Wind Charging

A comparison of investment volumes using the DTIM model

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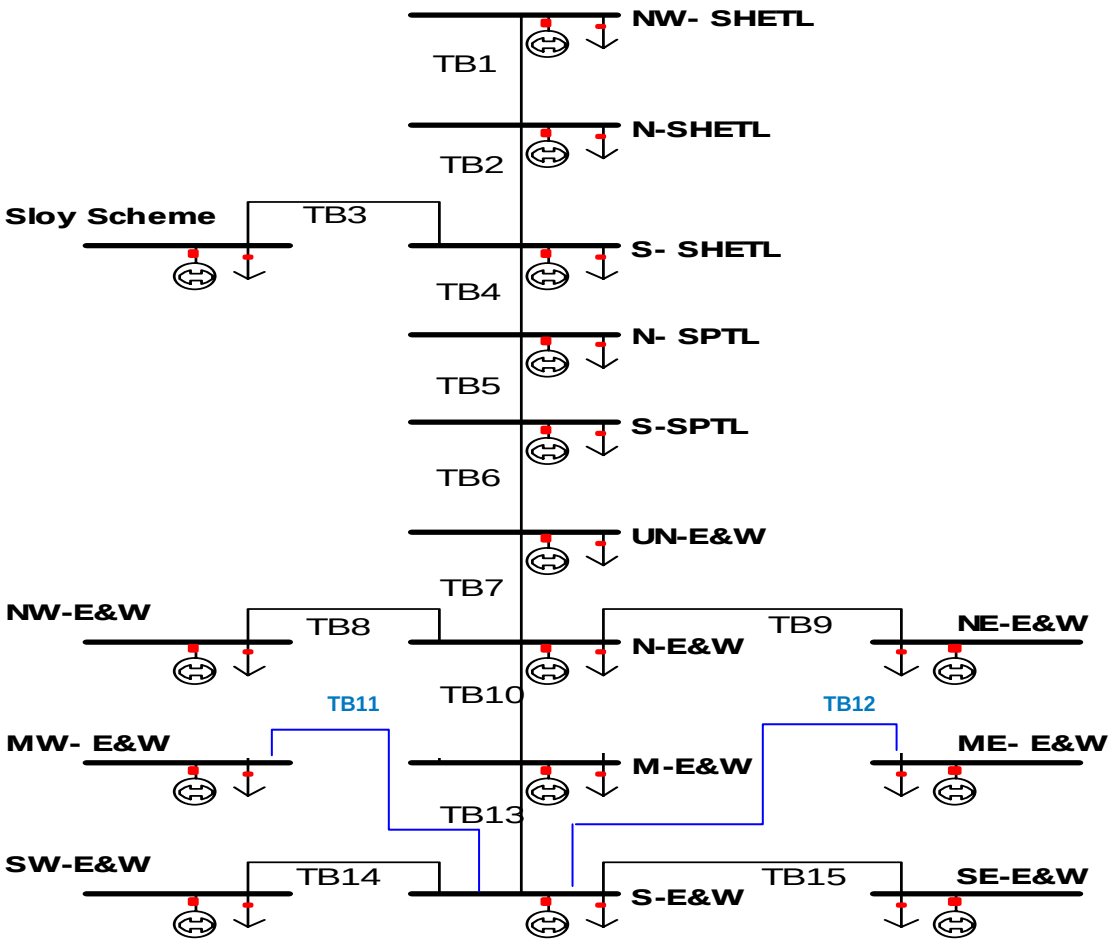
DTIM

- Numbers in this presentation are for discussion at CISG to aid the development of charges – they are not proposed charges
- Developed by Imperial College and is also being examined as part of the SQSS fundamental review
- Incremental asset investment on a cost benefit basis over a number of years
- Feed in cost of transmission, capability of existing network, the cost of bids and offers, demand & generation profiles
- Optimises investment and constraint costs across multiple years and multiple zones with year round analysis
- This study is not looking at the absolute cost, but comparing wind to conventional

System



	Length [km]	Cap [MW]
L1	60	400
L2	100	1600
L3	50	210
L4	120	1550
L5	35	2618
L6	150	2200
L7	150	4700
L8	79	3000
L9	40	5500
L10	93	10000
L11	75	3500
L12	80	2800
L13	155	10000
L14	195	3477
L15	60	5000

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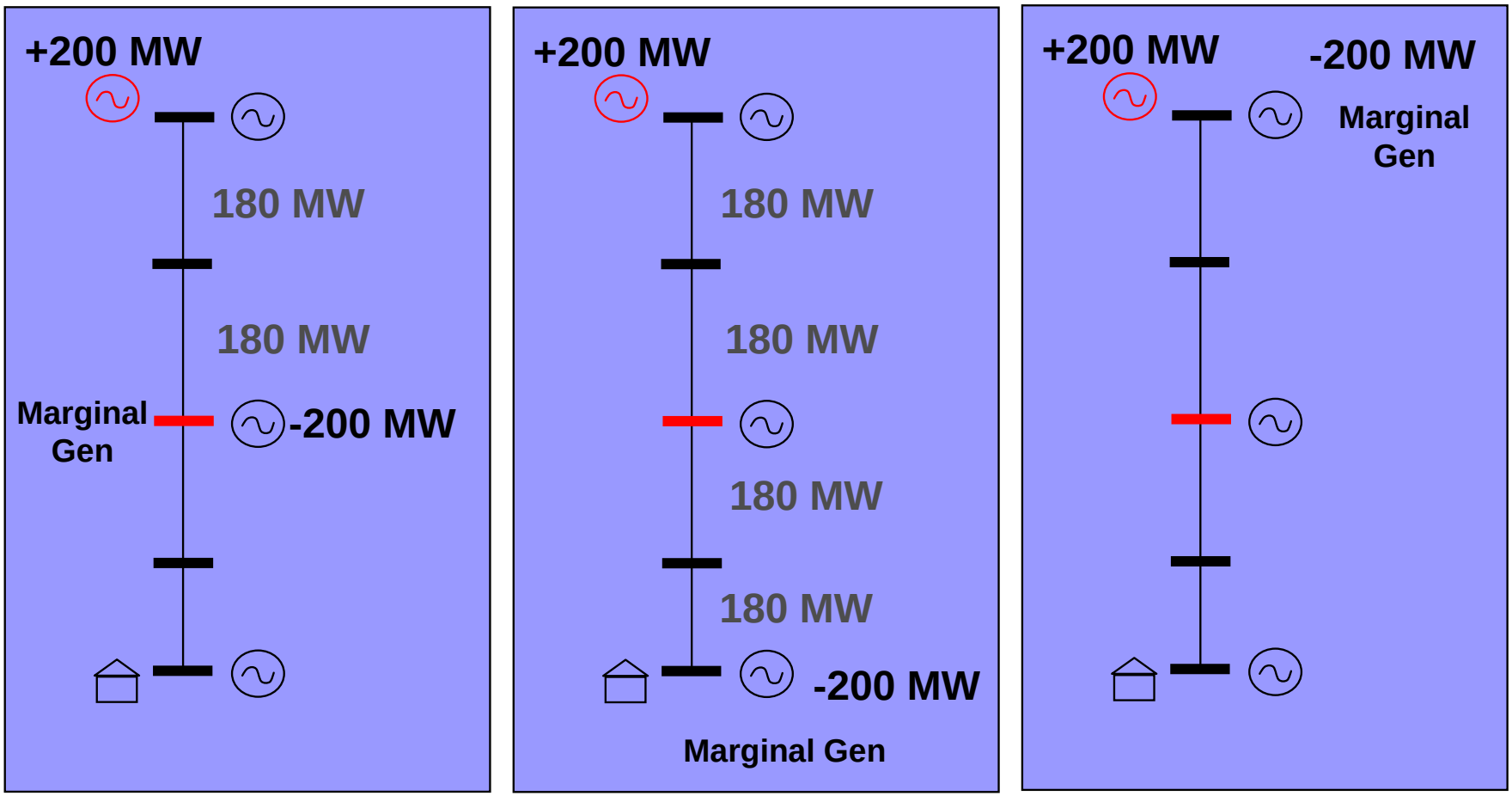
Modelling

- Each system boundary has a ‘length’
- Cost of reinforcing based on single type e.g. OHL, and common across the system
- Bid and offer prices based on GSR001 data
- Wind output based on triangular distribution
  - All other plant scaled by availability and stacked by price
- Unconstrained merit order based on fuel price ranking
  - North South fuel differential
- Merit order has a significant impact on investment

Variables

- Duration of the study, 5 periods
  - 10 years (2,2,2,2,2); 23 years (3,5,5,8,2)(GG)
- Demand, peak MW and Annual TWh
  - 59GW, 355TWh per annum
- Merit order
  - SQSS GSR001
- Transmission rate of return
  - 0%
- Cost of transmission
  - £50/MW.km – cost of incremental boundary capacity
- Contracted generation background
  - Now, Gone Green

Merit order effect



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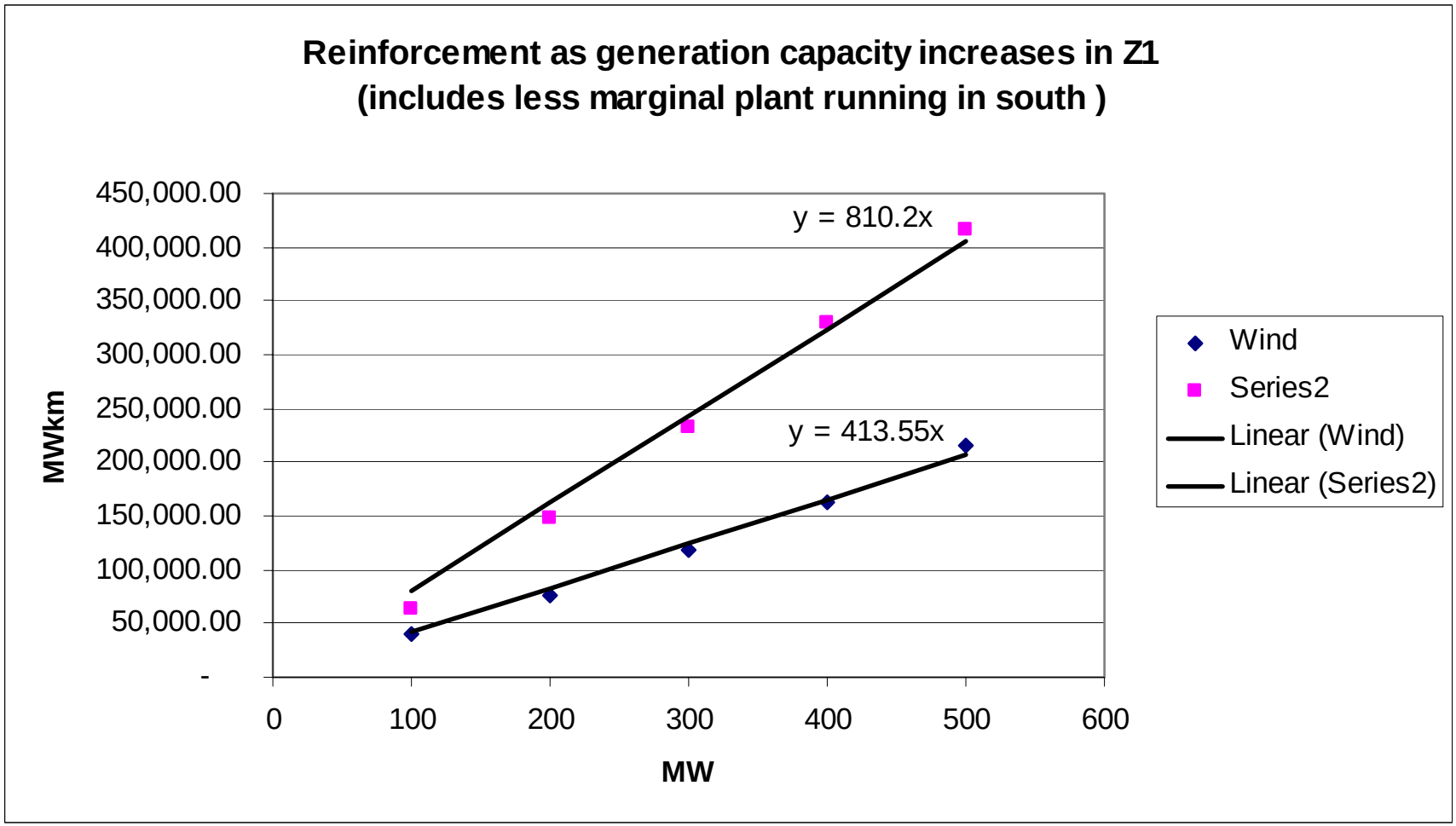
Merit order effect in comparison

Boundary	Wind (MWkm)	Gas (MWkm)	
1	25,723	27,513	93%
2	26,238	47,626	55%
4	40,391	54,949	74%
5	2,981	6,057	49%
6	48,447	61,627	79%
7	26,279	77,953	34%
10	16,923	52,847	32%
13	28,204	88,078	32%
Sum	215,187	416,650	52%

Zone 1 incremental increase in isolation



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Increases against contracted background

- Under GG 30 up to 6GW of wind connects in Z1
  - 3,5,5,8,3 – years in each period
  - Results in MWkm
- Under this scenario incremental cost of wind vs. gas is
  - 140% of gas
  - This system is building for wind on top of wind i.e. no sharing
- Incremental gas fits in with the wind and causes little or no investment (up to a point).
- For zone 6 :
  - 160% of gas
- Wind itself creates spare capacity

Investment over a shorter period

- Using 22222, 10 years
- GG 30 prorata for 10 years
- Zone 1:
  - 85% of gas
  - 251% on L1
- Zone 6:
  - 65% of gas
  - 86% on L6

Results

- Wind causes less investment
  - Unless it is dominant in an area
  - Need to consider in context of a deterministic methodology
- In a world with lots of wind thermal causes less investment
- Results depend on several factors
  - Plant type already in the group
  - Plant type expected to be connected in the group
  - Merit order
    - Covers the full period of the analysis
    - Hub effects
- Many assumptions need to be made about future running regimes and cost of constraints

Next steps

- Other areas for investigation
  - Correlation of wind & probabilistic thermal output
  - Merit order – hub / marginal gen effect
  - Rate of return & different cost of capacity
  - Stability of charges as investment drivers change
  - Desensitise to assumptions
- Negative zones
- Interaction with peak based and marginal MWkm methodology in TNUoS
- Impact on CUSC
- Application to conventional
  - Implications for CUSC rights, information provision
  - Sharing

Thank you

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