GBESO Technology Advisory Council Control Room of the Future sub-group Minutes

TAC Control Room of the Future Meeting Minutes 26/11/21

Date:	26/11/2021	**Location:**	Virtual
Start:	09:00	**End:**	12:00

All material from the meeting can be found on the GBESO Technology Advisory Council MS Teams site:
https://nationalgridplc.sharepoint.com/sites/GRP-UK-National-Control-ESO-Technology-Advisory-Council

Participants

Attendee	Organisation
Angela Wilks (Chair) (AW)	GBESO
Claudia Centazzo (CC)	Independent
Chris Dent (CD)	University of Edinburgh
Andy Hadland (AH)	Arenko
Chris Kimmett (CK)	Reactive Technologies
Steve Sinclair (SS)	Flexitricity
Peter Frampton (PF)	Elexon
Simon Pearson (SP)	Energy Systems Catapult
Kerri Rogan (KR)	Transport for London
Kane Forkasiewicz (technical secretary) (KF)	GBESO

For specific agenda items

Attendee	Organisation
Rob Rome (RR)	GBESO
Ian Dytham (ID)	GBESO
Adam Tyler (AT)	GBESO
Steve Parenzee (SPz)	GBESO
Andrew Fletcher (AF)	GBESO

Apologies

Attendee	Organisation
David Sykes	Octopus Energy
Peter Stanley	Elexon
Matt Hopkins	GBESO

Agenda

1. Welcome and introductions
2. Minutes of last meeting and matters arising
3. Feedback from last meeting
4. Comments on Terms of Reference
5. Non-disclosure agreement and declaration of business interest forms
6. Next meeting and calendar
7. Balancing and National Control Programmes
8. AOB

Discussion and details

#	Topics discussed
1.	**Welcome and introductions**
	• The chair welcomes all members of the group for the first time. All present members give an introduction.
2.	**Minutes of last meeting and matters arising**
	• N/A
3.	**Feedback from the last Meeting**
	• N/A
4.	**Comments on Terms of Reference**
	• It was highlighted that the TOR should include automation; the panel chair will update the TOR to reflect this.
	• A quorum of 6 was agreed for future meetings.
	• The chair highlighted that the value in the working group was to gain advice and insight from industry experts to help GBESO (Electricity System Operator) develop the tools needed for system operation in a low carbon future. It was also clarified that to ensure this the flow of the meetings will allow for regular input from the members.
	• The time on the agenda allowed for a discussion of some relevant areas before the presentations being delivered by the network control and balancing programs.
	• GBESO was asked its views on the current Balancing Mechanism design and its suitability for operating the system with increased levels of automation? An example was given as whether BOAs (Bid Offer Acceptance) will be fit for purpose with automated systems and / or improved decision making support due to potentially incurred un-winding costs from adjusted BOAs.

- Members wanted to clarify the interaction between this group and the virtual energy system. The chair clarified that the GBESO virtual energy system project will be incorporated into future agendas. One such area to explore further is what a digital twin looks like in context of a control room of the future. A brief discussion on digital twins took place, one application of digital twins mentioned was that it could significantly improve training times for GBESO control room staff.

- It was agreed that GBESO will identify clearly defined problems for the meeting group to advise on.   Advice from the Group will be collated via offline discussions as well as via allocating time on the meeting agenda.

- Clarity was also sought on whether this group should be confined to what is within the control of GBESO or whether it could still explore things outside the remit of GBESO. The chair highlighted that the GBESO focus is on the RIIO2 obligations.

5.   Non-disclosure agreement and declaration of business interest forms

- All members have fulfilled the requirements.

6.   Next meeting and calendar

- Members were keen to meet at least once per month where possible, the next meeting will be scheduled for the middle to end of January 2022. A Doodle poll will be used to ascertain the best day and it was noted that there was a preference towards meeting on a Friday again.

7.   Balancing and National Control Programmes
2025 ambitions

- The Balancing and National Control programme representatives were introduced to the group and an initial presentation was given on the 2025 ambitions for the Electricity National Control Centre (ENCC). An overview was given of the different ambitions.

- The overview defined the requirements for the 2025 systems as:
  - Agile with modular design to minimise impact on real-time operations, with an "evergreen" environment which is under constant refresh cycles.
  - Tools and technology to deliver improved access to Users, particularly to data flows, use of cloud based computing and to move to programming platforms with more widely available skills & resources.
  - Having business processes that work in partnership with suppliers of systems to build products together to meet the rapidly changing requirements for operating the whole system during the transition to zero carbon. Replace existing manual business processes by a transition to processes with increased automation to provide Control Room operators with situational awareness and advice.
  - Environments which facilitate optimisation scenarios and which integrate with other products; these environments will deliver enhancements to GBESO training and simulation capabilities.
  - Delivering systems separated from NGET with intuitive GUI's focused on providing control room operators with situational awareness and advice for securing and balancing the system.
  - Delivering access to real time data & analysis to industry and control room operators.

- KR fed-back to consider the people side in terms of roles and responsibilities in the design of the new tools for 2025. ID confirmed the Balancing and Network Control programme is being managed with product lines with associated workshops being run with customer / user groups to capture and properly understand the user requirements. In addition, a business change team has been setup to manage the transition to new processes and tools and how change is implemented.

- SP inquired what learning has GBESO taken from other businesses who have undergone or are undergoing similar large scale transformation? ID advised some companies have been visited, such as the Bank of England. ID agreed GBESO should look to learn from other business regarding transformation.   PF advised that Elexon's Connect project recently re-architected settlement systems into the cloud, making them modular, improving analytics capability and data availability and also implemented a new organisational wide target operating model. ID to follow up with Elexon to understand key learning.

- How do you address the challenge that requirements are being set now for the control room of the future when there is such a rapid change of pace and uncertainty of what the future challenges are going to be? ID confirmed a flexible agile approach has been adopted which should make it easier to adapt to changing requirements and from experience it should not be a concern not to be able to identify all the requirements as an agile approach is the preferred way to mitigate against an

elevated level of uncertainty. GBESO has a change map drawn up to show how change will flow to 2025.

- The Balancing and Network Control Programme presentation covered key non-functional requirements, key technology, architecture and the path to production. Feedback from the meeting was requested on:
  - the suitability of the presented approach,
  - opinions on new technology that should also be considered to make use of the breadth of experience in the room.
  - successes & lessons learnt from similar programmes and their implementation from industries represented in the room.

Non-functional requirements

- The non-functional requirements of availability, modular, security, UI / UX, scalability, open data were presented and opened for discussion within the group.

- AH queried where automation fits into the non-functional requirements and suggested GBESO consider AI as a control room operator when looking at user requirements and develop an AI user journey which could be a hybrid between a human and AI operator. SS suggested the programmes have a clear understanding of the decisions that need to be made by the systems and understand which decisions will be AI and which will be human.

Key technology

- Key technologies were identified and presented as follows: Virtualisation & Containerisation; API's; Dev Ops; ML/AI; Hybrid Cloud; Solver Engine; Git Config; DAP.

- The focus in the Balancing programme is on the flexibility of public cloud for development and testing and the security of CNI for actual production. The Red Hat Open Shift platform has been selected for the Balancing programme. Balancing has completed a main design phase & is entering a first phase of development.

- In terms of machine learning (ML) and AI, ML and AI have many different interpretations as to how they are defined. CD recommends GBESO define their understanding of ML & AI in the context of the Balancing and Network Control programmes to avoid any ambiguity with industry on the interpretation of the terms. GBESO are currently referring to AI and ML in the broadest meaning of the terms as the programmes are still in the early stages, ML & AI will be defined further as the programme progresses. One of the challenges for application of ML & AI is that the GBESO data quality is not the highest.

- A discussion took place about having concerns about reliance on AI due to such high implications of the decisions it could make. It was accepted that AI will become a necessity due to the complexity of the system in the future and there should be a focus on bringing people along with AI to meet the challenges. Advice was provided that the roll out of ML / AI processes to users must include communication of how the ML / AI processes work to build trust.

- The meeting requested clarity on whether GBESO is looking to ML / AI for decision making or decision-making support. GBESO responded that the GBESO ways of working focuses on what the customer wants to create product lines within the programmes, these customer requirements & product lines are translated to a tool set which will be either procured or built, ML / AI will potentially be solutions to meet the customer requirements.

- It was also pointed out that GBESO has made a division between Network Control and Balancing programmes. Despite there being two large teams, they have regular touchpoints and the levels of integration will increase towards 2025 particularly where the two systems overlap.

- Some further points were raised on the issue of "ethical AI", this is where ML / AI have bias in their systems and decision making, this could be for example due to historical data. Ethical AI could lead to legal challenges if bias is proved. It was discussed that there is limited agreement across industry in terms of industrial standardisation for AI, CC advised Rolls Royce have issued a framework for ethical AI which should be considered by GBESO and explored further in a future meeting.   Post   meeting   note: https://www.rolls-royce.com/sustainability/ethics-and-compliance/the-aletheia-framework.aspx "The Aletheia FrameworkTM is a new standard of ethics and trustworthiness in artificial intelligence that we believe is too important to keep to ourselves. So, we've made it freely available to everyone. We are deploying it in our business and believe that if organisations around the world use it comprehensively, it could help build public trust in artificial intelligence."

- In the context of implementing ML / AI processes and building user trust, CK recommended GBESO prioritise the criticality of processes and look to deploy ML / AI initially to the less critical processes to start to build confidence and trust. It was also suggested to map out the impact of failures to identify where to start using FMEA (Failure Mode Effect Analysis.)

Open Balancing Platform and Architecture, Modular Architecture, Service Flexibility & Harmonisation

- AF presented the overview of the Balancing Platform design and the approach for meeting the challenge of delivering greater flexibility to add new energy services, which is to incrementally create a generic set of parameters and configuration to represent energy balancing services.

- AH suggested starting with the most extreme challenging energy balancing service entity and defining the parameters & config for this case first because the parameters for the most extreme case should then cover all other cases.

Hybrid Cloud – Path to Production

- AF presented on the challenge of accessing the benefits from the flexibility of public cloud while retaining the security needed for CNI.

- AH informed that performing UAT (User Acceptance Testing) with a digital twin enables testing the impact of a change with historic data which should make it easier to quantify benefits of the change. AH gave an example from within their company of this being useful for quantifying the impact of any changes. AF noted that this was only possible with a fully automated system which AH agreed was the case for the example.

- CD asked for thoughts on how the NGESO Virtual Energy System (VES) programme will be relevant to system operation. ID informed that there are several virtual models of the energy system in separate systems within the ESO. The VES programme is looking to integrate the current virtual systems. If the Network Control and Balancing programmes requirements drive a need for functionality from the VES this would be actioned.

Closing discussions

- A question was posed to the group if they had any suggestions for code improvements from the perspective of a market participant. The group reinforced that both industry and research should be pushing for code changes in addition to GBESO and all parties in the industry should be prepared to change to be able to meet the requirements of the system of the future. It was suggested that GBESO make sure to engage in the Energy Data Taskforce as different parties all have different priorities and engaging in task forces is the way to influence change.

- It was fed-back that the Dynamic Containment procurement process worked well as it incentivised parties to provide data to participate in the new market. AH advised that the benefit from GBESO explaining to industry how provided data is used would add value to the data and the industry would respond quickly to data requests once the value is understood. There was acknowledgement about a high dependency on good quality data provision from participants.

8. **AOB**
- There was no AOB.

The chair closed the meeting by thanking members for their participation.

Decision Log

Note – this document contains current decisions and a rolling history of decisions. The complete log may be found in:

https://nationalgridplc.sharepoint.com/sites/GRP-UK-National-Control-ESO-Technology-Advisory-Council

Decisions: Made at last meeting

ID	Description	Owner	Date
1	Terms of Reference agreed	All	26/11/2021
2	Meeting frequency to be monthly where possible	All	26/11/2021
ID	Quorum of 6 was agreed.	All	26/11/2021

Action Item Log

Note – this document contains in-progress items and a rolling history of completed items. The complete log may be found on the GBESO Technology Advisory Council MS Teams site:

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Action items: In progress and completed since last meeting

ID	Description	Owner	Due	Status	Date raised
1	Provide comments on Terms of Reference	All	26/11/2021	Closed	26/11/21
2	Update TOR based on feedback received in the first meeting	GBESO	03/12/2021	Closed	26/11/2021
3	Determine the time and date for the next meeting	GBESO	03/12/2021	Open	26/11/2021
4	Circulate the minutes within the group for comment at the next meeting	GBESO	03/12/2021	Open	26/11/2021
5	Circulate the agenda for the next meeting	GBESO	03/12/2021	Open	26/11/2021
6	GBESO to create clearly defined problem statements for the meeting to provide advice on.	Rob Rome	25/02/2022	Open	26/11/2021
7	ID to share the list of companies GBESO have visited / will visit for learning on transformational projects.	Ian Dytham	25/02/2022	Open	26/11/2021
8	NGESO to consider the Aletheia FrameworkTM and feedback on its application to the Network Control and Balancing programmes	Rob Rome	25/02/2022	Open	26/11/2021