Relationships between Generator System Usage and Transmission Constraints

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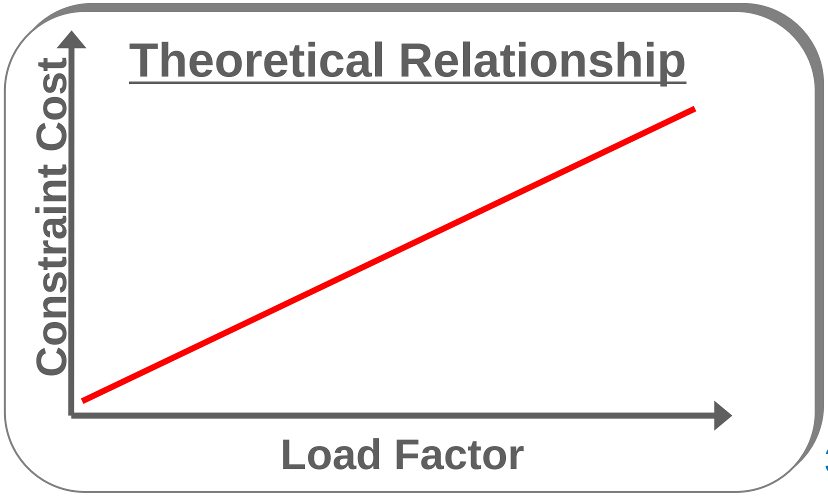
Background

- GB ECM-25 Review of Intermittent Generation
  - *Intermittent generation drives less transmission investment*
  - Analysis;
    - Supported results
    - However may be applicable to other generation types
    - Further analysis required

2011 Analysis - Aims

- To determine the level of relationship between;
  - The amount a generator uses the transmission system
    - i.e. load factor
  - The level of transmission constraints incurred
    - Is this a suitable proxy for transmission investment requirements?



2011 Analysis Methodology

- Impact of incremental generation change on GB constraints.
  - Incremental MW added by;
    - generation type
    - zone
  - 1500 cases run for each scenario to assess year round constraints.
  - Impact on total constraint cost for the year assessed.
  - Undertaken using 2011/12 system background
    - National Grid Gone Green assumptions

Models Used

- Analysis run on two models with similar background assumptions
  - SQSS Intermittency model
    - As used for GB ECM-25 analysis
  - SRMC model
    - To be rolled out as part of RIIO engagement
  - Differences between models;
    - Engine used to solve constraints
    - Modelling of interconnectors / pumped storage
    - Zonal arrangements

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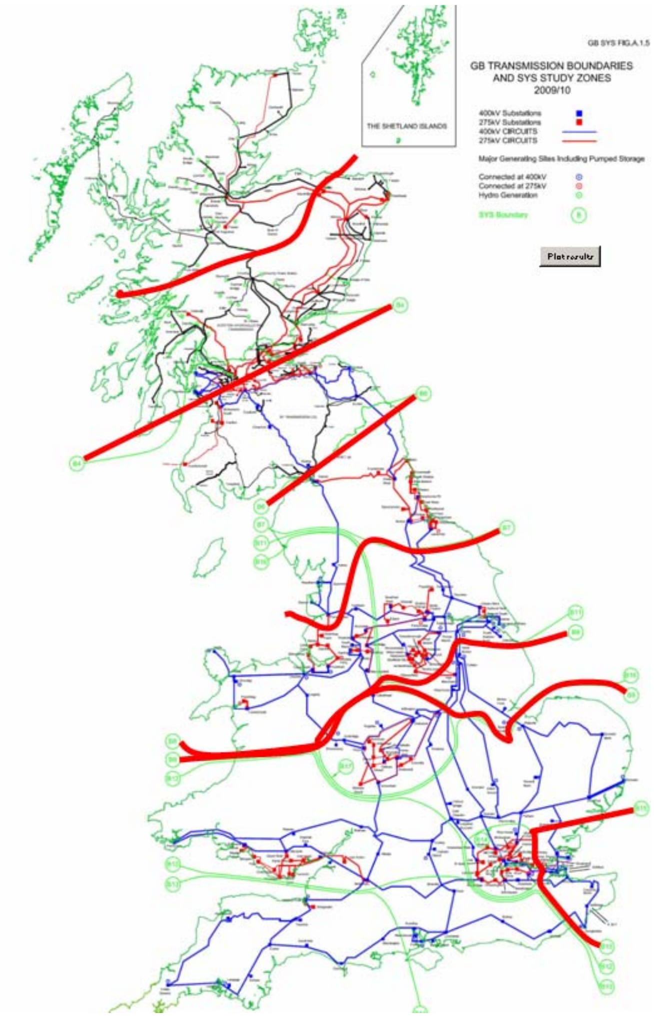
Zonal Generation Assessment

- Models set up such that;
  - GB system divided into 8 zones
  - Incremental generation changes made within each zone
  - Impact on GB constraints across 7 major MITS boundaries determined



Results Analysis – SPT zone

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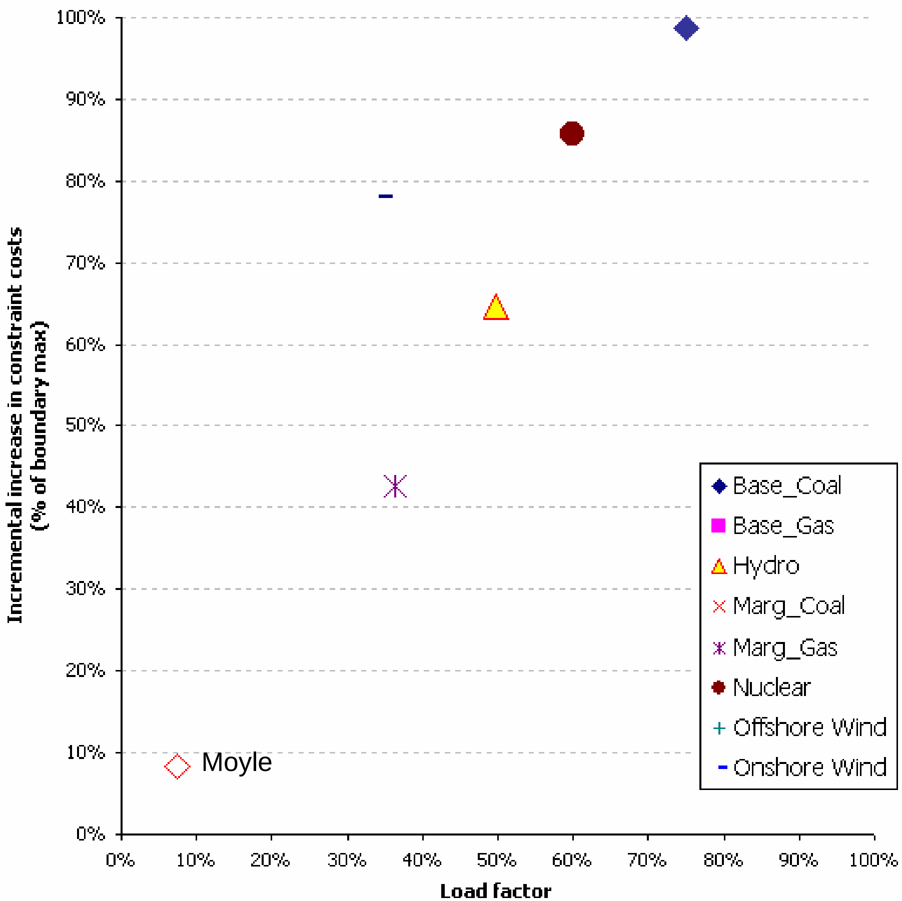

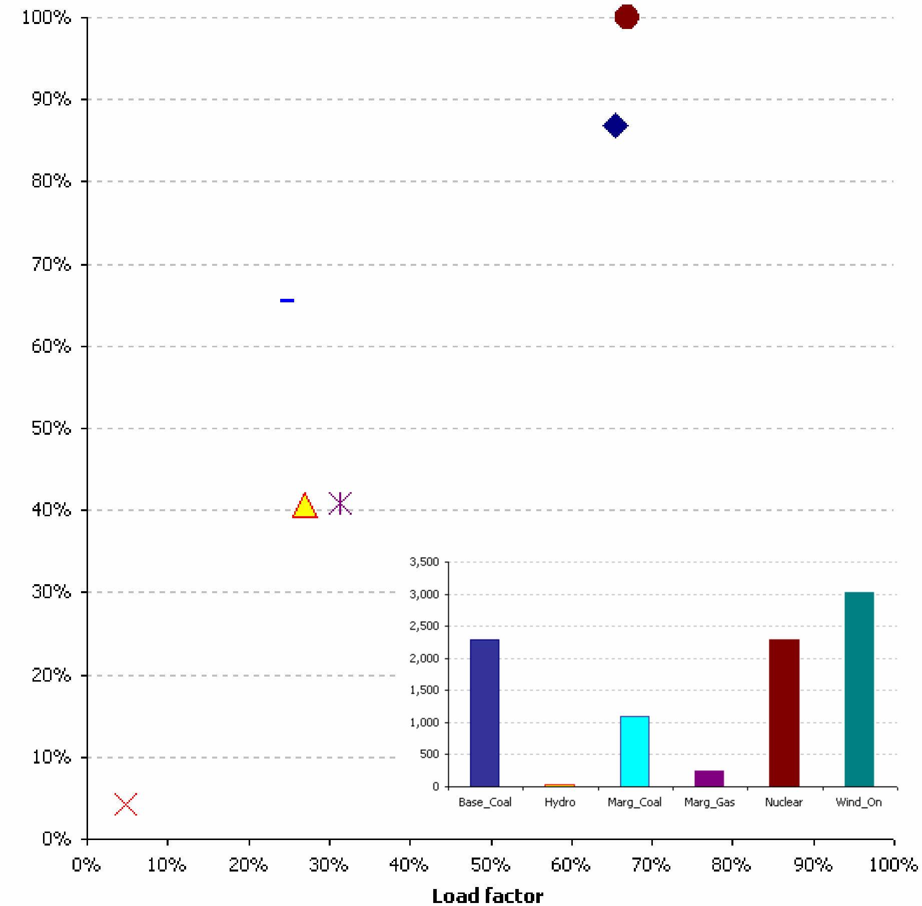

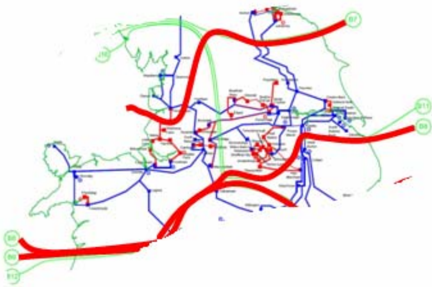

Results Analysis – N England / Wales

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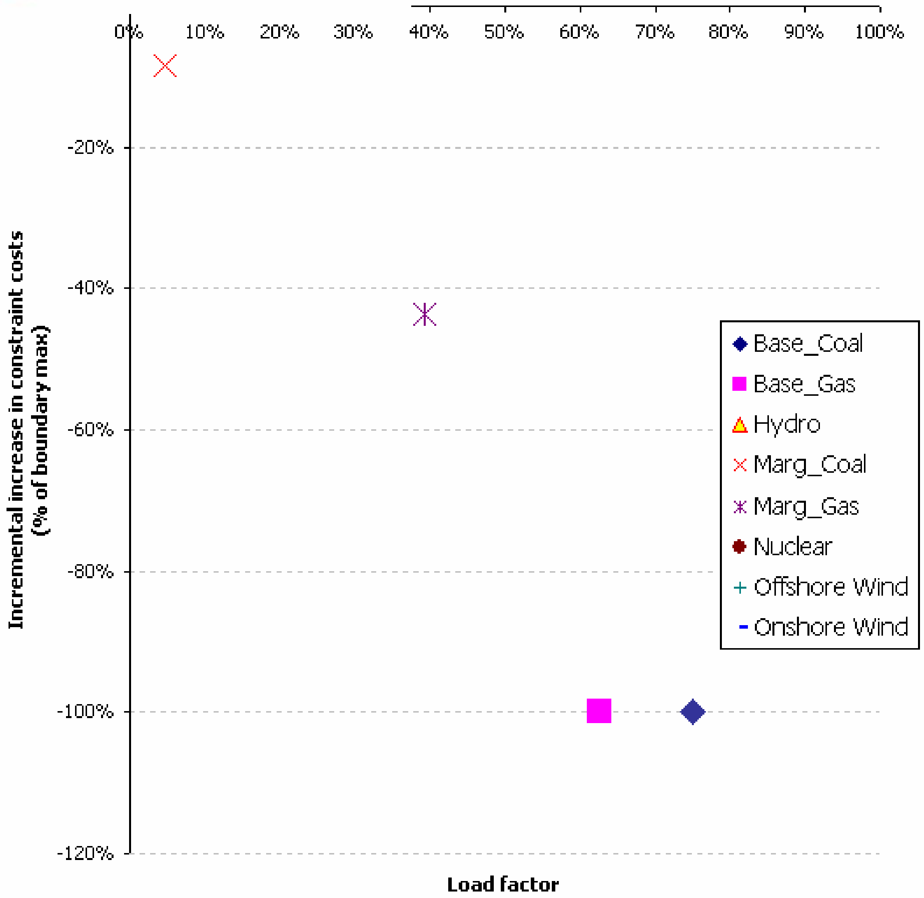

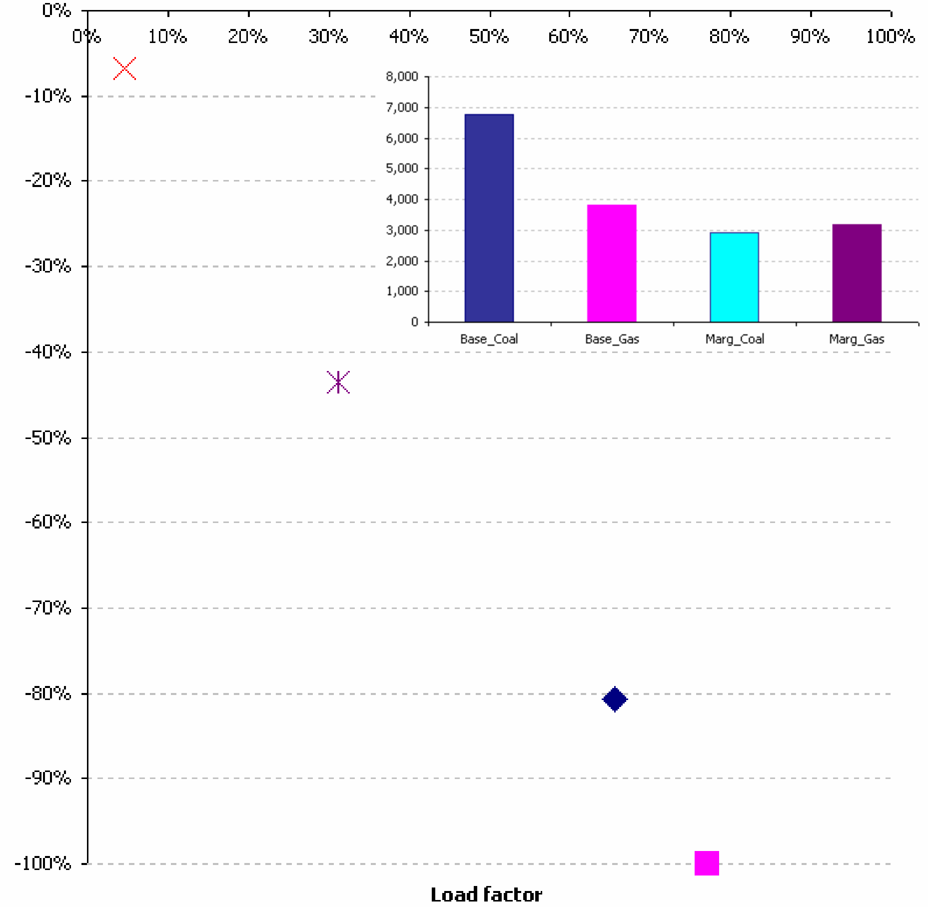

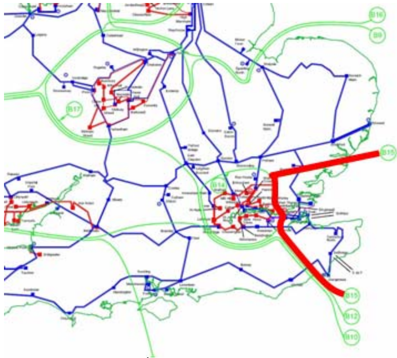

Results Analysis – Thames Estuary

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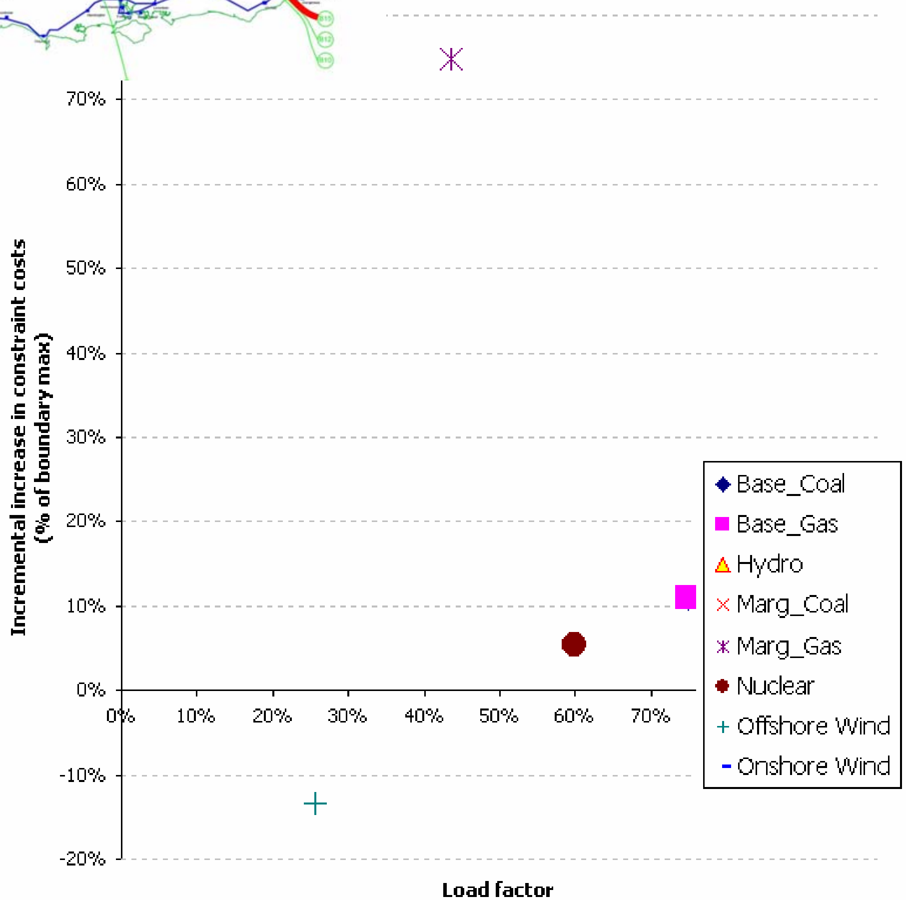
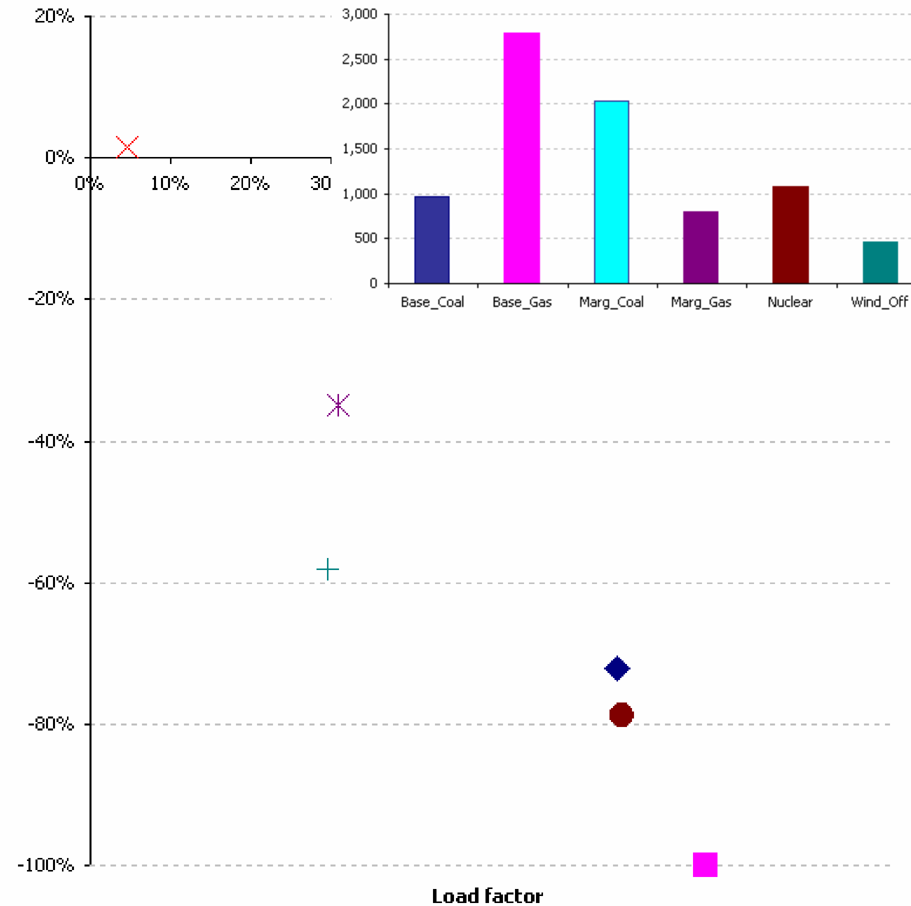




Conclusions

- Generator load factor does affect transmission constraints
  - Evidence of a linear relationship
  - However a number of complexities distort this relationship;

Diversity

Impact of dominant fuel type

Wind

Seems to have disproportionately larger impact

Price

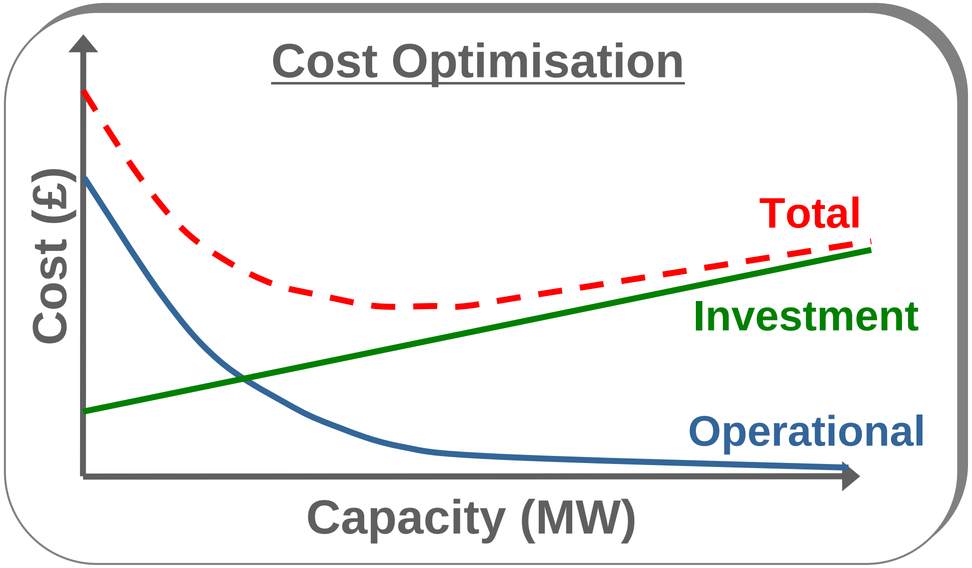
Time of use limitations

Availability

Demand security concerns

Current Hypothesis

- What can we use this information for;
  - Better anticipating transmission investment?
    - Link between investment and constraints
    - Need for long term certainty
    - Information from User



Next Steps

- Further analysis required;
  - Future years assessment
    - Is the relationship maintained?
  - Consideration of complexities
- Links to Industry initiatives;
  - RIIO
    - Can this help the justification of future transmission development needs?
  - TransmiT
    - Will this assist with any revised charging arrangements?