

GridZero.ai ESIG Webinar Q and A

No.	Question text	Question Answer
1	How can AI support system service aggregators in managing flexibility assets, specifically for participating in programs like Ireland's DS3?	The GridZero.ai platform has all relevant data, incentives and interactions in a single system. This allows a complete view of interactions and an ability to maximise revenues across energy markets, flexibility incentives and system services payments including DS3 in Ireland. It also allows aggregators to test the impacts of different strategies and see the impact across multiple value drivers.
2	Variable Renewables, less Predictable than conv Gen. Need for Walk Through models. AI to assemble data sets for sequential fault application to Schedulers?	This could be a very interesting application of AI although it's not one we are focussed on at this stage.
3	Increasingly Volatile Situation as regards matching Demand (Generation Requirement) to Generation. AI risk analysis to guide with Visualisation?	<p>Yes, this is a very important topic, the holistic system view provided by the GridZero.ai platform can provide a robust view of system adequacy. As the system captures complex interrelationships over time it can provide more sophisticated scenario analysis than existing tools. We have developed a visualisation suite as part of the platform and this can be easily reconfigured to meet specific user requirements.</p> <p>We can also predict the impact of prices on demand, capture feedback loops where a change in one attribute has multiple downstream effects, and enable multi-decision optimization via what-if and adaptive forecasts.</p>
4	Do you have a prioritized list of data was most useful for this project?	Yes - we completed an analysis of the key factors. The top ten data drivers for LSI are shown on slide 9 of our deck. Our platform is designed to deliver quickly explainable results and can produce similar insights for other outputs and sensitivities.
5	I take it you look at both EU CE Market and Operator action through GB to IE? Volatile German Solar/Wind, French Nuc buffering.	For this project we looked at GB and Ireland only. We plan to extend model to include these effects over the next few months.

6	Effect of GB acting as EU CE Transmission??!! e.g Import From France and Norway?, Export to Belgium, Holland and Denmark seen.	For this project we looked at GB and Ireland only. We plan to extend model to include these effects over the next few months.
7	What's the financial impact of getting the LSO-LSI planning wrong?	If you are too conservative you are increasing consumer costs through over procurement of reserves. If you under procure you create a security risk. Having better visibility of likely needs further in advance enables an overall better operating frontier where operational risk is kept within acceptable tolerances and costs are reduced. The tool is intended to be used to enable improved and simpler operating strategies.
8	is your foundation model purpose built for LSI and LSO? Can it perform other functions?	The model looks at all operational and market data so can perform a wide range of functions. LSI/LSO was the test metric for this project but it's very easy to adapt for other problems. We see huge advantage in having multiple applications on the same data and platform as it helps the model better represent actual system conditions and hence produce better results.
9	Wind Curtail 4 reasons GB. Owner Curtail protective High Wind, Automatic Cutout High Wind, Owner Curtail Market Negative, Operator Curtail. Data for model?	Yes we can model all these. Integrating weather and grid models will improve performance in all these. Our platform has been purpose built for the electricity system with highly structural ways to embed dependency and expert knowledge into the model to meet specific requirements such as these.
10	Can the model account for traders changing their behaviour based on the forecast and subsequently update it?	Yes, that's a key advantage of new transformer architectures over traditional model architectures. They enable real-time context and adapt to new data as it arrives. They also enable increased ability to test scenarios (what if....?) to provide improved context related planning and optimisation.
11	Do you have an overall metric which reflects the system cost savings based on use of this technology?	If this model was used with the reserve requirement set at the 90th percentile it would reduce reserve needs by 15% with associated cost savings.
12	Do you include contingencies and congestion in your model?	Yes we include simplified versions of network constraints (rather than full power flows).
13	Is the model only usable in a static system? So does it need new Training data, when the system is transformed, like adding new lines (AC/DC) or REEs	The model uses transformer architectures that adapt as the system changes. For a major system transformation we would work through a structured model update and retraining which would take around 4 weeks.

14	AI is generally regarded as mathematically and logically inaccurate. How did you deal with this and what accuracy methods and metrics were used?	We use AI models for probabilistic modelling of market effects, grid dynamics, weather and the inter-dependencies across these signals along with space and time. When coupled with rigorous statistical evaluation methods, newer gen model are far more accurate, adaptive, and powerful at embedding the underlying physics than classical ML driven forecasts which have been traditionally used in the industry for a long time. Also, note that this approach integrates with power systems tools rather than replacing those. At the end of the day all models are approximations of the physical world.
15	In your example LSI results did the Schedule based rolling hour model outperform the GridZero.ai model? That's what it looks like to me from the plots.	The schedule based model was a rolling 8 hour ahead model which had access to increased levels of data including market bids, generator notifications, more recent RES forecasts etc. It was used as a comparator to see how close could a day ahead (9am D-1) forecast with limited data get to a near real time forecast with near real time data. On a like for like comparison with both models having the same data and lookahead we would expect to outperform the existing model. In this test our DA model was within 1% of the rolling 8 hour ahead existing model.
16	How easy is to apply it to other country? Do you think to apply any transfer learning techniques?	The platform is purpose built for electricity systems and is suitable for use in any country. The performance in any country will improve as more training data and local regulations are incorporated. In this trial we configured the existing platform to the Irish system in 5 weeks.
17	Given that this was a true "first" project for you, how did you determine and sell your project baseline schedule and milestones, and how on target were you?	We have completed other projects but they are commercially sensitive. We used this experience to propose milestones to EirGrid and delivered all on time and to target.
18	More extensive and Intensive Data exchange with GB NESO?	This is an area of huge opportunity that could improve the quality of forecasts for both systems and identify opportunities for improved co-ordination and optimisation.
19	Transmission line ratings become limiting factors for gen dispatch. Can this system be used for predicting Ambient Adjusted Ratings using forecasted weather?	Yes, this is a very exciting potential application. The ability to consider previous loading levels and weather in a single model means we will be able to manage this way better than existing models.

20	You are currently talking about operation, do you see opportunities of using AI in system Development?	Yes, we have currently solutions to work up to 4 years ahead of real time and have a design for longer term planning.
21	How is this sensitive power grid data kept secure?	We offer secure data integration support provided by Databricks Delta + Clean room, AWS PrivateLink with RBAC, and custom deployment to on-premise hardware upon requirement.
22	EirGrid ... comment on whether tools like this will enable the operator to go towards 100% asynchronous generation at least for some of the time?	<p>EirGrid identified the key actions required to enable very high levels of asynchronous generation in its Shaping our Electricity Future roadmap (https://www.eirgrid.ie/shaping-our-electricity-future) and its Operational Policy Roadmap 2025-2035 (cms.eirgrid.ie/sites/default/files/publications/EirGrid-SONI-Operational-Policy-Roadmap-2025-2035.pdf).</p> <p>As part of this, EirGrid identified the need for new and enhanced tools and capabilities. This exploratory project demonstrated that new tools and technologies, like GridZero.ai, offer enhanced capabilities to support management of the new challenges and requirements introduced by the increased complexity of system operations.</p>
23	Will AI applied to the scheduling process by new battery storage improve the price discovery process and provide better market outcomes?	Yes, it will improve overall optimisation and better use of all available resources. To optimize usage of batteries, one needs to predict the trajectories and distributions of demand, generation, reserves and prices many hours out, and optimize decision making across a horizon along with adaptation of the decisions as new info comes in and predictions are revised. This level of feedback and interrelationships is difficult for numerical models that can end up "hunting" however it is a natural feature of modern transformer based AI architectures.
24	What advantages your model has compared to traditional neural network based models	There has been a remarkable advance in the power of transformer based AI models in the past five years. We have seen the impact of this in many public facing models and the same underlying technical advances increase the power of our purpose built platform for electricity. Specifically the model has very strong generalisation abilities that are more powerful and adaptive to real time context than over simplified pattern based techniques. Our platform includes model based reasoning rather than a forecast-only method. The outputs of our platform are highly explainable and empower users to better understand answers and underlying system behaviours compared

		to previous models that delivered blackbox type outputs only.
25	Does your model trained on one electric network and applied on another network? If not, how can we call this foundation model?	The model will work on any electricity network. It will require training on the data elements of interest to a specific model. But the model itself is purpose built for the power sector and is generalisable.
26	Forward data from Commitment and Dispatch feeding Network Analysis? We did provide Nodal Gen and Demand and Gen sync'd from the GB Scheduler back from 1983.	Many of the ideas we use are not new, what has changed is the computational and algorithmic power to implement these ideas and deliver more sophisticated and holistic analysis.
27	how are results verified?	We compared the results of our model with published results from the existing 8 hour ahead model and validated these with EirGrid SMEs. We also tested the confidence intervals provided by the model.
28	when you say "operations", is it day-ahead or real-time operations?	This use case was day ahead, but the same model would apply equally well from week ahead to real time. For real time application we would need to integrate live data streams.
29	Can you share the volume of the data you used for training? Did you have issues in getting access to the datasets?	We trained the model using a mix of publicly available and proprietary datasets provided by EirGrid, covering weather, grid, and market variables across Ireland and Great Britain. The data period (2022–2024) was selected in line with customer requirements.
30	Do you offer any performance guarantees or valid region of model application? How often do you train the model? Over what period/ the size of your datasets?	<p>We collaborate with customers to define performance targets and partnership structures that align with their business goals. We are happy to stand over delivery against these targets and the business outcomes for our customers.</p> <p>The model is periodically retrained and continuously monitored through online evaluation against a consistent benchmark suite to ensure stable and reliable performance over time</p>
31	Can you change the risk tolerance to meet the needs of the user?	Yes, this is a key advantage of these models, the model can be calibrated to meet complex multi factor objectives including risk tolerance.
32	In what ways could your model improve its inference performance other than speed of response?	We improve inference performance by enhancing how the model captures relationships among key variables and operational constraints. This includes integrating additional relevant data sources, refining feature representations, and embedding domain expertise directly into the model in collaboration with SMEs.

	<p>Over time the performance will also improve as more applications are used on the same platform as increased understanding and visibility of one aspect e.g. reserve management will improve the modelling of other aspects e.g. battery scheduling. The model will also improve its ability to adapt to new information, taking into account the impacts of decisions made, and in general capturing correlations between various signals. For example, if a demand response programme is activated this will change many aspects of future system operations, an integrated platform can capture and optimise against these impacts.</p>
<p>33 How did you achieve explainability when a change in the most correlated input did not always result in a change in the model's output?</p>	<p>Real-world prediction problems are highly contextual, often driven by multiple interacting factors rather than a single dominant input. Our approach enhances explainability by tracing the trajectories of all relevant variables, interpreting outcomes through model internals along with post-hoc methods, and retrieving similar historical events to detect regime shifts for more informative decision making.</p>
<p>34 Daunting Technology? - Automate the Operator Function? Advanced Intelligence Systems from Artificial Intelligence Analysis and Predictive software?</p>	<p>This is more a business strategy question around new technology adoption in mission critical systems. Many operator functions are already automated. To add more sophisticated AI we currently start in the DA space where there is more opportunity to use the insights and have operator involvement in risk management. Over time as confidence and experience grows the benefits of the system will move closer to real time.</p>