Generation Zoning

AEP offices London, 22nd August 2008

nationalgrid

Introduction

- Previous meeting (Meeting 8) – Presentation of zones using nodal exchange rates
  - Small zones
  - Unfavourable for TEC sharing or for use in other CUSC Amendment Proposals
- Zonal Alternative
  - Estimating consequences of using larger zones – short term indicative zones as base
  - Cost of constraint analysis
- Nodal Alternative

nationalgrid

Cost of Constraint Analysis

- Divided into two components
  - Locational component
  - Utilisation component
- Previous analysis calculated headroom for each zone
  - Maximum transfer volume which causes minimal effect outside zone
- Repeated against full SQSS requirements
  - “Required transfer” condition at winter peak
- Cost of constraint estimates up to headroom comprises of utilisation component only
  - Effect of locational component anticipated to be minimal
- Beyond headroom – locational and utilisation components both significant

nationalgrid

Locational and utilization component

- Locational component
  - Different location → different impact on circuit loadings
- Utilisation component
  - Refers to utilisation of long-term access rights

nationalgrid

Assumptions 1

- SYS ranking order used to pick up the possible TEC donors and TEC recipients
  - No closures
  - Refinement to align with work on CAP164
  - SYS background up to 2012/13 used
- For this analysis, new generators with signed applications will try to buy full TEC from donors instead of waiting for access
  - Not considering overrun and other products
- Local works are based on local charging assumptions (up to a “MITS substation”)

nationalgrid

Assumptions 2

- Cost of constraints due to increased utilisation estimated using historical cost (2006 and 2007)
- Generation scaled (across GB) to meet demand condition
- Trading occurs at every opportunity and donors are willing to sell when they themselves are not generating

nationalgrid

Steps to estimate cost of constraint Generator utilisation component

- Step 1: Obtain average seasonal load factors for all plant types (2001/02 to 2007/08)
- Step 2: Consider all existing and new signed generators in the zone
- Step 3: Maximum tradable TEC calculated (up to headroom for this analysis) [in MW]
  - TEC donors = (1 – Load Factors)
  - TEC recipients = Load Factors (default load factors for new Gen types suggested)
  - Maximum tradable MWs is the lower of the two
- Step 4: Current MWh utilisation versus historical cost of constraint estimated

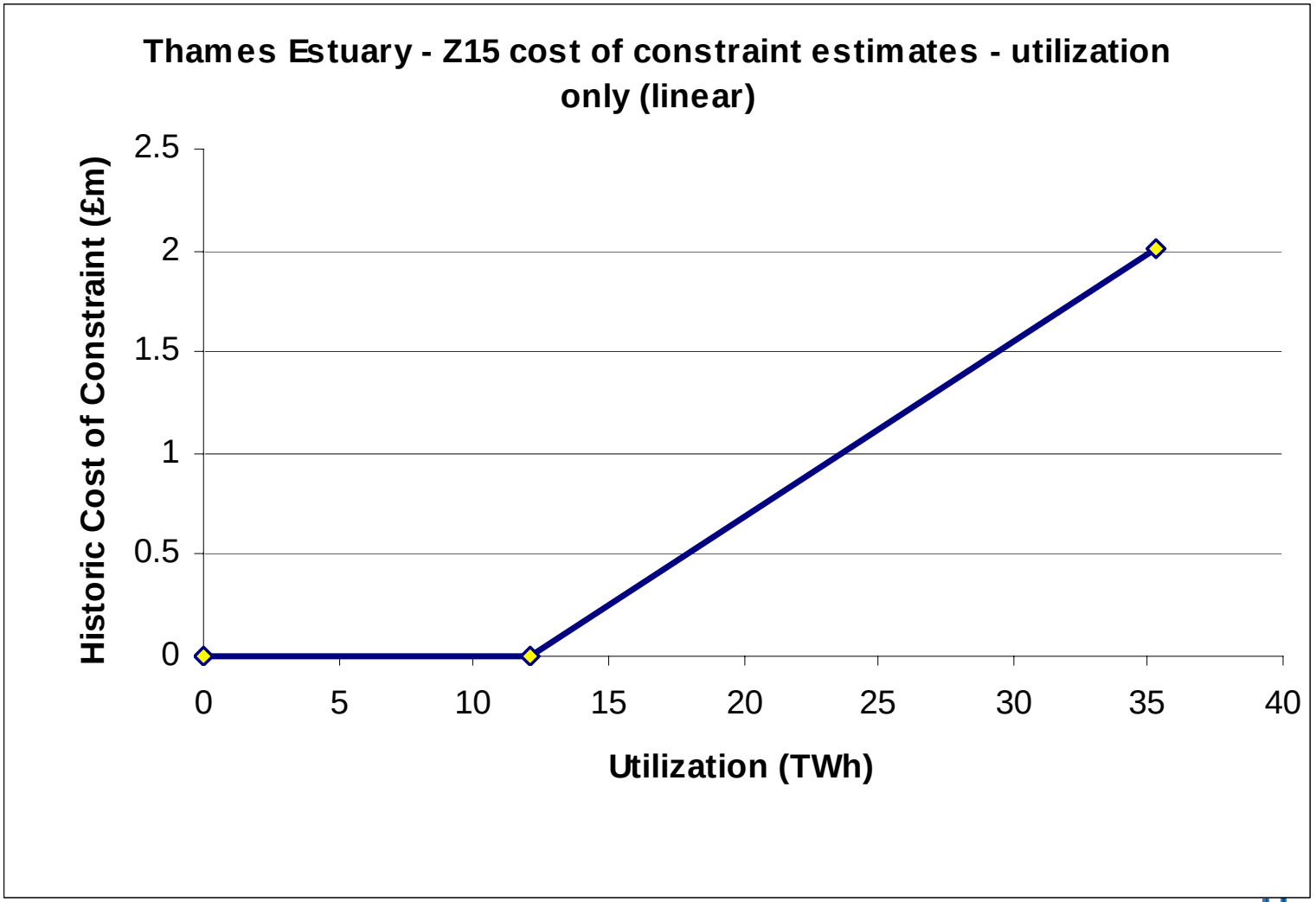
nationalgrid

Steps to estimate cost of constraint – utilization

- Step 5: The utilisation point at which no cost of constraint is incurred is estimated
- Step 6: Percentage increase in MWh utilisation calculated
- Step 7: By linear extrapolation, the increase in cost of constraint calculated
- Step 8: Using utilisation analysis, a high and low scenario is estimated

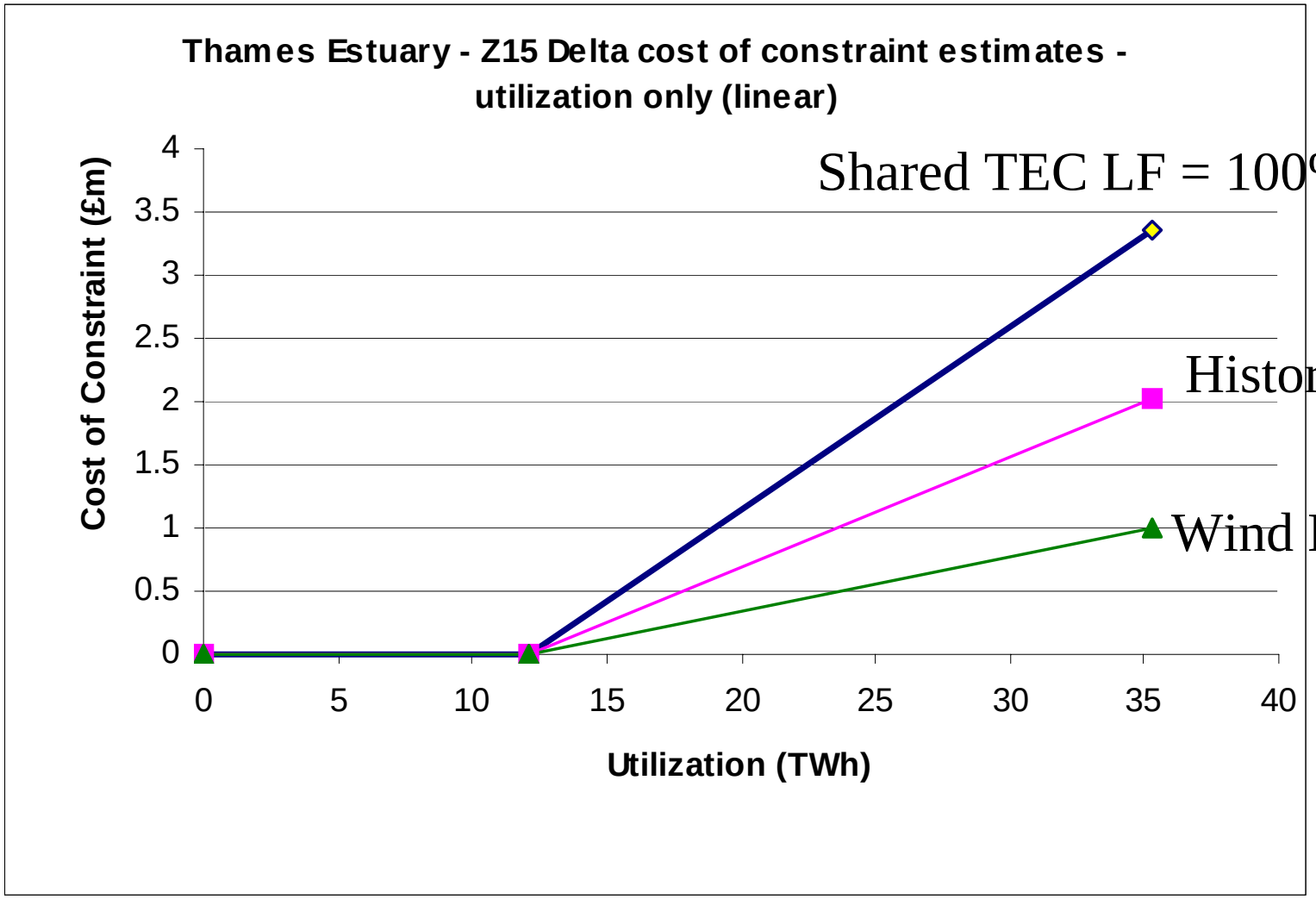
nationalgrid

Utilisation component results with offset (Z15 – Thames Estuary only)



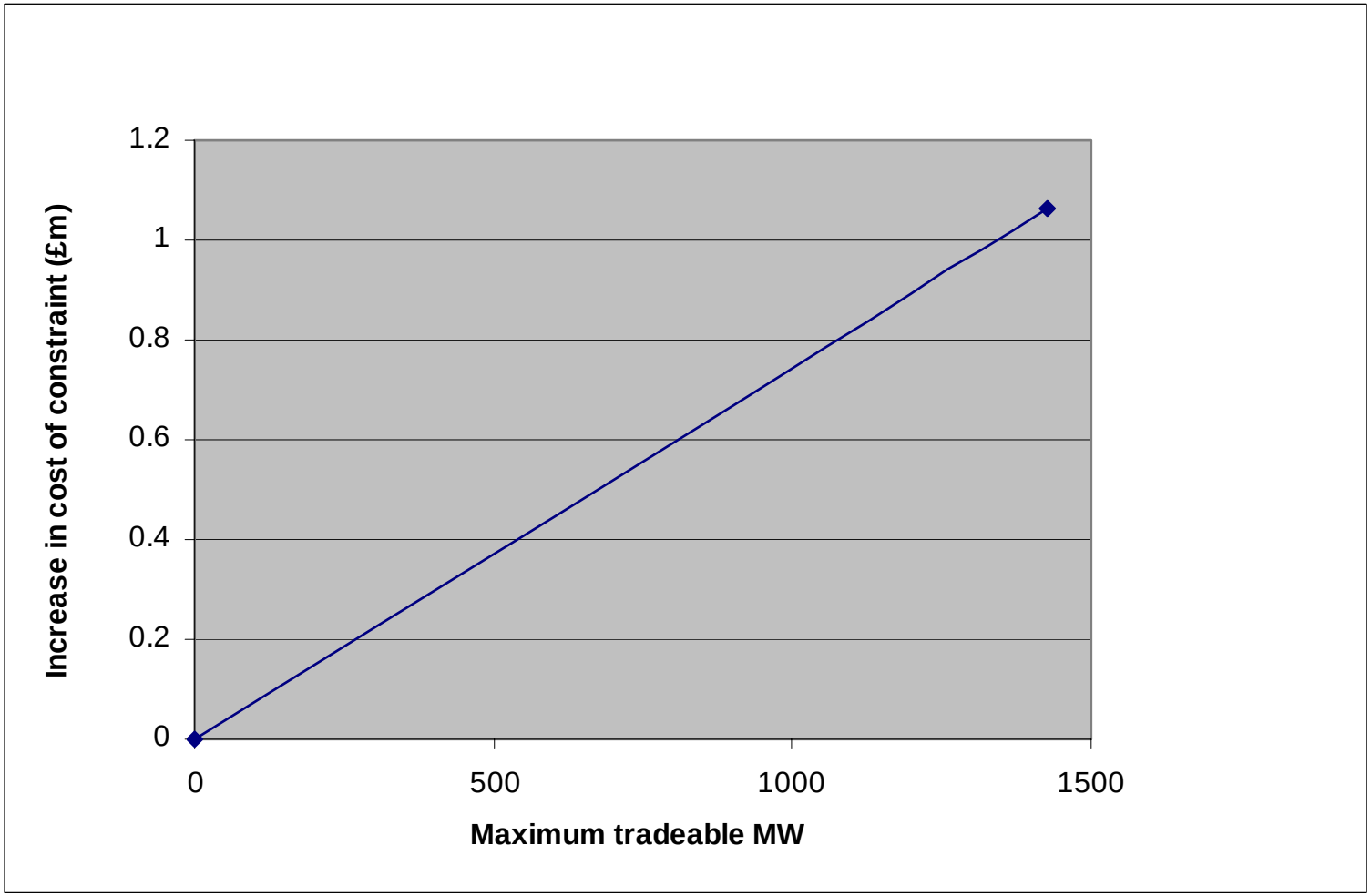
nationalgrid

Utilisation component with different shared TEC load factors



nationalgrid

Tradeable MWs against cost of constraint



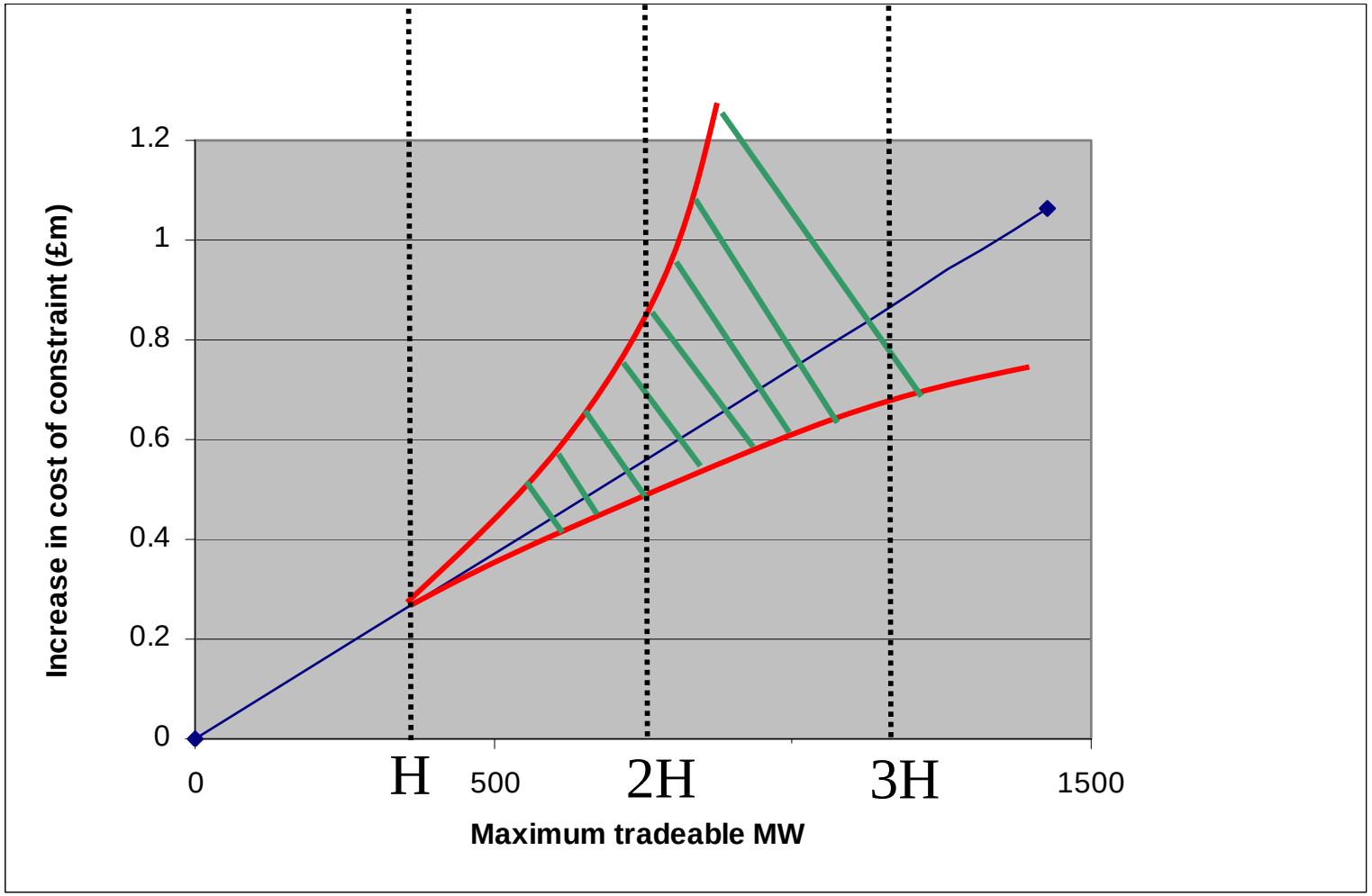
nationalgrid

Locational component

- This comes into effect beyond the headroom – e.g. any trades above 400MW aggregate in Z15
- Further analysis to be carried out beyond headroom to estimate impact of locational constraint
  - Local constraints – local works according to local charging assumption used (could be permanent)
  - Locational component includes changes to historical load factor behaviours, TEC donors selling at times when they would normally operate
  - Trades can be good or bad
    - Asymmetrical as we secure against multiple contingencies, i.e trade from A to B not symmetrical with B to A, therefore tends to cause more constraint cost
    - Ratio of load factors of recipient to donor TEC important – could cause reduction in cost of constraints if most frequent trades good

nationalgrid

Utilisation and locational component results (Z15 – Thames Estuary only)



nationalgrid

Results Summary

- Utilisation component
  - Up to headroom, the additional cost of constraint in the Thames estuary is £0.3m per annum
  - Utilisation more dominant in a zone like Z15 where the donor is mainly Grain oil and the recipients are both at Grain – no locational element
  - Initial feel is that the cost of constraints will be in this order of magnitude but further work on other zones needed
  - Low wind load factors mean a smaller increase in utilisation but increased volatility of wind could make it difficulty to identify opportunities to schedule outages
- Locational component
  - Minimal effect up to headroom, further analysis beyond headroom

nationalgrid

Cost of Constraints
- Refinements

- Ex post historical data used (i.e. following operator action)
  - Utilisation numbers used are already constrained numbers
  - Cost of constraint reduced
- Cost of replacement energy increasing
- Better estimates of load factors/behaviours of new generators by plant type – wind, interconnectors
- Upper and lower limits of cost of constraint estimation
  - High and low ranges
- Quarterly (seasonal) analysis might be more accurate but outage periods becoming longer and longer
- Interactivity between various zones
  - Utilisation increase in one zone leads to reductions in another – difficult so zonal analysis provides some sort of upper range
  - Shifting of system issues as the background changes due to trades might have to be explored

nationalgrid

Next Steps

- Expand this work to other zones (including Scotland) to obtain full impact
- Further refinement of techniques to obtain better accuracy

nationalgrid