

System Flexibility Indicators



Operational Forum 2011

Introduction - recap

- There is potential for the recent increases in volatility of gas flows to continue in future years, driven in particular by:
 - Growth in renewable sources of electricity generation
 - CCGTs may become the marginal source of generation
 - New sources of gas supply (more LNG, more fast cycling storage etc.)
- Greater supply, demand and linepack variation may result, both within day and across days
- A more 'flexible' NTS may therefore be required by our customers

Introduction - recap

- It is our intention to monitor and report on 'indicators' of such trends to help indicate any system / regime requirement for change
- 2 industry workshops were held in 2009 to develop 'leading' and 'lagging' indicators
- 'Final Proposals' on indicators were presented to the February 2010 Transmission Workstream
- Agreed to report on indicators to Operational Forum on a regular basis

Introduction – update

- The first presentation given at the May 2010 operational forum covered the full set of agreed indicators
- This second presentation (delayed from December) will be on a subset of the indicators with the full pack made available online shortly after today's presentation
- We were originally hoping to be able to present an extension of the original set of indicators at this forum which focused on information provision accuracy and wind impact to gas consumption
- Work is still ongoing in these areas to produce simple / meaningful indicators which, in conjunction to potential responses to Ofgem's consultation on NTS flexibility capacity, we hope to be able to present on an extension / improvement to this original design later this year

Phase 1 'Leading' Indicators

Reminder – Full Set

Supply

- Day on day difference in proportion of supply from the North & South
- Day on day difference in supply by group
- LNG
- UKCS
- Norway
- ICs
- Storage

Linepack

- Maximum daily range of within day linepack changes
- Frequency of linepack changes at particular thresholds
- Within day PCLP changes

Demand

- Within day demand variation by sector
- Flow flexibility usage by sector
- ICs
- Storage
- Power stations
- DN offtakes

Phase 1 'Lagging' Indicators

Reminder – Full Set

Supply

- Use of Operating Margins gas
- Use of entry buybacks
- Use of entry scalebacks

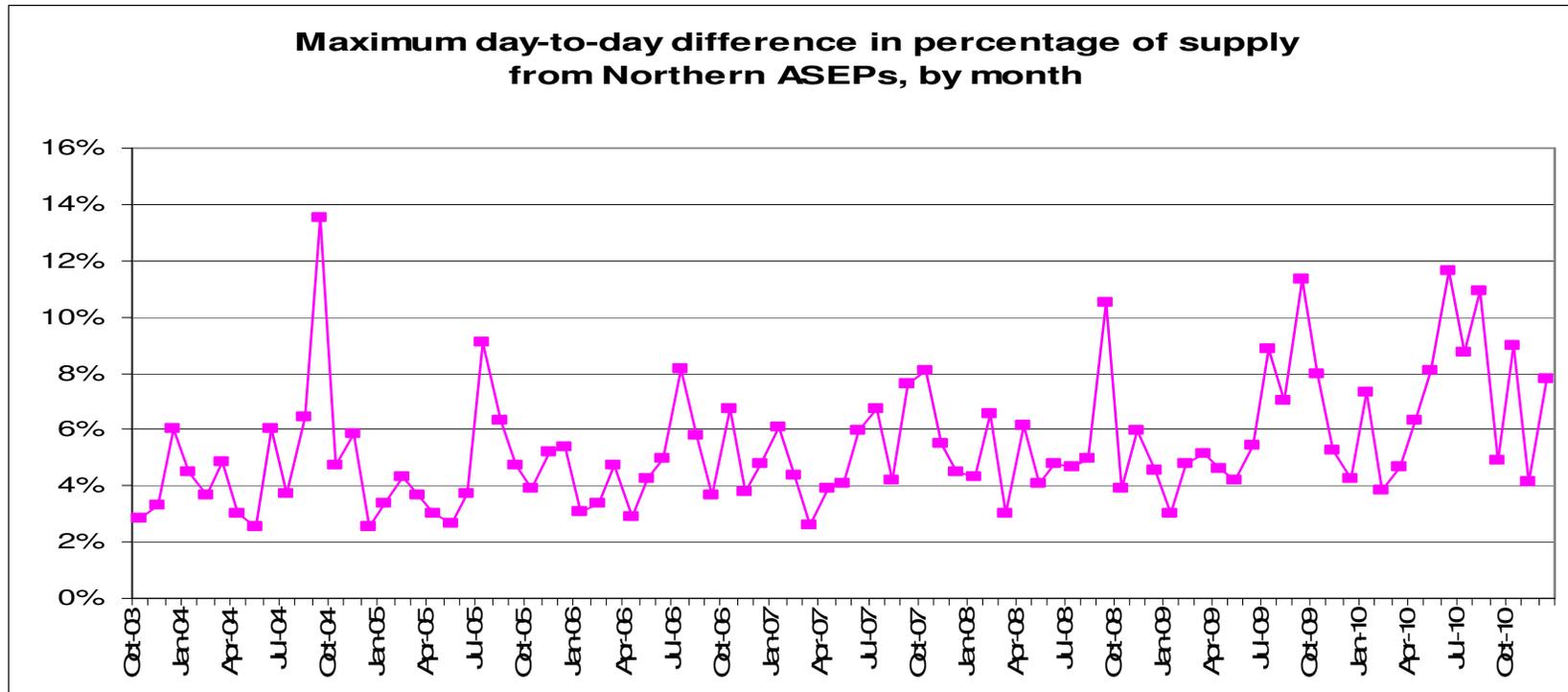
Supply & Demand

- Residual balancing frequency
- Residual balancing volumes
- Residual balancing costs

'Leading' Supply Indicators

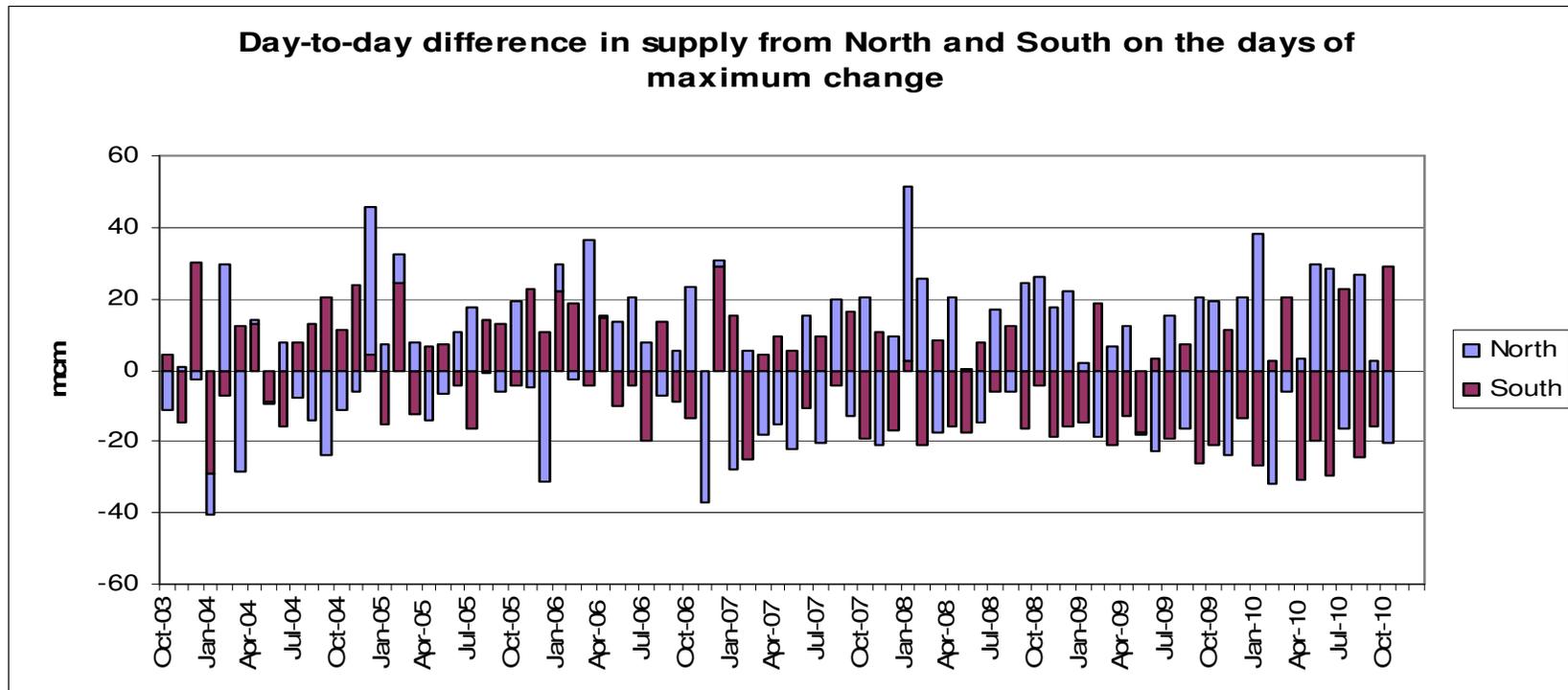


'Leading' Supply Indicator 1: Day to Day North / South Supply Volatility



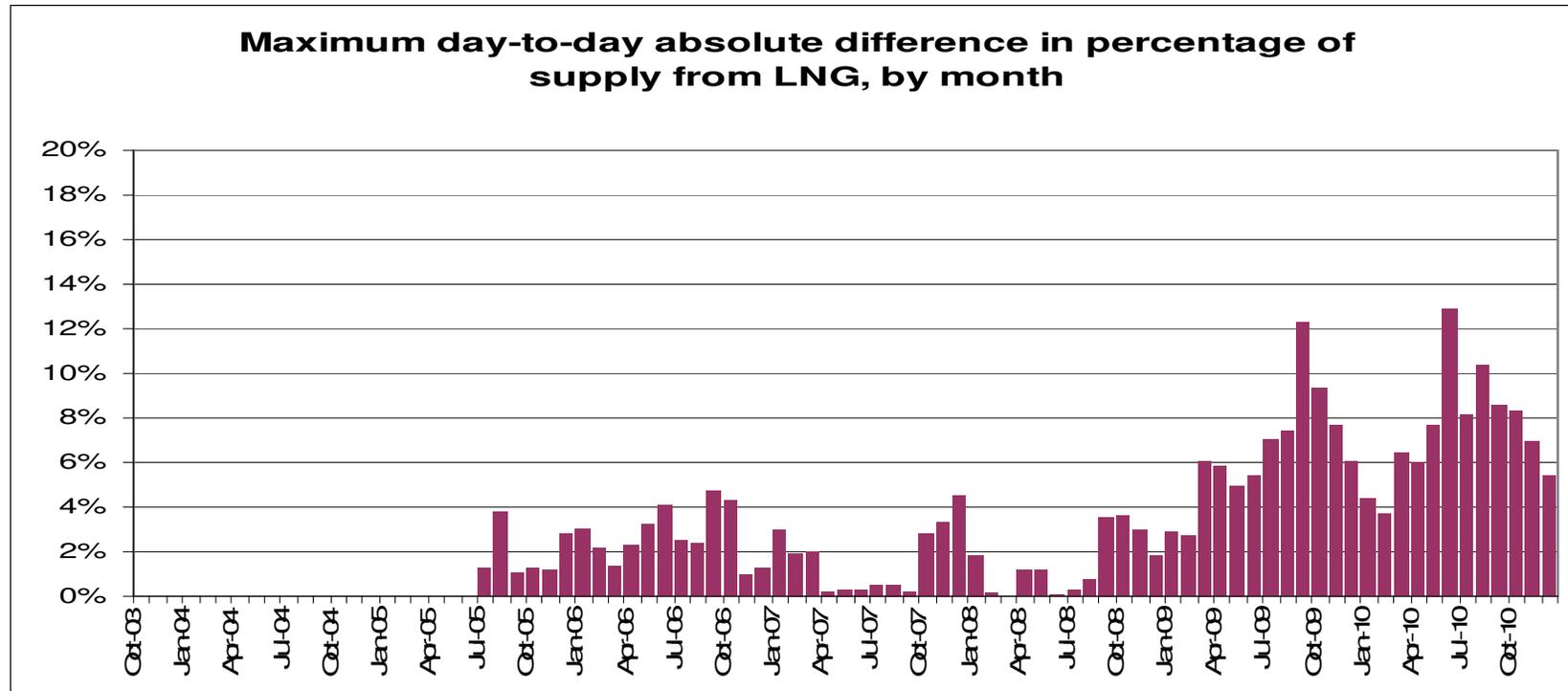
- This graph shows the maximum day on day change per month in the percentage of total supply from Northern ASEPs. Eg. if on one day 255 mcmd came from North and 117 mcmd from South (68% from North) then on the next day 257 mcmd came from North and 102 mcmd from South (71% from North), the day to day percentage change would be 3%. If this was the highest in that month, 3% would be plotted on the graph.

'Leading' Supply Indicator 1: Day to Day North / South Supply Volatility



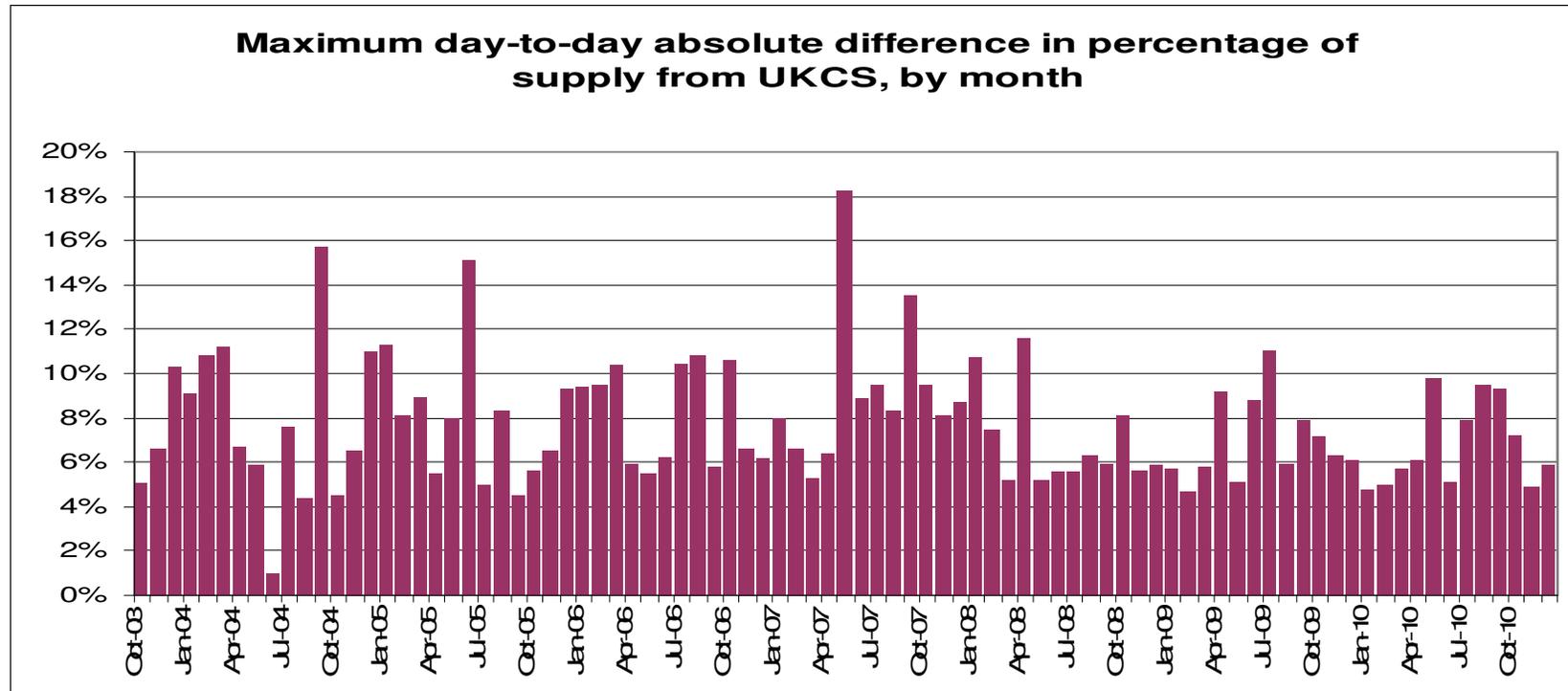
- This graph shows the associated volume changes from the previous graph.

'Leading' Supply Indicator 2: Percentage of supply accounted for by group



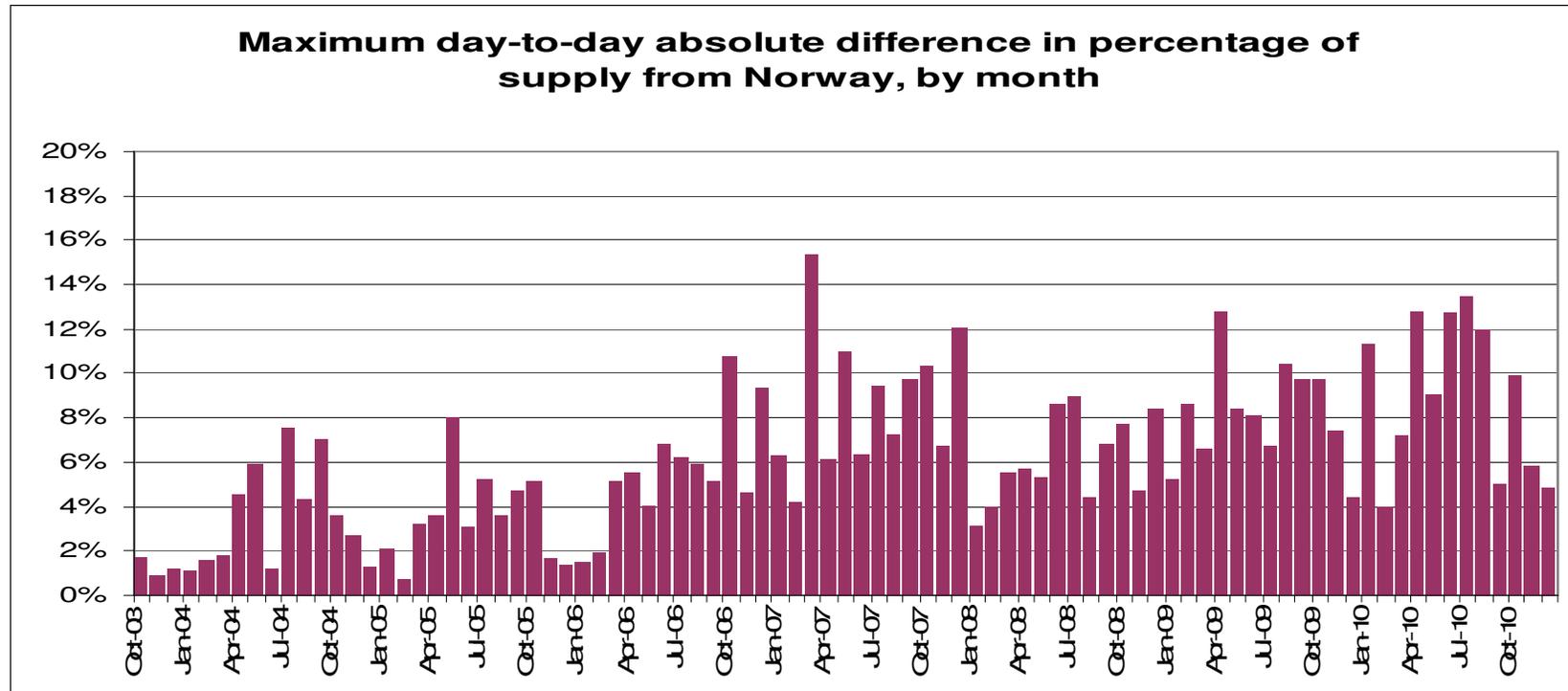
- This shows the maximum day on day change per month in the percentage of total supply from this supply group. Eg. if the supply from LNG was 50 mcmd on a day and 35 mcmd on the next day against total NTS supplies of 380 mcmd (13%) and 370 mcmd (9%) respectively, the day to day percentage change would be 4%. If this was the highest in that month, 4% would be plotted on the graph.

'Leading' Supply Indicator 2: Percentage of supply accounted for by group



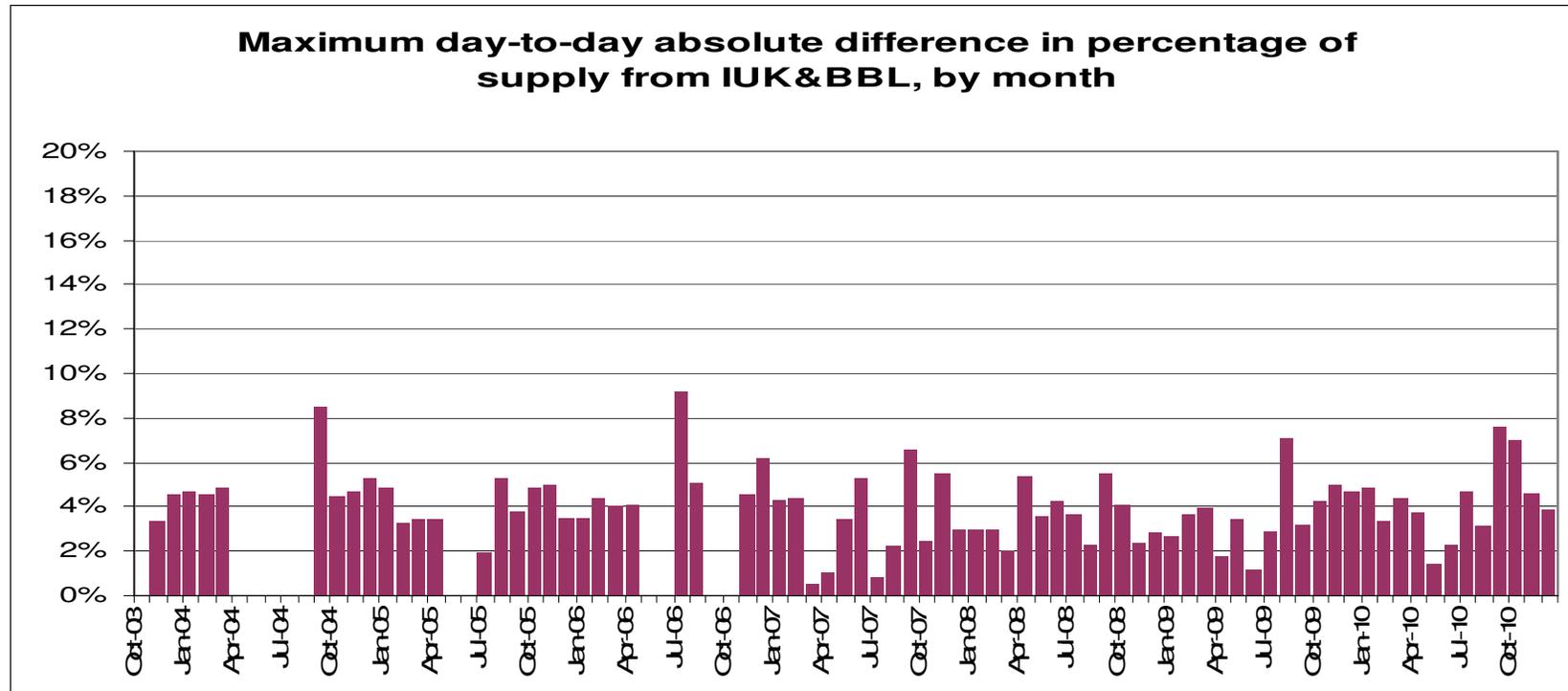
- This shows the maximum day on day change per month in the percentage of total supply from this supply group.

'Leading' Supply Indicator 2: Percentage of supply accounted for by group



- This shows the maximum day on day change per month in the percentage of total supply from this supply group.
- Norwegian flows are estimated due to the unavailability of flow data by source for St Fergus terminal

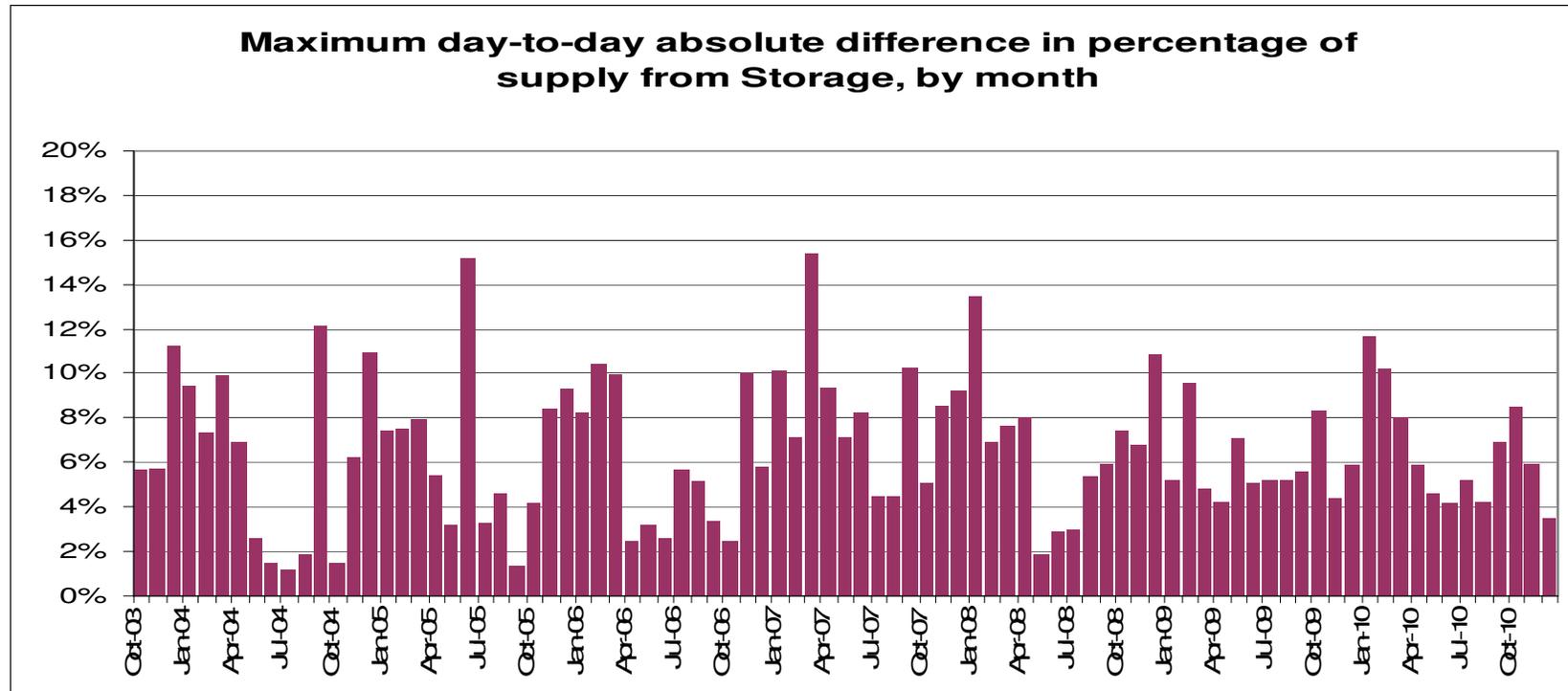
'Leading' Supply Indicator 2: Percentage of supply accounted for by group



- This shows the maximum day on day change per month in the percentage of total supply from this supply group.

'Leading' Supply Indicator 2:

Percentage of supply accounted for by group

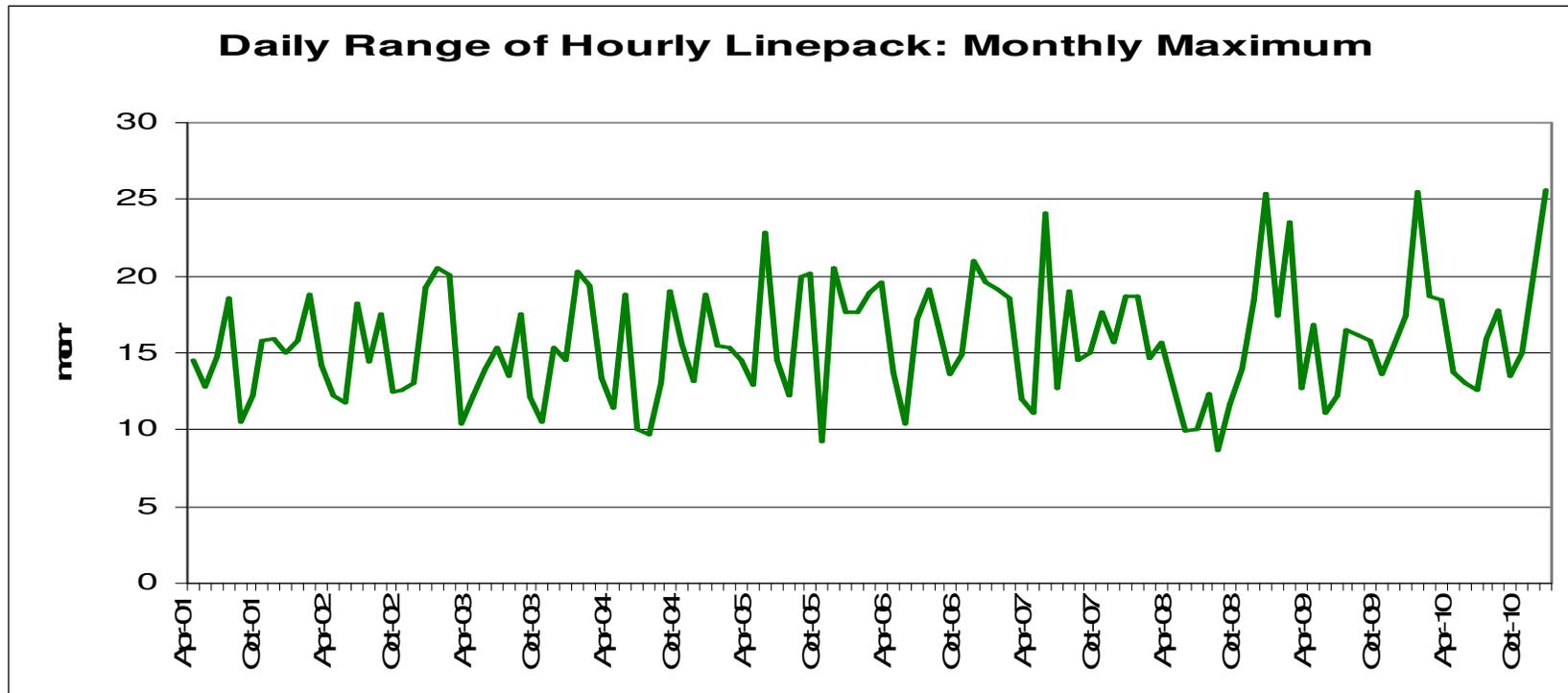


- This shows the maximum day on day change per month in the percentage of total supply from this supply group.

'Leading' Linepack Indicators



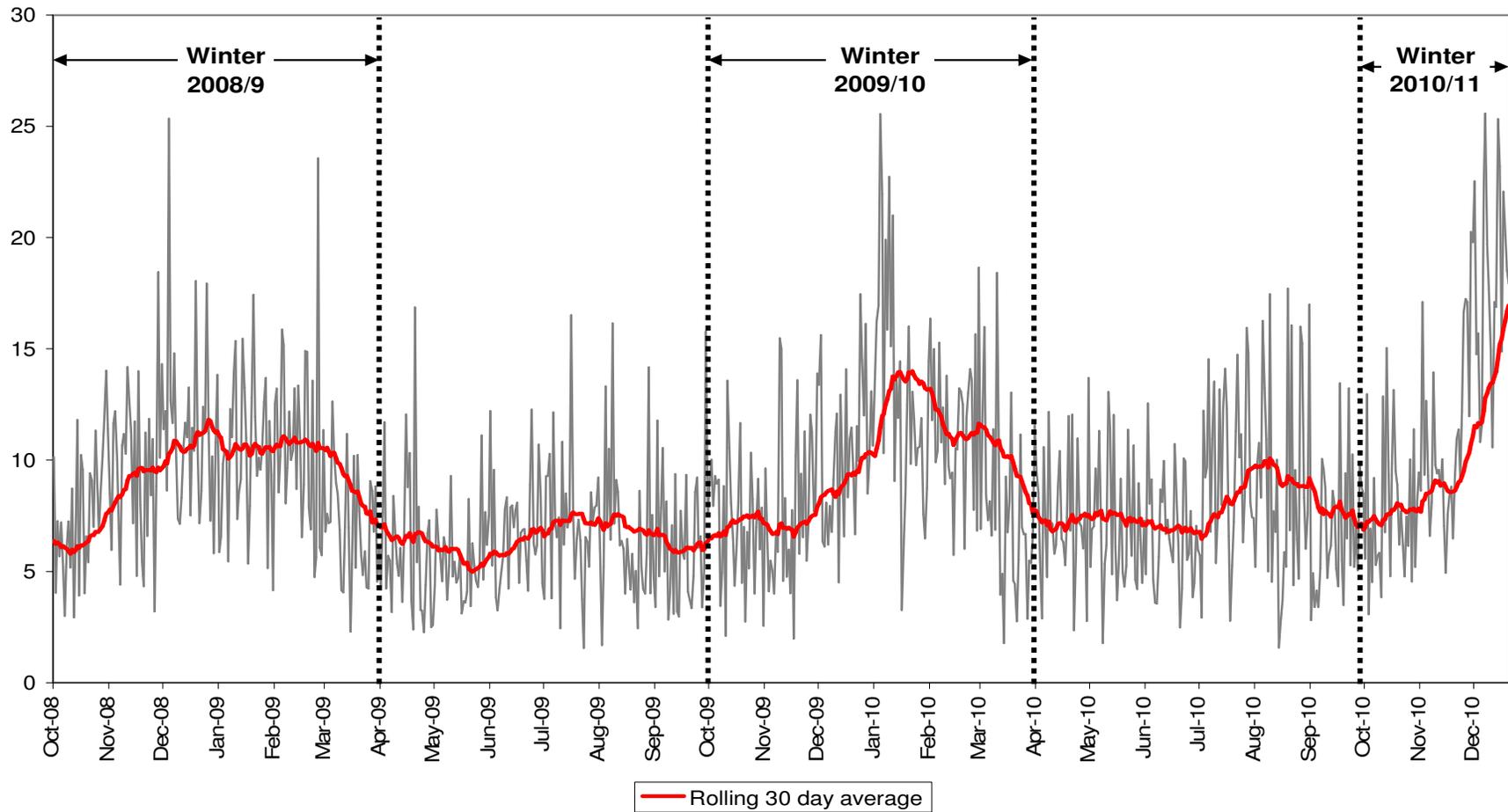
Leading Linepack Indicator 1: Maximum daily range of within day linepack changes



- This graph plots the maximum range on any day in each month between the highest and lowest hourly NTS linepack. Eg. if the highest hourly linepack recorded was 330 mcm and the lowest was 315 mcm on the same day and that constituted the largest daily range in that particular month, 15 mcm would be plotted on the graph for that month.

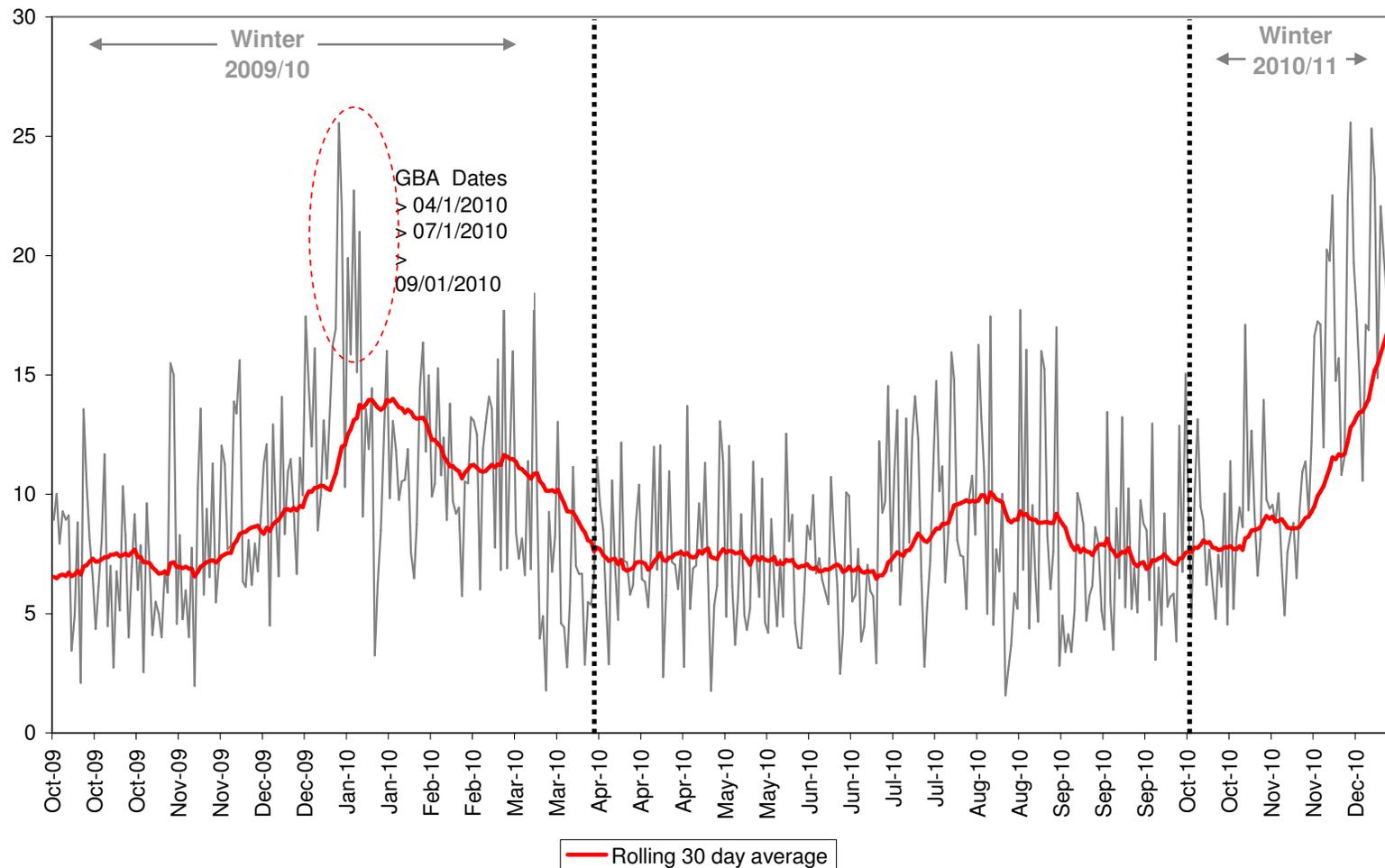
Leading Linepack Indicator 1: Maximum daily range of within day linepack changes

Within day max-min range of NTS linepack (mcm)



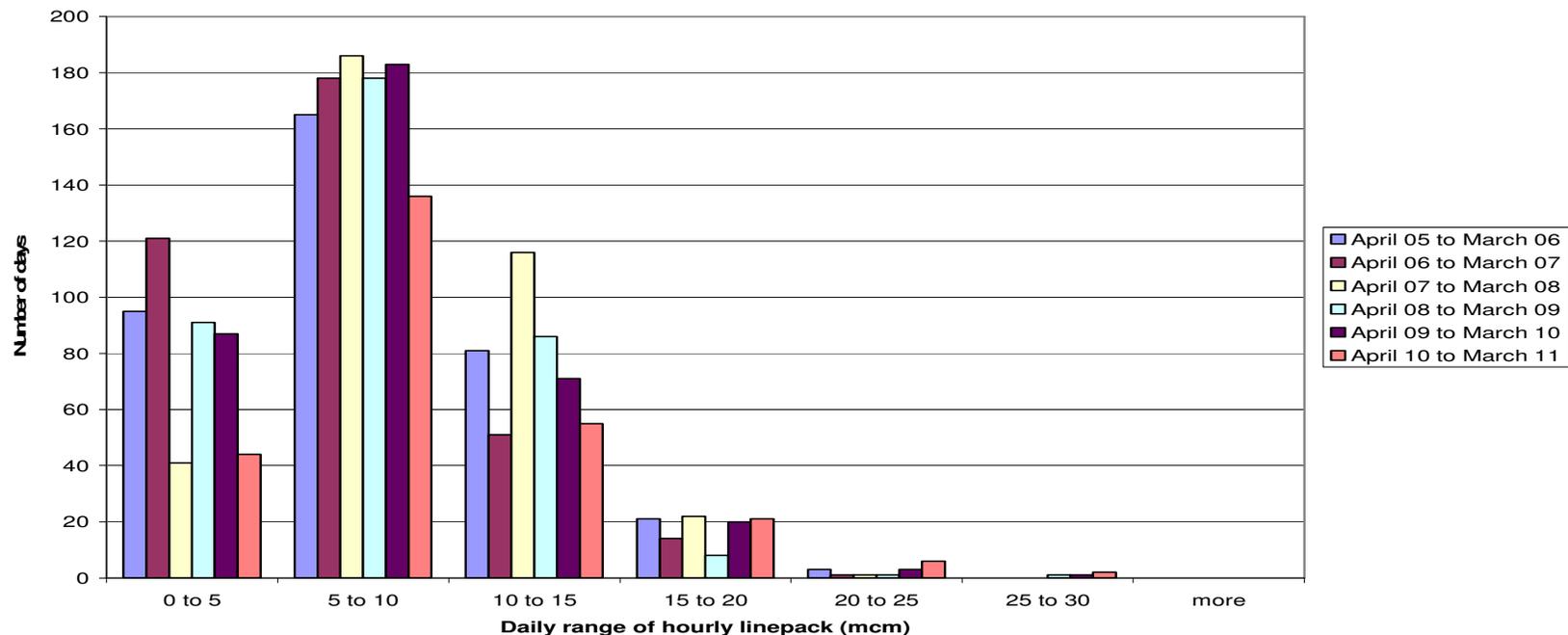
Leading Linepack Indicator 1: Maximum daily range of within day linepack changes

Within day max-min range of NTS linepack (mcm)



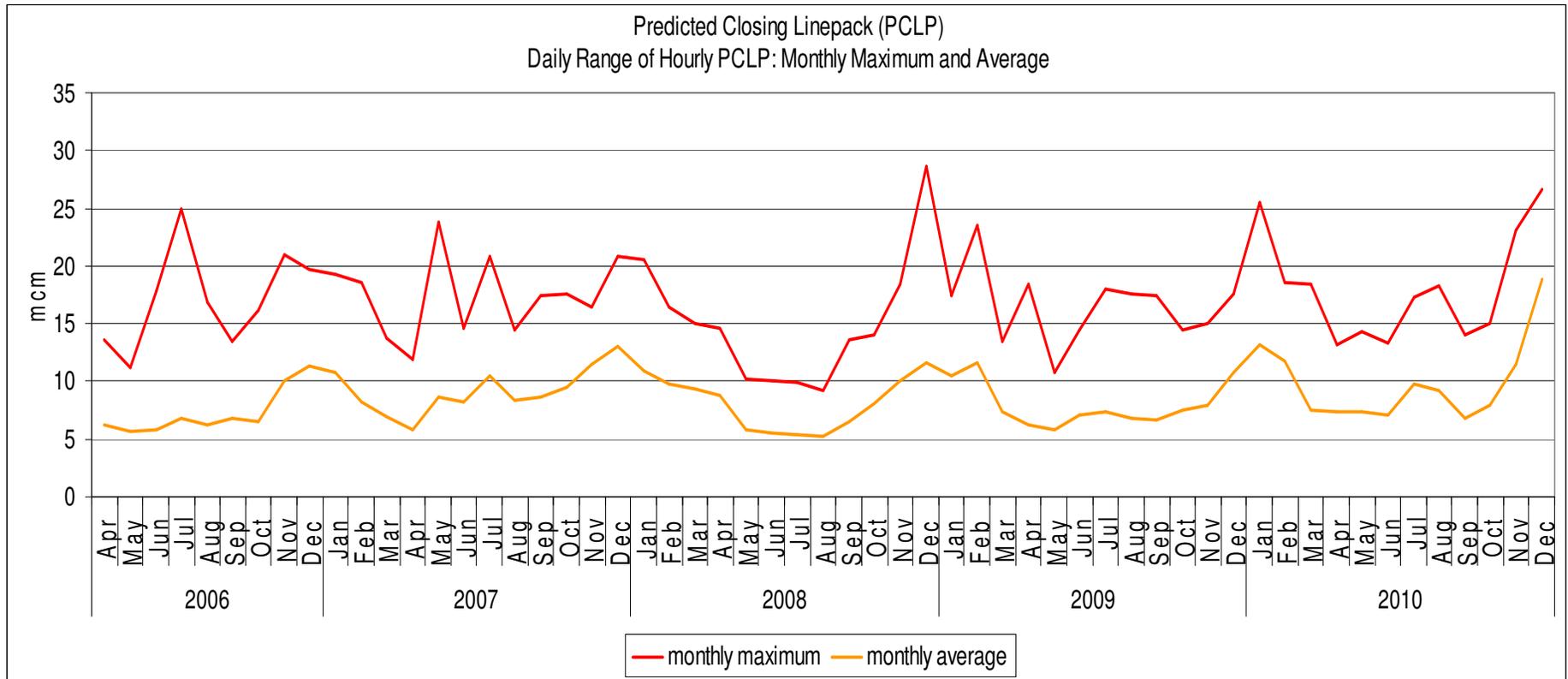
Leading Linepack Indicator 2: Frequency of within day changes

Hourly linepack - daily range - by year



- This graph shows, for April 2005 to date, the distribution of the maximum daily range of hourly linepack. Eg. for Apr-05 to Mar-06, the maximum daily range was less than 5 mcm on just below 100 days, was between 5 and 10 mcm on approximately 160 days etc.

Leading Linepack Indicator 2: Within-day PCLP swings



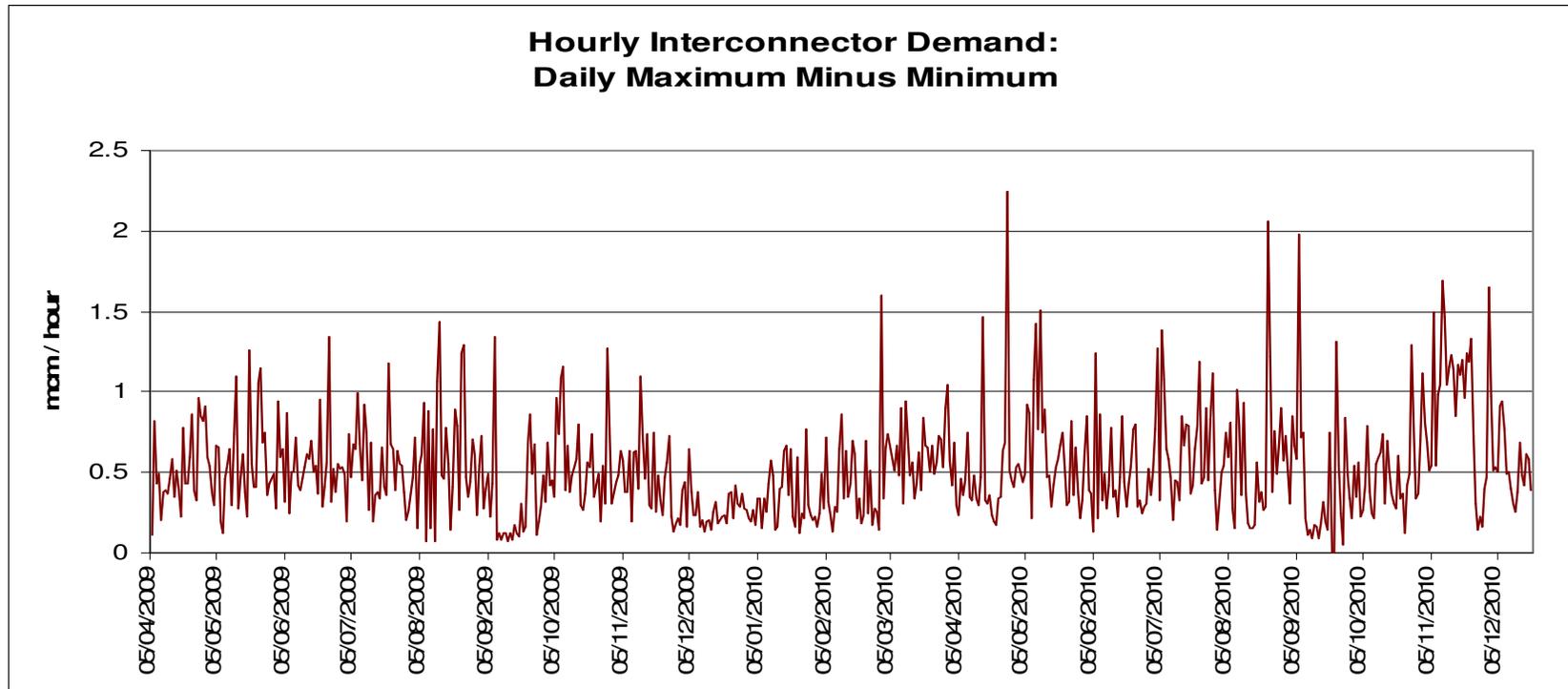
PCLP = Opening linepack
 + System Inputs (Daily Flow Nominations and Storage Flow Nominations)
 – System Demand (Offtake Profile Notifications)

This graph shows ranges of hourly PCLP values during the gas day.

'Leading' Demand Indicators

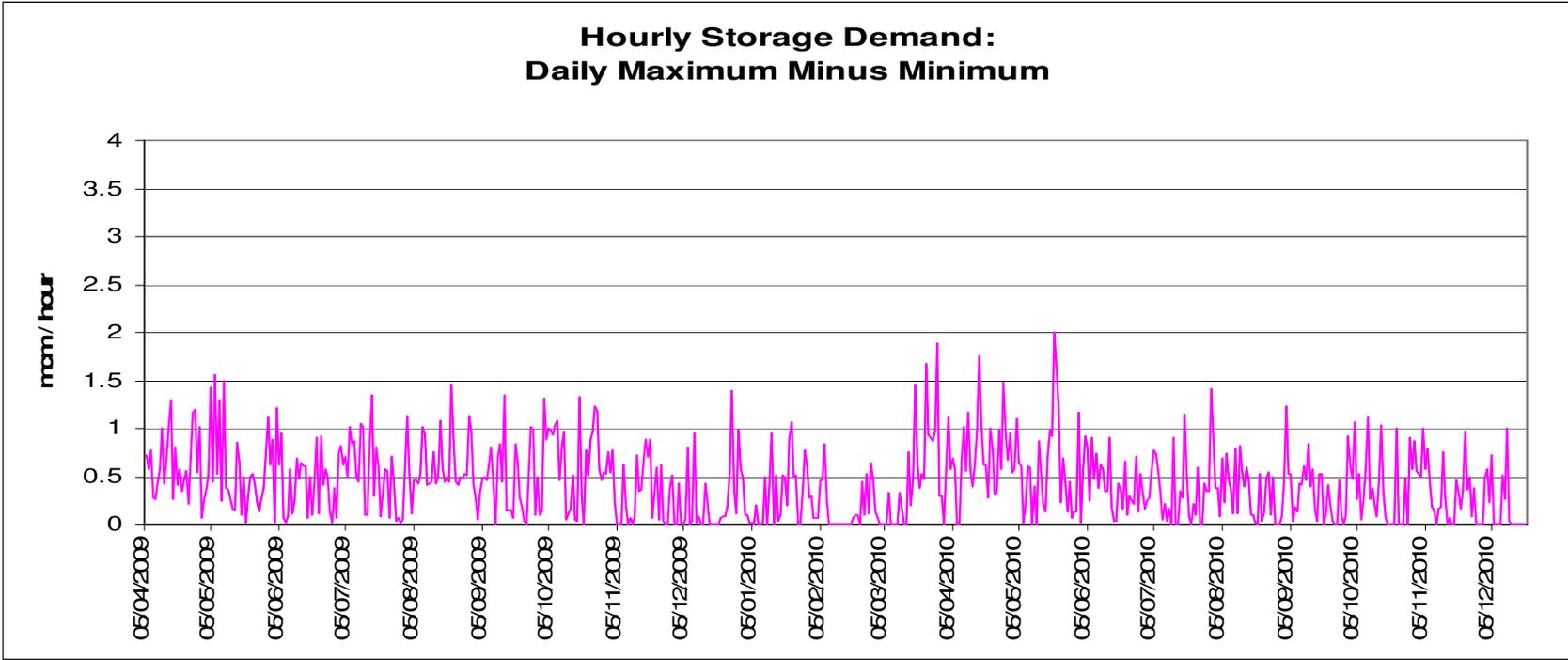


Leading Demand Indicator 1: Within day demand variation by sector

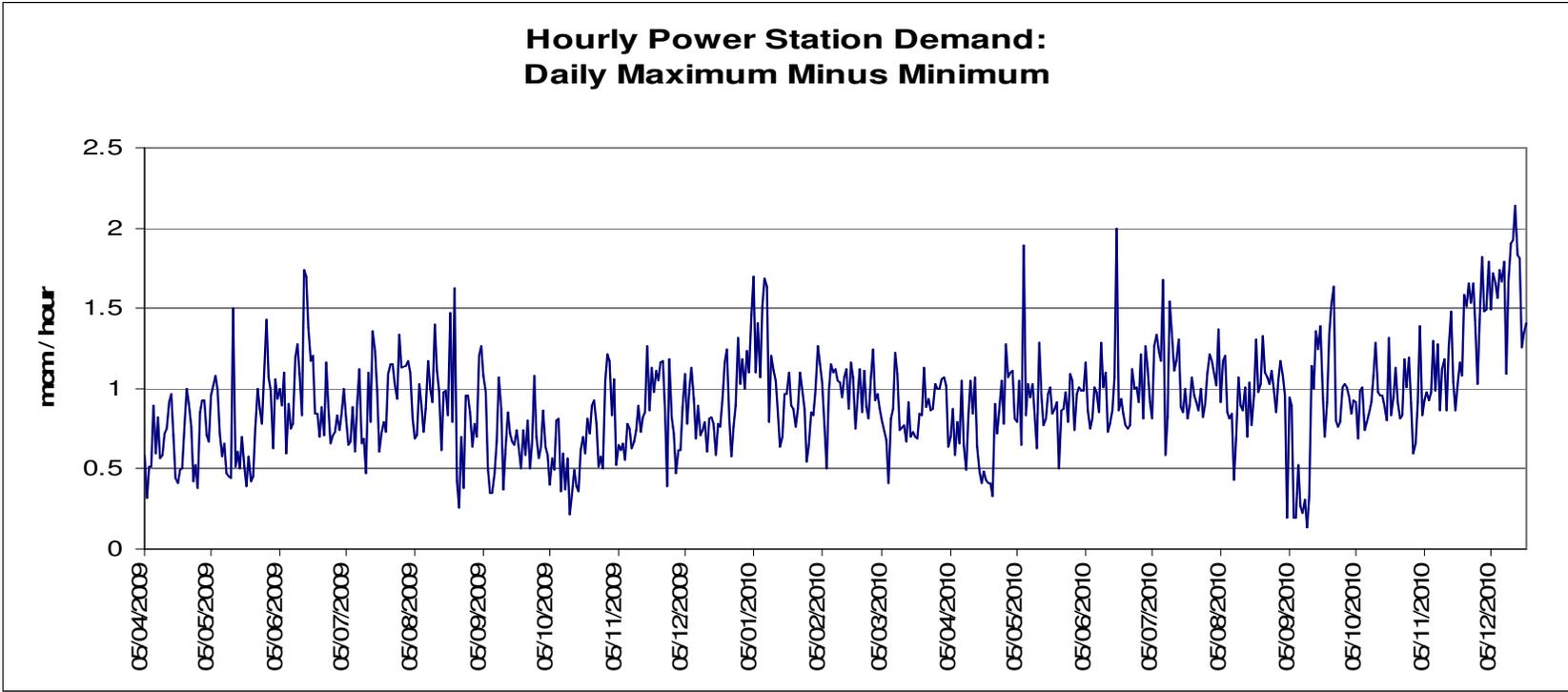


- This graph (and the next 3) shows the difference between the maximum hourly volume offtaken and the minimum hourly volume offtaken for each demand sector. This graph displays the results for the Bacton and Moffat interconnectors.

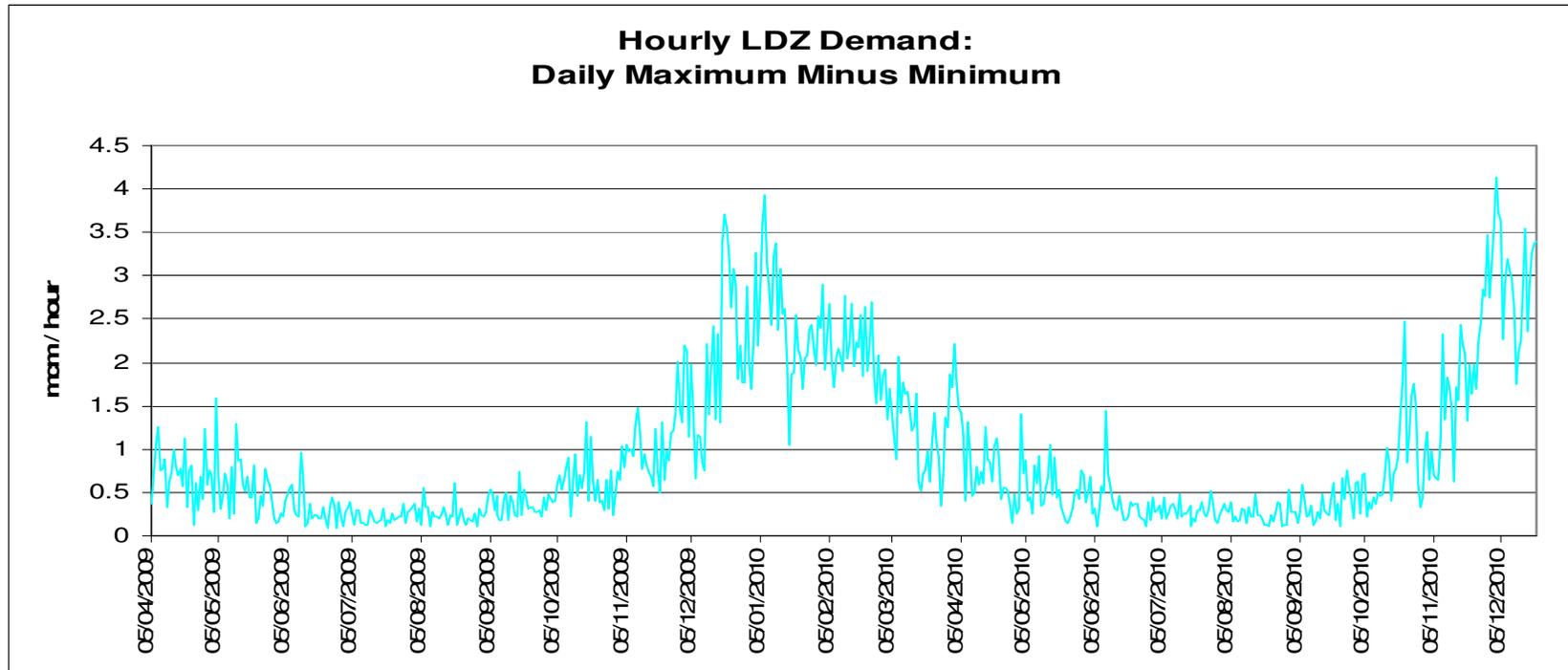
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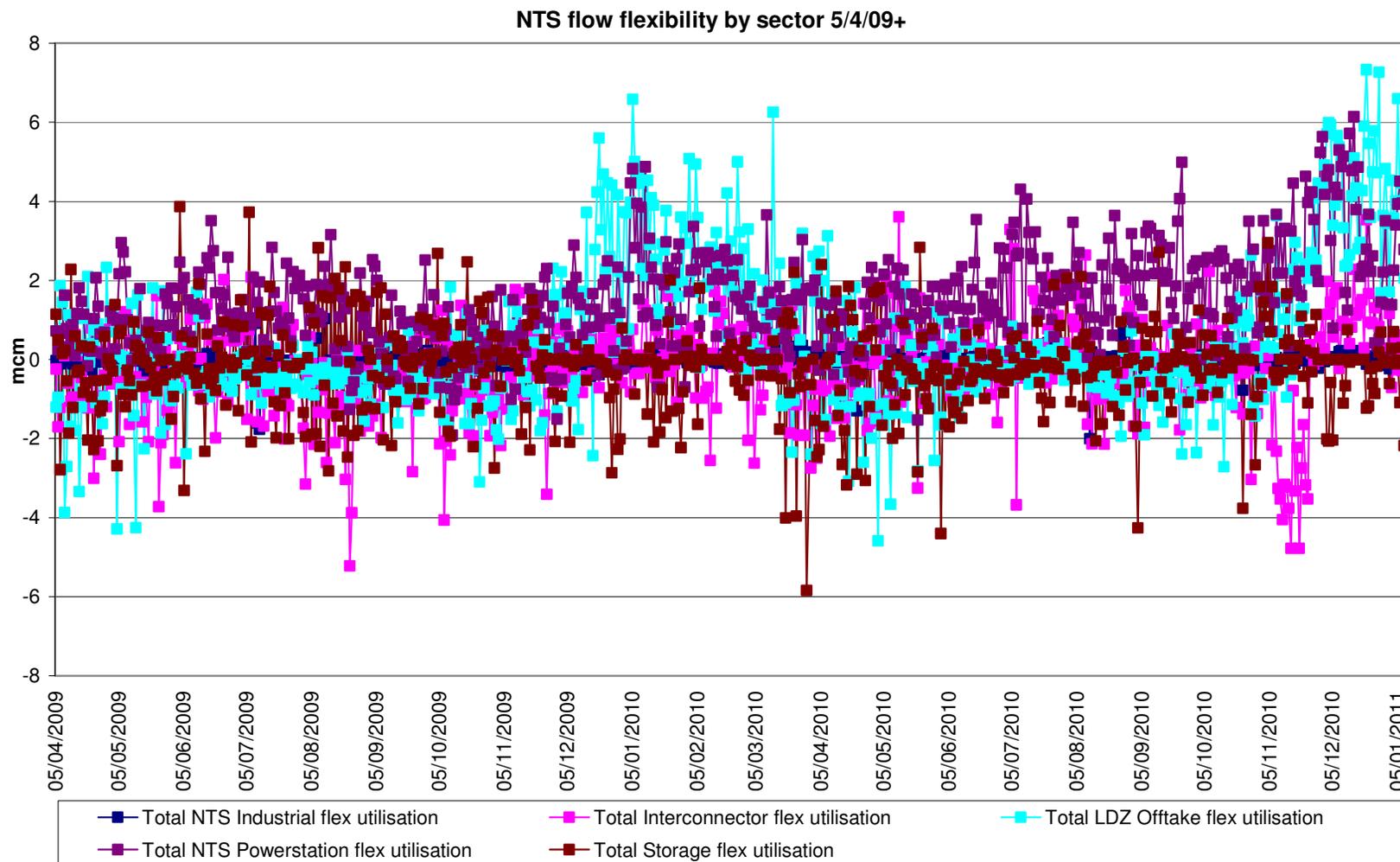
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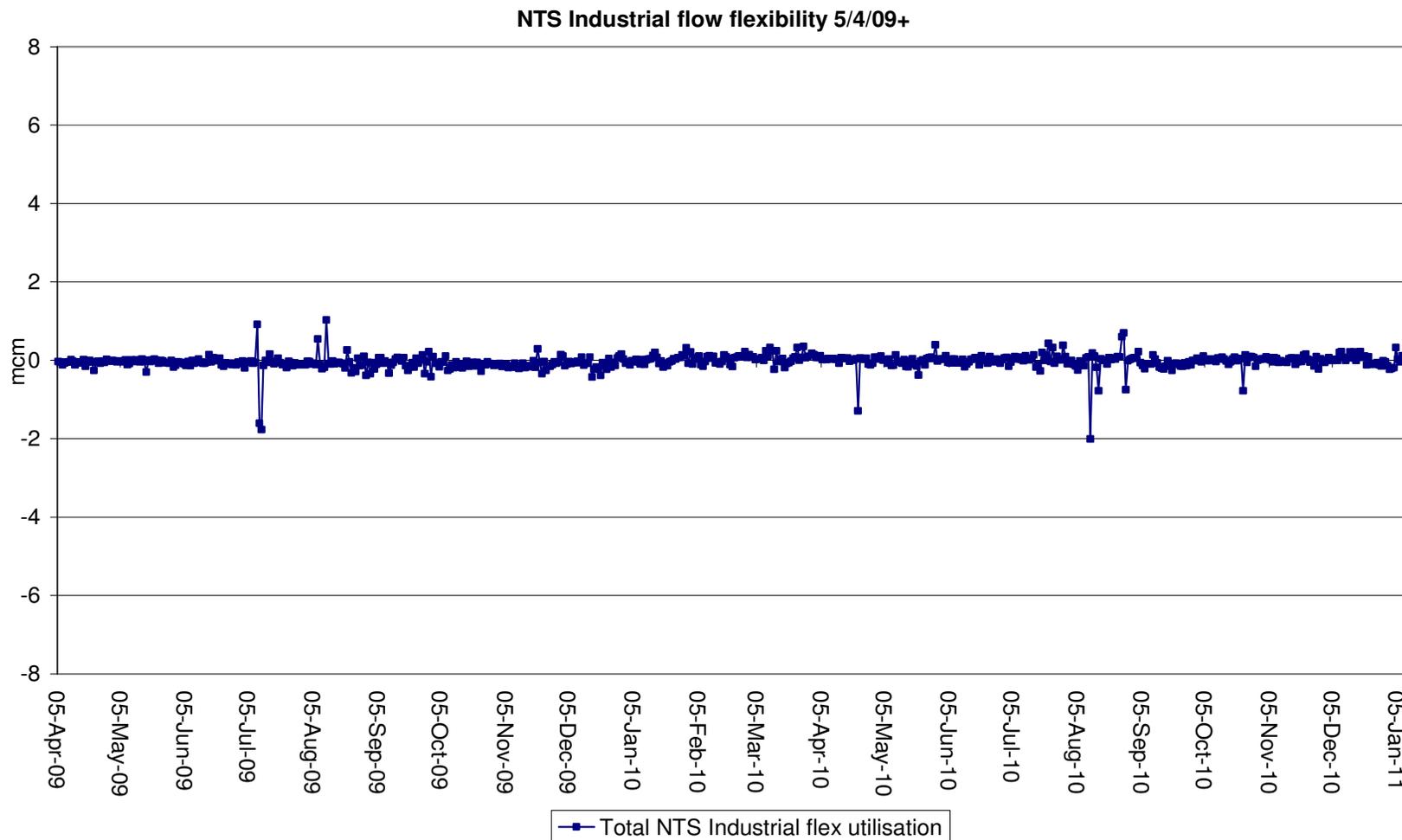
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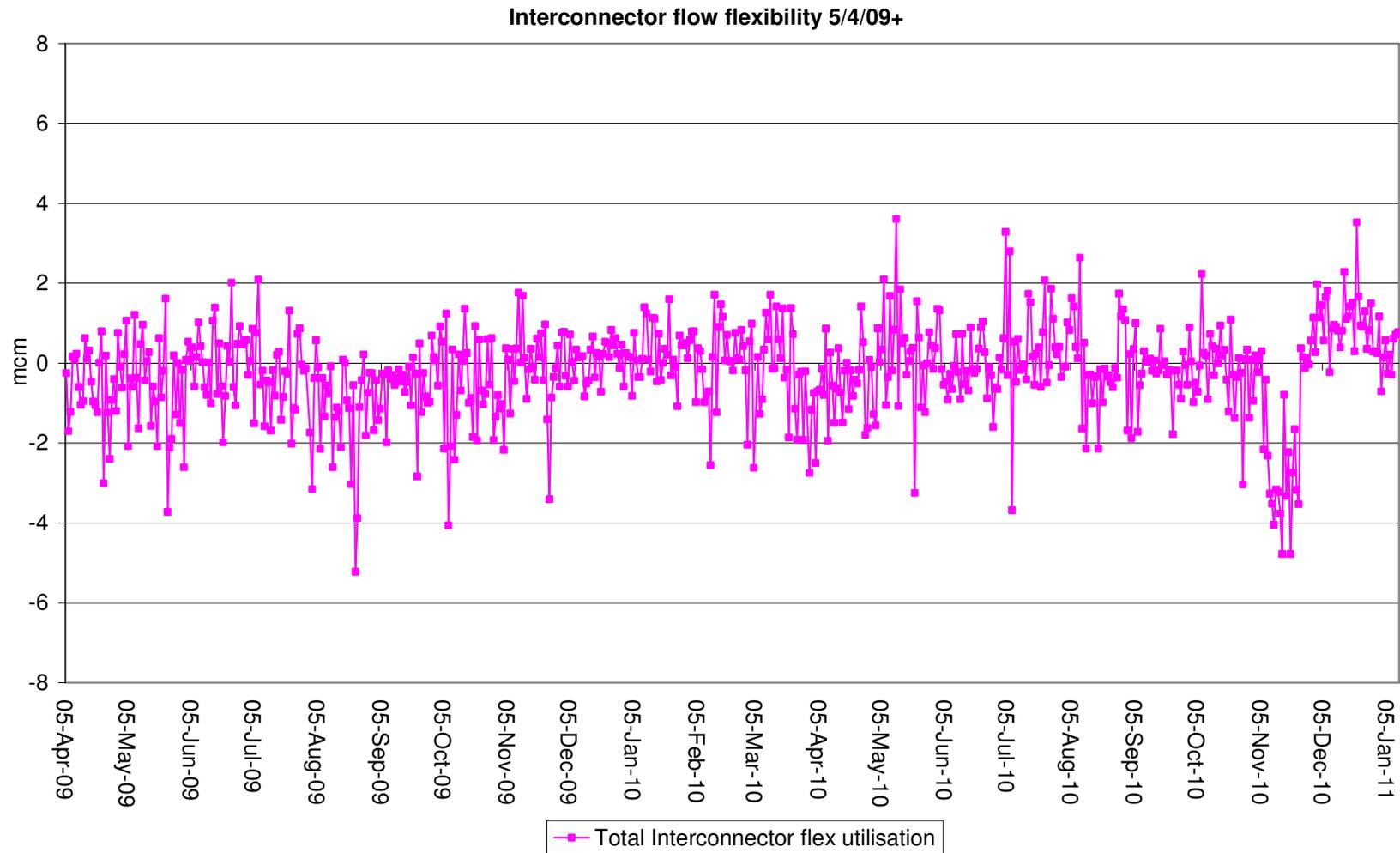
'Leading' Demand Indicator 2: Flow flexibility usage by sector



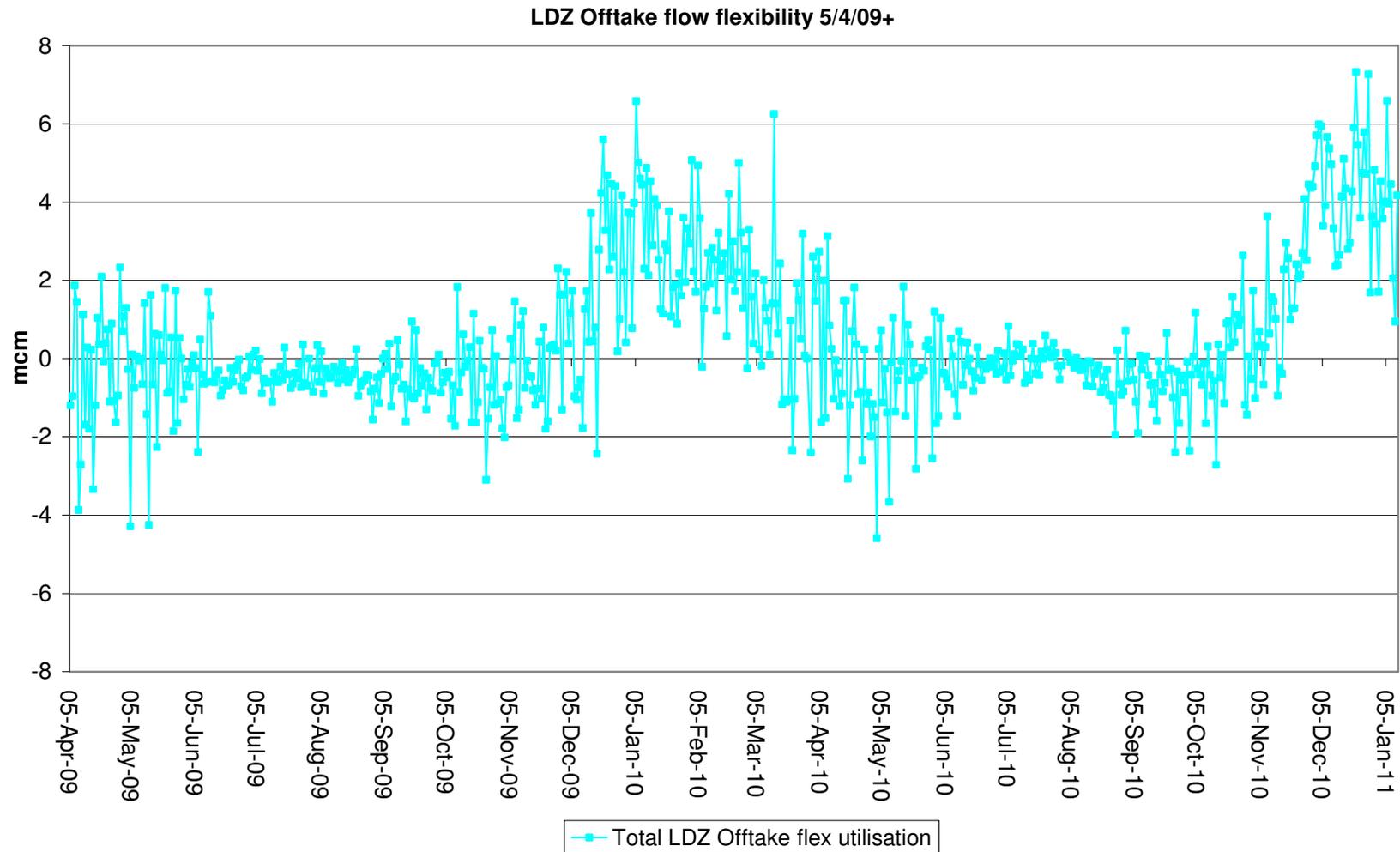
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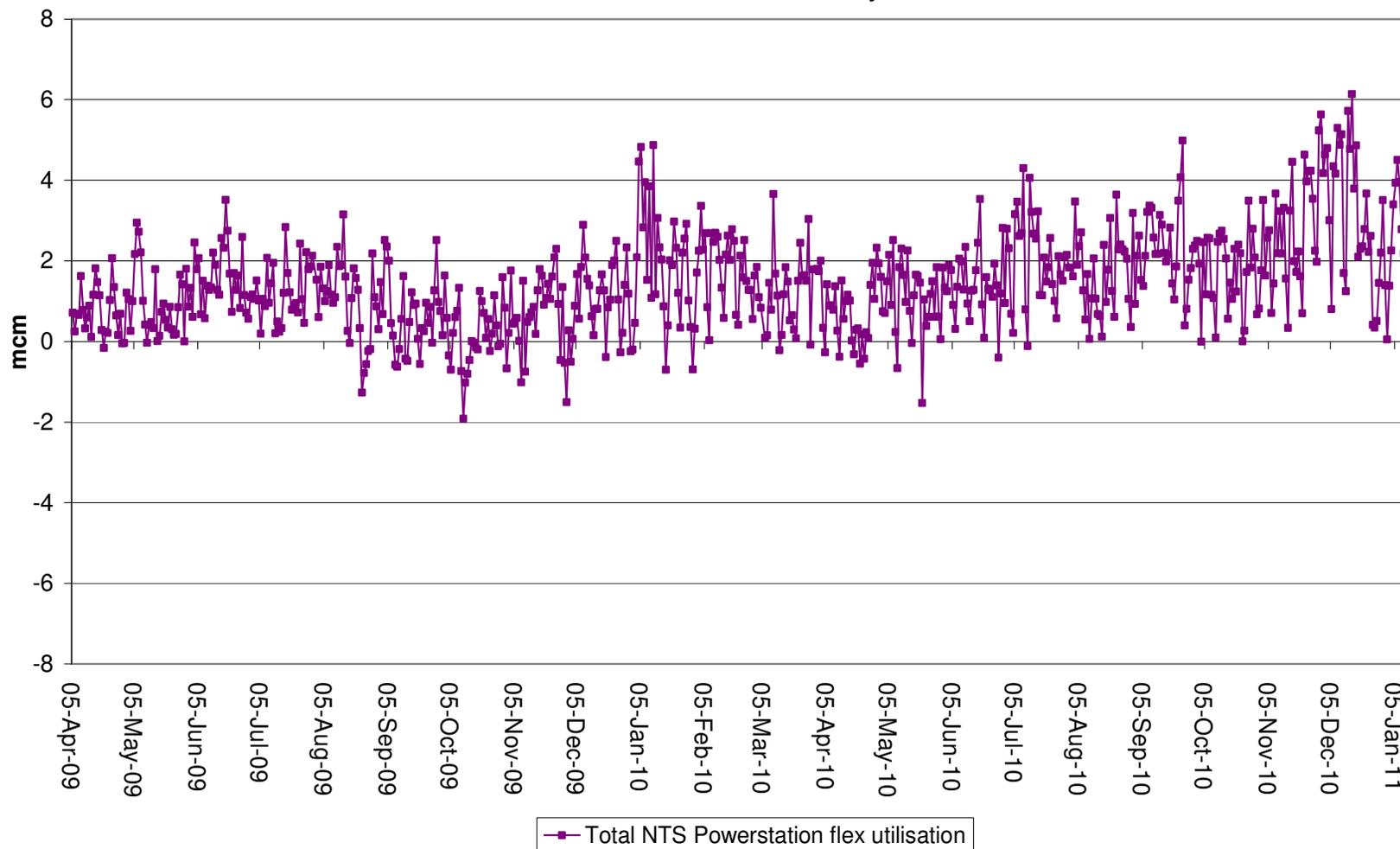


'Leading' Demand Indicator 2: Flow flexibility usage by sector

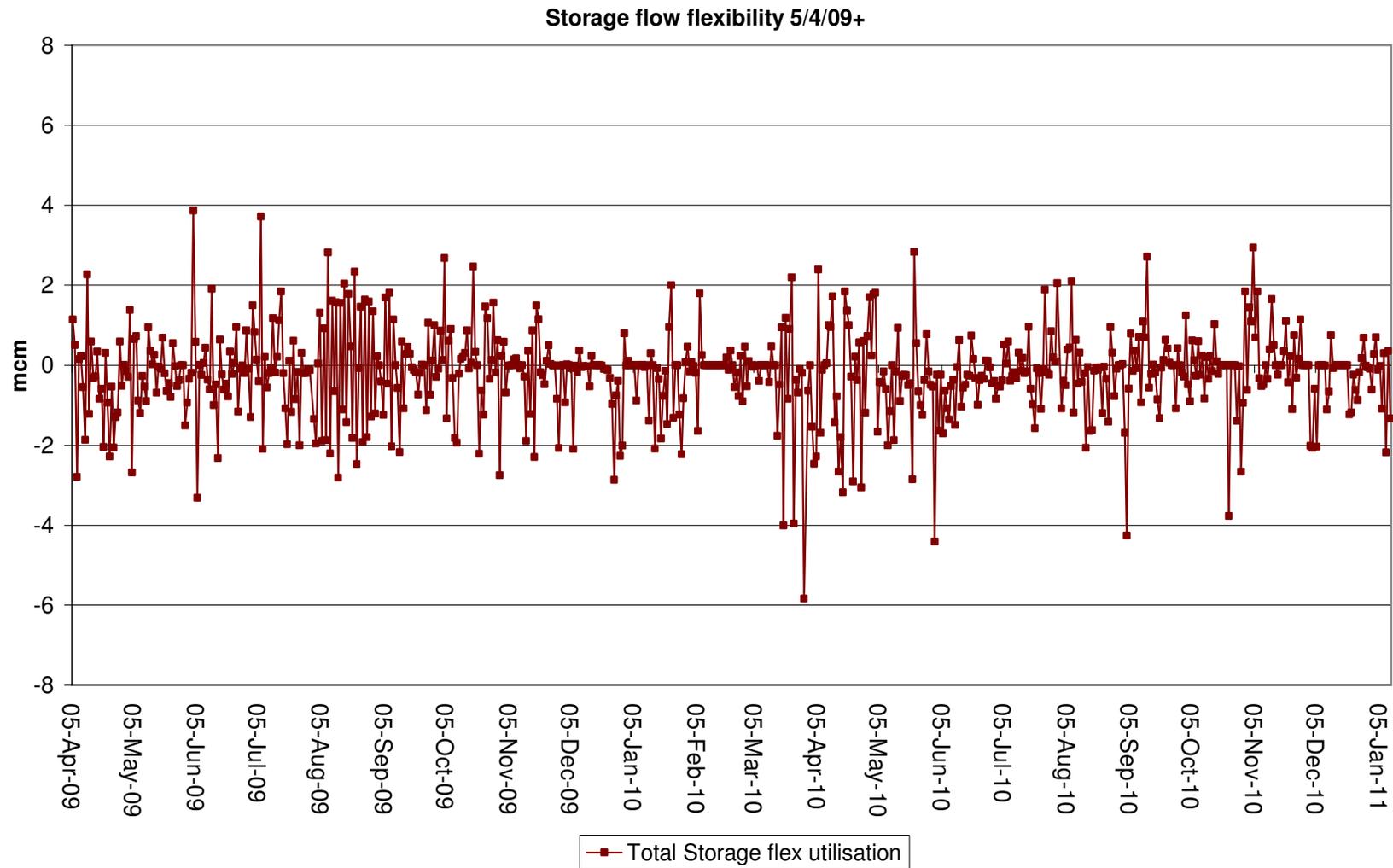


'Leading' Demand Indicator 2: Flow flexibility usage by sector

NTS Powerstation flow flexibility 5/4/09+



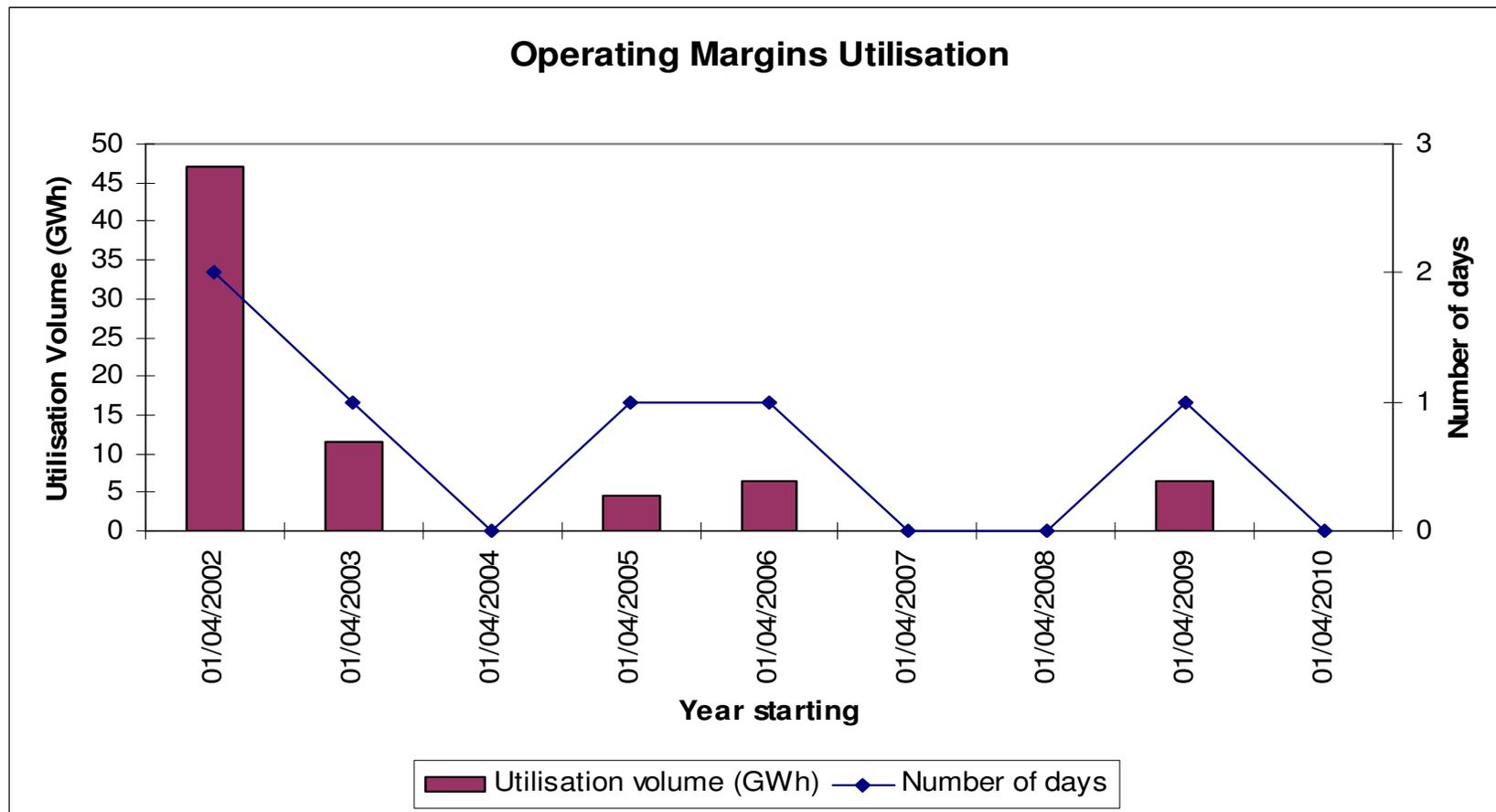
'Leading' Demand Indicator 2: Flow flexibility usage by sector



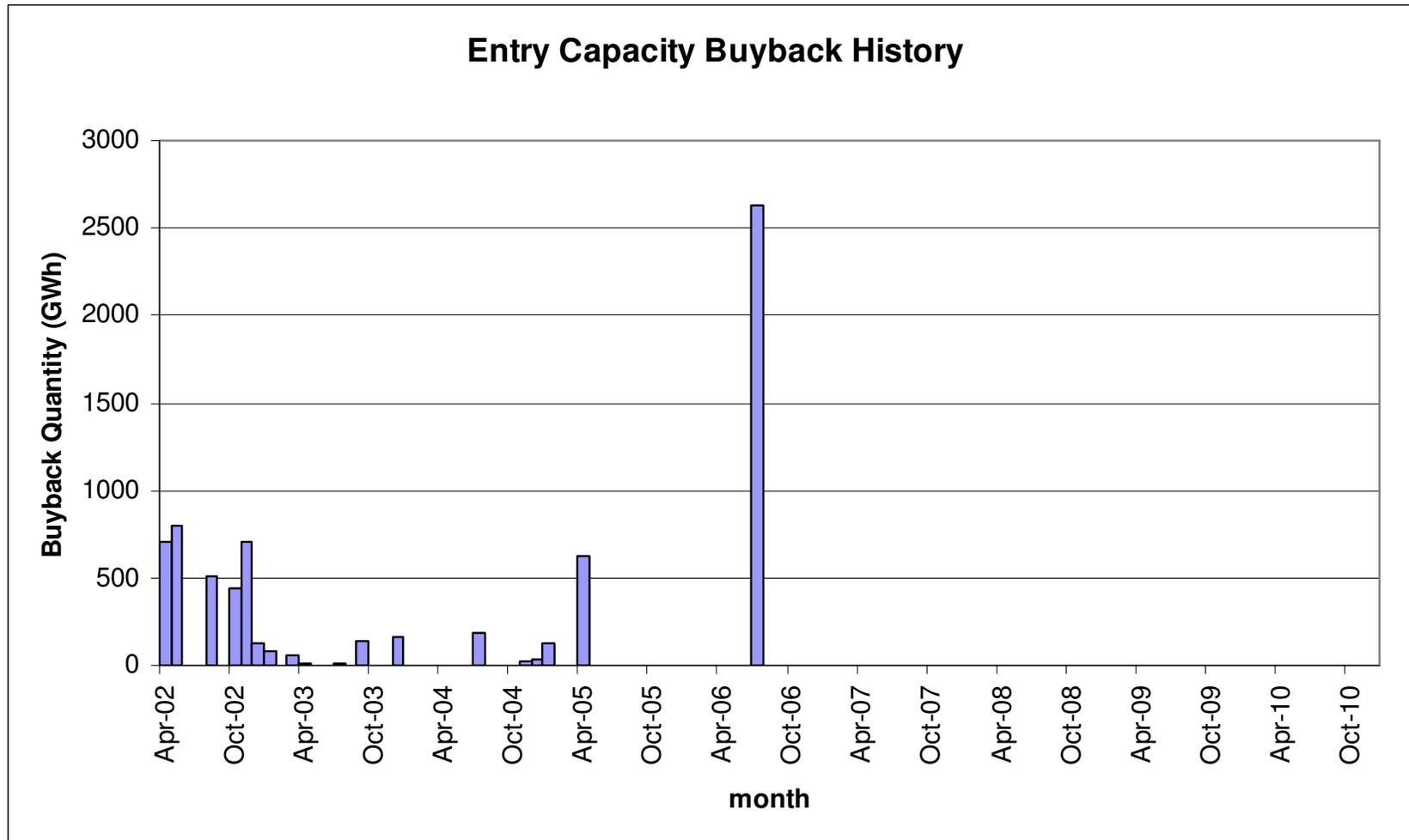
'Lagging' Indicators



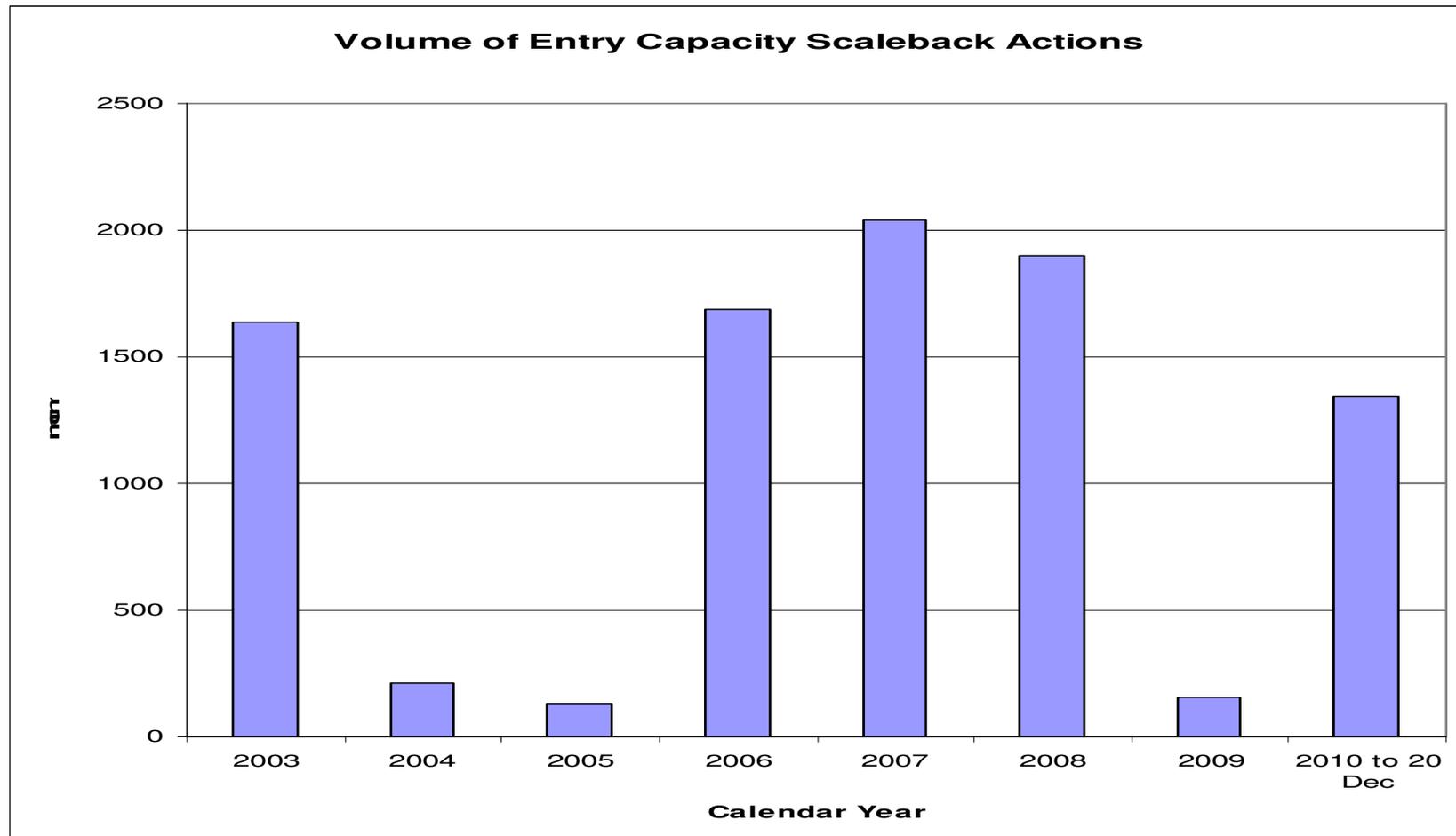
Lagging Supply Indicator 1: Use of Operating Margins Gas



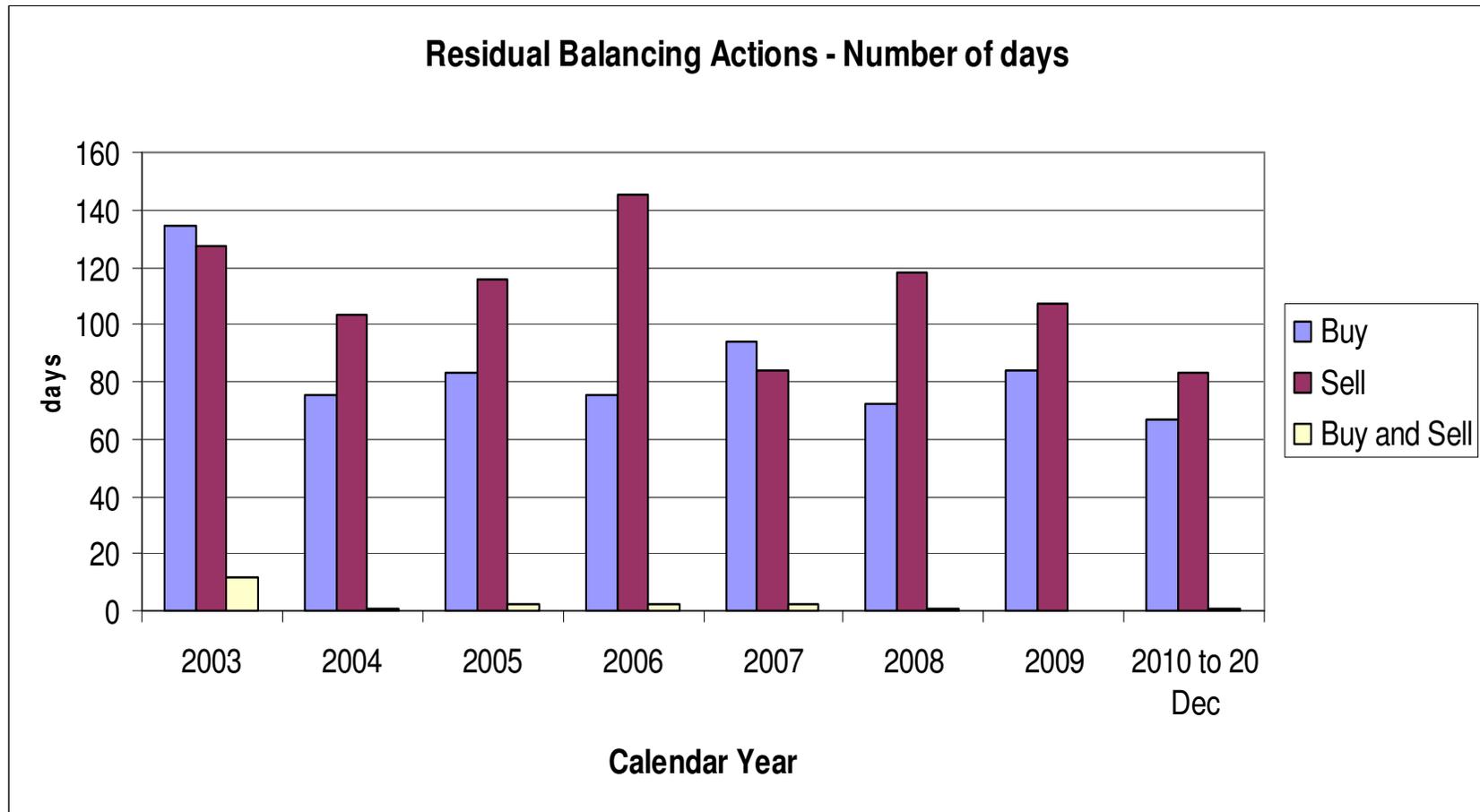
Lagging Supply Indicator 2: Entry Capacity Buybacks



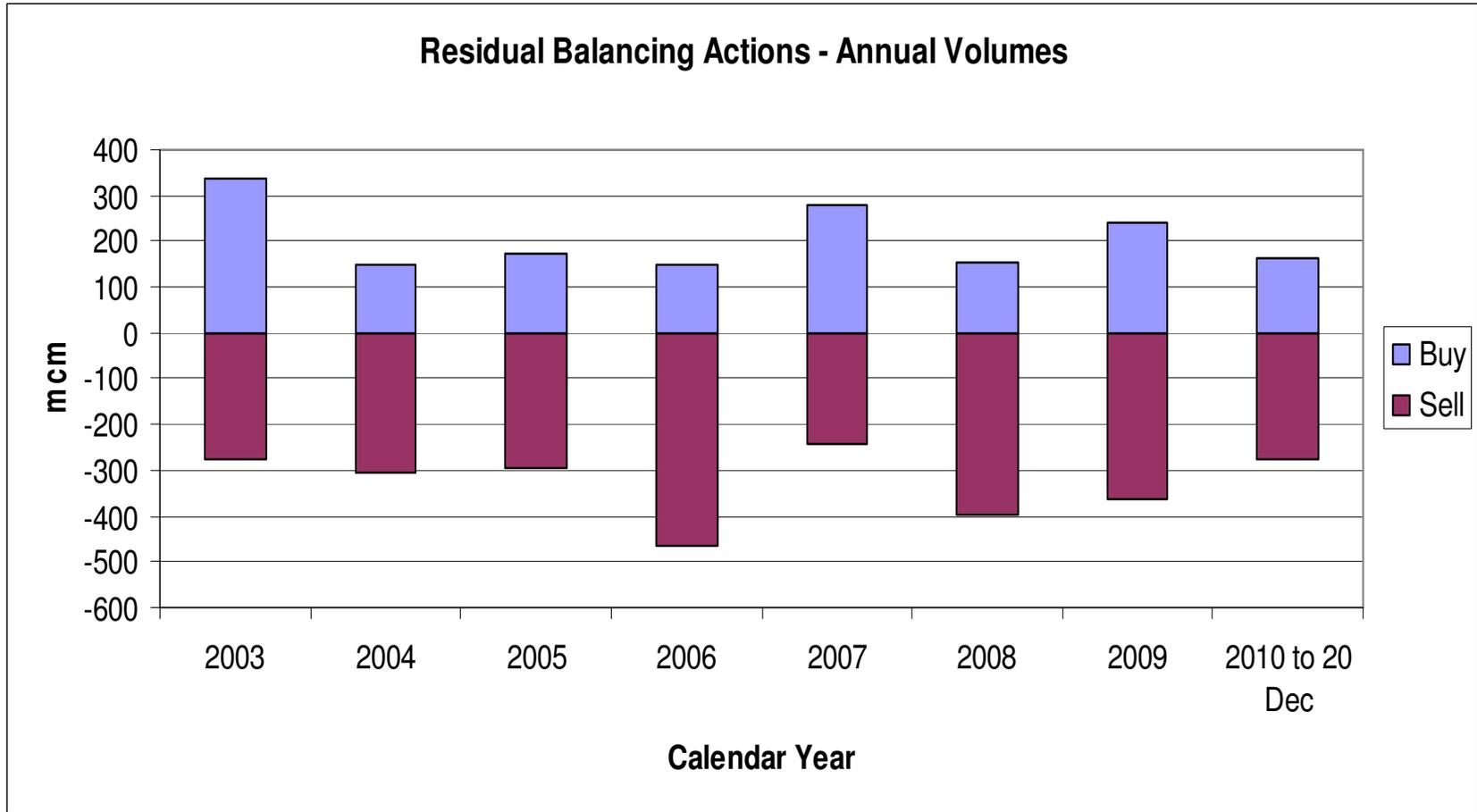
Lagging Supply Indicator 3: Interruptible Entry Capacity Scaleback



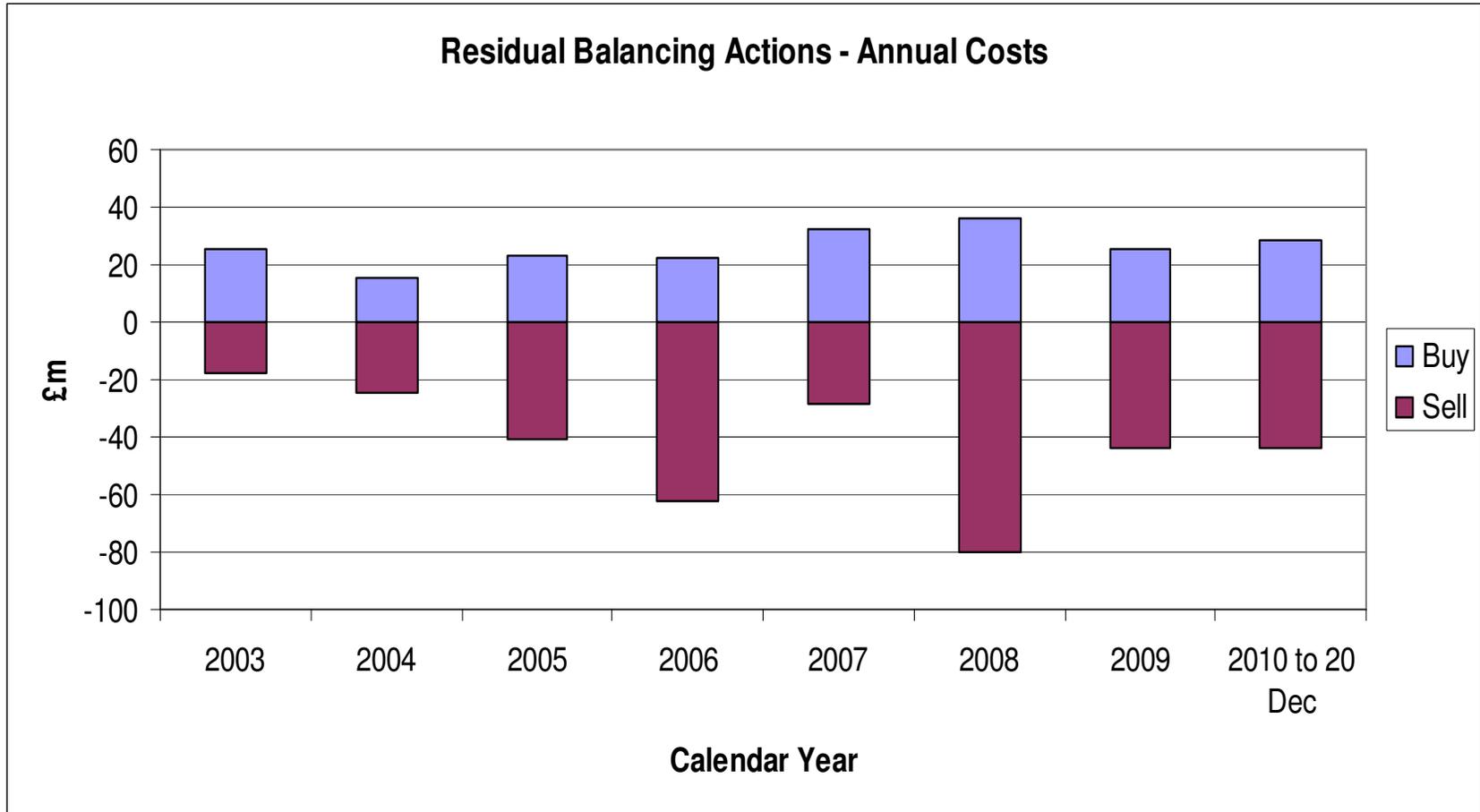
Lagging Supply & Demand Indicator 1: Number of days of residual balancing actions



Lagging Supply and Demand Indicator 2: Residual Balancing Annual Volumes



Lagging Supply and Demand Indicator 3: Residual Balancing Annual Costs



Summary

- We continue to see a number of the daily supply indicators being driven by the increased usage of LNG – (e.g. upward trends in % day to day differences and locational splits).
- Discernable trends are also being established on increased within-day linepack usage (resultant supply / demand mismatch). Further work on component elements and demand correlation is underway.
- Indicators on ‘information provision’ accuracy (System Input and Offtake), Improvements to Phase I indicators and impact on wind penetration will be presented through 2011