

Aims for broader network charging reform and the development of flexibility markets at distribution | August 2021

Introduction

By the end of the 2020s, the electricity networks, and especially the distribution networks, will be quite different to now. The distribution networks will have significant volumes of local renewable electricity, battery storage, EV smart chargers and even some V2G. Demand will not be passive but will be flexing in response to signals through the wholesale market, flexibility markets and network charging signals.

Through future network charging reforms and the RIIO-ED2 price control, BEIS and Ofgem should aim at developing a framework that will work effectively for this world and where the interactions between network charging and flexibility markets (at distribution and national level) are considered more explicitly in policy design than has been the case to date.

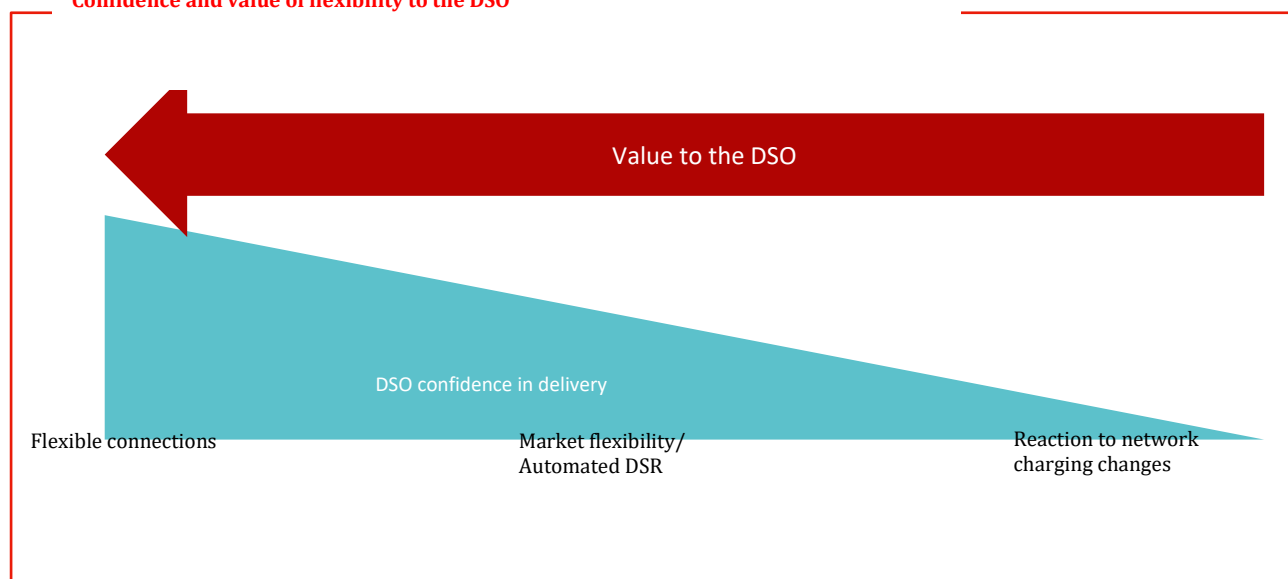
Principles

Our initial view is that the principles that should guide the discussion at least in the short-term regarding the interactions between flexible connections, contracted flexibility and network charges should be that DNO confidence in delivery should determine their relative value.

Thus, DNOs should be willing to pay more for balancing from flexible connections (highly certain), then flexibility procurement, then network charging.

With respect to DSO flexibility markets in particular, it is also important that this is consistent with the Clean Energy Package; including, for example, setting of utilisation prices.

Confidence and value of flexibility to the DSO



Questions to consider

This should include consideration of the following questions at least (noting that this is not in any way comprehensive).

- What are the respective roles of network charging, wholesale/retail market signals and flexibility markets in sending signals to distribution-level generation, storage and demand-side response for managing constraints?
- How will the role of the Balancing Mechanism develop with respect to constraint management and how should this be considered within distribution network charging reforms? For example, is it possible that the Balancing Mechanism will eventually be used to manage distribution constraints and if so, what impact should this have on distribution network charging (if any)?
- How should “conflicting” signals between network charging at different voltages and flexibility markets be managed? In many cases, such “conflicts”, for example where the value of providing flexibility at national scale is outweighed by the cost incurred at a given time of exacerbating a constraint may be appropriate. However, without explicit consideration of how these different methodologies are created, it will be difficult to ensure that these interactions are correct and efficient.
- What is the role of BEIS policy in preventing any consumer detriment arising from cost-reflective (and possibly volatile) network charging and flexibility market signals to support Ofgem’s role in designing an effective charging framework?

Objectives for the RIIO period

The following builds on the ADE’s existing priorities for RIIO-ED2.

They are focused specifically on interactions the industry would support developing between the Access and forward-looking charges review and ambitions regarding progress in DSO functions in the lead-up to, and within, the RIIO-2 period.

We have focused on 4 principal objectives –

1. Dx demand, generation and storage has at least financially firm, physically non-firm access
2. Dynamic, localised congestion pricing down to LV
3. The efficiency of flexibility is considered on its own account, rather than only in relation to network reinforcement
4. Fixed costs distort flexibility signals less

We have set these out in more detail below.

1. Dx demand, generation and storage has at least financially firm, physically non-firm access

We recognise that the ability to make participants ‘whole’ at Distribution level when they support balancing actions is complex and will require several reforms.

Overarching considerations

To do this, it would need consideration of, among others –

- Whether this is achieved through combining ESO/DSO congestion management in the Balancing Mechanism or through separate Dx balancing markets

- If Dx markets are chosen as the preferred approach –
 - How the markets will ensure liquidity
 - The extent to which gaming would be possible (e.g. between intraday wholesale market and the BM/Dx level balancing markets). This is a subject of debate currently in European markets and has been a concern regarding national markets in the UK. However, it is also likely to be significantly more difficult for many distributed assets to game the system in the same way; for example, renewable generation.
 - How gate closure at Distribution and the BM will be managed to support assets to participate in both when that is efficient
 - How structural constraints at Dx will be avoided to mitigate gaming
 - How constraints straddling different GSPs will be managed
- How such actions, some of which are likely to be very close to real-time, will be coordinated and managed between ESO and DNOs
- Communications and dispatch technology to support actions close to real-time at Distribution
- Monitoring of Distribution network conditions close to real-time
- The overall IT architecture to support this; including, as above, the ability to manage constraints in real-time between local and national level and between different GSPs
- Whilst noting that this will not be an issue for some time given the volumes involved, some consideration may be needed to ensure that reforms are robust to the future possible impact on settlement and suppliers' overall balancing position as volumes increase

Existing Active Network Management connections for generation

Active Network Management effectively values generation-side flexibility at connection, rather than on an ongoing basis in response to conditions on the network.

For new connections, the use of Active Network Management contracts should be phased out as financially-firm connections are introduced.

It will likely be more difficult to migrate existing flexible generation contracts, particularly in the short-term. Therefore, we assume that some generation at least will remain on flexible connections, even if financial firmness becomes an ambition for the RIIO-ED2 period.

At present, our view is that this could be managed in several ways –

- DNOs could be required to gradually reduce their annual allowance of curtailment hours over time, making greater use of flexibility in the local area
- Allowing generation to bilaterally trade out of being curtailed (at least within a given area)
- DNOs should be incentivised to increase network utilisation through their Network Utilisation Strategies as part of RIIO-ED2

Carbon monitoring of system services

At present, BEIS is reviewing the carbon impact of the Capacity Market, BM and ESO system services. Further to this, the ESO has committed to being able to operate the market at zero carbon by 2025.

An equivalent commitment should be explored further through the RIIO-ED2 process with a view to the DNOs setting out a commitment for 2028 regarding their operations and impact on net zero that is at least aligned with, and of similar ambition, to the ESO and broader changes to monitor carbon in system services.

Interaction with emergency actions to protect the grid

Developing full balancing markets will impact network planning, the security standards to which the networks build/reinforce the grid and also the actions that are available to DNOs to protect the grid in emergencies.

At present, this includes –

- Ongoing work regarding P2/7 and broader security standards at Distribution
- A longer-term trend to gain greater commercial access to Dx assets, led by wider access to the Balancing Mechanism, has been exacerbated by Covid, leading to the introduction of new services (sometimes very quickly, such as ODFM)
- At the same time, ongoing work is underway regarding the conditions (if any) under which DNOs can take direct control of Dx assets in emergencies (incl. modifications GC0147 and SEC0046/DCP371).

If not developed appropriately, the latter could effectively move demand to less firm physical connections (as per ANM) without reductions in their connection costs as is seen on the generation side. Migrating all Dx connections to being financially firm would be a step towards resolving these issues but it also likely requires strategic direction and a position on the circumstances (if any) when it is appropriate to control Dx assets. This would be particularly important if financially firm contracts can only be extended to larger Dx assets but emergency controls (incl. direct control for a prolonged period without compensation) are extended down to domestic-level Dx assets.

What could this entail for RIIO-ED2 and the Access 'roadmap'?

Recognising that there is significant uncertainty in how this would be developed, a few immediate interactions and priorities for RIIO-ED2 and Access can already be identified.

From RIIO-ED2 –

- RIIO-2 business plans should set out an ambition to develop financially-firm connections
- DSO Performance Panel (if introduced) should explicitly measure and reward DNO performance on measures taken to meet this commitment
- Investment through RIIO-2 will be needed to put in the infrastructure for this and support its introduction (e.g. reviewing connections, working with industry to establish these, trials)
- A clear Ofgem strategic direction on how emergency conditions will be considered at Dx level if financially-firm connections are introduced
- Investment through RIIO-2 to introduce IT and Comms needed for dispatch; including ensuring that any IT architecture developed through RIIO-ED2 can work with the ESO's equivalent IT upgrade through its RIIO-2 price control
- Investment through RIIO-2 to introduce new ways of monitoring the networks (incl. LV)

From the Access 'roadmap' and further work following the SCR –

- A clear Ofgem strategic direction on how (if at all) existing flexible connections and those from 2023-2028 would be managed if Dx balancing markets are introduced
- If the connections are not to be revised if/when Dx balancing markets are introduced, the impact on the likely liquidity of these markets and how the interaction will be managed; including, for example, whether flexible connectees can trade their way out of curtailment
- Further analysis of the interaction between Dx balancing markets, existing static RAG DUoS and any further reforms of this (see below)
- Regarding how emergency actions by DNOs on Dx assets should be considered with respect to access rights and whether this reduces the physical firmness of demand connections, Ofgem should publish to industry a) an explicit direction on the process by which this is decided (ideally through Ofgem leading a consultation with industry rather than DNO-led modification changes) and b) its decision on this matter.

2. Dynamic, localised congestion pricing down to LV

As flexible assets grow significantly at domestic levels and at Distribution more generally, signals for such assets that reflect the close to real-time state of the network are likely to become more important. In a smart distribution network, it is likely to be more important to understand and influence import/export between different parts of a network and between voltages than it is today.

Our initial view is that this cannot be left entirely to flexibility tenders and new markets (including potentially balancing markets as above). Network charges indicating network congestion in close to real-time are likely to also be needed.

This could require –

- Dynamic DUoS and TNUoS rates, reflecting hour by hour the different costs of transporting electricity over different parts of the network
- Greater locational granularity; potentially down to feeder level
- The ability therefore to price electricity transport costs, assuming that it travels the shortest route (for example, within a given LV network area); using nodal models such as the Transport model

Outside of DNO reforms, this could also require –

- Further reforms to ensure that suppliers/aggregators can give customers the option of very granular locational pricing rather than smearing it over broader base (incl. both commercial considerations and whether suppliers/aggregators have billing systems in place to support dynamic charging)
- Whilst noting that this will not be an issue for some time given the volumes involved, some consideration may be needed to ensure that reforms are robust to the future possible impact on settlement and suppliers' overall balancing position as volumes increase

What could this entail for RIIO-ED2 and the Access 'roadmap'?

From RIIO-ED2 –

Similar to above, this would likely require –

- RIIO-2 business plans should set out an ambition for dynamic, locational network charging
- DSO Performance Panel explicitly measure and reward DNO performance on measures taken to meet this commitment
- Investment through RIIO-2 to introduce new ways of monitoring the networks (incl. LV)
- Investment through RIIO-2 to develop how such charges would be introduced (e.g. how will charging be calculated, how will it be communicated to assets, how will DNO billing work)

It could also require –

- Expanding existing trials into dynamic TOU tariffs already exist (e.g. UKPN)
- Trials into local-only network access

From the Access 'roadmap' and further work following the SCR –

- Further assessment of the feasibility of more locational network charging
- Direction on how static RAG charging could practically be phased out
- As above – Ofgem direction regarding treatment of flexible connections

3. The efficiency of flexibility is considered on its own account, rather than only in relation to network reinforcement

At present, network costs are dominated by the capex costs of network reinforcement and the majority of flexibility actions by the DNOs are defined relative to network reinforcement avoidance.

In future, the use of flexibility, for a variety of operational purposes, will increase and extend beyond only resolving long-term network reinforcement needs. As a result, it will become important to be able to incentivise efficient systems operation more independently of its impact on reinforcement – and somewhat approaching (whilst noting the differences with) the case at Transmission where the ESO is judged based on a counterfactual of an efficient systems operator and in only limited aspects (for example, NOA) compares the costs of flexibility with network reinforcement avoidance.

What could this entail for RIIO-ED2 and the Access 'roadmap'?

From RIIO-ED2 –

- Significant review mid-way through the ESO's RIIO-2 price control to understand how separation has worked (incl. the use of pass-through costs, incentive mechanism tied to the Performance Panel) and the lessons for any similar price control structure at Distribution
- What the counterfactual for efficient systems operation at Distribution should be (noting the differences between the national and distribution systems)

4. Fixed costs distort flexibility signals less

Over the next few decades, electricity infrastructure is likely to increase significantly – increasing fixed costs borne by demand (by increasing overall cost of infrastructure). On the other hand, gas infrastructure may shrink (at least in certain areas) – increasing fixed costs borne by demand (by decreasing the denominator over which charges are recovered). Finally, at least some heating

and steam demand may be met by smaller networks than currently (e.g. hydrogen clusters, city-wide heat networks) – these networks are likely to need new or refurbished infrastructure and thereby, will create infrastructure costs to a relatively small demand population.

As it stands through Access and the TCR, each 'system' (e.g. electricity, heat networks, eventually hydrogen) will recover its own fixed costs from its own demand base (based on import volume or capacity). This is likely to lead to –

- Rising fixed costs in each 'system' as commodity costs become more variable but also those systems see more prolonged periods of very low costs as increasing volumes of near-zero marginal cost renewable plant is built
- Different systems having different levels of fixed cost – affecting those users' ability to pay, distorting choices between 'systems', dampening or reinforcing signals for flexibility in different areas and creating questions around fairness (especially if choices for heat decarbonisation in a given area are limited)

This is likely to require –

- A clear long-term view from Government on whether the fixed costs of decarbonisation will be recovered through taxation or energy bills
- If these costs are recovered through energy bills, further review of recovery – noting that a) continued (and even increased) coupling between these systems will likely be needed b) the relative fixed costs associated with each system will likely change over time c) the degree of socialisation of these costs that could be required.

Interactions with broader workstreams

CLASS

The development of the DSO functions set out above will require significantly more collaboration between the ESO and DNOs; including dispatch decisions, information on the state of the network and possibly service needs going forward.

This information is shared to some extent with the rest of industry but not fully. Some of this information is likely to be useful in understanding ESO's demand in system services tenders which, under CLASS, the DNOs will bid into as commercial providers.

A recent example demonstrates this. In August, the ESO asked FFR, STOR and Frequency Response providers to allow the ESO to share asset data beyond MPAN and postcode with the DNOs. The industry could not agree to this request because firstly, the confidentiality agreement between the ESO and the DNOs could not be shared and secondly, such information would allow DNOs to identify assets that could support CLASS services.

Further clarity is therefore needed on how data-sharing for whole system outcomes and DSO/ESO collaboration will interact with CLASS.

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