Local asset charging arrangements - update

TAR Meeting 3

May 08

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Agenda

- Substation local charge
  - Switchgear rating
- Specific treatment of local generation assets
  - Generation only approach
  - Marginal investment approach
- Distance to zonal hub
  - Use of Demand Cost Weighted average
  - Straw man illustration

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Substation element

- Switchgear rating
  - £/kW substation local charge component could be derived from switchgear capacity rather than average generator size – consistent with principle of paying for capacity used rather than that installed

	400kV	275kV	132kV
Average Size (MVA)	1365	645	55
Double circuit £/kW	0.43	0.60	4.21
Single circuit £/kW	0.21	0.38	2.32

	400kV	275kV	132kV
Switchgear capacity (MVA)	2770	1500	457
Double circuit £/kW	0.21	0.26	0.51
Single circuit £/kW	0.10	0.16	0.28

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Switchgear thermal & fault ratings

Voltage (kV)	Typical power station size (MVA)	Percentage of s/gear thermal rating	Percentage of s/gear fault rating
400	2000	72% (0.036% per MVA)	22% (0.011% per MVA)
132	100	22% (0.22% per MVA)	7% (0.07% per MVA)

Note: Based on typical s/gear ratings

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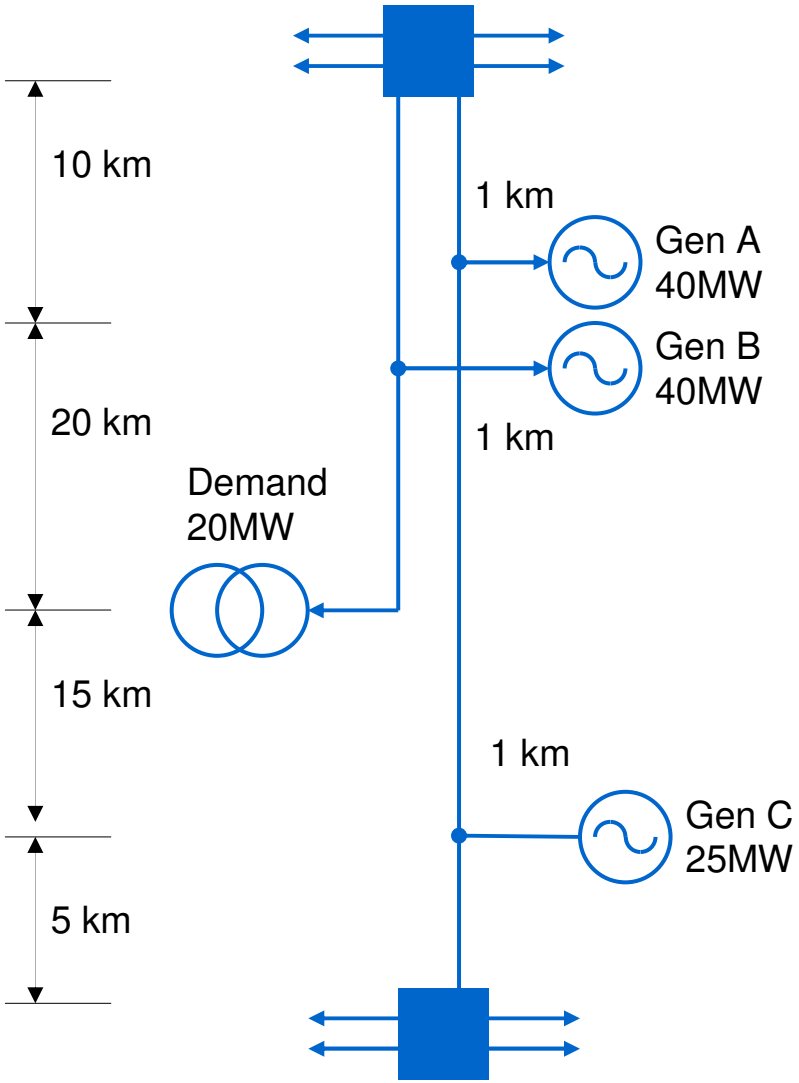
Specific treatment for local generation assets



- Illustration of two approaches:
  - 'Generator only' assets
  - Marginal investment
- Substation element not considered
- All circuits are 132kV OHL

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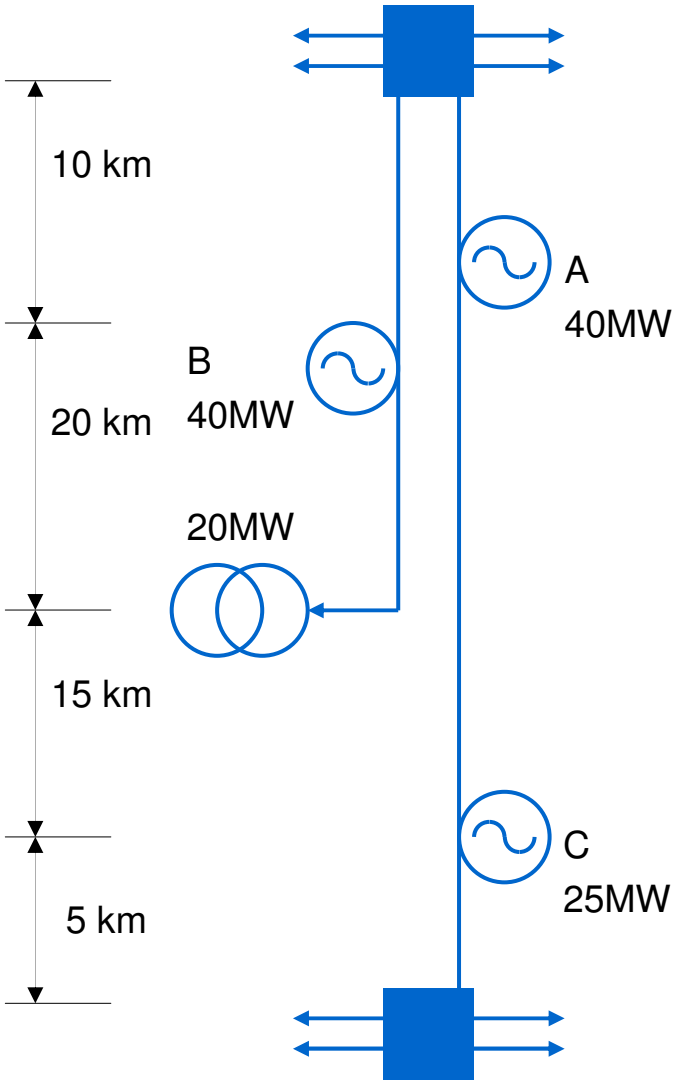
‘Generator only’ approach



Generator only Local Charge:

= Spur Length x Local EF x Local SF x EC /1000

= 1 x 6.0 x 1 x 10.27 / 1000

= £0.062/kW

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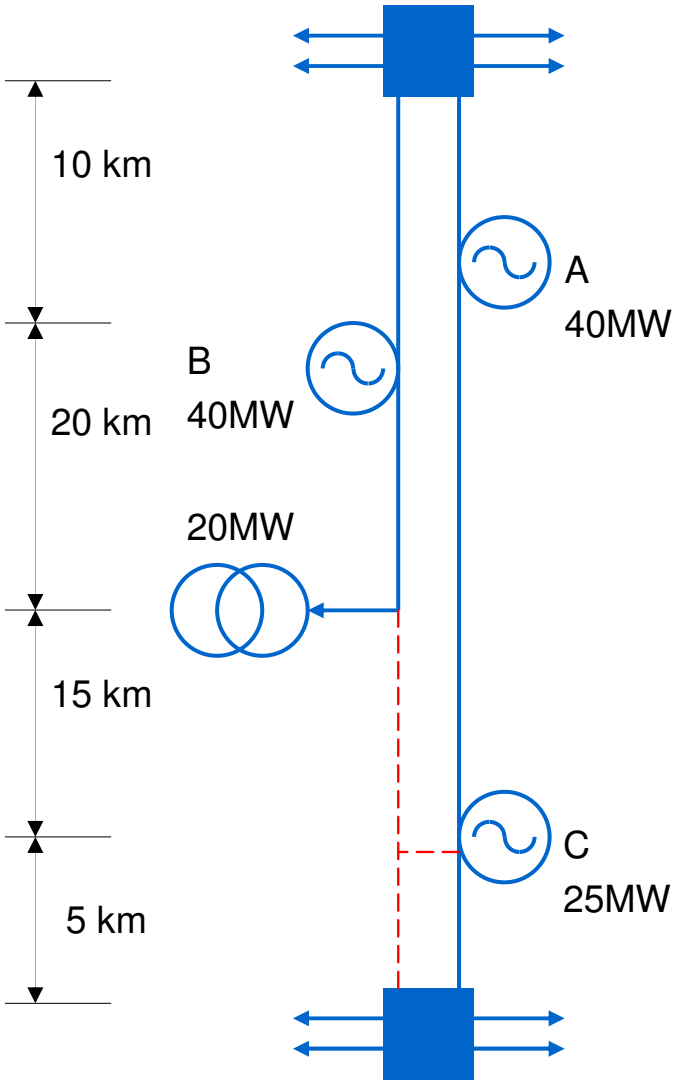
‘Generator only’ approach



Generator only Local Charge:

= Spur Length x Local EF x Local SF x EC /1000

= 1 x 6.0 x 1 x 10.27 / 1000

= £0.062/kW

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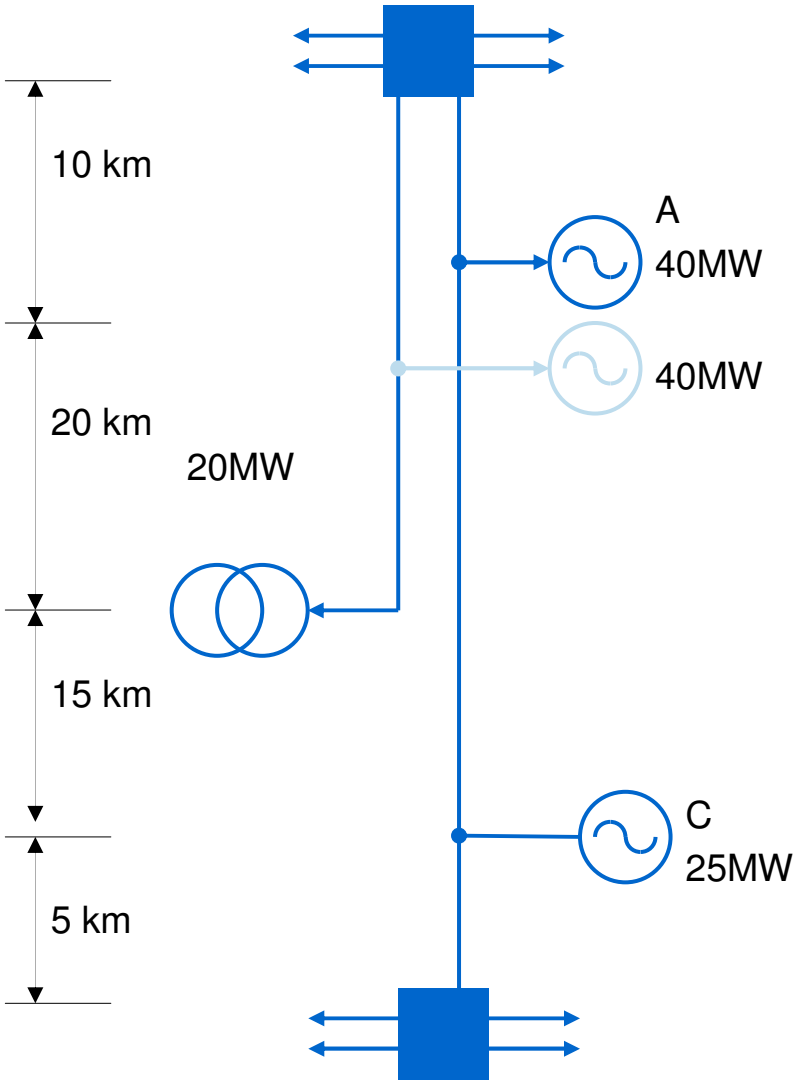
Marginal investment approach I



- **T-connections** local charge (Gen A & C):

= Length of entire tee x Local EF x Local SF x EC /1000

= 51 x 6.0 x 1 x 10.27 / 1000

= £3.14/kW

- In order to ensure the 'Local' use of teed-circuit is not also double counted in the 'wider' zonal charge generation should must be modelled at the remote nodes

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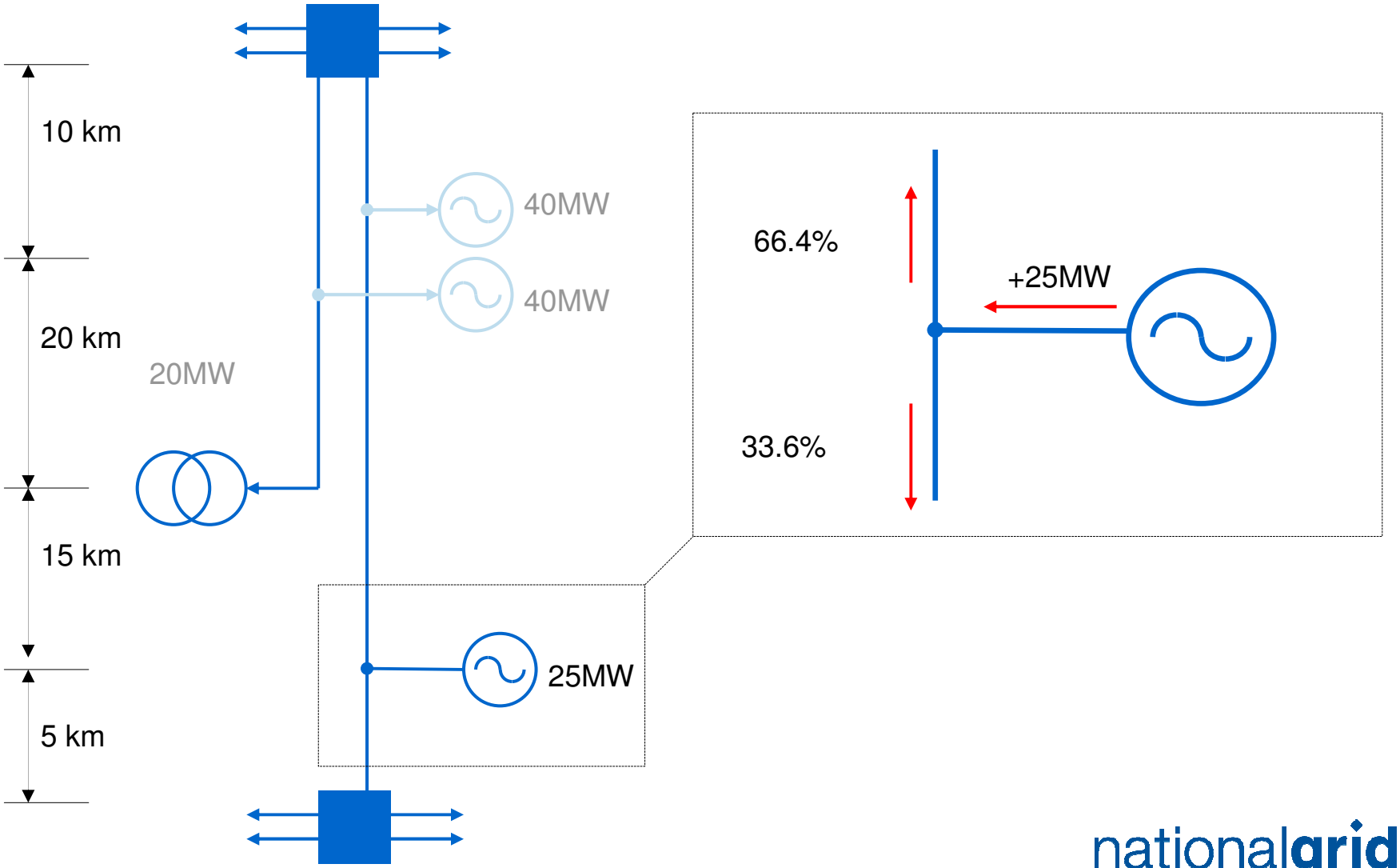
Marginal investment approach II



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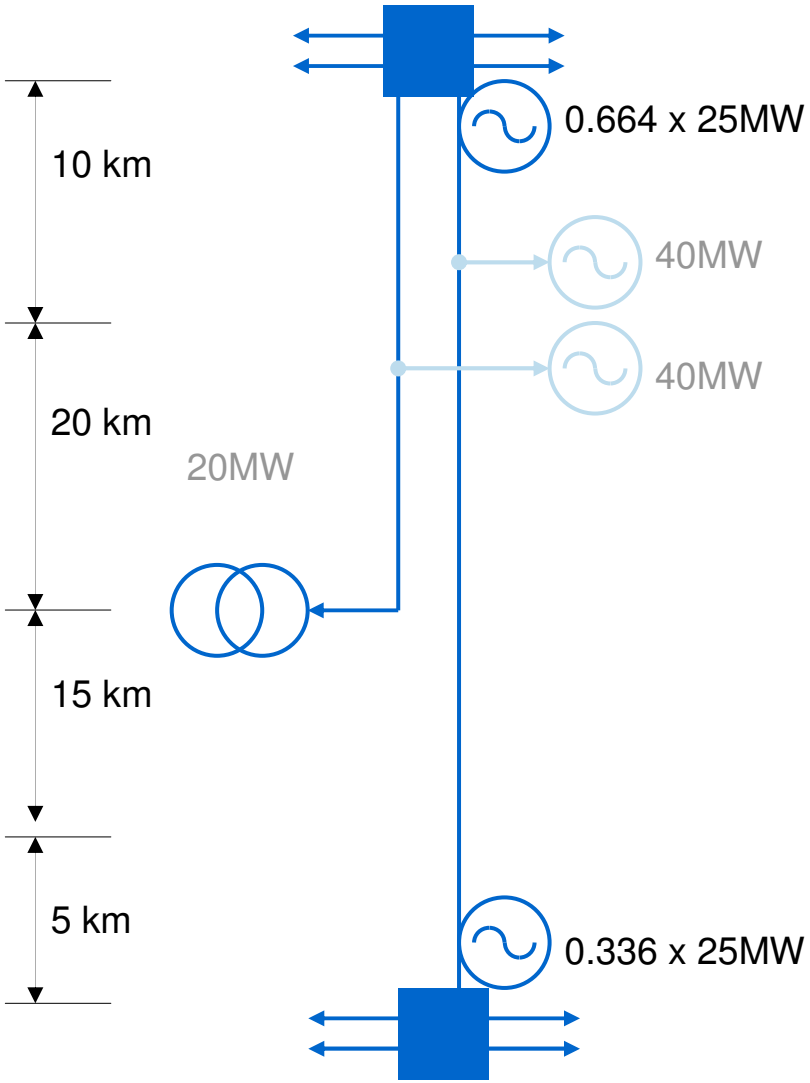
Marginal investment approach III



- Should ensure demand charges and other generators wider charges are unaffected

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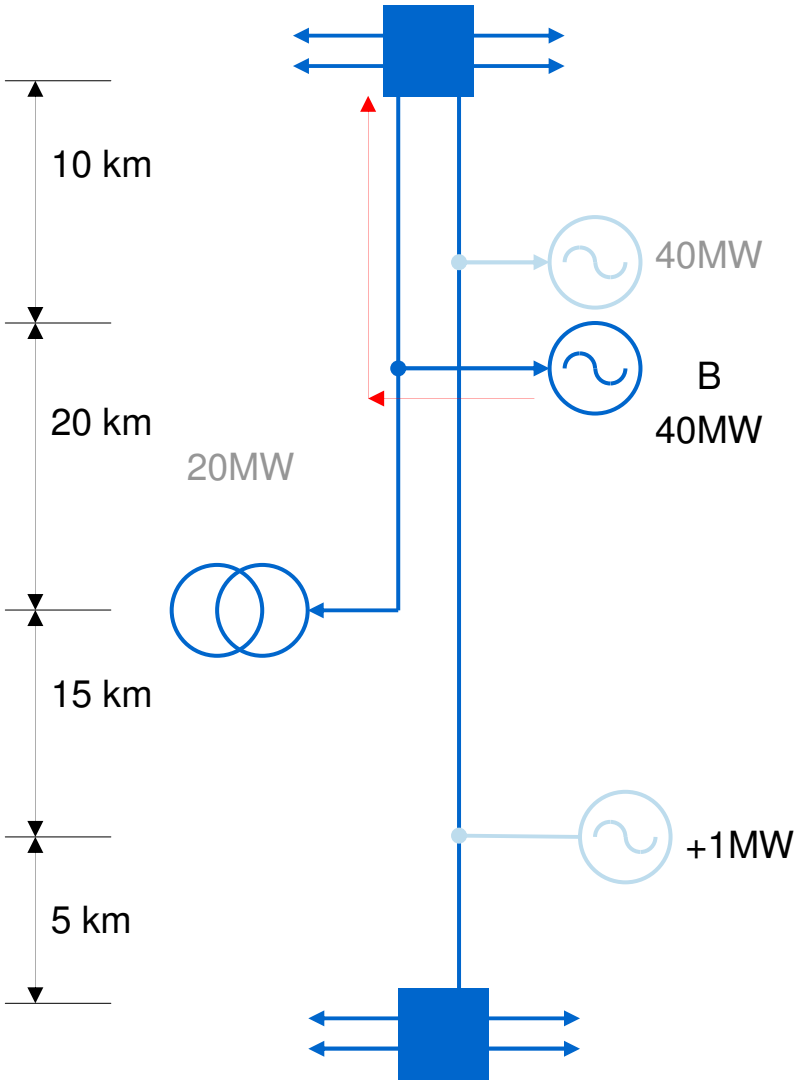
Marginal investment approach IV



- **Shared spur** local charge (Gen B) G>D:

= Length of path between gen and MITS x Local EF x Local SF x EC /1000

= 11 x 6.0 x 1 x 10.27 / 1000

= £0.68/kW

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Use of Demand Cost Weighted Average Zonal Hubs

- Use of demand cost weighted average as a zonal hub leads to negative differentials in some zones
- Would require different treatment to avoid negative local charges or perverse signals

Gen Zone	Lowest Gen MWkm	Dem Weighted Av
1	909	765
2	797	755
3	756	524
4	603	617
5	513	513
6	491	402
7	393	360
8	282	305
9	52	20
10	255	228
11	99	71
12	-	-
13	-76	-69
14	-177	-195
15	-485	-443
16	-575	-625
17	-267	-235
18	-346	-364
19	-531	-472
20	-730	-681

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Distance to zonal hub – straw man

- Zonal hub: generator node with lowest marginal secured cost (SECULF output)
- Zonal local EF ratios determined from circuits within each generation zone
  - Cost determining factors used: Circuit capacity (<>200MW) and single/ double circuit construction

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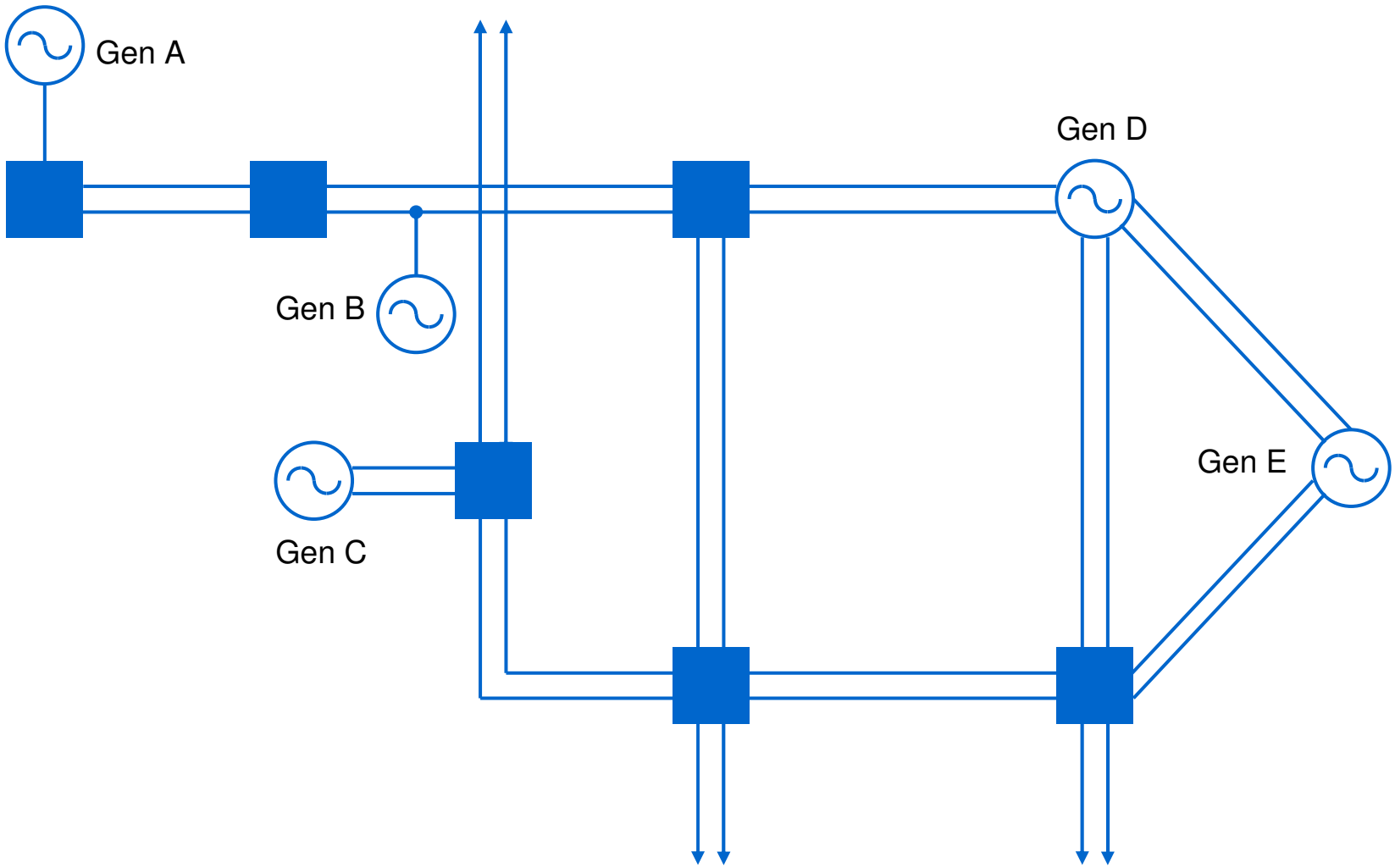
Specific treatment for local generation assets



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Zonal hubs results

Node	Local Charge £/kW	Wider Charge £/kW	Residual Change	Net tariff change
A	0.60	4.66	-1.97	-0.70
B	0.00	4.66	-1.97	-1.29
C	2.57	4.66	-1.97	1.27
D	2.23	4.66	-1.97	0.94
E	2.07	4.66	-1.97	0.77

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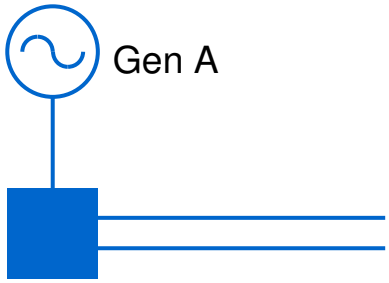
Cost reflectivity of distance to zonal hub

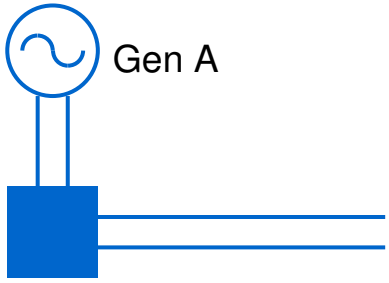


Spur length – 5km; single circuit

Wider EF – 3.0 Local EF ratio – 1.46 (actual 4.38)

Distance to zonal hub = 39.7km

Local charge = £0.60/kW



Spur length – 5km; double circuit

Wider EF – 3.0 Local EF ratio – 1.46

5km x 4.38 = 21.9 marginal kms built

Distance to zonal hub = 54.7km (+15km)

Local charge = marginal length x Local EF x [EC/1000]

15km x 1.46 = 21.9kms

Local charge = £0.82/kW

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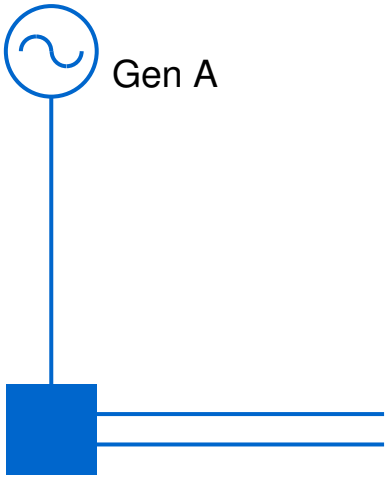
Cost reflectivity of distance to zonal hub



Spur length – 15km; single circuit

Wider EF – 3.0; Local EF ratio – 1.46

Distance to zonal hub = 69.7km (+30km)

Local charge = £1.05/kW

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