Linkages between options for reform – discussion note

Summary

In the other discussion notes, we have set out the options for reform and our preliminary considerations on the areas of access right choices, the locational charging model(s) used for distribution charges, and the network charging design.

There are important links between the different options for reform. In this note we set out the linkages between these areas that we have identified. We expect these linkages will inform how different options could be packaged together.

1.1. In this chapter, we identify some of the links between access rights, locational charging models, network charging design, and connection charging boundary options:

- **Access rights** define the nature of users' access to the network and the capacity they can use – how much they can import or export, when and for how long, and whether their access is to be interrupted and what happens if it is.
- The **distribution locational charging models** determine the approach to calculating future networks costs at different locations. We are considering different options which would reflect different network cost horizons and impact the volatility of the charges. The models also determine the level of locational granularity – the extent to which charges are calculated separately for different locations.
- **Network charging design** refers to the choice of options such as between volumetric or capacity based charges, whether charges should include seasonal differences and whether the same design should apply to both transmission and distribution and generation and demand users. Charging design also takes into consideration the locational granularity that charges should be calculated and applied at.
- The **distribution connection charging boundary** determines the extent to which connection user pays for any wider network reinforcement that is triggered when that user connects to the network.

1.2. The potential options for connection charging reform are not covered in detail in this working paper. They will be discussed in the second working paper that is published later year. As part of the second working paper we will also capture any further links between the connection charging boundary options and the wider options for reform.

Links between access rights and charges

Access rights and charge design

1.3. In general, having more defined and tradeable access rights could involve a move away from consumption based charging towards more access-based capacity charges. These would have to be designed so that users pay for the import and export capacity that they require (eg demand users that have onsite generation may be required to agree import and export capacities if they intend to export onto the network). Where access

rights are not well-defined, it is difficult to use access rights as the basis for charge design. Instead charge design could be based on actual consumption volumes, actual capacity or other actual outcomes such as critical peak pricing.[1]

1.4. Where a user chooses an access right option that provides less firm access and delivers network benefits, then the user should be appropriately rewarded. The value of alternative distribution access rights ("flexible connections") is currently reflected via connection charges. For example, if a user chooses a flexible connection that avoids the need for network reinforcement, then the user can benefit from a reduced connection charge and a quicker connection.

1.5. If the connection boundary were changed (ie so that network reinforcement costs are not signalled via connection charges), consequential changes may need to be made to use of system charges to ensure alternative access choices are cost-reflectively charged (eg users with less firm, time-profiled or shared access rights should pay less). The non-firm access could be taken into account as part of the locational cost model and/or the charge design. For example, the locational cost model could calculate future network costs differently, depending on a users' level of non-firm access (ie so that the extent to which the user is contributing towards future network costs is adjusted to reflect the level of curtailment that they have agreed to). Alternatively, non-firm access could be reflected via the charge design. For example, users with non-firm access could receive a lower agreed capacity charge or they could avoid peak time-of-use charges (to reflect that, if the network is constrained, the user will be curtailed). We need to undertake further analysis to identify the optimum approach for reflecting alternative access choices.

1.6. However, non-firm, time-profiled or shared access rights that don't provide network benefits (eg if a user only wanted access during "peak" periods) should not result in a reward for the user, because the user's access choice provides no network benefits. Where there is no network benefit (either in the short term or the long term), it is questionable what value alternative access choices provide.

1.7. Some access choices also raise specific use of system charging and billing issues that will need to be explored. For example, currently larger users are individually charged for their use of the system. If users choose to adopt shared access, then we will need to consider how the distribution network operators will be able to cost reflectively charge suppliers for shared access.

Standardisation of access rights

1.8. If we move to a shallow connection boundary, having access right choices that reflect a menu of standardised options may make it more manageable to design the network cost models and charging design that reflects the network benefits of non-firm, time-profiled or shared access.

1.9. If bespoke access rights exist, designing a locational charging model to cope with this complexity may be more challenging. In broad terms, we would need to design a cost model where the long run marginal cost could be adjusted for the probability that individual users will not be using the network during peak times under their non-firm or time-profiled

[1] Though capacity subscription charges, which are an implicit form of agreed capacity limit, might be an exception to this.

access right. The feasibility of estimating the probabilities for each user's access right could be challenging.

1.10. Alternatively, we could consider bespoke, individually negotiated charges. The cost model could then take the revenue from the individually negotiated access rights/charges and net that off the forward-looking revenue to be recovered from other users. Individually negotiated charges introduce the risk of bias (discounts) to particular users/user segments or a lack of rigour in the calculation of the charges because it would not be based on a common methodology. More information on the standardisation of access rights can be found in the Access rights discussion note.

The charges that apply if a user exceeds their access rights

1.11. If a user exceeds their agreed access rights, then this can create additional costs for network and system operators. We need to consider how we will design any charges that apply for exceeding agreed access rights. Exceedance charges should be transparent and cost-reflectively calculated, but could be high as when parties are exceeding their capacity this creates the risk of outages due to overloading of network assets. We will need to consider the methodology in the locational charging model for calculating exceedance charges and the design of any exceedance charges.

1.12. Suppliers, or other third party intermediaries, could potentially offer direct load control services for their customers' smart appliances, as a means to reduce users' exposure to the exceedance charges. This could lead to innovative new services being provided by suppliers in offering a range of services. This is consistent with the views from stakeholders received through the half hourly settlement call for evidence and our early supplier engagement interviews, which are summarised in the Engagement with external stakeholders discussion note.

Linkages between distribution locational charge models and charge design

1.13. There are strong links between the methodology used to estimate future network costs and how they are recovered from different types of users, the extent to which distribution charges vary by location and the design of network charges. We outline some of the key linkages below.

Whether demand and generation should be treated as equal and opposite

1.14. As part of our work on cost models and charge design, we are considering whether we should adopt a symmetric approach to charging demand and generation. Our preliminary view is that if actions taken by generation or demand drive the same costs on the network, then adopting a symmetric approach to cost modelling may be more cost reflective and incentivise efficient use of the network. However, even where the underlying cost model allocates costs to generation and demand users consistently, it may not be appropriate to apply the same charge design across generation and demand users. We intend to undertake further work to consider the design of network charges for generation and demand users.

The extent to which the design of network tariffs varies by location

1.15. The cost of installing, operating and maintaining the electricity network varies geographically. We are considering options to improve the locational granularity of forward-looking network costs, to help improve cost reflectivity. The introduction of more granular network charges allows for the development of more location-specific network tariffs. For example, different time-of-use tariff profiles that reflect local network conditions could be applied, depending on the network user's location. This would also enable us to consider the introduction of seasonality that reflects different types of users in a location. For example, in a generation dominated area, local assets might peak in summer, rather than in winter when the majority of a DNO region peaks, better aligning users' peaks with the network peaks.

Real time pricing and short run marginal cost based charging

1.16. In order to implement a short run marginal cost and real time pricing charge design, the DNOs would need detailed information about actual network conditions, which would be obtained by accurately mapping the relevant network assets for all customers and undertaking detailed network monitoring at all voltage levels. Introducing fully nodal locational charges to the low and high voltages would also require the DNOs to undertake detailed network modelling. More detailed network modelling is required to understand how network costs change on a short term, real time basis.

1.17. Based on the information that is currently available, our preliminary view is that any option that requires very granular network monitoring may not be feasible for our SCR implementation date of 2023. We are continuing to assess the cost and benefits of more granular network monitoring, and we encourage DNOs to continue making ongoing improvements to their network visibility.

The methodology used to calculate reactive power and excess capacity charges

1.18. Under the current network charge design, there are specific reactive power charges. These reactive power charges are only applied to reactive power in excess of the level set out in the standard terms of connection. If we retain a reactive power charge as part of the network charge design, then we will need to decide how to identify the cost impact of excess reactive power, as part of our work to develop the cost models. Similarly, if we retain exceeded capacity charges as part of the distribution network charge design, then we will need to ensure that the distribution cost models are able to estimate the future network costs of the user exceeding their agreed level of capacity.

Linkages between distribution connection charging boundary and locational use of system charging models

1.19. To ensure the economic and efficient development of the network, it is important that there is a signal to users about where to locate on the network. We have stated that we will only implement a shallow distribution connection boundary, if we can send improved locational signals through ongoing use of system charges.

1.20. There are two key areas that determine how locational charging signals are calculated – the network cost model (the methodology used to estimate future network costs) and the locational granularity (the extent to which distribution charges vary by location). Our decision in both these areas have links with the connection charging boundary.

Locational granularity

1.21. Under the current connection charging methodology, the connection customer is required to pay the costs of single use assets needed to provide their connection. They must also contribute to the cost of any reinforcement to the existing network needed at the same voltage level as their connection, plus the one above.[2] The connection charging methodology sends a strong locational signal to the connection customer about their impact on the existing distribution network. The connection charge is specific to the exact location where the connection is requested. We need to consider whether the options to improve the locational granularity of distribution network charges send equivalently granular signals to users about where to invest.

Network cost model

1.22. We are considering different methodologies that could be used to estimate future network costs. The decision on the network cost model has links with our decision on distribution connection charging boundary.

1.23. For example, an allocative long run margin cost model approach may better align with a shallow-ish connection boundary than a shallow connection boundary. Under an allocative long run marginal approach, the cost model would signal the long term cost of maintaining and investing in the network, whilst the shallow-ish connection boundary provides a near-time locational signal about where there is spare capacity. However, arrangements would need to be designed to ensure that the user is not charged twice, via both the shallow-ish connection charge and the allocative long run marginal cost approach, for the costs that it is driving.

1.24. Under a long run incremental cost model approach, a user would not have faced a higher use of system charge for capacity on the network as reinforcement neared. A long rung incremental cost model approach may therefore also work well with a shallow-ish connection boundary, to ensure that the user still receives a locational signal about where to locate.

1.25. Further work is required to consider how the options to amend the distribution connection charging boundary could work alongside the options to improve locational DUoS signals.

Linkages between trading access rights and locational charging models

1.26. If users trade their access rights[3], we would also need to consider how we charge those users. Network or system operators could be notified that an access right has been traded and take this into account when billing users. Alternatively, the original access right holder could be charged in accordance with the use-of-system charging methodology and

[2] For generation connections only, reinforcement costs in excess of the high-cost project threshold of £200/kW shall be charged in full to the connection customer.
[3] Better enabling the trading of access is being progressed by the Energy Networks Association (ENA) outside of the SCR. Further information is available here: http://www.energynetworks.org/electricity/futures/open-networks-project/

the amount paid by parties that buy traded access could be negotiated by the two parties that trade access.

Common considerations

1.27. As part of our review, we need to consider how options could apply to all users. For example, we need to consider how options for reform could apply to non-half hourly, unmetered, or Independent Distribution Network Operator (IDNO)-connected users.

- **IDNO-connected users**[4] - Some users are connected to IDNO networks rather than DNO networks. IDNOs also complete a large number of new connections (eg housing estates). We need to consider how access and charging reforms could apply to IDNOs and IDNO connected users. IDNOs are represented on the Delivery Group and have been actively inputting into the development of options. We will consider the applicability of our reforms to IDNOs.
- **Non half-hourly metered users** – Some users (including many small users) are currently not half-hourly metered. In 2017, we launched a Significant Code Review to consider introducing market-wide half-hourly settlement (HHS), this could increase the number of users that are half-hourly metered. We need to consider how reforms could apply to any users that continue to be non-half-hourly settled. At a minimum, arrangements should not provide a disincentive to receive a smart meter and move over to HHS. Ideally, arrangements should provide an incentive to move over to HHS. We will consider this issue further as part of second working paper later this year.
- **Unmetered users** – Legislation allows predictable loads, where the load is smaller than 500W or it is impractical to install a meter, to be supplied without a meter (eg street lighting). We need to consider how access and network charge reform options could apply to unmetered users (eg how time-of-use or critical peak pricing charges could be applied to unmetered users where consumption is not measured).

[4] Independent Distribution Network Operators (IDNOs) develop, operate and maintain local electricity distribution networks. IDNO networks are connected directly to Distribution Network Operator (DNO) networks, or indirectly to the DNO via another IDNO, often serving new housing and commercial developments. We regulate the amounts that IDNOs can charge their network users for using their networks via a 'Relative Price Control'. This ensures IDNO charges for domestic customers cannot exceed the DNO equivalent charge.