

### Consumer Behaviour & Engagement

- Workforce or consumer behaviour
- Retail incentives inc. Time of Use tariffs
- Demand-side flexibility
- Consumer behaviour clustering around half-hourly settlement boundaries
- Behind-the-meter demand aggregator challenges
- Growth/decline of certain industries e.g., data centre growth
- Appetite for self-generation & consumption
- Cost of living

## Technological Developments

- Growth and evolution of established technologies (Energy, Storage, Heat Pumps & EVs, Smart appliances etc.) e.g., EV batteries increasing in size, reducing charging frequency - more variability in when and where charging occurs.
- Emerging technologies
- Increased volumes of Distributed Energy Resources
- Active network management

# Regulatory, Economic, & Natural Environment

- Weather changes (Global warming)
- REMA (Review of Electricity Market Arrangements) potential to influence how systems operate and how distributed generation is sized
- Incentives reshaping how demand is managed and responded to inc. demandside incentives
- Economic outlook
- Cross-border complexity Increasing difficulty in managing international energy
- flows & extra regional load from European consumption is affecting interconnectors.



### Question 1:

What new forecasts are required and why (type / regularity / granularity)?

What problem will it solve?

Neso view of forward surplus margin/negative prices; to encourage demand side load shift.  Win-win	Customer reaction to variable renewable generation output by switching times of Appliance use and EV Charge/Discharge renders the basis of current Top Down Forecasting methods useless. Need to rebuild from the bottom up through DNOs to Customer behind the meter systems with simple bartering.	Publishing in an easily accessible format all data, methodology and assumption underpinning key forecasts (including regional versions)
Datacentres- likely demand and actual demand	Is there a way to forecast EV charge demand profiles based on hisoric actuals and future growth in EV sales?	All price-sensitive demand (e.g. VTPs and suppliers with agile tarrifs) should have to FPN or otherwise publish more reliable forecasts, given they're essentially dispatchable. They already model this internally anyway
Freely available (down to consumer level) grid carbon ntensity national and regional forecasts at ~1h/1d/1w grain.	Freely available (down to consumer level) solar national and regional forecasts at ~1h/1d/ 1w grain. Better timing/	Forecasting for Peer to Peer Energy Trading

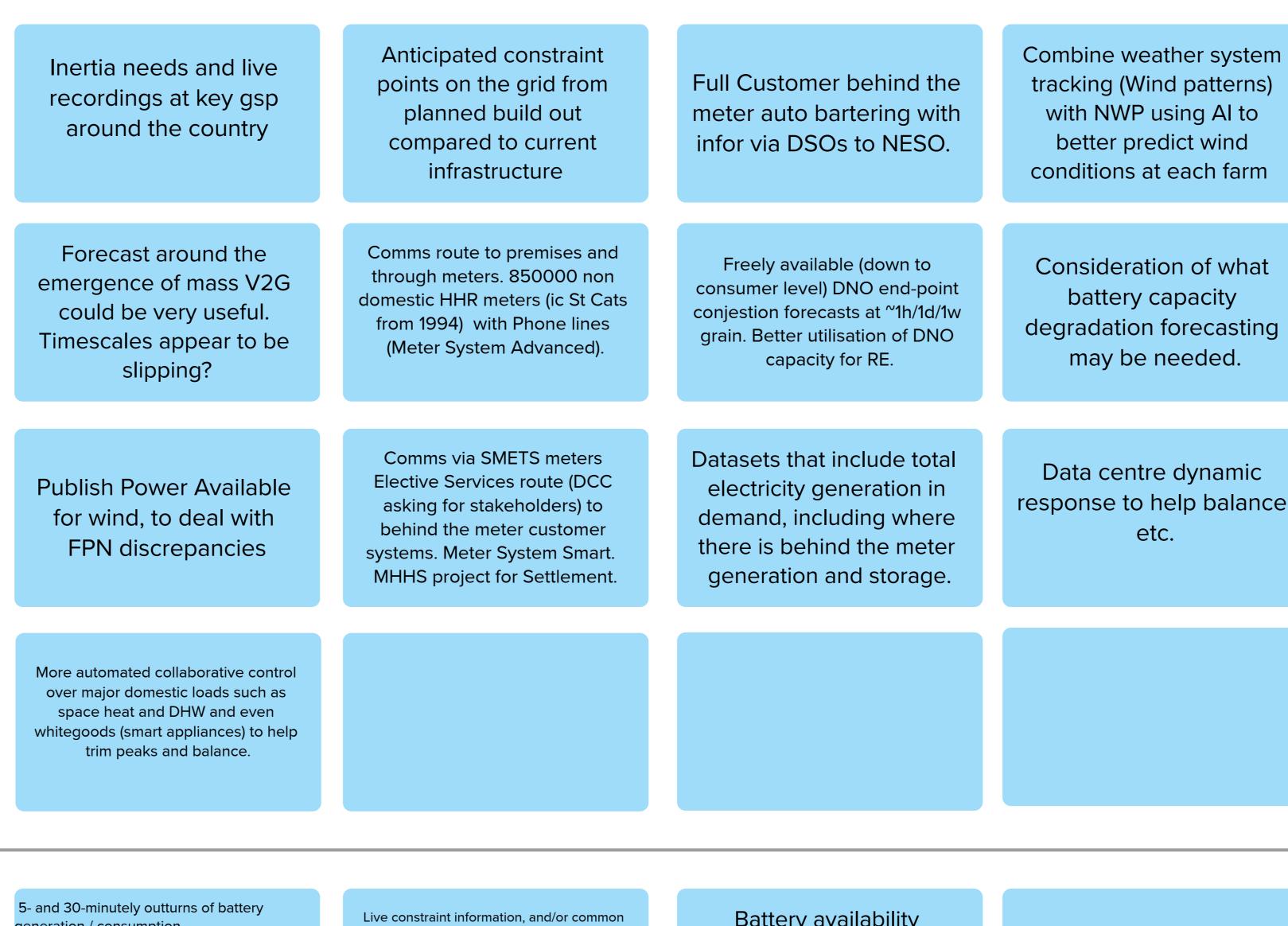
#### down to laptops): automation is to a mutually understood picture alone eg see todays NESTA report. e demand (e.g. VTPs A lot of what I'm seeing here is talking Freely available (down to consumer level) DNO end-point very act of trying to forecast these and erwise publish mor onjestion forecasts at ~1h/1d/1w asts, given they're publishing a forecast will likely grain. Better utilisation of DNO incentivise consumers to target capacity for RE. different times; changing the forecast Headroom/footroom available from demand-

side flex, minutes to days

ahead, national/regional.

An approach by NESO, DNOs

and TOs to make information on





### Question 2:

What additional data might be required over the next 6 years that will unlock improved forecasting, and where is it?

How could you support NESO?

SEG forecasts - expected
changing demand there
impacting shaping (smart
export guarantee - solar
panels mainly meant here)

Peak time consumption

demand. From mart meteres

real-time metered consumption

for use in better forecasting.

enabled with consents for near

Better timing of domestic



Greater emphasis on

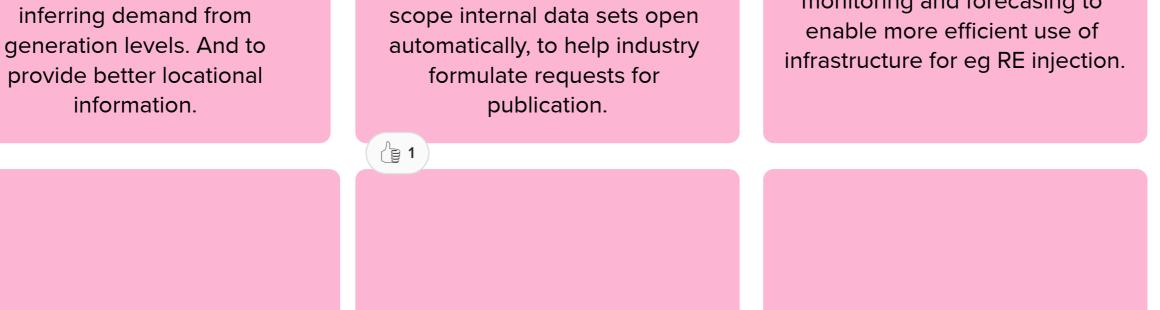
operational metering

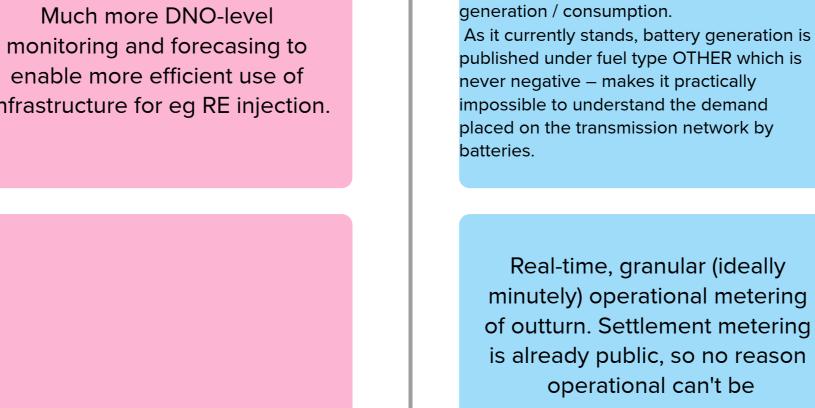
accuracy and reliability t

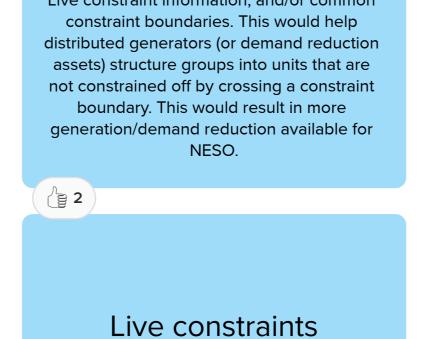
give a full data set.

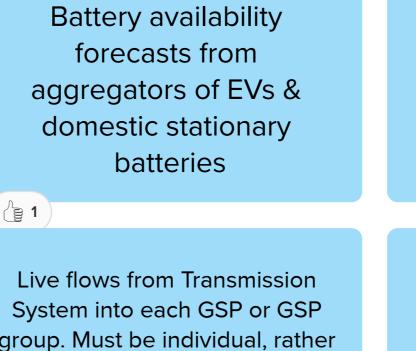
eployment of beind-the-meter

storage.









variation can be understood.



challenges to encourage th

forecasting community to

develop better approaches

alone eg see todays NESTA report.

Re comment below V2G is

likely to be a when not if?

Mass market consumer PV

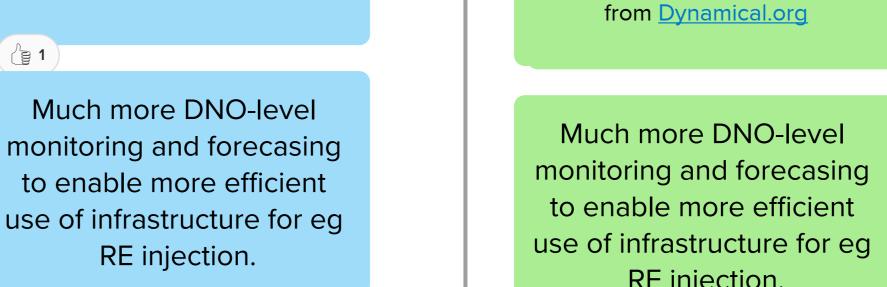
was a unicorn in 1980s!

Beware of becoming drawn into unicorn hunts! XYZ new tech sold

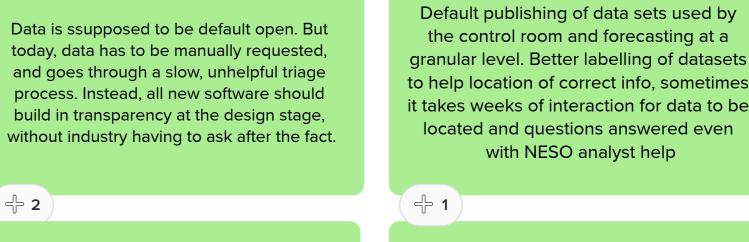
s being the one thing that matters,

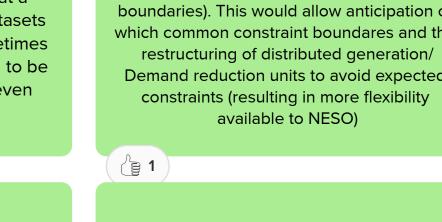
ut it never materialises. Suggested

example: V2G.











### Question 3:

What might an industry recognised "What does good look like" be?

What KPIs could we use to measure progress?

Minimum publication latency (e.g. a few seconds, like at Elexon)	Level of system imbalance?	Percentage of data sets available to the control room, or underpinning data used by the control room, that is available live online	equivalent organisations	Benchmarking against data availability in other grid internationally.
		₩ .	( <del>+</del> 1 )	
Something about pro- active data cleaning, e.g time to notice missing data, or time to notice errors	Minimising Balancing Costs	Empirical evidence that NESO's forecasts are state of the art (compared to other commercial forecasters & academia)	Independent annual benchmarking of NESO performance against best practice and quantitative annual targets.	Consultation with industry on what ambitious but achievable quantifiable (and independently verifiable) targets should be set annually
	( § 1			
% of all NESO data a) catalogued b) triaged c) published	Running the grid for many hours per week on 100% renewable generation + batteries	More transparency around forecast errors- why they happen, how often, how significant as parties make  decisions based on system view and  Ofgem can hold them accountable for various actions, even if forecasts were incorrect or changed significantly	Equivalent data available for BM and non -BM markets	Could you provide a comments/suggestions section on the data sets published so specific suggestions/questions could be directed at individual datasets? Perhaps a Q&A session would be useful for answered questions and visibility on % of questions responded to within 3 days (for example)
Vast majority of grid (NESO> DNO) data free and open and available to all participants down to consumers. Eg CC0 or CC4 licenced. To maximise participation of eg wider public and innovators.	Percentage of data relating to new products that is available online	KPI: stable, reliable and cheap electricity supply. In the last few years, electricity too expensive	Reliability of data sets in % availability - often live data feeds go down which we use in market operation - this reduces the efficiency of market operation	ready access to data on the accuracy of all forecasts and actions in place if any to improve each data set.
Higher renewables injection at DNO level.	Higher DNO (low voltage) connection utilisation for higher renewables injection (without overload)	Reduction in margin held between MEL and SEL on fossil fuel types in BRMS.  This zone of operation is (1) the least efficient mode for CCGTs and (2) an indication that forecast uncertainty was high enough that a unit had to be synchronised ahead of gate.		

Monitoring of load by GSP to

reduce the dependence or

Maximum co-operation between different levels of the electricity system to allow for a secure transition to a low carbon grid.	NESO capable of onboarding a new dataset (that could improve NESO's forecasts) within a month	NESO capable of implementing new forecasting algorithms from the literature within a month.	Public sandbox forecast algorithms, just NESO or with collaborators.	Significant and expanding live automated collaborative interaction between domestic (and small commercial) major loads and grid state, eg heat for DR, but also loads such as home/bsuiness computing which largely have rqd software present too. "Hey Siri, please help the grid."
KPI: Cost savings from integrated network planning. IE: money is saved by choosing the most effective place/way to reinforce the network	NESO running hundreds of internal experiments per month to continuously improve forecasts. (Modern ML is an empirical science!)	A vibrant community of forecasters constantly trying to push the state of the art, using GB grid data, in public long-running competative challenges.  See Donoho 2023.	<< HH pricing and data granularity to minimise abrupt pricing/demand steps.	Long term vision to move to a 1 minute market and settlement to allow the market address balancing issues.
NESO's-DSI used fully to allow information to flow freely between DNOs and NESO, enabling better forecasting/planning/modelling				



# Anything else you would like to feedback that isn't captured in the 3 questions?

hackathon or competition style approaches to

with a vastly different energy landscape - how incentives need to change as the system changes. Not really forecasting? Make sure relevant forecasts on the need for post quantum crypto for NSCS are shared widely, to allow time of implementation

forecasts.

generation meets close

which data is sensitive and which isn't on a geolocational basis?

problems you are dealing with into a basecamp process? Possibly more helpful than a hackathon, given security considerations

Where does forecast to help support disaster response fit in?