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Maxine Frerk  
Senior Partner – Smarter Grids & Governance  
Ofgem,  
9 Millbank,  
London  
SW1P 3GE

Dear Ms Frerk,

## **FURTHER REVIEW OF INDUSTRY CODE GOVERNANCE**

The IET is pleased to respond to Ofgem's open letter consultation on Industry Code Governance and supports Ofgem's contextual remarks in regard to significant industry changes that need to be considered as part of a governance review.

There is evidence that these changes are already making an impact on the operational behaviour of the GB power system (for example the issues of voltage control and system dynamics identified in National Grid's System Operability Framework), that these changes are in many cases 'whole-system' issues rather than confined to traditional distribution or transmission boundaries and businesses, and that sector activities point to continuing and increasing scale and pace of change. (The latter is demonstrated by the range of successful technical and commercial innovations developed and demonstrated under the Low Carbon Networks Fund and set to continue under RIIO).

It is against this background of wider system changes that we offer the following comments, rather than from experience of the detailed mechanics of the present governance mechanisms. There are system-wide changes ahead that challenge the fundamentals of today's governance and, if these are not addressed, are capable of threatening future cost-effectiveness, decarbonisation goals, and supply security.

It seems to us that the main subject of the open letter is the processes by which panels react to some industry changes, and the processes by which they take decisions. Given the scale of industry change in the future we wonder if it is more appropriate to review if the current code structure reflects the needs of customers and the industry in the future. The current structure is based on history and has been modified incrementally to track the changes in the market. In the short term we are not aware that it needs significant change, given the improvements in recent years that the open letter demonstrates. However, in parallel with any short term governance considerations, we would recommend that some assessment of the code structure's long term suitability is done.

As you will be aware, The IET formed a cross-industry expert group in 2013, called Power Network Joint Vision (PNJV), and this group has published a number of documents addressing whole-system challenges. Lessons from other sectors have been examined and

include best practice approaches used in other sectors to manage highly complex systems. We summarise below some key messages arising from that work, which is on-going, and we will be pleased to discuss them further if that would be helpful.

**Ofgem Question 1: Do you consider the governance changes introduced under Code Governance Review (CGR) and CGR2 have been effective in improving the code governance arrangements. In particular considering the efficiency and effectiveness of code change, the ability for large scale reform to be implemented, and the accessibility of the arrangements for smaller/newer industry participants and consumer representatives?**

The IET's work under PNJV examined current industry code arrangements and our observations are included in a report published in October 2014<sup>1</sup>. The comments in the report on effectiveness were drawn from industry practitioners and addressed the context of increasing system complexity and the requirement for addressing change on a whole-system basis. The report notes the following limitations of today's arrangements:

- a) The Grid Code and Distribution Code Panels have a narrowly defined remit – they cannot take a comprehensive view of the whole electricity system. In addition, the remit of the Panels is purely technical, yet most real world solutions will work best with the technical, operational and commercial impacts treated together.
- b) “Smart loads” such as the electric vehicle charging infrastructure, internet-connected white goods and heat pumps, will have a major impact on the system but are not represented on either panel.
- c) Today's code change procedures work reasonably well for small incremental changes, but there is doubt about their ability to implement large, rapid or complex changes.
- d) Ofgem now has Significant Code Review powers. However it is not clear whether these arrangements are wide enough for the future, or may be constrained in other ways.
- e) The Codes refer to the ‘System’ but not in the sense of ‘whole-system’ as used in the context of ‘System Architecture’. The Distribution Code definition of System is simply “An electrical network running at various voltages”.
- f) New European network codes, being prepared for the Commission by ENTSO-E (the European Network of Transmission System Operators for Electricity) are likely to influence future arrangements.
- g) The code panels have essentially short-term time horizons but many System Architecture issues are more forward-looking and in the domain of a strategic planning activity.

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<sup>1</sup> “Transforming the Electricity System: how other sectors have met the challenge of whole-system integration” main report, IET, October 2014 (pages 11-12 refer)  
<http://www.theiet.org/factfiles/energy/pnjv-report-full-page.cfm>

**Ofgem Question 2: Do you agree that there is a need to consider further reforms to the industry code governance arrangements? If so, what issues do you consider should be addressed, and what possible solutions do you identify?**

Our work through the PNJV group has highlighted the significant challenges ahead as the GB power system is decarbonised and is migrated from a largely centralised system with passive consumers, to a highly distributed system with high volumes of interactive consumers, automation and embedded intelligence derived from data and multiple communication channels. Community Energy and increased interaction with other energy vectors (e.g. gas, community heating), can also be anticipated.

These changes will need to be reflected in the form and style of future governance arrangements and it is important to be open to entirely fresh thinking if that's what changing circumstances require.

Today's supply chain already forms a complex interconnected system. At the transmission level, traditional tasks such as system balancing and maintaining system stability will become increasingly complex while, at the distribution level, managing the impacts of reverse power flows, fault levels, and voltage rise will bring new challenges. Solutions are likely to include moving to automatic controls for applications such as solar panels, home energy storage, demand management and electric vehicle charging. Furthermore, improvement to the asset carrying capacity of transmission and distribution lines will be achieved by techniques such as dynamic thermal ratings, network real-time reconfiguration and Active Network Management.

The considered view of The IET is that implementation of such wide-scale automation will need to be handled with considerable care to ensure stable operation of the power grid and avoid unexpected and potentially serious outcomes. Avoiding unintended interactions between automatic control systems is a matter of priority for system security and quality of supplies; also, it will be important to prevent unplanned 'herd behaviours' created by common mode interactions arising from, for example, market price signals.

To give a simple example, if in the near future, just 2% of smart meters are controlling charging of electric vehicles based on time of use tariffs, and the market were to move from a high price half hour (where no vehicles are charging) to a low price half hour (where all the vehicles switch to charging), the step change in demand would be some 4GW, which is significantly beyond the capability of today's power system and would endanger national supply security. Here we are describing one of many possible scenarios where a highly distributed and automated activity at consumer level could adversely affect the security of distribution networks, transmission networks, and national frequency control. There are various solutions that could be proposed to this dilemma but, under today's governance arrangements, whose responsibility is it to address such a cross-system matter that also involves third parties such as EV and EV charger manufacturers, none of whom are 'Code signatories' and with whom there are few established business interfaces?

This example demonstrates that effective whole-system coordination is not a 'nice to do' opportunity but a necessary role in a complex system; the corollary is that achieving this coordination should be a clearly placed *accountability* and is not something that can be left to industry goodwill or loose committee oversight.

With these types of challenges in mind, it appears unlikely that modest refinements to today's governance arrangements will be satisfactory, assuming we move towards the decarbonisation of the energy sector in line with Government commitments. This observation is based on the following facts:

- a) the emerging changes we can anticipate are not simply matters for the Distribution Code alone, or for the Grid Code alone, but will in many cases be whole-system;
- b) the challenges are compounded by the growing importance of third parties who are not Code signatories, not represented in the existing panels, and will 'work around' existing regulated structures rather than get enmeshed (as they see it) in industry governance processes;
- c) customer behavior will be increasingly important. Customer behavior is not constrained by codes, rather by commercial or other considerations. Commercial interaction with customers and the smart grid needs to be factored into any debate dealing with the future nature of codes and code processes;
- d) the challenges of significantly greater complexity, including the need for interoperability and Open Systems to facilitate market-led innovation, is not a 'project' but an on-going process;
- e) there needs to be active engagement and harmonisation with European and International standards (which in practice is particularly challenging in terms of making available sufficient expert resource);
- f) the GB market structure is complex, compared with many elsewhere in Europe and internationally. An example is our 'supplier hub' model and the poor alignment this presents in relation to smart grid technologies that interact with buildings, energy automation and consumer choices.

These challenges and future requirements have in part been explored by IET's PNJV expert group, which draws attention to the role found in other sectors described as systems engineering, or the 'System Architect' (SA). This role, importantly, is not that of an asset owner or chief engineer, but works with all stakeholders to deliver *accountability* for whole-system co-ordination and holistic thinking.

The SA role is more than that of a 'system integrator'; the role includes holistic system thinking to ensure that stable technical platforms are developed that are robust against, for example, cyber threats and are designed for flexibility to ensure a capability to adapt to future developments. The SA role avoids the risk of 'building a house of cards' as new innovations are added to a complex system. The development of the World Wide Web is managed in this way, as described in the PNJV report (see Footnote 1).

We would encourage Ofgem to continue to support further work the IET is discussing with DECC to develop our collective understanding of the need for more formal systems engineering in the future electricity system, and to consider possible transition pathways from today's Code Panel structures to arrangements more suited to the future system, as necessary.

**Ofgem Question 3: In addition to a post implementation review of our CGR reforms and potential changes discussed in this letter, are there any other areas of industry code governance that should be considered in this review?**

The IET was pleased to see the recent Non-Traditional Business Model (NTBM) consultation from Ofgem and we have replied separately to this. In regard to industry governance, we would encourage Ofgem to stress-test its thinking and ensure that governance changes are put on a path that will accommodate fundamental energy system changes ahead such as:

- Community Energy developments;

- new business models for network companies (DSO and DSPP for example<sup>2</sup>);
- wider energy system developments, noting the work of the new Energy Systems Catapult;
- aggregation by commercial operators, network companies and others to provide ancillary services to the System Operator, and to local networks, with simple commercial mechanisms, for demand management, storage charging and discharging, Vehicle-to-Grid, service innovations from networks (e.g. transformer tap-changer coordinated responses);
- the implications for the electricity system of changes brought about by the technology revolution, currently including the internet of things, peer to peer behaviours, App-based services and extensive smart city interactions.

This response has been developed on behalf of the Board of Trustees by the IET's Energy Policy Panel and takes into account inputs received from the wider IET membership.

If the IET can be of any further assistance on these issues, please let me know.

Yours sincerely



Paul Davies  
Head of Policy  
The Institution of Engineering and Technology  
Email [pdavies@theiet.org](mailto:pdavies@theiet.org)  
Telephone: 01438 765687

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<sup>2</sup> DSO = Distribution System Operator, DSP = Distributed System Platform Provider (see the New York State Regulator's Reforming the Energy Vision REV project)