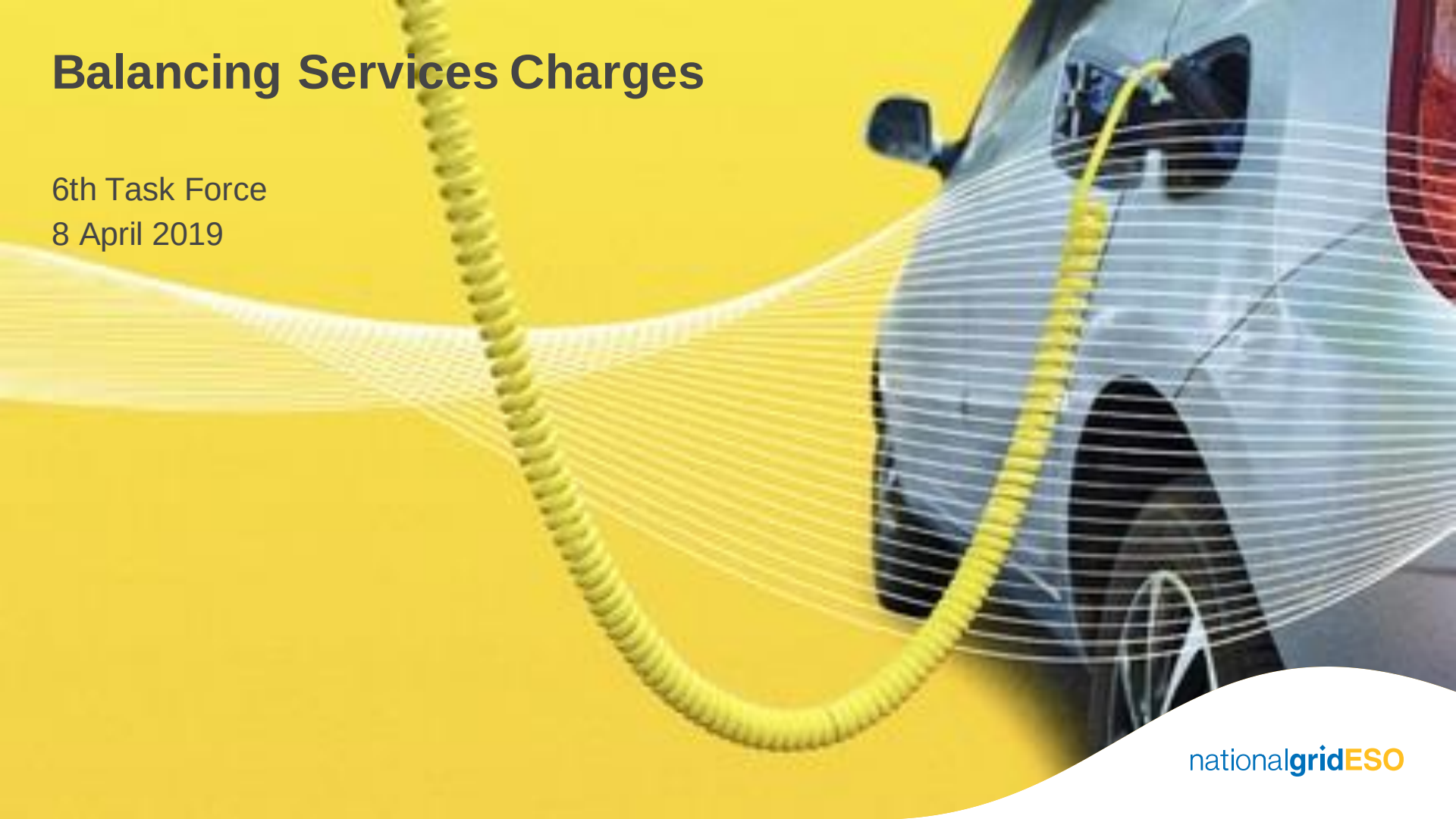
Balancing Services Charges

6th Task Force
8 April 2019



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Welcome and introductions

Colm Murphy

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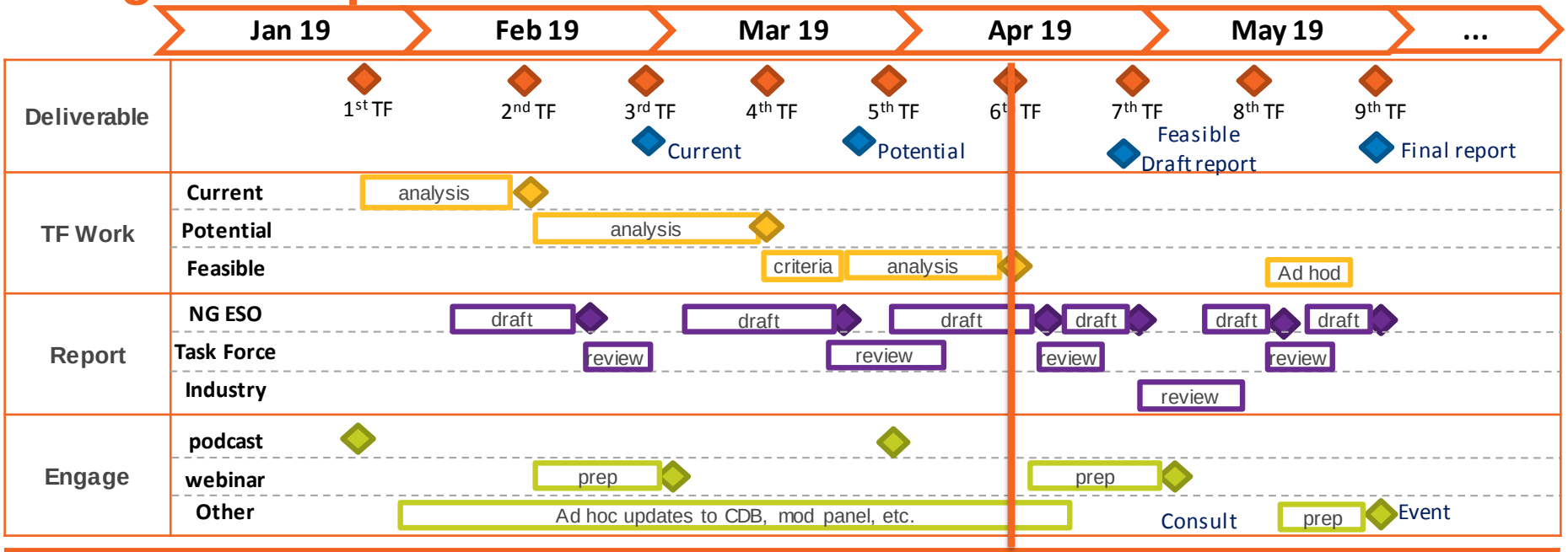
Purpose of today

- The **focus** of the task force meeting today is:
  - To socialise the pre-work created by each of the 3 sub-groups on the other 3 Potential Options
  - To continue to discuss the advantages and limitations of each of those potential options.

No	Subject	Lead	Time
1	Welcome and Introductions; Review Actions and Minutes	Colm Murphy	10:00-10:30
2	Does locational BSUoS have any economic rationale?	Frontier Economics	10:30-11:30
3	Locational Reactive and Voltage Constraints: Playback and Discussion	James Kerr	11:30-12:15
4	*Lunch*	-	*12:15-12:45*
5	Response and Reserve Bands: Playback and Discussion	Mike Oxenham	12:45-14:15
6	Response and Reserve Utilisation: Playback and Discussion	Nicholas Gall	14:15-15:45
7	Summary and Next steps	Colm Murphy	15:45-16:00

Programme plan



1- TF 29Jan	2- TF Feb	3- TF Feb	4- TF Mar	5- TF Mar	6- TF Apr	7- TF Apr	8- TF May	9- TF May
• TF plan • **Currently**: analysis actions	• **Currently**: agree conclusion • **Potential**: agree scope + analysis actions	• **Potential**: progress analysis - review options	• **Potential**: finalise options and decide progression towards **Feasible**	• **Feasible**: further analysis options	• **Feasible**: assessment options	• **Report**: finalisation before consultation	• **Report**: comments review and actions	• Final **report** + event

Action log

No	Action	Owner	Open/Closed
1	Ensure feedback received from the wider industry is taken on-board by Task Force	Sophie van Caloen (ESO)	Open/Ongoing
2	Give consideration to analysis, questions and data sets required and provide this to the taskforce where possible	All TF Members	Open/Ongoing
3	Live Data Sets/Dashboards to be looked into	Mike Oxenham, Paul Wakeley	Open/Ongoing
4	Liaise with Elexon in regards to Data Provision	Mike Oxenham (ESO)	Open/Ongoing
5	TF Members to feed in thoughts to MO on which data from Elexon may be helpful.	All TF Members	Open/Ongoing
6	GS to attend next TCMF – Secretariat to arrange	GS, JH	Open
7	PW to Circluate Slides to TF	Paul Wakeley	Open
8	ESO to speak to PW re: constraints and locational signals being double counted in TNUoS	ESO	Open
9	ESO to speak to PW re: Plexos usage	ESO	Open
10	GS to formulate definitions for "short term" and "long term"	GS	Open

Engagement - Feedback

Feedback from previous engagements:

- Ops Forum – 26th March
- EIUG – 27th March

Next engagements:

- TCMF – 10th April
- DCMDG – 11th April
- Consultation and Webinar end April / early May – see next slide

Proposed plan – Report & Consultation

Draft report to be published - by end of April:

- ESO to draft report and circulate to TF next week (at the latest Thur 18th April)
- TF members to review and send comment for Wed 24th April (Task Force meeting)
- ESO to circulate final draft report Friday 26th April for validation

Consultation & final report - by end of May:

- 10 working days consultation, to close on Wednesday 15th May
- Webinar on draft report and consultation, proposed on the 7th of May (current TF meeting to be cancelled)
- Collection and review of consultation responses– proposal to have a add a placeholder for additional TF meeting on Wed 22nd (current TF only 23rd)
- Finalised report by end of May

Frontier Economics

Sam Street,

Dan Roberts

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Does locational BSUoS have any economic rationale?

A presentation to the Balancing Services Charges Task force

8th April 2019

Contents

1.	What are the relevant principles and what has Ofgem said about them?	3
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1.	What are the relevant principles and what has Ofgem said about them?	3
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Ofgem has made clear that cost reflective charges should be based on a concept of marginal cost…

Minimising total system costs

- Market participants should face the costs that they impose on the system
- They then take these costs into account in all of their investment and operational decisions.
- In other words, charges should be *cost reflective*

Cost reflective network charges

- To internalise costs in the decisions of market participants:
  - *forward looking costs* must be reflected: these can be changed by future behaviour; and
  - *incremental or marginal* costs, not average costs
- No meaning to 'cost reflectivity' in relation to *historic* costs

> *Economic theory indicates that users will make the most efficient decisions about where, when and how to use the network when they are facing the incremental or marginal cost of their behaviour.* ***Ofgem, 2017 TCR consultation***

… and has stated that charges recovering any excess of total cost over marginal cost should be set to minimise the risk of distortions

Cost reflective charges won't recover sunk costs

- Natural monopoly networks: average cost > marginal cost
- Marginal cost tariffs will not recover total costs
- The *residual* needs to be recovered in the most efficient way possible

Cost reflectivity not relevant

- Sunk cost recovery charges not intended to generate incentives, but to recover irreversibly incurred costs
- Correct approach is to recover them in a way which minimises change in behaviour
- Recover charges from those who are not sensitive to price…
- … but fairness considerations also apply

Economic theory indicates that residual charges should be set in such a way to prevent the signals from the forward-looking charges from being distorted, so that users take account of the forward-looking signals to the greatest extent possible. ***Ofgem, 2017 TCR consultation***

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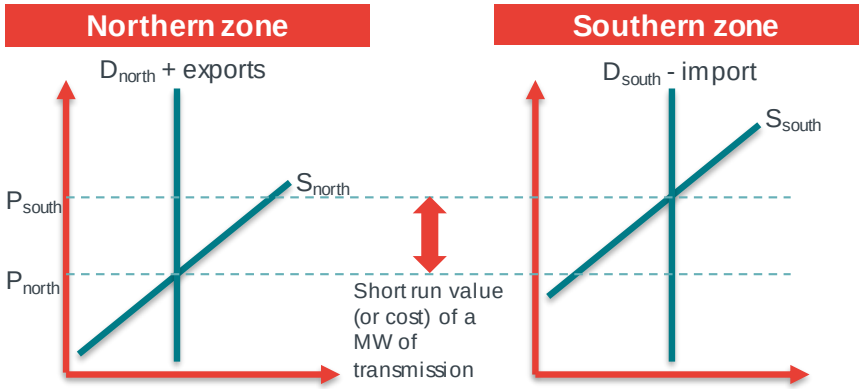
In relation to congestion, marginal costs can be reflected in zonal prices (SRMC based signals e.g. market splitting)…

Nodal or zonal prices mean that generation and load are incentivised to produce in an optimal way to minimise congestion*. Price differentials will also send a signal to invest in transmission.



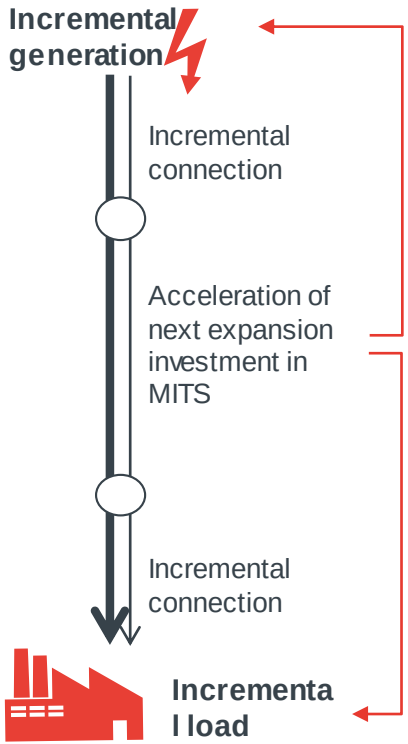
In this stylised two zone example:

- All investments considered fixed (short run)
- Cheaper generation in the North exported to the South at the maximum capacity of "interconnector"
- Prices can't be fully equalised due to congestion on interconnector.
- Price differential reflects short run cost of transmission – it represents the value (or cost) of a MW of additional transmission i.e. incremental capacity would save customers the difference in prices
- The price differential sends locational signals for generators and load.

Wide recognition in Europe that market splitting has both pros and cons

* Note: In the GB market losses (which are also short run marginal costs of transmission) are already allocated locationally

… or can reflect incremental investment costs (LRMC basis e.g. locational TNUoS)



Entry charge

Exit charge

In this stylised two zone example:

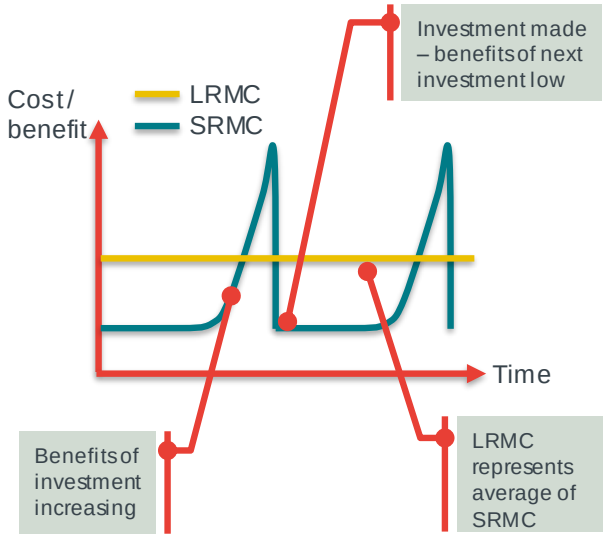
- Investments can vary (long run)
- Incremental generation results in new investments in transmission*
- Cost ideally measured by considering acceleration of transmission investment (PV effect)
- Sometimes approximated to cost incurred if next investment happened now
- Investment cost annuitized to derive annual cost, which is then divided into entry and exit charges which send locational signals to generation and load
- Energy price is then national, so redispatch required

* Note: Since investment costs relate principally to congestion, it may be considered reasonable to accompany long run marginal costs with locational allocation of the short run marginal costs of losses

Under certain conditions, the two approaches are equivalent over time, so there is no logic to having both SRMC and LRMC signals

In this stylised two zone example:

- Ideally, the transmission system should be expanded until the NPV of incremental benefit equals the NPV of incremental cost
  - The incremental benefit of expansion can be measured by the SRMC (i.e. the reduced despatch costs*)
  - The incremental cost is simply the LRMC
- So over time, if the system is expanded optimally, the NPV of SRMC based signals should equate to those of LRMC based signals
- This would result in zonal price spreads which follow a sawtooth pattern



A regime with both SRMC and LRMC approaches would risk double counting locational signals

* In fact, reduced despatch costs and changes in producer and consumer welfare – we ignore these for simplicity

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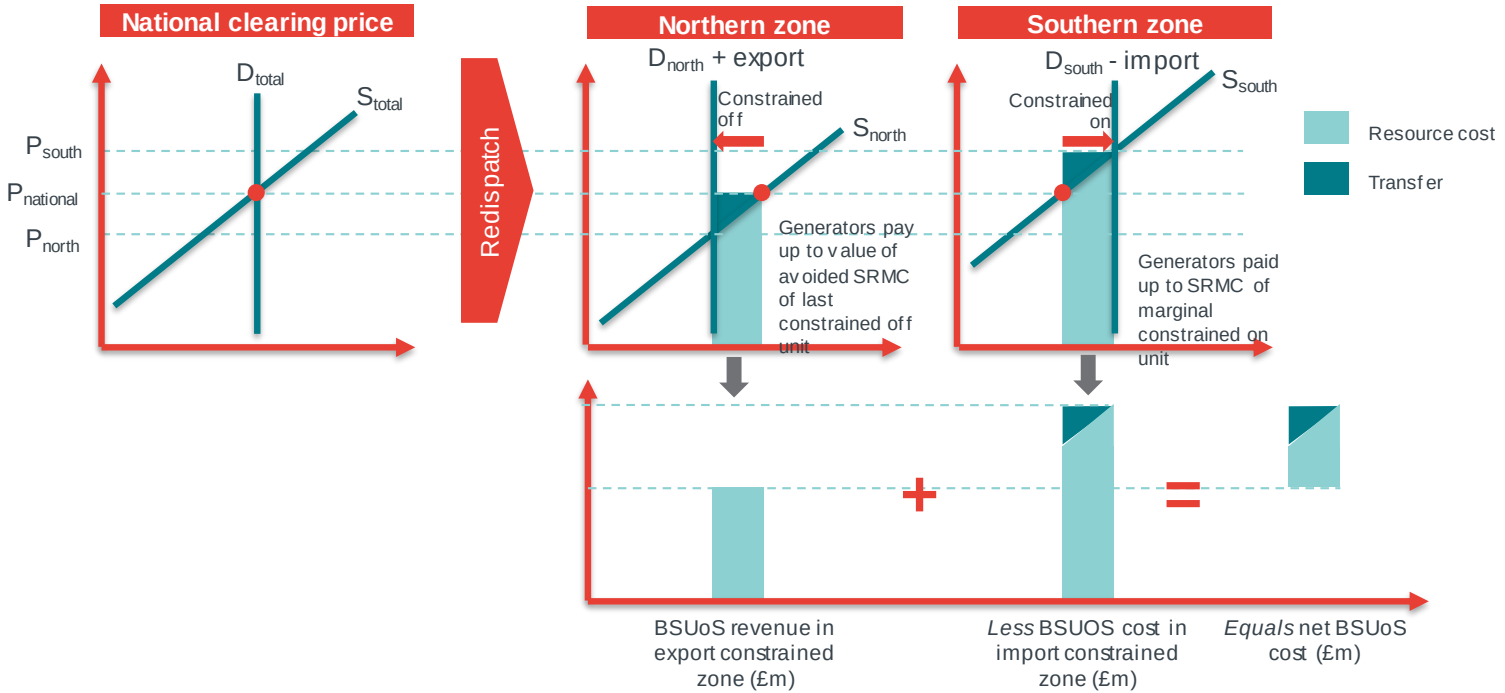
The constraint cost element of current BSUoS represent the total cost of redispatch, comprising resource costs and transfers

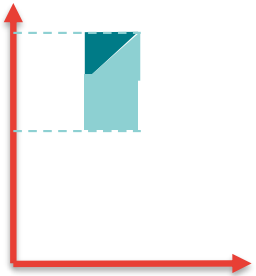


It is related to the price spread – but multiplied by the volume of redispatch, not the volume of generation/demand

Ofgem should agree that allocating a total cost is unlikely to send efficient locational signals i.e. ones which reflect marginal cost

The BSUoS constraint cost in each half hour could be allocated in a number of different ways, however, it would only be by chance that it resulted in equivalent signals to zonal prices

1. Allocating net BSUoS cost

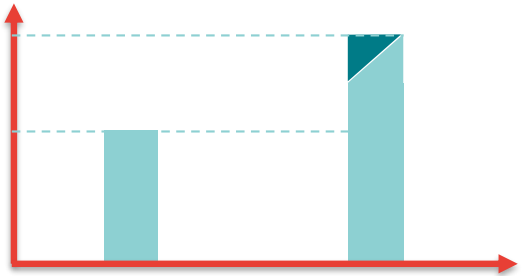


Equals net BSUoS cost (£m)

- If net cost is charged to generators in the North (where zonal price would be lower) and customers in South (where price would be higher), then unit charge will depend on the quantity of in merit generation / load in the half hour
- As volume of in merit generation / load changes relative to constrained volumes, unit charge will vary
- It is not clear how this would provide a basis to pay generators in the South or load in the North

or

2. Allocating BSUoS revenues and costs



BSUoS revenue in export constrained zone (£m)

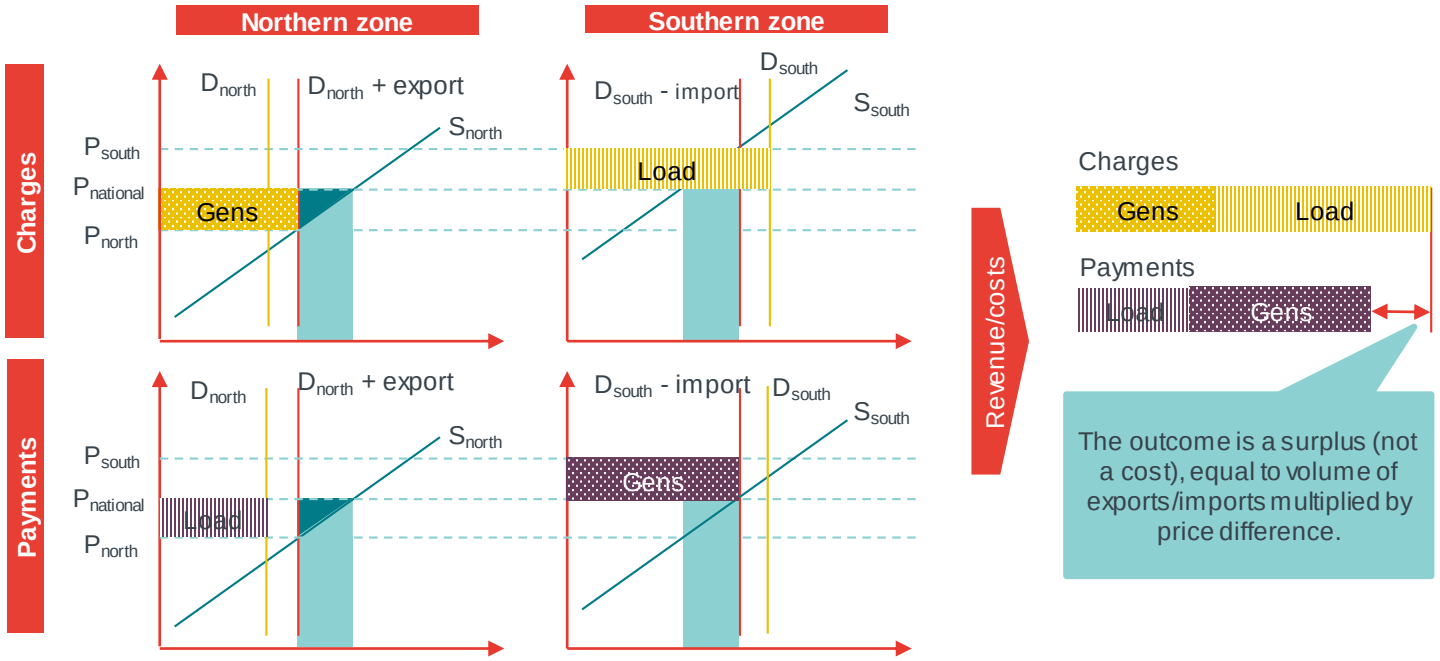
BSUOS cost in import constrained zone (£m)

- BSUoS revenues earned in the North could be paid to generators in the South / customers in the North
- BSUoS cost could be charged to generators in the North / customers in the South
- Signals would be directionally aligned with zonal prices. However, again, level of charges/payments depends on the quantity of in merit generation / load in each zone. There is no reason to think this would reflect the marginal cost of congestion.

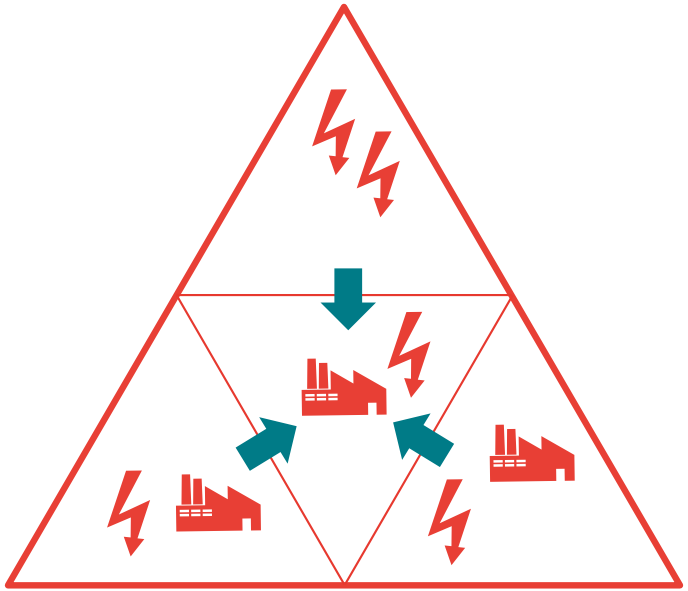
Furthermore, a simple two zone example ignores a key complication – how should total BSUoS net cost (or cost / revenue) be allocated between multiple constrained zones?

In theory there are a set of locational charges/payments which will mimic market splitting. However, they are unrelated to redispatch total costs.

This this is just a complicated (and expost) way to get the market splitting result. However, it clearly shows that to achieve marginal cost signals the necessary set of payments and charges bears no relation to redispatch total costs.



This conclusion can be demonstrated quantitatively via simplified modelling of a transmission system



1. Dispatch system to calculate zonal prices
2. Calculate national price and redispatch costs (and hence constraint element of BSUoS)
3. Test allocation methods to see if an efficient allocation BSUoS constraint cost element could be identified
4. If efficient allocation is found, "fast forward" in time (more transmission, more generation etc.)
5. Reperform 1 & 2, and show that allocation methodology no longer works

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Key takeaways

- Ofgem has clearly stated that **cost reflective charges should be based on marginal costs and that total cost recovery charges should minimise distortions** (see CMP 264/265 decisions and TCR consultation).
- **GB currently has theoretically justifiable locational signals** from the locational allocation of transmission losses and LRMC based TNUoS charges.
- According to Ofgem's own logic, the only **other theoretically justifiable basis for locational signals would be SRMC based signals**. These would need to be **instead of rather than as well as TNUoS charges**.
- There is a well **recognised way to implement SRMC based signals: market splitting**. It has both pros and cons.
- Ofgem has said that '*BSUoS may be changed to introduce incentives to influence forward-looking behaviour*'. But the **constraint cost element of BSUoS represents the total cost of redispatch**, comprising resource costs and transfers.
- There are an infinite number of ways to allocate this cost, but there is **no reason to believe that allocating a total cost will result in efficient cost reflective marginal cost based signals** (you would not start to think about efficient tariffs by looking at total costs).
- The level of charges/payments resulting from allocating redispatch total cost will depend on the quantity of in merit generation / load in each zone relative to the constrained on/off volume. The **charge/payment level will effectively be arbitrary**.
- There **is a set of payments and charges that would create marginal cost based signals, but they bear no relation to the BSUoS total cost** (and indeed, they will end up with a financial surplus rather than recovering a total cost).

Potential Options: Playback and Discussion

All

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Potential Options

Locational Transmission Constraints	Locational Reactive and Voltage Constraints	Response and Reserve Bands	Response and Reserve Utilisation
For example, if in 'Zone A' there are transmission constraint costs being incurred across a particular boundary then those costs could be allocated to those specific parties behind the constraint and generating (or not taking demand) at the time of the constraint.	For example, if in 'Zone B' there is a voltage issue and costs are incurred resolving that voltage issue due to reactive power absorption payments then those costs will be recovered from those in 'Zone B' who are contributing to the need for reactive power absorption.	For example, if analysis has shown that an extra 'X' MW worth of response has been procured to continue to protect system frequency due to the largest loss then the costs of this additional response could be paid by those connections in the new range, or by those who are exacerbating the issue.	For example, a frequency service is automatically utilised for frequency support due to the trip of a generator so the costs associated with service utilisation are paid for specifically by the generator which tripped and caused the frequency issue at that time, whereas those other related costs are then treated as a cost-recovery charge.

Summary and Next Steps

Colm Murphy

nationalgridESO

Task Force - Future Meeting Dates

Date	Time	Location
Wednesday 24 April	10am – 4pm	TBD
Tuesday 7 May	10am – 4pm	TBD
Thursday 23 May	10am – 4pm	TBD

Thank you

If you have further views please contact **ChargingFutures@nationalgrid.com**.