ESO

Use Cases Advisory Group

Meeting 1 minutes

Date:	17/03/2023	**Location:**	Virtual
Start:	10:00	**End:**	12:00

Participants

Attendee	Organisation
Professor Jim Hall (Chair)	University of Oxford
Corinna Jones	National Gas Transmission
Dan Monzani	Aurora Energy Research
Dr. Hilary Williams	Energy Systems Catapult
Peter Philip	Scotia Gas Networks
Sarah Rigby	Scottish & Southern Electricity Networks
Joanna Webb (Technical Secretary)	ESO
James Edwards-Tombs (Observer)	ESO
Dozie Nnabuife (Observer)	ESO
Vikaran Khanna (Observer)	ESO
Ankit Patel (Observer)	Arup

Apologies

Attendee	Organisation
Nicholas Watson	National Grid Ventures

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Agenda

1.	**Apologies for absence**
2.	**Introductions**
3.	**Conflicts of interest review**
4.	**Virtual Energy System programme introduction**
5.	**Use Cases Advisory Group role**
6.	**Discussion of use case identification and reflection points**
7.	**Next meeting date, time and agenda**
8.	**AOB**

Discussion and details

#	Topics discussed
1.	**Apologies for absence**

- Nicholas Watson – National Grid Ventures

2.   Introductions

- The Chair welcomed everyone to the meeting and led the introductions by the attendees.

3.   Conflicts of interest review

- The Chair explained the conflicts of interest review; none were declared by the attendees.

4.   Virtual Energy System programme introduction

- The Technical Secretary gave an overview of digital twins, the Virtual Energy System, current use cases, the programme's timeline, and its context in the ESO, the FSO and the wider energy industry.

Discussion

- The value of the Virtual Energy System and the ESO's approach to developing it was welcomed and supported by the group.
- It was agreed that the energy system is profoundly changing, digitalisation is central to its future, and the programme needs to be feasible and deliverable.
- There needs to be a focus on the overall architecture, the use cases need a strong sense of direction, while also acknowledging that some experimentation may be required, but ultimately the use cases should be integrated into the system.

5.   Use Cases Advisory Group role

- The Technical Secretary briefed the group on the Virtual Energy System programme's stakeholder engagement, the roles and scopes of the three advisory groups and how they will feed into each other.
- It was confirmed how the insights and guidance from this advisory group will be integrated into the programme and with the two other advisory groups.
- Details of the Technical Secretary's role were confirmed, the roles of the ESO Observer colleagues, and also wider ESO colleagues who are available to provide research and analysis.

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- The three workstream structure (Use Cases, Common Framework and Stakeholder Engagement) was confirmed and how the outputs and learnings from each are constantly fed back into each other in a cycle, feeding the development of the programme.
- ESO explained how use cases are commissioned and funded, which is currently via the Network Innovation Allowance (NIA) and the Strategic Innovation Fund (SIF), but potentially within the business plan in the future. The number of and application process for these projects were discussed; ESO project lead some and are partners on others.
- It was suggested that it is important to keep the use case programme as open as possible, as some vectors in the energy system aren't yet tangible, and will be added and evolve, and are difficult to anticipate.
- ESO confirmed that there are a number of use case projects proposed which could be discussed in more detail at future advisory groups.
- It was agreed that partnering on use case projects and supporting others to build their own digital twins is the right approach for GB, but it is important that the rules, access, interfaces and standards are right, for it to be successful, because of the decentralised approach.
- The importance of proactively progressing the right use cases for the programme was highlighted.
- The group expressed interest in deep dives into the three current use cases in the briefing document.
- It was confirmed what success will look like for the advisory group; what would be the most useful outcomes from the group:
  - To challenge ESO on its decisions or factors that might not have been considered.
  - Suggest opposing views and different ways of looking at an issue.
  - Put forward ideas for areas that ESO can research.
  - Relevant and concise advice from the group that can be taken onboard by the programme, published, and shared with Ofgem and DESNZ.
  - Members are to be the voice of the industry, to guide the programme.
  - To comment on the direction and strategy of the programme.
  - To request further information, meetings, and deep dives into relevant topics and use cases.

Recommendation

- Deep dives into the three use cases in the briefing document to be considered for future advisory group meetings.

6. **Discussion of use case identification**

Reflection Point

1. What metrics should we use to quantify the financial, social or environmental benefits of a use case?

Discussion

- It was agreed that this is a very challenging area, particularly as it is quantifying the benefits of something that is exploring solutions and new approaches for decision making.
- The use cases are all different, therefore there probably isn't a one-size-fits-all answer.
- It is not possible to quantify some benefits and use cases are difficult to compare as not comparing like with like.
- It was suggested that use cases could be evaluated against the end goal of the programme as that could form a framework for questions and is likely to identify that several use cases will be valuable.
- Could price signals be overlaid; the use cases might enable more efficient modelled outcomes?
- Data availability (real and synthetic) for the use case.

- Those use cases that look at the scale of the challenge: use cases that have small impact but are scalable across the network for large impact, e.g., demand side response. Or use cases with large impact but in smaller volumes and might include the whole system.
- There were some quantifiable measurements suggested such as energy saved in megawatts, carbon level reductions, hours reduced or moved in time or location e.g., for generation.
- There may be conflicting use cases; because of what is needed locally and nationally and the associated operational and investment timeframes.
- How many actors or types of actors would be interested in engaging with a use case?
- One advisory group member has experience in prioritising use cases in a similar project (a proof-of-concept demonstrator) and could potentially share details of the decision-making process with the group in the future.

Priority use cases were identified as:

- Stress testing and resilience; future security is important, balancing different energy producers in a more distributed energy system that is responsive down to the household level.
- Use cases that bring the whole system approach together.
- A use case that considers balancing electricity supply with gas supply, in use cases where gas is redirected to produce electricity.
- Those with the ability to model opportunities; market design, increase participation and competition (in different timescales), and opportunities to invest in the system by using the data to make judgements.
- The use cases of increasing productively and efficiency, and quicker access to data, especially in an emergency. It was noted that the time saved is difficult to measure.
- A use case that enables optimal locational decisions, of existing energy systems and emerging technologies.

Reflection Points

> *2. How should we assess the needs of the users?*
>
> *3. Are any of those user 'critical' users?*
>
> *4. Are there any other key factors to think about regarding users of the potential system?*

Discussion

- A number of potential user segments of the Virtual Energy System were highlighted as important:
  - Storage
  - Gas distribution networks
  - National Gas
  - CO_2
  - Hydrogen
  - Heat
  - Biomethane producers
  - Carbon capture
  - Regulators and policymakers (local and national)
- Two recently published Ofgem consultations were circulated to the group and could be relevant to the discussions about the regulator being a potential user of the system.

- It was noted that there are many different types of users with different requirements, and they need to be broken down into more detail and some user mapping is required, including distinguishing between direct users and beneficiaries. An example that was given was breaking down commercial and domestic users into consumers that are active and willing to engage and make real time decisions on energy use, and those that have a device that they input settings into and it operates on their behalf, but they are passive. There are customers who don't want to engage, don't want to have relevant device or don't want to adapt their energy use.

Recommendation

- ESO to explore further detailed user mapping.

Reflection Point

5. Are there high-level use cases which we have not covered?

Discussion

- It was suggested that some of the 26 proposed use cases (Table 1 in the briefing document) are more aims, optimisations or processes, and not use cases and therefore some refining and standardisation of this list is required.

- The use cases need more detail to fully understand what they are, their scope and purpose and how they fit into the whole energy system. It was suggested that this further detail is concise and consistent across the use cases (ideally keeping to one slide).

- It was suggested that other energy types use cases (in addition to electricity) need to be identified to reflect the FSO's future role, such as gas, hydrogen, CO_2, storage, and at a range of scales.

- It was observed that the use cases are network centred rather than decentralised assets and other areas could be considered:
  - Energy storage providers that make optimisation decisions.
  - Generators that flexibly use power to provide system services.
  - Organisations that bid into local flexibility markets.
  - Use cases to aid optimal asset location and design decisions, optimising investments.

- Other suggestions to consider:
  - Where does demand shifting (temporal or geographical) fit?
  - Can digital twins give better modelled outcomes compared to when the data is not available, e.g., with overlayed price signals?
  - When modelling energy storage, alternatives to storage such as modelling demand shifting could be explored.
  - It was summarised that the portfolio of use cases needs to add value, to make the Virtual Energy System work more efficiently, reliably and affordably on the path to net zero. The use cases also need to be feasible, balancing those that are quick wins and those that require more investment and are higher risk. The optimum portfolio of use cases will create a complete system.

Recommendation

- ESO to carry out further work on categorising use cases (Table 1).

Reflection Point

6. What frameworks would be helpful in identifying, categorising and prioritising use cases?

Discussion

- ESO clarified that it is looking for use case identification, categorisation and prioritisation advice so that the development of the Virtual Energy System isn't reactive, but ESO will actively drive investment and innovation funding internally and with industry. Are there existing use case frameworks or guidance ESO could use?

- The December 2010 European Commission Task Force for Smart Grids, Expert Group 1: Functionalities of smart grids and smart metres document, the March 2011 European Commission Smart Grid Mandate M/490, the September 2021 IEC 62559-2 Use Case Template-based Smart Grid Architecture Analytics and associated book were suggested as sources of guidance.

Recommendation

- ESO to review the suggested European Commission documents.

Reflection Points

7. Can you identify any criteria we have missed?

8. Is there criteria we can identify as essential whose exclusion can be dealbreakers?

Discussion

- It was suggested that some more detail would be useful on Table 2 in the briefing document, some items are embedded within others and that it could be reordered.

- An important consideration is data, some detailed discussion took place about how it relates to decisions about use cases:
  o Is the data available and accessible, or if synthetic data would be used in the short-term?
  o Can the data be shared between organisations?
  o Are there any regulatory and legal barriers to sharing commercial data?
  o What granularity of data would be beneficial and optimal, such as real-time, day ahead or half-hourly smart meter data, and analysis of the costs of the enhanced benefits of different granularities?

- What learnings are required from the use case for the programme?

- It was suggested that the group is given a briefing on data availability, the future of data, and the Common Framework and the demonstrator project.

- Information from NIA project 'DISCERN Knowledge Transfer' shared with the group.

Recommendation

- ESO to explore providing more detail and reordering of Table 2.

- A future briefing on data, and the Common Framework and the demonstrator project may be useful for the group.

- ESO to review DISCERN Knowledge Transfer project as may be relevant to future discussions.

Reflection Points

9. Are there any motivations for use cases in the Virtual Energy System that have not been listed?

10. Are there tools or processes that you use which can help to define a use case?

11. How could we incorporate findings from other known use cases?

Discussion

- It was concluded that the expected benefits are difficult to quantify and might need to be derived from wider system priorities. Looking from the network operators' perspective, does the use case address the biggest challenges to integrating the system?

- ESO clarified that learnings from other industries, such as the built environment or transport would be transferable to the energy industry and to encourage any knowledge or use case prioritisation in digital twins from these areas to be shared.

- It was suggested that it might be valuable to select use cases that are smaller, achievable and solve an existing problem for industry, which could generate support for the programme. It was agreed that the SIF is designed for participation in a number of innovation projects at different phases and scales of development.

- The 'Theory of Change' was also suggested as a possible framework to inform implementation of use cases and would include the steps that will be followed, barriers, enablers for uses cases and delivery.

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- Also suggested was plotting the use cases on two axes, one axis would be the scale of the benefit (such as market share, transferability, smaller use cases and larger game changers) and the other axis would be feasibility (such as a quick win, data availability, flexible incremental implementation).

Reflection Points

12. Can you share your experience of moving innovation use cases into BAU and lessons learnt?

13. How do we diversify the funding mechanism to deliver use cases?

- Due to the group contributing such detailed and valuable insights it was not possible to cover the last two items, and they will be considered for incorporation in future advisory group meetings.

7.	Next meeting date, time and agenda

- The next meeting will be held on Friday 19th May from 10:00 to 12:00.

8.	AOB

- The Chair thanked the group for their attendance and valuable contributions.