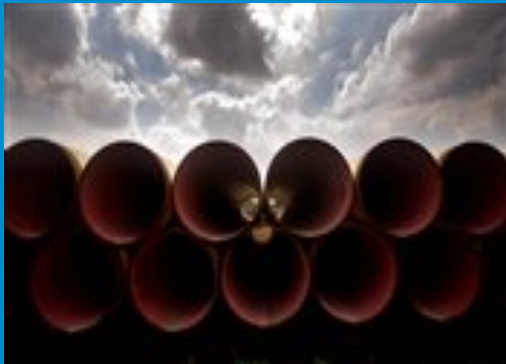


0504 - Demand Side Response Implementation



Agenda

- DSR Progress to Date
- DSR Trial Report
- Proposed Timeline and Approach
- Modification Development
- AOB

DSR Progress to Date



Significant Code Review (SCR)

Security of Supply (SoS) Background

- Ofgem raised SCR in January 2011
- Aim of the Gas SoS SCR:
 - To reduce the likelihood, severity and duration of an emergency;
 - Ensure that market arrangements provide sufficient incentives on shippers to maintain SoS; and
 - Ensure that in an emergency Market Rules appropriately incentivise shippers to balance supply and demand.
- In the context of the Customer the key issue the SCR sought to address was:
 - Cost of involuntary Demand reduction in an Emergency, i.e. Firm Load Shedding (FLS) is not factored into cashout price, therefore much of the risk sits with the consumer;

Developing payment arrangements for voluntary and involuntary DSR

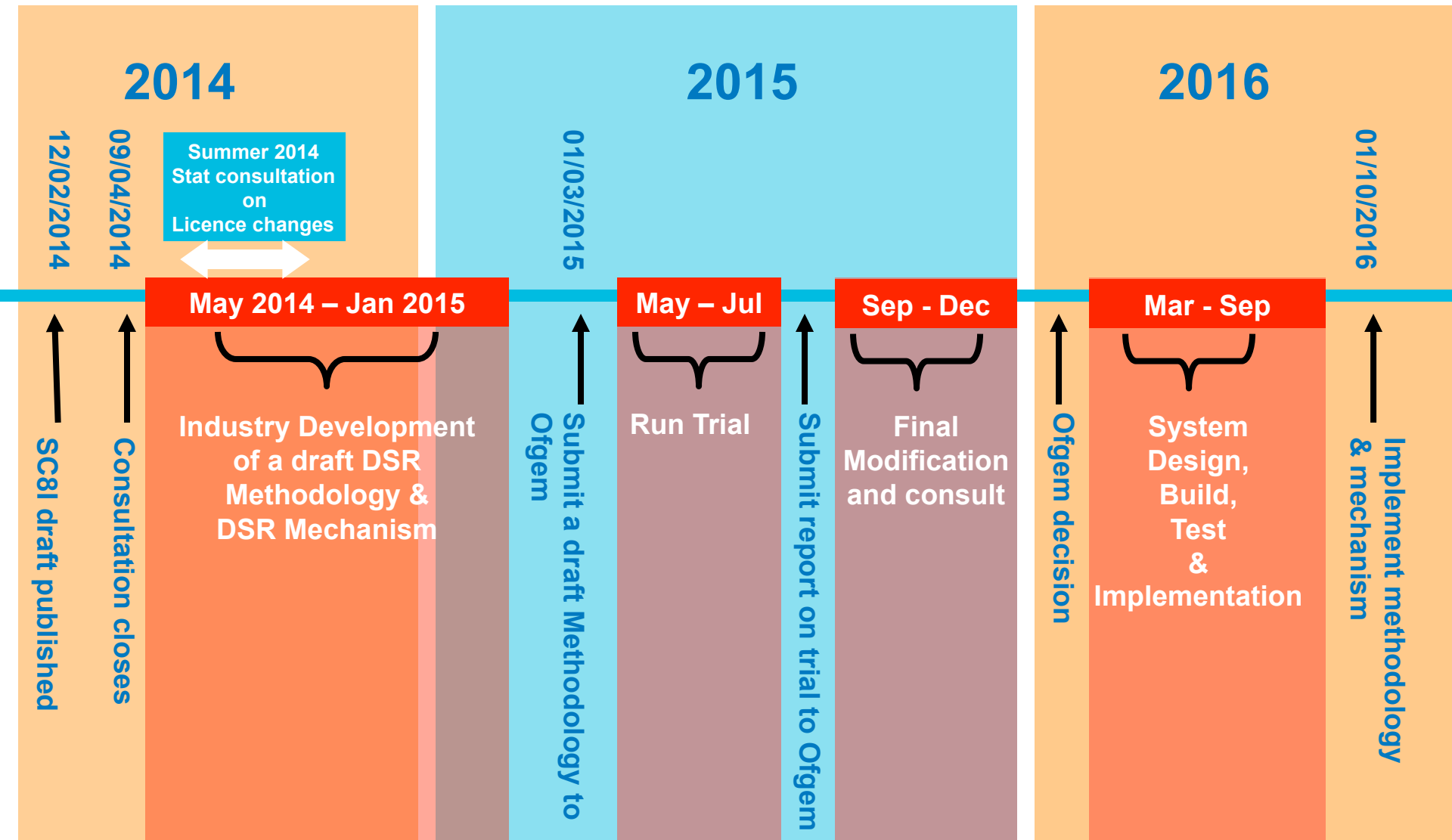
DSR Key principles

- Ofgem's key principles for DSR are:
 - To create a “route to market” for additional DSR and not prevent commercial interruption from emerging
 - Reveal price for DSR and factor into Cashout
 - Minimise market distortions and be efficient, cost effective and compatible with existing market arrangements

Proposed DSR Licence Obligation

- Draft Licence Condition on NGG to;
 - Develop a DSR methodology, in consultation with stakeholders; and
 - Where directed by the Authority run a trial of the approved DSR methodology; and
 - Report back to the Authority on the outcome of the trial; and
 - Subject to the outcome of the trial, and where directed by the authority, implement the DSR mechanism and methodology.

DSR Timescales



DSR Mechanism Interaction



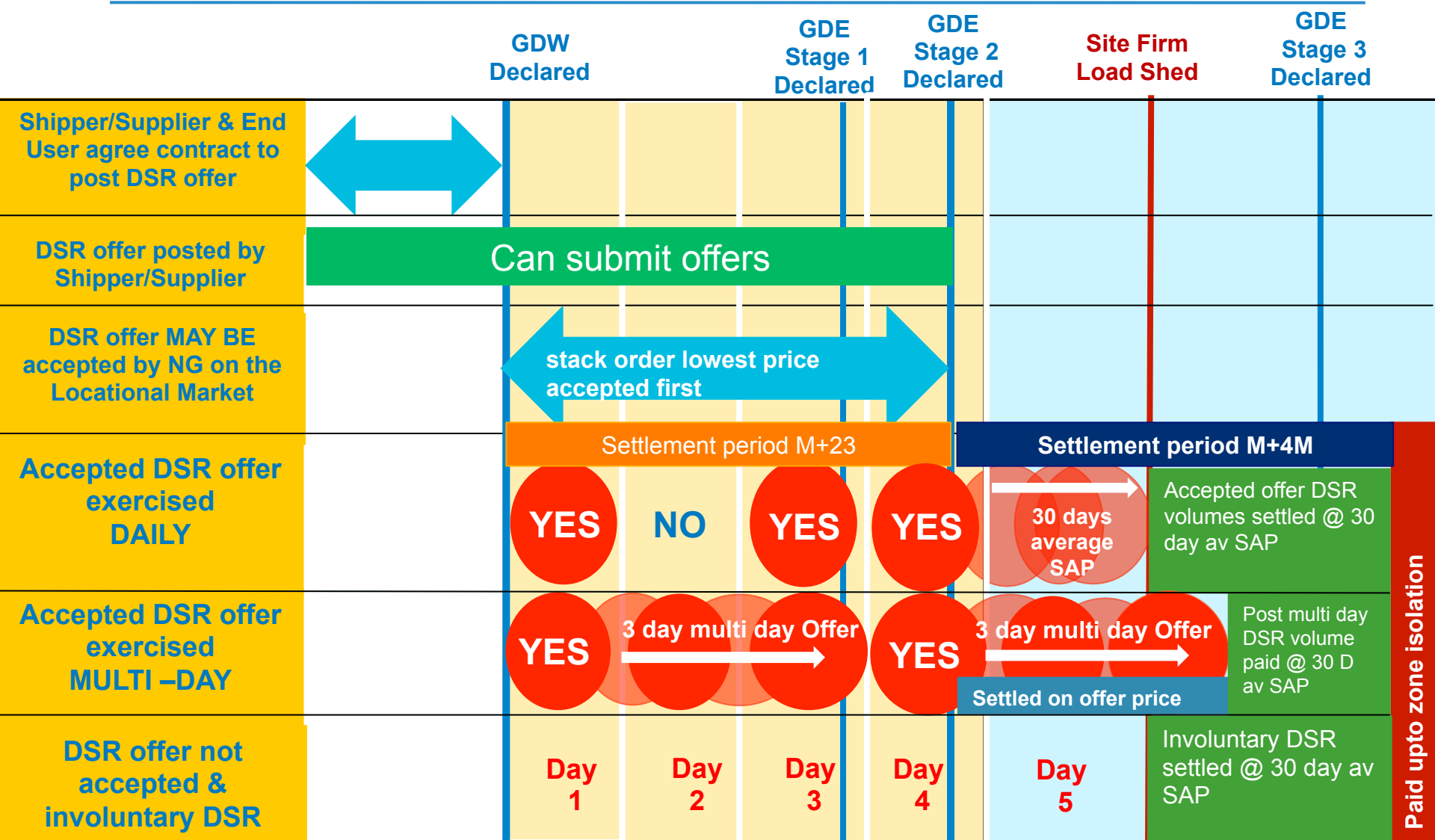
DSR Methodology Design

- DSR Offers
 - May be submitted onto the market at any point;
 - Only accepted Post GDW;
 - Will not be visible to the market until the GDW is declared; and
 - Unfrozen (aligned with current OCM “supply side” market) for price and volume
 - Offer prices held in price stack order – lowest price in stack accepted first
- One to many Market (NG NTS being only ‘price taker’)
- Daily offer:
 - A Within Day / Day ahead structure – with carry over each day – Day not date dependant
 - A 7 day profiled offer – i.e. can submit differing values for each day of the week
- Multi Day offer (in same form as current functionality)
- Offers accepted within Stage 1, but on the Day of entry into GDE stage 2 will be obligated to remain off until instructed back on

DSR Product Options

Single Day	<ul style="list-style-type: none">• Accepted and exercised for the Gas Day.• Available to accept on all subsequent up the end of GDE Stage 1.• DSR Offers accepted on the day GDE stage 2 declared remain exercised for each subsequent day until instructed back on through direction from NEC.
Multi-day	<ul style="list-style-type: none">• Accepted and exercised for a specified number of days not greater than 7.• Available to accept, when the specified days have lapsed, up to the end of GDE stage 1.• The specified days may roll into GDE Stage 2 and will be settled as agreed in the trade
Off till On	<ul style="list-style-type: none">• Once DSR Offer accepted, trade automatically re-exercised on subsequent days until NG instructs customer can come back on as part of GDE emergency arrangements. (adopted on the day a GDE stage 2 is declared)

DSR Mechanism Process Flow: Daily or Multi-day Offers



Paid upto zone isolation

DSR Settlement Arrangements

- In respect of National Grid NTS to the Shipper; the settlement of DSR trades fees shall be:
 - For each day, prior to the end of GDE stage 1, where the DSR Offer has been exercised, the DSR exercise will be regarded as a Market Balancing Action (MBA) taken by National Grid NTS. Settlement of DSR exercise fees associated with such days will be undertaken in accordance with normal operation settlement arrangements for MBAs
 - For each day, following declaration that the GDE has entered stage 2, all settlement of DSR exercise fees will be undertaken in accordance with the provisions and timescales prescribed within the DSR Methodology
- In respect of the Shipper/Supplier to the Customer; the passing on of DSR exercised trades Payments will be:
 - Settled in accordance with this DSR Contract; and
 - In accordance with the provisions set out in the proposed modification to the Shipper Licence Condition 15A and the Gas Supply Licence 19D

DSR Governance Overview

	Sets out obligations for:	Parties	Governed under Contract :
DSR Methodology	Processes associated with the operation and design of the DSR arrangement	National Grid	National Grid Transmission Transporter Licence
DSR arrangements – UNC TPD provisions	participating in the On The Day Commodity Market (OCM) based DSR Mechanism that is operated in accordance with the DSR Methodology	UNC signatories (NG, Shippers, Suppliers and the OCM Market Operator)	UNC TPD
Shipper Licence condition 15A & Gas Supply Licence condition 19D	Shipper/Supplier requirement to pass on DSR payment the End Consumer	Shippers & Gas Suppliers	Shipper and Supplier Licence
DSR Service contract and DSR Offer Notice contract provisions	Shipper/Suppliers & Customer to participate in the DSR mechanism in accordance with the DSR Methodology	Shipper/Supplier & Customer	Standardised Contract provisions either within the Shipper/Supplier and Customer Contract or an annexed contract

Implementation - Locational Platform

DSR Offers can be supported by the existing OCM Locational Market
New functionality required:

DSR Flag	Introduce a flag to identify DSR Offers, eligible for acceptance post a GDW, which can run along side other products available on the Locational Market
Feed into cashout	Prices associated to accepted DSR Offers will feed into cashout. Locational actions, accepted for constraint purposes, will continue to have their prices excluded from cashout, through an ID code – existing functionality
1 to many	The Locational Market revised to a one to many market (NGG the single 'price taker')
Offer visibility	DSR Flagged Offers will not be visible until the GDW is declared -

Removes the need for additional markets to be created and monitored:
Likely to be less development cost and governed under existing UNC provisions

Concerns raised during Methodology Stage

- Shipper/Supplier and end consumer DSR service agreement
 - End consumers concerned with liabilities for failure to respond to DSR instruction
 - Shipper/Supplier to discuss with end consumer
 - Agreed it is not appropriate for NGG to lead on the design of contracts with end consumers
- Use of option fees are not consistent with the DSR principles or the relevant objectives due to;
 - Inappropriate costs being passed to consumers, especially due to the extremely low likelihood of this event
 - Possibility of prevention for the establishment of a competitive DSR market
 - NGG extending its role beyond that which is required to provide a route to market for DM customers

Concerns raised during Methodology Stage

- Shippers ability to cope with an ‘unfrozen’ market i.e. updating bids throughout a DSR period
 - To be mitigated by Shippers managing the update frequency with end consumers
- Visibility of DSR offers post a Gas Deficit Warning
 - NGG provided reassurance that only a site’s unique UK Link number would be visible and only OCM participants will be able to view this information
- Aggregation of DSR offers at smaller supply points
 - Workgroup agreed that aggregation would introduce more complexity and provide insufficient volume to make a difference

Concerns raised during Methodology Stage

- No provision to notify DNO's of accepted LDZ embedded DSR offers and there is a risk that they would not take appropriate actions to reduce demand forecasts or OPN's
 - Wider issue related to gas market trading which NGG will raise internally and provide updates at the Workgroup
- Certainty of volume being offered
 - No guarantees that an acceptable level of volume will be provided ahead of a GDW or GDE
 - However, if there was a contracted volume ahead of time this could distort the market
 - DSR facilitates a route to market as required under the licence condition for an unlikely event

DSR Trial Overview



Trial Scenario

- Closures of UK coal and nuclear power stations have resulted in a greater demand for gas as a source of UK energy generation
- The winter period has seen gas demand running above seasonal normal levels due to the UK experiencing an extended period of cold weather with unprecedented snowfall and gale force blizzards
- Demand has reached 1 in 20 peak day demand of 499 mcm/d and additional weather warnings have been issued which are likely to result in further disruptive conditions.
- There have been a number of large impact events resulting in significant supply loss
- A range of commercial and physical mitigating actions have been taken to reduce the impact on linepack however, the overall position on the NTS looks unsustainable with forecast national demand not expected to reduce and supply losses set to continue
- NEC make the decision to declare a GDW – DSR offers become visible and can be accepted by NGG

Background

- As part of SoS SCR Ofgem initiated a consultation in July 2013 on the development of a DSR Mechanism
- The SCR process identified that the gas market would benefit from large consumers reducing demand voluntarily ahead of an emergency
- Licence obligations were put in place that require NGG to develop a DSR methodology, run a trial and implement the methodology if directed to do so
- The mechanism has been developed with Industry input and approved by Ofgem to progress to the trial phase

What is Gas DSR?

The DSR product would provide an additional 'route to market' through which Gas Consumers could offer to turn down their gas consumption at times of system stress in return for a payment

DSR offers would...

- Only be used once a GDW had been announced;
- Only be accepted by NGG;
- Utilise the existing OCM – locational market;
- Only be eligible to consumers with an AQ greater than 2 million therms and who could offer at least 100,000 kWhs; and
- Only be paid for if the offer was accepted i.e. no option fees.

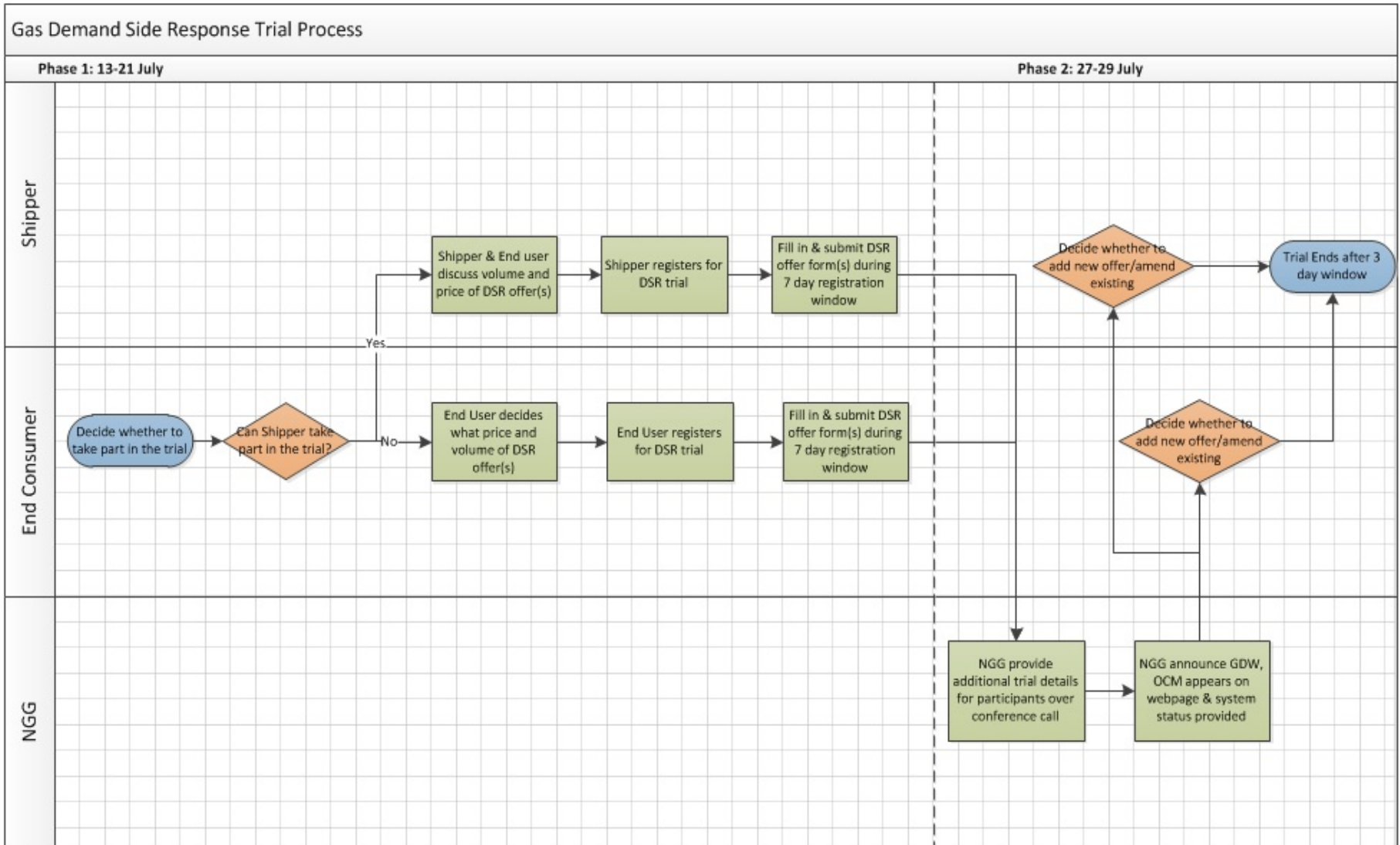
Gas DSR Trial

- The trial was developed with Industry input and NGG progressed with a web based, two phased option

It aimed to:

- Provide an indication of Industry appetite for a DSR product;
- To test some of the high level principles of the methodology;
- To give trial participants a greater awareness of the DSR methodology; and
- To help inform Ofgem's decision on whether to progress to implementation.

Gas DSR Trial Process



Phase 1

- The first phase of the trial took place between the 13th - 21st July 2015
- Interested parties were invited to register for the trial and fill in a DSR offer form(s)
- They could choose to fill in:
 - 7 day profiled - allows customers to offer differing values of volume and price for each day of the week
 - Multi Day - allows customers to offer DSR energy quantity for a set duration of time at a pre-determined price up to a maximum of seven days
 - Within Day - allows customers to offer DSR energy quantity at a set volume and price for one day
- The offer forms were primarily trying to understand what volume and price a participant thought they would be able to offer in a real Gas Deficit Warning

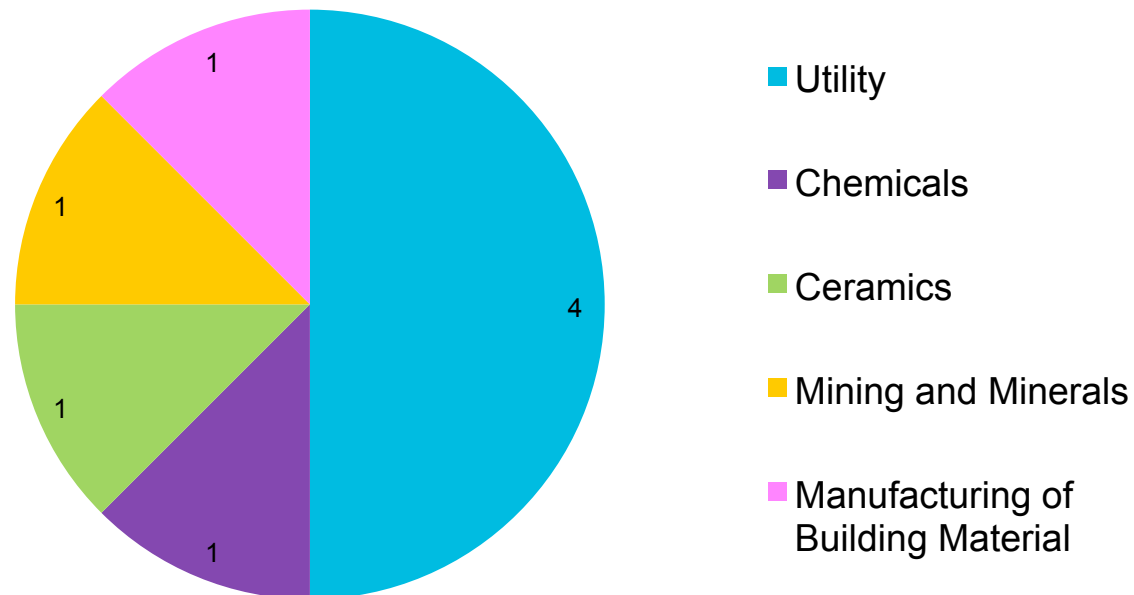
Phase1 : Results

- 10 registrants; 8 progressed to participation
- Total volume offered of 252,205,878 kWh/day
 - At least 247,300,000 kWh/day of this was from CCGTs
- Average Price offered of 120 p/thm
- Highest Price offered of 325 p/thm
- Lowest Price offered of 14.97 p/thm

Participants

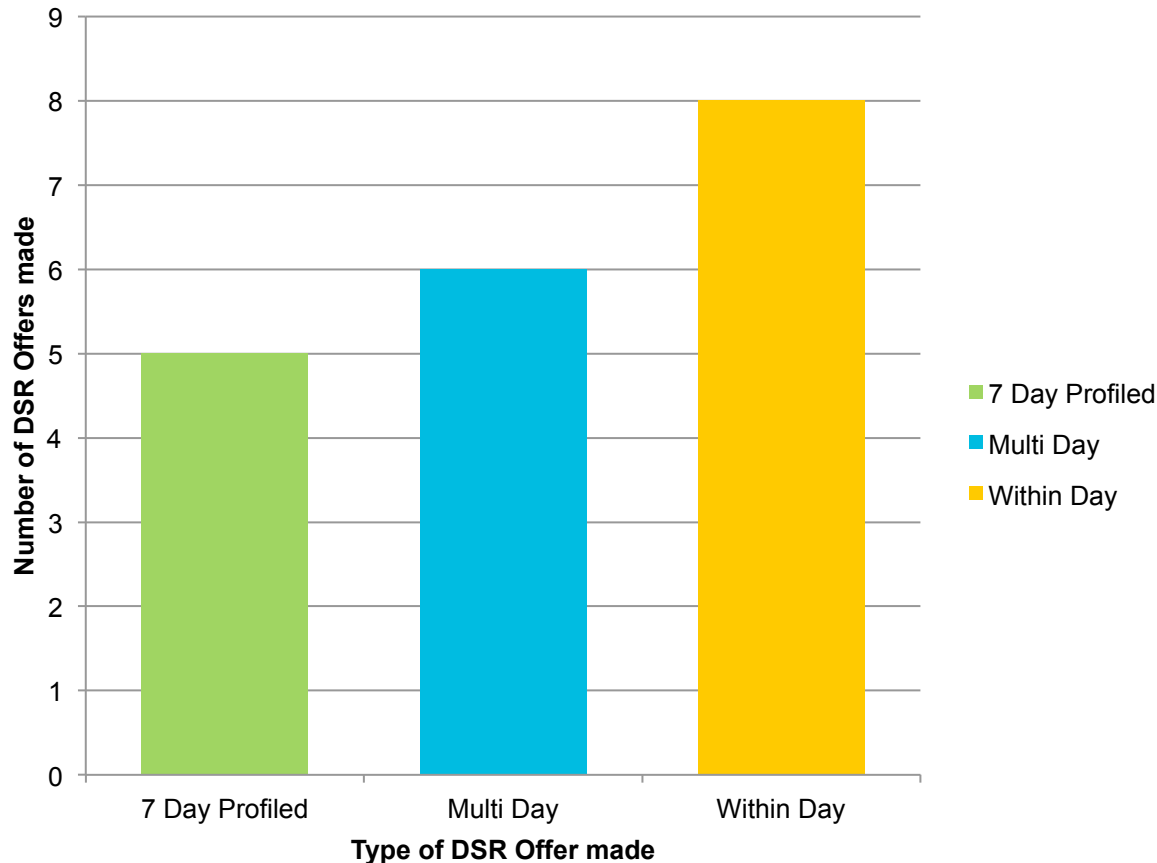
- Of the 8 participants
 - 5 were Shippers; and
 - 3 were End Users.

Participant Industry



Phase 1: Type of Offers

Number of DSR Offers made



- There were 19 offers made in Phase 1:
 - 5 x 7 day profiled
 - 6 x Multi day
 - 8 x Within day

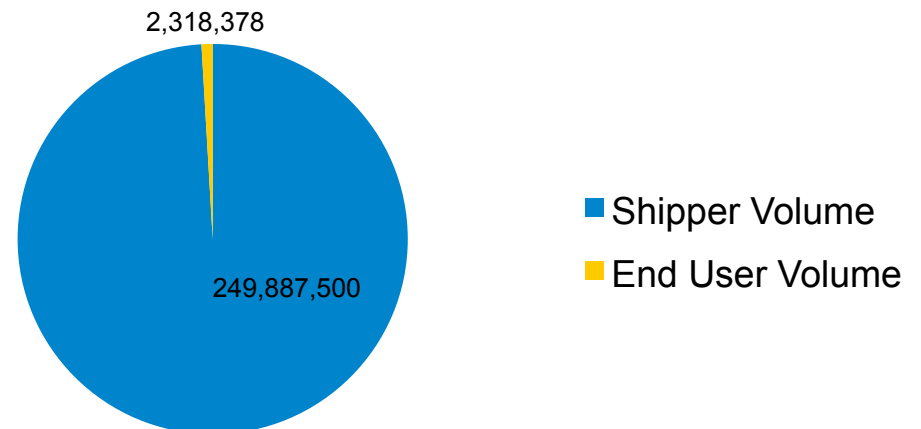
Phase 1: Volume Received

- Phase 1 total volume offered of 252,205,878 kWh/day

Participant No	244	245	246	248	249	250	251	252
Total Volume	250,000	337,500	1,000,000	2,000,000	1,168,378	205,000,000	42,300,000	150,000

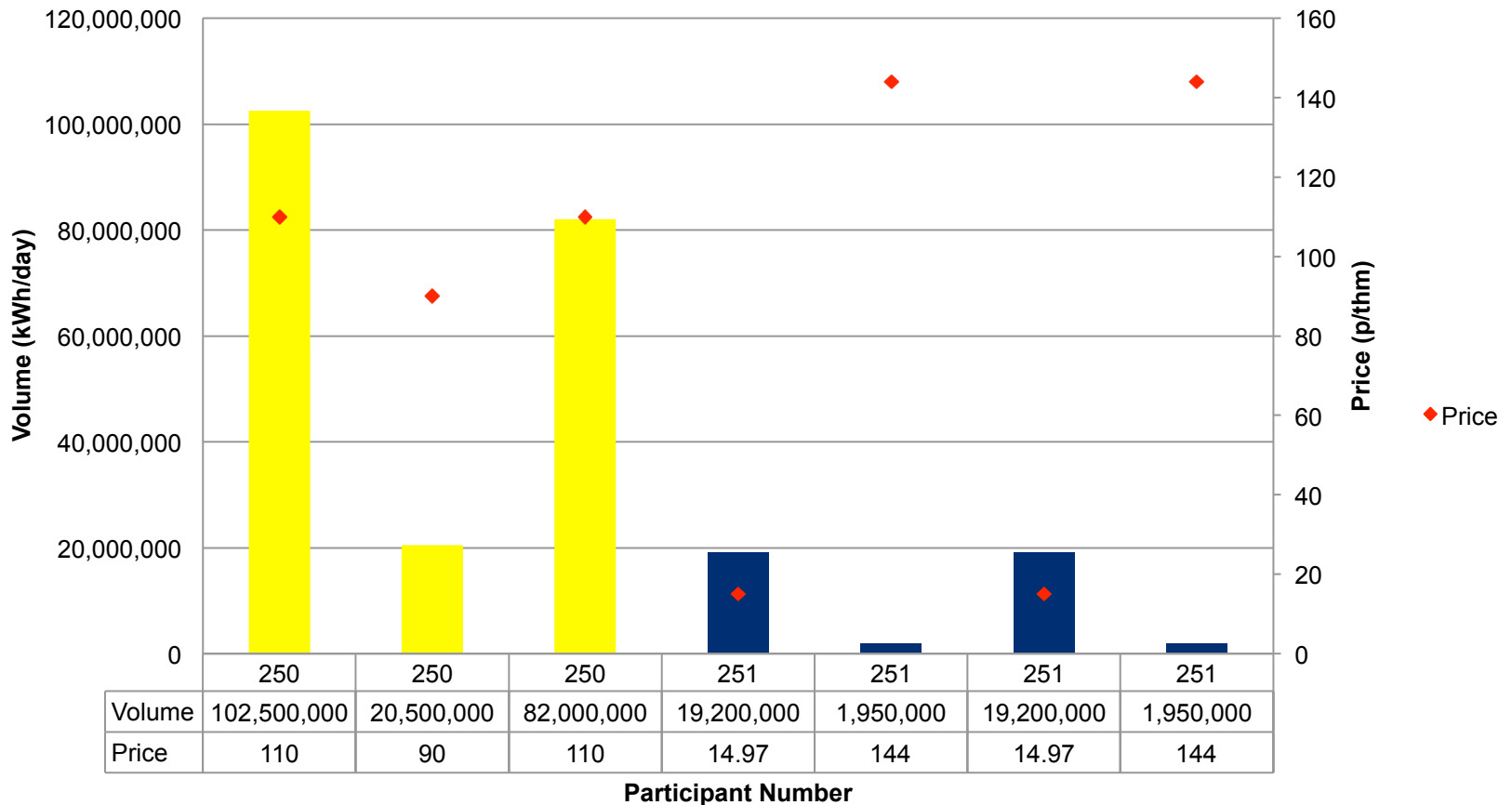
- There were 7 offers made by End Users and 12 offers made by shippers
- At least 7 of the Shipper offers were made for power stations

Phase 1 Shipper and End User Volume



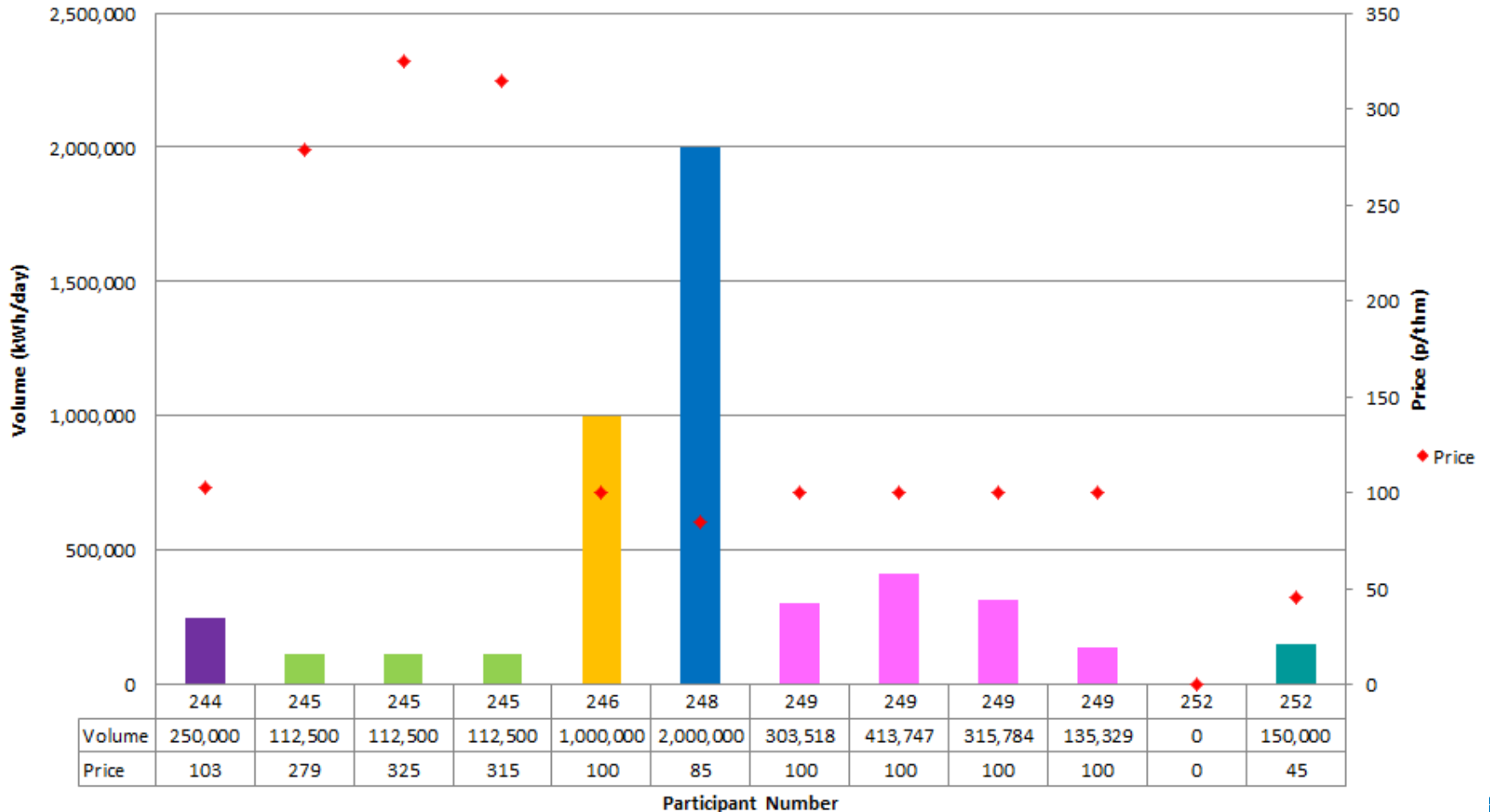
Phase 1: CCGT DSR offers

Volume and Price of DSR Offers for CCGT sites



Phase 1: Non CCGT DSR offers

Volume and Price of DSR Offers (non CCGT)



Phase 2

- The second phase took place between 27th-29th July
- NGG provided a mock GDW scenario for registered participants and then published existing offers on the DSR webpage
- Offers were published in an OCM style s/sheet in price order
- Participants were then able to submit new offers and withdraw or amend existing offers based on the market intelligence provided

Phase 2: Results

- Total volume of DSR offers of 261,153,378 kWh/day; this is an increase of 8,947,500 kWh/day from phase 1
- 247,300,000 kWh/day of the total final volume came from CCGT offers; this is the same CCGT volume as phase 1
- Prices ranged from 45 p/thm to 500 p/thm

Phase 2: Results

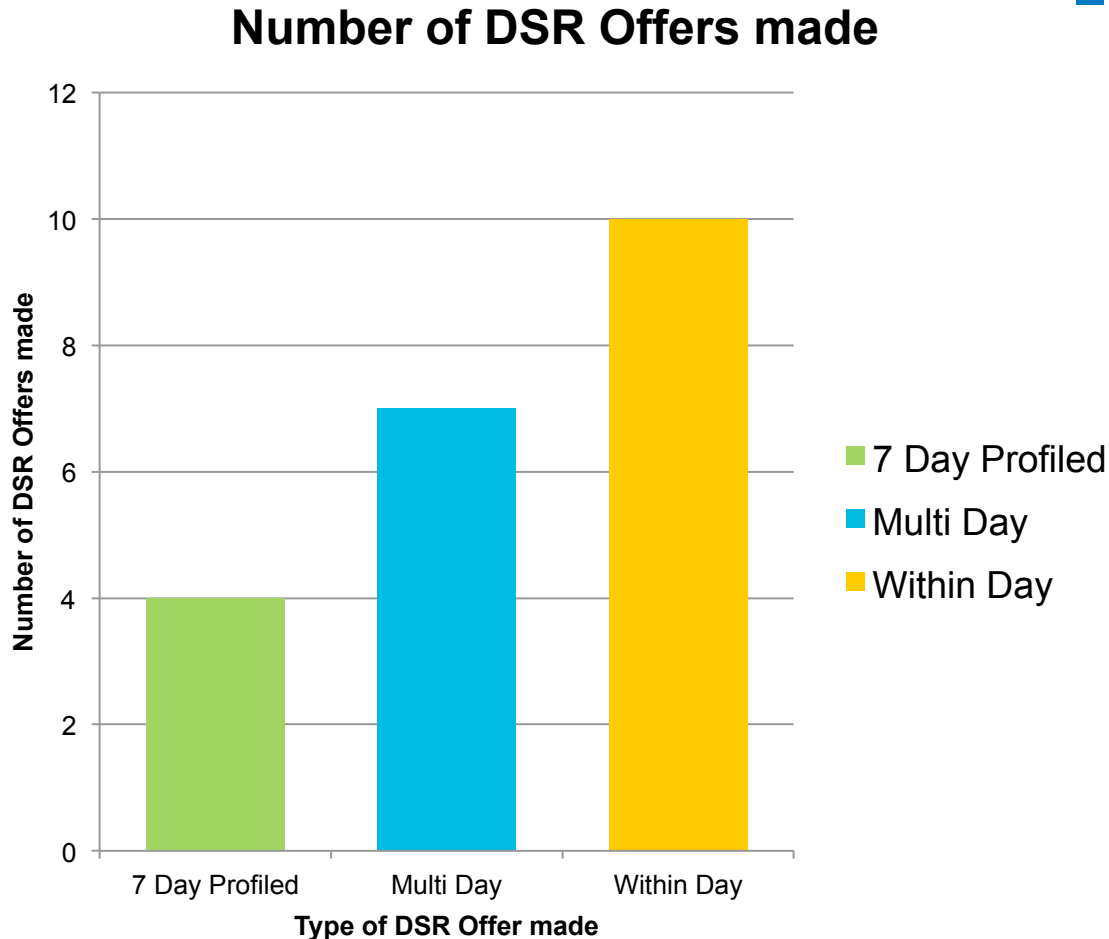
- There were 21 'live' offers at the end of phase 2

Offer No	Participant No	Volume	Price
28	252	0	0
29	252	150000	45
18	250	20500000	90
47	251	19200000	94.44
46	251	19200000	94.44
45	245	1000000	99
15	246	1000000	100
31	249	303518	100
35	249	135329	100
34	249	315784	100
33	249	413747	100
19	250	82000000	110
17	250	102500000	110
44	248	185000	143.5
43	248	2000000	143.5
21	251	1950000	144
23	251	1950000	144
38	245	2700000	245
39	245	2700000	255
40	245	2700000	315
42	244	250000	500

Phase 2: Offers

- 4 participants chose to submit new offers or amend/withdraw existing offers in phase 2
- At trial closure there were:
 - 12 x offers that remained unchanged from Phase 1
 - 5 x new offers
 - 4 x amended offers (a further offer was amended but then withdrawn)
 - 5 x offers that were withdrawn
- Of the 5 new offers, 2 were multi day and 3 were within day offers

Phase 2: Type of Offers



- There were 21 offers at trial closure:
 - 4 x 7 day profiled
 - 7 x Multi day
 - 10 x Within day

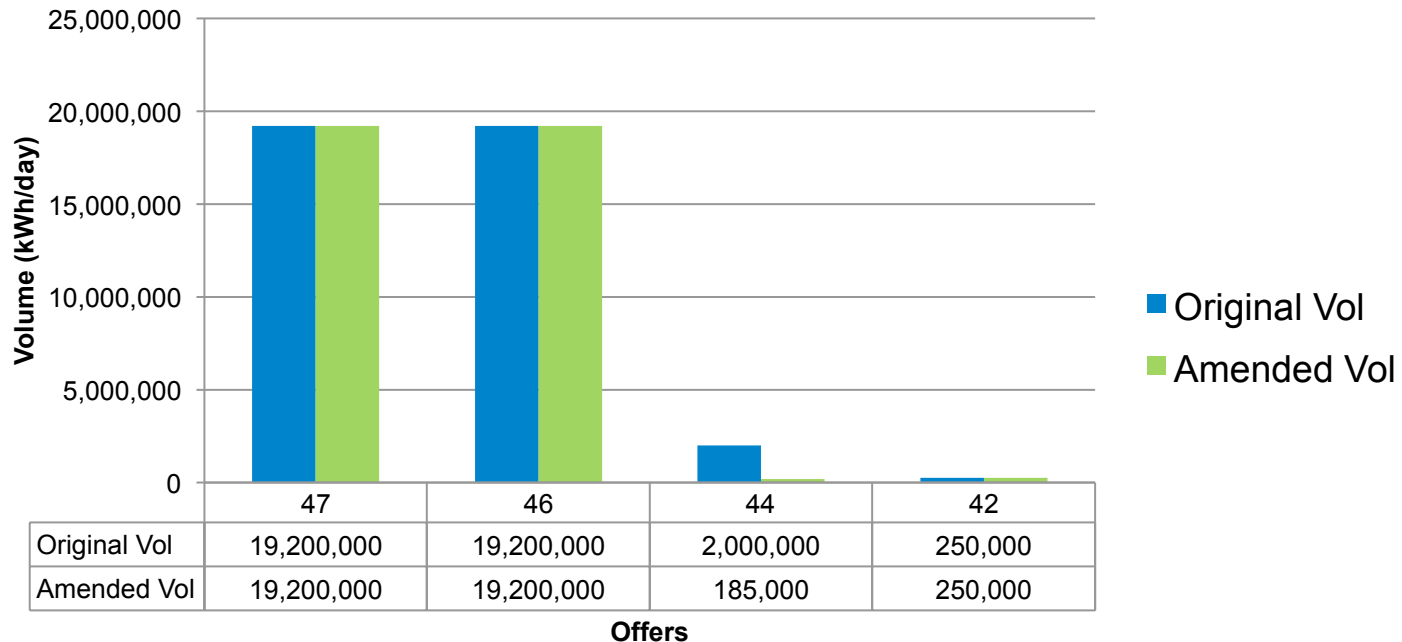
Phase 2: New Offers

- Total Volume of new offers received of 11,100,000 kWh/day
- 2 x participants placed new offers (both shippers)
- Highest new offer price was 315 p/thm
- Lowest new offer price was 99 p/thm

Phase 2: Amended Offers

- Total Volume of amended offers received was 38,835,000 kWh/day
- This was a decrease in volume of 1,815,000 kWh/day compared to the original offer volume
- 3 x participants amended offers (all shippers)

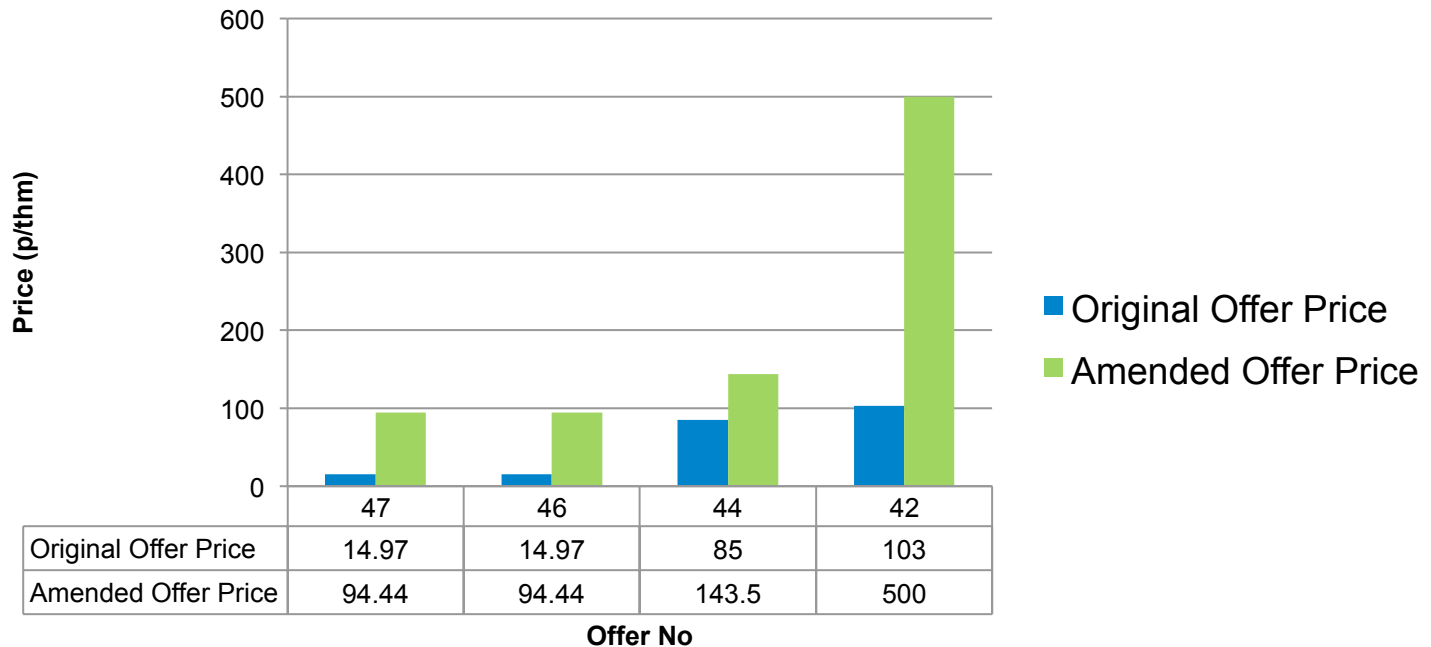
Original Offer Volume vs Amended Offer Volume



Phase 2: Amended Offers

- The highest amended price was 500 p/thm – this was the highest offer price in the DSR trial
- The 4 amended offers went from a combined total price of 217.94 p/thm in Phase 1 to 832.38 p/thm in Phase 2

Original Price Volume vs Amended Offer Price



Phase 2: Withdrawn Offers

- 2 x withdrawn offers were for offers made in Phase 1, and 3 withdrawn offers were for offers made in Phase 2
- One offer was amended in Phase 2 and then withdrawn
- All withdrawn offers were made by 1 participant
- The total of withdrawn offers was 562,500 kWh/day

Post Trial

- The trial ended on the 29th July 2015 – after this date NGG had 28 days (by 26th August) to submit their report on the trial to Ofgem
- Ofgem decision on moving to the next phase to be announced by the 23rd September
- NGG will need to raise the UNC mods to formally introduce the DSR methodology as soon as reasonably practicable
- No changes to the DSR Methodology as a result of the trial

Proposed Timeline and Approach



Work Group Plan

Time / Date	Venue	Workgroup Programme
10:30 Wednesday 7 th October 2015	31 Homer Road, Solihull B91 3LT	<ul style="list-style-type: none"> Review amended DSR implementation Modification 0504
10:30 Wednesday 4 th November 2015		<ul style="list-style-type: none"> Potential for further discussion of the Mod and any issues raised Discuss proposed legal text
10:30 Tuesday 1 st December 2015		<ul style="list-style-type: none"> Final meeting to finalise any remaining issues, the Mod and legal text

Modification Development



Modification Development

- The DSR Framework and Methodology indicated that the changes to UNC will include the following provisions:
 - ‘Prior to posting a DSR Offer onto the OCM the registered Shipper will have a record of the agreement, with the relevant End User of the relevant site, that the Shipper may post the DSR Offer(s) on behalf of the relevant End User’
 - ‘An accepted DSR Offer will be processed and settled in accordance with Locational Market Transaction arrangements’
- Modification is currently being drafted and the key sections of UNC to be amended are:
 - UNC TPD Section D – Operational Balancing and Trading Arrangements
 - UNC Section Q - Emergencies
 - UNC Section V - General

Close

- DSR Trial was a success with a good response from Shippers and End Users
- No changes necessary to the DSR Methodology
- Subject to Ofgem direction (expected by 23rd September) National Grid NTS will present the amended Modification to the Workgroup on 7th October
- For further information please contact
 - Gareth Davies at gareth.davies5@nationalgrid.com Tel 01926 654850
 - Debbie Brace at deborah.brace@nationalgrid.com Tel 01926 653233
 - Angharad Williams at angharad.williams@nationalgrid.com Tel 01926 653149