Dear Ofgem AI team,

Many thanks for providing the opportunity to respond to your consultation of AI guidance in the energy sector. I am writing in my capacity as a researcher and lecturer at the University of Bristol where for the past 5 years I have been researching the regulatory issues surrounding digitalisation in the energy industry (with projects pertaining to the implementation of the NIS regulations and the development of digital twins). I have been invited to respond to this consultation by Jonathan Thurlwell, following an AI community building event I organised at the University of Bristol (Bristol Digital Futures Institute).

First of all, in response to the consultation proposals, I would like to stress that we are currently positioned at the cusp of new market creation, with energy infrastructure operators, software developers (some local start-ups, others, established 'big tech' corporations), and governments entering new relationships through procurement, mergers and rentiership of software services. While this is not specific to the energy industry, it is an imperative that Ofgem watches carefully the evolving market and power dynamics as they'll inevitably have consequences on the emerging business models and the feasibility of fair competition.

Within that, it is important to exercise caution and avoiding overstating the promises of AI (e.g. the use of words like 'tremendous potential etc.). Above all, the AI 'supply chain' market (that is companies including chip manufacturers, frontier model developers, energy sector specific solutions, buyers of those solutions as well as providers of data models are trained on) in the UK as well as globally has a highly speculative and promissory character (Widder and Nafus, 2022; Galanos, 2023). The game-changing potential of AI is not sufficiently evidenced, indeed, the current state of the UK energy sector innovation is resembling of a frantic dash for relevant use cases and (ideally free of charge, in the eyes of model developers) datasets. Therefore, the current efforts of Ofgem should be focused on establishing appropriate methods for evidencing that the benefits of the proposed AI solutions outweigh their costs (or harms). Within that, I welcome the inclusion of safety, security, fairness and sustainability principles identified. They do need to come with more ambitious guidance recommending how stakeholders could meet those principles. I caution against commissioning reports which further contribute to the unfounded hype behind digitalisation and AI (cf. ARUP, 2024).

On the principles of safety and (here: cyber)security, I agree with Ofgem identifying them as critical and welcome the ongoing efforts to advance the collaborations between the academia, industry and regulatory bodies (e.g., FIGURE forum). The key takeaway from my research on the protection of critical infrastructures (largely consisting of ageing computers, many of them air-gapped or held locally), is that the reliability and safety of the UK grid cannot be taken for granted as the sector is

increasingly electrified (hence also increasingly digitalised; Michalec et al., 2022). Within that, power safety engineers and cyber security professionals have been the voice of reason, resisting the narratives of 'inevitability' of AI and calling for the development of digital solutions which are safety- and security-first. In practice, this means a much slower and deliberate development of technologies like AI, with clear lines of responsibility assigned to harms, protocols for 'worst case scenarios' and transparent reporting of incidents, errors and flaws. Consequently, any AI development in the context of safety-critical use cases ought to be conducted with significant involvement, if not leadership, from the energy domain experts (i.e., engineers maintaining legacy operational tech systems), rather than imposed by external software companies which fundamentally do not understand the safety and security case in OT (please see our work on 'anti patterns' done as a part of the National Cyber Security Centre Industrial Control Systems Community of Interest; 2023).

On the principle of fairness, I welcome Ofgem's emphasis on preventing bias, harms and building in consumer trust. However, there is a bigger story to be told here regarding fairness in terms of the market competition, monopoly risks and the potential for lock-in effects. It is currently unclear who are the recipients of the Ofgem guidance - e.g., DNOs who might be procuring AI solutions or developing in house expertise? UK based start-ups developing products based on foundational models? LLM /ML model developers like Open AI, software and hardware corporations seeking ways into a new market (NVIDIA, Google)? The dynamics of the energy market for AI are currently poorly understood, hence it should be Ofgem's priority to conduct 'political economy analysis' , i.e. map out all relevant stakeholders, their interests, potential conflicts and alliances. The digital economy has never been particularly characterised by its 'fairness' when it comes to competition, with critics highlighting negative effects, like 1) platform lock in / data enclosures (Sadowski, 2020) 2) regulatory capture (Saltelli et al., 2022); 3) waste of public spending under pressures from venture capitalists (Birch, 2022). As we're witnessing an increasing concentration of power of companies like Meta (now owning Instagram, WhatsApp, Facebook) as well as dangerous alliances with the far-right politicians in the US, it is of utmost importance that the UK's regulatory approach avoids paving the way for parallel developments in the UK energy sector.

With regards to the principles of sustainability, the emerging scientific evidence regarding AI's environmental footprint (mostly electricity consumption, rare minerals extraction and water consumption) has been a cause of alarm worldwide (Debus et al., 2023). Despite Google (and others') assurances of their net-zero ambitions, we continue to see proposals for additional energy supply capacity (e.g. small modular reactors) specifically being built to accommodate the construction of data centres. In order to sufficiently evidence the sustainability of proposed AI solutions, Ofgem

needs to adapt an impartial assessment methodology rather than passively accept companies own corporate reporting. Recently, a group of UK academics have put forward a call for improved reporting of electricity and water use by data centres – I very much welcome this development and join the growing number of voices concerned about the AI's environmental impact.

In practice, I recommend that the UK Government and regulatory bodies communicate the outcomes of their parallel initiatives, e.g. AI copyright consultation, data sharing infrastructure, consumer consent dashboard. Going forward, resolving the thorny problem of data access will be critical for building a market for AI that is genuinely safe, secure, fair and sustainable.

Apologies about the brevity of my statement - I found out about the consultation quite late in the process. I am keen to get involved in the further stages and look forward to hearing about the ideas coming from the AI Reg lab. The University of Bristol is also happy to host delegates from Ofgem for future engagements.

Finally, I will be sharing some insights from my current project on digital twins in the UK as a part of the Energy Systems Catapult webinar series (19th Feb at 12; recording will be available following the event). Over Spring 2025, I will be working closely with ESC on developing resources for further policy engagement and I would be very happy to keep you informed about our upcoming publications.

I am happy for the response to be published and it does not contain any confidential information.

Best wishes,
Dr Ola Michalec