

ECRB Workshop – Gas Market Models Capacity Auctions



Chris Logue, Vienna, 11 November 2010

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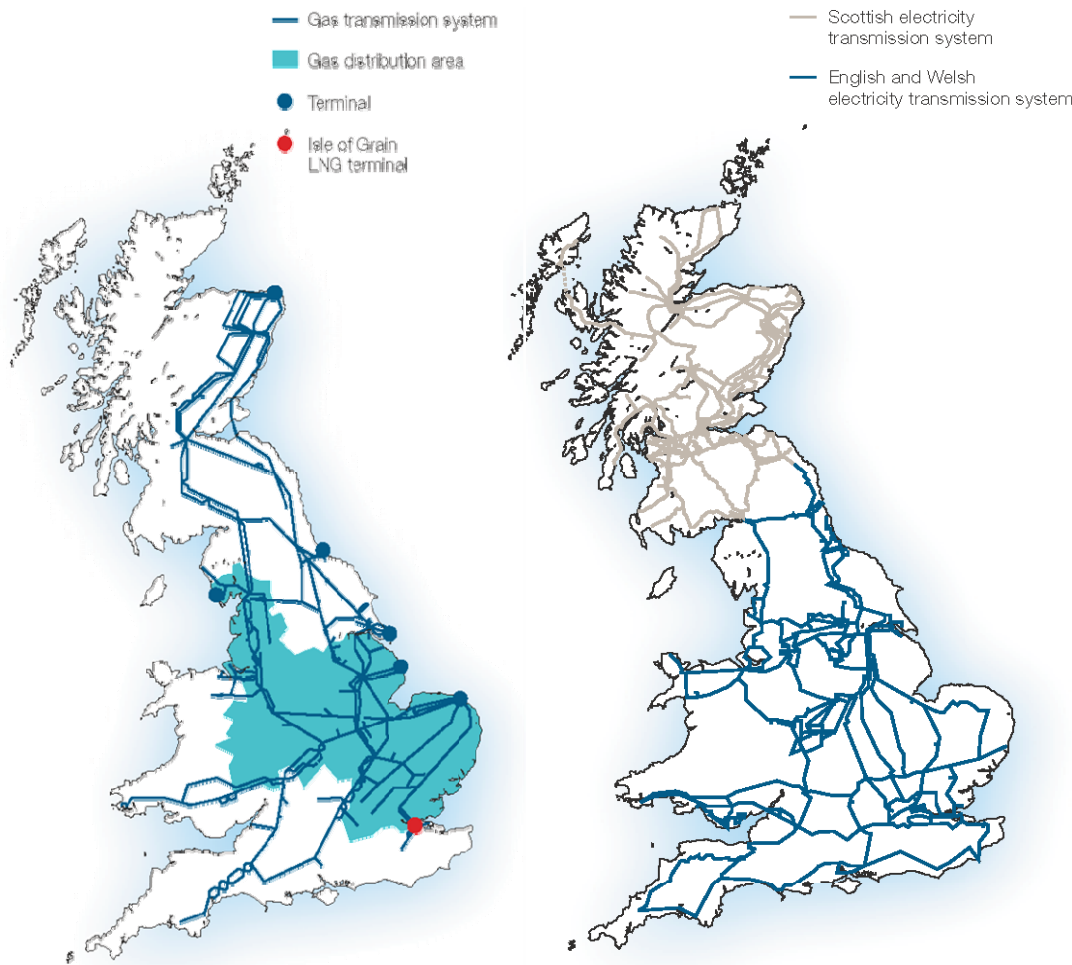
National Grid: an International Electricity and Gas Company



- National Grid is an international electricity and gas company primarily based in the UK and northeastern US. We play a vital role in delivering gas and electricity to millions of people in a safe, efficient and reliable manner
- One of the largest investor-owned utilities in the world. It is the largest utility in the UK and the second largest utility in the US.*
 - 50% UK, 50% US
 - 50% Electricity, 50% Gas
 - 50% Transmission, 50% Distribution
 - 27,000 -plus employees

**Based on customer numbers; includes the servicing of LIPA's 1.1 million customers*

National Grid: an International Electricity and Gas Company



National Grid owns the high-voltage electricity transmission system in England and Wales, operates the system across Britain, and owns and operates the high pressure gas transmission system in Britain

The company also operates the UK gas distribution system, distributing gas on behalf of shippers and suppliers to 11 million consumers.

Capacity Auctions

National Transmission System Commercial Arrangements

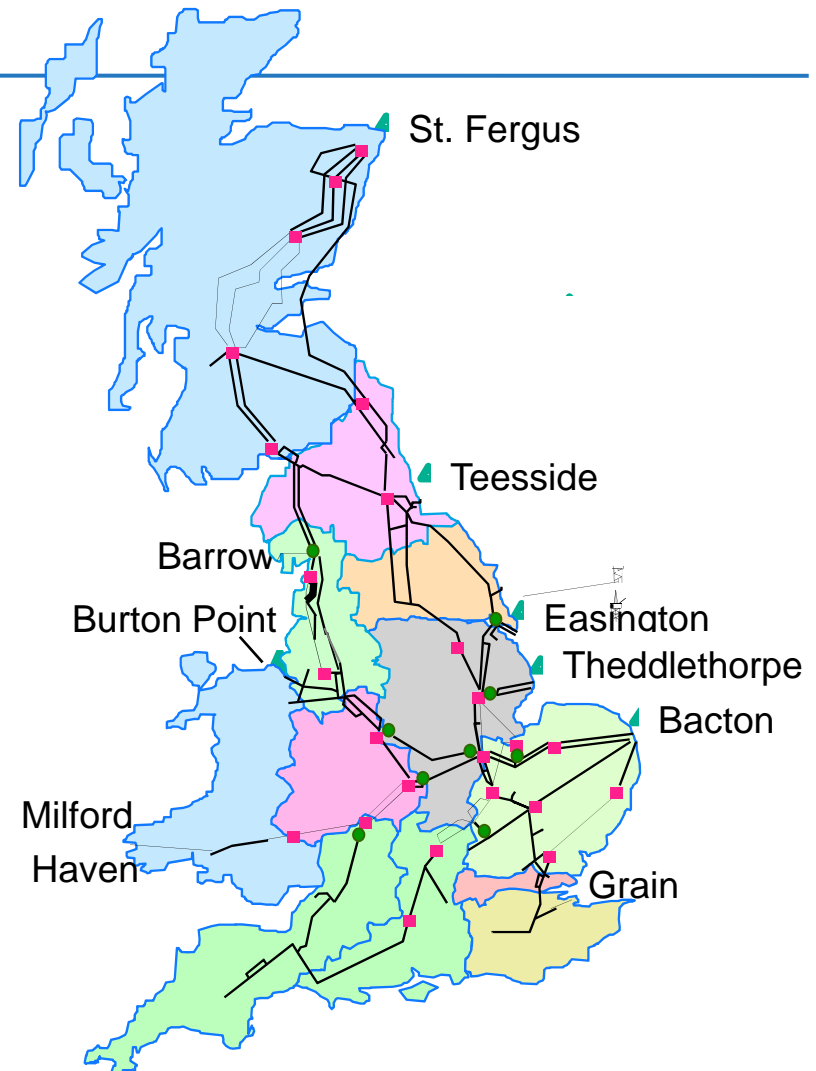
- Shippers who wish to use the National Transmission System (NTS) must be party to a single agreement between all Shippers and Transporters. This agreement is known as the Uniform Network Code (UNC)
- National Grid transports the gas between the NTS entry and NTS exit points
- Shippers purchase Capacity rights to input gas to the NTS (entry capacity) and to offtake gas from the NTS (exit capacity)

Objectives of UK Capacity Allocation

- Non Discrimination
 - **Equal rights and opportunity for all market participants, e.g.; large/small, new/established**
- Transparency
 - **Capabilities**
 - **Quantities sold**
 - **Quantities available**
- To Maximise System Use
- To Provide Market Signals for New Capacity

System Entry Capacity

- **System Entry Capacity rights are a requirement for Shippers wishing to input gas into National Transmission System**
- **Entry Capacity is available on a firm or interruptible basis**
- **Sold through Auctions (in bundles of quarters, months, days)**
- **Required at all entry points incl. LNG, Beach, Storage etc**



Baseline Capacity “calculation”

- National Grid obligated to offer ‘baseline’ amount of capacity at each entry point (technical capacity)
- Baseline set close to practical maximum physical capacity
 - Aggregate baselines exceeded peak flows by 58% in 2008/9
 - Baselines represent a significant overselling of capacity
 - National Grid cannot flow all baselines simultaneously
- Baselines set at each price control by regulator, via National Grid modelling, negotiation and industry consultation
- Fixed for five year price control period

Entry Capacity - Release Obligation (GWh/day)



ASEP	Baseline	Obligated
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ASEP	Baseline	Obligated
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Bacton	1783	1783
Barrow	309	309
Easington	1062	1407
St Fergus	1671	1671
Teesside	476	476
Theddlethorpe	611	611
Glenmavis	99	99
Partington	215	215
Avonmouth	179	179
Isle of Grain	218	453
Dynevor Arms	49	49
Harrogate	175	175

Hatfield Moor	25	25
Cheshire	286	286
Hole House Farm	132	132
Wytch Farm	3	3
Point of Ayr	74	74
Barton Stacey	83	173
Garton	0	420
Milford Haven	0	950
Fleetwood	0	0
...	...	0

National Grid is required to make available the obligated capacity level, i.e. the baseline as specified in the Licence plus any new capacity released

Entry Capacity Products



Product Type	Auction	Auction Timing	Capacity Period	Minimum Quantity Offered	Reserve price discount
Quarterly, Firm	Quarterly System Entry Capacity (QSEC)	Annually (March)	Y+2 to Y+16	90% baseline	0%
Monthly, Firm	Annual Monthly System Entry Capacity (AMSEC)	Annually (February)	Y=1 & Y=2	10% baseline + unsold QSEC	0%
	Rolling Monthly Transfer and Trade System Entry Capacity (RMTTSEC)	Monthly	Next calendar month	Unsold from AMSEC	0%
Daily, Firm	Daily System Entry Capacity (DSEC)	7 days before gas flow day up to 06:00 on the day before	Day Ahead	Unsold from RMTTSEC	33%
		From 06:00 on the Day	On the Day	Unsold from Day Ahead	100% (clearing)
Daily, Interruptible	Daily Interruptible System Entry Capacity (DISEC)	7 days before gas flow day up to 13:00 on preceding day	Day ahead	UIOLI	100% (clearing)

Reserve Prices in Auctions

- Calculated as the Long Run Marginal Cost of transporting gas, based on network model
- Adjusted from LRMC's to maintain 50:50 split between entry and exit revenues and to have minimum reserve price at 0.0001 p/kWh

Releasing Additional / New Capacity



- If new capacity or new entry point requested, NG uses a market based approach
- New point discussed with potential customers
- The Unit Cost Allowance (approximate cost of providing capacity) is agreed with regulator
- Aggregate QSEC auction bids for quantities above baseline must satisfy an Economic Test

Releasing Additional / New Capacity



The Economic Test

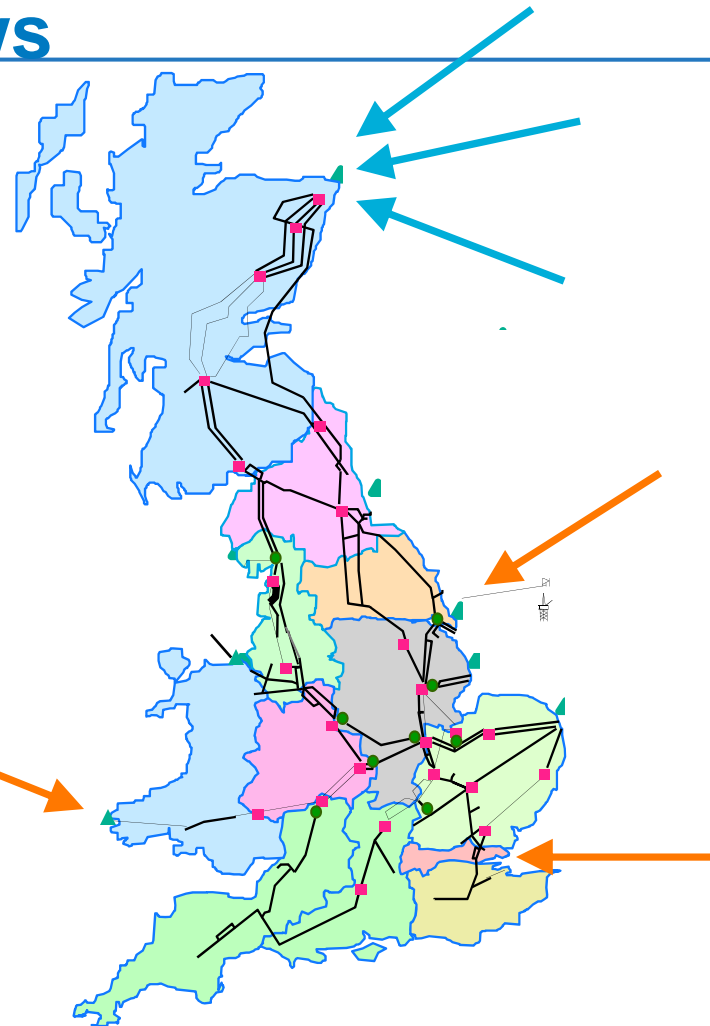
- Net Present Value of aggregate bids (over 8 year period) must be at least 50% of cost for providing capacity
- If test is passed then National Grid is obliged to release capacity (effectively increasing baseline level)
- If not, NG may consider releasing non mandatory capacity
- Subject to lead time

Long Term Allocations vs Changing Flows

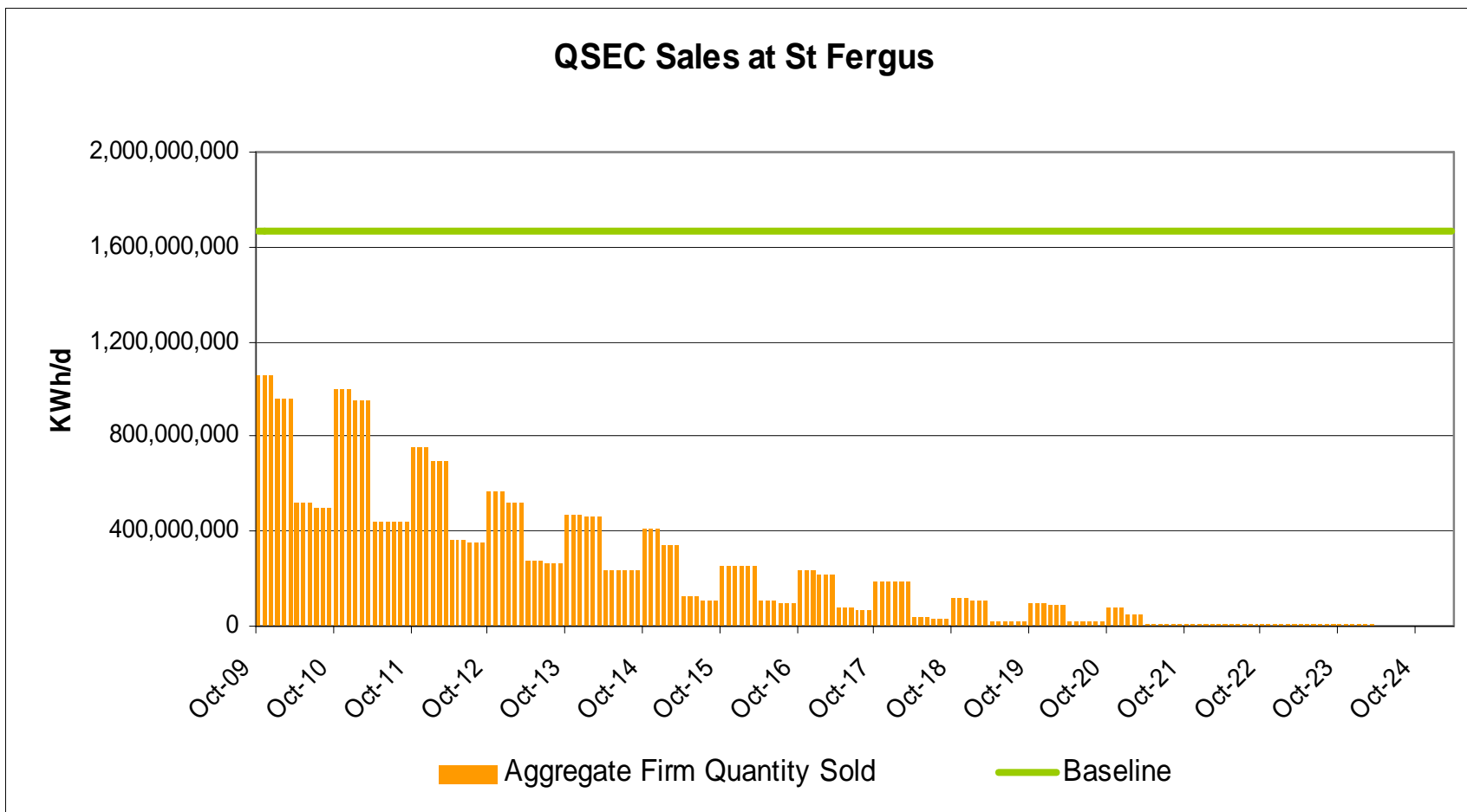
UK gas flows
changing...

UKCS gas used to
dominate, entering
via **St Fergus**,
meaning North to
South gas flows

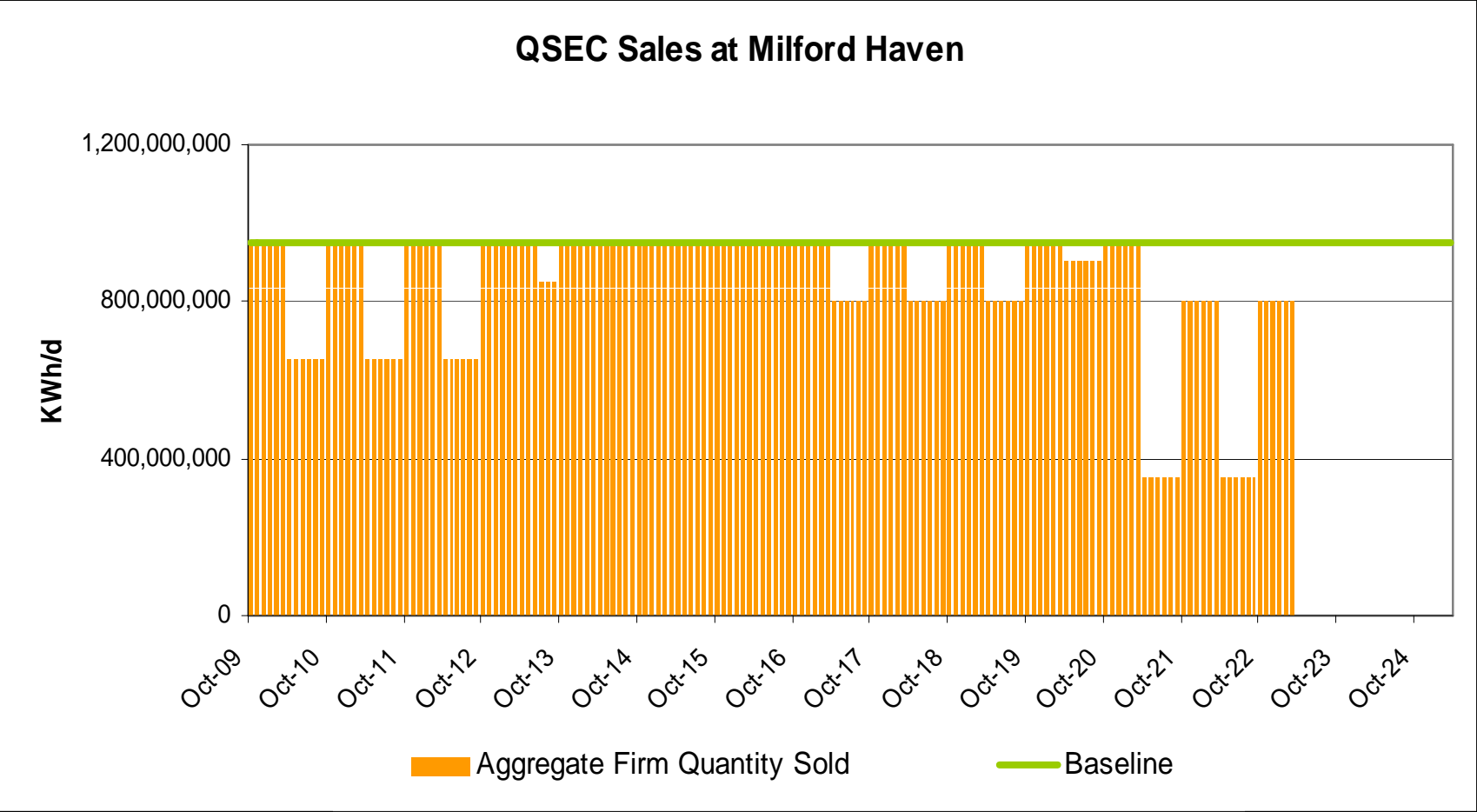
GB now more
import dependent,
e.g. **Milford Haven
LNG, Grain LNG
or Easington**,
meaning changing
gas entry patterns



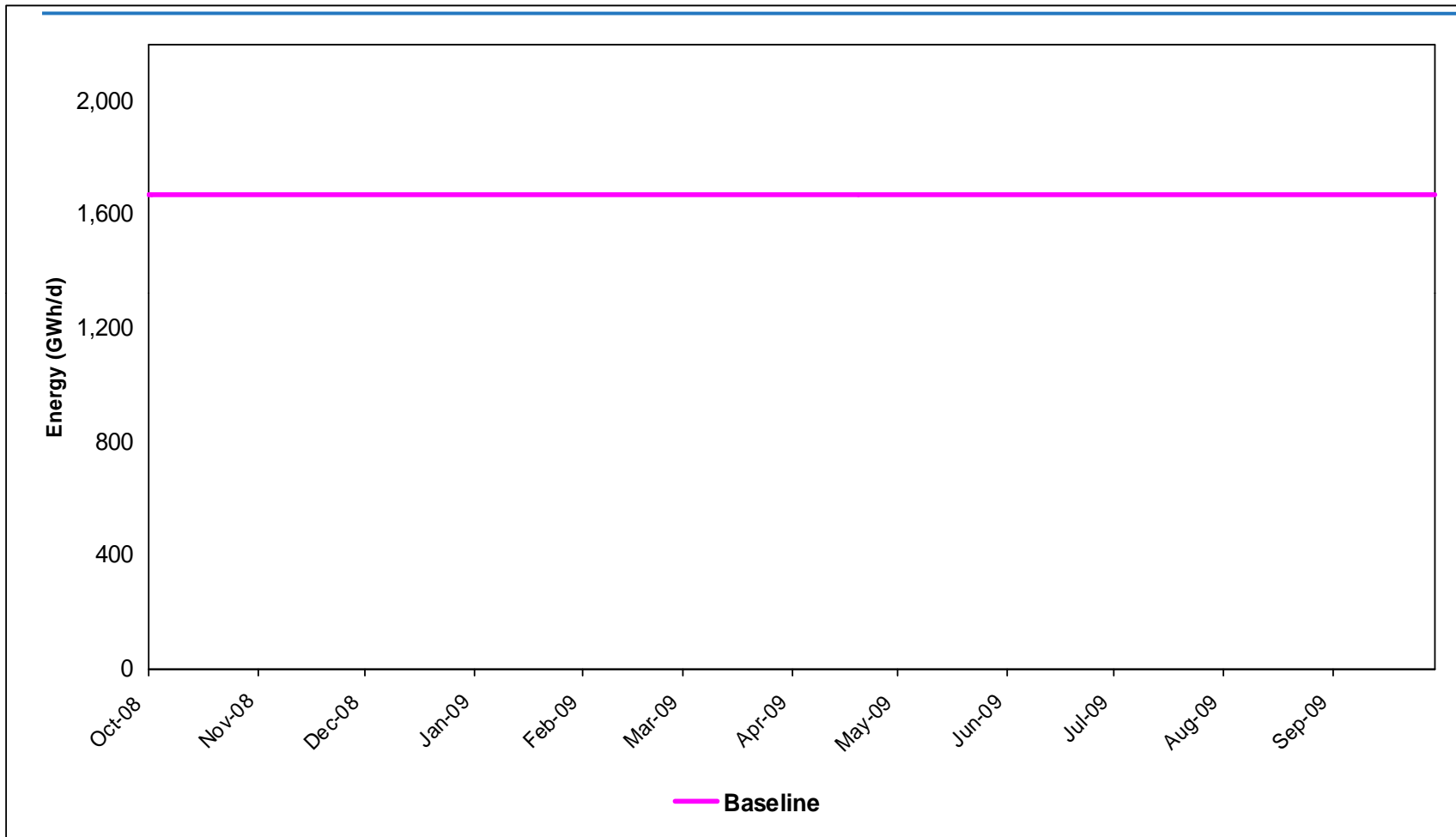
Long Term Allocations vs Changing Flows



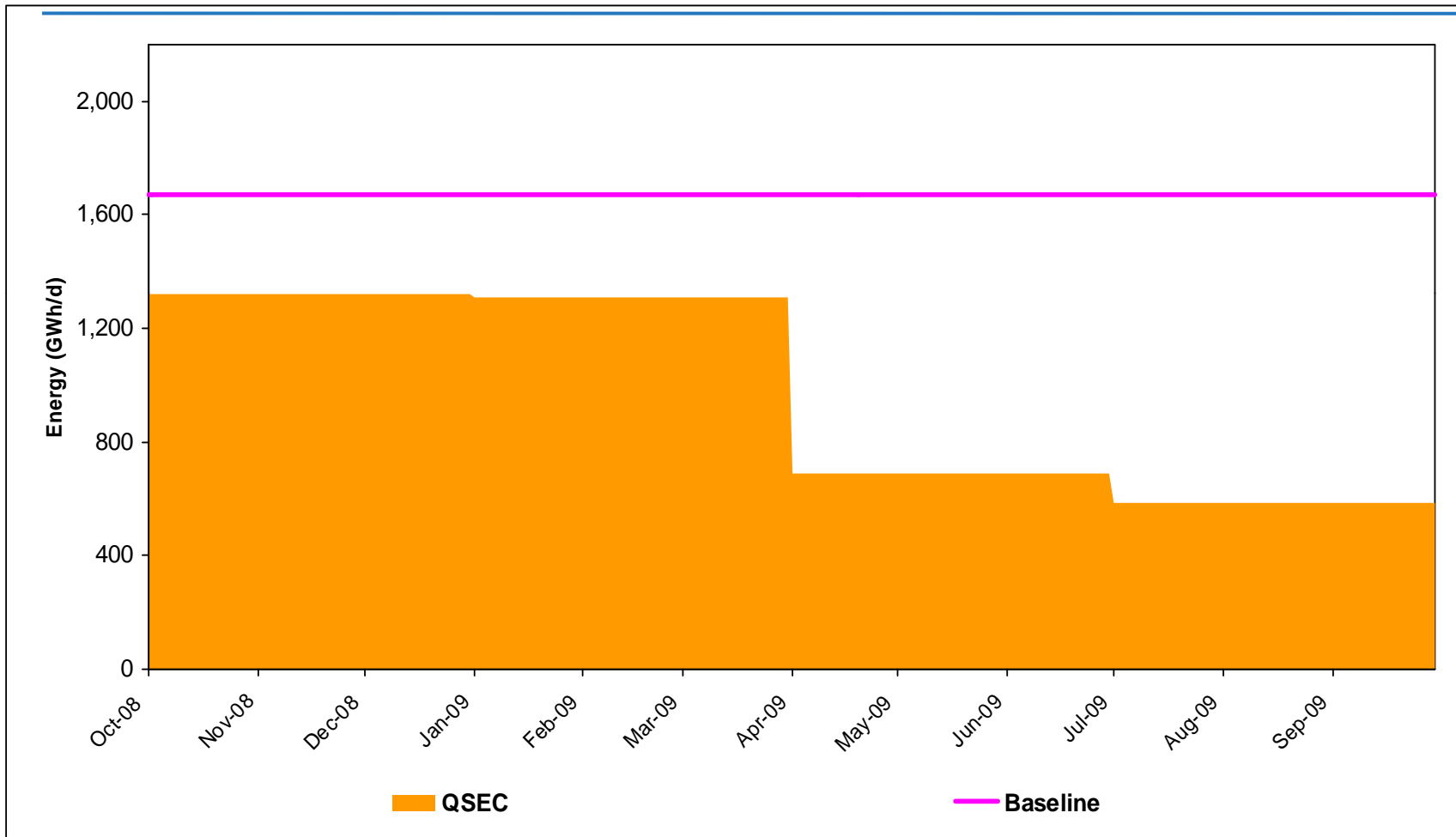
Long Term Allocations vs Changing Flows



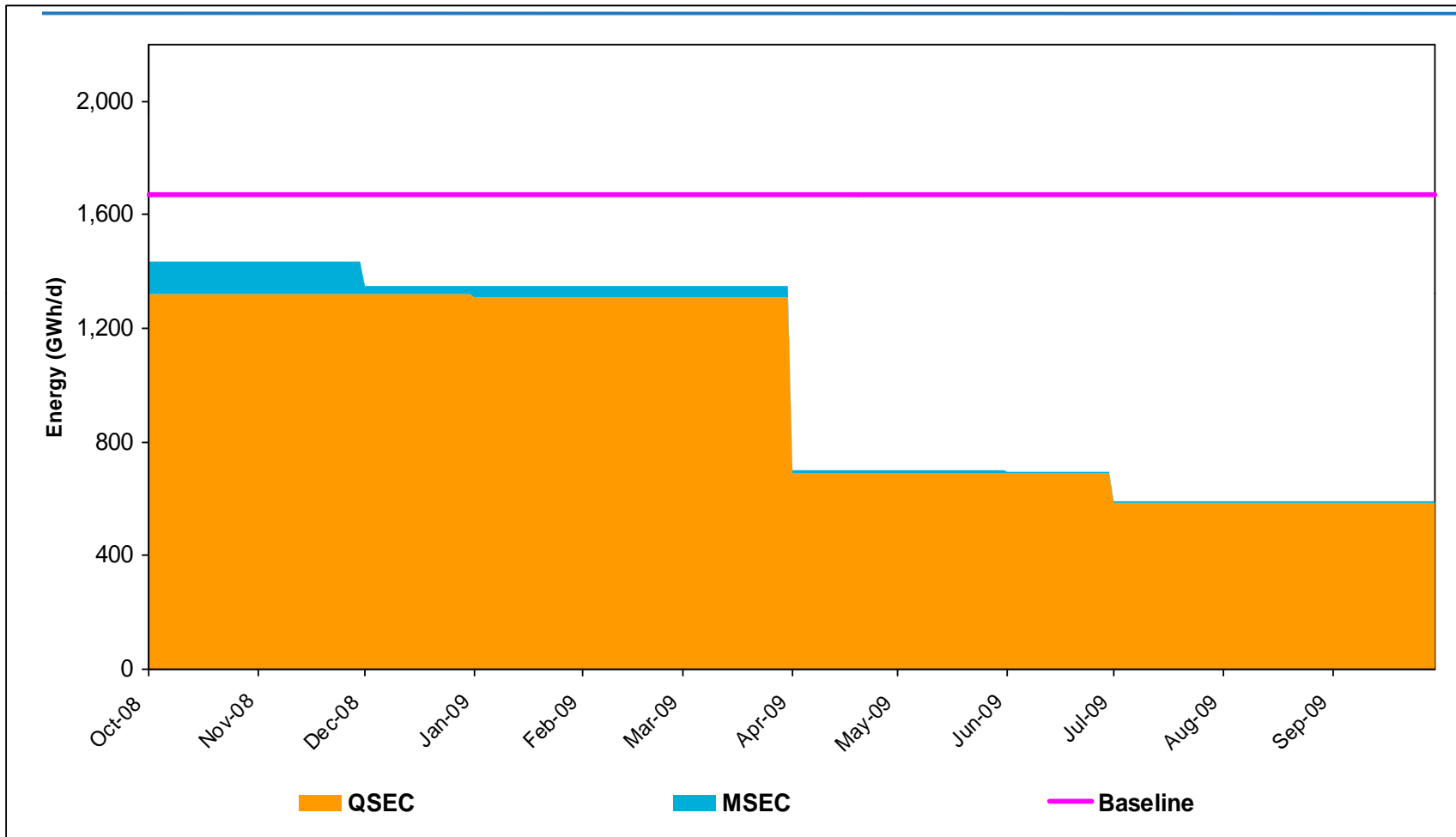
Capacity Sold – St Fergus



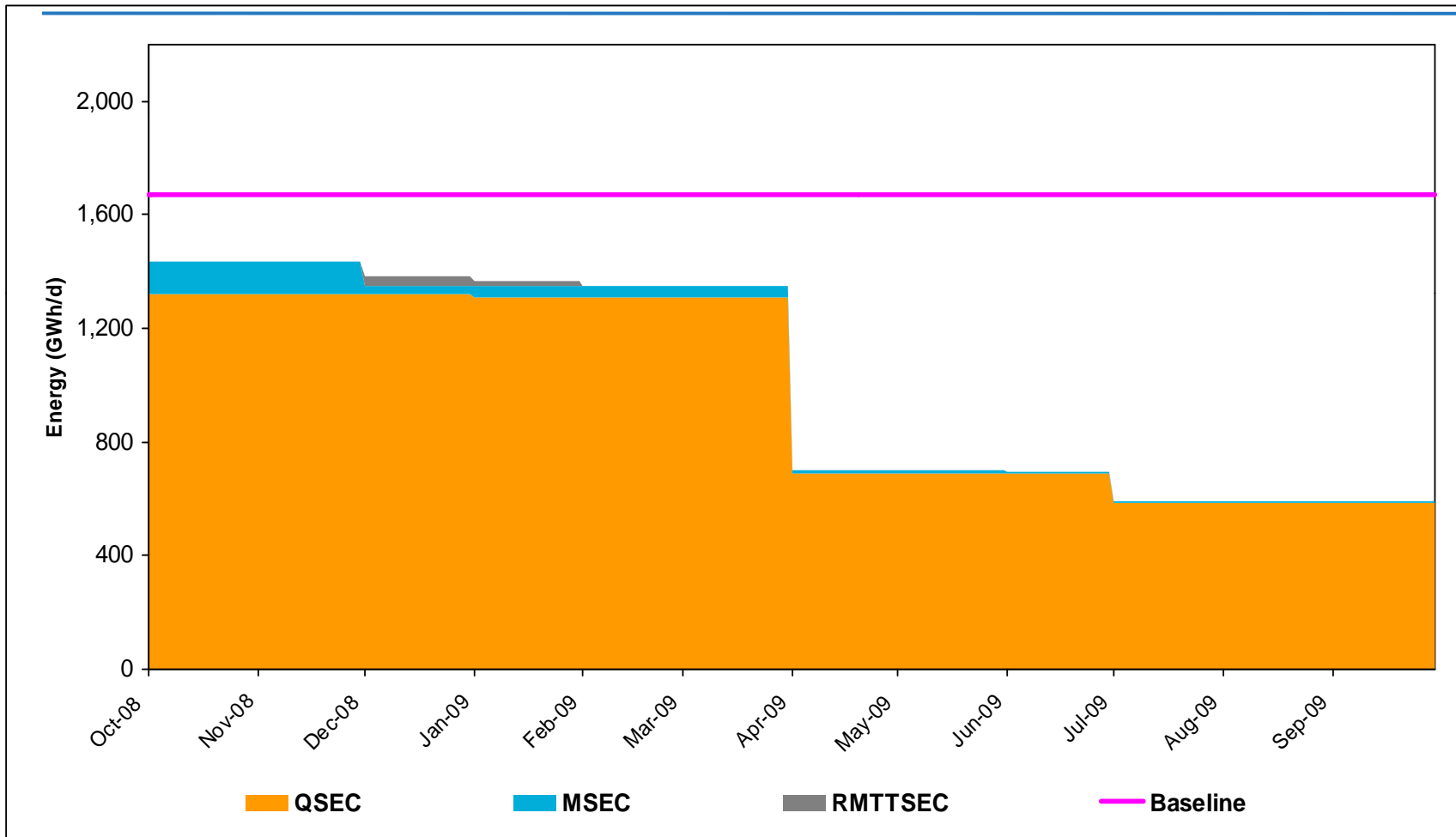
Capacity Sold – St Fergus



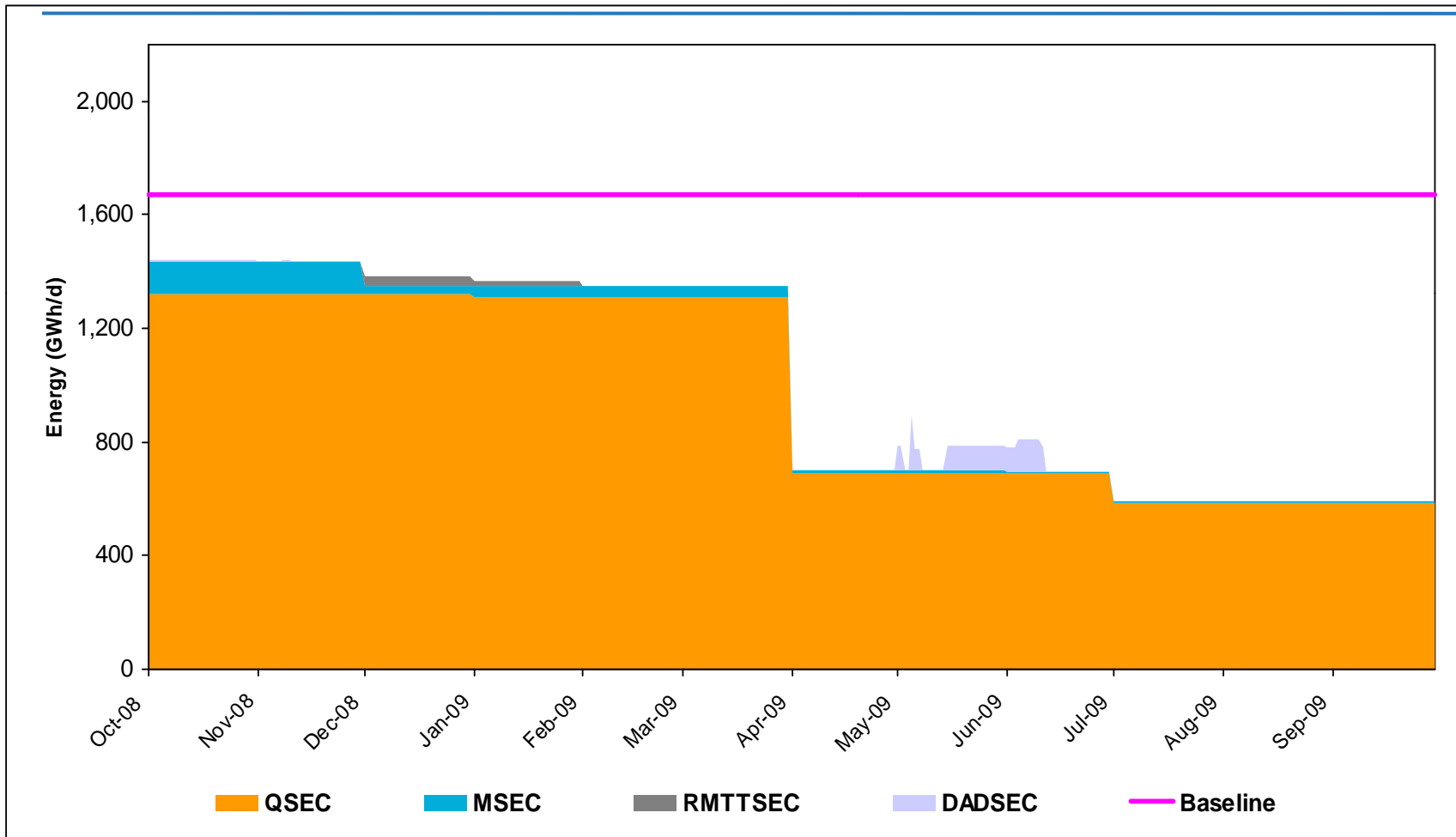
Capacity Sold – St Fergus



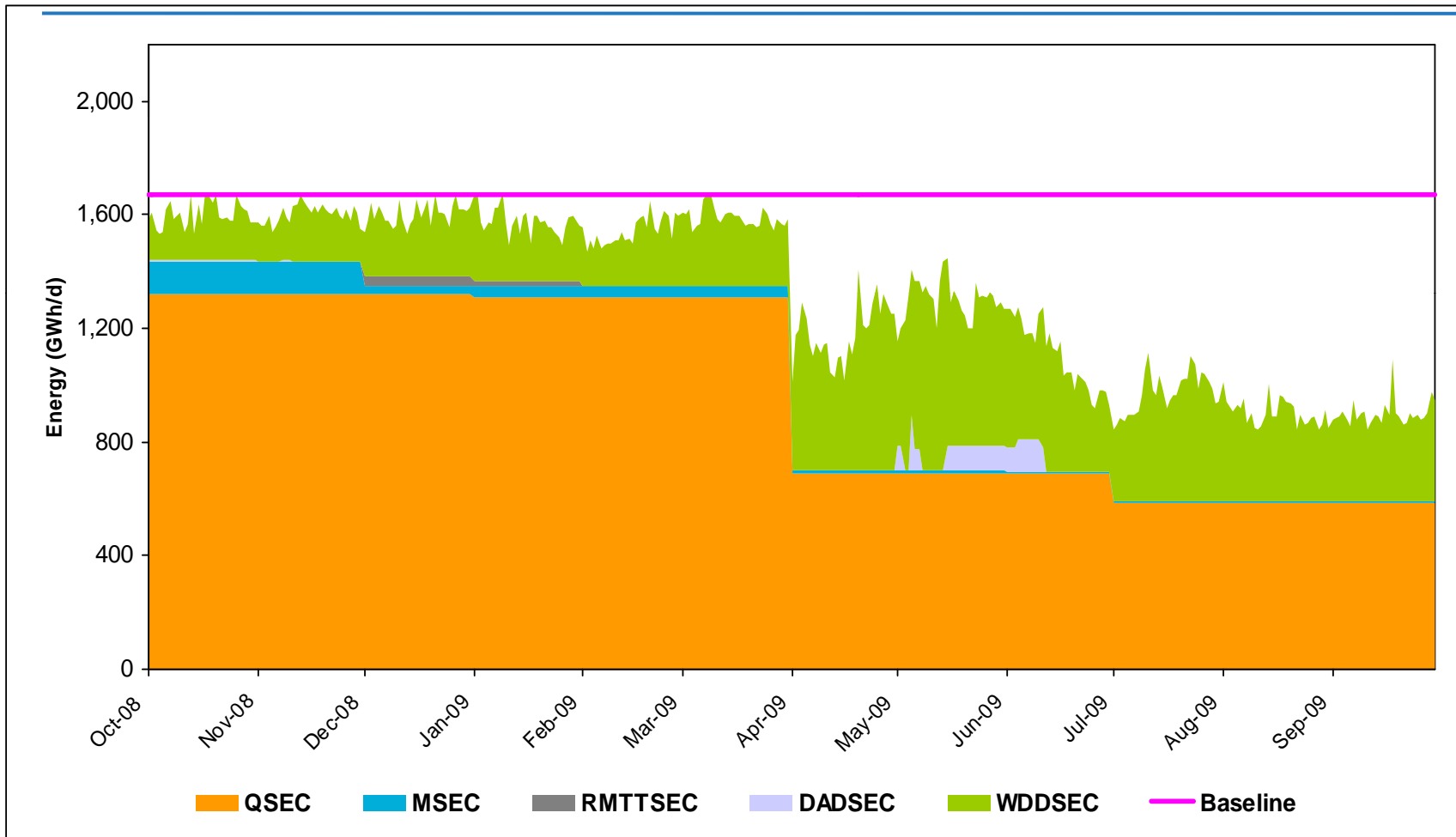
Capacity Sold – St Fergus



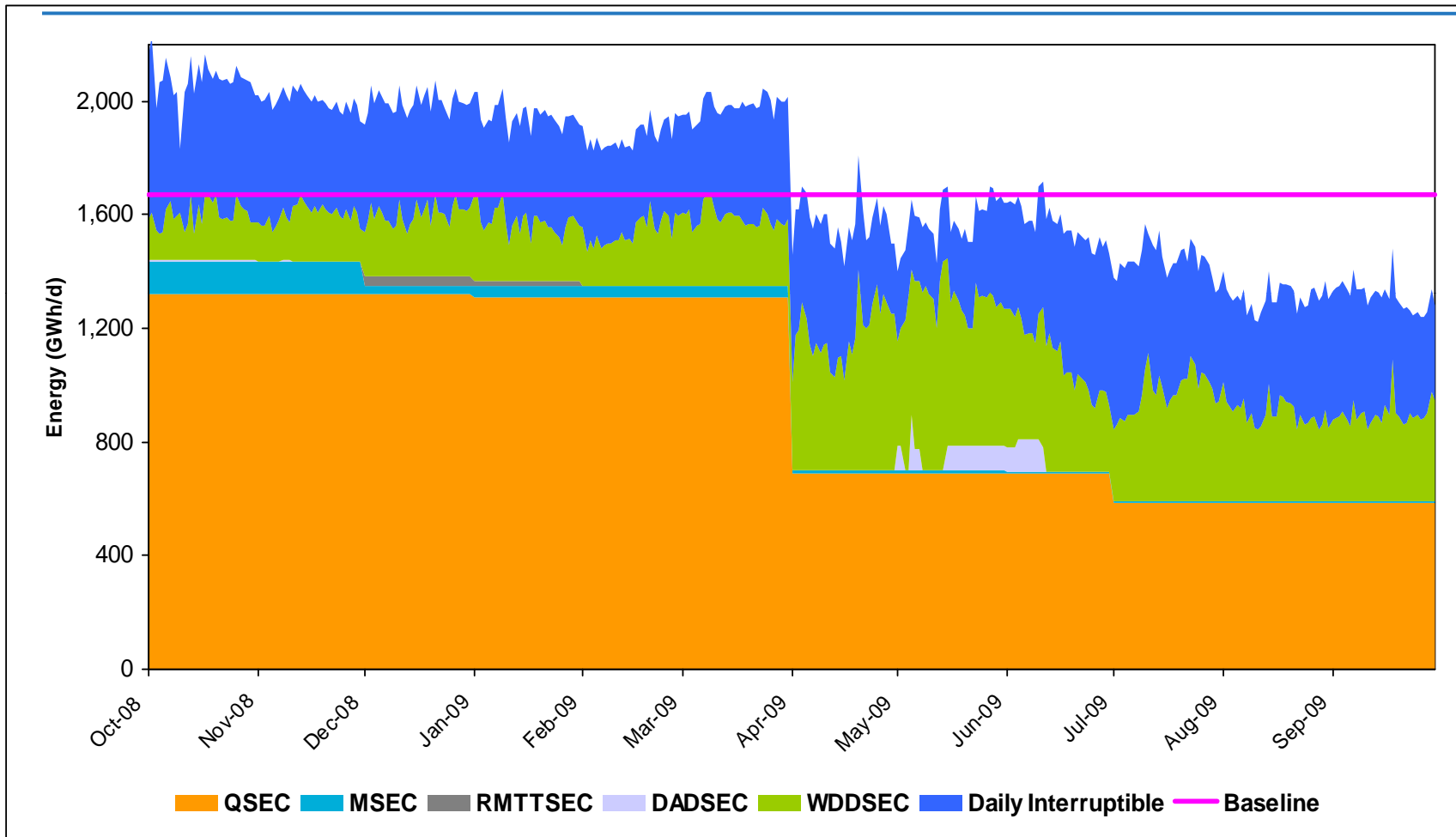
Capacity Sold – St Fergus



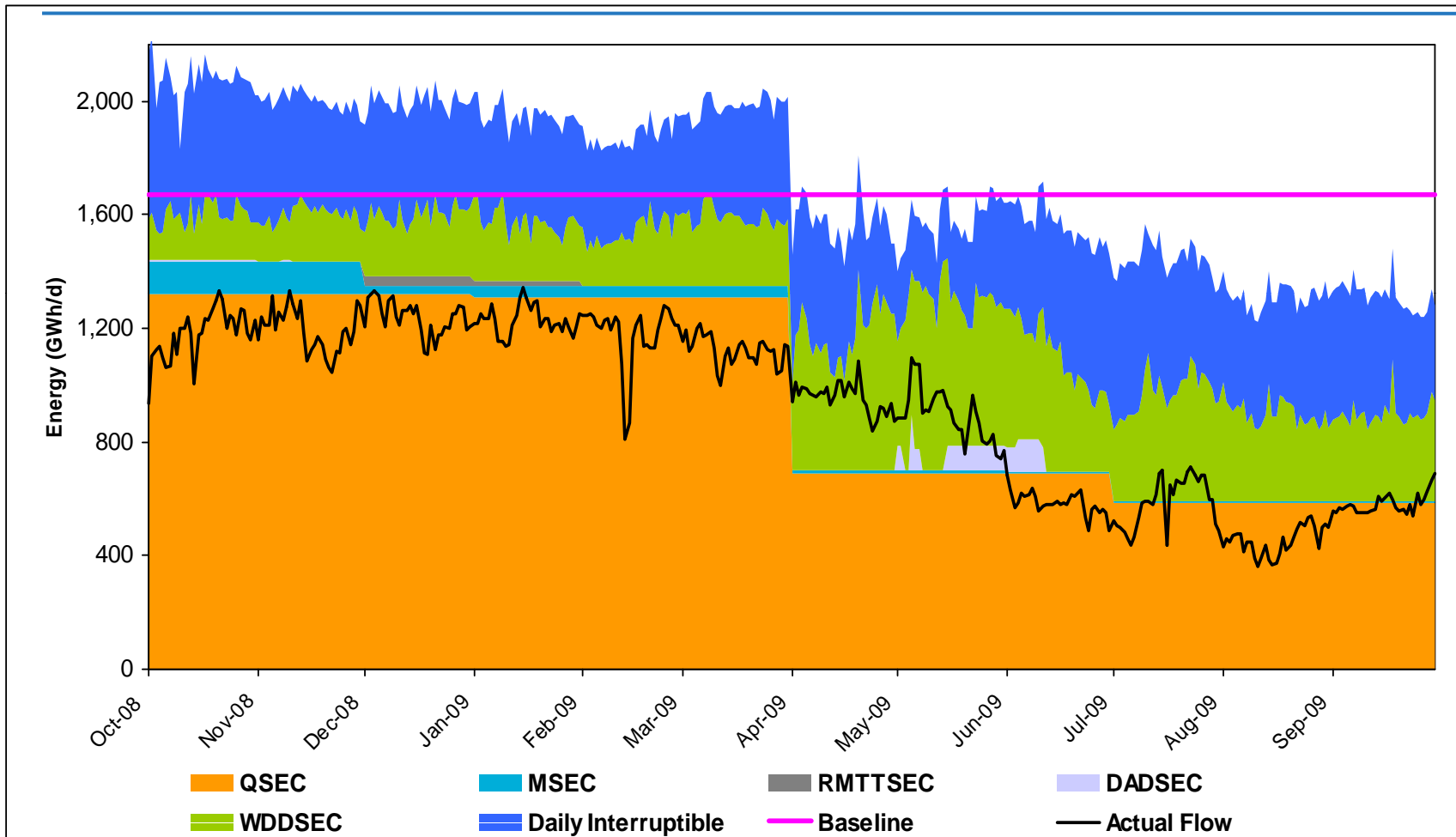
Capacity Sold – St Fergus



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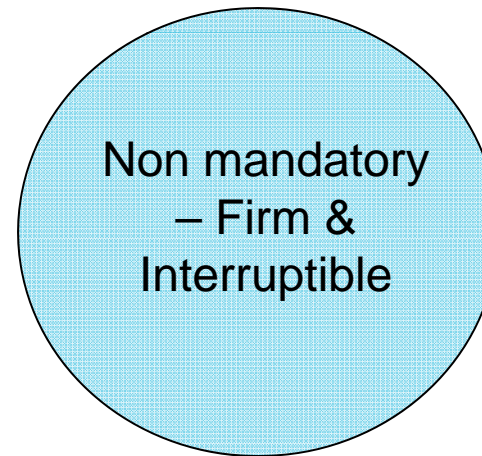
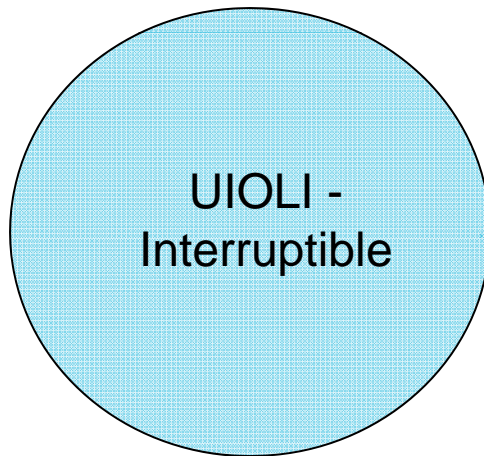
Capacity Sold – St Fergus



Congestion Management and Incentives

Capacity Release in Excess of Baseline

- NG obligated to make baseline available
- NG may release capacity in addition to baseline through:



- Increases risk that flows will exceed physical capability – physical congestion

Use It Or Lose It (UIOLI)

- NG obligated to auction unused firm capacity daily, as interruptible
- Introduced to prevent hoarding
- Auction held at 14:00 D-1
- Revenue generated feeds into the incentive scheme
- Daily UIOLI volume offered is average of unused capacity over previous 30 days falling 7 days before D
 - An indicator of unused firm capacity

AUC = aggregate amount by which daily Firm Entry Capacity held at ASEP exceeds the daily quantity delivered

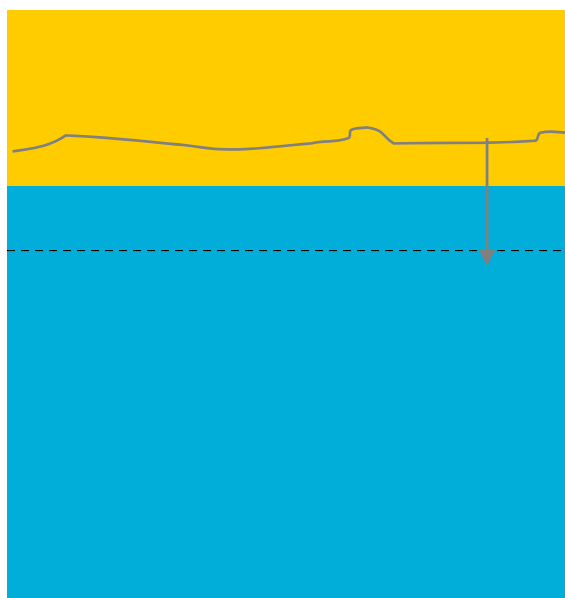
$$AUC / 30 = UIOLI \text{ offered}$$

Non-mandatory Capacity

- National Grid may hold ad-hoc (discretionary) auctions for further capacity
 - firm capacity available above baselines
 - interruptible capacity available above UIOLI
- Monthly or daily firm products
- Revenue generated feeds into the incentive scheme

Congestion Management Tools

- If flows are expected to exceed capacity, National Grid avoids physical congestion by:



- Scaling back interruptible capacity
- Buying back firm capacity for specific periods
- If no commercial action is possible:
 - Terminal Flow Advice (TFA) to curtail capacity
 - Pro-rated between all shippers at entry point
- Costs generated feeds into the incentive scheme

Capacity Buy-backs

-
- Capacity can be bought back in advance or on the day:
 - Options - NG has right to buy back an amount of capacity for a specified number of days. NG chooses when to exercise the option
 - Forwards - NG buys capacity for specific periods
 - Prompt - NG buys within-day

 - Cap on Incremental Buy back price $>0.52\text{p/kWh}$ applicable to Incremental sales after 1st April 2007 (until capacity physically delivered).

Buy-back: Options

-
- National Grid asks shippers holding capacity whether they are willing to enter into option agreements
 - Interested shippers indicate:
 - Option Fee
 - Exercise Price
 - National Grid chooses most cost effective & pays the Option Fee
 - In event of physical congestion and after scale back of interruptible NG exercises option and buys the capacity back at the Exercise Price

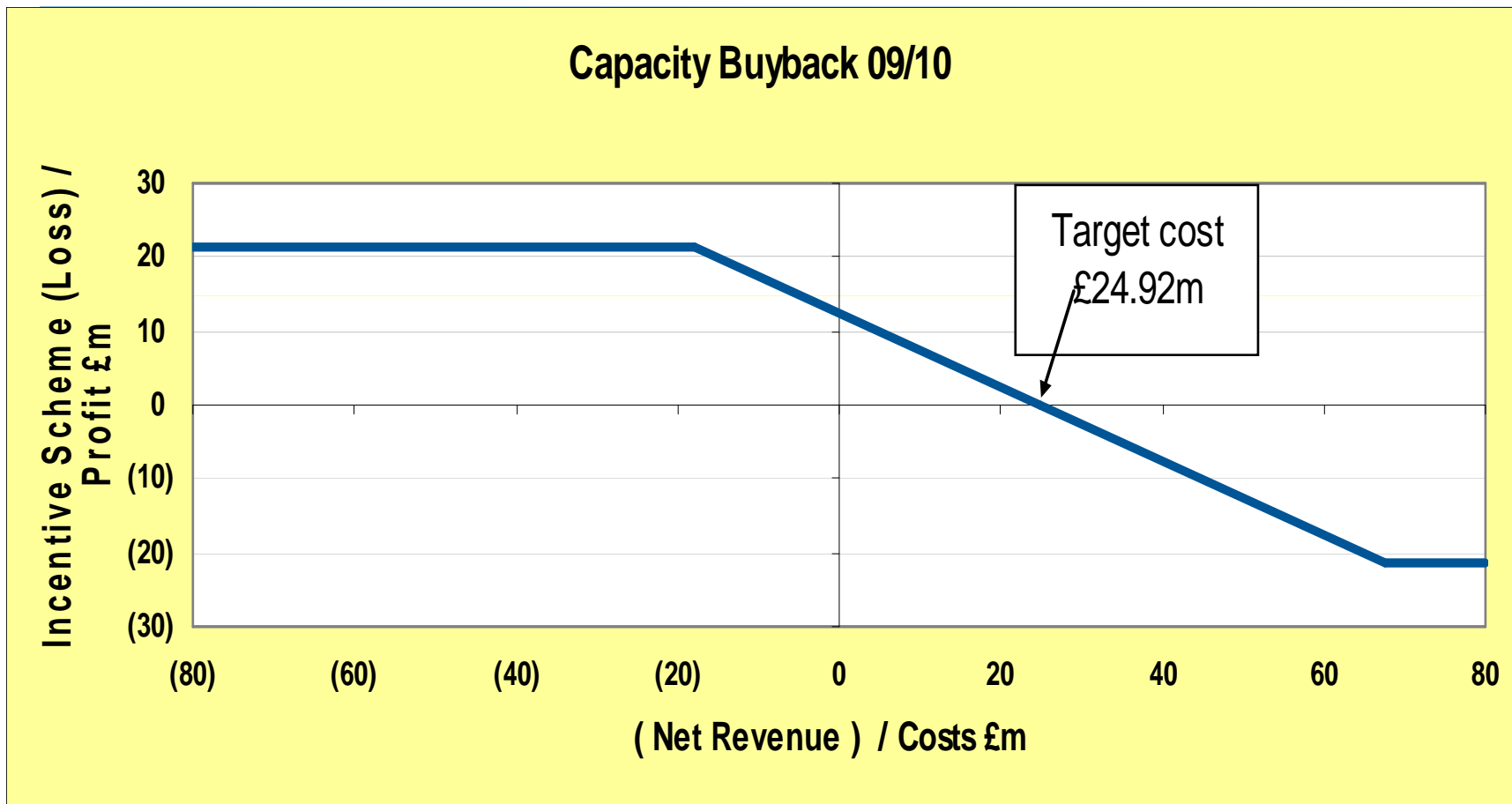
Buy-back: Forwards

- National Grid asks for capacity for specific periods
- Shippers state the price and quantity they're willing to sell back (subject to time limits)
- NG chooses lowest cost solution
- If prices too high NG may take risk of waiting until the Prompt Market (though often more costly)

Buy-back: Prompt Market

- Used in circumstances which are not reasonably foreseen, e.g. compressor failure
- Can be achieved at short notice
- NG alerts shippers at entry points of the option to sell back firm capacity to NG
- Shippers specify their price and quantity (subject to time limits)
- NG chooses lowest cost solution

Operational Buy-back incentive



Example – Incentive Scheme

- National Grid make £10m revenue but spend £40m
- Hence net position under the scheme is a £30m cost (performance measure)
- Under the incentive scheme this would mean our actual performance is:
- $30 \text{ (cost)} - 24.92 \text{ (cost target)} = £5.08\text{m}$
- $5.08 \text{ multiplied by } 50\% \text{ sharing factor} = £2.54\text{m}$
- Hence £2.54m cost to National Grid under the scheme & £2.54m cost to the Shippers (administered via the SO commodity charge calculations).

<http://www.nationalgrid.com/uk/>