NTS Exit Capacity Definition

The Spatial Consideration

DISG, 26th October 2004

National Grid Transco

UK Transmission

Overview

- Key objectives of product design
- Trade-offs between objectives in terms of spatial definition
- Analysis of Options
  - Large Zones
  - Small Zones
  - Nodes
- Summary of analysis
- Views

Key Trade-offs

- Extent of promoting unfacilitated competition and ability to ensure economic and efficient development, maintenance and operation of the system and be cost reflective
- Range of options for the commercial regime
  - One extreme is national product with full unfacilitated substitutability but with no locational information and no cost reflectivity
  - Other end is a physical party specific (sub-nodal) product with no trading whatsoever and precise information on location and user specific cost reflectivity
- Hence balance to be struck

Some Characteristics of gas transmission

- System design based around peak conditions
  - Supply sources well understood
  - Limited scope for supply to move around
- Lack of parallel paths due to low failure rate
  - Lack of meshing on the network hence few common constraint boundaries
  - Flows generally radial in nature
  - Zones would be more “cigar shaped” than boundary based
- The physics of gas transmission
  - Transmission capability falls as average transmission distance increases, or
  - Bigger system needed to transmit same quantity of gas over larger distance
- Hence offtake specific information important in sizing the network appropriately

Definition of Zone

- Geographic area in which capacity can be utilised at any of the nodes contained therein (existing or proposed) on an equal basis.
- Challenge is a single demand figure for a zone leaves uncertainty about how the demand is distributed within the zone
- Large zone could be defined as existing LDZ boundaries
- Looked at scenarios of incremental demand change within zone

Demand Growth 2005 to 2008

Uncertainties Arising From Utilising Zones for Investment Purposes

LDZ	Incremental demand	Components
Scotland	-3.52 mcmd	LDZ + 1.98 mcmd (across 18 offtakes) Moffat interconnector –5.5 mcmd
Northern	1.13 mcmd	LDZ +1.13 mcmd (across 14 offtakes)
North West	2.64 mcmd	LDZ +2.42 mcmd (across 13 offtakes) Shellstar +0.22 mcmd
North East	0.86 mcmd	LDZ +0.86 mcmd (10 offtakes)
East Midlands	5.56 mcmd	LDZ +1.83 mcmd (across 14 oftakes) British sugar +0.44 mcmd Staythorpe +3.73 mcmd
West Midlands	1.88 mcmd	LDZ +1.88 mcmd (across 11 offtakes)
Wales North	0.29 mcmd	LDZ +0.29 mcmd (at 1 offtake)
Wales South	0.80 mcmd	LDZ + 0.80 mcmd (across 3 offtakes)
Eastern	2.30 mcmd	LDZ +1.86 mcmd (across 11 offtakes)
North Thames	1.30 mcmd	LDZ + 1.30 (across 4 offtakes)
South East	0.99 mcmd	LDZ +0.99 mcmd (across 5 offtakes)
Southern	2.19 mcmd	LDZ +2.19 mcmd (across 6 offtakes)
South West	8.95 mcmd	LDZ +1.61 mcmd (across 13 offtakes) Marchwood +3.56 mcmd Langage +3.58 mcmd
	25.36 mcmd	

Market Power Considerations

Zones	HHI	Top Three Market Share
Scotland	3,110	81%
Northern	5,424	93%
North West	7,660	95%
North East	7,172	100%
East Midlands	4,573	81%
West Midlands	10,000	100%
Wales North	6,834	100%
Wales South	7,449	100%
Eastern	6,039	92%
North Thames	8,719	100%
South East	10,000	100%
Southern	6,950	100%
South West	6,818	64%

Implications of large zones

- Un-facilitated Trading enabled within a zone (though could be limited by dominance of large DNO in some zones)
- Large zonal information however not likely to be greatly effective as a commercial tool to signal new capacity requirements or in demand management for solving within zone congestion
- Would rely heavily on additional mechanisms for providing nodal information in order to plan and operate the system in line with our obligations

Exploring Other zonal definitions

Need to identify scope for offtake groupings to support zones

Defined methodology to assess different zonal configurations

- Transmission capability loss assessed in a single pipeline
  - Typical distances and pipe diameters
  - Use of Panhandle equation
  - Relationships not linear
- “Loss rates” used to assess extent of downstream transferability

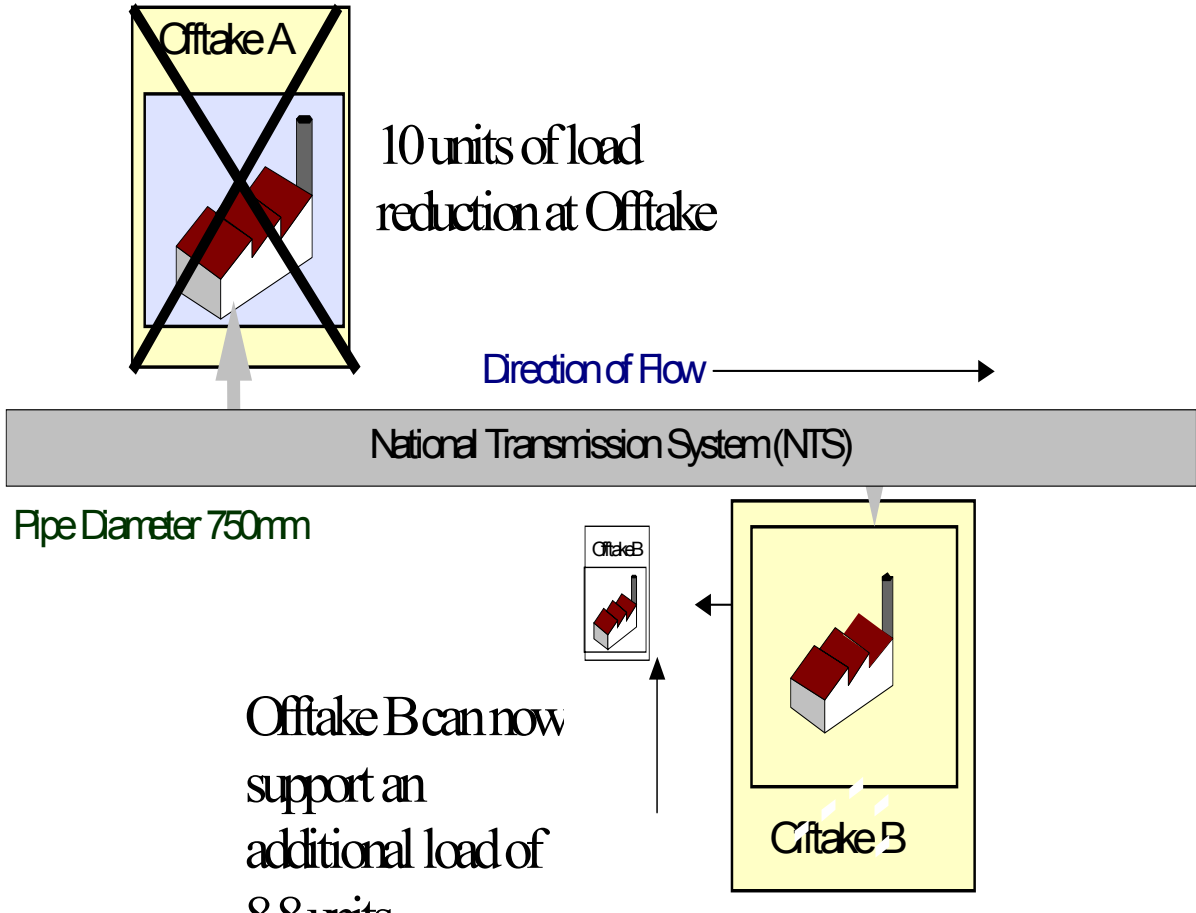
… the following slides illustrate how the above principles have been applied

Exploring Capacity Substitutability & Its Consequences

Load substitubility

20km x 0.6 = 12% Loss

88% of 10 units = 8.8



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Exploring Capacity Substitutability & Its Consequences

There may be merits in supporting the transferability of capacity rights between offtake points and commercial efficiency might be best delivered by effecting 1:1 transfers.

However consequences of the substitutability loss might be:

- To allow the unconstrained transfer of 10 units of demand between these offtakes the pipeline would need to be an overall system 20/18.8 times bigger.

Or.

- UK Transmission would be dependent on buyback of capacity or demand turndown to effectively reduce demand on the system.

Zonal Definition – Methodology Applied

- Simple methodology applied to:

- Derive the percentage of substitutability loss between proximate offtakes
- Define the Exchange Rate levels & establish thresholds
- Establish the number of groups where exchange rate thresholds are exceeded
- Analysis of the number of zones implied by different differing Exchange Rate thresholds

Zonal Definition –

Summary Analysis

Exchange Rate Pairings

Exchange rate to be at Least:	Number of multi-node zones	Implied number of zones
0.9	30	140
0.8	43	117
0.7	43	103
0.6	43	97

System involves 180 offtakes currently

Figure 2: Zones > 0.9

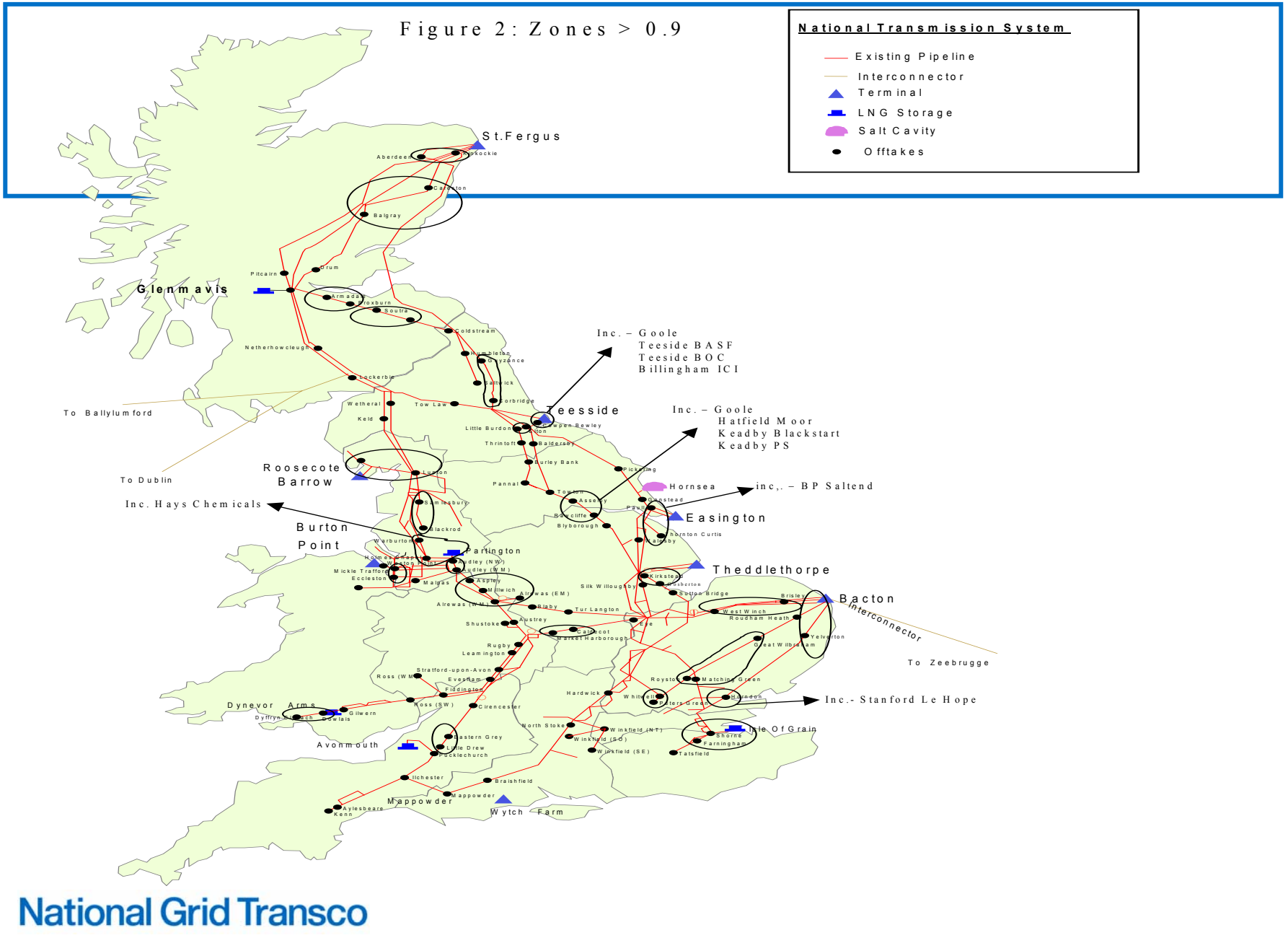

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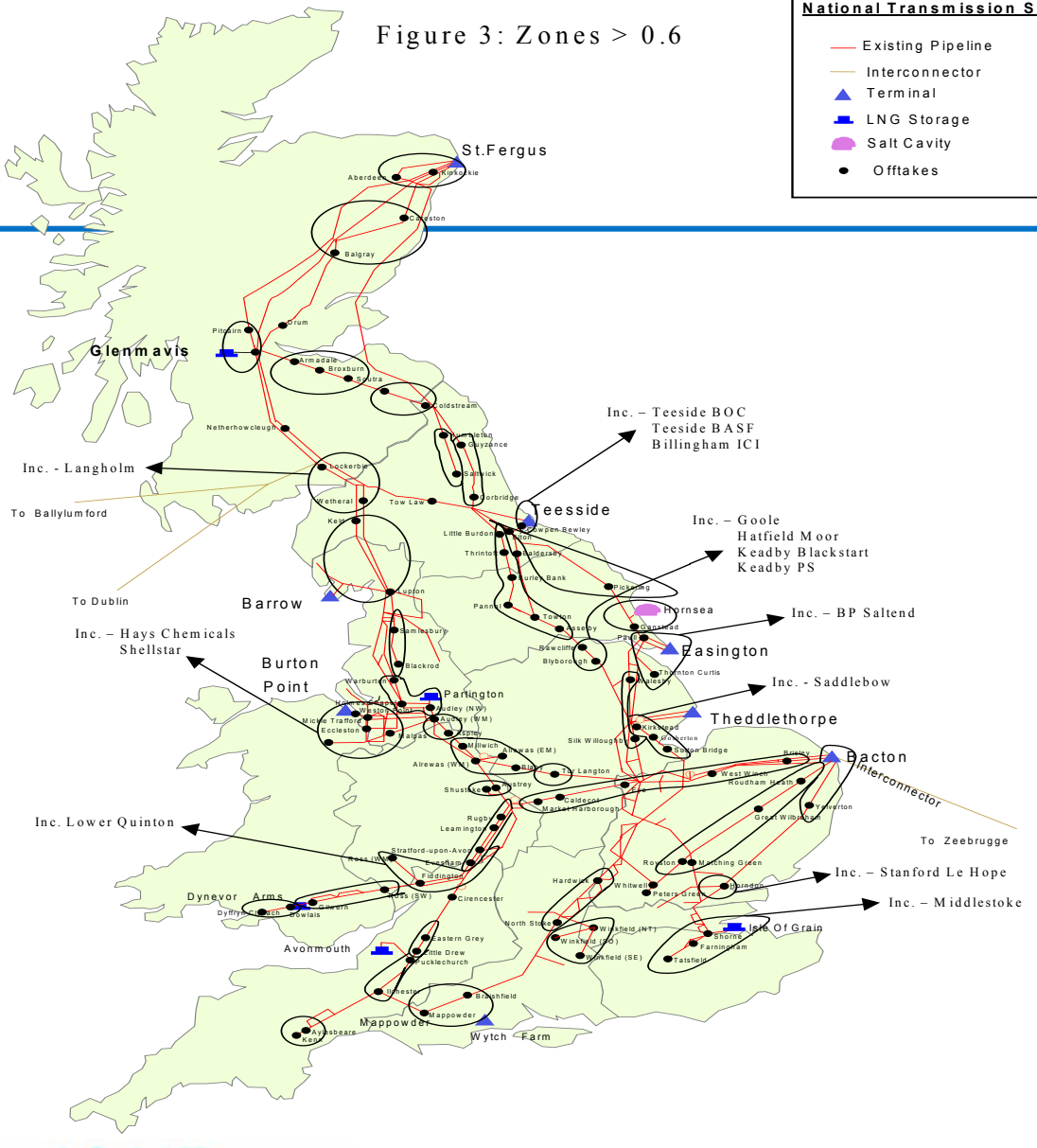
Figure 3: Zones > 0.6



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Zonal Definition –

Investment And/or Demand Management Consequences

Exchange rate to be at Least:	Investment	Demand management/ buy-back
0.9	54-65	9-53
0.8	139-169	42-251
0.7	250-302	121-727
0.6	357-433	270-1622

Costs in £m capex equivalent

Implications of small zones

- Analysis shows that even with a small number of multi-node zones, significant costs may be incurred if decisions on planning and operation were to be driven by the commercial capacity bookings
- Demand management could be more targeted but still major uncertainty within zone
- Extent of un-facilitated trading likely to be very limited
- Does not preclude a facilitated trading process

Nodal Approach

- Scope for clear signals for capacity requirements to promote efficient investment and operation
- Effective targeting of demand management tools
- Un-facilitated trading inter node unavailable
- Does not preclude a facilitated process

Transco Facilitated NTS Exit Capacity Transfers

Rather than accommodate all capacity transfers on a 1:1 basis (with the consequences identified earlier) it may be appropriate to consider an additional System Operator facilitated transfer mechanism ……

… this may permit greater opportunities to transfer capacity over greater distances

… and might allow for the benefits of secondary trading without undermining nodal information necessary for economic investment

Summary

Model	Planning/Operating Information	Increased Investment/ Buy Back Costs	Inter Node Trading	Average Herfindahl Hirschman Scor
Nodal	Matches physical requirements	Small	Only Facilitated by SO	10,000
Large Zones	Very limited physical information (Additional mechanism required)	Very Large	Yes, widespread	6,980
Small Zones	Reasonable	Large	Very Local & Limited	10,000

Assessment against exit reform aims

	Nodal model	Zonal model
Protect Customers	Provides Information reflecting physical realities and hence should promote efficient decision making	Uncertainties about location of demand could lead to more active demand management
Promote competition	Little competition at a node, potential for trading across nodes	Full trading across nodes within zones
Economic and efficient development. Maintenance and operation	Provides specific information about where, when and how much.	Less specific information arising from capacity sales and trading.
Avoiding undue discrimination	Combination of price based allocations and baseline obligations limit potential for discrimination	Combination of price based allocations and baseline obligations limit potential for discrimination
Cost reflective charges	Cost reflective prices per node are possible.	Cost reflectivity averaged over a zone

Our view

- From our analysis, we would recommend a nodal approach with facilitated trading by the SO
- Difficult for us to assess the benefits of trading against the costs
- Would welcome other views