Carbon Capture and Storage (CCS) Network Code – consultation on the indicative Heads of Terms – response form

The consultation is available at: https://www.gov.uk/government/consultations/carbon-capture-and-storage-ccs-network-code-updated-heads-of-terms

The closing date for responses is: 16/02/2024.

Please return completed forms to:

CCS Network Code Team
Department for Energy Security and Net Zero
6th Floor
3-8 Whitehall Place
London
SW1A 2AW

Email: codes.engagement@energysecurity.gov.uk

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Comments: Click here to enter text.

Questions

Name: Shell U.K. Limited

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	Respondent type
☐	Business representative organisation/trade body
☐	Central government
☐	Charity or social enterprise
☐	Individual
☐	Joint response from a Track-1 cluster
☒	Large business (over 250 staff)
☐	Legal representative
☐	Local government
	Medium business (50 to 250 staff)
☐	Micro business (up to 9 staff)
☐	Small business (10 to 49 staff)
☐	Trade union or staff association
☐	Other (please describe)

1. Introduction

Shell U.K. Limited[1] (Shell) welcomes the opportunity to respond to the Department for Energy Security and Net Zero's (DESNZ) *Consultation* on the indicative heads of terms for the carbon capture and storage network code.

This response is provided by Shell U.K. Limited.

This response is structured as answers to the consultation questions and in the "other comments" section, comments relating to the necessary arrangements required to incorporate unbundled services within the CCS Network Code.

[1] In this response "Shell", is used for convenience where references are made to Shell U.K. Limited and its subsidiaries in general. Likewise, the words "we", "us" and "our" are also used to refer to Shell U.K. Limited and its subsidiaries in general or to those who work for them.

1. **Do you agree with the approach to Code governance as set out in the Heads of Terms?**

Modification Panel

We consider that the Track 2 prospective T&S systems (T&S Cos) should be represented on the code modification panel from the initiation of the CCS Network Code ("the Code").

We understand that the Code will apply for the Track-1 T&S Cos who are likely to become operational earlier than the Track-2 T&S Cos, but it will equally apply to the Track-2 clusters and will need to be fit for purpose from the day Track 2 systems accede to the Code.

This is particularly important since DESNZ considers it likely that the code will evolve in its early years of operation, introducing the risk that the pre-introduction Code could be better suited to the Track-2 clusters than the Code they later accede to.

Modification Process

We agree with the process for Modification Proposals, which can be raised by all Code Parties and third-party participants.

However, we are concerned that Third Party Participants which would be materially affected by modifications to the Code will not be represented by Voting Members, for example, if the interests of existing and future T&S Cos and users differ.

We therefore recommend including provisions for ensuring that the interests of future parties to the Code are represented. For instance, Third Party Participants could be allowed to have full or partial voting rights. We support proposals for ensuring that voting rights are permanently weighted 50:50 between T&S Cos and Users as the Panel Membership changes over time.

In the interests of transparency and fairness, we would further recommend ensuring that the code:

- Avoids the potential for multiple voting representatives from a single company on a Modification Panel, as this could potentially be viewed as anti-competitive. Instead, consideration should be given to reducing the size of the Panel until there are enough interested parties to form a full Panel, or, to facilitate discussion, allow for multiple company representatives on the Panel as non-voting members with only one vote per organisation, or a set number of votes per User type. This would also avoid the potential risk of bloc voting if any business or sector is over-represented by multiple panel members.
- Has the ability to introduce new members, or the redistribution of voting rights at the point where there is representation available, rather than as a matter of course; and
- Ensures the proposed dispute process is proportionate, effective, and timely, and adopts best practice from other UK energy networks by utilising the role of the Competition and Markets Authority in dispute resolution to provide consistency across codes. This is understood and valued by market participants.

Role of Ofgem and Secretary of State

We agree with the proposal that Ofgem and Secretary of State (i.e. DESNZ) representatives should have formal roles as non-voting panel members of the Modification Panel, and that Ofgem and DESNZ should be able to raise a Modification Proposal (including through a Significant Code Review process).

2. **Do you agree that the approach set out affords appropriate pathways for Users and prospective Users to obtain a new or modified connection, either with or without UK government support being sought?**

Shell agrees with the proposed approach and makes the following comments in respect of the more detailed application and implementation of the code:

- Further consideration should be given to whether the code is sufficiently clear in relation to "Eligible Applicants" and the longevity of the Selection Process. Our understanding is that the current draft of Section C will apply until all forms of government support are no longer required, but clarity on this point would be appreciated;

- We would support disputes in the first instance being determined by Ofgem. Having the Secretary of State as the first escalation point is unlikely to be the best use of resources, and, in our experience, ten business days is unlikely to be sufficient time to successfully resolve disputes; and

- Development of a connection methodology would be beneficial (taking learnings from the existing PARCA or CLOCC processes) including clarification on cost allocation.

3. **Do you agree with the proposals set out in Section D?**

For the initial Code we have no comments.

4. **Do you agree with the proposed approach to Registered Capacity?**

Shell supports DESNZ's objective of developing a relatively simple approach to Registered Capacity in the early years of the Code.

However, if Users are asked to commit to long-term contracts only, this may be a barrier to some (typically smaller) Users, who require more flexible capacity products, or for whom the associated liabilities may be a barrier to investment.

There is a risk Users requiring capacity intermittently or seasonally may underbook capacity (reducing their volumes of carbon capture) or overbook and then fail to use booked capacity (preventing other users from capturing emissions).

This may not support the most cost-effective use of capacity and allocation of costs to Users, and for networks only provides revenue security if the capacity is all booked. We therefore recommend DESNZ considers allowing for alternative capacity products under the Code.

5. **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?**

Shell's view is that aggregate Registered Capacity being greater than Obligated Network Capacity would expose T&S Cos and Users to uncertainty and may have the unintended consequence of encouraging Users to strategically apply for Capacity in anticipation that the Obligated Network Capacity will be, or is, insufficient.

We consider it advisable that the capacity allocation system be managed with regard to the User's historical network usage, preventing sterilisation of Capacity and enabling Capacity to be made available to other Users.

The ability of T&S Cos to reallocate capacity – provided that such reallocation follows due consultation with the User concerned, and there is no bona fide requirement for continuation of the Registered Capacity – would support effective network management and embed the correct approach from the start of operations.

We appreciate the configuration of Users for each network will vary and a flexible network-by-network approach would be beneficial.

6. **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?**

The Nomination Non-conformity Notice process should encourage accurate demand forecasting from the outset of network operations. This will help ensure economically efficient network utilisation and accurate User forecasting and nominations. Proportionate and appropriate financial or other penalties being available from the early stage of network operations will support this.

However, the process should not be unduly punitive. Further consideration should be given to whether the current draft of the code demonstrates sufficient recognition that the CCS industry is nascent in the UK, with little or no operational experience. Margins can and should be tightened over time in line with increased operational and network usage certainties. A "soft-landing" period for any penalties could be adopted to illustrate the impact on network operations to Users and harsher penalties introduced incrementally.

We welcome the use of hourly profiles as a better indicator of expected network demands which will give T&S CO's a better basis to manage their network.

7. **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?**

We consider that useful learnings can be drawn from the overrun charging regime employed by National Gas Transmission for Users whose nominations vary compared to their respective capacity bookings, provided it is recognised that Gas UNC represents an end-state model.

8. **Do you agree with the pro rata approach being a fair and equitable default mechanism to manage constraints within the network (noting the exceptions listed above)?**

Given the minimum capacity booking period is one year, it is likely that at any given point in time, a User's registered capacity may vary significantly from its expected usage over a specific period – within day, daily, etc. There is a concomitant risk that in any constraint period, Users who have higher levels of booked capacity will be less impacted, regardless of expected usage levels. It may encourage more efficient Use of the network and capacity booking to allocate available capacity based on profile notifications for the constraint period to ensure the network usage is optimised.

9. **Do you consider that the process and timelines proposed for maintenance are acceptable?**

Yes. Depending on the configuration of each network, some level of flexibility in the arrangements may support both Users and efficient network planning and development.

10. **Do you have any feedback on the proposed approach the Code will take to CO_2 metering? Please provide justification in your answer.**

Shell understands that the introduction of an uncertainty requirement of ≤±1% in section F 4.7 b) relates to the quantification of 'pure CO2', meaning that the uncertainty of the CO2 analyser needs to be accounted for in the overall metering system uncertainty. Previously distributed consultation material from DESNZ suggested the uncertainty requirements would align with those in the draft ICC Emitter Contract, which differentiates between 'CO2 Output' (aka 'pure stream CO2') and 'CO2 Rich Stream Output', with uncertainties of ≤±1.5% and ≤±1% respectively. Due to the current lack of calibration facilities for testing meters on CO2 at the size/rates expected, it will be difficult to accept an uncertainty of ≤±1% until more comprehensive test/performance data is available, which is being led by industry.

11. Are the proposed CO_2 specifications and measurement requirements appropriate?

The CO2 specifications submitted by the Hynet and Northern Endurance projects do not include the latest insights obtained on the formation of strong acids due to chemical reactions between H_2O, O_2, NO_x H_2S and SO_x, and therefore introduce an integrity risk to the transport infrastructure.

This risk was highlighted in the 2020 ISO technical report on CO_2 composition[2] and extensively studied as part of the Kjeld Dense Phase JIP. A "safe limit" was published based on measurements at 100 bar and 25°C[3], which the listed specifications are in line with. At that time, there was a first indication that temperature could be important from first measurements undertaken at lower temperatures.[4]

Various projects that Shell is participating in have evaluated its CO_2 specification experimentally for conditions relevant in its offshore pipeline (~100 bar, 2-4°C) and under medium pressure shipping concentrations (20 bar, -23°C) and observed drop out of a corrosive phase at the concentrations presented as a safe limit at 100 bar and 25°C. This insight on a temperature dependency has been shared in the public domain[5] and is incorporated in the CCS standard from the AMPP.[6]

Shell advocates that prior to finalizing it, infrastructure projects experimentally verify the CO_2 specification under worst case conditions and considering the requirements of infrastructure located downstream.

A joint publication on measurements, including those at temperatures below 25°C, by experts from Shell, TotalEnergies, Equinor and IFE has recently been published of art on this risk is provided as part of the ongoing JIP for CO_2 composition coordinated by Wood, in which many leading CCS infrastructure developers are a participant.[7]

12. Is the proposed approach on the CO_2 Re-use Service appropriate?

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[2] See for example: appendix A.4 in ISO/TR 27921:2020(E) Carbon dioxide capture, transportation, and geological storage — Cross Cutting Issues — CO2 stream composition, 1st edition May 2020.

[3] B. H. Morland, A. Dugstad, G. Svenningsen, Experimental based CO2 transport specification ensuring material integrity, International Journal of Greenhouse Gas Control, 119, (2022) p. 103697.

[4] G. Svenningsen, B. H. Morland, "Corrosion and chemical reactions in simulated ship transport CO2 containers", CORROSION/2021, paper no. 16669 (Houston, TX: NACE International, 2021).

[5] J. Sonke, Y. Zheng, CO2 Transport and Injection, Effect of Impurities Understanding of Reactions and Consequences, submitted

[6] AMPP Guide 21532-2023 "Guideline for Materials Selection and Corrosion Control for CO2 transport and injection

[7] See also the Work package 2 deliverable in the Wood Plc. Led JIP on CO2 composition: Industry Guidelines for Setting the CO2 Specification in CCS Chains, Work Package 2: Reaction Chemistry, 522240-WP2-REP-001 Rev 0, November 1st, 2023.

Shell has no objections to the proposal in principle, but note that further consideration of cost recharging, metering, data management and charging arrangements is necessary.

13. **Is the proposed approach on Industrial Procedures (including the list of proposed Industrial Procedures and the Terms of Reference for each) adequate?**

Shell is of the view that the link between Section G I Industrial Procedures, and the Self-Governance Procedures under Section B in respect of Modification Proposals and the rights of the Users in the Modification process remains unclear, and therefore it is not possible at this point to confirm that the approach is adequate.

14. **How should the proposed Terms of Reference for each listed Industrial Procedure be further developed ahead of the Code being implemented, to ensure sufficient and relevant detail?**

For each network, a joint forum between potential system Users and T&S Cos to develop draft industrial procedures would be beneficial. Sharing draft procedures across the networks would also support the efficient development and implementation of common standards and procedures.

15. **Do you agree with the proposed charging structure, Charges and associated definitions?**

The principle of separate, cost-reflective and proportionate charges for onshore and offshore transportation and storage services linked to User requirements is one we support. As the UK CCS market matures and develops, charging structures may need to be adapted. This may be on a general or network specific basis.

16. **Do you agree with the use of a Mutualisation Cap to limit Users' exposure to mutualisation?**

Shell supports the principle of a Mutualisation Cap that limits Users' exposure to other Users' use of the system. Further detail is required to determine whether a Cap linked directly to UK ETS Futures Contracts is appropriate. Notwithstanding such protection being afforded to Users, it is essential that T&SCo's have a clearly defined pathway to the recovery of all allowed revenues through the revenue mitigation measures to ensure they are investible in the short and long term.

17. **Do you agree with the proposed calculation of the Mutualisation Cap?**

We support the split of the cap between the onshore transportation system and offshore pipeline infrastructure and storage complex, and that this is done in line with the split of Allowed Revenues based on the forthcoming charging year. However, the calculation of the basis of the Mutualisation Cap requires further guidance and/or explanation.

18. **Are the proposals on invoicing and payment appropriate?**

Based on our discussions with our Industry Partner in the Scottish Cluster, National Gas Transmission, we understand that consideration of the following areas would support code implementation:

- Implementation of a Central Data Service provider as anticipated by Section I (9) (on a similar basis to Xoserve in the UK gas market) will provide expertise and economies of scale that would benefit all parties;

- Clarification of whether the 10 days for invoice production are calendar or business days (business days would be the most practical basis);

- Invoice payment within 35 (business) days of final date of use may not provide sufficient time should the production of invoices be delayed; a due date for payment of 25 business days post invoice production may be a more robust basis;

- It is proposed that Late Payment Charges will be applied from five business days after the due date. Whilst a grace period may be appropriate, the option to apply late payment charges immediately once they become due is more logical and provides a means of managing persistent late payments. Similarly, clarity on the detail for calculation of late payment charges (a fixed penalty, a proportion of the invoice value, an interest adjustment etc) would support all parties and avoid the potential for disputes; and

- Whilst we welcome the proposal that five business days post non-payment of late payment charges, a T&SCo could then refuse to accept CO2 from a User who has not made such payment,it may be more appropriate for the T&SCO to determine whether it wishes to continue accepting the CO2 for a defined period while escalating the debt collection and late payment charging process, or to refuse to accept such CO2 from the User concerned.

19. How far in advance of the Commercial Operations Date should the Draft Data Annexures be developed?

Early and clear development of the Draft Data annexures will benefit all parties and we recommend a minimum period 18 months from Commercial Operations Date. This will enable system design, development and testing and facilitate the recruitment of staff.

20. Are the wider data provisions appropriate?

Shell's view is that the wider data provisions are in general appropriate, although provisions relating to the revision of Terms of Reference might benefit from being clearer in specifying which Parties are eligible to become a Proposing Party.

21. Is the proposed CDS proportionate to meeting the minimum requirements of managing the delivery of public funding?

Shell is not able to respond to this question as currently drafted.

22. Do you agree with the scope of financial liability which is allowed for in Section J of the Code?

Yes.

23. Do you agree that financial liability between Users and T&S Co should be driven by the concepts of property damage and third-party liability as they exist in law, rather than allowing for any agreement to be made directly between the Parties?

Yes.

24. Are you supportive of the liability caps proposed above? If not, please explain your reasoning, with supporting technical documentation where possible?

We would welcome further clarification on the proposed liability caps. Given the number of network Users is expected to grow and may vary significantly between networks, and the development of separate CO2 transportation and storage licenses, a degree of flexibility will likely be required.

25. **Is the proposed Code Accession Agreement adequate?**

Yes.

26. **Is the proposed structure and content of the Construction Agreement appropriate?**

For initial network development, yes.

27. **Is the proposed structure and content of the Connection Agreement Appropria**te?

For initial network development, yes.

28. **Is the CDS Accession Agreement adequate?**

Yes.

Do you have any other comments that might aid the consultation process as a whole?

Please use this space for any general comments that you may have, comments on the layout of this consultation would also be welcomed.

Shell currently has a number of interests across the UK in respect of CCS which will require us to be a direct or indirect party to the Network Code. The following comments should be read within the context of these interests.

1. Comments originating through Shell's interest in the Scottish Cluster.

We recognise that the Initial Code will be designed to work for the Track 1 projects.

The consultation notes that the Initial Code will target simplicity and be tailored for the early networks, and that modifications will be needed to the Initial Code to accommodadepate other structures and arrangements which are desirable features of the wider future CO2 T&S landscape but not part of Track 1 projects.

In particular, the Initial Code will need to be modified to accommodate an 'unbundled' project in which different parts of the overall T&S infrastructure are owned and operated by different entities, and also to accommodate non-pipeline transportation (NPT).

The Scottish Cluster T&S project is to be developed as unbundled, with Feeder 10 (and associated onshore transportation infrastructure) owned by National Gas Transmission, and other specified onshore transportation infrastructure and all offshore transportation infrastructure and the store owned by Acorn.

The development and implementation of those structural modifications of the Initial Code should be centrally managed to ensure they are done in a timely and focussed way, coordinated with the planning and development of the next T&S projects. They should not be left to 'business-as-usual' modification

processes, which are mainly about incremental change to the code, and are managed by code parties who may have no interest in seeing those structural changes delivered (see the CMA's findings for energy codes, giving rise to code governance reform under the Energy Act 2023).

We therefore strongly support the proposal that the Secretary of State should have the power to direct modifications of the Code during an interim period. We consider that the introduction of the modifications needed to enable an unbundled approach, and NPT (particularly, transportation by ship), are obvious candidates for the use of those powers, by way of 'SoS Modification Proposal'. It would be helpful, in terms pf providing clarity on the way forward, if DESNZ would confirm specifically that these topics would be the subject of SoS Modification Proposals.

We note that the 'interim period' in the Energy Act 2023 is to be the period in which the Secretary of State may grant CO2 transportation and storage licences; that is not necessarily the same as the period in which it is appropriate for the Secretary of State to make SoS Modification Proposals. To facilitate the changes necessary to deliver the market creation and market transition phases of a commercial and competitive CCUS market, the duration of the latter period should be kept under review and reflect the pace of market development [but be no shorter than the expiry of the first regulatory period for all of the Track-1 and Track-2 clusters].

We note that DESNZ is considering whether future legislation should introduce a separate power for the SoS to direct modifications to the Code. As it is doubtful that such legislation would be in place in time to deliver the modifications needed for unbundling and NPT, it will be important to be sure that the proposed mechanism within the Code for 'SoS Modification Proposals' is as robust as possible.

Recognising that the SoS Modification Proposal route will only be available when the Initial Code comes into force, we suggest that a 'shadow' modification process could be established at an early stage to progress, in parallel with the finalisation of the Initial Code, in an open and transparent way, the modifications that will be needed to implement unbundling and NPT.

Unbundling

It is premature to respond in detail to the consultation questions from the perspective of an unbundled T&S system. Before considering those questions, the commercial model for an unbundled network will need to be decided. Provisionally, we consider a possible model could include these features:

- each owner/operator of infrastructure comprised in the T&S project holds a separate licence (for CO2 transportation, CO2 storage or both);

- the Network Code operates in such a way as to provide Emitters a single set of arrangements for delivery of CO2 at a delivery point for transportation and storage;

- under those arrangements, Emitters should not need separate operational interfaces with each of the owner/operators.

In an unbundled network, arrangements for coordination will be needed between the different owner/operators to underpin such a commercial model. Emitters would not be directly concerned with those arrangements. We consider that regulatory oversight would be required of those arrangements.

Those arrangements could be included in a separate part of the Network Code (to which Emitters are not party) or a separate document governed by a new licence condition.

Under such a possible model, some very preliminary issues to address, with reference to the consultation questions, would include the following.

B. Governance

See comments above.

C. Connections

A User would make a single Connection Application and receive a single Initial Offer and Connection Offer. Coordinated input from each owner/operator will be needed to decide on the application and create the Initial Offer and Connection Offer.

D. Network Structure and Planning

As stated above, we recommend a SoS Modification Proposal to develop the provisions for which a 'placeholder' is included.

We note that the boundary interface between different owner/operators may not correspond to the boundary between onshore and offshore infrastructure.

A User will provide a single set of long and short-term forecasts consistent across both Onshore and Offshore systems, in line with the intent of the draft terms related to Registered Capacity

The owner/operators will coordinate their network planning and other decisions (on the basis of those forecasts), to create separate but linked Agreed Network Development Plans.

E. Network Use and CapacityS

A User would make a single application for capacity, which would operate as an application to each relevant owner/operator. Arrangements would be needed to ensure alignment of the capacity allocated to a User in each part of the T&S system. In effect capacity in each part of the system would be bundled (analogous to the processes implemented Prisma in interconnection gas bookings).

A User would make single nominations, which would operate (to the extent necessary) as nominations to each relevant owner/operator. The owner/operators would coordinate to process nominations. The User would be treated as flowing the same quantity / at the same rate in all relevant parts of the T&S system. Where a constraint affects any part of the T&S system, the capacity available to the User in all parts of the system would be reduced. (However the availability incentive for each owner/operator under its licence would reflect the availability of its relevant part of the system only.)

Owner/operators would coordinate to provide Users with a single, combined maintenance programme.

F. Network Design and Specification

Code provisions for specification and measurement of CO2 would apply to a User at the delivery point on the part of the T&S network at which it introduces CO2. The owners/operators would coordinate and exchange information on quality and flow rates / quantities downstream of that point.

G. Industrial procedures

So far as the industrial procedures impose obligations on Users, it would be desirable that the procedures for each part of the system are aligned or integrated such that the User's obligations apply at the delivery point at which it introduces CO2 into the overall system.

H. Charges, Invoicing and Payment

Each owner/operator will make charges to Users (but invoicing and collection might be coordinated – compare the role of Xoserve in the gas network code). An 'onshore only' owner/operator would only make the Onshore Charges.

A decision will be needed whether the postage stamp approach applies across the whole T&S system or the parts of it that are separately owned/operated by different licensees.

Mutualisation will apply separately for each owner/operator (and will not be identical for each, since there may be Users that do not use every part of the overall T&S system).

Thank you for taking the time to let us have your views on this consultation. We do not intend to acknowledge receipt of individual responses unless you tick the box below.

Please acknowledge this reply ☒

We carry out our research on many different topics and consultations. As your views are valuable to us, would it be okay if we were to contact you again from time to time either for research or to send through consultation documents?

☒Yes ☐No