

Design Variation Charging Arrangements

TCMF

15th October

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Introduction

- ◆ Veto decision suggested that a site specific discount should be assessed
- ◆ Further analysis has shown that discount not consistent with the Charging Methodology leads to perverse incentives
- ◆ Further work has concentrated on refining the accuracy of a TNUoS discount approach based on industry and Authority comments

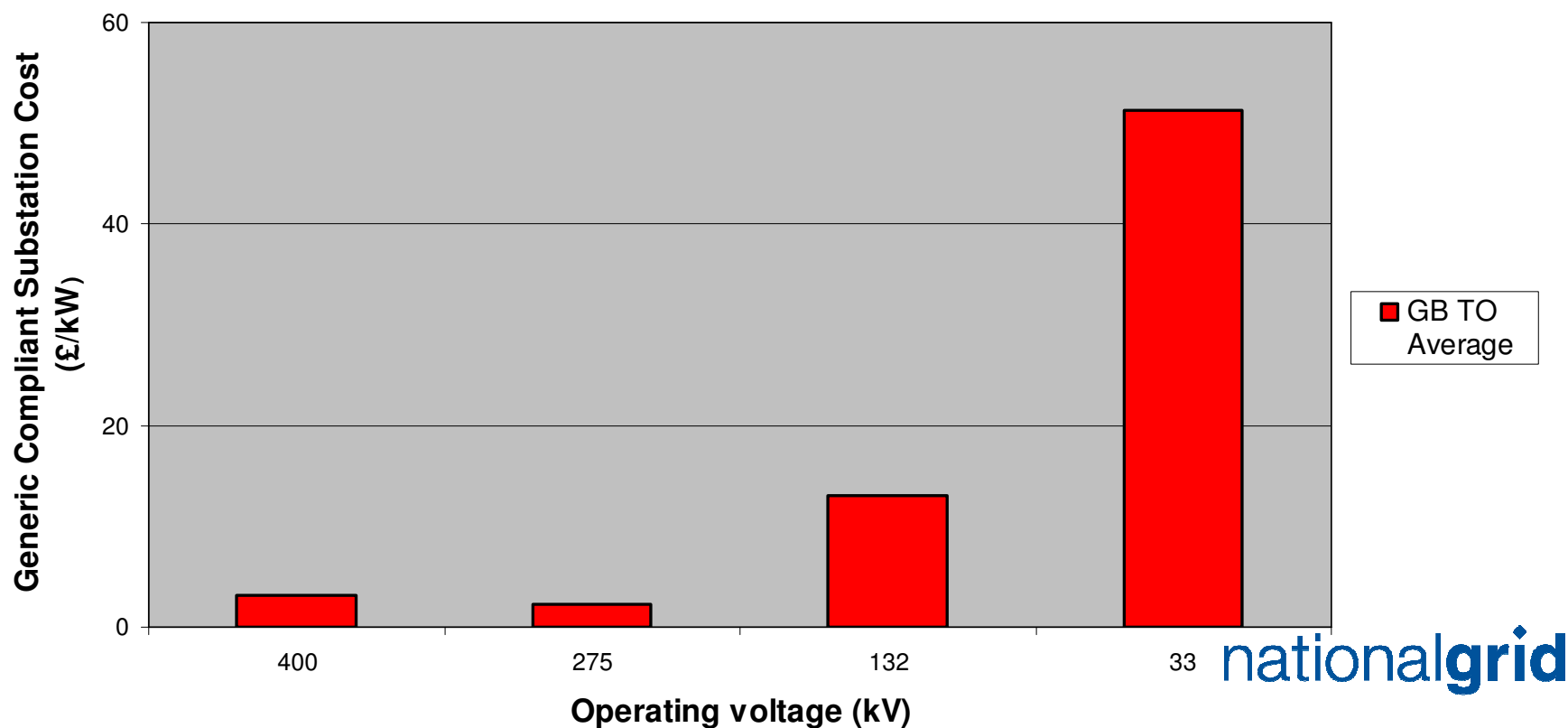
Substation discount I

Original modification proposed a tiered £/kW substation discount:

- ◆ 33kV: £3.12/kW
 - ◆ 132kV: £1.05/kW
 - ◆ 275/400kV: £0.49/kW
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- ◆ Received a range of views from the industry:
 - ◆ Several parties stated this was not consistent with the Charging Methodology e.g. Flat £/kW approach for non-locational assets and the 27:73 (Generation: Demand) split
 - ◆ Another view was the assumption of certain generic substation designs were sometimes wrong and that there are many types of design

Substation discount II

- ◆ Analysis undertaken to determine actual capital efficiencies for a broader range of substation designs
 - ◆ Based upon costs submitted by all TOs
 - ◆ Striking conclusion was that the £/kW approach already benefited the probable recipients for any DV discount



Substation discount III

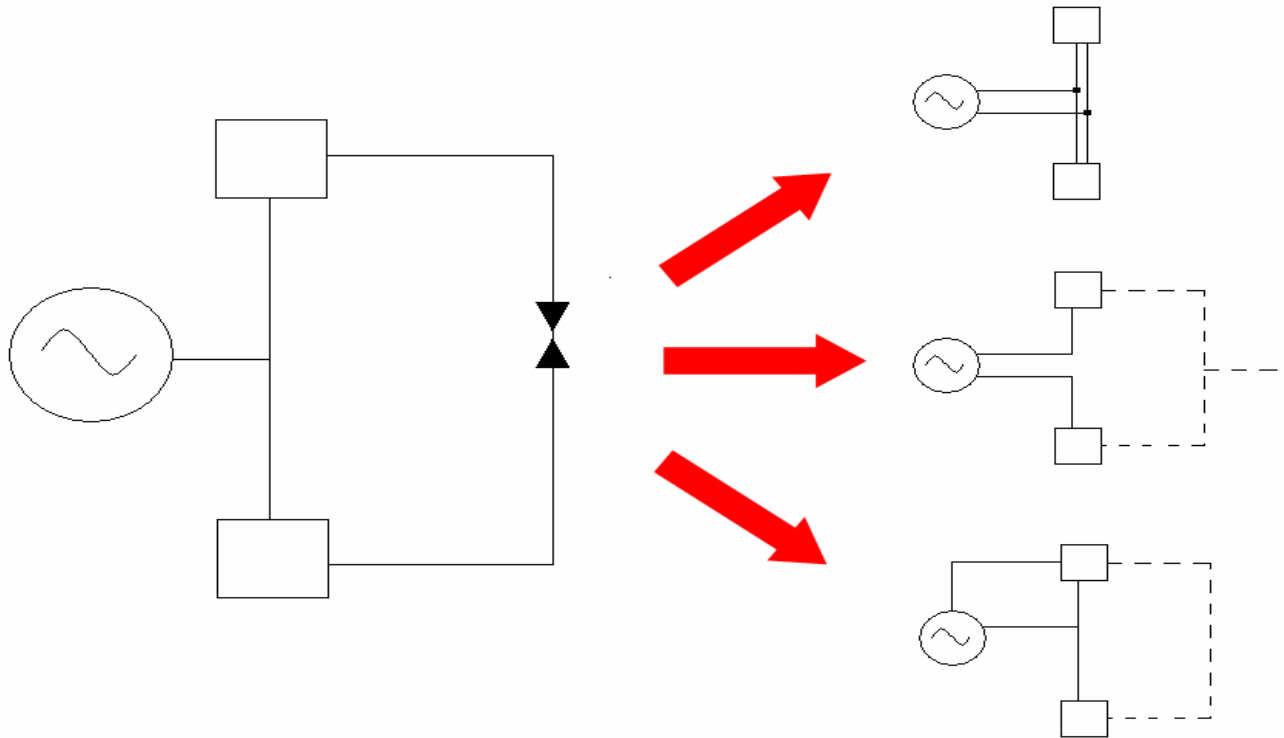
- ◆ National Grid now minded that any discount should be wholly consistent with the Charging Methodology
- ◆ Any additional substation discount could create an inappropriate perverse incentive that may lead to inefficient investment
- ◆ Only viable option to create a true cost reflective signal for single circuits is to move the connection/ infrastructure boundary
 - ◆ The User is charged the site specific capital cost each time and therefore the full savings would be reflected
 - ◆ National Grid believes this would have far more significant and broader considerations that being considered by this modification
 - ◆ Should be reviewed independently

Charge vs discount

- ◆ Through the Locational Security Factor (SF) each User pays 1.8 times the cost of a minimum connection which covers the average assets built to provide post fault security
- ◆ Original discount proposed:
 - ◆ Wholly cost reflective **discount**
 - ◆ Compliant charge(1.8) – discount = final charge
 - ◆ Discount: 1.0 x circuit cost
 - ◆ Final Charge: 0.8 x circuit cost
- ◆ National Grid agree with suggestion that there is not sufficient justification to provide the entire circuit cost discount:
 - ◆ Wholly cost reflective **charge**
 - ◆ Discount: 0.8 x circuit cost
 - ◆ Final Charge: 1.0 x circuit cost

SECULF - Tee and Spur Connections

- ◆ Previously, discount given on the spur length only
 - ◆ Industry stated that there are wider cost implications
- ◆ NG looked to quantify actual savings to refine discount

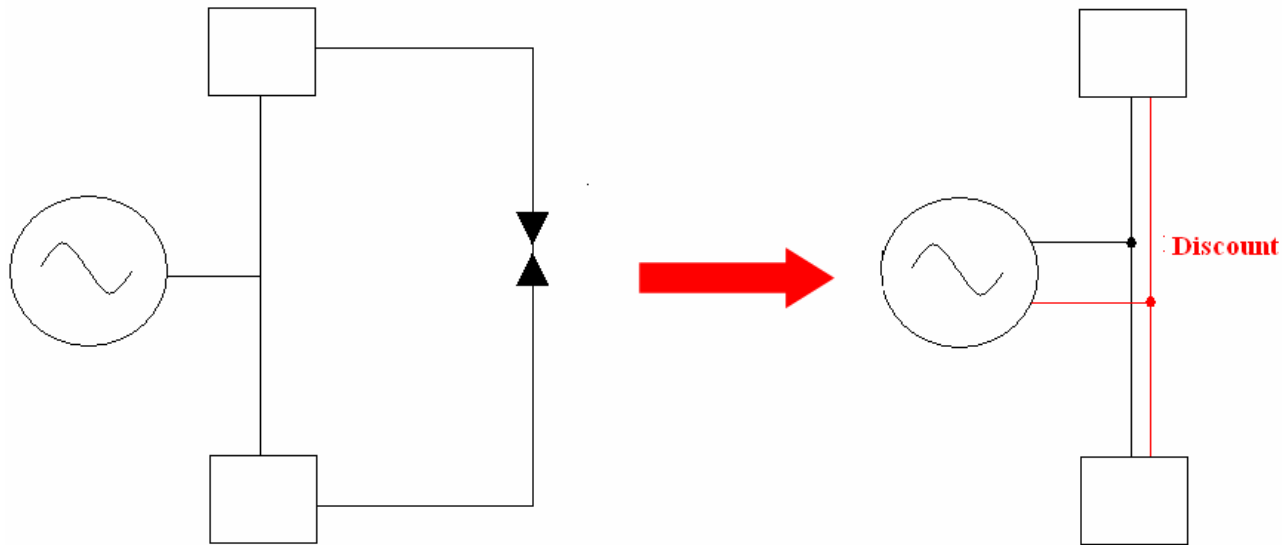


SECULF - Tee and Spur Connections II

- ◆ Several approaches examined:
 - ◆ 1) Nodal Specific SF. The nodal specific SF is found at the single circuit node and differential with SF (1.8) is used to calculate discount:
 - ◆ Single circuit not the only factor in determining discount
 - ◆ Many nodes (half?) would not qualify
 - ◆ Lack of transparency associated with SECULF modelling
 - ◆ 2) Compare the local network with and without compliance. Nearest compliant node assumed to have SF (1.8) and the nodal SF found within two models of the local transmission network (compliant/ non-compliant)
 - ◆ Discount determined from the differential
 - ◆ Transparent and does not require a model
 - ◆ Requires 'likely' network design to be known
 - ◆ Ignores parallel paths/ wider system effects not modelled

SECULF - Tee and Spur Connections I

- ◆ 3) Second Tee discount:
 - ◆ Assumes most efficient reinforcement is second tee circuit and therefore that the parallel path is longer than the tee
 - ◆ Discount based upon length of entire Tee



Examples - Single Tee connection

In-Tact Marginal Cost:

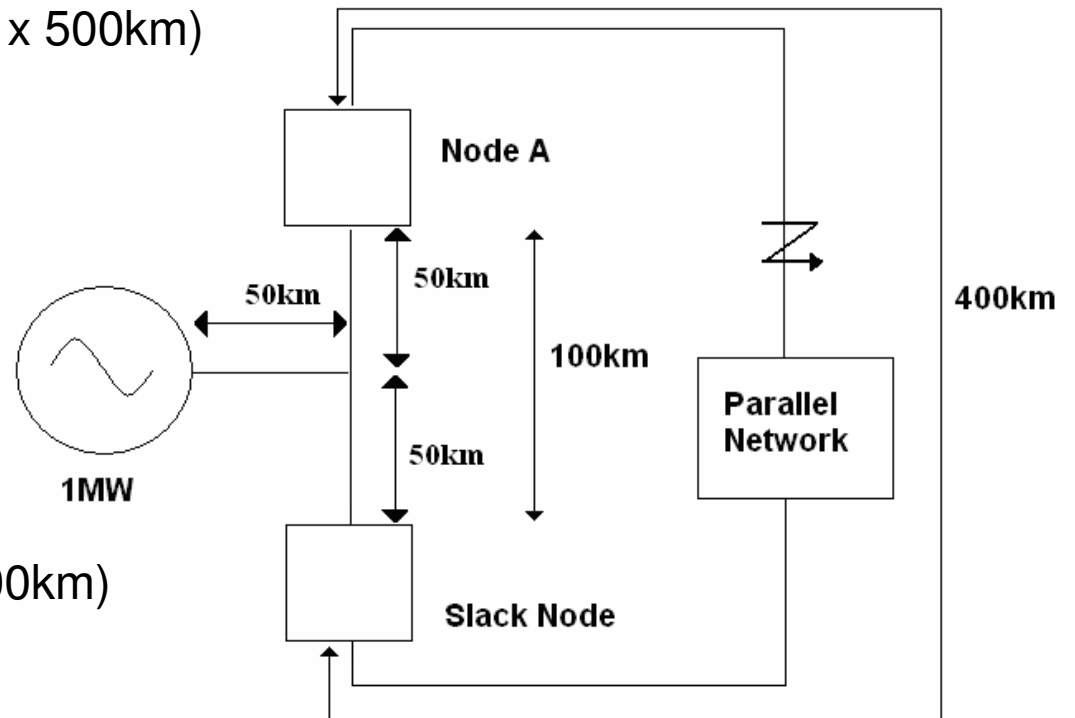
$$= (0.833\text{MW} \times 100\text{km}) + (0.167\text{MW} \times 500\text{km})$$

$$= 167 \text{ MWkm}$$

Secured Marginal Cost:

$$= (1\text{MW} \times 100\text{km}) + (0.167\text{MW} \times 500\text{km})$$

$$= 184\text{MWkm}$$



Examples - Double Tee connection

Intact Marginal Cost:

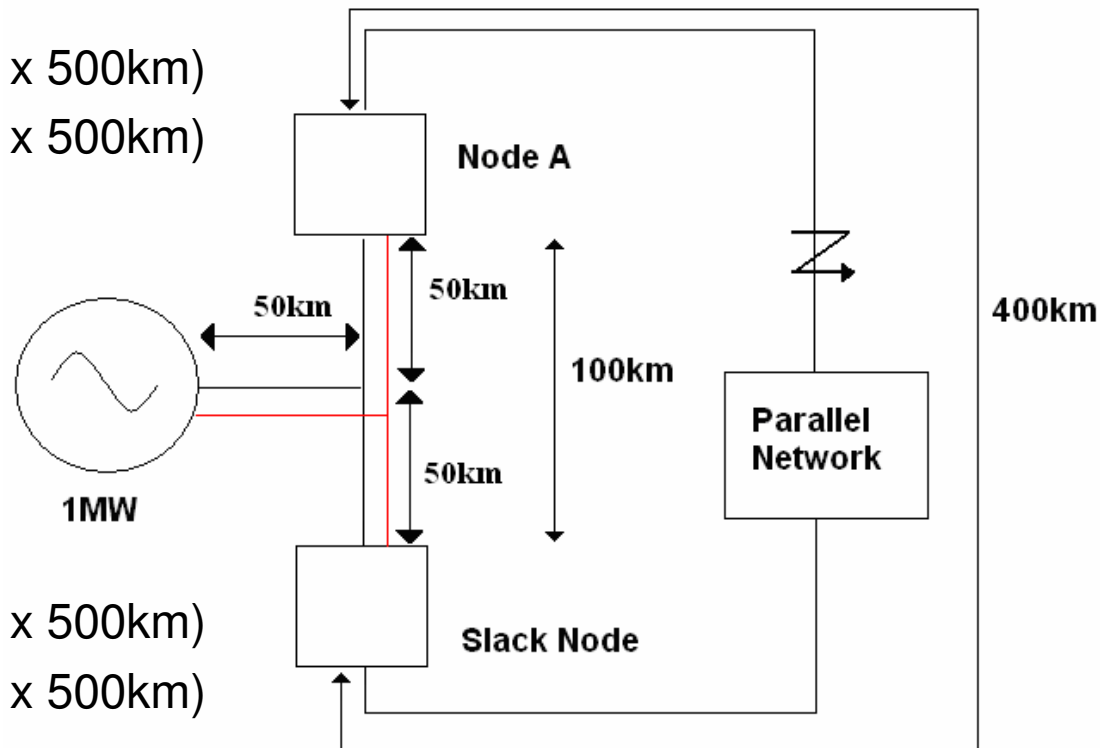
$$= (0.417\text{MW} \times 100\text{km}) + (0.083\text{MW} \times 500\text{km}) \\ + (0.417\text{MW} \times 100\text{km}) + (0.083\text{MW} \times 500\text{km})$$

$$= 167 \text{ MWkm}$$

Secured Marginal Cost:

$$= (0.833\text{MW} \times 100\text{km}) + (0.167\text{MW} \times 500\text{km}) \\ + (0.833\text{MW} \times 100\text{km}) + (0.167\text{MW} \times 500\text{km})$$

$$= 334 \text{ MWkm}$$



Examples – Circuit Turn- in

In-Tact Marginal Cost:

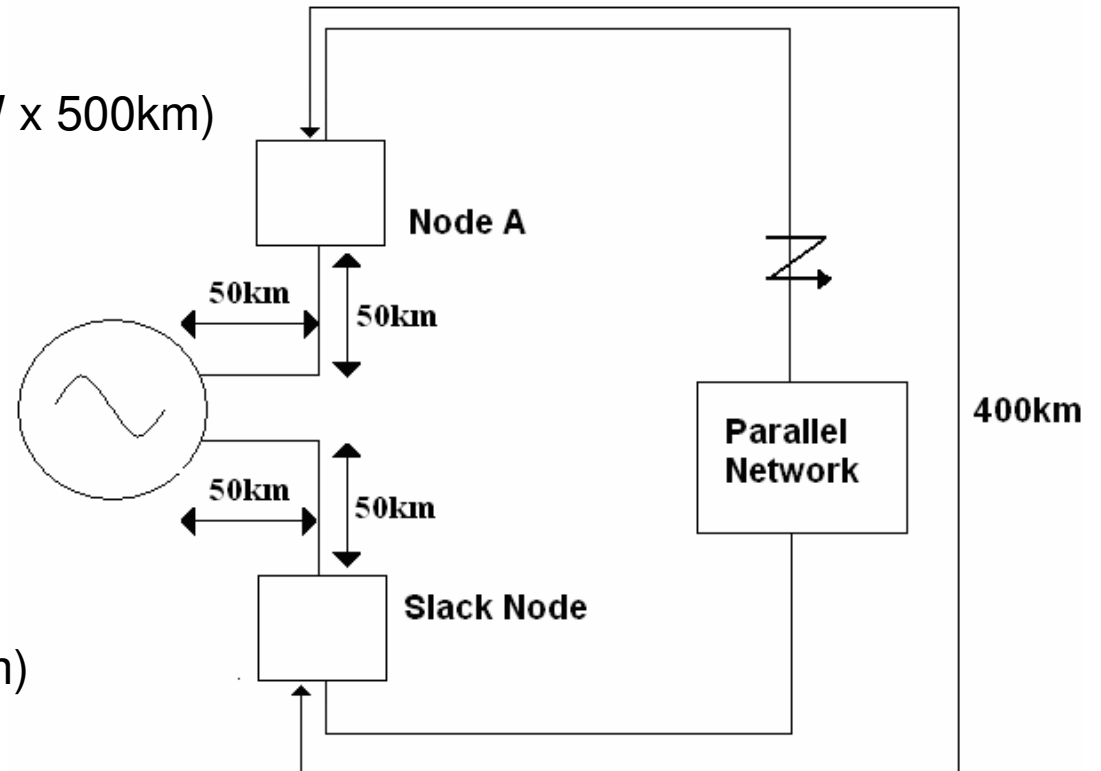
$$= (0.833\text{MW} \times 100\text{km}) + (0.167\text{MW} \times 500\text{km})$$

$$= 167 \text{ MWkm}$$

Secured Marginal Cost:

$$= (1\text{MW} \times 100\text{km}) + (1\text{MW} \times 500\text{km})$$

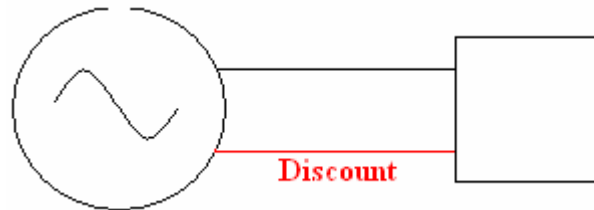
$$= 600 \text{ MWkm}$$



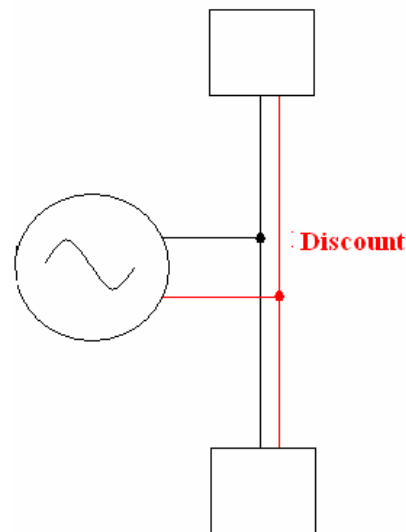
334MWkm (Double T) < 600MWkm

Summary of the proposed discount rules

- ◆ If generator connected on a spur, discount based on the length of the spur.



- ◆ If generator connected on a Tee, discount based on the length of the Tee



132kV Circuit Uprating – Existing Approach

- ◆ For each Scottish TO region the 132kV Expansion Factor is derived taking into account expected upratings
- ◆ At Price Control, the total number of kms are requested that are “likely to be uprated”
- ◆ EF is a weighted average of the incremental cost for 400kV (i.e. 1.0) and the actual cost of 132kV (2.87)
- ◆ Benefit is smeared across all 132kV circuits in a TO’s region
- ◆ The reduced EF also reduced the DV discount

132kV Circuit Upgrading – Proposed Approach

- ◆ Annually, circuits with sanctioned upgrading schemes would be identified
 - ◆ Through Table B.2.1a of the SYS (Existing and Planned Network: Circuit Parameters)
 - ◆ Assigned the 400kV EF
 - ◆ Remaining ccts would then have the unadjusted 132kV EF
- ◆ Increases the cost reflectivity of the DV discount for 132kV OHL – these circuits were not going to be upgraded
- ◆ Generic 132kV circuit data received
 - ◆ Assumptions being verified to ensure “apples with apples” comparisons

Timescales

- ◆ Design Variation Consultation aim to publish this week
- ◆ 28 days consultation (Mid Nov)
- ◆ Conclusions report (End Nov)
- ◆ 28 days Authority veto period (90 days IA)
- ◆ Implementation for 01 April 08