

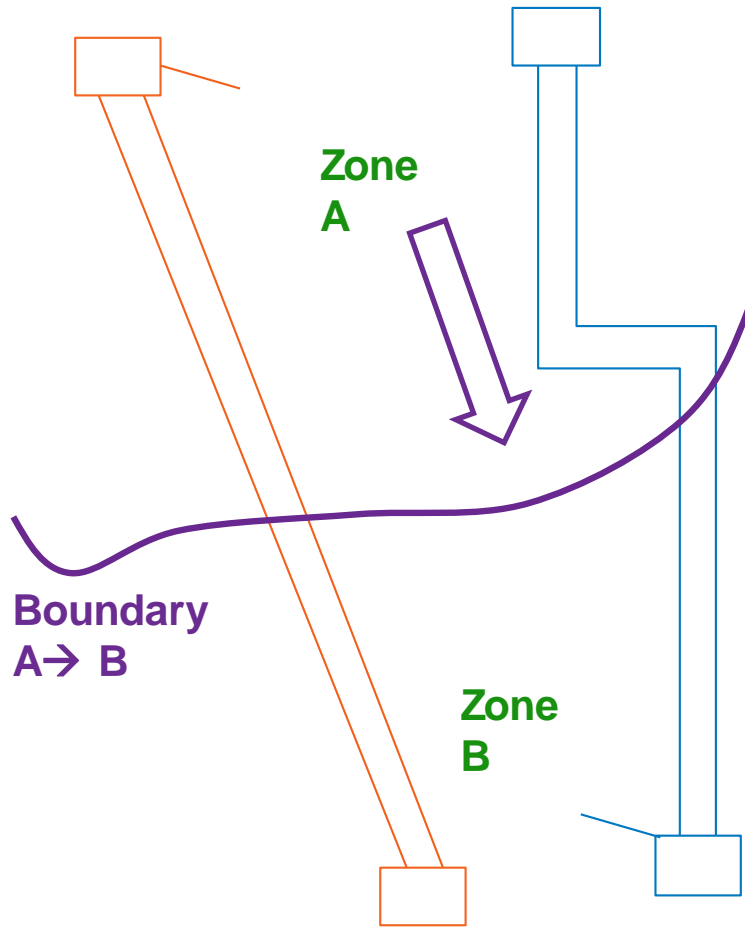
# Generation Re-Zoning (CMP324/325)

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# Agenda

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- 1 Re-cap (Zones & Boundaries)
  - 2 Re-cap (TNUoS tariffs)
  - 3 How to convert nodal costs into zonal tariffs
  - 4 ETYS Zones
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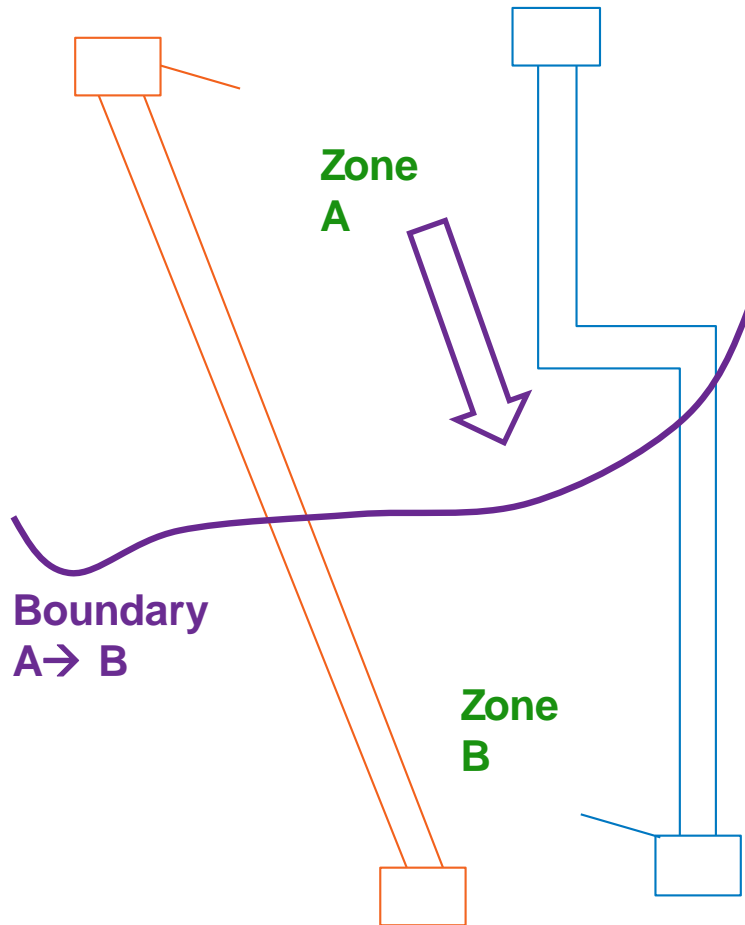
# Zones and Boundaries



Assuming demand centre is in zone B. The following four options achieve the same goal –

- Adding 1MW of generation in zone B, or
- Reducing 1MW of gross demand in zone B, or
- Adding 1MW of generation in zone A, which sends **additional**  $x$ MW of flow along  $y$ km of line 1, **additional**  $k$ MW of flow along  $l$ km of line 2, ...
- Reducing 1MW of gross demand in zone A

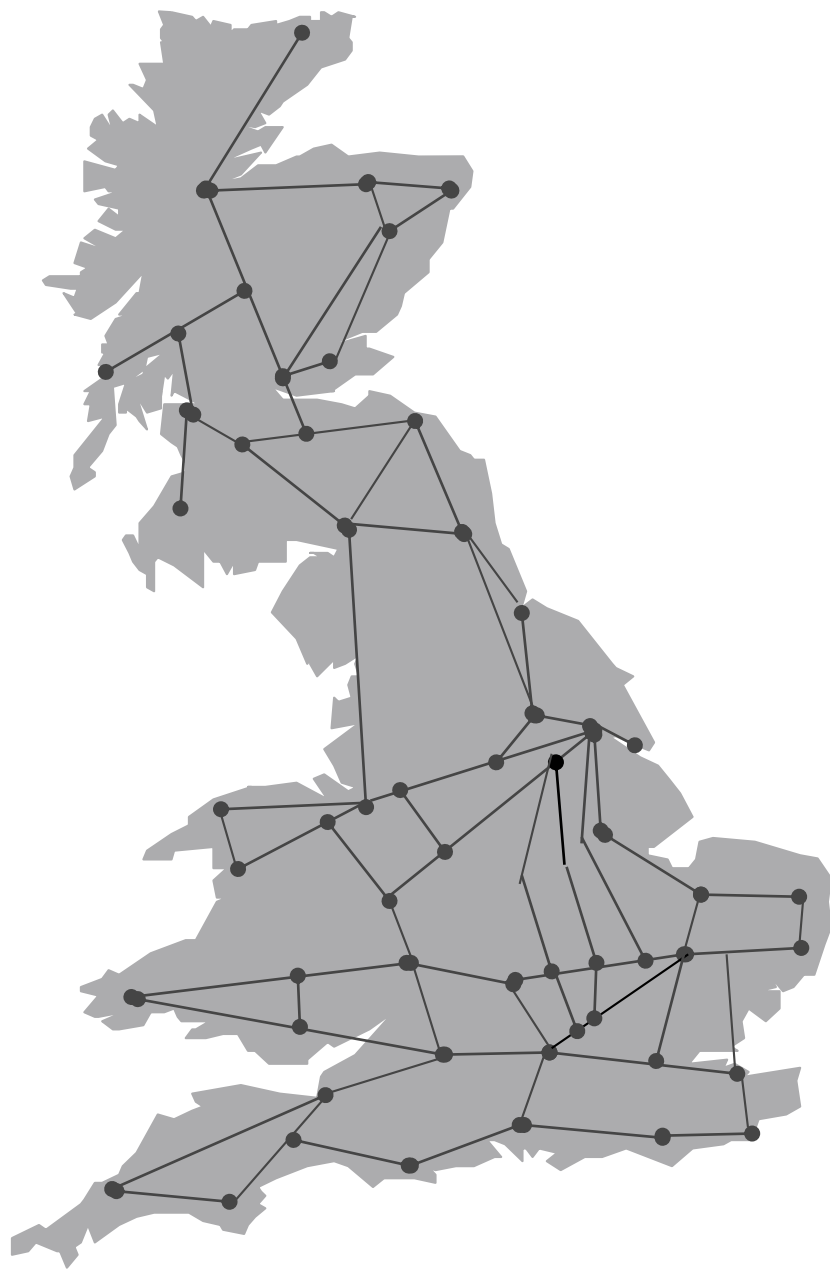
# Zones and Boundaries



## TNUoS locational tariffs –

- The incremental network cost for generators in zone B is 0 (at the demand centre)
- $(x*y+k*I+...)$  MWkm indicates the incremental network cost for generators in zone A
- Introducing “security factor” (SF, currently 1.8) for network redundancy, and using “Expansion Constant” (EC) to convert MWkm to £ → this is the network cost in £ for 1MW of additional gen capacity in zone A
- $SF * (x*y+k*I+...) * EC \rightarrow$  locational tariff

# TNUoS – dual backgrounds



Load Factor Scaling for Contracted Generation		
	Peak	Year Round
Wind, Solar, Tidal	Fixed 0%	Fixed 70%
Nuclear	Variable	Fixed 85%
Interconnectors	Fixed 0%	Fixed 100%
Hydro	Variable	Variable
Pumped Storage	Variable	Fixed 50%
Peaking	Variable	Fixed 0%
Other	Variable	Variable

Transport Model Demand	
Peak	Year Round
Winter Peak from Week 24 Data	

# Dual backgrounds and nodal costs



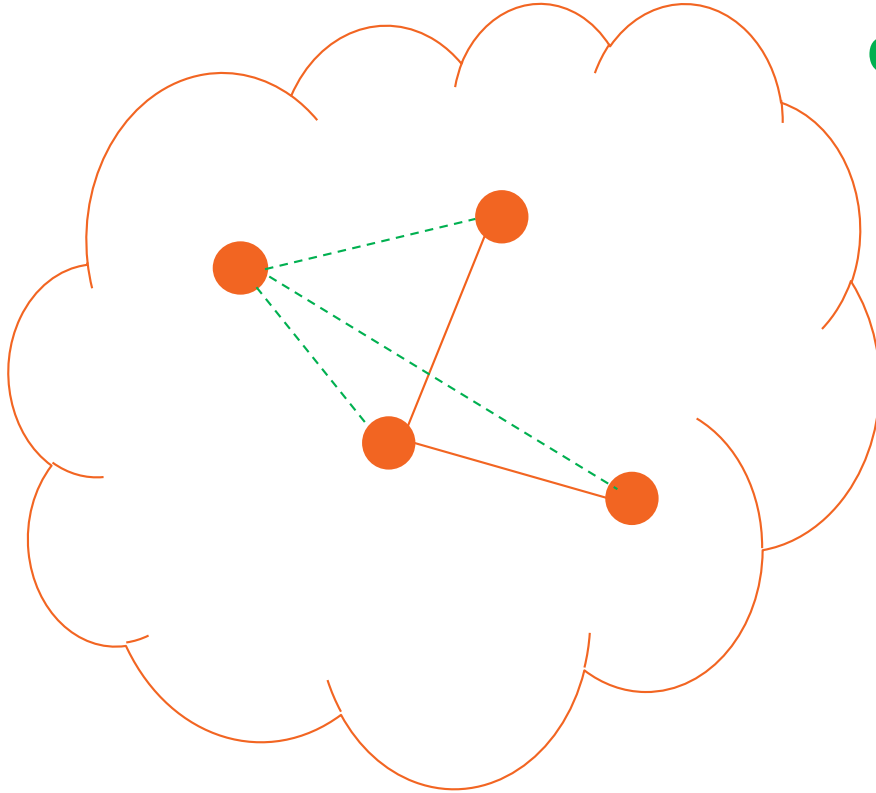
**Peak Security -**  
Reflects what we build for demand security, under peak demand “stress”



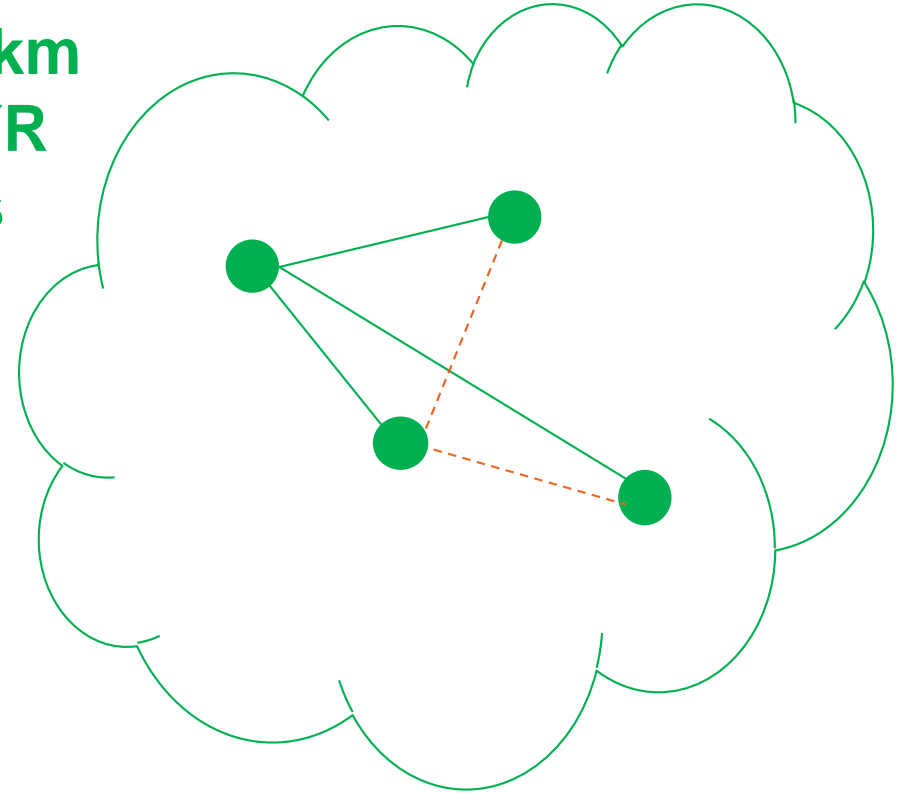
**Year Round**  
- Reflects what we build under SQSS economic criteria

# The nodal costs

Incremental MW\*km on all PS circuits



Incremental MW\*km on all YR circuits



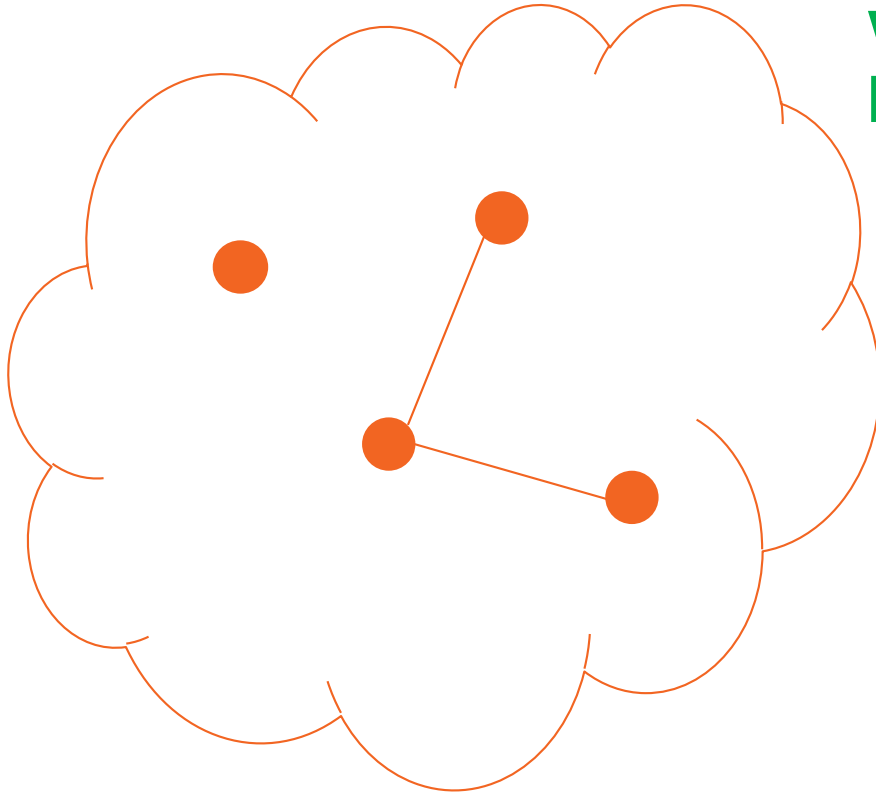
# How to convert nodal costs into zonal tariffs



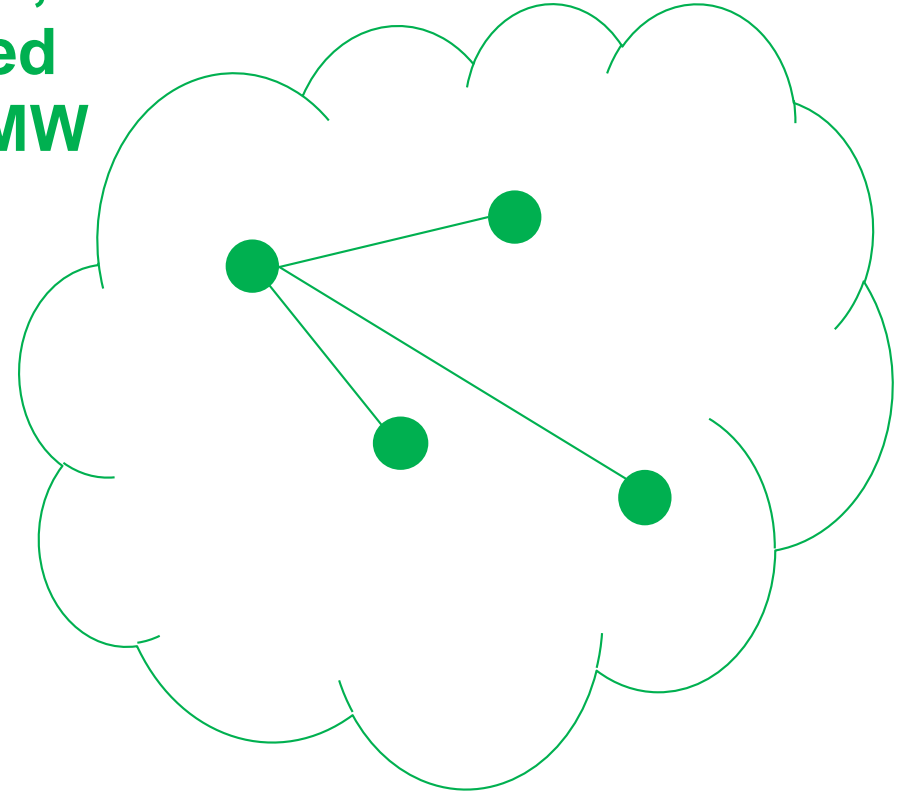


# The process

PS £/kW,  
weighted  
by PS MW



YR £/kW,  
weighted  
by YR MW

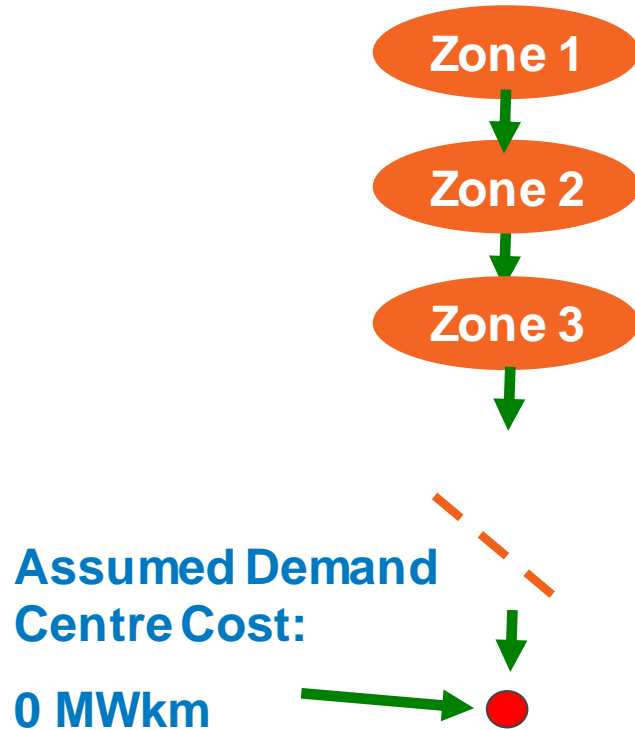


- Sites that have no MWs, are not included in the calculation
- For demand tariff calculation, negative nodal demand (exporting GSPs) are not included



**How to split the  
year-round  
tariffs into  
YR-shared and  
YR-not shared?**

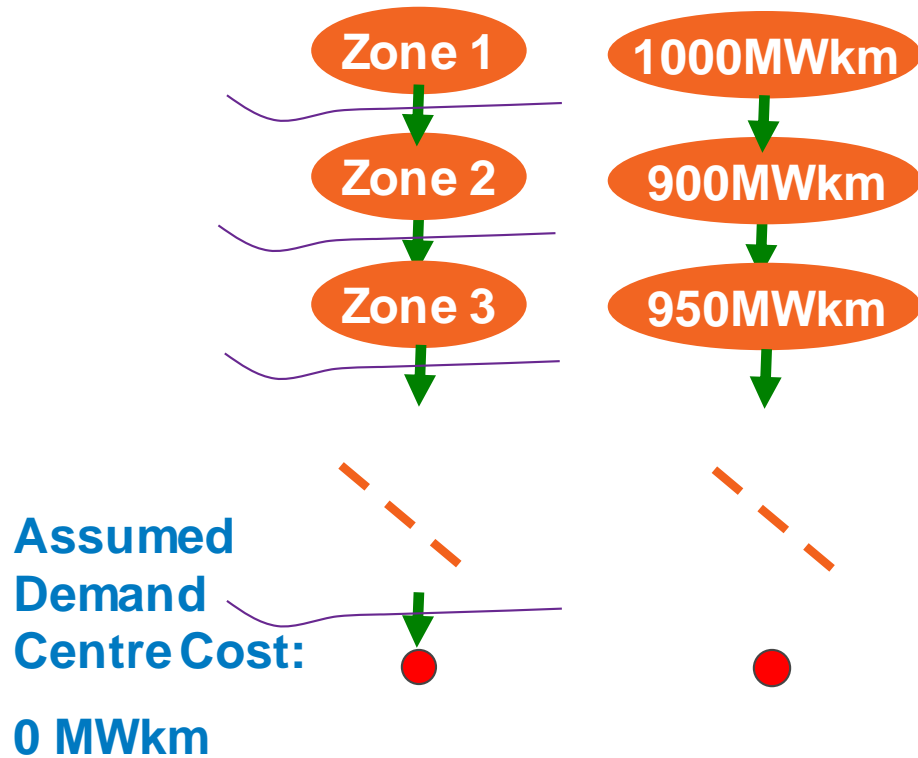
# Zonal Tariffs



- Two “most representative” scenarios –Security Background and Economic Background, in SQSS Ch4 (known as Peak Security and Year Round in the CUSC)
- Nodal MWkm costs (under PS and YR)
- Weighted average zonal MWkm costs (also under PS and YR)
- How to derive the YR-Shared and YR-not shared?

# Zonal Tariffs

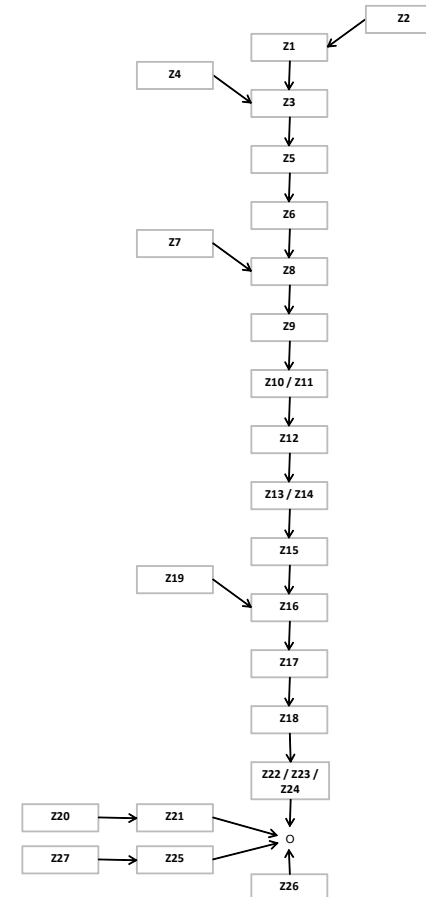
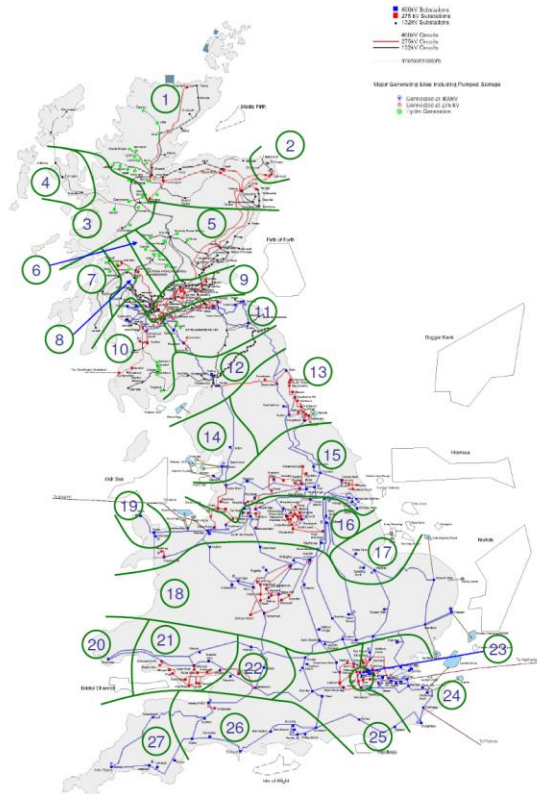
## – the boundary sharing



- We have the zonal YR MWkm (weighted average)
- The boundary B1 represent a cost ( $1000 - 900 = 100$  MWkm in this example)
- For zone 1, its YR MWkm is the total costs of  $B1 + B2 + B3 + \dots + Bn$
- The MWkm cost of B1 is split into YR-shared and YR-not shared
- Similarly, we split the MWkm costs of B2, B3... by the aggregated LC/C TECs behind each boundary
- For zone 1, its YR-shared zonal MWkm, is the total of YR-shared MWkm cost of  $B1 + B2 + B3 + \dots + Bn$

# Network Connectivity

The network is converted into a simplified network connectivity diagram, showing the typical YR flow through the boundaries to the main demand centre. This allows us to portion Zonal Year Round MWkm into shared / not-shared



# Generation zoning criteria (as per the CUSC)

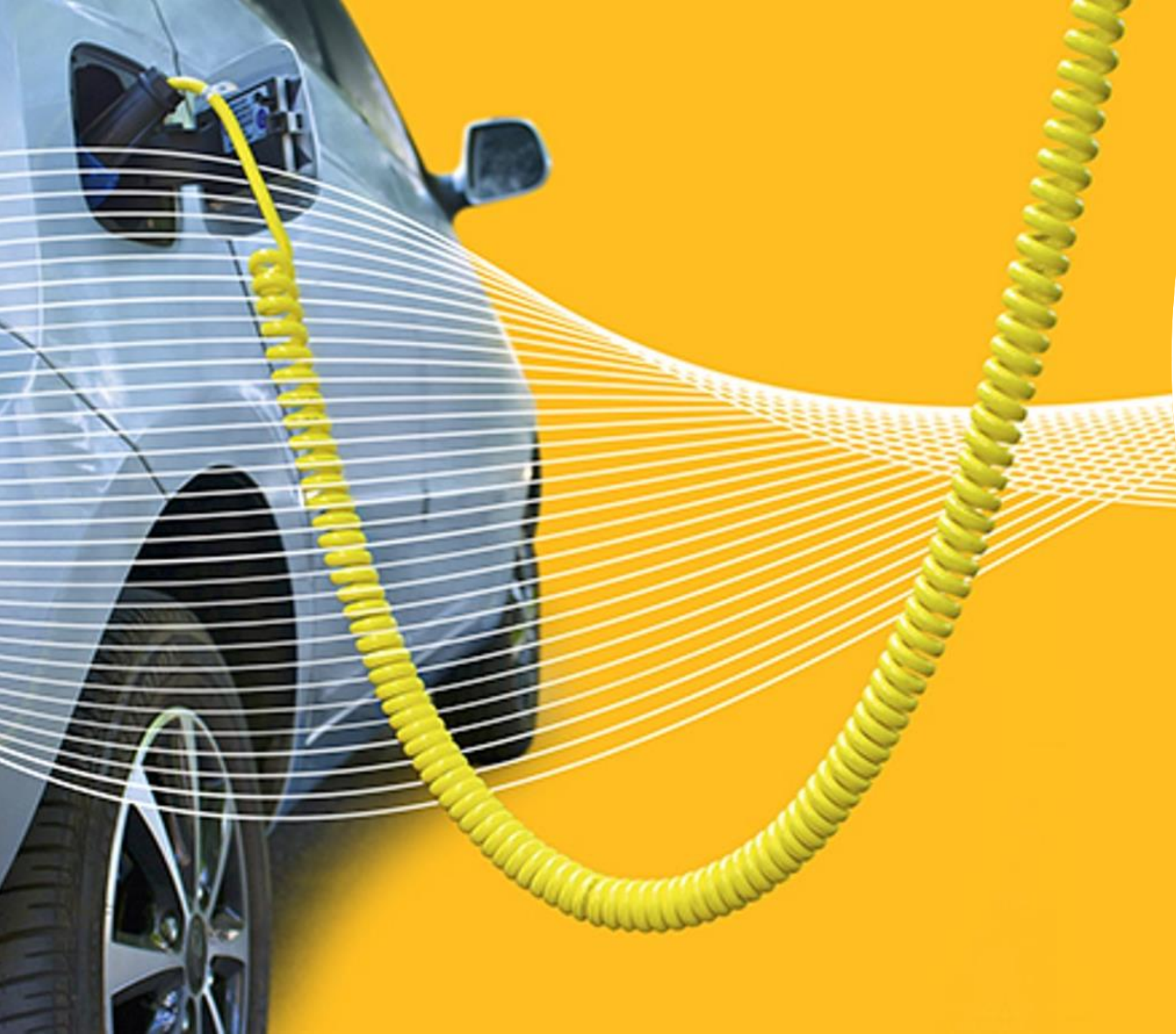
- Zoning is determined using the generation background with the most MWkm of circuits. Zones should contain relevant nodes whose total wider marginal costs from the relevant generation background (as determined from the output from the transport model, the relevant expansion constant and the locational security factor, see below) are all within +/-£1.00/kW (nominal prices) across the zone.
- This means a maximum spread of £2.00/kW in nominal prices across the zone.
- The nodes within zones should be geographically and electrically proximate.
- Relevant nodes are considered to be those with generation connected to them as these are the only ones, which contribute to the calculation of the zonal generation tariff.

# Doing your own zoning analysis

- Step 1, input the proposed gen zones into the “Zone\_Manual” tab
- Step 2, using inputs from step 1, calculate the weighted-average zonal PS and YR MWkms by updating the pivot tables
- Step 3, identify the connectivity of the gen zones, and update the “connectivity matrix”
- Step 4, check to ensure that all the matrices in sheets “TxNetwork\_Manual” and “Diversity\_Manual” are updated
- Step 5, check to ensure that the YR-shared MWkms on the “Zone\_Manual” is picked up, and the tariffs are calculated correctly



# ETYS Zones





# ETYS Zones

## Updated annually as part of ETYS\*

- Map shown in ETYS Appendix A
- Used to simplify analysis of the MITS Network (e.g. FES)
- The zones are identified by two characters.
- Zones established & reviewed by an STC subgroup
- Zones based on engineering judgement and system boundaries
- Confirmed each November as part of ETYS
- Main drivers for zones changes would be;
  1. Generation changes
  2. Demand changes
  3. Reinforcement

Boundary	Minor Zones
B0	T5
B1	T1, T5
B1a	T1, T5, T6
B2	T1, T2, T5, T6
B2a	T2 (Peterhead area only)
B3b	T3
B4	T0 (T1, T2, T3, T4, T5 and T6)
B5	T0, S5
B6	S0 (S5 and S6), T0
B7	S0, T0, Q0
B7a	S0, T0, Q0, R0
B8	S0, T0, Q0, P0, N0, M0, R0
B9	S0, T0, Q0, R0, P0, M0, N0, L0, K0
B10	B0, E0, F0
B11	S0, T0, Q0, P0
B12	B0, E0, F0, G0, H0, D6
B13	E0, F0
B14	A0
B15	C0
B15a	C3, C4, C7, C9
B16	S0, T0, Q0, P0, K0
B17	L0
NW1	M8
NW2	M6, M8
NW3	M6, M7, M8
NW4	M0
EC1	P7
EC3	J1
EC5	J2, J3, J5
SC1	B1, B3, C4, C7, C9, E1/6, E8, F6
SW1	H0
SC2	B1, C4, C9, C7
LE1	A0, B1, C0

