



The Future Power System Architecture (FPSA) Programme: Perspectives for Policy Makers & Supporting Organisations

Including: Policy Makers, Academia, and Research Councils (though power sector academia will probably be interested in all templates), non-technical media

The power system in Britain is undergoing radical transformation. The Future Power System Architecture (FPSA) programme is taking a holistic and whole-system approach to the evolution of its architecture - considering technical, governance, commercial and societal factors. FPSA is a multi-stakeholder collaboration led by the Institution of Engineering and Technology and the Energy Systems Catapult, sponsored by Innovate UK. This note considers stakeholders that are making or informing policy or strategy decisions about the future of the GB power system architecture. They will influence whether FPSA progresses to further stages and will make decisions about whether to act on FPSA recommendations.

Drivers:

Drivers of change arise primarily from government policy interventions, including decarbonisation and air quality objectives, the need for a cost-effective energy system as specified in the Industrial Strategy, and the imperative for security and stability of critical national infrastructure. Expanding customer choice and changing sentiment are also factors.

Opportunities and consequences:

There are four main reasons to implement the proposed new functionality:

First, new functionality is necessary to accommodate and optimise the diverse range of generation, demand-side, and storage technologies and new 'smart' techniques at sufficient scale to meet the fifth carbon budget (2028-32) and to be positioned appropriately for further decarbonisation on a pathway towards the 2050 target of the Climate Change Act.

Second, the impact of not having sufficient 'smart grid' capability will mean that the system imposes constraints on customers, undermining policy incentives to use new technologies such as electric vehicles. Alternatively, the system

would be over engineered with inefficiently-utilised and costly investment in network capacity and generation. This has significant implications for Ofgem's forthcoming price control reviews and the costs passed on to customers from the capacity mechanism.

Third, several of the new functions are required to maintain the stability, security and resilience of the power system as it becomes more distributed and based on weather-dependent technologies rather than on large scale centrally dispatched power plants. Managing recovery from major outages ('Black Start') will be more challenging by 2030.

Fourth, a flexible, open and agile platform is required to support the development, integration and uptake of innovative new technologies and services, especially 'beyond the meter'.

How can the FPSA functions help?

The primary concern of policymakers is the functioning of the system as a whole, but the main interest in functions would be as follows, approximately in this order of priority:

- Functions that prevent crises, such as those concerned with avoiding black-outs, protecting against cyber threats and recovering as rapidly as possible after failures.
- Functions that keep a downward pressure on rising customer bills and allow increased competition to drive inefficiency and rent-seeking out of the system.
- Functions that are necessary to meet government environmental targets and to meet them cost-effectively.
- Functions that enable new services to customers and accommodate tipping points.

The policy makers' perspective: what does this mean for me?

- **Are the functions really needed?** The thirty-five functions contain process and systems that are substantially more complex than the existing equivalent landscape. Interactions require that they are developed in co-ordinated way to ensure a coherent whole. Some prioritisation will be possible.
- **Is intervention essential?** FPSA analysis demonstrates the barriers to the development of the functions inherent in the current institutional arrangements. Furthermore their scope does not properly encompass the devices and parties 'beyond the meter'.
- **Could existing changes incorporate this?** Current initiatives to adapt the sector do not go far enough. They focus around traditional industry structure, do not create frameworks to support the thirty-five functions, or address the changing demand side capability. They recognise the flexibility imperative, but do not propose structures to help achieve it.
- **What do the new Enabling Frameworks add?** Today's landscape is characterised by protracted and discrete decision-making with a stakeholder representation limited to the traditional industry, recognising the need for change, EFs suggest an approach that is both more agile and flexible, and can engage a much greater number of stakeholders.
- **Government action?** The key policy action is to recognise the fundamental nature of the thirty-five functions and look to design a regulatory framework that supports them explicitly. Alongside this overall sector governance needs to be aligned to the functions which suggest that a transition to a governance model as proposed by EFs is required, although this requires further development.

Call to action:

The FPSA programme has identified new power system functionality necessary to meet major policy objectives by 2030. It will require a systematic effort to deliver these functions on time and without disruption. This requires government to take high-level ownership of the challenge to enhance the GB power system architecture and to commission further work.

For more information and to get involved please visit: es.catapult.org.uk/fpsa and www.theiet.org/fpsa