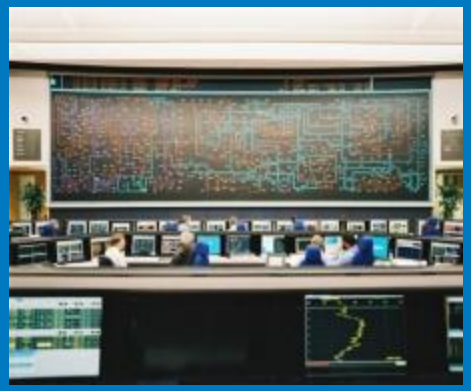
# Welcome to the National Grid Customer Seminar



Thursday 26th February 2015
London

nationalgrid

# House Keeping

- No planned fire alarm
  - Leave through nearest exit
  - Muster point is at the front of the building near the taxi rank. A member of staff will be holding a sign for guests
- Facilities
- Mobile phones

nationalgrid

# Safety Moment


## 112

### The single European emergency number

Wherever your travels in the European Union take you, 112 can be dialed free of charge

- from fixed and mobile phones
- from a phone box or
- Pre-register to use the service via sending the text “REGISTER” to 112 for use in areas where mobile reception is poor

**https://www.youtube.com/watch?feature=player_detailpage&v=jXVn2YIf5Jk**

# Agenda

| | |
|---|---|
| Introduction | Nicola Paton |
| Connections Update | Julian Leslie |
| Customer Policy Update | Richard Smith |
| Charging and Capacity Developments | Patrick Hynes |
| Electricity Market Reform Update | Ian Nicholas & Paul Mullen |
| ITPR | Ben Graff |
| BREAK | |
| System Operability Framework Update | Vandad Hamidi |
| ETYS Update | Stewart Whyte |
| Transmission Owner Update | NGET– Duncan Hughes<br>SHE – Danny McMillan<br>SPT – Cathie Hill |
| LUNCH | |
| Round Tables and Interactive Zones | |

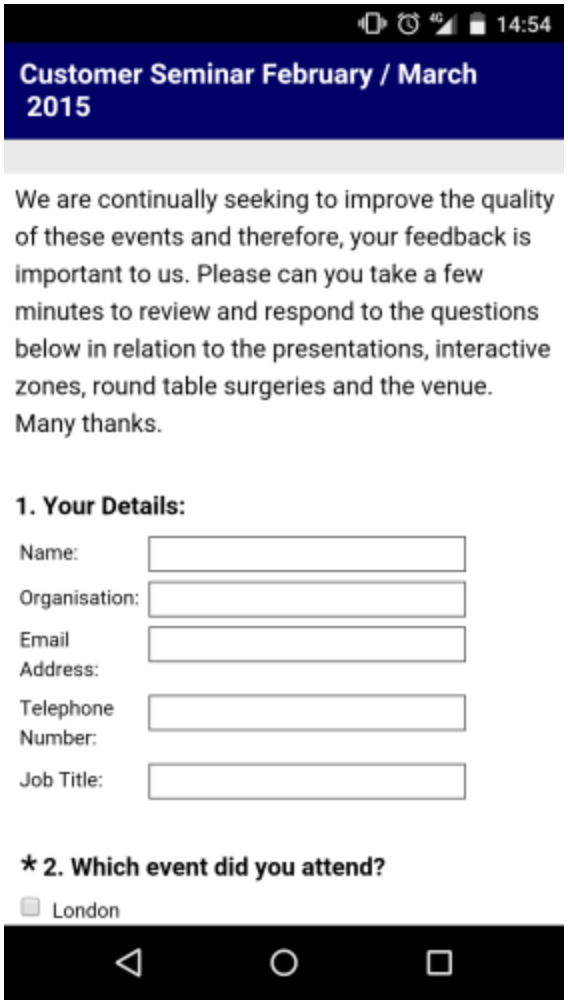
nationalgrid

# Round Table Sessions & Interactive Zones

1. Customer Policy
2. Charging and Capacity Development
3. ITPR - Onshore Competition
4. ITPR - Network Options Assessment
5. SP Transmission Construction Update
6. SHE Transmission Connections Update
7. National Grid Electricity Transmission
8. Network Development & Operability
9. Ancillary Services
10. Market Outlook
11. EMR
12. Customer Connections

# Mobile Interaction

- Use phone to scan QR Code found on feedback forms on tables
- Will go to online feedback form



nationalgrid

# Connections Update

Julian Leslie
Electricity Customer Manager

nationalgrid

# Topics

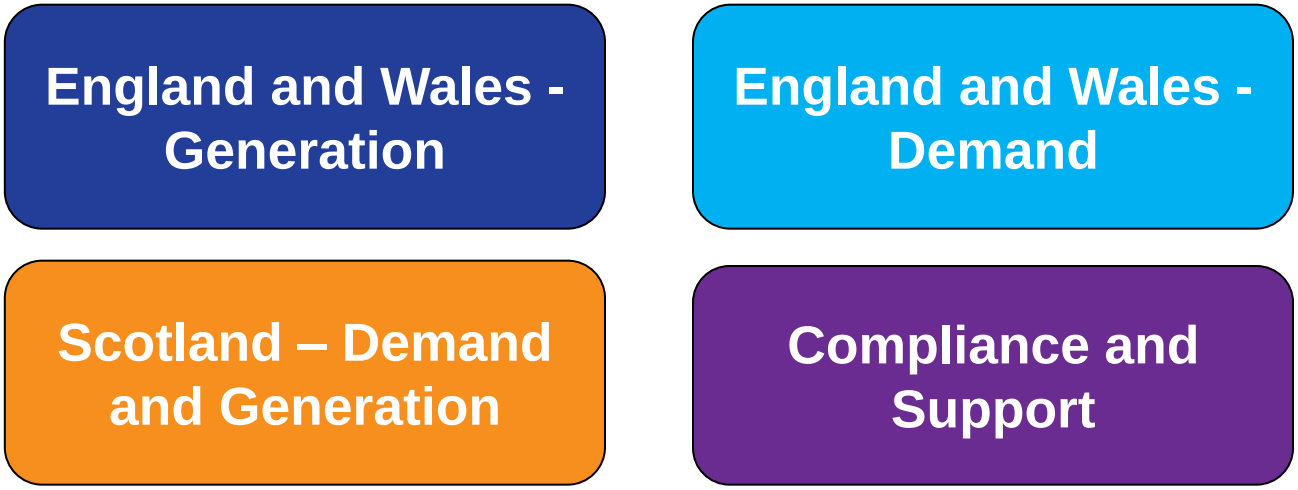
- Team developments
- Customer survey
- EU Code update
- Contracted generation developments
- EMR results

# Team Developments

- Workload
  - Scottish onshore wind new offers
  - Mod apps
  - New connections – compliance
  - Offshore wind transitions almost complete

# New structure and resource

- Change to team structure




- Additional resource in Compliance and Support and Scotland

nationalgrid

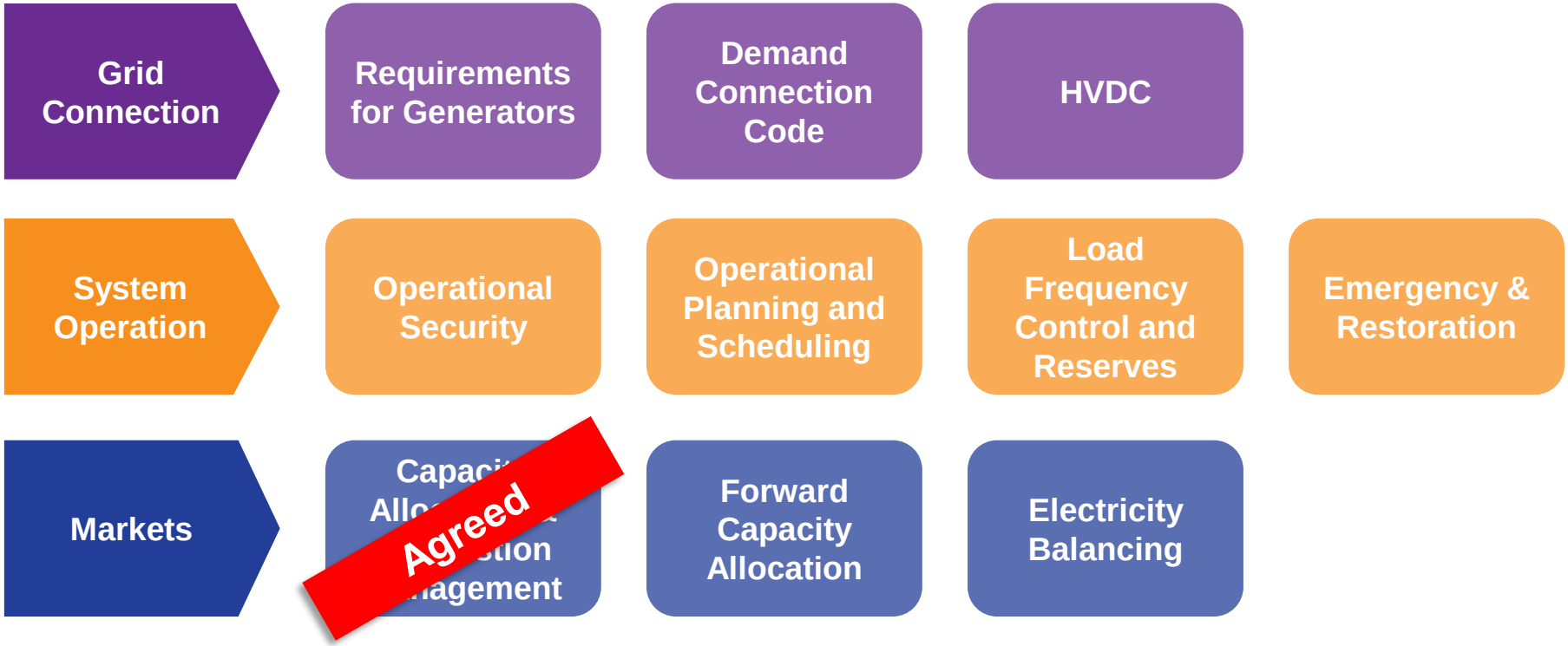
# Customer Survey

- We need your help
- Your answers to the survey do help us to identify and prioritise improvement areas
- Last October for the Connections Process
  - Nearly 100 eligible customers
  - Only 30 responses
- Next phase of interviews starts 8th March and finishes on 2nd April
- Reschedule at a time to suit you

nationalgrid

# Latest Status on European Network Codes

- A suite of European Legislation entering in to force from 2015 onwards
- Will take precedence over all existing GB arrangements



nationalgrid

# Focus on Requirements for Generators

- RFG is expected to be the next European Network Code to be adopted through Comitology in around June 2015
- Commission and member states are now agreeing the final text

## When does it apply?

- **Applies to new generators who let major contracts 24 months after entry in to force of the Code**
- Does not apply retrospectively unless a need is demonstrated (needs a CBA, consultation and NRA approval). No areas currently identified

## How to get involved

- Engage with GC0048 Workgroup which is defining changes to Grid/D-Code via grid.code@nationalgrid.com
- Engage with DECC to inform GB's negotiating position for Comitology

# Key Topics in RFG: Pertinent Technical Requirements

nationalgrid

- Many requirements in RFG are the same or similar for Large generators. Greater potential impact for Small, Medium and D-connected generators
  - Type A and B (800 W – 50 MW†) requirements are akin to a '**product standard**'
  - Type C and D (>50 MW) requirements typically need **active management** of the generator
- Pertinent topics are:
  - New **Fault Ride Through** Requirements for Type B+ (>1MW)
  - Mandatory **Frequency Response** for Type C+ (>50MW)
  - National choice of **parameters** affecting all Types, where ranges are specified in the RFG

† All banding thresholds are still subject to agreement.

nationalgrid

# To learn more and get involved ….

- Come along to the **Joint European Stakeholder Group**

  A single monthly meeting covering all European issues including European Network Code development and implementation

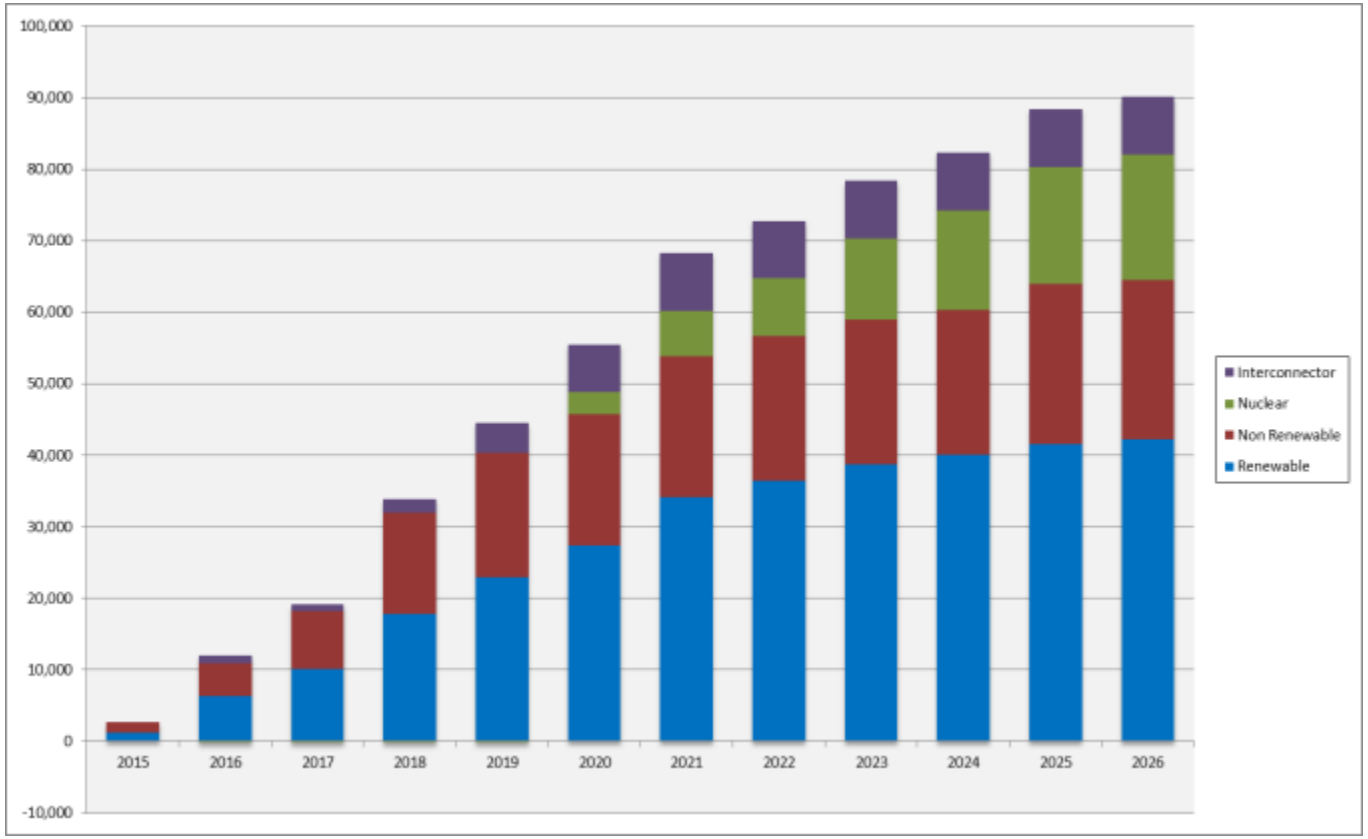
  Supported by DECC, Ofgem, National Grid and others

- Grid-Code / D-Code **GC0048 Workgroup** on RFG
- Sign-up for the **Weekly Email Newsletter Update**

**For more information contact:**
**europeancodes.electricity@nationalgrid.com**

nationalgrid

# Contracted Generation




- 27.5GW Renewables by 2020, 10GW Consented
- 13 to 15GW required to meet 2020

nationalgrid

# EMR Results

- Capacity Mechanism
  - 1.8GW Trafford Power successful
  - 5.2GW of new generation unsuccessful
  - 6.6GW of existing generation unsuccessful
  - May result in early closure of existing
  - Delays/terminations of future new capacity
- Contract for Difference
  - Complete on morning of 26th

nationalgrid

# Customer Policy Update



Richard Smith
Customer Policy Development Manager

# Current Work Areas

- Queue Review
  - To date management within Queue at transmission level
  - Now looking at wider process and embedded interactions
- CMP 192 Review
  - Reviewed CMP192 following implementation
  - Currently quantifying total value at risk between spend and liability

nationalgrid

# Current Work Areas

- Non-Firm Policy
  - Use CUSC/SQSS definitions
  - Minded to only offer to consented projects
- Active Network Management
  - In principle we support ANM, but it should not impact on our ability to operate the system

nationalgrid

# Current Work Areas

- Investment Ahead of TEC (Delay Charge/Backfeed)
  - Proposal based on CEC before TEC
  - Will roll out interim in near future
  - Do we formalise in CUSC
- Distributed Generation National Grid Application Process
  - Statement of Works – CMP238
  - Looking at wider process

nationalgrid

# Current Work Areas

- High Volts
  - Engaging with DNO's to look at technical issues
- Outage Cancellations
  - We are now experiencing constraints on parts of the system which have led to outages being cancelled
- Refurbished Assets
  - Refurbishment rather than replacement of assets being explored as an option
  - How do we reflect this in Connection Offers

# Stakeholder Engagement

- Are there any other issues we should be looking at?

For more information contact:

Richard Smith
Customer Policy Development Manager
richard.smith5@nationalgrid.com
m: +44(0)7964 538892

nationalgrid

# Charging & Capacity Developments

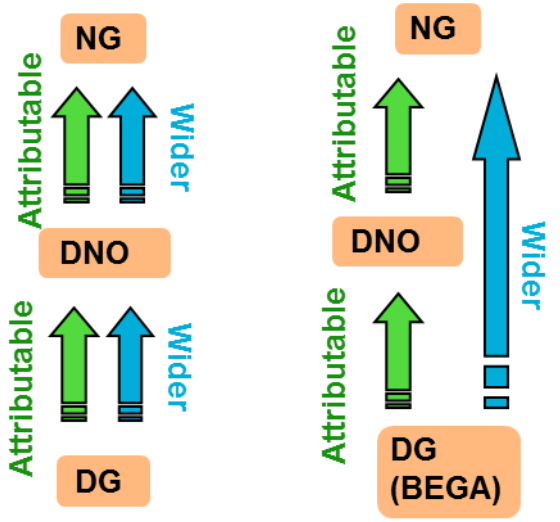


Patrick Hynes
Electricity Charging and Capacity Development Manager

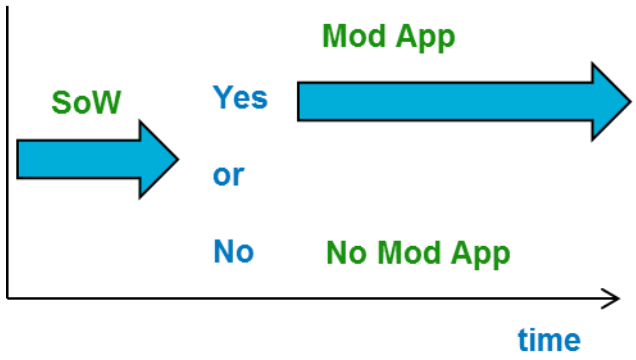
nationalgrid

# Ongoing modification proposals

- **CMP223: Arrangements for Relevant Distributed Generators Under the Enduring Generation User Commitment**
  - Passing lower securities through DNOs to embedded generation

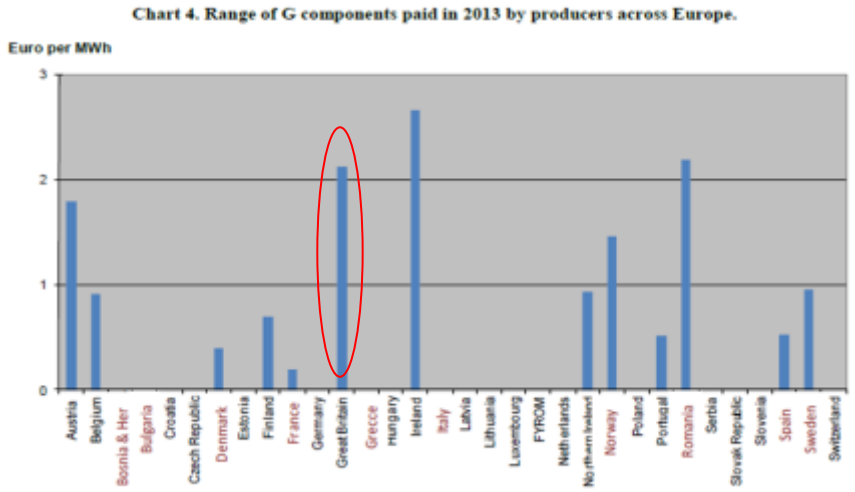


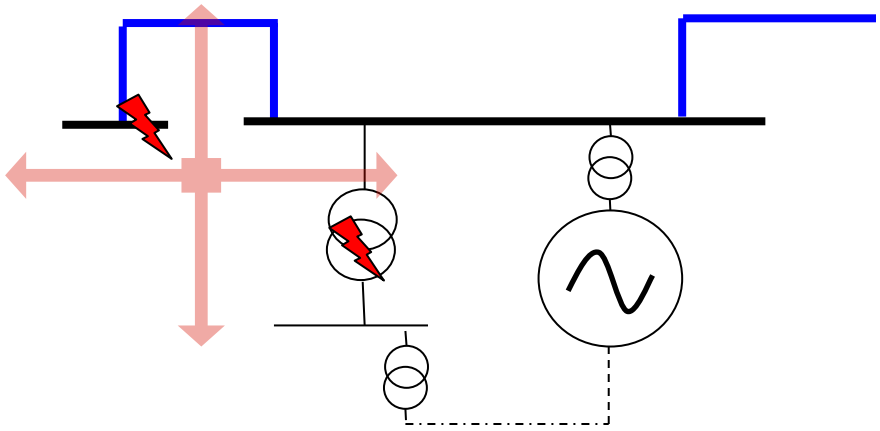

- **CMP238 – Application of Statement of Works Process when a Modification Application is made**
  - Removing the need to go through SoW process prior to a Modification Application



# Ongoing modification proposals

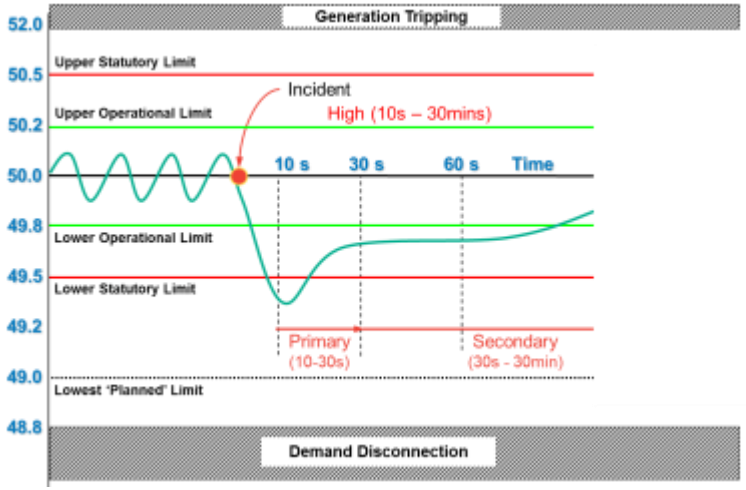
- **CMP227 - Reduce the G:D split of TNUoS charges, for example to 15:85**
  - When should we move to a lower Generation component?
- **CMP235 / CMP236 – Introduction of a new Relevant Interruption Types…**
  - Expanding the definition of event where compensation would be paid.
    - Loss of station supplies Tx system
    - Quality of supply on Transmission System

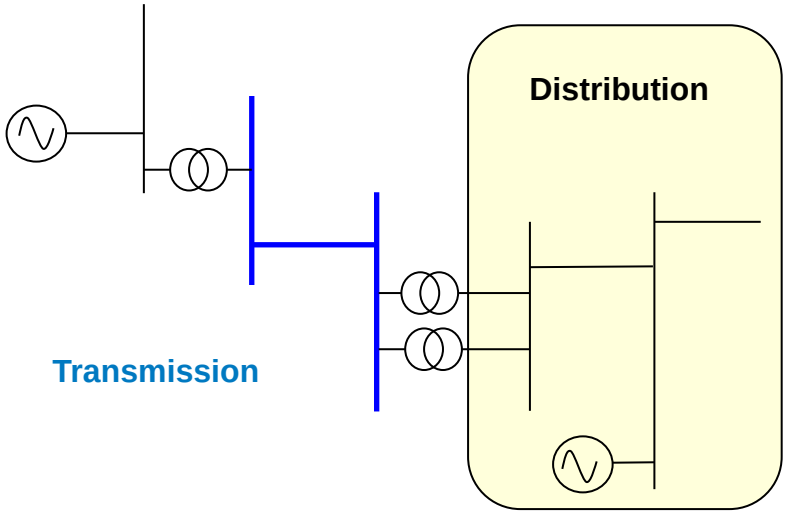


# Ongoing modification proposals

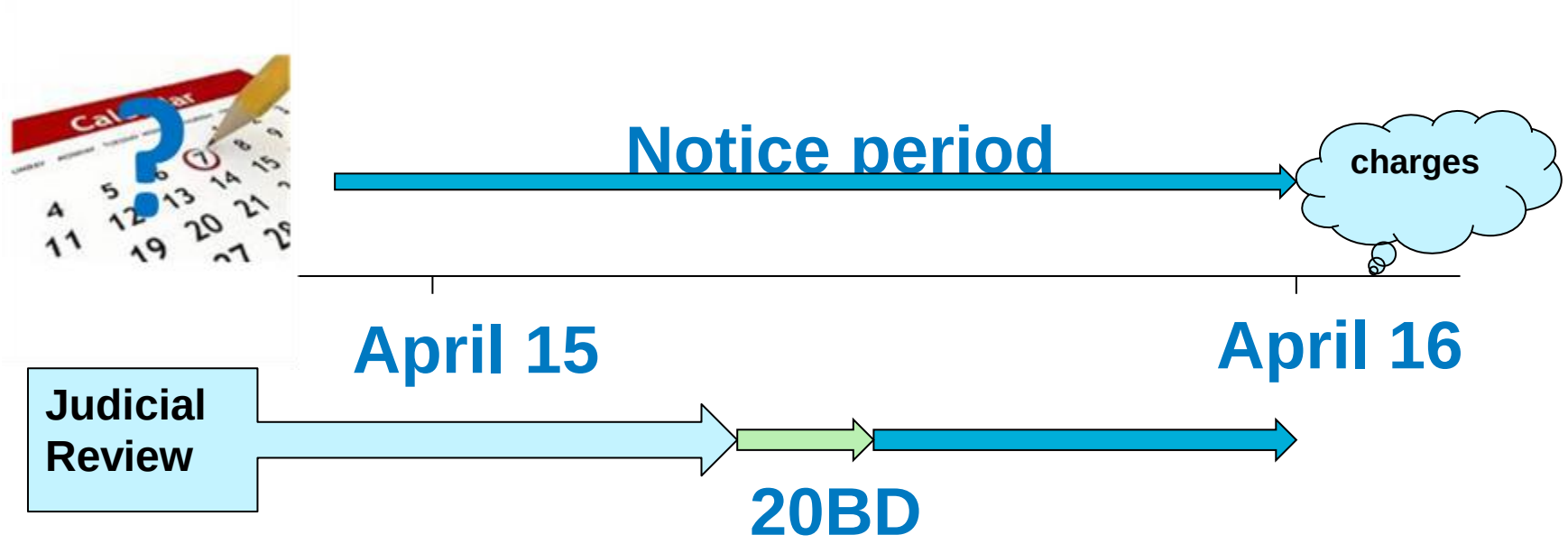
- **CMP237 – Response Energy Payment for Low Fuel Cost Generation**
  - Recognising that current arrangements need to be updated to cover low fuel cost stations
- **CMP239 – Grandfathering Arrangements for the Small Generator Discount**
  - Currently a separate time limited condition
  - Including this in charging methodology to make it enduring for existing parties.



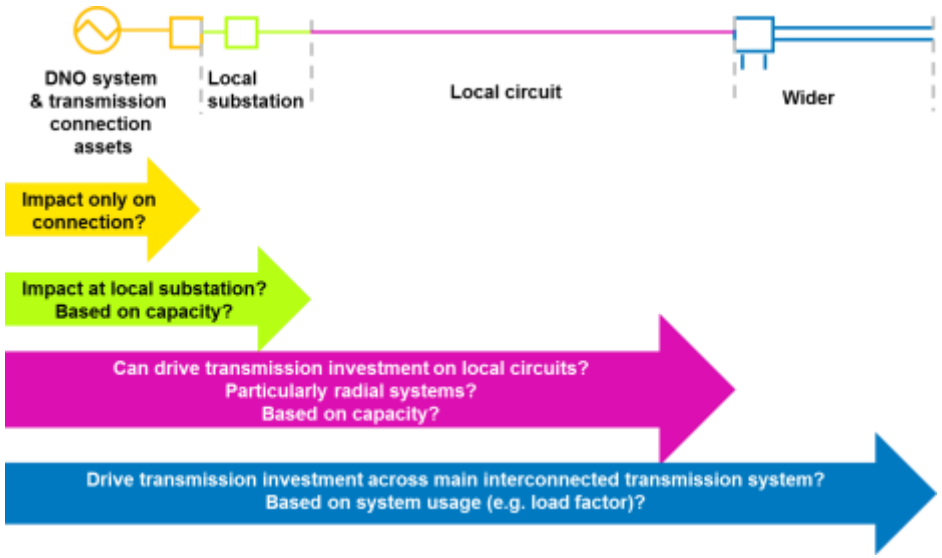
# Ongoing modification proposals

- **CMP240 – Amending the Cancellation Charge liability within a CMP213 Judicial Review Period**
  - With the ongoing JR, flexing the date when closure decision needs to be given without incurring cancellation charge

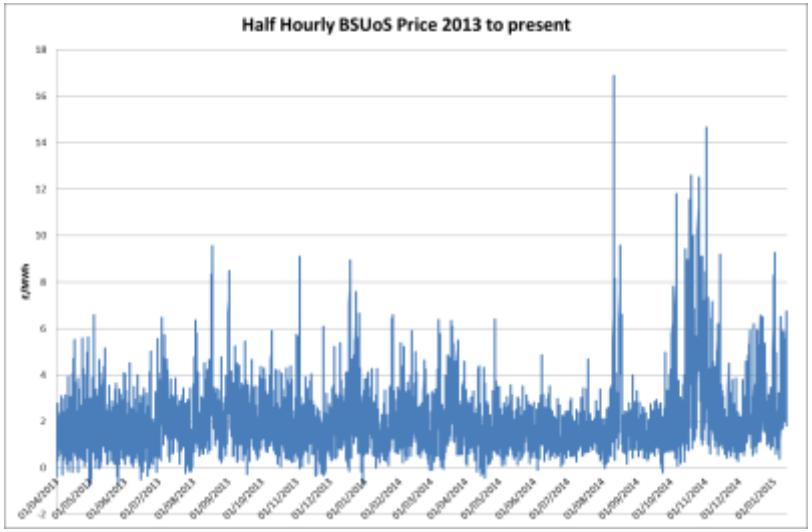


# Ongoing Strategic Issues Update

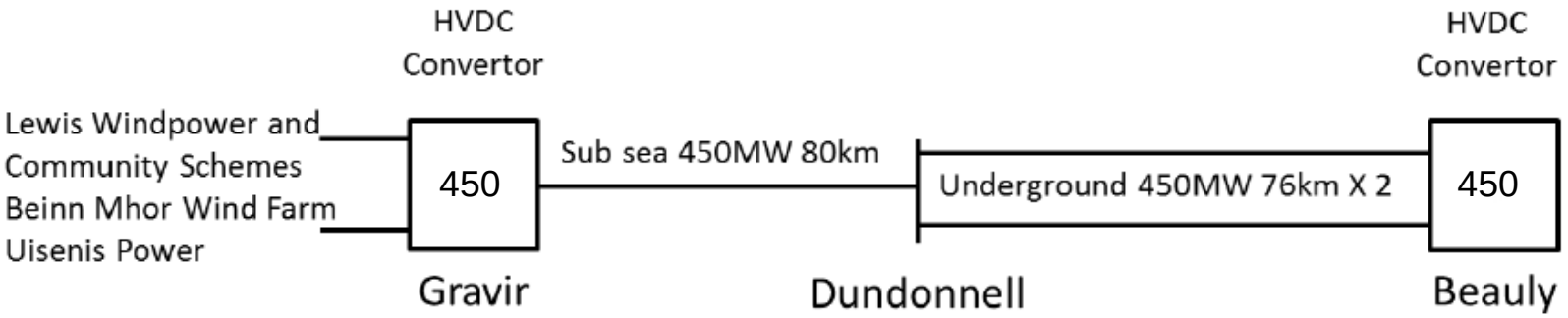
- **Exporting GSPs**
  - What signals should be sent to exporting GSPs
  - Definition of capacity and associated rights
  - Appropriate party




- **BSUoS Stability**
  - Investigating alternative models for recovering BSUoS
  - Objective is to improve predictability and / or stability



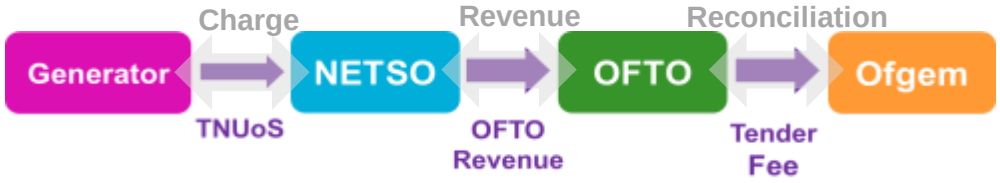
# Treatments of anticipatory investments

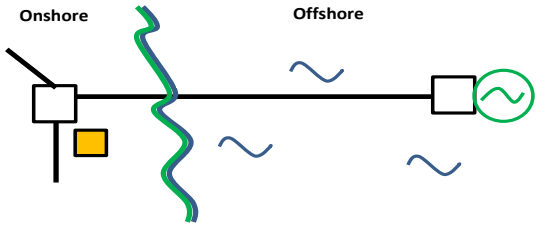


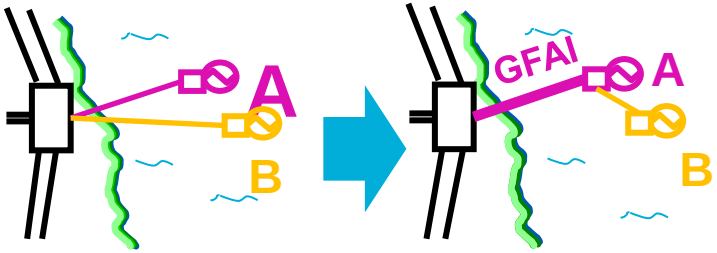

- Proposed link consists of 2 x underground cables
  - 2nd cable understood to be purely anticipatory investment
- Current methodology looks at overall cost
- How should the additional cost be dealt with

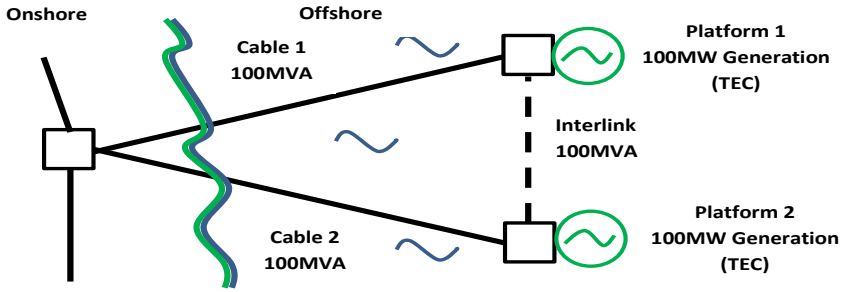
# Further offshore considerations

- Tender fee reconciliations
- Bespoke elective spares
- User commitment for shared offshore works (GFAI)
- Interlinks



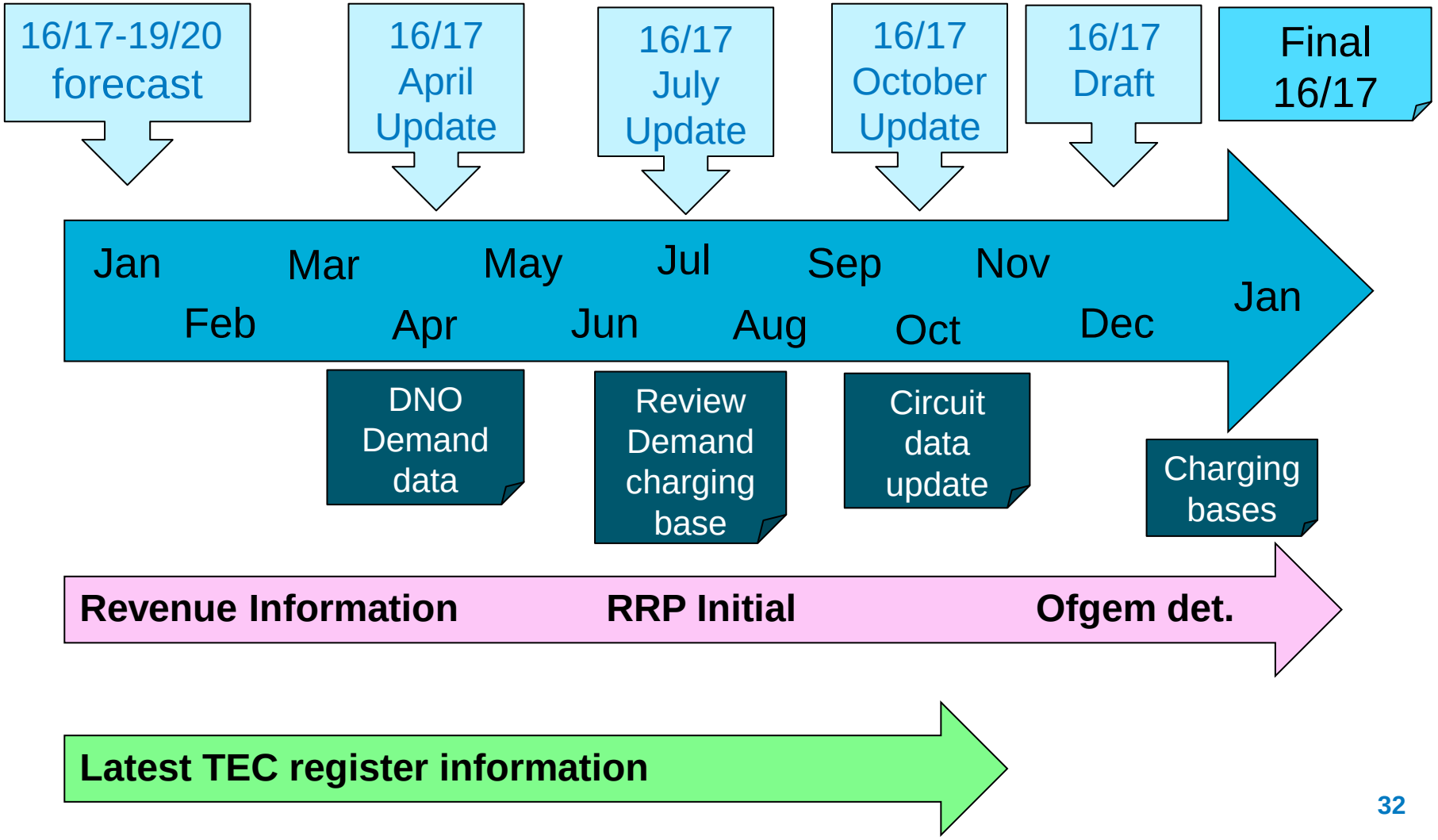



nationalgrid

# Tariff forecast calendar



nationalgrid

# EMR Update



Ian Nicholas - EMR Delivery Manager &
Paul Mullen - EMR Delivery Manager

# Capacity Market

**Ian Nicholas**
EMR Delivery Manager

nationalgrid

# Why EMR? – the changing energy landscape

Power station closures

~25%

of total capacity by 2020 vs 2010 levels

Decarbonise electricity

**80%**

CO2 reduction by 2050

Energy from renewables

~15%

of total supplies by 2020

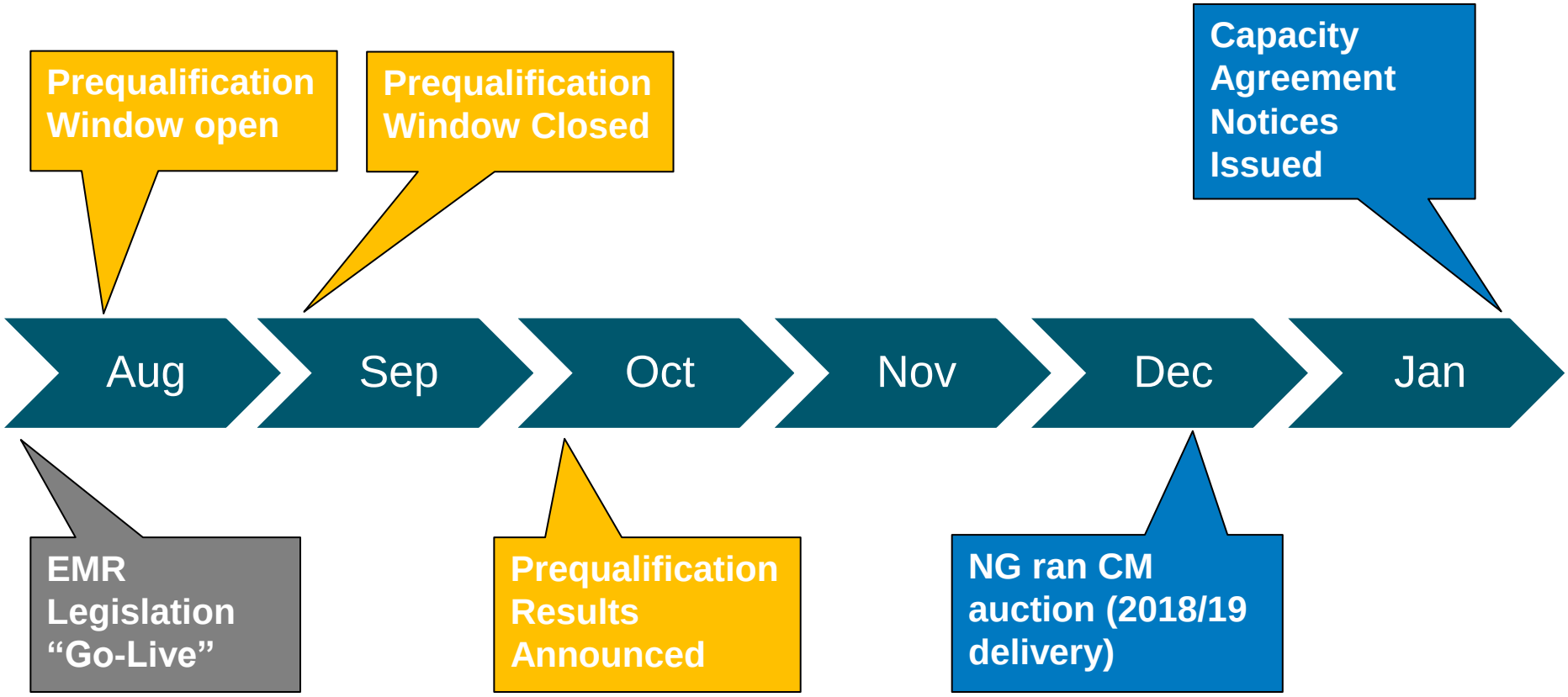
## Capacity Market

To provide reliable and flexible security of supply

## Contracts for Difference

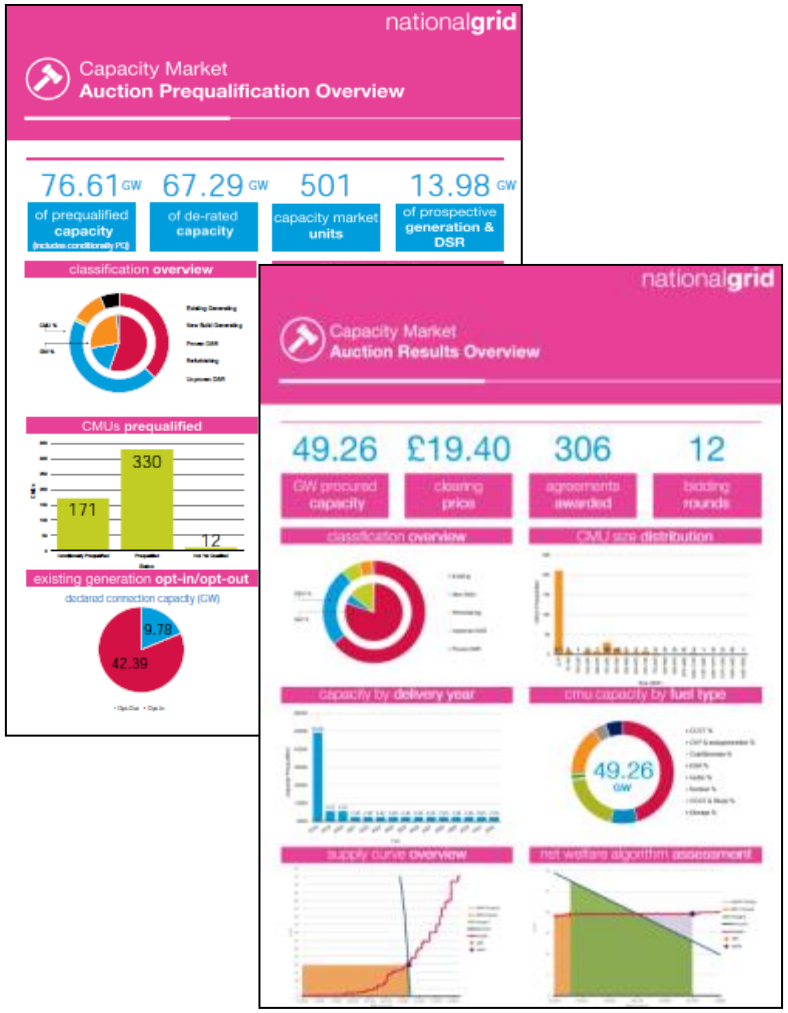
To incentivise low carbon investment and manage emissions

# Capacity Market Timeline 2014/15

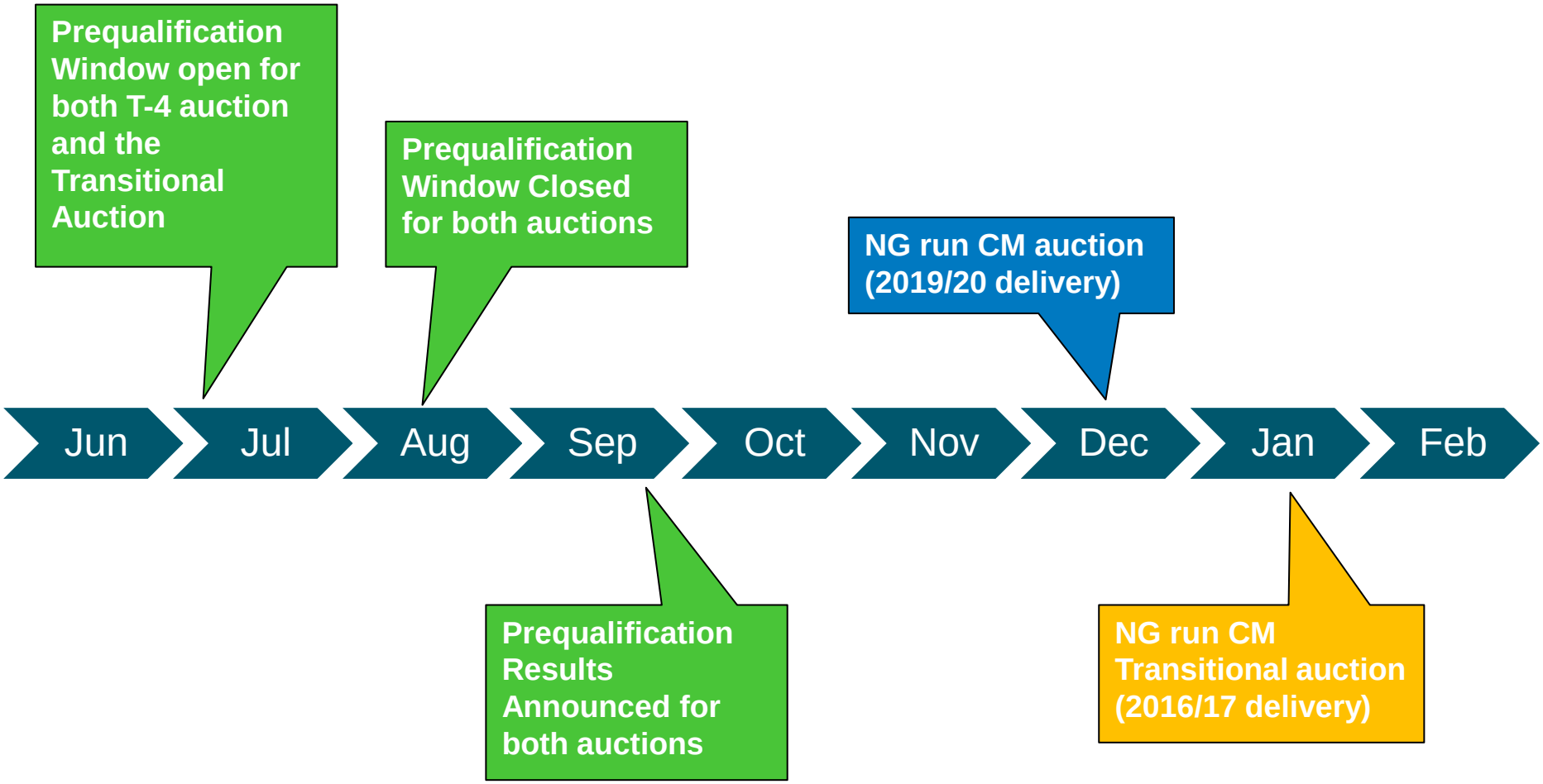


# 2014 Capacity Market Summary

- **67.29GW** of Capacity Prequalified for the 2014 Auction representing 501 Capacity Market Units
- Auction held over three days and 12 rounds in December 2014
- **49.26GW** of Capacity Procured representing 306 Capacity Market Units
- Clearing Price of **£19.40/kW** and total expenditure in 2018/19 of approx. **£950million** (2012 prices)



# Capacity Market Provisional Timeline 2015/16

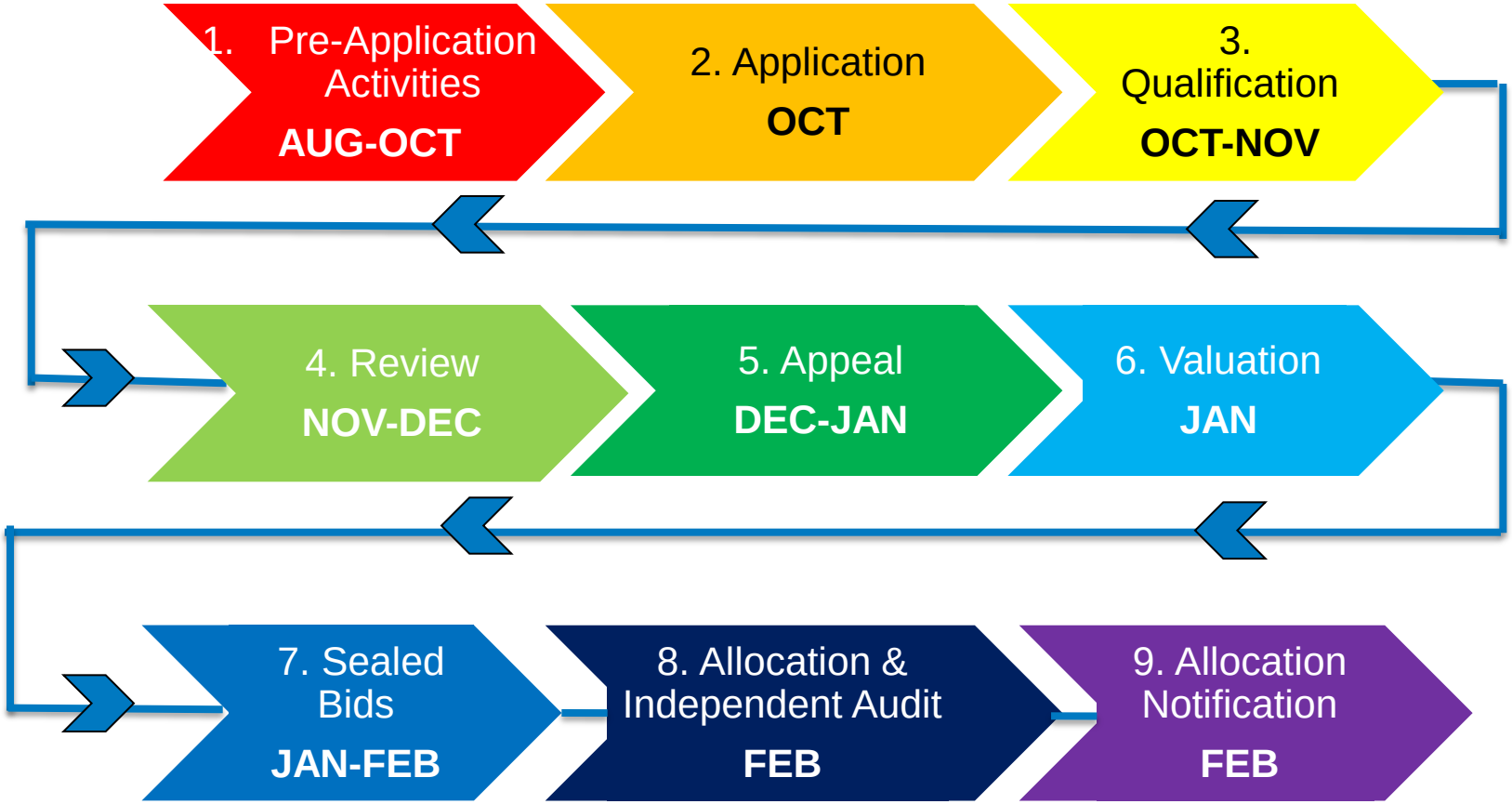


# Contracts for Difference

**Paul Mullen**
EMR Delivery Manager

nationalgrid

# CfD Process – End to End



# CfD Process – Next Round

**Non Delivery Disincentive**

**Budget: £50 million already indicated for established technologies**

**Implementation Events from late spring 2015**

nationalgrid

# ITPR



Ben Graff
Transmission Strategy Manager

# What is Integrated Transmission Planning and Regulation (ITPR)?

- ITPR is a project initiated by Ofgem in early 2012 to consider how to achieve **coordination of network investment** with multiple Transmission Owners with differing objectives/drivers and how to **deliver this investment efficiently and economically**

Conflicts of Interest

Broader advisory role to TOs, developers and Ofgem

Identification of Interconnection opportunities

Network Options Assessment (NOA) methodology

Coordinating other aspects of system planning

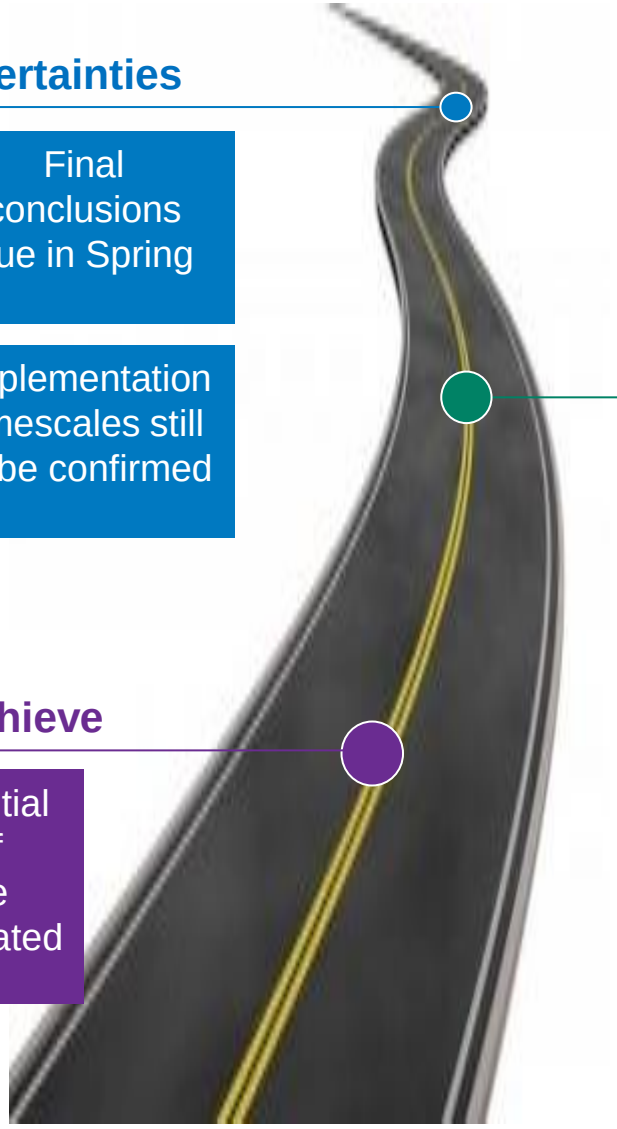
Facilitating onshore competition

Greater role developing needs cases for strategic investment

# Where are we on our ITPR Implementation journey?

## There are many uncertainties

- Policy requires further development
- Final conclusions due in Spring
- Licence drafting requires further development
- Implementation timescales still to be confirmed



## We approach these uncertainties collectively in the following ways

- Proactively creating hypothesis around what the outputs look like
- Testing these hypothesis with each other and landing on a way forward
- Flushing out differences in understanding, to agree timely implementation

## What are we trying to achieve

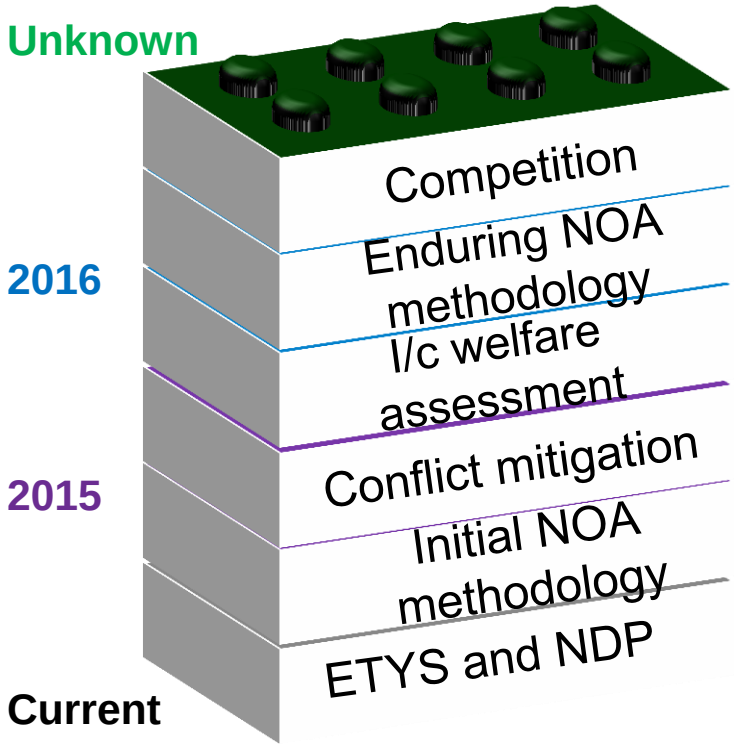
- Ensure 2015 and 2016 obligations can be met and that outputs work for all
- Ensure potential conflicts of interest are properly mitigated

# The main NOA output will be delivered in a two year phased approach agreed with stakeholders…

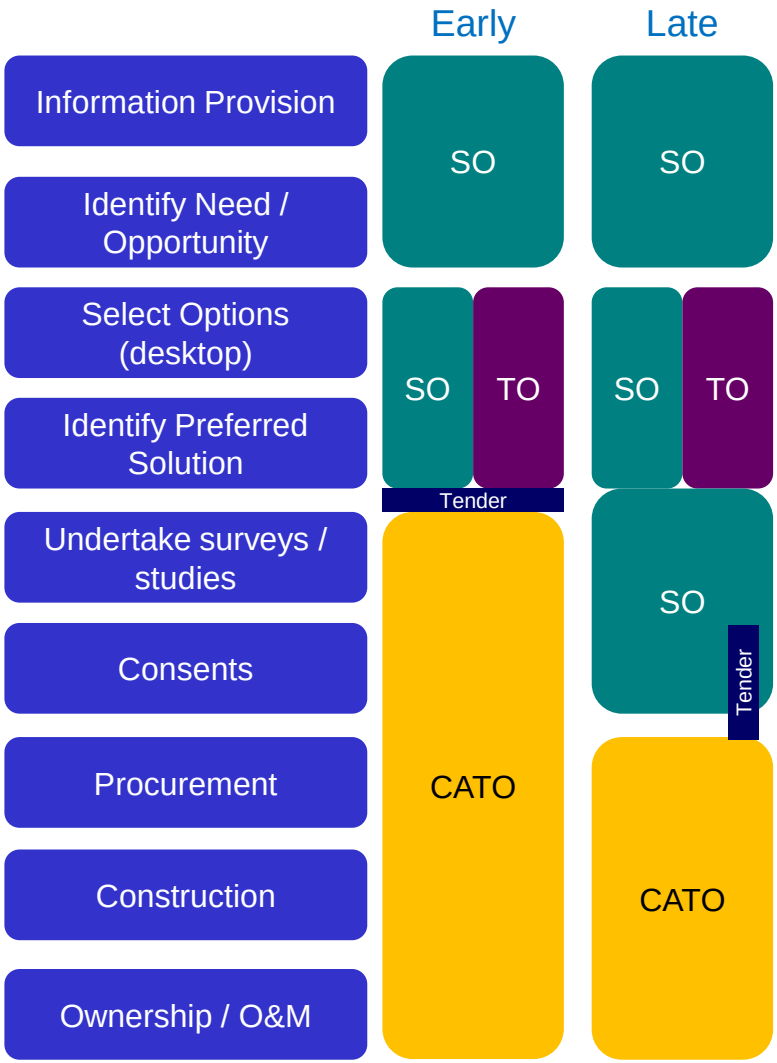
## Round Tables

**Sessions 1 and 2:**
- Onshore Competition Table
- Network Options Assessment (NOA) Table

**Session 3:**
- General ITPR Discussion



# Ofgem have proposed two models for onshore competitive tendering




## Early Model:

- SO develop the project to the point where a high level specification could be prepared
- SO undertakes some early development activity e.g. determining the capacity needed and connection and interface points
- Model preferred in our consultation response

## Late Model:

- SO undertakes all pre-construction activities including more detailed routing and securing consents for the project

# We are committed to doing the right thing. Effectively managing conflicts of interest is key for successful implementation

nationalgrid

| | |
|---|---|
| Business separation and information ring-fencing | • Business and legal separation from associated competitive businesses<br>• Ring-fencing of sensitive information related to the enhanced SO role |
| Transparency and information provision | • Publication of and consultation on methodologies for the NOA process<br>• Publication of annual NOA report<br>• Transparency on business structures |
| Annual compliance statement | • Summary of measures employed to ensure business compliance<br>• Submitted to Ofgem and published on our external website<br>• Aims to increase transparency of activities |

## Contact details

For more information contact:

Ben Graff
Transmission Strategy Manager
M: +44(0)7836 293164
ben.graff@nationalgrid.com

nationalgrid

# Coffee Break

Please sign up for Round Table surgeries and take a look at the Interactive Zones

nationalgrid

# System Operability Framework Update



Vandad Hamidi
SMARTer System Performance Team Manager

# What's happening in GB?

## Islanded AC Power System

## Changes in the Energy Landscape

### Generation

- Increase in non-synchronous generation
- Closure of conventional plants

### Demand Side

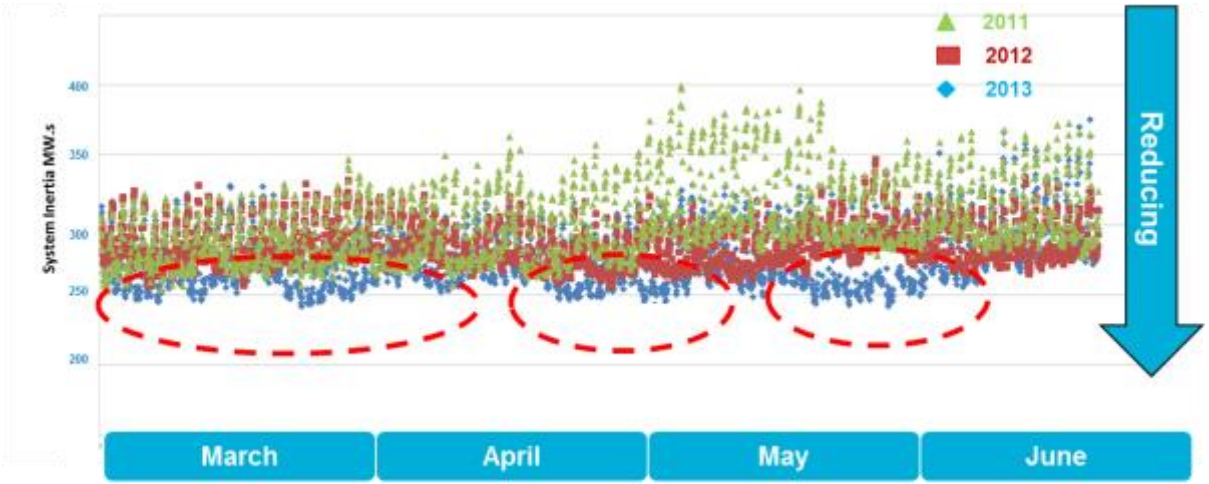
- Increase in Embedded non-synchronous generation
- Change in Demand type (LED lights – Heat Pump)

### Network

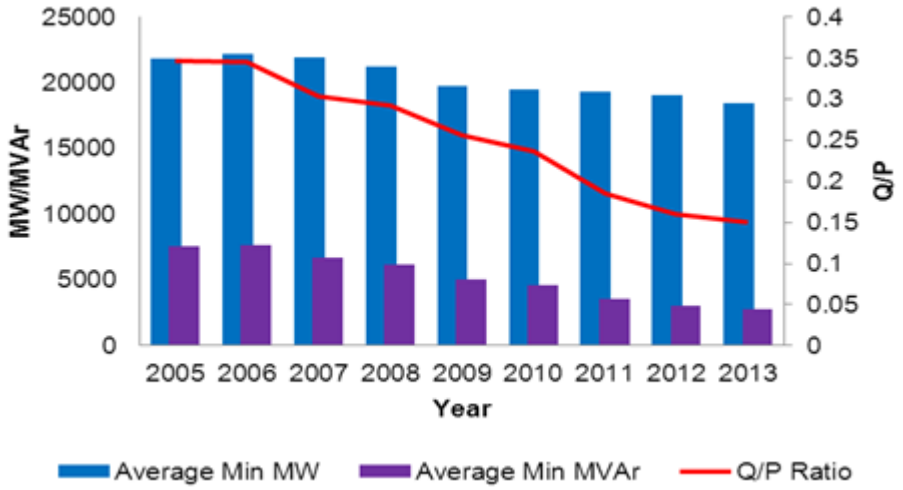
- First Embedded HVDC Link (parallel to AC)
- Thyristor Controlled Series Compensation (TCSC)

# And the impact?

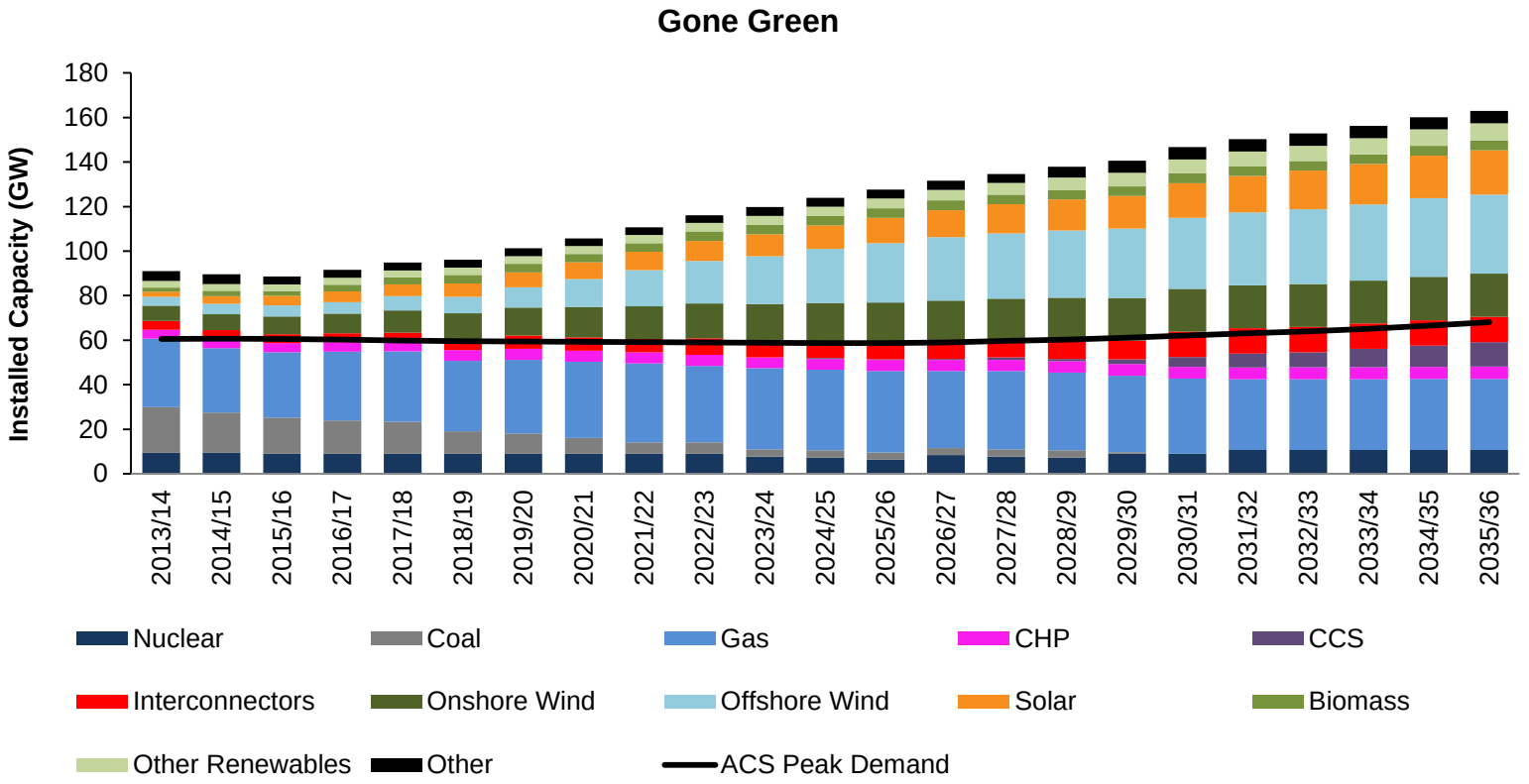
**System Inertia**




**MVAr Demand**

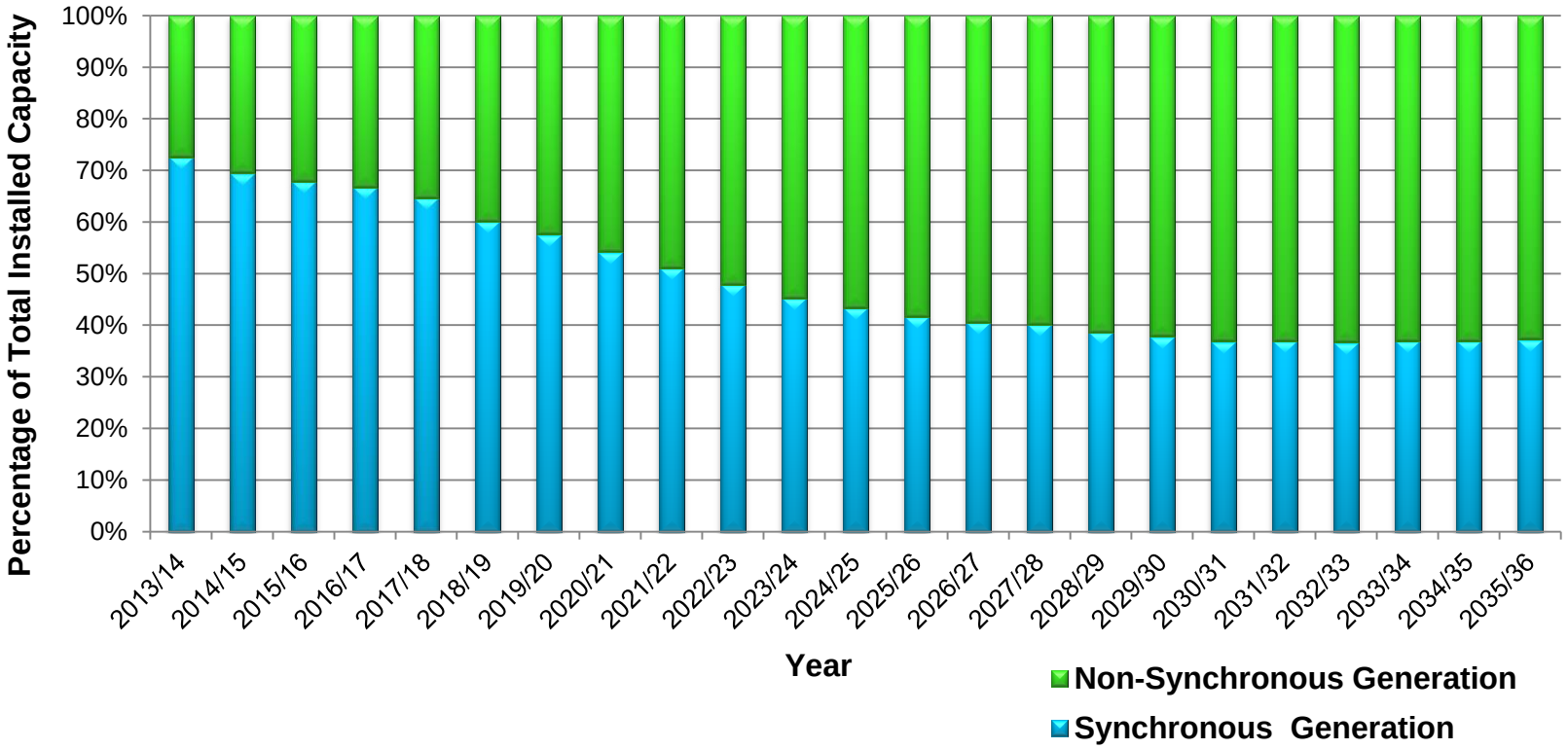


# The scale of change
# Generation Mix (Gone Green Scenario)



# The scale of change
# Generation Mix (Gone Green Scenario)

nationalgrid




**Power grids were designed to operate with 100% synchronous generation!**

# Example - System Inertia & Frequency Containment

| | Solution | Cost (2020 Gone Green) |
|---|---|---|
| Conventional Services | Constrain generators | Extra £600m |
| | Constrain largest infeed/outfeed | Extra £130m-£270m (depending on when the large infeeds are connected) |
| | Carry larger volumes of response | Extra £210m |

| | Solution |
|---|---|
| New Services | Enhanced Frequency Control (Fast Response or synthetic inertia) |
| | Low Load Operation of Thermal Plants |
| | Synchronous Compensator |

# System Operability Framework (SOF)

nationalgrid

**Future Energy Scenarios**

**Change in Energy Landscape**

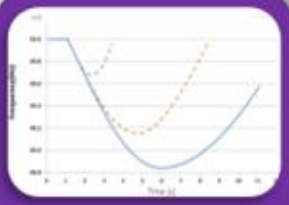
- Generation mix
- Interconnection
- Demand side services

**Performance Requirements**

**Economic, Efficient and Operable System**

- Large infeeds (>1800MW)
- System stability
  - Frequency
  - Voltage
  - Rotor angles
- Constraint minimisation
- Market facilitation

**Operational Challenges**



**Reduction in System Strength**

- System inertia
  - RoCoF
  - Primary response
  - System stability
- Short circuit level
  - Power quality
  - Protection
  - HVDC commutation
  - System stability

**Operation Solutions & Opportunities**

**SMART Grid Development**

- Rapid response
- Demand side response
- Low load operation of thermal plants
- Dynamic thermal ratings
- System wide controller
- Parallel HVDC links

**Electricity Ten Year Statement**

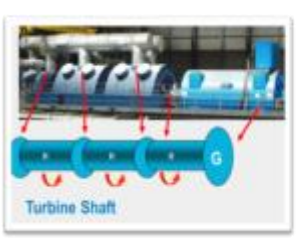
**System Operation Chapter of ETYS**

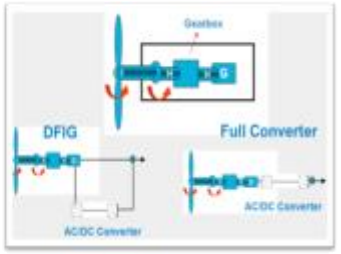
- Variations in each topic
- Opportunities for stakeholders to provide new services
- Stakeholder feedback

# SMART Frequency Control Project
## (Enhanced Frequency Control Capability, EFCC)

nationalgrid

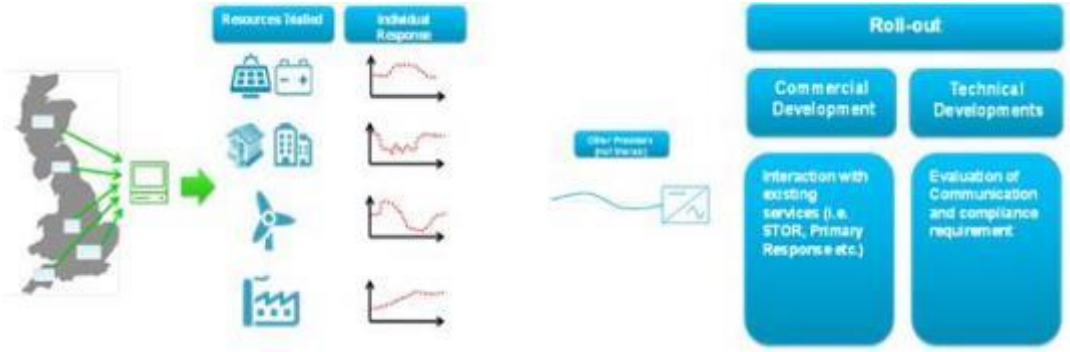
- **Why SMART Frequency Control?**
  - Change in generation mix




- **Benefit of SMART Frequency Control**
  - A potential saving of up to £200m per annum by 2020 to be passed to the consumers
  - New balancing services commercial framework for rapid frequency response

- **Objective**




- **Collaboration**

ALSTOM
BELECTRIC™
centrica
flexitricity
Unlocking smart grid revenue
MANCHESTER 1824
The University of Manchester
University of Strathclyde Glasgow

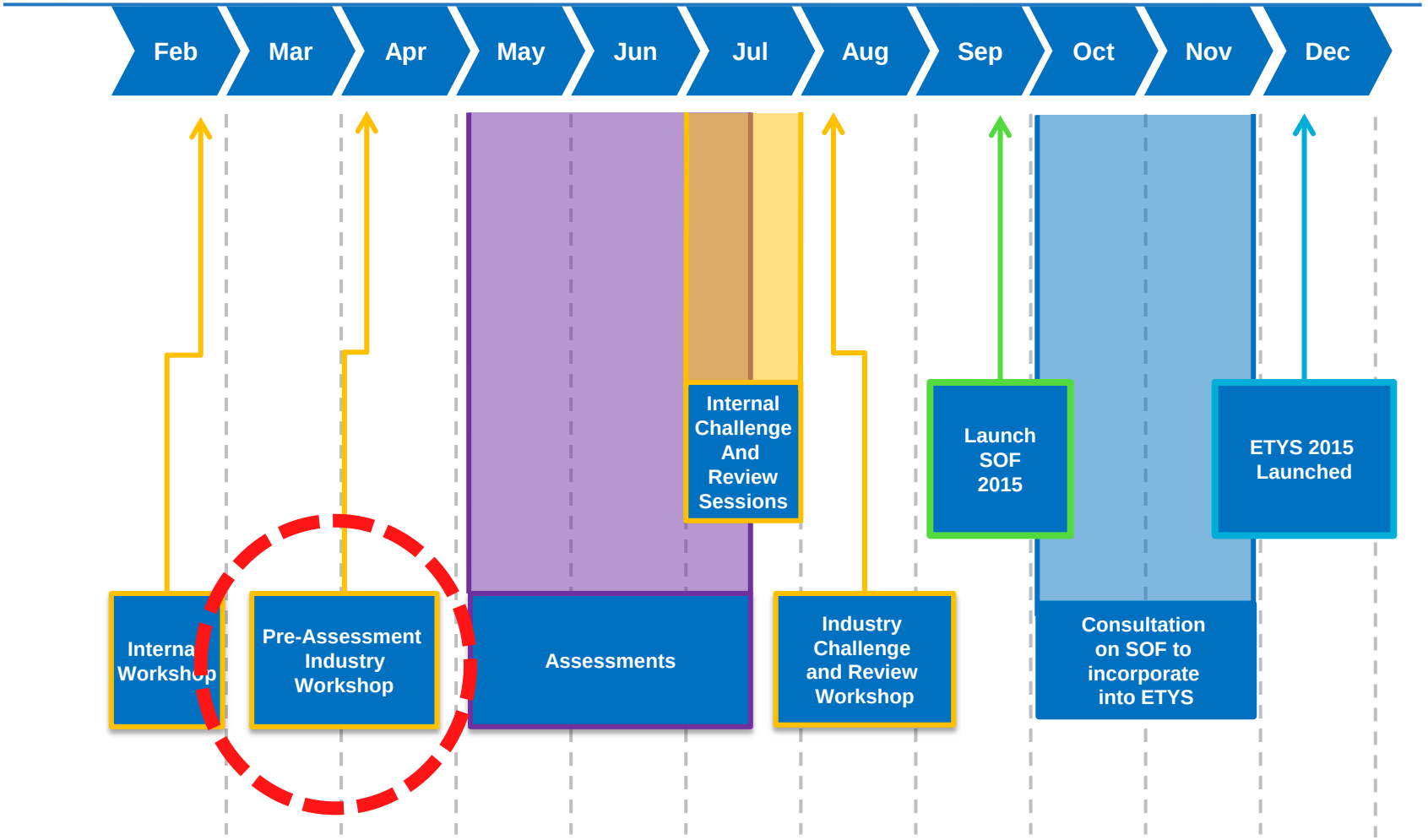
# SOF and the interaction with market players

nationalgrid

| How? \ Who? | Service Providers (Generators, Aggregators, Interconnectors) | Onshore and Offshore Transmission Owners | Distribution Network Operators | Manufacturers and Technology Providers |
|---|---|---|---|---|
| Design of the new balancing services | Future revenue streams | Future compliance | DSO services | Future products / Compliance |
| Coordinate the use of existing capability | Additional incentives | Coordination of resources | Coordination of resources | Retrofit vs new design |
| R&D and joint innovation projects | Collaboration and engagement | Collaboration and engagement | Collaboration and engagement | Collaboration and engagement |

**SOF aims to provide necessary input into commercial and regulatory frameworks to ensure future grid operability**

# High Level Development Timeline



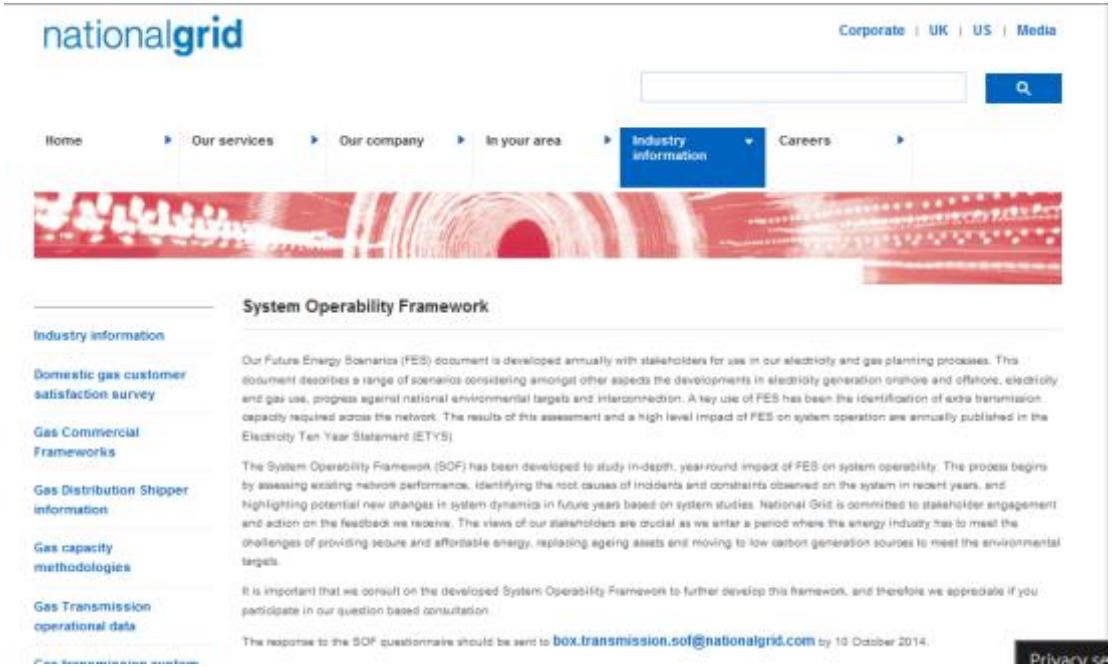

**9th April 2015 – Warwick**

# System Operability Framework

## Thank you for your attention

For more information contact:

box.transmission.SOF@nationalgrid.com




http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/System-Operability-Framework/

nationalgrid

# Electricity Ten Year Statement Update



Stewart Whyte
Network Development Strategy Manager

# Agenda

- Background
- Network Development Policy
- 2014 Outcomes
- Document Launch
- Identification of opportunities
- Customer Capacity Tool

nationalgrid

# ETYS Chapters

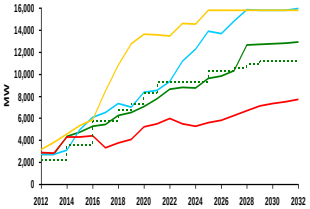
## Network Development Inputs

Stakeholder engagement process


UK Generation and demand Scenarios

## Network Capability and Requirements

Identify future transmission capability requirements



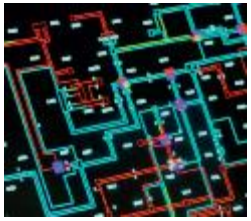

## Network Development and Opportunities

Identify future transmission solutions

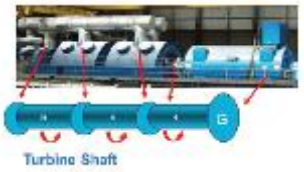

Selection of preferred option

## System Operation

Operational chapter



Articulation of key Operational challenges today and in the future




## Stakeholder Engagement

ETYS 2015 Engagement timeline

Summary of ETYS 2014 Engagement

nationalgrid

# Network Development Policy

What Does the Future Generation & Demand background look like?

How does it affect the network?

What options do we have to accommodate for future requirements?

Decision on options

Publish results end November (licence obligation)

## Input

Stakeholder Engagement Process

UK Generation and Demand Scenarios

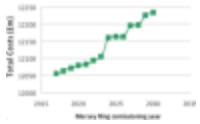
## Requirements

Identify Future Transmission Capability Requirements

## Solutions

Identify Future Transmission Solutions

Calculate Operational Costs for Transmission Solutions



## Select

Development of Options

Selection of preferred options

## Output

Electricity Ten Year Statement (ETYS)

Capital Plan

# England and Wales
# NDP 2014 Recommendations

nationalgrid

| Project | Network Area | No Progression | Slow Progression | Low Carbon Life | Gone Green | Contracted Sensitivity | ETYS 2014 decision |
|---|---|---|---|---|---|---|---|
| Western HVDC Link | Scotland to England border | 2016 | 2016 | 2016 | 2016 | 2016 | Complete Construction |
| Series & Shunt Compensation | Scotland to England border | 2015 | 2015 | 2015 | 2015 | 2015 | Complete Construction |
| Wylfa – Pentir Second Circuit | North Wales | N/A | N/A | 2027 | 2028 | 2025 | Complete pre-construction planning |
| Pentir-Trawsfynydd Second Circuit | North Wales | N/A | 2022 | 2027 | 2021 | 2021 | Delay |
| South Coast Reactive Compensation | South Coast | N/A | 2021 | 2021 | 2020 | 2020 | Delay |
| Bramford-Twinstead New Overhead Line | East Anglia | N/A | 2025 | 2023 | 2023 | 2023 | Delay |
| Hinkley – Seabank New Line | South West | 2029 | 2027 | 2025 | 2026 | 2021 | Continue pre-construction |
| Wylfa-Pembroke HVDC link | North and South Wales | N/A | 2024 | 2024 | 2024 | 2024 | No decision required |

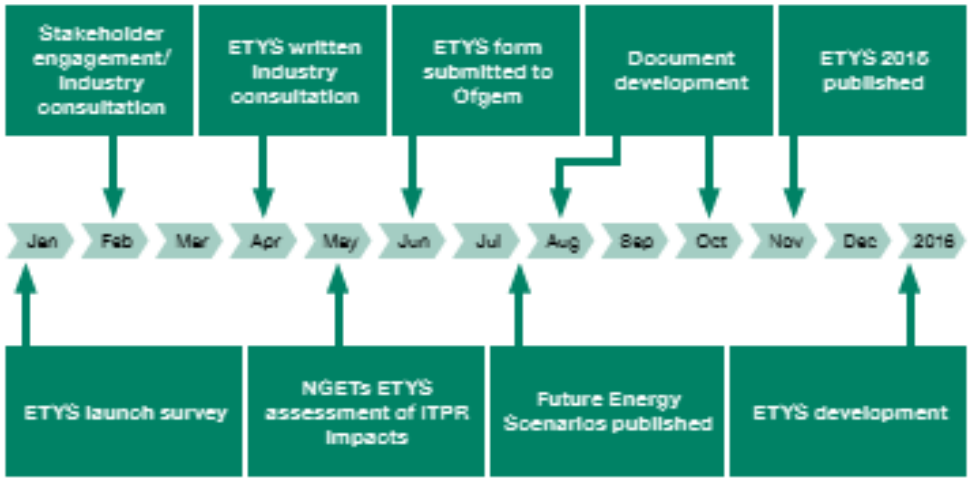
# Scotland
# ETYS 2014 Recommendations

nationalgrid

| Project | Network Area | No Progression | Slow Progression | Low Carbon Life | Gone Green | Contracted Sensitivity | ETYS 2014 decision |
|---|---|---|---|---|---|---|---|
| Shetland HVDC link | SHET | 2020 | 2020 | 2020 | 2020 | 2020 | N/A |
| Western Isles HVDC link | SHET | 2020 | 2020 | 2020 | 2020 | 2020 | N/A |
| Caithness-Moray HVDC Link | SHET | 2018 | 2018 | 2018 | 2018 | 2018 | N/A |
| Orkney 132kV Sub Sea link | SHET | 2018 | 2018 | 2018 | 2018 | 2018 | N/A |
| Beauly – Denny reinforcement | SHET/SPT | 2015 | 2015 | 2015 | 2015 | 2015 | N/A |
| Central 400kV Upgrade | SPT | N/A | 2021 | N/A | 2019 | 2019 | N/A |
| Dumfries and Galloway | SPT | N/A | 2023 | N/A | 2023 | 2023 | N/A |

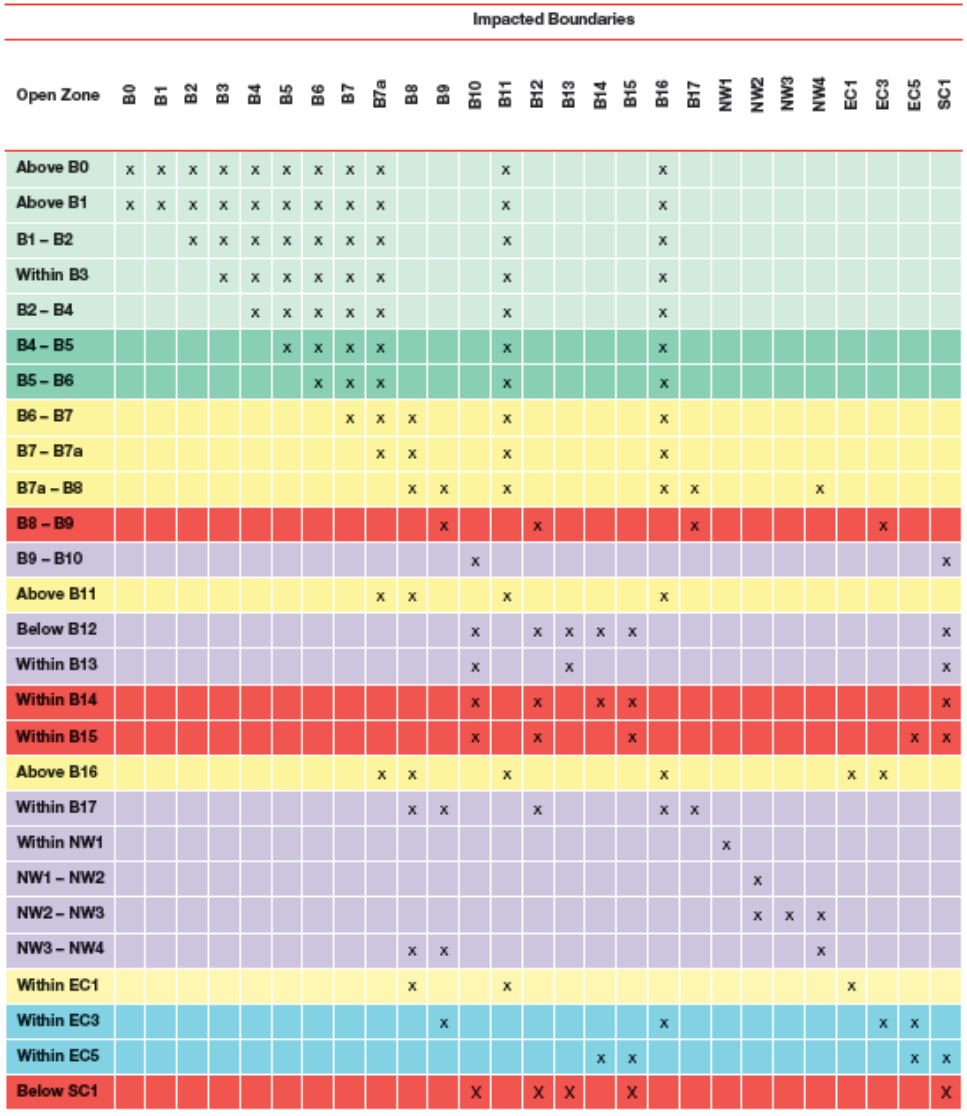
# Stakeholder Engagement


- 522 signed up to receive ETYS
- 302 opened document
- 189 clicked Link
- 58.9% open rate of document



# ETYS 2014 Capacity Identification

- Chapter 4 Network Opportunities
  - Highlights boundaries regionally
  - Provides a high level view of connection timescales
  - Opportunities for connection and service provision
  - Key issues affecting the area
  - Linked to Chapter 4.3 Commercial Opportunities



| | Impacted Boundaries | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Open Zone | B0 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B7a | B8 | B9 | B10 | B11 | B12 | B13 | B14 | B15 | B16 | B17 | NW1 | NW2 | NW3 | NW4 | EC1 | EC3 | EC5 | SC1 |
| Above B0 | x | x | x | x | x | x | x | x | x | | | | x | | | | | x | | | | | | | | | |
| Above B1 | x | x | x | x | x | x | x | x | x | | | | x | | | | | x | | | | | | | | | |
| B1 – B2 | | | x | x | x | x | x | x | x | | | | x | | | | | x | | | | | | | | | |
| Within B3 | | | | x | x | x | x | x | x | | | | x | | | | | x | | | | | | | | | |
| B2 – B4 | | | | | x | x | x | x | x | | | | x | | | | | x | | | | | | | | | |
| B4 – B5 | | | | | | x | x | x | x | | | | x | | | | | x | | | | | | | | | |
| B5 – B6 | | | | | | | x | x | x | | | | x | | | | | x | | | | | | | | | |
| B6 – B7 | | | | | | | | x | x | x | | | x | | | | | x | | | | | | | | | |
| B7 – B7a | | | | | | | | | x | x | | | x | | | | | x | | | | | | | | | |
| B7a – B8 | | | | | | | | | | x | x | | x | | | | | x | x | | | | x | | | | |
| B8 – B9 | | | | | | | | | | | x | | | x | | | | | x | | | | | | x | | |
| B9 – B10 | | | | | | | | | | | | x | | | | | | | | | | | | | | | x |
| Above B11 | | | | | | | | | x | x | | | x | | | | | x | | | | | | | | | |
| Below B12 | | | | | | | | | | | | x | | x | x | x | x | | | | | | | | | | x |
| Within B13 | | | | | | | | | | | | x | | | x | | | | | | | | | | | | x |
| Within B14 | | | | | | | | | | | | x | | x | | x | x | | | | | | | | | | x |
| Within B15 | | | | | | | | | | | | x | | x | | | x | | | | | | | | | x | x |
| Above B16 | | | | | | | | | x | x | | | x | | | | | x | | | | | | x | x | | |
| Within B17 | | | | | | | | | | x | x | | | x | | | | x | x | | | | | | | | |
| Within NW1 | | | | | | | | | | | | | | | | | | | | x | | | | | | | |
| NW1 – NW2 | | | | | | | | | | | | | | | | | | | | | x | | | | | | |
| NW2 – NW3 | | | | | | | | | | | | | | | | | | | | | x | x | x | | | | |
| NW3 – NW4 | | | | | | | | | | x | x | | | | | | | | | | | | x | | | | |
| Within EC1 | | | | | | | | | | x | | | x | | | | | | | | | | | x | | | |
| Within EC3 | | | | | | | | | | | x | | | | | | | x | | | | | | | x | x | |
| Within EC5 | | | | | | | | | | | | | | | | x | x | | | | | | | | | x | x |
| Below SC1 | | | | | | | | | | | | X | | X | X | | X | | | | | | | | | | X |

nationalgrid

# Customer Interface Tool

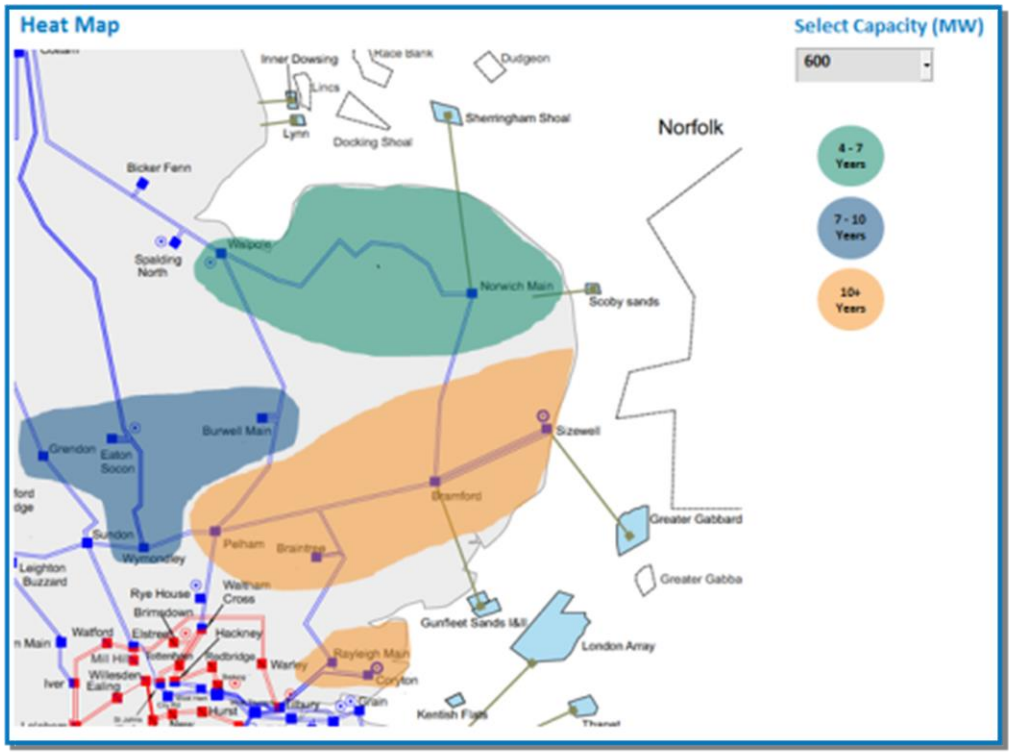
**Why?**

**What are we trying to achieve?**

- Requested by Industry
- Provide clarity for potential applicants
- Improve Customer Connection Process

**Who have we consulted?**

- Customers
- Transmission Owner
- System Operator




**Please visit our stand for demo and feedback!**

nationalgrid

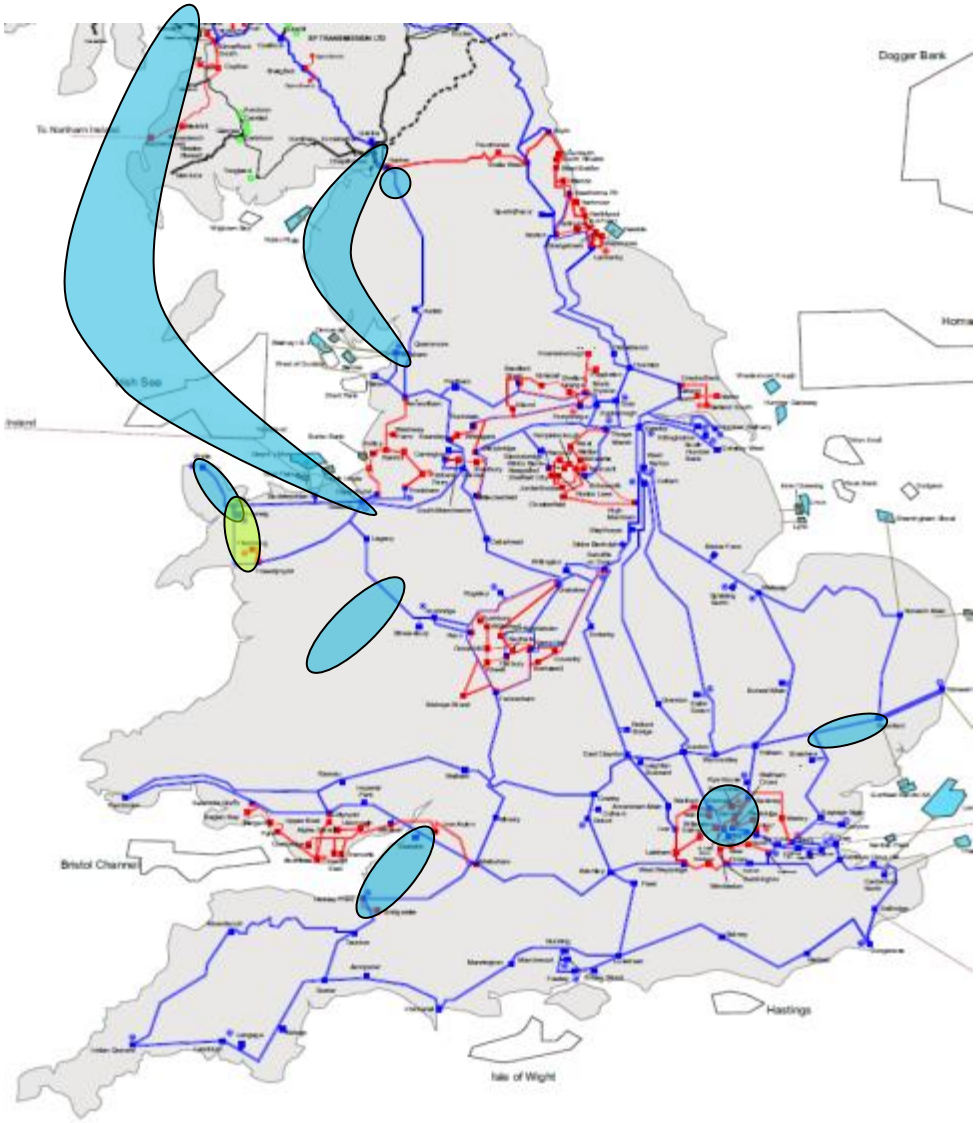
# National Grid TO Major Projects



Duncan Hughes
Planning Application Team Manager

nationalgrid

# National Grid's Major Projects




## In Construction

- London Tunnels
- Series Compensation
- Western Link (HVDC Interconnector with Scotland)

## In Pre-Construction

- Hinkley Point C Connection (~54km)
- North Wales (~40km)
- North West Coast Connections (~167km)
- Mid Wales (~50km)
- Bramford-Twinstead (~29km)

# Scotland – England Reinforcements

**Western HVDC Link**

- Joint venture between National Grid and Scottish Power
- 2.2 GW CSC HVDC Link
- ~420km
- Converter station construction commenced 2013
- Subsea cable installation commenced 2014
- Completion scheduled for 2016/17

**Series Compensation**

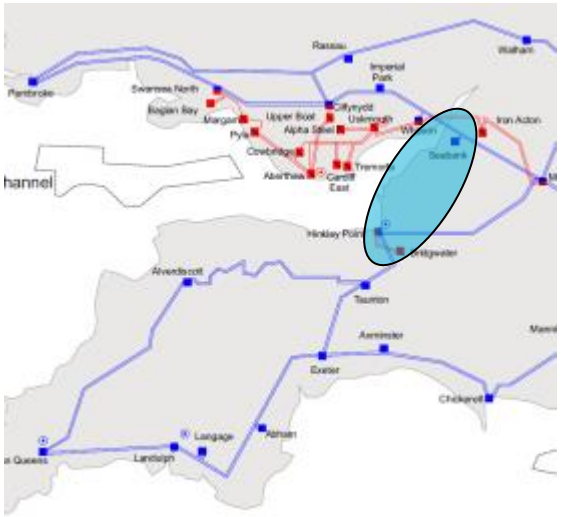
- Co-ordinated project with SPT
- Maximises effectiveness of existing assets
- Fixed and thyristor controlled capacitors
- Commissioning in progress

nationalgrid

# London Cable Tunnels

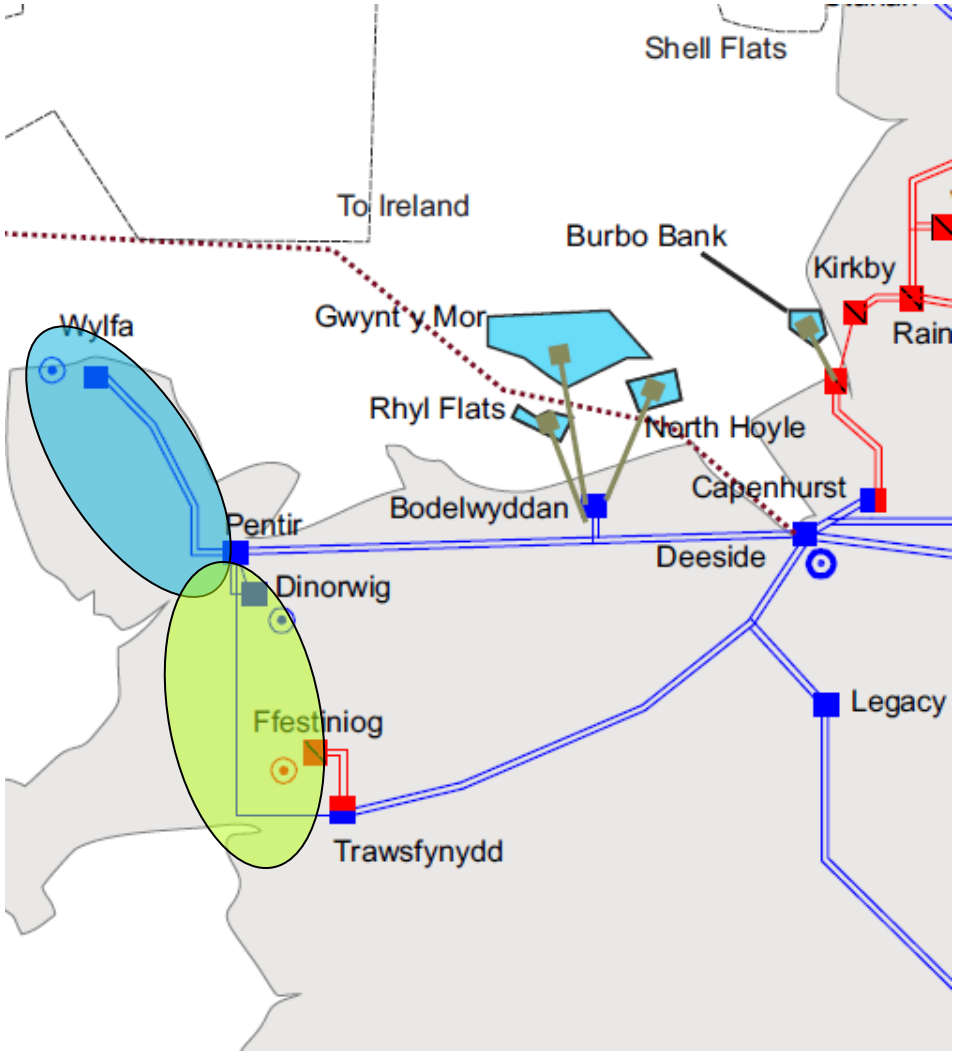

- Scheme value ~ £900m
- Asset replacement of old 275 kV oil filled cables
- Upgrades London network to meet future requirements
- 35.5 km of new tunnels containing 400 kV double circuits
- Construction scheduled to complete in 2018

# Hinkley Point C Connection




- New 400kV double-circuit from Bridgwater to Seabank, ~ 46km OHL, + 8km underground cable
- Connections new generation at Hinkley Point (3.3 GW) and Seabank (1.2 GW)
- First use of T-pylon
- DCO application submitted May 2014
  - Secretary of State decision expected 2015
- Ofgem SWW funding review underway, 1 – 2 year process
- 5 years of pre-construction development work
- Completion expected 2021

# North Wales




- New 400kV double-circuit from Wylfa to Pentir, ~40km
- Connecting new nuclear (2.8 GW) and wind generation (2 GW)
- Preferred route corridor announced January 2015
- Stage 3 consultation in 2015
- DCO application scheduled for 2017
- Changeable generation background over the course of development

# North West Coast


- Potentially up to ~275km new circuits
- Facilitates connection of 3.4 GW new nuclear generation
- Stage 2 consultation process complete
  - Final design to be confirmed
- SWW and DCO requirements
- Completion scheduled for 2024

SP ENERGY NETWORKS

# Customer Seminar
# SP Transmission Update

Cathie Hill

February 2015

# Update Topics

- Progress on major upgrades
- Update on SWW projects
- Overview of connection timescales

# SPT Major Reinforcements

## Western HVDC Link

- Main building erecting commenced at Hunterston Converter Station
- 6 out of 8 HVDC land cables installed in Scotland
- First 'landing point' drill at Ardneil Bay complete and pipe installed
- First marine campaign complete


## Hunterston Kintyre

- SPT onshore drilling and duct installation complete
- Substation construction commenced

## Beauly Denny

- Continuing with tower line construction and substation works
- Transfer Capability available by end 2015

- MSCDN – commissioning final unit
- Series Comp – in construction
- East-West – re-conductoring and substation works progressing – outage dependent

## 4.4GW Upgrade

Series Compensation Moffat Platform Erection –

Re-conductoring OHL over M74

# Dumfries & Galloway Strategic Reinforcement

## Main project drivers

- Replace assets approaching end of life and remove infrastructure no longer required
- Facilitate renewables in the area

## Current Status

- Options generated and technically assessed
- Stakeholder survey carried out
- Options for route corridors and substation locations identified

## 2015 Plan

- Public consultation – two stages, post General Election
- Cost Benefit – facilitate connections, impact on boundaries
- Need case submission end 2015


## Connecting in this Area

- Likely that any generation will impact transmission network
- GSP transformer replacement, OHL re-conductoring triggered
- Restricted access becoming very difficult to manage
- Timescales set by SWW reinforcement - 2023

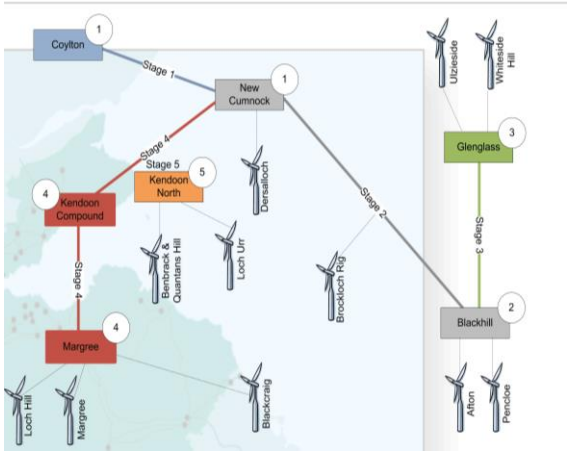
# South West Scotland

## Progress since last seminar

- Coylton – New Cumnock – Coylton works done, 275kV tower erection ongoing, New Cumnock civil
- 132kV circuits - remaining Section 37 consents received Feb 15, contracts for OHL, transformers, switchboards


Coylton - New Cumnock OHL


New Cumnock S/S



Network under construction

## Connecting in South Ayrshire

- Building 275kV/132kV infrastructure for 2016 &2017 connections
- Earliest connection in this area likely to be 2019
  - Reinforcement of new assets,
  - Changes at Kilmarnock South
  - Upgrading required at Maybole and New Cumnock GSPs
- Timescales could be longer where new 132kV overhead lines needed

# Connection Considerations

- Make good use of pre and post application meetings
- We will look at ways to connect you that avoid long lead times – but it may be un-avoidable
- We might look at ‘collaborative connections’ – though not always achievable
- Where connection is at distribution but impacts transmission we will look to use ARC techniques – more info at the round tables

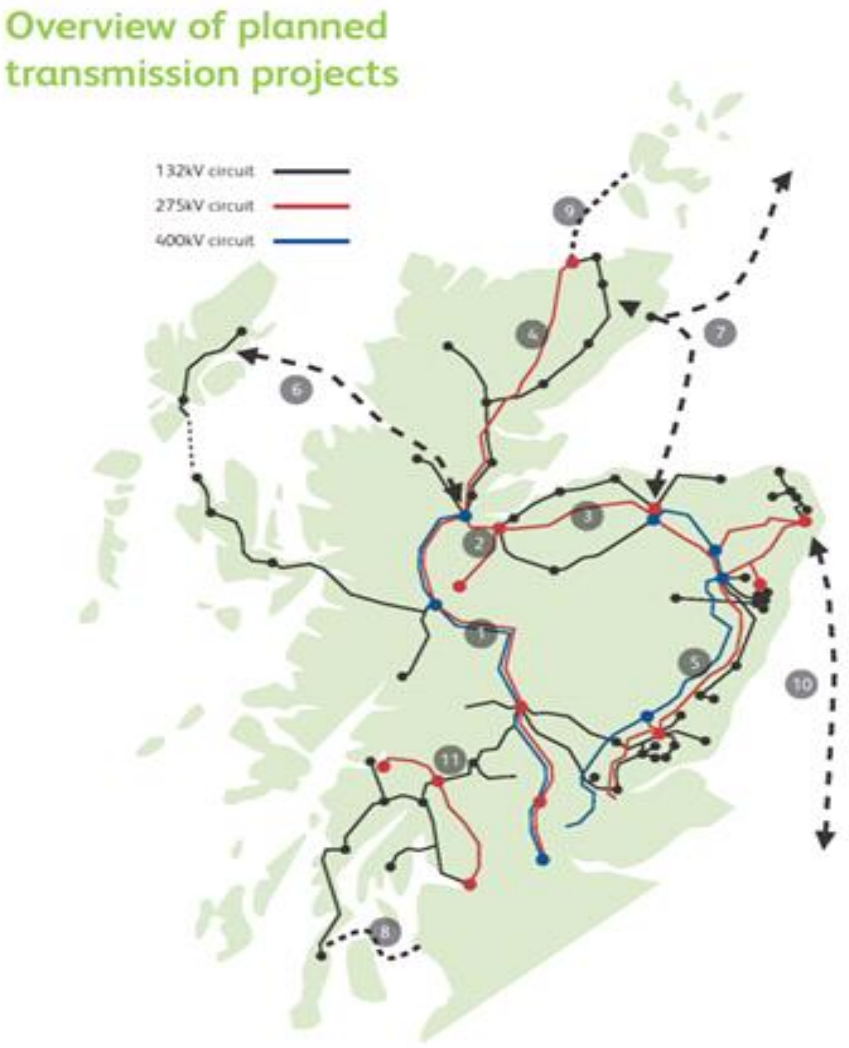
# SHE Transmission Update


**Danny McMillan**

**February 2015**

Scottish and Southern Energy
Power Distribution

# Projects Due to Complete During 2015




**Large SWW Projects in Construction with Scheduled Completion 2015:**

**1 – Beauly Denny 400kV**

**3 – Beauly Kintore 275kV**

**Beauly Mossford OHL**

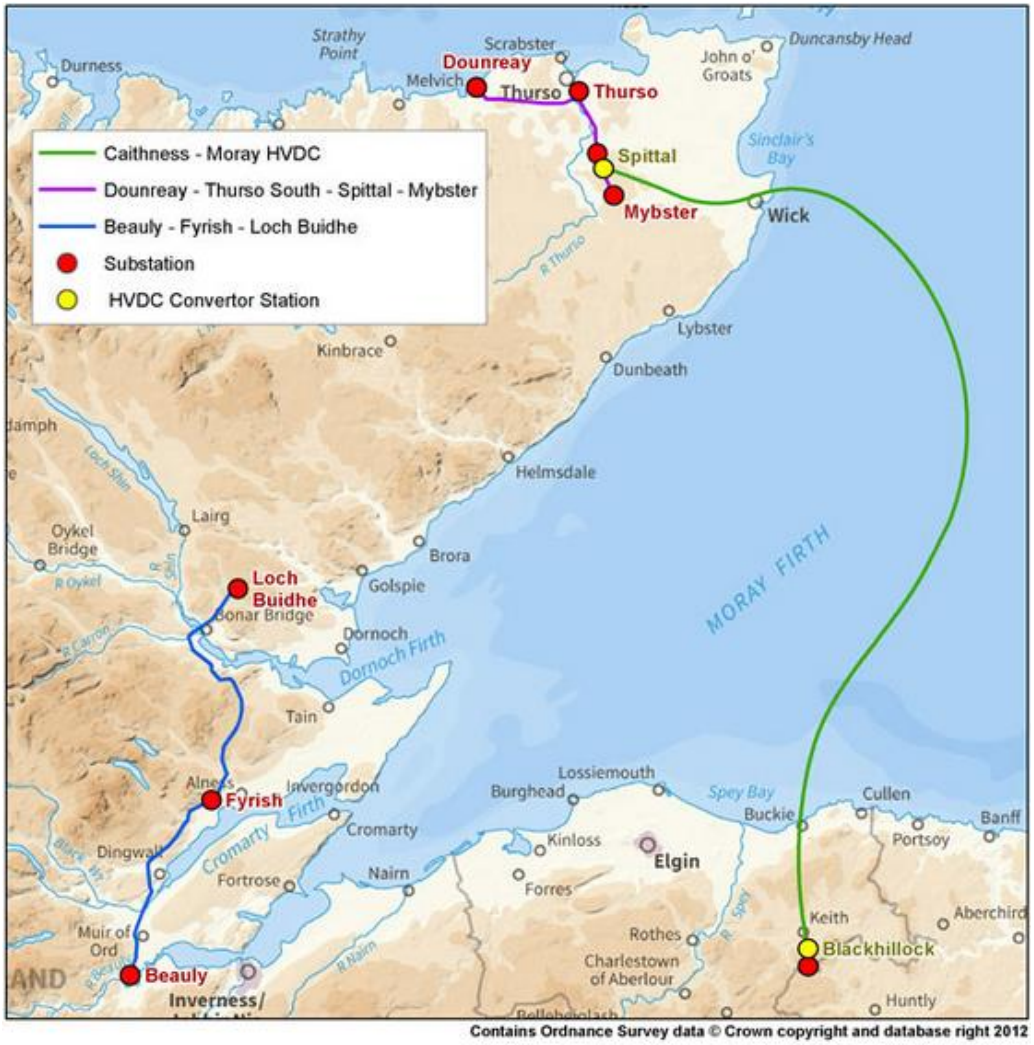
**8 – Kintyre Hunterston 220kV Subsea**

Scottish and Southern Energy
Power Distribution

# Kintyre Hunterston – Making Good Progress

Scottish and Southern Energy
Power Distribution

# Caithness – Moray HVDC Link




- Scheme Cost & Outputs submission is now approved
- Contract for HVDC Link is in place
- Design process for the link is well underway
- Land & subsea cable manufacture underway ahead of schedule
- Overall scheme completion scheduled for 2018
- Construction works well underway @ both Spittal & Blackhillock sites

Scottish and Southern Energy
Power Distribution

# Blackhillock Substation Site

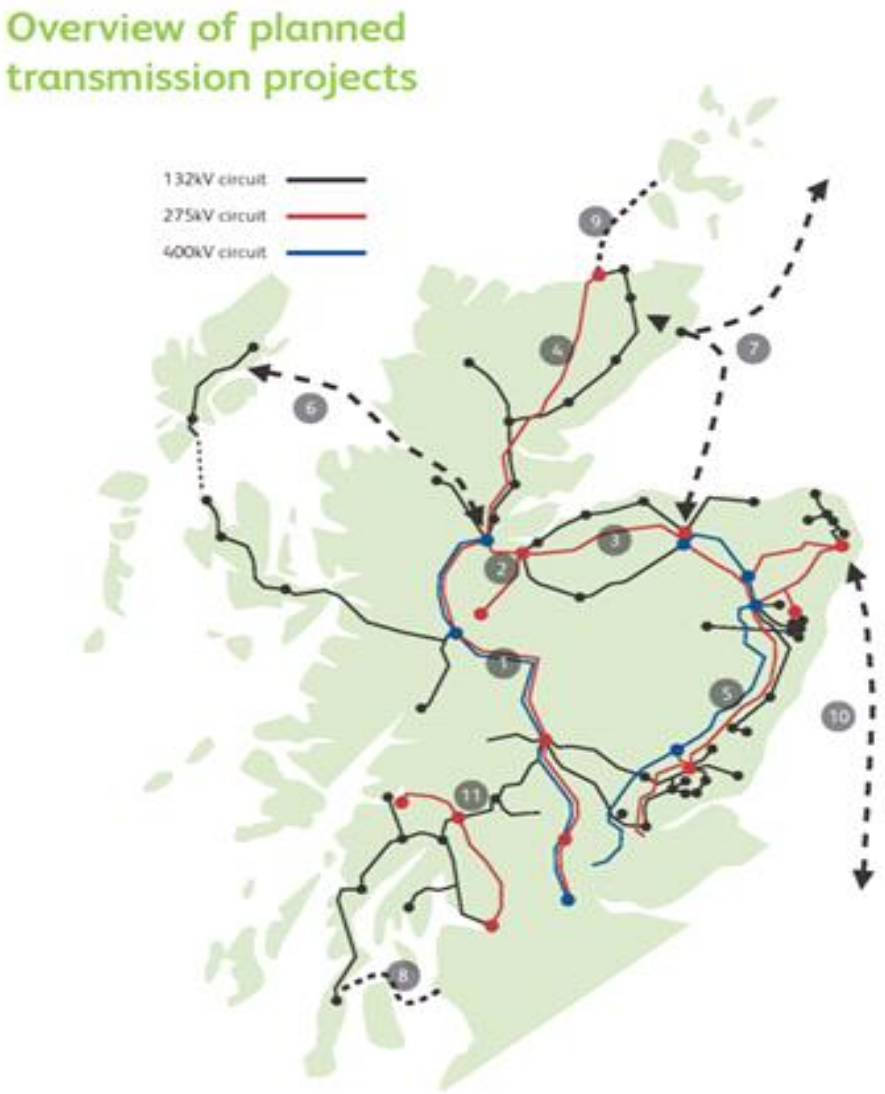

Scottish and Southern Energy
Power Distribution

# Blackhillock Substation Site


- 6 miles of drainage
- Over 4.5 miles of cable containment
- 1.3 miles of permanent road
- Copper earth tape ~ 14 times length of the Forth Road Bridge
- 1.1 miles of electric security fencing

Scottish and Southern Energy
Power Distribution

# Future SWW Schemes (Near term)




**Needs Case Submission 2015**

**5 – East Coast Stage 1**

**Island Connections:**

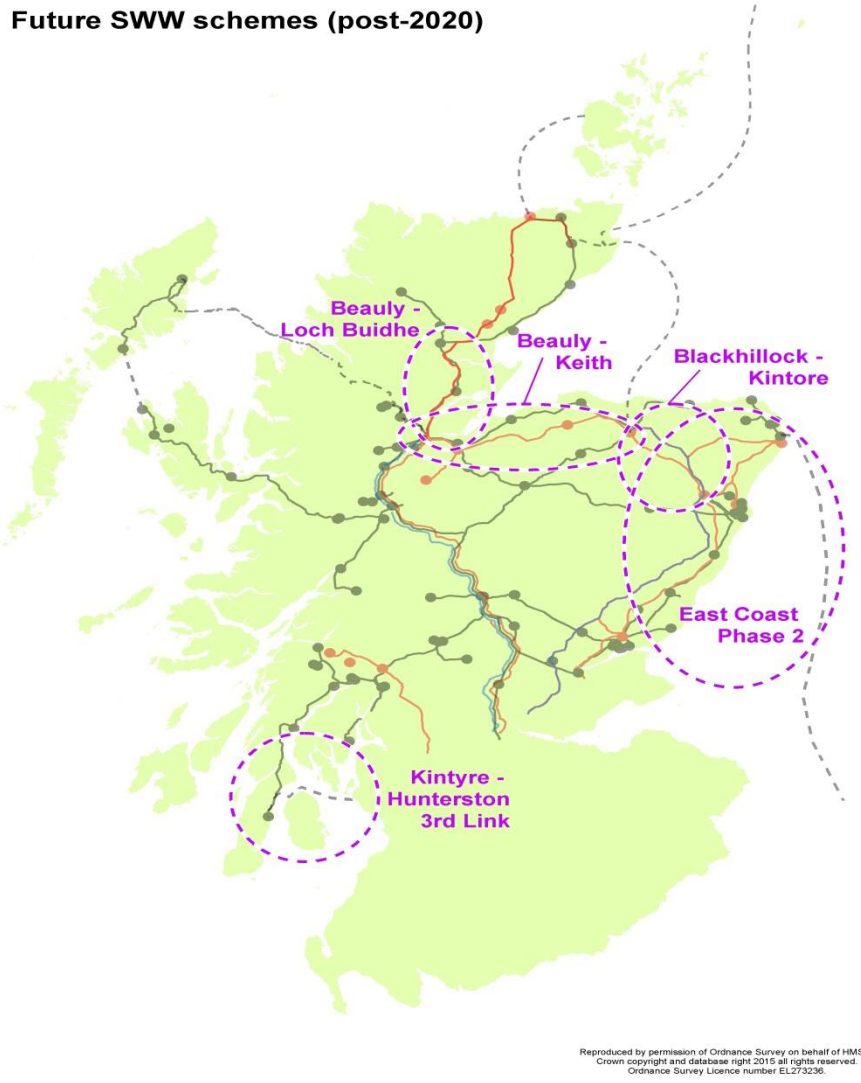
**6 – Western Isles HVDC Link**

**7 – Shetland HVDC Link**

**9 – Orkney AC Link**

Scottish and Southern Energy
Power Distribution

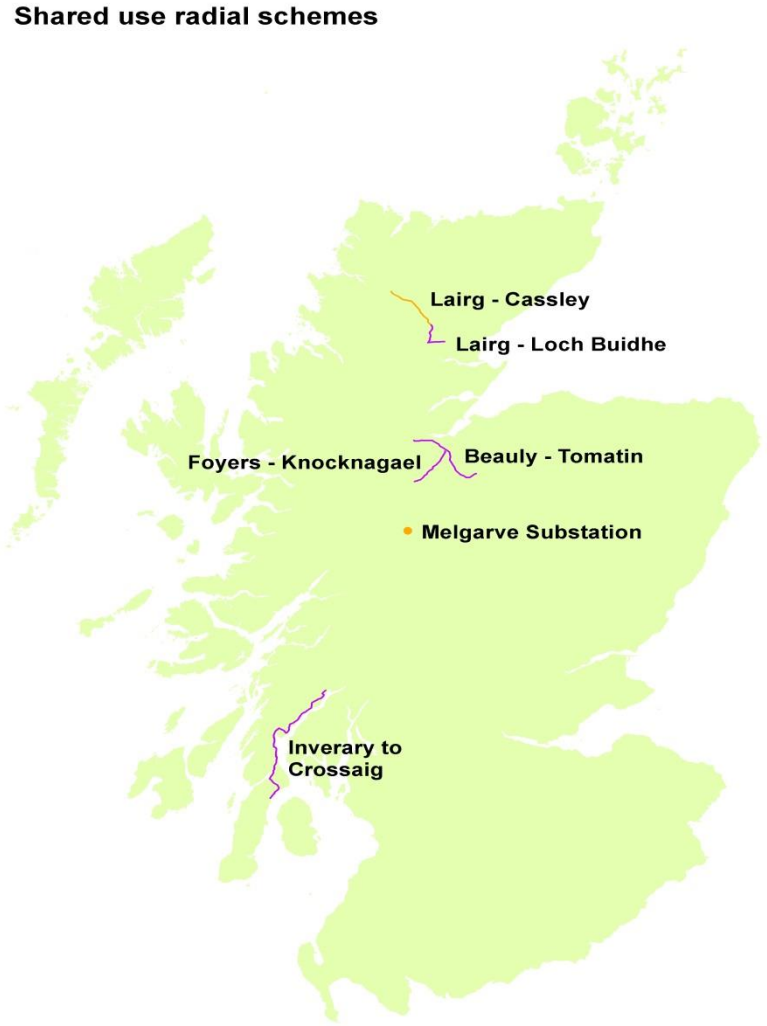
# Future SWW Schemes (Long term)




- Beauly to Loch Buidhe 275kV Circuit
- Beauly to Keith 400kV Circuit
- Blackhillock to Kintore 400kV Circuit
- East Coast Stage 2
- Kintyre – Hunterston 3rd Circuit

Scottish and Southern Energy Power Distribution

# Shared Use Infrastructure Schemes

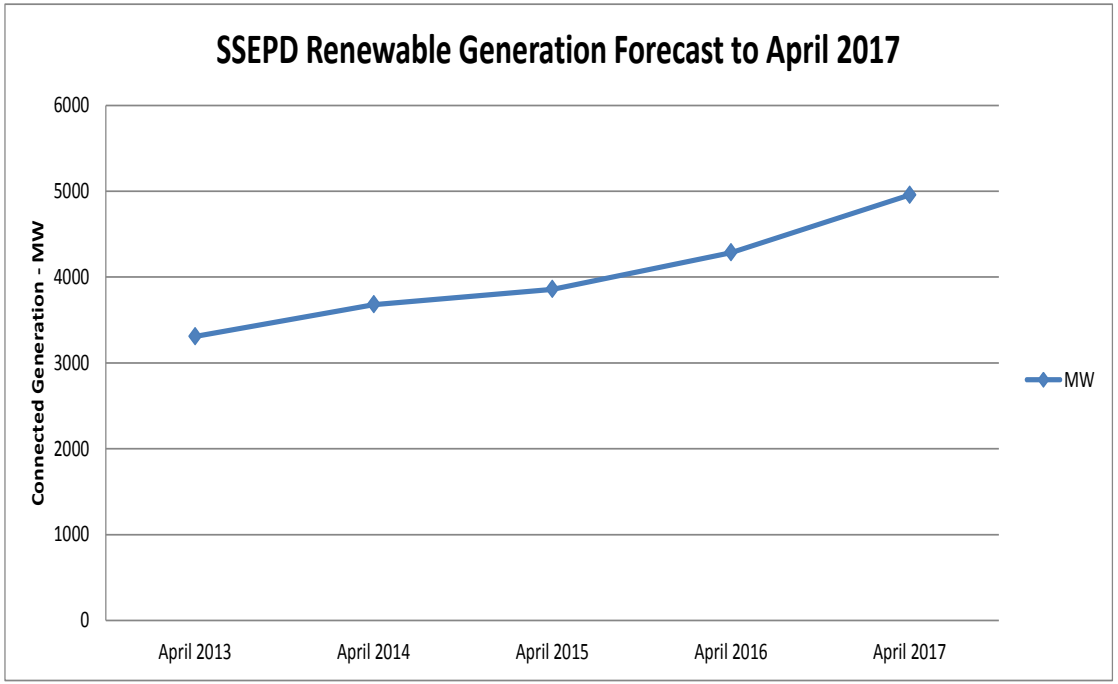





- Knocknagael – Foyers Upgrade
- Beauly – Tomatin
- Melgarve Substation
- Inveraray – Crossaig
- Lairg - Loch Buidhe OHL
- Lairg - Cassley

Scottish and Southern Energy
Power Distribution

# Generation Connected




- 3.8GW connected now
- Expect to ramp up connection in next 2 years (4.5 – 4.9GW)

Scottish and Southern Energy
Power Distribution

# Questions?

Scottish and Southern Energy
Power Distribution

nationalgrid

# Question and Answer Session

Julian Leslie
Electricity Customer Manager

nationalgrid

# Round Table Sessions & Interactive Zones

1. Customer Policy
2. Charging and Capacity Development
3. ITPR - Onshore Competition
4. ITPR - Network Options Assessment
5. SP Transmission Construction Update
6. SHE Transmission Connections Update
7. National Grid Electricity Transmission
8. Network Development & Operability
9. Ancillary Services
10. Market Outlook
11. EMR
12. Customer Connections

nationalgrid

# Feedback Forms

Please fill in your feedback form to help us improve the next event

Thank you

# Lunch Break

Round Table sessions will start at 13:00

nationalgrid

# Round Table Sessions & Interactive Zones

1. Customer Policy
2. Charging and Capacity Development
3. ITPR - Onshore Competition
4. ITPR - Network Options Assessment
5. SP Transmission Construction Update
6. SHE Transmission Connections Update
7. National Grid Electricity Transmission
8. Network Development & Operability
9. Ancillary Services
10. Market Outlook
11. EMR
12. Customer Connections

# Thank you for coming

Canapés and drinks will be available

Have a safe journey home

For any unanswered questions please contact your

Customer Account Manager or e-mail
transmissionconnections@nationalgrid.com