ofgem Making a positive difference for energy consumers

Challenge Group – 2nd April 19

Ofgem
6.3.19

ofgem Making a positive difference for energy consumers

1. Second Challenge Group meeting agenda

	Agenda Item	Timing
1	Welcome and agenda	10:00 - 10:10
2	Project overview	10:10 – 10.20
3	Taking on-board previous CG feedback	10:20 – 10:40
4	Cost Drivers	10.40 – 11:25
	BREAK	11:25 – 11:35
5	Access rights	11.35 – 13:00
	LUNCH	13:00 – 13:45
6	Locational charges	13.45 – 15.15
7	Network Access allocation update – non SCR	15:15 – 15:25
	AOB and close	15:25 – 15:30

2. Project Overview

Reminder of current priority work areas

Network cost Drivers

What are key drivers of future network costs?
How does user contribution to these vary by time and location?

Key input for policy thinking

Access rights

What are the options for improving definition and choice of access rights to make better meet users' needs and support efficient use and development of the network?
How feasible and desirable are these options?

Charge Design

What are the options for how charges for DUoS and on TNUoS demand charges are structured?
How feasible and desirable are these options?

DUoS charging models and locational granularity

What are the options for a) how the different DUoS charging models could be changed to provide better and more cost-reflective charges and b) how locationally granular DUoS charges should be?
How feasible and desirable are these options?

Focus of first working paper

Charge design work-stream

Progress and ongoing work

- Taken on board feedback from challenge group and delivery group on charge design note, which is now finalised.
- Starting to gather evidence to enable us to assess long list of options and identify those to be considered further.
- Engaging internationally to develop understanding of other jurisdictions.
- Surveying network companies to collect evidence of feasibility of different options.

Ways to engage

Supplier engagement

Who: suppliers, big and small

When: from late April

What: semi-structured interviews about how suppliers will respond to different options and the feasibility of options.

Why: how the options are passed to consumers will influence the consumer response. This is important for our understanding of the potential benefits. Feasibility questions will influence practicality assessment.

Future challenge group meetings

Who: all members

When: Next meeting May, roughly 6 weekly thereafter

What: Current view of forthcoming meetings (May and June/July) -

- Feedback on our/delivery group analysis of on how well different options support cost reflectivity
- confirming the conclusions we draw on feasibility
- workshop where stakeholders will have a chance to score different options on the basis of the evidence developed to date

Why: we want the challenge group to help test the initial assessment of options we are developing to ensure the analysis is robust and that we are appropriately ambitious in considering innovative approaches

+ potential further surveys etc - tbc

3. Listening to feedback...

We are listening to your feedback..

You said…	We did…
Improvements to meeting logistics…	Documents sent in advance, new room layout, name badges, stricter time-keeping, more use of menti.
Suggested additions to the CG membership	Some new CG members identified, still searching for reps in some areas (eg medium demand users). Any help would be appreciated!
Ongoing provision of information and feedback.	We issued charging design "survey" – keen to hear feedback on this approach. ENA considering other approaches to facilitating ongoing info provision and feedback.
More help to understand current arrangements.	On CFF there is an online depository for useful documents (eg training materials). We are also developing "glossary".
Desire for examples and insight from other sectors and other countries	We are committed to ensuring that future reports and working papers will include information on this. Feedback from academic workshops will be shared with CG members
Desire to review approach to modelling that will be used to help assess options	We are committed to seeking CG feedback on modelling. Once we have developed shortlist of consultants, we will seek feedback from CG.
Increased focus on desired outcomes, rather than guiding principles.	Committed to undertaking assessment against the guiding principles. As part of our assessment, we will consider the impact on different users.
Improved clarity about guiding principles to ensure it includes whole system considerations.	See upcoming slide.
Improved clarity of how project aligns with government decarbonisation objectives.	See upcoming slide.
Improved clarity of how Access aligns with other Ofgem projects.	See upcoming slide.

Our reforms should enable the connection of low carbon technologies (LCTs), by reducing the cost of accommodating them.

For example:

- **Improve choice and definition of access rights** – Allow LCTs to choose type of access that most suits their needs and could allow users to connect to the network quicker and cheaper (eg off-peak access or better defined non-firm access).
- **Review connection boundary** – the high upfront cost of getting connected to the network has often been highlighted as a potential barrier to LCTs.
- **Comprehensive review of distribution network charges** – this could better signal the benefits that LCTs provide to the network.

We do not think that it is in consumers' interest to design arrangements to favour specific technologies over others. Instead, network charges should cost-reflectively signal to all users how their actions can impact future network costs. Government subsidies are more transparent way of promoting government's environmental objectives.

The sustainability impacts of proposed reforms will be fully factored into our decision (eg IA).

Improved clarity of how Access aligns with other Ofgem projects.

The energy sector is changing. The regulatory and market arrangements need to evolve to ensure this happens in a way that protects and advances consumers' interests and enables them to benefit from innovation and new services.

RIIO2	Through RIIO2 we want to ensure that the ESO and network companies have the right incentives to develop, maintain and operate the networks while minimising costs to consumers. This includes ensuring they make full use of flexible alternatives to traditional reinforcement. The Access review may change the scope of what is included within a price control (eg amount of price control funded network reinforcement).
Procurement of flexibility	Procurement of flexibility can be used where access and forward-looking charging arrangements do not fully balance the system or manage network congestion. We will consider the trade-offs between these approaches under the SCR.
Targeted Charging Review (TCR)	Access and TCR cover different aspects of network charges - forward-looking charges and residual charges. Access SCR may affect the amount of revenues recovered through residual charges. Both reviews seek to promote a level playing field between different sizes and types of users. We are mindful of the combined impact of both reviews.
Half-hourly settlement	Both elective and market-wide programmes act to expose suppliers (or other intermediaries) to improved price signals, incentivising them to help consumers unlock flexibility. For example, this could be by developing new products and services to enable and encourage consumers to shift consumption.
Future Retail Market Design	Review of retail market to enable options for enabling new business models, while ensuring that future consumers are protected. Changes could better enable response to price signals and maximise consumer benefits.

Improved clarity of our guiding principles

We intend to tweak wording of first guiding principle to improve clarity.

Arrangements support efficient use and development of the energy system ~~network capacity~~	• Access arrangements support network capacity being allocated in accordance to users' needs and the value they ascribe to network usage • Arrangements provide signals that reflect the costs and benefits of using the network at different times and places, to support efficient use of capacity, and ensure no undue cross-subsidisation between users • They provide effective signals for where new network capacity is justified • Arrangements reduce barriers to entry and enable new business models where these can bring value for system • Arrangements support decarbonisation, primarily by enabling uptake of low carbon technologies through enabling quicker connections and reducing network costs. They will also look to enable and reflect the benefits that new, innovative approaches and business models (such as local energy models) can bring to the network. However, they will not provide any undue preferential arrangements based on technology or user type.
Arrangements reflect the needs of consumers as appropriate for an essential service	• Electricity provides an essential service and small users in particular need protection from arrangements which may result in harm to their welfare. This may be achieved in the access and charging arrangements themselves or through the wider policy and regulatory arrangements. • Users, or suppliers/intermediaries on their behalf, are able to understand arrangements and have sufficient information to be able to reasonably predict their future access and charges
Any changes are practical and proportionate	• Changes can be implemented given the applicable legislative framework and technologies • Costs of change are proportionate to consumer benefit

4. Cost drivers

Scope of cost driver subgroup considerations

- We requested the subgroup to:
  - Identify each of the key network cost drivers
  - Comment on how predictable/stable the links are between these drivers and network costs
  - Comment on the materiality of each network cost driver
  - Draw upon the data received from network businesses in response to a Request for Information, as well as other relevant data

- We also identified a list of topics the subgroup should consider, as a minimum:
  - Peak driven costs, including any locational and seasonal variations
  - Whether costs are impacted by different categories or characteristics of users that could be used to segment costs
  - Any costs drive by energy consumption or the number of customers
  - The impact of downstream costs (in addition to upstream costs)
  - Losses and reactive power
  - The impact of emerging technologies and how changing behaviours could impact on load diversity

- The network companies applied three criteria in order to classify their costs:
  1. Material (for DNOs over £1m and variable for TOs)
  2. Locational
  3. Attributable to customers
- The costs were then classified as:
  - **Primary** – where material, locational and attributable
  - **Secondary** – where material and either locational or attributable
  - **Tertiary** – where not material
- During the next phase of the review, primary costs will be investigated further, while secondary costs will be investigated on a case-by-case basis. It is not expected that any tertiary costs (i.e. immaterial costs) will require consideration in further detail.

Percentage of TO cost categories by priority

Cost Category	% Primary	% Secondary	% Tertiary
Load related	100%	-	-
Non-load capex (ex. Non-op capex)	-	76.9%	23.1%
Non-op capex	-	50%	50%
SWW	100%	-	-
Network Op. Costs	-	100%	-
Closely associated indirects	-	100%	-
Business support costs	-	100%	-
Other costs within price control	-	100%	-
Costs outside price control	-	100%	-
Totals*	***13.2%***	***73.7%***	***13.2%***

*Totals 100.1% due to rounding

Total DNO RIIO-ED1 Costs by priority

Cost Category	Value Primary (£m)	Value Secondary (£m)	Value Tertiary (£m)	Primary %	Secondary %	Tertiary %
Load related	1,959.9	-	98.3	95.2%	-	4.8%
Non-load capex (ex. Non-op capex)	4,409.6	2,803.3	421.0	57.8%	36.7%	5.5%
Non-op capex	-	1,016.9	-	-	100%	-
HVP	-	-	168.3	-	-	100%
Network operating costs	-	5,216.6	109.8	-	97.9%	2.1%
Closely associated indirects	-	6,282.7	-	-	100%	-
Business support costs	-	£2,767.5	-	-	100%	-
Other costs within price control	-	332.7	218.9	-	60.3%	39.7%
Costs outside price control	-	62.4	-	-	100%	-
NABC	-	6,870.6	-	-	100%	-
Totals	**6,369.5**	**25,352.7**	**1,016.3**	**19.5%**	**77.4%**	**3.1%**

What costs should be signalled through network charges?

Examples include:

- Non-load capex
  - Asset replacement
  - Black start
  - Flood mitigation
  - Visual amenity
- Network operating costs
  - Faults
  - Tree cutting
  - Smart metering roll out
- Closely associated indirects
  - Wayleaves
  - Vehicles and transport

Transmission

- In order to identify peak driven costs, the TOs are reviewing their historic and planned peak driven investment and identifying examples of reinforcement projects
- For SHE Transmission, examples include:
  - **Beauly – Corriemoillie** – driven by local peak flows caused by hydro and wind
  - **Coupar Angus** – a new GSP driven by entirely by distibuiton connection low carbon generation
  - **East coast upgrade** – wider reinforcement driven by large volumes of low carbon generation in North of Scotland with limited capacity to transfer to England.

    Not attributable to one generator or customer but is driven by approx. 60 transmission and over 130 distribution connected generators and an interconnector

Distribution

- Across all the DNOs, load related reinforcement comprises 6.3% of total RIIO-ED1 costs
- The DNOs are analysing their Load Index data and other information to identify the following by substation and substation group:
  - Primary voltage
  - Secondary voltage
  - Number of customers
  - Season of peak demand (winter or summer)
  - Whether an N-1 or N-2 intervention
  - Historical and forecast expenditure
- This evidence will help to inform the locational granularity subgroup's work and decisions on seasonal charging

Note the cost driver subgroup report will include the outcomes of the analysis being undertaken by the TOs and DNOs

- The subgroup has considered alternative ways of segmenting the network companies' customer bases and undertaken an initial assessment of whether the segment is identifiable and the cost drivers that could be used to attribute costs to the segments.

Segmentation types	Is the Segment Identifiable	Cost Drivers
Large directly connected demand (transmission)	Refer to relevant Agreement or Contract	No recent evidence of demand driven reinforcement. Asset replacement schemes benefit demand customers
Urban / Rural	Subjective, as first need to define urban/ rural and then apportion customers into the groups	Asset replacement, rising and lateral mains, visual amenity, tree cutting,
Places where assets deteriorate more quickly (e.g. coastal or corrosive)	Subjective, as first need to define these places and then apportion customers into the groups and apportion the cost ratio	Asset replacement, refurbishment no SDI
Higher growth rate of certain types of trees	The growth rates of certain types of trees are more advanced than others. Would need to use technology, such as LIDAR, to inspect the network as there will be different profiles of growth across the country	Tree cutting
Generation types (e.g. synchronous, hydro, BM participant)	Identified on relevant Agreement	Connection asset works, peak and wider reinforcement driven by directly connected generation.

	Transmission	Distribution
Upstream vs downstream	• In 2017-18, half of GSPs in Scotland exported onto the transmission networks, including 60% of SHEPD GSPs exporting during winter peak/summer minimum • The TOs have identified a number of reinforcement works that are driven by connections on the distribution networks	• DNOs have advised that IDNOs do not generally impact on costs any differently than are other customers connected at the same voltage
Energy consumption and customer no.	• Although network size is partly a function of customer numbers, and usage, the TOs consider the link to be tenuous • The TOs have evaluated each of the schemes which have driven costs to ascertain if they have been driven by number of customers or by energy consumed. The TOs concluded that there is no direct link between network costs and energy consumed or number of customers	• The DNOs identified that there is a link between replacement, refurbishment and civil works costs and units consumed. However, there are also a number of other factors that mean this link is tenuous • DNOs have determined there are no costs directly driven by customer numbers

	Transmission	Distribution
Losses and reactive power	• The TOs did not identify any significant evidence of losses driving network costs. They also noted it is difficult to identify costs specifically linked to managing losses, due to other factors that are considered in a CBA • Reactive power absorption and injection are closely linked with voltage control requirements. The ratio between reactive and active power at GSPs is declining, contributing to voltage issues. • TOs take a number of actions to manage voltage issues, including procuring additional reactive power and installing reactive compensation devices • Losses are charged to users zonally seasonally.	• Losses on networks to supply LV customers can be 5-11% of power consumed, though under current arrangements this cost does directly not accrue to DNOs. • DNOs have identified that some relatively high loss equipment can justify early replacement to save on future losses. However, it is expected that this will not be an ongoing issue, as the high loss equipment is replaced • The DNOs noted that some customers operate with a poor power factor, which results in them using additional network capacity. However, there are no examples of reinforcement being solely due to poor power factor.
Energy technology and load diversity		• It is possible to identify the costs associated with larger customers participating in ANM and should be able to be attributed to the participants

- The subgroup is still investigating evidence for several topics:
  - Finalise the evidence of peak driven costs drawn from regulatory submissions
  - Treatment of losses and reactive power, including where users can assist with reducing costs or mitigating constraints
  - Evidence of the potential impact of future technologies, including outcomes of innovation trials

- Following finalisation of this report, it is expected that the cost driver subgroup may need to undertake further work, including identifying where there is additional evidence that can support the locational granularity subgroup's options evaluation

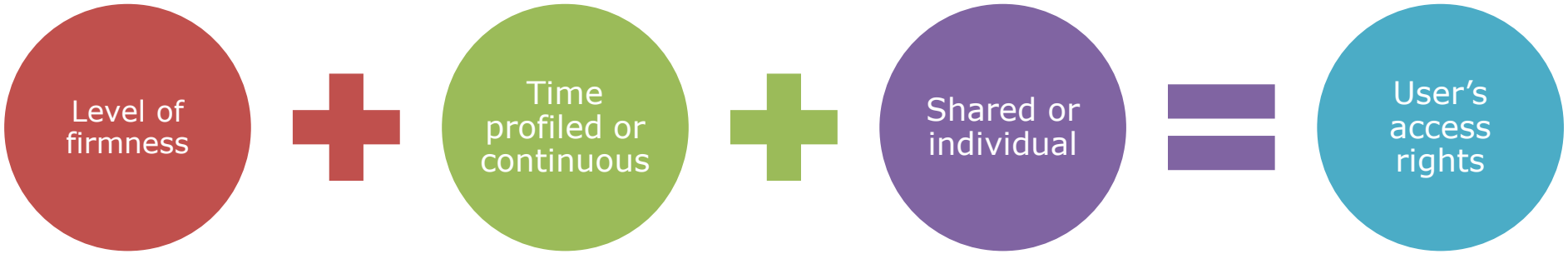
Are you aware of any other data (e.g. third party analysis) that could inform identification of drivers of costs or provide evidence of avoidance of costs?

What further evidence do you think would be useful for supporting decisions around access arrangements and charge design?

5. Access rights

Overview of access choices

A users' access rights could be a combination of their decisions across each access choice:



There are also some cross cutting issues, that are relevant to all access choices:

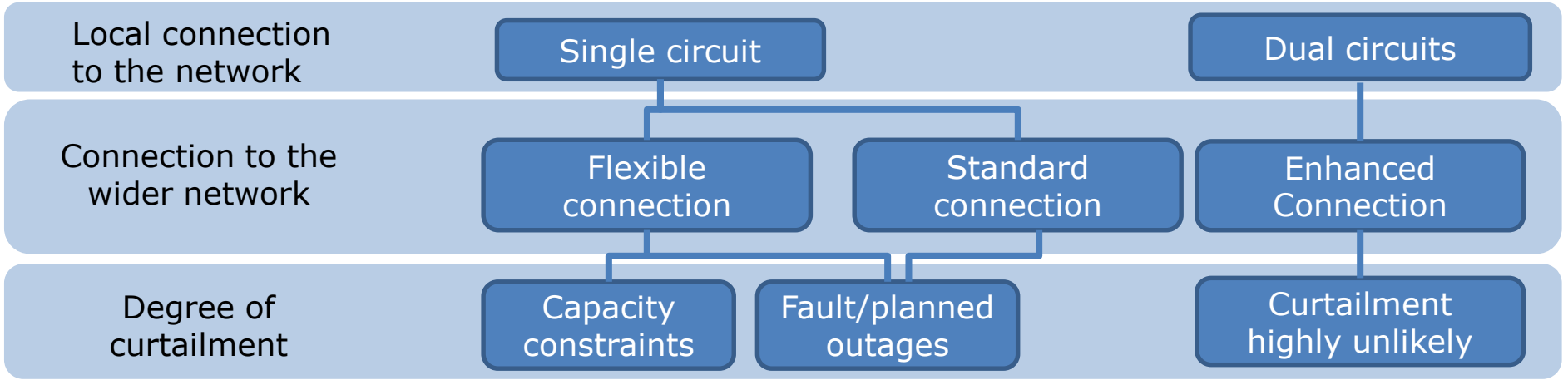
- The extent to which options are bespoke or standardised.
- How access to the "wider system" is defined (ie parts of the network that the user is not directly connected to).
- The options to monitor compliance and arrangements that apply if a user exceeds their access rights.

Firmness: This is the extent to which a user's access to the network can be restricted and their eligibility for compensation if it is restricted.

Physical firmness

Network access is, to some extent, be defined by the physical assets that connect them to the wider system and the design of the network at the point they are connected. Users level of firmness could be defined using this.

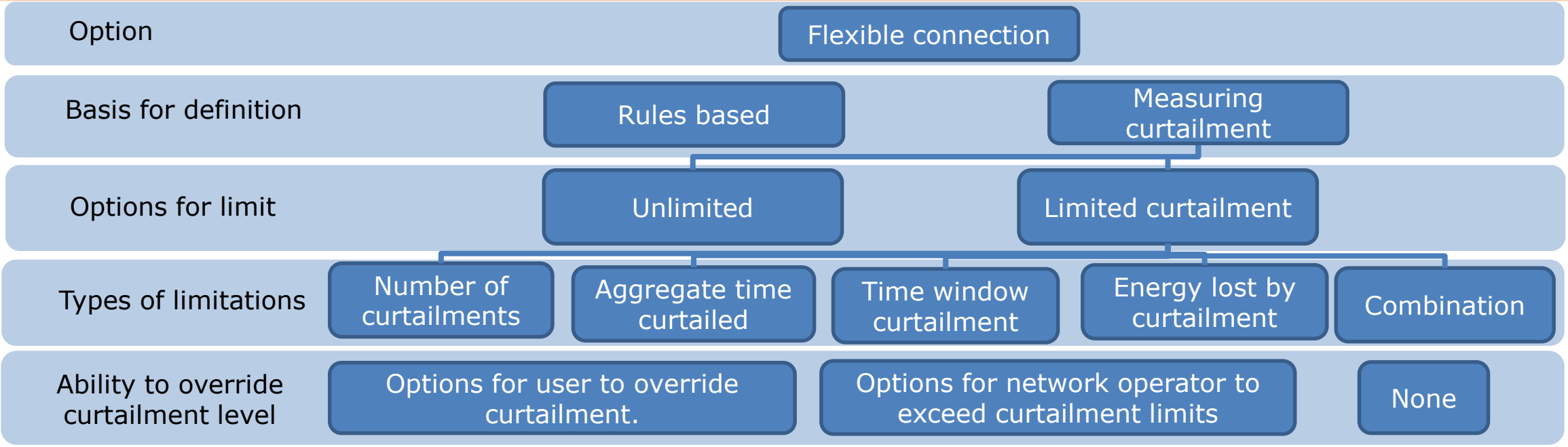
Design Options



Initial thinking

- An individual user's access choice and wider network security of supply are linked.
- Increased physical firmness may lead to inefficient network development.
- User choices about physical firmness informed by individual risk appetite.
- Some users may value additional clarity about degree of curtailment (eg distribution generation).

Customer outcomes of firmness



Initial thinking.

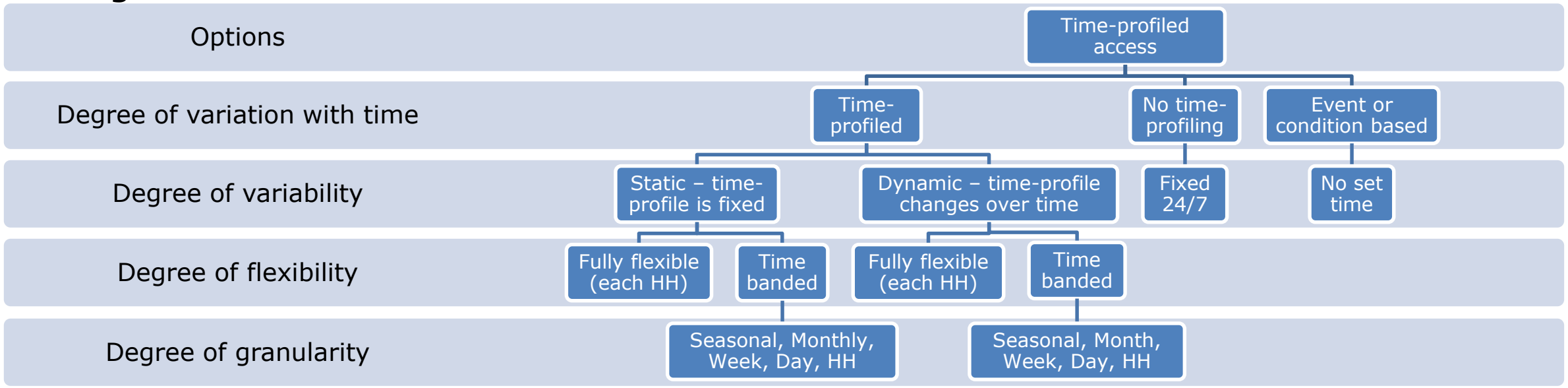
- Measuring curtailment gives greater focus on customer outcomes, which may be more valuable for users.
- Defining risk in terms of customer outcomes may shift risk from customers to network operators. There may be difference in how this risk manifests itself (eg requirement to reinforce the network).
- Override options could require "backstop" conditions.
- Options could be developed to introduce financial firmness (ie financially reimbursing customers when their access to the system is limited or unavailable). There are several ways that financial firmness could be calculated (eg value of avoided network cost, value of lost energy, value of market value). This could inform network operator investment decisions.

Questions to consider:

- In which circumstances might these choices provide value? Why?
- Are there any barriers that would stop you choosing this access option or would make it difficult to implement this option?

Time-profiled rights - access rights would allow users to choose whether their access to the network is either constant or variable in time

Design choices



Initial thinking. Time-profiled access rights:

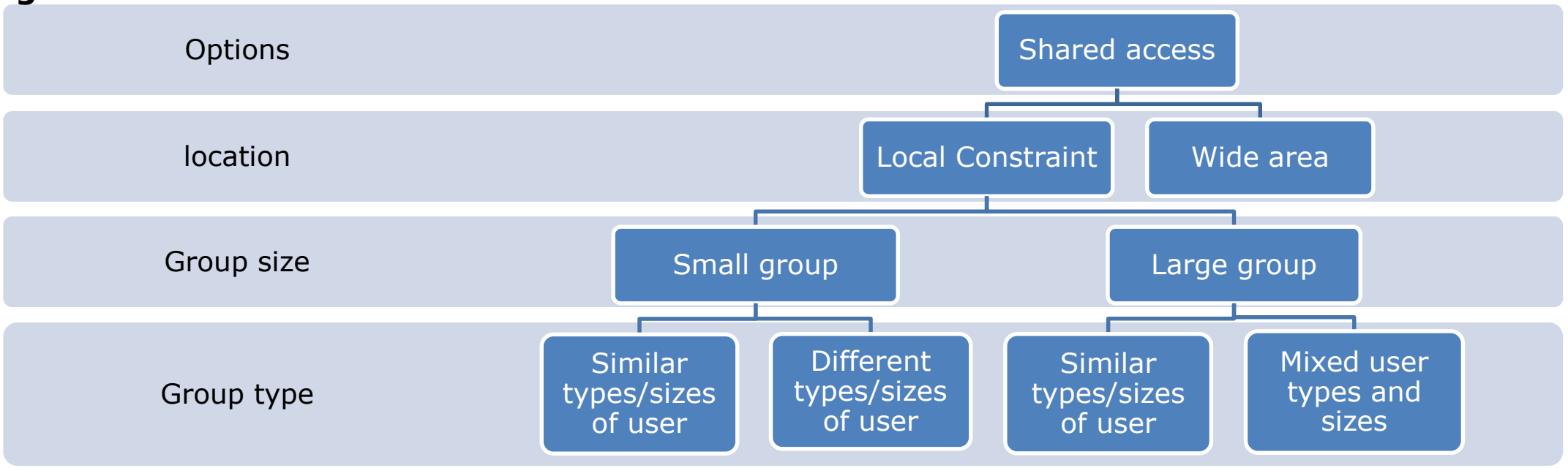
- Can support efficient network use and development.
- It should be practically possible and proportionate for network operators to offer this access type
- May be more appropriate for some users (eg those that can predict when they will want access) than others.
- Some options would require more complex monitoring and billing systems.
- Dynamic options would require notification to users.

Questions to consider:

- In which circumstances might time-profiled or time-limited access options provide value? Why?
- Are there any barriers that would stop you choosing this access option or would make it difficult to implement this option?

Shared access rights: Network users could share access to a mutually agreed access volume and timeframe.

Design choices



Initial thinking.

- Larger groups increase usage diversity, but also increase complexity.
- Need to monitor utilisation of access at both individual and aggregated level.
- May be more attractive to some users. Best suited to multiple customers behind constraint. Could work for wider area, but becomes more complex (eg exchange rates).
- Requires a "coordinator" to monitor and manage usage.
- Network companies already allow for some implicit "sharing" through diversity assumptions.

Questions to consider:

- In which circumstances might shared access options provide value? Why?
- Are there any barriers that would stop you choosing this access option or would make it difficult to implement this option?

Breakout question

Which access option do you consider would provide you with the most value? Why?

Standardisation of access rights: the extent to which access choices are bespoke or standardised

Design choices

Standardisation?	Standardised	Bespoke	Combination
Across all locations?	Options standardised across GB	Options standardised within each DNO areas	Options standardised based on local network conditions (eg rural vs urban).
For all users?	Standardised options for all users.	Different standardised options for different user types.	
Codified?	Standardised options established in codes and planning standards	Standardised options **not** established in codes or planning standards.	

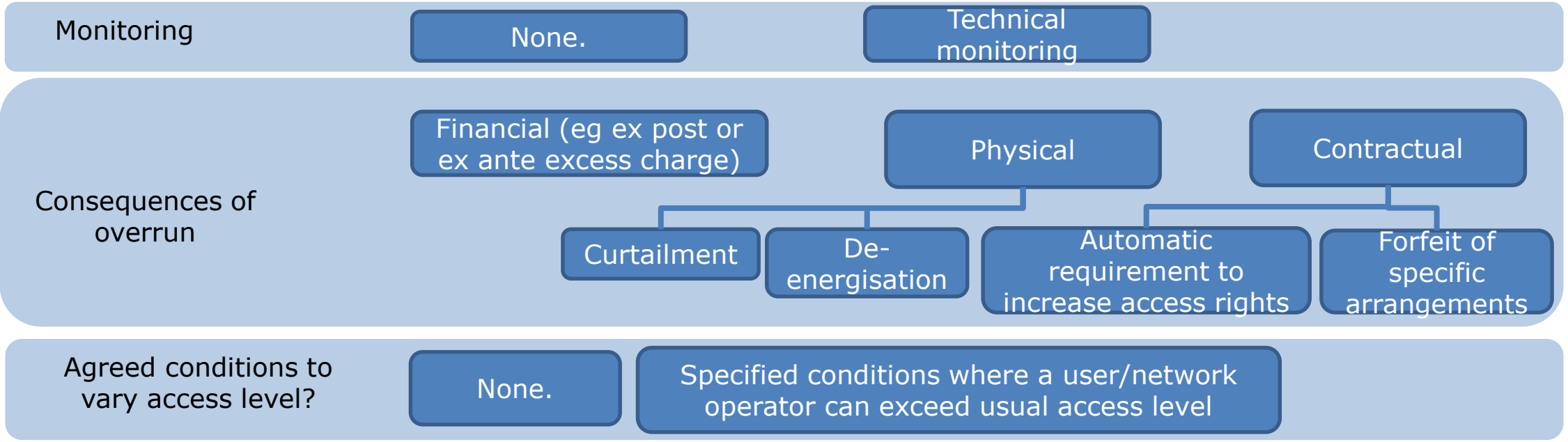
Initial thinking.

- There is a **balance between efficiency and complexity.**
- Arrangements **need to be reflected in charging**. It may be difficult to reflect bespoke access arrangements in ongoing network charges with a shallow connection boundary
- A **combination** of standardised and bespoke may prove to be desirable (some comparability, with ability to develop bespoke arrangements to meet individual user's needs).
- Codifying options could improve consistency, transparency and efficient network planning. It may also reduce administrative burden. However it could limit ability to offer innovative choices.

Questions

- Should access right choices be standardised, bespoke or a combination of both? Why?

Design choices



Initial thinking.

- Compliance with access rights necessary to deliver benefits of access reform.
- Consequences of overrun should be proportionate to the impact of overrunning access rights.
- Consequences should continue to reflect users needs, as appropriate for an essential service.
- Different options for ensuring these would involve different balance in risk between network operators and users.

Questions

- What consequences would you prefer? Should users have choice?
- In what conditions would you want to exceed your access rights? Eg links with other markets

Breakout question

Are there areas of analysis that you think we should focus as part of next stage? (value of options, feasibility of options, charging links, design of new access choices).

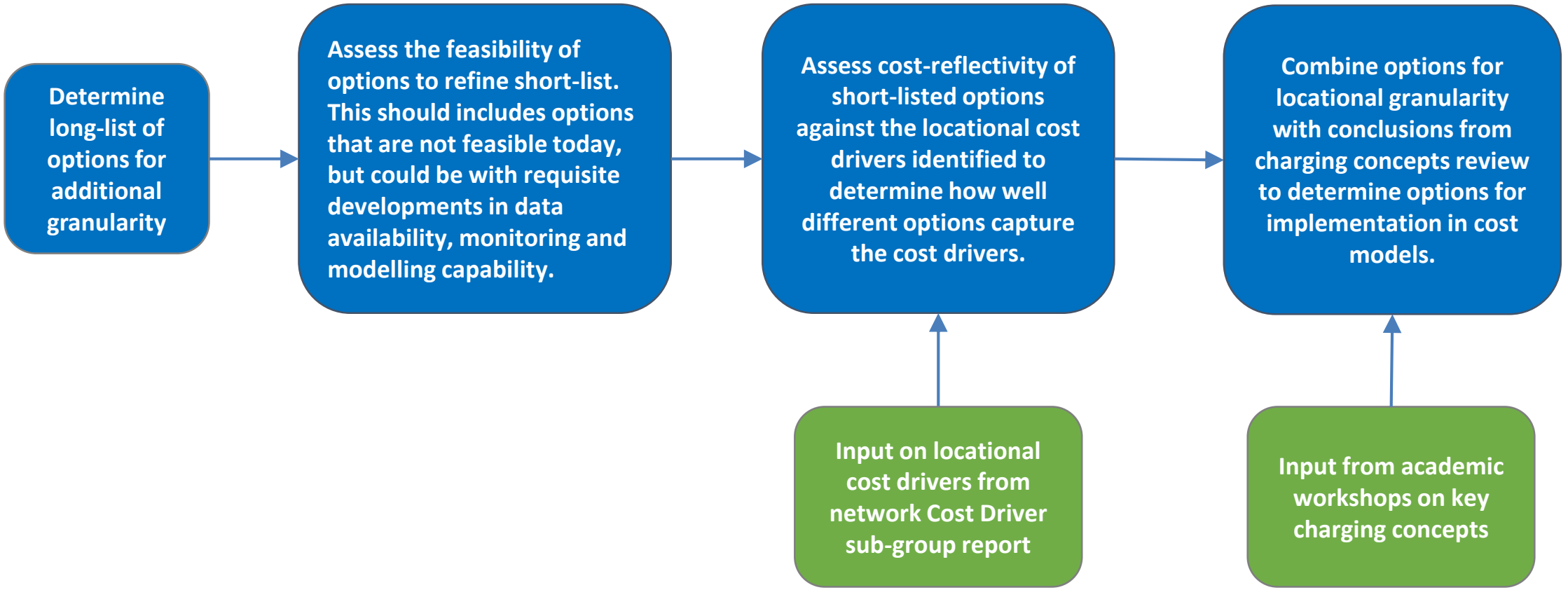
6. Locational charges

Today's session is focussed on the options that have been considered so far, and the initial assessment of the Locational Granularity sub-group, reporting into the main Delivery Group.

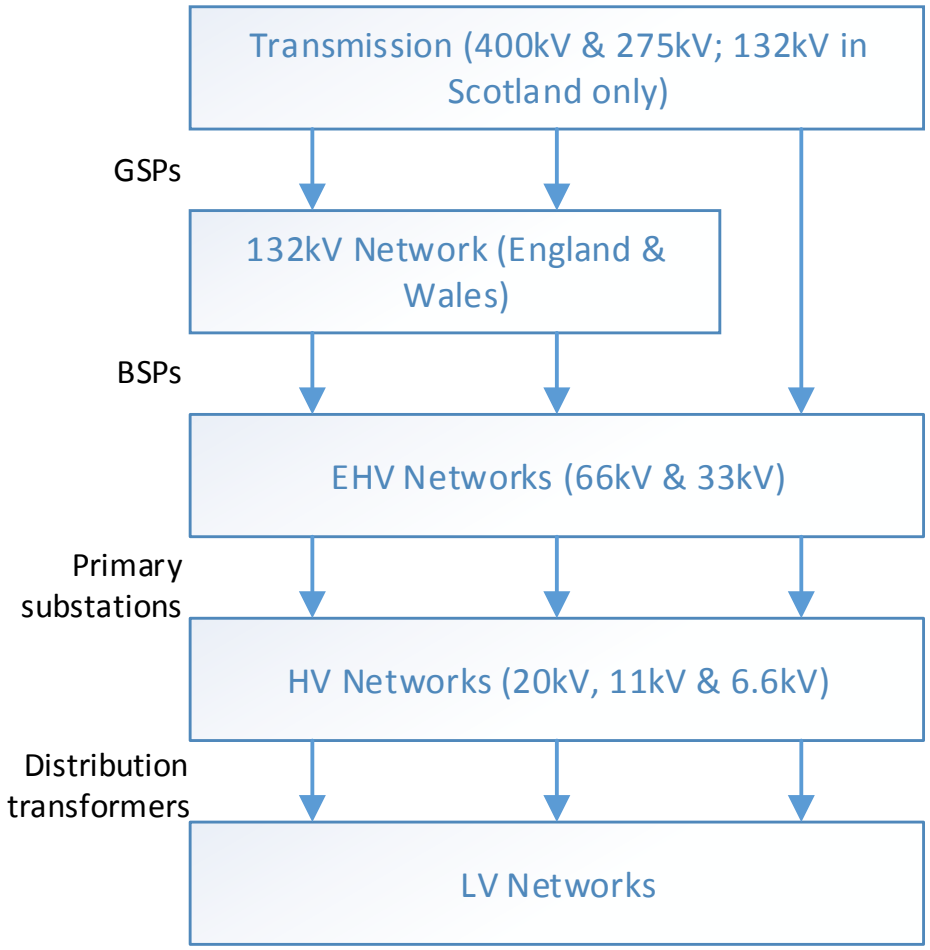
These views are currently draft, and will be made available in a full report format in the coming weeks.

Contents

Sequencing of subgroup tasks



Overview of network topology

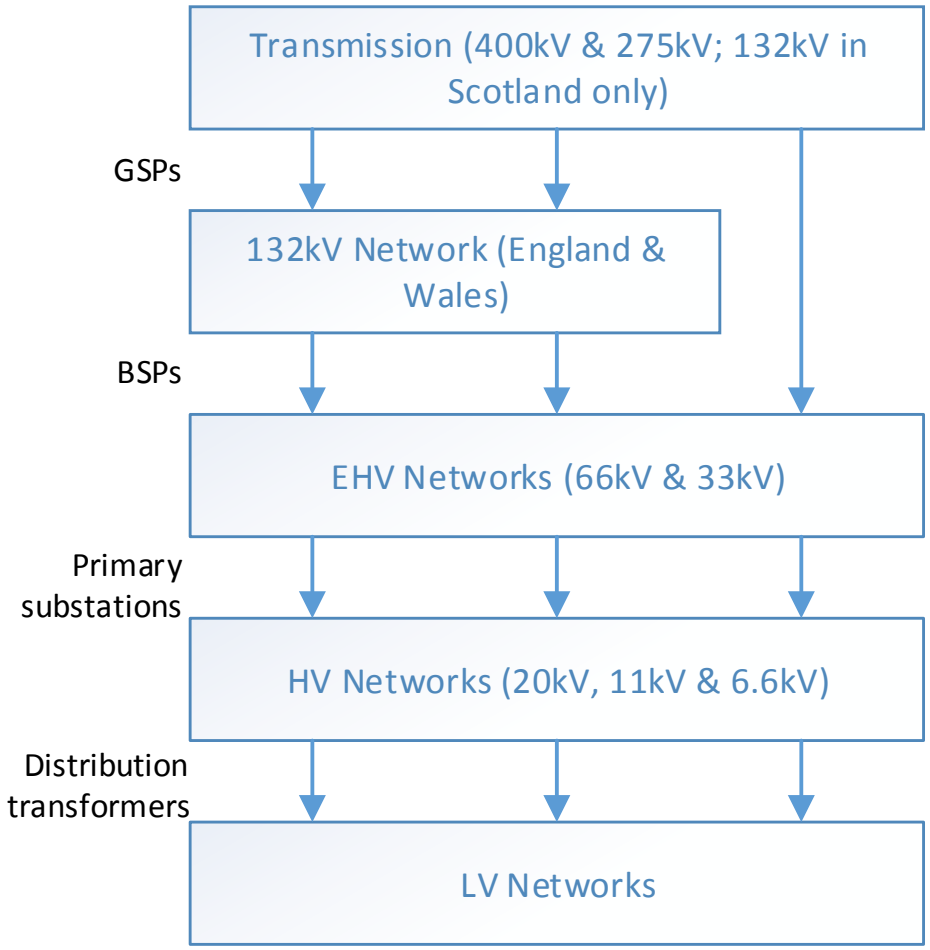


Transformer Voltage	GB Transformer Count
132kV/EHV	2,016
EHV/HV	10,731
HV/LV	594,576

Voltage of Connection	Customer Count	Generator Count
GSP	152	123
132kV Network	211	152
132kV/EHV Substation	281	171
EHV Network	1,398	1,332
EHV/HV Substation	371	92
HV Network	24,104	3,514
HV/LV Substation	10,392	448
LV Network	30,777,150	11,527
Total	30,814,059	17,360

Definitions: EHV (Extra High Voltage) – between 132kV (except in Scotland) and 22kV.
HV (High Voltage) – between 22kV and 1kV.
LV (Low Voltage) – below 1kV.

Overview of network topology



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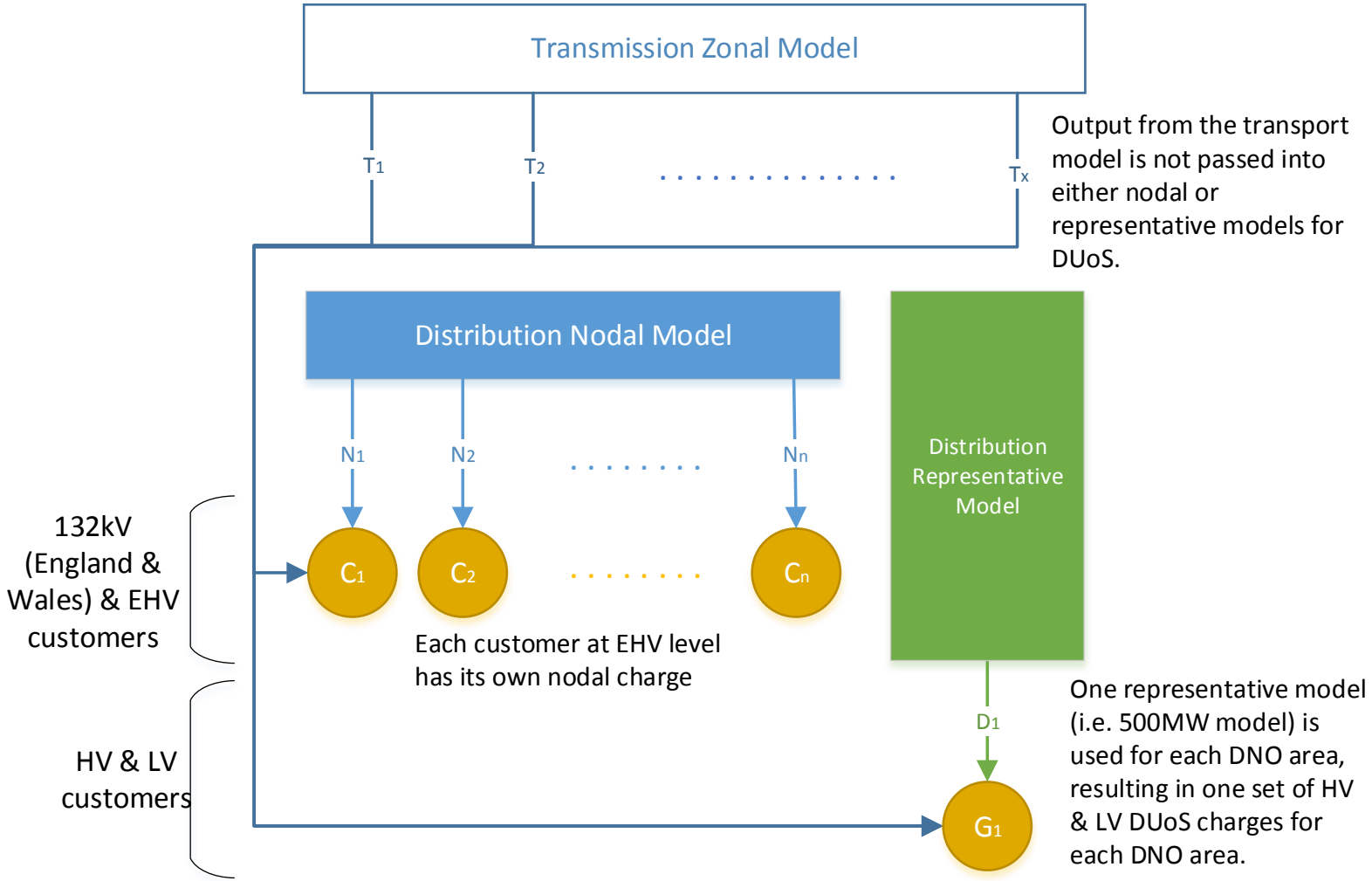
To access the majority of network users, we need to better reflect the costs/savings that HV and LV connected customers can confer to the wider network.

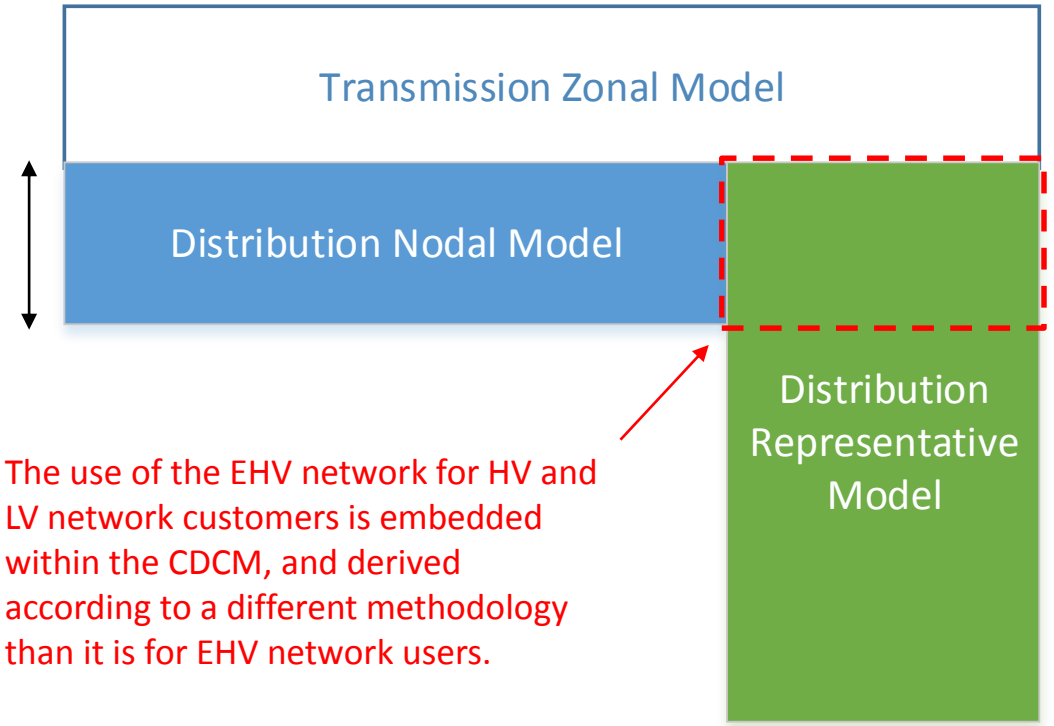
Commercial structure of network charges (1/2)



Commercial structure of network charges (2/2)

EDCM[1] charges EHV connected users for use of the EHV network.

Highly locational signal (nodal charge bespoke to the customer).



The use of the EHV network for HV and LV network customers is embedded within the CDCM, and derived according to a different methodology than it is for EHV network users.

CDCM[2] charges HV and LV connected users for use of the EHV, HV and LV network.

Very limited locational signal (averaged across each of the 14 DNO licence areas by voltage level).

[1] EDCM is the 'Extra High Voltage Distribution Charging Methodology' – it applies to users connected at EHV (22kV up to 132kV in England and Wales), or customers connected to a substation where the infeed is at 22kV or above.

[2] CDCM is the 'Common Distribution Charging Methodology' – it applies to users connected below 22kV.

Summary of issues identified

- Current charging arrangements have a hard commercial boundary between the EDCM and CDCM methodologies, as well as between EDCM and transmission.
  - **This creates a non-cost reflective 'cliff edge' in charges at the boundaries because the charge for each portion of the network is derived in isolation.**
- Users connected at HV and LV do not see a locationally granular signal for the costs/savings they could confer to the EHV network (whilst EHV connected users do).
  - **This means that the charging signal for behavioural change is more locationally muted for these users.**
  - **This could be a barrier for increased levels of flexibility in response to network charges for those users who are located in constrained areas of the network at lower voltages.**

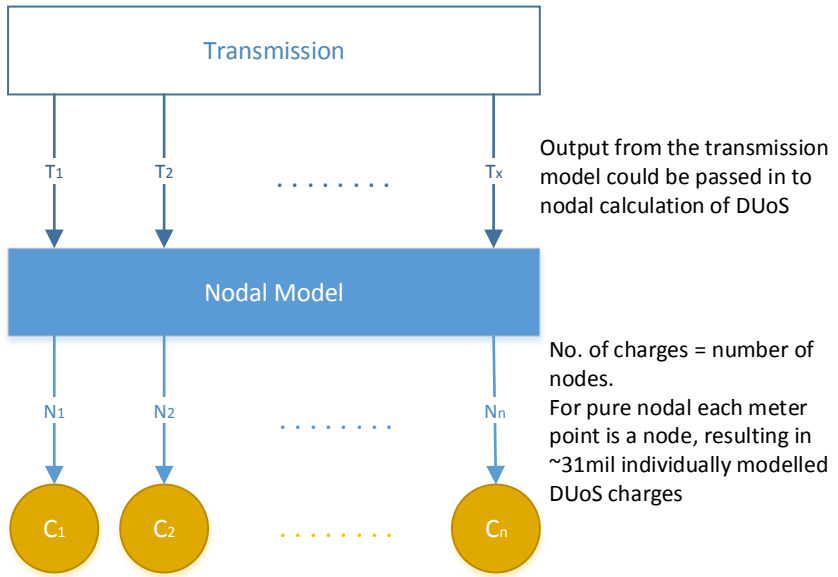
Questions:
- Do you agree with these conclusions regarding the structure of network charges?
- Are there other issues regarding linkages between the methodologies and/or network voltages that you think need to be considered?

Options in the report fall into two broad categories:

- Options 1 and 2 as presented today are an evolution of status quo arrangements, which explore extending arrangements that are similar to either EDCM or CDCM to provide a consistent methodology for the whole distribution network.

- Option 3 (and its variants) as presented today is a combined 'hybrid' approach, which would vary the level of locational granularity according to the availability of network data and an assessment of how well differences in cost drivers are captured.

Option 1: Nodal pricing for all network customers



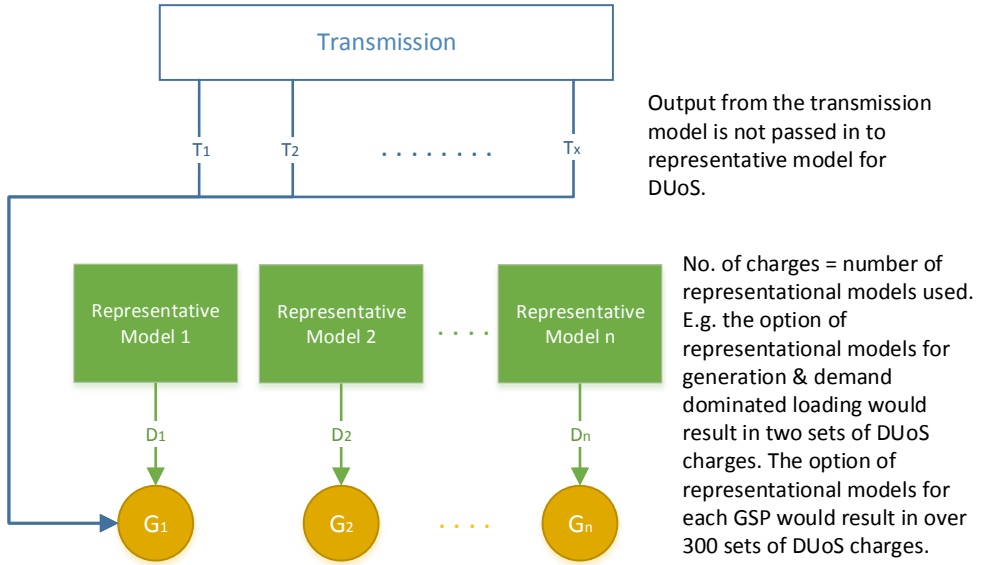
Descriptor: The EDCM uses a power flow based methodology for **nodal pricing**. This could be extended further into the distribution network. Taken to the extreme, a 'pure' nodal approach would involve **fully locational charges for every entry and exit point from the network**. Every customer would have an individual, site-specific tariff based on the assets that serve them.

Requirements: For a power flow-based approach, complete electrical and physical characteristics of all assets and their connectivity to each node would be required, with sufficient usage data available at each node.

Conclusion: Pure nodal pricing down to each individual connection is **not feasible with current data availability and is not expected to become feasible in the foreseeable future**. Nodal pricing could be used down to *at least* primary substation level and possibly HV network in the future.

Questions:
- Do you agree with these conclusions?
- What level of granularity do you think would be appropriate for nodal charges?

Option 2: Representative model for all network users



Output from the transmission model is not passed in to representative model for DUoS.

No. of charges = number of representational models used. E.g. the option of representational models for generation & demand dominated loading would result in two sets of DUoS charges. The option of representational models for each GSP would result in over 300 sets of DUoS charges.

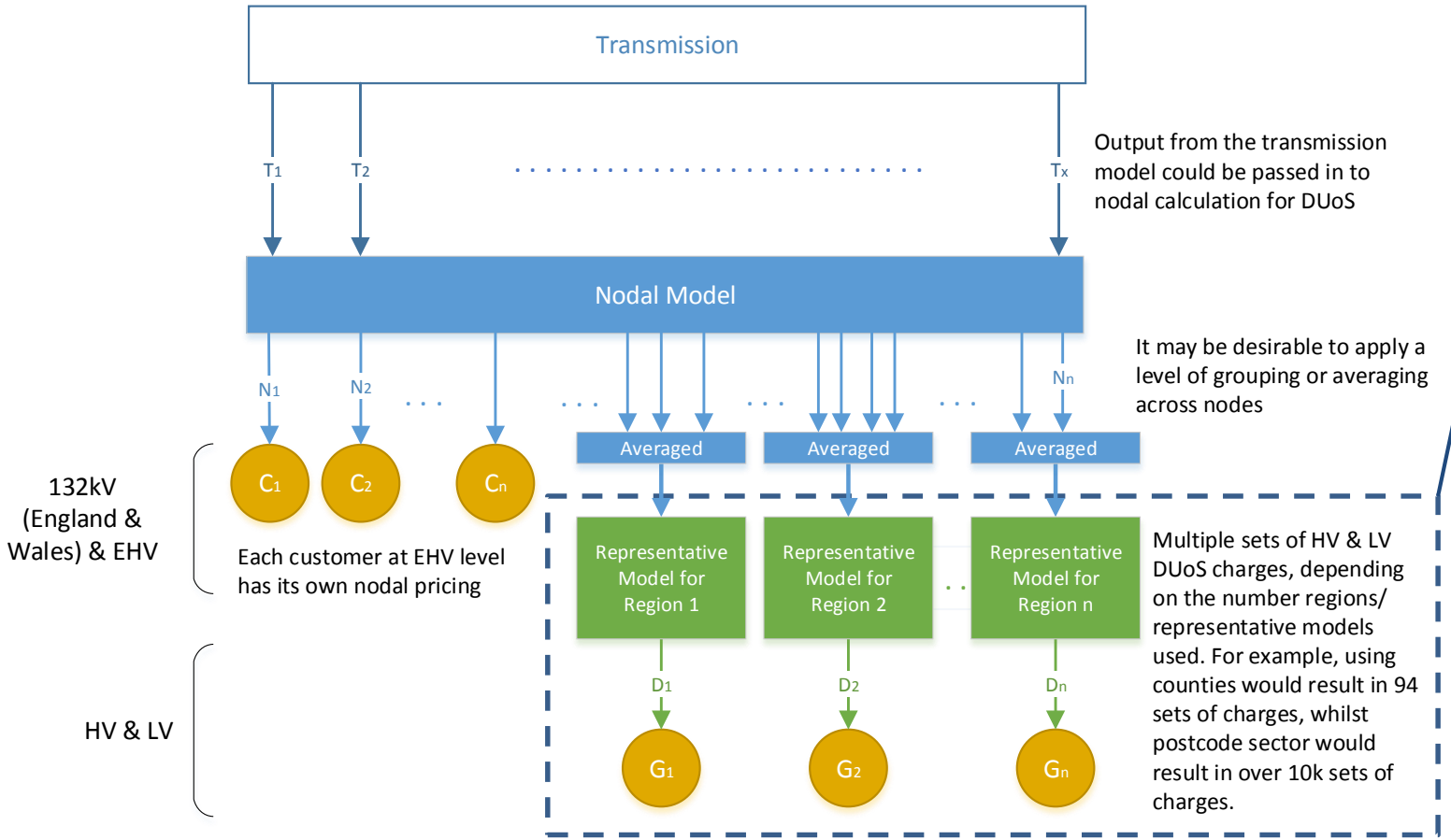
Descriptor: The CDCM uses an averaged, representative network model of the assets. This is used to derive the costs for customers depending on the asset mix in each DNO zone and the voltage level of the user. This could be made more granular and extended up to EHV, and used to model different segmentations of customers (e.g. by geography, network characteristics or any other justified segmentation.

Requirements: develop and maintain a set of representative models e.g. a representative asset model for each area; a suite of 'archetypical' model assigned based on customer/network characteristics; or charges based on network monitoring data.

Conclusion: For customers connected at EHV/HV-substation and above (i.e. EDCM), this approach would be likely to give less locational granularity than the status quo. However, it may increase locational granularity for HV and LV customers.

Questions:
- Do you agree with these conclusions?
- What level of granularity do you think would be appropriate for representative models?
- Do you have any suggestions for representative/archetypical models which should be considered?

Option 3: Combined 'hybrid' nodal/representative model



Dependant on alignment with network cost drivers, representative models could be based on:

- Geographical regions (e.g. postcode area/sector)
- Archetypical models (based on network characteristics)
- Archetypical models (based on customer characteristics)
- Network monitoring (e.g. load indices)

Questions:

- What are your views on a hybrid model?
- Do you think that this could sufficiently improve the locational granularity of forward-looking DUoS charges?

Enablers for next steps – further options development and cost-reflectivity assessment:

Cost Drivers of Network Development

- Which cost drivers should be considered as forward looking? (How should different costs be treated, such as reinforcement and replacement?)
- What are the principle cost drivers? (Which costs are most material and therefore important to capture?)
- How locational are the variations in these costs? (What level of locational granularity is required of the models to capture them?)
- Who are these costs attributable to? (Whether they are attributable to individuals or groups of users could influence the model design decisions.)

Key Network Charging Concepts

- What is the most appropriate way to consider incremental costs? (What are the merits of the conceptual approaches that could be applied?).
- To what degree should the models take into account a representation of the network? (e.g. how should they consider spare capacity, generation versus demand dominated areas).
- How should charges be attributed within and across transmission and distribution network boundaries?
- What is the role of the forward looking charge versus alternatives behavioural signals (e.g. flexibility services)?

7. Non-SCR update

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