NTS Exit Capacity Flexibility Product - System capability assessment

EOWG

3rd May 2006

Nks/060503_EOWG_Flex_assumptions_results_v0p1

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Network Modelling Challenge

- NTS
  - designed and built as a “bulk transmission” system
  - limited ability to absorb “within day” and “end of day” imbalances
- “Linepack availability” critically dependent upon
  - Previous activity and starting linepack distribution
  - Daily supply and demand distribution
  - Supply input and offtake demand within day flow rate variations
  - Pipeline and plant availability
- Network Model used to assess capability of network
  - Assumptions critical to understanding outputs
  - Network runs labour intensive
    - Base network set-up
    - Sensitivity runs

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High level description of Network Model

- Limited scenario analysis credible in available time
- Analysis undertaken on:
  - Three supply scenarios
  - Three demand days
  - Five “maximisation scenarios”
    - National
    - Sub-zonal: North, Midlands, East and West
- 9 “base network runs” plus 45 “iterations”
  - estimated 63 man-days of analysis, excluding quality checking
- All modelling based on 2010/11

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Supply side assumptions

- Three TBE 2005 scenarios:
  - Transit UK — “aggressive build-up of imports from Norway and from LNG … appreciable exports to Europe”
  - Global LNG — “LNG to alternative markets … high volumes from Norway, … interconnector net imports”
  - Auctions+ — “entry capacity signalled by market … flows constrained by obligated capacity”
- Gas supply patterns determined under each scenario for each demand level

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Demand levels

- Three demand levels investigated:
  - Day 1 Highest demand expected in an average year
  - Day 50 Typical winter day
  - Day 150 Typical autumn/spring day

Day Number	National Demand (mscmd)
1	541
50	424
150	376

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NTS – 2010/11 Network

- Supply scenario differences:

Investment	Driver	Scenario / approx. cost (£)		
		TransitUK	Auctions+	Global LNG
East Ilsley to Barton Stacey	SW quadrant exit	42m		
IoG to Shorne	Grain entry	17.5m		
Felindre extra power	Milford Haven entry	8m		
Kings Lynn to Wisbech	Grian/Bacton entry	29m		29m
Alrewas reverse	Milford entry/deep		8m	

- Assumed **all** projects are built and to time
- Enables better comparison of results

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Other key analysis and operational assumptions

- Flat supply entry profiles — No offshore problem
- National supply/demand balance — No forecasting errors
- Full pipeline and plant availability — No compressor trips
- Base offtake profiles based on experienced coincident patterns
  - Scaling process to generate credible profiles
- Current ANOPs and OCS assured pressures apply

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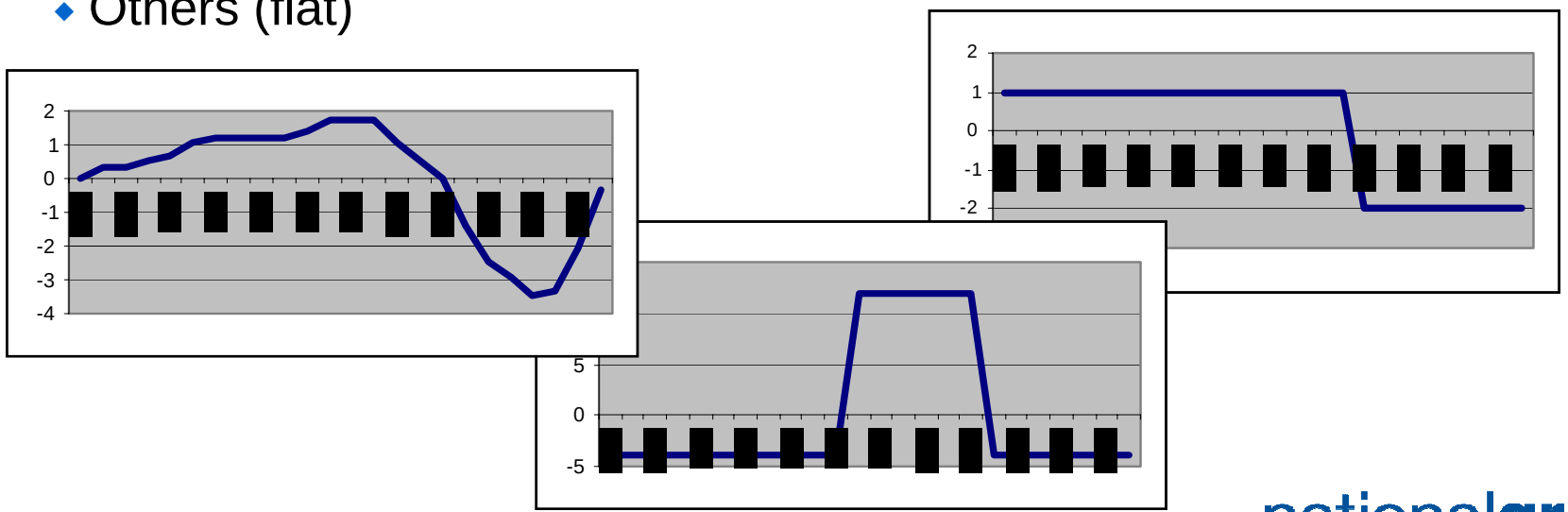
Offtake Profiles

- To simplify administration and human interaction
- 4 categories
  - Volumetrically controlled DN offtakes
    - Assuming strategy not changed within day
  - Pressure controlled DN offtakes & CCGTs
  - OCGTs (additional units)
  - Others (flat)



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Flexibility utilisation profiles

- Historical usage observed on 21 and 22 November 2005 provides basis for “base offtake flow rate variation level”
- Represents credible observed co-incident pattern

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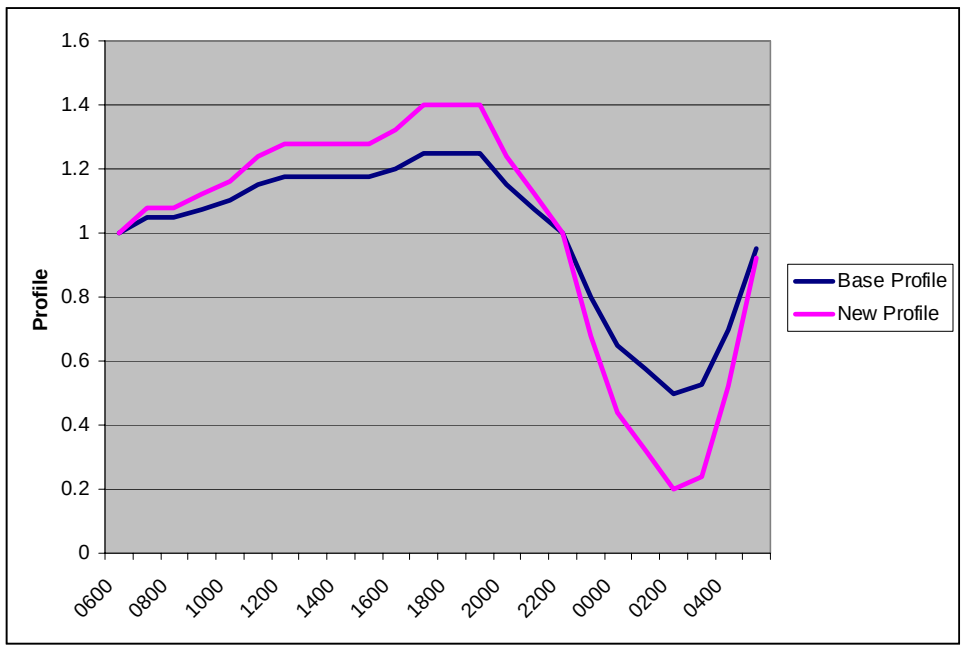
Flex Capacity Profiles - Scaling

- Assumed that no demand could swing below zero flow
- Additional flex capacity apportioned automatically across demands using scaling spreadsheet



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Results matrix

		National	North	Midlands	SouthWest	SouthEast
TransitUK	D1	31				
	D50	30				
	D150	26				
GlobalLNG	D1	20				
	D50	22				
	D150	21				
Auctions+	D1	17				
	D50	32				
	D150	36				

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Key observations / potential implications

- National linepack indicative of where first “constraints” arise
  - Criticality of assumptions
    - supply side gas sourcing
    - uniform scaling of offtake profiles
- Zonal analysis
  - better indication of local linepack availability?
  - Ability to absorb greater variations in some zones?
  - … but issue about how coincident flows can be managed

… early days of analysis/thinking about results

… zonal analysis of Transit UK may be complete by end of this week

… other scenarios “shortly”

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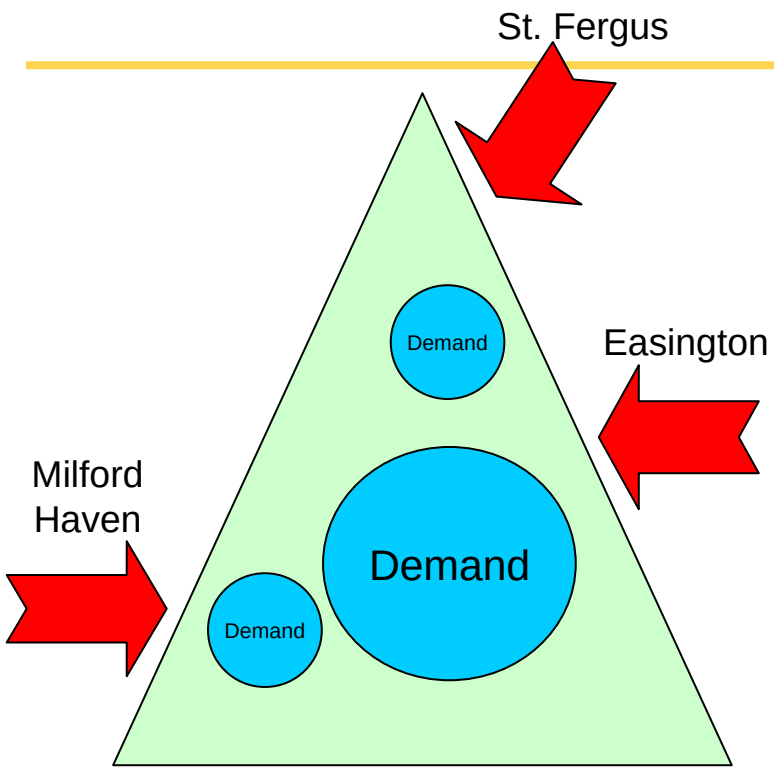
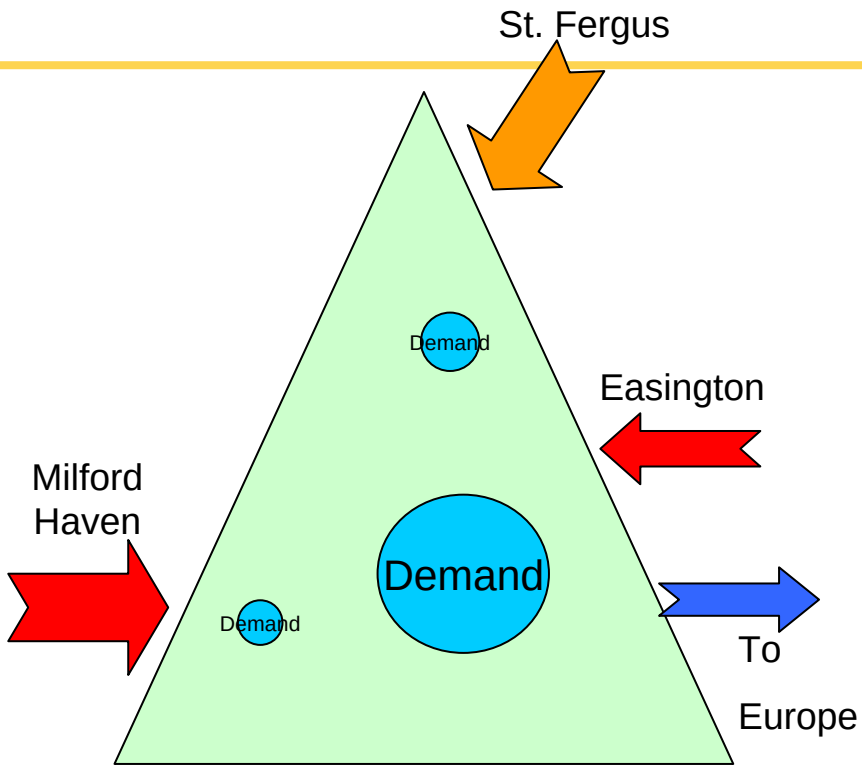
Explaining reduced “linepack” capability under reduced demand





Day 1

- Large flows from three main terminals
- High local and national demand

Day 150

- Milford and St. Fergus do not reduce noticeably
- Local demand significantly reduced
- System capacity must be used for transmission of large volumes of gas further into the system

.. lower demands can generate higher transmission utilisation of some sectors of the system

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Next steps and way ahead

- Further presentation at subsequent EOWG?
- “Product definition” by end of May?

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