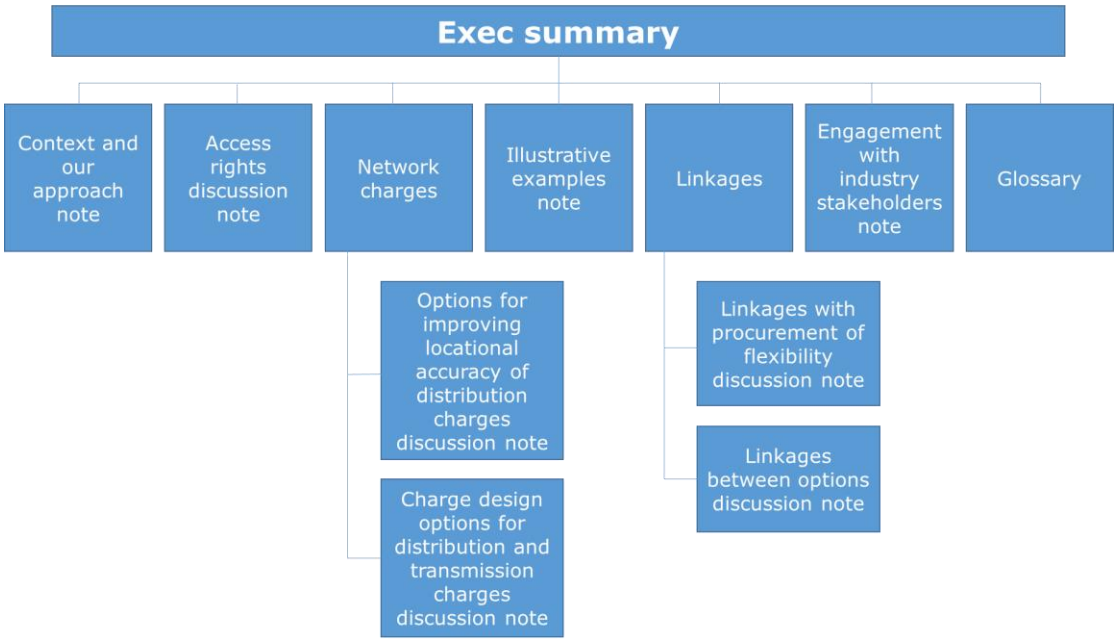
Exec Summary – Summer 2019 working paper

Our energy system is undergoing a radical transformation as the process of decarbonisation, digitisation and decentralisation accelerates. We are undertaking a package of reforms to enable competition and innovation, decarbonisation at lowest cost and to protect consumers in the transition to a smarter, more flexible and low carbon energy system.

Our Future Charging and Access programme is an important part of these reforms. The Future Charging and Access programme aims to ensure that all users pay a fair share towards the costs of the existing networks and systems, whilst supporting efficient decisions and reducing harmful distortions to the forward-looking, cost-reflective charges. The programme goes hand in hand with enabling greater use of flexibility and builds on the Smart Systems and Flexibility plan we produced with government.

As part of our programme, in December 2018 we launched a Significant Code Review (SCR) into network access[1] and forward-looking charging.[2] The objective of the SCR is to ensure that electricity networks are used efficiently and flexibly, reflecting users' needs and allowing consumers to benefit from new technologies and services while avoiding unnecessary costs on energy bills in general.

This is the first of two working papers we intend to publish this year, and consists of a suite of discussion notes setting out our current thinking –



[1] Network access rights define the nature of users' access to the networks – how much they can import or export, when and for how long, where to / from, and how likely their access is to be interrupted and what happens if it is.
[2] Forward-looking charges are the elements of network charges that signal to users how their actions can either increase or decrease future network costs in different locations. These charges include the upfront connection costs for connecting to the system and the ongoing forward-looking use-of-system charges.

- **Context and our approach to this SCR:** we outline the range of reforms underway on network access and charging to support the transition to a smarter, more flexible and low carbon energy system. It also provides an overview of the approach we have taken to date and intend to take in the future to develop reforms prior to consulting on our draft conclusions and Impact Assessment in mid-2020.
- **Options for reform of access rights for distribution and transmission:** we set out the options we are considering for better definition and choice of access rights, and our initial assessment of these options. We are considering a menu of defined access products common to all distribution and transmission networks and will continue to consider the pricing of these products and their relationship with forward looking charges.
- **Network charges:**
    - **Options for improving locational accuracy of distribution charges:** we explain some of the key framework questions underlying distribution cost models that we are considering, focusing particularly on what kind of signals should be sent through distribution network charges and the model(s) used to calculate these. We are proposing to base these models on longer term cost signals in line with general academic thinking. This approach would still allow for charging signals close to real time. We also consider the extent to which charges could vary by location.
    - **Charge design options for distribution and transmission charges:** we set out further options with respect to the tariff structure of distribution network charges. We think the leading options are those where charges would be based on capacity or usage during certain fixed time periods, but are keeping a number of options on the table and with the option of a dynamic time related charge in future. We also explain options we are considering for transmission network charges, focusing particularly on different options for the design of transmission network charges for demand users. There will be further thinking on transmission charges in our second working paper.
- **Illustrative examples:** we explain how the options we are considering could benefit different users of the system – a distribution-connected wind generator, a local energy scheme, an existing large industrial user, a business with a large industrial fleet and a storage operator.
- **Linkages between options for reform:** we describe our thinking on the links between the access rights, network charge design and cost models options that we are considering.
- **Linkages with procurement of flexibility:** we identify the relative merits of different approaches for valuing system flexibility and describe how our proposals and procurement of flexibility will deliver better value from the electricity system.
- **Engagement with industry stakeholders:** we provide an overview of the engagement we have undertaken with industry stakeholders, including information about interviews we conducted with suppliers and a summary of their responses.

Development and assessment of options for change

Network access rights define the nature of users' access to the network and the capacity they can use (eg how much they can import or export, when and for how long and whether their access is to be interrupted). Improving the **choice and definition of access rights** could bring benefits both to those connecting to the system and to consumers in general, by increasing the speed of connections and keeping reinforcement costs and consumer bills

down. We are focusing on options to improve the definition of non-firm access[3], and to introduce time-profiled[4], and shared access[5]. We will quantify the potential benefits of improving the choice and definition of access rights. We will consider further how access right trading and sharing access interact. We are aware that users support the development of financially firm access at distribution level[6], and we need to consider how feasible this is within SCR timescales. Further work is required to assess the feasibility of offering new access choices to users (eg how alternative access choices would be reflected in network charges).

We are undertaking a wide ranging review of the forward-looking element of Distribution Use of System charges, covering both how to improve distribution locational charging signals and considering the most effective charge design.

Our work on improving **distribution locational charging signals** includes options to reform network cost models (the methodologies used to estimate future network costs) and locational granularity (the extent to which distribution charges vary by location). At a high level, our initial thinking is that distribution network cost models should continue to be based on the Long Run Marginal Cost (LRMC).[7] We also want to improve the consistency of cost methodologies across different voltages to minimise distortions. We intend to undertake further assessment of the different approaches to calculate the Long Run Marginal Cost (eg whether the methodology should take into account spare capacity on the network). We are continuing to assess the different options or locational granularity of charges. Current analysis suggests that varying charges by primary substation may be possible and that there may be benefits in classifying the network into different archetypes for charging purposes (eg distinguishing generation and demand dominated areas).

Alongside considering how we improve distribution locational charging signals, we are also considering how we improve the **design** of distribution network charges. We have identified a number of basic options for how tariffs could be structure to send cost reflective signals about users' contribution to network costs. These options vary according to whether they are based on a users' agreed capacity rights, their maximum measured capacity requirement during a particular period or their usage during particular time periods. There are also potential options for charges to be set more dynamically, for example involving high charge periods being determined and notified close to real-time based on forecast peak network periods. There could also be an option for charging rebates at peak times where users reduce their usage. Our initial assessment is that there may be feasibility challenges with dynamic options due to insufficient network monitoring and forecasting capability in the nearer-term. Our initial assessment is that there may be some challenges in implementing dynamic charging and peak rebate options by 2023 due to the changes required to support it (eg network monitoring equipment at lower voltages). Of the remaining options, charges according to usage at different times seems like it would be easiest to understand but further work is needed to consider the extent to which this option

[3] Under a non-firm access right, a user agrees for their access to import or export electricity to be restricted, subject to certain parameters. We are exploring the options to improve the definition about when and how much a user can be curtailed.

[4] Where a users' access rights vary over time. For example, a user may agree an access right that allows them to export or import more overnight than during the day.

5 Shared access would allow multiple sites, in the same broad area, to obtain access up to a jointly agreed level.

[6] Financially firm access requires the network user to be compensated if their access to the network is restricted.

[7] This is where network infrastructure is not taken as a fixed consideration in charge setting. Network charges are based on the cost of developing the network and whether the behaviour of network users will increase or decrease these costs. Under an LRMC-based approach it is possible for network users to receive charges or credits based on the extent to which they increase or decrease the network cost counterfactual. This is the current approach to forward-looking charging in GB and is also the pre-dominant approach used internationally for network charging.

relative to the capacity charging options would best reflect the key drivers for network costs.

The scope of our review of Transmission Network Use of System charges is narrower than the scope of our review of distribution network charges. In this paper, we focus on options to reform the design of transmission forward-looking charges for demand users. There are three high-level options for reforming transmission demand charges. We could reform the current dynamic charging approach, we could introduce an agreed capacity approach, or we could adopt a static charging approach (based on actual energy consumed or actual capacity used during peak periods). Our initial thinking is that an option which involved dynamically setting peak charging periods or moving to an agreed capacity approach could lead to the most cost-reflective signals. These are however not without implementation challenges.

Flexibility is generally defined as the ability of users of the electricity system to vary their generation or demand in response to signals at different times. Better allocation of capacity and better signals help us get more out of our electricity system and ensure that flexibility providers are able to access the value they can bring to the system. There are different options for how this value can be signalled – network price signal flexibility[8] and contracted flexibility.[9] The options we are considering within the Access SCR will affect how the value that flexibility can bring to network management is signalled. In this paper we explain and assess the different options.

Taking forward the review

The analysis set out in this suite of discussion notes represents our initial thinking on the long-list of options, and we will continue to develop this. We also intend to publish a second working paper later this year. The second working paper will consider the applicability of reforms to small users, distribution connection charging reform and the remaining focused areas of transmission network charging reform (transmission network charges for distribution-connected users and the Reference node).

We intend to consult on our draft SCR conclusions and draft Impact Assessment in mid-2020, with a decision on final conclusions and Impact Assessment early in 2021. We propose to implement all reforms in April 2023.

We are committed to undertaking our work on Future Charging and Access reforms in a transparent and open manner. To help support the development of the SCR we have

[8] Network price signal flexibility - where a party varies its demand or generation in response to the price of energy or network use at a particular time and/or location. In the context of the value that flexibility can provide for network management, this can be signalled through forward-looking network charges. These charges can be discounted for users choosing non-standard access rights, ie options that involve them being flexible in their access to the network.

[9] Contracted flexibility - where parties trade and directly contract with one another to procure flexibility. In the context of network management, this could be the electricity system operator (ESO) or distribution network operators (DNOs) procuring flexibility services from users, to the extent that additional actions are needed to ensure secure network management once users' actions from price-signalled flexibility are taken into account. It could also be network users trading access between themselves – for example, if one user with a flexible connection was contracting with another party nearby to either turn up or down to reduce the extent they would be curtailed.

launched a Challenge Group[10] and Delivery Group.[11] In addition, we will continue to engage stakeholders more widely, primarily through Charging Futures. We will be discussing and seeking feedback to the content in these discussion notes at the Charging Futures Forum on 19 September 2019. This the primary vehicle that we use for wider stakeholders to learn, contribute and share the future of charging arrangements.[12]

If you have any views on this working paper, please contact us at FutureChargingandAccess@ofgem.gov.uk.

Please contact chargingfutures@nationalgrideso.com to sign up to the Charging Futures distribution list and receive regular updates on future Charging Futures events and webinars.

[10] The Challenge Group provides ongoing stakeholder input into the SCR. This group provides a challenge function to the work of the Delivery Group and ensures policy development takes into account a wide range of perspectives.
[11] The Delivery Group comprises of network companies, the Electricity System Operator and relevant code administrators. The Delivery Group support us in developing and assessing options, drawing on their expertise and knowledge of how the networks are planned and operated.
[12] http://www.chargingfutures.com/