

Industry Expert Panel

Reforms Pre-Read

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Agenda

Item	Time	Who
Welcome + coffee	09:15–09:30	
Introduction + housekeeping	09:30–09:40	Jon Wisdom
CFI feedback on balancing reform	09:40–09:55	Sebastian Campos / Danny Taylor
Break out session 1	09:55–11:10	All
Break	11:10–11:20	
Break out session 2	11:20–12:35	All
Wrap up and next steps	12:35–12:45	Jon Wisdom
Lunch	13:00–13:30	

Introduction

Context

Following the Call for Input (Cfi), we are now moving into detailed design and assessment. We have heard clear messages through the Cfi from across the industry, and we are now seeking to reflect those views through the next phase of the CBA and Implementation Assessment.

Today's discussion is about testing whether we have taken the feedback forward in the right way, and whether the right issues are being carried into the next stage of work.

Focus of the session



Test our interpretation of the feedback: Whether we have captured the key messages correctly, identified the main risks, issues and concerns, and not missed any material points that should shape the analysis.



Provide constructive challenge on the views we are taking forward: With a shared objective of market arrangements that support flexibility, innovation and investor confidence, while maintaining a secure and reliable system.



Use the breakout rooms for open discussion and co-design: They have been prepared to encourage conversation, test assumptions and help refine the emerging analysis together.

CFI feedback on balancing reform

Principles and challenges

Key Messages from the CFI feedback

- Respondents broadly agree that the principles provide a framework for reform under national pricing and self-dispatch, but trade-offs need to be handled explicitly with clear prioritisation.
- Many organisations highlight the need for additional principles, such as proportionality, consumer value, and investment confidence, to ensure reforms align with long-term system needs and avoid unintended consequences.
- The structural driver of redispatch volumes is the mismatch between generation and demand, and the corresponding lack of transmission network capacity.
- Challenges such as limited visibility of distributed assets, wholesale and balancing market misalignment, and strategic behaviour around constraints are viewed as amplifiers rather than root causes. Addressing these symptoms alone will not resolve the underlying structural issue resulting in redispatch.

Topics for further investigation:

- **Coordination across workstreams** – RNP can play a unifying role for existing programmes to provide a coherent system architecture. Balancing reforms must be aligned with other initiatives, such as TSO-DSO and IEM.
- **Clear handover vs market flexibility** – Consistent concern about the “clear handover” principle if taken too rigidly, which could limit participants' ability to self-balance close to real time, increasing imbalance risks and costs.
- **Proportionality** – we are in a period of transition with ongoing work to reduce the structural drivers of constraints, reforms need to be proportionate to this.

Next steps

1. Establish clear prioritisation and weighting for the reform principles and challenges
2. From this, set out how we will prioritise the reform package for the CBA and implementation strategy.
3. Establish stronger combined narrative for balancing and dispatch reform, and how they are going to be considered together

Prioritisation of the balancing reform package

Reform principles in the CFI

- Efficient operational signals and incentives
- Clear handover of balancing responsibility between market participants and the System Operator
- Secure and efficient operation of the system



Proposed changes to reform principles

1. Secure and efficient operation of the system
2. Efficient operational signals and incentives
3. Whole-system value
4. Clear handover of balancing responsibility between market participants and the System Operator

Individual options:

- Lower BM threshold
- Shorter settlement period

Package 1 – Increase visibility and coordination:

- Lower the BM threshold + shorter Settlement Period + visibility of traded positions

Package 2 – Increase market behaviour change & compliance:

- Lower the BM threshold + shorter Settlement Period + FPNs match traded positions (portfolio) + align market trading deadline with Gate Closure

Unit-bidding

- CFI feedback suggests that the evidence base is not clear on the case for unit-bidding
- Given this, we propose to better establish the potential scale of the problem/inefficiency from strategic behaviour around constraints, alongside assessing high-level implementation costs
- This approach will determine the value of pursuing unit bidding as part of balancing reform.

Breakout Sessions

Breakout tables

Breakout group topics

Reform specific design questions

- Lower Balancing Mechanism Threshold
- FPNs to match traded position + Align Market Trading Position with Gate Closure
- Unit Level Bidding
- Shorter Settlement Period

Assessment approach for next phase

- Cost Benefit Analysis
- Implementation Planning

Discussion points

- Whether you believe the CFI feedback has been captured and interpreted correctly, i.e. key messages, items for further analysis, market impacts etc have been identified.
- Specific reform design questions included in the pre-read
- Specific questions on the CBA and Implementation approach for the next phase of the assessment included in the pre-read.

Lower Balancing Mechanism (BM) threshold

Key messages

- Respondents were broadly supportive of the aims of the reform and phasing, however many highlighted challenges for smaller participants and challenges with NESO/DSO coordination. Some respondents were more supportive of lowering the threshold to 10MW with visibility only below 10MW, down to 1MW.
- Some respondents believed that a phased implementation should have clear checkpoints at each threshold, where a decision is made on whether to proceed with the lower threshold based on updated costs and benefits.

Topics for further investigation:

- Skip rates and interactions with DSO flexibility markets could hinder the success of the reform or have unintended consequences.
- Regulatory disparity and potential market distortions if aggregators are used.
- Potential for early decommissioning with retrospective application and cost burden on smaller assets.
- Proportionality of the reform in relation to costs and obligations on smaller parties compared to benefits.
- Potential for threshold reduction to 10MW with visibility down to 1MW.
- Some respondents highlighted that retrospective application is crucial, however others noted that funding needs to be available for this.

Questions for the panel

- If we were to relax requirements for smaller Balancing Mechanism Units (BMUs), which areas would have the biggest impacts, benefits and risks (i.e. registration, metering, operational requirements)
- How would an alternative option to provide visibility only of smaller BMUs (i.e. Physical Notifications) without providing access/control to NESO impact your views on thresholds?
- What assets should retrospectivity be applied to? Are there unintended consequences from using older assets? Is a cost recovery mechanism appropriate for retrospectivity?

Final Physical Notifications (FPN's) match traded positions

Key Messages

- Most participants in principle support NESO having better visibility of participants' intended position, but do not support the specific reform proposal
- If taken forward, participants prefer requiring matching on a portfolio-level, over the unit-level option because of significantly more implementation complexity in the latter
- Implementation cost categories: system changes to trading and settlement interfaces & dataflows, forecasting systems & processes, compliance monitoring, reporting & remediation, contract novation

Topics for further investigation:

- Proportionality and liquidity risk: strict matching risks incentivising participants to adjust FPNs to fit trades, rather than adjusting trades to reflect physical reality
- Strong alternative preferences: Instead of hard rules, use e.g.:
 - Strengthen enforcement of: FPN Accuracy Guidance Note (Grid Code BC1.4.2(a)), including escalation for habitual poor performance.
 - Information Imbalance Charges (IIC): Currently set to zero but could be used as a price-based incentive rather than a trading restriction.
 - Recognise risk of double penalisation given imbalance price and again through non-compliance with FPN=TP rule
- Ensure the reform dovetails with ongoing control-room improvements to wholesale market trading data

Questions for the panel

- What information could be made available to NESO ahead of Gate Closure to improve understanding of the wider market position?
- If NESO were to take forward any form of FPN-to-traded-position alignment, what are the main risks of moving forward with matching on a portfolio-level, how would you represent non-BM units?
- Would you support an alternative pathway – improved visibility, stronger monitoring/FPN accuracy enforcement, or price-based incentives, like Information Imbalance – before any hard matching obligation is considered?

Align Market Trading Deadline with Gate Closure

Key Messages

- Most participants are not supportive of this reform and have argued that it requires further evidence on its effectiveness. They raise that this reform reduces a participant's ability to self balance and increases forecast, operational and imbalance risk for them.
- Dominant view is that this reform is a blunt instrument, that has notably liquidity downsides and high implementation costs, i.e.: system & process change, testing, participant readiness, better risk management tools, contract novation, increased risk premiums. Crucially, operational expenditure expected to be higher than previously understood.

Topics for further investigation:

- Risks to market efficiency:
 - Removing key self-balancing window, especially close to delivery (*corrective trading*) ->
 - Forces earlier commitment with poorer information (*risk moved from NESO to participants, e.g.: non-physical traders leave the market*) ->
 - Increases risk premiums (*e.g.: necessity to hold larger working capital, weakens intraday price signals, pushes more balancing actions onto NESO*) holding which may show up as an increase in wholesale prices ->
 - Negatively impacting market price discovery (*reform seen as risking market efficiency for operational simplicity*)
- Disproportionately impacts intermittent generation, DSR and flexibility; one respondent has raised insolvency risk.

Questions for the panel

- How do you consider the impact on liquidity? Do you agree/disagree that liquidity would "shift earlier in time" from this change, rather than entirely removed from the market?
- What would be the case for considering alternative options, such as moving the trading deadline to 30 minutes before the Settlement Period? What impact would this have on mitigating market efficiency concerns?

Unit-bidding

Key Messages

- Mostly unsupportive of Unit Bidding, under both options. Many feel the case for change is not well evidenced.
- Storage, flexibility aggregators, and traders see potential competition benefits but raise concerns around tolling contracts and portfolio complexity.
- Unit bidding is viewed as weakening portfolio-based self-dispatch without a clear or quantified reduction in balancing costs.
- While improved visibility and monitoring are acknowledged, confidence that unit-level bidding outperforms incremental alternatives is low.

Topics for further investigation:

- Unit-level bidding risks fragmenting liquidity, weakening price formation, and increasing consumer costs.
- Reduced portfolio netting could raise imbalance volumes, increase BM usage, and drive greater NESO intervention.
- Significant operational, IT, compliance, collateral, and reporting burdens across participants and central bodies, with smaller participants hit hardest.
- Option 2 (financial / gross pool) risks – Widely viewed as a return to centralised dispatch.
- Strong argument that concerns about strategic behaviour should be addressed via targeted monitoring, incentives, and enforcement (e.g. REMIT/TCLC) rather than market redesign.
- Concern that UB combined with tighter PN alignment or SSP would compound risk rather than resolve it.
- Evidence case for change.

Questions for the panel

- How might unit bidding influence forward market liquidity and hedging behaviour, and what outcomes could emerge in the short and longer term for market liquidity?
- Unit bidding could enhance market monitoring – what forms of evidence would be most useful in understanding and validating the potential consumer benefits? To what extent could alternative regulatory measures, including enhancements to existing frameworks (e.g. TCLC or IOLC), deliver similar improvements?
- How might unit bidding interact with different route to market trading models, including those that rely on portfolio level optimisation and those that operate on a more unit by unit basis?

Shorter Settlement Period (SP)

Key Messages

- Conceptual support for shorter settlement, recognising benefits for flexibility and reduced imbalance volumes/costs.
- 15-minute SP is the preferred option, offering IEM alignment and lower delivery risk; Not much support for 5-minute SP (only from storage assets).
- Mixed confidence in benefits being realised in practice, with uncertainty around implementation complexity, metering, data and process changes and interactions with other reforms.
- Phased implementation is strongly favoured, wholesale-first and then retail rollout.

Topics for further investigation:

- **Metering investigation** – understanding difference between requirements for different meter types, proportion of different meter types within industry.
- Whether the **benefits of 5-minute** shorter SP justify the additional cost, **complexity** and risk.
- **Gate Closure and trading deadline alignment** – risk of undermining SSP benefits if Gate Closure is not shortened.
- **Market and consumer impacts** – effects on liquidity, volatility, imbalance risk (Supplier side), and whether benefits reach end consumers.
- **Sequenced implementation model** – sequencing (15-min first), use of shadow settlement, and conditions for moving to 5-minute SP.

Questions for the panel

- What do you think we need to consider when balancing the trade-offs between a 5-minute or 15-minute SP? Please consider:
 - Short-term practicality vs enduring solution
 - European (mis)alignment
 - Feasibility of retaining optionality for 5-minute SP, if 15-minutes is chosen
- What would be the most practical and cost-effective deployment of shorter SP to the retail market? E.g. initially opt-in, mandatory for meter replacements, transitioning to wider, mandatory shorter SP over time

Cost Benefit Analysis (Baringa led)

Please come prepared for the breakout session having read slides 17–22 and 23–36, which will frame our discussion

Key Messages

- Cfl feedback indicates that CBA assessment should test whether assumptions are realistic, reflect liquidity and wider market dynamics, capture uncertainty, and account for system interactions beyond balancing. It should also ensure the process is credible and transparent, with realistic delivery timelines and clear understanding of distributional and competition impacts aligned to policy intent.
- We have summarised the high-level approach for modelling in the CBA¹, including both the counterfactual and reform packages. This is intended to capture how the modelling will reflect the hypothesised benefits for system operation.
- In Scope for today's discussion: High-level CBA approach and methodology, with a focus on key NESO system operation impacts
- Out of Scope: Market participant impacts (to be covered with the IEP on 30/06), and full modelling of unit bidding within the CBA

Topics for further investigation:

There are several points arising from the Cfl responses that we are continuing to consider as we develop the full modelling methodology, for example:

- Non-physical traders: Differentiation between Virtual Lead Parties (VLPs) and purely financial traders, and the associated impacts on market liquidity
- Market liquidity: Use of forecast error deviations to inform churn, noting that impacts on bid-ask spreads are harder to capture
- Flex markets/DSO alignment: Potential need for targeted/bespoke analysis and qualitative assessment to capture interactions and alignment with distribution level flex markets and operation

We will capture the assumptions that will go into the modelling, which will be presented and discussed in the next IEP (30/06)

Questions for the panel

- Do you agree with our high-level modelling framework and approach? Are there any key system operation impacts that are missing or misrepresented?
- Do you agree with the key modelling considerations to reflect each of the options? What are your views on the approach required to model the counterfactual?
- Is there any data/evidence that you believe we should take into account in finalising the analytical approach?

(1) The CBA refers to the modelling used to quantify system-wide benefits and disbenefits. The final CBA will also incorporate implementation costs (both upfront and ongoing, where applicable), informed by the assessment of impacts on market participants under the Implementation workstream.

Implementation Planning (Baringa led)

Please come prepared for the breakout session having read slides 17–22 and 40–47, which will frame our discussion

Key Messages

- Cfl feedback indicated broad support for a phased roadmap, with lower BM threshold identified as an early candidate, but requiring close industry collaboration, and assessment of interactions with wider reforms (e.g. MHHS and Market Facilitator). Delivery must reflect realistic timescales, recognising NESO's critical path role and limited specialist resource across industry.
- A four-stage approach to the Implementation Planning workstream was established during the Inception Phase to guide delivery
- The Target Operating Model (TOM) is the first stage (out of four), defining the cross-industry changes required across market participants and central bodies to enable the reforms
- The purpose, context and design principles of the TOM have been clearly articulated to underpin the analysis and methodology
- Market participants and central bodies have been segmented into key groups to structure analysis and stakeholder engagement efficiently

Topics for further investigation:

- Key interactions and information exchanges across market participants, NESO and relevant central bodies (e.g. Elexon) for each reform
- Identify expected high-level impacts of each reform to market participants – outlining key stakeholders impacted
- Gather expected high-level impacts of each reform on NESO's internal capabilities, processes and responsibilities and validate impacts based on mapped processes changes (NESO led)
- Gather expected high-level impacts of each reform on central bodies identified (e.g. Elexon, DNOs) internal capabilities, processes and responsibilities and validate impacts based on mapped processes changes

Questions for the panel

- Do you agree with our high-level workstream plan and approach?
- How clear and well understood is our proposed TOM methodology both in scope and purpose?
- Do you agree with our stakeholder segmentation approach?

CBA and Implementation assessment: High- level approach

Pre-read

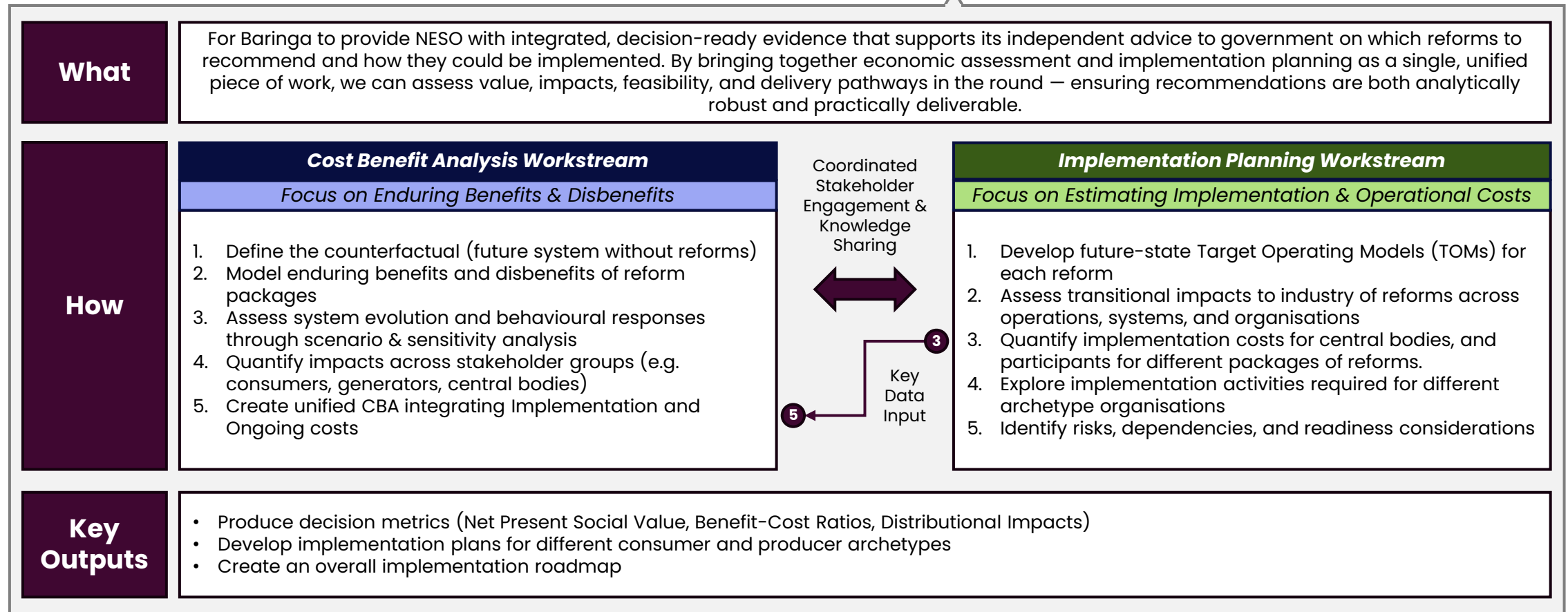
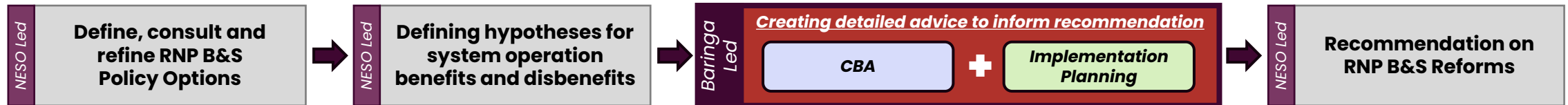
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RNP B&S Analysis Scope (Baringa led content)

How CBA and Implementation Planning Work Together

Sharing the scope and key interactions between both workstreams



Scope and Objectives of the CBA

Conducting a CBA of RNP Balancing & Settlement Reforms

This project has two workstreams

CBA

Implementation Planning

The Implementation Planning workstream will also develop implementation and ongoing cost estimates to feed into the CBA

Purpose of CBA

- Develop a transparent framework for assessing the benefits, disbenefits and wider system impacts of proposed reforms, to support NESO's independent advice to government on which reforms to recommend
- Structure and facilitate targeted engagement with industry stakeholders, leveraging your expertise to strengthen the evidence base and ensure robustness of analysis
- Provide integrated, decision-ready evidence to support NESO's recommendation, noting particularly:
 - Overall impact of reforms (e.g. NPV)
 - Total and distributional consumer impacts, including on specific sub-groups
 - Distributional producer impacts and possible impacts on investment

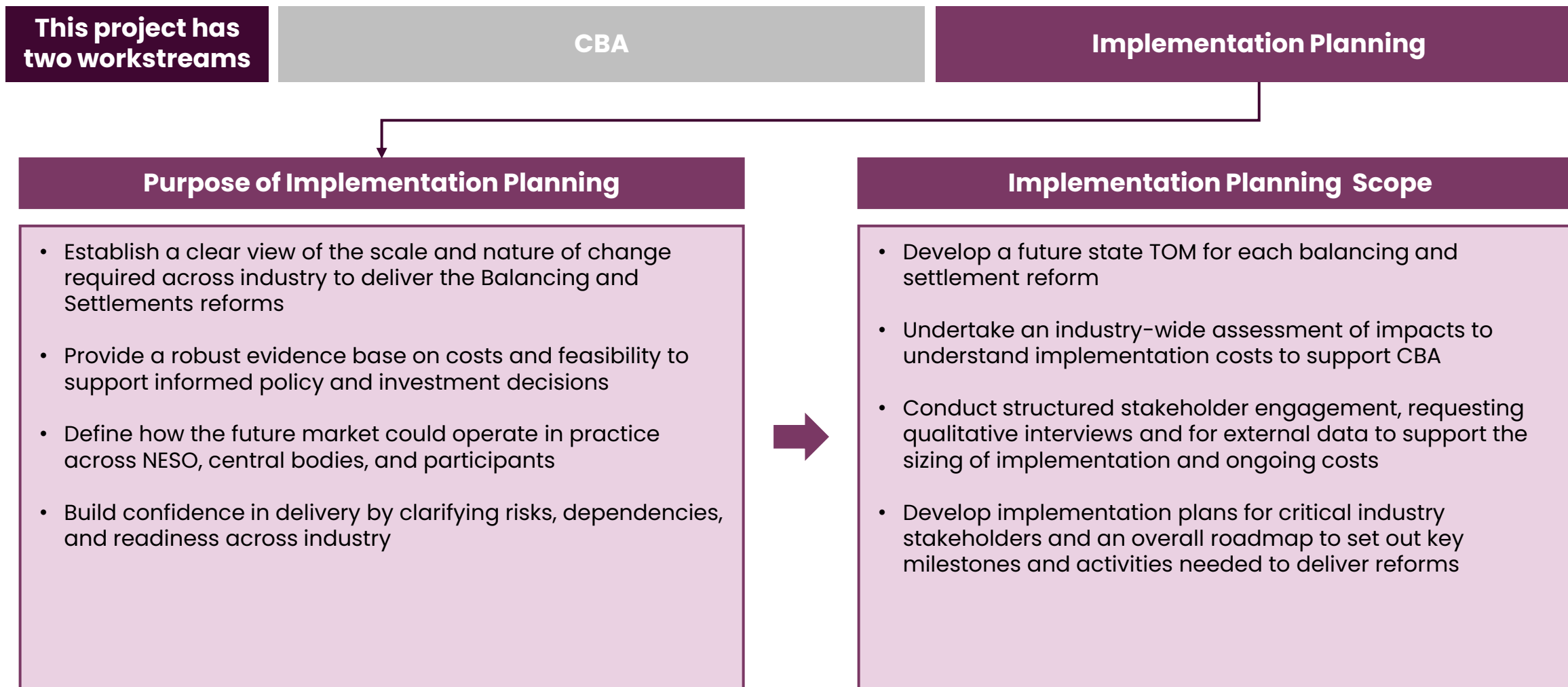


Scope of CBA

- Define a counterfactual scenario based on a best estimate of the future development of the market and energy system, and behaviour of market participants absent reform
- Model the benefits and disbenefits of packages of reforms, defined by NESO
- Include scenario and sensitivity analysis covering e.g. behavioural responses, implementation pathways, etc
- Calculate benefits, disbenefits and implementation costs for defined stakeholder groups (e.g. specific consumer archetypes, generators, central bodies, other parties)
- Deliver outputs including Net Present Social Value, Benefit-Cost Ratios, and distributional impacts of reform packages

Scope and Objectives of Implementation Planning

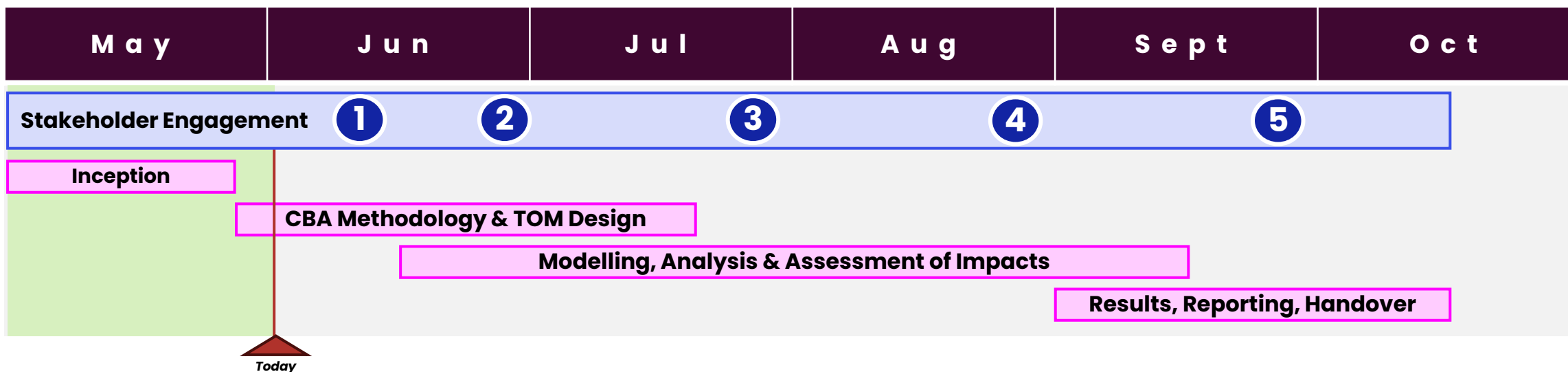
Establishing a clear view of the scale and nature of change required across industry to deliver the Balancing and Settlements reforms



Scope and Plan for CBA

Timeframes and Engagement with the IEP

IEP will have multiple opportunities to input into the approach and analysis, alongside more targeted opportunities for engagement



Stakeholder Engagement	1 10 th June	2 30 th June	3 July	4 August / September	5 September
IEP engagement	Overarching approach and high-level methodology for CBA modelling Focus on key system operation impacts	Detailed methodology, assumptions and data requirements, sensitivity choices Inc. market participant impacts	Outcomes from early model testing and finalisation of outstanding inputs and assumptions	Discussion of draft results	Presentation of final results
Alignment with wider programme decisions	Confirmation of option sets to model and clarity on key option design choices and mechanisms for operational benefits	Final, detailed policy options and benefits mechanisms	Confirmation of key assumptions, option variants and required sensitivities. Cost data from Implementation workstream	N/A	N/A

CBA Modelling Input and Principles

Constructive IEP engagement and input will be essential to developing a robust, well-informed CBA

What we require from the IEP

We will develop inputs and assumptions reflecting:

- How market participant archetypes currently behave under existing market arrangements.
- How market participant archetypes will change behaviour to respond to reform proposals.



Experience and insight

Your industry knowledge and expertise will be used to represent key groups of market participants within the industry, feeding into assumptions regarding how we model representative behaviour from those market participant groups.



Data and evidence

Several inputs and assumptions will be dependent on data and evidence provided by you – e.g. on operational behaviours. We will set out data requirements to support modelling. We also welcome voluntary data and evidence submissions that support your perspectives on modelling choices.



Constructive challenge

We will always value challenge and feedback on our proposed approach. We will consider and take into account your challenge in our modelling choices. Modelling choices will also take account of the modelling principles set out on the right and in the context of the overall scope and purpose of the CBA.

Modelling principles

Difficult choices will be required regarding representation of the options and market participant behaviour in the modelling. The following will be used as design principles to establish a shared agreement across all involved parties on how we will approach CBA modelling.



Materiality

Prioritise modelling choices that are expected to have the greatest materiality on decision-making, concentrating effort and modelling complexity on the most significant variables.

Not all dynamics will be possible to quantify. Some will be assessed qualitatively. Indirect, highly uncertain, or low materiality items may not form part of assessment.



Transparency

We will use regular external stakeholder touchpoints to update on progress, and to seek challenge, evidence and data on our approach. We will publish key documents, including our modelling methodology.

Your expertise and insight will be essential to informing our analytical approach.



Evidence-Based

Analysis will be grounded in data and subject matter expertise, incorporating inputs from stakeholders where relevant. We will weight perspectives more highly where supported by data and evidence to support arguments for certain modelling choices.

The evidence backing behind industry perspectives will be considered carefully in refining inputs and assumptions.



Managing Uncertainty

All modelling has limitations and necessary abstractions/assumptions. Confidence levels, sensitivities, etc will be used to inform assessment of key uncertainties.

Key limitations and assumptions will be documented and reported, including their potential impact, to aid decision making.

Objectives of IEP 2 CBA Breakout Discussion

We are seeking input on our high-level approach to modelling of key system operation impacts

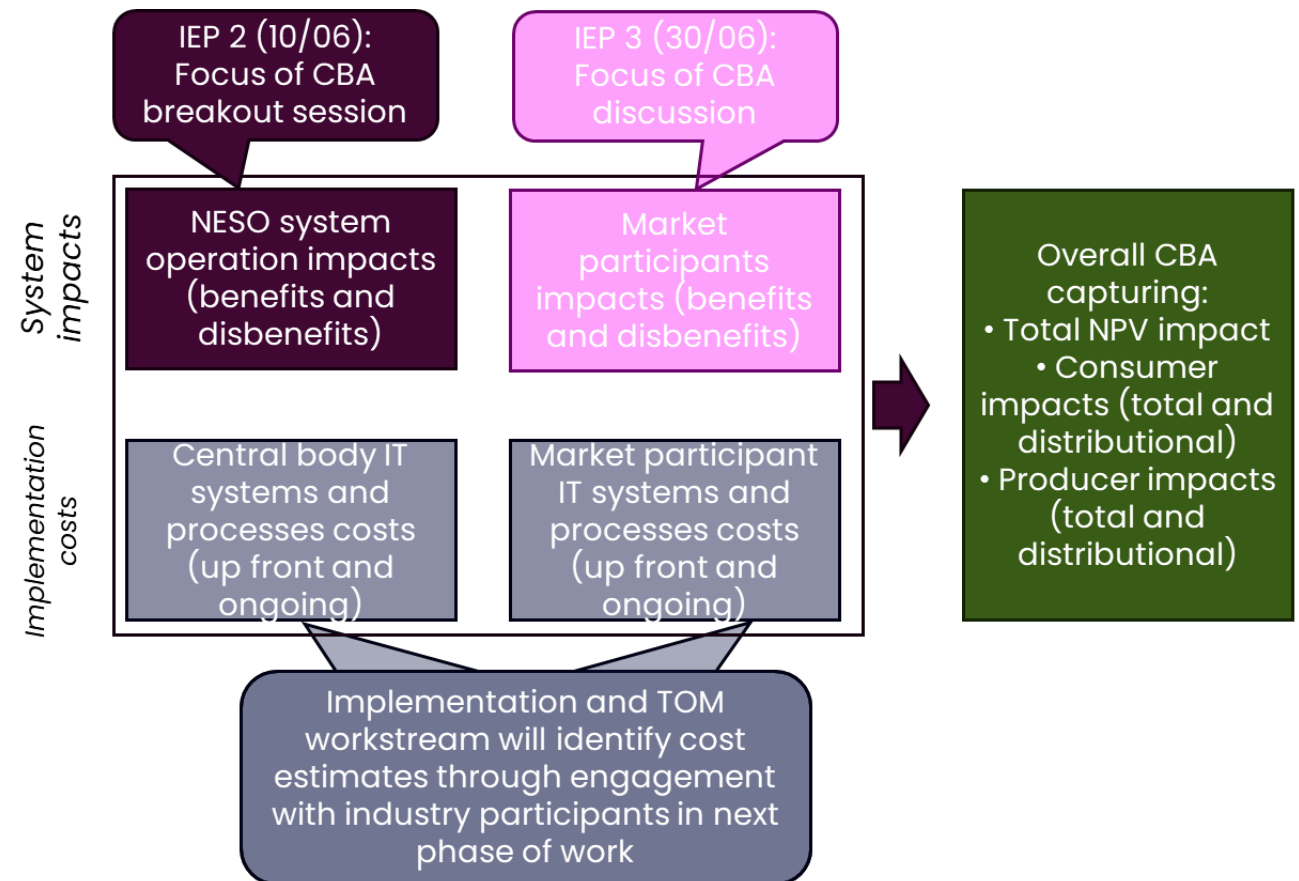
The CBA breakout sessions will focus on our high-level methodology for modelling of the key impacts on NESO system operation. Key questions for the IEP:

1. *Do you agree with our high-level modelling framework and approach? Are there any key system operation impacts that are missing or misrepresented?*
2. *Do you agree with the key modelling considerations to reflect each of the options?*
3. *What are your views on the approach required to model the counterfactual?*
4. *Is there any data/evidence that you believe we should take into account in finalising the analytical approach?*

On 30/06, we will:

- Discuss key modelling assumptions
- Focus on market participant impacts and how we will capture them

In parallel, the Implementation and TOM workstream will develop estimates of implementation costs for central industry bodies and market participants.



CBA Approach and High-Level Methodology

Proposed Option Sets to Model

Combining a mixture of individual and package options assessments

"Better information & more visibility"

"Market behaviour change & more compliance"



Reforms	Counterfactual	Individual options	Package 1	Package 2
Lower BM threshold	-	Lower threshold to 10MW + 1MW visibility	Lower threshold to 10MW + 1MW visibility	Lower threshold to 10MW + 1MW visibility
Align MTD with Gate Closure	--	--	--	Align MTD with Gate Closure
FPNs = traded position	--	Interaction with Power Requirement Accuracy programme	Visibility of traded positions	FPNs = TPs at portfolio-level
Shorter SP	--	5-mins base case / 15-mins sensitivity	5-mins	5-mins

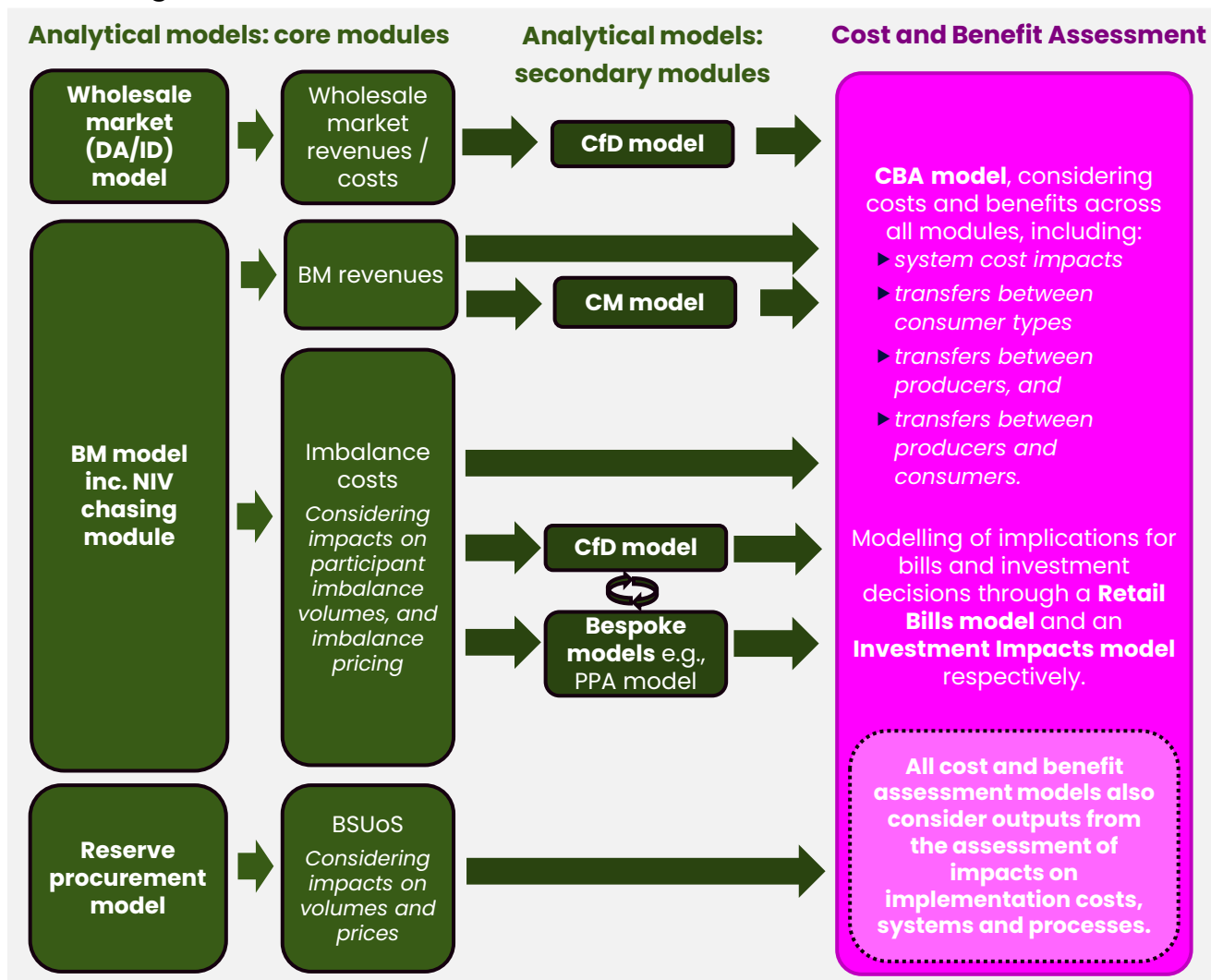
Unit bidding	Assessment of the potential scale of the problem/inefficiency from strategic behaviour (+ implementation costs and requirements)
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Based on CFI feedback, the proposed assessment structure enables NESO to better establish the value of pursuing unit bidding as part of balancing reform, before committing to a full CBA and detailed design.

Modelling Framework and Approach

Building a methodology based on identifying impact mechanisms to inform core and secondary analytical models

Modelling framework overview



Decisions about modelling the counterfactual as well as defined policy option impact mechanisms will feed into the design of core modules

This could include key data inputs to these modules and models that feed into the creation of some of the key inputs. For example:

- ▶ Forecast error sampling tools and NIV chasing models currently inform the relationship between the DA and ID wholesale market models and between these and the BM model. These would be re-calibrated to better align with the counterfactual and policy option definitions e.g., to reflect 5-min temporal granularity forecast error distributions.
- ▶ Similarly, NIV chasing may be split into a BMU NIV chasing behaviour model – reflecting BMU ‘imbalance trading’ behaviours – and a non-BMU NIV chasing behaviour model – reflecting observed non-BMU NIV chasing patterns
- ▶ The Reserve procurement model may need to be updated to better reflect NESO control room processes, e.g., forecasting approach and how this links to the procurement volume determination for reserve, etc.

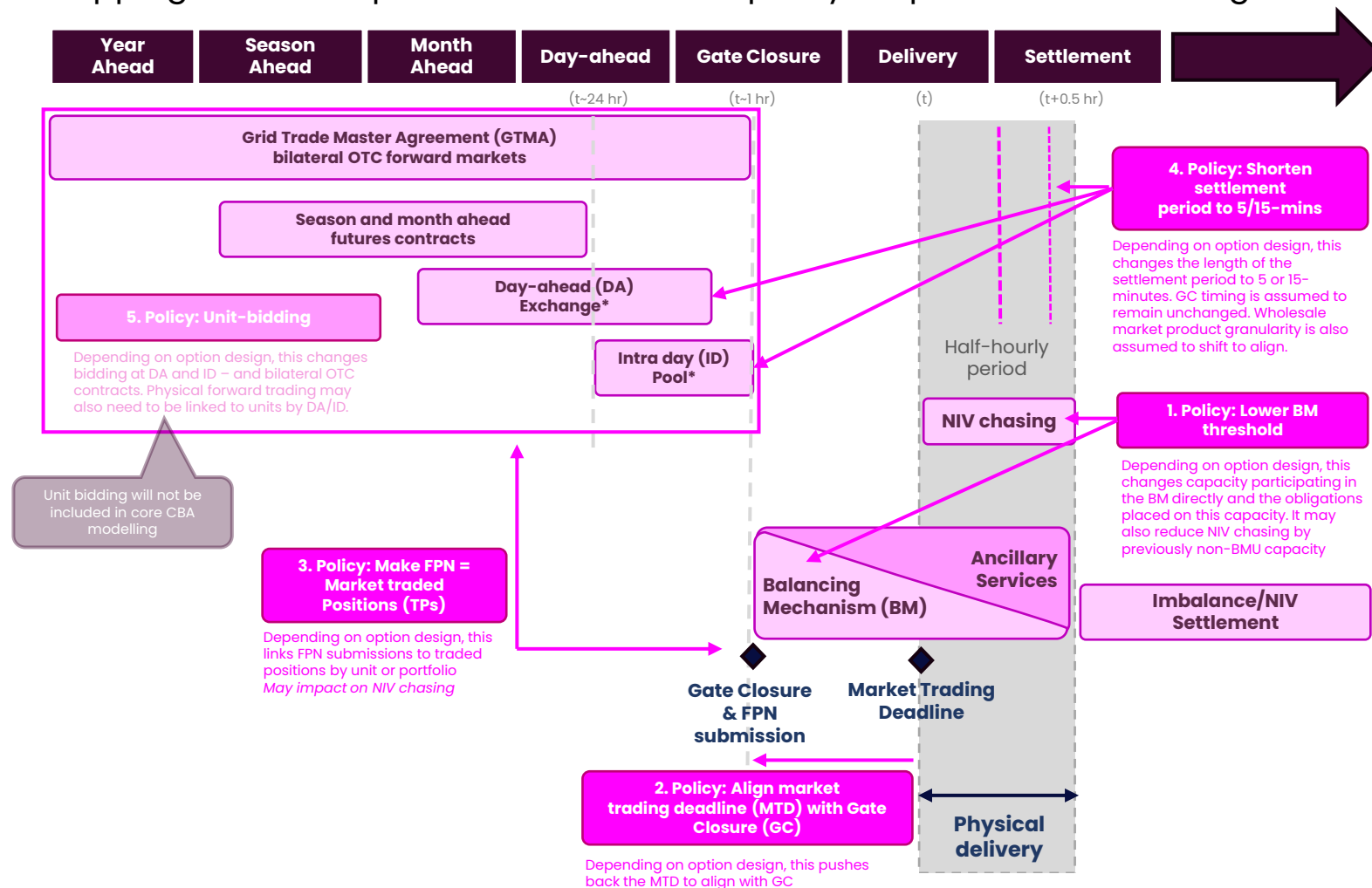
Our methodology document will focus on the design of these core modules, and how assumptions have been reflected.

Secondary modules will reflect wider impacts – e.g., on support-scheme costs such as the CfD, these modules will consider the impact of reforms respectively on missing money and CfD payments to/from generators considering impacts on the reference price and production volumes – as well as **second-order impacts where relevant** – e.g., impacts on CfD strike prices as a result of higher imbalance exposure and similarly second-order impacts elsewhere in the market will be captured through bespoke models, e.g., the impact on PPAs.

Where evidence suggests that impacts are unlikely to be material, they may instead be assessed qualitatively or abstracted from the CBA analysis.

Modelling the Policy Options

Mapping how the expected effects of each policy map onto our modelling tools



The majority of policy options will be represented through changes to our BM and Ancillary Services modules.

Shorter settlement is the main option that will have material implications for the wholesale market. Other options such as aligning the MTD with GC and making FPNs=TPs will have indirect implications – primarily to be reflected through the relationship between the DA, ID and BM modules, e.g., through adapting the forecast error sampling tools and NIV chasing models that connect these.

There are also a number of outstanding questions arising from the CfI responses that are likely to affect the modelling of all options – to be considered and addressed under the methodology development phase. These are outlined below:

Issue	Bespoke approaches required	Outstanding questions
Non-physical traders	<i>Fundamental modelling does not typically capture these effects adequately – requiring bespoke analysis</i>	▶ VLPs vs. financial only traders? ▶ Linked to impact on volatility
Market liquidity	<i>Capturing market liquidity impacts on different trading timeframes within the CBA will require bespoke analysis to combine several metrics</i>	▶ Forecast error deviations can be used to inform churn ▶ Impacts on bid-ask spreads harder to capture
Flexibility markets/ DSO alignment	<i>Impacts on flexibility markets will need to be understood to consider potential for quantitative analysis</i>	▶ Qualitative assessment or bespoke analysis may be required to support this
IC trading	<i>Interconnector trading and EU reintegration may impact on benefits</i>	▶ Robustness to interconnector efficiency may be explored through sensitivities

DA and ID markers are reflected in our Wholesale Market modelling modules. These also capture bilateral OTC trading to an extent.

Lowering the BM Threshold

How the key impacts of each policy option may be captured in the quantitative modelling

Key impacts on system operation	How could these be modelled?	Key assumptions – refined at a later stage
More capacity participating in the BM ▶ More bids/offers may be available in the BM, increasing competition ▶ Some may be more economical lowering the per MWh costs of balancing actions	▶ More non-BMU capacity would be included in the BM model, in line with the option threshold ▶ The BM and ID models interact, i.e., actions taken in the BM are reflected in the next settlement period in the ID model optimisation, so any indirect effects on ID trading will be reflected <i>What needs to be reflected in the counterfactual</i> ▶ Non-BMU capacity is already excluded in our BM model in line with the current threshold ▶ Non-BMU NIV chasing may need to be modelled explicitly, assumptions refined and differentiated from BMU NIV chasing	▶ Opt-in: How should 'opt-in' to the BM be represented? E.g., some DSR may be part of VLPs already in the BM, even if below the threshold. ▶ Non-BMU behavioural response and phasing: Would all previously non-BMUs now in the BM respond 'rationally'? Might there be a 'phased' response?
Greater visibility ▶ NESO has a clearer view of the intended physical positions of a larger share of the market	▶ Better visibility reflected in uncertainty/forecast error considerations that feed into reserve procurement decisions <i>What needs to be reflected in the counterfactual</i> Same reserve/procurement rules would be applied but with lower visibility of smaller assets	▶ NESO trading: Should greater visibility also be reflected in more efficient trading by the NESO (e.g., with fewer trades needing to be unwound by BM actions following NIV chasing), including countertrading on ICs (subject to limitations)

Align Market Trading Deadline (MTD) with Gate Closure (GC)

How the key impacts of each policy option may be captured in the quantitative modelling

Key impacts on system operation	How could these be modelled?	Key assumptions – refined at a later stage
No post-GC trading ▶ Market trading positions are fixed at GC, leading to more certainty on actions required by NESO post-GC ▶ But, intermittent gen/non-controllable demand that faces forecast error close to real time cannot trade out positions post GC	▶ Impact of greater certainty reflected in reserve procurement as well as in reductions in self-balancing and NIV chasing actions by market participants that are counterproductive for the system either: (a) as a result of their impact on constraints and/or (b) because NESO had already taken actions to address an expected imbalance leading to ‘overshooting’ ▶ Impact of reduction in post-GC self-balancing and NIV chasing actions by market participants that would be helpful to the system reflected as greater volumes of imbalance fed into our BM model (with implications for the ID as well). This would be calibrated based on a historical assessment of: (a) what proportion of trading takes place post-GC, and (b) what proportion of forecast error/imbalance is resolved through trading post-GC. Impacts on incentives for NIV chasing would also be captured implicitly in our NIV chasing models (e.g., having to take a position earlier may change the risk-reward balance). <i>What needs to be reflected in the counterfactual</i> ▶ Same reserve/procurement rules would be applied ▶ The counterfactual needs to reflect counterproductive market participant actions between GC and the MTD, which separates out the impact on constraints and constraint management actions, and the impact on ‘overshooting’	▶ Network build and location of capacity/demand: This will determine what proportion of the time that the network is congested, leading to some of these self-balancing actions being counterproductive when constraints are taken into account ▶ Overshooting impacts: How might the ‘overshooting’ effect be best captured? Should this rely on an assessment of this impact historically (extrapolated to the modelling horizon and chosen scenario), or should it be represented through a two-step BM optimisation, (1) without the additional self-balancing post-gate closure to determine NESO actions and (2) with these added in after an % proportion of NESO actions have already been taken, to capture the impact of overshooting endogenously?

Match FPNs to Traded Positions

How the key impacts of each policy option may be captured in the quantitative modelling

Key impacts on system operation	How could these be modelled?	Key assumptions – refined at a later stage
Limits the ability for BMUs to deliberately trade at an imbalanced position at GC ▶ Market trading positions must be aligned to FPNs (submitted at GC), so this leads to the same effects as aligning MTD to GC for BMUs ▶ Depending on option design, this may or may not also limit trading from non-BMUs (given that their positions may be captured through supplier BMU FPNs)	<i>Largely the same as with aligning MTD with GC – but with the focus being on BMU trading, with some indirect effects on non-BMUs through supplier FPNs</i> + Impact on NIV chasing incentives, to reflect the significant reduction in ability for BMUs to NIV chase (and some indirect impacts on non-BMU NIV chasing through supplier FPNs) <i>What needs to be reflected in the counterfactual</i> ▶ As per aligning MTD with GC ▶ + BMU NIV chasing modelling may need to be refined (considering also refinements made to non-BMU NIV chasing modelling to reflect the option to lower the BM threshold) ▶ The counterfactual may need to be refined to appropriately reflect how significant the divergence is for BMUs between FPNs and traded positions currently – and the extent to which this is driven by (i) pre-GC trading vs. post-GC trading, or (ii) differences between FPNs and metered position	The key impact relies on the assumption that BMUs closely align their FPNs with their metered positions (matching exactly for controllable assets (except under outages), and matching other than forecast error for the rest).¹ ▶ We need to consider what proportion of the time the network is congested and some self-balancing and NIV chasing actions after FPN submission are counterproductive. ▶ How might counterproductive self-balancing/NIV chasing best be reflected in the counterfactual? Does this require an assessment of this impact historically, or might it be represented through a two-step BM optimisation, with and without the additional self-balancing post-gate closure?

Note: 1. This assumes that NESO are able to strengthen reputational incentives on market participants to do this (e.g., through the ongoing workstream to improve FPN accuracy) and that they have the ability to match FPNs to metered positions as closely as possible. But, it is worth considering whether matching of FPNs and traded positions could change incentives for this – for example, the options could introduce the perverse incentive of encouraging less accurate FPNs relative to metered positions.

Shorter Settlement Periods (SSPs)

How the key impacts of each policy option may be captured in the quantitative modelling

Key impacts on system operation

More granular imbalance price signals incentivise behavioural change

- ▶ Market participants trade at a greater temporal granularity in wholesale markets, reducing system imbalance and smoothing step-changes between settlement periods
- ▶ Market participants that don't /can't change their behaviour e.g., those who continue to trade at 30-minute granularity or who can't forecast at the lower granularity, may face higher imbalance costs
- ▶ Greater granularity in retail offerings from suppliers

Improved alignment with EU markets

- ▶ More efficient cross-border trading and utilisation of ICs

How could these be modelled?

- ▶ Greater temporal granularity, in both wholesale and BM models - *dependent on data availability*
- ▶ Impact on step-changes between settlement periods reflected in uncertainty considerations that feed into reserve procurement decisions

What needs to be reflected in the counterfactual

- ▶ Same reserve/procurement rules would be applied to reflect how this changes under shorter settlement
- ▶ Counterfactual will need to reflect 'structural' imbalance i.e., linked to the sub-30min granular shape, as well as forecast error change at sub-30min granularity
- ▶ Models may also need to reflect unit commitment decisions and techno-economic constraints at a unit-level (in both the counterfactual and option), to reflect ramping and its impacts on structural imbalance

Approach TBD – may be captured qualitatively, e.g., based on evidence in other markets

Key assumptions – refined at a later stage

- ▶ **Behavioural response and phasing:** Would all market participants respond 'rationally'? Might there be a 'phased' response, e.g., with some market participants (at different proportions for different asset types) continue trading at 30-mins long after the implementation?
- ▶ **Impacts on flexible assets:** Might more flexible resources participate/be selected in the BM? *This will be captured in the modelling to some extent in response to unit ramping/techno-economic constraints, but any second-order effects, e.g., greater entry from flexible resources may need to be considered through separate analysis of impacts on investment signals.*

Unit Bidding: Quantifying the Magnitude of Potential Benefit

How the key impacts of each policy option may be captured in the quantitative modelling

Key impacts on system operation

How could these be modelled?

Key assumptions – refined at a later stage

NESO is considering unit bidding on a longer timeframe to the other options. It will not be captured in CBA modelling. Instead, we will develop analysis to assess the potential of the overall magnitude of the issue that NESO has designed unit bidding to address. This is not considering actual market behaviour, but theoretical profit maximising behaviour.

This would be linked to:

- ▶ constraint-related behaviour in which portfolio bidders may maximise revenues by balancing FPNs across their portfolio in a way which artificially raises constraint costs,
- ▶ other portfolio level behaviour which may maximise revenues while artificially raising ancillary services costs, e.g., linked to locational services such as voltage.

The analytical approach may rely on stylised modelling of the potential behaviour of market participants to seek to maximise revenues under certain market conditions.

As it is not being modelled as part of the CBA, we do not intend to focus attention on modelling of unit bidding as part of the IEP on 10/06/2026

Modelling the Counterfactual

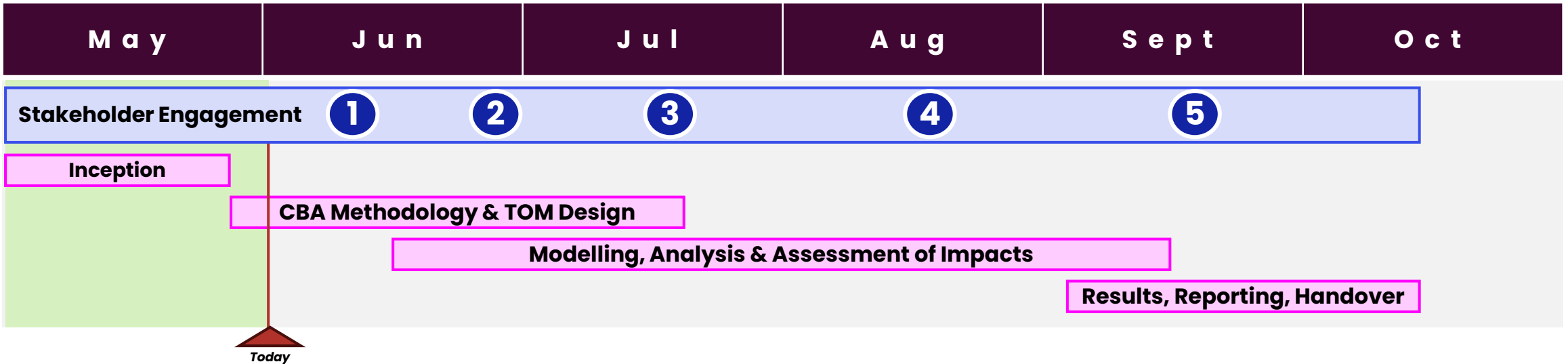
Capturing the effects of each policy by ensuring the counterfactual reflects existing market design and behaviours

Elements of the counterfactual to define		
Element	Overview	Why this is important
Policy background and impacts on market participant behaviour	Should P462 be assumed to go ahead? What behaviours will it drive? Should TCLC influence BM bid and offer pricing beyond existing behaviours? What impact will MHHS have on consumer led flexibility? Should the Constraint Collaboration Project/ forecasting improvement workstream outcomes be reflected in the counterfactual?	Choices on the policy background could influence how significant policy impacts may be, e.g., under P462, matching FPNs to traded positions may have larger benefits, or if TCLC lowers BM bidding premia further, lowering the BM threshold may not reduce BM pricing as much as it would otherwise
Choice of scenario <i>We intend to focus analysis on</i>	We are minded to choose Holistic Transition as our FES background scenario as the NZ consistent scenario most aligned to current trends. Key assumptions will be calibrated in the modelling, e.g., uptake of low-carbon consumer technologies will determine consumer-led flexibility	This would drive the generation/ demand mix, as well as the proportion of distributed assets, and determine the availability of resources for balancing
Siting decisions for new assets / existing asset closures	The chosen scenario will need to appropriately reflect the geographical distribution of assets on the network – particularly siting decisions for new assets	This – alongside network build assumptions – will impact on constraint management costs
Network build and congestion	Network reinforcements planned over key boundaries over our modelling horizon Current use of network assets may also need to be reflected in the counterfactual, e.g., to what extent are these assets underutilised as a risk management approach?	This will directly impact on the magnitude of Balancing and System Services costs that policies can impact on – particularly drive constraint management costs, and the proportion of time the system is congested

Scope and plan for Implementation Planning

Stakeholder Engagement Plan

Overview of plan, including key IEP touchpoints and intended use of each session



Stakeholder Engagement	① 10 th June	② 30 th June	③ July	④ August / September	⑤ September
Desired Outcome of IEP	Stakeholders have clarity on the overarching approach and TOM methodology	Stakeholders have visibility of initial TOM outputs and emerging impact insights, with opportunity to provide feedback	Stakeholders have reviewed preliminary impact findings and understand key assumptions, with gaps identified for further input	Stakeholders understand the confirmed assessment of impact outcomes and the pathway to implementation planning	Stakeholders have a clear, end-to-end view of implementation plans and the overall delivery roadmap
Assumptions on wider programme progress required to deliver as planned		Initial TOM designs are sufficiently developed to be credible and interpretable	Stakeholders have provided sufficient, high-quality inputs to underpin a robust and credible assessment	Impact analysis has been refined and validated through stakeholder input with key uncertainties understood and appropriately framed	Implementation plans are sufficiently detailed, realistic, and evidence-based

IEP 2 Breakout Discussion: Key Guiding Questions

Inviting feedback on the high-level Implementation Planning approach and TOM Methodology

Key Guiding Questions for IEP 2

1

Do you agree with our high-level workstream plan and approach?

2

How clear and well understood is our proposed TOM methodology both in scope and purpose?

3

Do you agree with our stakeholder segmentation approach? How comfortable are you with supporting additional bilateral engagement outside of formal IEP sessions where needed?

Your input today will support the progression of our TOM analysis. We will share an update on 30/06 covering the following areas:

- Outputs of our TOM analysis
- Emerging impacts by policy from our analysis

TOM & Implementation Planning Approach

Overarching Workstream Approach

Sharing a four-stage approach to delivering the Implementation Planning workstream

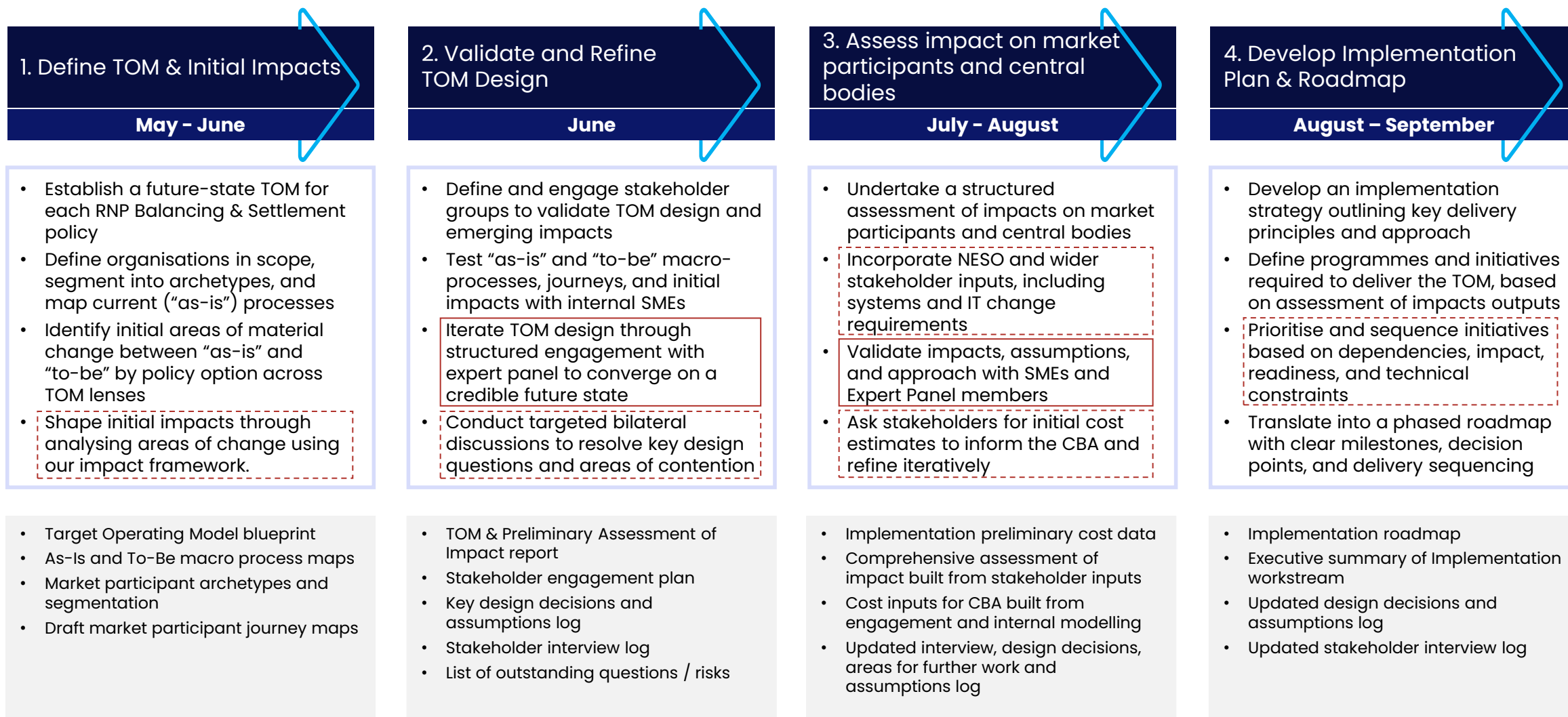
Key:

Explicit engagement
with IEP scheduled

Bilaterals with IEP
members as required

ACTIVITIES

OUTPUTS



Purpose of the TOM & Preliminary Assessment of Impacts

Outlining the context and design principles guiding our TOM analysis

Purpose of TOM assessment

Implementation Workstream Stages

1. TOM Assessment
(First Deliverable)

2. Assessment of Impacts

3. Implementation Plans & Costs



CBA Workstream

The Target Operating Model (TOM) represents the first stage (1) of the Implementation Workstream, defining and driving the cross-industry changes required to deliver the reforms across market participants and central bodies. It provides a structured framework to guide and organise engagement with stakeholders, while establishing an initial view of the end-to-end future operating environment, including interactions across the value chain. It identifies preliminary hypotheses of impacts across:

- **Processes**
- **Roles and responsibilities**
- **Data and technology**
- **Capabilities**

The outputs of the TOM serve as the foundation for the next phase of the Implementation Workstream, which will develop a detailed assessment of impacts (2) and quantify costs associated with each reform together with implementation plans (3).



How this industry TOM differs to typical TOMs

This TOM adopts an industry-wide, reform-driven approach, unlike standard TOMs that focus on a single organisation design. It serves to map reform-driven changes and materially impacted participants. It is centred on identifying where organisations may need to adapt internally, as well as how interactions between different market participants and central bodies may evolve as a result of these changes.

TOM design principles

The design principles below establish a shared agreement across all involved parties, aligning on a common objective and a consistent understanding of how the Target Operating Model is structured and the purpose it is intended to serve.



Materiality

Prioritise analysis on the most significant changes from the current state, concentrating effort on areas with the greatest scale, complexity, and impact across participants and processes.

Exemplified by our TOM methodology (slide 43) which details how our analysis depth is calibrated to expected change.



Transparency

Ensure regular external stakeholder touchpoints to share project outputs, articulate key assumptions, and prioritisation decisions to support stakeholder understanding and confidence.

Exemplified by our Overarching Approach (slide 41) where engagement opportunities are clearly outlined.



Evidence-Based

Analysis will be grounded in data and subject matter expertise, incorporating inputs from stakeholders where relevant. While data requests will be made, stakeholders are encouraged to proactively share information to support.

Exemplified by our TOM Methodology (slide 43) which outlines how we evaluate deltas between current and future state.



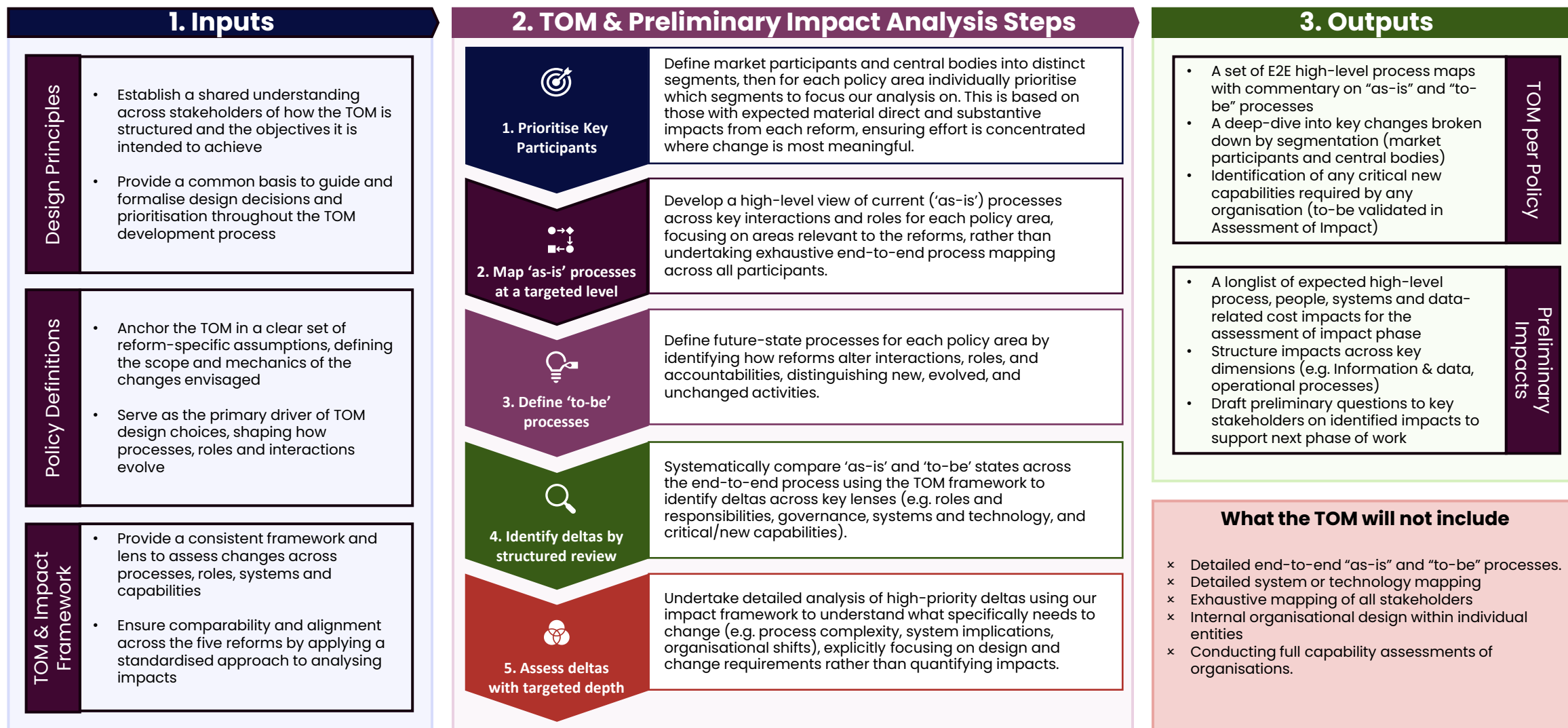
Managing Uncertainty

Reflecting the breadth and scope, the TOM provides strategic direction and a foundation for subsequent phases, explicitly outlining areas of uncertainty and further investigation.

Exemplified by our TOM Methodology (slide 43) which outlines what is explicitly out of scope.

Defining the TOM Methodology

Sharing key inputs, activities and outputs of this stage of the project



Creating Archetypes and Segments to Guide Analysis

Sharing how the definitions and segmentation of market participants will guide our work

1. Define market participants into groups and archetypes

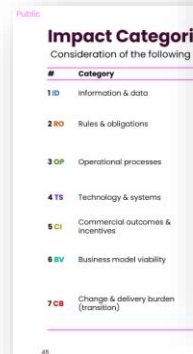
- **Segmentation provides a consistent lens to assess impact across the market**
The archetypes group participants based on their operating model (e.g. asset ownership, trading role, consumer behaviour) and system / capability setup, enabling structured comparison across reforms
- **Archetypes reflect materially different capabilities, constraints, and exposure to reforms**
Each group faces distinct implications across trading, operations, systems, and commercial models, requiring tailored impact assessment and response
- **Enables targeted TOM design, implementation planning, and stakeholder engagement**
Segmentation allows us to:
 - Identify where capability build is required (e.g. trading, data, dispatch)
 - Prioritise implementation complexity and timelines by archetype
 - Structure engagement with participants based on their specific needs and readiness

Group	Archetype
Asset Owners (Vertically Integrated / IPPs)	Intermittent generation (price takers)
	Dispatchable Assets
	Portfolio Players
Suppliers	Independent B2C Suppliers
Assetless traders	Aggregators
	Assetless traders (Brokers / multi-jurisdiction traders)
Consumer	I&C customers
	Small Medium Enterprises
	Residential consumers
Third-Party	Technology Providers

2. For each reform, create segmentation that can guide impact analysis

- **Impacts vary by reform and within groups**
We considered 7 different types of impacts for each reform, this revealed that there were differences within groups and archetypes, leading to reform specific segmentation.
- **Segmentation is reform-specific, reflecting differences in how each reform affects market participation, operational processes, and system requirements**
Each reform introduces a distinct change (e.g. access thresholds, dispatch obligations, settlement frequency), requiring a tailored lens to identify who is exposed, how they are impacted, and what capabilities are required to respond.
- **Archetypes are re-segmented and prioritised per reform based on exposure, capability maturity, and role within the value chain**
This ensures the analysis captures material differences in impact (e.g. asset size, trading maturity, system capability, outsourcing model) rather than applying a static segmentation across all reforms. This also drives primary and secondary stakeholders affected by the reform.

Reform 1 – Lowering BM	Reform 2 – Align MTD to GC	Reform 3 – FPN submission	Reform 4 – Unit bidding	Reform 5 – Shorter settlement
Wind & Solar > 50MW	RES assets	Generators	All – forecasting	1. Players with in-house technology: - 11. Mature trading operations - 12. Immature trading operations 2. Player that outsource
Wind & Solar < 50 MW				
Asset > 50 MW	Thermal generators / Large BESS / Interconnectors	Interconnector users	All – less impacted	
Asset < 50 MW		Generators	All – highest impact	
Asset > 50 MW	Mixed portfolio	Suppliers BRP	All – GSP impact	
All	Vertically integrated suppliers	Supplier BRP	All – GSP impact	CORP/2 meters Smarter meter Traditional meter All systems end-to-end
VLPs	VTPs	VTPs & VLPs	VTPs & VLPs	
Non-physical traders	n/a	Non-physical traders	Indirectly	
With Flex	n/a	n/a	n/a	
Without Flex				
Energy Data Management		Scheduling & nomination systems	Trading platforms	
SCADA / telemetry	Trading platforms		Energy Data management SCADA / telemetry	



Impact Categories

Consideration of the following types of impacts informed our segmentation and stakeholder engagement strategy

#	Category	WHAT it captures	Examples
1 ID	Information & data	Visibility, accuracy, granularity, timeliness of positions/behaviour/system state	If the BM participation threshold is lowered to 1 MW, then NESO will have visibility of significantly more distributed assets in real time.
2 RO	Rules & obligations	New/changed mandatory requirements, tolerances, enforcement, compliance obligations	If FPNs are required to match traded positions, then generators will face new mandatory compliance and enforcement obligations.
3 OP	Operational processes	Day-to-day operating workflows and behaviours (scheduling, dispatch/balancing workflow, coordination)	If the market trading deadline is aligned with Gate Closure, then traders will need to finalise trades earlier and manage higher imbalance risk.
4 TS	Technology & systems	IT builds, integrations, data/metering systems, platforms & tooling (build + run)	If settlement periods move to 15 minutes, then settlement systems will need to handle higher-frequency metering and data flows.
5 CI	Commercial outcomes & incentives	Direct cost outcomes, risk exposure, and financial incentives (system cost, bill impacts, market behaviour incentives)	If balancing reforms reduce redispatch volumes, then system balancing costs could reduce and positively impact consumer bills.
6 BV	Business model viability	Whether some business models/technologies become structurally advantaged/disadvantaged (viability/exit/need to redesign)	If unit-level bidding is introduced, then aggregators with diverse portfolios will face increased complexity.
7 CB	Change & delivery burden (transition)	One-off change effort, phasing, migration risk, dependencies, programme constraints	If multiple reforms are implemented together, then central bodies and industry will face a significant phased delivery and migration challenge.

Key Category		Key Category	
ID	Information & data	CI	Commercial outcomes & incentives
RO	Rules & obligations	BV	Business model viability
OP	Operational processes	CB	Change & delivery burden (transition)
TS	Technology & systems		

Central Bodies

Most impacted through market rules (governance) and coordination of change, with a few designing and operating core infrastructure which will determine feasibility, delivery risk and implementation complexity

Role Type	Stakeholder	Lowering BM	Align MTD to GC	FPN submission	Unit-level Bidding	Shorter Settlement
Delivery & System Operator	NESO	ID, RO, OP, TS, CI, CB	RO, OP, CI, CB	ID, RO, OP, TS, CI, CB	ID, RO, OP, TS, CI, CB	ID, RO, OP, TS, CI, CB
Regulator / Enforcement	Ofgem	RO, CB	RO, CB	RO, CB	RO, CB	RO, CB
Policy sponsor	DESNZ	RO, CB	RO, CB	RO, CB	RO, CB	RO, CB
Code & Settlement	Elxon	ID, RO, OP, TS, CB	ID, RO, OP, TS, CB	ID, RO, OP, TS, CB	ID, RO, OP, TS, CB	ID, OP, TS, CB
Wholesale markets	Power Exchanges	RO, OP, TS, CI, CB	RO, OP, TS, CI, BV, CB	RO, OP, TS, CI, CB	RO, OP, TS, CI, BV, CB	ID, RO, OP, TS, CI, CB
Data infrastructure	Smart DCC	TS, CB			TS, CB	ID, RO, OP, TS, CB
Subsidy interaction	LCCC (incl. ESC)					OP, CB
Network interface	DNOs/DSOs	ID, RO, OP, TS, CI, CB				ID, RO, OP, TS, CI, CB
Network owners	Transmission Owners	OP, CI, CB				ID, OP, CI, CB

NESO spans multiple roles, particularly system operation and market coordination, which is why impacts appear broad across categories but this does not materially change engagement

LCCC could technically be split into the CfD (LCCC) and CM (ESC) roles but impacts are relatively minor compared to other central bodies for prioritisation and mostly implementation change burden rather than fundamentally changing how they operate

Elxon's multiple roles is where the most complexity sits and where further segmentation adds value. We need deep engagement with its SMEs for better informed analysis.

Market Participants – Potential Segmentation

For each reform, we'll segment participants with different lenses to structure and identify the impact

Group	Archetype (CBA)	Segmentation				
		Reform 1 – Lowering BM	Reform 2 – Align MTD to GC	Reform 3 – FPN submission	Reform 4 – Unit-level bidding	Reform 5 – Shorter settlement
Asset Owners (Vertically Integrated / IPPs)	Intermittent generation (price takers)	Wind & Solar > 50MW*	RES assets	Generators	All – forecasting	1. Players with in-house technology: 1.1. Mature trading operations 1.2 Immature trading operations 2. Players that outsource
		Wind & Solar < 50 MW				
	Dispatchable Assets	Asset > 50 MW	Thermal generators / Large BESS / Interconnectors	Interconnector users	All – less impacted	
		Asset < 50 MW				
	Portfolio Players	Asset > 50 MW	Mixed portfolio	Generators	All – highest impact	
		Asset < 50 MW		Suppliers BRP		
Suppliers	Independent Business to Consumer (B2C) Suppliers	All	Vertically integrated suppliers	Supplier BRP	All – GSP impact	
Assetless traders	Aggregators	Virtual Lead Parties (VLPs)	Virtual Trading Parties (VTPs)	VTPs & VLPs	VTPs & VLPs	
	Assetless traders (Brokers / multi-jurisdiction traders)	Non-physical traders	n/a	Non-physical traders	Indirectly	
Consumer	I&C customers	With Flex	n/a	n/a	n/a	COP1/2 meters
	Small Medium Enterprises					Smarter meter
	Residential consumers	Without Flex				Traditional meter
Third-Party	Technology Providers	Energy Data Management	Trading platforms	Scheduling & nomination systems	Trading platforms	All systems end-to-end
		SCADA / telemetry			Energy Data management	
					SCADA / telemetry	

