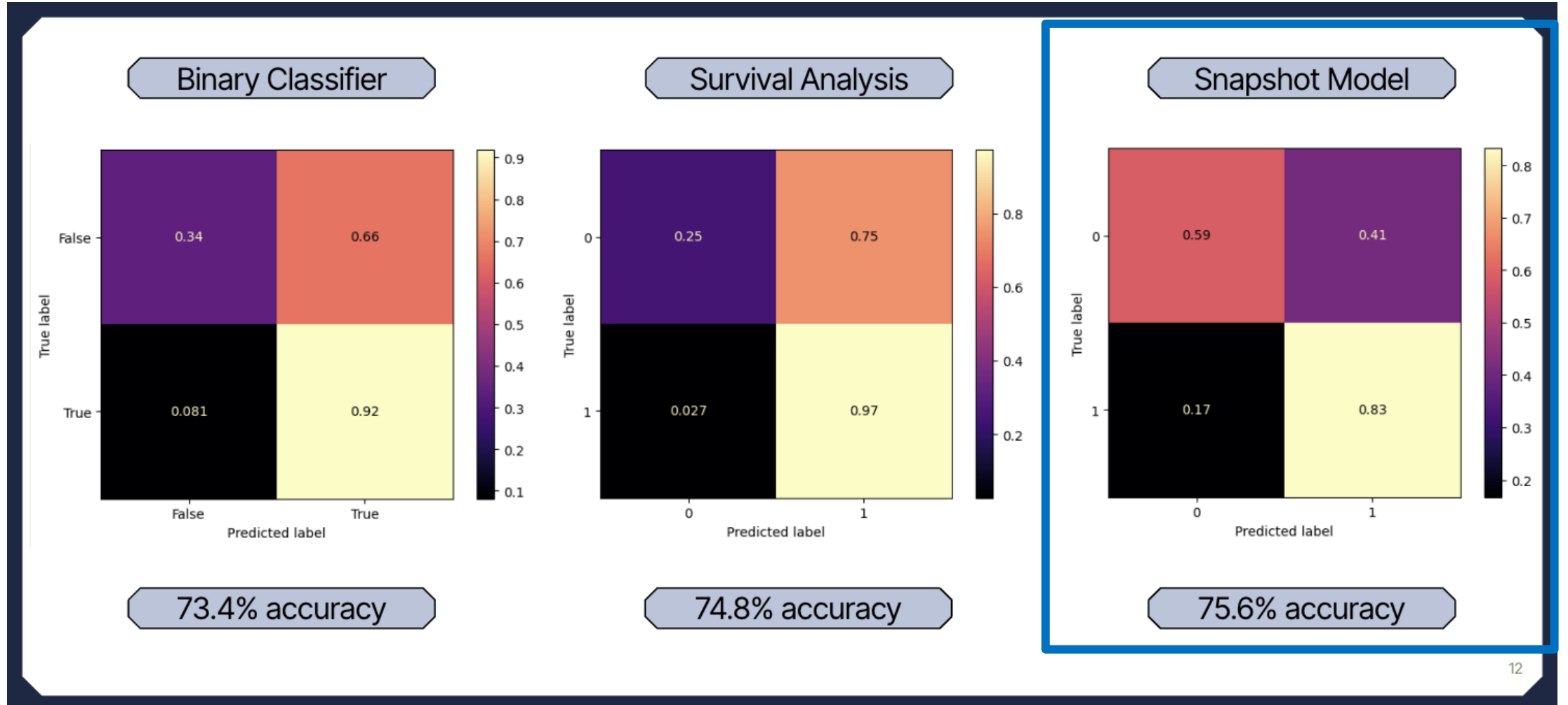
Worst case scenario connections forecast

Most likely probabilistic connections forecast (with uncertainty interval)



OVERVIEW OF MODELLING RESULTS

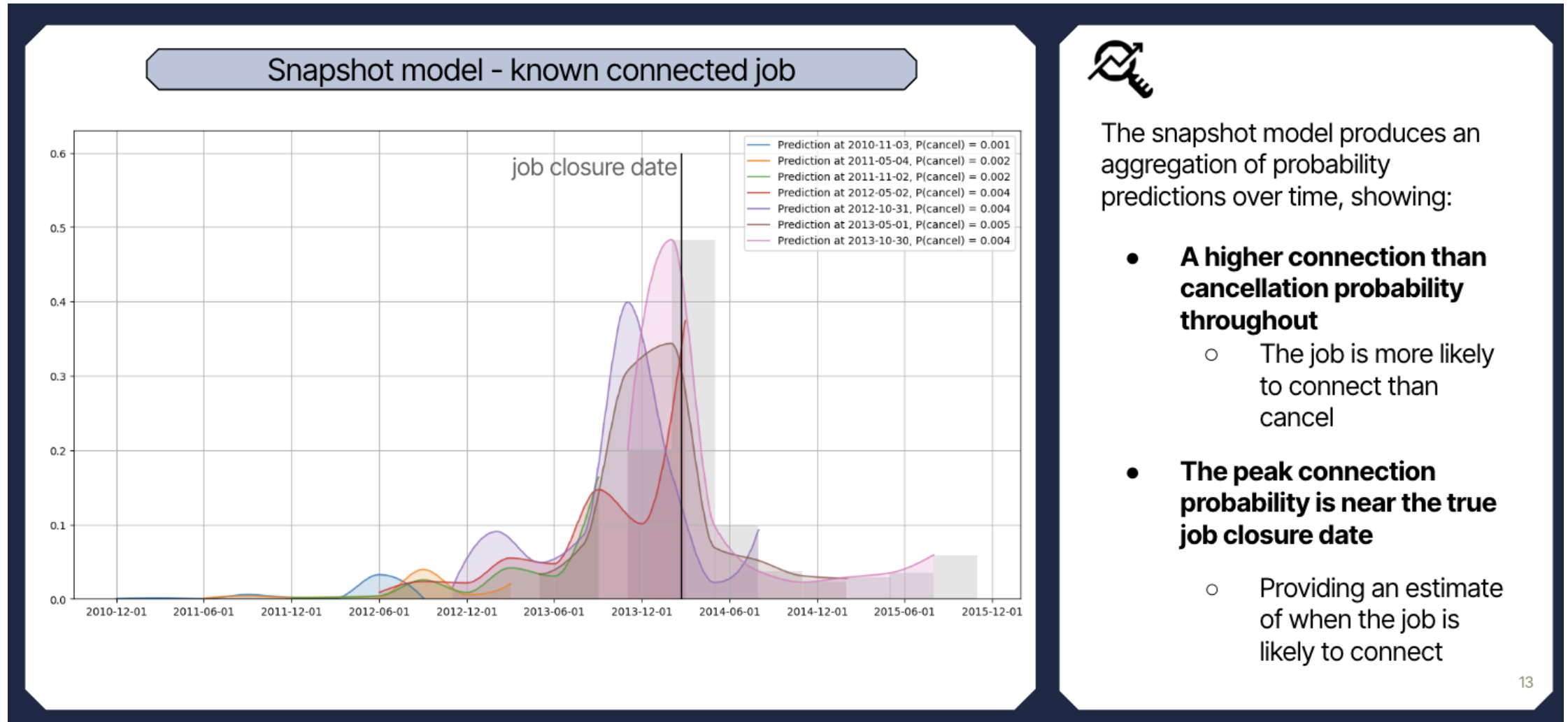
SEASONAL MODEL PREDICTIONS AT 5-YEAR HORIZON





EXAMPLE JOB

THE SNAPSHOT MODEL PREDICTS CONNECTION AND CANCELLATION PROBABILITIES OVER TIME





SOLUTION TESTING AND VALIDATION

Continuous testing

Continuous testing of the model outputs and performance, as well as the solution designs to ensure it meets user needs and requirements

Real-life case study

Case study on Bicester North BSP to assess the usability and value of FastTrack

Testing with DNOs

FastTrack concept and designs were tested with 3 other DNOs to ensure transferability and applicability of the solution

System Planners: *“We want confidence levels in demand, not just a single number.”*

Modelling Team: *“I can see a lot of value in your ‘most-likely’ forecast in terms of better understanding what you actually think is going to happen.”*

Flexibility Team: *“A lot of people in the business would use this tool.”*

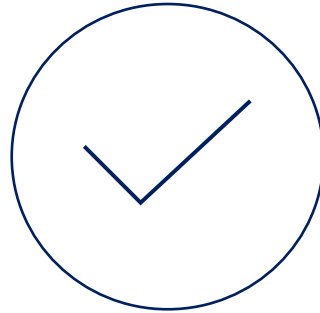


FOCUS OF THE BETA PHASE



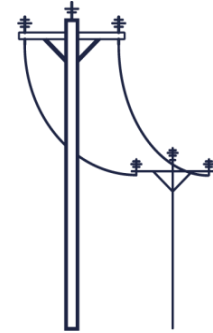
Earlier connection date

Demonstrate how customers could connect to the network earlier than their enduring access date



Risk-based approach

Make risk visible, explicit, and assessable, supporting how that risk can be managed



Evidence base

Generate an evidence base that supports earlier connections and future reinforcement justification



BETA PHASE OBJECTIVES

Beta focuses on delivering key upgrades to existing capabilities, as well as building new features to transition from a Proof-of-Concept to a productionised tool.



Improvement, validation and credibility of features built during Alpha

- Further improvement to the load forecast with attrition
- Live data and system integration
- Conform credibility of results
- Validate target workflow
- Added interactivity



Further innovation via new features and capabilities

- Capacity utilisation & Demand profiles
- Expansion of the problem space: forecast timeline + North
- Connections Acceleration via Flex and Access Products
- Connections Management page
- Map View and Connections Summary pages



FastTrack tool deployed, embedded into SSEN's environment

- FastTrack tool in the hands of users, deployed into SSEN's environment
- Integrated with relevant existing tools, processes and workflows
- Validated performance and robustness of core features
- Defined route to BAU



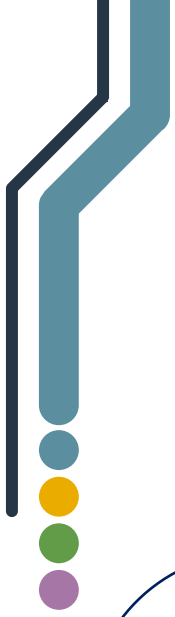
THANK YOU



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Electricity Networks

working with

FACULTY



Q&A





SHOW AND TELL

DYNAMIC, DATA DRIVEN ASSET RATING (3DAR)

Cori Critchlow-Watton, SSEN
Payal Majmudar, Sia Partners



Scottish & Southern
Electricity Networks

working with





SHOW AND TELL DYNAMIC, DATA DRIVEN ASSET RATING (3DAR)

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Electricity Networks

IMPERIAL

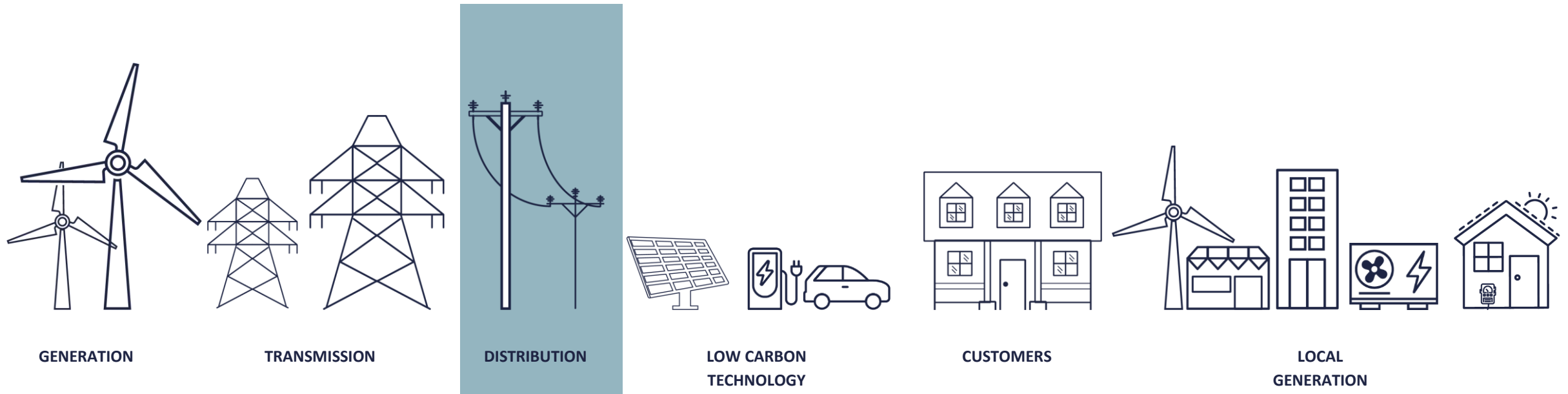




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STATIC VERSUS DYNAMIC ASSET RATING

Rating tells us how much load an asset can safely carry

Static/fixed/conservative:

- Assets can be transformers, cables, overhead lines or switchgear
- Uses a static (not changing) rating to give a fixed capacity limit
- Based on worst case temperature and loading conditions
- Leads to thermal headroom being unused

- Electricity networks are increasingly constrained
- With increasing demand we need to find a way to:
 - Integrate renewables and EV load growth
 - Reduce reinforcement
 - Support flexible, smart grid operation

- **Dynamic** asset rating is not new
- Asset capacity is adjusted in near real time
- Based on actual load profiles and weather data
- Increases capacity when conditions allow
- Reveals 'hidden capacity' already available in the network
- Gives 'true' current capacity
- Enables smarter, data driven asset management

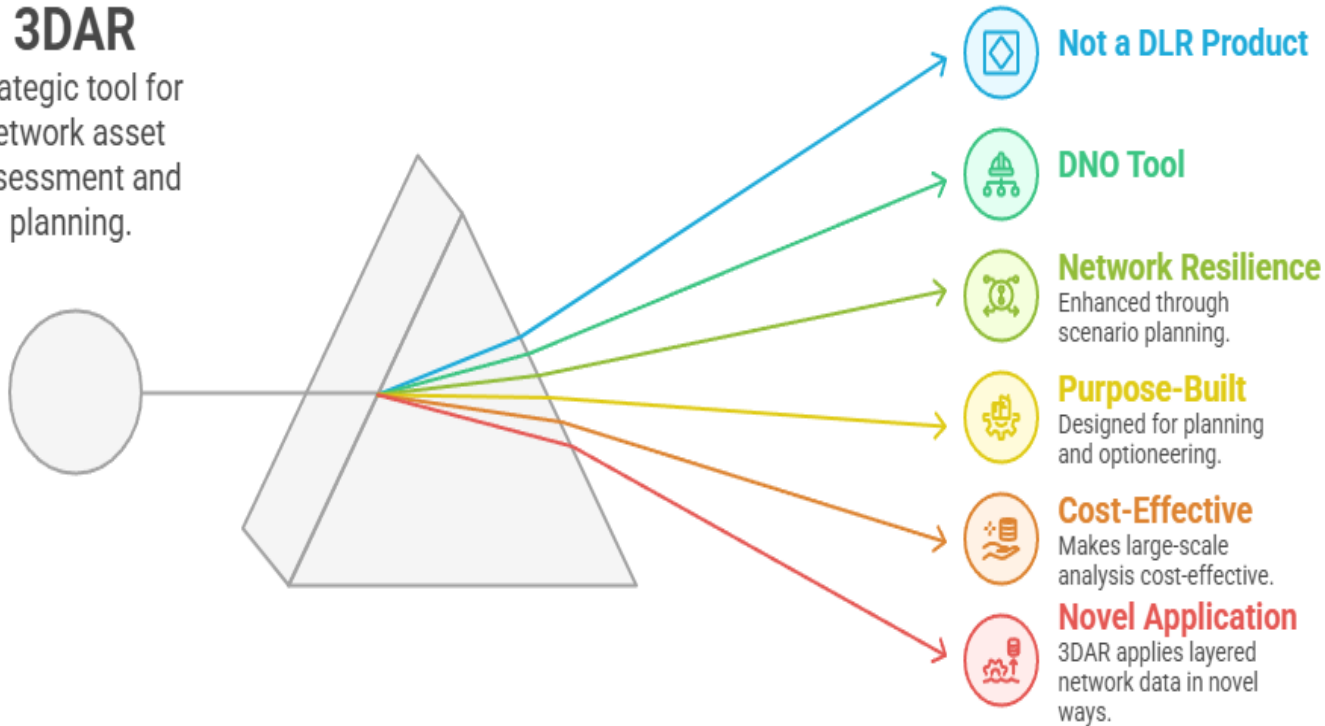




LINE RATING OR ASSET RATING PROBLEM AND SOLUTION

DNOs have **no visibility where** to focus DAR or **how to integrate** freed capacity into the planning process

3DAR
Strategic tool for
network asset
assessment and
planning.



- 3DAR is **not a DLR product**
- DNO tool to strategically assess the network to rank assets for DLR



SCOPE OF ALPHA: PROJECT OUTCOMES

WP1

Project Management

- UKRI Engagement
- Project delivery management

WP2

Identify where in SSEN processes using DR rather than static would bring value

- Understand where 3DAR fits in planning processes
- Understand all use cases and functionalities required for 3DAR
- Gauge key criteria to prioritise lines for DR
- Understand the scope for applying the methodology to other assets

WP3

Collecting data for model creation and building and validating a prototype

- Conduct data collection
- Refine and test methodology on selected circuits for enhanced ratings
- Establish scoring methodology
- Validation of methodology

WP4

Explore solution design

- Identify what the end product could look like
- Articulate the technical design requirements for 3DAR and associated infrastructure

WP5

Understand best commercialisation plan and benefits

- Engagement with other DNOs about the approach
- Engagement with network modelling and reporting team to remodel CBA for an updated valuation estimate of 3DAR



WP2: IDENTIFY WHERE USING DYNAMIC RATINGS WOULD BRING VALUE WITHIN SSEN PROCESSES

SSEN stakeholders engaged across various teams:

Systems Planning

Flexibility

Whole Systems Planning

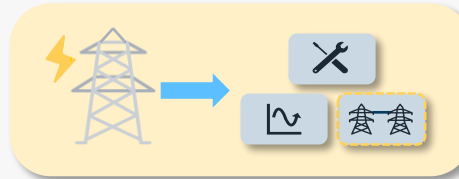
Transmission

Active Network Management



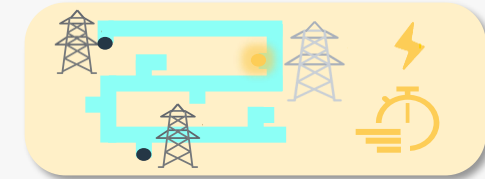
Use Cases Identified:

1. DLR as a network intervention



- ⚡ Identifies where **DLR could defer or reduce reinforcement needs by unlocking additional capacity on constrained overhead line circuits.**
- ⚡ Supports more **targeted optioneering** by showing where DLR may be viable alongside other network interventions e.g.: reinforcement or flexibility
- ⚡ **Improves investment decisions** by helping SSEN prioritise circuits where DLR can deliver the greatest value, reduce costs and support earlier intervention.

2. DLR to accelerate connections



- ⚡ Identifies where **DLR could unlock additional headroom to connect customers earlier.**
- ⚡ Supports **improved connection** offers by helping planners assess whether DLR can **reduce curtailment**, enable enhanced access or support time-limited firm capacity.
- ⚡ Improves customer and network outcomes by **reducing connection delays**, improving financial viability for customers and utilising existing assets.



WP3: DATA COLLECTION AND PROTOTYPE BUILDING

Key Datasets:

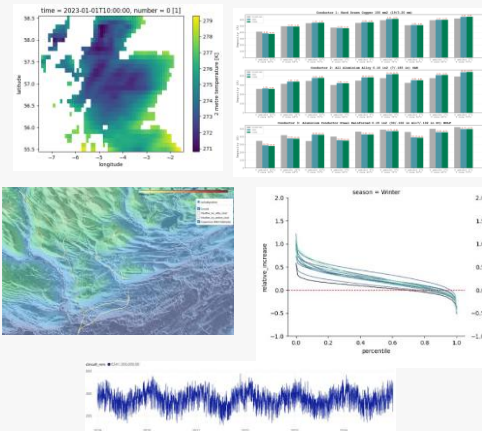
Historical Weather

Future weather projections

Infrastructure Setup and Line Data

Ampacity results

Future constraints & other criteria



Building the Prototype: 3 Core Activities

1. Collected required data

- ⚡ Overhead line segments, with poles/towers, max temperature, conductor specification and static rating
- ⚡ Historical regional and downscaled weather
- ⚡ UK climate projections
- ⚡ Topography (Digital Elevation Model)
- ⚡ Network topology (limiting assets), future load scenarios, connection queues etc

2. Calculated ampacity for historical and future period

- ⚡ Hourly ampacity time series spanning 30yrs of historical data and 10yrs of future projections, computed at span level and aggregated to circuit level
- ⚡ Seasonal distribution of both relative and absolute uplift compared with current static ratings
- ⚡ **Across analysed circuits, median dynamic uplift versus static ratings ranges from ~20% to 50% (≈40–180 A), varying by circuit and season.**

3. Applied a ranking framework to identify best candidates

- ⚡ Developed criteria to rank where DLR could deliver the greatest practical network value.
- ⚡ Identified where DLR is a strong standalone option and where it may need to be combined with other interventions.
- ⚡ **Confirmed that high dynamic uplift alone is not enough to make a circuit a strong candidate for DLR. A multi-criteria approach is essential.**



Overall, this phase defined the data requirements, developed the methodology for dynamic ampacity calculation, and delivered an initial ranking framework identifying where DLR is most likely to deliver practical network benefit.

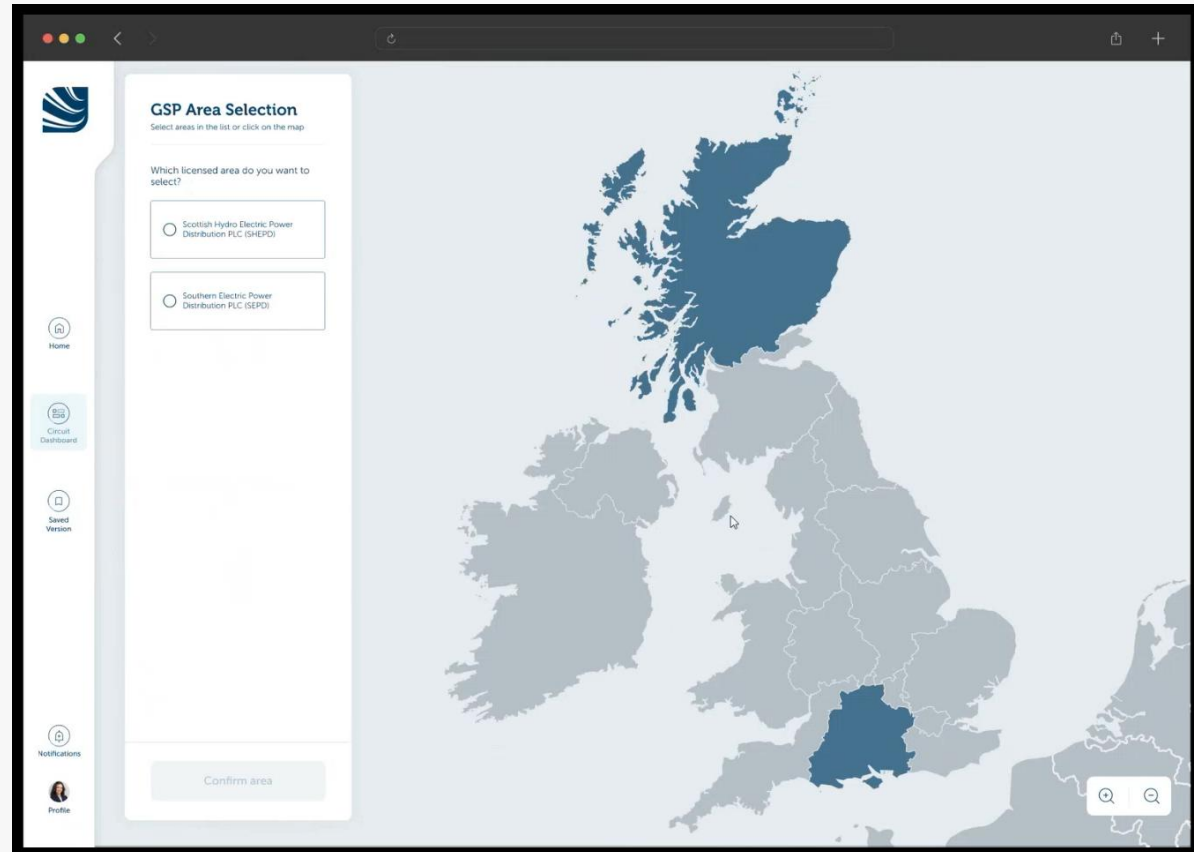


WP4: SOLUTION DESIGN

Approach:

- ⚡ **Developed a clickable prototype based on use cases, epics and data requirements.**
- ⚡ Enabled users to view ampacity model outputs at circuit level and understand how these are contextualised against wider prioritisation criteria.
- ⚡ Produced technical integration requirements to support the future embedding of 3DAR into existing systems and planning processes.
- ⚡ The analysis found that data quality and system alignment will be critical, with a phased implementation route through the Network Model Manager offering a practical pathway to scale. Further work is required to confirm the preferred architecture, data standardisation approach and level of DNO-specific customisation.

3DAR Clickable Prototype Demonstration:



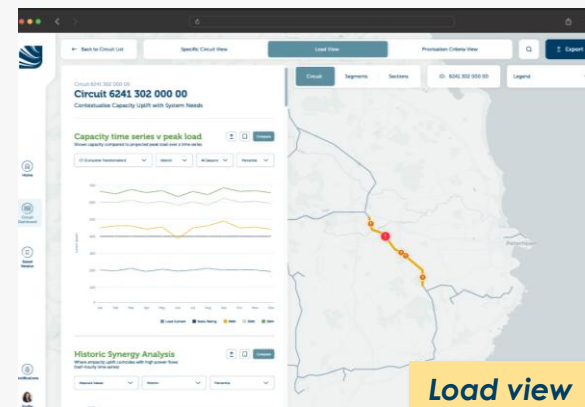
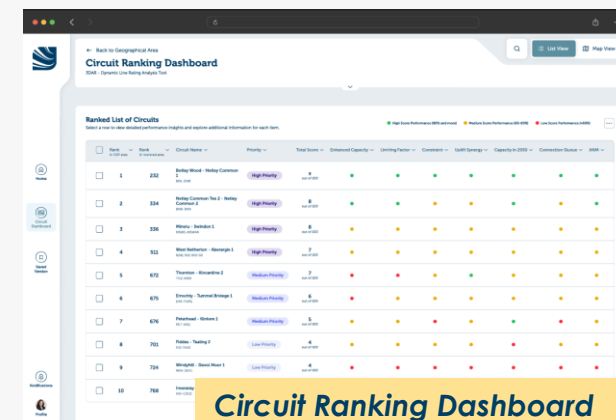
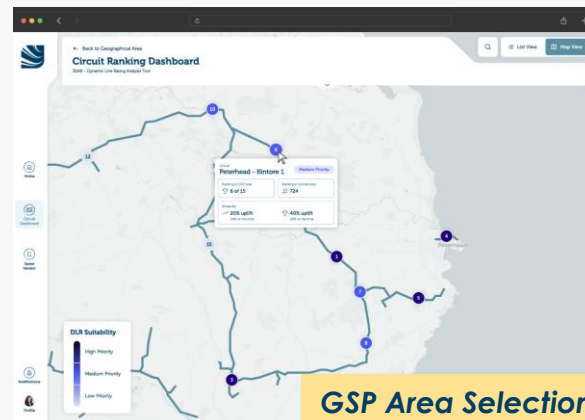


WP4: SOLUTION DESIGN

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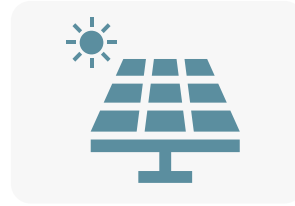




LESSONS TO TAKE INTO BETA



Data quality and validation are critical to confidence and scale



The use of 3DAR by system planners could deliver significant benefit



3DAR delivers probabilistic outputs, a process is needed for planners to use this

Next Phase of Work

Build Solution

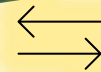
Build and scale the 3DAR MVP by defining the target architecture, data pipelines, governance and integration approach, while enhancing the core ampacity, weather and ranking models so they can operate across the distribution network and reflect DNO-specific planning needs.

Test Solution

We will need to test and validate the solution through sensor-based trials, comparison with DLR provider outputs, user acceptance testing, scenario analysis and cost-benefit assessment, using the results to refine the modelling, quantify risk appetite, and prove the value of 3DAR against real planning decisions.

Deploy Solution

We will prepare 3DAR for deployment and BAU adoption by embedding it into planning processes and systems such as PowerFactory, finalising business rules, regulatory evidence, governance, commercial arrangements, training, change management and a continuous improvement cycle.





NEXT STEPS

01

SSEN decision on Progression to Beta (October)

02

Data and Timeline Clarity: Remove ambiguity around when and how data gaps will be filled, and which are critical for Beta success.

03

High-Level Engagement with DLR Providers (Pre-procurement): Ensure the market is willing and able to support 3DAR Beta as potential partners before formal procurement begins.

04

Application for Beta: Once there is a formal SSEN endorsement of the project to enter Beta, market validated confidence of DLR providers as willing partners, clear realistic procurement timescales to derisk delivery and a clear data integration and data lake alignment roadmap, then a Beta application should be prepared.



Q&A





HOW YOU CAN REACH US

- Engage during regular innovation project calls
- Participate in stakeholder webinars and events
- Submit an innovation proposal via the official idea form
- Email the Future Networks team directly

Alternatively, you can engage with us through our social media channels:



twitter.com/ssencommunity



facebook.com/ssencommunity



instagram.com/ssencommunity



linkedin.com/company/ssencommunity



futurenetworks@sse.com



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THANK YOU FOR JOINING US TODAY

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