UNC 0849R:

Hydrogen Blending: Commercial framework review and amendments

Review Group Two

Tuesday 18th July

Agenda

14:00 – 14:05 Welcome and agenda
14:05 – 14:25 Review Updated Assumptions
14:25 – 15:00 Review Issues List
15:00 – 15:30 Review Actions Tracker
15:30 – 16:15 Balancing Review
16:15 – 16:30 Next Steps, AOB, Close

Assumptions and Parameters

There are still some unknown certainties for hydrogen blending which will be answered through separate pieces of work, therefore, to ensure deliverability of this project, a number of assumptions have been defined:

- As the Government are currently set to make a decision in principle for blending into the Distribution Networks by the end of 2023, with a decision for Transmission likely to follow, we assume that changes to GS(M)R for Dx will be implemented before Tx. Having different GS(M)R specifications across networks will therefore need to be considered within this Review Group.
- Both In-network (commingling facility owned by Gas Transporter) and pre-blend (commingling facility owned by Delivery Facility Operator) connections will be considered within this work
- Hydrogen will be available to blend
- Blending hydrogen onto gas networks may be used for the role of "reserve offtaker"; therefore variability in hydrogen volumes to be injected needs to be considered.
- This project will consider onshore networks regulatory frameworks as well as Interconnectors, however we assume that there won't be any direct changes to IP section of UNC as its currently set out. – Megan to review this
- Other projects will be concluding on framework principles (e.g. the "Connections and Capacity Methodology project" and the "Functional Specification project")
- Assume all existing market players and their roles will be included in blending development
- All GB Industrial, Commercial and Domestic users will be assumed to be customers of Hydrogen blend as well as Independent Gas Transporters
- This project is just considering the commercial amendments required, not physical arrangements
- We assume within the project that low levels of blending (C.5%) won't impact physical capability of the networks (due to higher volumes vs energy)

Assumptions and Parameters

The aim of this project is to enable the first roll out of hydrogen blend injections in a timely and efficient manner whereby no amendments to Primary legislation (Gas Act 1986) and Secondary legislation (GCOTER) is required. To achieve this, the below parameters for the first phase of blend connections have been suggested:

- Within this report we assume that GS(M)R will be updated following a HSE safety review in order to accept volumes of up to 20% hydrogen into the networks.

- This project aspires to implement H2 blending by 2025 with least change to existing market framework as possible, it therefore assumes that limits to maximum blend percentage volumes lower than 20% may need to be agreed within relevant NEA's and Injection sites will need to comply with a CV target submitted by the network operator. This is to minimise the risk of triggering CV capping which is outlined in the Gas Calculation of Thermal Energy Regs (GCOTER). A CV target will be calculated based on three things (a) not exceeding the proposed 20% volume cap in the Transporter's pipe(s) (b) the available volume of natural gas in the pipe at the hydrogen connection point to blend hydrogen with and (c) the CV of the natural gas to be blended with.

- The Connections and Capacity Methodology project will be reviewing suitable connection roll out models that remain in-line with the Gas Act 1986. These models will then be considered within this work.

Do we agree with these assumptions and parameters?
Are there any additional considerations?

Issues List

Copy of Issues and Actions Tracker 0849R (002) (version 1)

Actions Tracker

Copy of Issues and Actions Tracker 0849R (002) (version 1)

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Deblending

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Deblending- Commercial Framework Considerations/Issues

- How to ensure that decisions to invest in deblending to meet customer needs or network needs are least cost from a wider system perspective.

- Targeted or socialised costs for deblending equipment, who will pay?

- How to recover the costs incurred by network companies, if they build and operate deblending facilities.

- Re-injection of deblended H2 in to the networks and the impacts of H2 blend levels downstream of deblending equipment.

- How to manage double charging issues for customers who own and operate a deblending facility through changes to charging methodology.

Recommended changes to Commercial Framework for Deblending, summarised in the Frontier Economics Report Gas framework changes to enable hydrogen deblending 290722 (9).pdf

Network planning	Implement an application process for customers to request a specific gas quality from network operators, including supporting evidence to justify the need.
	If costs of deblending are socialised, networks required to consider alternative options for meeting the gas quality need and justify expenditure on deblending using a cost-benefit analysis (CBA). If costs are targeted at the relevant customer, no changes needed.
	Rely on existing totex incentives to minimise network costs in the case of network deblending investments to meet a purely network-driven need (e.g. to manage blend levels).
Managing system impacts	Deblending reinjection points from customer-owned facilities connected to grid subject to a pre-connection Impact Assessment by the network operator. Connection agreement to enable the network operator to constrain reinjection if required for blend management purposes.
	An administrative approach* for network operators' choices between different tools (including deblending) for managing blend levels and for constraining any network owned deblending facilities that are being operated for customer needs.
	Enhanced co-ordination between transmission and distribution networks when applying system operation solutions.
Network charging	Networks that provide a deblending use-case to their customers recover the associated equipment and operating costs from the specific customers receiving the use-case.
	Customer-owned deblending facilities only pay network charges on the basis of 'net exit', with no entry charges on reinjections.

Balancing

Legislative Hierarchy Review

Assumptions and Parameters

- We assume within the project that low levels of blending (C.5%) won't impact physical capability of the networks (due to higher volume vs energy of H2)
- Assume all existing market players and their roles will be included in blending development

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Balancing Review: Existing Market Participants

Balancing the quantity of gas input and offtaken from gas networks helps to ensure safe operating limits and network pressures are maintained.

Suppliers

Evaluates gas demand of customers and contracts for expected energy from wholesale market through Shipper contracts.

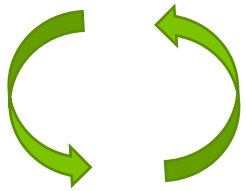
System Operator – Residual Balancer

Ability to trade on the OCM (sell and buy) when it is evident that overall network balance is outside of acceptable linepack range.

OM gas- can be used at short notice to support the network for a short period until shippers are able to provide sustainable solution.

Traders

Trader user has ability to trade NBP title gas



Distribution Network Operator

Distribution networks balance their energy inputs and outputs for each gas day so that imbalances are apparent on the NTS and become subject to their arrangements as residual balancer.

Terminal Operators

Notifies the System Operator (Physical Notification) of physical flow

Shippers- Primary Balancer

Incentivised to balance their energy profiles across the gas day

If imbalance occurs on NTS shippers will be charged.

They nominate in advance the quantity of gas they plan to flow on and off the system.

Inaccuracy in these nominations is discouraged through scheduling charges.

Hydrogen Blending: Balancing

Primary Legislation 	**Gas Act 1986**	**No impact**
Regulations 	**Gas Safety (Management) Regulations 1996** **The Gas (Calculation of Thermal Energy) Regulations 1996**	**No impact**
Licence 	**Gas Transporter Licence: Standard Conditions:** Condition 1: Definitions and Interpretation (daily energy balancing / physical balancing role) **National Grid Gas plc Gas Transporter Licence Special Conditions:** (physical balancing role; residual balancing incentive; OCM independent market for balancing) **Gas Shipper Standard Licence** (Primary balancer role; imbalance incentive; daily balancing regime)	**No change:** *(daily balancing regime remains; primary and residual balancing roles stay the same; OCM remains the balancing market)*
Code (UNC) 	**TPD Section C: Nominations:** daily energy balancing regime **Section D Operational Balancing and Trading Arrangements:** Shippers incentivised to balance supply with demand; primary balancing role **Section E Daily Quantities, Imbalances and Reconciliation:** Imbalance and cash out process; NTS residual balancer; concept of NBP **Section F System Clearing, Balancing Charges and Neutrality:** Imbalance and cash out process; NTS residual balancer; concept of NBP **Section K: Operation Margins**	**Section C and D no change-** (*primary balancing roles stay the same)* **Section E and F no change** **Section K no change**

Balancing Review:

Do we agree that the commercial process and roles for balancing will remain the same –blended gas traded on OCM at NBP same as natural gas, shipper primary balancer, SO Residual balancer?

Physical aspect of balancing will need consideration in terms of relevant tools required to guarantee a change in flow to manage blend cap/CV, (decrease and also increase).

For the scope of this Review Group (which suggests that for initial blending phase, Hydrogen volume percentages will be limited to minimise CV capping) is there a requirement for additional tools? Or does this become an issue with increased H2 blending volumes and will therefore need to be considered within the second phase of blending?

Network Reconfiguration

Reconfiguring the network using compressors to re-direct gas across the network.

Linepack

Utilising linepack gas as buffer to manage pressures until market is able to balance.

Trading

To move prices and encourage the market to balance

Enforce Contractual Limits

For example capacity and ramp rates

Capacity Scaleback

Scaleback off peak capacity and stop releasing firm exit capacity

Trade with Shippers to Reduce Demand

Buy back exit capacity, reduce offtake flows and locational trades

Existing Tools to increase Flows

Thank you

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Appendices

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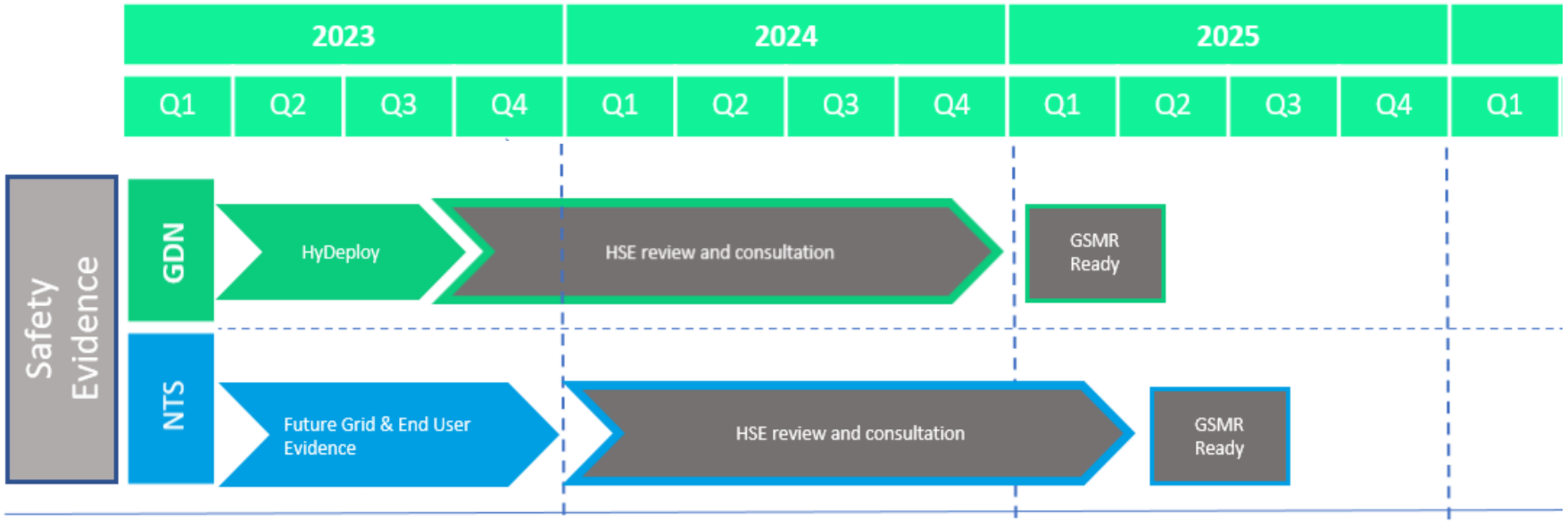
Expected Policy Timelines



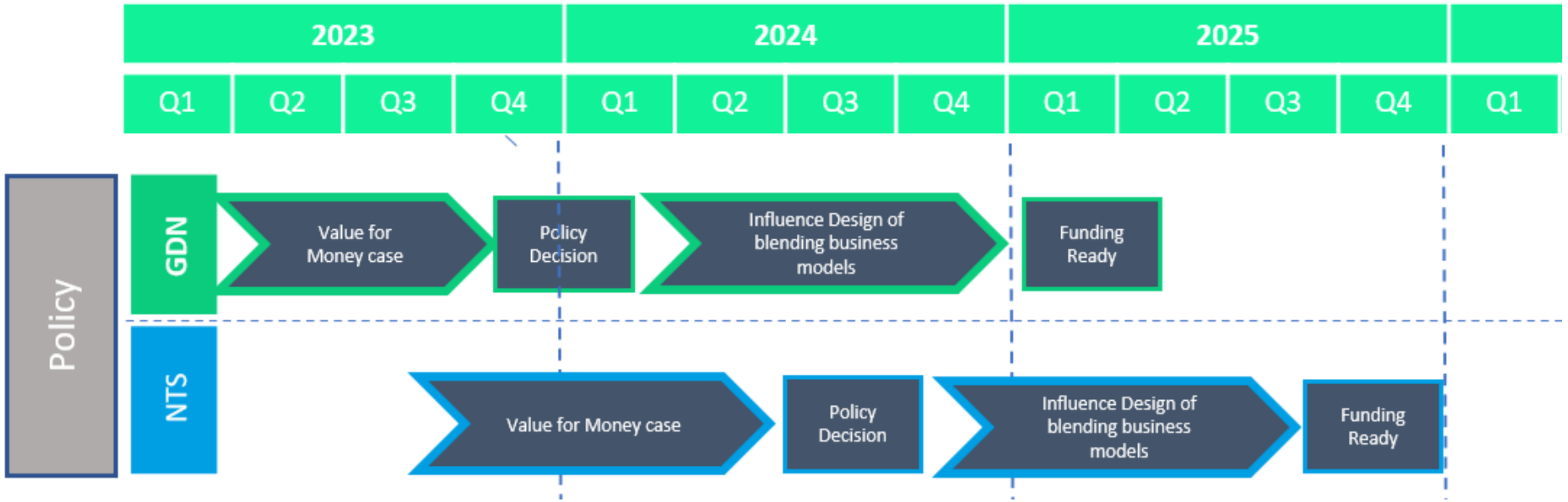
HyDeploy

Keele University (100 homes & 30 Uni buildings. 18 month trial)
Winlaton (668 homes, 1 school. 10 months)
Tested- network infrastructure/ pipes and home appliances.
Safety data evidence due to be submitted in 2023.

FutureGrid

Decommissioned asset test facility located in Cumbria.
Tests for 2%, 10% & 20% blends begin in 2023. Safety data due to be submitted by the end of the year.

Expected Policy Timelines



For the Distribution Networks, the Government have confirmed that a policy decision in principle will be made at the end of 2023. Development into the design of blending business models will then begin whilst the HSE conduct their safety evidence review. The Distribution Networks are therefore aiming to be GS(M)R ready by 2025, with first initial blend injections connecting throughout the year.

Timelines for the NTS is still unclear as this is dependant on the on-going work at Future Grid and the work reviewing impacts to Industrial end users, however current assumption is that this will follow shortly after Distribution.

EU Blending Strategy

Harmonised Rules

The Commission introduced a 5% blending mandate at interconnection points (article 20).
Parliament and the Council proposed to delete this article but agreed on common rules for gas quality for blended volumes comprises between 0 and 3 %, while leaving Member States the decision to apply H2 blending or not.
In the revised article 19, the Council proposes to apply harmonised rules at IPs for hydrogen blends up to **2%.**

Article 52 of the Regulation
The European Commission's initial proposal wanted the Network Codes and guidelines for gas and hydrogen in the EU to "*apply to all interconnection points within the Union and entry points from and exit points to third countries*".
The Parliament is supporting the Commission's proposal.
The Council has proposed to delete this reference to third countries.
The initial proposal of the Commission would means that we would need to comply with EU Network Code and guidelines, should we want to send gas/hydrogen to the EU.

Interconnectors

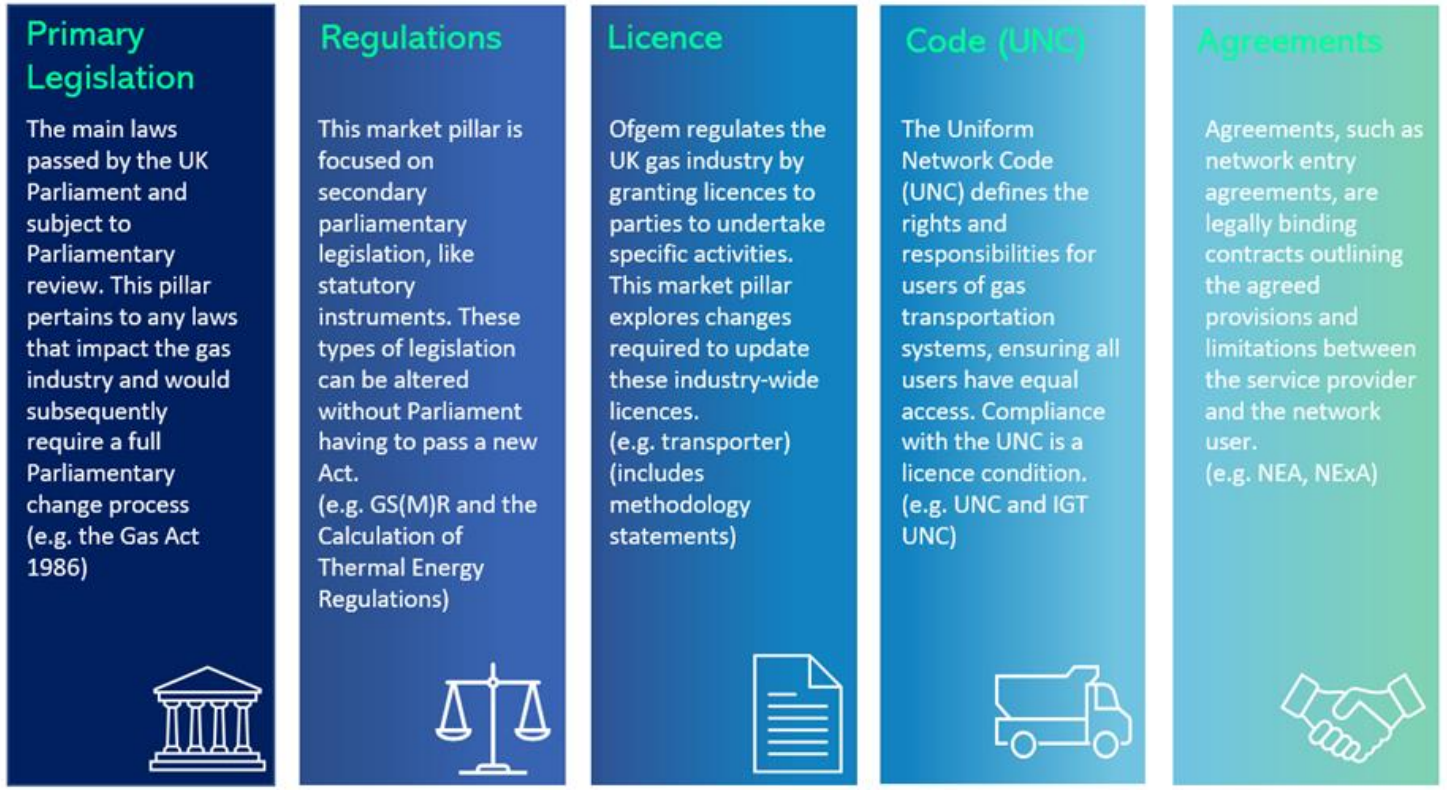
Belgian has amended its Gas Law to allow a 2% hydrogen blend as of July 2023. However, the first concrete injection project will start later, in 2024. Initial Blends will only impact the regional network and won't reach interconnection points. Fluxys has plans to reach a blending level up to 10%. Going beyond this threshold would require changes in the way the network is operated.

The Netherlands Government Strategy on Hydrogen also includes the option of a H2 blending obligation, outlining that "*Physical blending up to 2% is already achievable with minor adjustments, and with further adjustments, the percentage could gradually be increased to approximately 10-20%.*"

Gas Goes Green Proposal

The ENA Gas Goes Green working group have been involved in a number of workshops to develop an initial thought piece on existing commercial framework compatibility and the required amendments necessary.

This Review Group has been proposed for a period of 6 months to review these high-level amendments and further develop solution options with the objective to agree commercial framework changes required with wider industry and raise suitable enabling modifications.



0849R Work Group Objectives:

Work Group 1	Work Group 2	Work Group 3	Work Group 4	Work Group 5	Work Group 6
-Introduction and overview of H2 blending progress so far. -Agree Assumptions and Parameters -Gas Quality Review -System Operation Review	-System Operation Review continued.. -Balancing Review	-Trading Review -Charging Review (overview of functional specification project outputs)	-GGG Connections Methodology Solution Options -Capacity Review -Connections Review	-TBC (Progress to be reviewed throughout sessions)	-Final Considerations -Pre-mod Review