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CMP457: Revision of the Obligatory Reactive Power Service (ORPS)

Workgroup One, 21 October 2026

Online Meeting via Teams

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National Energy System Operator

WELCOME



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Agenda

Topics to be discussed	Lead
Introductions	Chair
Code Modification Process Overview • Workgroup Responsibilities • Workgroup Alternatives and Workgroup Vote	Chair
Objectives and Timeline • Walk-through of the timeline for the modification	Chair
Review Terms of Reference	All
Proposer presentation	Proposer
Questions from Workgroup Members	All
Agree Terms of Reference	All
Cross Code Impacts	All
Any Other Business	Chair
Next Steps	Chair

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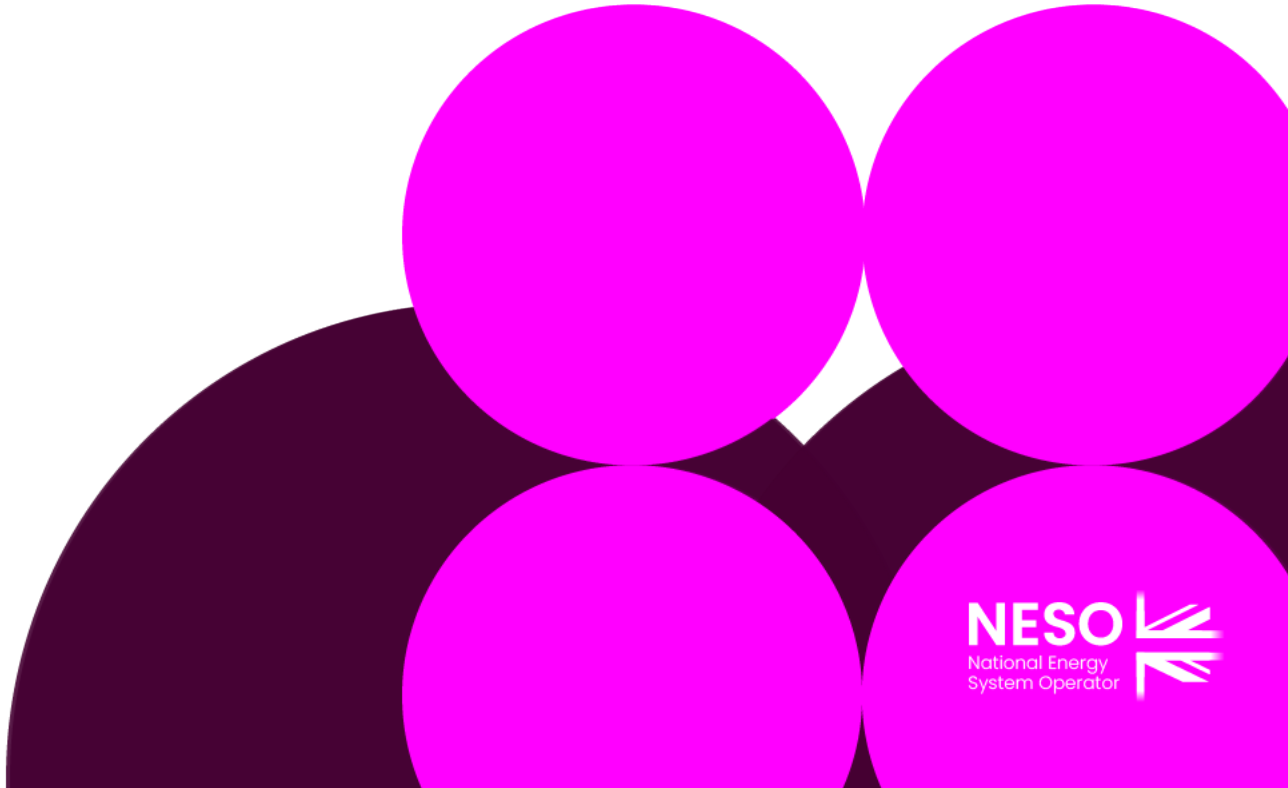
Modification Process

Teri Puddefoot – NESO Code Administrator



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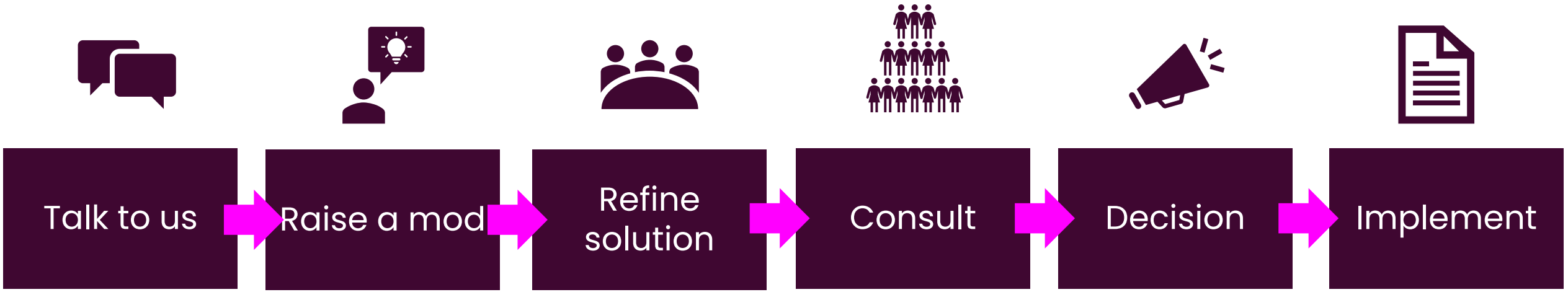
Code Modification Process Overview



Forums

Panels

Workgroups
(Workgroup Consultations)

Ofgem/Panel

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Refine Solution

Workgroups



- If the proposed solution requires further input from industry in order to develop the solution, a Workgroup will be set up.
- The Workgroup will:
  - further refine the solution, in their discussions and by holding a **Workgroup Consultation**
  - Consider other solutions, and may raise **Alternative Modifications** to be considered alongside the Original Modification
  - Have a **Workgroup Vote** so views of the Workgroup members can be expressed in the Workgroup Report which is presented to Panel

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Consult

Code Administrator Consultation

- The Code Administrator runs a consultation on the **final solution(s)**, to gather final views from industry before a decision is made on the modification.

- After this, the modification report is voted on by Panel who also give their views on the solution.



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Decision



- Dependent on the Governance Route that was decided by Panel when the modification was raised

- **Standard Governance:** Ofgem makes the decision on whether or not the modification is implemented

- **Self-Governance:** Panel makes the decision on whether or not the modification is implemented
    - an appeals window is opened for 15 days following the Final Self Governance Modification Report being published

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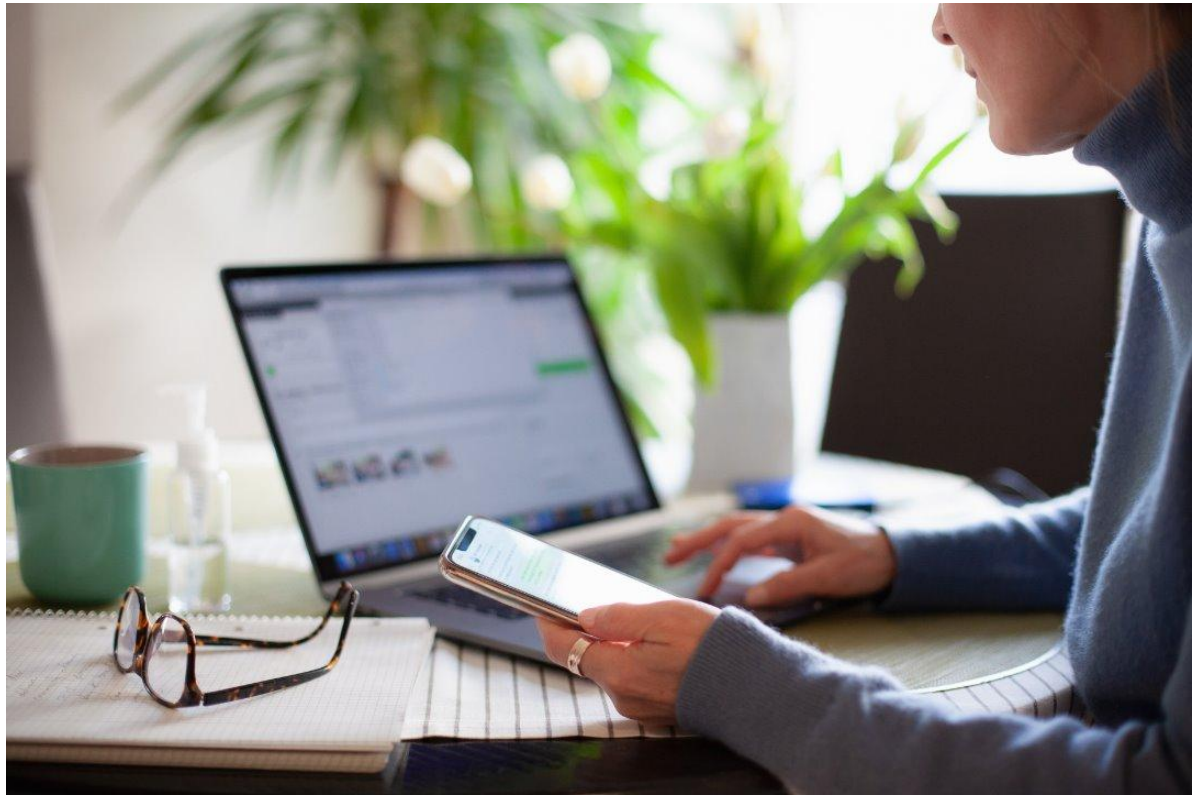
Implement

- The Code Administrator implements the final change which was decided by the Panel / Ofgem on the agreed date.



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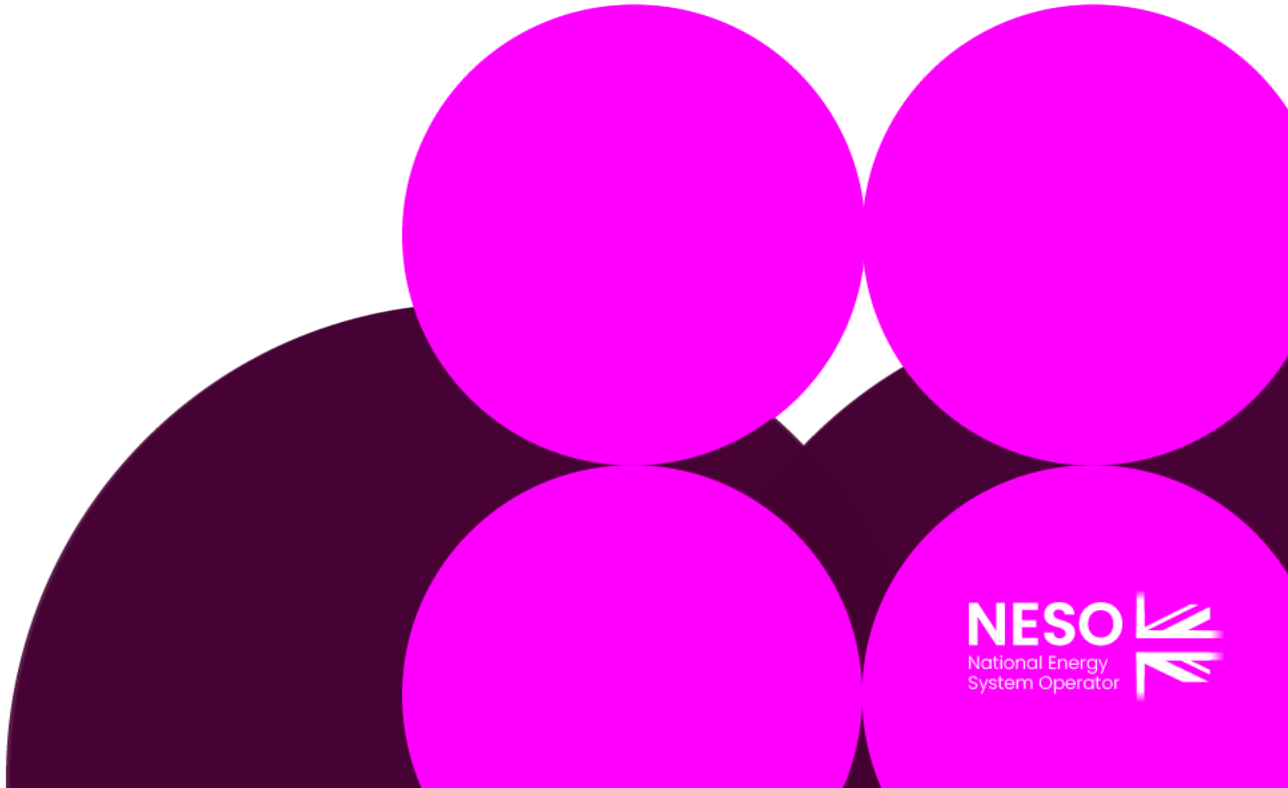
Workgroup Responsibilities and Membership

Teri Puddefoot – NESO Code Administrator



Expectations of a Workgroup Member

- Contribute to the discussion
- Be respectful of each other's opinions
- Language and Conduct to be consistent with the values of equality and diversity
- Do not share commercially sensitive information
- Be prepared - Review Papers and Reports ahead of meetings
- Complete actions in a timely manner
- Keep to agreed scope
- Email communications to/cc'ing the .box email

Your Roles

- Help refine/develop the solution(s)
- Bring forward alternatives as early as possible
- Vote on whether or not to proceed with requests for Alternatives
- Vote on whether the solution(s) better facilitate the Code Objectives

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Workgroup Membership

Role	Name	Company
Proposer	Jeremy Taylor	NESO
NESO Rep	Stephen Dale	NESO
Workgroup Member	Agustin Mengoni	Eleclink Ltd
Workgroup Member	Tim Ellingham	RWE
Workgroup Member	Garth Graham	SSE Generation
Workgroup Member	Cem Suleyman	Statkraft UK
Workgroup Member	Guillermo Antonio Rios Pavia	Conrad Energy
Workgroup Member	Lamin Saidy Vulart	Qair Renewables UK Limited
Workgroup Member	Hannah Rochford	Zenobe Energy Limited
Workgroup Member	Eleanor Horn	EDF
Authority Representative	Zong Yan	Ofgem

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Workgroup Membership

Role	Name	Company
Workgroup Member (alternate)	Patrick Murphy	Eleclink Ltd
Workgroup Member (alternate)	Andrew Allan	RWE
Workgroup Member (alternate)	Andrew Colley	SSE Generation
Workgroup Member (alternate)	Ali Khatami	Statkraft UK
Workgroup Member (alternate)	Jing Bai	Conrad Energy
Workgroup Member (alternate)	Tom Palmer, Jo Bushnell	Zenobe Energy Limited
Observer	Loukas Papageorgio	Transmission Investments
Observer	Roger Carter	Transmission Investments

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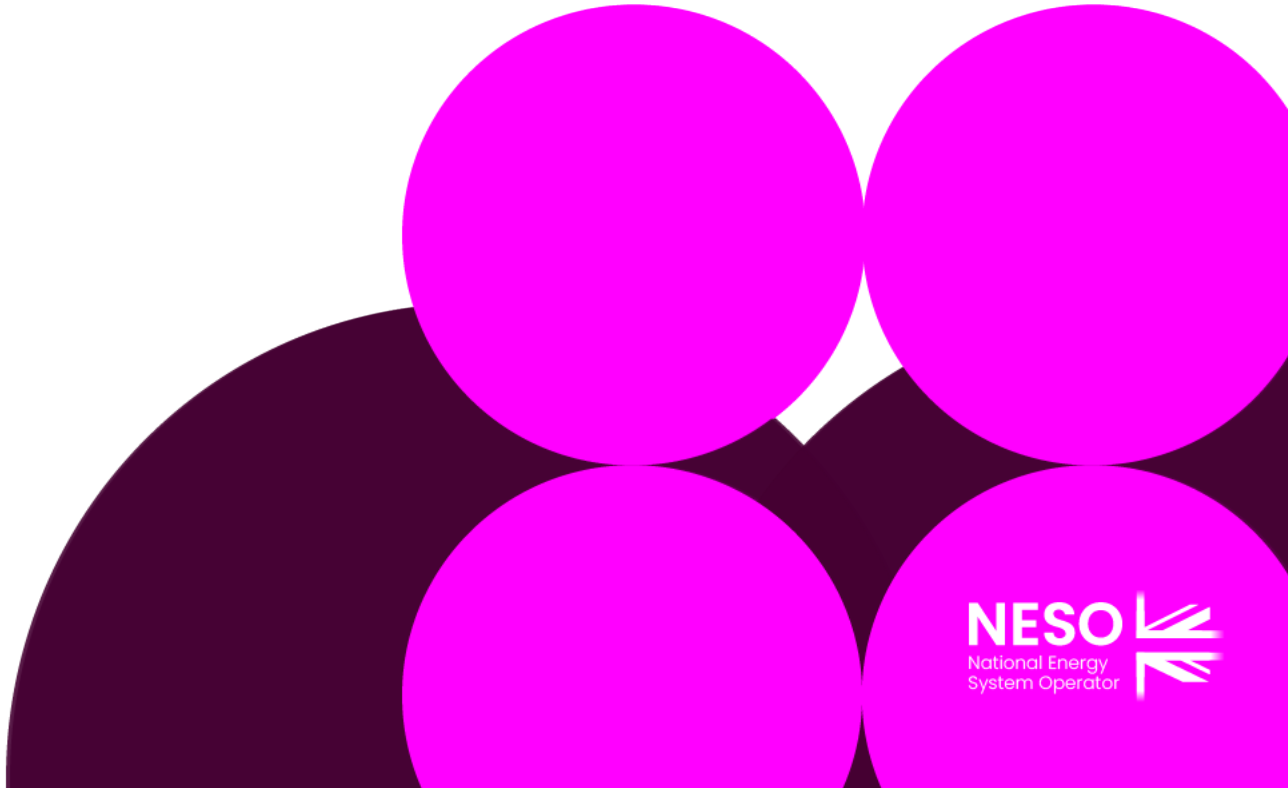
Workgroup Alternatives and Workgroup Vote

Teri Puddefoot – NESO Code Administrator



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What is the Alternative Request?

What is an Alternative Request? The formal starting point for a Workgroup Alternative Modification to be developed which can be raised up until the Workgroup Vote.

What do I need to include in my Alternative Request form? The requirements are the same for a Modification Proposal you need to articulate in writing:
- a description (in reasonable but not excessive detail) of the issue or defect which the proposal seeks to address compared to the current proposed solution(s);
- the reasons why the you believe that the proposed alternative request would better facilitate the Applicable Objectives compared with the current proposed solution(s) together with background information;
- where possible, an indication of those parts of the Code which would need amending in order to give effect to (and/or would otherwise be affected by) the proposed alterative request and an indication of the impacts of those amendments or effects; and
- where possible, an indication of the impact of the proposed alterative request on relevant computer systems and processes.

How do Alternative Requests become formal Workgroup Alternative Modifications? The Workgroup will carry out a Vote on Alternatives Requests. If the majority of the Workgroup members or the Workgroup Chair believe the Alternative Request will better facilitate the Applicable Objectives than the current proposed Original solution, the Workgroup will develop it as a Workgroup Alternative Modification.

Who develops the legal text for Workgroup Alternative Modifications? NESO will assist Proposers and Workgroups with the production of draft legal text once a clear solution has been developed to support discussion and understanding of the Workgroup Alternative Modifications.

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Can I vote? And What is the Alternative Vote?

To participate in any votes, Workgroup members need to have attended at least 50% of meetings. The vote shall be decided by simple majority of those present at the meeting at which the vote takes place (whether in person or by teleconference)

Stage 1 – Alternative Vote

- Vote on whether Workgroup Alternative Requests should become Workgroup Alternative CUSC Modifications.

- The Alternative vote is carried out to identify the level of Workgroup support there is for any potential alternative options that have been brought forward by either any member of the Workgroup OR an Industry Participant as part of the Workgroup Consultation.

- **Should the majority of the Workgroup OR the Chair believe that the potential alternative solution may better facilitate the CUSC objectives than the Original then the potential alternative will be fully developed by the Workgroup with legal text to form a Workgroup Alternative CUSC modification (WACM)** and submitted to the Panel and Authority alongside the Original solution for the Panel Recommendation vote and the Authority decision.

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Can I vote? And What is the Workgroup Vote?

To participate in any votes, Workgroup members need to have attended at least 50% of meetings. The vote shall be decided by simple majority of those present at the meeting at which the vote takes place (whether in person or by teleconference)

Stage 2 – Workgroup Vote

- 2a) Assess the original and Workgroup Alternative (if there are any) against the relevant Applicable Objectives compared to the baseline (the current code)
- 2b) Vote on which of the options is best.

Alternate Requests cannot be raised after the Stage 2 – Workgroup Vote

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Objectives and Timeline

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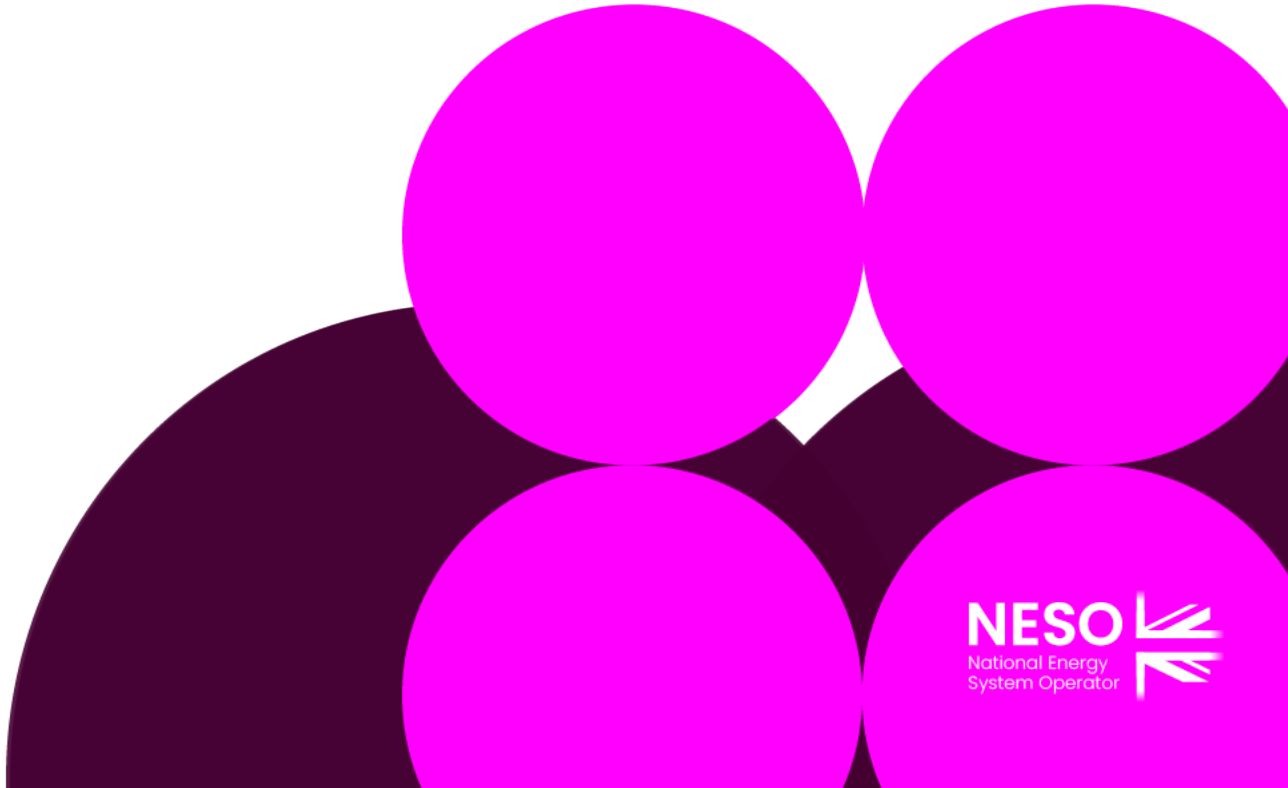

Timeline for CMP457 as at 21 October 2026

Milestone	Date	Milestone	Date
Modification presented to Panel	25 July 2025	Code Administrator Consultation	30 June 2027 – 22 July 2027
Workgroup Nominations (15 Business Days)	09 September 2026 – 30 September 2026	Draft Final Modification Report (DFMR) issued to Panel (5 Business Days)	19 August 2027
Workgroup 1 Workgroup 2 Workgroup 3 Workgroup 4	21 Oct 2026 18 Nov 15 Dec 27 Jan 2027	Panel undertake DFMR recommendation vote	27 August 2027
Workgroup Consultation (15 Business Days)	10 February 2027 – 03 March 2027	Final Modification Report issued to Panel to check votes recorded correctly	31 August 2027
Workgroup 5 Workgroup 6 Workgroup 7 Workgroup 8	10 March 2027 07 April 2027 05 may 2027 02 June 2027	Final Modification Report issued to Ofgem	10 September 2027
Workgroup report issued to Panel (5 Business Days)	17 June 2027	Ofgem decision	TBC
Panel sign off that Workgroup Report has met its Terms of Reference	25 June 2027	Implementation Date	TBC

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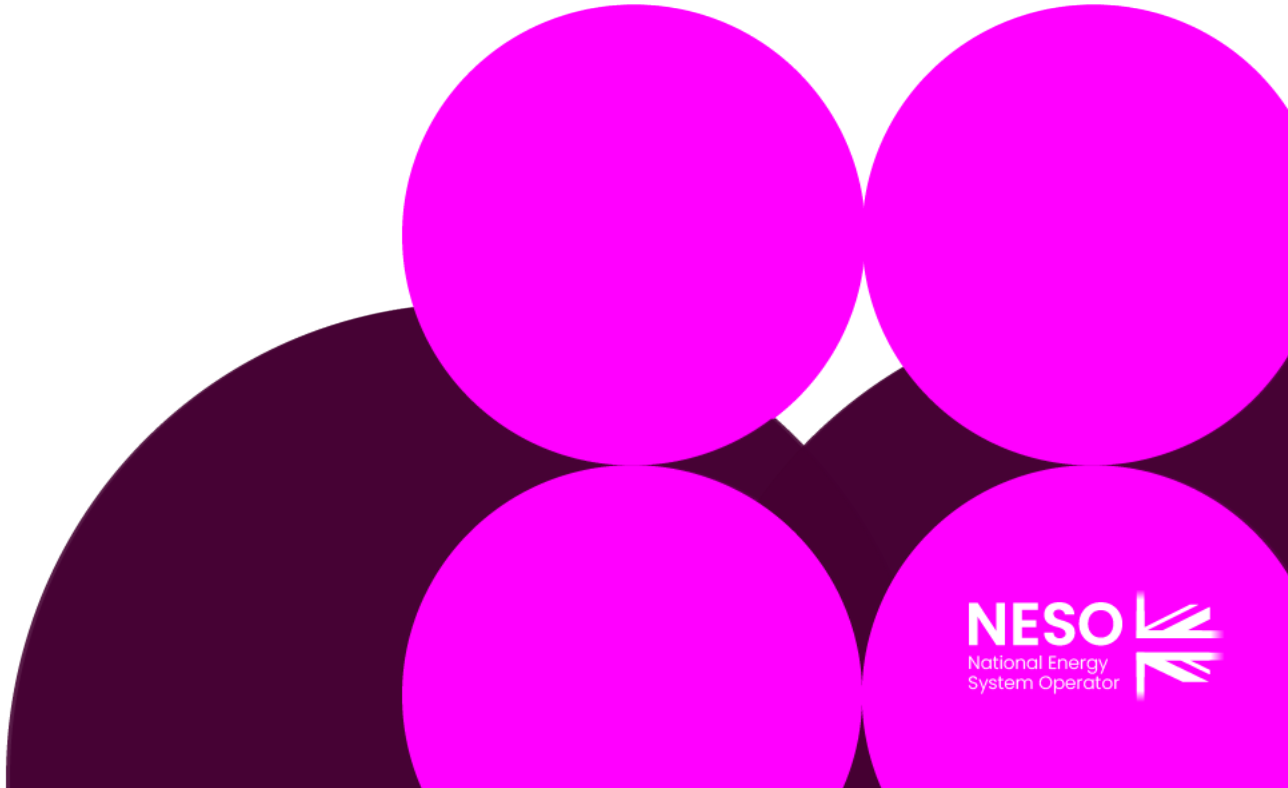
Review Terms of Reference

Teri Puddefoot – NESO Code Administrator



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Terms of Reference

Workgroup Term of Reference	Location in Workgroup Report (to be completed at Workgroup Report stage)
a) Consider EBR implications	
b) Consider Interaction with Enhanced Services and the overall requirement for reactive services (i.e locational and temporal requirements of the system).	
c) Consider Interaction with requirements within the grid code in terms of reactive power provision.	
d) Consider the findings of the OPRS Methodology Review completed by DNV	
e) Consider to what extent the proposed solution interacts with existing NESO procurement of long term Reactive Power contracts	

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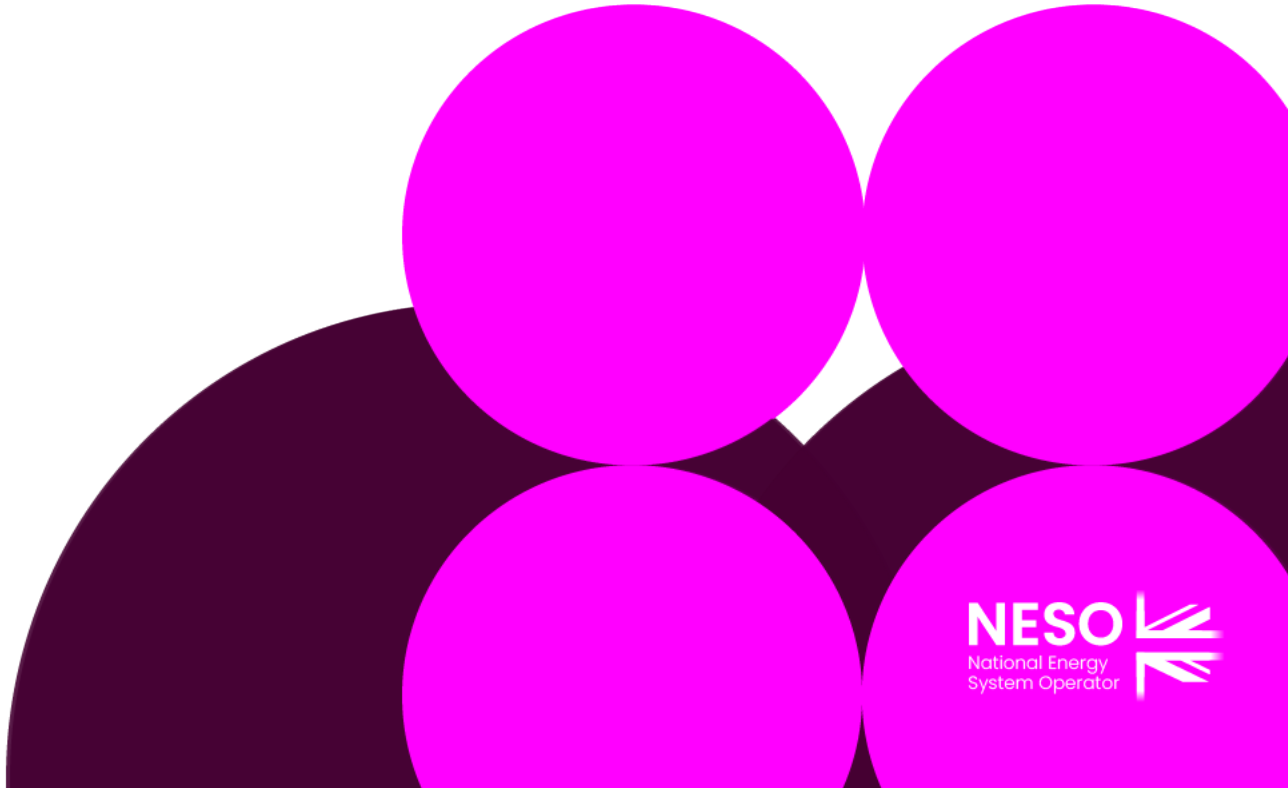
Proposer's Solution: Background; Proposed Solution; Scope; and Assessment vs Terms of Reference

Jeremy Taylor – NESO



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CMP457
Background and proposed solution



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Obligatory Reactive Power Service - DEFECT

- The Obligatory Reactive Power Service (ORPS) default payment rate is a formula outlined in the CUSC.
- It calculates the £/MVArh compensation rate for providers of mandatory reactive power services, as per their Grid Code obligation.
- The rate is calculated and applied monthly, being based on RPI, Power Price Indexes (strongly linked to gas wholesale prices), and historic ORPS revenue.

Equation 1: Default Unit Payment Rate (BP_U)

$$BP_U = \frac{(46{,}270{,}000 \cdot I_m \cdot X \cdot Y)}{42{,}054{,}693}$$

Equation 2: Indexation Formula (I_m)

$$I_m = \frac{RPI_x}{RPI_1} \cdot \left\{\left(0.5 \cdot \frac{FRPI_m}{RPI_x}\right) + (0.5 \cdot PI_m)\right\}$$

Equation 3: Wholesale Power Price Index (PI_m) based on selected power indices

$$PI_m = HPI + PAPI + PPI$$

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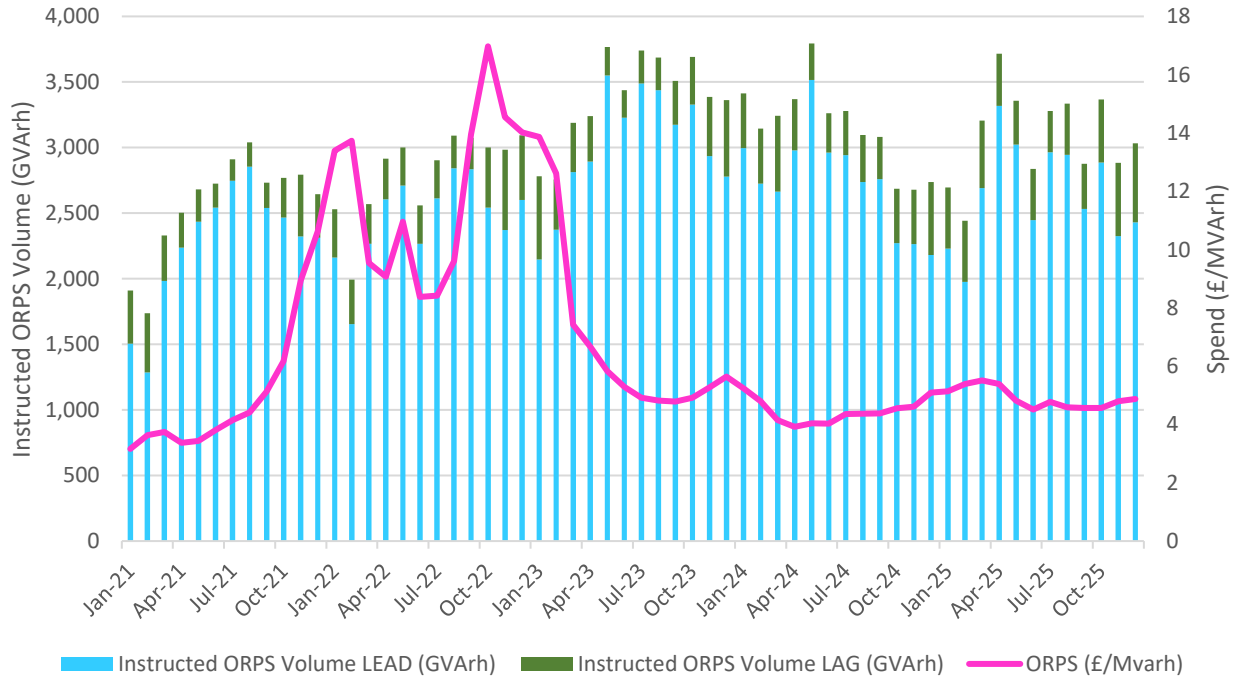
Drivers for Review - DEFECT

- **Outdated methodology**
- **Linked to volatile/unrelated markets**
- **Increase in reactive requirements**
- **Evolving energy landscape**



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Criteria of a new methodology

- **Comply** with the CUSC core payment principle that is only to compensate ORPS Service Providers for their variable costs and fuels costs directly incurred for the provision of reactive power.
- **Fairness**: Ensure fairness to both ORPS Service Providers and end consumers.
- **Proportionality**: Payments should be proportionate to the actual provision of ORPS by Service Providers.
- **Robustness**: Create a mechanism that is resilient and not affected by high volatility as much as practicality possible. The variables considered as part of the new mechanism should remain suitable and available over the long term.
- **Reasonable Implementation effort:** for both NESO and Service Providers
- **Transparency**: Make both the payment process and supporting data transparent to allow Service Providers to forecast revenue.
- **Simplicity**: Ensure the methodology structure is straightforward and easy to understand.
- **Inclusivity**: Make the approach applicable to all existing technologies and also future ones

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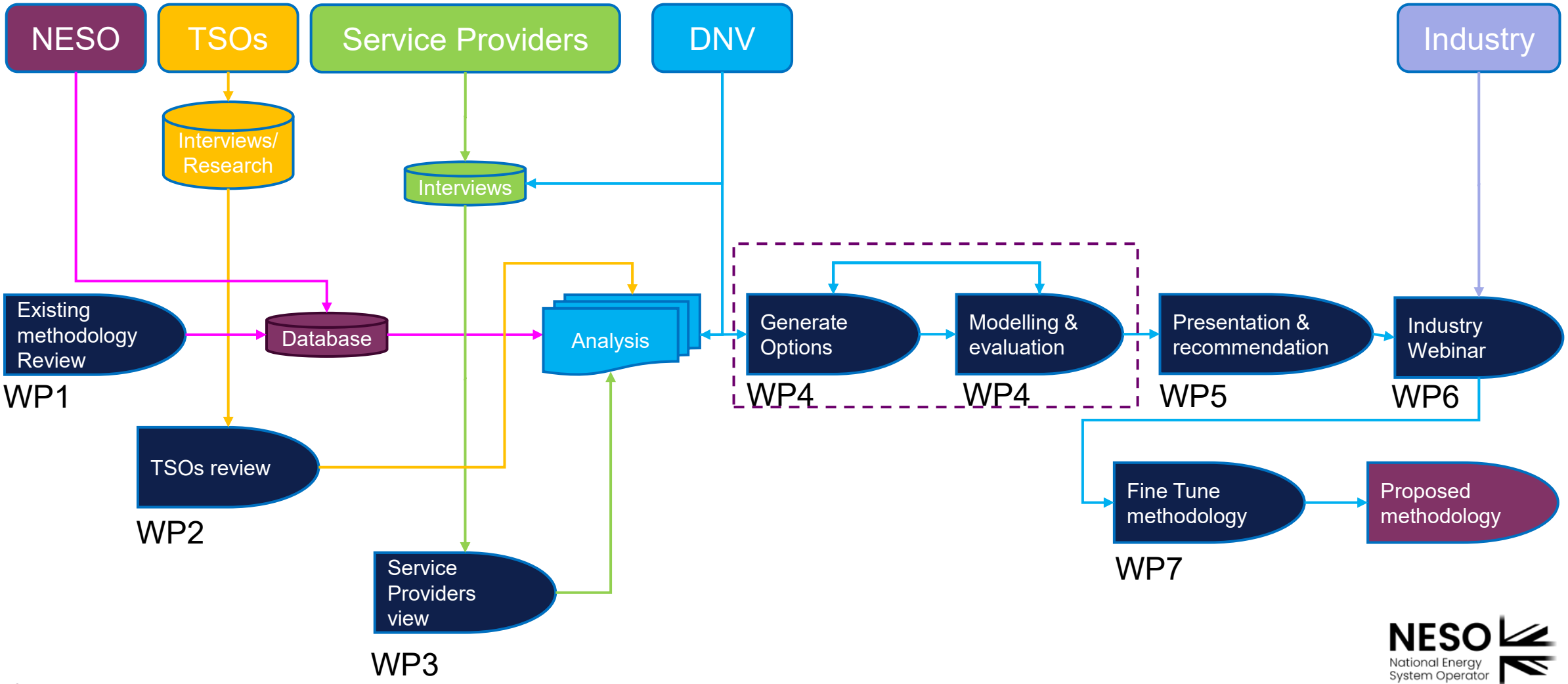
Project flow chart - APPROACH



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High level review of present methodology - ANALYSIS

- Strengths
  - Clear eligibility criteria
  - A transparent, pre-published tariff structure.
  - A mechanism allowing for compensation levels to be adjusted in line with inflation
- Weaknesses
  - Eligibility criteria are inconsistent
  - The uniform payment tariff may not adequately reflect differences in costs
  - Reliance on uncontrollable indices

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Engagement - APPROACH

Overseas TSOs:

TSO	ORPS equivalent mechanism
AEMO	No compensation
Elia	Market base: Pay-As-Clear / Pay-As-Bid
ERCOT	No compensation
RTE	Capability payment + utilisation payment + penalty system
Svenska	Developing new approach based on Tariff linking to “voltage pathfinder” projects

GB Service Providers:

1-to-1 meetings took place with 8 x Service Providers covering 11 generation technologies. Key feedback received during meetings include:

Strength of ORPS	Weakness of ORPS
• Simple • Applicable to all technologies • Same rate for all Service Providers (fair to Service Providers) • Utilisation payment (fair)	• Single rate – not cost reflective • Lack of transparency of some parameters • Gas price driven formulae • Expensive to end consumers

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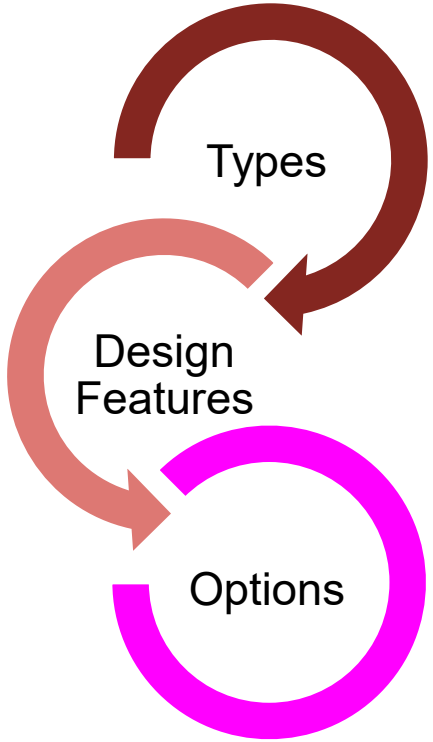
Options identified - APPROACH

- Several main design features – see table - that covers Payment Basis and variant of potential variables were identified
- 18 initial options identified by combining design features
- 8 rejected due to overlap or not meeting the objectives (e.g. incompatibility of design feature e.g. hybrid solution can't be applied to whole of GB, some design feature – capability – found low relevance)

Design features	Design Features Values
Payment Basis (type)	Fixed tariff Market-based Hybrid No compensation
Payment Measurement	Metered Volume or MVAr Capability
Fixed tariff structure	Single rate or Multiple rates
Market-based	Pay-as-Bid or Pay-as-Clear
Regional	All GB or regional
Price Cap & Floor	With or without Cap & Floor
Penalty	Penalty or not



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Options identified - ANALYSIS

#	Options	Key Decision
1	No compensation model	Not aligning with CUSC
2	Existing model with no changes	Linked to gas price. Not proportionate to all technologies
3	Fixed tariff – capability payment with a single rate	Not reflective of utlisation
4	Fixed tariff – utilisation payment with a single rate	Single rate not proportionate
5	**Fixed tariff – utilisation payment with different / multiple rates**	**Most appropriate**
6	Market-based mechanism – pay-as-bid	Mandatory service and not enough liquidity in some areas
7	Market-based mechanism – pay-as-clear	As above
8	Hybrid tariff – fixed tariff with capability and utilisation payments – single rate	Capability judged not fair
9	Hybrid tariff – market-based (pay-as-bid) tariff with a backup fixed tariff with utilisation payments	Mandatory service and not enough liquidity in some areas
10	Hybrid tariff – market-based (pay-as-clear) tariff with a backup fixed tariff with utilisation payments	As above

Screening with between DNV and NESO down (qualitative assessment) to 2 options

Quantitative assessment of best option and benchmarking against existing ORPS – Plexos simulations

Identified Option:

Multiple Rate – one per technology

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High Level SOLUTION

- **The solution** is designed to align with the charging principles in the CUSC Schedule 3, Appendix 7.
- **The rate** will continue to be calculated monthly, as a £/MVArh, but one rate per technology type. It will be based on apportioned variable O&M costs and fuels costs for each technology type.
- **The design** references the latest data in DESNZ's Levalised Cost of Electricity (LCOE) publications, which DESNZ update regularly
- **The innovation** is the method that extrapolates out £/MVArh values from £/MWh by applying a power factor conversion against the variable O&M costs and a flat percentage against the fuel costs.
  - There are two power factor conversion types: one for Synchronous machines, and one for non-Synchronous machines
  - A flat rate of 1% is applied to the fuel costs, where such costs are applicable.
  - Indexation is proposed monthly using CPI.
  - As some iterations of the LCOE reports contain technology updates while others don't. It is proposed to use GDP deflator to align all technology costs to "year 0", where necessary.
  - ORPS rates will be re-aligned to when new LCOE reports are published.

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High Level SOLUTION

$$\text{Monthly Payment for a } SP_m = \sum_{i=1}^{n} (\text{Unit Rate}_m \times \text{Volume}_i \times \text{Factor } X_i \times \text{Factor } Y_i$$

$$\text{Unit Rate}_{(m)} = \text{Initial Unit Rate} \times \frac{CPI_m}{\text{Initial } CPI_{(1)}}$$

$$\text{Initial Unit Rate} = \text{Converted LCOE Variable O\&M cost}_{year0} + \text{Converted LCOE fuel cost}_{year0}$$

$$\text{Converted LCOE Variable O\&M cost}_{year0} = \text{LCOE Variable O\&M cost (£/MWh) x 19.6\% (non-Sync) or 27.25\% (Sync)}$$

$$\text{Converted LCOE fuel cost}_{year0} = \text{LCOE fuel cost (£/MWh) x 1\%}$$

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Conversion process - SOLUTION

p.f	P=MWh	Q=MVArh	S=MVAh	% Q/P	% Q/S
1	100	0	100	0	0.00%
0.99	100	14.25	101.01	14.25%	14.11%
0.98	100	20.31	102.04	20.31%	19.90%
0.97	100	25.06	103.09	25.06%	24.31%
0.96	100	29.17	104.17	29.17%	28.00%
0.95	100	32.87	105.26	32.87%	31.22%
0.94	100	36.30	106.38	36.30%	34.12%
0.93	100	39.52	107.53	39.52%	36.76%
0.92	100	42.60	108.70	42.60%	39.19%
0.91	100	45.56	109.89	45.56%	41.46%
0.9	100	48.43	111.11	48.43%	43.59%
0.89	100	51.23	112.36	51.23%	45.60%
0.88	100	53.97	113.64	53.97%	47.50%
0.87	100	56.67	114.94	56.67%	49.31%
0.86	100	59.34	116.28	59.34%	51.03%
0.85	100	61.97	117.65	61.97%	52.68%
			1-0.95 ave	20.28%	19.59%
			1-0.85 ave	38.58%	34.92%

For Non-Synch-SPs: 0.95 lead/lag. Assumes evenly operation within range (i.e. 50% time lead and 50% time lag), average Q/S ratio would be = ½ x 19.6% + ½ x 19.6% = 19.6%.

e.g. onshore wind = £ 6 x 19.6% = £1.176 per MVArh

For Synch SPs: 0.95 lead and 0.85 lag. Assumes evenly operation within range (i.e. 50% time lead and 50% time lag), average Q/S ratio would be = ½ x 19.6% + ½ x 34.9% = 27.25%.

e.g. CCGT = £ 2 x 27.25% = £ 0.545 per MVArh

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Payment tables - OUTPUT

Synchronous Generation Technologies									Non-synchronous Generation Technologies				
Technology	Unit (2021 real price)	Nuclear	Pumped Storage	Hydro	CCGT	OCGT	Biomass	Landfill Gas	Onshore Wind	Offshore Wind	Large Scale Solar	BESS	IC
LCOE Variable O&M	£/MWh	5.730	12.730	7	2	1	7	10	6	1	0^	NA	NA
LCOE Fuel Cost	£/MWh	5.730	34.370	0	43	68	38	0	0	0	0	NA	NA
New Unit Rate without Fuel	£/MVArh	1.561	3.469	1.908	0.545	0.273	1.908	2.725	1.176	0.196	1.176	1.176	1.176
New Fuel cost	£/MVArh	0.057	0.344	0	0.430	0.680	0.380	0	0	0	0	0	0
Initial Unit Rate (2021 price)	£/MVArh	1.619	3.813	1.908	0.975	0.953	2.288	2.725	1.176	0.196	1.176^	1.176*	1.176*

Public Engagement - FEEDBACK

- **<u>Key areas were highlighted during the webinar:</u>**
  - Power factor variations
  - The Design’s 50/50 split
  - Dispatch process
  - Opportunities to refine the LCOE data
  - Appropriateness of the LCOE data

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Agree Terms of Reference

Teri Puddefoot – NESO Code Administrator

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Terms of Reference

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Cross Code Impacts

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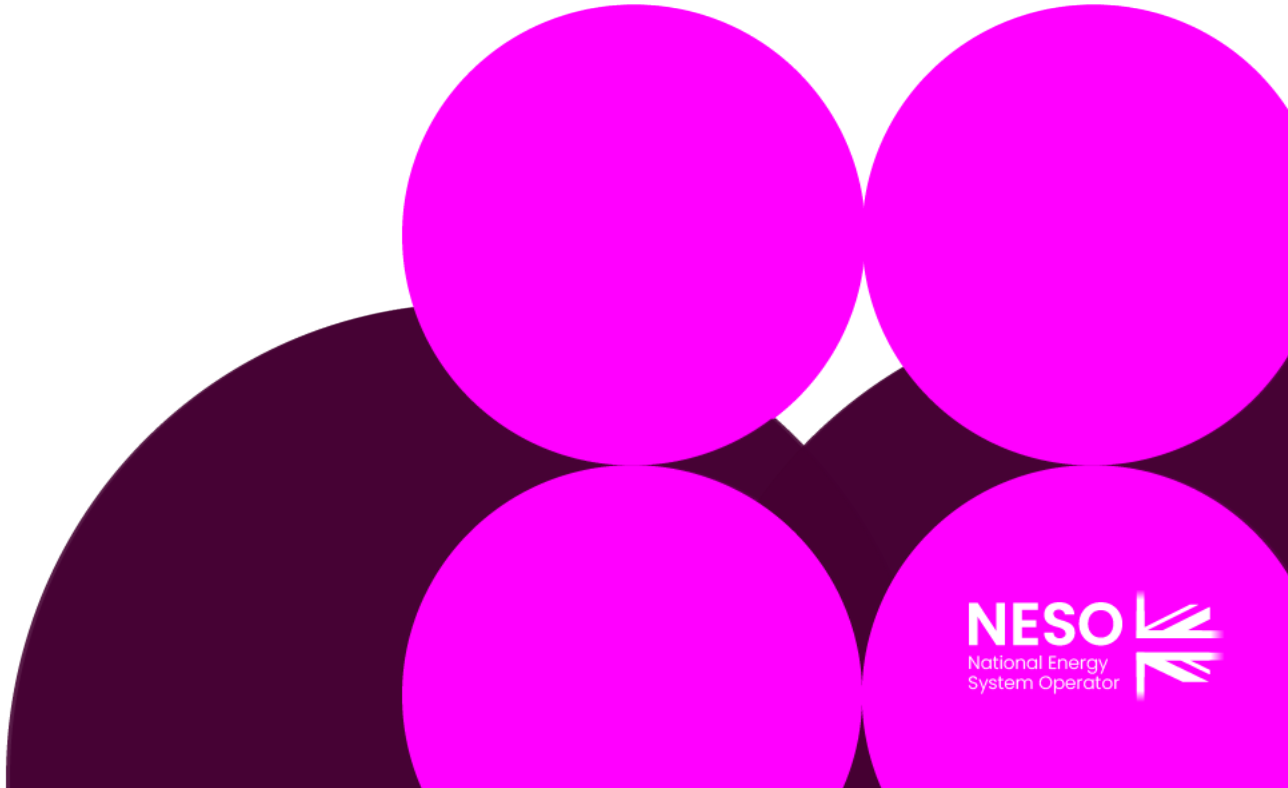

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Any Other Business

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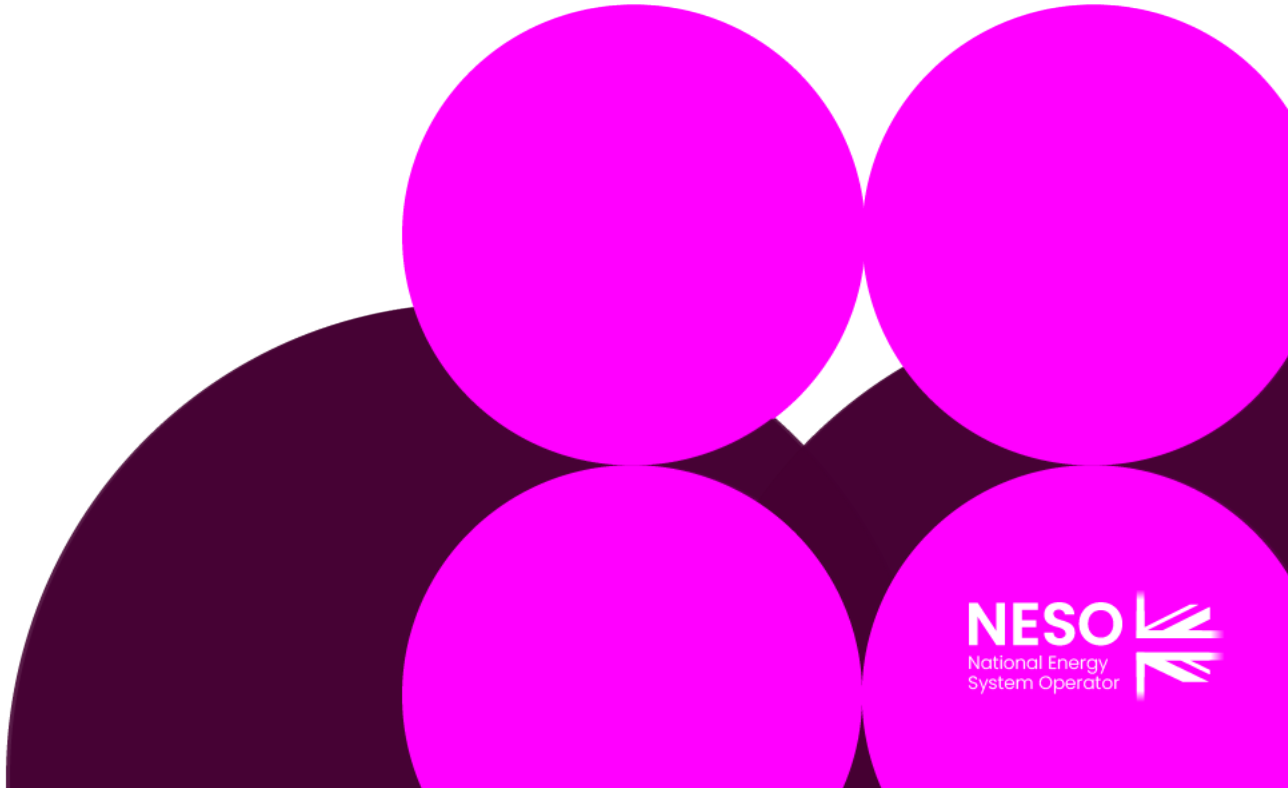

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Next Steps

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