
Network Use, Capacity Allocation and Nominations

CCS Network Code: Section E

Disclaimer

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Introduction

The network use, capacity allocation and nomination paragraphs within section E aim to clearly outline and define the capacity of the network, the process and products available for network users to acquire capacity on the network, and how to provide accurate nominations to enable T&SCo to operate the network successfully.

This section, unlike others in the CCS Network Codes, is in active development to ensure a fit for purpose process that:

- Aims to meet the network access requirements for Users
- Provides an adequate process for T&SCo to operate under their Reasonable and Prudent Operator (RPO) duties
- A fair and transparent process that incentivises all stakeholders to pursue an efficient and economic use of the network
- Value for Money (VfM) on capital investment and subsequent energy consumer and UK taxpayer spend
- Enables the development and expansion of current and future networks, attracts and accommodates future Users and fundamentally avoids creating longer-term barriers for future network evolution

The consultation document puts forward the latest policy development to date constructed through considerations from engagement, feedback and communication from stakeholders.

We will further discuss this development in this session.

Timeline of Engagement

12 Dec 2022

Publication of the CCS Network Code HoT Explanatory note and updated indicative Heads of Terms (HoTs)

June 2023

User began direct participation in Codes development

28 July 2023

Summary of User feedback on Network Codes received

10 August 2023

2nd T&S Nominations, Renominations and Scheduling Workshops

1 Dec 2023

Public consultation on the CCS Network Code launched alongside publication of the updated HoTs

Q1-Q2 2024

Further engagement with T1 delivery partners on development of the full form Code

Late 2024
FID

02 Feb 2023

First engagement session with T&SCo on HoTs Section E

26 July 2023

1st T&S Nominations, Renominations and Scheduling Workshops

24 August 2023

3rd T&S Nominations, Renominations and Scheduling Workshops

16 Feb 2024

Public consultation on the CCS Network Code closes

Q2 2024

Draft full form Code to be informally shared with T1 clusters

Definitions

NETWORK CAPACITY (NC)

Users may apply for and register as holding capacity in the T&S Network ("Network Capacity") at Delivery Points. Network Capacity is expressed in tCO₂/hour.

OBLIGATED NETWORK CAPACITY (ONC)

The minimum mass of Network Capacity T&SCo is required to make available ("Obligated Network Capacity") in accordance with the terms of its Licence.

REGISTERED CAPACITY (RC)

The Network Capacity which the User is registered (in accordance with this Section E) as holding at a Delivery Point; and
Which constitutes a User's entitlement (but not obligation) to deliver carbon dioxide at a Delivery Point measured in tCO₂/hour and constituting the maximum instantaneous flow rate.

REGISTERED CAPACITY PRODUCTS

Registered Capacity Products are annualised products and can be booked yearly on a rolling basis or long-term up to 15 years ahead¹, this is initially managed through the selection process².

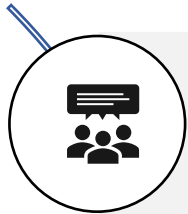
Where Users already hold Registered Capacity, they can (through the selection process):

1. apply for additional registered capacity (subject to the terms of the network codes)
2. surrender registered capacity (subject to another user requesting capacity. Where no other user demand exists, the capacity holder remains liable for the capacity and associated charges)

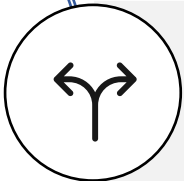
¹ *it is expected that shorter-term capacity products and interruptible capacity will be introduced by modification where there is demand*

² *in the future Network Capacity will be allocated and registered through a different mechanism, such as set capacity allocation windows*

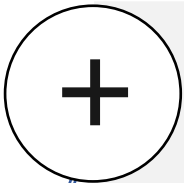
An alternative approach on RC?



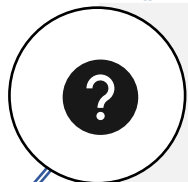
A core risk allocation feature of the Code is that Users can flow up to their maximum instantaneous flow concurrently. This enables at any required point in time that all Users could effectively flow continuously at 100% of their Registered Capacity, regardless of the likelihood of this event. There are initially no interruptible capacity products proposed. This gives risk to potential predictable underutilisation relative to the annual volume cap under a Storage Permit, because 100% operation at full RC is unlikely to occur.



An alternative approach (not currently assumed in the Code) could see aggregate Registered Capacity exceed Obligated Network Capacity by an amount appropriate, after factoring in network under-utilisation where it is expected to occur (e.g. due to variation in User flow processes, presence of dispatchable Users, and/or maintenance and other outages).



Benefits of higher utilisation include lower T&S charges for users, higher stored volumes and better value for public money. Such an approach, that prevented storage sterilisation, could also be useful when a T&S Co is considering when/by how to increase available Network Capacity (i.e. expansion).



To enable this alternative approach in the Code, it would need to provide that a T&S Co could constrain User(s) in the unlikely event the store volume cap was at risk of being breached, with Users assumed to receive protection via their support contracts, as with other outages. A User right to flow up to RC would be unchanged during normal operation. Note: other factors e.g. technical would need addressing beyond the Code.

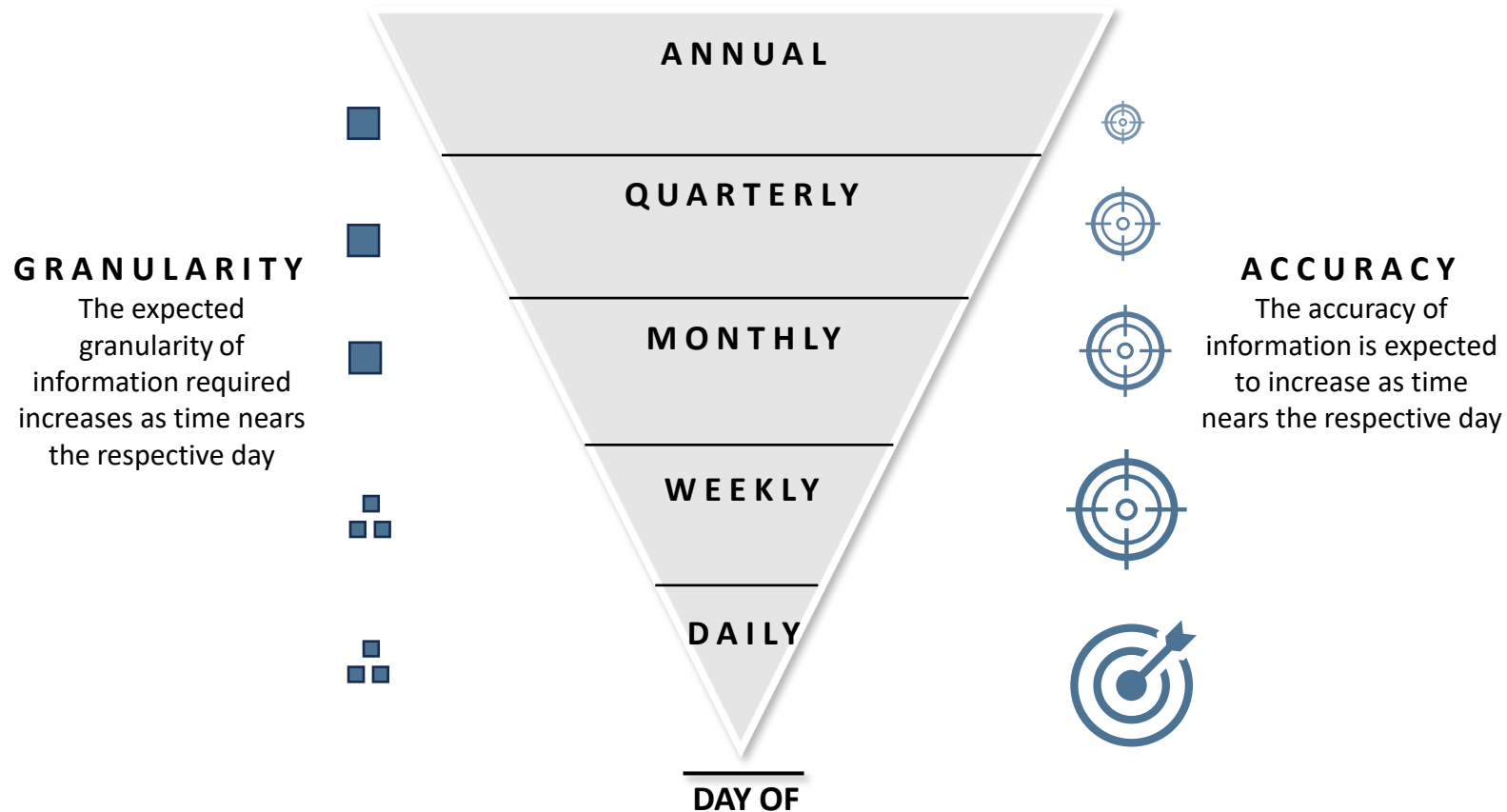
Forecasts and Nominations

Users are expected to “Forecast” long-term projected flows and provide “Nominations” daily. The table below outlines each of these.

REQUIREMENT	WHAT DOES IT COVER?	GRANULARITY
Annual Forecast	Annual Forecasts will cover all days within the following the charging year	Daily breakdown
Quarterly (Rolling) Forecast	Quarterly Forecasts will be a required on a rolling basis covering all days within the following three calendar months, to be submitted alongside the Monthly Forecast	Daily breakdown
Monthly Forecast	Monthly Forecasts will cover all days within the following calendar month	Daily breakdown
Weekly Forecast	Weekly Forecasts will cover all days within the following week	Hourly breakdown
Daily Nomination	Daily Nominations will cover all hours within the following day	Hourly breakdown

Annual, Quarterly (Rolling), Monthly and **Weekly Forecasts** are required for operational planning purposes and to indicate expected usage
Daily Nominations are an essential part of balancing and optimising network utilisation

Forecasts and Nominations



A User's Forecast specifies the amount of carbon dioxide expected to be delivered through a User's delivery point, in tCO₂/Hour for any Hour, or Daily equivalent.

Registered Capacity determines an upper export limit of CO₂ from a User site to the T&S network, implying, forecasts cannot and will not exceed this value.

A User shall use *reasonable endeavours* to ensure that each Forecast constitutes an accurate representation of the User's expected delivery of carbon dioxide during the time periods to which the Forecast relates to.

Purpose of Nominations

Nominations are required to enable T&SCo to:

- a) Ensure the stability around the operation of the T&S network and minimise the risk and likelihood of loss of service through flow related incidents
- b) Optimise the T&S system to operate as efficiently as possible providing value for money to all financial stakeholders

RC provides the right but not the obligation to flow onto the network, but alone does not inform day to day expected throughput on the network. There may be scenarios where a User is flowing within their RC, but with large variance from their nomination where T&SCo have the right to refuse flow under their RPO duties, without Users receiving business model protection. This could occur where user behaviour is causing material impact on the network integrity as a whole or having adverse impact on other Users access to the network.

Where nominations accuracy is poor or adherence to nominations is poor, and/or a User doesn't utilise the renomination process efficiently, this creates inefficiencies in the process and uncertainty to T&SCo. Who will in turn have to place redundancy measures (at cost, e.g. standby or run another compressor) to accommodate potential flow variance from nomination which may push flow into the next operating window.

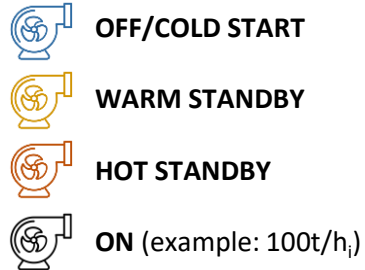
For example;

- There **is a cost** to running one compressor alone (£)
- **Additional cost** to run an additional compressor on standby due to the potential for flow to surpass one compressor (££)
- **Additional cost** to run two compressors on part or full load (£££)

Uncertainty in flows push up User fees, create an underutilised network and degrade the value proposition of efficient CCUS networks.

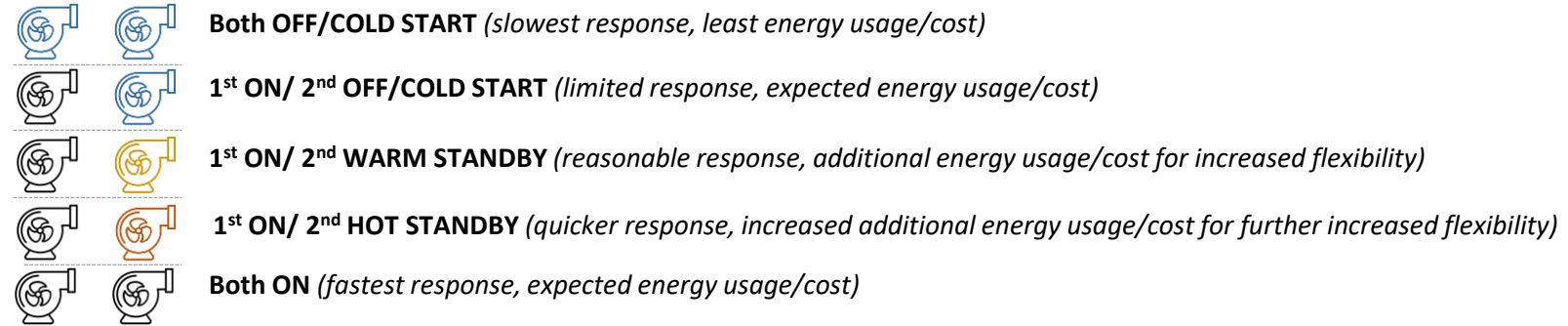
Purpose of Nominations (worked example)

Ex: Compressor States

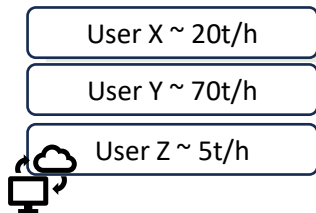


(Principles extend to wells, heaters and other system equipment)

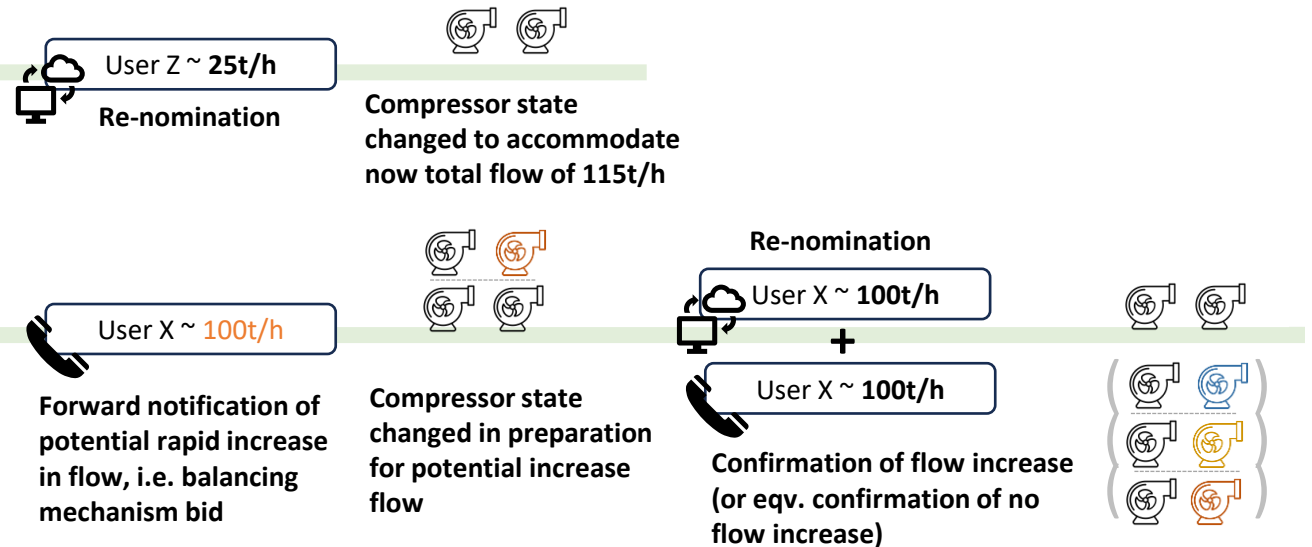
Ex: Potential Dual Compressor Operational States



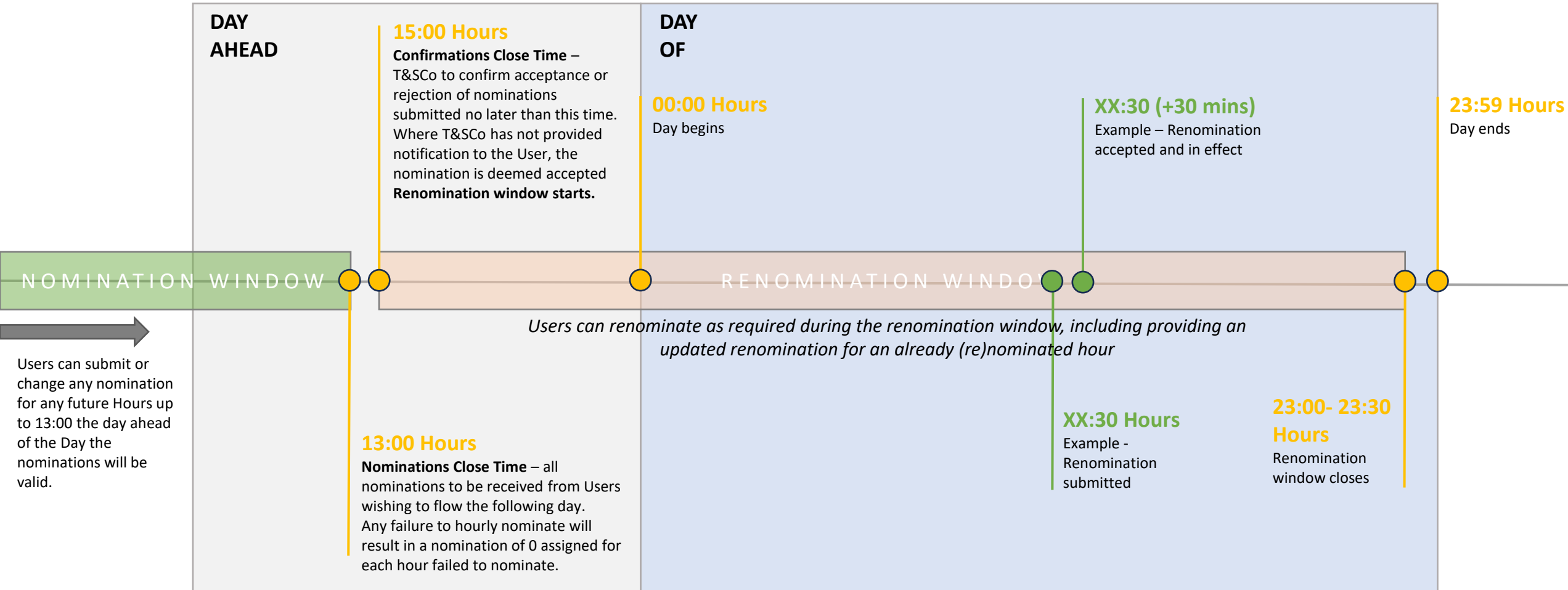
Ex: Day ahead confirmed nominations for Hour (H)



Different compressor strategies and subsequent energy efficiency and cost, will be dependent on the confidence in the accuracy of User submitted nominations.



Timeline of Nominations



Progression of ‘Nominations’

DESNZ has engaged with stakeholders in the process of developing the Network Code, holding topic specific working groups and received feedback on nominations and deviations alongside wider Code engagement. There was significant progression between December 2022 Head of Terms and the December 2023 updated release. The development thesis considers that;

- Users want flexibility,
- T&S optimisation requires some level of certainty around flow variance and;
- T&S flexibility depends on visibility of expected flows

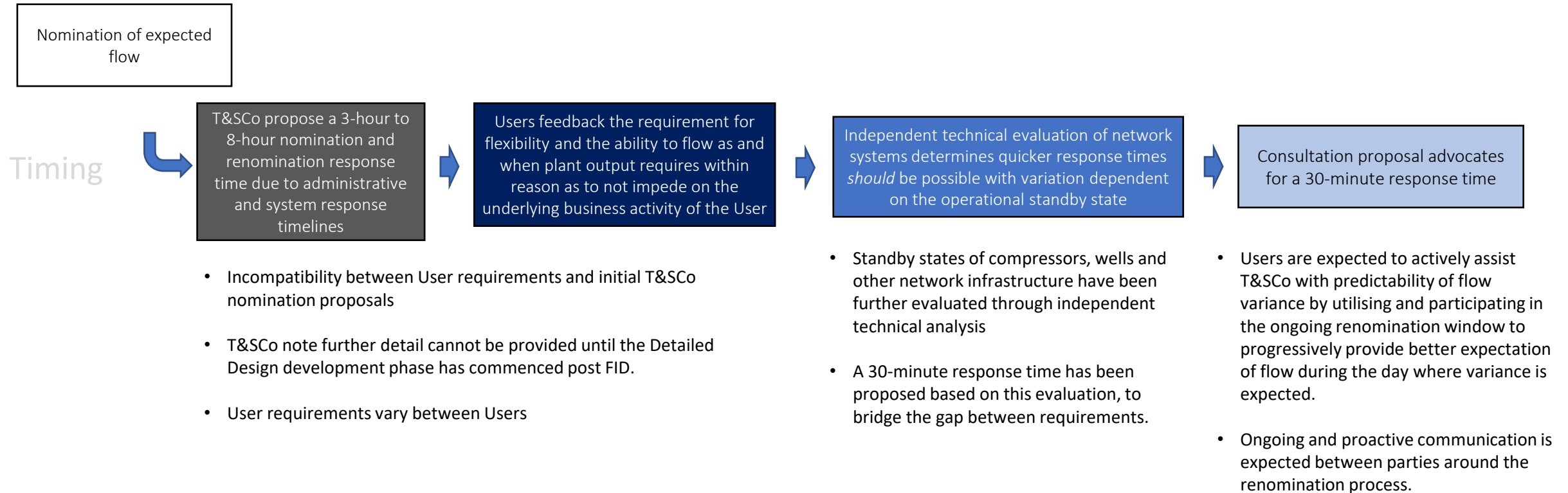
Providing flexibility will build in costs for T&S to be a more reactive service provider, and there is an economical case for this within the Codes but also in the wider UK net zero energy strategy.

The long-standing and further outstanding questions are;

- 1) how much flexibility should a User have access to,
- 2) how should the additional costs of flexibility be targeted,
- 3) how are users encouraged to play an active role in nominations to minimise the uncertainty (and costs) faced by T&SCo (noting that charges passed through business models to taxpayers do not influence User behaviour)

A workable network Code must be in place for clusters to take FID, understanding that certain parameters, equipment specifications and overall network response capabilities will not be known until detailed design stages of development.

Progression of 'Nominations'



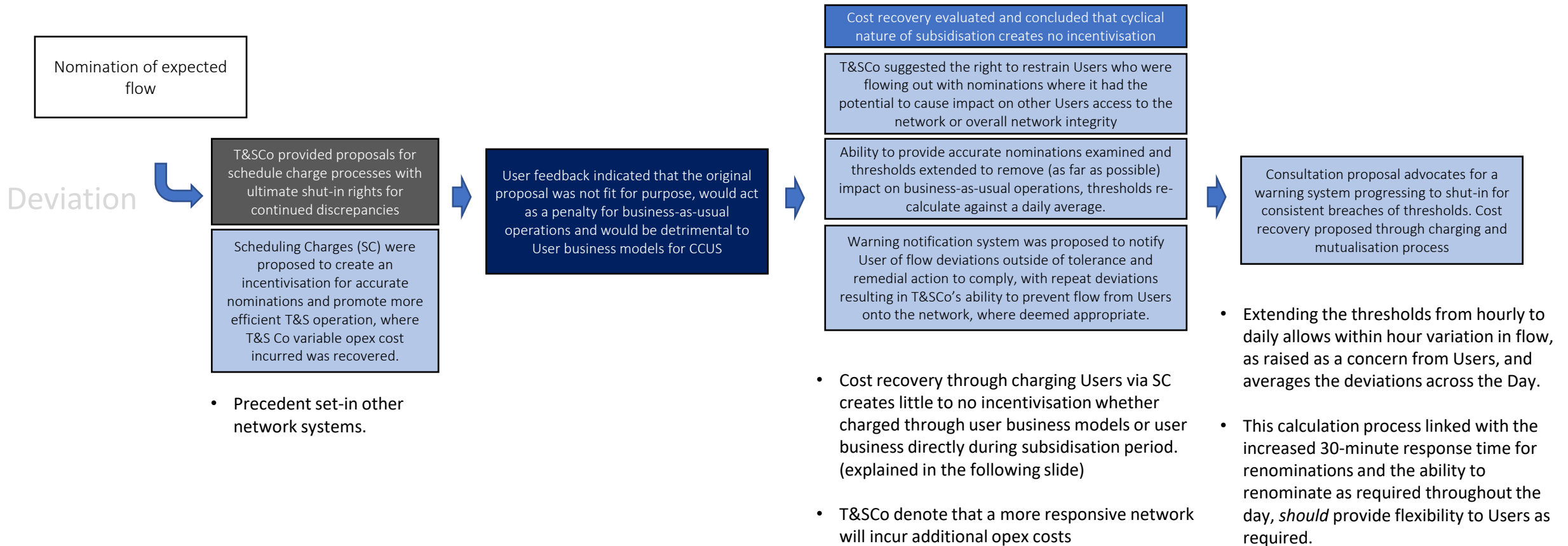
Technical Input

Policy Input

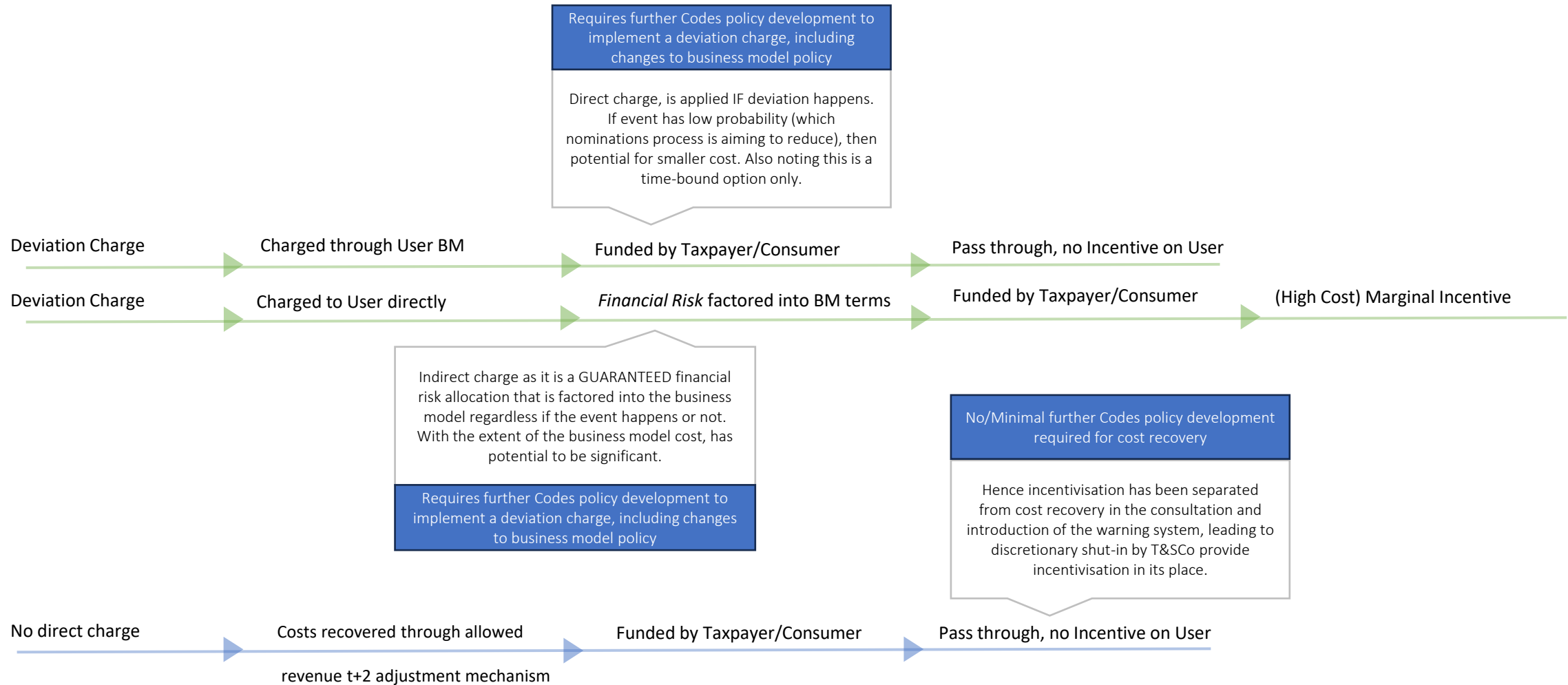
Users Input

T&SCos Input

Progression of 'Deviation from Nominations'

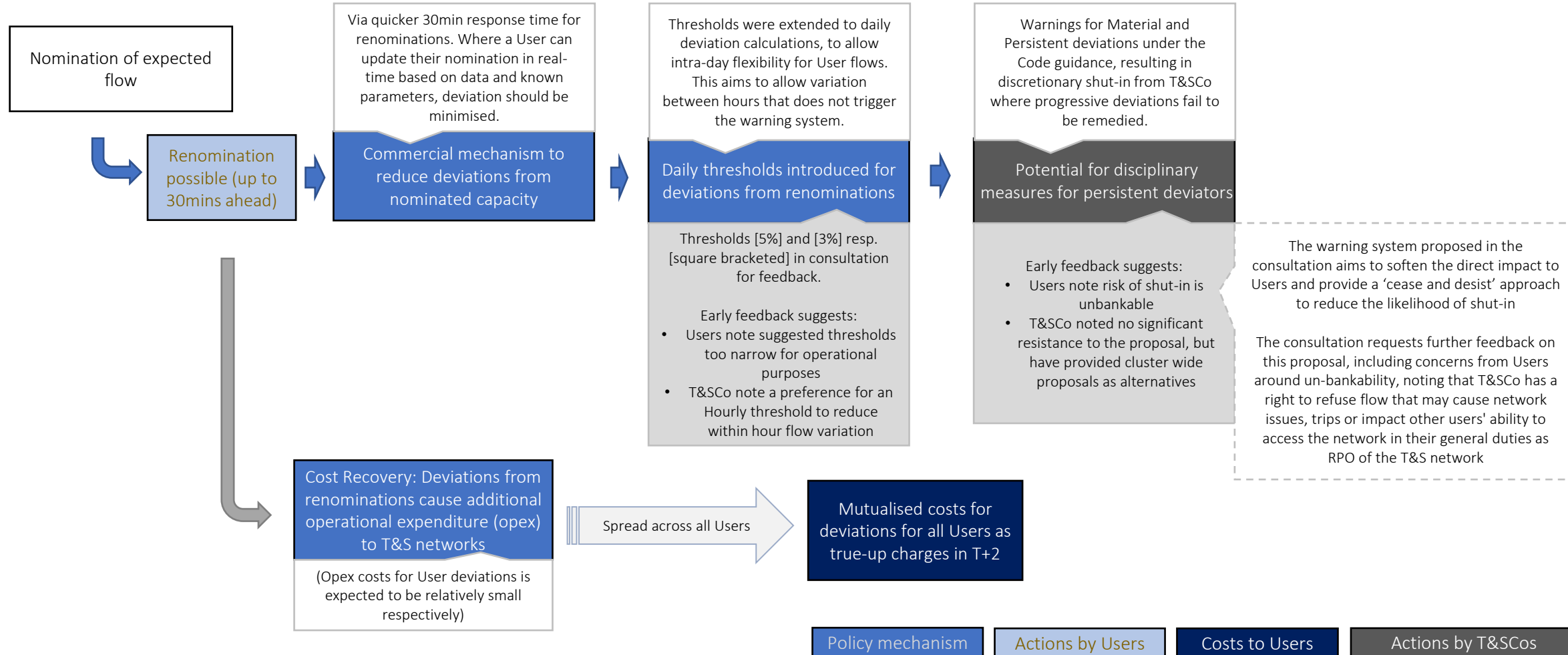


Charges during subsidisation



Consultation Proposal

Consultation proposal



Consultation feedback and development

The purpose of the consultation is to seek views on the proposed Code Heads of Terms to inform drafting of the detailed (full form) version.

Following conclusion of the CCS Network Codes consultation, DESNZ will have limited further engagement with T1 delivery partners on development of the full form Code in Q1/Q2 2024 and we will informally share the draft full form to T1 clusters targeted for April 2024.

Section E of the consultation asks the following questions:

Registered capacity

- *Do you agree with the proposed approach to Registered Capacity? (as proposed in the Heads of Terms)*
- *Would an approach that allowed aggregate Registered Capacity to be greater than Obligated Network Capacity be beneficial, and would the associated risk be manageable for early projects? (as discussed in slide 6)*

Nominations

- *Do you agree that the proposed approach to Nominations and Renominations will support efficient and responsive operation of a cluster, balancing the needs of both Users and T&S Co?*
- *Do you have any information or evidence that would support calibration of the “material” and “persistent” thresholds used to assess deviation between actual flows and Nominations?*

DESNZ ask that all respondents use this opportunity to provide feedback on the above questions and the wider principles in Section E, noting the limited ability to input due to time restrictions before the full form is drafted. It is in the interest of all stakeholders that feedback provided considers actions and consequences, Users and T&SCos requirements (and limitations) and considers the wider system perspective.

Thank you

For additional information or queries, please contact:
codes.engagement@energysecurity.gov.uk

CCS Network Codes: Recap of the Draft Heads of Terms

Section E (constraints)

23 January 2024

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Constraints

CCS Network Code: Section E

Background

A "Capacity Constraint" is a constraint in or affecting any part of the T&S Network at any time, as a result of which carbon dioxide flows in any part of the T&S Network are less than the affected User's Registered Capacity.

We recognise that these events will affect the T&S Networks and have been exploring ways to manage the available capacity during these events, in a transparent and methodical way, noting the nascency of these networks and the limited options available (for example, mature networks may have a variety of capacity products which can be scaled back, or have multiple pathways for flow).

Furthermore, we recognise that the users of these networks will be very diverse and so, although some networks use 'merit orders' to dictate who gets priority access during constraints, we are seeking to treat all affected users in an even way. And finally, we are seeking to avoid the introduction of perverse incentives or opportunities for 'gaming' (for example, encouraging artificially high or low nominations).

This has culminated in DESNZ recommending that the default approach to managing constraints is based on a 'pro rata' process (which we believe addresses the considerations outlined above and has precedence as a tool in similar networks). Therefore, in the December 2023 Network Codes publication we have outlined this process and are seeking views on it as part of the consultation.

Pro rata process

Step 1

- Constraint arises (unplanned) or becomes known (this could arise from planned maintenance) and T&S Co performs the following calculation to determine the available capacity (tCO2/hour) to be allocated to each affected user:

$$\frac{\text{available capacity}}{\sum \text{affected users' registered capacity}} \times \text{relevant user's registered capacity}$$

Step 2

- T&S Co informs affected users of the constraint and what their allocated available capacity is.
- Affected users can choose to utilise all of their available capacity, or a portion, or none (users have the right to utilise up to their available capacity, but not an obligation).

Step 3

- Similar to the 'normal' process, users will submit forecasts and nominations/re-nominations in line with their allocated available capacity and T&S Cos will confirm the prevailing nomination, which users are expected to flow in line with.

Note that Available Capacity will be pro-rated based on Registered Capacity.

Feedback

Based on feedback received so far, we believe that pro rata is a fair and reasonable default approach to managing constraints in the network, particularly in the early operational phases of the network.

However, we recognise that there are certain scenarios where pro rata may not be viable, in particular emergencies and unplanned constraints.

These are generally described as situations where the network operates outside of its normal operating envelope and reactive maintenance may be required, and in the most extreme cases there could be a loss of containment.

Furthermore, we recognise that the basic pro rata proposal may result in some available capacity not being utilised due to user capabilities varying during a constraint.

Therefore, on the following slides we detail our proposals for:

- (i) emergency/unplanned constraint scenarios; and,
- (ii) pro rata optimisation.

Emergencies

Where a constraint is caused by an emergency* then, unless it is safe and practicable for T&S Co to immediately apply pro rata, then T&S Co shall apply the relevant Emergency Procedure and the following Constrained Capacity Optimisation Principles in order to allocate available capacity in the network:

Primary objectives:

- Only reduce a constrained user's ability to deliver CO2 at their delivery point(s) as a last resort;
- Maximise quantity of CO2 stored.

In achieving these the T&S Co shall:

- Endeavour to maximise the number of affected users delivering CO2 into the Network;
- Take into consideration the operational features and requirements of constrained users including, but not limited to, a constrained user's minimum turndown rate, minimum and maximum ramp rates, any minimum flow requirements over a minimum period of time, and any maintenance that the user will carry out;
- Actively communicate with all constrained users.

Note that where a T&S Co applies the principles above to allocate available capacity, they shall transition to applying pro rata as soon as it is reasonably practicable.

*Definition of emergency: a situation where a T&S Co considers action must be taken without delay to (i) avert or reduce danger to life or property, or (ii) secure the network, or part of the network, or the safe transportation of CO2 by it or reducing the risk to it.

Unplanned constraints

Where a constraint is not caused by an emergency, but the circumstances of that particular constraint mean the application of pro rata will likely jeopardise the safety, integrity or operability of the T&S network then T&S Co may apply the Constrained Capacity Optimisation Principles (as per the previous slide) in order to allocate available capacity in the network.

Similar to an emergency scenario, where a T&S Co applies the principles to allocate available capacity, they shall transition to applying pro rata as soon as it is reasonably practicable.

Optimisation

Following the implementation of pro rata, we recognise that a constrained user may not be able to utilise any or all of the available capacity allocated to them, resulting in Surplus Available Capacity. Following notification by the relevant constrained user that there will be Surplus Available Capacity, T&S Co may reallocate this to an alternative constrained user in accordance with the Constrained Capacity Optimisation Principles (as per the previous slide).

Note that where a constrained user's registered capacity is reduced by (i) pro rata or (ii) application of the Constrained Capacity Optimisation Principles, then the difference between the user's registered capacity and what they are allocated during the constraint (Reduced Capacity) is known as Constrained Registered Capacity for the purposes of any availability adjustment under T&S Co's licence.

Thank you

For additional information or queries, please contact:
codes.engagement@energysecurity.gov.uk