



Enhanced National electricity market design for Great Britain

Public Summary Report

FEBRUARY 2025

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Executive Summary

Under the REMA process, a range of major reform options is still under consideration. Many of the more radical reform options have now been ruled out; zonal pricing remains on the table alongside various elements of an enhanced national design¹. Previous work by AFRY² concluded that zonal pricing could yield small but material efficiency gains. However, the benefits of zonal pricing are very sensitive to the level of network build, with all studies to date showing that increasing network build significantly reduces the impact. Moving to a zonal market would come at the cost of significant disruption, and with the risk that increased volatility would raise the cost of capital for investors, outweighing any efficiency gains and ultimately raising costs to consumers overall.

This project has explored options for evolutionary reform within the existing decentralised national market design.

We have not focused on locational investment efficiency in this work since we consider that on this aspect the benefits of zonal pricing could be replicated through more centralised spatial planning of networks, connected assets, and infrastructure in adjacent sectors, and government or regulatory targeting of support contracts for renewables, interconnectors and flexibility providers. We have therefore focused on operational efficiency as the area in which most of the potential benefits of zonal pricing could arise. Our assessment and previous work have shown that most of these operational efficiency benefits would result from improved operational efficiency of interconnectors, small-scale and storage assets.

Overall, our view is that an enhanced national market design could deliver positive benefits rapidly with limited downside risk. The alternative option of a zonal market has a wider range of outcomes, with higher possible benefits but also potentially resulting in significant net overall costs.

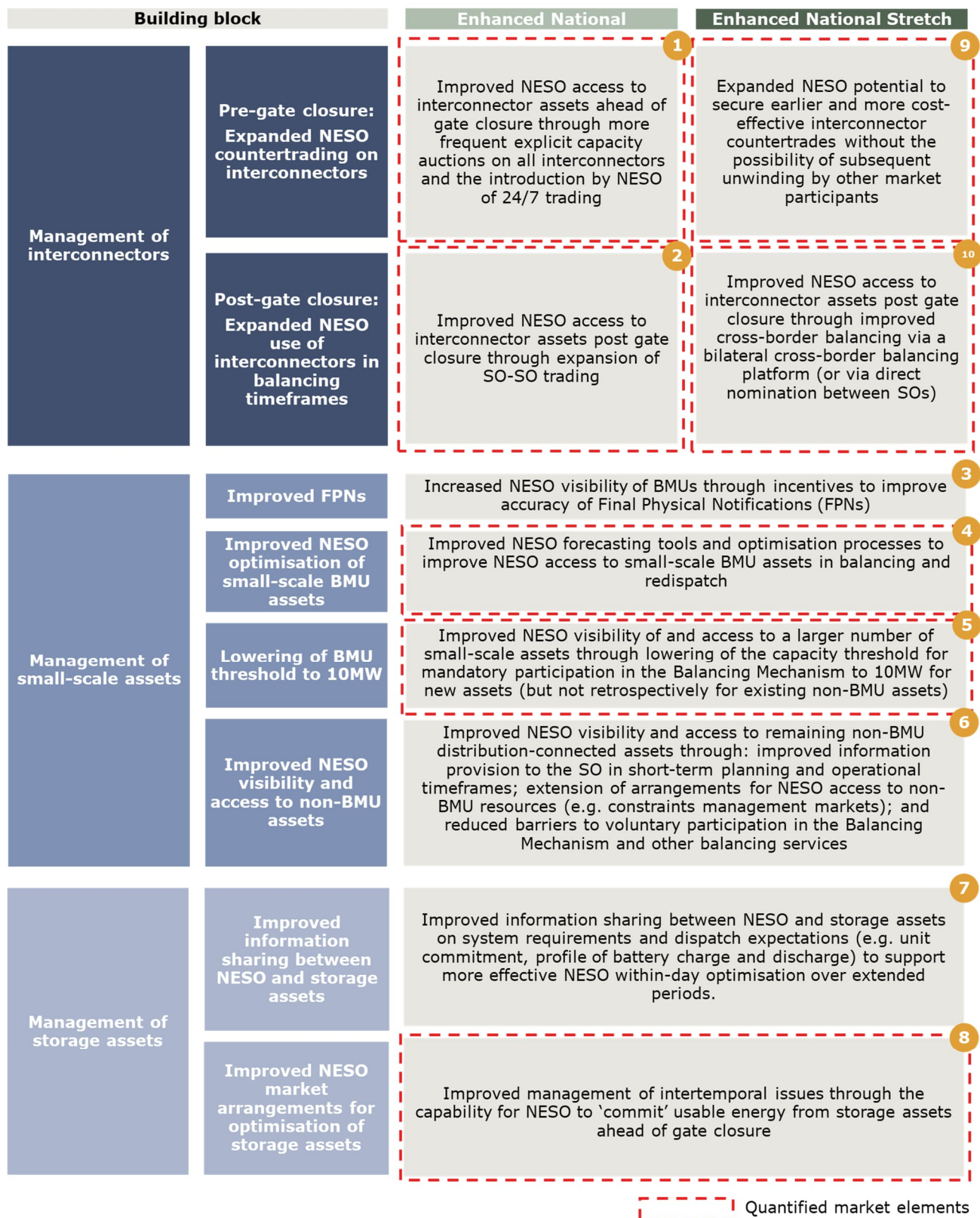
The Enhanced National and Enhanced National Stretch market designs are summarised in Exhibit 1.1. These reflect different degrees of change to interconnector arrangements: an 'Enhanced National' world in which any changes are subject to bilateral discussion between the countries concerned (TSOs, potentially with some national political agreement) and an 'Enhanced National Stretch' world in which – we believe – the application of the Trade and Cooperation Agreement (TCA) would need to be clarified and/or (potentially) UK-EU agreement would be needed³.

¹ Review of Electricity Market Arrangements, Autumn Update (DESNZ, December 2024) <https://www.gov.uk/government/publications/review-of-electricity-market-arrangements-rema-autumn-update-2024>

² Review of Electricity Market Design in Great Britain, Phase 2 Public Summary Report (AFRY, August 2023) https://afry.com/sites/default/files/2023-12/gb_electricitymarketdesign_phase2_publicsummaryreport_v500.pdf

³ We have excluded topics which we believe would not be possible within the existing TCA, although in the end the boundaries could only be established firmly by negotiation.

Exhibit 1.1– Summary of the Enhanced National and Enhanced National Stretch market designs

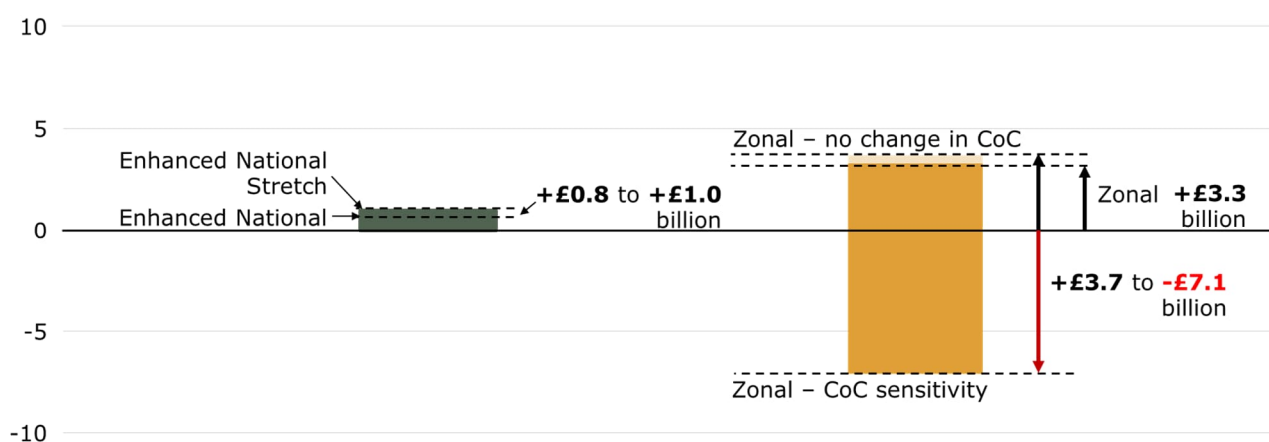


The differences in economic welfare between today's national business-as-usual and the Enhanced National, Enhanced National Stretch and Zonal alternative cases are shown in Exhibit 1.2⁴.

We find that adopting the Enhanced National market design achieves a positive overall economic welfare benefit relative to current arrangements of £0.8 billion (NPV 2030-2050, 3.5% discount rate), which increases to £1.0 billion in the Enhanced National Stretch case.

The alternative Zonal case shows positive welfare benefit of £3.3 billion, but within a range from of £3.7 billion benefit to a -£7.1 billion disbenefit, depending on the impact of risk on the cost of capital.

Exhibit 1.2 – Range of total economic welfare benefit, Enhanced National and Zonal cases versus National BAU (Net Present Value, £billion real 2023)



Notes: All figures are based on Net Present Value over the period 2030 to 2050, with a 3.5% discount rate. The Zonal case assumes a 100bps increase in hurdle rate for non-CfD supported thermal capacity (+50bps for OCGT). The Zonal – CoC sensitivity case assumes that in addition hurdle rates for CfD-supported capacity increase by 100bps; the Zonal – no change in CoC sensitivity removes all increases in hurdle rates from the Zonal case.

Of the enhancements to a national market design which we have considered, improved arrangements for interconnection have the largest potential to deliver benefits.

Changes to interconnection arrangements cannot be implemented unilaterally, and would require collaboration between transmission system operators (with political support where needed) to bring mutual benefit.

⁴ In all cases, the total economic welfare figures exclude implementation costs, which are expected to be higher (and a significant share of the modelled benefit) in the Zonal case. Additionally for the Zonal cases, the economic welfare figures also exclude potential negative impacts from the following: imperfect foresight of transmission constraints at the day-ahead stage; imperfect day-ahead market coupling; any impacts from reduced liquidity; any additional ongoing costs for trading and hedging; and any negotiated mitigations of the wealth transfers from interconnected markets to GB.

The operation of interconnectors is a matter for mutual agreement with neighbouring TSOs but the principles are defined by the UK-EU Trade and Cooperation Agreement (TCA) and the EU's own market design.

We note the recent statement by Government that “there is very little that can be done unilaterally in GB under reformed national pricing to improve the flow of interconnectors”⁵, however we believe significant improvements to interconnector flows could credibly be achieved through negotiation to expand the flexible use of interconnection for mutual benefit.

Some interconnector arrangements might relatively easily be changed to accommodate our recommendations with the agreement of the counterpart country. We believe that significant gains could be achieved bilaterally (without EU negotiations) by expanding existing arrangements for intraday countertrading.

Further gains could be achieved with innovations on the use of interconnector capacity restrictions to enable earlier countertrading, although these are more likely to require re-interpretation of the EU-UK Trade and Cooperation Agreement (TCA).

We have not taken legal advice on interpretation of the TCA, nor do we offer any. The TCA itself is up for renewal in 2026 but may be rolled over until 31st March 2028. We believe that the introduction of zonal pricing would also require discussion under the TCA.

As an enduring solution, we believe that it would be possible to retain explicit auctions for countertrading alongside implicit coupling arrangements; countertrading could also operate with implicit coupling by creation of a capacity product for use within the market coupling (auction or continuous).

Currently most GB interconnectors have arrangements for capacity allocation based on explicit capacity auctions. The only interconnectors currently with implicit capacity allocation are those to Ireland and Norway.

Under the TCA it is intended that Great Britain achieves a degree of market coupling via Multi-Region Loose Volume Coupling (MRLVC) using implicit auctions, although progress has been slow to date. A return to implicit price coupling is unlikely in the foreseeable future, although not completely impossible in the long-term.

There are two possible ways for NESO countertrading to remain an enduring solution with implicit capacity allocation. We believe both are feasible, but each would require European agreement.

- explicit auctions for countertrading alongside implicit coupling arrangements
- under an alternative approach, the market operator for the implicit coupling would offer a new product setting a specific price for the capacity

⁵ Review of Electricity Market Arrangements, Autumn Update (DESNZ, December 2024)

product itself⁶. This would be used in the algorithm to determine prices and flows.

Any changes to interconnector arrangements must be mutually beneficial for both countries and must be within – or within the interpretation of – the terms of the EU-UK TCA.

The unliteral introduction of zonal pricing would potentially have larger impacts on interconnected markets than those under reformed national pricing.

The possible introduction of a zonal market in Great Britain would also have a significant impact on interconnected EU markets. Although we have not explored this issue, the introduction of a zonal market would be unlikely to avoid the need for negotiation with interconnected markets and likely to form part of the renegotiation of the TCA due in 2026. Unlike the welfare benefits in the enhanced national market designs, a significant portion of the economic benefit to Great Britain of the Zonal case (including £0.8 billion of redispatch profits lost by overseas producers) results from a redistribution of welfare from non-GB parties, and this theoretical benefit could be reduced or removed depending on the outcome of EU negotiations. Other changes are also afoot including the possible application of the EU Carbon Border Adjustment Mechanism to GB electricity exports, which could dwarf the effect of REMA.

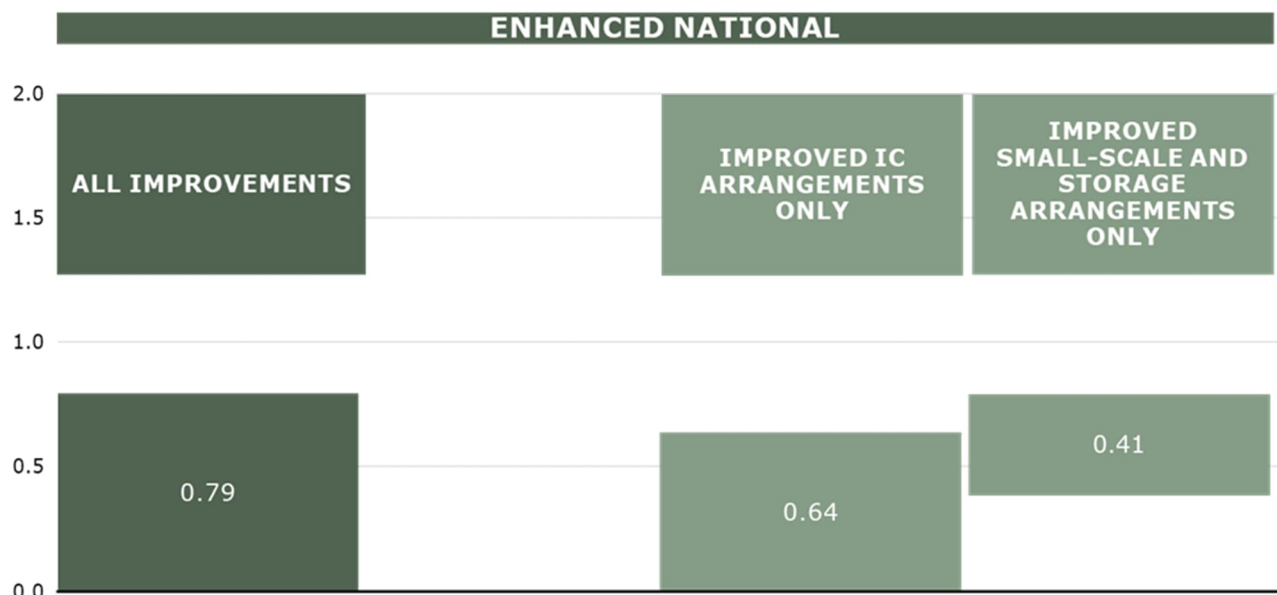
The potential welfare gains from improvements for small-scale and storage assets are smaller but more easily achieved than changes for interconnectors.

We propose enhancements to market arrangements for both small-scale and storage assets, including better access to these resources and improved forecasting and optimisation tools. Change is ongoing, especially for the set of information and tools which NESO uses to predict and (where relevant) to optimise the patterns of use of smaller scale assets. Many of the required changes are already under development by NESO.

We have examined two variants of the Enhanced National case, one based on applying only the changes to interconnection, and the other based on applying the changes related to small-scale and storage assets only. The results of these variants are shown in Exhibit 1.3.

⁶ AFRY (then Pöyry) created this idea in 2013, as part of a body of work on flexibility and the allocation of network capacity between market timeframes: day-ahead, intraday and balancing, and presented at the Florence Forum in 2014. Within that work we noted the possible application to congestion management by the TSOs. See [woodhouse_florence_forum_20140520_v_1_0.pdf](#).

Exhibit 1.3 – Total economic welfare benefit, Enhanced National and variants with partial improvement versus National BAU (Net Present Value, £billion real 2023)



Notes: All figures are based on Net Present Value over the period 2030 to 2050, with a 3.5% discount rate.

Of the total welfare of £0.79 billion in the Enhanced National, the variants indicate that most of the benefit (£0.64 billion) is potentially achievable through improved arrangements for interconnection alone. The welfare benefit from improved arrangements for small-scale and storage assets alone are also significant, amounting to around two-thirds (£0.41 billion) of the total benefit of the Enhanced National case. Considered in isolation from each other, the impacts of changes to arrangements from small-scale and storage assets are smaller than those from interconnectors⁷.

Having multiple possible routes to achieving a significant share of the potential gains also adds a degree of robustness to the likelihood of achieving a significant share of the potential; failure in one area does not mean all (or even most) of the potential gains are lost.

Other potential areas of reform (e.g. reformed access rights for storage assets and constraint management markets) could provide some further operational efficiency gains as part of an Enhanced National market, although these have not been quantified.

Many of the ideas in this report are already being progressed by NESO, and we commend NESO for the impressive range of initiatives it currently has under development to improve existing arrangements⁸. Building on these

⁷ These results show that welfare changes resulting from individual changes to arrangements are not additive; the welfare changes are dependent on the order that changes in assumptions about the effects of market design are applied.

⁸ The latest Balancing Cost Portfolio update gives an indicative summary (NESO, February 2024) <https://www.neso.energy/document/288791/download>

developments will have enduring value whether or not a zonal market is eventually implemented.

Although higher than those achieved in either the Enhanced National or Enhanced National Stretch cases, the operational benefits arising from a possible move to a zonal market are relatively small in a scenario with an appropriate level of network build

Grid build will reduce the effects of (and the need for) zonal pricing, and plans for rapid reinforcement of the grid are now in train. The estimated £20 billion programme of work approved by Ofgem under the ASTI programme was an important marker⁹. The recently published Government plan to decarbonise the power grid by 2030 is based deploying more transmission reinforcement in 5 years than has been accomplished in the past decade, enabled through an improved planning and consenting environment and potentially a tightened regime of penalties on network owners¹⁰. The removal of the ban on onshore wind developments in England¹¹ has also removed a major restriction on the ability of new generation to locate nearer demand, helping to limit the growth of network constraints.

Improved operational efficiency could be achieved with an enhanced national market, with lower investment related risk and disruption for market participants than under a move to a zonal market.

An Enhanced National or Enhanced National Stretch market design would be likely to deliver, sooner and more reliably, a significant share of the operational efficiency gains of a zonal market without the downsides, and is unlikely to deliver a negative outcome overall. The alternative option of a zonal market has a wider range of outcomes, with higher possible benefits but also potentially an overall worse outcome depending on the effectiveness of the markets and the impact on cost of capital.

The Enhanced National or Enhanced National Stretch market design may also enable efficiency gains to be realised sooner than a zonal market alternative, as the need to develop an extensive risk management framework and grandfathering of existing rights to deal with wealth transfers is avoided. The need for EU-level negotiation would also be avoided in the Enhanced National case (and might be in the Enhanced National Stretch case, although this is less likely).

⁹ <https://www.ofgem.gov.uk/press-release/proposed-anglo-scottish-electricity-superhighway-power-millions-homes-first-progress-through-fast-track-ofgem-process>

¹⁰ Clean Power 2030 Action Plan (DESNZ, December 2024)

¹¹ Policy statement on onshore wind (DESNZ, July 2024)

<https://www.gov.uk/government/publications/policy-statement-on-onshore-wind/policy-statement-on-onshore-wind>

Recommendations

We recommend that:

- the Enhanced National Stretch market design is progressed; in event the additional elements within the Enhanced National Stretch design were not delivered, the Enhanced National design would result as a fallback option. Many of the required changes are already in development and can be delivered ahead of any properly managed introduction of a zonal market;
- there should be rapid development of measures to improve operational (and investment) efficiency within the existing national market, particularly in the areas identified in this report;
- in particular, there should be recognition that improvements to interconnector arrangements are needed for both zonal and enhanced national market designs; these should be pursued bilaterally and where necessary at European level, within the existing the EU-UK TCA; and
- the impact of the impact of network build on the benefits of zonal should be recognised, and co-ordinated grid build accelerated as planned.



ÅF and Pöyry have come together as AFRY. We don't care much about making history.

We care about making future.

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