

# Transmission Arrangements for Distributed Generation

Working Group Meeting 4

21<sup>st</sup> June 2010



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# Agenda

No.	Agenda Item	Lead	Time
	Arrival and Coffee	-	10 minutes 10:00
1.	Housekeeping	Patrick Hynes	5 minutes 10:10
2.	Summary of Issues Presented at Meeting 3	Ivo Spreeuwenberg	20 minutes 10:15
3.	Detailed Gross Supplier Agency Options	Ivo Spreeuwenberg	60 minutes 10:35
	Break	-	10 minutes 11:35
3.	Detailed Gross Supplier Agency Options	Ivo Spreeuwenberg	45 minutes 11:45
4.	Lunch		30 minutes 12:30
5.	Industry Framework Changes and Timescales	Ivo Spreeuwenberg	30 minutes 13:00
6.	Progress on Actions	Ivo Spreeuwenberg	60 minutes 13:30
7.	AOB	-	10 minutes 14:30
<b>End</b>			<b>14:40</b>

# 1. Housekeeping

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- ◆ Chair
- ◆ Fire/Evacuation Procedure
- ◆ Agenda
- ◆ Arrangements for Leaving Site

## 2. Summary of Issues Presented at Meeting 3

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- i -

- ◆ A net model can only address the inequality in competition through the removal of direct competition (explicit, nodal access rights)
- ◆ This is unlikely to result in the best outcome for the consumer
- ◆ The significant change required to deliver such a model does not compare to the benefits it currently has the potential to provide
- ◆ Charging the residual in a different manner could be a solution to the problem consistent with original TADG objectives
- ◆ Gross charging required for alternative residual solutions in order to solve the problem
- ◆ Minded to take some form of GSAM forward for consultation

# 2. Summary of Issues Presented at Meeting 3

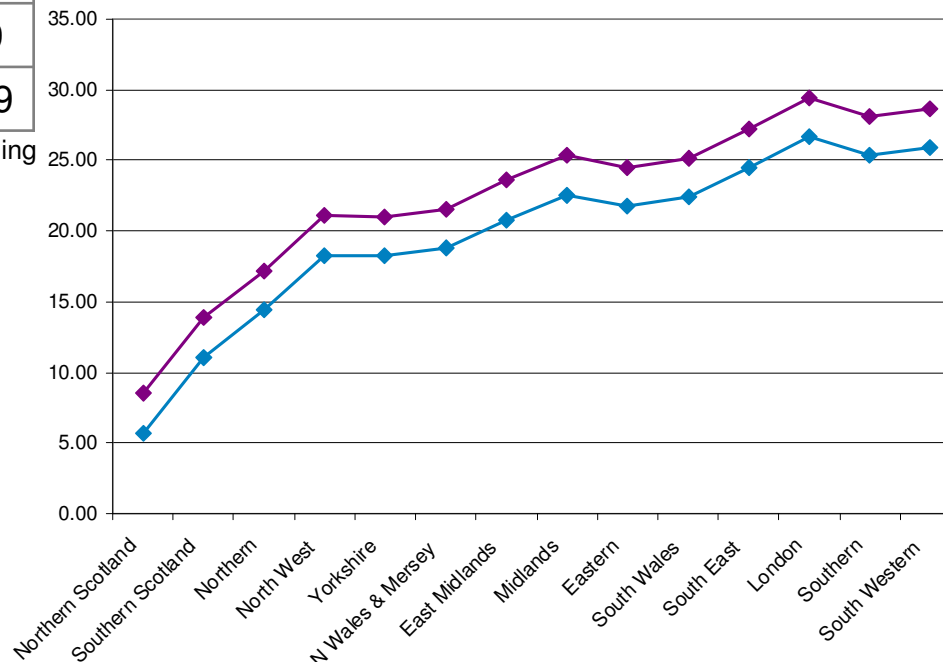
## Alternative Methods of Levying Charges

### Net Demand 27/73

G/D Split	27/73
EC	10.633
LSF	1.8
MAR (£m)	1599.8
Gen (£m)	<b>431.94</b>
Dem (£m)	<b>1167.8</b>
Local	72.36
Gen Residual	3.479
Dem Residual	18.559

Illustrative Figures Used for Modelling

- ◆ Recovery of all revenue locationally was previously investigated
- ◆ Charging the residual to demand was reviewed at meeting 3
- ◆ Entails revenue transfer of ~£330m from demand to generation



### Gross Demand 6.25/93.75

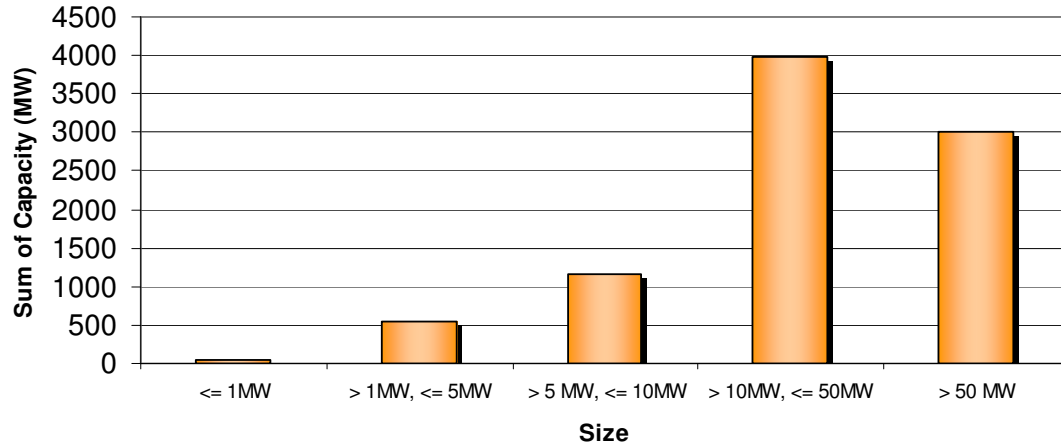
G/D Split	27/73
EC	10.633
LSF	1.8
MAR (£m)	1599.8
Gen (£m)	<b>99.99</b>
Dem (£m)	<b>1499.8</b>
Local	72.36
Gen Residual	<b>0</b>
Dem Residual	<b>20.883</b>

Illustrative Figures Used for Modelling

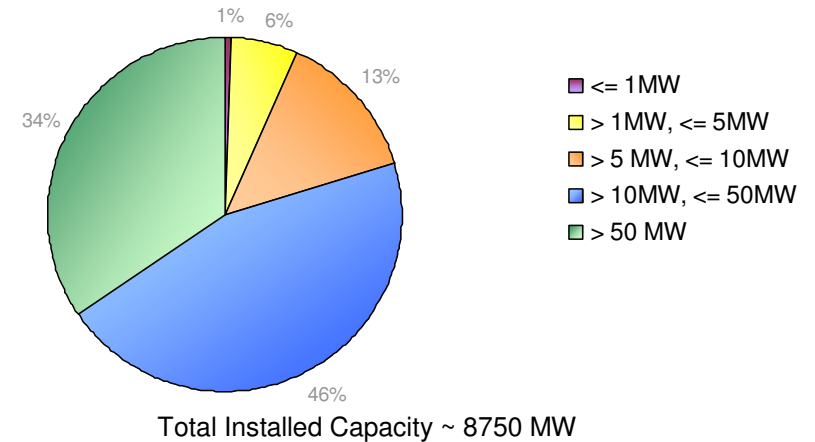
# 2. Summary of Issues Presented at Meeting 3

## Capacity and Sites of GB Embedded Generation

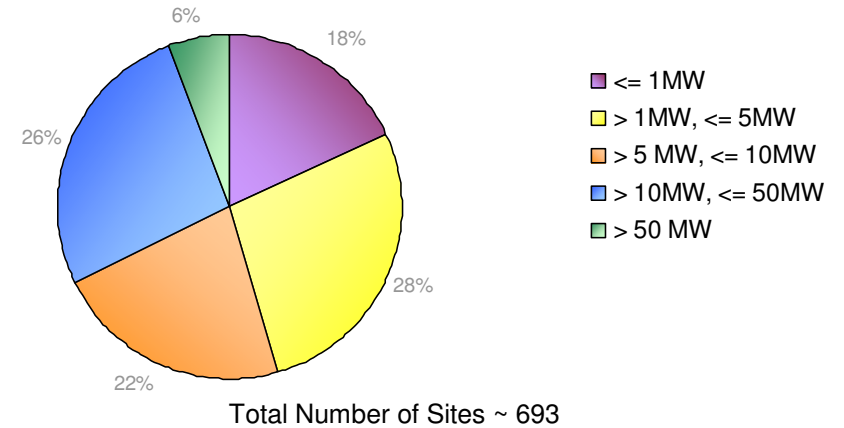
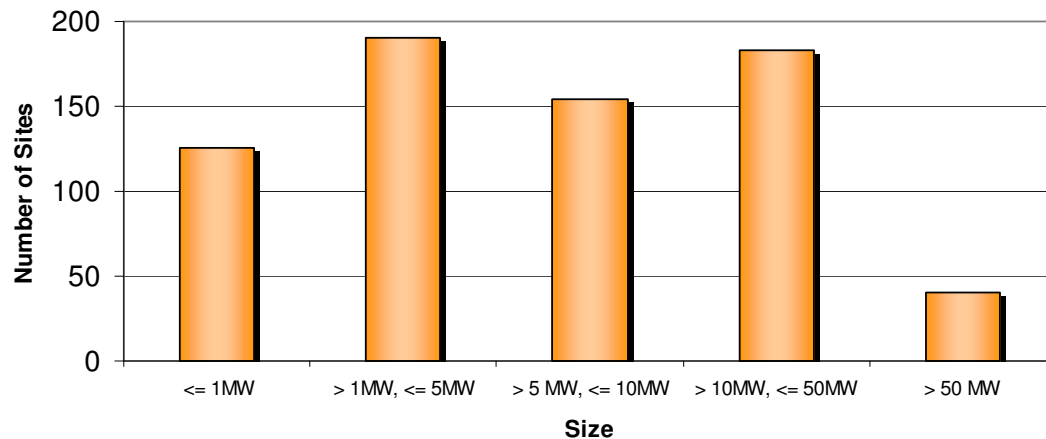
Total Installed Capacity (MW) of GB Embedded Generation by Size



Percentages



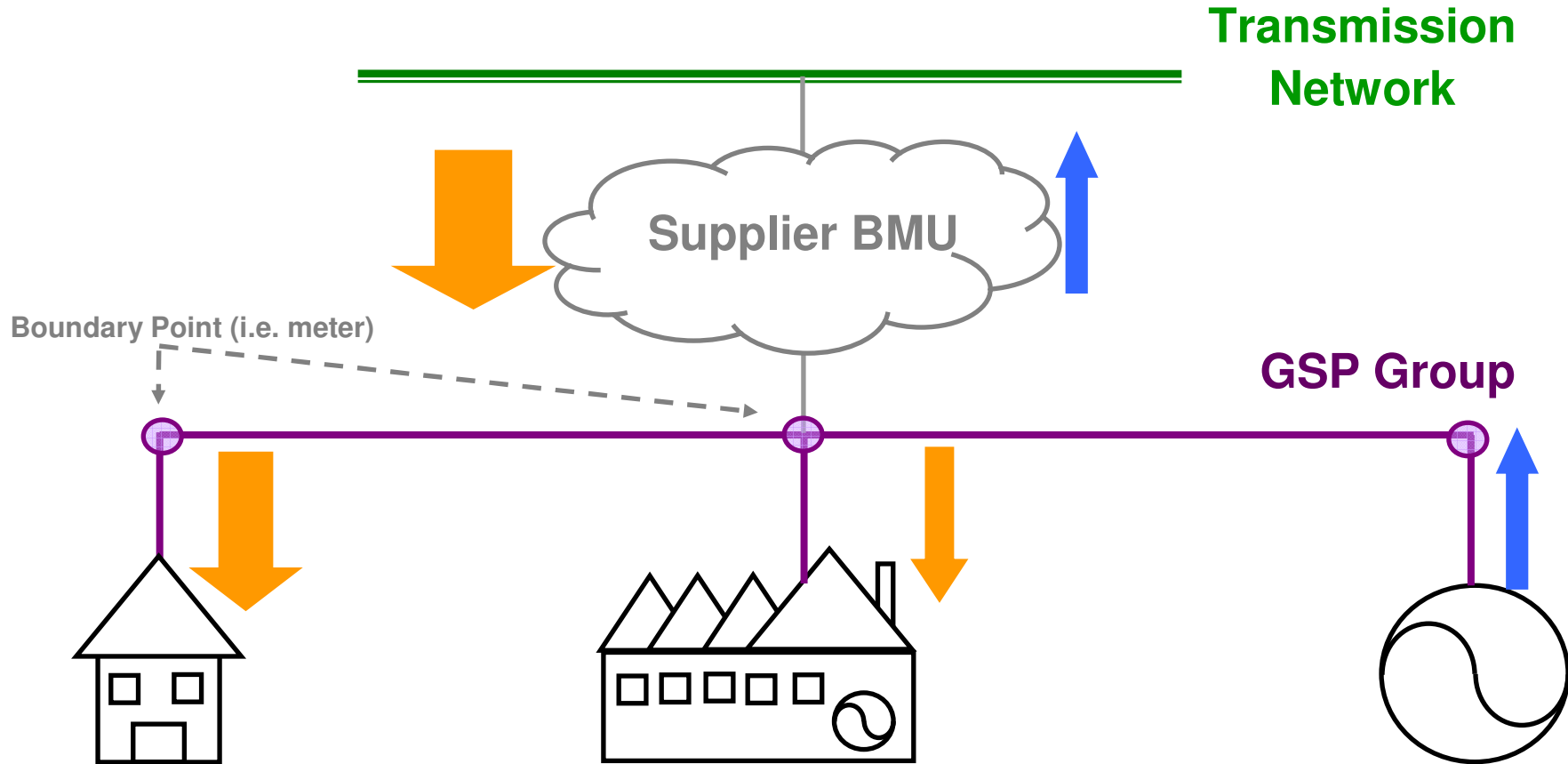
Total Number of Sites by Size of GB Embedded Generation by Size



**Generators > 100MW excluded**

## 2. Summary of Issues Presented at Meeting 3

- ii -



- ◆ Netting occurs behind the Boundary Point
- ◆ On-site generation does not pay for export of electricity consumed on-site

### 3. Options for GSAM Solution

#### Overview

- ◆ Currently suppliers are charged TNUoS on the basis of net consumption per BMU per GSP Group
- ◆ This introduces an arbitrary benefit due to the residual
- ◆ Some form of gross charging (avoiding the need for nodal explicit access rights) is the best solution to this issue via
- ◆ Three possible options:

Method	Supplier TNUoS charges	
	Production	Consumption
<b>Existing</b>	None	Net $D_{TNUoS}$ on Triad MW
<b>Option A</b>	Gross $G_{TNUoS}$ on Triad MW	Gross $D_{TNUoS}$ on Triad MW
<b>Option B</b>	Gross $G_{TNUoS}$ on Installed MW	Gross $D_{TNUoS}$ on Triad MW
<b>Option C</b>	None	Net Loc. element of $D_{TNUoS}$ on Triad MW + Residual on Gross MWh (or Triad MW)

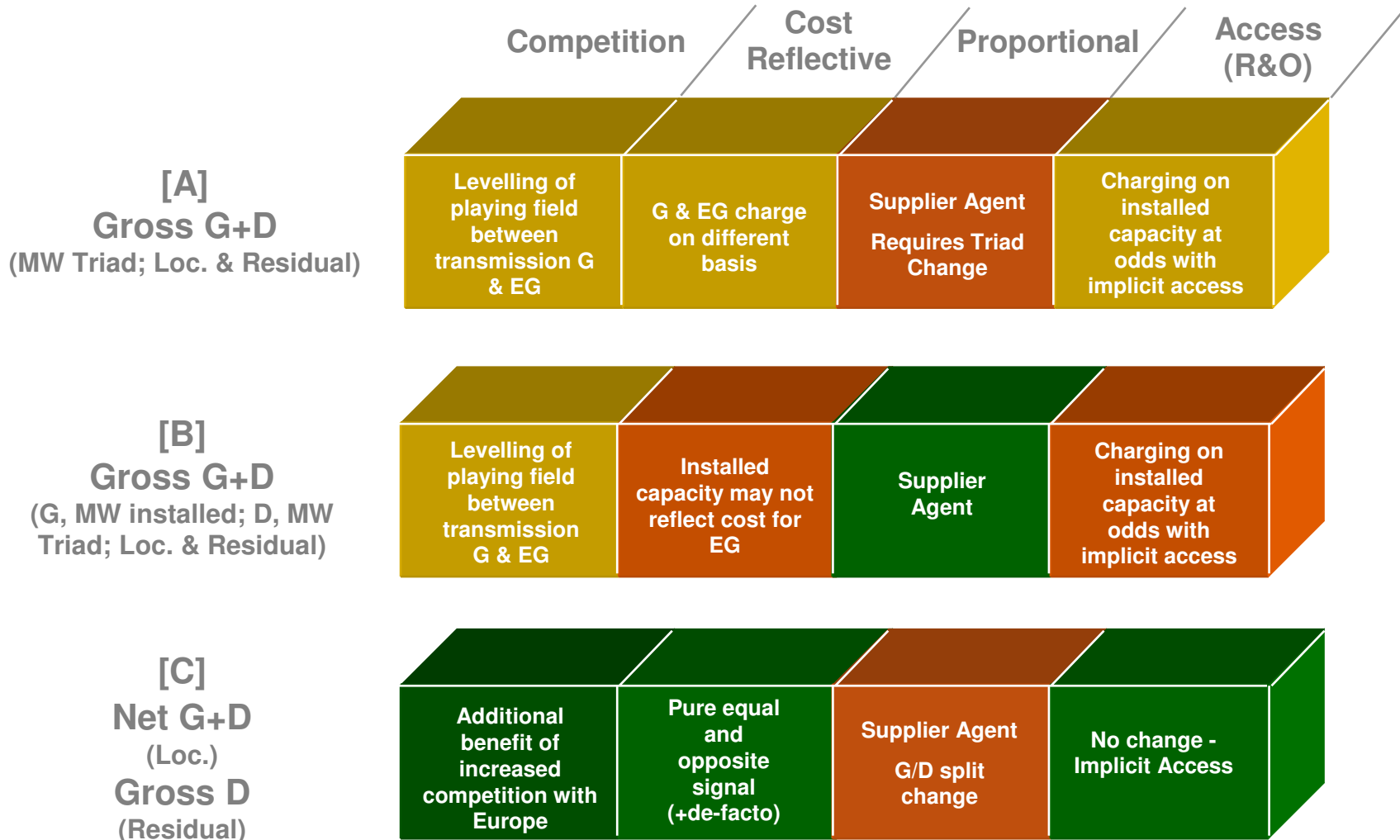
### 3. Options for GSAM Solution

#### *Example*

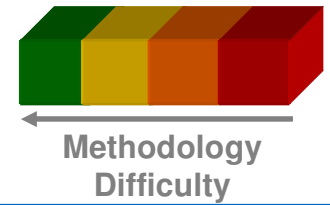
- ◆ For a supplier BMU with 10 consumption units (at Triad) and 5 production units (output 4 units over Triad):

Method	Supplier TNUoS charges	
	Production	Consumption
Existing	-	6 MW x $D_{TNUoS}$
Option A	4 MW x $G_{TNUoS}$	10 MW x $D_{TNUoS}$
Option B	5 MW x $G_{TNUoS}$	10 MW x $D_{TNUoS}$
Option C	-	6 MW x Loc. element of $D_{TNUoS}$ + Gross MWh (or 10MW) x Residual

# 3. Options for GSAM Solution Objectives



# 3. Options for GSAM Solution Issues



De-facto Benefit / Deminimus Threshold / Triad / Supplier Implement / D&G Zone Alignment

**[A]**  
**Gross G+D**  
 (MW Triad; Loc. & Residual)

Benefit netted from charge	Generators may or may not pay depending on Triad output	Incentive not to generate at peak in exporting zones	Suppliers to change contracts with EG Timescale?	Zonal misalignment requires solution for EG
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**[B]**  
**Gross G+D**  
 (G, MW installed; D, MW Triad; Loc. & Residual)

Benefit netted from charge	Threshold required may simply move perverse incentives	No interaction with Triad	Suppliers to change contracts with EG Timescale?	Zonal misalignment requires solution for EG
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**[C]**  
**Net G+D**  
 (Loc.)  
**Gross D**  
 (Residual)

Would require separate payment to EG	Threshold not required	Negative demand charging zones require change to Triad	Major change to supplier contracts 18 months?	Zonal misalignment issues same as existing arrangements
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### 3. Options for GSAM Solution

#### *Establishing the De-facto Benefit*

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- ◆ Gross charges for embedded generators may benefit from a cost reflective discount
- ◆ Avoided local investment associated with ***demand reduction*** and ***generation connection*** costs
- ◆ Seek to avoid double counting  
(i.e. investment already accounted for in locational element of TNUoS and connection assets)
- ◆ Embedded Generators connecting to purpose built GSPs should not receive discount
- ◆ Previous analysis had demonstrated that the total level of this discount was in the order of £6.50/kW

### 3. Options for GSAM Solution

#### *De-facto Benefit – Avoided Demand Investment*

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- ◆ Previous analysis had utilised a top down approach for avoided exit related investment:

$$\frac{\text{Annual Average Investment}}{\text{Annual Average Demand Increase}}$$

- ◆ This led to annuitised avoided investment of approx. £5/kW
- ◆ Alternatively, using a bottom up approach could look like:

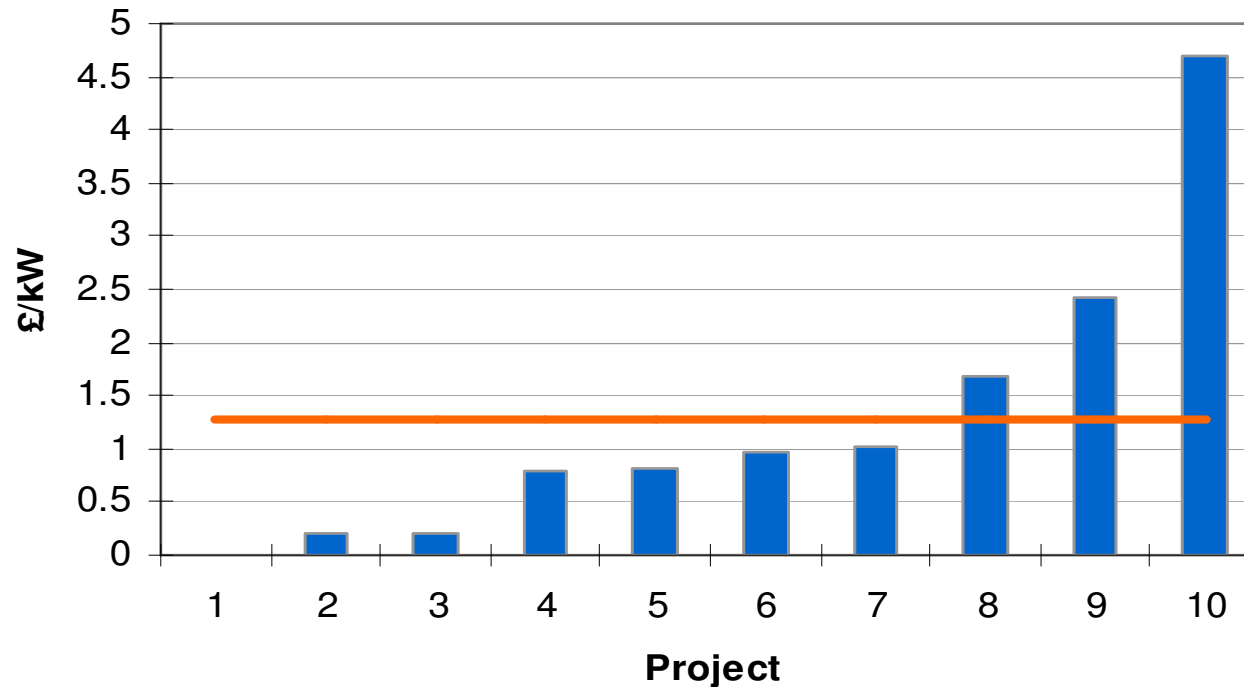
$$\frac{\text{Average SGT Infrastructure Cost}}{\text{Average SGT Size}}$$

- ◆ This leads to a unit cost for a marginal increase in demand of approx. £1/kW (i.e. £3m/240MVA x 8%)
- ◆ This is a significant reduction from the previous estimate
- ◆ Can this be corroborated?

### 3. Options for GSAM Solution

#### *De-facto Benefit – Avoided Demand Investment*

**Annuitised Infrastructure Costs - Exit Related Projects**



- ◆ Comparing infrastructure costs vs. capacity delivered amounts to an average annuitised cost of ~£1.3/kW
- ◆ Based on a sample of 10 recent E&W projects

### 3. Options for GSAM Solution

#### *De-facto Benefit – Avoided Generation Investment*

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- ◆ Previous analysis had utilised Local NGET revenue drivers from TPCR4:

	Local UCA
South & South West	15
Thames Estuary	15
London	60
South Wales	15
East of England	10
West Midlands	5
East Midlands	5
North West & North Wales	30
Yorkshire & Lincolnshire	15
North East	15

- ◆ Averaged across the revenue driver zones this gave an annuitised cost of ~ £1.50/kW
- ◆ Unit cost allowances can include some elements of cost already included in the transport model

### 3. Options for GSAM Solution

#### *De-facto Benefit – Avoided Generation Investment*

- ◆ A similar bottom-up approach could be used for calculating a generic unit cost of connecting generation
- ◆ How much generation capacity is to be assumed as delivered by a given connection?
- ◆ Methodology should not duplicate inter-voltage level economic efficiencies, but rather reflect avoided incremental investment
- ◆ This has already been done in the local substation charge

Substation Rating	Connection Type	Substation Voltage		
		132kV	275kV	400kV
<1320 MW	No redundancy	0.135	0.082	0.066
<1320 MW	Redundancy	0.305	0.195	0.157
>=1320 MW	No redundancy	0.000	0.261	0.210
>=1320 MW	Redundancy	0.000	0.423	0.340

- ◆ Set at price control and indexed by RPI

### 3. Options for GSAM Solution

#### *De-facto Benefit – Combined*

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- ◆ Overall re-calculated benefit may therefore equate to:

Avoided incremental demand investment ~ £1.30 /kW

Avoided incremental generation connection ~ £0.135/kW

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Total Benefit ~ £1.435/kW

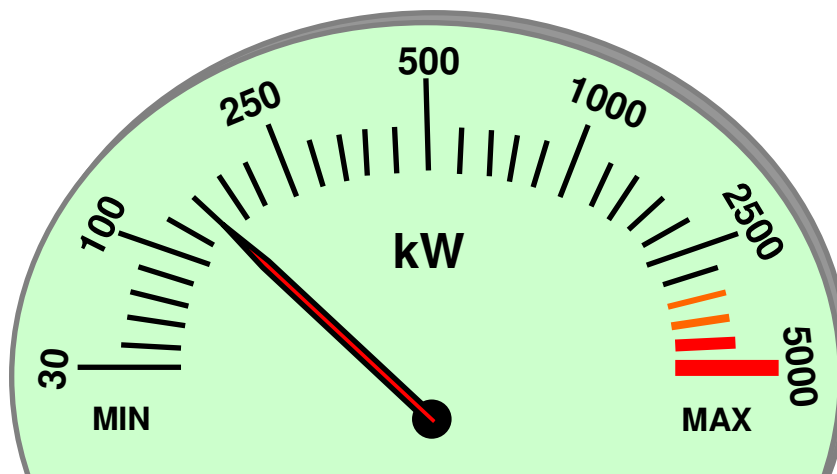
- ◆ To be explored in consultation

### 3. Options for GSAM Solution

#### *Deminimus Level – Range of Options*

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- ◆ Minimum level below which embedded generators would not be charged on a gross basis
- ◆ Seek to avoid introducing greater perverse incentives than those associated with the existing embedded benefit
- ◆ Practically limited to charging users with HH metering due to data requirements
- ◆ 30kW maximum threshold for exporting sites; smart meters predominately HH; deminimus threshold should not be based on meter type



### 3. Options for GSAM Solution

#### *Deminimus Level – Approach*

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- ◆ All else being equal, in order to avoid perverse incentives threshold should be as low as possible
- ◆ Is there any interaction with the Feed-in-Tariff (FiT)?
- ◆ A tariff calculated to increase return on investment by between 5 – 8% was found to likely be sufficient to promote investment for efficiently located units
- ◆ Meeting 3: Seek to minimise impact on government policy objectives (FiT) with solution to ‘embedded benefit’ issue:
  - ◆ To what extent was ‘embedded benefit’ taken into account when setting FiT levels?
- ◆ Subsequent discussions with DECC FiT economists has revealed that network charges were not taken into account when calculating FiT

### 3. Options for GSAM Solution

#### *Deminimus Level – Approach*

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- ◆ Does generation technology factor into the decision?
  - ◆ Conventional, renewable, CHP
- ◆ No solution would completely avoid perverse incentives at the threshold
- ◆ Theoretically, the lower the threshold, the less chance for perverse incentives
- ◆ Seek to avoid charging domestic users with generation
- ◆ With a 45A consumer unit, max. power is 10.8kW; 30kW threshold is therefore likely to avoid all domestic users
- ◆ To be explored in the consultation

### 3. Options for GSAM Solution

#### *Misalignment of Charging Zones – D&G Zones*

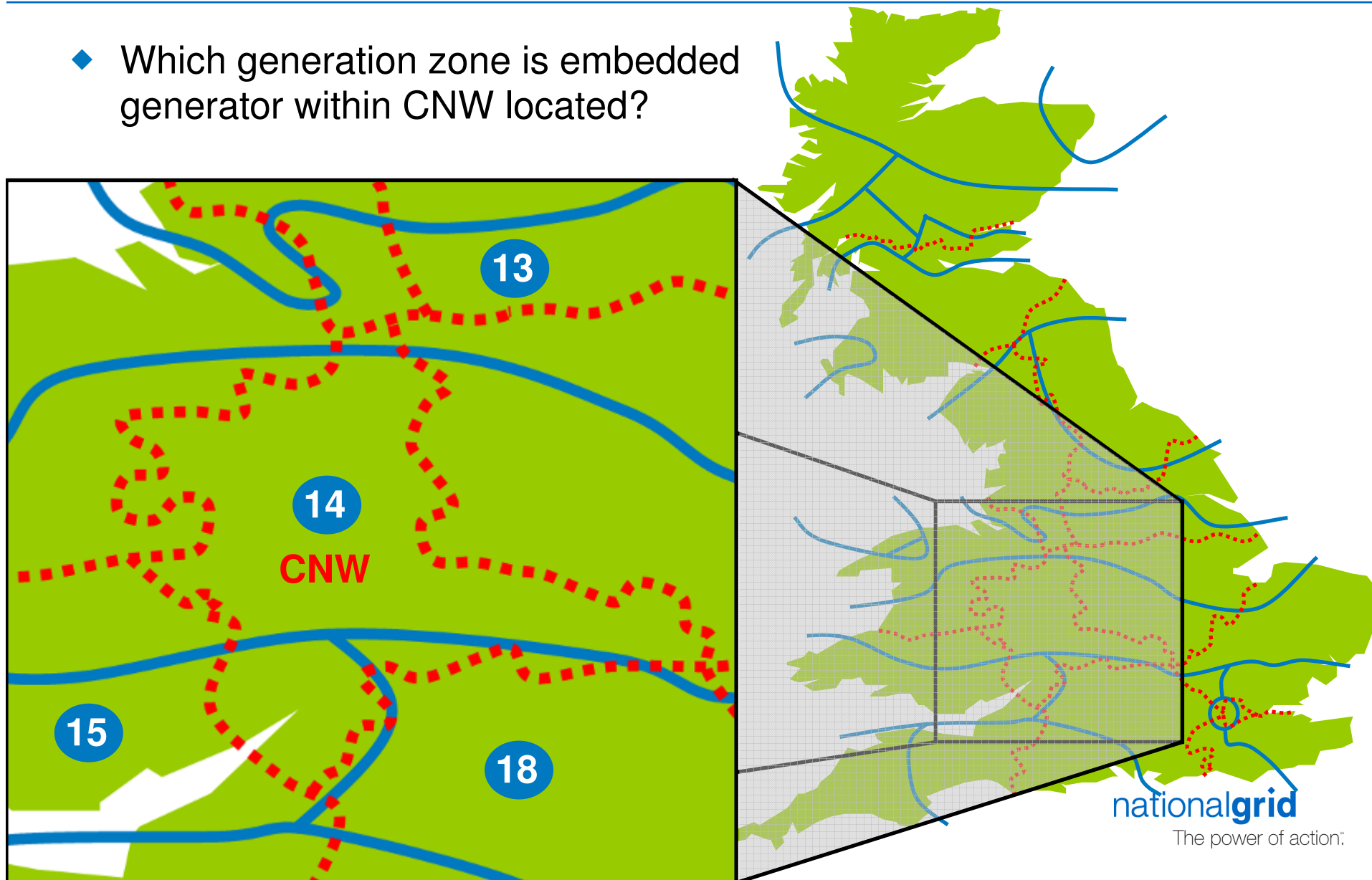
- ◆ Locational TNUoS elements calculated as equal and opposite
- ◆ Generation zones calculated based on stable, but cost reflective criteria
- ◆ Rigidity of demand zoning due to metering limitations limits disaggregating
- ◆ Demand Zones = GSP Groups



### 3. Options for GSAM Solution

#### *Misalignment of Charging Zones – The Problem*

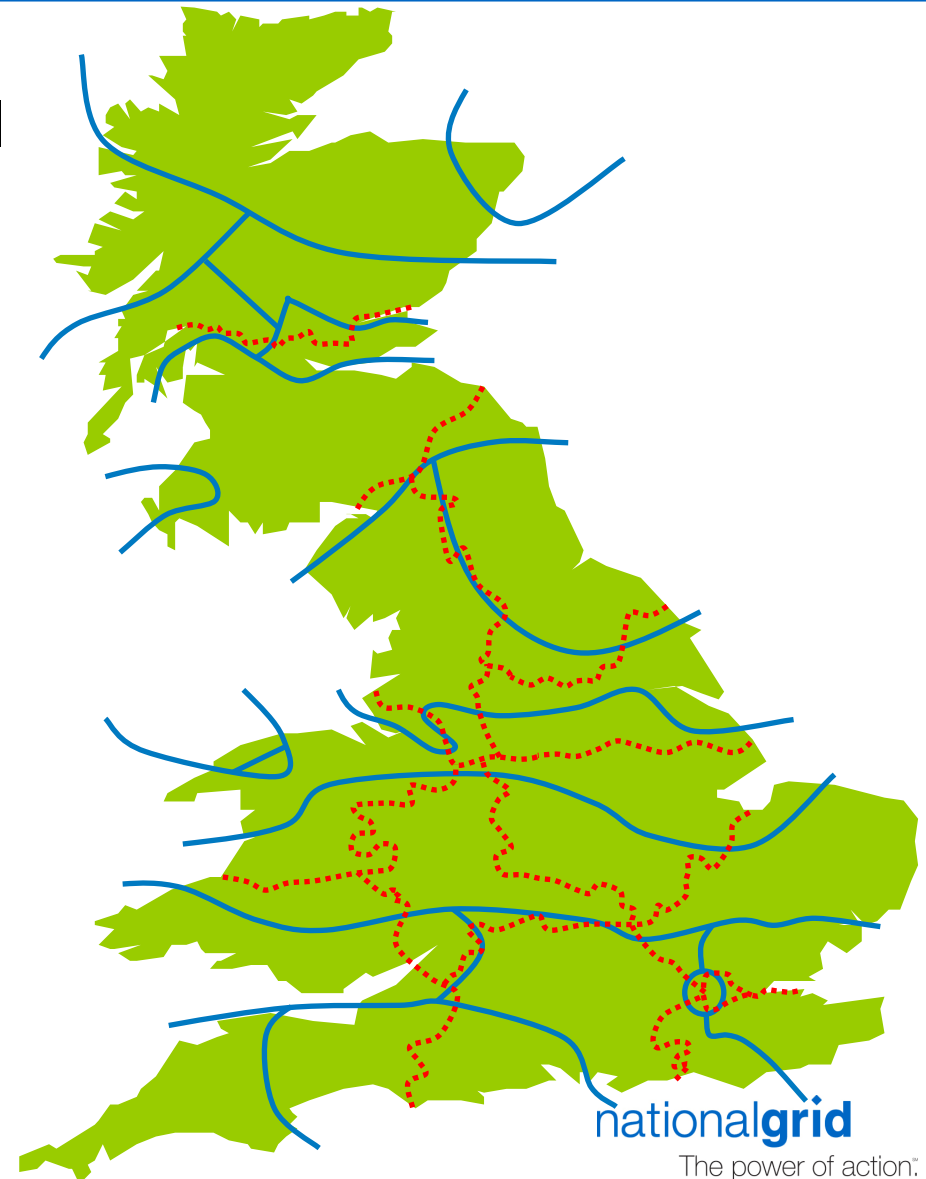
- ◆ Which generation zone is embedded generator within CNW located?



### 3. Options for GSAM Solution

#### *Misalignment of Charging Zones – Possible Solutions*

- ◆ Request additional locational information beyond GSP Group information
- ◆ Simple averaging
- ◆ Weighted averaging
- ◆ Other 'rule of thumb' approach
  
- ◆ No solution will allow 100% alignment



# 4. Lunch



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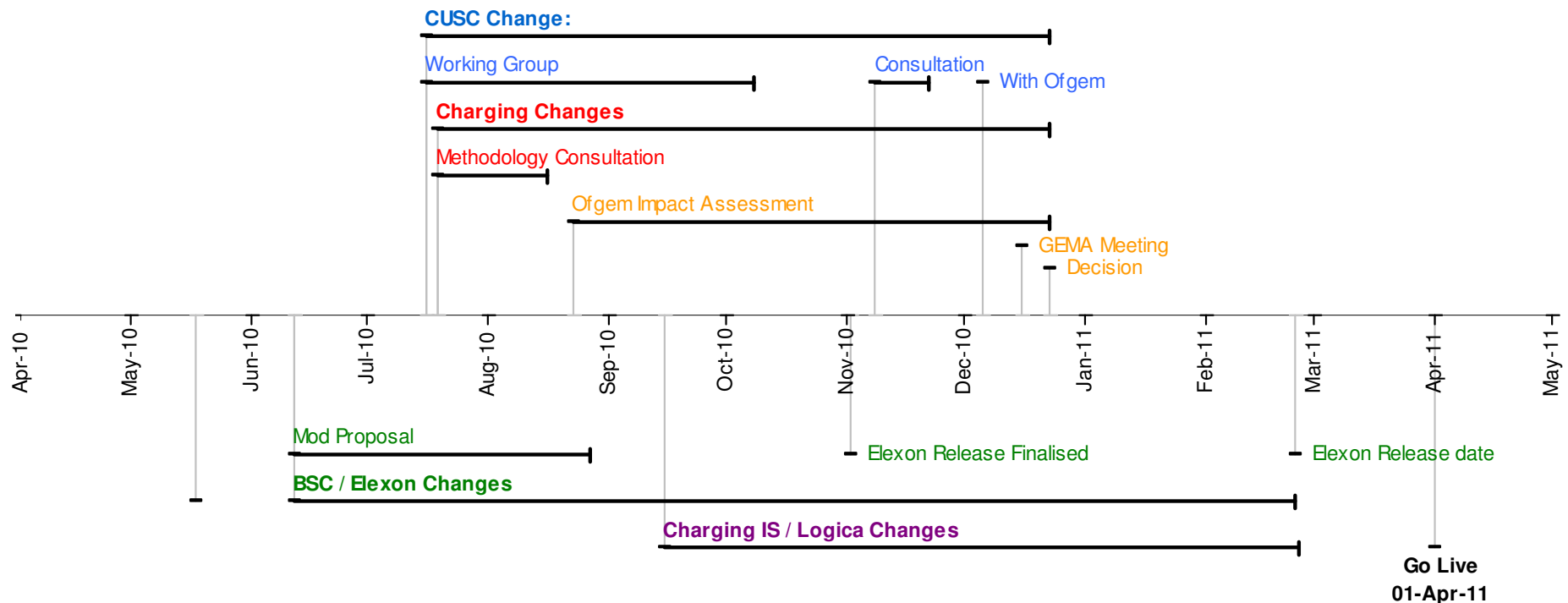
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7.	AOB	-	10 minutes 14:30
<b>End</b>			<b>14:40</b>

# 5. Industry Framework Changes and Timescales

## *Indicative Timeline*



### Note:

- ◆ BSC modification process begins prior to Charging modification
- ◆ Assumes 4 month impact assessment period
- ◆ Supplier implementation timescales to be confirmed

# Presentation to BSUoS Panel

## Modification Proposal P260

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# BSC P260 – Extension of Data Provided to the Transmission Company in the TUoS Report

Ivo Spreeuwenberg

10<sup>th</sup> June



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# Context & Timing

## *Licence Obligation*

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- ◆ SLC C13 – Small Generator Discount
- ◆ Interim charging solution at BETTA; resolution requires fundamental problem to be addressed
- ◆ Further information required in order to review and address the benefit for embedded generation introduced through the residual element of TNUoS
- ◆ All charging options under consideration would require the same modification
- ◆ SLC C13 ‘best endeavours’ to develop and implement a solution by April 2011
- ◆ BSC modification proposal brought forward ahead of charging methodology change in order to allow possibility of Feb. 2011 release date; to facilitate May 2012 reconciliation

# TUoS Report (P0210) Changes

## 2 Additional Data Elements

- ◆ 4 pieces of data are currently utilised by the Transmission Company for invoicing from a portion of the P0210 file under GSP Group → Supplier
- ◆ The proposed modification to this file would disaggregate the Period BMU HH Allocated Volume into three separate data items:
  - ◆ Net Period BMU HH Allocated Volume (Demand minus generation; as received currently but **renamed**)
  - ◆ Gross Period BMU HH Allocated Demand Volume (**Gross Demand; new data item**)
  - ◆ Gross Period BMU HH Allocated Generation Volume (**Gross Generation; new data item**)

BMU	0-*			
	BMU Unit Id	text(11)	TRUE	File uploaded to Eve
	Default BMU Unit Flag	text(1)	TRUE	
	HHA	HHA	0-*	
	Settlement Period Id	integer(2)	TRUE	File uploaded to Eve
	Settlement Period Label	text(6)	TRUE	
	Period BMU HH Allocated Volume	decimal(13,4)	TRUE	File uploaded to Eve
	Period BMU NHH Allocated Volume	decimal(13,4)	TRUE	File uploaded to Eve

# BSC Changes

## Table 7, Annex V – 1, Section V - Reporting

TABLE 7 – SVAA REPORTING

Category of Data	Frequency	Recipient	General Description
Supplier Consumption Information	Daily	Relevant Party	Supplier consumption data per Settlement Period and/or Settlement Day aggregated by Supplier BM Unit and/or Supplier and GSP Group for each such Supplier Where appropriate, such data is by
GSP Group Consumption Information	TUoS Report	Daily	Transmission Company
GSP Group Profile Information			
DUoS Report			
			Report containing GSP Group Correction Factor and GSP Group Scaling Weight are provided
TUoS Report	Daily	Transmission Company	Various reports containing GSP Group Take, Supplier Deemed Take by Settlement Period and/or Settlement Day in respect of each GSP Group and Supplier, and half hourly and non-half hourly consumption by Settlement Period and/or Settlement Day in respect of each Supplier BM Unit.

◆ Example possible modification to text:

...and Supplier, half hourly production and consumption and non-half hourly consumption by Settlement Period....

Various reports containing GSP Group Take, Supplier Deemed Take by Settlement Period and/or Settlement Day in respect of each GSP Group and Supplier, and half hourly and non-half hourly consumption by Settlement Period and/or Settlement Day in respect of each Supplier BM Unit.

# Use of Data

## *Charge Setting, Reconciliation and Efficient Revenue Management*

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**Annual Charge Setting**  
(January [Y0] – Data in Oct./Nov.[Y-1])

**Billing**  
(Monthly [Y0])

**Reconciliation**  
(May [Y+1])



- ◆ Annual charge setting for 2011 would need to be done based on data provided through a data request
- ◆ Data utilised intra-year in order to corroborate CUSC *Demand Forecasts* (CAP55) and effectively manage the collection of transmission revenue
- ◆ More efficient and accurate enduring solution is likely to be a change to systems

# BSC Objectives

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*(a) the efficient discharge by the Transmission Company of the obligations imposed under the Transmission Licence;*

**Help facilitate compliance with SLC C13 by the Transmission Company**

*(c) promoting effective competition in the generation and supply of electricity;*

**Allow the Transmission Company to consider and implement changes to transmission charges that address the perceived discrepancy between embedded and transmission connected generators**

*(d) promoting efficiency in the implementation and administration of the balancing and settlement arrangements;*

**Better facilitate the determination and allocation to BSC parties of the quantities of electricity delivered to and taken off the total system**

# Impact

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- ◆ **Transmission Company**
- ◆ **ELEXON**

**Parties**

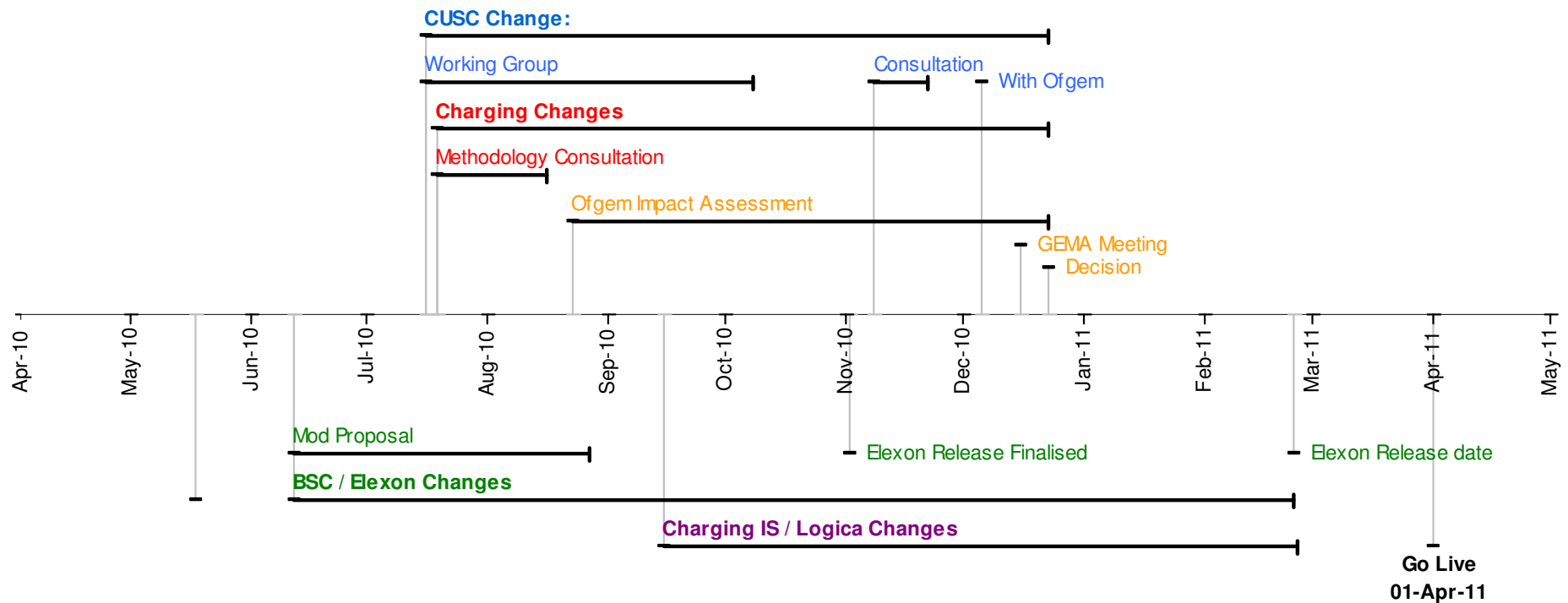
- ◆ **SVA Data Catalogue Volume 1**
- ◆ **Settlement Software Document update**

**Documents**

# Recommendations

## ◆ Amendment goes to working group (WG) / report

- ◆ Propose that cost and time implications worked up through WG
- ◆ Possible interim use of data requests if Feb. release not achievable as a result of wider framework interactions



- ◆ Enduring solution requires daily information to efficiently manage revenue flows within year

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**June Working Group**

**July Panel for Decision on  
Consultation**

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## 5. Industry Framework Changes and Timescales

### *CUSC Changes*

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- ◆ Suppliers currently supply National Grid with 'Demand Forecasts' through the CUSC in order to allow timely adjustment of tariffs
- ◆ Obligation will have to change in order to reflect preferred GSAM solution
- ◆ Changes also likely to be required in order to introduce a compensation mechanism for embedded generators if unable to generate due to a transmission fault
- ◆ Details to be worked up

## 6. Progress on Actions

### *Status as at Meeting 3*

#### *Actions Ongoing*

Meeting	Num.	Action	Update	Raised by	Estimated Completion
05/03/10	1	Data and analysis on the current situation including pros and cons against the objectives of the review	Initial information provided on 22/03 Further information provided on 22/04	LS	Ongoing
05/03/10	6	An indication of how a gross model would deal with: <ul style="list-style-type: none"> <li>- a trading site with generation &amp; demand</li> <li>- a directly connected generator with onsite demand</li> <li>- charging arrangements for generation and demand behind an interconnector</li> <li>- private networks</li> </ul>	Discussed on 22/04	TR	Ongoing
05/03/10	7	How would each proposal effect innovation for suppliers/DNOs	Initial information provided on 22/03	MHS	Ongoing
05/03/10	8	Further information/analysis on the 'de-facto' benefit	To be addressed at a future meeting	RH	21/06
05/03/10	10	Production of a 'money-go-round' to illustrate revenue flows	Initial information provided on 22/03	PJ	Ongoing
05/03/10	13	Rights and obligations associated with connecting DG as opposed to T connected	Discussed on 22/04	JA	21/06
05/03/10	14	A description of why it is better to treat small generators as generators rather than demand		RF	TBA
22/03/10	15	Investigate possible interactions between FiT and GNSAM		MHS	21/06

# 7. A.O.B.



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