nationalgrid

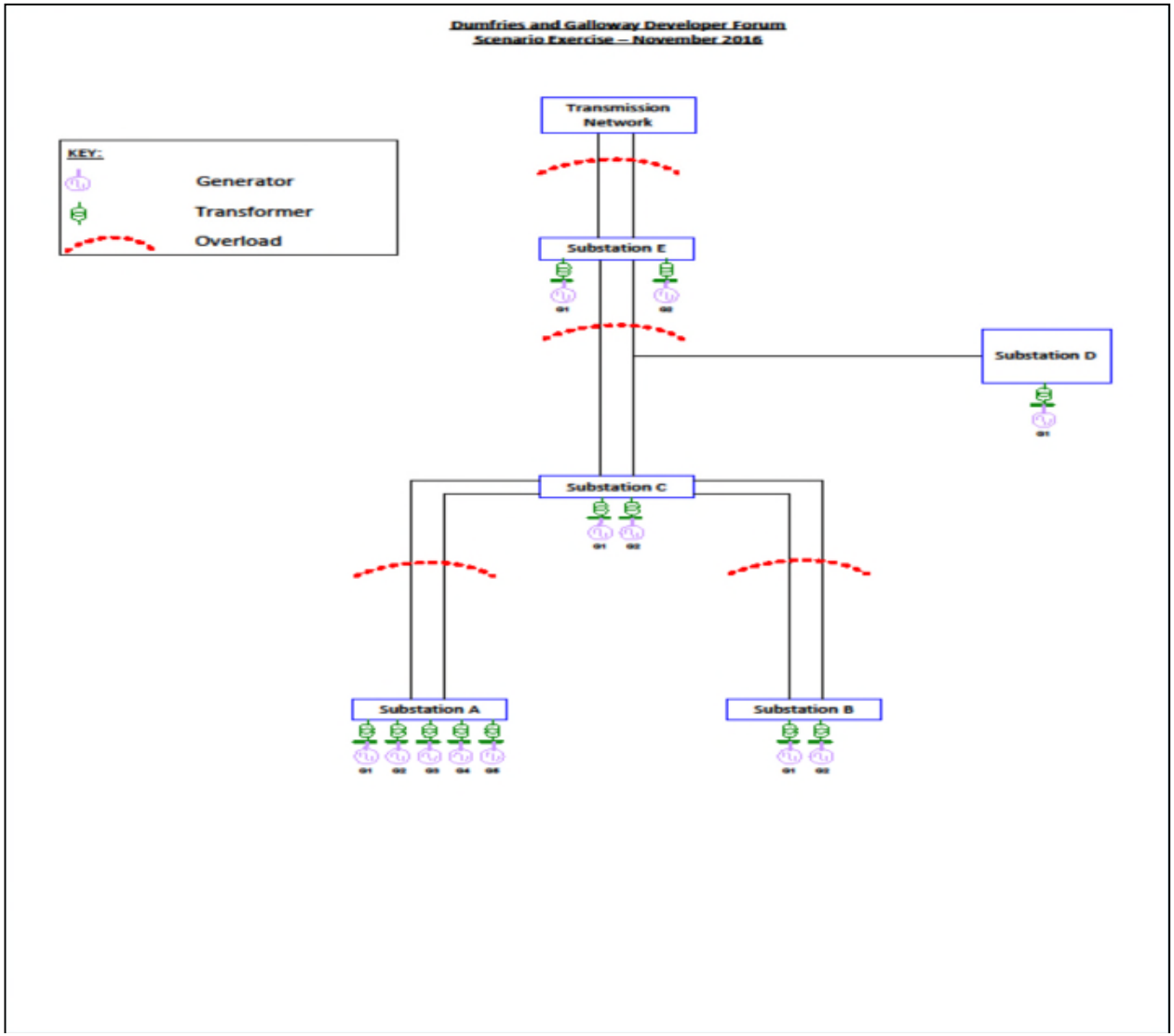
Dumfries & Galloway Stakeholder Forum November 2016
Commercial solution worked examples: Stakeholder Feedback Summary

Diagram of Theoretical Network

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 is calculated through Cost Benefit Analysis (CBA) as being more economic for the consumer.

The Challenge: 5 alternative scenarios are presented that propose different mechanisms to reduce generation and protect the network. The feedback you provide will highlight issues, benefits and blockers to identify which solutions we should develop



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 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 Inter-trips + 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. But 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 ot existing connected sites. May limit smaller sites becoming involved.
The cost benefit analysis may not stack up depending of volem of generation connecting
Requires co-ordination acorss 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 starage converiosn for larger hydro schemes. This may be the basis of a full DSO arrangment.
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.