# NGESO's Net Zero Market Reform programme

9th Annual EPRI-IEA Challenges in Energy Decarbonisation Workshop

6-7 October 2022

nationalgridESO

# EMR successfully facilitated early-stage investment in low carbon technologies, but the economic, policy and system context has changed



## Late 2010s energy challenges

**Retirements:**
20% of 2011 electricity generation to close by 2020

**Nascent technologies**
High capex and cost of capital for immature technologies

**Missing money & carbon**
Missing value due to market design & carbon policy

**Moderate carbon ambition**
80% reduction in carbon emissions by 2050 and 15% by 2020.

## EMR* success

- ✓ Delivered contracts worth ~30GW of capacity by 2030
- ✓ Lowered cost of capital for investment
- ✓ Return of revenues above strike price to consumers (£39m in the last 3 months of 2021)
- ✓ Competitively procured firm capacity, consistently meeting peak demand
- ✓ Rule changes to encourage DSR and distributed assets
- ✓ Supplied the 'missing money'
- ✓ CPS+EPS largely phased out coal

## Challenges for REMA*

**New generation mix and need for flexibility**
Significantly more renewable and small / decentralised generation, requiring scale up of flexibility

**Need for investment at unprecedented scale and pace**
Need high volume of low-cost finance for investment in high-capex (but mature) low carbon resources

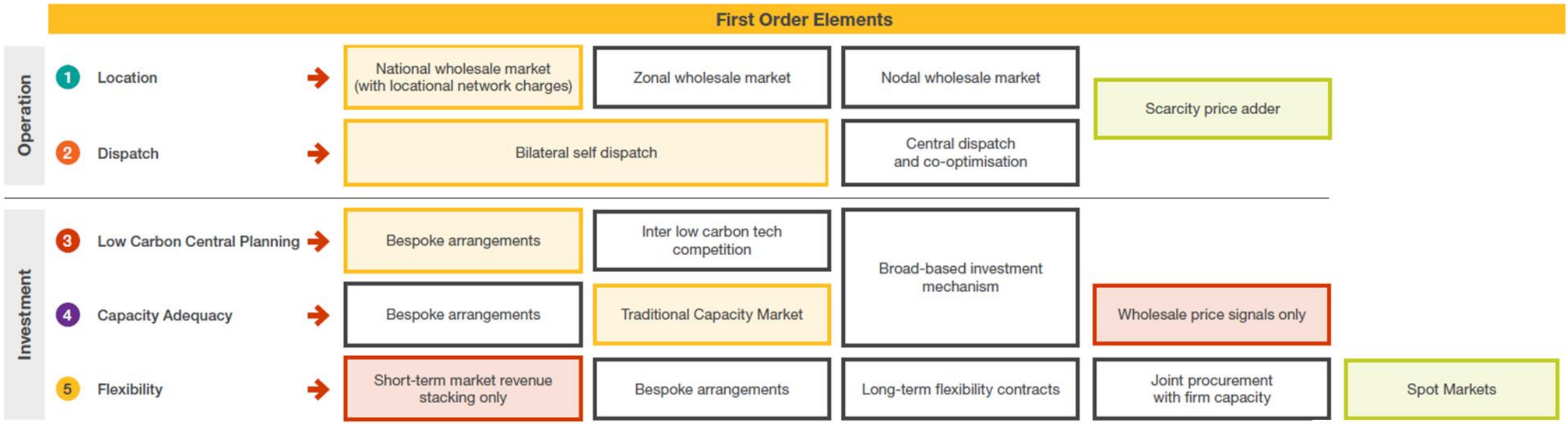
**Managed exit of fossil fuel**
Dispatchable high-carbon plant exiting market - need to ensure orderly exit of plant and replace with low carbon alternatives with 'right' capabilities

**Ambitious climate targets**
Electricity system needs to be fossil fuel free by 2035

***Note:** EMR = Electricity Market Reform policy, adopted in 2011*
*REMA = Review of Electricity Market Arrangements, currently underway in Great Britain*

# NGESO's assessment framework






Indicates predominant status quo arrangements

Indicates option eliminated in Phase 2

New option added for Phase 3

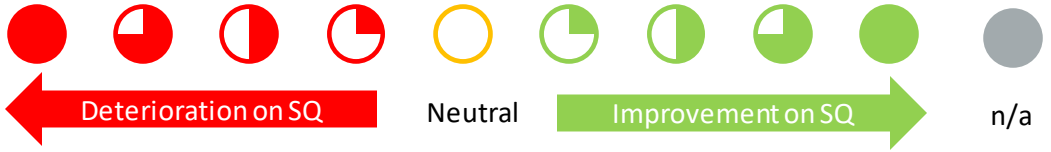
Second Order Elements

6 Low Carbon Support Mechanism

7 Settlement Period Duration

8 Ancillary Service Market Design

# NGESO's assessment criteria




| Criteria | Sub-criteria |
|---|---|
| **Value for Money** | Reduce relative proportion of redispatch |
| | Improve operational efficiency of interconnectors |
| | Ensure appropriate risk allocation |
| | Increase system flexibility |
| | Reduce inefficient inframarginal rent |
| **Competition** | Align markets/avoid distortions |
| | Better target system costs through market signals |
| | Promote greater inter-technology competition |
| | Promote greater market transparency |
| | Reduce barriers to entry |
| | Avoid risk of gaming or exploitation of market power |
| **Deliverability** | Minimise complexity/interdependencies |
| | Minimise market disruption |
| | Minimise implementation cost |
| | Reduce risk of unproven solutions |
| | Expedite implementation |
| **Investor Confidence** | Respect existing legal framework and rights |
| | Provide assurance for debt holders |
| | Provide suitable incentives for equity |
| | Promote market liquidity |
| | Minimise ongoing regulatory risk |

| Criteria | Sub-criteria |
|---|---|
| **Full chain flexibility** | Optimise investment in flexibility |
| | Optimise dispatch of flexibility |
| | Manage large and extended mismatches between supply and demand |
| | Promote demand side participation |
| **Whole system** | Align investment incentives for cross-vector assets |
| | Align dispatch incentives for cross-vector assets |
| **Adaptability** | Embrace new and evolving business models |
| | Reduce risk of lock-in or asset stranding |
| | Adapt to changing technology trends |
| **Consumer fairness** | Limit adverse distributional impacts for consumers |
| | Allow greater consumer choice |
| | Ensure fair allocation of costs, based on cost-reflectivity |
| **Energy security and system operability** | Ensure sufficient capacity to meet peak demand |
| | Ensure sufficient available energy to manage extended low renewable output |
| | Ensure sufficient capacity to maintain system operability |
| | Manage external shocks and unintended consequences |
| **Decarbonisation** | Increase probability of achieving decarbonisation objective |

SQ = status quo

# Net Zero Market Reform

## Case for change



### Key future needs

There is a need to manage dramatic energy imbalances with **flexible and firm technologies** across both supply and demand


There is a need to **invest** at unprecedented scale and pace

There is a need to incentivise assets to **locate** and **dispatch** where they can minimise whole system costs

### Key emerging issues for Operation (phase 3)

The limitations of operating a high-renewables, flexible system under the current market arrangements have already emerged, leading to rising costs and operational issues.

We identified four key issues:

**1. Constraint costs are rising at a dramatic rate**

**2. Balancing the network is becoming more challenging and requires increasing levels of inefficient redispatch**

**3. National pricing can sometimes send perverse incentives to flexible assets, that worsen constraints**

**4. Current market design does not unlock the full potential of flexibility from both supply and demand.**

# Net Zero Market Reform

## Case for change – issues for Investment/Whole System (phase 4)

**In order to deliver the 2035 decarbonisation objective cost-effectively and without worsening system security issues we must:**

1. **Get the most efficient resource mix invested in the right place, entering/exiting service at the right time,** but:

    a. currently there is asymmetry in policy and market design; and
    b. we are not sending the right locational signals

2. **Ensure all operational signals fully and accurately reflect system needs (internalise marginal costs and externalities – e.g. operability, carbon),** but:

    a. market signals are insufficiently granular;
    b. inconsistency in magnitude and targeting of signals through policy and markets; and
    c. policy sometimes shields assets from system value signals or distorts signals.

# Thank you

NGESO's published work (ongoing) on Net Zero Market Reform is available at:

https://www.nationalgrideso.com/future-energy/projects/net-zero-market-reform

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