

Transmission Arrangements for Distributed Generation

Working Group Meeting 2

22nd March 2010



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1. Housekeeping

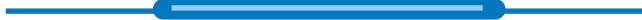
- ◆ Chair
- ◆ Fire/Evacuation Procedure
- ◆ Agenda

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 1	Ivo Spreeuwenberg	15 minutes 10:15
3.	Options for Change	Patrick Hynes	30 minutes 10:30
4.	Overview of Net DNO Agency Model	Patrick Hynes / Ivo Spreeuwenberg	90 minutes 11:00
5.	Lunch		30 minutes 12:30
6.	Progress on Actions i. Initial analysis of current situation ii. Consequences of pure locational charge iii. Potential effects on innovation for suppliers/DNOs iv. Outstanding actions	Ivo Spreeuwenberg / Matthew Hays-Stimson	110 minutes 13:00
7.	Confirmation of Future Meetings	Ivo Spreeuwenberg	10 minutes 14:50
8.	AOB	-	10 minutes 14:50

2. Summary of Issues Presented at Meeting 1

- i -

- ◆ National Grid has obligations through its transmission licence to promote effective competition and charge cost-reflectively
 - ◆ Charges therefore have both a locational element (reflecting impact on investment) and a residual element (collecting revenue)
- 
- ◆ DG is in competition with directly connected generators for supply of demand
 - ◆ DG avoids g-TNUoS and pays negative (i.e. receives) d-TNUoS
 - ◆ If charges were purely locational, this would be broadly cost-reflective and equitable between DG and directly connected
 - ◆ Locational element of d-TNUoS tariffs correctly reflects impact on the **wider** transmission system of a DG in a given location
 - ◆ In addition to the impact on the **wider** transmission system, DG also has an impact on the **local** transmission system.

2. Summary of Issues Presented at Meeting 1

- ii -

- ◆ Impact on **local** system manifests itself as reduced investment at the GSP and avoided generation transmission connection investment
- ◆ High-level analysis suggests that this results in an average saving of ~£6.50/kW over and above the locational signal
 - ◆ A benefit that should be attributed to DG

-
- ◆ Residual element of tariffs introduce an artificial benefit (resulting purely from the charging construct) for DG compared with directly connected generation, thus upsetting the relatively equitable balance between the two
 - ◆ Amounts to the sum of the residual elements of g-TNUoS and d-TNUoS; calculated to be ~£18/kW (increasing to ~£22/kW in 2010/11)

-
- ◆ Result is a non cost-reflective benefit much greater than the additional savings from the avoided **local** transmission system investment

$$\text{£18/kW} - \text{£6.50/kW} = \text{£11.50/kW}$$

Over and above existing locational element of d-TNUoS

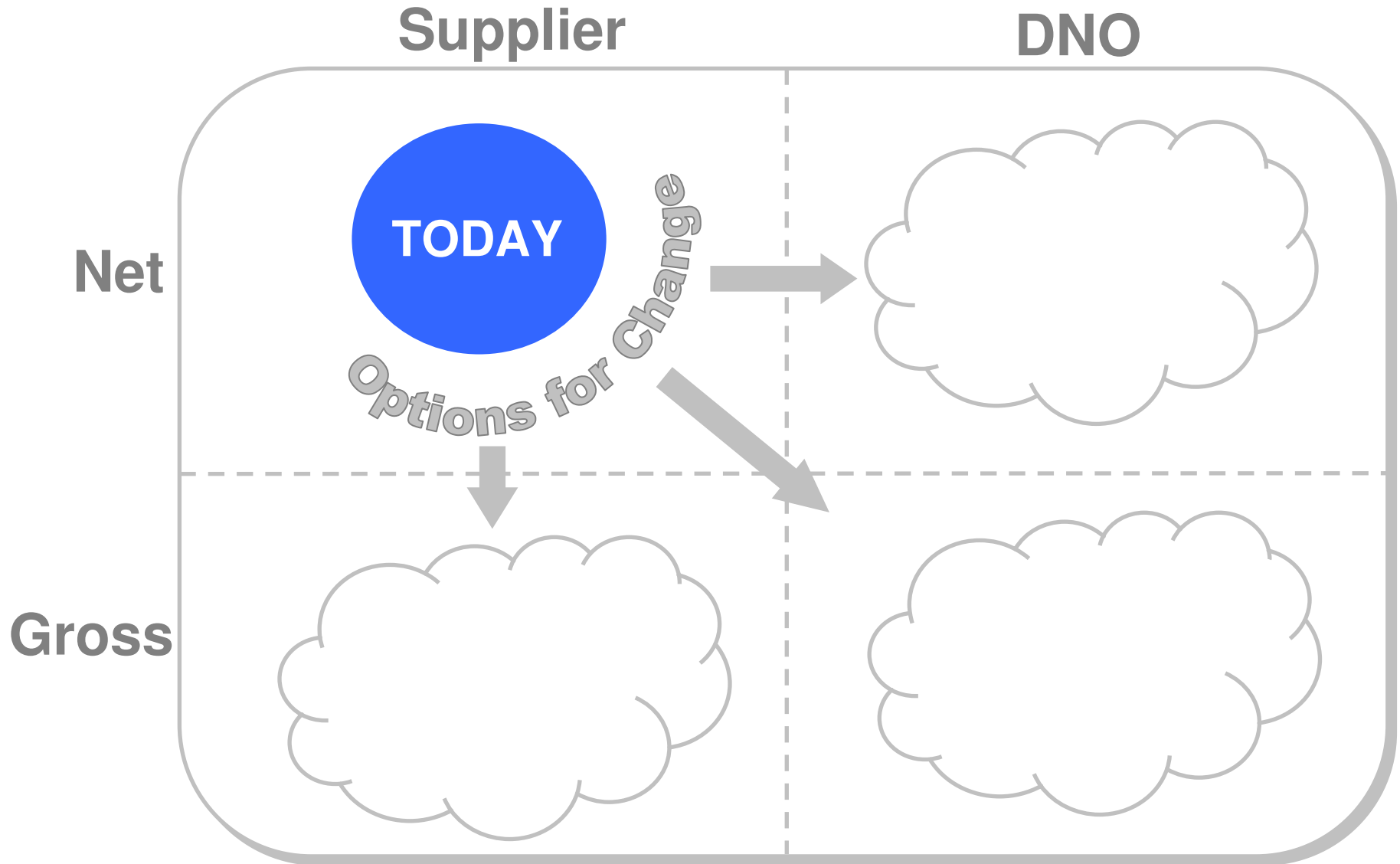
2. Summary of Issues Presented at Meeting 1

- iii -

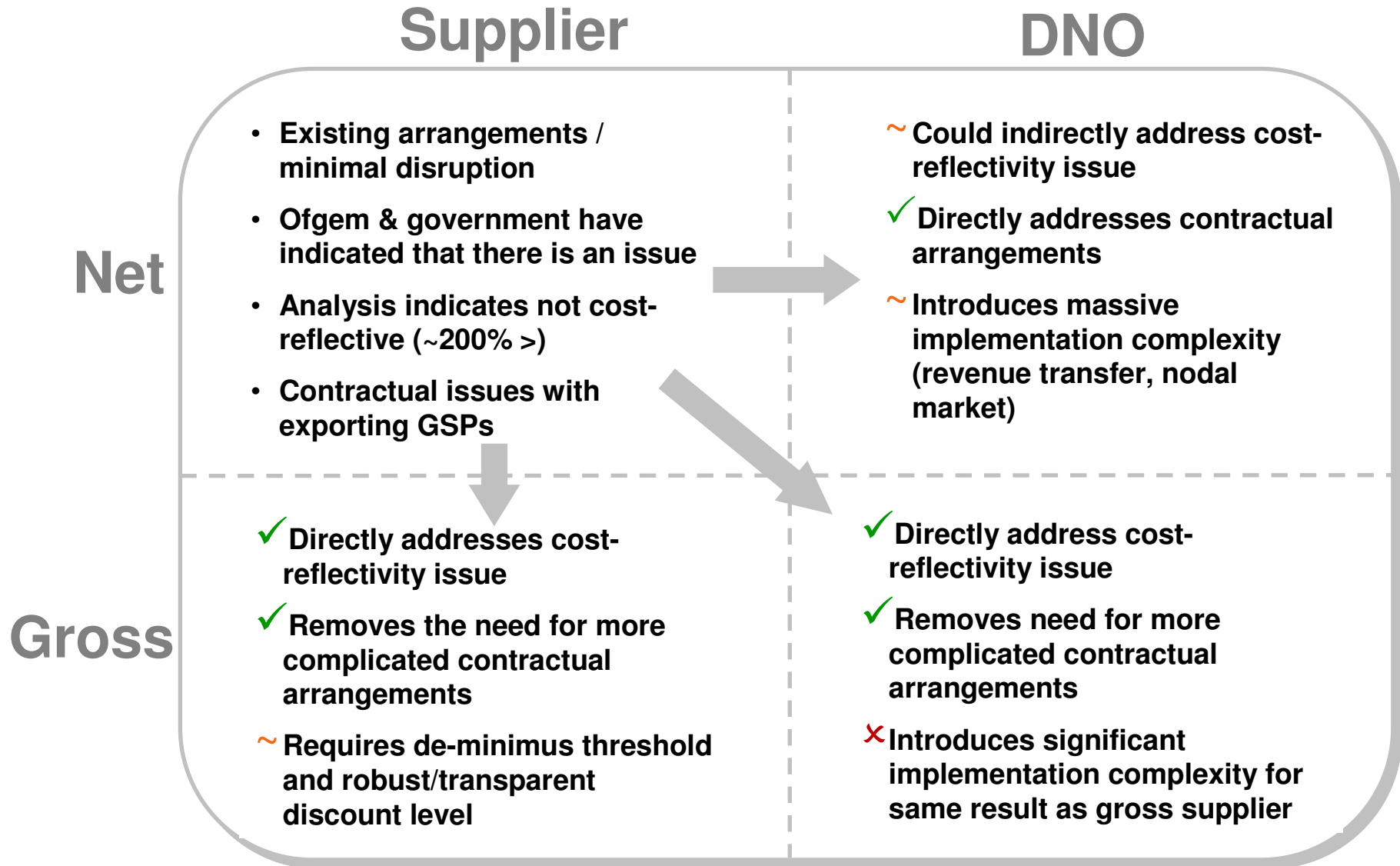
 The problem arises from the residual element of charges 

- ◆ Therefore the solution **must address** the issue of the residual
- ◆ In addition, the contractual issues associated with exporting GSPs should form part of an enduring solution
- ◆ Various options have been investigated through the original TADG working group chaired by Ofgem
- ◆ Broadly these models fall into four categories as discussed at the meeting on March 5th, 2010

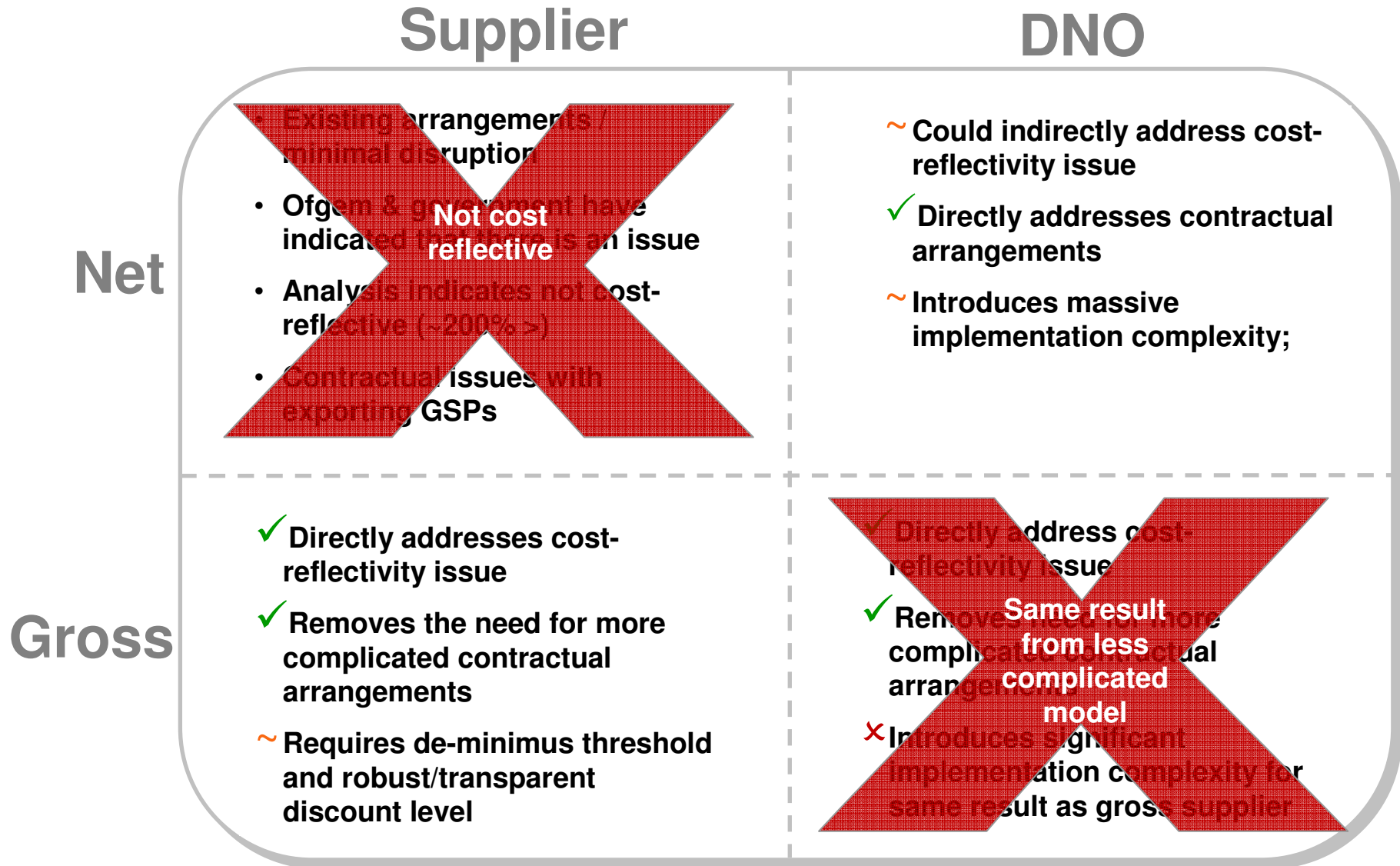
3. Options for Change



3. Options for Change



3. Options for Change



3. Options for Change

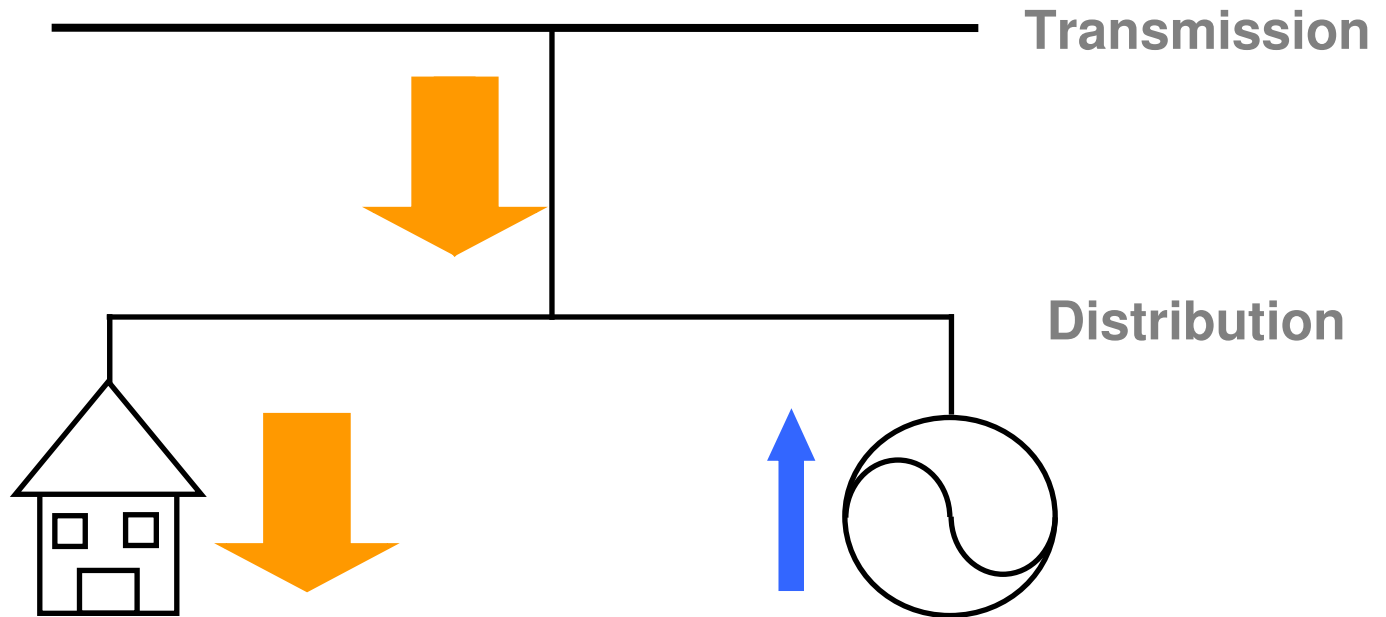
- ◆ Therefore, National Grid launched a pre-consultation in January 2010 focusing on the Gross Supplier and Net DNO models as possible options for change
- ◆ The specifics of how these could be implemented is part of the work to be undertaken through this group
- ◆ There may be sub-options within the 2 broad models (such as how the residual is charged) that warrant further investigation

4. Overview of Net DNO Agency Model

- i -

- a) High level overview
- b) How Net DNO model addresses the issue
- c) Contractual interfaces
- d) Illustrative revenue flows
- e) Framework modifications

4. a) High Level Overview



4. b) How Net DNO addresses the issue

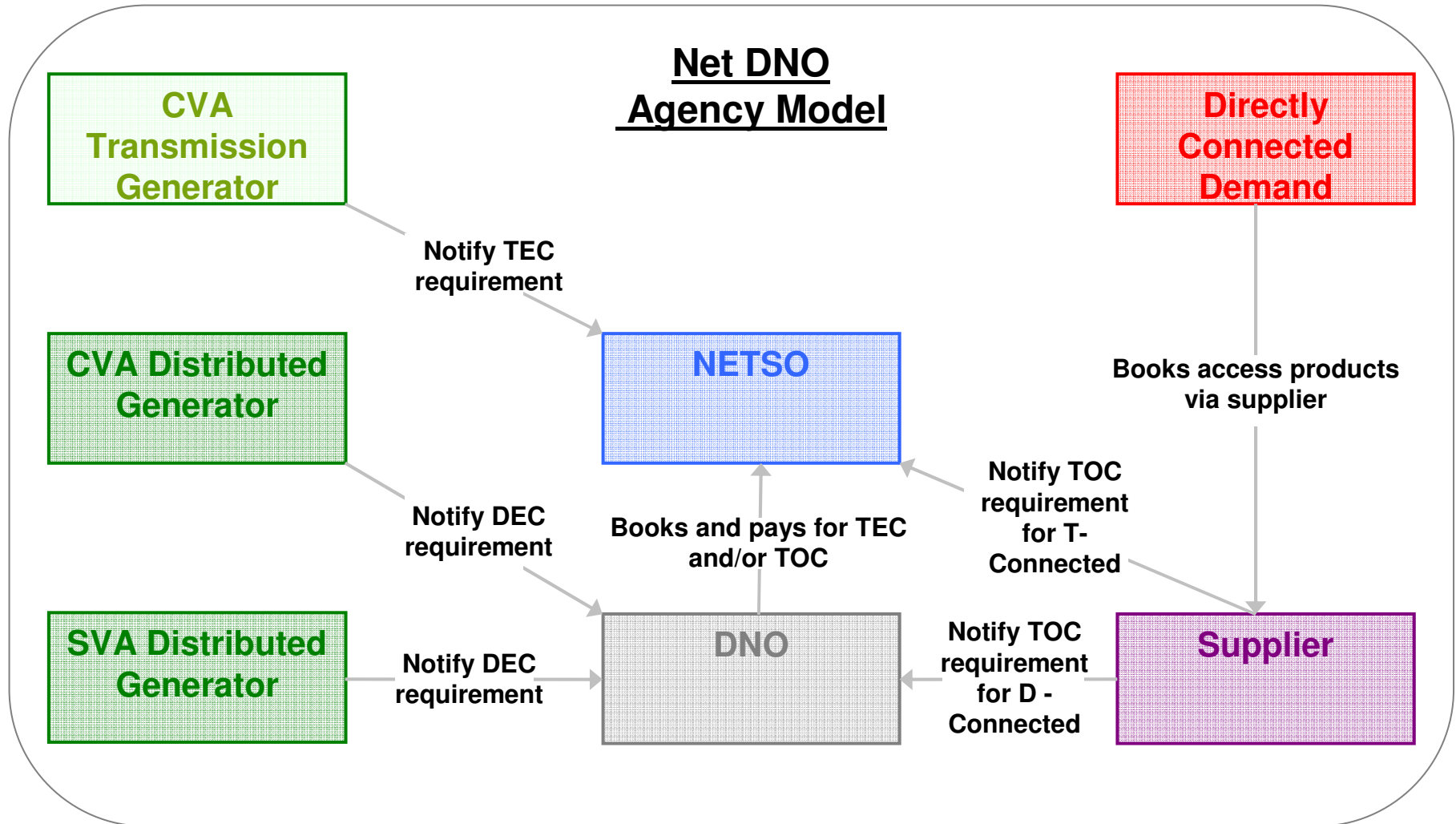
- ◆ Continues to treat DG as negative demand behind a GSP
- ◆ New access products introduced: transmission offtake capacity (TOC) and distribution entry capacity (DEC)
- ◆ Supplier notifies DNO of offtake capacity (TOC) requirements
- ◆ Requires DG Users to book firm entry capacity with DNO (DEC)
- ◆ Exit reform – new products mean that access rights become explicit rather than implicit

4. b) How Net DNO addresses the issue

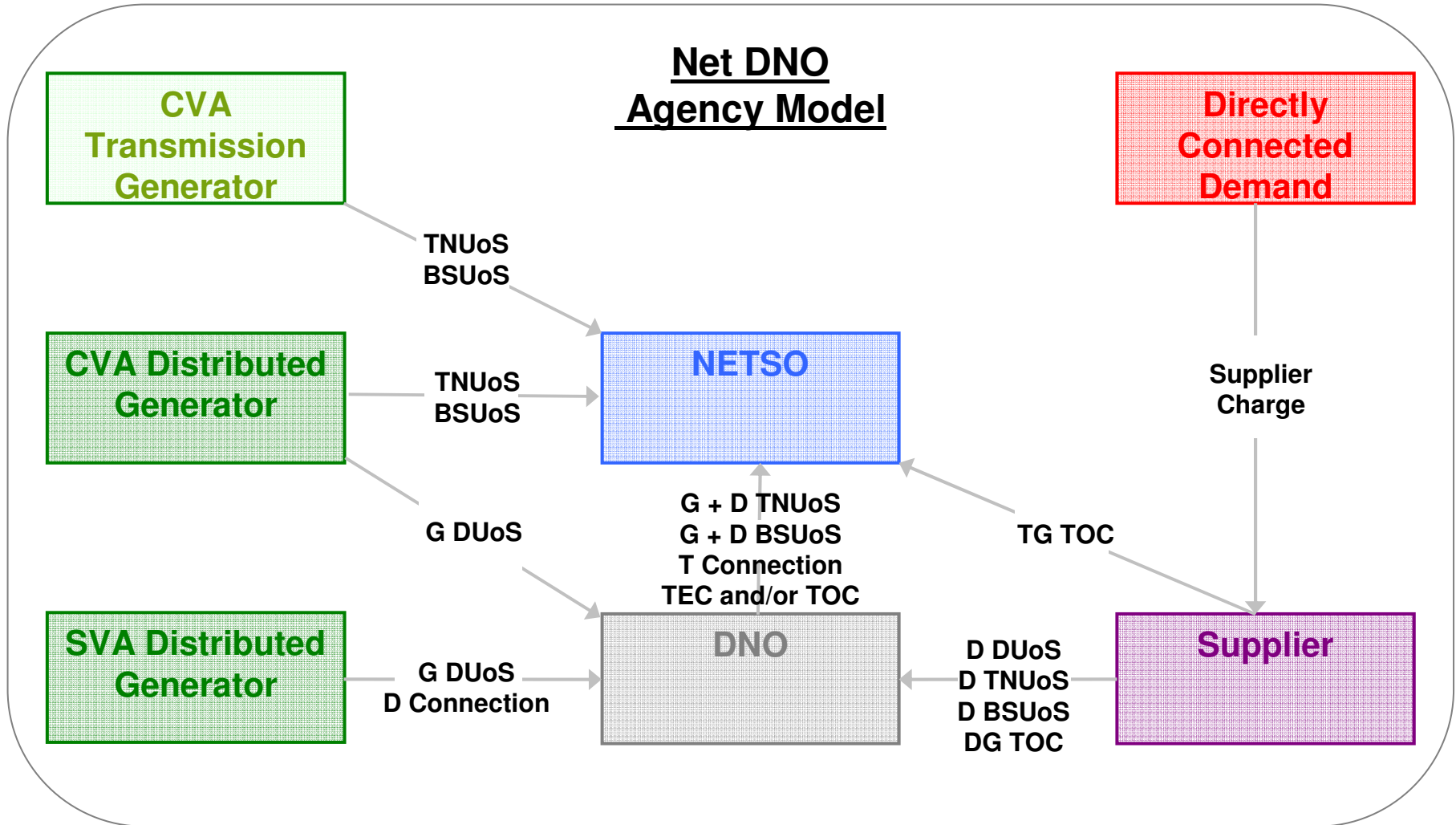
- iv -

- ◆ DNOs forecast net position for each grid supply point and book TEC and/or TOC with National Grid
- ◆ DNOs run Balancing Mechanisms for each supply point that has DG connected
- ◆ DNOs pay TNUoS and BSUoS on behalf of DG
- ◆ DNOs charge cost-reflectively

4. c) Contractual Interfaces



4. d) Illustrative Revenue Flows



4. e) Framework Modifications

- vii -

- CUSC
 - ◆ Role of DNO
 - ◆ Define TOC
 - ◆ Short-term access products

- Grid Code
 - ◆ Role of DNO (despatch and data provision)

- BSC
 - ◆ DNO responsibility for DG
 - ◆ Metering information
 - ◆ Balancing Mechanism registration and settlement systems

- Charging
 - ◆ TNUoS levied on DNOs, direct connects and generators
 - ◆ Removal of HH / NHH differences

4. e) Framework Modifications

- viii -

- ◆ DNO Price Controls would require reopening
- ◆ Further modifications would be required to distribution codes, DCUSA and bilateral agreements

5. Lunch



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Actions 1, 11 & 12

Analysis of Current Situation

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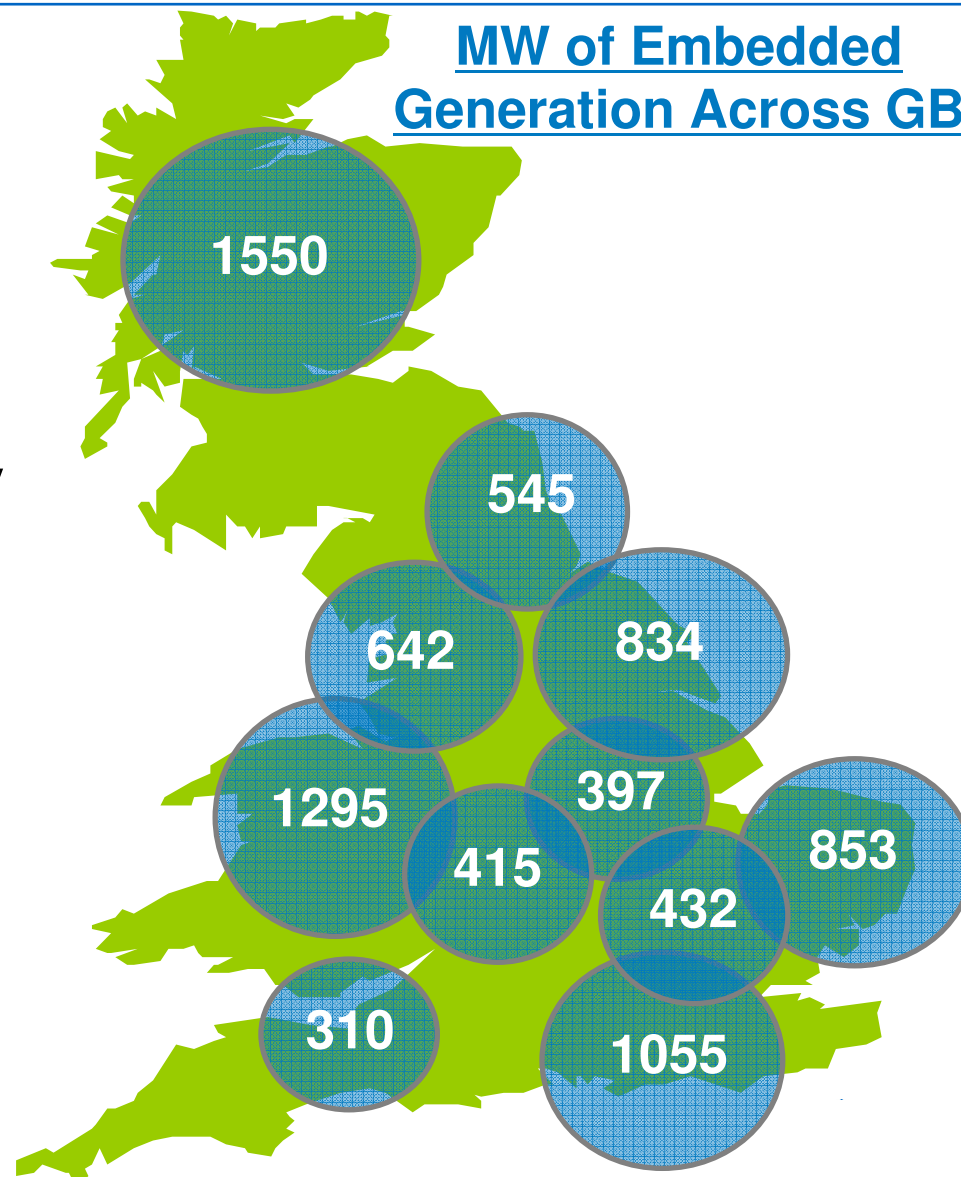
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Analysis of Current Situation

Relative Locations of Embedded Generation

MW of Embedded Generation Across GB

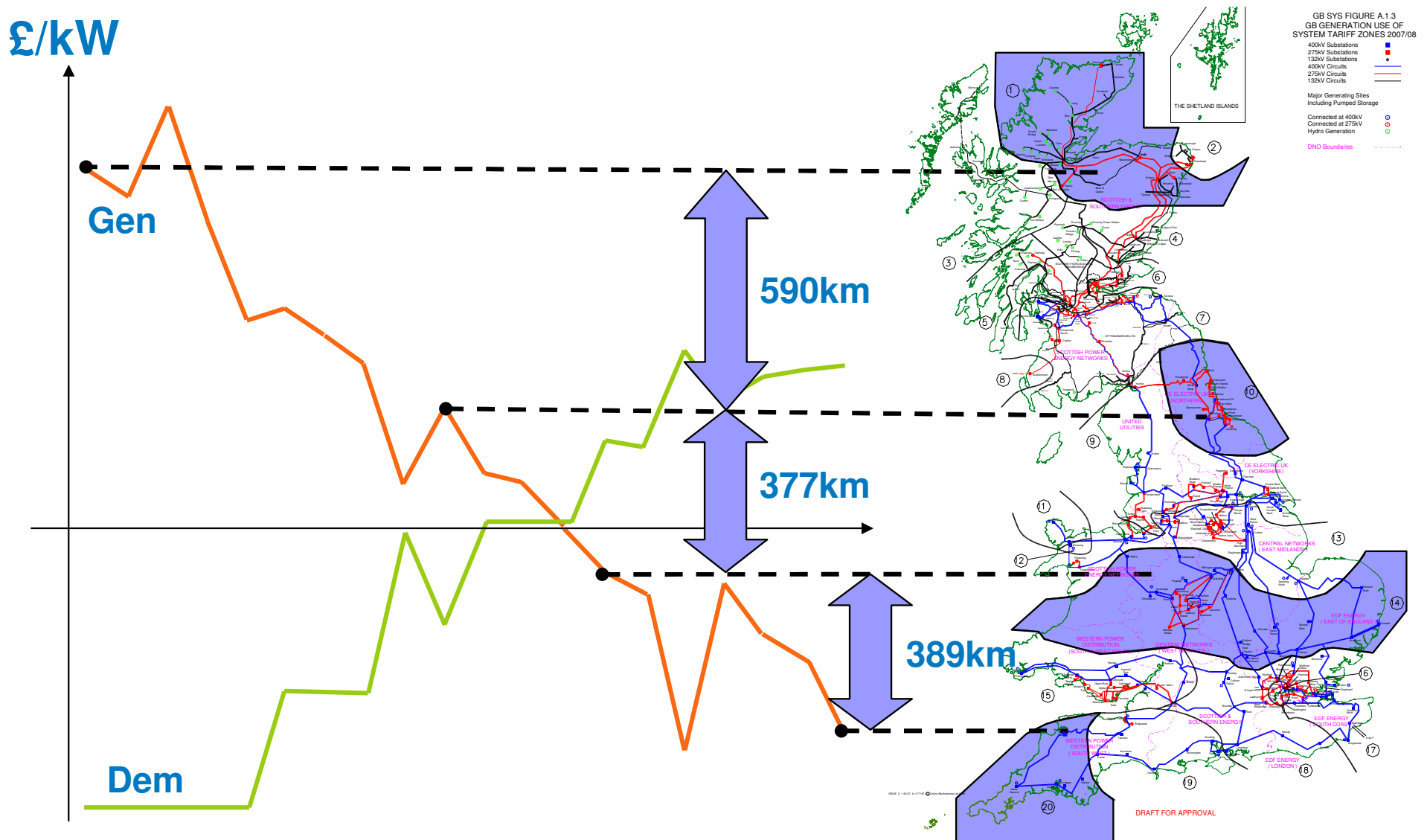
- ◆ We are currently working to collate an up-to-date table of embedded generation data
- ◆ DECC 'Digest of UK Energy Statistics' – 2009*; Tables 5.11 and 5.12 is one source
- ◆ Still not a complete list (e.g. missing some CHP)
- ◆ Indicative analysis to date suggests ~8300MW total



*<http://www.decc.gov.uk/en/content/cms/statistics/source/electricity/electricity.aspx>

Current Situation – Review of TNUoS

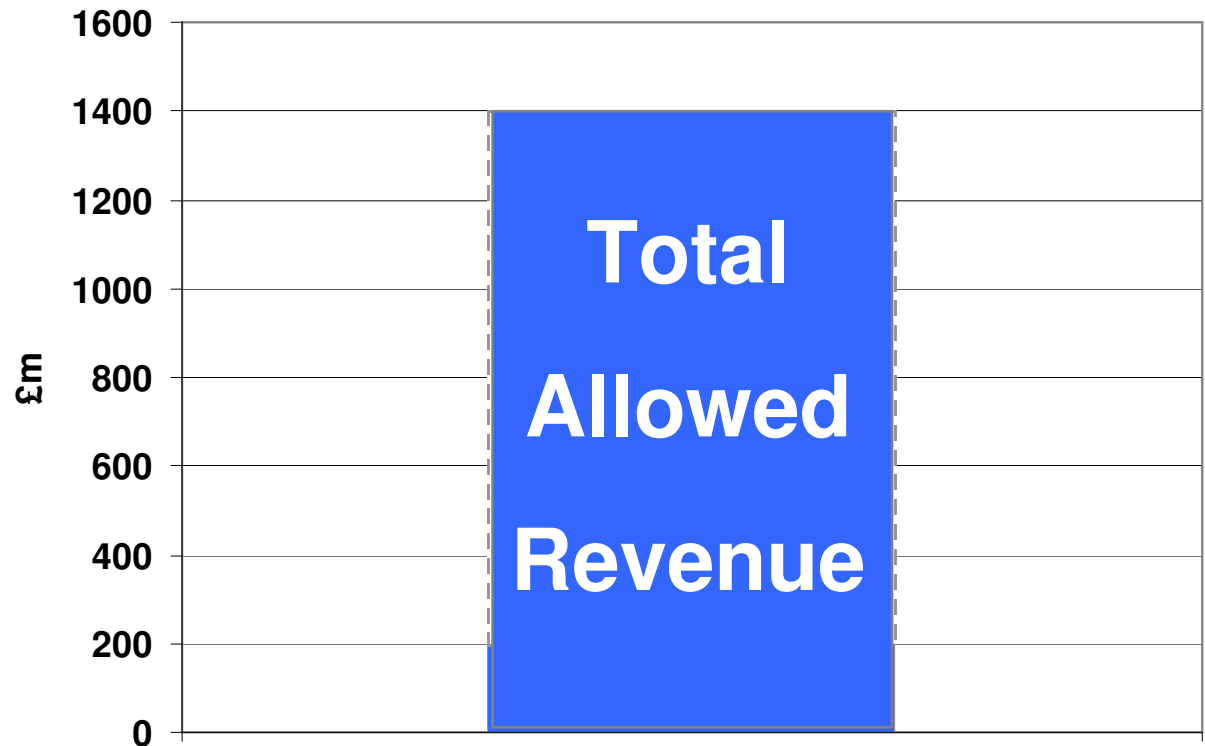
Locational Element – Reflects Cost of Investment



Current Situation – Review of TNUoS

Revenue Recovery

- ✓ Locational elements provide good economic signal
- ◆ Allowed revenue for 2010/11 ~ £1.4bn
- ✗ Locational elements poor at revenue recovery

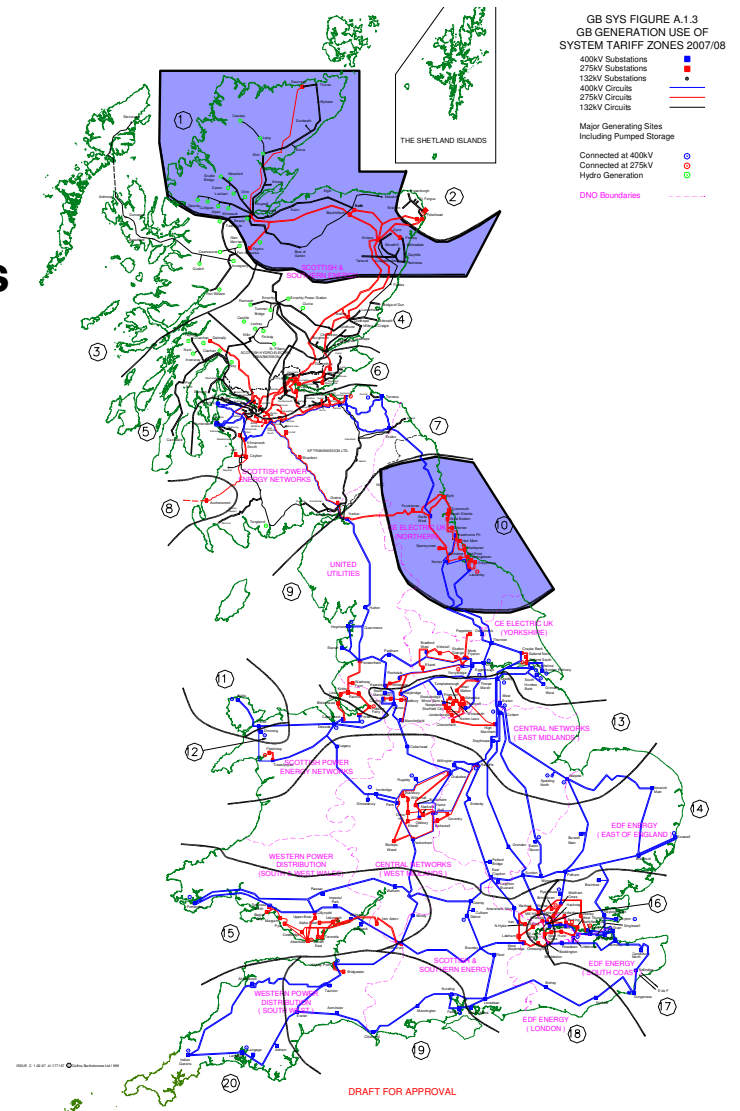
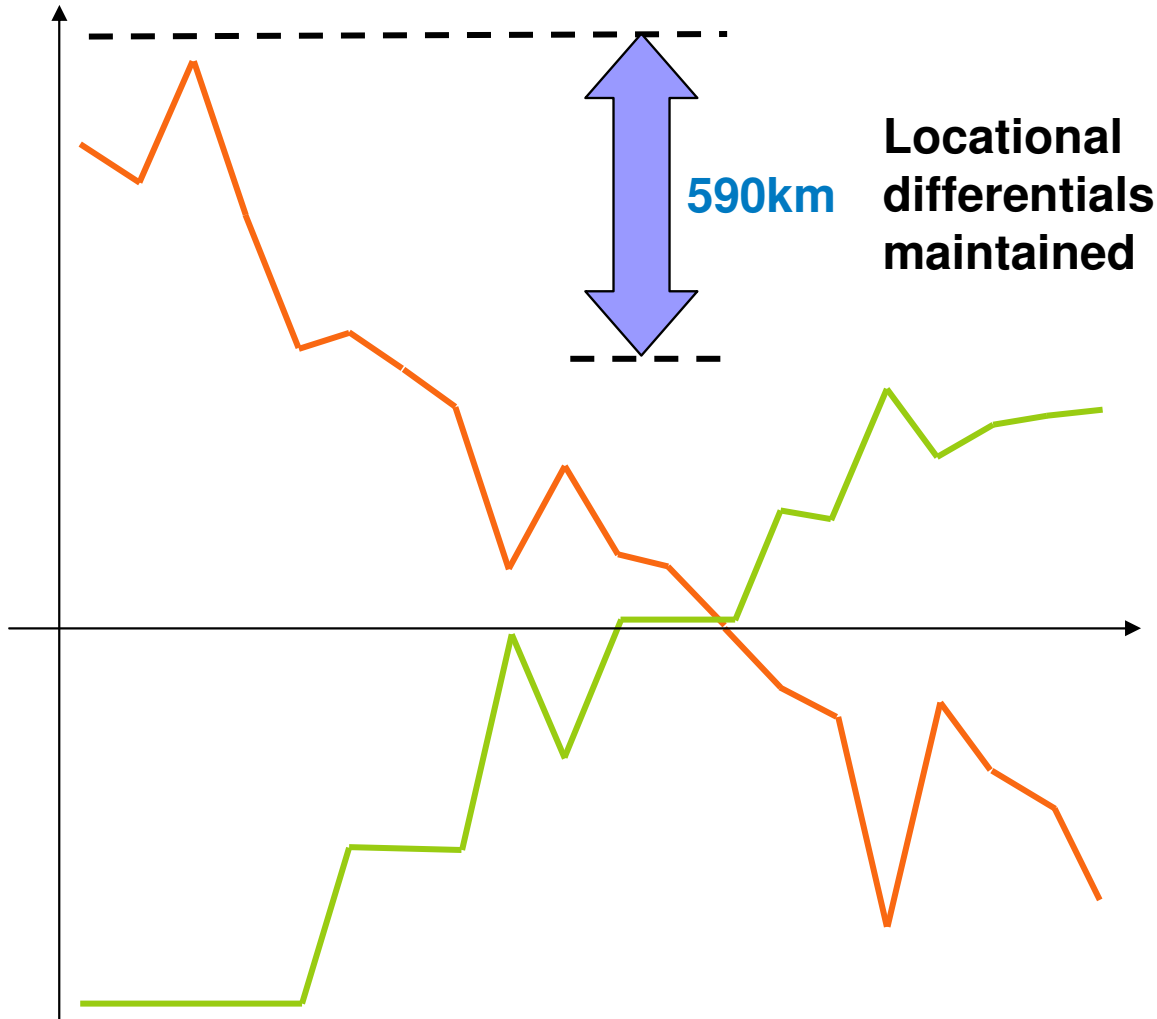


- ◆ ‘Flat’ (i.e. non-locational) residual element needed to recover the total allowed revenue

Current Situation – Review of TNUoS

Introduction of the Residual Element

£/kW



Current Situation – Who Pays What?

Supplier Net Charging – The Numbers

Key Stats:

MAR ~ £1.6bn
 EC ~ £10.63 /MWkm
 $G_{\text{residual}} \sim \text{£ } 3.48 /\text{kW}$
 $D_{\text{residual}} \sim \text{£ } 18.56 /\text{kW}$
 SF = 1.8

- v -

North Scotland

Generators:

$G_{\text{locational}}$	£16.60 /kW
G_{residual}	£ 3.48 /kW
G_{tariff}	£20.08 /kW

Transmission | Network

Suppliers:

$D_{\text{locational}}$	-£12.82 /kW
D_{residual}	£18.56 /kW
D_{tariff}	£ 5.74 /kW

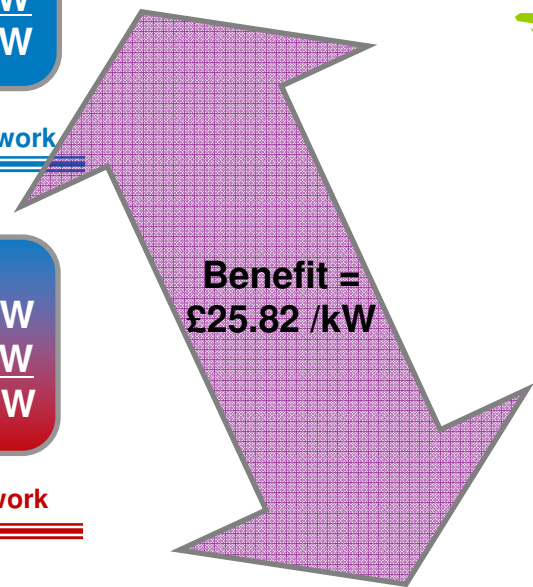
Distribution | Network

Demand:

D_{tariff}	£ 5.74 /kW
DUoS specific	
+ connection charge, energy charge and supplier premium	

Distributed Gen:

$-D_{\text{tariff}}$	-£ 5.74 /kW
DUoS specific	
+ connection charge, energy payment and supp. premium	



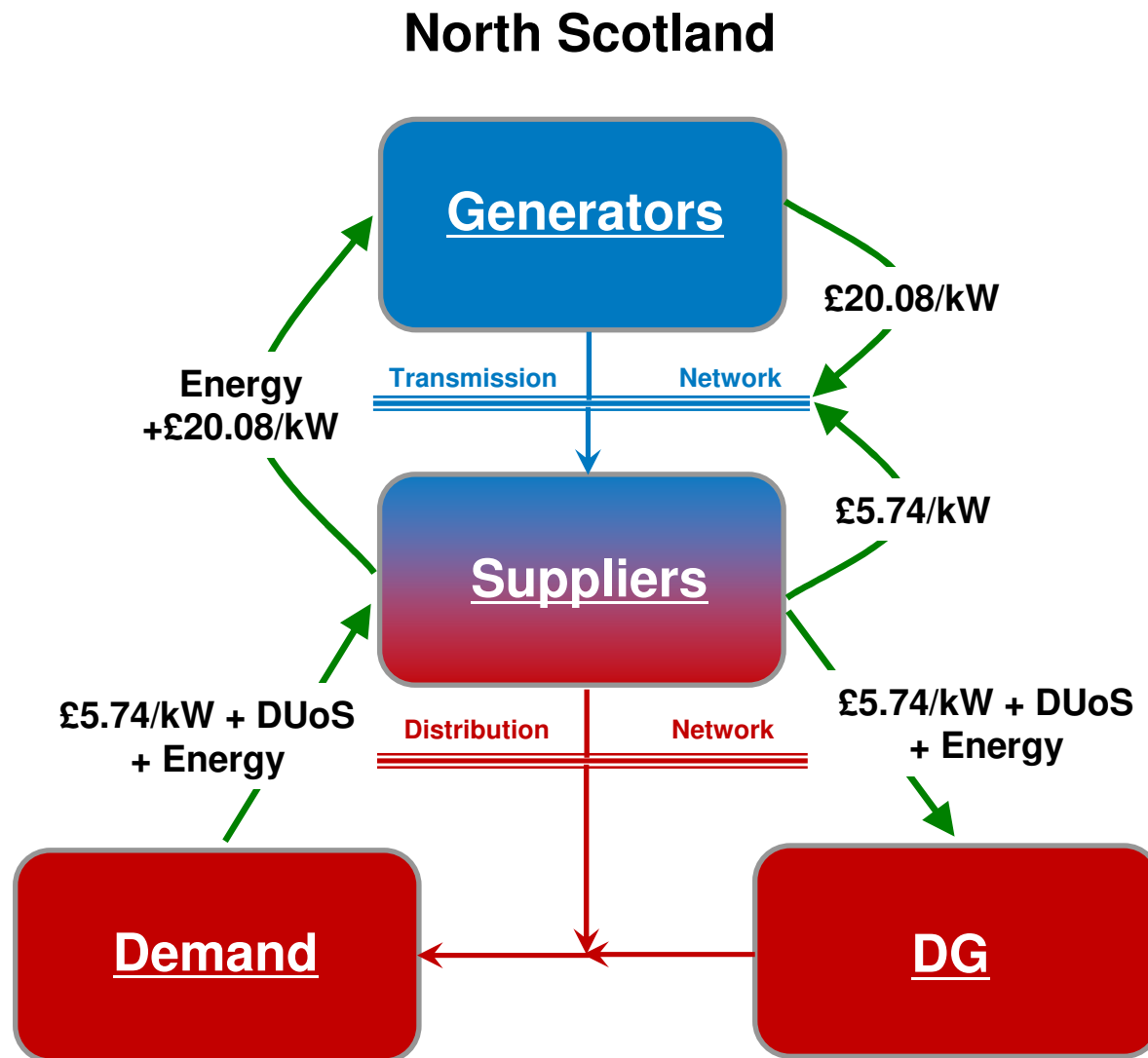
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- vi -



Current Situation – Who Pays What?

Supplier Gross Charging – The Numbers

Key Stats:

MAR ~ £1.6bn
 EC ~ £10.63 /MWkm
 $G_{residual}$ ~ £ 3.48 /kW
 $D_{residual}$ ~ £18.56 /kW
 SF = 1.8

North Scotland

- Gross charging would reduce the residual
- Previous analysis has shown an impact on charges of up to 5%

Generators:	
$G_{locational}$	£16.60 /kW
$G_{residual}$	£ 3.48 /kW
G_{tariff}	£20.08 /kW

Transmission | Network

Suppliers:			
$D_{locational}$	-£12.82 /kW	$G_{locational}$	£16.60 /kW
$D_{residual}$	£18.56 /kW	$G_{residual}$	£ 3.48 /kW
D_{tariff}	£ 5.74 /kW	$DG_{discount}$	- £ 6.50 /kW
		DG_{tariff}	£13.58 /kW

Distribution | Network

Demand:	
D_{tariff}	£ 5.74 /kW (gross)
DUoS specific	
+ connection charge, energy charge and supplier premium	

Distributed Gen:	
DG_{tariff}	= £13.58 /kW
DUoS specific	
+ connection charge, energy payment and supp. premium	

Benefit =
£6.50 /kW



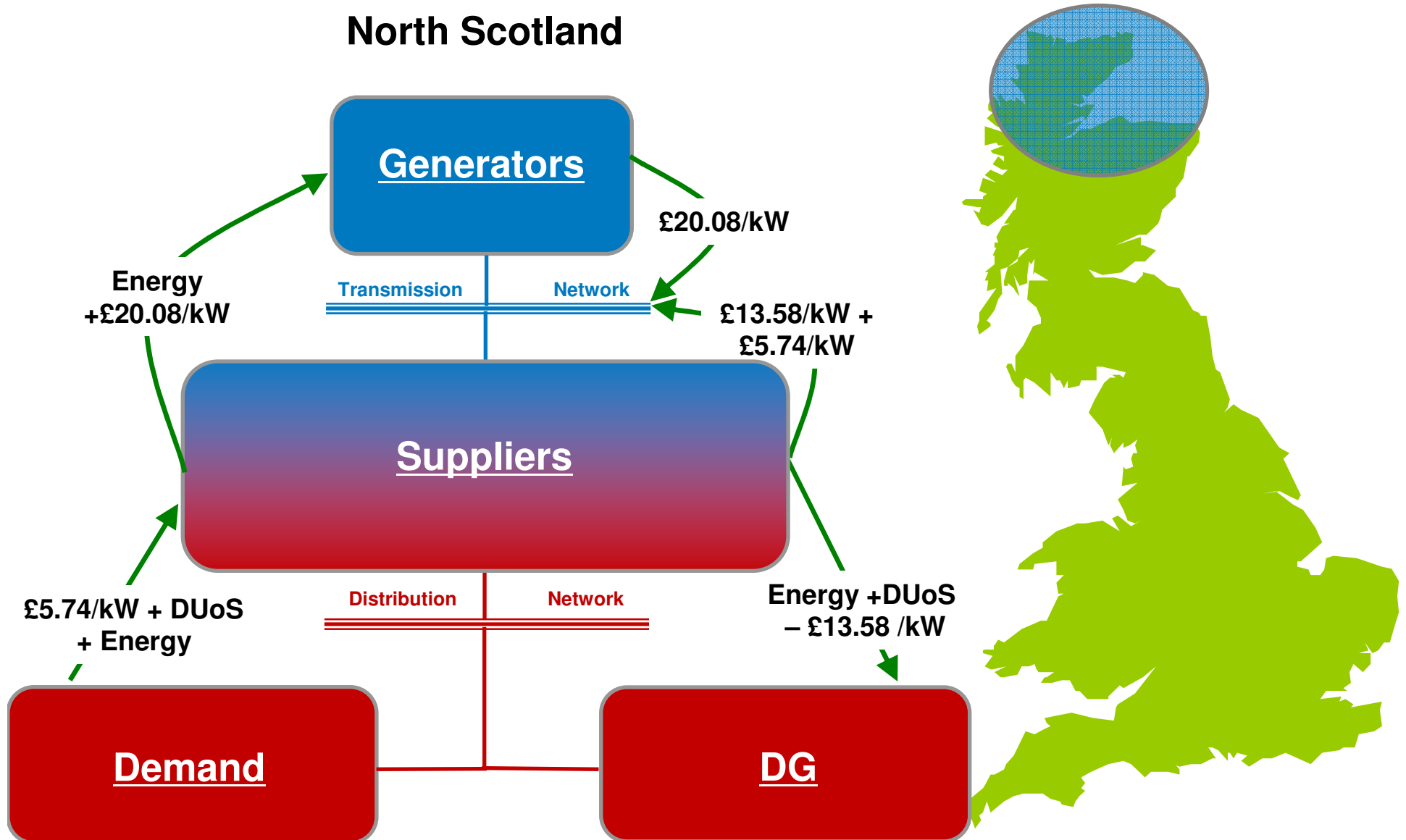
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Supplier Gross Charging – The Numbers

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 SF = 1.8

- viii -



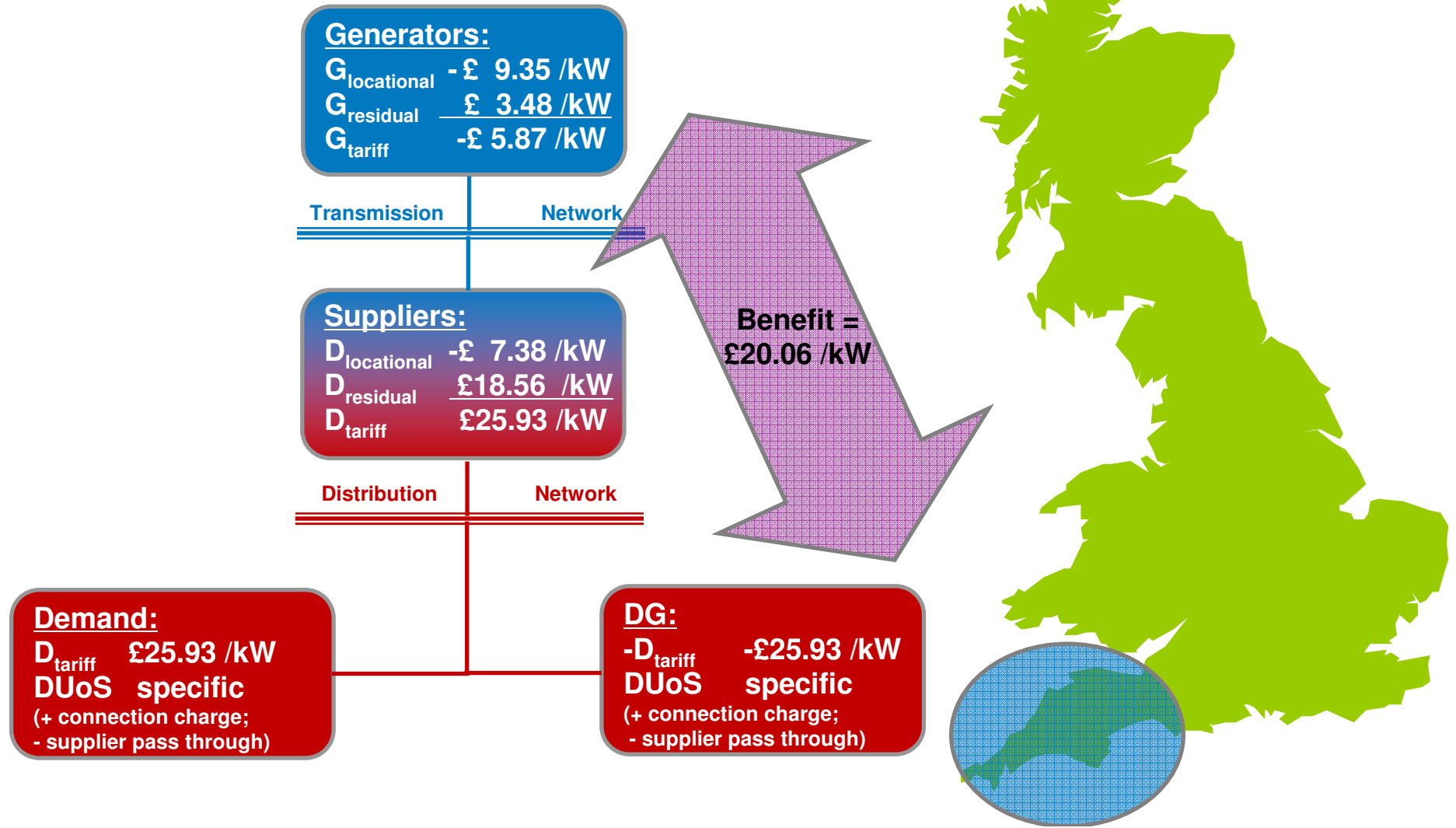
Actions 1 & 11 – Who Pays What?

Supplier Net Charging – The Numbers

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Peninsula/South West



Current Situation – Who Pays What?

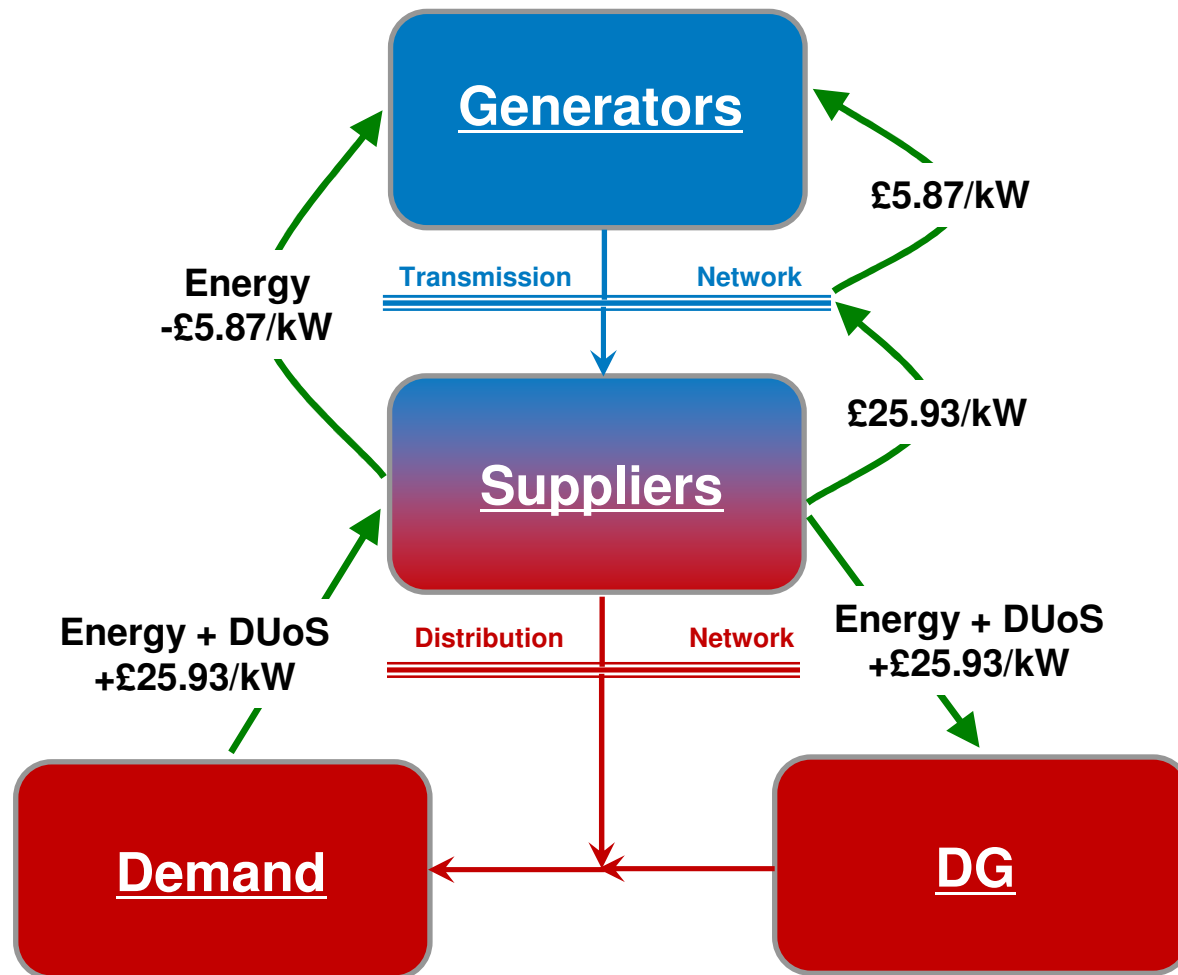
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- X -

Peninsula/South West



Current Situation – Who Pays What?

Supplier Gross Charging – The Numbers

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 $D_{residual} \sim \text{£ } 18.56 /kW$
 SF = 1.8

- xi -

Peninsula/South West

- Gross charging would reduce the residual
- Previous analysis has shown an impact on charges of up to 5%

Generators:	
$G_{locational}$	- £ 9.35 /kW
$G_{residual}$	£ 3.48 /kW
G_{tariff}	-£ 5.87 /kW

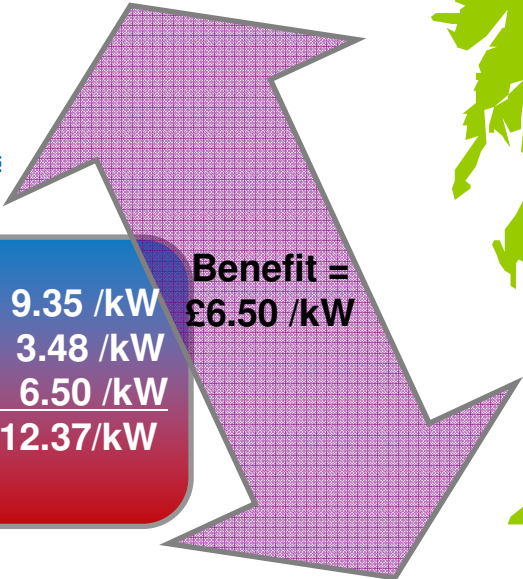
Transmission | Network

Suppliers:			
$D_{locational}$	-£ 7.38 /kW	$G_{locational}$	-£ 9.35 /kW
$D_{residual}$	£18.56 /kW	$G_{residual}$	£ 3.48 /kW
D_{tariff}	£25.93 /kW	$DG_{discount}$	-£ 6.50 /kW
		DG_{tariff}	- £12.37/kW

Distribution | Network

Demand:	
D_{tariff}	£ 25.93 /kW (gross)
DUoS specific	
+ connection charge, energy charge and supplier premium	

Distributed Gen:	
DG_{tariff}	= - £12.37 /kW
DUoS specific	
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Current Situation – Who Pays What?

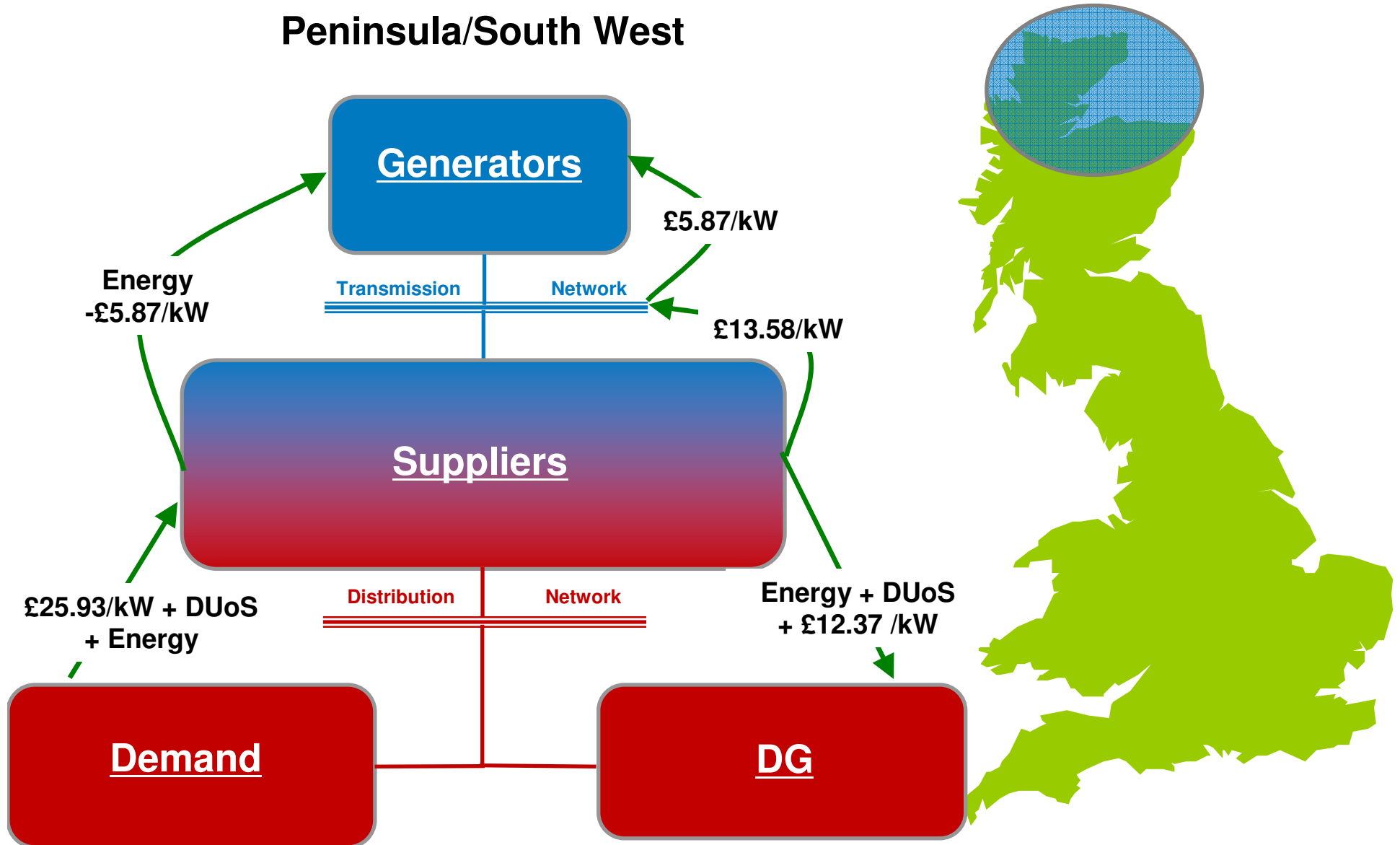
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- xii -

Peninsula/South West



Action 2

What If All Charges Were Locational?

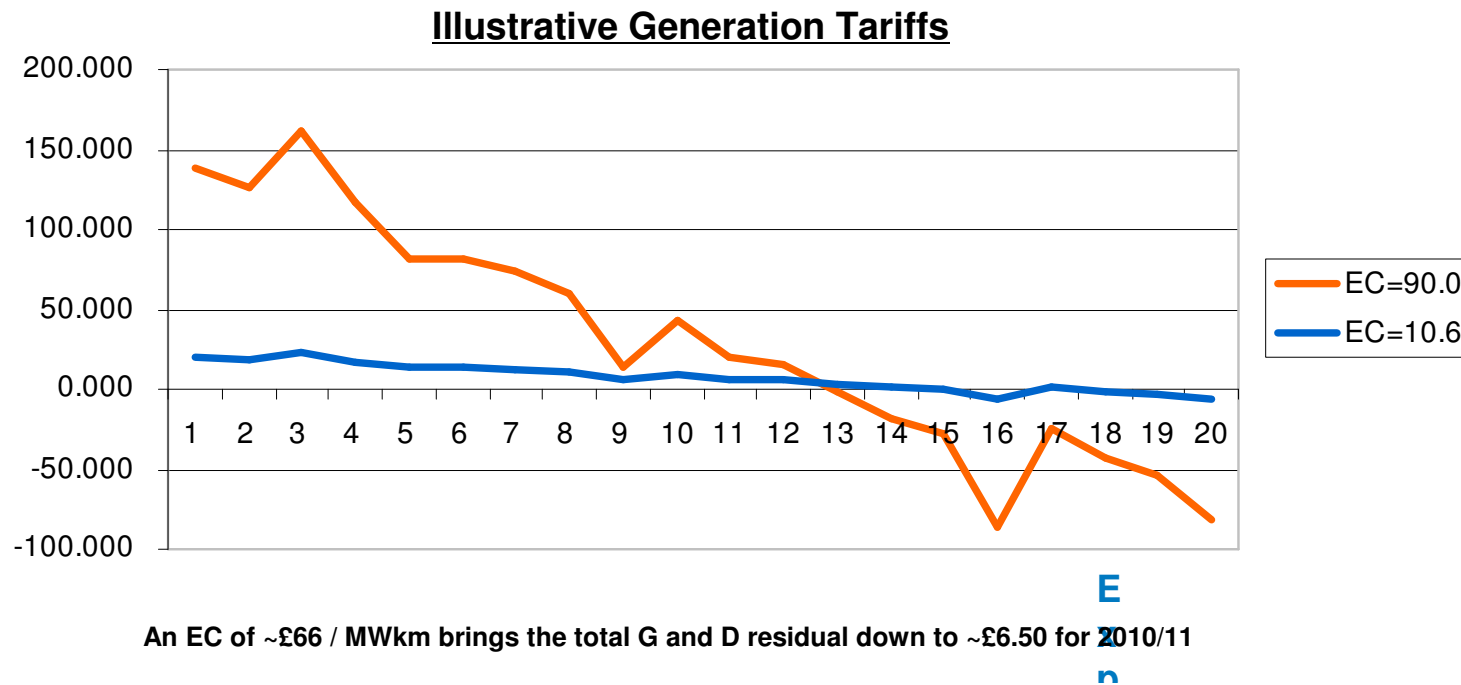
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Action 2

All Revenue Collected via Locational Element (no Residual)

- ◆ Expansion constant needs to increase in order to increase revenue collection from the locational element
- ◆ Currently expansion constant \sim £10.63 / MWkm
- ◆ In 2010/11 this would need to increase to \sim £90 / MWkm
 - ◆ The resultant impact on tariffs would not be acceptable



Action 7

Potential Effects on Innovation for Suppliers and DNOs

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Potential Effects on Innovation

Analysis undertaken by EdF Energy Networks

- ◆ Any model taken forward to address the issues should seek to mitigate the potential for unintended consequences

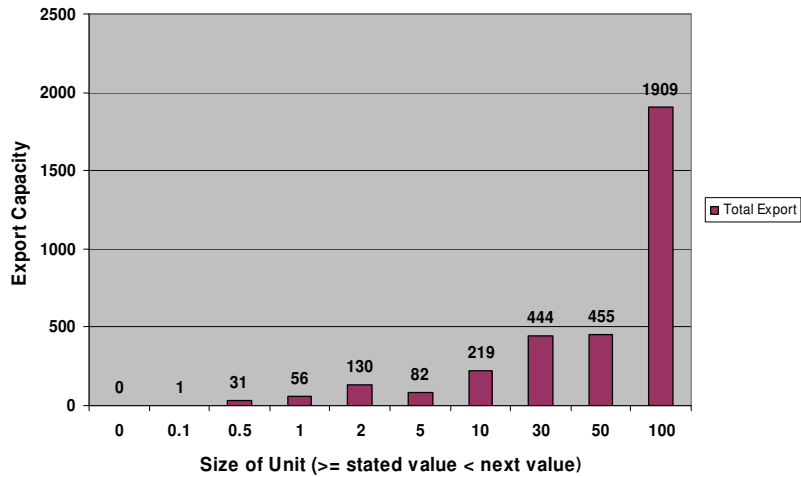
- ◆ The drive to innovate for suppliers/DNOs has been highlighted as an area that needs to be considered

Potential Effects on Innovation

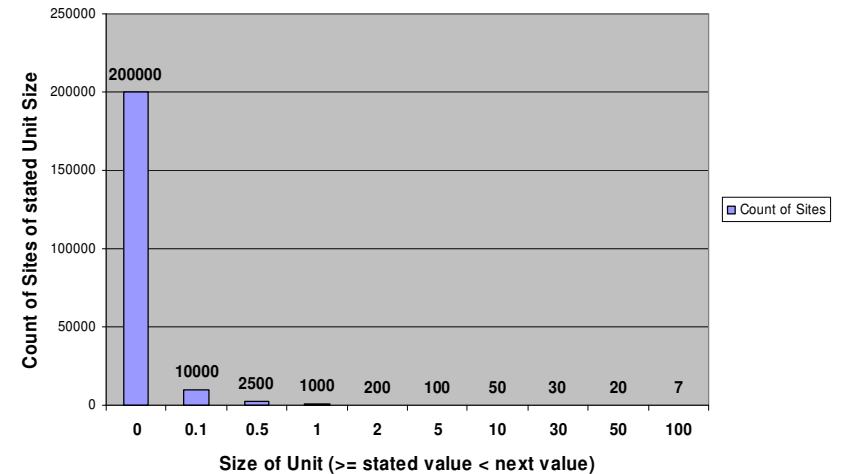
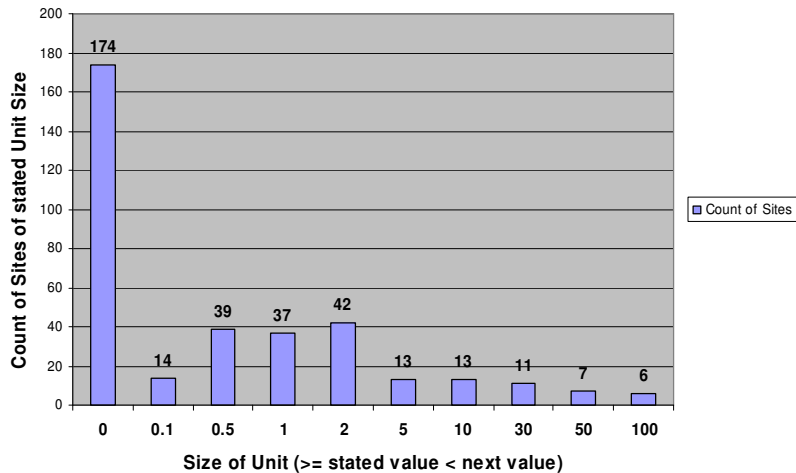
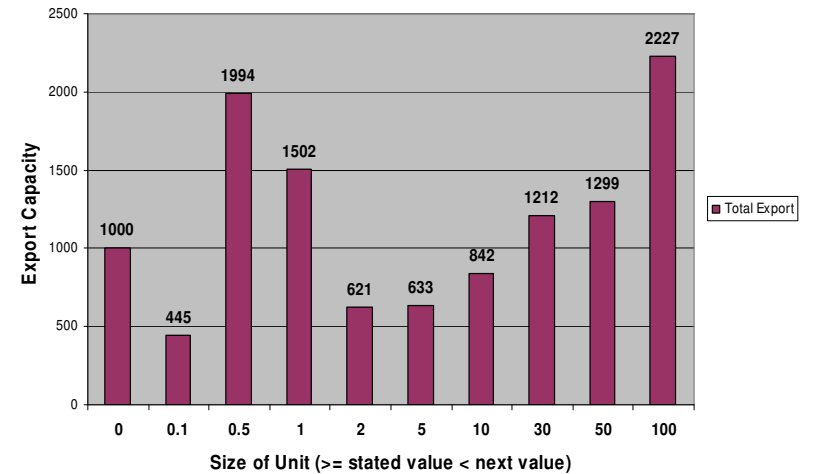
Analysis undertaken by EdF Energy Networks

A Changing Energy Mix

Today (2010)

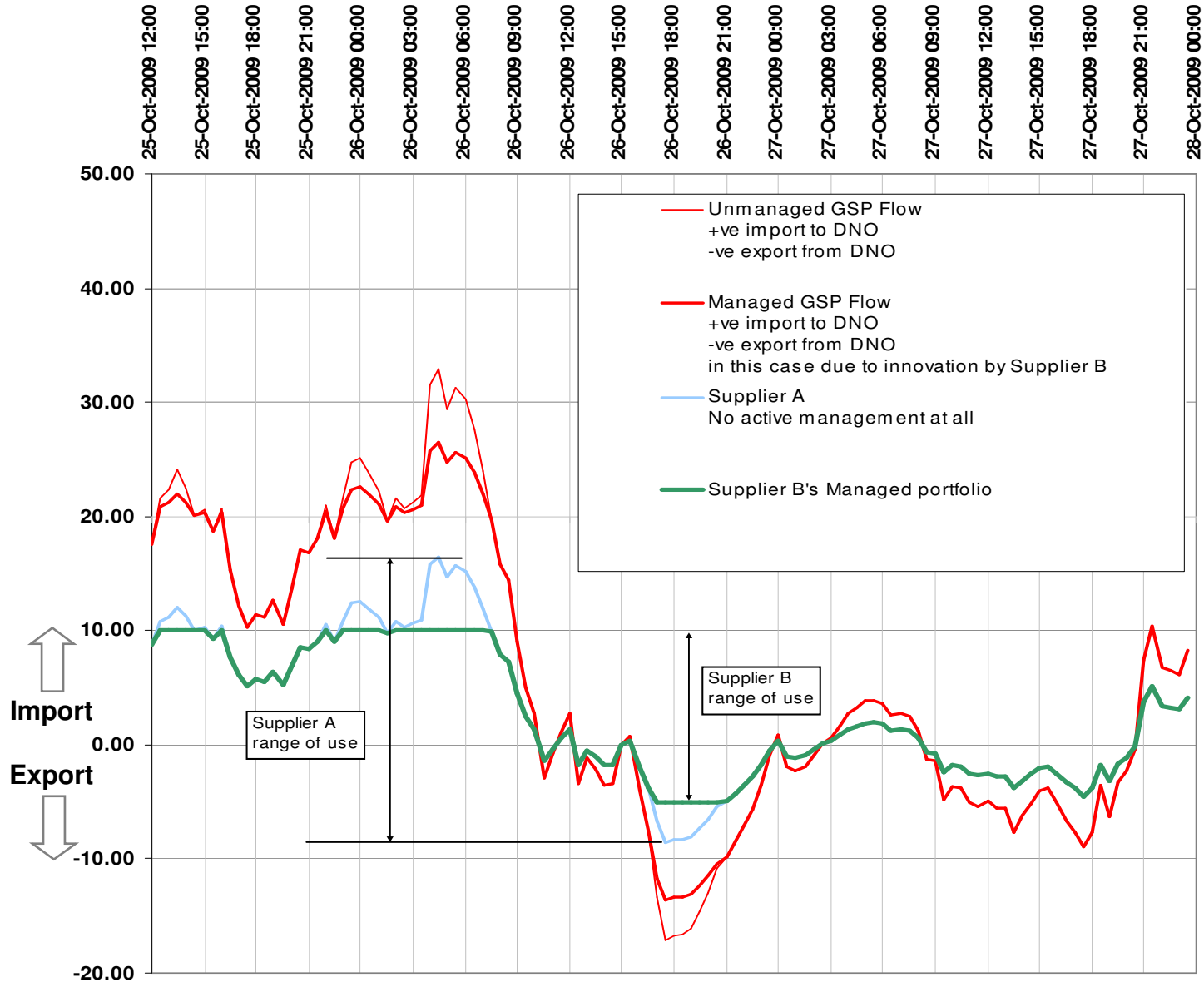


Potential Future (2020)



Potential Effects on Innovation

Net Flows in a Fictitious Demand/Generation Group



Future Meeting Dates

April 2010						
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	CISG	28	29	

May 2010						
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	TCMF	26	27	28
29	31					

- ◆ Note cancellation on 9th of April
- ◆ Note confirmation of 5th and 20th of May

A.O.B.



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