Energy Flexibility – The Future of Our Energy System

Imagine a future where electrical appliances and new low carbon technologies are turned on and off automatically according to the availability and the price of power; where electric vehicles charge overnight; where major energy consumers see the rewards of providing demand-side response as a significant revenue stream. This future, according to current policy thinking, needs to be less than 11 years away.

Our energy system is undergoing change – the most radical change since the construction of the national grid almost a century ago. There is now more low carbon generation (e.g. solar and wind) located close to people's homes and businesses; generating volumes of electricity that vary dependent on the weather and time of day. New technologies, such as storage, are emerging in the market. The costs are rapidly falling and the performance improving of these technologies. More IT-enabled business models which are cheaper than traditional engineering solutions.

All of these changes present interesting opportunities for the industry, from the formation of new business, the entrance of non-traditional players into the market, innovative methods to balance the system and the empowerment of consumers to have more control over how they use electricity. These same changes however present pain points for the industry such as challenges with infrastructure capacity constraints, where energy generated is unable to be delivered to the place it is required at the time it is needed because of a lack of physical capacity. Such constraints are increased by new types of connections and changing behaviour patterns on the demand side.

To harness the potential of these opportunities and to offset the pain points; the UK needs a flexible and smarter power system. Over the past three years CGI and Utility Week have conducted annual surveys of sector leaders the results of which have been published in exclusive market insight reports providing quantitative data to inform the debate about what has come to be referred to as the 'smart, flexible energy system' – oh, and of course, identify the perceived barriers to achieving that goal.[i]

> "Sector leaders are convinced that a flexible power system principally built on storage, demand-side flexibility and interconnection is the future for the industry"

The first report, Energy Flexibility: Transforming the Power System by 2030[ii] was published in 2016. It set the scene on the strategic significance flexibility will play to the power system by 2030 and highlighted the range of ongoing practical and policy-based barriers preventing flexibility. In 2017 the Demand Side Flexibility: Transforming The Power System by 2030[iii] report revealed that the market is in its infancy regarding demand-side flexibility and analysed the true potential to transform the power system by 2030 and the barriers to its realisation.

The 2018 report, Embracing Flexibility: Transforming the Power System by 2030[iv] was the most challenging of the three research pieces as it identified greater differences in how the sector perceives energy flexibility, its challenges and benefits.

[i] Unlocking Value: Flexible Power System, [ONLINE] Available at: https://utilityweek.co.uk/unlocking-value-flexible-power-system, [Accessed May 2019].

[ii] Energy Flexibility: Transforming the Power System by 2030. [ONLINE] Available at: https://www.cgi-group.co.uk/en-gb/article/energy-flexibility-transforming-the-power-system-by-2030,[Accessed May 2019].

[iii] Demand Side Flexibility: Transforming The Power System by 2030 [ONLINE] https://www.cgi-group.co.uk/en-gb/article/demand-side-flexibility-in-the-uk-utilities, [Accessed May 2019].

[iv] Embracing Flexibility: Transforming the Power System by 2030 [ONLINE] Available at: https://www.cgi-group.co.uk/en-gb/media/white-paper/embracing-flexibility-transforming-power-system-by-2030, [Accessed May 2019].

The anchoring view consistently identified in all the reports according to the survey findings is that different players in the British electricity value chain see value in a flexible energy system. Sector leaders are convinced that a flexible power system principally built on storage, demand-side flexibility and interconnection is the future for the industry and the answer to many of the challenges facing the country's power market.

So what is preventing us from having this new shiny flexible system now?

There are still numerous barriers to the market reaching maturity. Irrespective of the rapidly falling costs of technology for low carbon generation and storage; having flexibility now is expensive. However, the biggest barrier to flexibility identified is the lack of a commercial market framework that stacks value and facilitates continual evolution to the ultimate benefit of consumers.

It is important that the industry supports the delivery of a market framework that enables access to new markets, improve coordination and market infrastructure across the system, and enable these businesses to realise the true value of their services enabling cash to flow. The Government and Ofgem have set out a "Plan"[v] to enable the development of a smart, flexible energy system that will reduce costs for consumers and industry, and support the growth of innovative new businesses. It has been projected that it will save GB consumers between £17bn and £40bn to 2050[vi] – a broad range, but even at the lower end, it's pretty material! The aim is to upgrade regulatory and market frameworks, which in turn will open up new opportunities for consumers and market participants, and provide conditions in which innovation can flourish. As a core part of the Industrial Strategy, it is an opportunity to increase productivity at home, and put the UK in a leading position to export smart energy technologies and services to the rest of the world.

To find out more about CGI's view of the opportunities that energy flexibility presents, please read Rich Hampshire's White Paper - Beyond Smart - Generating the demand-side flexibility opportunity for British energy.[vii]

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[v] Upgrading our energy system: smart systems and flexibility plan, [ONLINE] Available at: https://www.gov.uk/government/publications/upgrading-our-energy-system-smart-systems-and-flexibility-plan, [Accessed May 2019].

[vi] An analysis of electricity system flexibility for Great Britain, [ONLINE] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/568982/An_analysis_of_electricity_flexibility_for_Great_Britain.pdf, [Accessed May 2019]

[vii] Beyond Smart - Generating the demand-side flexibility opportunity for British energy, [ONLINE] Available at: https://www.cgi-group.co.uk/en-gb/white-paper/beyond-smart-generating-demand-side-flexibility-opportunity-british-energy, [Accessed May 2019].