





Dumfries and Galloway Developer Forum

> Welcome and Introduction

Scott Mathieson

Network Planning and Regulation Director

Agenda

Introduction – Scott Mathieson

- Introduction of team (SPEN and NGET)
- Agenda for the day
- Conclusion of design, development and analysis works

SPT Needs Case Submission Update – Diyar Kadar and Colin Brown

- Needs case process for D&G
- Overview of SPT technical solutions being worked on inc timeline

NGET update - The Way Forward - Ivo Spreeuwenberg (NGET)

Group Discussion

Question Panel & Close





Conclusion of design, development and analysis works

Initial project developed under the RIIO-T1 Strategic Wider Works (SWW) framework to address three key drivers : Asset Replacement; Connection of renewable generation; Interconnector capacity

The SWW process has concluded with a project conclusions report submitted to Ofgem on 7th July

The D&G area has a maximum demand of 190MVA and generation in excess of 340MW currently connected to the system

It explains we will take forward a "Reduced Scheme" that will meet the above drivers through a combination of infrastructure and operational/commercial solutions

The Reduced scheme defers investment, avoids stranded assets and has been developed to allow the progress of works which are no regret and essential to secure existing customers and optimise utilisation of South West Scotland assets currently under construction

This is a game changer and today is about laying out how we have come to this solution, the implications and the next steps





The CBA indicates our Reduced Scheme will allow over 95% of the available renewable energy required to flow

It demonstrates in this situation it is more cost effective to allow market operations to limit the export of generators and interconnectors commercially rather than build infrastructure to meet all of the potential new generation and interconnection

SP Distribution and National Grid are represented here and we are working very closely to ensure we are co-ordinating our different roles and responsibilities to meet your needs.

We value your input and feedback going forward.







29th July 2016

Dumfries and Galloway Developer Forum

SPT Network Planning

Diyar Kadar

Background and Drivers



Modernisation of existing end of life assets to secure supplies to customers

Provide additional capacity for generation customers in D&G, facilitating renewables

Provision of NETS SQSS compliant capacity for the Moyle interconnector in line with its design capability





Existing System – Electrical Layout

Interconnected legacy 132kV network

Single circuit in nature and runs in parallel with the Supergrid MITS

The single circuits from Kendoon North to Dumfries were built in the 1930s

The circuits are beyond economic refurbishment and in need of modernisation

Very limited in capacity and cannot accommodate further generation







Cost Benefit Analysis Summary

As part of the Strategic Wider Works need case development a Cost Benefit Analysis (CBA) by the System Operator (NGET SO) in collaboration with the TO (SPT) was carried out

The main inputs to the CBA were reinforcement options, scheme costs and generation background scenarios and sensitivities

A baseline system (counterfactual) against which all other reinforcements are assessed had to be established

The enhancement that each scheme provides is determined in terms of boundary capabilities that the reinforcement provides

The benefit of each option in terms of constraint savings against the baseline (counterfactual) system is then determined

Constraint savings will be compared to the incremental capital cost of the scheme over and above the baseline system to determine the net present value of the scheme

If the scheme produces a positive net present value then this will be taken forward to a least worst regret analysis

This analysis determines the scheme that produces the optimal balance between capital cost and constraint savings across the various generation scenarios and to the benefit of GB consumers





Generation Background - Current Status



Initial delay (up to 2017) is due to consenting issues in SWS, later delays is due to change of connection dates by developers

Only 23% of the total generation is currently connected

48% of the generation is contracted but not consented





Generation Scenarios

More money available

Prosperity

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Less money available

Consumer Power

Consumer Power is a market-driven world, with limited government intervention. High levels of prosperity allow for high investment and innovation. New technologies are prevalent and focus on the desires of consumers over and above reducing greenhouse gas emissions.

Gone Green

Gone Green is a world where policy interventions and innovation are both ambitious and effective in reducing greenhouse gas emissions. The focus on long-term environmental goals, high levels of prosperity and advanced European harmonisation ensure that the 2050 carbon reduction target is achieved.

No Progression

No Progression is a world where business as usual activities prevail. Society is focused on the short term, concentrating on affordability above green ambition. Traditional sources of gas and electricity continue to dominate, with little innovation altering how energy is used.

Slow Progression

Slow Progression is a world where economic conditions limit society's ability to transition as quickly as desired to a renewable, low carbon world. Choices for residential consumers and businesses are restricted, yet a range of new technologies and policies develop. This results in some progress towards decarbonisation but at a slower pace than society would like.

Less focus

Green ambition

ore focus

NGET Future energy scenarios were complemented with local energy scenarios

This reflects a local bottom up approach with a wider top down system approach





Options and Costs

Total of 29 options were assessed against environmental, technical and cost benefits.

The merits of these options were technically assessed against project drivers.

The viability of new technologies were also being assessed (e.g. onshore and offshore HVDC)

Options can be subdivided into four categories

Four options were progressed to the CBA stage (one from the first two categories and two supergrid)

Technology	Number of Options	NETS SQSS Compliance	Cost Band £
Minimum	3	No (Connected and consented)	< 200m
High Capacity 132kV on New Routes	3	No (Connected and Contracted)	200m< Cost <300m
Supergrid	17	Varies (Connected, Contracted and headroom)	475m< Cost <620m
Onshore and Offshore HVDC	6	Yes (Connected, Contracted and headroom)	>850m*





Options for CBA





System capabilities for CBA options

Each scheme progressed to the CBA stage provides enhanced system capability over and above the existing system

Local system boundaries were defined (L1, L2, L3, L4, L5 and Moyle) to determine the improvement that the reinforcements produce

These boundary capabilities were then utilised to determine the constraint costs for each zone and the incremental benefits each scheme provides when compared to the counterfactual

System supply security had to be maintained in all options and ensure compliance with NETS SQSS is achieved







Taking into consideration the various generation scenarios and other system developments, any reinforcement over and above the counterfactual system results in a negative Net Present Value (NPV)

Two main factors have a significant influence on the CBA analysis, one is the development of the eastern HVDC link and the second is the behaviour of the Moyle interconnector

For other generation scenarios the reduced scheme provides significant benefits to the system and GB consumers

Hence it is proposed to progress the development of the reduced scheme to modernise assets and provide additional capacity to the system in Dumfries and Galloway





Reduced Scheme



New 132kV transmission infrastructure between Kendoon and Tongland

Rationalises the existing 132kV network

Extension to existing Glenlee site instead of constructing new substation

No regret investment and part of the full proposal already consulted on in 2015

Ensures security of supply to existing demand and connected generation customers

Provides capacity for 60% of the contracted generation position





Reduced Scheme – SQSS Capability













Development of a Regional Active Network Management scheme. This will allow generation to connect and be constrained off on a commercial basis by the System Operator

Derogation from normal design standards (NETS SQSS) could potentially be required in the future.

Further commercial solutions and potential changes to commercial policies of National Grid, SPT and SPD

Requirement to work constructively with the System Operator to develop these operational and commercial solutions

However taking into consideration power factor, other reinforcements and system power flows the CBA analyses have shown that in excess of 95% of the energy volume will flow







29th July 2016

Dumfries and Galloway Developer Forum

SPT Development

Colin Brown

Needs Case process

- Initial project developed under RIIO-T1 Strategic Wider Works (SWW) framework
- Transmission Owner Reinforcement Instruction (TORI) 141 created based on the full Auchencrosh to Harker scheme
- TORI 141 quoted as Enabling Works in connection offers for completion in 2023
- Full Auchencrosh to Harker scheme was developed based on the project drivers
- Environmentally led routeing process to identify broad route corridors and substation siting areas
- Need case consultation with current and potential system users
- Public consultation on the proposals in summer 2015
 - Approximately 175km of new infrastructure of up to 400kV from west to east
 - Approximately 46km of new 132kV infrastructure from Kendoon to Tongland
 - Construction of four new substations at Auchencrosh, Newton Stewart, Glenlee and Dumfries
 - Removal of approximately 132km of existing 132kV infrastructure





Consultation in summer 2015







Feedback from the consultation

- Respondents were concerned about potential visual impact on the landscape
- Respondents felt that the connection should have been put underground
- A subsea connection would have the least visual impact and least impact on tourism and wider economy
- Respondents felt that the Government announcement (during the consultation period) on onshore wind subsidies could impact the amount of generation required
- Many called for a re-think / moratorium
- Other comments on timing of sharing the proposals, advertising & information leaflet





Proposed Reduced Scheme

- The development of the Auchencrosh to Harker proposal has involved extensive stakeholder engagement, detailed technical assessment and economic modelling
- Through the SWW process the Cost Benefit Assessment (CBA) identified that the full Auchencrosh to Harker proposal was not economic at this time
- The Reduced Scheme now being progressed <u>is significantly reduced in scope, scale and</u> <u>only partially meets the original project drivers</u>
 - No regret investment
 - Component of original scheme
 - Ensures security of supply to existing customers and provides incremental capacity
- The Reduced Scheme now being progressed does not meet the SWW criteria and will be developed under a different set of regulatory mechanisms
- The SWW process has concluded with the submission of our Project Conclusions Report to Ofgem in early July





Reduced Scheme Elements & Timelines

- The Reduced Scheme is known as the Kendoon to Tongland Reinforcement (KTR) project and has three main elements:
 - Kendoon to Glenlee Reinforcement
 - Glenlee to Tongland Modernisation
 - Glenlee to Newton Stewart Reinforcement
- Estimated completion by 2023
- A combination of these elements 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 (Reduced Scheme)







Stakeholder Engagement

- Implementation of the KTR Project will require operational and commercial solutions to be put in place and further agreement with Ofgem on how the network will be operated
- Several meetings with Ofgem have taken place prior to our project submission, including those with National Grid as System Operator
- Ongoing engagement to communicate these new proposals including:
 - Dumfries & Galloway Developer Forum
 - Statutory Stakeholder Liaison Group
 - Stakeholder e-mails and website updates
 - Further public consultation on KTR project planned in autumn 2016





D&G Next Steps

Ivo Spreeuwenberg Electricity Customer Manager

System Operator



Agenda

- Concept of cost benefit analysis used within both strategic wider works and network options assessment processes
- Recap on range of energy scenarios and transmission network reinforcement options considered
- Next steps
- Conclusions

The key concepts of CBA are used in two processes



RECAP: Future energy scenarios basis of future market conditions



 Four FES scenarios form basis of future market conditions

 Augmented by six additional scenarios to stretch test for local generation capacity scenarios

Focus on local onshore wind and Moyle interconnector capacity sensitivities

http://fes.nationalgrid.com/

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 old assets 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 and next steps

- 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 working 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:



Conclusions: ~25 contracts in the region could be affected

- 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 are working closely with SP Transmission to assess each contract on a case-by-case basis and commit to engage and discuss with all affected parties in the event that any contract amendments are identified
- We would like to reassure developers that the NOA 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

Stakeholder Engagement – Group Discussion

There is a long way to go on this project and we can't do without you. Your input is integral to this process. For the next 20 minutes please discuss the following questions and we will capture your views.

- Is there anything else we should have considered as part of the analysis?
- Do you see this change introducing risk to your project? If so, what are they?
- What do we need to take into consideration when amending your contracts?





Any Questions?





Thank you for your time



