Local asset charging arrangements

TCMF

February 2008

nationalgrid

Pre-consultation

- Preconsultation published 22nd Feb
  - Responses due 21st March
- Views sought on a number of approaches and sub-options

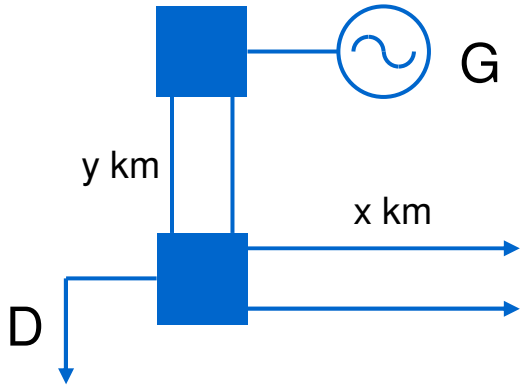
nationalgrid

High level options

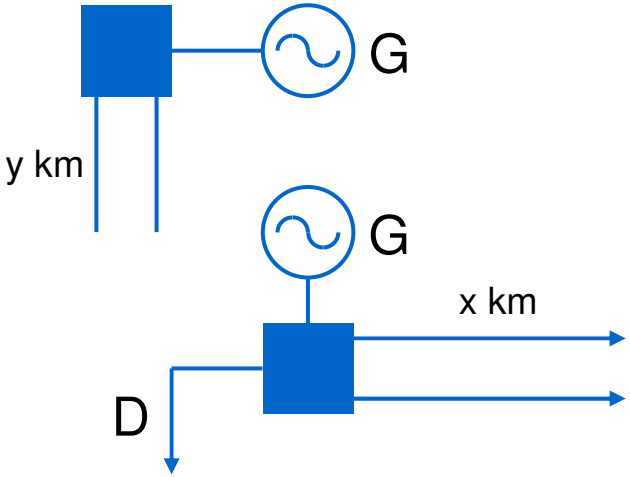
- Changes to TNUoS
  - Specific treatment of generation connections
  - Specific treatment of distance to zonal hub
- Local charge for substation assets
- Change to connection/use of system boundary

nationalgrid

Specific treatment of generation conns



For G>D; 1MW×(x+y)×EF×LSF



For G>D, (1MW×x×EF_{WIDER}×LSF) + (1MW×y×EF_{LOCAL}× $SF_{SPECIFIC}$)

- Current arrangements
  - "Local" and "wider" circuits subject to the same expansion factor (£/MWkm)
  - "Local" and "wider" circuits different construction type and costs (particularly at 132kV)
- Specific treatment gen con
  - "Local" assets removed from transport model
  - Separate treatment of "local" assets with more specific expansion factor and security factor

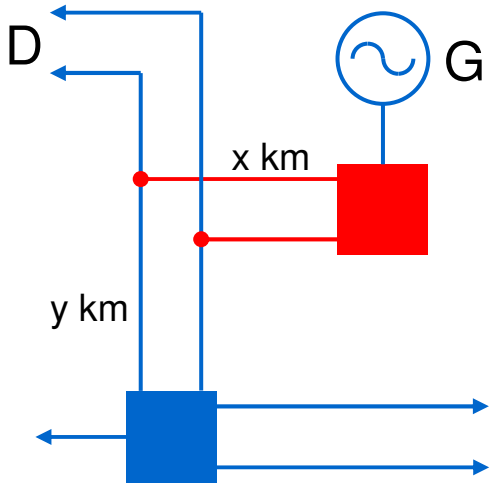
nationalgrid

Specific treatment of generation conns

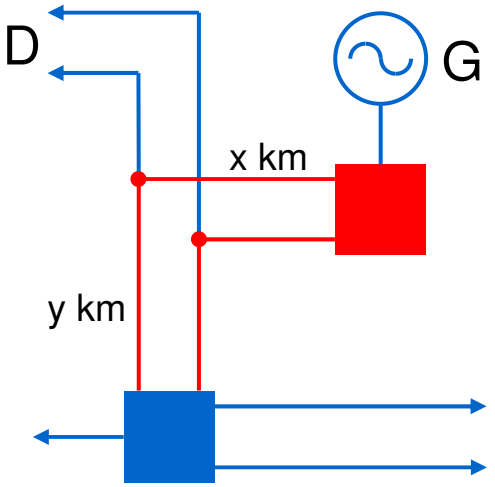
- Sub-options
  1. Generator only vs. marginal investment
     - Shared radial spurs (following slide)
     - Interconnected tees
  2. Applicable voltages
     - 132kV only
     - All voltages
  3. Local expansion factors
     - Generation zone/ TO region/ GB
     - construction type/ circuit rating
  4. TEC or CEC
     - Post TAR – combination of short term and long term access

nationalgrid

Specific treatment of generation conns



- Generation only
  - “Local” assets
    - xkm of ohl



- Marginal investment for generation
  - “Local” assets
    - For G>D; (x+y)km of ohl
    - For D>G; (x-y)km of ohl

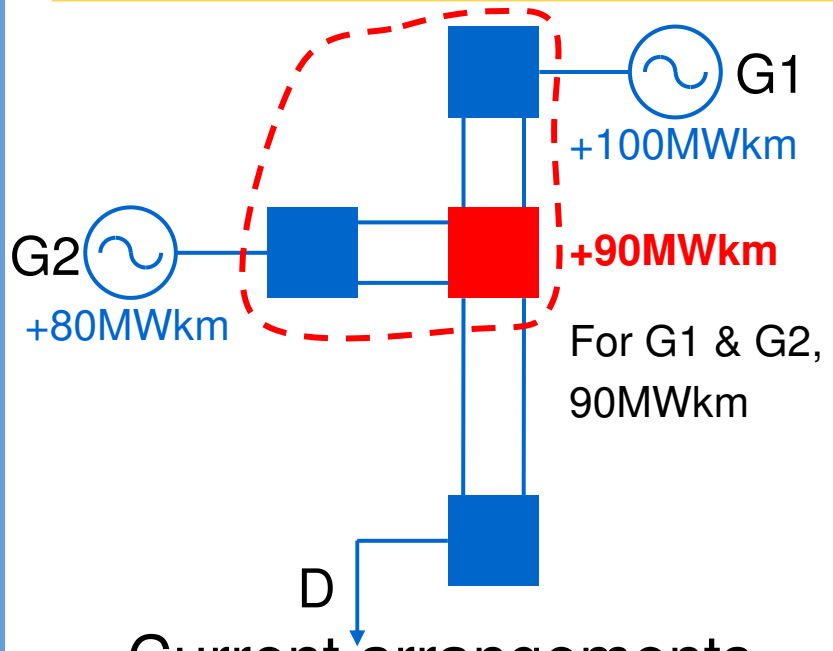
nationalgrid

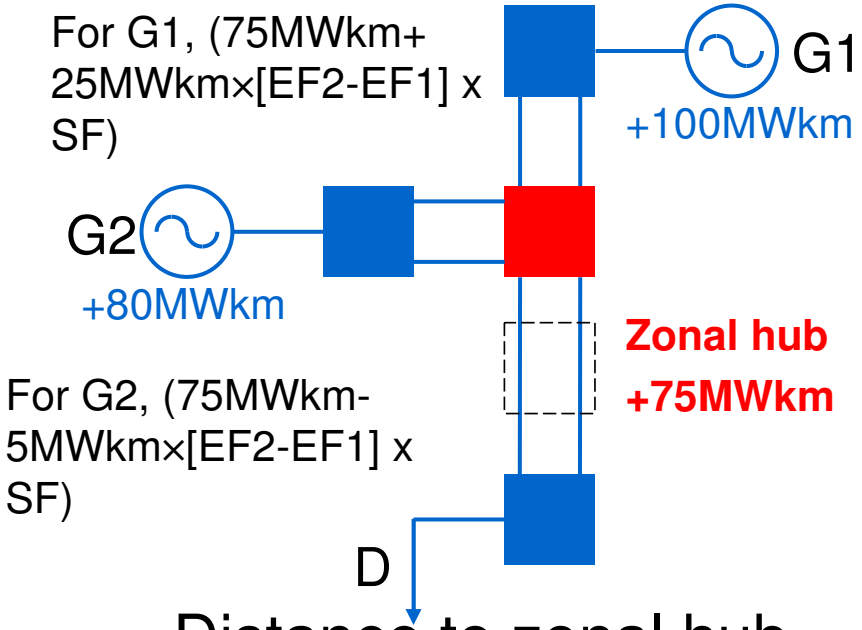
Pros and Cons – specific treatment of generator connections

- Specific treatment of generation connections
  - Pros
    - Maintain some advantages of plugs (avoid exposure to TO wider decisions)
    - Simple concept
  - Cons
    - May not provide signal for all types of connection design variation
    - Definition of “local” asset may be problematic

nationalgrid

Specific treatment of distance to zonal hub





- Current arrangements
  - Transport model used to calculate nodal costs based on standard expansion factors
  - Tariffs based on zonal costs; weighted average of applicable nodal costs

- Distance to zonal hub
  - Nodal charges based on:
    - Zonal charge
    - Difference between nodal and zonal MWkm
    - Difference between “local” and “wider” EF

nationalgrid

Specific treatment of distance to zonal hub

- Sub-options
  1. Local Expansion Factors
     - Volume weighted for Gen zone or TO region
     - Simplified model (last connecting circuit)
     - Average of generation connection circuits
  2. Local Security Factors
     - Simplified assumptions
     - Seculf
  3. Selection of Zonal Hub
     - Generation marginal cost weighted average
     - Lowest generation node
     - Demand marginal cost weighted average

nationalgrid

Pros and Cons – distance to zonal hub

- Specific treatment of distance to zonal hub
  - Pros
    - Maintain some advantages of plugs
    - Calculation is straightforward
    - Improved signals for connection design variations and "connection only"
  - Cons
    - Concept is more complex

nationalgrid

Local asset charging of substation assets

- Required to reflect the full cost of local assets
- A £/kW average cost for the remote end substation
  - Zonal
  - TO region
  - GB

nationalgrid

Change to connection/use of system boundary

- Deepening of the charging boundary exposes the User to the full specific cost of asset investment
- Complexity with applying a consistent boundary
- Options
  - 132kV only or all voltages
  - Connection asset sharing methodology
    - TEC
    - CEC
    - Fault level contribution

nationalgrid

Pros and Cons - connection/use of system boundary

- Pros
  - Cost reflective signal provided for connection design variation connections
- Cons
  - User is exposed to decisions made for wider system reasons
  - Methodology for shared connection assets is required
  - Definition of local assets problematic
    - Will impact on other Users (e.g. demand)

nationalgrid

Illustrations

nationalgrid

Specific treatment of gen spurs – example 1

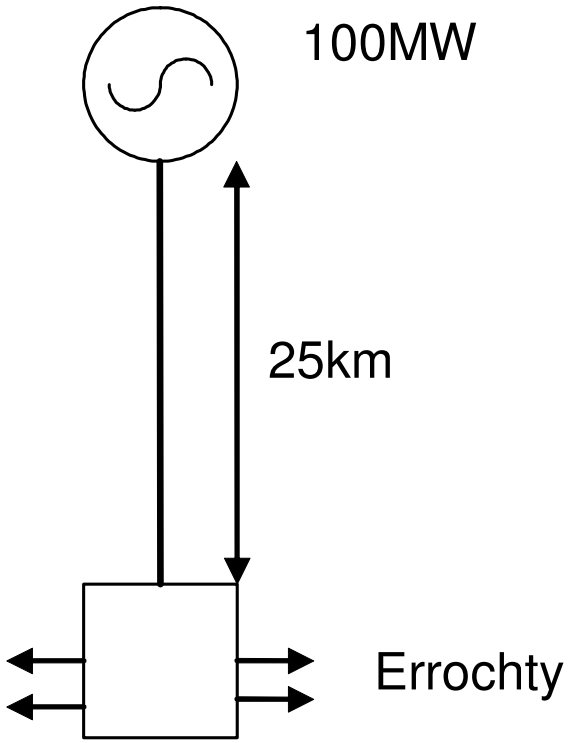
Generator local charge (£/kW) = $\frac{\text{LSP x EC x LEF x SSF}}{1000}$

LSP = Spur Length (km)

EC = Expansion Constant (£/MWkm)

LEF = Local Expansion Factor

SSF = Specific Security Factor



$= \frac{25 \times 10.29 \times 6.0 \times 1}{1000}$

Generator local charge = £1.54/kW

Base zonal tariff = £16.20/kW

Total TNUoS tariff (£/kW) = "Wider" charge + "Local " charge

= 16.20 + 1.54

= **£17.74/kW**

nationalgrid

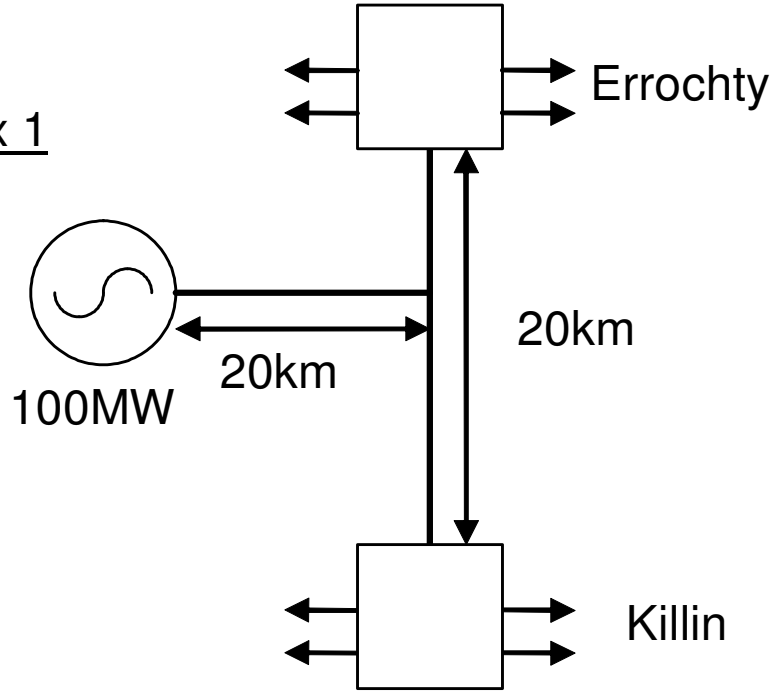
Specific treatment of gen spurs – example 2

Generator local charge (£/kW) = $\frac{\text{LSP x EC x LEF x SSF}}{1000}$

$= \frac{20 \times 10.29 \times 6.0 \times 1}{1000}$

Generator local charge = £1.23/kW

Base zonal tariff = £16.22/kW



Total TNUoS tariff (£/kW) = "Wider" charge + "Local " charge

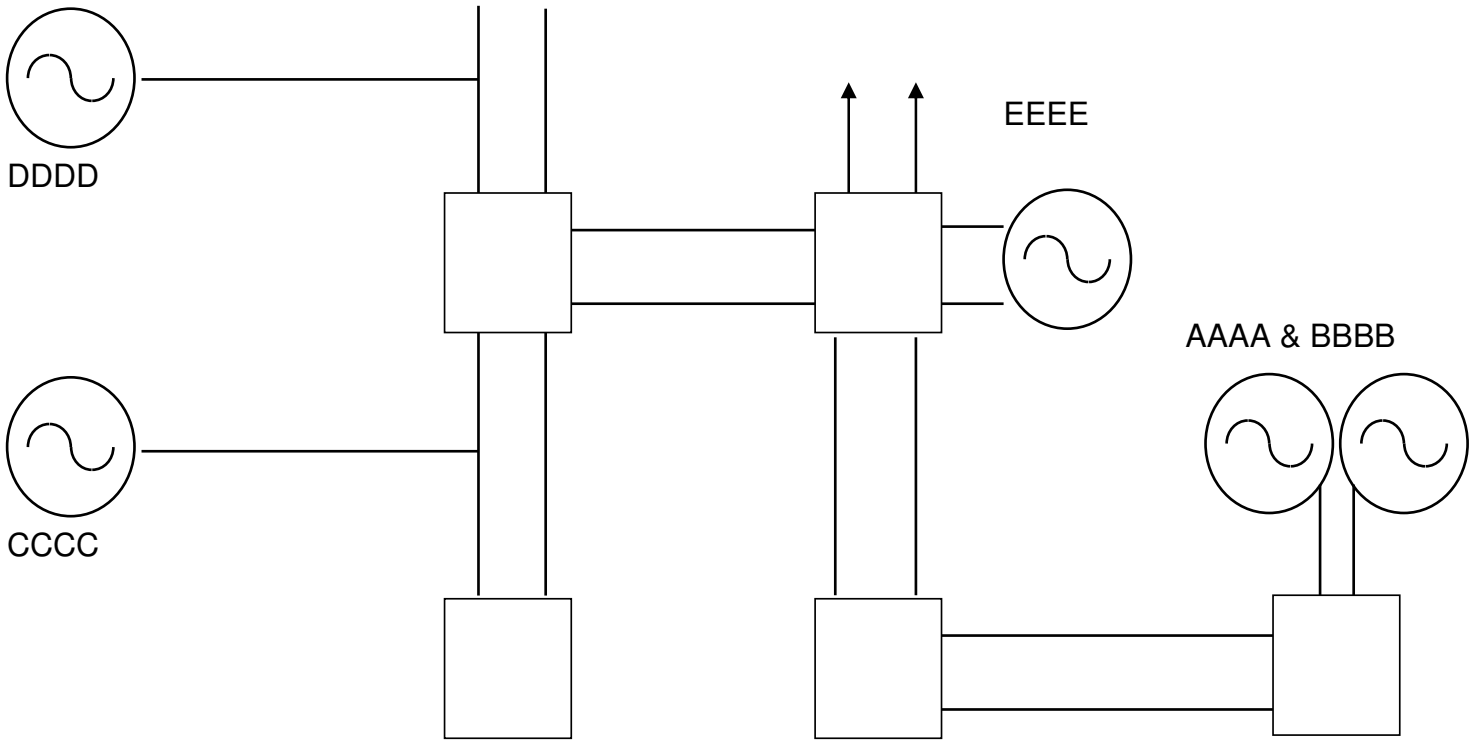
= 16.22 + 1.23

= **£17.45/kW**

nationalgrid

Distance to zonal hub – example 1

TNUoS Zone A



nationalgrid

Distance to zonal hub – example 1 (cont'd)

Zonal hub: Lowest secured marginal cost generation node

Local security factor: Nodal secured costs taken from SECULF model

Local expansion factor: Simplified assumptions – zonal average

Zonal hub charge £/kW = **Secured marginal cost differential** x expansion factor differential x Expansion Constant / 1000

Where secured marginal cost differential is the difference between generator node and the zonal hub using Seculf

Node	Voltage	MW	Unsecured nodal cost (km)	Secured nodal cost (km)
AAAA	275	220	545.6	884.1
BBBB	275	220	545.6	884.1
CCCC	132	30	575.2	816.7
DDDD	132	15	593.6	835.1
EEEE	132	80	513.3	762.2

nationalgrid

Distance to zonal hub – example 1 (cont'd)

EF Differential = EF Local(5.00) – EF Wider(2.24)

For DDDD Local charge = $\frac{(835.1 - 762.2) \times 2.76 \times 10.29}{1000}$

Local asset charge = **£2.07/kW**

Adjustment for moving zonal hubs = **-£2.23/kW**

Net change to TNUoS tariff = £2.07 - £2.23 = **-£0.16/kW**

nationalgrid