

SUPPORTING EVIDENCE DOC 1

Please find attached the joint response from npower and Innogy to the joint BEIS / Ofgem Call for Evidence “A Smart, Flexible Energy System”.

npower (npower Group plc) is one of Britain’s leading energy companies, and is part of the innogy SE group. We serve around 5.1 million residential and business accounts with electricity and gas and have recently launched our own DSR aggregation service.

innogy Renewables UK Ltd is one of the UK’s main renewable electricity developers. We operate over 1GW of renewable generation, including onshore wind, offshore wind and hydro. We are reviewing both our operational and development pipeline to consider options to improve flexibility.

innogy SE is Germany’s leading energy company, with revenue of around €46 billion (2015), more than 40,000 employees and activities in 16 countries across Europe. With its three business segments Grid & Infrastructure, Retail and Renewables, innogy addresses the requirements of a modern, decarbonised, decentralised and digital energy world. Its activities focus on its 23 million customers, and on offering them innovative and sustainable products and services which enable them to use energy more efficiently and improve their quality of life.

Executive Summary

We welcome BEIS and Ofgem’s focus on ensuring a swift transition to a more flexible system. It is essential that the Spring 2017 Plan that follows will set clear actions and milestones to facilitate increased system flexibility in the near term 2017-2020 in the context of a coherent longer term Strategy.

Our response (please see the responses to the individual questions) is predicated on high-level principles which we believe are essential to the effective and efficient development of a future smart and flexible electricity market.

In order for a smart and flexible system to develop, it is crucial that the system is considered holistically and is not addressed through discrete, “silo” thinking and actions, which will preclude the development of a future-proof system that cost effectively delivers the necessary levels of flexibility in a way that benefits the whole system and all market participants.

Recent examples of decisions being considered separately (such as the Ofgem Embedded Benefits review) must be avoided and we continue to recommend that a Significant Code Review be undertaken– as any ongoing approach based on incremental improvements does not and cannot address many of the key issues facing network companies now and in the future.

Our list of key principles, applicable throughout our response is shown below:

- Network access and network charging must continue to be technology neutral. Government / Ofgem should not seek to “pick winners” through amendments that may favour storage over other providers of system flexibility.
- Flexibility needs to be considered in the broader sense, extending beyond generation / consumption flexibility to other requirements of the system, such as inertia and voltage.
- Care must be taken not to conflate storage with flexibility and in particular battery storage with the wider range of storage technologies.
- Network operators must continue to comply with existing unbundling requirements– network owners and or operators must continue to be prevented from owning or operating storage assets, (in the same way they are prevented from owning generation or offering supply)

Otherwise they can distort the energy market and the market for ancillary services which are essential for all generators, suppliers and independent storage operators alike.

- Final consumption levies should only be applied once; however any loss associated with the utilisation of a storage device, is the final consumption and should continue to be liable for those charges.
- BEIS and Ofgem must provide clear strategic support to the development of smarter markets – this includes ensuring swifter decisions are taken and implemented by network operators, who cannot be allowed to “drag their feet”.
- All current and future flexibility services must be appropriately procured and remunerated.
- Appropriate consumer protection will be required and in some instances, this will require additional protection to be developed, in particular for future smart enabled products and services (such as DSR or smaller scale battery devices) targeted at domestic and / or microbusiness customers.
- Ensuring the successful (and cost effective) roll out of smart meters to domestic and smaller non-domestic customers is the priority. Until the smart meter roll out has completed, Government and Ofgem should avoid directly seeking to engage consumers on specific flexible products or services (such as Time of Use tariffs / mandatory Half Hourly Settlement).
- We support greater coordination between the TSOs and DSOs in future, and, we believe the establishment of an independent System Operator (SO) is required to ensure the development and delivery of a forward focused, more cost effective system.
- Project TERRE has the potential to radically amend the market for reserve balancing services and wider stakeholder engagement must be delivered to ensure all current and future market participants are aware of and can input into the proposed policy and regulatory developments.
- Barriers that limit the viability of hybrid sites (i.e. generators + storage and generator – generator) must be addressed ASAP.

In addition to our answers to your specific questions we would like to submit further evidence of the benefits of enabling increased system flexibility (see ‘Supplemental Evidence’). New Imperial College research shows that the costs of integrating renewables are relatively low compared to popular debate and that the move to a flexible system and managing the existing system better will bring benefits to consumers by reducing spend on extra capacity and infrastructure.

Supplementary Evidence Annex

The National Infrastructure Commission (NIC) has already presented high quality, convincing evidence of the value to the consumer from increased system flexibility in its Smart Power Report¹. Amongst others, UKERC suggests that not only is a smart system an enabler for decarbonisation but indeed that the savings from innovation in energy system management “*will be much higher if UK renewable energy targets are achieved*”². In addition to our answers to your specific questions we would like to submit further evidence of the benefits of enabling increased system flexibility. New Imperial College research shows that the costs of integrating renewables are relatively low compared to popular debate and that the move to a flexible system and managing the existing system better will bring benefits to consumers by reducing spend on extra capacity and infrastructure.

The case for System flexibility - Imperial College Study

¹ National Infrastructure Commission (2016) **Smart Power**

² UKERC (2014) Scenarios for the Development of Smart Grids in the UK
http://orca.cf.ac.uk/57649/1/Scenarios_for_the_Development_of_Smart_Grids_in_the_UK_Synthesis_Report%5B1%5D.pdf

The recently adopted 5th Carbon Budget will require the construction of new low carbon generation capacity capable of producing around 260TWh of electricity by 2030, equivalent to more than three quarters of all current output. All credible scenarios imply that this can only be achieved by deploying a significantly increased volume of renewable generation – likely to be around 50GW, predominantly from a combination of onshore and offshore wind and solar PV.

In November 2016 Imperial College published a study³, commissioned by innogy and others, which explored the cost implications of significantly increased levels of variable renewable generation. The study involved a number of scenarios to investigate the impact of varying degrees of system flexibility on the system integration costs of renewable generation in 2030. A ‘no progress’ scenario is created which represents a useful counterfactual to assess the benefits of flexibility. This scenario only included existing levels of flexibility and did not assume any improvement in the years to come. While useful for illustrative purposes we note that this counterfactual is already out of date since the recent Enhanced Frequency Response tender from National Grid will deliver 200MW of new storage by end of 2017. The counterfactual is compared with other scenarios described in Figure 1 below.

The Imperial College analysis was used to inform the E3G report “Plugging the Energy Gap”⁴ recommendations that “Ongoing market reform will be essential to support delivery of this plan. The Government should mandate Ofgem to ensure the regulatory regime and market mechanisms create a coherent system that is sufficiently flexible to support cost-effective delivery of the necessary volumes of low carbon generation.” We welcome this call for evidence as a first step towards this

Figure 1 – Description of cost scenarios used to investigate cost implications of system flexibility.

Scenario	Description	Comment
No progress	Current levels of interconnection, no new storage, zero uptake of demand side response	Broadly the current situation
Low flexibility	10GW of interconnection, 5GW of storage and 25% uptake of demand side response potential	Can be considered as ‘business as usual’
Mid flexibility	11GW of interconnection, 10GW of storage and 50% uptake of demand side response	Likely to require some new policy initiatives
Modernisation	As in Mid Flexibility but with a range of measures to improve system operation (concerning wind predictability, capability to provide ancillary services etc.)	Would involve modernising system operation practises, to meet 21 st century standards
High flexibility	15GW of interconnection, 15GW of storage and 100% uptake of demand side response	Would require significant new policy push to increase flexibility

Source (E3G paper), based on findings of the Imperial College Study⁵.

The Imperial College analysis illustrates that even relatively modest improvements in system flexibility allow increased volumes of variable renewable generation to be accommodated cost-effectively on the power system. This opens up options for government to deploy more low cost low carbon

³ The full report, *Whole-system cost of variable renewables in future GB electricity systems* by Prof. Goran Strbac and Dr. Marko Aunedi can be found at https://www.researchgate.net/publication/310400677_Whole-system_cost_of_variable_renewables_in_future_GB_electricity_system

⁴ The E3G Report “Plugging the Energy Gap”, by Simon Skillings, Tom Lafford, (2016) can be accessed at https://www.e3g.org/docs/Plugging_the_Energy_Gap.pdf

⁵ Ibid

technologies, whilst maintaining security of supply, thereby avoiding unnecessary increase in energy bills.

The study found that the cheapest way to decarbonise the UK power system involves flexibility and large volumes of renewable generation. This built on the findings of the National Infrastructure Commission's "Smart Power" report, which indicated that system flexibility could deliver savings of £8bn per annum. Please see Figure 2 (System Integration costs £/MWh by technology in 3 core scenarios in 2030).

Furthermore, through the modernisation scenario, the study identified the significant cost reductions that can be delivered through optimisation of the system via improved system operations such as; contracting wind generators being able to provide synthetic inertia and frequency response, allowing wind generators being able to provide reserve when curtailed and the improved forecasting of wind.

Figure 2. System integration costs (£/MWh) by technology in three core scenarios at 2030

