

**Dumfries and Galloway
Developer Forum**

Welcome and Introduction

Pearse Murray

Agenda

Introduction – Pearse Murray
NGET Update – Julian Leslie
KTR Project Update – Colin Brown
Q&A

Forum Themes

- Working closely with NGET to create the right solution.
- Working closely with SPD to create an innovative embedded solution.
- Keen to gain your views on how to proceed.

D&G Next Steps

Julian Leslie
Customer Connections Manager

James Kerr
Scotland Connection Contracts Manager

System Operator



Agenda

- How we have arrived here?
- What are we trying to solve?
- Overview of 5 options shared in November 2016 and your feedback
- Preferred option
- Other potential options
- How will this work?
- How will you be compensated?
- Who can participate?
- What happens if you don't participate?
- Next Steps / timeline for implementation
- Questions
- Exercise

How have we arrived here?

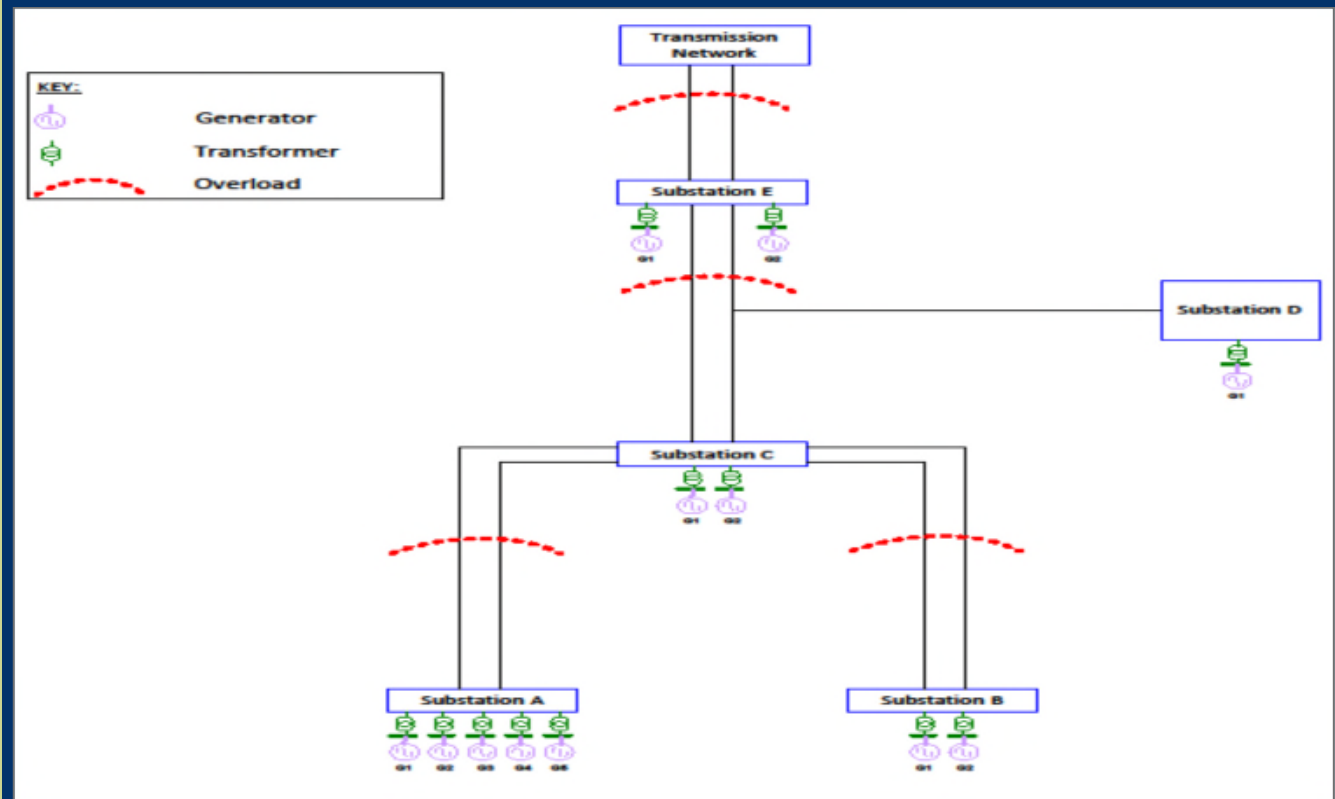
- National Grid carried out a Cost Benefit Analysis against TORI 141 triggered by the Strategic Wider Works submission (>£100m)
- A counterfactual (no build) solution recommended to SPT - A 132kV network that replaces assets at end of life and provides enhanced local capacity for Galloway. It is more cost effective for the consumer to pay the assumed additional constraint costs than the cost of additional network capacity
- In January 2017, we updated connection agreements to remove TORI 141 from User Commitment (securities) and adding TORIs 223 and/or 154
- We presented high level options at the last workshop in November 2016 and asked for your initial feedback
- Since then, National Grid, SP Transmission and SP Distribution have been working closely to narrow down technical and commercial options taking on board your feedback

What are we trying to solve?

The Problem: The generation contracted position in the D&G area, will result in overloads under certain conditions at different local boundaries as shown.

The Solution: To avoid system overload it is proposed to reduce generation rather than build infrastructure to meet peak demand. This was calculated through Cost Benefit Analysis (CBA) as being more economic for the consumer.

The Challenge: 5 alternative scenarios were presented that proposed different mechanisms to reduce generation and protect the network. The feedback you provided highlighted issues, benefits and blockers to help us identify which solution(s) we should develop further.



Option A: Balancing Mechanism (BM)

- Constraints would solely be managed through the BM
 - The BM is designed to be utilised to manage the last few percent, not full constraints
 - Relies on enough BM participants in area of constraint to work

Stakeholder Feedback Summary

Is there sufficient options in terms of available generation who will participate in the BM to manage overload competitively?

For developers not all will be able to or to want finance the technical requirements to be able to participate in the BM.

Could cheaper or different solutions be offered to encourage more participation such as sharing of existing fibres installed for protection?

The Balancing Mechanism (BM) is one of the tools National Grid uses to balance electricity supply and demand close to real time. It is needed because electricity cannot be readily stored and must be manufactured at the time of demand. Where National Grid predicts that there will be a discrepancy between the amount of electricity produced and that which will be in demand during a certain time period, they may accept a 'bid' or 'offer' to either increase or decrease generation (or consumption). The balancing mechanism is used to balance supply and demand in each half hour trading period of every day.

Option B: Commercial Intertrips + Balancing Mechanism (BM)

- Commercial Inter-trips would be utilised on larger sites, easing the majority of constraints. BM utilised to manage the last few percent
 - Larger sites only
 - Hard trip
 - Post fault scenarios

Commercial Inter-trips: will automatically trip a Generator in the event of an unplanned outage (fault). It is commonplace to use this facility when planning outages on the network to ensure it remains secure after the next credible fault. These are normally defined as 'Category 2' intertrips in the Grid Code and the Generator would be compensated following a trip.

Stakeholder Feedback Summary

There would need to be clarity as to whether a site could be part of BM and have a commercial inter-trip agreement and if so how these would work together appropriately

Hard trips are not good for mechanical and operational reasons from a generators perspective.

However, alternatives to a hard trip could be utilised e.g. HVDC ramp down where available, or manual intervention to achieve softer run down arrangements.

The down side of this is would the time to implement any manual intervention quickly enough to ensure network overloads do not damage the system.

Commercial inter-trips could provide a means to incorporate multiple and smaller sites who can't participate in BM. This might be facilitated by an Aggregator

The challenge to agree commercial terms and accommodate multiple system conditions might limit the capability of this approach.

Option C: Commercial contracts + Balancing Mechanism (BM)

- Commercial contracts would be called on to manage majority of constraints with the BM utilised to manage the last few percent
 - Contracts provide security of longer term constraint management
 - Options for tendering
 - Provides Control Room with contracts to call on
 - Needs new form of innovative contracts
 - Difficult to predict constraint requirements in advance, especially for wind

Commercial Contracts: will allow the System Operator to vary the output of Generation according to a pre-agreed value and price. Commercial Contracts are often used to manage Generation output levels according to forecast data and/or specific outage conditions. The primary goal is to reduce reliance on the BM.

Stakeholder Feedback Summary

Refer to feedback on commercial inter-trips.

Need to clarify difference between commercial inter-trips and commercial contracts.

Assuming the contracts are intended to give proactive management rather than just the reactive solution delivered by commercial inter-trips then:

Commercial contracts would remove hard trip problems for generators. Allow manual intervention well in advance of potential overload.

Presents a risk of payments being made unnecessarily if the forecast overload does not materialise

Option D: Active Network Management (ANM) + Balancing Mechanism (BM)

- A fast acting, intelligent, ANM technical solution that would outperform the manual instruction time of 2 minutes, with additional BM interventions where necessary
 - Would you be interested in being involved?
 - Time available to design different type of innovative solution to current live ANM or Load Management Schemes. *Potential* innovation funding project
 - Pre fault management of constraints
 - Potential for DSO role in solution
 - AN ANM would actively manage the output from Generation pre-fault whereas intertrips are commonly used to manage post-fault overloads

Active Network Management (ANM):

“Using flexible network customers autonomously and in real-time to increase the utilisation of network assets without breaching operational limits, thereby reducing the need for reinforcement, speeding up connections and reducing costs.”

Stakeholder Feedback Summary

This is a development of the proposed Commercial Contract option with solutions for non-manual ramp down of generators

This avoids risk of hard trips on wind turbines, optimises network capacity and avoids overloads with safety net of protection schemes if mechanism fails.

But could be costly to implement especially if retrofitting to existing connected sites. May limit smaller sites becoming involved.

The cost benefit analysis may not stack up depending of volume of generation connecting

Requires co-ordination across different sites so need to develop rules for which generator is turned down first.

Also needs to interact with BM and other possibly conflicting ancillary services (e.g. voltage control)

Option E: Innovative solutions – e.g. storage, demand

- Do you have any other ideas which we may not have considered?

Stakeholder Feedback Summary

Multiple opportunities exist ranging from community level balancing using electric vehicle storage and other demand side management to larger scale pump storage conversion for larger hydro schemes. This may be the basis of a full DSO arrangement.

However, there are technology issue, regulatory and political challenges to be overcome. There may be a risk that this increases prices and exacerbates fuel poverty

Furthermore, the commercial opportunities are unclear at this time and it will need to be demonstrated to be financially viable especially if constraint volumes are small

The commercial viability of hydrogen fuel cells could provide real solutions. Community ownership needs to be promoted with flexible pricing policies that attract new entrants. Good communication will be key to achieving this.

Preferred Option

- Option A: BM Only – following further analysis and based on the contracted background we believe there is sufficient generation within the BM (Transmission and Distribution) to manage constraints on the network. However, to drive value for consumers we believe that a further option needs to be taken forward. This option does not include all parties.
- Option B: Commercial intertrips + BM – preferred option
 - Your feedback - No ‘hard trips’, potential for distribution generation to aggregate and participate – taken on board
 - Load Management Scheme (MkII) to be designed and installed to manage pre-fault conditions to N-1, incorporating a 2-stage automated trip (ramp down signal followed by a hard trip)

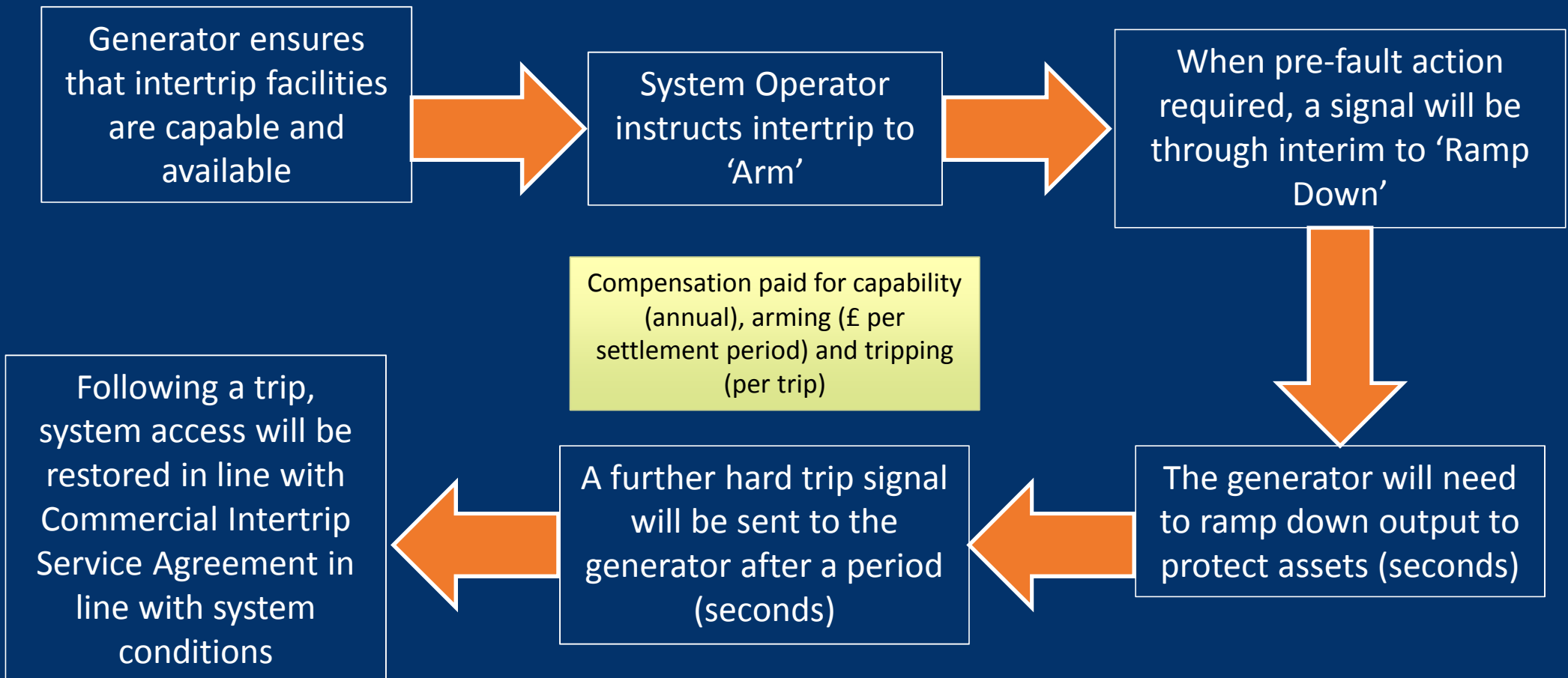
Other potential options

- Option C: Commercial Contracts + BM
 - Difficult to predict pre-fault constraints for wind, may still be used for longer term constraint management
- Option D: Active Network Management + BM
 - Development of Commercial inter-trip with more sophisticated control to optimise output and network usage
 - Requires all or majority of parties to participate
 - Complex design/implementation
 - Could conflict with ancillary services provided by Users
- Option E: Innovative solutions
 - Demand or storage projects will help relieve constraints under certain conditions
 - We will continue to work with developers wishing to progress demand or storage projects

How might this work?

- *Caveat* – existing Commercial Intertrip Service (CIS) details – this may change as the contracts develop to incorporate 2 stage intertrip.
- Any generator wishing to participate in a CIS will agree a commercial contract up front (Heads of Terms)
- The CIS needs to be capable and armed in order to qualify for payment
- Should the control room wish to utilise the intertrip, a ‘reduce output’ signal will be sent to the generator with a further ‘hard trip’ signal followed a number of seconds later (variable depending on the network conditions and number of parties)
- What do you need?
 - Requirements are specific to the location of the intertrip, however these may have already been required and defined with Appendix F1 within your connection agreement.
 - To provide control and visibility to the network companies and suitable redundancy

How might this work? In practice



How might this work? Payment

Payment structures for commercial intertrip are negotiated bilaterally.

- Capability Payment – Annual payment. £1.72 per settlement period (April 2005, subject to indexation)
- Arming Fee* – Whenever the CIS is armed, NGET shall pay to the generator an Arming Fee (an amount in £ per Settlement Period).
- Tripping Fee - Whenever generation trips in accordance with the CIS, NGET shall pay to the generator a Tripping Fee (an amount in £ per trip per BMU).



Who can take part?

- No obligation to take part, although we would encourage you to consider doing so
- Both transmission and distribution generators – subject to further commercial and technical design and incorporating interface to SPD eliminating the need for the User to interface with the System Operator
- Infrastructure will be in place for embedded Users to take part



What if you don't take part?



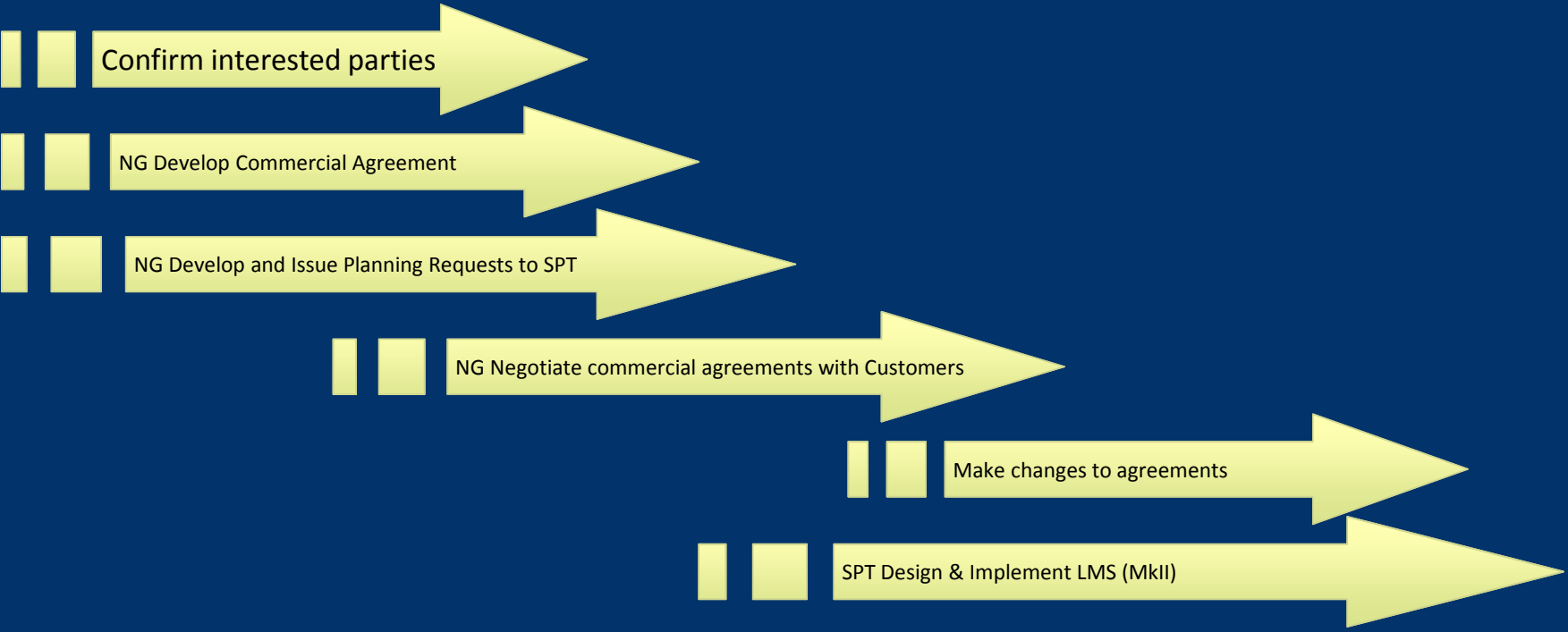
- Post 2023 - No additional Allowed Interruptions will be imposed on your agreement and you will be held 'commercially whole', i.e. you will be compensated for loss of access to the network in line with your connection agreement
- If you are a BM participant you will be able to continue to participate in this mechanism.

Next steps

- If you wish to take part in additional services over and above the BM, connection agreements may need to be amended to reflect this.
- Now - No changes required to connection agreements – completion dates will remain at 2023.
 - Earlier completion dates may be available subject to Restricted Available Access. You will not be compensated for loss of access until 2023. Please discuss with your Contract Manager and SP Transmission.
- Now – 2019 – National Grid to develop and submit Planning Requests to SPT as required
- 2018-2020 – National Grid to negotiate commercial intertrip service contracts with contracted parties
- 2019-2022 – Implementation of LMS MkII following Planning Request to SPT

Timeline

Now 2018 2019 2020 2021 2022



Go Live

Questions

- Do you have any questions for us?
- We would also welcome questions after the event through the feedback forms or directly to james.kerr@nationalgrid.com

Exercise - facilitated discussion

At your tables, please discuss the following questions:

1. Is a Commercial Intertrip something you would be interested in exploring further?
2. If not, is there a particular reason why? What would work better?
3. What can you offer in terms of response time to reduce output and at what rate?
4. What considerations should we make for user equipment to be installed? Does the timeline allow sufficient time to install user equipment?

A colleague from National Grid or SP Transmission will be guiding the conversation and recording your feedback.

Alternatively:

- Feedback forms available on the tables – please hand to a National Grid or SP Transmission colleague
- Feedback to National Grid/SP Transmission after the event – james.kerr@nationalgrid.com



8th June 2017

Dumfries and Galloway Developer Forum

SPT Development

Colin Brown

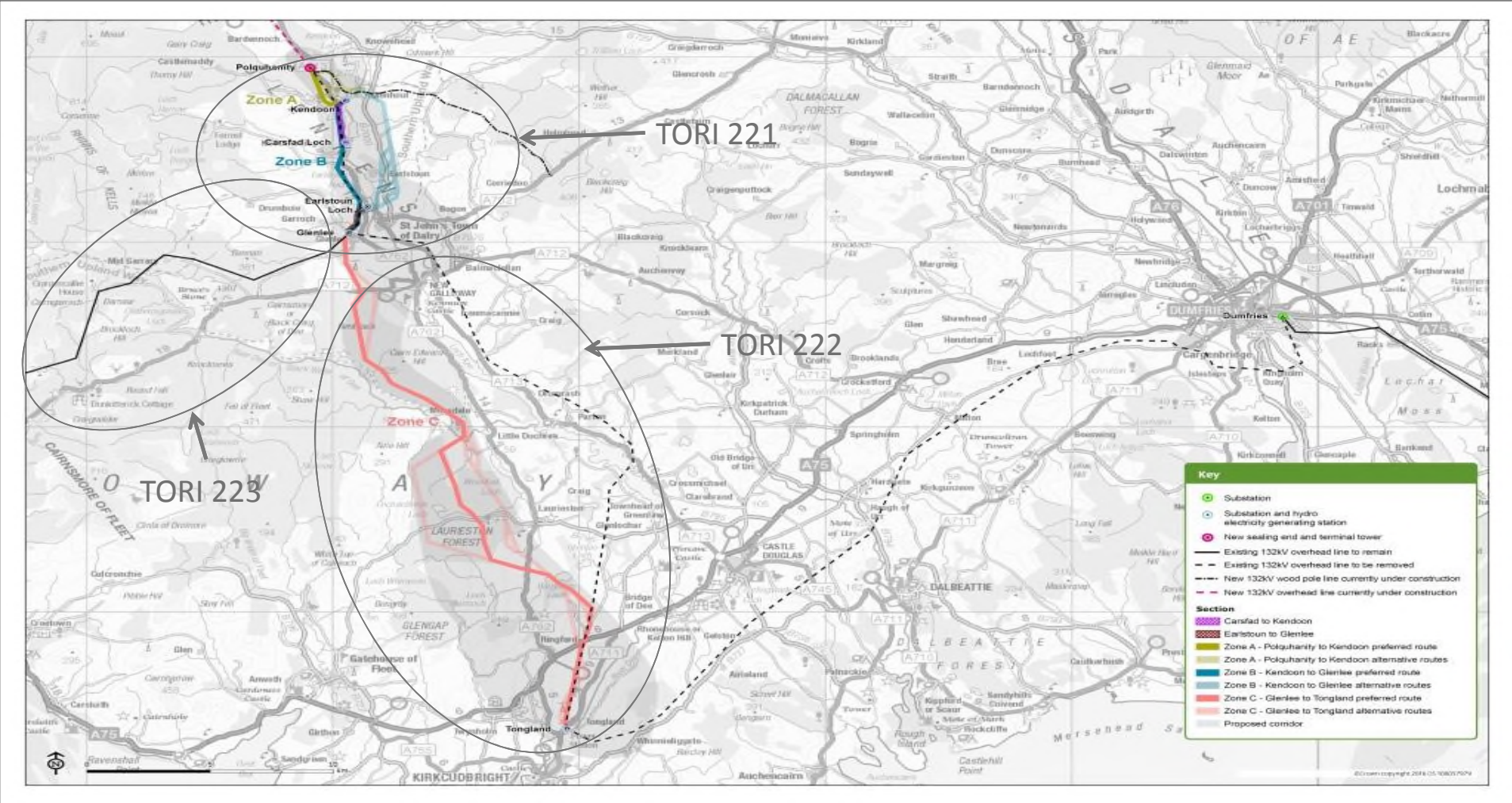
Agenda

- Recap on KTR project scope and completion dates
- Progress since last forum
- Next steps

Kendoon to Tongland Reinforcement Project

- Kendoon to Tongland Reinforcement (KTR) project is being delivered through the following TORIs:
 - Kendoon to Glenlee Reinforcement (TORI 221)
 - Glenlee to Tongland Modernisation (TORI 222)
 - Glenlee to Newton Stewart Reinforcement (TORI 223)
 - New Cumnock SGT2B (TORI 213)
- Estimated completion by 2023
 - TORI 213 will be completed by 2022
- A combination of these TORIs will allow all existing generation contracted in D&G to connect as planned and provide some headroom for new generation
- New commercial and operational arrangements will be developed to manage wider system constraints

Kendoon to Tongland Reinforcement Project



2nd Round of Public Consultation

- Public consultation on Preferred Routes for Kendoon to Tongland Reinforcement (KTR) project took place between October and December 2016



- Over 100 responses received from members of the public, landowners, statutory consultees and community councils/groups
- Issues raised included consideration of alternative overhead line routes and designs
- Consultation feedback report published in March 2017 (see website www.spendgsr.co.uk for details)

Progress since last forum

- **Planning scoping opinion** for the project was submitted in April
 - Informs scope of the Environmental Statement as part of 2018
- **Statutory Stakeholder Liaison Group (SSLG)**
 - Ongoing role through pre and post application process
 - Chaired by the Scottish Government, the SSLG involves key statutory decision makers, D&G Council and SPEN
- **Community Liaison Group (CLG)**
 - Formed to ensure local communities are fully engaged in proposals
 - Chaired by the Scottish Government, the CLG brings together representatives of communities within consultation zone, D&G Council and SPEN
- **Engineering design**
 - Technical and environmental teams working together on next stage of overhead line routeing
 - Site investigation work at Glenlee to inform design of substation extension



Next Steps

- Detailed routeing to identify individual tower positions and accesses
- Further landowner discussions on our proposals
- Combination of desktop and site based surveys

- Continued dialogue through Statutory and Community groups
- Next round of public consultation in Q4 2017 on detailed route alignment prior to planning consent application in Q4 2018



Any Questions?