Connections Customer Forum

National Railway Museum

25 April 2017

Welcome

- General housekeeping
- Format of the day
- Filming and photography
- Ask questions
- Voting and green card feedback

Connections Update

April 2017

Mike Hammond

Head of Connections Services

Connections performance update – April 2017

Current performance

- BMCS (YTD) NPg 4th overall (86.3%), Connections 3rd (84.5%)
- Month of March Connections 4th place – 83.8%
- 16/17 Reg Yr Av time to Quote – LVSSA&B outperformed Ofgem max target
- 16/17 Reg Yr Av time to Deliver – LVSSA&B just outside Ofgem min target
- ICE – Delivered 22 original committed actions
- Also delivered 9 additional ICE actions committed in mid-year update

Outputs delivered

- ✓ Small Works re-structure live Jan17
- ✓ Monthly updates of heat map data
- ✓ Contract milestones capacity clawback
- ✓ Workshop on access to network records
- ✓ Stakeholder technical workshop
- ✓ Technical workshop – Assessing PoCs

Ongoing initiatives

- Small works transformation implemented January 2017
- Medium & Large Works transformation ongoing in 2017
- Commercial changes – ECCR, contract milestones, A&D fees
- Technical innovation - ANM, storage, ELD's
- Development of 2017-18 ICE work plan; continued stakeholder engagement and process change

ED1 environment

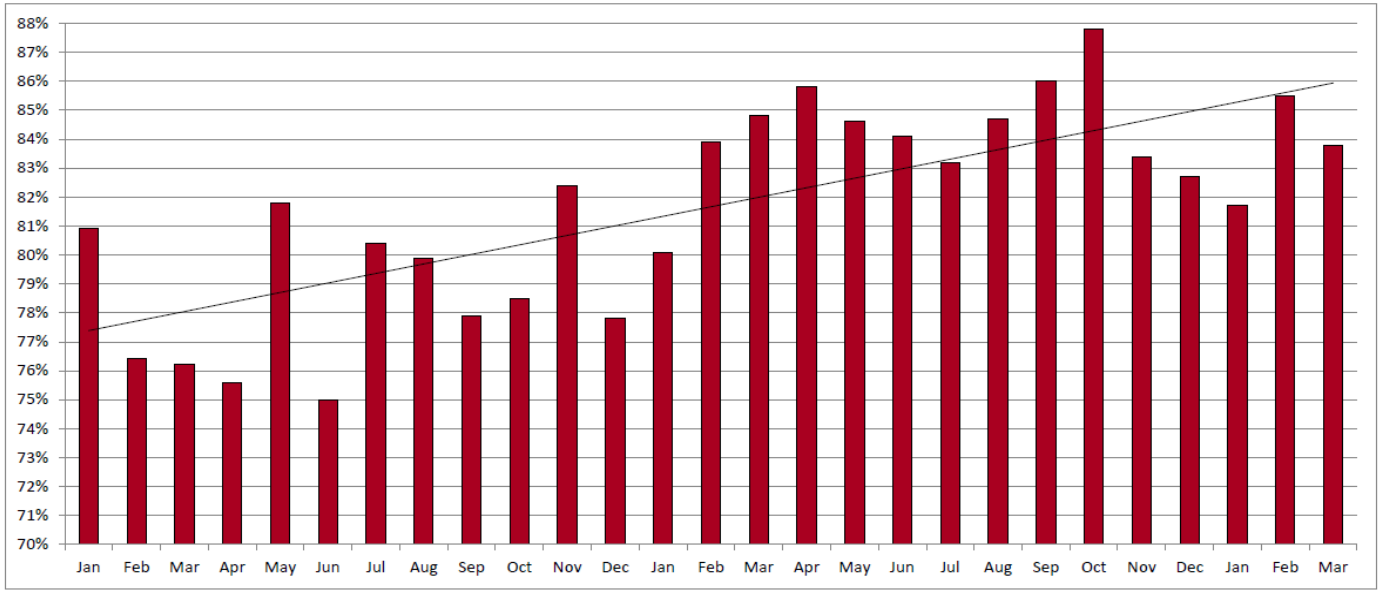
- Minor cons BMCS reward/penalty
- Minor cons TTC/TTQ reward
- Major works ICE incentive – penalty only
- Constrained Networks
- QMEC consultation outcomes

Connections BCMS scores by month

BMCS Weekly Scores - Connections - Week 16 2017

Connections - Overall score by month with position Page 10

Month	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17
Connections	80.1%	83.9%	84.8%	85.8%	84.6%	84.1%	83.2%	84.7%	86.0%	87.8%	83.4%	82.7%	81.7%	85.5%	83.8%
DNO Position	5	4	2	1	3	2	3	3	2	1	5	6	6	3	4



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Industry Update

Jim Cardwell
Head of Trading and Innovation

Topics

- Smart, flexible energy system – consultation
- Network constraints – report
- Quicker and more efficient connections (QMEC) - update
- Second comer connections – implementation
- Assessment and design fees – consultation
- Northern Energy Taskforce – report

A smart, flexible energy system – call for evidence recap

Published November 2016

Responses provided January 2017

Removing policy and regulatory barriers 10
- Enabling storage
- Clarifying the role of Aggregators

Providing price signals 17
- System value pricing
- Half-hourly settlement
- Smart tariffs
- Smart distribution tariffs
- Other government policies

A system for the consumer 15
- Smart appliances
- Ultra low emission vehicles
- Consumer engagement with DSR
- Consumer protection
- Cyber security

The roles of different parties 4
- The impact of system changes
- The need for immediate action
- Further future changes to arrangements

Innovation 2

Next steps Spring 2017

48 questions; over 200 responses

https://www.ofgem.gov.uk/publications-and-updates/smart-flexible-energy-system-call-evidence

A smart, flexible energy system - our response, key messages

- Global energy systems are experiencing change and this is particularly acute in the UK
- Roles and responsibilities in the UK system work well, but the challenge is to manage the system to allow for flexibility
- Policy needs to facilitate innovation, diversity and experimentation
- More customer engagement and regulatory innovation will be needed
- Strategic priorities for the development of distribution charges need much clearer focus
- The transition to a more active DSO merits careful consideration
- Both third party and network companies should be allowed to deploy and operate distributed energy resources
- There needs to be a re-think of the funding routes available to support a 'whole energy system' approach for innovation projects
- We are committed to bringing our broad experience to help policy makers to get the balance right and support economic growth

Our response in full is available online at:
http://www.northernpowergrid.com/document-library/policies-reports-regulation

Our position on embedded benefits

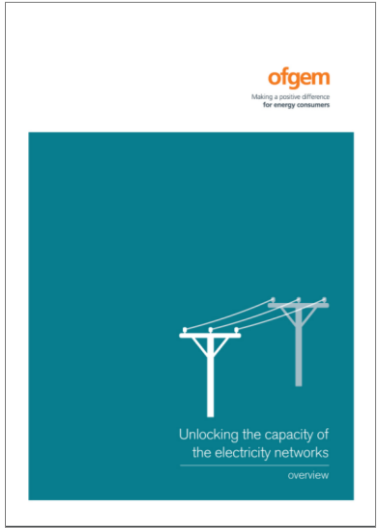
- As patterns of network usage change and new technologies are introduced, it is important that energy policy keeps pace
- The issue of charging for generators is a growing one and needs to be addressed
- However, unintended consequences from any remedy must be avoided so as not to transfer the market distortion and retain the inequity
- We would welcome a holistic review of any wider distortions in encouraging the efficient development of the energy system

Next steps – a smart, flexible energy system

- BEIS and Ofgem published a joint call for evidence on 10 Nov 2016
  - Ofgem will consider next steps on distribution constraint management and the interactions with the wider system in its forthcoming Spring Plan publication https://www.ofgem.gov.uk/system/files/docs/2016/11/a_smart_flexible_energy_system_a_call_for_evidence.pdf
- In summary:
  - The call for evidence considered how the management of the networks may need to evolve to meet the changing system needs
  - New technologies and approaches need to enable efficient and flexible use of the network
  - New approaches to help manage distribution network constraints and support an efficient wider system
  - Greater clarity needed on how storage connects to the network

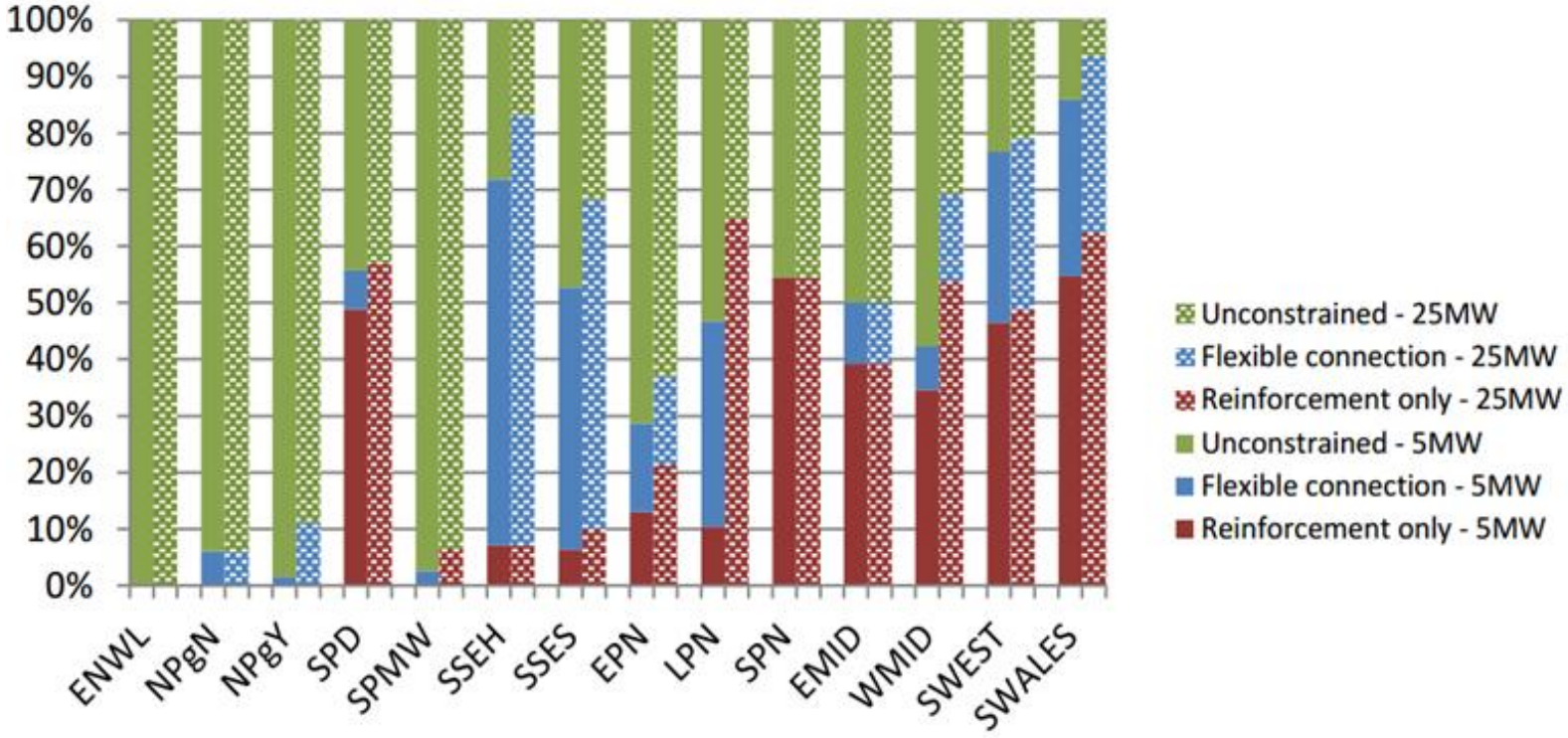
Unlocking the capacity of electricity networks

- Ofgem alerted by a constraint in the South West that created a connections queue, particularly for new generation
- Seeking to understand the national picture, whether DNOs are fulfilling their duties and if the regulatory framework needs change
- Consultations through 2016 and Ofgem status report in Q1, 2017
- Ofgem reports:
  - www.ofgem.gov.uk/node/111071
  - www.ofgem.gov.uk/node/111056



Ofgem report, February 2017

Well positioned for generation capacity



Source: Ofgem, Unlocking the capacity of the electricity networks, February 2017

Constrained areas for generation

- The bulk of our substations have spare capacity
  - ✓ 2/3 of higher voltage circuits have material capacity for new generators
  - ✓ 91% of larger substations can accept 25MW of new generators
- In four locations generators have accepted more flexible, innovative offers instead of paying for upstream reinforcement
  - ✓ Blyth – constraint on NGET equipment
  - ✓ Seal Sands – constraint on our equipment
  - ✓ Hull East to Roos – single customer constraint on the circuit
  - ✓ Driffield – constraint on our equipment (at Driffield and Beverley)
- In 2015/16, the flexible connection of 130MW EHV generation saved £4m in connections costs

Engaging with Ofgem on Quicker More Efficient Connections (QMEC)

- Ofgem published its update on industry progress on 29 January 2016
- It summarised the progress DNOs have made on the actions Ofgem set out in QMEC September 2015

  https://www.ofgem.gov.uk/system/files/docs/2016/01/quicker_and_more_efficient_connections_jan_2016_-final_29.01.2016_0.pdf
- Key areas of development include:
  - Improved visibility and availability of flexible connections, flexible payment terms and consortia for connecting customers
  - Development of a set of principles and rules for the introduction and enforcement of milestones in connection offers
  - Development of an action plan for industry to progress more effective queue management
  - Ofgem invited DNOs and stakeholders to propose trials that might enable reinforcement to take place in anticipation of future connection customer requirements

Engaging with customers on QMEC

- Releasing capacity - reducing the need for reinforcement through discussion with;
  - existing connected customers to relinquish unused contracted capacity
  - customers in receipt of connections offers where the work is not progressing (queue management using milestones principles)

- Progressing trials for investment ahead of need - Ofgem will continue to work with DNOs and stakeholders and publish periodic updates

New regulations for second comer rules

Department for Business, Energy & Industrial Strategy

- New second comer rules went live on 6 April 2017

  https://www.gov.uk/government/publications/potential-changes-to-the-electricity-connection-charges-regulations-2002

- Second comer regulations
  - These regulations protect connections customers by securing refunds if ‘second comers’ connect to assets they have paid for
  - The repayment period increases from 5 to 10 years from the date of the first connection

Assessment & Design fees - supporting BEIS

Department for Business, Energy & Industrial Strategy

- BEIS published call for evidence 24 March 2016
- Sought responses by 6 May 2016

  https://www.gov.uk/government/consultations/assessment-and-design-fees-call-for-evidence

- In summary:
  - DNOs should charge the customers requesting the services to create a fairer allocation of costs
  - Following the call for evidence BEIS has been working on its impact assessment and we have provided additional connections data
  - BEIS plan to consult in 2017 on draft regulations

Sponsoring the Northern Energy Taskforce

- An ambitious programme of work through 2017 that will develop an energy strategy for the Northern Powerhouse
  - ✓ Develop a plan for the northern energy system to 2030
  - ✓ Create a vision and a roadmap for a northern energy system
  - ✓ Set out a plan for ‘energy devolution’

NORTHERN ENERGY TASKFORCE

http://www.ippr.org/publications/northern-energy-taskforce-a-call-for-evidence

Northern Energy Taskforce roundtables

Roundtable	Topics
Tees Valley	**Energy supply:** What is the future of energy supply in the North? What are the impacts of this for businesses and residents?
North East	**Research and development:** How to develop research in the North and ensure products get to market
Yorkshire & Humber	**Supply chain:** How to develop the jobs and GVA associated with energy generation and align other core northern industries to supply domestic and international energy markets
North West	**Finance**: How to finance an energy strategy for the North
Yorkshire & Humber	**Decentralised energy:** Examining the opportunities presented by the transition to localised power and heat systems. Thinking about strategic ways of working in this transition
Manchester	**Devolution**: How to ensure the North has the powers it needs to implement a northern energy strategy

Northern Energy Taskforce initial reports

- Opportunities
  - ✓ Geological, geographic and historical assets to power and heat the nation
  - ✓ The low-carbon economy and assets needed to deliver new sources of generation
- The North of England could:
  - ✓ Act as a pathfinder for unlocking the energy trilemma
  - ✓ Generate significant economic benefits
  - ✓ Successfully demonstrate a new whole energy system approach and pioneer implementation regionally

Acting on your Feedback

Mike Hammond

Head of Connections Services

Topics

- Incentive on Connections Engagement (ICE)
- How we delivered on our commitments in 2016/17 (Looking Back)
- How we developed our improvement plans for 2017/18 (Looking Forward)
- Your opportunity to tell us what you think

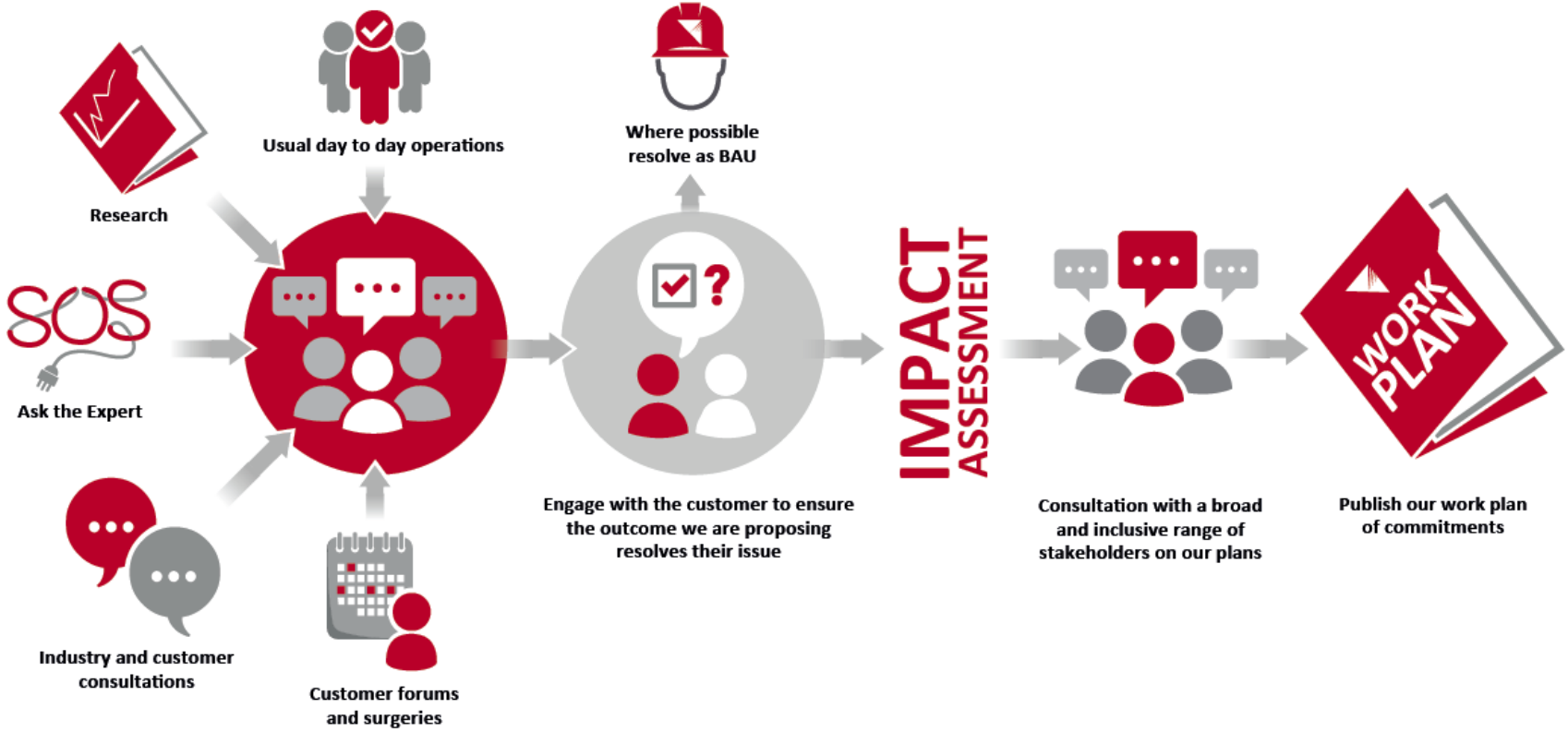
Incentive on Connections Engagement

- The Incentive on Connections Engagement (ICE) drives DNOs to continually improve services to major connections customers
- Each year we produce a detailed work plan of service improvement actions
- Our work plans are developed together with our connections stakeholders, all actions are based on their feedback and ideas

Delivering on our 2016/17 commitments

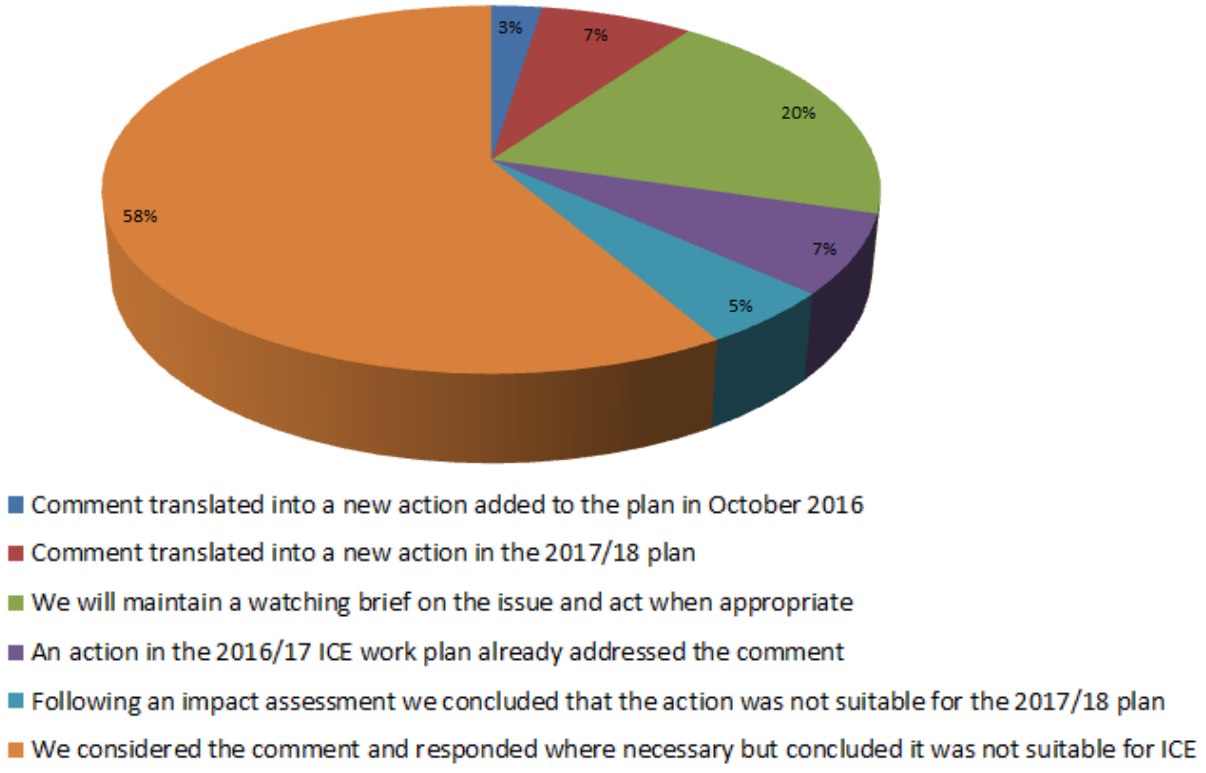
- Our plan for 2016/17 consisted of 31 service improvement commitments
- All actions were derived from our stakeholders comments and feedback
- We have delivered on all the commitments within our gift to complete and will be carrying two over into our Looking Forward plan

Preparing our 2017/18 work plan



Seeking your feedback

- 243 stakeholder comments collected from a range of different sources considered in the preparation of our work plan



Examples of the feedback we received

"Is there a 'simple' guideline for the new connections milestones? I would like to issue to some of our developer/landowner clients so they can understand the process and associated risks"

"Have small workshops on various emerging topics - storage, DNO service procurement, flexible connections…and anymore you think would be relevant."

Attending these events is costly for SMEs - why don't you provide live webinar of the presentations for stakeholders?

"What are you doing to become a DSO as SSE are starting to set out plans and consult with stakeholders on the items required?"

"Can you alter the online application form to include battery storage, or maybe have an 'other' option with the ability to input the technology type?"

"UKPN provided a commitment and timeframe to provide protection settings, and other design-related detail including fault level. Please consider."

Our review of customers comments

- A number of comments generated actions in our 2017/18 plan
- Some stakeholder comments related to non-connection issues
- Some comments related to specific customer projects and are dealt with through BAU
- Some identified emerging issues which we will maintain a watching brief on
- Some issues we will address through normal business operations
  - Emergency response cover for IDNO networks
  - Inventory management services for unmetered supplies

Seeking your feedback

- Do you agree these actions will improve the connections service Northern Powergrid provides?

1/YES 2/NO 3/DON'T KNOW

Provision of information

1.1 We will trial recording the content of our connections forums and workshops and posting it to the web.

1.2 We will trial social media 'Ask the Expert' Q&A sessions on topics identified by our connections customers.

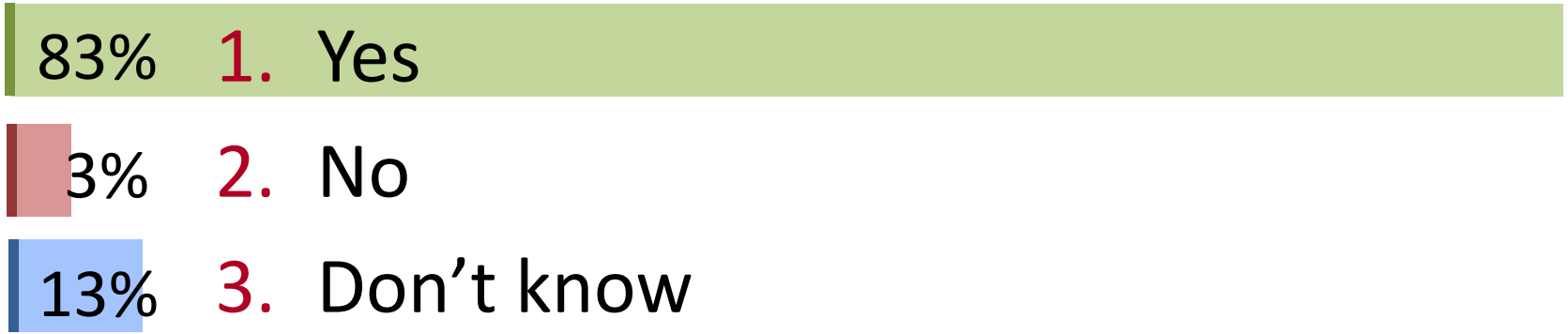
1.3 On timescales for providing protection settings and other design-related detail; we will conduct a formal business review.

1.4 We will produce a simple guide to the implementation of new contract milestones.

1.5 We will hold a workshop for connections customers on how to access Northern Powergrid's mains records.

Provision of information

- Do you agree these actions would improve the connections service Northern Powergrid provides?



Improving our application and delivery process

2.1 We will modify the G59 application form on our website to include an option to connect energy storage.

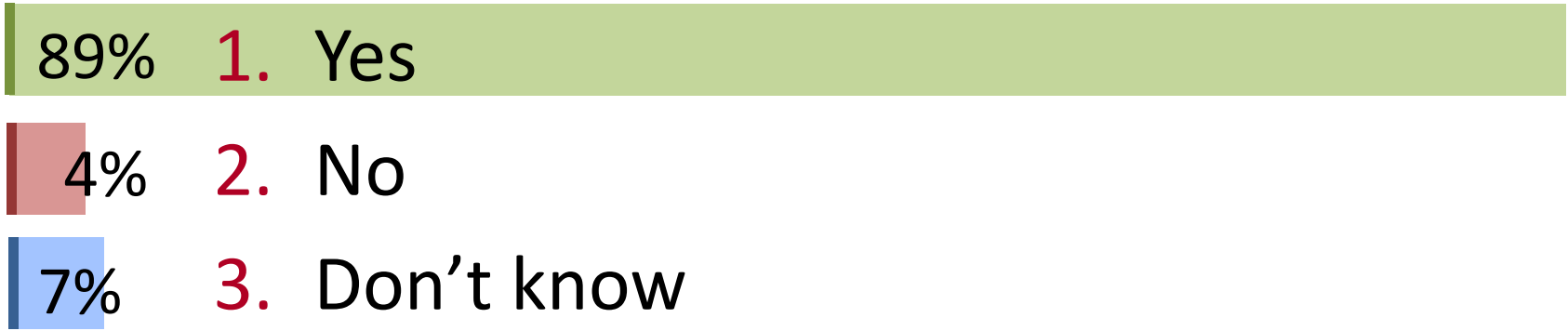
2.2 We will create a quick cost calculator for generation connection applications and make it available on our website.

2.3 We will create a new page on our website that promotes our multi-optioneering (Quote+) service and explains the process to customers.

2.4 We will benchmark our find my MPAN online service against other DNOs and make improvements as required.

Improving our application and delivery process

- Do you agree these actions would improve the connections service Northern Powergrid provides?



Improving our communication and engagement

3.1 We will hold targeted workshops on emerging connections topics suggested by our customers.

Improving our communication and engagement

- Do you agree these actions would improve the connections service Northern Powergrid provides?

93%	1.	Yes
0%	2.	No
7%	3.	Don’t know

Technical and commercial developments

4.1 We will continue to contribute to the national debate on A&D fees and keep our customers informed of the outcomes. On conclusion of the BEIS consultation, we will implement any changes to our existing policies or practices required and communicate these to our customers.

4.2 We will continue to support customers through the T/D interface and engage on their behalf in the activities of the national working parties. Where necessary, we will implement changes to our existing policies and working practices to reflect best practice recommendations.

4.3 We will engage with Ofgem on behalf of our stakeholders on the treatment of the costs for undergrounding of rural network in AONB.

Technical and commercial developments

- Do you agree these actions would improve the connections service Northern Powergrid provides?

76%	1.	Yes
10%	2.	No
14%	3.	Don’t know

Enabling competition

5.1 We will develop an end-to-end process map that covers all aspects of our input services and explains how ICPs can interface with us more effectively.

5.2 We will publish a schedule of rates for the input services available to ICPs so that they can 'pick and mix' the services they require.

5.3 We will update our standard design matrix rules to include unmetered connections and simplify the technical specification.

5.4 We will publish the average time it takes us to issue ICP point of connection and design approvals on our website.

Enabling competition

- Do you agree these actions would improve the connections service Northern Powergrid provides?

93%	1. Yes
0%	2. No
7%	3. Don’t know

NEW Innovation

6.1 We will continue to support and contribute to the national working party on the development of TSO/DSO roles and keep customers informed of the outcomes.

6.2 We will share our vision for the transition of DNOs to DSOs. We will describe the work taking place at Northern Powergrid and seek our customers views on how to shape the outputs of this work.

6.3 We will engage with storage developers to create a suite of standard storage service offers.

6.4 We will develop and publish case studies that share future use cases and applications for energy storage.

Innovation continued

6.5 We will engage with customers on the progress of our first replicable ANM scheme in Driffield, South East Yorkshire.

6.6 We will develop and launch a new 'Low Carbon Connection Gateway' on our website that provides information on different types of LCTs, how to apply for a connection and when to notify us about their installation.

NEW Innovation

- Do you agree these actions would improve the connections service Northern Powergrid provides?

87%	1. Yes
3%	2. No
10%	3. Don’t know

We would also like your view on…

- Overall, would you agree that Northern Powergrid has a comprehensive work plan of service improvement commitments that meets the needs of it's connections stakeholders?

Overall

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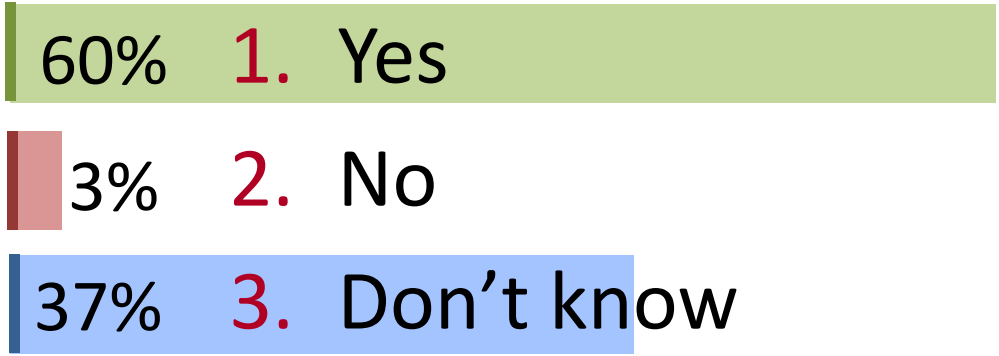


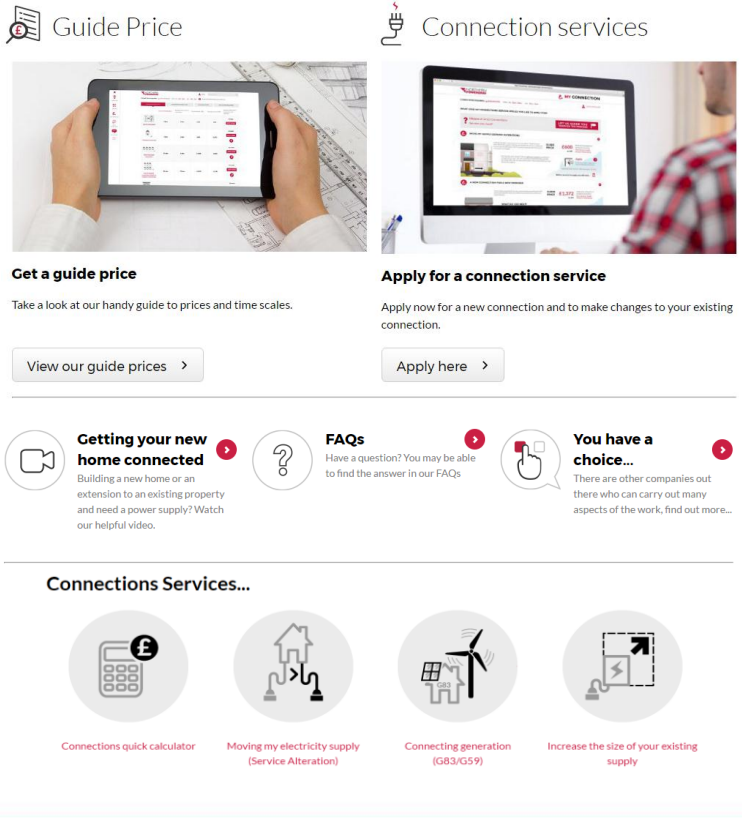
Helping you to Get Connected

Kendra Burrow
Connections Quality Assurance Manager

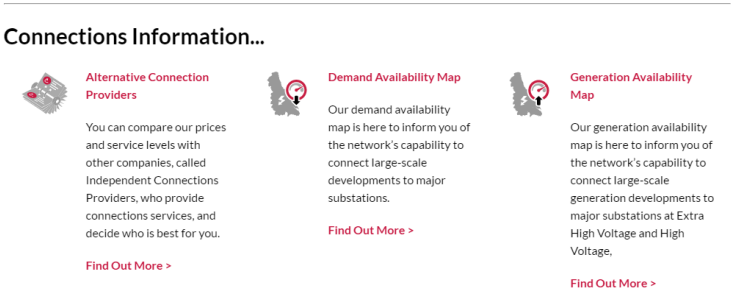
Topics

- Your online experience
- Applying for a connection
- Your online account
- Availability heat maps

Your online experience – get connected



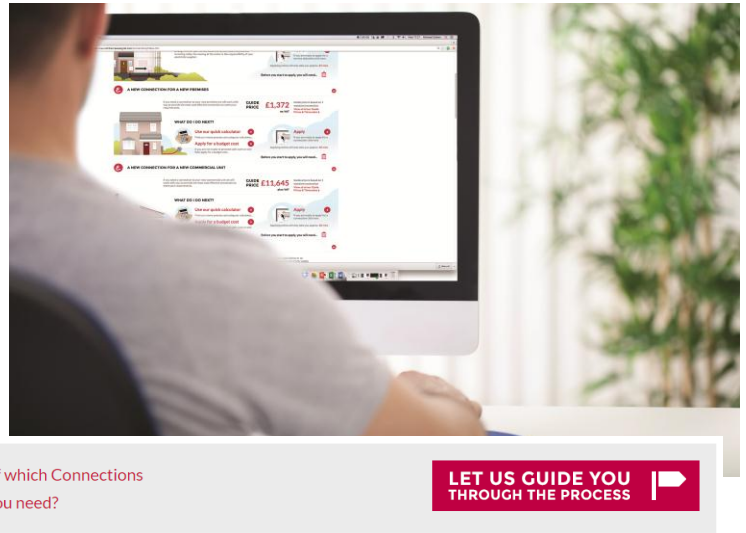
- ✓ Improved prominence of services
- ✓ Limited number of navigational links
- ✓ Improved ‘click ability’
- ✓ Improved search engine
- ✓ Better document library
- ✓ Enhanced FAQs



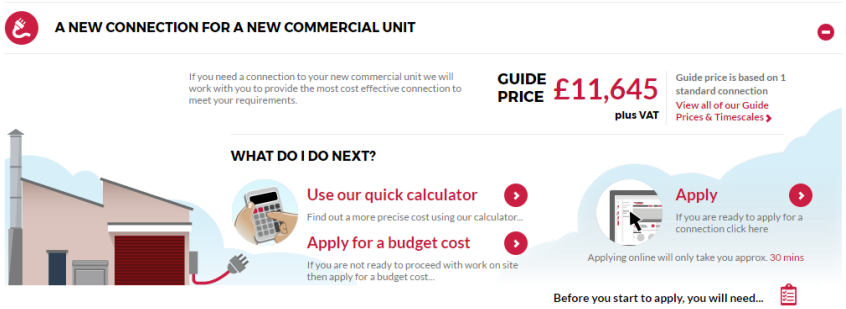
http://www.northernpowergrid.com/get-connected/

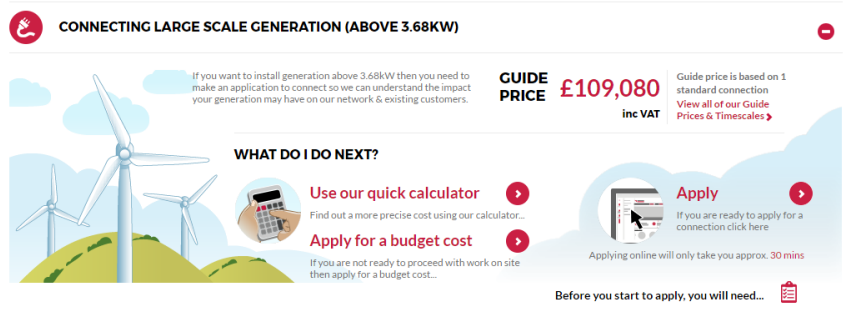
Online applications vs. other formats

- Guides you through the online application process
- Our online system has a pre-defined format that helps us better understand your requirements
- The system has been tried and tested for security purposes which means Northern Powergrid and the user are protected



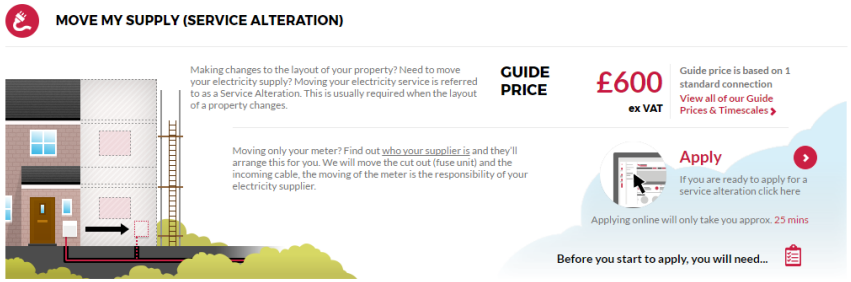
Applying for a new connection



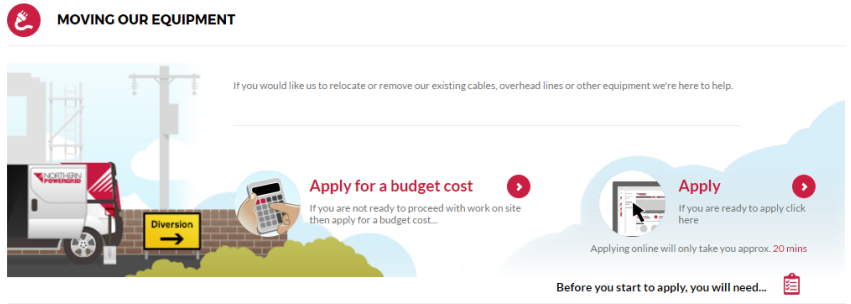


- Application for a new connection
  - ✓ Quick cost calculator
  - ✓ Budget estimate
  - ✓ Firm quotation
- Before you apply you will need:
  - ✓ Contact details
  - ✓ Site details
  - ✓ Requirements

Altering an existing connection

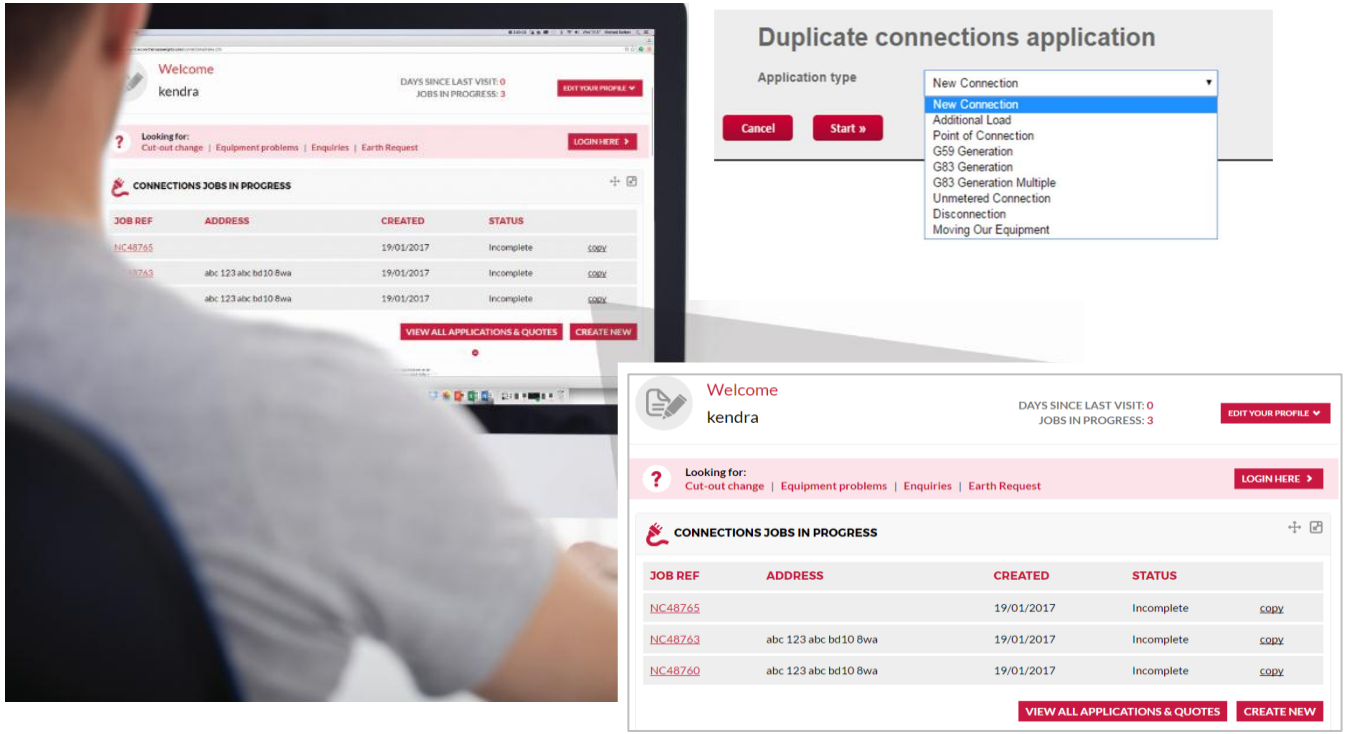


- Moving an existing connection – single/three phase less than 60kw



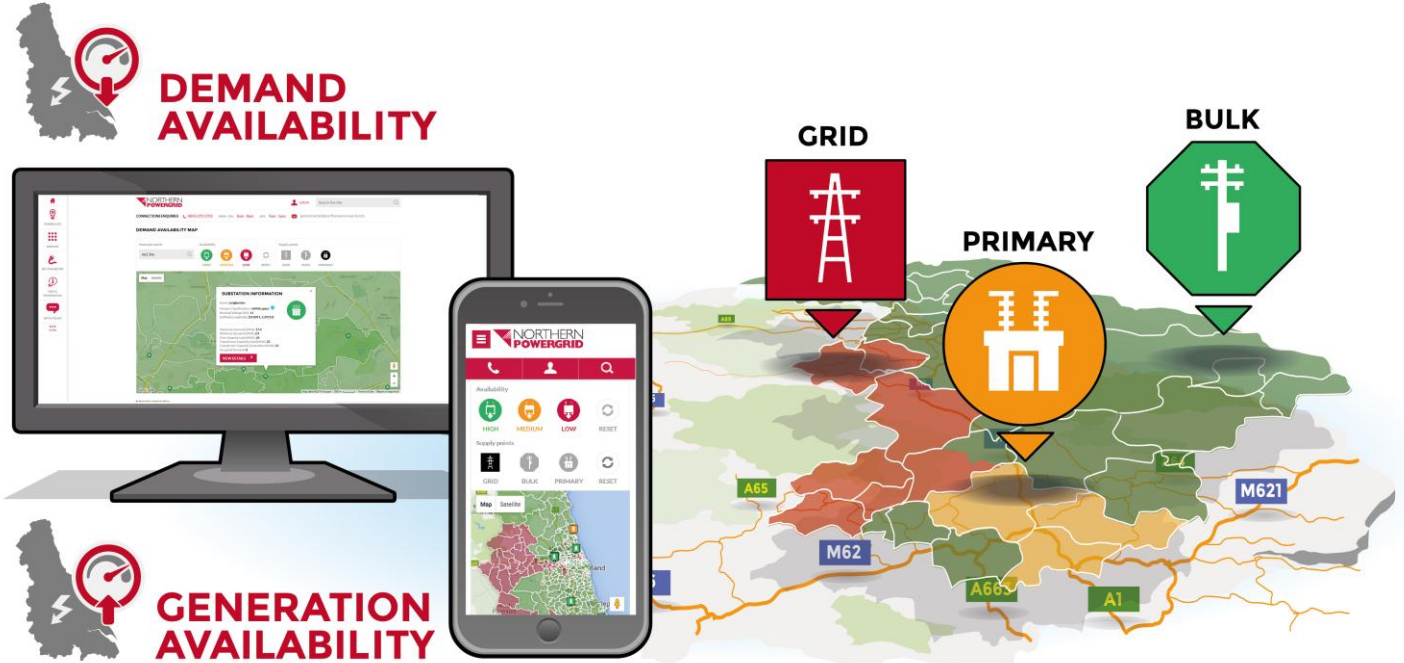
- Moving an existing connection – single/three phase greater than 60kVA

Online account



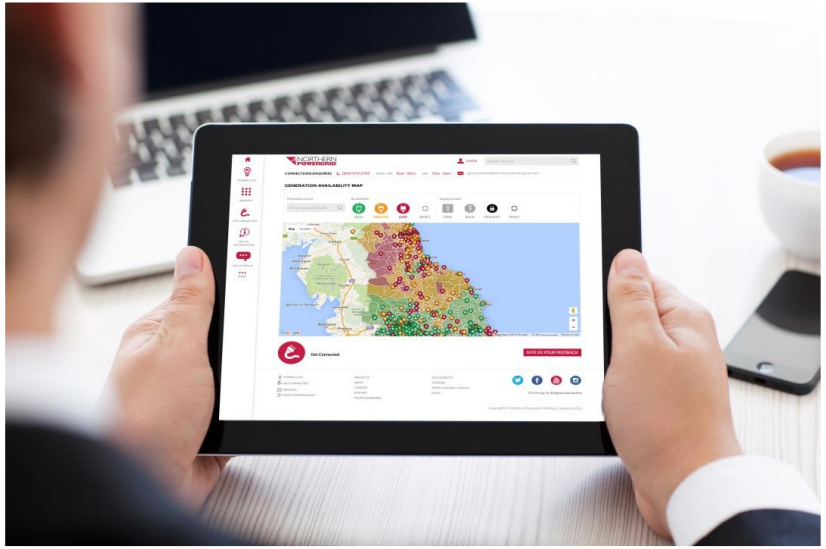
- ✓ View all applications submitted
- ✓ Create a new application
- ✓ Copy an existing application

Improved availability heat maps



Generation availability

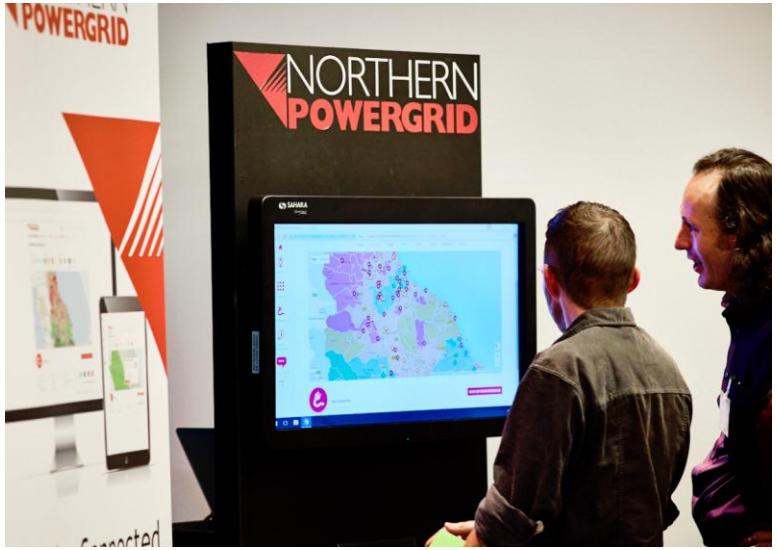
- Our generation availability map is here to inform you of the network's capability to connect large-scale generation developments
- Information available:
  - Fault level
  - Voltage constraints
  - Reverse power flow capabilities
  - Physical constraints
  - Quoted but not accepted schemes
  - Accepted but not connected schemes



http://www.northernpowergrid.com/generation-availability-map

Demand availability

- Our demand availability map is here to inform you of the network's capability to connect large-scale developments to major substations
- Information available:
  - Spare capacity value
  - Maximum demand
  - Minimum demand
  - Transformer rating
  - Accepted but not connected schemes



http://www.northernpowergrid.com/demand-availability-map

Flexible Network Connections

David van Kesteren

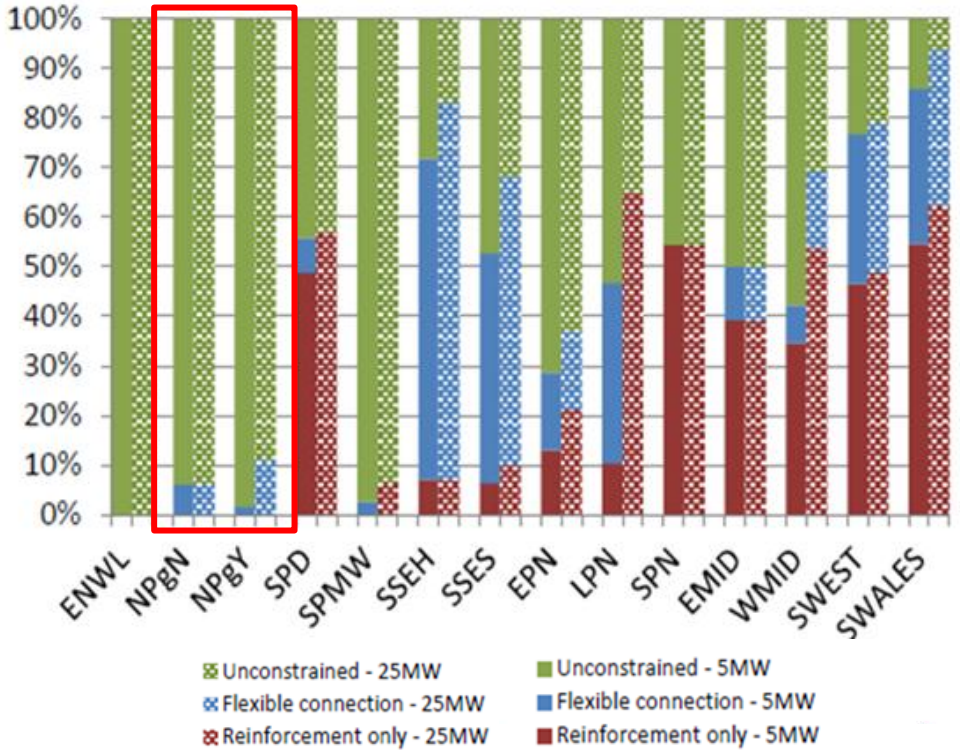
Senior Asset Management Engineer

Topics

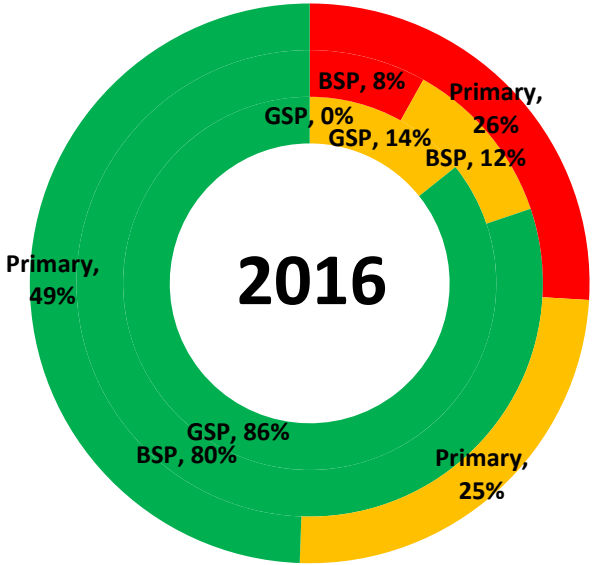
- How constrained is Northern Powergrid's network?
- Update on the progress of our first replicable Active Network Management (ANM) scheme

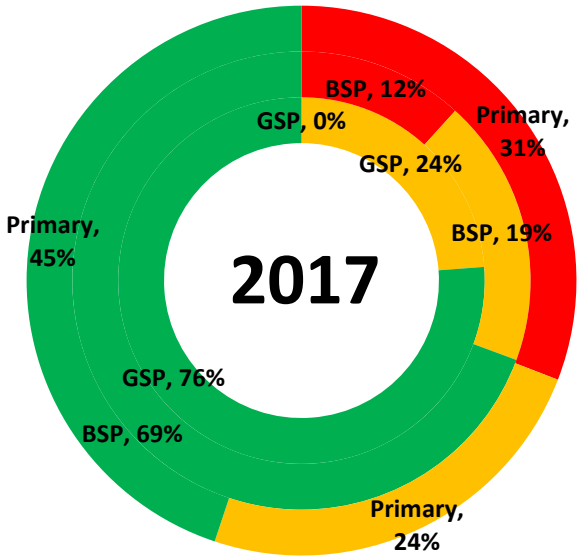
Ofgem report – significant constraints

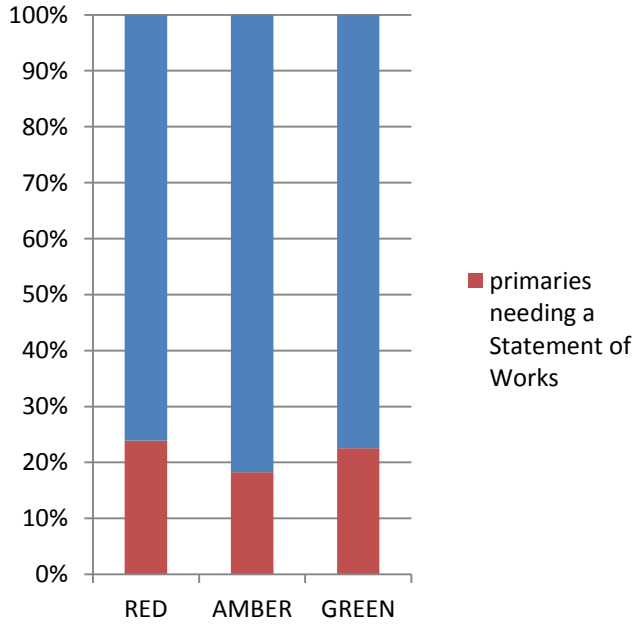
- Results primarily reflect constraints on the transmission network (NGET) at the GSP
- Cost of traditional GSP reinforcement in the region of £20-50m
- Connecting at 132/33kV substations
- Does not reflect constraints at primary substations



Northern Powergrid network constraints by s/s







Main reasons for constraints

- 37% • Network over-voltages
- 27% • Thermal issues
- 15% • Physical constraints
- 10% • Fault level issues
- 10% • Upstream issues

Active Network Management (ANM)

- 129MW of generation in the Driffield group
- Network full at key times;
  - Early Summer mornings
  - Network outages
- ANM will release headroom outside of key periods
- Last In, First Off principle

Active Network Management (ANM)

- Six connection offers made to date;
  - Two accepted
  - One lapsed
  - Three still valid
- Project initiation - Summer 2017
- Completion - Autumn 2018
- Ability to use ANM anywhere - 2019 onwards

Requirements for ANM participation

- Connections at LV are excluded but limited to <250kW at existing sites
- All new HV and EHV connections into the Driffield network must participate
- Modifications to existing connections will often affect curtailment levels for existing ANM participants. The following are examples of where a modified connection may be required to participate;
  - ✓ Increase in export capacity
  - ✓ Increase in installed capacity (with or without a change to export capacity)
  - ✓ Changing the type of generation (with or without a change to export capacity)
  - ✓ Changing the operating regime (where a customer has an existing connection agreement for a specific operating regime)
- A customer requesting a generally more expensive conventional connection will not be required to participate in ANM

Releasing Network Capacity

Mark Johnston
Major Connections Proposals Manager

Quicker More Efficient Connections

Ofgem requested development of regimes to withdraw capacity from customers where it is not being used

Material changes	Construction milestones	Build out timescales	Unused capacity	Diversity
Does a customer requested change impact on their queue position?	Develop 'best practice' milestones in connection offers	Introduce a time limit to 'build out' once connected	Seek reductions from existing customers using <75% capacity	Investigate use of diversity factor when assessing peak export capacity

Efficient use of capacity

In our 2016/17 ICE plan we made a commitment to;

- Continue to participate in the actions being driven by the DG-DNO steering group under Ofgems QMEC work
- We said we would communicate the outcomes to our customers and implement any necessary process or policy changes resulting from these actions

Efficient use of capacity

In October 2016 we added further commitments to;

- Contribute to the ENA best practice guide on fair contract milestones
- Implement standard contract milestones into connection offers
- Implement standard contract milestones to claw back capacity from projects after a maximum build-out period
- Proactively contact all EHV and HV customers utilising less than 75% of their maximum export capability

Implementation of milestones

Feb 2015:
Ofgem Consultation - Quicker More Effective Distribution Connections

Dec 2015:
DG-DNO Steering Group Agree High Level Queue Management Principles

Sept 2016:
Outputs from ENA Consultation Communicated at 3x DG-DNO Fora Events

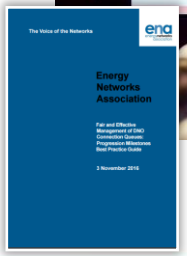
Mar 2017:
Northern Powergrid Amend Contracts

2015 → **2016** → **2017**

Apr 2016:
ENA Fair and Effective Management of DNO Connection Queues – Progression Milestones

Nov 2016:
ENA Best Practice Guide Published

Nov 2016:
Northern Powergrid Inform Customers About Milestone at Connections Forum



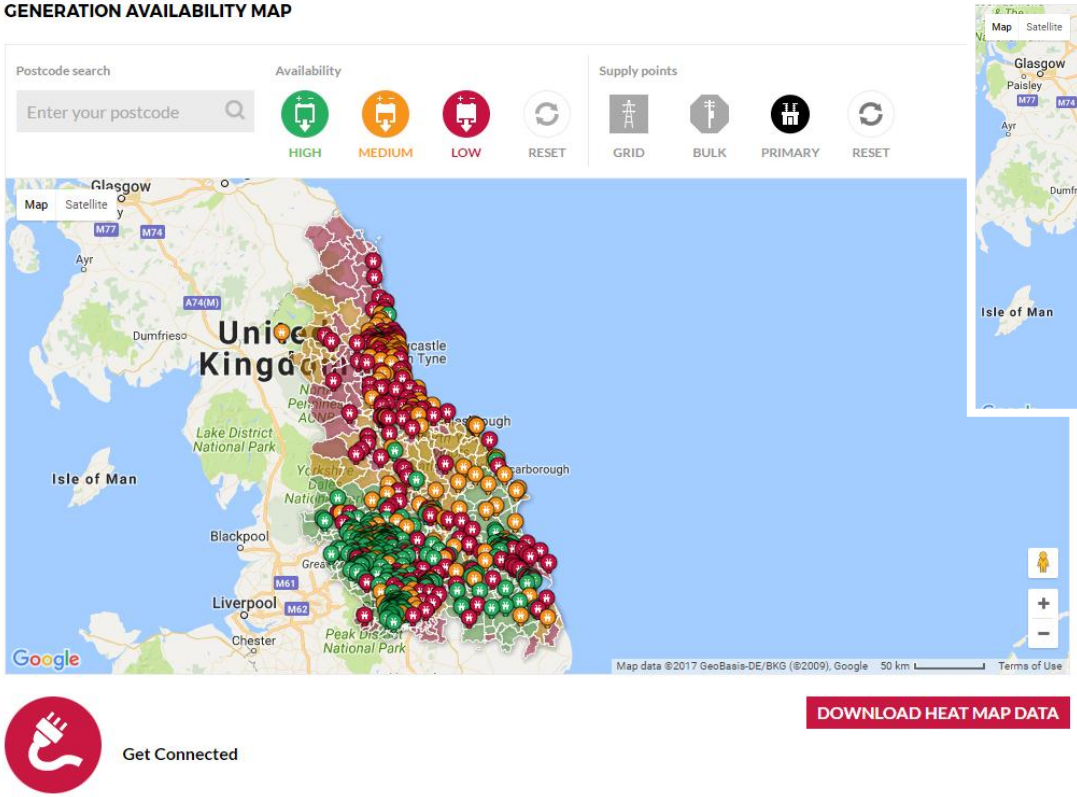
Underutilised capacity

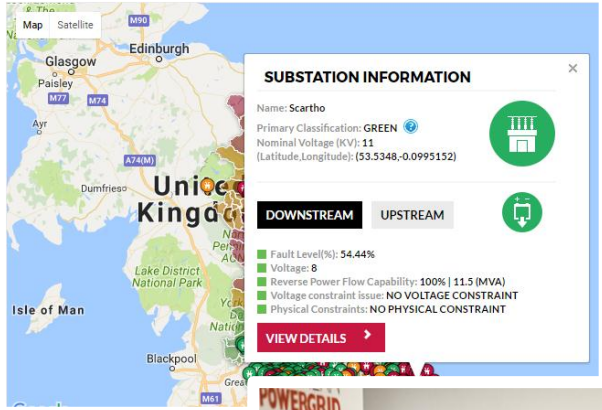
- We contacted 170 customers in total – this included all EHV and HV generators who underutilise capacity at levels <75%
- We had 79 responses
- We recovered an additional 18MW of export capacity in 2016/17
- This exercise continues as business as usual, we will report our success rates back via the DG-DNO Steering Group and Ofgem

Terminated connections offers

- In the past 24 months, terminated connections offers have released 329MW of distributed generation capacity
- Sizes ranged from 5MW to 49MW
- New milestones should improve the efficiency of this activity

Identifying spare capacity





http://www.northernpowergrid.com/generation-availability-map

Distribution System Operator (DSO) Update

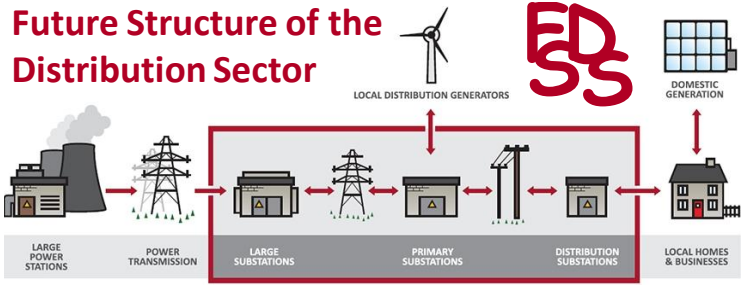
Jim Cardwell

Head of Trading and Innovation

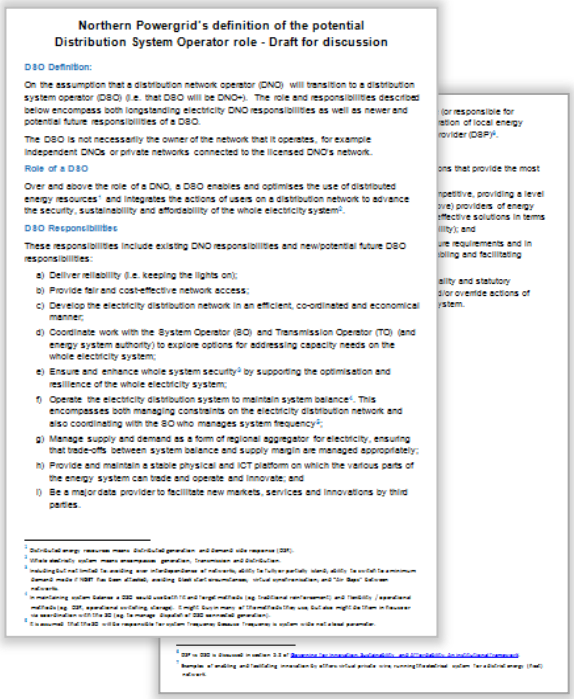
Industry collaboration on TSO/DSO in full flow

Our emerging DSO programme

1. Scoping the future through innovation
   - ✓ Exploring appropriate market design and industry architecture to optimise customer and network distributed energy resources
   - ✓ Demonstrating micro-grid resilience
2. Getting on with it
   - ✓ Trading grid services using CLNR energy storage
   - ✓ Developing forecasting processes
   - ✓ Exploring new commercial propositions
3. Building required capability
   - ✓ £83m smart grid enablers to become ‘DSO ready’



Developing our definition of the DSO role



Northern Powergrid's definition of the potential Distribution System Operator role - Draft for discussion

DSO Definition:

On the assumption that a distribution network operator (DNO) will transition to a distribution system operator (DSO) (i.e. that DSO will be DNO+). The role and responsibilities described below encompass both longstanding electricity DNO responsibilities as well as newer and potential future responsibilities of a DSO.

The DSO is not necessarily the owner of the network that it operates, for example independent DNOs or private networks connected to the licensed DNO's network.

Role of a DSO

Over and above the role of a DNO, a DSO enables and optimises the use of distributed energy resources[1] and integrates the actions of users on a distribution network to advance the security, sustainability and affordability of the whole electricity system[2].

DSO Responsibilities

These responsibilities include existing DNO responsibilities and new/potential future DSO responsibilities:

a) Deliver reliability (i.e. keeping the lights on);
b) Provide fair and cost-effective network access;
c) Develop the electricity distribution network in an efficient, co-ordinated and economical manner;
d) Coordinate work with the System Operator (SO) and Transmission Operator (TO) (and energy system authority) to explore options for addressing capacity needs on the whole electricity system;
e) Ensure and enhance whole system security[3] by supporting the optimisation and resilience of the whole electricity system;
f) Operate the electricity distribution system to maintain system balance[4]. This encompasses both managing constraints on the electricity distribution network and also coordinating with the SO who manages system frequency[5];
g) Manage supply and demand as a form of regional aggregator for electricity, ensuring that trade-offs between system balance and supply margin are managed appropriately;
h) Provide and maintain a stable physical and ICT platform on which the various parts of the energy system can trade and operate and innovate; and
i) Be a major data provider to facilitate new markets, services and innovations by third parties.

- DNOs have a key role to play providing a stable and secure base for the energy system on which others may compete
- As DNOs become DSOs they become the physical trading platform for energy markets
- Ensuring that the DNOs can play that role effectively is an important part of keeping the lights on
- The owner of a network is best placed to operate it

Workshop Sessions

Workshop discussion topics

1. Our 2017/18 ICE Looking Forward plan
2. What more could Northern Powergrid do to;
    (a) help you get connected;
    (b) improve your project's viability
3. What do you consider to be the emerging technologies in connections and what new challenges will they bring?
4. What do we do well and what could we do better?

Workshop Feedback

Closing Remarks

Jim Cardwell

Head of Trading and Innovation