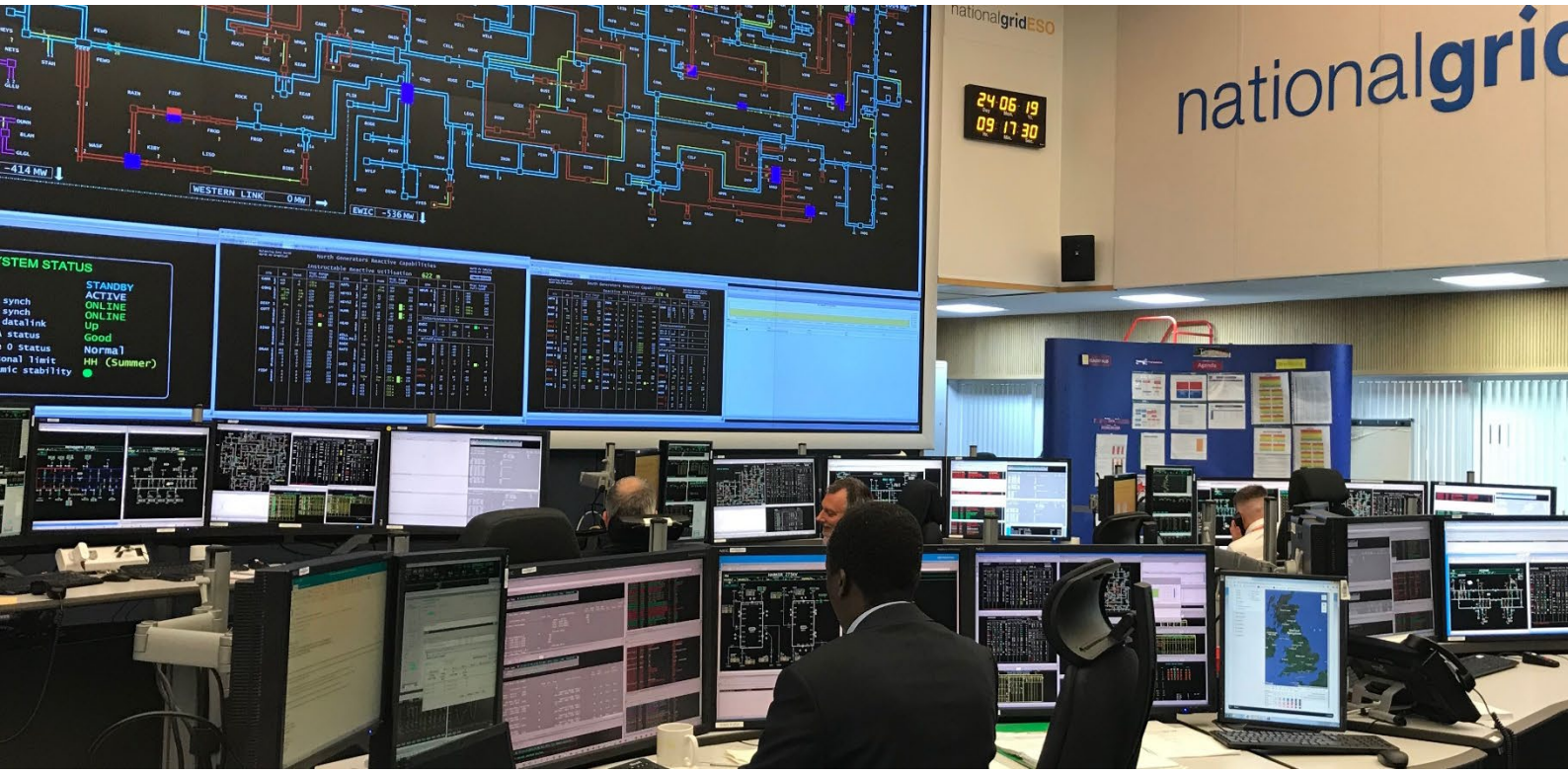
BRIEFING NOTE

The Review of Electricity Market Arrangements (REMA)

Insights for local authorities and community organisations on the government's ongoing programme of wholesale market reform.

March 2024



Acknowledgements

This note has been sponsored by National Grid.

As part of National Grid Electricity Distribution's programme of support for local and community energy groups in its licence area, it is supporting Regen to provide briefings on key developments that these groups may wish to have a say in. National Grid does not endorse any of the views or policy proposals set out in this briefing.

Author:

Ellie Brundrett, Markets Lead, Regen
ebrundrett@regen.co.uk

About National Grid

National Grid is the largest electricity transmission and distribution business in the UK, delivering electricity safely, reliably and efficiently to the customers and communities they serve, while working towards a cleaner, greener energy future.

About Regen

Regen is an independent centre of energy expertise with a mission to accelerate the transition to a zero-carbon energy system. We have nearly 20 years' experience in transforming the energy system for net zero and delivering expert advice and market insight on the systemic challenges of decarbonising power, heat and transport.

Regen is also a membership organisation and manages the Electricity Storage Network (ESN) – the voice of the UK storage industry. We have over 150 members who share our mission, including clean energy developers, businesses, local authorities, community energy groups, academic institutions and research organisations across the energy sector.

Contents

Glossary of terms

Term	Definition
Bilateral agreements	Agreements brokered between two parties without the need for a central market operator.
Centralised dispatch	The operation of power generators is centrally controlled, with the grid operator deciding which generators will be dispatched based on their cost, availability and other factors.
Churn rate	A measure of market liquidity - the number of times electricity generated is traded within the market.
Dispatchable generation	Generation in which the power output can be adjusted accordingly. Gas and nuclear power plants are examples of dispatchable generation plants.
The Electricity System Operator	Also known as the ESO.
Final Physical Notification	Also known as FPN. A notification from a generator or a supplier to the ESO of the amount of electricity that it intends to produce or consume in a given half-hour period.
Intermittent generation	Generation in which the power output cannot be adjusted, and instead relies on the resource being available. Wind farms and solar PV installations are examples of intermittent generation plants.
Liquidity	The efficiency or ease with which electricity is bought or sold without causing a major change in its price and without incurring significant transaction costs.
Marginal cost	The cost of producing one additional unit of electricity (i.e., one more MWh) in the given conditions. The marginal cost is set by the most expensive generator delivering in that period.
Settlement period	A half-hour period used for the trading and balancing of electricity. There are 48 settlement periods in a settlement day (except on clock change days).
Strike price	The Strike Price should reflect the price a generator is willing to receive over the CfD contract period (currently 15 years) in order to secure the investment needed to build. Developers will also consider the potential for revenue post-CfD contract (this is sometimes called 'the merchant tail') as well as other revenue streams such as Renewable Energy Guarantees of Origin (REGOs).

Section 1:
Introduction

1.1 What do we mean by energy markets?

Prior to 1990, electricity generation, supply and distribution was a nationalised, regulated industry, with not very many organisations participating. This meant there was little choice around where electricity came from, or who provided it. This all changed when the industry was privatised, meaning new markets were created to stimulate competition, investment and encourage new participants to get involved, creating a more decentralised system. Today, markets form the backbone of the electricity system and can broadly be split into two main areas:

- **Retail markets** cover the relationship between suppliers and end users of electricity, as well as the structures which protect consumers.
- **Wholesale markets** cover the relationship between generators and suppliers and the policies or mechanisms that provide signals to invest in and operate assets that generate or use electricity. This also includes operational structures that facilitate the balancing of supply and demand of electricity to deliver power at the right voltage and frequency and maintain an exact system balance 24/7.

It is important to understand that, while separate, the two types of market are closely related and do impact each other. Suppliers will procure energy in the wholesale markets on behalf of their consumers and pass on the cost of this via the billing process. Therefore, any reforms impacting the efficiency or function of the wholesale markets will impact consumers in some way.

1.2 Why have we written this guide?

The Review of Electricity Market Arrangements (REMA), launched by the government in the summer of 2022, could potentially bring forward the most comprehensive set of reforms to wholesale market arrangements in Great Britain (GB) in over a decade.

This briefing note aims to support local authorities and community organisations to understand why market reform is being explored, the context around the reform process and how the debate has matured. It also discusses some of the most significant options that are of most importance to local authorities and community energy organisations, and what the impact of these reforms might be for such organisations looking to invest in or operate renewable energy projects in GB.

Section 2:

The current GB market arrangements: an overview

2.1 New Electricity Trading Arrangements (NETA)

The current market arrangements, built upon a decentralised, competitive trading system, were established in 2001 as part of a series of reforms called NETA and bring together lots of different options for buying and selling electricity. Trading tends to start several years ahead, with suppliers and generators 'locking in' prices for some of their demand or output through long term contracts called Power Purchase Agreements (PPAs).

Standard PPA products do exist, but it is up to participants if they want to use them. Smaller generators, such as community-owned assets, may have a single PPA – typically a bilateral agreement to sell energy at an agreed price over an agreed term (1-20 years), between a generator and a supplier or consumer – while larger generators may use a variety of trading options. Trading options can include forward trading for delivery at a future time – yearly, seasonally, monthly or day ahead. In fact, trading can continue right up to the point at which electricity is generated and delivered.

There are also day ahead exchanges where electricity is traded (see Figure 1). Usually when we refer to the 'wholesale price' or 'market reference price' we are referring to the values of these day-ahead exchanges. However, it is important to understand that the exchanges represent a more visible part of a much wider trading ecosystem. In fact, it's common for a single unit of generated electricity to be traded several times ahead of delivery – this is called the churn rate, and the average for electricity is 2-3 times per unit.[1]

All of this culminates at 'gate closure', an hour before delivery, when market participants[2] have to inform the Electricity System Operator (ESO) of their intended volumes for demand and generation as agreed through wholesale trades – this is called their Final Physical Notification (FPN). The ESO then takes over the market system to manage balancing, constraints and operability across the GB network. This is done principally via the Balancing Mechanism (BM).

[1] Figure taken from Ofgem's data portal.

[2] Here we mean the larger market participants with registered balancing mechanism units (BMUs). Smaller generators may not participate in the balancing mechanism directly but will almost certainly sell their electricity to an "offtaker" who does.

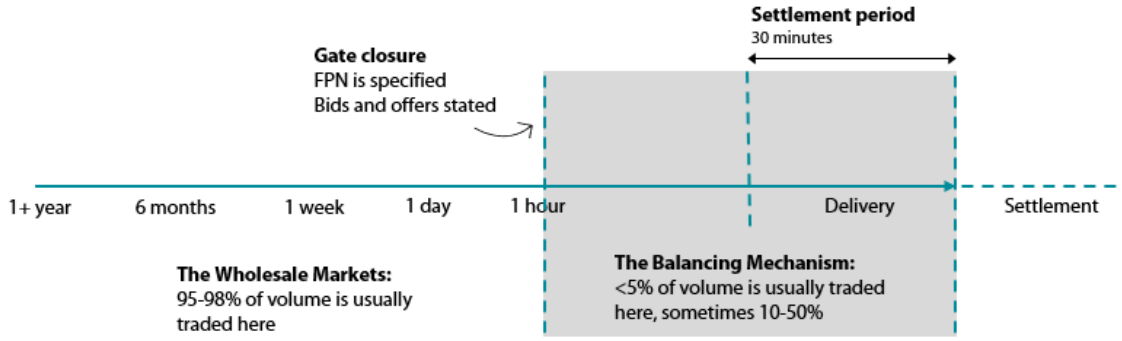


Figure 1: Typical trading timelines

2.2 The Balancing Mechanism (BM)

The Balancing Mechanism (BM) is the ESO's most important tool to ensure that the total energy supplied in GB (generation, interconnection import, energy storage discharge) is equal to the total consumed at all times. Balancing the system is the primary function of the BM, and the ESO uses it to deliver the right amount of electricity required to balance supply and demand on the network in real time by re-dispatching assets, instructing them to turn up or down generation or demand.

The BM is also used to manage constraints at the transmission level. A constraint occurs when the electricity transmission system is unable to transmit power to the location of demand, due to congestion at one or more parts of the transmission network. Relieving a constraint can be expensive as the ESO may have to pay a wind farm to turn down behind a constraint and pay a dispatchable generator, such as a gas fired power station, to turn up in front of the constraint to balance the system and meet demand.

Other assets can be used to manage constraints, such as batteries and demand side response, and there are lots of ongoing reform discussions focusing on how to open up the BM to make best use of these assets. However, it is currently the case that the GB system operator is heavily reliant on the use of fossil fuel assets dispatched through the BM. This is a key area for future market reform.

Balancing, constraint and operability action costs are recovered via the Balancing Services Use of System (BSuOS) charge which is socialised across all consumers in GB.[3]

2.3 Electricity Market Reform (EMR)

Prior to REMA, the most recent evolution of market arrangements was the passing of the Energy Act in 2013, which introduced EMR and established two important support mechanisms:

[3] You can find out more about the Balancing Mechanism on the ESO's website here and about the cost of managing constraints here.

- **The Contracts for Difference (CfD) scheme:** a two-way price differential scheme that fixes the price per MW at which renewable electricity is procured, providing generators with price stability to encourage investment and consumers with a 'hedge' against very high energy prices.
- **The Capacity Market (CM):** an auction scheme designed to support security of supply, which enables the government to buy capacity and provides generators with an additional source of revenue in order to remain operational.[4]

EMR didn't change the wholesale energy trading arrangements themselves, but the way that these two support mechanisms interact with wholesale energy trading has been an important part of the context which has led to REMA.

The current system isn't perfect and several challenges exist that REMA aims to tackle, such as managing the operation of the system as it decarbonises and becomes more complex. Many of the challenges identified in the initial consultation were first introduced in the Energy White Paper published in 2020.

[4] You can read more about the CM here.

Section 3:

REMA: the story so far

3.1 What is REMA?

The Review of Electricity Market Arrangements (REMA), launched by the government in the summer of 2022, could potentially bring forward the most comprehensive set of reforms to wholesale market arrangements in GB in over a decade.

The current wholesale market arrangements have facilitated the development of almost 56 GW[5] of renewable capacity. However, in order to reach net zero by 2050, the UK has committed to the full decarbonisation of the electricity sector by 2035. Achieving this will require the development of an electricity system that will look very different to today, including around 2.5 times more generation capacity by 2035 and over 4 times more by 2050 (see Figure 2)

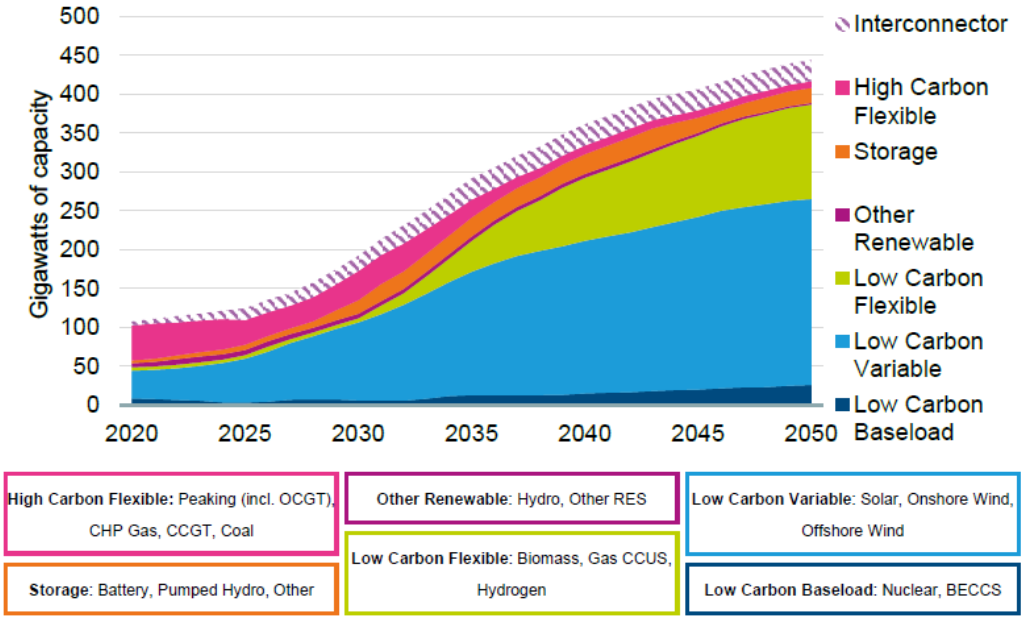


Figure 2: Illustrative Capacity Mix, 2020-2050. Source: BEIS

Future market arrangements need to enable the scale of investment required to achieve this, but also manage the impacts on the electricity system of an evolving generation mix, which will be more decentralised and dynamic than the current mix. They also need to provide the right signals for flexibility[6], so that the system can cope with the variability of intermittent renewable generation and maximise the value of this to the consumer. With that in mind, REMA's core objective is to

[5] Taken from the government's Energy Trends: UK renewables publication, December 2023.

[6] Ofgem defines flexibility as: *'modifying generation and/or consumption patterns in reaction to an external signal (such as a change in price) to provide a service within the energy system.'* We explore flexibility in more detail in Section 4.

reform electricity market arrangements so that that they "*facilitate the full decarbonisation of the electricity system by 2035, subject to security of supply, and are cost effective for consumers*".

3.2 What is in scope?

Electricity wholesale markets are where trading takes place between generators and suppliers to facilitate the balancing of supply and demand of electricity across the system. The scope of REMA, shown in Figure 3, focuses on reforming the structure and operation of these markets, as well as the mechanisms that support investment in renewable generation, flexibility and capacity, such as the CfD scheme and the CM.

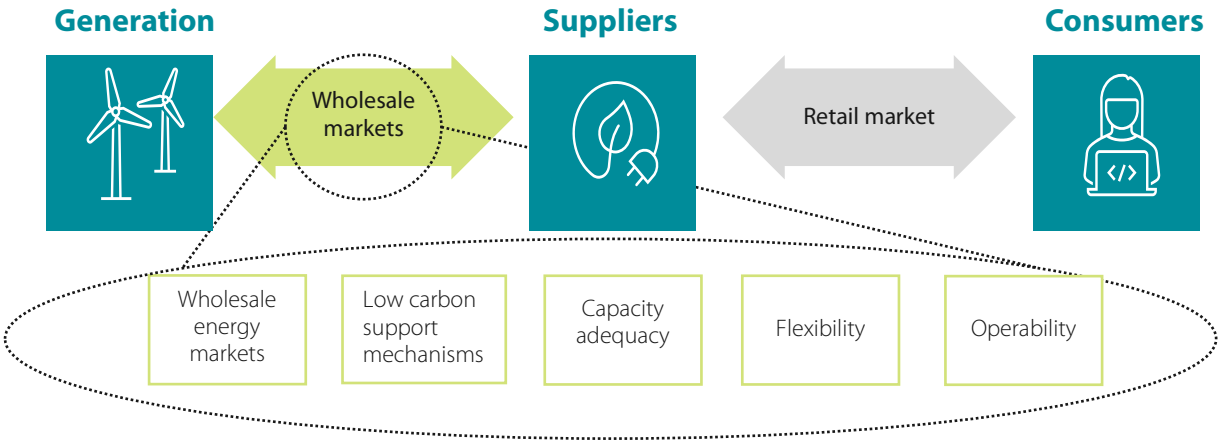


Figure 3: The scope of the REMA reform process

While this may seem quite broad, there are critical areas of reform which are not included in the scope of REMA, but which will need to happen in tandem and be closely aligned. The government has been explicit that REMA needs a clear remit, but that it will also need to interact with other significant aspects of system reform. For example, while the interactions and overlaps between the wholesale and retail markets were considered in the consultation, explicit retail reform will not be considered as part of REMA, something we discuss in more detail in Breakout box 1. Other areas that are out of scope for the REMA programme include:

- Policy on greenhouse gas removals.
- The existing cap and floor for interconnectors.
- Policy levers for incentivising demand reduction, such as support programmes administered by retail suppliers.
- The delivery of projects, infrastructure and bespoke support mechanisms to bring forward certain 'first-of-a-kind' technologies.

What about retail?

The government has been clear that retail reform will not be considered as part of REMA. However, some of the reform options included in the initial consultation relied upon a functioning retail supply market in order to be successful:

- The 'splitting the market' concept would require suppliers to trade between two markets and make decisions on behalf of consumers around which 'pot' their power was coming from. We discuss this concept in more detail in Section 4.1.
- Introducing a supplier obligation that mandates suppliers to procure a certain amount of generation from renewable sources and/or flexibility on behalf of consumers was also explored, as a mechanism to support investment in these technologies.

In the summary of responses, many respondents highlighted that both of these options would put a lot of stress on an already struggling retail market, and may lead to increased costs for consumers as a result. The government agreed not to take forward a supplier obligation as the main mechanism for driving low-carbon investment in the short term. They have stated, however:

"We will… continue to consider the role of suppliers – and whether it is necessary to place duties and requirements upon them – in support of the delivery of other REMA options."

This highlights the importance of considering the need for retail reform – to make the retail market work better for consumers, become more resilient and investable and support the transformation of our energy system – in tandem to any reform of wholesale market arrangements. The government has committed to explore this in the publication of their vision for the energy retail market. This included releasing a Call for Evidence on how the regulatory framework needs to evolve to support new ways of offering energy supply this summer, which many in the industry felt did not go far enough in exploring the potential for reform. More consultations are expected in 2024, although there are not yet clear timelines on this.

3.3 How long will the reform process take?

The planned timelines in the initial consultation saw implementation from the mid-2020s, but the reform process is ongoing. A broad range of options are being considered and timescales for implementation will depend on the reform options that are chosen – medium-term changes to existing arrangements could be delivered from the mid-2020s, while longer-term transformational reforms could take until the 2030s to implement fully. The process is also exploring low regret 'quick wins', which could be pursued on accelerated timelines and implemented regardless of the end package of reform. All of this also depends upon the upcoming election cycle and whether decisions are made ahead of then.

3.4 Who are the main players involved?

- **Government:** the REMA team is based in the Department of Energy Security and Net Zero (DESNZ). Graham Stuart is the minister in charge of REMA although core decisions sit with the Secretary of State, currently Claire Courtinho. There have been several changes of minister and Secretary of State since the REMA process began – this is a recent appointment with Ms. Courtinho taking over from Grant Shapps in August 2023. There is a large team of civil servants developing the policy options for REMA, who have been highly visible and engaged over the past eighteen months.
- **Ofgem:** The Office of Gas and Electricity Markets (Ofgem) is GB's independent energy regulator. It is bound by a statutory framework set by Parliament to protect energy consumers.
- **National Grid ESO:** the Electricity System Operator (ESO) for GB. The ESO plays multiple roles in the GB electricity system and is about to transition into a fully independent National Energy System Operator (NESO), as explored in more detail in Breakout Box 2.

Breakout box 2: From ESO to NESO

From ESO to NESO

Currently, the ESO is a legally separated part of National Grid group with responsibility for the electricity system. Following the passing of the Energy Act 2023, which legislated for a Future System Operator (FSO) to be created, the ESO will soon evolve to become a not-for-profit publicly-owned organisation with wider system planning responsibilities that go beyond the electricity system.

The new National Energy System Operator (NESO) will play an important role in coordinating and ensuring strategic planning across the sector. It will have an ambitious long-term vision and provide independent advice to government and Ofgem. Furthermore, the NESO will adopt a 'whole system' approach within the energy system, with responsibilities in strategic network planning, long-term forecasting and market strategy. Through these roles, the NESO will drive progress towards net zero, while maintaining energy security and minimising costs for consumers. The expectation is that the NESO function will continue to be funded by consumers through a price control arrangement, i.e. there will be an agreed budget, with charges placed on energy bills.

3.5 The challenges set out in the initial consultation

To achieve the overall objective of reforming electricity market arrangements to ensure that they facilitate the 2035 goal – subject to security of supply and in a way that is cost effective for consumers – the government identified five key challenges that future market arrangements need to overcome:

- **Increasing the pace and breadth of investment in generation capacity:** the system will require a significant amount of new low-carbon electricity capacity to meet decarbonisation targets.
- **Increasing system flexibility:** as the amount of variable renewable generation on the system increases, we will also need to invest in lots of flexible capacity across supply and demand to ensure that the system can still be balanced.
- **Providing efficient locational signals:** the market will need to send locational signals that both a) stimulate generation, flexibility and demand to build in suitable parts of the network – known as 'investment' signals – and b) encourage assets to operate in a way that benefits the system and reduces costs – known as 'operational' signals.
- **Retaining system operability:** system operability – the physical process of running an electricity system – will become more challenging as the system decarbonises and more intermittent sources of generation change the characteristics of the network.
- **Managing price volatility:** as the percentage of renewable generation on the system increases, wholesale market prices may become more volatile and market arrangements will need to help mitigate this.

All the options put forward under REMA should aim to help with at least one of these, and in response to the initial consultation many stakeholders agreed that there are big challenges to be solved. However, many respondents noted that it is important to understand the details and there was disagreement on the extent to which the existing market arrangements are already able to address these challenges. For example, whilst respondents broadly agreed that locational signals are important, many disagreed with the suggestion that the current system lacks any form of locational signal – something Regen explored in the insight paper Improving locational signals in the GB electricity market.

There are also some key issues that were missed in the initial consultation and as the debate has evolved, so too have the government's objectives, to better reflect the issues that REMA needs to address. This is something we discuss in more detail in Section 5.1.

3.6 What else has been going on in this space?

REMA has not been the only process looking at wholesale market reform over the past few years:

- The ESO's Net Zero Market Reform programme was established in early 2021 to examine the changes to current GB electricity market design that will be required to achieve net zero. The final report was published in November 2023.
- Ofgem has also been undertaking its own assessment of locational wholesale electricity market design options. This kicked off in June 2022 alongside the publication of the Net Zero Britain report, which highlighted Ofgem's view of the key challenges for market reform.

Ultimately, the legislative decisions that come out of REMA will sit with the government. However, the reform process is complicated, with several key players influencing decision making. These programmes running parallel to REMA will likely have influenced the proposals contained in the second REMA consultation, with DESNZ, Ofgem and the ESO all working closely together.

Section 4:

The reform options

Following the original consultation, the government formally discounted some reforms when they published the summary of responses, although most options remain on the table. The following section doesn't explore every single reform option, but discusses the most significant options that are still in discussion and those which are of most importance to local authorities and community energy organisations. Figure 4 shows the options presented in the initial REMA consultation.

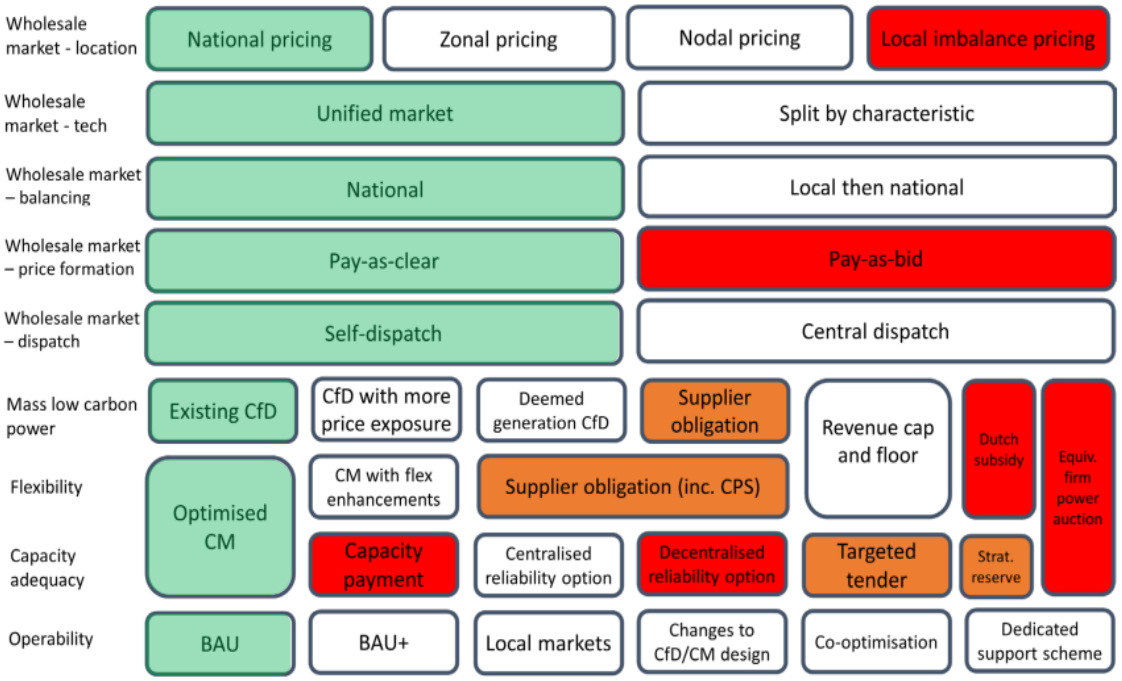


Figure 4: The options presented in the initial REMA consultation. Options highlighted in red have been rejected from further assessment, while those in orange have been discounted as standalone mechanisms but are being considered in conjunction with other reforms. Options highlighted in green represent current market arrangements.

4.1 Split markets

4.1.1 What is it?

The 'split markets' concept represents a splitting of the structure of the wholesale market into two, based on the characteristics of the generators. One pot would be 'as available' for intermittent renewables and nuclear and the other 'on demand' for all dispatchable generators.

Currently, short-term (day ahead and intraday) electricity prices in exchange markets are heavily correlated with the price of the marginal generator (the most expensive generator needed on the

system to meet demand), which is usually gas generation, and therefore the price of gas. The split markets option was proposed in response to the energy crisis as a way to reduce the influence of high gas prices on electricity prices. The concept suggested that prices in the 'as available' market would instead be set by the long-term, lower levelised cost of renewables, with only prices in the firm 'on demand' market being set by the marginal cost.

When the government published its summary of responses it was clear that many respondents did not agree with this concept, due to it not being implemented anywhere else and remaining a theoretical idea without a worked-up design. It would also be very complicated to implement, with one academic model proposing that a successful scheme would require each household to be fitted with two electricity meters – one for each pool.

Several alternative options do exist to ensure the value of renewables are passed to the consumer and many respondents highlighted that the CfD mechanism is one such example. The scheme already works as a form of splitting the market by acting as a 'hedge' for both generators and consumers, protecting consumers against very high energy prices by fixing the price per MW at which electricity is procured. This is demonstrated by the fact that, as shown in Figure 5, in the last quarter of 2021, generators paid back over £133 million to the CfD scheme, helping to reduce energy costs for bill payers.

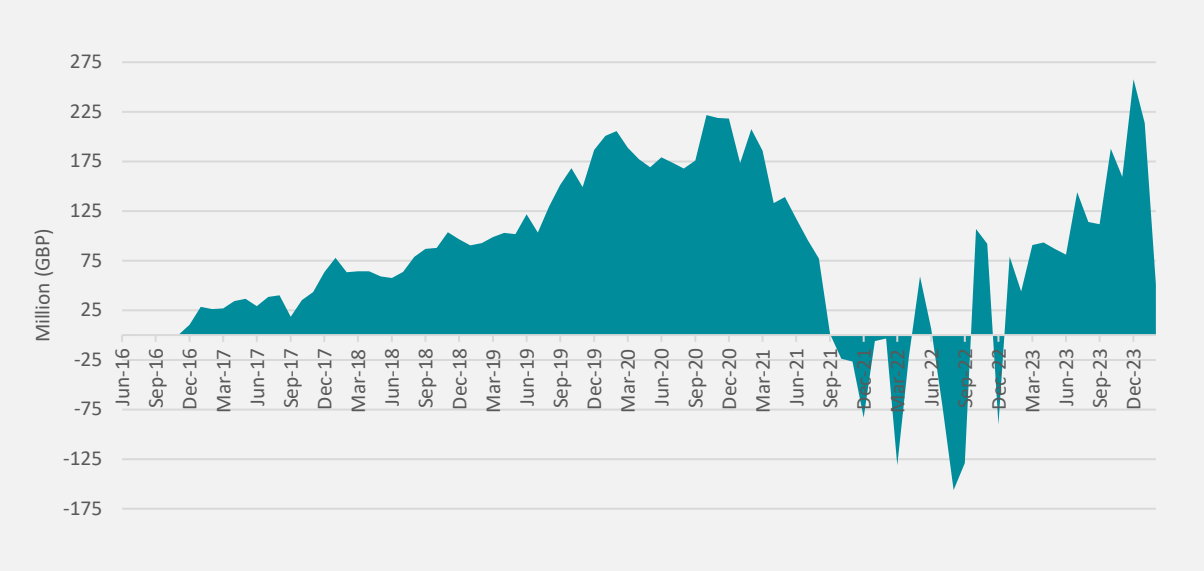


Figure 5: CfD support payments to generators. Source: LCCC Data Dashboard

4.1.2 What does this mean for local authorities and community energy organisations?

It is unlikely that REMA will result in a fully split market and government engagement suggests that it will not be included in the second consultation. There are too many complications and much of the benefit could be achieved via other means. However, it is useful to understand the origins of the split market concept and the motivations behind its inclusion in the initial consultation, as part of exploring other options to help bill payers to benefit from renewables and be less exposed to volatile international gas prices.

4.2 Locational Marginal Pricing (LMP)

4.2.1 What is it?

An LMP-based market is a market where the price at each location (node or zone) is set at the cost of meeting the next unit of demand at that location. Unlike the current system, market operation and dispatch in an LMP-based market is centralised and is run by an independent market operator using an algorithm. System access is non-firm, meaning market participants only have the right to access the system when instructed to do so by the market operator. This means, for example, that a renewable generator would not be able to export to the grid unless instructed to do so.

LMP is often presented as a way of valuing local generation. In fact, price differences are almost entirely driven by the level of constraint that is present between nodes or zones, rather than the level of generation present within each. A completely unconstrained system, where electricity could flow from generator to consumer wherever they are and without any restrictions, would have equal prices at every node. The presence of constraints on particular transmission lines causes the market to split and different prices to emerge.[7] Figure 6 compares a zonal and a nodal market system.

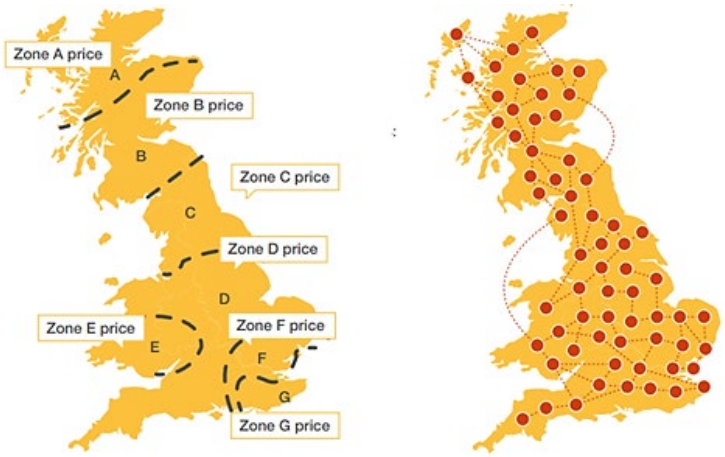


Figure 6: Illustrative examples of (a) a zonal and (b) a nodal GB wholesale market. Source: National Grid ESO

Low nodal prices might arise 'behind' a constrained node due to the presence of lots of intermittent generation that can't be used by the system (e.g. when it is windy or sunny) and incentivising increased local demand (directly or via storage). High nodal prices might arise 'in front' of a constraint, reflecting the fact that generation elsewhere on the system can't be used to meet local demand because of the lack of network capacity and requiring the use of local, expensive on-demand generation in its place, such as gas-fired power plants.[8]

[7] Regen was recently invited to brief MPs on the issue of network constraints and what can be done to reduce rising constraint management costs. You can find out more about this issue here.

[8] You can read more about LMP here and here.

4.2.2 What does this mean for local authorities and community energy organisations?

Supporters of a move to LMP argue that it would reduce the cost of managing constraints that have been caused by a lack of investment in grid infrastructure, and send locational signals to incentivise both demand and supply to locate in places that is better for the system. However, Regen and much of the industry is not in favour of such a move, for several reasons:

- **Time:** it could take years to transform the wholesale market arrangements in such a radical way – the ESO's own analysis suggests that it could take up to eight years to implement such a radical programme of reform, and that is only after the decision to do so has been made. We only have 11 years to reach the 2035 target of a decarbonised electricity system and spending much of that time in a period of uncertainty will make it harder to invest in and build the renewables we need.
- **Complexity:** generators with experience of LMP markets have told us that it is harder for organisations with fewer resources to participate in such markets, because the complexity of operating in a market that is centrally run using an optimisation algorithm makes it challenging to predict or manage price risk.
- **Uncertain benefits:** the benefit case for LMP has been challenged by a range of independent consultants and academics, many of whom agree that the modelling used to quantify such benefits is based on some hypothetical and unlikely assumptions.
- **Cost and investment risk:** all the uncertainty caused by moving to an LMP-based system is likely to lead to significant transaction costs and increase overall energy costs, making the business case for smaller scale organisations wanting to develop renewable energy projects more challenging.
- **Issues of fairness:** LMP price differentials are driven by network constraints, something largely determined by historic network investment. This could create winners and losers across GB based on whether they have historic energy infrastructure and investment, raising issues of fairness. All communities or local authorities should have the opportunity to develop low-carbon projects and contribute to the decarbonisation of our energy system, regardless of their location.

As such, we would recommend that local authorities and community groups engaging in the market reform debate should not support a move to an LMP-based market system. Regen, and other industry groups, have been calling for the adoption of a progressive agenda for market reform, something we explore in more detail in Section 5.2.

4.3 Power Purchase Agreements (PPAs)

4.3.1 What are they?

PPAs are popular bilateral agreements used to sell energy at an agreed price over an agreed term (1-20 years), between a generator and a supplier or consumer. There are different types of PPA that

are commonly used by generators to secure either an offtaker for their power or financing for their project:

- **Sleeved PPA:** an arrangement whereby a third-party supplier is involved to deal with the transfer of the electricity from the generator through the local distribution network to the buyer.
- **Direct PPA:** direct PPAs tend to refer specifically to private wire scenarios, where a physical wire is run from the generation site to the electricity customer.
- **Virtual PPA:** a purely financial instrument where two parties agree a 'strike price' at which the buyer pays the generator for energy they produce, although no transfer of energy takes place, and similar to a CfD, the contract provides a hedge to ensure the generator receives the agreed strike price regardless of the price received on the wholesale market.

While not explored in the initial consultation, many respondents highlighted the potential to increase the availability and use of long-term PPAs to improve forward market liquidity[9] and support the financing and development of new generation projects.[10]

This was then identified in the summary of responses by government as an area for further study and it's possible that the second consultation might include options to provide additional support for the PPA market. This could include measures to increase the standardisation of and access to contracts, helping to reduce energy costs and market volatility.

"We have reviewed all additional suggestions and note in particular the feedback on the potential of the PPA market. We are considering whether [the] government could stimulate the PPA market, and what form this stimulation could take."

DESNZ, Summary of responses to REMA consultation, March 2023

4.3.2 What does this mean for local authorities and community energy organisations?

Any government intervention regarding PPAs that focuses on the demand side or small-scale generation could be impactful for local authorities and community energy organisations looking to finance renewable energy projects. Should the government explore retail reform in tandem with REMA, there is the possibility that this could further support the uptake of sleeved PPAs, such as through mandating that suppliers provide some kind of sleeved offering if requested to do so.

[9] Liquidity is defined as the efficiency or ease with which electricity is bought or sold without causing a major change in its price and without incurring significant transaction costs. Market liquidity is important for supporting competition and efficiency – a liquid market creates greater price transparency which can then provide opportunities for increased competition across the market. Liquidity is a key measure deployed by Ofgem to monitor the effectiveness of the wholesale market.

[10] Regen has explored different models for local authorities and communities to finance and develop renewable projects – more information on this work can be found here.

4.4 Green Power Pools

4.3.1 What are they?

The Green Power Pool concept sees a central buyer or intermediary manage a pool for variable renewable power, which would operate alongside the existing wholesale market. The operation of several collaborative and coordinated power pools could offer some of the benefits of a split market without the same level of market upheaval.

The attraction of Green Pools would be to target lower cost renewable energy at a specific consumer group – local, social tariff or sector. The initial concept suggested that the central buyer would be the System Operator, with the pool operational nationally. This concept has evolved to explore the creation of several, decentralised pools.

How the pool concept could work:

- A central buyer (or collaboration of buyers) enters a 'sleeved' PPA with an energy generator(s) to create a Green Power Pool.
- Under appropriate conditions of competition the contract price in the pool should, in a similar way to the CfD, approach the long-term, levelised cost of renewable generation.
- A pool would need a licensed energy supply company to be involved to manage the balancing process. Any residual demand not covered by power from the pool would then be sourced from the market by the supply company.

4.3.2 What does this mean for local authorities and community energy organisations?

Green Pools could be viewed as an extension of the growing PPA market by allowing multiple organisations to participate where they might struggle to procure a PPA directly, due a lack of sufficient financial backing or resource. Regen has previously worked on developing structures similar to the pool concept, such as Bristol City Council's 'sleeving pool' and other local supply models, and in time such pools could become a useful tool to allow local authorities to support the development of local and community-led renewable energy projects.

However, at present, the concept remains theoretical and has not been demonstrated to work in practice. There are several challenges that the option faces, including the requirement for supplier participation to manage the balancing and settlement process. This is a key barrier as, given the current retail market, many suppliers are not interested in taking on this risk.

Much like encouraging uptake of PPAs, if the government were to explore retail reform in tandem with REMA, to make it easier for suppliers to facilitate the creation of Green Pools, or were to look at charging reform to better reward local consumption of renewable generation, then these could become a new avenue for local authorities and community energy organisations to fund renewable energy projects and sell or procure energy locally.

4.5 Contracts for Difference (CfD) reform

4.5.1 Challenges faced by the current CfD mechanism

Although CfDs have been highly successful in supporting renewable development, particularly the expansion of the offshore wind sector during the late 2010s and early 2020s, there are several concerns around the system impacts of CfD generators and, in particular, how they behave in the wholesale energy markets. In addition to this, the failure of AR5 to bring forward any bids from offshore wind suggests that significant reform may be needed to deliver against the UK's 2030 target for 50 GW of offshore wind and the future build-out of capacity required during the 2030s.

- **Reduced liquidity in forward markets:** any CfD top-up is based on the reference price, which is currently linked to the day ahead market price, and a CfD coupled with a PPA directly linked to the day ahead auction prices provides a perfect hedge during periods of positive price. However, this removes any incentive for generators to sell their electricity in anything other than day ahead auctions as this introduces risk for the wind farm owners, which causes issues for forward market liquidity. The knock-on impact of this is that it can be harder for other market participants, such as community-owned generators, to procure long-term contracts.
- **Encourages generators to maximise electricity export to the grid:** generators receive a differential payment to a fixed strike price, meaning their renewable assets are less exposed to price signals and instead are encouraged to maximise grid exports. This can create distortions during over-supply periods and may dissuade generators from the use of co-located storage.
- **CfDs may not recognise the full value of different types of generation at different locations:** the government has also been consulting on a number of 'non-price factors', asking how the CfD scheme should recognise and reward generators for different types of value creation such as regional development, supply chain, jobs and community benefits.

The consultation explored removing the CfD scheme altogether, as well as proposing three options for reform of the mechanism to address the above concerns, including encouraging CfD holders to behave more efficiently in all wholesale markets and to reduce the influence of the CfD in driving trading behaviour. In the summary of responses, the government did not rule out any of the proposed reform options, meaning they are all continuing to be explored.

4.5.3 What does this mean for local authorities and community energy organisations?

As discussed in Section 4.1.2, the CfD is one mechanism for protecting consumers against very high energy prices by fixing the price per MW at which electricity is procured and, as more CfD-backed projects start generating, the impact of this on reducing price volatility for consumers should become more apparent. It seems that the government agrees with this and, as such, is unlikely to discontinue the scheme altogether.

However, the scheme could evolve to encourage CfD holders to operate their assets in a way that is more beneficial to the energy system as a whole – although the potential impacts of the proposed

reforms are still being understood. Changes to the CfD scheme to recognise and reward generators for different types of value creation could encourage generators to put more emphasis on developing local supply chains, supporting local job creation.

The summary of responses highlighted that some respondents *"advocated allowing small-scale (<5 MW) generation to participate in the CfD scheme"*, and the possibility of creating a community-focused CfD scheme was explored by Regen in our response to the initial consultation. The government did not directly comment on these proposals but, given other policy interventions such as the Community Energy Fund announced last year, it seems unlikely that the CfD scheme will be expanded to support smaller-scale renewable energy projects, such as those that might be developed by local authorities or community energy groups.

4.5.4 What is it?

Flexibility is the ability to adjust supply and demand to achieve balance across the electricity system. Traditional patterns of demand are being disrupted by smart technologies like heat pumps and electric vehicles which, coupled with the increased variability of supply caused by renewable generation, means that there is a growing need for our electricity system to be flexible. As Figure 7 highlights, by 2035, between 80 and 100 GW of energy flexibility will be needed to operate a net zero energy system, across lots of different technology types. This will be used to manage variable generation, meet peak demand, ensure security of supply and manage network constraints. Flexibility will also be key to make best use of renewable generation when energy is in abundance. Bringing forward the investment in flexibility needed is therefore a key challenge for the REMA reform process.

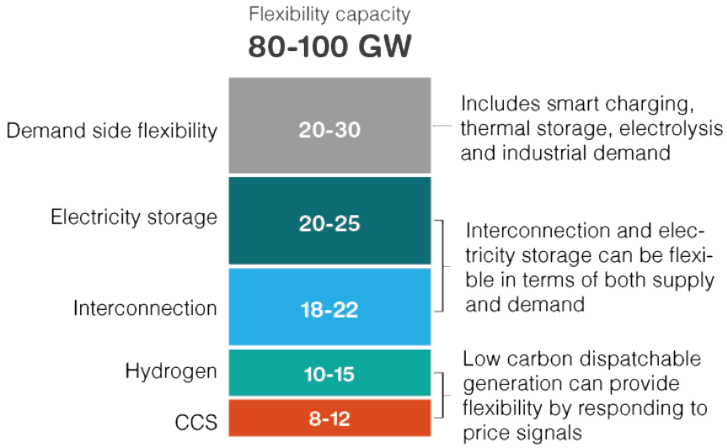


Figure 7: Technologies providing energy flexibility in 2035, by capacity, taken from Regen's A Day in the Life of 2035 report

4.5.5 The initial REMA consultation

Most of the options discussed in the initial consultation for supporting the development of flexibility focused on doing so at the transmission level. However, in addition to introducing LMP which, as discussed in Section 4.2, could impact assets connected at the distribution level, the consultation did briefly explore an option relating to 'local markets'.

This proposal involved breaking up and re-orientating the existing wholesale market structures around local, distribution-level markets – like the BM, but operated at the distribution level, with each Distribution Network Operator (DNO) running a balancing market in their area. Responses to this option were mixed and the summary of responses stated that: "*the government has decided not to take forward local imbalance pricing as an option into the next phase of assessment*".

However, since then, this thinking has evolved to explore the creation of new, locally-focused flexibility markets, such as Constraint Management Markets (CMMs). These could be used to contract flexibility on various timescales to manage both 'turn down' costs incurred in reducing generation or increasing demand behind a constraint, and 'turn up' costs incurred in increasing generation or decreasing demand in front of a constraint.[11]

Finally, as discussed in Section 2.2, there has also been an increased recognition of the importance of reforming the BM to make it easier for flexible assets to participate.

4.5.6 Distributed flexibility

The summary of responses highlighted that there was support for improving the level of coordination between the ESO and DNOs. This included the need for investment in digitalisation to improve the exchange of data between DNOs and the ESO and the need to improve the visibility of assets on all parts of the network in order to support the operation of an increasingly complex system.

Since the government has indicated that they are exploring an additional workstream within the REMA process that focuses explicitly on distributed flexibility. Ahead of the publication of the second consultation there isn't a huge amount of information available on what this might look like, but the aim of the workstream is to ensure that markets are accessible for distributed assets to participate and to incentivise further investment in flexibility technologies and services by creating opportunities for market participants to earn revenue.

4.5.7 What does this mean for local authorities and community energy organisation?

Communities and local authorities are increasingly turning to flexibility, whether co-located with renewable generation or stand-alone, to diversify business models and provide new opportunities for the public to benefit from the energy transition. However, the current market framework does not maximise the potential for the full range of flexible technologies to deploy or operate flexibly, particularly at the distribution level. If the REMA process does deliver reforms focusing on distributed flexibility, this could make it easier for local authorities and community energy organisations to maximise revenue from renewable generation projects, through investing in co-located storage, or improve the business case for investing in other flexibility projects, such as EV charging or stand-alone storage projects.

[11] You can read more about Constraint Management Markets here and the current Local Constraint Market trial being undertaken by the ESO here.

Section 5:

How the debate has matured

5.1 The four challenge areas

By summer 2023, partly as a result of extensive industry engagement, the government changed its articulation of the priorities of REMA. This has refocused reform options around four objectives, which take a more pragmatic approach and focus on the outcomes that are needed. These are:

- **Investment to create a renewable-based system at pace:** focuses on ensuring that there are sufficient investment incentives to support the deployment of renewables and investment in grid, storage, flexibility etc. Options include reforming the CfD mechanism and the creation of new markets for flexibility, such as local constraint markets at scale.
- **Passing the value of lower cost renewables to the consumer:** considers the challenge of some generators having the opportunity to make excess profits, based on the marginal cost of gas influencing electricity prices. Reform options include an expansion of the CfD scheme, potentially to existing generators, and encouraging greater use of long-term price contracts such as PPAs.
- **Transitioning away from unabated fossil fuels to a flexible, resilient and decarbonised electricity system:** explores providing support for new low-carbon generation like hydrogen and CCUS, long duration storage and flexibility. Reform options focus on changing to the CM to enable it to better support low-carbon flexibility.
- **Operating and optimising a renewable-based system cost effectively:** explores the potential for more fundamental reforms to improve locational signals and ensure that markets support – and can provide services to enable – system operability and resilience. Reform options include a potential shift to zonal locational pricing, moving to centralised dispatch or measures to improve the BM.

5.2 Progressive market reform

in the past year there has been a renewed focus on what could be achieved through ambitious, but incremental, reform within the existing national market and trading arrangements. As well as delivering value to the consumer and meeting the REMA objectives, a progressive programme of reform could potentially be delivered with less risk and upheaval for market participants than some of the more radical options introduced in the initial consultation.

As part of this progressive reform package, there are several additional areas of energy system reform that the second REMA consultation may consider exploring in tandem. This includes addressing the need for greater strategic planning of the whole electricity system or exploring the potential of charging reform to achieve some of the REMA objectives, such as introducing stronger locational signals within network charges, to influence where generation and flexibility projects are built. We discuss these reform areas in more detail in our locational signals paper.

Section 6:

Conclusions and next steps

6.1 What does this mean for local authorities and community organisations?

The REMA process of reform aims to make the GB wholesale market structures more dynamic and flexible, opening up more opportunities for innovation and supporting the transfer of the value created by renewable generation to consumers.

Any period of uncertainty can lead to the introduction of risk and some of the reform options introduced in the initial consultation represent a radical overhaul of the existing market structures. This could increase investment risk, making it harder for new projects to be developed. However, the direction of travel appears to favour reforms that are more incremental, building on existing market arrangements rather than overhauling them entirely. A wholesale market that is more dynamic and flexible could create new revenue streams for existing renewable energy and flexibility projects or make it easier to invest in new projects.

Finally, it is important to understand the relative scale and impact of the different reform options and how their proposed delivery timelines interact with timelines for projects that are already in development. Some reforms might be enacted relatively quickly, with little risk, while others could take years.

6.2 Next steps

The government should be publishing the second consultation in early 2024.

We strongly encourage local authorities and community energy organisations to have their say by submitting a response to the consultation once it has been published.

We see responding as an important process to ensure the government's changes to market arrangements consider how reforms impact the ability of local authorities and communities to invest in – and benefit from – the energy transition.

Regen is also planning to submit a response to the consultation – if you have views that Regen could include in its response, please share these with Ellie Brundrett (ebrundrett@regen.co.uk). We will publish our response online.

To keep up to date with Regen's work in market reform and other relevant work, sign up to our community energy or local authority newsletters via the form on our website.

Photo credit: Tren Basin Solar Project

Regen
Bradninch Court
Castle St
Exeter
EX4 3PL

01392 494 399
www.regen.co.uk

March 2024