

# Review of electricity market design in Great Britain

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KEY MESSAGES



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**AFRY**  
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**1. While there is a case for change, existing arrangements have had significant success in delivering decarbonisation, whereas radical change is likely to deter the necessary investment for the complete decarbonisation of the electricity sector by 2035**

The scale and pace of the investment required to deliver a decarbonised power sector by 2035 means that investor confidence needs to be enhanced. This becomes harder to achieve as the proposed changes to existing arrangements become more radical. Any significant change to market arrangements is likely to impact investor confidence in the short-term, given that new risks and opportunities will not become fully apparent until detailed design and implementation has taken place. Revised arrangements to 2035 should therefore aim to address the problems with the current arrangements to the extent necessary, but not more.

**2. Wholesale power market reform is not enough on its own; action is also needed in network investment, planning policy, retail markets, and in related areas such as CCUS and hydrogen infrastructure**

Although of critical importance, revised wholesale power market arrangements are only one component of the overall effort required to deliver a decarbonised power sector by 2035, with the following out-of-market arrangements also critical for success:

- investment in network capacity needs to keep pace with renewable and distributed generation appropriately
- the planning system needs to enable generation capacity to be installed faster and in more diverse locations
- the retail electricity market needs to better enable flexible demand-side response from consumers

Furthermore, the electricity system must become better integrated with adjacent sectors with planning co-ordinated with network, CCUS and hydrogen infrastructure.

**3. The scale and pace of the investment required to deliver rapid decarbonisation requires a centralised approach to capacity planning and procurement**

All credible decarbonisation visions require centralised long-term contracting for low carbon and flexible capacity, at least until 2035. In each of our strawman market designs we have therefore assumed centralised long-term contracts for new renewables and for the capacity needed to deliver reliability over the timeframe to 2035. This echoes BEIS' thoughts in its REMA consultation paper, being minded to exclude decentralised capacity arrangements. We recognise there is already some corporate procurement of long-term contracts, but this is not considered a primary motivator for large scale investment over the period until 2035.

**4. Spot markets with central dispatch are limited in their treatment of flexibility and decentralised resources, whereas decentralised models are limited by their treatment of location and the degree of coordination**

A necessary feature of any revised market arrangements will be improved operational efficiency within the wholesale energy and flexibility markets intraday, with a range of ambition and designs across our strawmen.

There are trade-offs in operational efficiency in the choice between centralised and decentralised dispatch. Allowing opportunities to re-trade (potentially continuously) close to real time as information changes is an important feature of decentralised market design.

**5. Locational energy prices improve incentives on market actors for efficient dispatch, but place new risks on investors and participants, increasing the cost of capital**

Locational energy markets aim to improve the locational efficiency of both investment and operational decisions, reducing the costs to consumers of locational inefficiencies. Locational value and risk are passed onto market participants, which would represent a major change to the investment cases for both new and potentially (retrospectively) for existing generation.

Increased price uncertainty which is unlikely to be fully hedgeable over the financial lifetime of a new asset would increase costs of capital for new investments, while existing assets in constrained areas would potentially face endemic exposure to zero-priced periods. The risks to investor confidence, particularly for renewable investors, are serious given the need to improve investor confidence further to achieve the pace of investment required to 2035.

**6. Long-term support contracts for renewables will remain necessary to achieve rapid power sector decarbonisation, but need to incorporate improved incentives for efficient operational decisions**

Renewable generators face exposure to price cannibalisation and zero pricing; conversely customers are facing marginal pricing set by gas and carbon although the share of these technologies is falling. Solutions to both these issues involve longer term fixed price contracts for renewables, with potentially an 'evergreen' option in which a new fixed price would be agreed at the end of the initial contract period (akin to a split markets model).

Revised market arrangements should also provide increased incentives for renewable generators to make more efficient operational decisions from a system perspective, and deemed generation CfDs feature heavily in our strawmen as a key tool in enabling this.

**7. Capacity markets must adapt to procure low carbon resources while delivering the flexibility needed to manage variations in renewable production**

Revised market arrangements should provide increased investment and operational signals for flexible capacity which is consistent with decarbonisation. The existing capacity market targets peak capacity which relates to variation in demand. Future reliability needs will arise from fluctuations in available renewable generation, and the nature of the capacity needs will change, for example to deal with ramping requirements or 'four cold days with no wind'.

In our strawmen this changing flexibility need is met in different ways, through fine-tuning of the derating factors in the existing capacity market, a segmented capacity market with targeting of flexible capacity, or alternative designs of reliability options (in which the capacity contract takes the form of an option contract against a reference market price).

Long term contracts should be limited to low carbon generation in order to avoid carbon lock-in. Capacity procurement must be consistent with the decarbonisation targets.

Each of our models is consistent with an option of strategic reserve to mitigate the uncoordinated closure of existing thermal capacity generation (principally CCGTs).

**8. Decentralised resources at low voltage levels could become hugely important in system planning, operation and risk management; and must be properly accommodated in all market timeframes**

We are moving to a world in which distributed energy resources form a larger share of the overall set of flexible assets. Distribution network congestion management will become more commonplace and DSOs must move to active management of their networks, while maintaining close co-operation with TSOs and market actors. However, we do not see a strong case for a switch to a model in which system operation is led from distribution areas.

We note the long-term inconsistency of reconciling a centralised market model – whether centrally-directed investment or centralised market operation and dispatch – with innovative use of diversified distributed energy resources. The fabled 'smart energy system' will not be dominated by central planning, long term contracts or central dispatch.

**9. In the long-term, a world of state-backed long-term contracts is unlikely to be a desirable final position, and a pathway will be needed to encourage forward contracting, retail innovation and market-led investment**

The more centralised approach to investment that may be necessary to achieve a fully decarbonised power sector by 2035 is likely to be sub-optimal in the longer term; the current review of market arrangements should not preclude a longer-term return to more market-based arrangements with less need for large-scale government intervention.

Having market-based arrangements which include longer-term bilateral forward contracts brings a number of benefits:

- forward contracting enables retail competition, allowing space for alternative strategies for hedging and risk management through trading and demand side flexibility
- large corporate consumers may achieve their own decarbonisation commitments – potentially earlier than 2035 – through the purchase of long term renewable PPAs
- liquid forward markets over different timeframes enable the sequence of maintenance, operational planning and risk management to work effectively
- ultimately, we believe that market-led investment is likely to deliver more efficient outcomes including greater use of innovative solutions

**10. While AFRY will undertake further analysis, on an initial evaluation of a range of potential market designs, evolutionary rather than revolutionary solutions appear more credible in delivering a decarbonised GB power sector by 2035**

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