ESO Markets Advisory Council

3rd May 2023

ESO

Agenda

Item	Time	
Chair Intro	10	15:00 – 15:15
Accessing ESO balancing markets (Alastair Martin)	45	15:15 – 16:00
No regrets actions to speed up delivery of Net Zero power system (Rob Gross and Simon Virley)	45	16:00 – 16:45
Break		16:45 – 17:00
Considerations for implementation of nodal pricing (Guest speaker Maddie Brookes)	45	17:00 – 17:45
AOB	15	17:45 – 18:00

Chair intro

Flexitricity

DEMAND-SIDE FLEXIBILITY

Market access for growth

May 2023

About Flexitricity

- First **demand response aggregator in GB**
- First energy supplier to bring a DSR asset into the **Balancing Mechanism; first VLP trade**
- **Tens of thousands** of demand response events; 996MW of capacity contracted
- **24-hour** operations
- Fully **automated**
- <1s to 30m response
- Flexible load, CHP, hydro, energy storage, UPS, peakers, standby
- **Positive and negative reserve**
- Industrial, commercial, public sector, utilities, heat networks, investors and developers

Customer types

Flexitricity

Industrial, commercial, public sector

- Diverse capacity types
  - Heating, pumping, refrigeration, growlights, arc furnaces…
  - Combined Heat and Power, BtM batteries…
- Core focus: energy costs
  1. Long-term deals with large suppliers
  2. Energy efficiency projects
  3. Flexibility revenue/saving
- Overwhelmingly conservative
  - Won't take downside risk
  - Won't let aggregator take downside risk
  - Won't bet on a future revenue stream
  - Believing requires understanding
- Have been here before
  - Initiative fatigue
  - Approval cycles
  - Brigadoon projects

Merchants

- In-the-money assets only
  - Batteries
  - Gas peakers
- Core focus: return on investment
  - Everything is on the table
  - "Revenue agility"
  - Performance is a financial matter
  - Constant benchmarking

Domestic

- What do we really know about domestic customers?
  - Many studies, very little established practice
  - Some specialist companies – are we hearing them?
- What do domestic customers know about us?
  - Even the "prosumers" have a hazy view

Administrative attrition

Flexitricity

Customer examples

Flexitricity

Steelworks

- Arc furnace
  - 30MW maximum load
  - Daily production cycle
  - Occasional interruptions 30-90s in duration
- What can they do?
  - Reserve, response
    - STOR ✗ ruled out by daily cycles
    - QR, SR ? depends on details
    - Static FFR/recovery ✗ ruled out by interruptions
  - Other opportunities
    - CM should be ✓ but ✗ perceived penalty risk
    - BM should be ✓ but ✗ skip rate
    - Wholesale
      - Currently ✗ because VLPs don't have access and supplier chosen for tariff reasons
      - Should become ✓ with P415

Commodity chemicals

- Largely an electrical process
  - Three sites of ~10MW each
  - Continuous production
- What can they do?
  - Reserve, response
    - Static FFR/recovery ✓
    - Became ✗ after a period of heavy use (IFA trips) then lockdown. Not coming back!
  - Other opportunities
    - CM ✓
    - BM ✗ because short shutdowns not practical
    - Wholesale
      - Currently ✗ because VLPs don't have access and supplier chosen for tariff reasons
      - Should become ✓ with P415

Service launch examples

Flexitricity

Demand Flexibility Service

- "Open to all"
  - But HH boundary meter data required
  - Suppliers have this
  - Aggregators can *buy* this with customer consent
  - Evidence of consent = MAC address of in-home display
- How about using metering from the flexible asset itself?
  - Identifies the most important load
  - Directly dispatchable
  - Not accepted by ESO
    - But ESO accepts this in all other services

Local Constraints Market

- "Open to all"
  - But ABSVD goes (unpriced) to registered supplier, regardless of who the provider is
  - Hence aggregators face large price disadvantage
  - "Interim" for 3-4 years over MHHS transition?
- A known problem with wider impact
  - P412 proposed by ESO in 2020; multiple extensions
  - P415 proposed by Enel-X, approved by BSC Panel
  - P444 proposed by Flexitricity, approved by BSC Panel

Suppliers and aggregators are different

Flexitricity

Accessible through supplier hub

Role of supplier hub

Not accessible through supplier hub

Long-term hedging	Shaping	Day-ahead	ToU Granular tariffs "Nudge"	Intraday	Physical Notifications	Balancing mechanism, balancing services	Real-time automated dispatch	Operational metering

Collateral / pricing / customer churn

Corporate obsessions

Customer capability / speed / revenue options

‘No Regrets’ actions to speed up deployment of renewables and deliver a Net Zero power system

ESO

	Action	Responsible Party
Speed up planning, consenting and regulatory approvals for major energy infrastructure projects, by:	Task the FSO to develop a strategic plan for electricity transmission infrastructure needed on and offshore, building on the work from Holistic Network Design (HND), Off-shore Transmission Network Review (OTNR) and the recent Ofgem decision on accelerated strategic transmission investment (ASTI). The TOs should be able to then refer back to this National Plan when engaging with local communities on how best to mitigate the impacts of new infrastructure on that local area.	Department for Energy Security & Net Zero; ESO; FSO
	Ensure Statutory Bodies, like Natural England, and the Planning Inspectorate have sufficient resources to cope with the increasing number of applications out to 2030 and beyond	Department for Energy Security & Net Zero; Department for Levelling Up, Housing & Communities; Department for Environment Food & Rural Affairs
	Deliver on the promise made in the British Energy Security Strategy (BESS) to reduce consent times for offshore wind from 4y to 1y on average.	Department for Energy Security & Net Zero
	Reform the 'queue system' for connections to enable suitable prioritisation of the 330GW currently awaiting connection	Department for Energy Security & Net Zero; ofgem
	Amend the wording in the National Planning Policy Framework (NPPF) to enable onshore wind and solar with sufficient local support to go ahead in England.	Department for Energy Security & Net Zero; Department for Levelling Up, Housing & Communities
	Work with Defra to map the agricultural land suitable for deployment of large scale solar and make this readily available to developers.	Department for Environment Food & Rural Affairs
	Accept Lords amendment to Energy Bill giving Ofgem an explicit Net Zero duty to enable Ofgem to support more anticipatory investment	Department for Energy Security & Net Zero; ofgem
Stimulate the market for low carbon flexibility and demand-side response, by:	Expanding the demand response service, building on the success of the trials carried out this winter	ESO; FSO
	Introducing emission limits into the Capacity Market (CM), as per the Jan 23 con doc proposals.	Department for Energy Security & Net Zero
	Introducing clearer system signals into the Contract for Difference (CfD) to encourage renewable generation at times when the system needs it most (e.g. via deemed CfD, changing reference price design, or a premium for offering flexibility).	Department for Energy Security & Net Zero
Support the deployment of long-duration storage, by**:**	Introduction of a technology agnostic cap and floor regime for long-duration storage (or similar mechanism to encourage deployment)	Department for Energy Security & Net Zero; ofgem
	Innovation funding to stimulate deployment of hydrogen for inter-seasonal storage	Department for Energy Security & Net Zero
Ensure AR4 & AR5 offshore wind projects do go ahead, by:	Recognising and providing some relief for the exceptional supply chain inflation pressures facing developers since the AR4 bids were submitted and the auction concluded	Department for Energy Security & Net Zero

Break

Considerations for implementation of nodal pricing

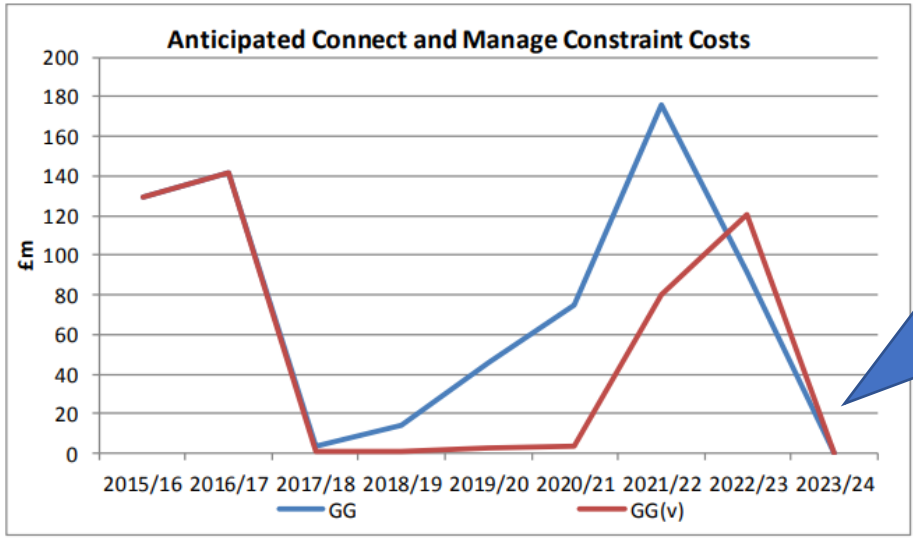
ESO MAC – Locational Pricing Discussion - 3rd May 2023
Angus MacRae and James Samworth

- Recap of history of congestion forecasts
- Challenge to benefits hypothecated in REMA
- Generator's perspective
- External perspectives
- Where now?

Congestion Revisited

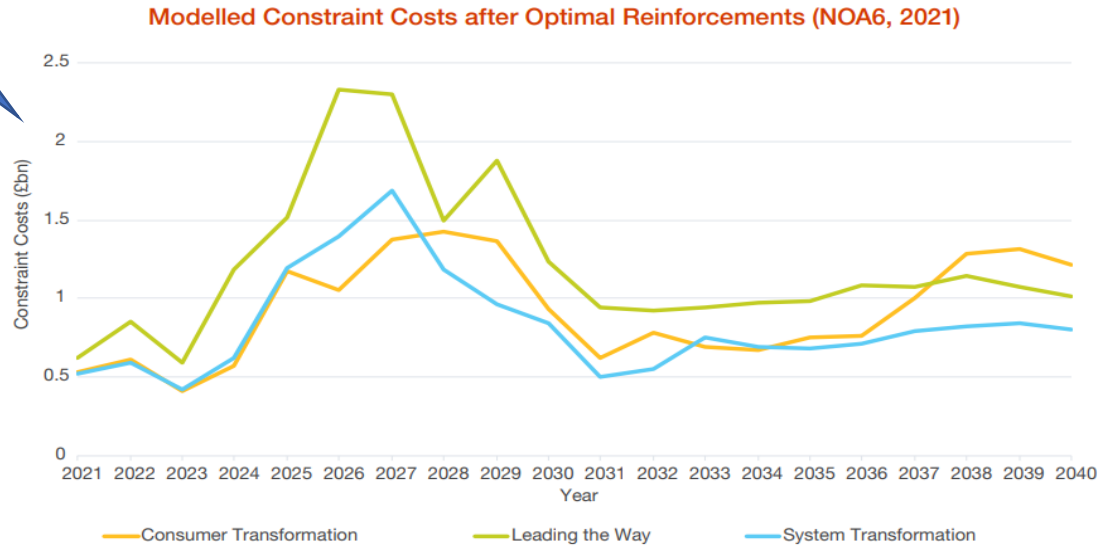
What happened ?

Monitoring the ‘Connect and Manage’ electricity grid access regime, Ofgem, December 2015

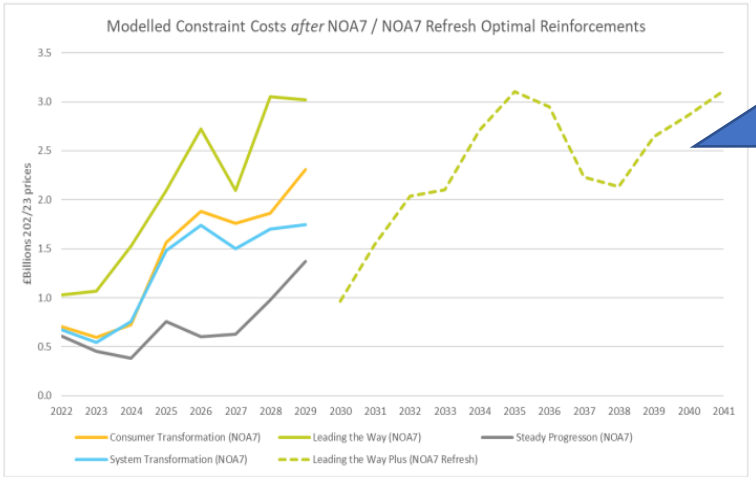


Congestion costs: addressed by network build

Net Zero Market Reform, ESO November 2021



DESNZ MPF Locational Pricing April 2023 (from NOA 21/22 Refresh



Increase suggests anticipated failure to build network

ETYS November 2016

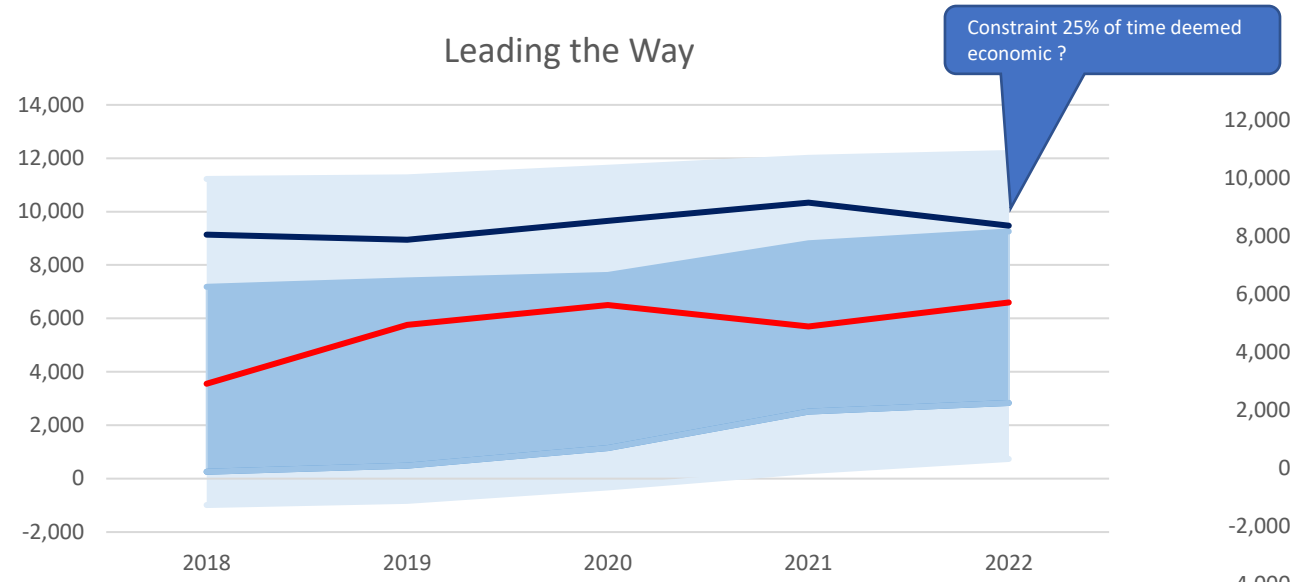
The economy criterion – defines the NETS’s boundary transfer requirements when demand is met with heavy reliance on intermittent and low-carbon generators and imports from interconnectors. Against this generation and demand background the NETS’s present capability and future requirements are established according to the SQSS

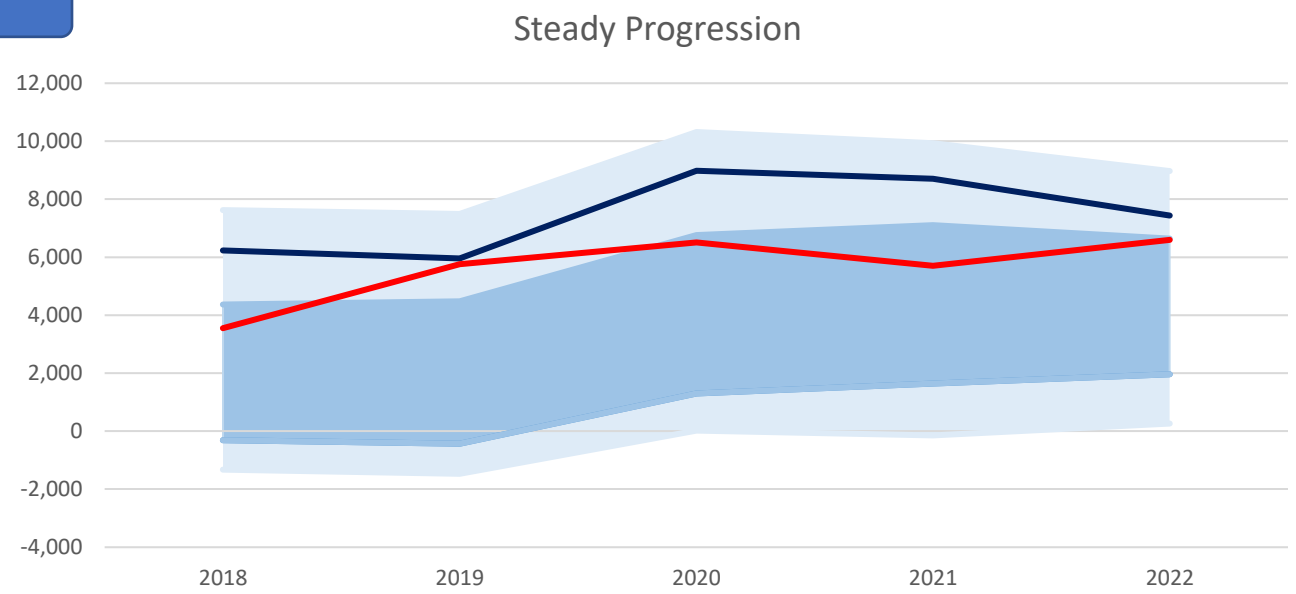
No mention of high constraint cost expectation

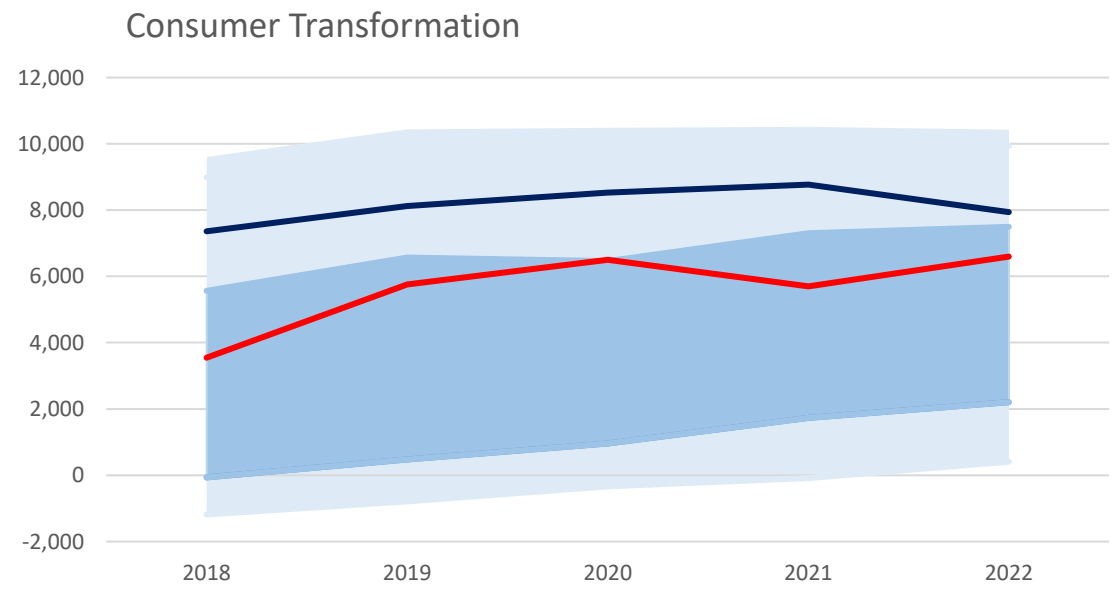
2023 Forecast B6 boundary capacity: from ETYS year for each FES Scenario

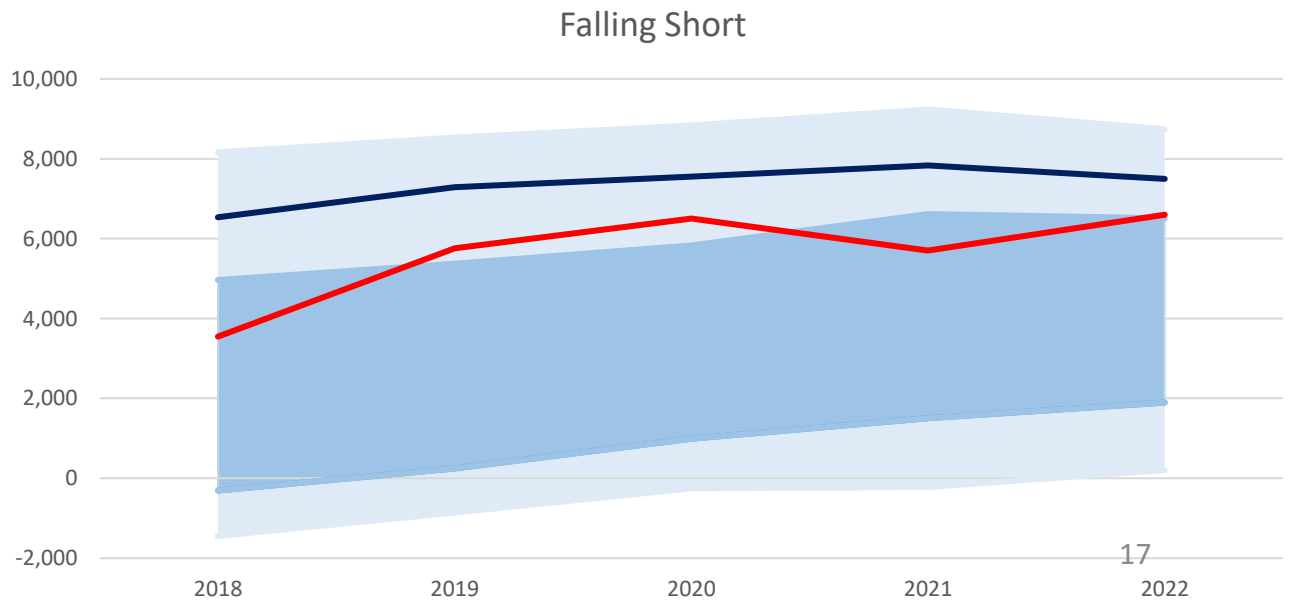
Upper 50% line for 2023 from ETYS 2022 in MW: (what is actual in 2023?)

FS	ST	CT	LTW
6509	6646	7492	9261







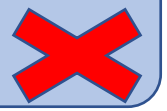


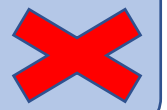
Market Issues (relating to locational pricing): NZMR Ph3 : Challenge

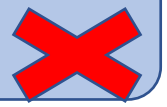
Constraint costs are rising at a dramatic rate	Locational signal strength is not the reason ?
Balancing the network is becoming more challenging and requires increasing levels of inefficient redispatch	Locational signal strength is not the reason –reality is that move towards net zero means dispatch has to change with progress towards T=0?
National pricing can sometimes send perverse incentives to flexible assets, that worsen constraints	What is the scale of this problem?
Current market design does not unlock the full potential of flexibility from both supply and demand.	What is the real scale of this problem?

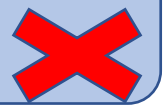
NZMR Ph3 Report, p05

Locational Pricing – the Benefits (NZMR 3) : Challenge

End of payment to constrained-off generators 

More Efficient dispatch 

More Accurate granular price signals drives efficient siting 

More accurate price signals enables whole system optimisation 

Payment is explicit element of policy to deliver more renewable generation through Firm access ahead of Transmission build

Limited evidence that operational gains are likely or significant in GB

Prices are unpredictable over investment timescales and risks are unmanageable, Relying on congestion to guide network investment will delay network delivery

Other ways of broadening coverage are less disruptive and more likely to be impactful

NZMR Ph3 Report, p28-30

Locational Pricing: Generator Perspective

Reasons for locating are complex.

Production considerations, Capital and Operating Cost are main concerns, beyond availability of sites and land rights / Planning etc.

Network costs are a consideration but importance should relate to proportion of overall cost associated with network not simply the absolute costs of network – **minimising network cost** is not a useful objective.

Predictability is important means of balancing signal and risk.

Network related Locational signal through TNUoS and TLAfs is already strong.

TNUoS signal incorporates cost of reinforcement. (economy criteria).

Congestion costs beyond those deemed economically acceptable arise through lack of build or low availability of transmission grid.

Building generation ahead of grid has been explicitly recognised as beneficial to GB consumers.

Any consideration of constraint costs has to take into account the benefits that have been derived from building ahead of network

cost savings through market impacts,

carbon reductions,

impact of cost of building required generation.

– as was the case when C & M regime was being actively monitored.

Locational Pricing: Generator Perspective 2

GB moving to an Electricity Supply mix that is More Capital Intensive.

Future Electricity Supply mix has limited operational costs.

Capital Efficiency becoming much more significant overall than Operational Efficiency across GB generation fleet.

Uncertainty increase under locational pricing models is indisputable – more difficult to gauge balance of issues at smaller granularity whilst same policies apply.

Simplest guide is move from RO to CfD (less than 50% of revenue market exposed) accepted as 100 bps. (sets low end benchmark for opposite direction of move from going from national to locational market).

This is corroborated by our experience in US and European Zonal and Nodal markets.

Uncertainty of locational price applies to all generation – possibly more so for flex compared to “as available”.

Locational Pricing – some external views

- **Investec, March ’23 on REMA.** “There is a narrowing of options, but what is left is far from narrow, and there is no clear timeline for change. Considerable investment is needed across the value chain, and uncertainty does not help…..We question the extent to which supply can move closer to demand, and vice versa, and suggest that the uncertainties caused by continuing to consider location marginal pricing could impede the pace of much needed investment”.
- ***Stonehaven, REMA Investor Interviews, April 2023.*** “Whilst some saw the theoretical appeal of reflecting local conditions in prices, there was a broad consensus that the complexities of projecting returns under locational pricing would mean higher risks and thus higher cost of capital.”
- ***Strathclyde Report,Dec 2022*** “basically (re Texas) all the wind assets were built as part of the ‘CREZ’ process… the system operator had said we’re going to build new transmission capacity here just for wind so they were installed there not because of LMP but because there was transmission capacity and that was where the resource was.”
- ***Australia, Energy Security Board, April 2023*** – “The ISP [Integrated System Plan] modelling suggests the least cost way to deliver the energy transition is to build more VRE generation than the network can fully accommodate, even if we cannot use all output produced during the sunniest or windiest periods.”
- ***UKERC, Transition Risk: Investment signals in a decarbonising electricity system, April 2023*****,** “Exposing project developers to risks they are well placed to manage can help to sharpen the design of projects, reducing the chance that consumers get saddled with the costs of poor project choices. However, exposing projects to risks they are not well placed to manage raises the cost of capital with no commensurate benefit in terms of project quality.

From Australian Congestion Management Public Forum, Jan 2023

“In the past four years, very little has changed
• AEMC / ESB proposes LMPs in a consultation paper • ~90% of submissions oppose the LMPs for many varied and important reasons
• ESB tweaks the problem to be solved and/or LMP and proposes it again • ~90% of submissions oppose the LMPs for many varied and important reasons
• ESB tweaks the problem to be solved and/or LMP and proposes it again
• Etc., Etc., Etc.”

Where Now?

- Reframe the debate – locational pricing is not the solution to currently high congestion costs.
- Locational pricing introduces significant additional revenue risk to generators – both “as available” and flexible.
- Locational pricing will undermine investor confidence reducing investment appetite – at a time when huge investment is needed.
- Refocus on practical, deliverable, targetable measures that can deliver results quickly that can help increase system efficiency.

AOB