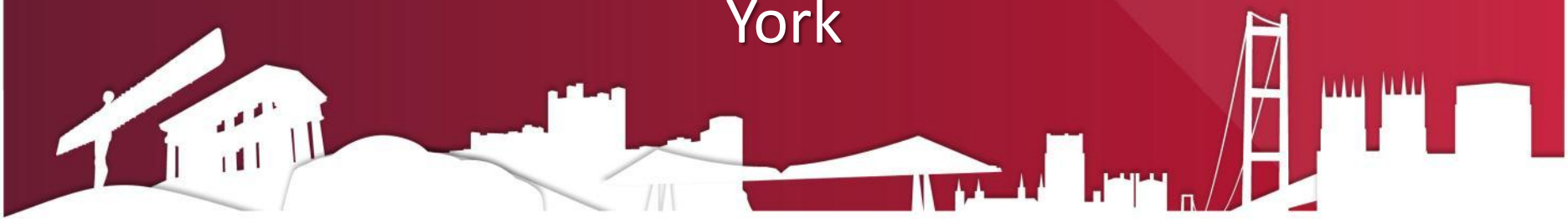
Connections Customer Event

6 March 2018

York



Welcome

Mike Hammond
Head of Connections Services

Agenda

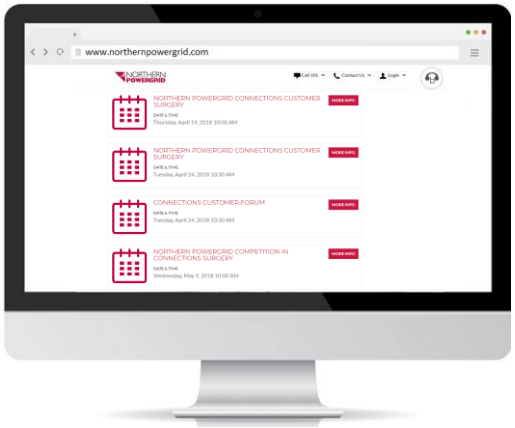
When	What
09.00	Registration
09.30	Welcome
09.35	Active Network Management Workshop
11.30	Tea/Coffee Break
12.00	Electric Vehicles Workshop
13.00	Lunch and Networking
14.00	Assessment & Design Fees Briefing
15.00	Event Closes

Format

- A series of drop-in workshops and briefings
- Topics suggested by our connections customers
- Intentionally informal
- We want to hear from you
- Please complete your feedback forms

Further engagement opportunities

When	What
Monthly	Connections surgeries
08 March 2018	Supporting vulnerable customers and communities roundtable
23 March 2018	Minimising our environmental impact roundtable
25 March 2018	Unlocking a smart energy future roundtable
29 March 2018	Reliability that delivers for our customers roundtable
04 April 2018	Delivering excellent customer service roundtable
24 April 2018	Connections Customer Forum
30 April 2018	Running a safe and secure network roundtable



- Visit www.northernpowergrid.com/customer-events-and-surgeries for details of forthcoming workshops and events

Active Network Management Workshop

David van Kesteren

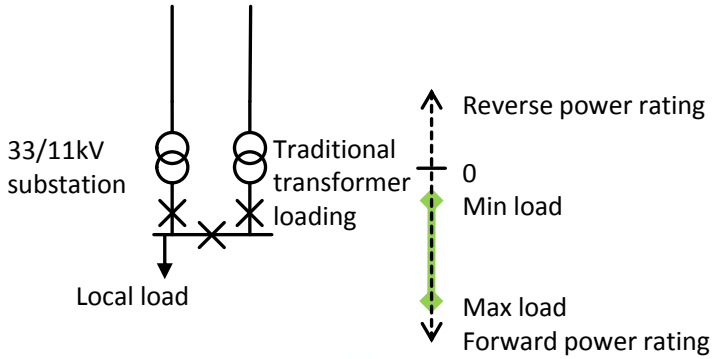
System Planning

Topics

- What is ANM
- Why do we need it at Driffield
- How will it work
- When will it be delivered
- How much will it cost
- When and how will it be rolled out elsewhere

Impact of connecting generation

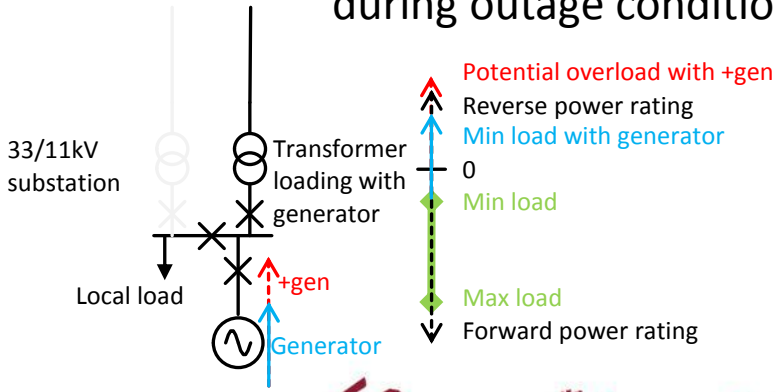
- Key network drivers
  - Develop an economic, efficient and coordinated network
  - Operate equipment within its design capability



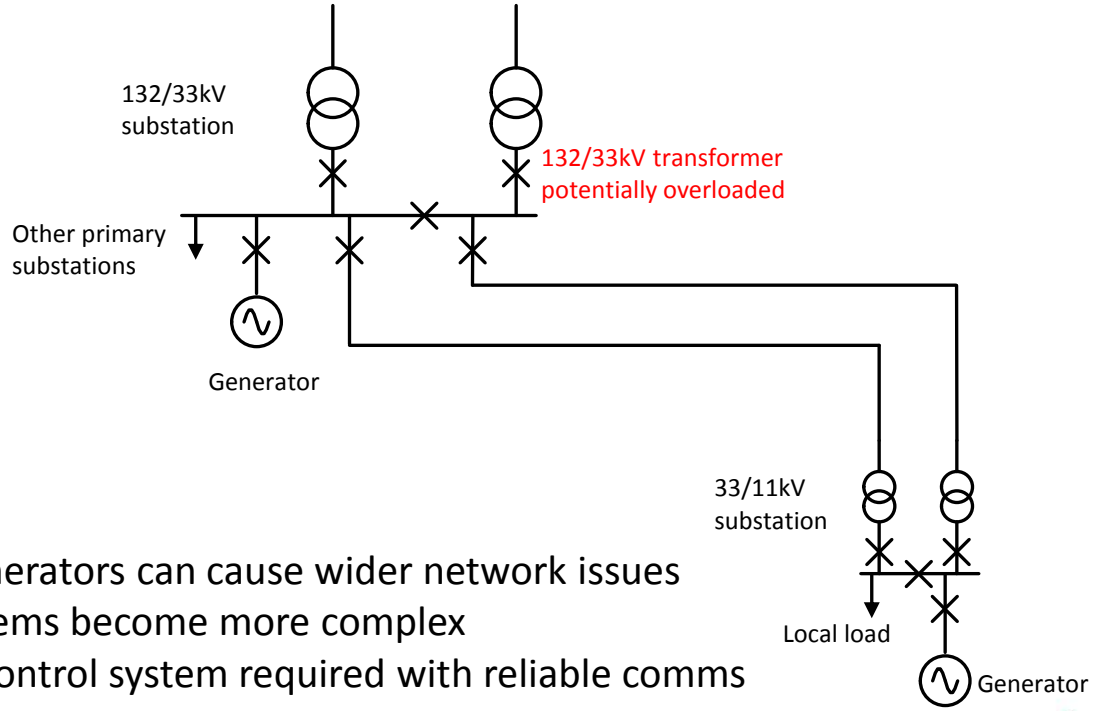
Impact of connecting generation

- Key network drivers
  - Develop an economic, efficient and coordinated network
  - Operate equipment within its design capability
- Potential frequency of overload driven by combination of demand and generation profiles
  - Many potential constraints occur infrequently
- Cost of reinforcing for infrequent constraints is uneconomic and inefficient for both the generator and the network operator
- A constrained connection, with lower capital cost, can be both economic and efficient

Simple local constraint signal can limit generator during outage conditions



Impact of connecting generation



- Multiple generators can cause wider network issues
- Control systems become more complex
- Wide-area control system required with reliable comms

Active Network Management as a solution

What is ANM?
ANM constrains the generator at peak times to avoid overloading the network.

Pros	Cons
✓ Minimum demand only occurs for short periods in the year	✗ No absolute guarantee of level of network availability
✓ As network demand increases more generation can be turned on	✗ Small-scale generation (LV) may erode available headroom over time
✓ Unused contracted generation capacity can be utilised by other generators	✗ Levels of curtailment will be higher for later entrants
✓ Lower cost of connection for generator and avoided reinforcement cost	
✓ Potentially releases more capacity than can be economically achieved through conventional reinforcement	

Active Network Management at Driffield

Ian Fletcher

Smart Grid Implementation Unit

Driffield network issues

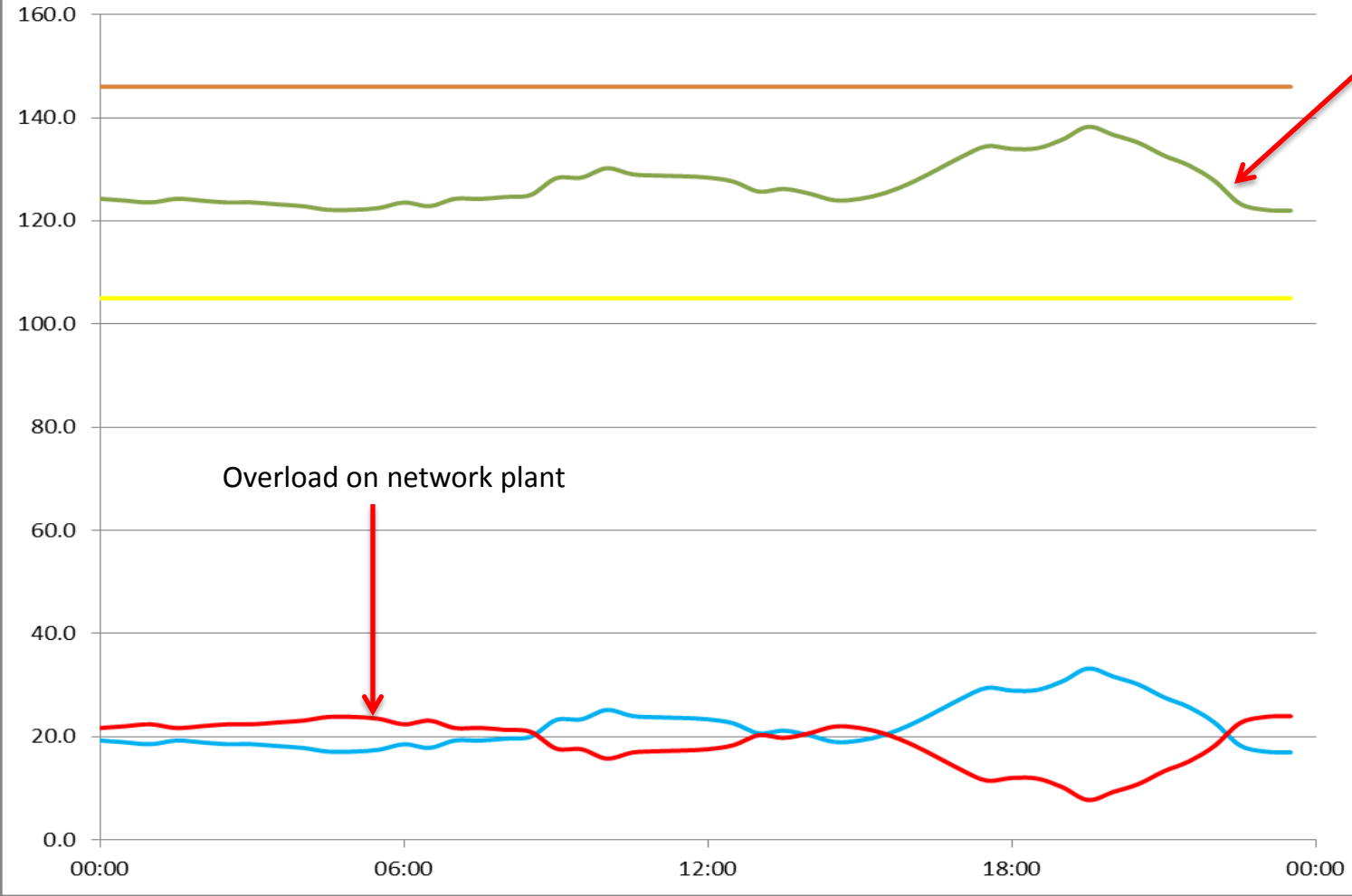
Current contracted HV/EHV generation capacity	146MW
Network export capacity	105MW
Network minimum demand	17MW
Overall generation capacity at minimum demand	122MW
Maximum demand	114MW
Theoretical generation capacity at maximum demand	219MW

Conventional limit for generation

Additional headroom can only be accessed by managing the output from generation

- Exceeding the conventional limit for connected generation may lead to network plant being overloaded
- Network minimum demand can reduce or increase over time

Plant overload example - existing & contracted generation



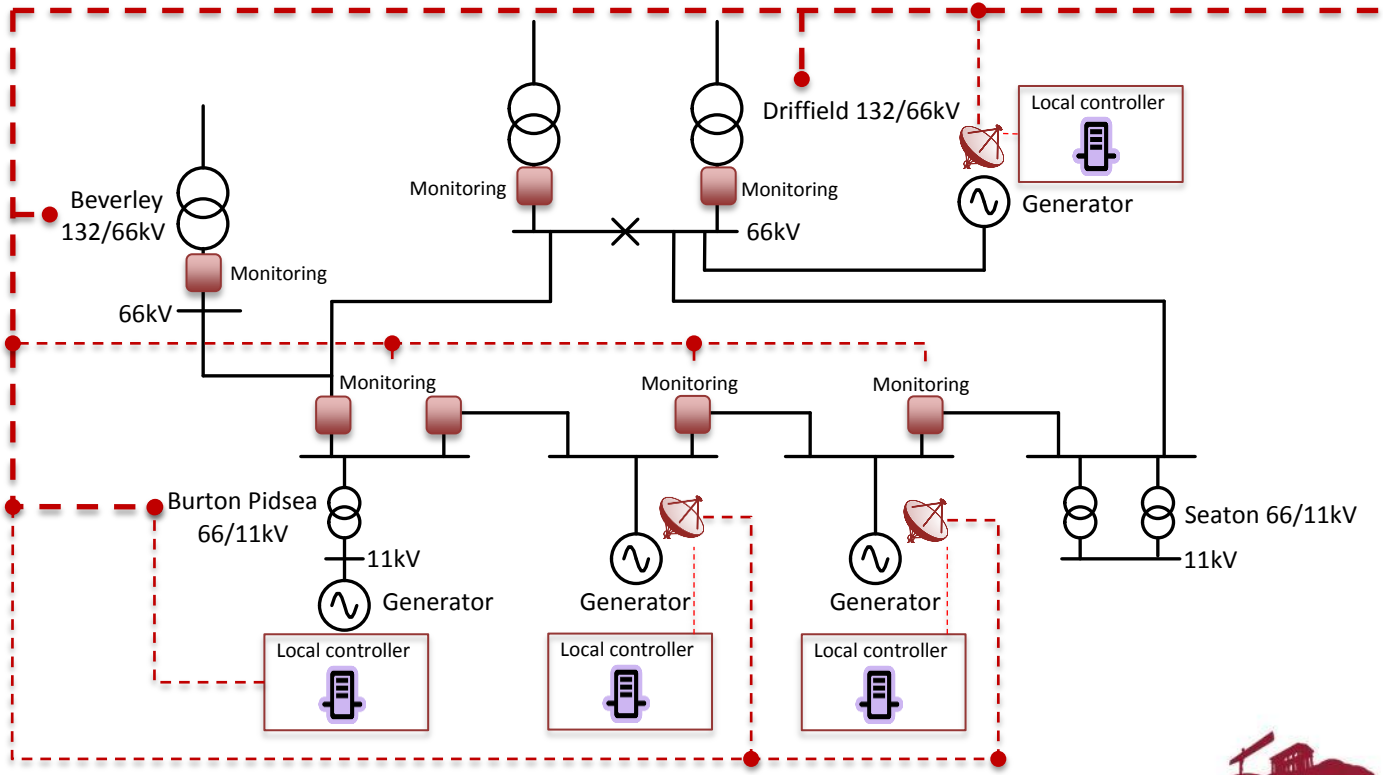
Assumes all HV/EHV generation is operating at maximum output, though this will not occur often. All of the existing generation is wind powered or controllable synchronous plant

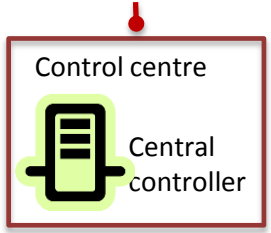
- total generation
- summer network capacity
- summer demand
- total generation limit
- overload

Conventional reinforcement solutions

- Increase network export capacity via reinforcement
  - Increase capacity of existing transformers, or;
  - Install additional capacity
  - Minimum cost reinforcement solution ~£12m
  - Creates up to 30MW of capacity
- Minimum cost new connection solution (from an alternative network point) ~£6m
  - Dedicated long cable routes and/or transformer (sole user assets)
  - No cheap solutions
  - Cost is prohibitive to new entrants

ANM building blocks





Transformer constraints

Circuit constraints

Delivery Programme

John Rowland

Primary Engineering Projects

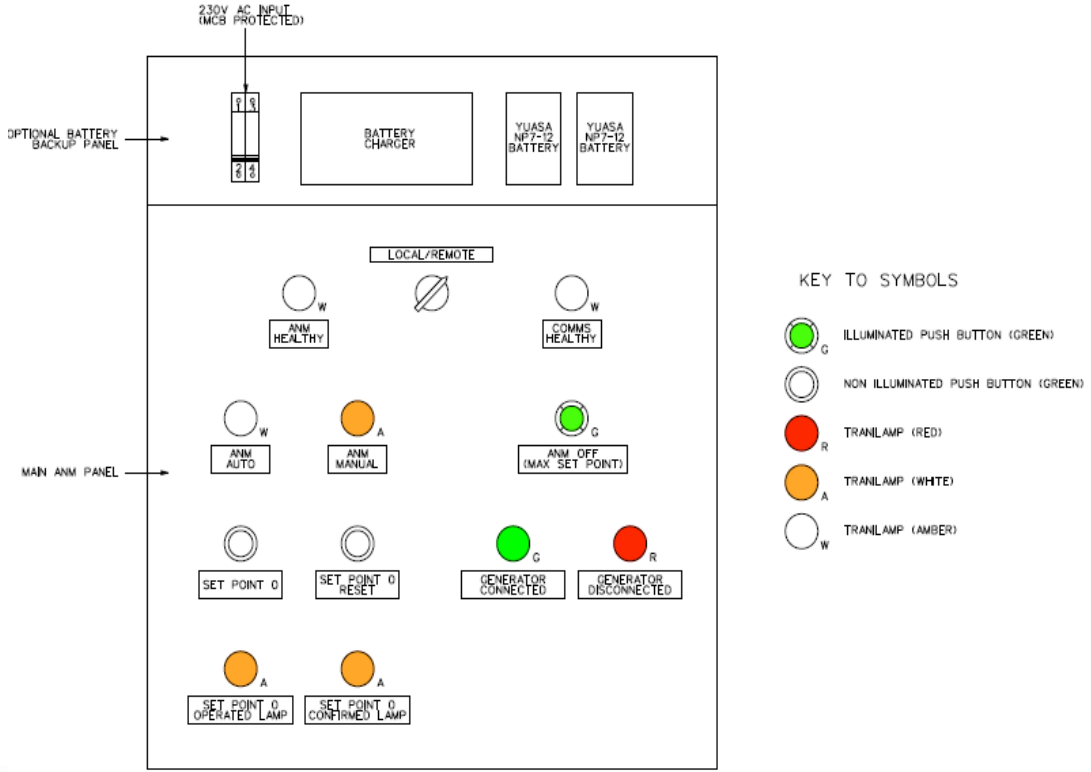
Delivery programme

What?	When?
Develop concepts and principles	2014-2015
Policy development	2015-2016
Detailed technical specifications	2016
Open market for customers to request ANM offers	April 2016
Customer contracts in place	June 2017
Select preferred ANM service provider	June 2017
Complete detailed design and build studies	February 2018
Construction commences	April 2018
Scheme commissioning	November 2018
Identify additional areas for ANM roll-out	September 2018

Current challenges

- Comms
- Functional Design Spec (FDS)
- ANM wall box functionality
- Cyber security
- Design interface
  - Northern Powergrid Plant to ANM wall box
  - ANM wall box to generator controller
  - Install contract

ANM wall box proposal



Commercial Considerations

Gary Camplejohn

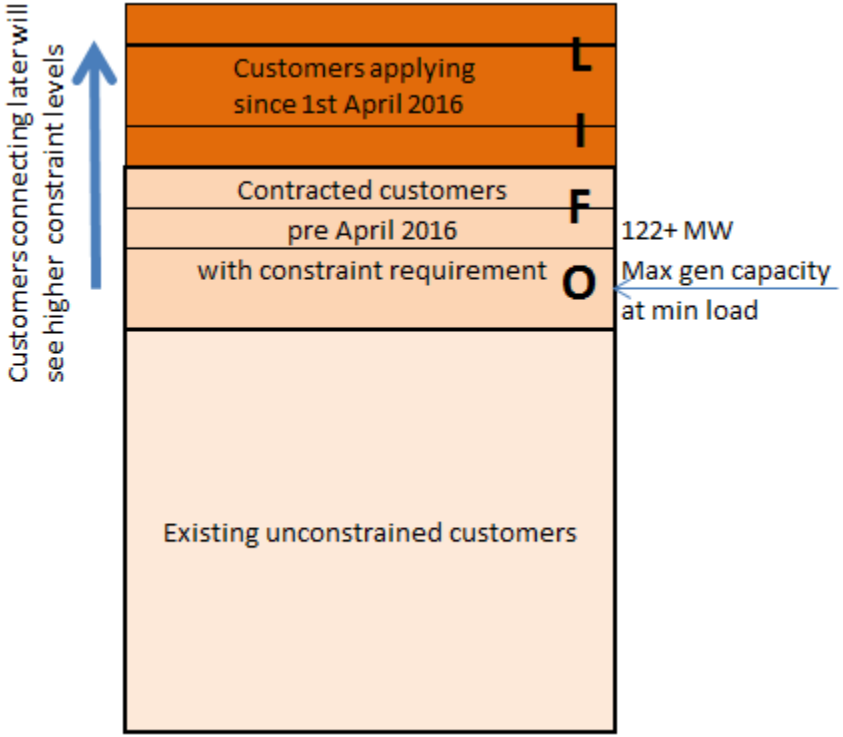
Connections

Requirements for ANM participation

- Connections at LV are excluded but limited to 190kW (200kVA) on existing and new sites
- All new HV or EHV generation connections into the Driffield network must participate
- A customer requesting a generally more expensive conventional connection will not be required to participate in ANM
- 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)

ANM application and queue position

- Generation applications in the ANM area are automatically considered for ANM
- Customers can still request a conventional connection offer but we will not process this in parallel with an ANM offer
- Queue position is determined by date of receipt of a competent application, subject to the customer continuing to show adequate progression.
- Queue position is key to the level of curtailment applied to the generator
- General principle is Last In, First Out (LIFO)



Cost structure for ANM elements

Capital costs:

- Shared costs for shared ANM components, on a per MW basis:
  - central controller, shared measurement points, shared comms routes
  - costs are re-apportioned as more customers utilise the equipment utilising the second comer methodology.
    - earlier connected customers may be eligible for rebates (for up to 10 years)
- Sole user costs:
  - local controller, local dedicated comms
  - any dedicated measurement points and associated comms routes
  - sole user elements could become shared if required for future customers

Annual costs:

- No additional site-specific charges,
  - operating costs are currently recovered via our general use of system charges

Indicative costs for Driffield

- Shared asset costs are dependent on the project location and scope of works required.
  - Estimated to cost in the region of £900k
  - Costs shared by the agreed capacity on the respective assets being used
  - Utilises the same methodology as the second comer rule
- Sole asset costs are dependent on the location and scope of works required.
  - Estimated to be in the region of £100k to £150k
- General principles
  - Offers and terms must comply with existing NPg financial policies
  - Each customer required to take the liability of the ANM scheme as if they were a standalone customer
  - Costs reconciled once the project has been delivered

Wider Roll-out

David van Kesteren

System Planning

Wider roll-out plans

What?	When?
Annual network loading assessment	April – August
Annual review of connections activity	August
Identify new areas for potential ANM	September
Assessment and selection of ANM areas	October-December
Approval and advertisement of new areas	January 2019
Issue ANM offers in new areas	March 2019
Re-commence annual cycle	April 2019

Selection process for new areas

- Identify networks with potential / actual loading issues
- Assess levels of customer connection request activity on each network
- Identify potential reinforcement costs for each network
- Identify potential cost of implementing ANM on each network
- Prioritise the networks that provide best overall benefit, taking into account all of the above

Discussion

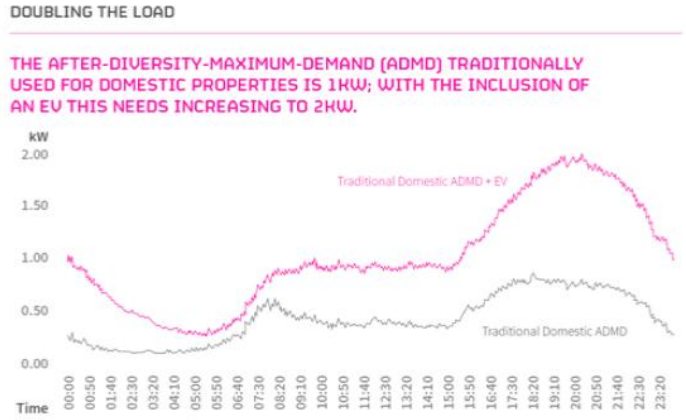
Electric Vehicles Workshop Issues and Responses

Iain Miller
Head of Innovation

The impact of EVs – a sense of scale

Power

- We have seen that 3-3.7kW chargers add 1kW to the evening peak (Low Carbon London - UKPN, Customer-Led Network Revolution - NPg)
- Roughly 30 million cars in the UK, so 30GW
- Hinckley Point C (due in 2025) is 3.2GW which is around 1.5-3 million EVs depending on charger size
- 30GW extra load represents around a 60% increase in the UK peak loading



Energy

- Taking that lower Hinckley Point C figure of 1.5m EVs…
- …each covering 8000 miles pa…
- …at 3.5 miles/kWh…
- …gives 3.4TWh/annum
- Around a 1% increase on the UK's energy consumption of circa 350TWh/annum
- Or equal to the energy generated by solar generation in Q3 of 2016[1]
- For 5% of the expected EVs

1. www.gov.uk/government/uploads/system/uploads/attachment_data/file/579527/Renewables.pdf

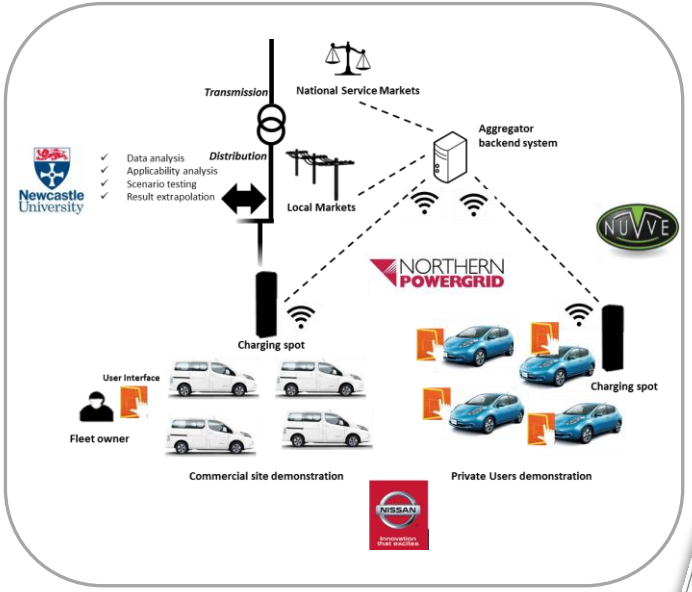
Is a 60% rise in peak a problem?

- Probably…
- OLEV are supporting both home and work charging – so perhaps it is only 30-40%
- And our peak has dropped by over 10% in the last 10 years
  - That is a 1% per annum fall leaving us needing 20-30% rise over what we know the network can do
- So 20-30% rise over say 20 years is 1-1.5% rise per annum
- But will the underlying fall continue?
  - If so it is up to 0.5% rise per annum
- That is probably manageable without managed charging, smart charging etc.

Slow or fast?

- The last example assumed slow(ish) charging at home and work
- Fast charging may concentrate charging in the evening rush hour
- Slow charging will require a minimum of extra infrastructure
  - Last slide's calculations or smart / managed charging
- Fast charging precludes smart / managed charging and V2G
  - Extra infrastructure?
- But is fast needed?
  - Motorways – Yes.
  - Otherwise – No, not given distances driven
  - And battery size doesn't really affect this
- Do some with vested interests want fast because of the infrastructure opportunities?
- Fast charging may concentrate charging in the evening rush hour

Our response – V2G, SilentNight, Cockle Park Farm



Newcastle University

Low Carbon Connections Gateway

- Developed in response to stakeholder requests
- Notify or apply?
- Your feedback will help us improve and develop this
- www.northernpowergrid.com/get-connected/low-carbon-connection-gateway

Discussion

Assessment & Design Fees Briefing

Mike Hammond
Head of Connections Services

New regulations on connections offer costs

- BEIS has decided that DNOs can charge A&D fees
- New regulations planned to go live on 6 April 2018
- The Government Response and Impact Assessment is available at https://www.gov.uk/government/consultations/assessment-and-design-fees-consultation-on-draft-regulations
- Allowing DNOs the option to charge A&D fees should create the following outcomes:
  - Allocate costs more fairly
  - Improve the efficiency of the connections process

Department for Business, Energy & Industrial Strategy

The Electricity (Connection Offer Expenses) Regulations 2018

- Connection Offer Expenses are commonly known as A&D fees
- The Regulations are now law as of 28 February 2018 when the Minister approved them
- They are expected to come into effect on 6 April 2018 (subject to parliamentary procedure)
- Ofgem and Northern Powergrid support the Government's view that this is fairer than the current arrangements where only those customers who accept connection offers are charged these costs
- Northern Powergrid will introduce charges from the 6 April 2018 go-live date for firm quotations and budget offers

Department for Business, Energy & Industrial Strategy

The New Regulations – High level principles

- The DNO must inform the applicant in writing if they are required to pay A&D Fees before the expenses are incurred
- This is called the first notice, on application, followed by a cool off period
- Expenses reasonably incurred include any of the following:
  - assessing the impacts of the connection on the distribution system;
  - assessing the impacts of the connection on a transmission system;
  - designing the connection, including, in particular:
    - designing any reinforcement works required to add capacity to the distribution system;
    - designing any reinforcement works required to add capacity to a transmission system;
    - designing any required extension of the distribution system;
    - designing any required extension of a transmission system
  - processing the application including, but not limited to, preparing the information to be included in the notice given under S16A(5) of the Act

Department for Business, Energy & Industrial Strategy

The Regulations – High level principles (continued)

- A second notice will be submitted at the time the quote is issued which will:
  - specify the amount to be paid by the applicant;
  - give sufficient information to enable the applicant to understand how the amount has been determined;
  - specify when payment must be made and how payment may be made and;
  - include a statement of the effect of section 23 of the Act (determination of disputes).

Department for Business, Energy & Industrial Strategy

Changing Standard Licence Condition 12 (SLC12)

- Currently SLC12 requires distributors to offer terms for the making of a connection as soon as possible and, in any event, in not more than 65 working days (WD)
- If there were no change to SLC12 the distributor would be obliged to release the connection offer within 65WD even if the applicant had not paid the A&D fee
- Ofgem are proposing to change SLC12 to exempt the distributor from this obligation…
- …i.e. so the DNO does not need to offer terms where the requester has not paid the relevant charge within a reasonable timescales requested by the distributor
- Ofgem have issued a consultation with a response deadline of 28 March 2018 https://www.ofgem.gov.uk/publications-and-updates/notice-statutory-consultation-proposal-modify-standard-condition-12-all-electricity-distribution-licences

Indicative A&D Fees – our price ranges (Section 16)

Demand	Range	Generation	Range
Small works	Payable on acceptance	G83	No charge
S16 LV	£350 - £430	S16 LV	£350 - £430
S16 HV	£430 - £1540	S16 HV	£720 - £2000
S16 EHV	£7880	S16 EHV	£7880

Budget estimates will be charged at a rate of:

- Demand - £190 to £510 depending on voltage level
- Generation - £150 to £620 depending on voltage level

Indicative A&D Fees – our price ranges (SLC 15)

- The tables show the proposed A&D fees where we carry out the non-contestable works only

Demand	Range
Small works	Payable on acceptance
SLC15 LV	£270 - £330
SLC15 HV	£330 - £1250
SLC15 EHV	£7140

Generation	Range
G83	No charge
SLC15 LV	£270 - £330
SLC15 HV	£620 - £1770
SLC15 EHV	£7140

Discussion