

## Distributed Generation Charging sub-group Closure Report

### Current arrangements

Large (>100MW) distributed generation pay wider charges; Small (<100MW) distributed generation (SDG) pay inverse of demand, capped at £0/kW; behind the meter distributed generation also see inverse of demand, either through Triad avoidance or by exporting (as SDG).

### Case for change

The case for change was presented by Ofgem during the Access and Forward-Looking Charges Significant Code Review<sup>1</sup>, the group discussed and agreed with Ofgem's identification of problems with the current arrangements.

Different charging regimes may create distortions around:

- Location (e.g. high capacity charges for LDG but capped at £0 for SDG in Scotland/credits for capacity by exporting during winter for LDG and credits if exporting at Triad for SDG in South)
  - Size (above/below 100MW)
  - Voltage – Transmission-connected generators are liable for local charges whilst DG are not.
  - Operation – SDG are encouraged to export at Triad based on demand zone; LDG and Transmission-connected face much more granular signals.
- (Note: TNUoS is not intended to send operational signals)

Growth in embedded generation is causing network effects (e.g. exporting GSPs).

Disconnect between SQSS planning (as generation) and charging (as inverse demand).

A more modular network model (i.e. increased embedded generation meeting demand locally) is likely to help ease constraints in Transmission system, especially as more locationally-dependant generation (e.g. wind, solar) is necessary for Net Zero.

SDG may export via a substation that is not a MITS node, meaning they are using capacity of another generator's local circuit but not paying. This is a small issue at present.

### Options examined by Ofgem in Access SCR

These are the options presented by Ofgem in their Consultation on Mindset to Positions. The group examined potential issues and advances to the three options. There were no other options that would be preferable to add for comparison.

- Option 1a TNUoS generation charges for all users
- Option 1b TNUoS charges for all generation >1MW and uncapped EET for <1MW
- Option 2 Uncapped inverse demand charges – all SDG

### Issues – potential solutions – pros/cons

Issue	Solution?	Pros	Cons
<b>DG do not have physical Transmission</b>	DG over 1MW can theoretically access Balancing Mechanism,	Growth in distributed flexibility services means physical	Are sufficient volumes of SDG in BM to prove this is practical?

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<sup>1</sup> <https://www.ofgem.gov.uk/publications/access-and-forward-looking-charges-significant-code-review-decision-and-direction>

<b>Access</b> – Status Quo for LDG	similar to Connect and Manage	Transmission access less necessary?	
	DG that pays TNUoS requires financially firm connection from DNO?		Out of scope of Task Force and contrary to Ofgem SCR decision on Non-firm Access; Cost of providing financially firm access would fall onto demand users – Impact Assessment probably required
	Individual SDG is unlikely to export to Transmission network majority of time – Exporting GSPs are caused by large numbers of small SDG & low demand - TNUoS should only reflect the investment need, not the operational state	Improved TNUoS arrangements would improve signal to reduce exporting GSPs, e.g. a positive charge indicating that increased embedded generation will result in more use of the Transmission system (as for T-connected generation)	
<b>Identification of TEC (or equivalent)</b> could be difficult	1 MW DG should be on DNO register	If required for larger DG, would be intensive for first year only. Changes could be made to DCUSA to provide ESO with information.	BTM generation may not have export capacity, so would need a measure other than installed capacity – could be capped according to distribution connection agreement
	Would have secondary benefits for DNO network planning/DUoS charging	DNOs provide capacity of small and medium DG as part of Week 24 data and aggregated capacity of DG <1MW (result of GSR016)	Would be demanding for all sizes of DG, especially at first
<b>DG interacts primarily with local demand,</b> not Transmission network	Differing charging arrangements based on exporting /importing GSPs?		Complicated and high change of unpredictability if GSPs ‘swing’ year on year – TNUoS should be separate from operational signals
			Investment signals may be inefficient if full export onto transmission system is assumed. This would

			have knock-on effect to consumers. If too-little export is assuming, will create operational constraints, which will not be reflected in TNUoS charge/EET.
	TNUoS/charged EET based on proportion of TEC-equivalent (i.e. not all the exported power reaches the Transmission Network	If calculated correctly, could be cost-reflective	Granular information (flows across network etc.) not available to estimate accurately for initial calculations, but should not be needed for ongoing solution, as TNUoS should not be operational. Parallels to scaling factors. Could use 'archetypes' of distribution network design. Likely to be strongly affected by other parties (e.g. new demand appearing) so would need to be balanced between high cost-reflectivity (risk of operational-type signal) and stability (for investment signal).
	Locally calculated AGIC e.g. where Transmission capacity would be significantly more expensive (e.g. Highlands of Scotland), that is reflected in a larger AGIC discount	<p>Could be done using existing datasets to be cost reflective.</p> <p>Could mitigate making DG uneconomical in high TNUoS.</p> <p>Could be applied to uncapped EET or TNUoS</p>	<p>If locational AGIC based on power flows at GSP, could become unstable if operational signals change behaviour.</p> <p>If expected embedded generation doesn't appear in response to locational AGIC investment signal, value is not realised and represents cost to consumer.</p> <p>Current AGIC methodology suitable</p>

			reflects transmission network not required due to ADG at <i>national level</i> .
<b>DG pays DUoS</b> , T-connected do not	DUoS is equivalent of 'local circuits' so DG should face wider tariff only	Upstream charging principle is well established and LDG already pay both TNUoS and DUoS	
<b>Cost-reflectivity:</b> D-network peak may not match Triad / local peak background may differ from national background	As modelled at Nodal level, tariff could reflect result of local conditions on Transmission Network. TNUoS should send investment signal, not operation so tariff should not relate directly to actual peak (local or national). Suggests EET should not be applied at Triad.		Requires specific data of distribution network and increased complexity to model, even if tariff is not based on 'peak' usage.
<b>Uncapped EET would send perverse signal</b> to turn down during Triad	EET could be applied on a different basis, such as 4-7pm weekdays	Removes operational signal	
		May align with DUoS, depending on outcome of DUoS SCR	
<b>Smaller DG may not be able to mitigate/respond to full TNUoS signal</b>	Limit to DG that can, e.g. those with access to BM		
	Grandfathering of DG that are already operational/past key investment gate (sunk costs)		Doesn't solve identified issues for grandfathered DG (e.g. protects from 'close' signal). Creates a two-tiered system where identical DG pay for network use differently. Increased complexity
<b>Limiting Regulation</b>	LDG currently included in Limiting Regulation as pay TNUoS. Uncapped EET would (probably) require no change; paying TNUoS may (and associated connection exclusion assets)		If included, cost recovery would be picked up by demand users via TDR; if not included, may create distortion between similar generations connected at different levels.

			Requires legal advice.
<b>How to locate DG in Transport model?</b>	DNOs could submit data on embedded forecast demand contribution and capacity of individual power stations >1MW and aggregated <1 MW (as recommended by GSR016)	Aligning Transport model to SQSS allows for continuity between network recommended build/operation and charging	
	If remain via demand zone but with GTNUoS structure, less no change required?		Would require new zone calculations of generation TNUoS and may not lead to equivalent charges as T-connected.
	could develop alternate estimation methodology to map capacity to nearest node(s)	Would be easier at higher voltages than lower.	Is distribution network information available? Would be resource intensive for first time/new DG and duplication of work

### Assessment of Options

A modification to **align the Transport model with the SQSS**, which models SDG as generation rather than reduced demand. This can theoretically happen independently of any changes to charging regimes but seems counterintuitive to model SDG as generation when calculating tariffs and then charge as negative demand.

This would likely provide the investment basis for importing/exporting GSPs without resorting to physical power flows (thus avoiding operational impacts and restrictions on available data at distribution level). Assignment of SDG to node(s) is done by DNOs as part of submission of Planning data to SQSS (“where it connects or exports most of its power”).

Analysis by the Electricity System Operator found that 9% of Distribution Generation >1MW participates in the Balancing Mechanism, which represents ~25% of the capacity. This volume does not justify Ofgem’s assumption that participation in the Balancing Mechanism will naturally mitigate full TNUoS charges for the majority of SDG. It does suggest that it can, if TNUoS charges act as a driver to encourage SDG into the BM and there are no significant barriers, especially for the lower capacity SDG (for example, those between 1 and 5 MW, compared to over 20MW).

#### **Option 1a – TNUoS generation charges for all users**

Aligns all generation under a common methodology so should lead to more efficient development of network.

Does not reflect the actual ability of all SDG, especially small/BTM, to export onto transmission system (e.g. non-firm access, power used within distribution network, limits on export in connection) or participate in BM (<1MW). Ofgem's assumption is that all SDG potentially can contribute to network flows/cost, which is reflected best by this option.

Will require significant work to identify TEC (or equivalent) to be basis of charge – current reporting by DNOs is registered capacity of power stations >1MW only. Smaller generation is aggregated by generation class and based on DNO's best view.

Potentially covers large numbers of users (e.g. domestic properties with solar, EV charging points). Unless Domestic/Micro-businesses/Small Business Consumers specifically excluded, may disincentivise small-scale decarbonisation/electrification and have impacts on retail market (via suppliers and export tariffs)

#### **Option 1b – TNUoS charges for >1MW and uncapped EET for <1MW**

Requires the assumption that 1MW also represents a reasonable threshold at which power is unable to reach Transmission network (as well as BM access and data availability).

Improved cost-reflectivity relative to national demand.

<1MW users cannot participate in BM so unable to mitigate impact of GTNUoS signals. Only 35% of >1MW SDG (by capacity) is in BM currently, so majority of Users will not automatically be able to mitigate against full TNUoS.

Risks creating a 'cut-off' size for similar SDG in same location, although value of cut-off will be different by tech type and location (e.g. exposed to peak element of TNUoS or not).

Aggregated capacities <1MW SDG can be used to model risk of uncapped EET sending signal to users to turn down. Is there an implicit assumption that <1MW is less reactive to temporal signals?

#### **Option 1c – Uncapped EET for all users**

Creates perverse incentive for users in northern demand zones to turn down during transmission peak. Demand HH charges are floored at £0 to prevent demand turning up during transmission peak. This operational signal could be mitigated by different charging arrangement than Triad (e.g. 4-7pm weekday peak). Without changes from Triad, is simplest option to implement.

Partially addresses distortion as SDG that drives transmission reinforcement will pay charges.

### **Conclusions**

AGIC should be based on investment signal, not operational, so cannot be based too closely on flows at particular GSPs/within zones. Current methodology reflects value at national level and no clear case for change to locational AGIC – recommendation that no change should be made.

Uncapped EET is an option if/when demand changing moves away from Triad.

Option 1b) is dependant on SDG participation in the Balancing Mechanism significantly increasing from today's levels. The group concluded that Option 1b) is the least-worst option but the main disadvantages are:

- Assumes full volume is exported to the Transmission Network.
- Increased participation in the Balancing Mechanism is required to avoid SDG being penalised in comparison to other generators.

- A new cut-off of 1 MW, where otherwise-similar Users are treated differently.
- Behind the meter generation (without export capacity) would still the inverse of demand charges through Triad avoidance.

These create new and different distortions to those identified in the case for change and as such, the group has concluded that none of the options considered would be proportionate. If Option 1b) is to be developed further by Ofgem, consideration will need to include encouraging participation in the Balancing Mechanism (which is out of scope of the Task Force) and interpretation of the Limiting Regulation.