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Reforming electricity charging together

Forum

SCR Access Subgroup Product 5 – Hybrid Options

Final Report

07-10-2020

Background

Scope of Product 5

The Sub-Group has developed a number of non-firm access "standardised" options

- Remit is to shortlist a "hybrid" approach to the standardised options
- Hybrid options could involve either;
  - standardised options that can be tailored to reflect certain users' or networks' requirements, or
  - standardised options that can be tailored up to certain limitations

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Standardised Options

- The Sub-Group has short-listed and developed three non-firm access “standardised” options:
  - **Time-profiled access** - where users could choose to agree capacity that varies over the day
  - **Local shared access** - where two parties located near each other could agree a single access right (e.g. a solar farm and a community centre)
  - **Non-firm access** - where a user can agree non-firm arrangements in return for a discount in their DUoS charges (e.g. a wind farm could agree that 20% of their output is curtailable)
- The Sub-Group agreed to focus on **Time-profiled** and **Non-firm** access as **Local shared** access will be site specific and less amenable to hybrid arrangements

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Time-Profiled Access

Time-profiled access

- The Sub-Group first considered what a standard **Time-profiled** access option might look like, the key criteria being that any option would help support more efficient use of the network
- Consideration was given to both Demand and Generation predominant connection types
- It was determined that access arrangements might have similar characteristics as Time of Use (ToU) tariffs for Distribution Use of System (DUoS) charging, i.e. RAG principles to encourage consumer to import/export at off-peak times, whether this be time of day or season

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Time-profiled access - Demand

- When considering Demand type connections the standard access arrangement could look similar to DUoS time patterns

Times	Unrestricted access	Restricted access	Higher Restricted access
Monday to Friday	All day	00:00 – 17:00 19:00 – 24:00	00:00 – 07:30 21:30 – 24:00
Weekends	All day	All day	All day

- Access at weekends would generally be unrestricted but restricted access would prevent consumers importing during the demand peak (nominally 17:00 – 19:00) and in higher restricted areas, during the day (between 7:30 in the morning and 21:30 in the evening)

- Restricted access periods could vary between DNO's according to when the network peaks occur e.g. in respect of specific constraints on the network

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Time-profiled access – Demand examples

Example 1

A new consumer requests a 10MW connection. Due to network constraints the consumer must curtail their import by 3MW during 'Restricted access' periods, i.e. they must reduce to 7MW between 17:00 and 19:00. To meet this requirement they limit manufacturing processes during this period.

Example 2

A new consumer requests a connection for a bus depot that requires 2MW to supply EV charge points. Due to network constraints the consumer must curtail their import during 'Higher Restricted access' periods, i.e. they must reduce to 500kW between 7:30 and 21:30. To meet this requirement they agree to charge vehicles overnight between 21:30 at night and 7:30 in the morning.

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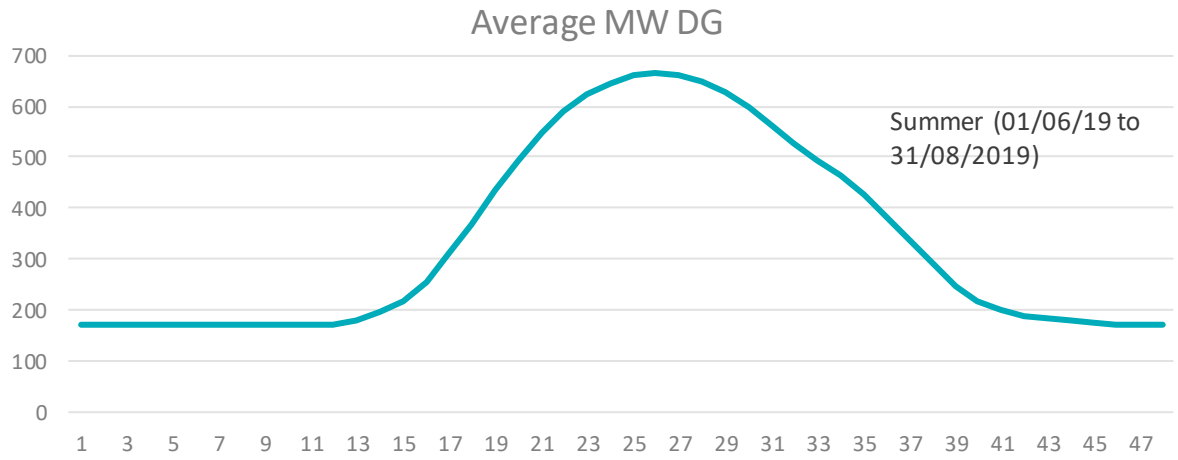
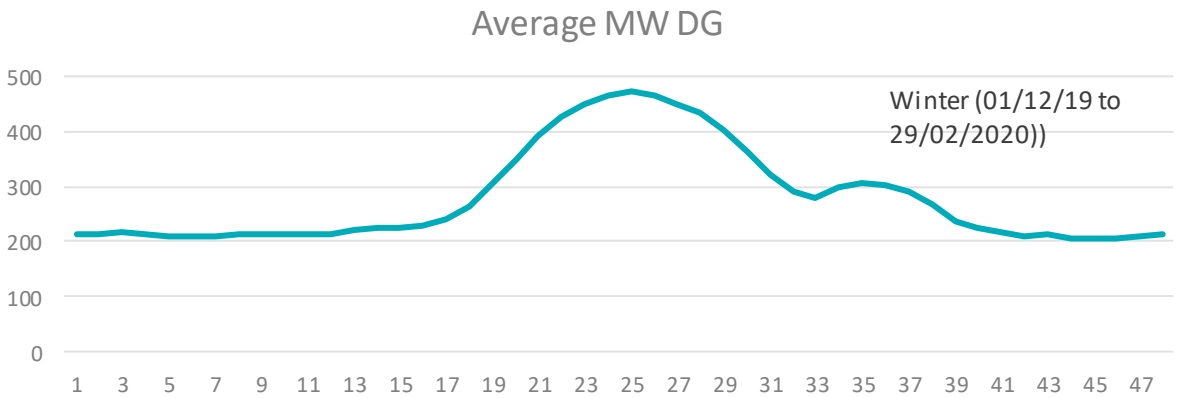
Time-profiled access – Generation

- Access for generation (e.g. solar) may look slightly different and be more seasonally affected
- Winter peak is less due to reduced solar contribution but profile generally similar
- Profile generally corresponds with dawn until dusk and peak occurs around mid-day
- Illustrative purposes only





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Time-profiled access – Generation

- Access for generation may reflect seasonality

Times		Unrestricted access	Restricted access	Higher Restricted access
Summer	Mon - Fri	All day	00:00 – 10:00 14:00 – 24:00	00:00 – 09:00 15:00 – 24:00
	Weekends	All day	00:00 – 10:00 15:00 – 24:00	00:00 – 09:00 16:00 – 24:00
Winter	Mon – Fri	All day	00:00 – 11:30 13:00 – 24:00	00:00 – 10:30 14:00 – 24:00
	Weekends	All day	00:00 – 11:30 14:00 – 24:00	00:00 – 10:30 15:00 – 24:00

- Restrictions would be higher at weekends to reflect reduced demand offset
- Winter restrictions would be less onerous to reflect reduced generation from PV

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Time-profiled access – Generation examples

Example 1

A new solar farm requests a 10MW connection. Due to network constraints during the summer, the consumer must curtail their export by 3MW during 'Restricted access' periods, i.e. they must reduce to 7MW between 10:00 and 14:00 on weekdays and 10:00 and 15:00 on weekends. To meet this requirement they must reduce export using an export limitation device to curtail onsite generation or instruct increase in onsite storage or onsite demand to achieve same end.

Example 2

A new energy storage facility requests a 20MW connection. Due to network constraints during the summer, the consumer must curtail their export to zero during 'Higher Restricted' access periods, i.e. between 09:00 and 15:00. To meet this requirement they must reduce export using an export limitation device.

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Time profiled access - timeband analysis from the cost model subgroup

- For the purpose of the previous illustrated examples this was not considered but moving forward with the time-profiled option it is important to consider the following points raised by the SCR DUoS Cost Model Subgroup:
- Whilst there may be merit is distinguishing between weekdays and weekends/ bank holidays, this is likely to add a lot of complexity for very little value.
- As the timing of peaks within a day could change and in order to simplify billing and charging processes it is necessary split the day with timebands of equal duration. The most likely option to consider would be 6 x 4 hour timebands but 8 x 3 hour timebands could also be considered if they could be justified.
- If time-profiled access is to be implemented through DUoS charges then more simplified timebands are likely to be required. More complex time profiled access arrangement are likely to require implementation outside of DUoS charging arrangements

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Time-profiled access – potential to change

Could restricted access periods change over time?

- One important consideration centres around whether the restricted access periods should be fixed or could change over time
- Evidence shows that DUoS time bands seldom change but the fluent nature of the network (especially if considered locally) means that energy patterns could change over time suggesting there is potentially a need for restricted access periods to be reviewed (possibly annually) and changed, if appropriate
- If restricted access periods were to be amended, further consideration would be needed as to whether existing users would be required to comply and change their energy profiles accordingly or whether it might only be applied to new users connecting to the network

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Time-profiled access – factors for assessment

- The standard time-profiled access periods could be tailored to meet locational circumstances, for example they could vary by distribution area or at substation level to reflect local network demand/export peaks
- Seasonal restrictions would take account of asset ratings, for example winter rating of overhead line may allow higher capacity and hence less curtailment
- Contractual position would be captured through the bi-lateral connection agreement between the DNO and the customer where restrictions were specifically tailored
- Real-time visibility through ANM scheme may allow further flexibility, i.e. allowing generation that is normally restricted to export during times when other intermittent generation is not (e.g. if no wind then other technology types can export)
- Larger connections connected at HV or EHV could be more receptive to time-profiling as they may have more flexibility in approach
- The counter-point to this any additional complexity becomes difficult to manage Access products should reflect that and if anything more complicated is needed by a customer then they would be better served by locational flexibility products

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Time-profiled access – hybrid options

- Hybrid options could support efficient network solutions (for example, tailoring access choices to reflect local network conditions)
- Could provide access choices that are easy for the customer to understand, with the ability to tailor to meet individual user needs. This could facilitate innovation, whilst maintaining a degree of commonality
- This would still increase complexity (for example, additional administration, charging and system operability), but could be easier to implement than bespoke access rights

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Time-profiled access – Enforcement options

- Users may be curtailed through contractual and physical means
- Physical constraint may be achieved through the implementation of flexible connections (ANM schemes or time-controlled) and may be more practical for larger connections due to cost
- Customer owned equipment such as export limiting or time controlled devices may also provide a solution, as might the addition of proportional load control functionality to the Smart Metering System
- Where physical control is deemed impractical (potentially cost prohibitive), DNO's may rely on a combination trust and monitoring. Cost reflective ToU charging or liability charges could be administered where supported by adequate metering/monitoring data but would need to be reflected in customer bills (not absorbed by the supplier).
- Consideration could be given to strengthening of existing DNO's rights as contained in the NTC's as many customers currently exceed their agreed capacity (simply paying excess capacity where they apply).

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Enforcement options across a range

- Trust – Contractually agreed, but not monitored or physically curtailed. May be appropriate for small users or for larger users in areas that are becoming increasingly constrained, but where there is still some headroom below the constraint.
- User self monitoring – contractually agreed, but not physically constrained. Monitoring would be by the user, with the user providing the DNO with periodic monitoring reports to demonstrate compliance or to report breaches. This may be appropriate where there is still some network headroom.
- DNO monitoring – Contractually agreed, not physically controlled and monitoring would be by the DNO to manage compliance and breaches. Again, this may be appropriate where there is still some network headroom.
- Customer installed equipment – Contractually agreed and the customer would also install and maintain physical control equipment e.g. time controlled export limiting devices. May be essential where headroom is limited by a constraint.
- DNO installed equipment – Contractually agreed access and DNO physical time control. As with ANM or wide area ANM this may be needed where breach of curtailment would have significant consequences (a potential step beyond customer installed equipment.

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Defined Level of Firmness

Defined Level of Firmness

- The Sub-Group first considered what non-firm access for distributed connected customers initially under Product 1
- Consideration was given to products that could be offered where there is little or no firm capacity available and the where possible the commercial viability of non-firm access products
- Ofgem have asked the group to consider that users with less firm rights should generally face lower charges. This currently occurs via reduced connection charges at distribution but could also be reflected via reduced UoS charges.

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Defined Level of Firmness

The group does not consider that non-firm access products should apply to sole use element of a customer's connection, however should a customer wish to connect to a part of the network that is limited in capacity that will require reinforcement by the network operator, alternative non-firm access options could be available which would limit access to the wider network.

Demand - The option of non-firm access for demand customers can be better defined due to the traditional nature of the connections and energy use being better understood

Generation – Typically these connections need to be assessed on a case by case basis with more detailed studies required to understand their impact on the network and if reinforcement is required. Where this is the case, and the customer wishes to connect without reinforcement, access would be managed via curtailment via a number of options.

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Defined Level of Firmness

- Application for Flexible Non-Firm Access - Where there is limitations on available capacity in a network area, non-firm flexible connections can be offered. The need for network access to be managed, may arise through capacity limitations which are remote from the Connection Point. For example, a Flexible Connection might comprise a constraint being present deeper in the network. Non-firm flexible Connections can be offered to customers so that reinforcement can be avoided or deferred.
- These are connection arrangements whereby a customer's export or import is managed (often through real-time control) based upon contracted and agreed principles of availability of capacity. Such connections are typically managed by utilising active network management.

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Defined Level of Firmness – Range of Options

Access Product	Agreed Export Capacity
Zero Access	Zero
DNO Managed Restricted Access	Zero up to agreed connected capacity, subject to network availability
Non-Firm Flexible Connection	Managed against agreed network conditions
Non-Firm Flexible - Time Limited	Managed against agreed network conditions until capacity released via network upgrades
Non-Firm Flexible Connection – Capped	Managed against agreed network conditions up to agreed capped level of constraint
Non-Firm Flexible Connection - Time Profiled	Managed against agreed network conditions at agreed times for agreed period
Tiered Access Flexible Connection	Agreed firm capacity threshold, additional capacity is managed on non-firm basis
Firm Access	Unrestricted export of agreed connected capacity

Defined Level of Firmness – Range of Options

Product	Zero Access
Agreed Capacity	Zero
Description	Would best apply to customers seeking to introduce energy efficiency within their site and to small scale generation requirement in areas with local distribution or transmission constraints.
Flexible Connection Management Interface	Export Limiting Device
Customer Type	Demand & Generation
Reduced UoS	No??? Is reduction on demand charges a thing?

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Defined Level of Firmness – Range of Options

Product	DNO Managed Restricted Access
Agreed Capacity	Zero up to agreed connected capacity
Description	Under circumstances when the distribution system is fully intact, the generator may be disconnected depending on particular network conditions. Available on an interim basis only to allow early access for connection ahead of completion of system reinforcements
Flexible Connection Management Interface	Load Management Scheme
Customer Type	Generation
Reduced UoS	No

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Defined Level of Firmness – Range of Options

Product	Non-Firm Flexible Connection – Time Limited
Agreed Capacity	Managed against identified network conditions until capacity release via network upgrades
Description	Connection arrangements whereby a customer's export or import is managed (often through real-time control) based upon contracted and agreed principles of availability of capacity. The generator may be disconnected depending on particular network conditions. Available on a staged basis whilst necessary network upgrades are taking place. For example Stage 1 Non-Firm Flexible Access Connection, Stage 2 Firm Access upon completion of reinforcement works.
Flexible Connection Management Interface	Active Network Management
Customer Type	Generation
Reduced UoS	No

Defined Level of Firmness – Range of Options

Product	Non-Firm Flexible Connection
Agreed Capacity	Agreed connection capacity managed against identified network conditions
Description	Connection arrangements whereby a customer's export or import is managed (often through real-time control) based upon contracted and agreed principles of availability of capacity. The generator may be disconnected depending on particular network conditions. Suitable to parties with intermittent requirements which would allow connection without the need for network reinforcement. Available on an enduring basis
Flexible Connection Management Interface	Active Network Management
Customer Type	Generation
Reduced UoS	Yes

Defined Level of Firmness – Range of Options

Product	Non-Firm Flexible Connection - Capped
Agreed Capacity	Managed against identified network conditions up to cap
Description	Could be either of the previous options, however limit would be placed on level of 'non-firmness' applied either by MW output or % over an agreed period
Flexible Connection Management Interface	Active Network Management
Customer Type	Generation
Compensation/Reduced UoS	Yes

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Defined Level of Firmness

Product	Non-Firm Flexible Connection – Time Profiled
Agreed Capacity	Managed against agreed network conditions at agreed times for agreed period
Description	As per base non-firm product, but limited to agreed times for agreed period
Flexible Connection Management Interface	Active Network Management
Customer Type	Generation
Reduced UoS	Yes

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Defined Level of Firmness – Range of Options

Product	Tiered Access Flexible Connection
Agreed Capacity	Agreed firm capacity threshold, additional capacity beyond agreed firm capacity is managed on non-firm basis
Description	Connection would have defined firm access capacity with additional capacity requested beyond that connected on a non-firm flexible basis. Available on either interim or enduring basis
Flexible Connection Management Interface	Active Network Management
Customer Type	Generation
Reduced UoS	Yes

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Defined Level of Firmness – Range of Options

Product	Firm Access Connection
Agreed Capacity	Unrestricted export of agreed connected capacity
Description	A firm arrangement which, in the event of a fault on, or the taking out of commission for maintenance or other purposes, any one circuit forming part of the connection arrangement, ensures continued availability of the agreed Capacity (assuming that the wider network assets that the connection is connected to are intact and operating normally).no loss of generation shall occur
Flexible Connection Management Interface	None
Customer Type	Generation
Reduced UoS	No

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Defined Level of Firmness – Questions

> Are there other options the group should consider?

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