Net Zero Market Reform

Market Design Options and Assessment Criteria Workshop

14th September 2021

Output Summary

nationalgridESO

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Overview of workshop

Objective: Identify possible future market design options and discuss options assessment criteria

Session 1: Market Design Options

"Given the issues identified in the initial presentation (or elsewhere) what market reform options could be consistent with an interventionist world?"

Session 2: Market Design Options

"Given the issues identified in the initial presentation (or elsewhere) what market reform options could be consistent with a market based world?"

Session 3: Assessment Criteria

"What criteria do you think could be used to assess the relative merits of different market design options?"

"Given that a change in market design will require a transition from the current arrangements, what additional assessment criteria might we consider?"

For awareness

- The following output summary slides summarise the views expressed by stakeholders during the workshop
- National Grid ESO will consider these views when identifying and assessing possible market design solutions

Sessions 1 & 2: Market Design Options – Output Summary

Specific Market Design Options/Comments

	Theme	Stakeholder comments
Investment	**Ensuring adequacy (Capacity Market / Strategic Reserve / Consumer obligation)**	• Adjust the current Capacity Market to buy certain levels of carbon emissions • Capacity Market should prompt new investment in storage and DSR • A fundamental shift, but phase out the Capacity Market and replace with a strategic reserve. • Consumer obligations have to secure capacity to fulfil their needs i.e. investing in the right kinds of capacity, flex etc
	CfD	• Contracts for Difference (Cfd) extended to every generator and cap/collars in place – possibly adjust current Cfd arrangements. • CfDs are still looking at carbon-free generation vs a demand approach that allows you to avoid the capex in the first place
	Regulated Asset Base (RAB)	• A strong investment mechanism (other than the capacity market) to drive new investment, e.g. Regulated Asset Base (RAB) • Enable DSO/DNO/TSO/ISO/FSO to include energy storage as part of a regulated (network) asset base
	Carbon price	• Carbon price that's realistic, to be used in evaluating bids • A carbon tax/allowance that reflects the social cost of carbon (rather than market traded price) • An economy wide carbon market with a decent carbon price. Like Emission Trading Standards (ETS) expansion in Europe into shipping and transport (challenge with air travel) - link to carbon capture and Guarantees of Origin (GoOs) • Carbon price: either Treasury takes more action, or do something within markets • If you want a market to deliver something specific, you have to create the big intervention, such as large carbon price, then step back.
	Other	• Cap and Floor • Replicate the Emission Trading Standards innovation fund (top-up mechanism) that doesn't distort participation in other markets • New South Wales' LTESA (Long Term Energy Service Agreement) options for generation and energy storage • Uniform constraint market • Corporate Power Purchase Agreements (PPA)s
Operation	**Settlement periods**	• Market signal needs greater temporal granularity than current half hourly for settlement periods
	Co-optimisation	• Co-procurement of energy and reserve in real time. Just copy many US markets.
Location	**Locational pricing**	• Locational marginal pricing to allow for stronger pricing signals. • Zonal pricing • Introduce the nodal model (similar to the US) mentioned in the ENTSO-E paper

Sessions 1 & 2: Market Design Options – Output Summary

General Market Design Comments

	Theme	Stakeholder comments
Investment	**Flexibility**	• Give demand-side response (DSR) the same performance rules to incentivise flexibility • Make use of renewable embedded generation and behind the meter generation by supporting storage and flexibility and to reduce curtailment • Explicit mechanism to support flexibility • Current market structures don't support investment in long duration storage which is absolutely needed for Net Zero
	Interventionist-based solution	• Regulatory body takes commercial risk for new technologies • Negative-type interventions – there could be technology types that industry may want to avoid procuring • Intervention is good at bringing in the known and lowering cost of capital via the Cfd and Regulated Asset Base (RAB) better than markets • Things should be procured by market mechanisms, but what should be procured should be driven by clear policy choices • Often the Interventionist approach has left asset owners at the mercy of the open market, making investment risky.
	Market-based solution	• Apply incentive (cost/revenue) directly to desired outcome: let carbon emission cost get high enough (and energy costs high and peaky enough) to drive higher (risk-adjusted) returns for lower-carbon tech/service • Market based approach to drive Capacity Market rather than the Security of Supply (SoS) approach • Our existing markets pre-suppose that a MWh has equal value irrespective of the generator that produced it. Is this a fair assumption in a net zero world? Should approach start by questioning this assumption and consider whether creating separate markets based on 'dispatchability', 'flexibility', 'carbon intensity' or other attributes may help inform whether an interventionist or market based approach is better
	Support for new or emerging technologies	• Support for first-of-a-kind projects of each technology, and maybe much-reduced support for second and third • Mechanisms to support smaller generators • No one is going to come into a market where they can't compete so need bespoke support for these – compare with how the rest of the world is dealing with it • Current market can't answer Q "where do I build my h2 electrolysed and when do I run it?"
	Contract duration	• Contract duration is also important. To incentivise the construction of new plants the contract durations need to be at least one-third of the amortisation life
Operation	**Clarity and predictability of requirements and markets**	• Better mapping of system needs: full assessment of capacity, stability, flexibility, network constraints and so on to create the necessary markets in order to ensure technologies get the value for the services they can provide • Clear rules around stackability, primacy, mutual exclusivity, visibility of requirements and system needs where possible, optimisation of asset use where possible • Align dispatch incentives • There is no penalty for information imbalance – information imbalance prices are zero • Active Network Management (ANM) schemes are expanding alongside flex markets – two different markets aiming to solve the same problem
Location	**TNUoS**	• Need for TNUoS review to provide cost reflective signals through network charging. • Need for stability in the long-term solution for TNUoS so a balance needed between cost reflectivity and stability to support investment • Use charging to roughly shape stuff and locate in the right place, then markets to fine tune
	Regional markets	• Should there not be an acceptance that transmission is (and will always be) the key bottleneck to any 'national' market and therefore accept that it is better to then incentivise more regional markets

Session 3: Assessment Criteria – Output Summary

Decarbonisation

- It's easy to take soft approach to net zero in next 10 years, but we need to make significant progress in the short term
- There needs to be a consideration of "enough decarbonisation" vs "full decarbonisation" - getting rid of the last few tonnes of carbon is not cheap/easy
- Many markets may lead to decarbonisation but some slow, some fast.
- Internalisation of carbon costs: how effective are arrangements re: carbon pricing across technologies including price signals.
- Need to deliver a 2050 Net Zero grid and not postpone strategic needs in favour of the "low-hanging fruit"

Value for Money

- Cost-Effectiveness - Definition of "lowest cost" – reducing cost of capital? Relying on market signals? Investing in options with some failing?
- Optimisation of use – i.e. dispatch efficiency
- Cost of capital to invest
- How investors assess their ROI (against different market signals) will be a trade-off worthy of consideration
- Total cost will obviously be a factor (faster decarbonisation likely more costly) but it needs to be cost viewed over the long term not short term.
- Low cost vs right cost: i.e. are we willing to increase costs now in the hope costs will be lower later
- Investor confidence is dependent on other considerations in addition to price signals
- Does the solution avoid perverse technical and project delivery incentives?
- Support mechanisms or market products to ensure there is no duplication
- Does the measure recognise the different range of services that an asset can deliver?

Security of Supply

- Level of dependency on imports during times of system stress
- Resilience: Robustness of model; Infrastructure and commercial consistency i.e. too many business collapses
- Market mechanisms rather than special financial instruments should incentivise new build
- Incentives for all energy services are required, e.g. not just energy but also energy + dispatchability + inertia + …
- Markets should enable large, broadly-capable plants to participate, especially when they can't deliver service A without also delivering services B and C

Session 3: Assessment Criteria – Output Summary

Consumer fairness

- Protecting the customer doesn't just relate to price i.e. protecting customers from carbon impacts
- Need to recognise that the 'consumers' referred to are all very different customers i.e. manufacturing companies are part of delivering net zero, it's not just about energy industry.
- Need to protect vulnerable customers
- Some classes of consumer need protecting in different ways from others i.e. those who can use energy flexibly vs those who can't
- Is it fair to put all risk onto end consumer? Risk should be put on who *can manage it best in the market to minimise risk*
- Consumer engagement: How empowered are consumers to be involved in the market? Beyond switching energy supplier
- Retail market not the only place where recovery should be i.e. policy cost spread accordingly through taxation perhaps
- Cost recovery strategies: Will all costs want to be recovered through one channel or multiple.

Competition

- Primary duty - to protect the interest of consumers by promoting competition wherever possible
- Are we allowing everyone to access different markets? Smaller assets are able to link in and join up.
- Same rules for everyone in the market: CM talks level playing field between gen and DSR but very different requirements, performance metrics etc
- Need to make use of data and digitalisation to support greater number of participants

Deliverability

- What do we need to do in the interim to get to long term goal?
- How do the assessment criteria consider unintended consequences?
- Does the solution avoid perverse technical and project delivery incentives
- The 'real-world' practicability needs considering, bearing in mind the physical constraints of the real world and what these mean for the final outcome.
- When designing a new market, how would you describe the market to a new customer / provider? They want to know what they have to do to get paid
- The solution must enable simplicity of delivery. Current approaches are delivering complexity, not simplicity, by salami-slicing, short-termism etc.
- Locational marginal pricing design to implementation very complex so is it conducive to a realistic impacting time frame
- Markets and policies should be compatible/ not undermine one another

Session 3: Assessment Criteria – Output Summary

Adaptability

- Don’t introduce something as part of interim arrangements that would need to be changed later i.e. solutions should be technology agnostic
- Adaptability - Though not too much if it comes at a cost of investability
- A degree of futureproofing in design is essential but tension with long term price signals
- Uncertainty is key part of the picture – we don’t know what tech we will be engaging with
- Innovative solution compared to the current state-of-the-art

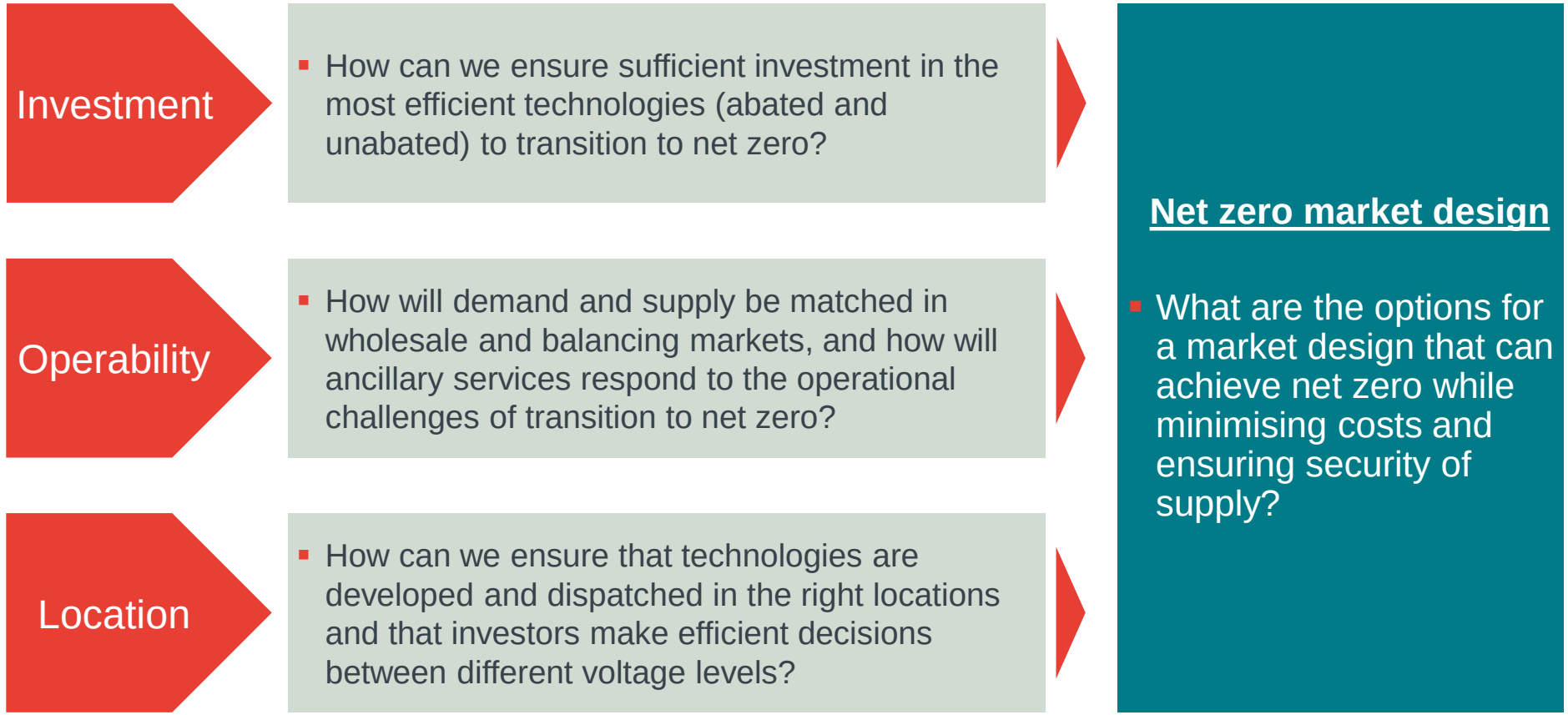
Other

- Follow the 4D's (Digitalisation, democratization, decentralization, decarbonisation)
- Governance: transparency & accessibility
- Consider institutional structure
- Split out objectives from cost: Very clear system requirements set out for what ESO needs; How ESO procures is a separate issue; Define overarching metrics
- Impact to other industries: Industrial progress could be built off low carbon – doesn’t need to be a conflict. Take opportunity to encourage industry
- [Need for] whole system solutions
- Trade- offs between pursuing technology neutrality and unintended consequences (Must define markets properly e.g. no carbon signal in CM)
- This is a global problem and it needs a global solution. We need solutions that don’t push UK business offshore
- Interaction with other environmental issues
- Discussion around getting the balance right between support mechanisms and market signals – it is not one or the other.

Market Design Options

Framework Overview

The transition to net zero raises a number of important questions for market design…



We have structured today's discussion around two possible backgrounds for considering market design

'Interventionist'

- Proliferation of bespoke arrangements
- Multiple support arrangements developed and adapted to bring on sufficient investment across a range of technology options

'Market based'

- Government role relates to legal framework and security and environmental standards
- Technologies compete within single market framework (to supply 'green' power and security) on a technology neutral basis

- Each 'state of the world' could be consistent with Net Zero.
- They differ mostly in the way investment support is provided, though there may also be differences in other markets (e.g. wholesale market and ancillary service markets)

Disclaimer: ESO is not currently advocating either of the 'states of the world' outlined; they are merely a framework for categorising potential outcomes and for stimulating discussion.

In the break-out discussions please think about possible options that could fit with each state of the world

	‘Interventionist’	‘Market based’
Investment	▪ What types of support mechanisms should be considered? ▪ How should capacity market (CM), wholesale, and ancillary service markets work alongside these support arrangements, considering greater policy risk and potential for distorted wholesale prices?	▪ How could single mechanism to support low carbon investment be designed to enable fair competition between different low carbon technologies? ▪ Are flexible sources part of the same mechanism or do other markets (CM, wholesale market and ancillary service) still have role alongside?
Operation	▪ How can efficient operational signals be maintained for all supported and unsupported technologies, given potential for distortions to market prices?	▪ How could wholesale and balancing markets be adapted to ensure flexible resources can capture the maximum value from flexibility?
Location	▪ Locational policy options may be similar in each state i.e. what are the relative merits of SRMC based locational signals (i.e. locational marginal pricing) versus more Long Run Marginal Cost (LRMC based signals such as TNUoS? ▪ Given future importance of distribution-connected technologies how do we ensure efficient voltage level decisions?	