

18th November 2016



Dumfries and Galloway Developer Forum

Welcome and Introduction

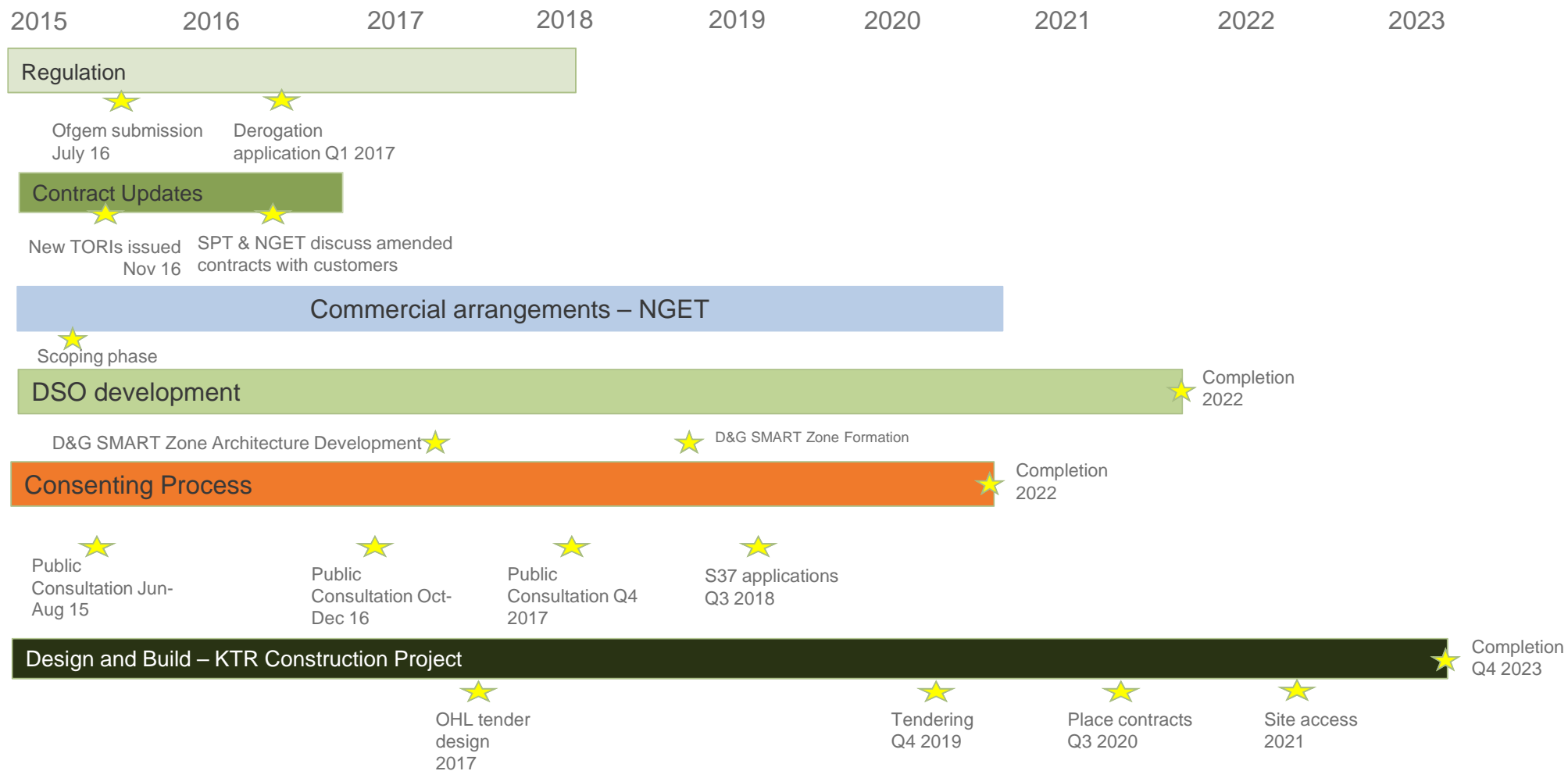
Scott Mathieson

**Network Planning and Regulation
Director**

Agenda

SPT Update – Scott, Diyar, Colin, Alan, Gerry
NGET Update – Julian Leslie
Group Exercise – James Kerr
Q&A

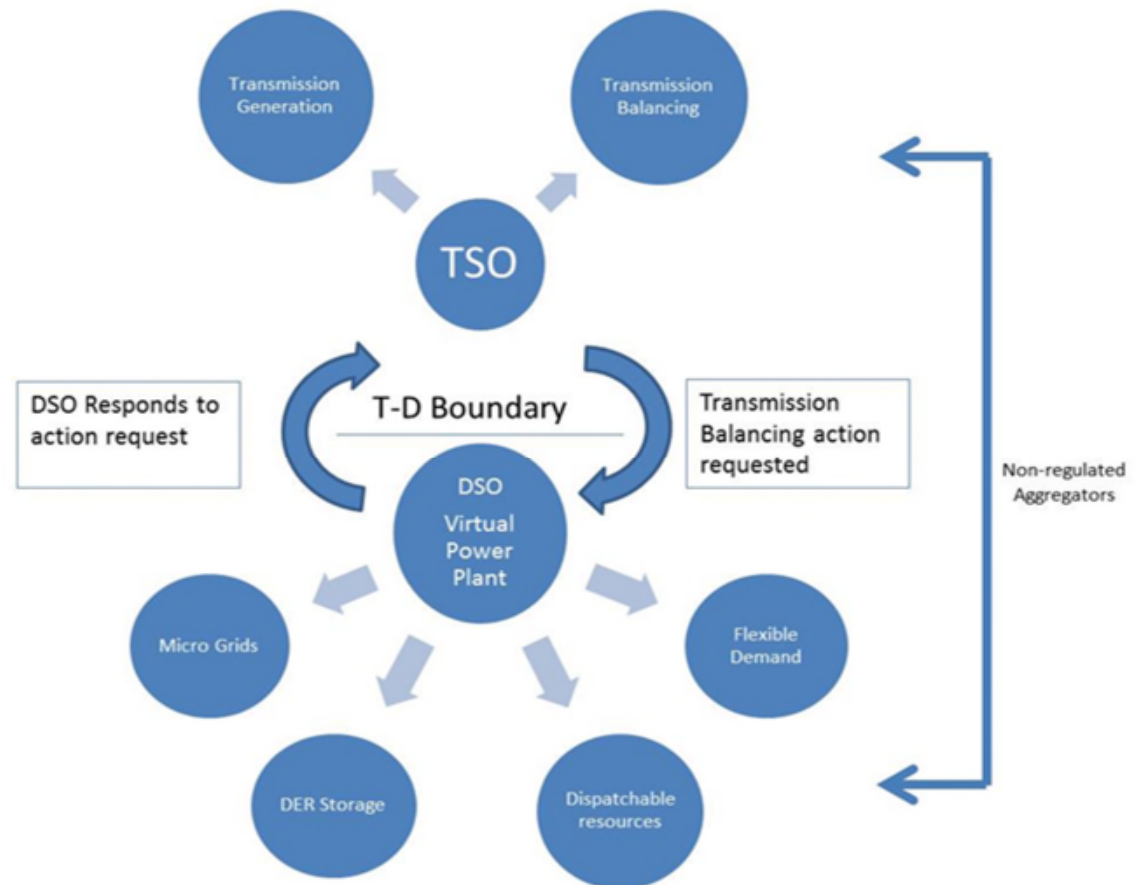
Programme and next steps



Taking a lead on what a DSO could entail

Develop & Implement D&G SMART Zone

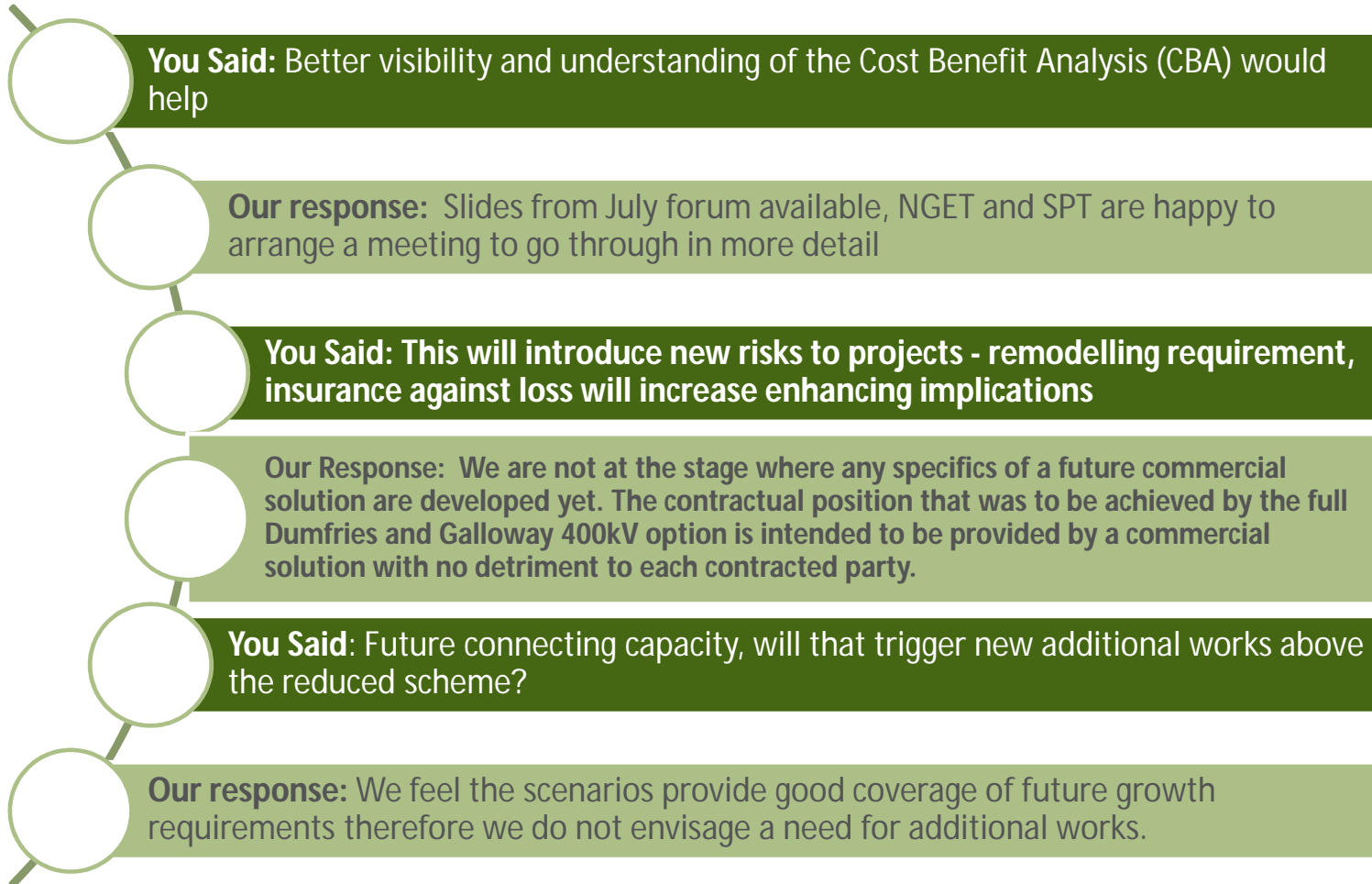
- Strong industry & regulatory focus in greater collaboration between the DNOs, TOs and SO
- SPD and SPT will jointly develop a SMART Zone for D&G building the foundations for the longer term DSO business model
- **Phase 1**
D&G SMART Zone Architecture Development
Completion by Q1/Q2 2017
- **Phase 2**
D&G SMART Zone Formation
Completion by 2021



Aims - D&G SMART Zone Architecture Development

- Development of geographical T&D Active Network Management
- Flexible connection solutions for connection of generation
- Explore ways to 'ring-fence' the 11kV network to minimise any impact of cumulative generation on the 33kV and 132kV networks
- Greater control for SPD to connect DG and manage network access
- Maximise the non-firm capability of the 132kV and 33kV network
- Building foundations across T and D boundary for DSO
- Breaking new ground – development of new innovative approach to design and commercial solutions

Feedback from the July Forum





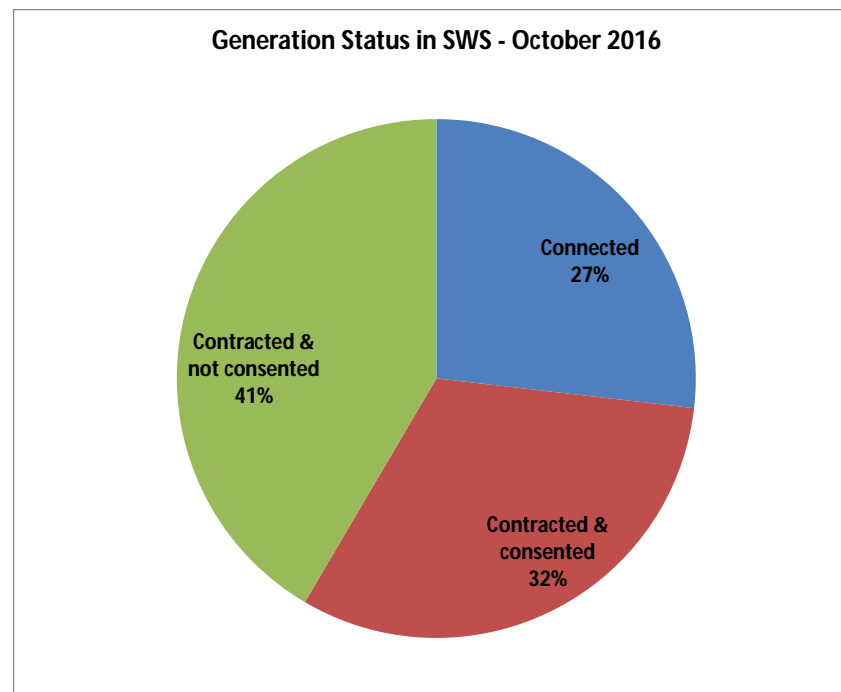
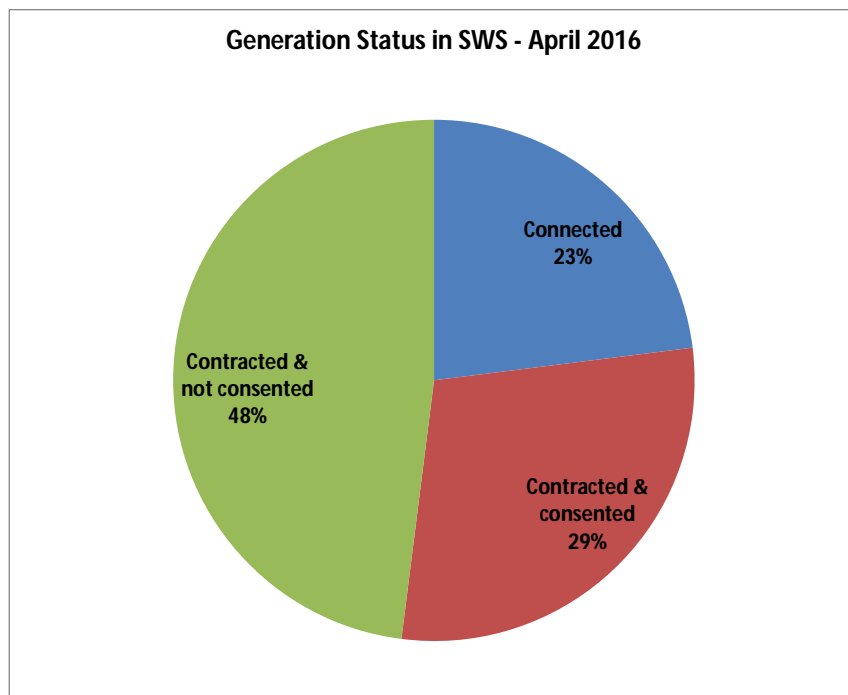
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SPT Network Planning

Diyar Kadar

Generation Background – Change from last forum



Three new wind farms connected to the system (Dersalloch, Glenchamber and Assel Valley)

Sandy Knowe partly consented

Total generation (Connected and Contracted) in the whole of South West Scotland is around 2900MW

Proposed System

The scheme takes advantage of developments in South West Scotland

The double circuit L7 Overhead Line infrastructure that is being constructed from New Cumnock to Polquany will be extended to Glenlee

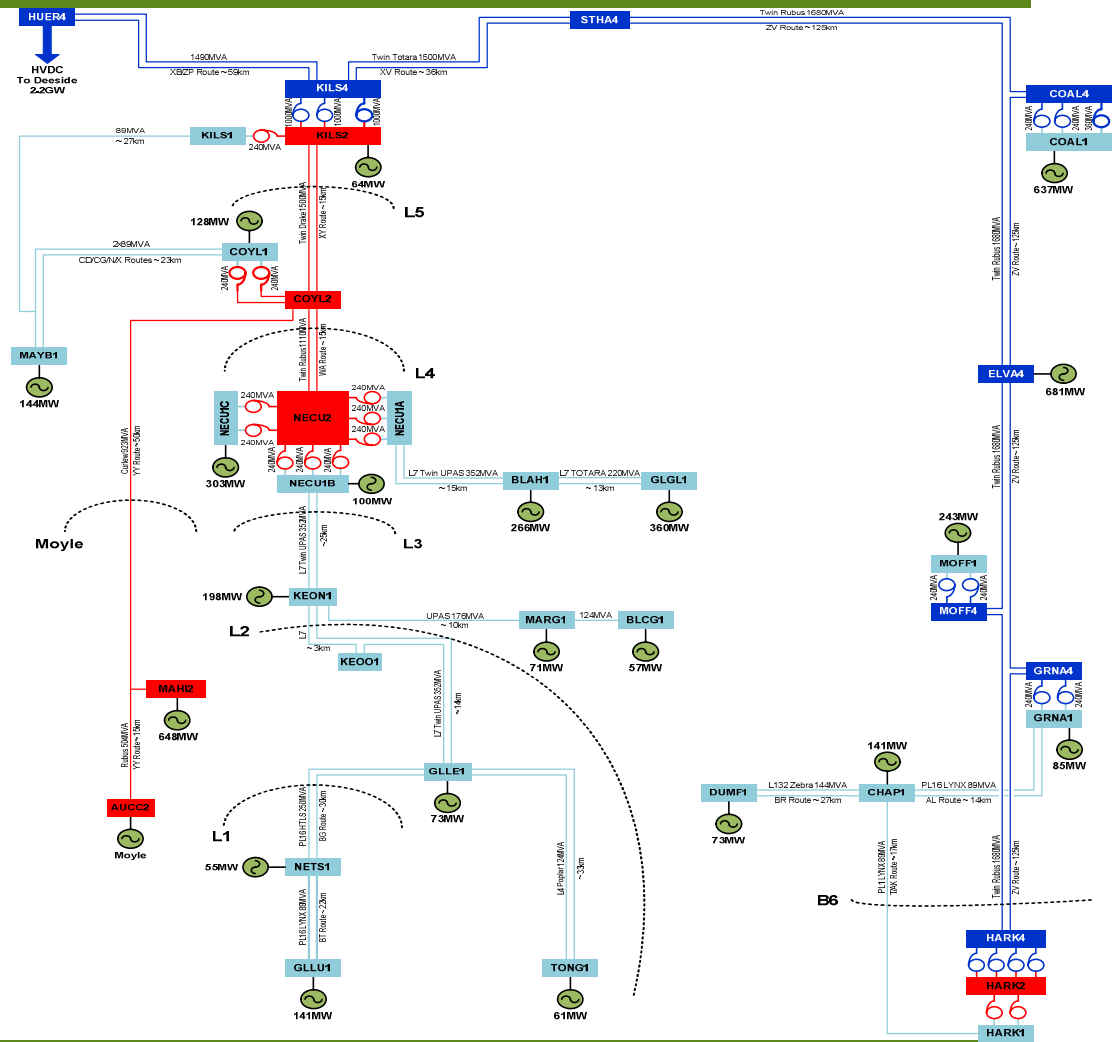
Glenlee substation will be extended to change the arrangement from a 4 to 6 mesh corner substation

Reinforcements will also be carried out at Kendoon Substation

Build a new double circuit Overhead line on L4 towers between Glenlee and Tongland

Increase the capacity at New Cumnock 275kV by installing a 6th Supergrid transformer

Decommission the existing 132kV circuit from Polquany to Dumfries (around 100km)



New and Existing TORIs to replace D&G TORI 141

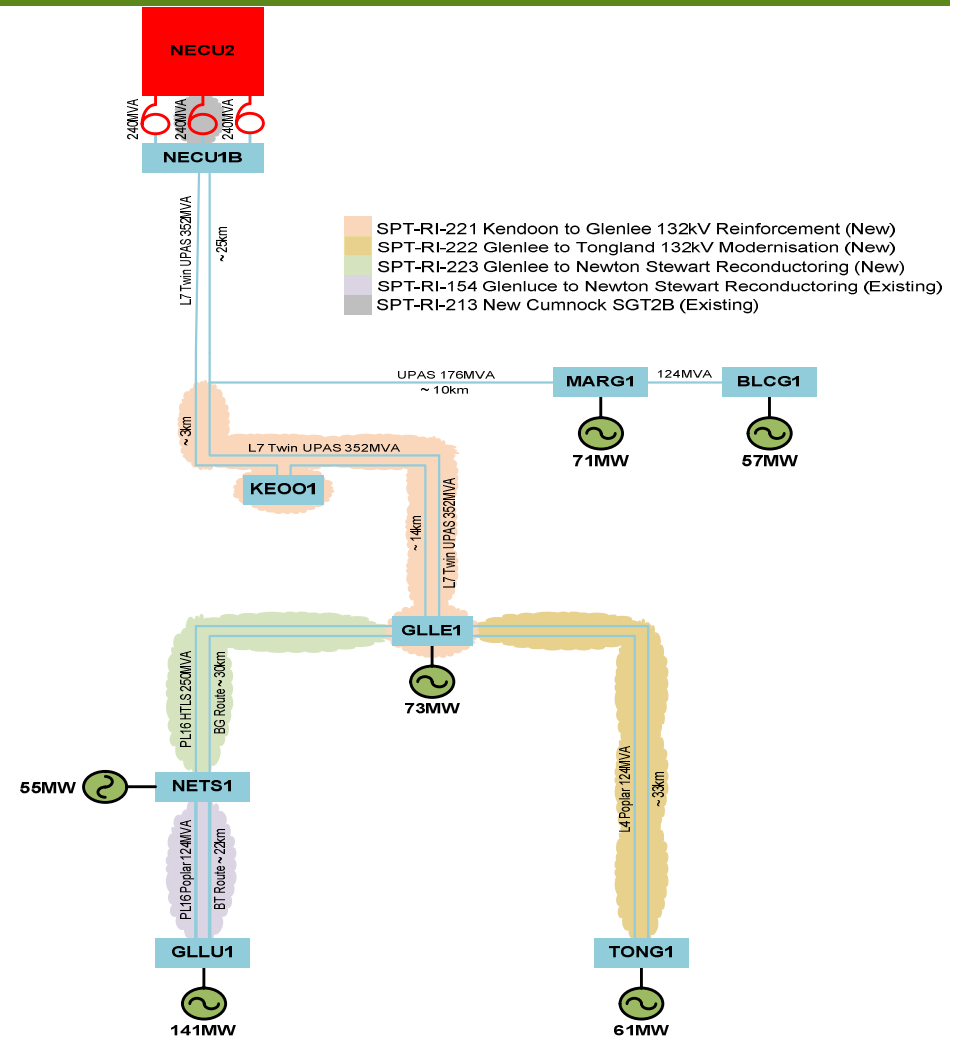
TORI 221 – Extension of the high capacity L7 double circuit from SWS to Glenlee (non-secured works)

TORI 222 – Modernisation of the Glenlee to Tongland 132kV circuit (non-secured works)

TORI 223 – Reconnector of the 132kV OHL circuit between Glenlee and Newton Stewart with HTLS conductor (secured works)

TORI 154 – Existing TORI to reconnector the OHL between Newton Stewart and Glenluce (secured works)

TORI 213 – Existing TORI to installing a third SGT at New Cumnock (non-secured works)



Other works

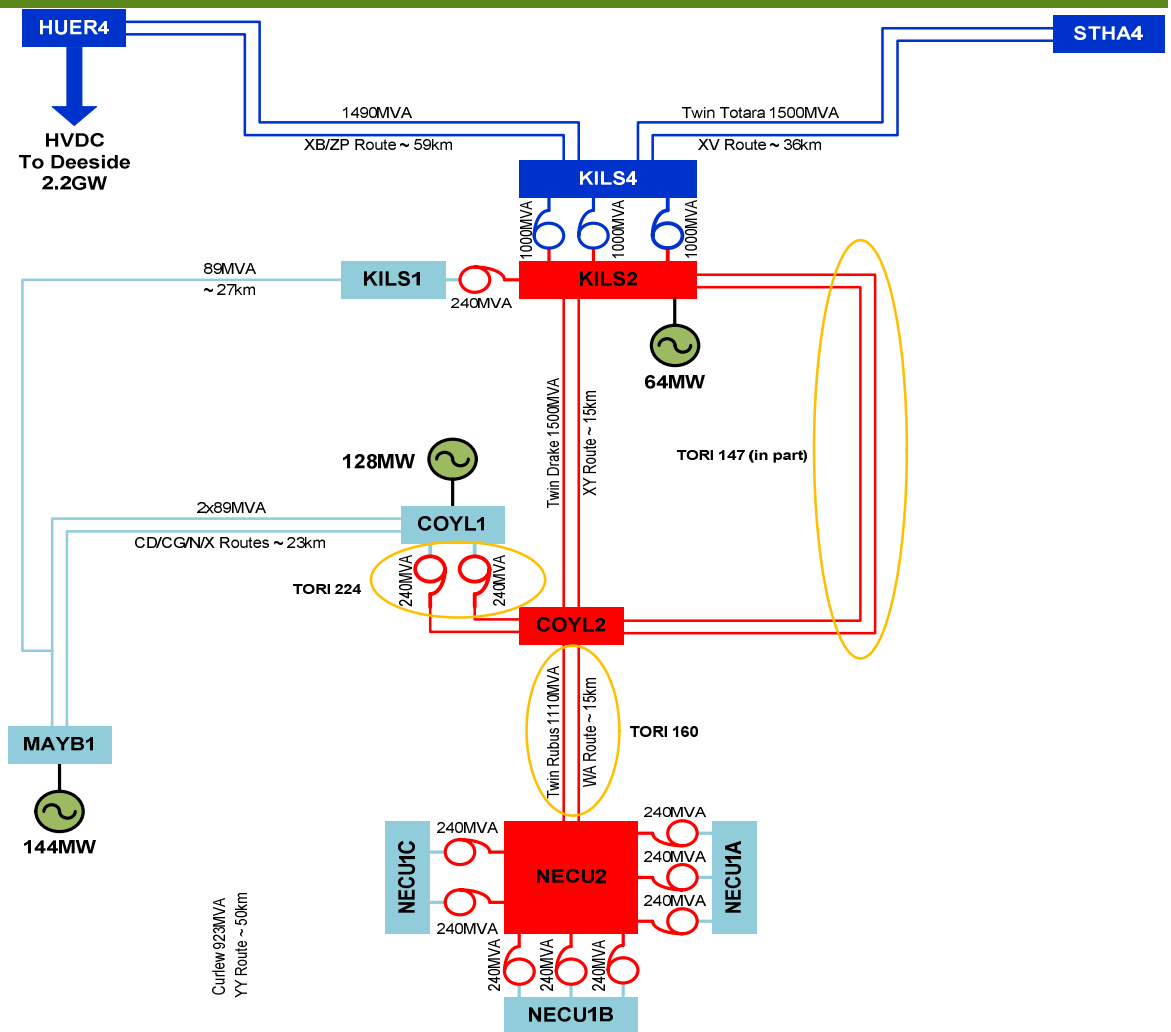
As well as withdrawal of TORI 141 (D&G SWW), TORIs 147 (in part) and TORI 160 will also be deferred.

TORI 147 was introduced to increase the capacity between Coylton and Kilmarnock South and ensure compliance with NETS SQSS

The OHL part of this TORI will not progress as recent Cost Benefit Analysis by NGET SO have shown the scheme to be uneconomic

The proposed transformer uprating at Coylton which is part of TORI 147 will go ahead and will be part of a new TORI (224)

TORI 160 is also being withdrawn as it assumes unrestricted capacity beyond Coylton



Issues with the Proposed System

Boundary	Capability (MW)	Anticipated Flow (MW)	Shortfall (MW)
L1	225	180	45
L2	334	303	31
L3	334	629	-295
L4	1001	1658	-657
L5 (MOYLE = 80MW)	1390	2679	-1289

Although the system is compliant from a supply perspective, against a contracted background some of the boundaries are non-compliant

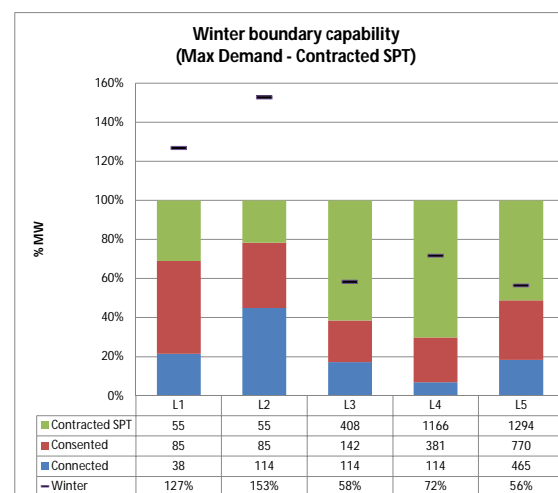
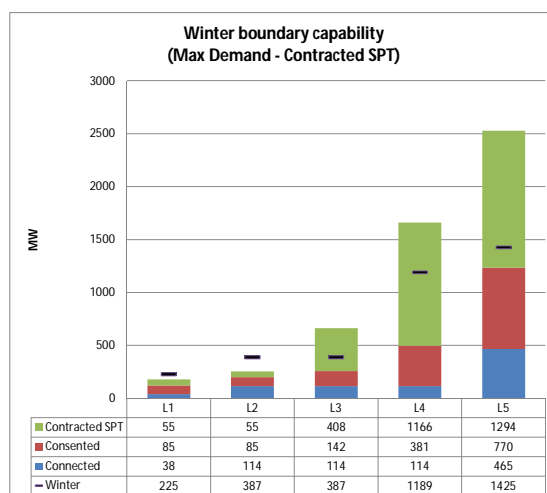
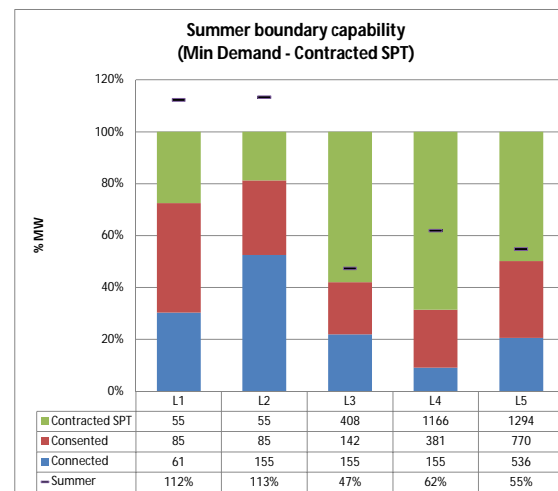
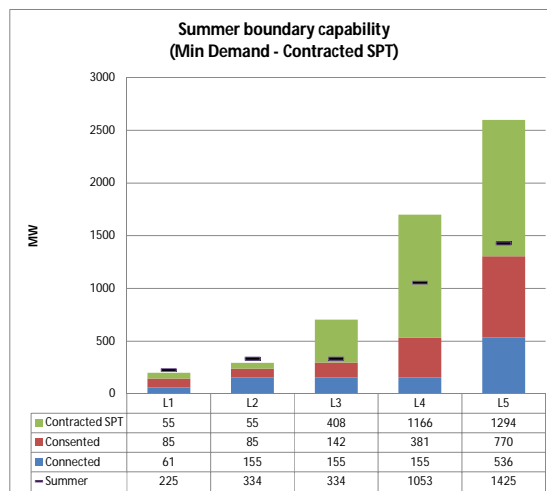
Level of non-compliance increases as the system incorporates more generation

The local system in Dumfries and Galloway is compliant against contracted background

The wider system from Kendoon North to Kilmarnock South is non-compliant against contracted background

New non-build arrangements need to be developed to ensure unacceptable overloads do not occur on the system

Proposed System – Capability (June 2016)



Contract Review

30 contracts are being reviewed to reflect the proposed transmission system changes

The aim is to remove TORIs 141, 147, 157 (Tongland booster) and 160

Include relevant new TORIs 221, 222, 223 and 224 in the amended contracts

Connection dates will remain unchanged

No changes to Connection Entry Capacity (CEC) or access restrictions

Restrictions post connection date will be managed through commercial means

In Summary

Proposed System is compliant against connected and consented generation (assuming Moyle flows into the GB system of 80MW)

NGET SO CBA analyses have shown that 95% of the volume of energy despatched in the area will flow unconstrained and only around 5% of output is constrained

Contracts are being reviewed to reflect system design changes but without changing connection dates, connection capacity or system access

Commercial arrangements will be developed to ensure system capabilities are not exceeded

Commercial arrangements might require additional non-build solution (e.g. ANM, DSO)

It is aimed to deliver the proposed development in 2023



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Dumfries and Galloway Developer Forum

SPT Development

Colin Brown

KTR Project - Programme Update

- 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

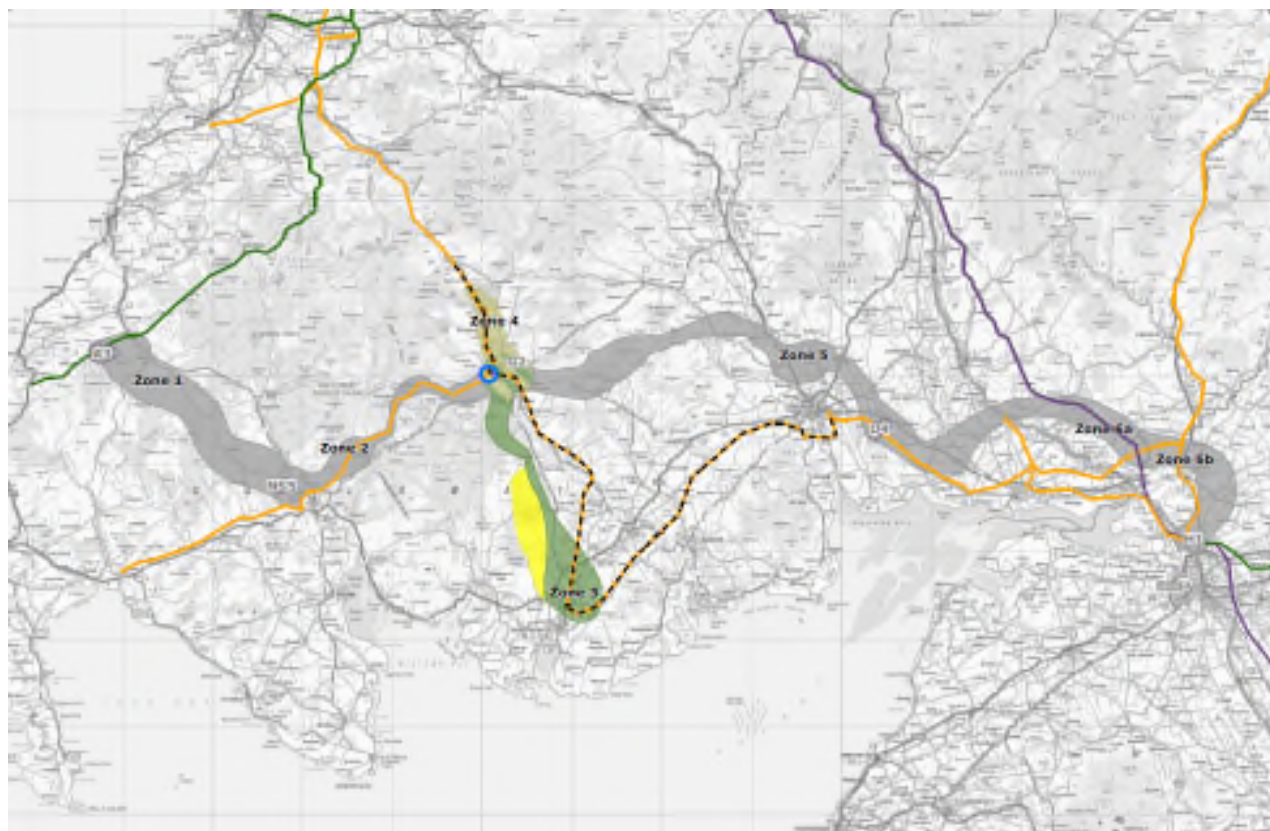
KTR Project - Programme Update

- Key dates in programme for Kendoon-Glenlee (TORI 221) and Glenlee-Tongland (TORI 222)

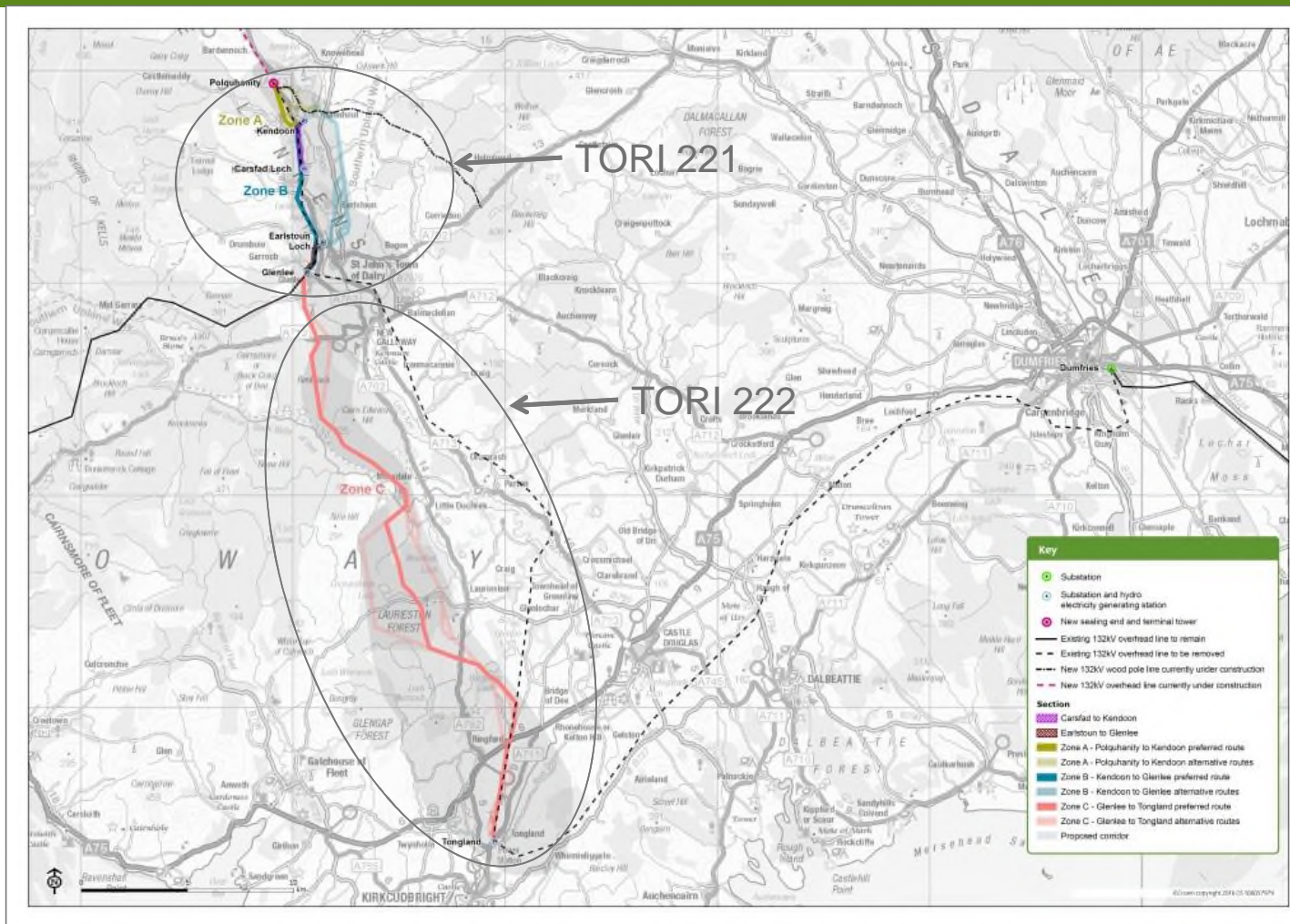
Preferred Route Consultation	Q4 2016
Publish Consultation Feedback	Q1 2017
Scoping Submission	Q1 2017
Preferred Route Alignment Consultation	Q4 2017
EIA surveys	Q4 2016 onwards
S37 Submission	2018
Site access	2020/21
Energisation	2023

KTR Project - Consultation Update

- Public consultation on Preferred Routes for Kendoon to Tongland Reinforcement (KTR) project is now underway
- Consultation closes on 21st December (13th January 2017 for feedback)



KTR Project - Consultation Update



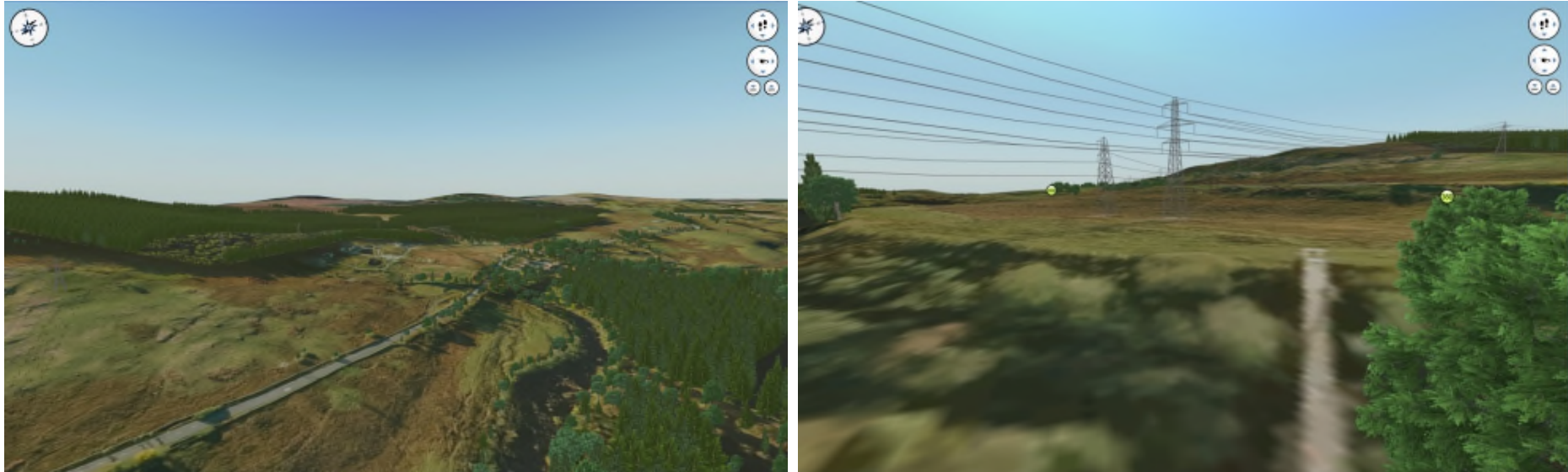
KTR Project - Consultation Update

- Consultation launched through
 - notifying affected landowners
 - stakeholder groups
 - public notices
 - direct mail project leaflet to affected properties
 - Elected member briefings
 - Information points set up in local areas
- Four public exhibitions in Dumfries, Kirkcudbright, Mossdale and New Galloway
- Feedback through various channels including website (www.spenergysr.co.uk) , freephone, e-mail, FREEPOST
- Statutory Stakeholder Liaison Group (SSLG)
 - Ongoing role through pre and post application process
- 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



KTR Project - Consultation Update

- 3D visualisation model



- Next steps
- Review feedback and publish Summary of Feedback report in Q1 2017
- Further round of public consultation in Q4 2017 on detailed route alignment prior to consent application



The Future of DSO Services

Gerard Boyd

Commercial & Innovation Manager

18th November 2016

Recognising a need for change

Widespread penetration of DG



The closure of Thermal Plant



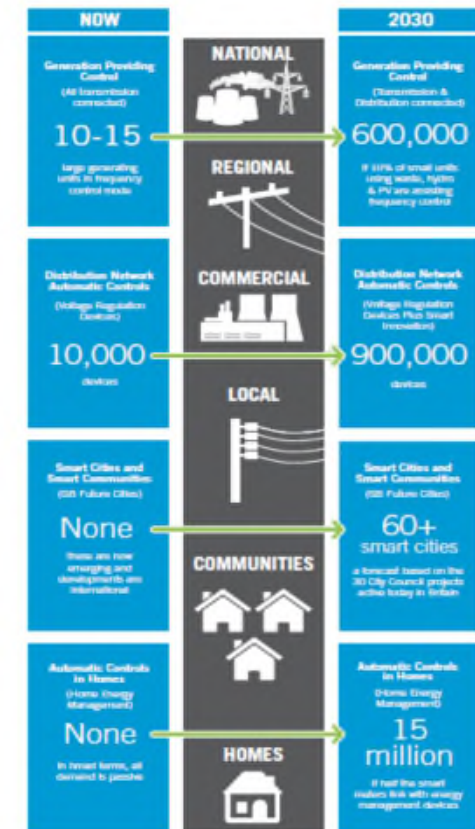
Low Carbon Technology Uptake



Step Change in Smart Players

Challenges

- Now over 27GW of DG connected in the UK
- The closure of thermal plant is changing the way we need to manage the network
- Heating and Transport contribute ~40% of the UK's CO2 emissions -> **EVs and EH**
- The way people interact with the electricity grid is changing; **prosumers, smart cities**

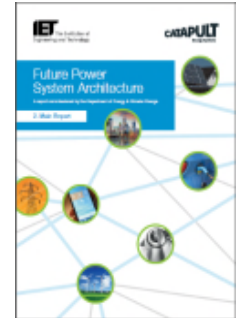
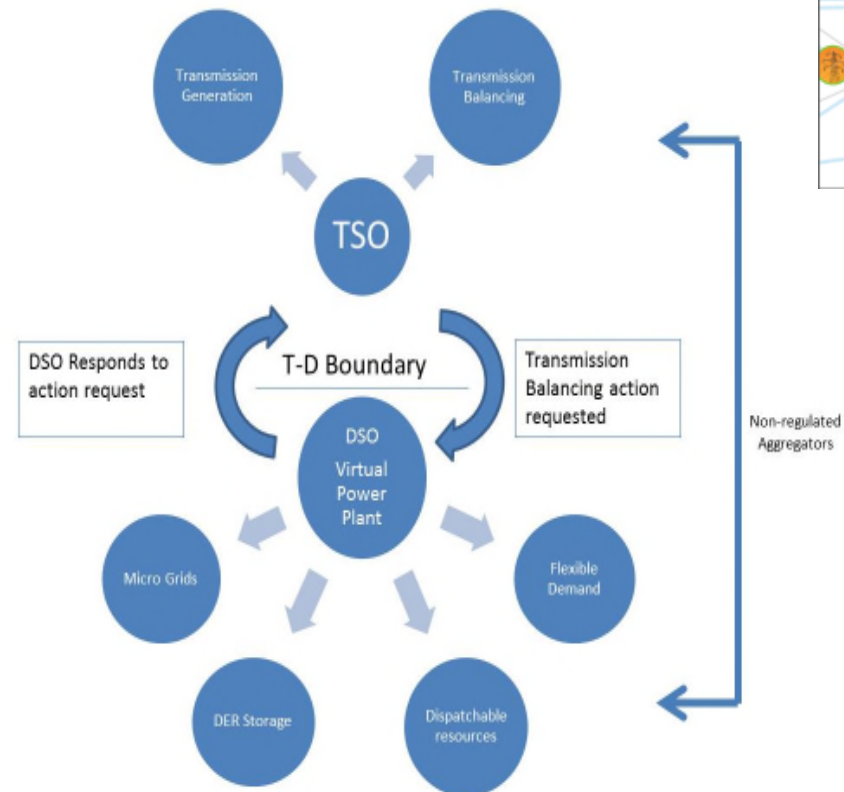


There is an emerging need to understand and control the network in real time

The changing role of Distribution Network Operators

There is widespread UK and International opinion that the role of DNOs needs to change to meet future challenges

- IET and the Energy Systems Catapult have jointly published their report on the Future Power System Architecture, sponsored by BEIS - July 2016
 - Focuses on 7 key drivers and 35 functions that a Future Network will require
- BEIS/Ofgem published their Call for Evidence on Future Energy Systems on the 10th November
 - Strong message that DNOs need to transition to DSOs, although not very specific on exact roles & responsibilities
- Key that Government, network operators and wider industry work together to develop a viable DSO model



Our DSO Vision

Facilitating an open and inclusive market for ancillary services.

Continue to improve customer service and maintain system security.

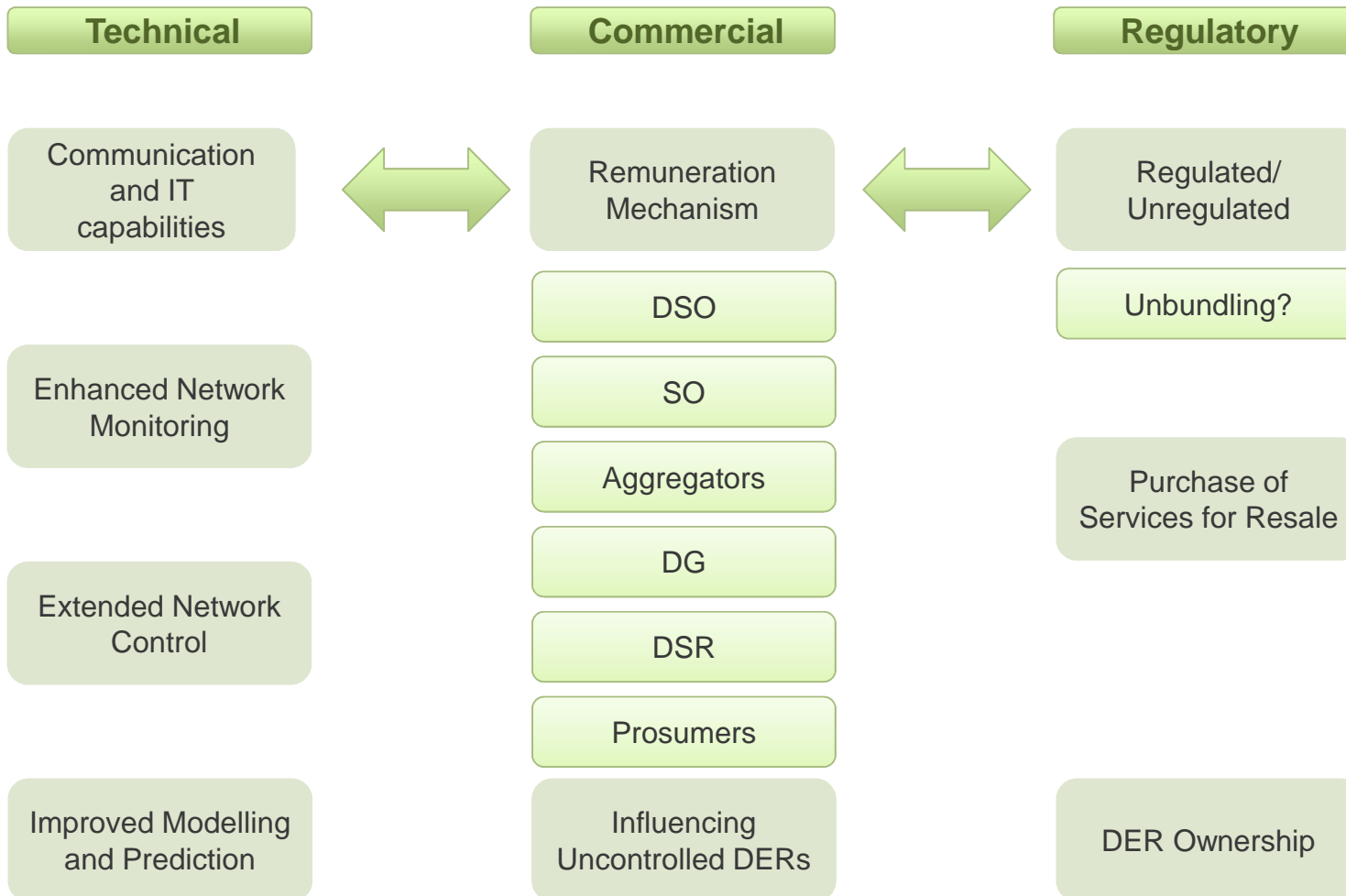
Enact balancing actions that best meet the needs of system operators and service providers.

SPEN DSO Principles

Work with key stakeholders to develop a fair and economic DSO model in the UK.

Transitioning to a DSO needs to demonstrate lowest overall cost for UK customers

Key Enablers



Next Steps

- Consultation open on our DSO Vision document
http://www.spenergynetworks.co.uk/pages/dso_vision_consultation.asp
- Review and publish consultation responses
- Respond to Ofgem/BEIS Call for Evidence
- Develop a more detailed DSO Route map document Q2 2017
- Trial areas developed for DSO transition

D&G Next Steps

Julian Leslie
Electricity Network Development Manager

System Operator



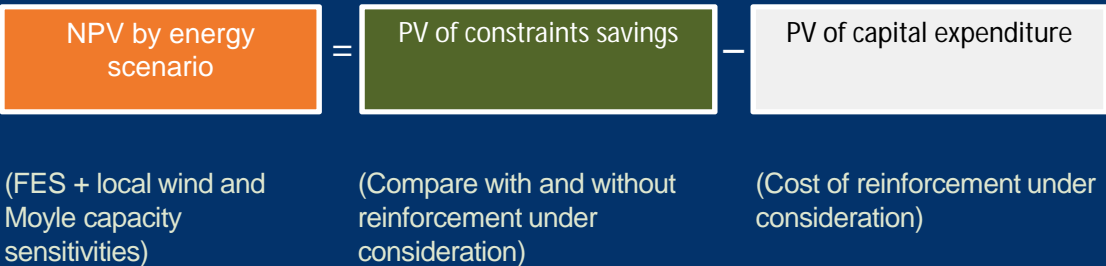
Agenda

- § Recap on Concept of cost benefit analysis used within both strategic wider works and network options assessment processes
- § Recap on transmission network reinforcement options considered
- § Recap on conclusions of cost benefit analysis / network options assessment
- § Next steps – contract changes and commercial options development

The key concepts of CBA are used in two processes

1

Key concepts of cost benefit analysis (CBA)



2

Used in two processes designed to minimise costs for the consumer

Strategic Wider Works

- § Transmission owner funding mechanism
- § Introduced under RIIO-T1 in 2012 to manage uncertainty

Network Options Assessment

- § System operator report providing investment signals
- § Introduced in 2015 to signal preferred system boundary reinforcements to proceed with in the next year

RECAP: Extensive work by SP Transmission on reinforcement options

- § Four reinforcement options, each with an earliest in service date of 2023, identified and considered:
 - § Counterfactual (Option 1): Reduced Scheme – A 132kV network that replaces assets at end of life and provides enhanced local capacity for Galloway
 - § Option 2: High Capacity 132kV solution
 - § Option 3: Supergrid from Glenlee to Harker
 - § Option 4: Supergrid from Auchencrosh to Harker (has wider boundary impact)

Conclusions

- § No economic case to reinforce the network beyond the counterfactual (i.e. 'reduced scheme') in any scenario
- § More cost effective for the consumer to pay the assumed additional constraint costs than the cost of additional network capacity
- § We are continuing to work closely with SP Transmission on the necessary activities required to ensure developers are no worse off than they would have been had the full D&G reinforcement currently in connection contracts gone ahead.
- § User Commitment or Restrictions on Availability may need to be amended to reflect the 'reduced scheme' and the Enabling Works may need to become subject to appropriate funding and an SQSS Derogation
- § We would like to reassure developers that the CBA outcome will not result in additional Allowed Interruptions – any physical reduction in network access due to the progression of the 'reduced scheme' will be covered on a commercial basis

Next steps

- § We have taken on board feedback presented following the last forum. Specific project related questions have been answered and, where possible, we have published further information.
- § We do not foresee any adverse affect of new applications on the Reduced Scheme. However, we recommend that pre-application discussions are held with National Grid and SP Transmission.
- § The changes required to contracts have been identified by SP Transmission and National Grid and have now been discussed with developers. Revised contracts will be issued to amend User Commitment (security requirements) ahead of January 2017.
- § Commercial and technical options to manage constraints are now being considered. Today we have our first opportunity to seek your views and input on possible options. They are still at a conceptual stage. The design and implementation of some of these options will not be a quick process. The timeline is dependent on the option(s) taken forward.
- § Please continue to engage with National Grid and SP Transmission where you have project specific questions.
- § Again, we are working hard on the necessary activities required to ensure developers are no worse off than they would have been had the full D&G reinforcement currently in connection contracts gone ahead.

D&G Workshop topics

18th November 2016

Definitions

- **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.” *Baringa*
- 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 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 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

OPTION B: Commercial Intertrips + Balancing Mechanism (BM)

- Commercial Intertrips would be utilised on larger sites, easing the majority of constraints. BM utilised to manage the last few percent.
 - Larger sites only
 - Hard trip
 - Pre and post fault scenarios

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

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.

OPTION E: Innovative solutions
e.g. storage, demand

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