Markets Forum
28th September 2022

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Agenda

Time	Agenda
09:15-10:00	Arrival
10:00-10:05	Welcome
10.05-10.20	Introduction and welcome from Head of Markets
10:20-11:20	Short-term priorities: Approach to Winter 2022
11.20-11.35	Break
11:35-12:30	Medium-term priorities: Updates on new projects such as demand flexibility and upward firm regulating reserve
12:30-13:25	Lunch
13:25-14:10	Long-term priorities: Net Zero Market Reform
14.10-14.15	Close to online delegates.
14:25-16:00	Breakout Collaborative Sessions
16:15-16:45	Summary, Q&A and Close
17:00-18:30	Networking event

Net Zero Market Reform

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Overview


Context
Recap
Case for Change
Shaping Packages
Next Steps


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Evolving context

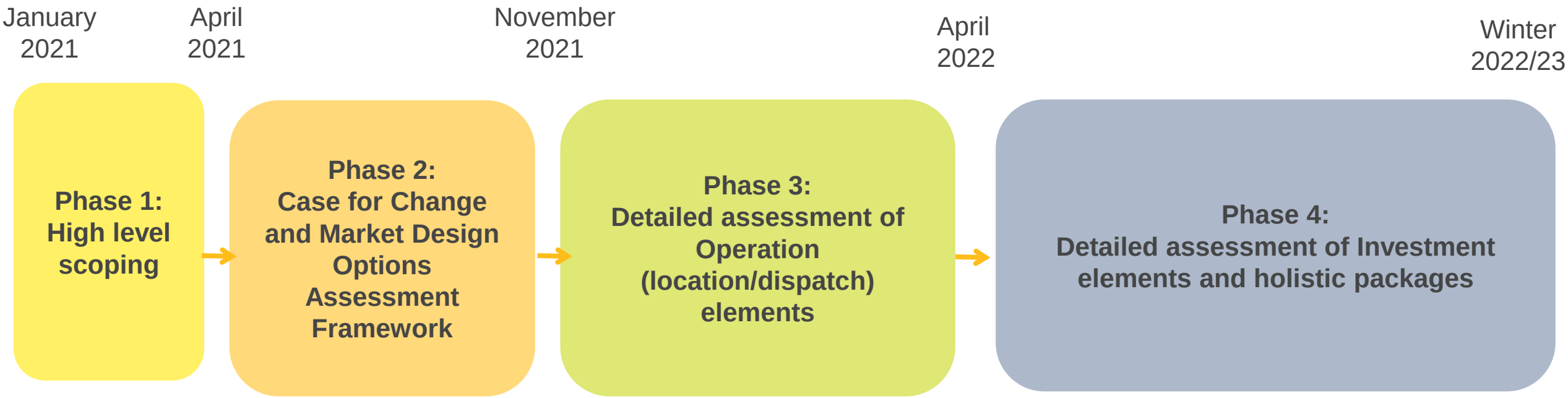
- What has changed since our May publication?
  - **gas price and cost of living crisis**
  - high priority **short-term interventions** to protect consumers, especially the most vulnerable, this winter
  - **GB long-term market reform** debate initiated (REMA and NZMR Phase 3)
    - Launch of Government's REMA consultation
    - Ofgem assessment on locational energy pricing; discussion/feedback on ESO NZMR Phase 3

- Huge challenge of **meeting net zero obligations** remains:
  - **Accelerated investment** in low carbon resources required across the **whole electricity system**
  - Need **vision for net zero power** and **long-term roadmap** for net zero **markets** and **policy**
  - Must deliver system that is **coordinated, efficient and secure, minimising costs and risks for consumers**

This is why REMA is so important, and **our NZMR programme aims to support REMA** by recommending an optimal reform package(s) for net zero, and the pathway to getting there

Recap

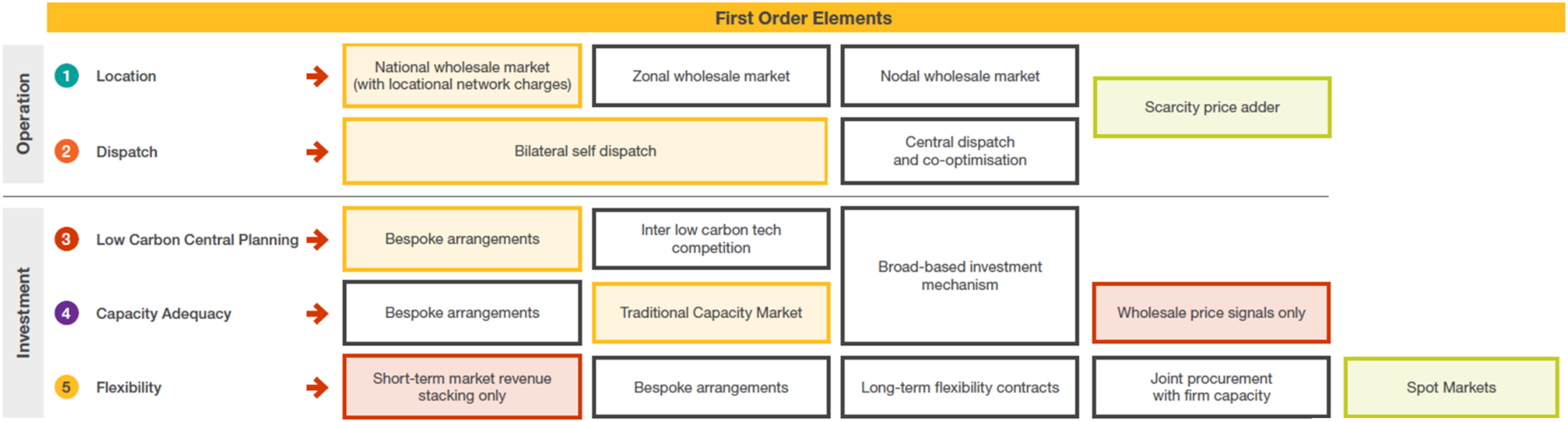
NZMR Project Timeline



Engagement with industry stakeholders and policymakers throughout

BEIS REMA consultation

Market Elements recap



Indicates predominant status quo arrangements

Indicates option eliminated in Phase 2

New option added for Phase 3

Second Order Elements

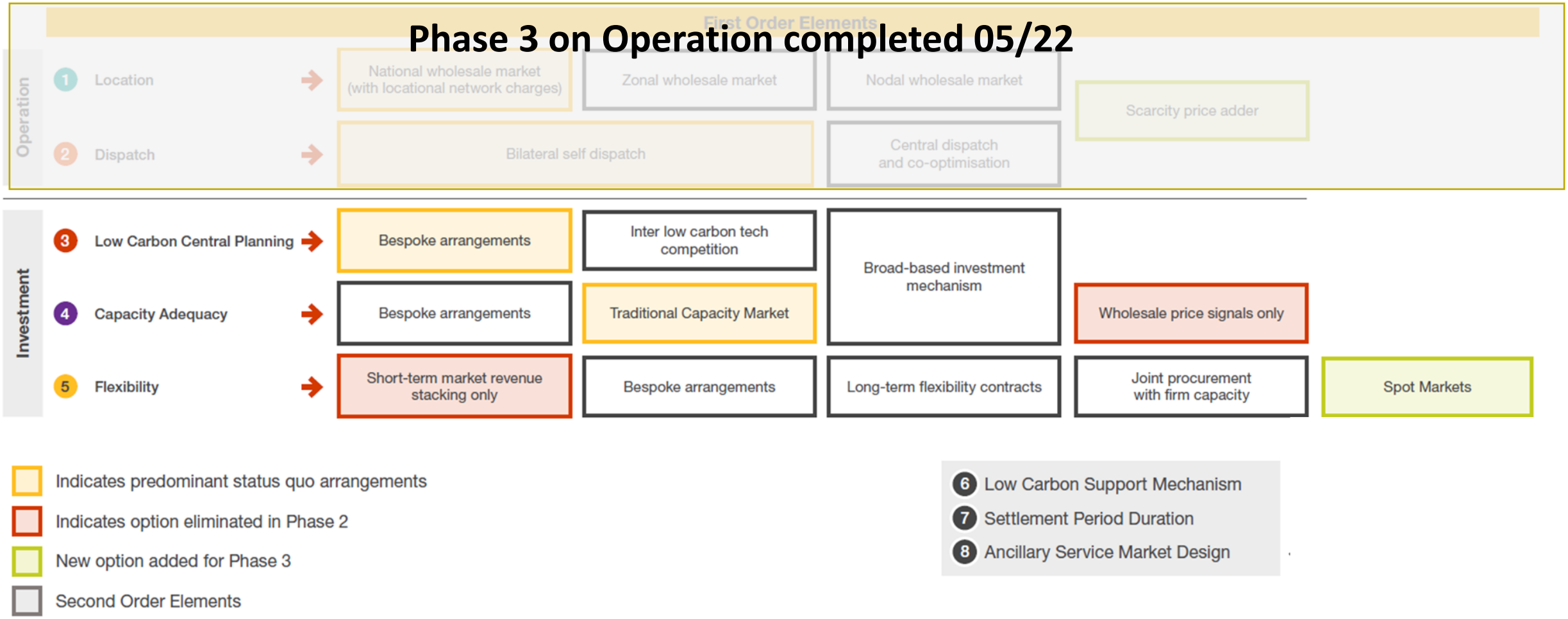
6 Low Carbon Support Mechanism

7 Settlement Period Duration

8 Ancillary Service Market Design

Market Elements recap

Phase 3 on Operation completed 05/22



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

Operation case for change (phase 3)

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.

Case for change:
Update on case for change with focus on Investment elements of the assessment framework

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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

High cost 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

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 - 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.

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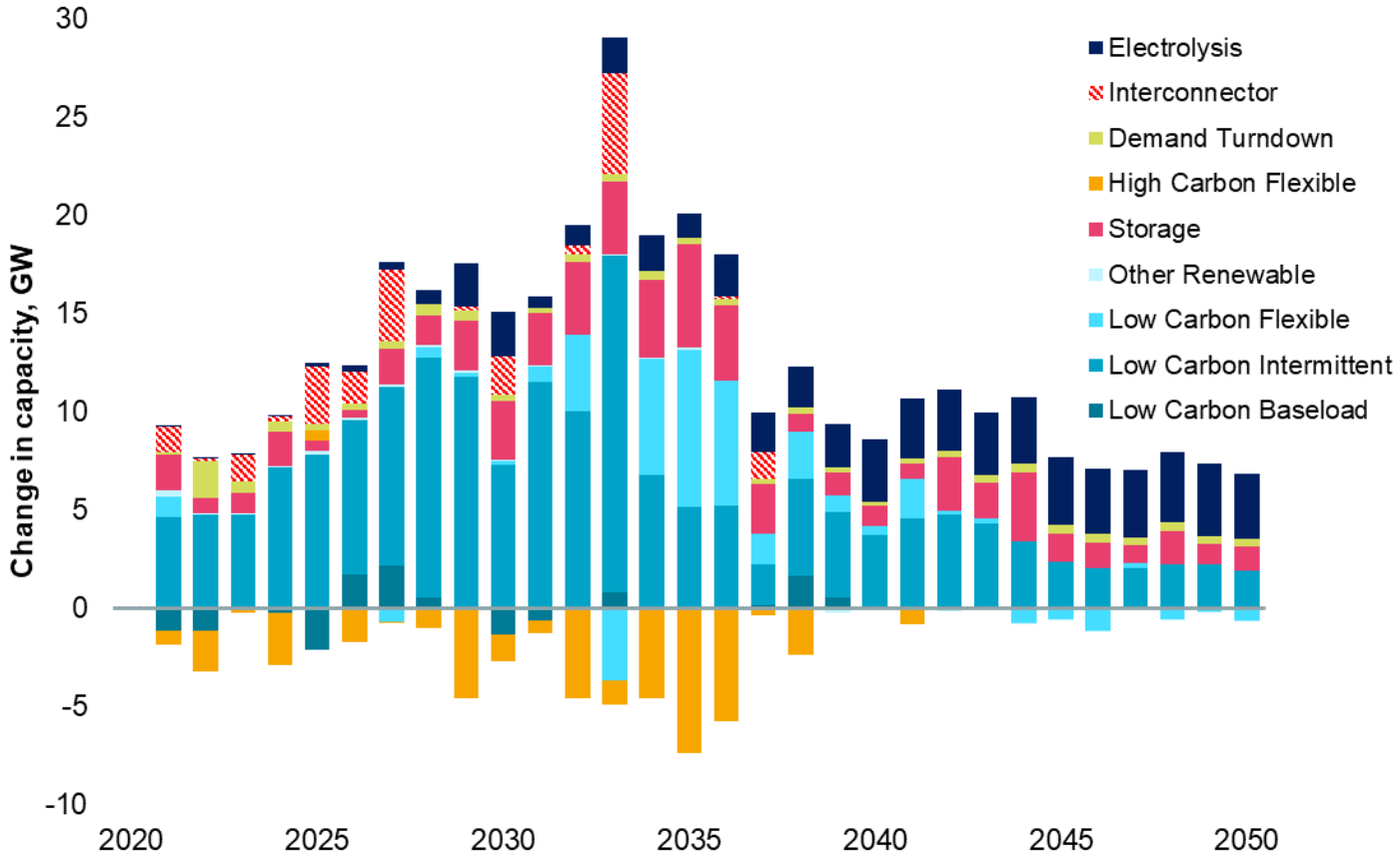
As investment dramatically accelerates, asymmetry in market design and policies must be rebalanced to deliver a cost-optimal system.

- Need to better **coordinate policy and de-risking support** across the whole system:
  - **optimal ratio** of variable renewables to flexibility
  - **implications** for networks, markets and wider system
  - **symmetry of treatment** between producers and consumers, supply / demand, e.g.:
    - **energy efficiency** not for market design to solve - needs massive policy ambition rebalancing;
    - **demand response** impact demand-side opportunities
- **Fuel switching** (electrification) requires **coherent carbon price signals across vectors**

Huge investment needed but lower costs in scenarios with higher demand-side ambitions (e.g. below – Leading the Way)



Long-term expectation of declining baseload wholesale prices reveals need to dramatically scale up flexibility

Baseload Power Price/ Total CfD Support (FES 2020 Leading the Way)

- Declining baseload wholesale prices expected under current market / policy arrangements:
  - more challenging for **merchant resources** to compete, increasing need for support
  - **reduced investor confidence** in future wholesale market
  - **increasing payments to generators** as the CfD top-up to strike price increases. Pass through of these costs to retail bills will **dilute demand response incentives**.

- Issues can be addressed over time through market / policy reforms that enable **system value to be accurately revealed through prices**.

Source: LCP/ FES 202 Leading the Way

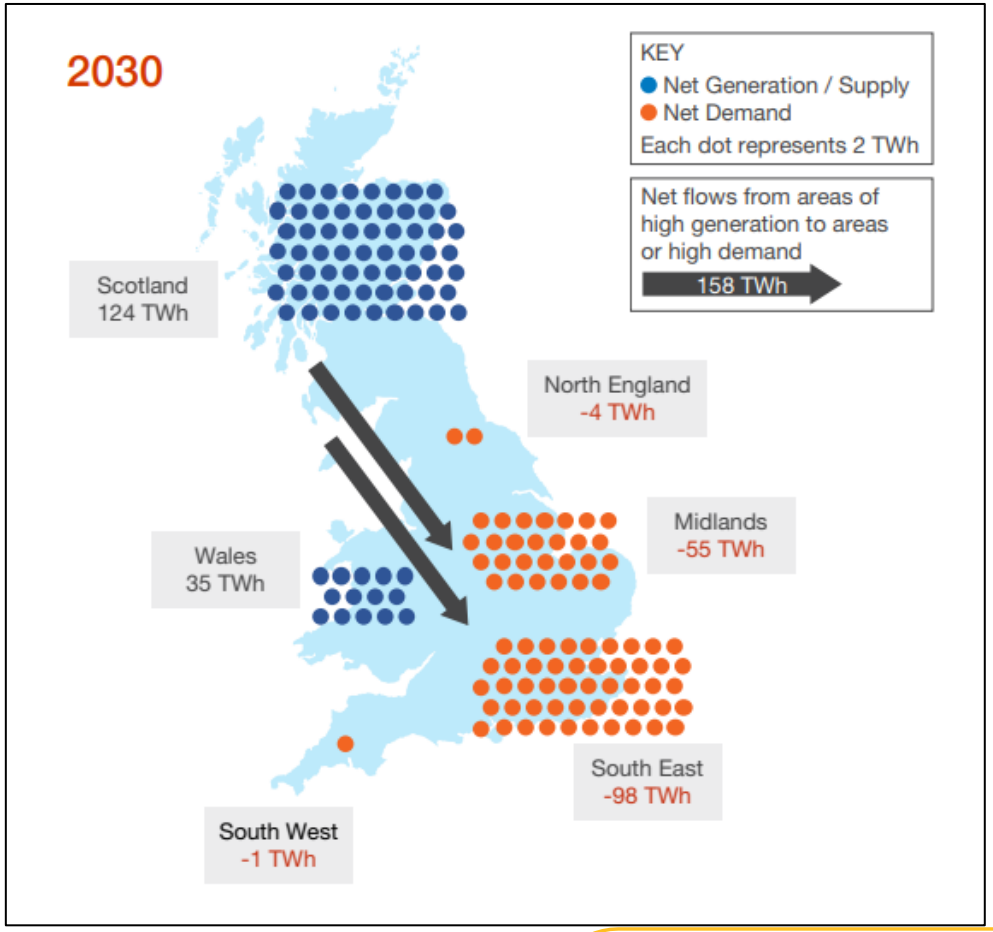
Substantial whole-system efficiency savings can be realised from stronger locational siting incentives

- **~£81.5bn** onshore & offshore transmission investment 2025 – 2050 (CSNP)
- Opportunity for **substantial capacity** to respond to **stronger locational signals**, reducing renewables' **curtailment** and **network development costs/risks**, and improving **industrial competitiveness**

Demand → North & West
- Hydrogen electrolysers
- Electricity-intensive industry
- Data-centres

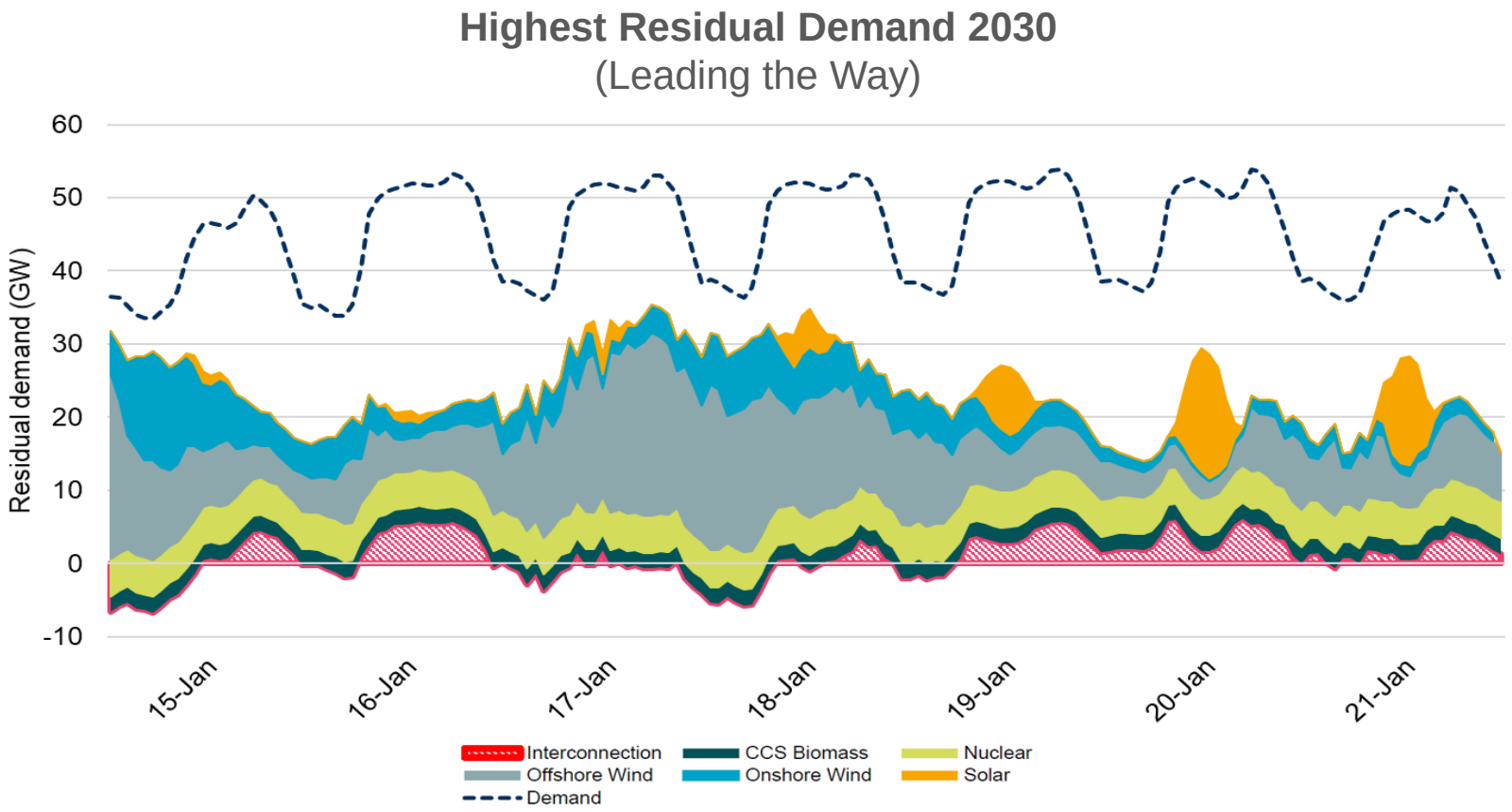
Supply → South & East
- Shift in some wind
- Batteries
- Solar
- Gas/CCS

Regional flows on the electricity transmission network in Leading the Way



Source: FES, Leading the Way

Current market signals (particularly the CM) do not reflect temporal requirements of the system



Note: Worse case week (15/01 to 22/01) based on 10 previous years weather data. Average excess, 21.3GW.

- CM designed around procuring sufficient capacity to meet **highest estimated winter peak demand,** with compensation targeting providers of that capacity.
- **Sustained response, two-way response, ramping** and other capabilities (and carbon intensity) increasingly needed for **system security** as duration/magnitude of supply/demand imbalances grows and net demand (not served by weather-dependent renewables) becomes more difficult to predict. Resources with these capabilities are **under-rewarded** by the CM for the value they provide.

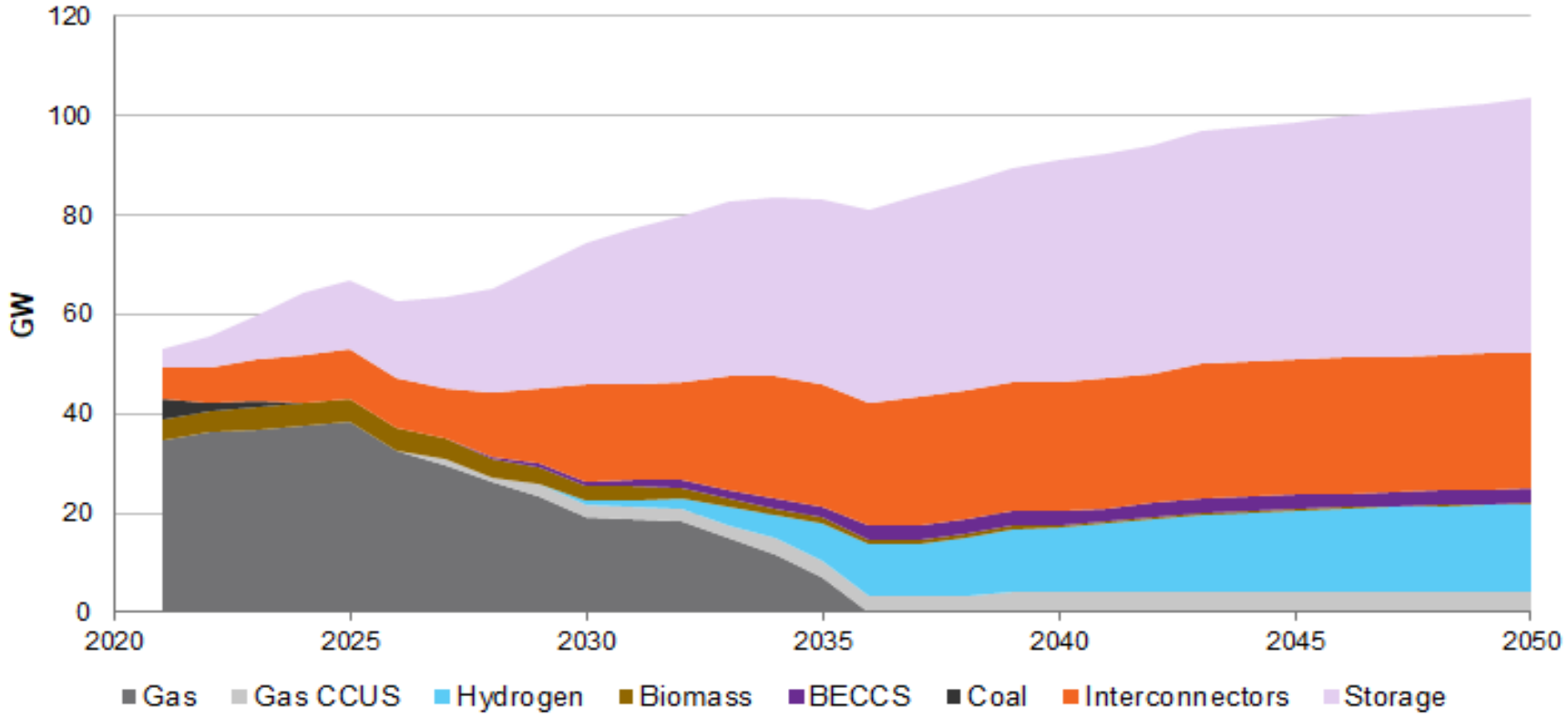
Current market signals (particularly the CM) do not reflect temporal requirements of the system

- **Ambitious, cost-effective and secure carbon reduction** is **dependent on growth and operation of flexible assets** and **efficient orderly exit** of high-carbon plant

- Markets need to **fairly** and **accurately reward** low carbon flexible assets on both the demand and supply sides of the system so **times of system stress** can be precisely mitigated **whenever** and **wherever** they occur

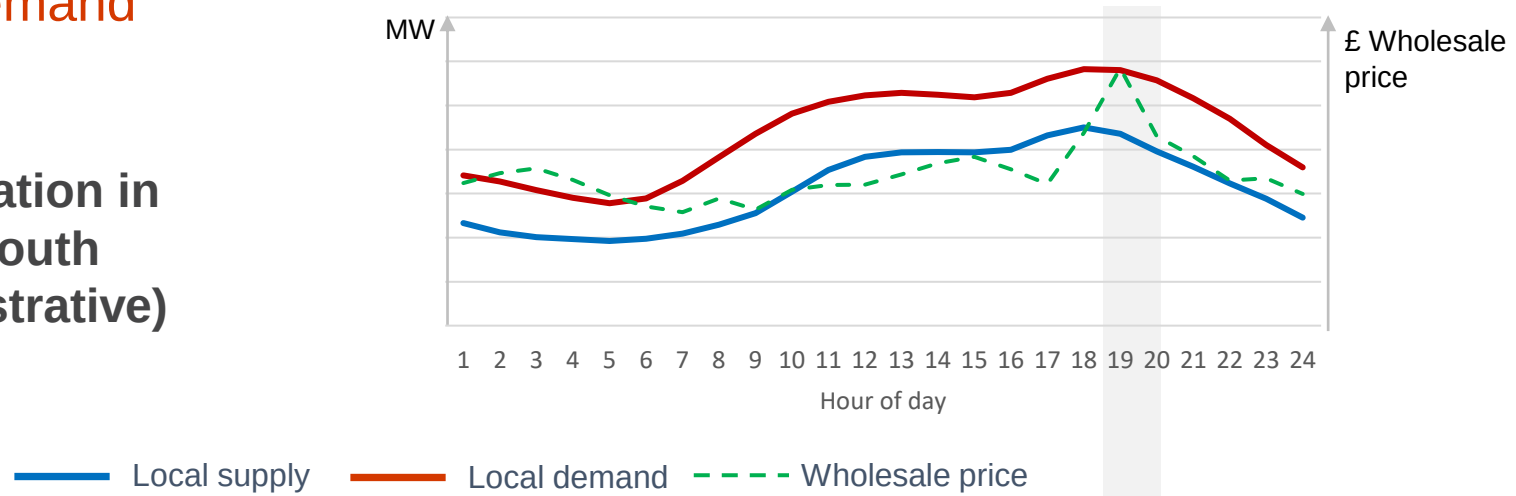
Dispatchable electricity supply sources to 2050

(Leading the Way)



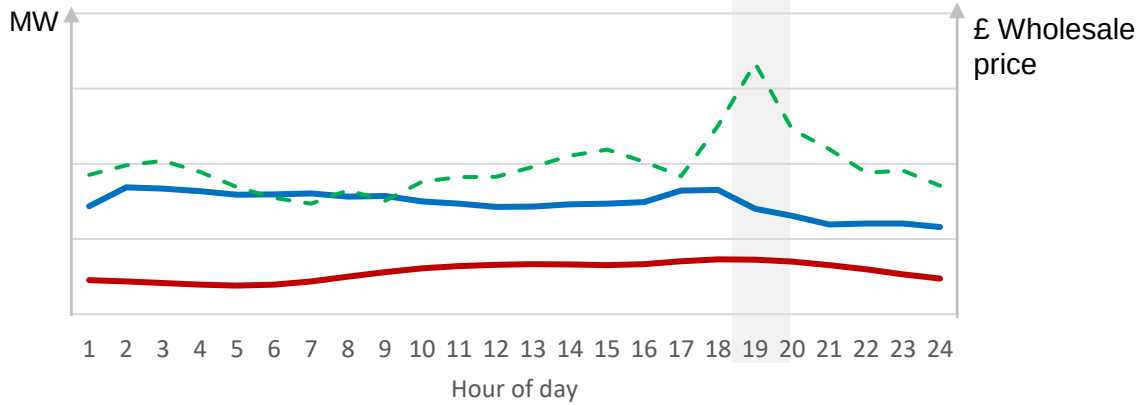
NZMR Phase 3 - lack of temporal and locational granularity in current energy price signals means weak (sometimes perverse) incentives for supply and demand

Location in South (illustrative)



Demand is incentivised to reduce load to address scarcity… (although not as much as it could be)

Location in North (illustrative)

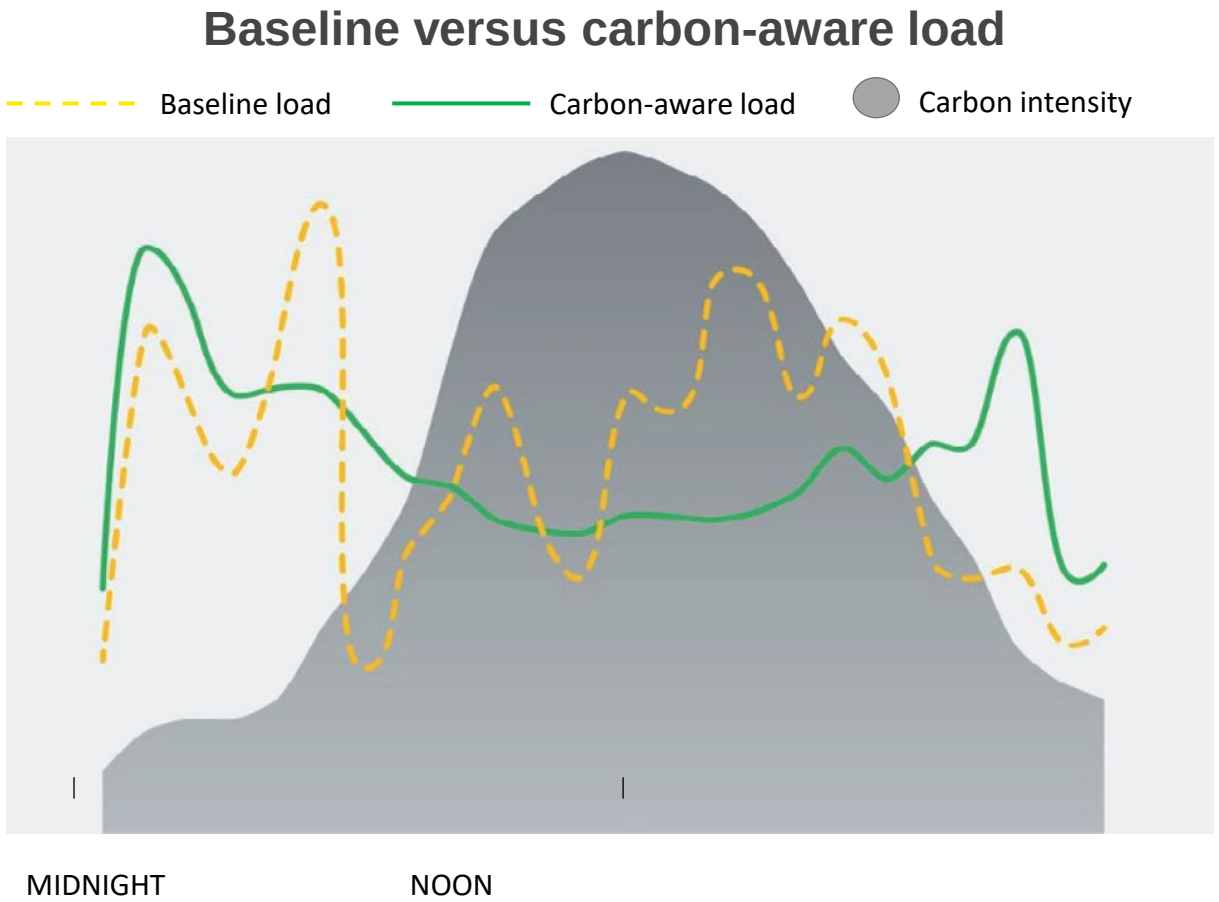


….but low demand location is also incentivised to reduce demand despite no scarcity issue

….and at times exacerbates constraints

Greater granularity of carbon signals would help drive low-carbon investment and flexibility

- **UK ETS emissions cap** covers several sectors that will decarbonise slower than power
- More low carbon capacity does not efficiently reduce emissions if renewables curtailed and redispatch is carbon-intensive. The **carbon intensity of electricity that is both generated and consumed matters.**
- **Temporal carbon signal in market is relatively weak** for some low-carbon resources, particularly those providing low-carbon adequacy or flexible technologies.
- Consumers have **poor visibility** by time/location of **actual carbon intensity** of **delivered/purchased electricity** though consumer demand for 'green tariffs' is strong



Source: Google - https://blog.google/inside-google/infrastructure/data-centers-work-harder-sun-shines-wind-blows/

Inconsistency in magnitude and targeting of signals through policy and markets

- **Missing value** for flex/adequacy in **wholesale market** while value in **procurement mechanisms** outside wholesale market inefficiently growing – CM, BM, Ancillary Services – and **less accessible** for **DER/demand-side resources** compared to **wholesale market** due to high transaction costs (right)
- The costs of these **procurement mechanisms** are passed to consumers via **charges and levies**, (e.g. BSUoS, CfD Supplier Obligation, CM Settlement Costs Levy), which in effect **dampen price signals for accurate demand response**
- **Smart Export Guarantee** for small generators (<5MW) does not accurately reflect system value and these small generators are not eligible for CfDs (auction eligibility starts from >5MW)

Wholesale market missing value for flex/adequacy (e.g. congestion):
Distortions, missing marginal costs, externalities not internalised

↓

More value can consequently and inefficiently end up in **procurement mechanisms**

↓

But compared to the wholesale market, these **procurement mechanisms are less accessible** for small/distributed/demand-side resources

↓

Restoring value to wholesale market would bring efficiency and competition benefits

Policy sometimes shields assets from system value signals or distorts signals

Contract for Difference (CfD) design can distort system integration incentives

- CfD generators **not incentivised to respond to low wholesale prices**
- CfD value impacts **incentive to participate, or changes bid behaviour,** in BM/AS markets

Capacity Market (CM) can interact with spot markets in distorting ways

- Availability payments can impact **spot market bids,** dampening **scarcity value** and **volatility** in prices needed by flex
- Ex-ante de-rating factors averaged for location/time - **risk of inaccurate reward**

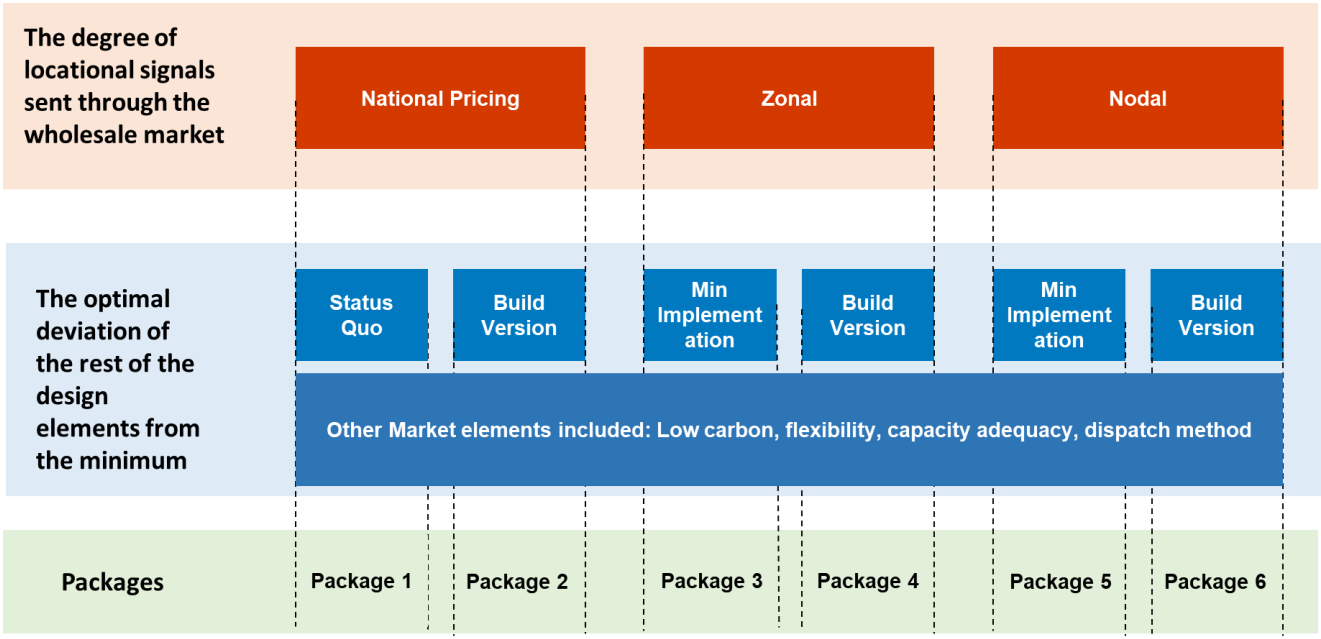
Demand shielded from opportunity to respond to wholesale prices and consumers' price signals distorted

- **Slow implementation** of enabling reforms e.g. MHHS
- **Retail market issues:** incentives for consumers/suppliers for demand response
- CM/AS/BM/CfDs as levies on retail bill - **price signal issues for demand response**

Shaping packages and next steps

Phase 4 Investment options assessment (topic of breakout session)

- **Enhanced assessment criteria -** We have enhanced our assessment criteria
  - Broad categories remain the same, apart from one change to definition of security of supply
  - Sub-categories have been added which allows better scrutiny of our assessment decisions, building on feedback we received in Phase 3
- **Assessment of different market design options** using enhanced criteria
  - Analysed each in isolation
  - Considered how they could be combined to form a complementary package
- **Construction of 6 coherent packages** that we believe will meet vision and objectives to varying degree. Packages vary by:
  - Degree of locational signals through wholesale market; and
  - Deviation of design elements from minimum necessary, in order to achieve better outcomes / confidence



NZMR Next Steps

Current Phase of Analysis

- Detailed assessment criteria
- Assessment of individual market design elements
- Assessment of holistic market design packages against assessment criteria

Publications sequence

- Baringa's Assessment
- ESO's REMA consultation response
- Detailed ESO NZMR report including Phase 4 assessment results and conclusions

We will continue engagement with industry stakeholders and policymakers.

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Q&A

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Close to online delegates

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