Mod 541 Cost-Benefit Analysis

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GAZPROM MARKETING & TRADING

Initial results “TOTALS” spreadsheet

Period: Oct14 to July15

	Total Volumes injected	Average Timeshift percentage	Max Option B variation	Sum of Option B 10 Terminals
kWh	314,240,890,564	1.17%	2042.19%	**£400,866**
mcm (11kWh/m3)	**28,567**			

			Increase/decrease variation	Select % 0%
Per Terminal	*Total volumes injected (mcm)*	*Average Timeshift percentage*	*Max Option B variation*	*Value of Option B*	*Value lost against DAH*
Bacton Parenco	1,535	0.37%	2.98%	£20,707.58	£20,598.88
Bacton Seal	3,048	0.44%	1.80%	£43,731.03	£52,357.34
Bacton Shell	3,154	0.44%	2.30%	£51,710.19	£64,866.76
Barrow	1,330	0.91%	23.12%	£33,634.56	£40,905.21
Easington Dimlington	2,126	0.40%	4.17%	£28,679.73	£35,938.84
St Fergus Mobil	5,356	0.43%	2.47%	£72,884.56	£79,651.50
St Fergus Shell	7,014	0.31%	2.00%	£74,190.48	£79,710.98
Teeside BP	1,774	0.44%	1.65%	£29,150.95	£27,492.79
Teeside PX	2,991	7.69%	2042.19%	£43,777.03	£51,901.62
Theddlethorpe	241	0.27%	2.83%	£2,399.78	£2,334.63
TOTAL	**28,567**	1.17%		**£400,866**	**£455,759**
				Difference SAP-DAH	**£54,893**
Sub Terminals Aggregate	28,567	0.60%	1.15%	**£175,764**	**£230,657**

Initial results “TOTALS” spreadsheet

- Mod 541 does not correct for full costs of time-shift imbalances **(£54,893 in 10 months)** because of difference between SAP and day-ahead prices (which usually trail SAP)
- Total time-shift costs by summing costs for each ST are significantly higher than aggregating time-shift imbalance costs: **£225,101 in 10 months**

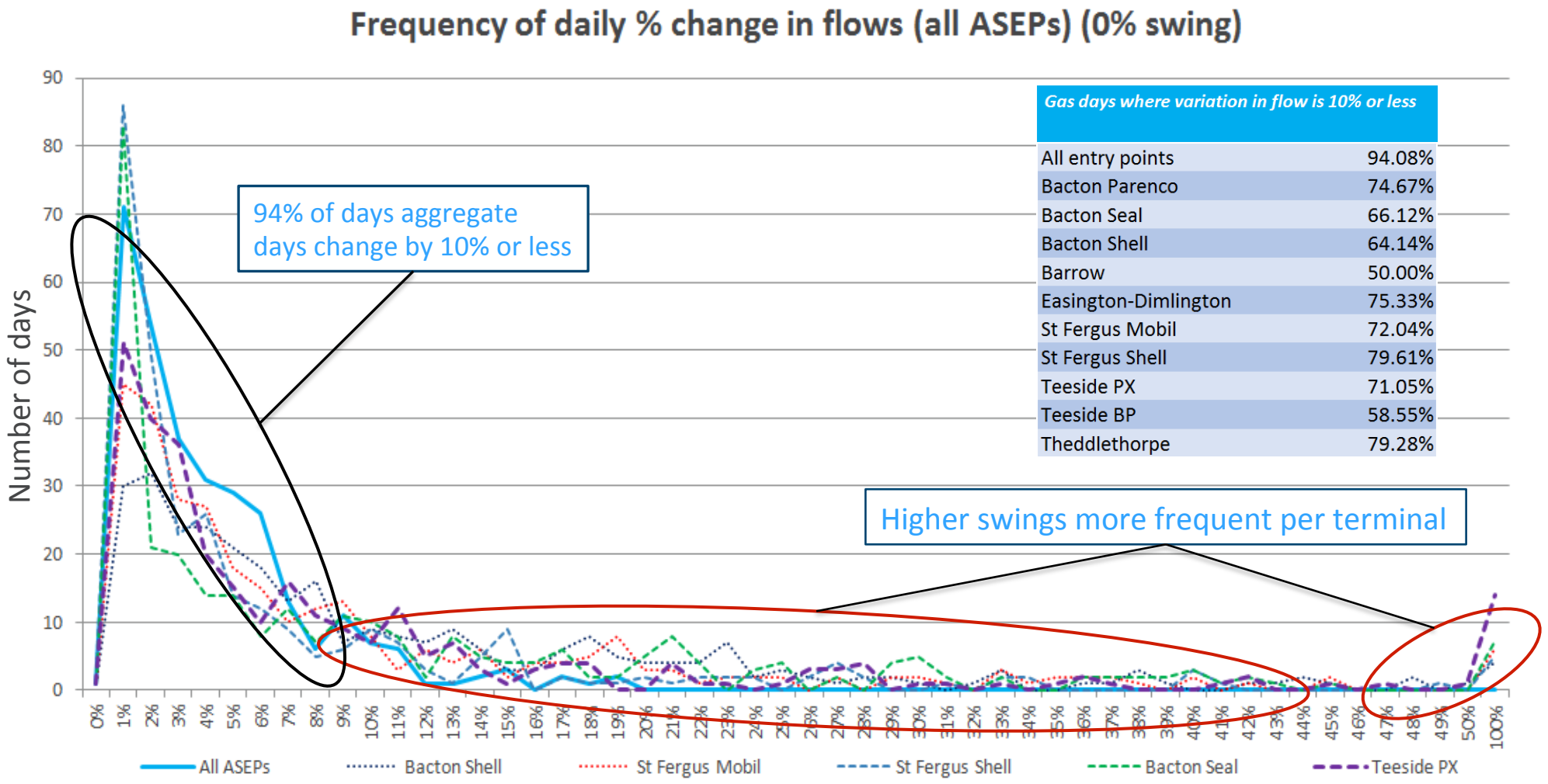
TOTAL	**28,567**	1.17%		**£400,866**	**£455,759**
				Difference SAP-DAH	**£54,893**
Sub Terminals Aggregate	28,567	0.60%	1.15%	**£175,764**	**£230,657**

- This suggests the smaller the granularity, the higher the costs; which means shippers may have higher costs than the sum of time-shift imbalances per terminal
- The same result is visible by aggregating ST flows for at Bacton or St Fergus

Bacton STs	*Value of Option B*
Sum individual data	£116,148.80
Bacton Aggregate	£84,401.30
Difference	**£31,747.50**

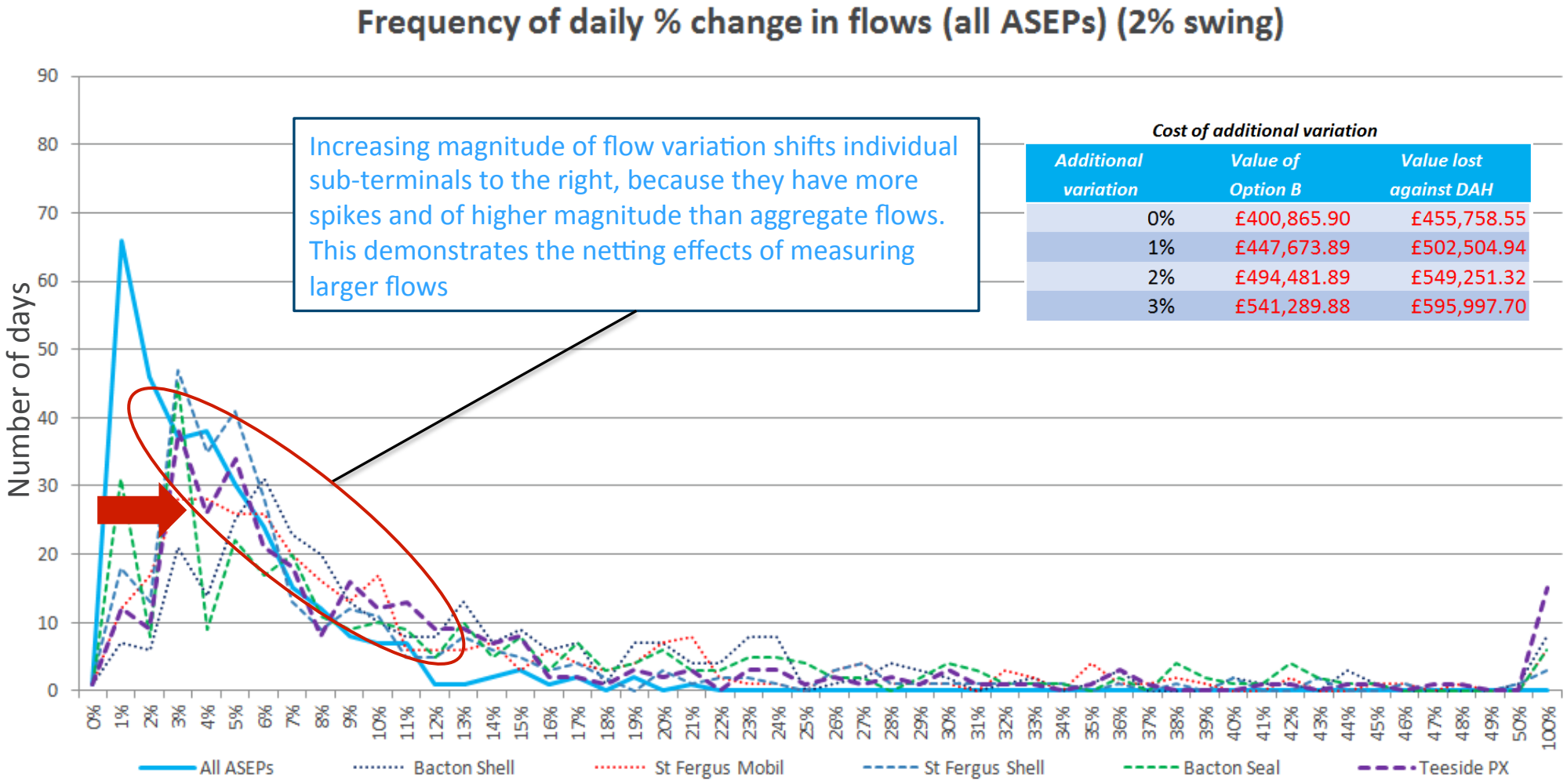
St Fergus STs	*Value of Option B*
Sum individual data	£147,075.04
St Fergus Aggregate	£118,654.26
Difference	**£28,420.78**

Aggregated flows are far more stable than per each terminal



Gas days where variation in flow is 10% or less	
All entry points	94.08%
Bacton Parenco	74.67%
Bacton Seal	66.12%
Bacton Shell	64.14%
Barrow	50.00%
Easington-Dimlington	75.33%
St Fergus Mobil	72.04%
St Fergus Shell	79.61%
Teeside PX	71.05%
Teeside BP	58.55%
Theddlethorpe	79.28%

2% variation in flow shows better the stability of aggregated flows
As swing increases, costs increase



Increasing magnitude of flow variation shifts individual sub-terminals to the right, because they have more spikes and of higher magnitude than aggregate flows. This demonstrates the netting effects of measuring larger flows

Cost of additional variation

Additional variation	*Value of Option B*	*Value lost against DAH*
0%	£400,865.90	£455,758.55
1%	£447,673.89	£502,504.94
2%	£494,481.89	£549,251.32
3%	£541,289.88	£595,997.70

Methodology:
Option to change DQ variation only focuses on the spikes