ICP & IDNO workshop

Ark Conference Centre
13th September 2017

Scottish & Southern Electricity Networks

Agenda:

10:00 - 10:15 Introduction and Housekeeping

10:15 - 10:30 Updates on the Code of Practise, Part Funded Reinforcement Trial and ECCR

10:30 - 11:10 Breakout Session – **Choice 1**

11:10 - 11:30 Comfort/Tea & Coffee Break

11:30 - 12:10 Breakout Session – **Choice 2**

12:10 – 12:50 Breakout Session **Choice 3**

12:50 Lunch & Close

Scottish & Southern Electricity Networks

Welcome, housekeeping and Safety moment

Rodger Yuile, Head of Connections- South and central England

Scottish & Southern Electricity Networks

Purpose of the event today

Update for our connections customers

Meet our teams – the people who deal everyday with your projects

Listen to you

Scottish & Southern Electricity Networks

Our approach to stakeholder engagement

…is all about our customers

Putting you at the heart of everything we do

Listening to what you tell us

Acting on your feedback

Continuously improving our services

Scottish & Southern Electricity Networks

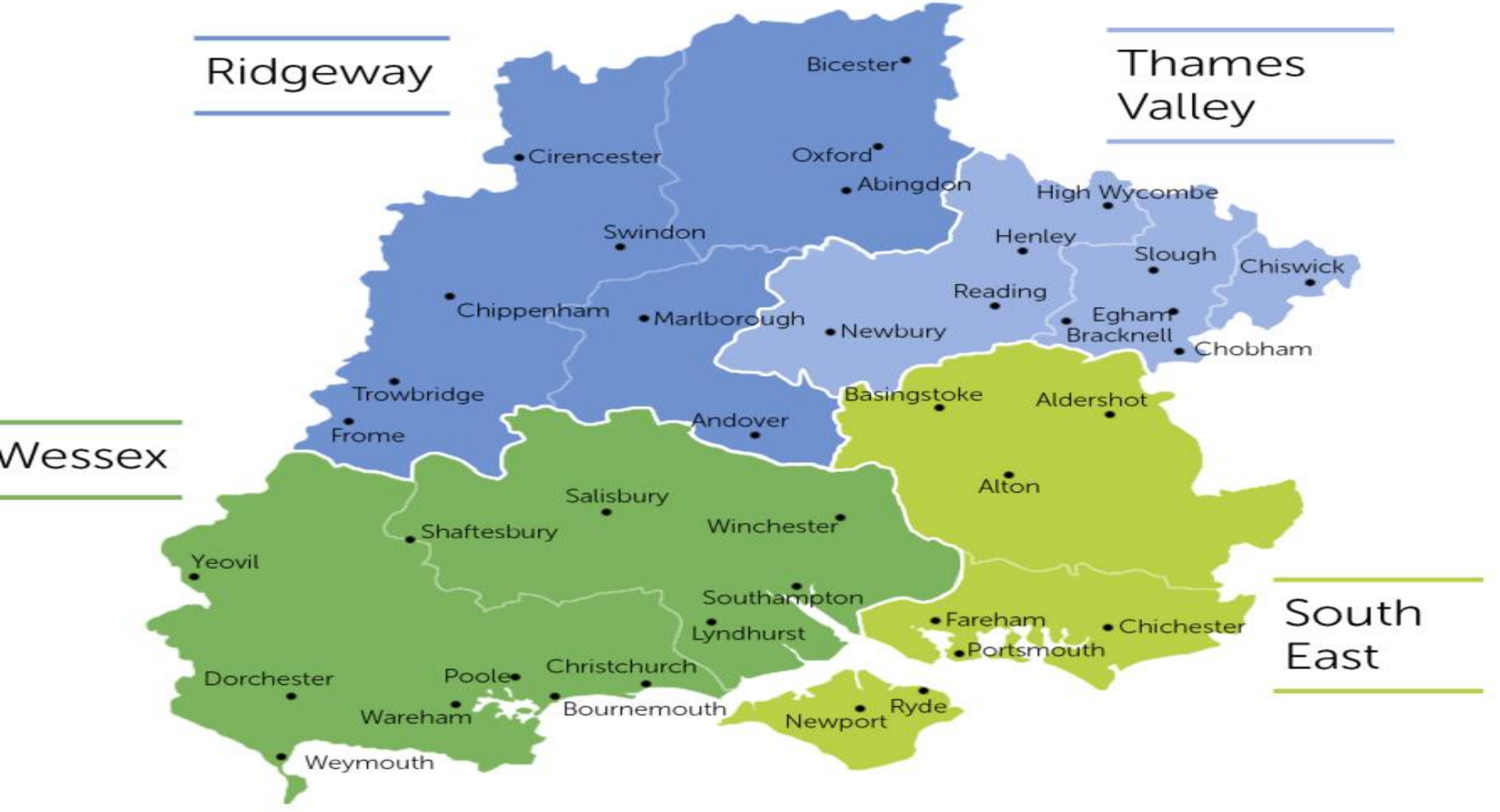
Newsletters and Events

Scottish & Southern Electricity Networks

Delivering a better service for ALL our customers: Our connections strategy

- Ease of initial contact
- Knowing who is dealing with your request
- Clear and easy to understand processes
- Increased awareness of choice

Scottish & Southern Electricity Networks


Ridgeway
Thames Valley
Wessex
South East
Bicester
Cirencester
Oxford
Abingdon
High Wycombe
Swindon
Henley
Slough
Chiswick
Reading
Chippenham
Marlborough
Newbury
Egham
Bracknell
Chobham
Trowbridge
Basingstoke
Aldershot
Frome
Andover
Alton
Salisbury
Shaftesbury
Winchester
Yeovil
Southampton
Fareham
Chichester
Lyndhurst
Portsmouth
Christchurch
Dorchester
Poole
Bournemouth
Ryde
Wareham
Newport
Weymouth

Looking Back 2016/17 and Looking Forward 2017/2018

Scottish & Southern Electricity Networks

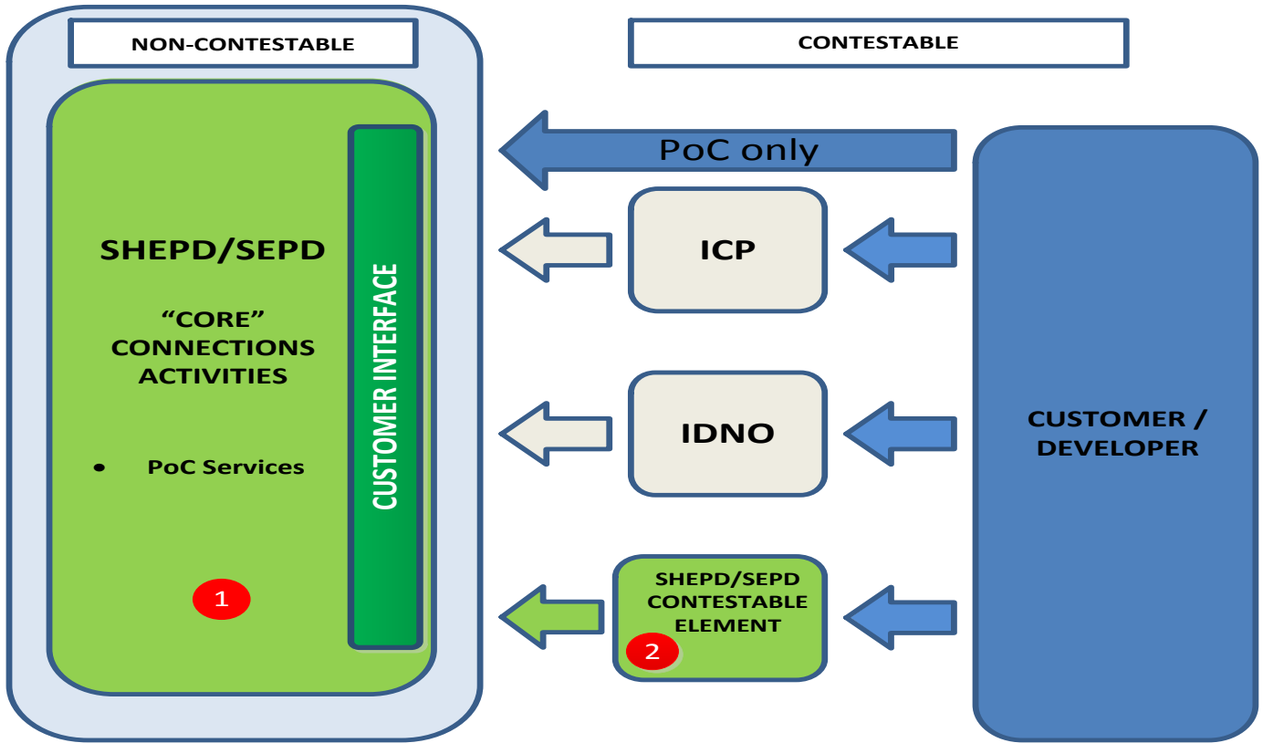
Scottish & Southern
Electricity Networks

Connections Update – for ICPs

Catherine Falconer - Commercial Manager – Competition in Connections

Scottish & Southern Electricity Networks

Delivering Transparency and Customer Choice



1 THE "CORE" BUSINESS

- New or modified Point of Connection (PoC) services

2 THE CONTESTABLE ELEMENT

- Interface with the "core" business on the same basis as ICPs and IDNOs
- Has all of the regulatory requirements and controls of the "core" business
- Make offers for new or modified connections to the end customer

Scottish & Southern Electricity Networks

You Have a Choice page on our Website

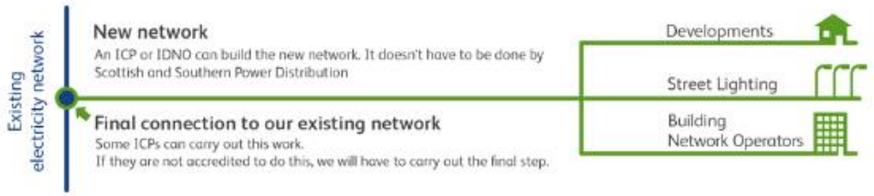
If you need a new connection in an area where we own the electricity network, did you know you have a choice?

Just because we own the network doesn't mean you have to accept a quotation from us. There are other companies out there who can carry out many aspects of the work. Competition gives you a choice and keeps us on our game making sure we deliver the best possible service for you. You can now compare prices and service levels to decide which company is best for you.

Your choices

Other companies who provide a connections service are known as Independent Connection Providers (ICPs) or Independent Distribution Network Operators (IDNOs).

The diagram below shows the competitive elements of new connections work:



What is an ICP?

An ICP is an accredited company which can build electricity networks to agreed standards. Please click below for alternative providers in our area.

› Alternative providers in our area

You can also visit the Lloyds Register website to find a list of accredited companies.

› Lloyds register

What is an IDNO?

An IDNO is also an accredited company that can build electricity networks, but unlike an ICP, it owns and maintains the network once it is complete. Take a look with the link below to see accredited companies in our area.

› Alternative providers

You can also visit Ofgem's website to find out which companies act as IDNOs.

› Ofgem

Scottish & Southern Electricity Networks

Identifying Alternatives Providers in our area

Alternative Provider List

Use the filters below to get contact details of alternative providers who have registered on our website and are active in our area.

Legal Disclaimer

We have developed the Alternative Providers List to assist you in seeking alternative quotations for your connections applications. The list is not exhaustive nor does it provide any form of recommendation or endorsement. It is a list of alternative providers who have chosen to register their details on our site. We shall not be liable for error or inaccuracy of the list, nor liable to you in tort (including negligence) or otherwise for losses arising from or in connection with your use of this Alternative Provider List for: (a) loss of profits; (b) loss of sales or business; (c) loss of agreements or contracts; (d) loss of anticipated savings; (e) loss of or damage to goodwill; or (f) any indirect or consequential loss.

From 01/07/2015, a Service Charge applies to calling 084 numbers. Contact your phone company if you want to check what a call would cost.

Filter

What country is your project in?

England

What region is your project in?

Portsmouth

Services required

What does your connection project involve? Leave unchecked if you are not sure to select all services.

- ☐ Extra High Voltage (Cable)
- ☐ Extra High Voltage (Overhead)
- ☐ High Voltage (Cable)
- ☐ High Voltage (Overhead)
- ☐ Low Voltage
- ☑ Unmetered
- ☐ Electrical Design Works

Filter | Reset

Scottish & Southern Electricity Networks

Competition in connections - for ICPs and IDNOs

When customers have a choice, competing providers are naturally driven to deliver a better service. We continue to work with Ofgem and ICPs to identify and implement further scope of works that can be opened up to competition.

If you have the appropriate NERS accreditation and have been engaged by a client to deliver their new connections, we can provide you with the necessary non-contestable services.
If you would like to find out more about gaining the necessary accreditation to compete for new connections work, please visit the Lloyds Register Website. Our simple diagram illustrates the high level process for opening up the connections market.

- Visit the Lloyds Register website
- Connections useful documents
- Non-contestable process flowchart
- Land Rights Requirements and Documentation
- Entering the electricity connections market

Our network adoption process

View our flow chart illustrating the adoption process for contestable works.

- View our process

Alternative providers register

We understand that opening the market to competition will be highly beneficial to customers, ensuring that their connections are delivered in a safe, timely and cost effective manner. We also know that ensuring customers are aware of their choice guarantees they can take full advantage of this. Therefore, we are committed to facilitating an open and competitive market.

If you are happy to appear on our website, once you have registered, our customers will then be able to more easily search for those that could offer them an alternative quotation in delivering their project.

- Register as an alternative provider in our area

Access to specifications, network information and GIS

- Online documentation

Information and data specifically for registered alternative providers - Independent Connection Providers (ICPs) and Independent Distribution Network Operators (IDNOs).

ICP application

Make an application for an electricity network connection you wish us to adopt. Please ensure you download the application form before continuing with your online application.

- Download application form
- Online application

Notify us that you are determining the point of connection. Please refer to our **POC Self Identification and Self Design Approval Guidance Note** before continuing with your application. It explains when you can determine your POC and also when you can approve your own on site design, if applicable. **This guidance note can be found on our secure website once you have logged in.**

- Access our specifications and network information
- Online notification for self-identified POC

Contact us

Email
nc.connections@sse.com

IDNO application

Make an application for an electricity network you wish to connect to our network. Please ensure you download the application form before continuing with your online application.

- Download application form
- Online application

Notify us that you are determining the point of connection. Please refer to our **POC Self Identification and Self Design Approval Guidance Note** before continuing with your application. It explains when you can determine your POC and also when you can approve your own on site design, if applicable. **This guidance note can be found on our secure website once you have logged in.**

- Access our specifications and network information
- Online notification for self-identified POC

Useful links

- North and South Operational staff contact map
- Connections home
- Connections help
- For developers
- You have a choice
- Power cuts
- Library
- MPAN

Scottish & Southern Electricity Networks

Significant ICP focussed ICE Commitments 2017/18

Part Funded Reinforcement Trial and ECCR :

- Part Funded Trial
  - Finalising details of trial to allow ICPs to deliver the reinforcement element of a project
  - All LV and HV related reinforcement, for Demand Projects
    - Costs based on our quotation
    - ICP will require suitable accreditation
    - Asset will be adopted in line with Adoption Process
- ECCR 2017
  - A customer will qualify for rebate on assets installed by an ICP
  - We will asses costs to use in calculation
  - Additional questions around Assets installed and post-energisation Eligible Person

Breakout Sessions

Identified during various communications with yourselves over the last six months:

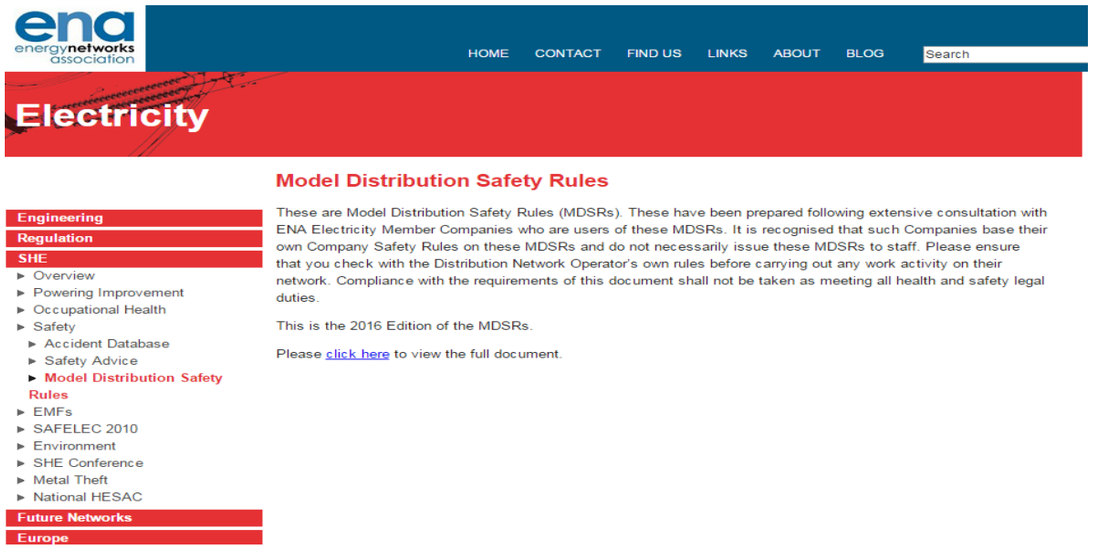
Select any 3 from the 5 (40min per session)

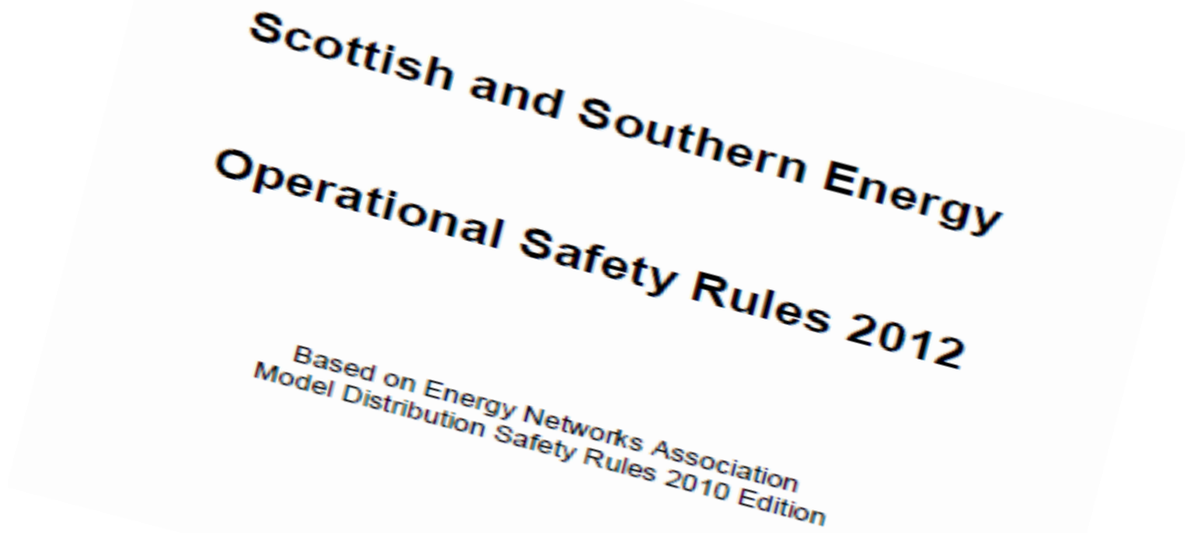
- Choice 1 – Operational Safety Rules, Final Connection Tests & Records
- Choice 2 – “A day in the life of a designer” – with case studies
- Choice 3 – Flexible Connections & Energy Storage
- Choice 4 – Earthing of Substations Contained in Buildings and Metering
- Choice 5 – Bilateral Connection Agreement & Adoption Agreements

Scottish & Southern Electricity Networks

Breakout Session Choice 1

ICP Distribution Safety Rules



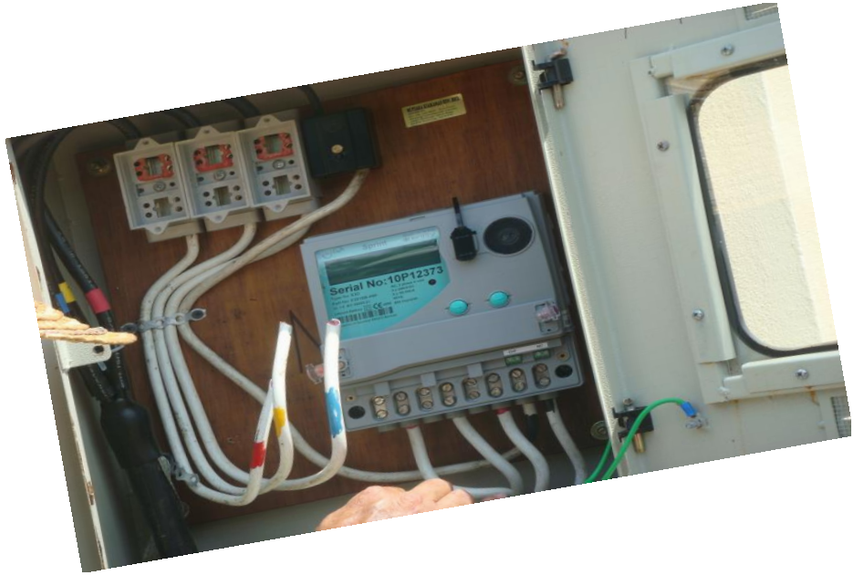


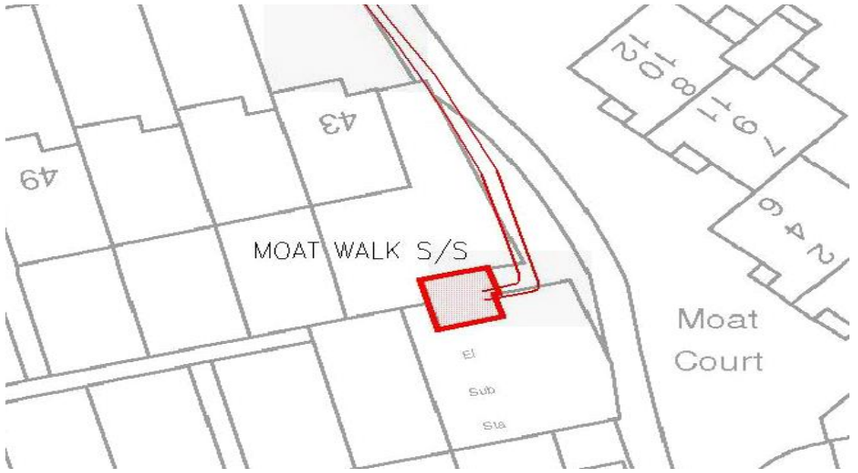
Distributionsafetyrules@sse.com

Scottish & Southern Electricity Networks

Final Connection

Tests and Records required





Scottish & Southern Electricity Networks

Breakout Session Choice 2

‘A day in the life of a designer’

- Receiving an application
- Network and System Planning
- POC location
- Design
- Sending out the quote
- Connection Agreements
- Adoption Agreements

Scottish & Southern Electricity Networks

Breakout Session Choice 3:

Flexible Connections & Storage Engagement:

- **What is SSEN doing?**
- What are flexible connections and why are we doing them?
- Flexible connections examples:
    - Active Network Management (ANM),
    - SGANM,
    - 3rd Party ANM,
    - Timed Export Limitation and
    - Export Limitation
    - Constraint Management Zone
- Currently only Generation
- Application process

Energy Storage

- Introduction to Energy Storage
- Growth of the energy storage market
- Energy Storage has been driven by-
- Overall storage market growth
- Setting The Scene
- Applications
- Moving Forward
- New Ideas

Scottish & Southern Electricity Networks

Breakout Session Choice 4

Metering

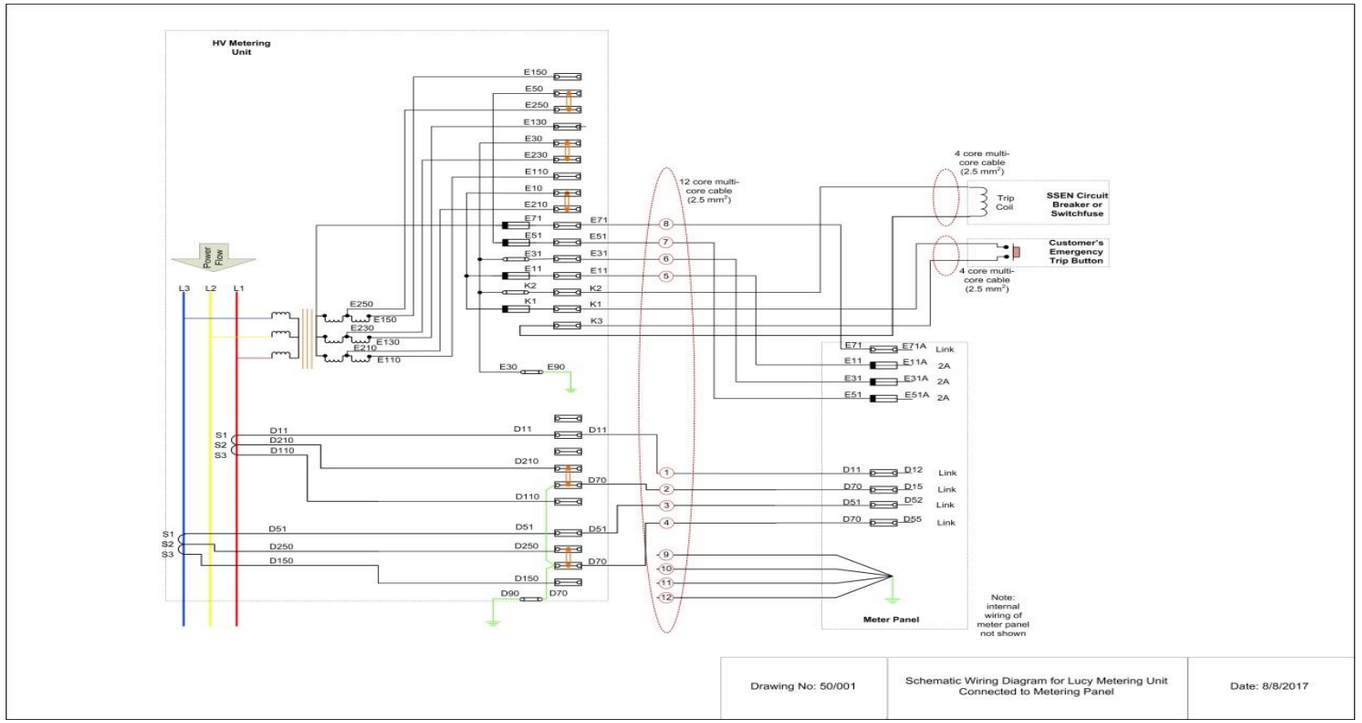
LV Supplies > 100A

HV Metered Installations

ICP responsibilities

Commissioning

‘The Paperwork’



Scottish & Southern Electricity Networks

Earthing of Substations within Buildings

Separate HV and LV earthing

Single HV/LV earth

What constitutes an earth electrode

1 ohm or not 1 ohm

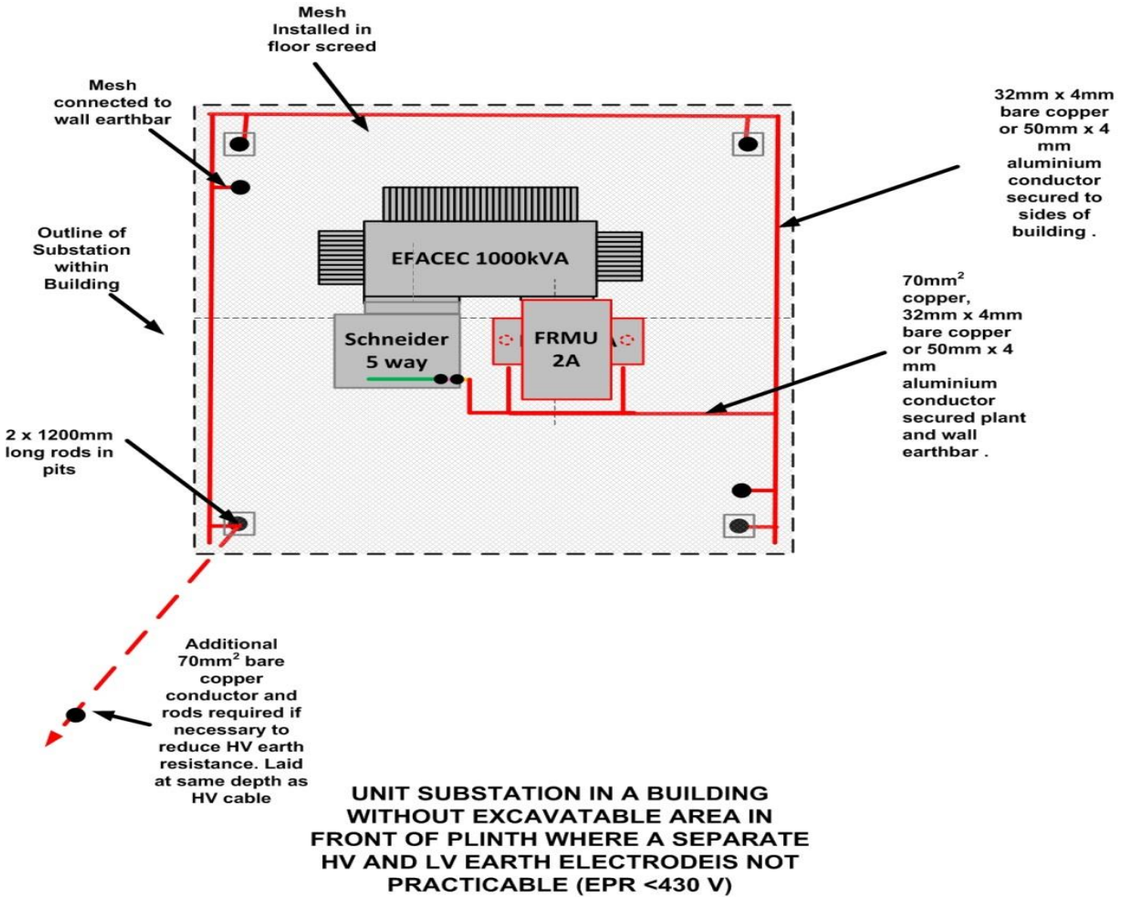
Earthing Studies

Joint ownership of substation

-SSEN/Customer

- SSEN/DNO or IDNO

Who's earthing design?



UNIT SUBSTATION IN A BUILDING WITHOUT EXCAVATABLE AREA IN FRONT OF PLINTH WHERE A SEPARATE HV AND LV EARTH ELECTRODEIS NOT PRACTICABLE (EPR <430 V)

Scottish & Southern Electricity Networks

Breakout Session Choice 5

Bilateral Connection Agreements, Access and Adoption Agreements

At the breakout session, the following will be discussed:

- What are each of these agreements
- In which circumstances the different agreements are required and between which parties
- At which point in the process the different agreements are issued for signature
- Who issues the different agreements and who they shall be returned to once signed
- The risks if these different agreements are not signed and returned

Scottish & Southern Electricity Networks

SSEN Flexible Connections & Energy Storage

13th September 2017

Scottish & Southern Electricity Networks

Introduction

Flexible Connections

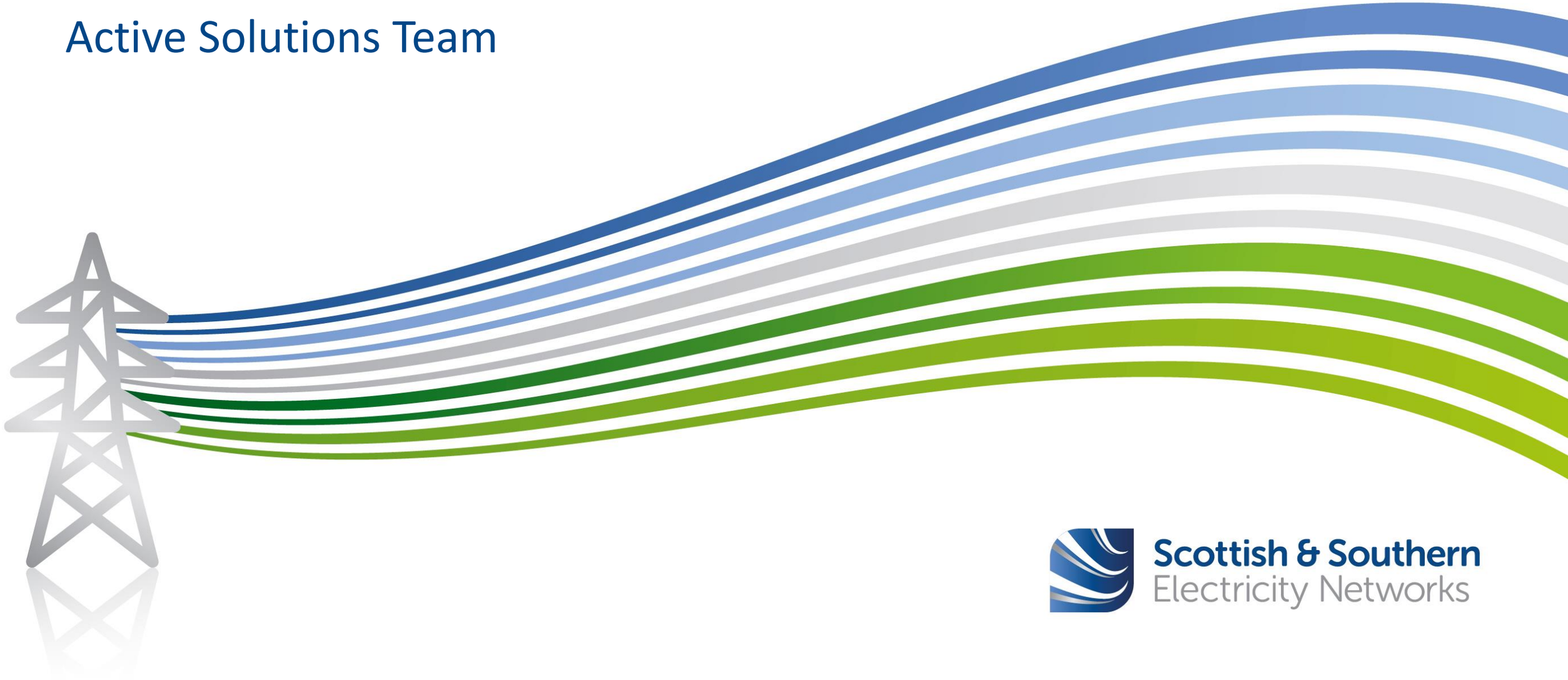
- What are flexible connections and why are we doing them?
- Flexible connections examples– Active Network Management (ANM), SGANM, 3rd Party ANM, Timed Export Limitation and Export Limitation
- Application process

Storage

- Introduction & Growth of the Storage Market
- Examples of Storage – SSEN Projects
- Application Process & Workshop

Flexible Connections

Active Solutions Team



Scottish & Southern Electricity Networks

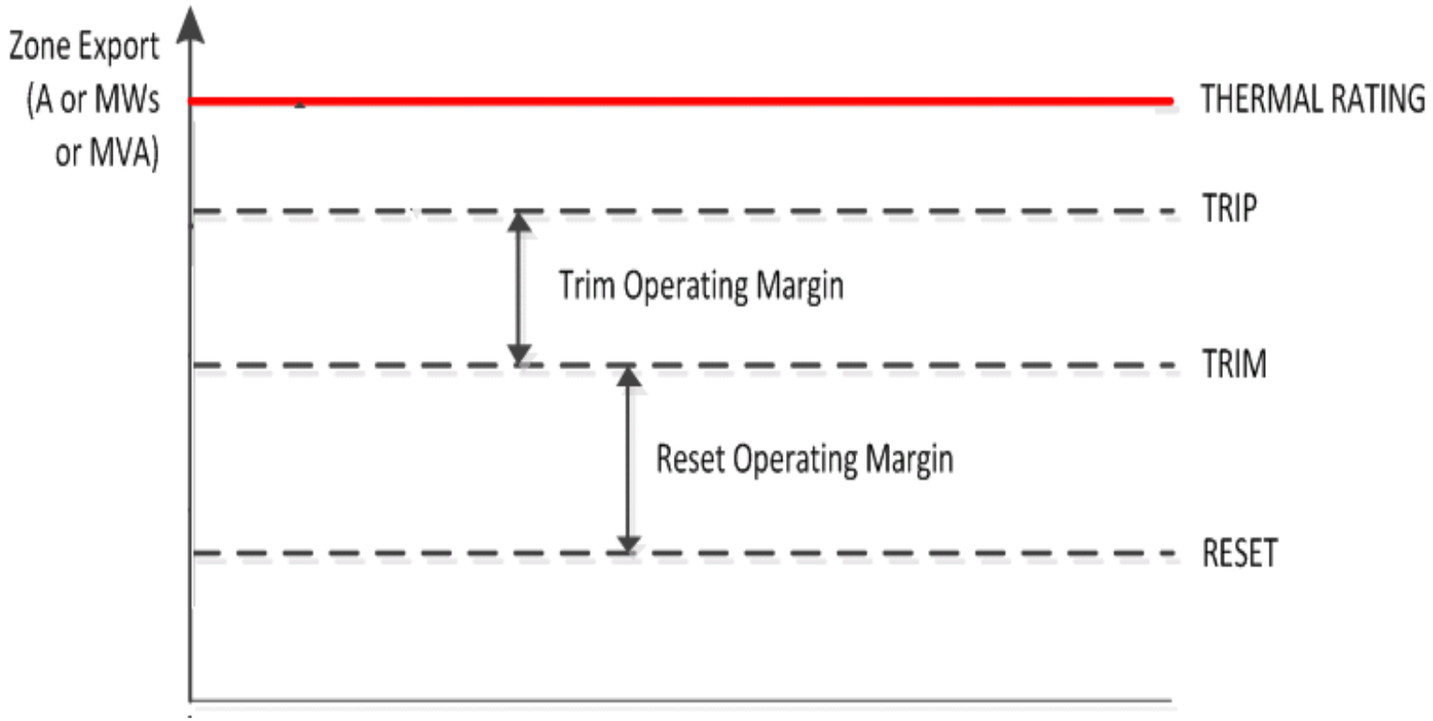
Flexible Connections Types, Functionality and Architecture

Scottish & Southern Electricity Networks

SGANM

Single Generator Active Network Management

- Proof of concept to BaU
- Alternative to reinforcement
- Established methodology and procedures
- Single generator
- Two monitored constraints maximum
- Evolves into ANM

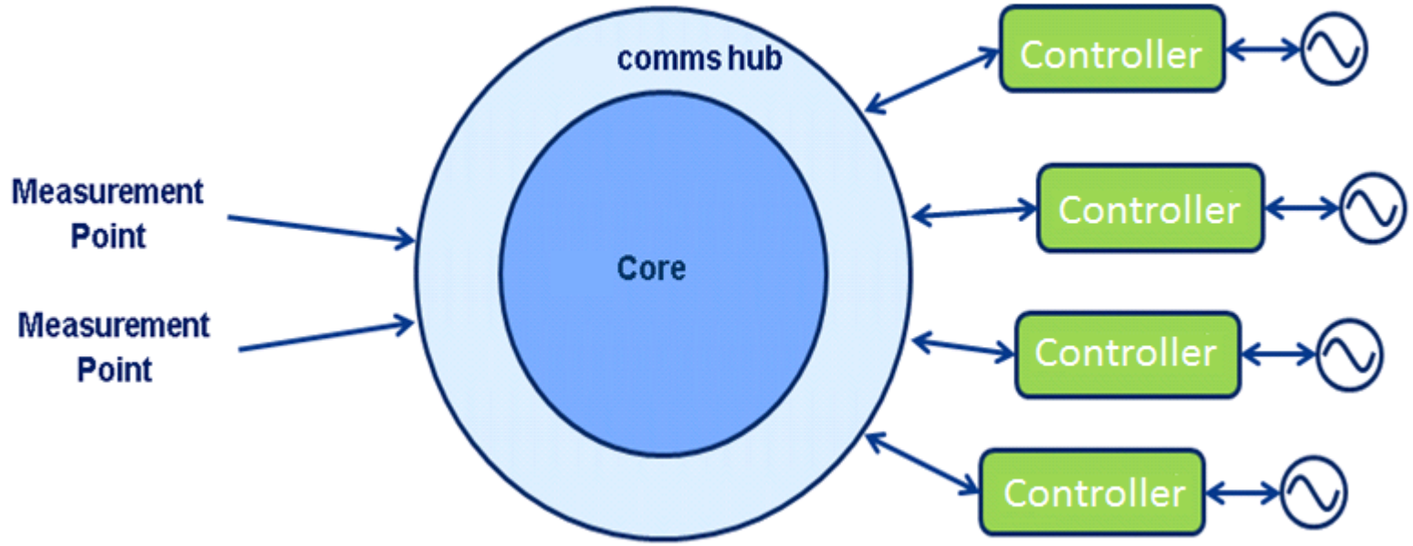


Scottish & Southern Electricity Networks

ANM

Active Network Management

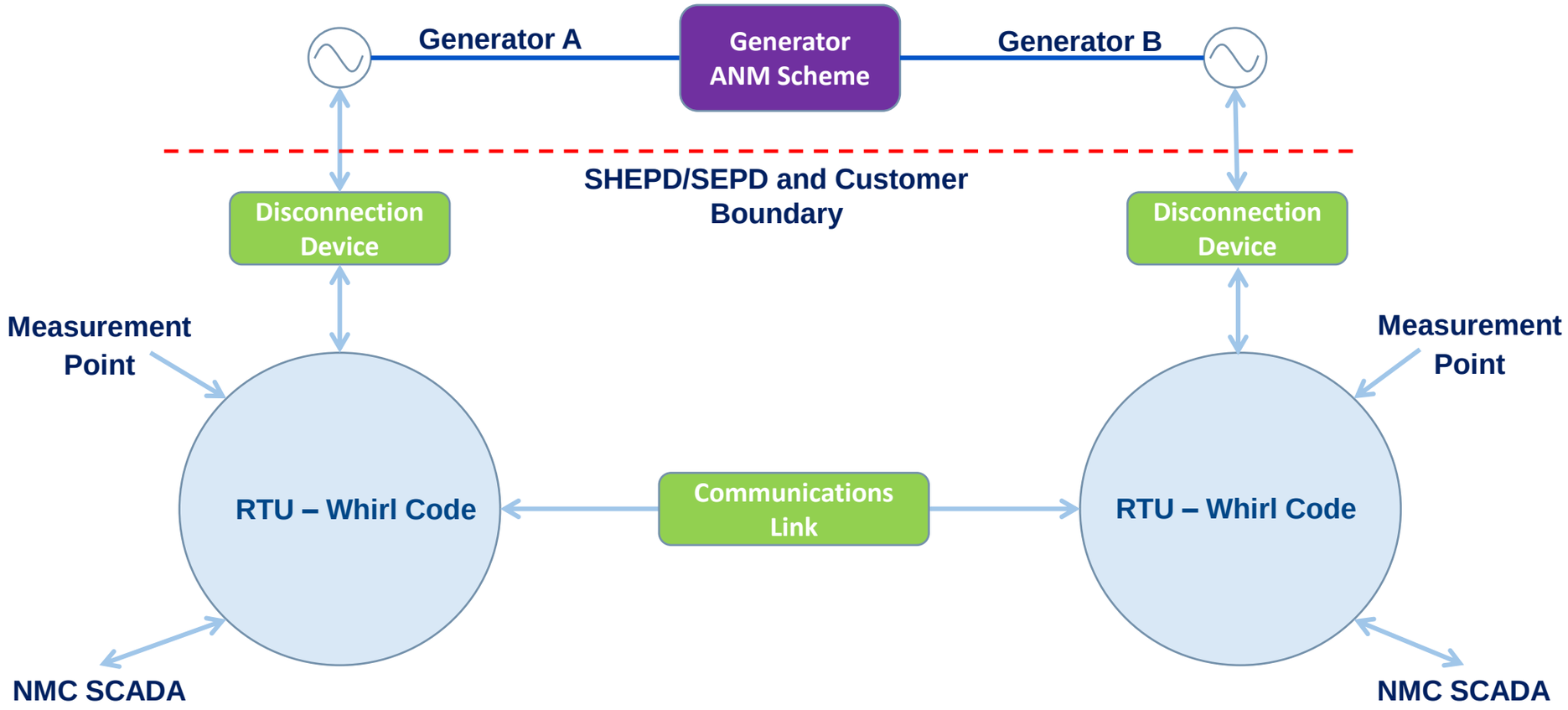
- Alternative to reinforcement
- Established methodology and procedures
- Multiple constraints and generators
- Expansion of SGANM
- Assessed on a scheme by scheme basis



Scottish & Southern Electricity Networks

Shared Capacity - Architecture

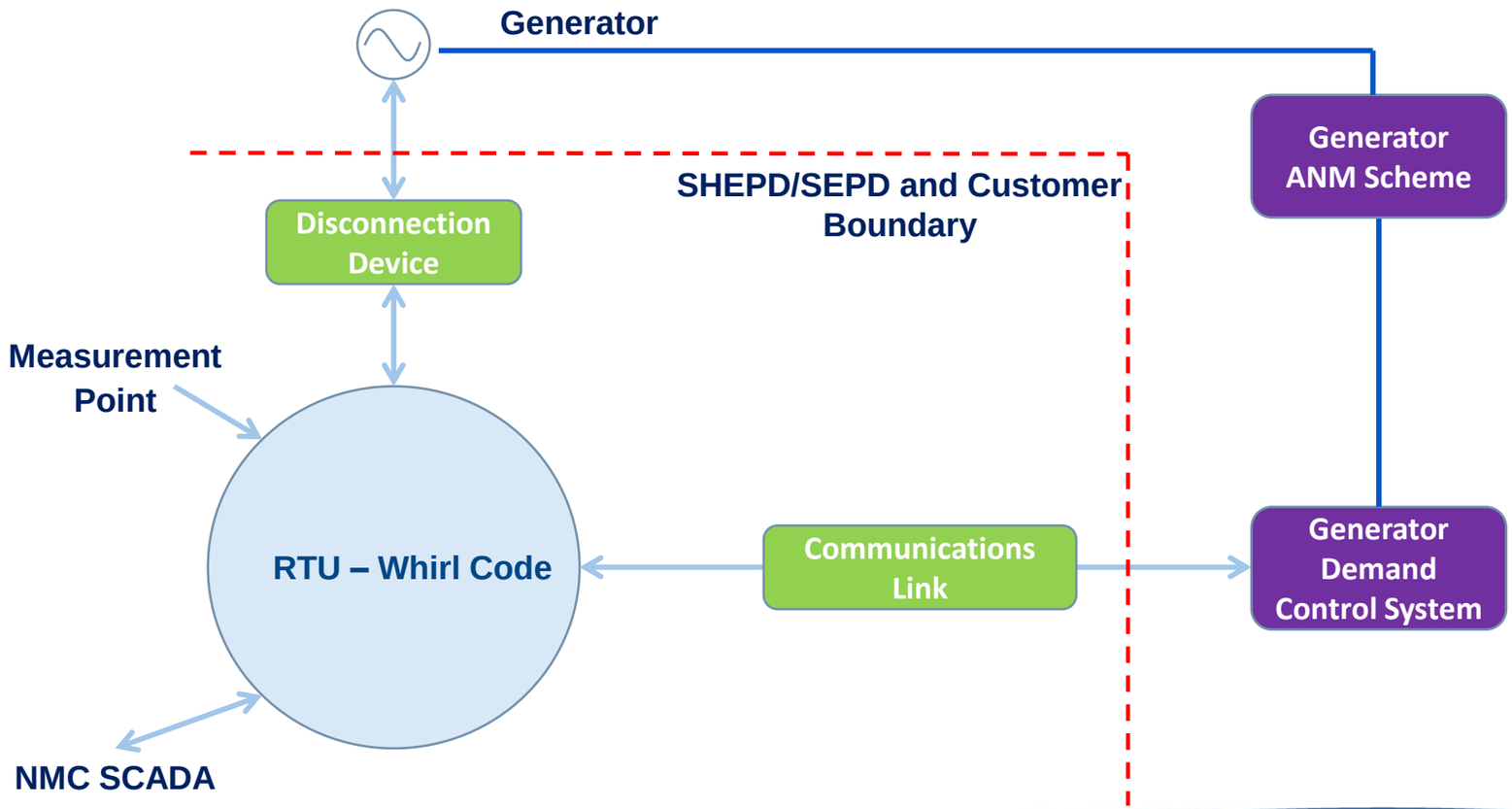
3rd Party ANM– Shared Capacity



Scottish & Southern Electricity Networks

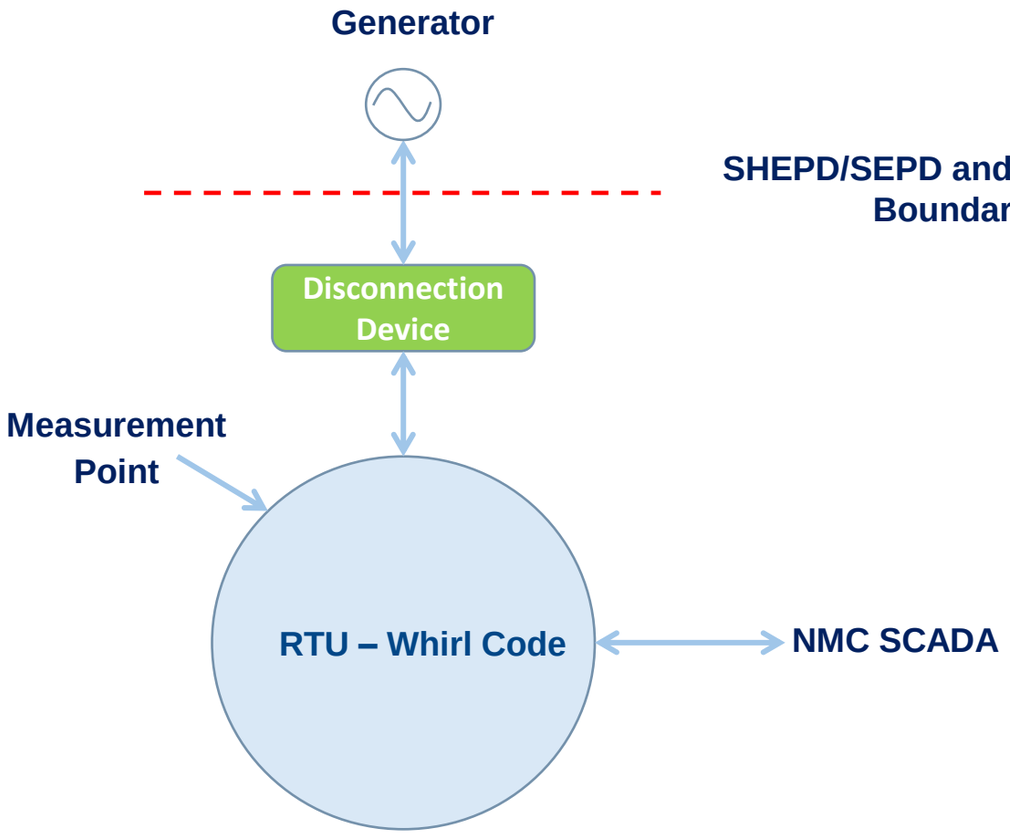
Demand Management - Architecture

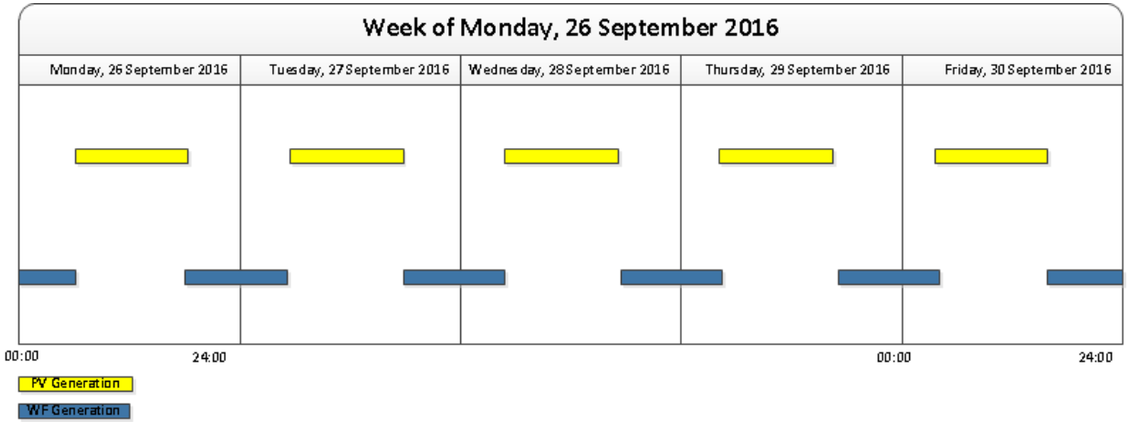
3rd party ANM – Demand Management



Scottish & Southern Electricity Networks

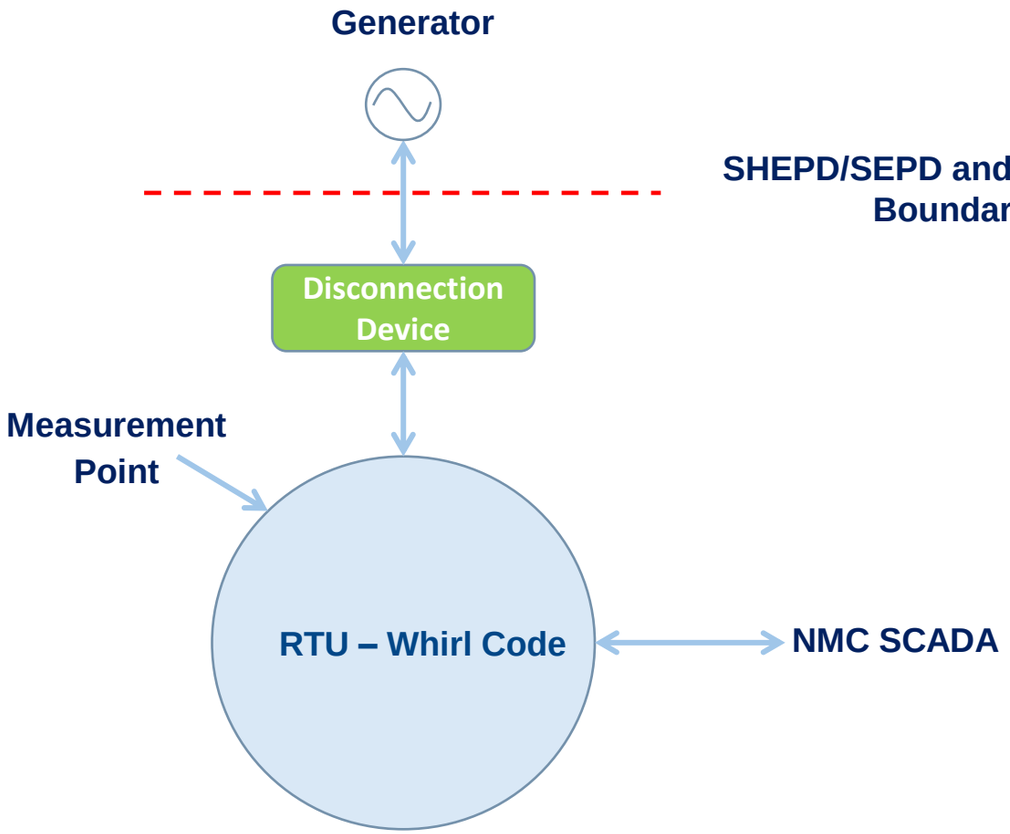
Timed Export Limitation – Architecture

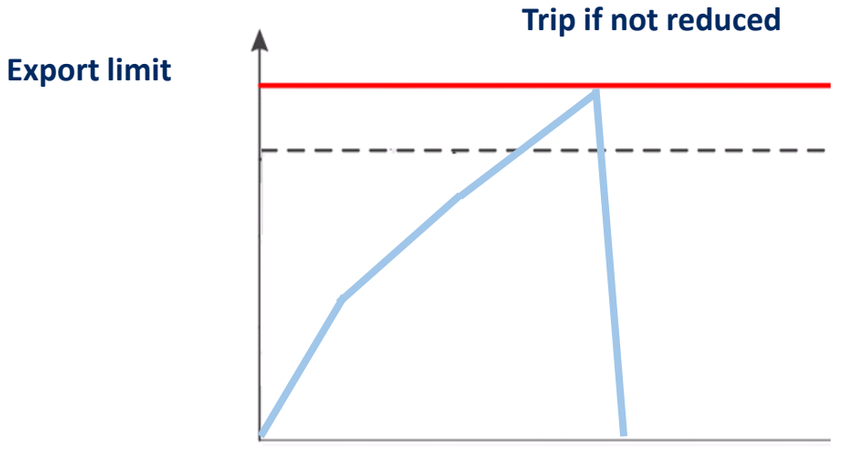




Scottish & Southern Electricity Networks

Export Limitation – Architecture





Scottish & Southern Electricity Networks

ENA Published G100 EL Scheme

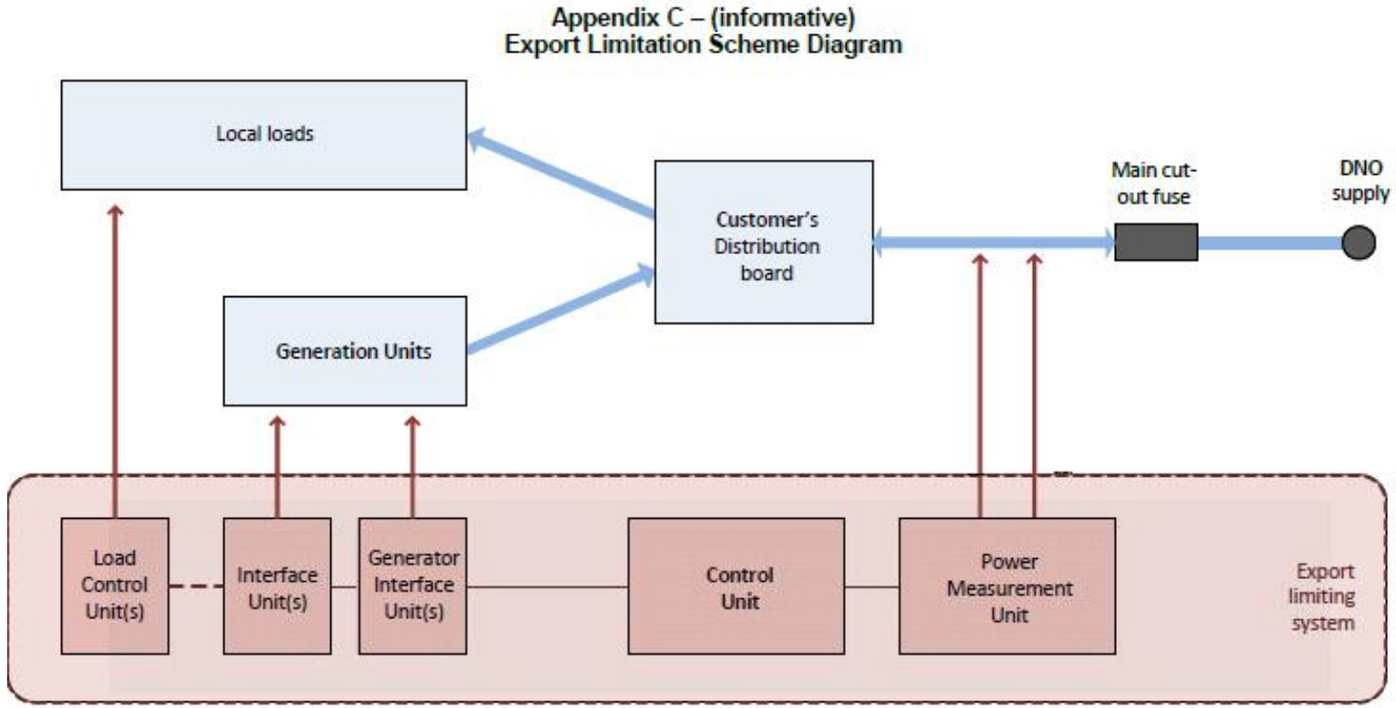
PRODUCED BY THE OPERATIONS DIRECTORATE OF ENERGY NETWORKS ASSOCIATION

Engineering Recommendation G100

Issue 1 2016

Technical Guidance for Customer Export Limiting Schemes

www.energynetworks.org



Scottish & Southern Electricity Networks

Commercial – Flexible Connection Application Process & Updates

Scottish & Southern Electricity Networks

Pre-application Requirements

- SSEN must issue the minimum scheme connection offer, then flexible connection offer
- Can find out more about what flexible options may be available by following this link https://www.ssen.co.uk/AlternativeGenerationConnections/
- Thermal constraints only, Voltage and fault level possible in future
- Only applicable to generation but looking into flexible demand connections 2018+
- Flexible Connections go live date October 2017+

Scottish & Southern Electricity Networks

Pre-application Consultation Process

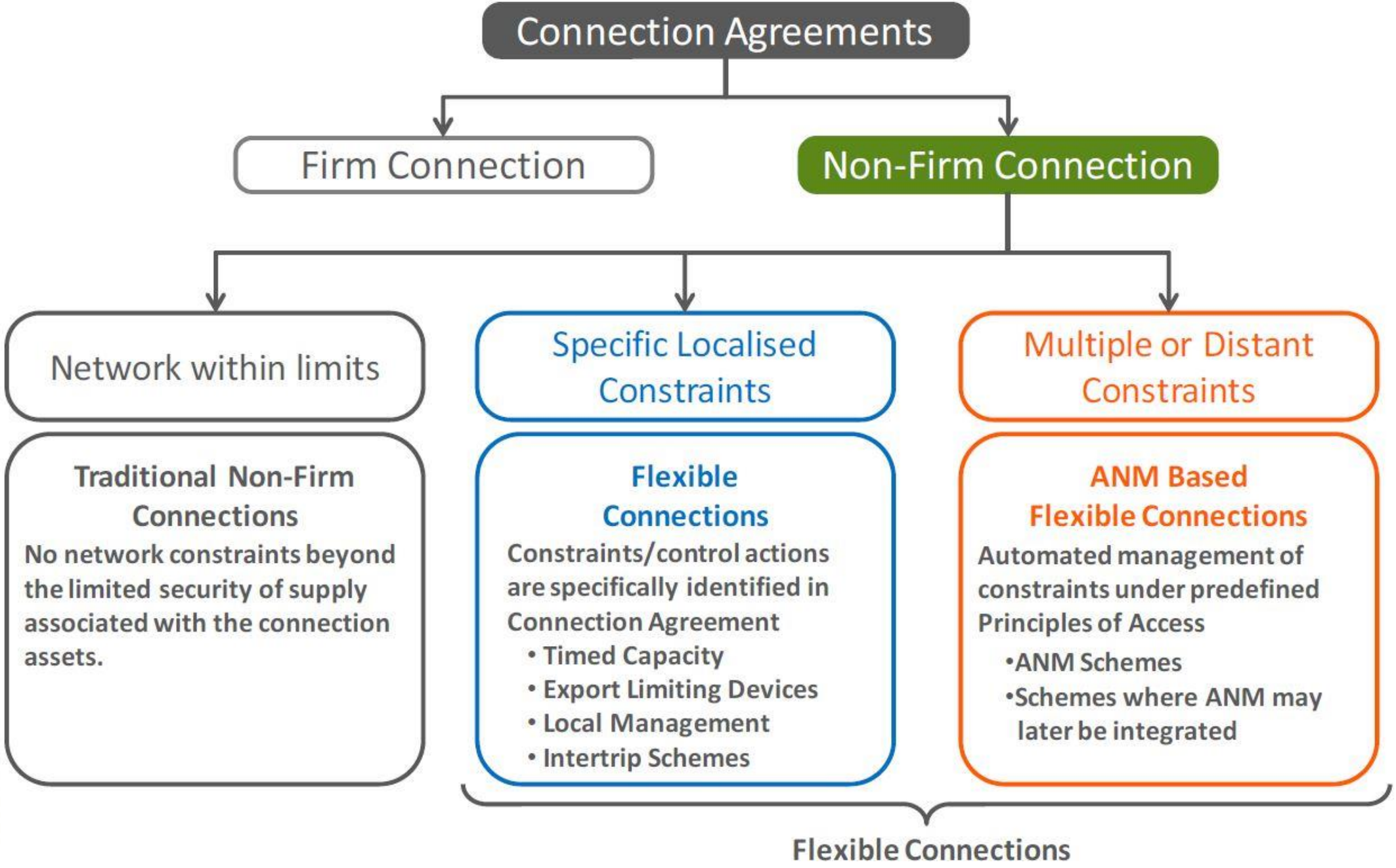
Our appointed Commercial Contract Manager will host a meeting between yourself and a rep from our Active Solutions team to discuss what flexible connection options may be available.

Customer

Commercial Contract Manager

Active Solutions Team

Scottish & Southern Electricity Networks


Connection Agreements
Firm Connection
Non-Firm Connection
Network within limits
Specific Localised Constraints
Multiple or Distant Constraints
Traditional Non-Firm Connections
No network constraints beyond the limited security of supply associated with the connection assets.
Flexible Connections
Constraints/control actions are specifically identified in Connection Agreement
• Timed Capacity
• Export Limiting Devices
• Local Management
• Intertrip Schemes
ANM Based Flexible Connections
Automated management of constraints under predefined Principles of Access
•ANM Schemes
•Schemes where ANM may later be integrated
Flexible Connections

Commercial Aspects

- We don’t do curtailment assessment ourselves
- Your ‘queue position’ can be maintained between traditional and flexible if going from one to the other
- A flexible generation connection offer will provide for an enhanced scheme not a minimum scheme
- SSEN won’t get involved in 3rd Party commercial agreements between 3rd Party ANM parties
- In order to operate flexible generation connections we are required to publish and share certain network information
- We will use your data to help all other applicants who are interested in flexible connections

Applying for a Flexible Connection Quotation

Completed ENA G59 form attached with;

- Site Map – An aerial view map showing the full land ownership boundary, the proposed/existing meter point
- Single Line Diagram (SLD) Drawing of the proposed system stating all gen sets and generation size + Demand
- A Letter of Authority (LOA) from the land owner to confirm that they wish to continue with your company to install the generation
- 3rd party ANM scheme/ Export limitation scheme design for SSEN review & approval

Summary

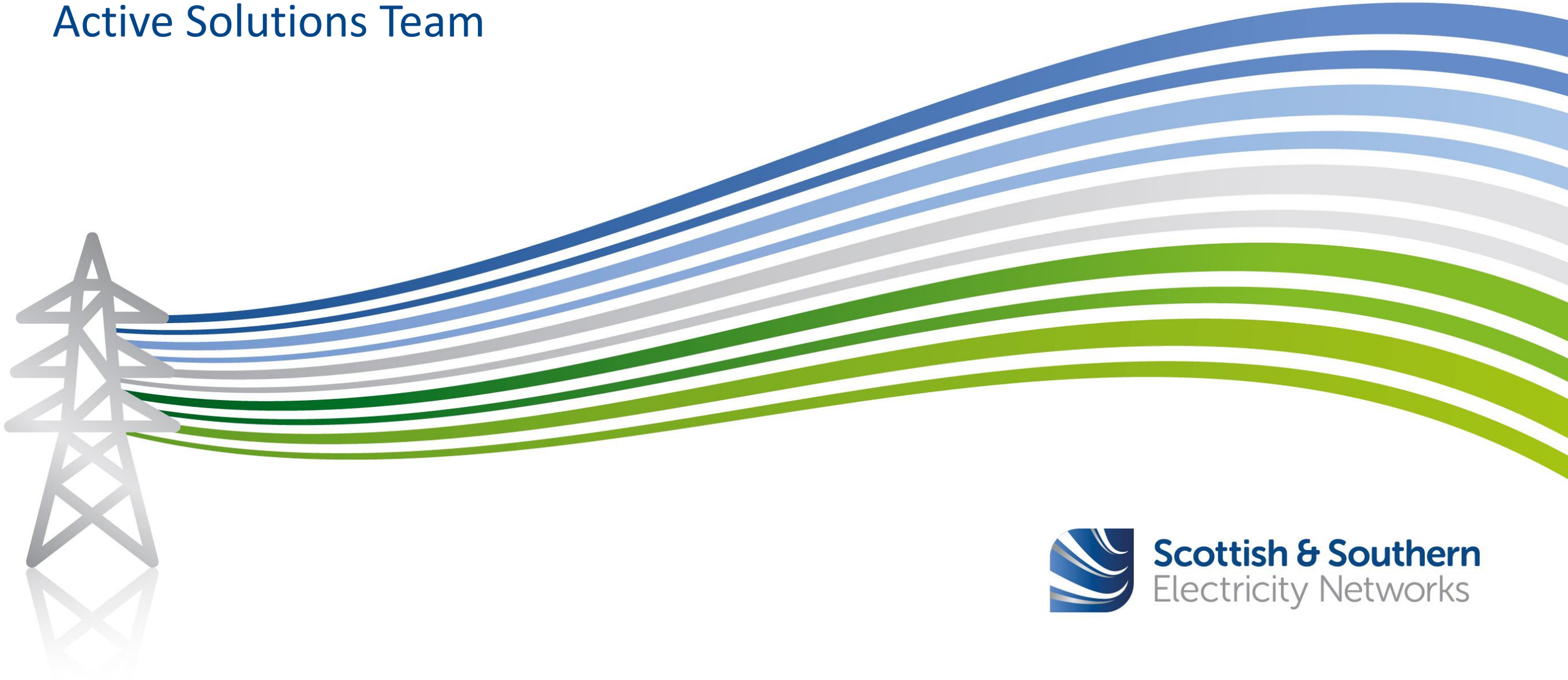
- ✓ Described what flexible connections are and why they are used
- ✓ Reviewed flexible connection examples– Active Network Management (ANM), SGANM, 3rd Party ANM, Timed Export Limitation and Export Limitation
- ✓ Discussed the Application process

Any Questions?

Scottish & Southern Electricity Networks

Storage

Active Solutions Team



Scottish & Southern Electricity Networks

Introduction to Energy Storage

- The UK energy system is undergoing significant change
- In November 2016, BEIS and Ofgem issued a joint call for evidence around '*A Smart, Flexible Energy System*'
- BEIS and Ofgem have since published a '*Smart Systems and Flexibility Plan'*
- Energy storage is a technology area that is well placed to support the needs of the changing energy system
- The role of energy storage is changing due to the changing market

Growth of the energy storage market

The storage market has come up against a number of barriers to progress

- technology constraints
- high up-front cost
- uncertain revenue streams
- potential for constrained connections and changing regulation

Scottish & Southern Electricity Networks

Energy Storage has been driven by -

- The expected fall in storage equipment costs, in particular, batteries.
- The need for higher levels of flexibility
- The availability of revenue streams for balancing and ancillary services and the need for storage to play a key role in Demand Side Response (DSR)
- The parallel slowdown in development of renewable energy (onshore wind and solar PV)

Scottish & Southern Electricity Networks

Overall storage market growth

Many industry analysts are predicting a rapid market growth for electricity storage and other forms of flexibility in the next decade. In order for this rapid growth to materialise, there is a need for steps to be taken to facilitate market innovation, with an early focus on battery storage

Scottish & Southern Electricity Networks

Setting The Scene

- **Changing landscape**
- **Lessons Learned**
- **Technical & Commercial Challenges**
- **Service Development**

✓ Stakeholder Engagement

✓ DG Customer Forum

✓ Niche Workshops

Scottish & Southern Electricity Networks

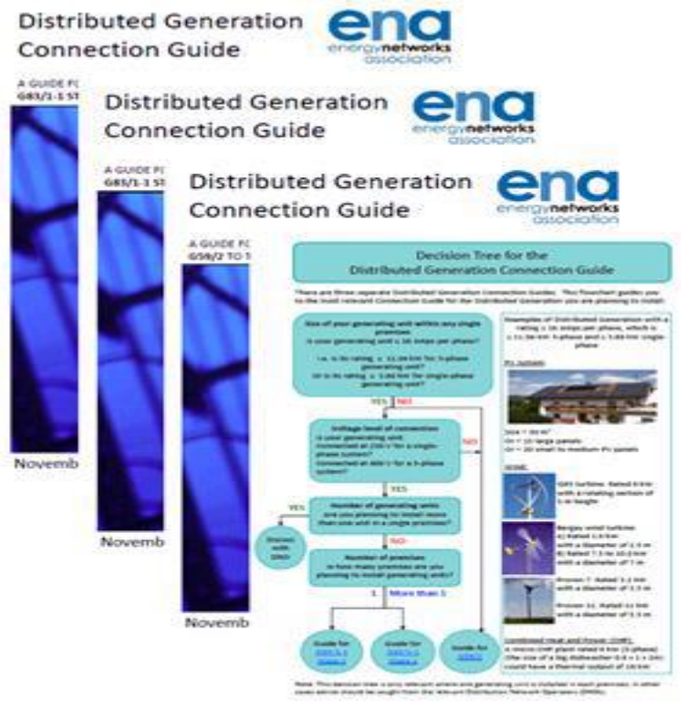
FREE GUIDES

From the Energy Networks Association:

Distributed Generation Connection Guides

G83/2-1 Stage1
G83/2-1 Stage 2
G59/3-1
Energy Storage Guides

Available to download on-line at:
www.energynetworks.org



Scottish & Southern
Electricity Networks

Shetland Battery Storage Project

- Project started in 2010
- Initial technology 1MW 6 MWh Sodium-Sulfur (NaS)
- Connected at 11kV

Scottish & Southern Electricity Networks

Greenwatt Way, Chalvey, Slough Low Voltage Connected Battery Project

Project started in 2011

- 3 x single phase, L-Ion 25kVA batteries (CES units) Connected at 230V

Scottish & Southern Electricity Networks

25 x 36kW/12.5kWh Lithium Ion batteries- Bracknell

Energy Storage and Management Units(ESMUs)

- 25 X 12.5 kWh 3-phase ESMUs installed in Bracknell
- Total LV Storage in NTVV is 500 kWh’s
- The Low Voltage network is volatile and difficult to predict

Scottish & Southern Electricity Networks

Energy Storage Workshop

Application Process

Scottish & Southern Electricity Networks

Application Methods

- Email — mcc@sse.com >50KW
  north.microgen@sse.com <50kW

- Web — www.ssen.co.uk

- Post — Major Connections Contracts,
  Scottish and Southern Electricity Networks,
  Perth Training Centre,
  Ruthvenfield Road, Perth, PH1 3AF

- Phone — For advice on how to apply **0345 072 4319**

Scottish & Southern Electricity Networks

Application information

From the competent application submission the Distributed Generation Designers will first look at:-

- MPAN if available
- A letter of authority
- Land boundary map
- Single line diagram (SLD)
- A completed G83 / G59 application
- Data sheets

Scottish & Southern Electricity Networks

Connection application process

The performance standards for processing DG connection applications are:

- Maximum 45 working days for LV connections
- Maximum 65 working days for HV and EHV connections

If your G59 fast tracked application (<32A LV connected) then no quote is needed, the installer should notify SSEN within 28days of installation

Scottish & Southern Electricity Networks

G83/2-1 (Stage 1, <16 amps/phase) Install and Notify

- For micro: CHP, PV, Wind, Hydro & Fuel Cell Technologies.
- This translates (230V x 16A) into 3.68kW

Installers have **28** days from commissioning to inform SEPD of these single installations on the relevant notification form

Scottish & Southern Electricity Networks

G83/2-1 (Stage 2) Multiple Installations

G83/2 Multiple Installations

You must apply for connection before starting work

Charges:

<3.68kW (i.e. part of G83/2-2)

A & D charges apply

Good News: ✔

RIIO – ED1 network reinforcement due to G83/2 multiple applications at the DNO cost

Scottish & Southern Electricity Networks

G59/3-1 Generation

- G59/3 is an industry standard for generators greater than 16A per phase
- Up to 50kW there is a provision for type tested equipment similar to G83/2
- G59/3 connection applications must be submitted for system studies and associated network reinforcement where necessary prior to connection

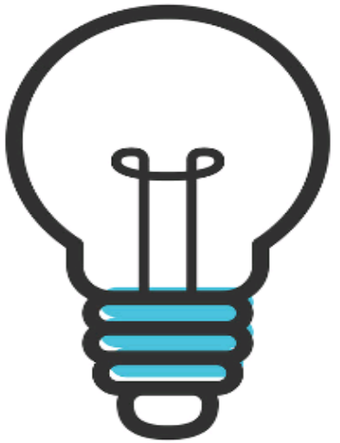
Scottish & Southern Electricity Networks

Moving Forward……

- SSEN are looking into these ‘innovations’ and make them business as usual for batteries
- We are looking at the process in place where we look to procure batteries to relieve constraints or provide stability (such as CMZ but in different forms i.e. Voltage constraints, fault level etc.)
- From a generation customer perspective we are looking into how we can integrate batteries into the flexible connection process

Scottish & Southern Electricity Networks

New Ideas



- Looking into flexible connection’s
- How can we use batteries within a DSO
- How can we use batteries to create a smoother power graph
- Is there anywhere on the network that a battery could relieve Constraints releasing additional capacity
- Can we use batteries at Primary substations
- Can we utilise batteries for faults

Scottish & Southern Electricity Networks

Scottish & Southern
Electricity Networks

connectionsfeedback@sse.com

Scottish & Southern
Electricity Networks