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Response to BEIS Consultation on A Smart Flexible Energy System

These comments are from Dŵr Cymru Welsh Water, the statutory water and sewerage undertaker that supplies over three million people in Wales and some adjoining parts of England. We are owned by Glas Cymru, a single purpose, not-for-profit company with no shareholders. We provide essential public services to our customers by supplying their drinking water and then carrying away and dealing with their wastewater.

Welsh Water is a significant energy user, consuming around 450GWh/year of electricity and is a growing energy generator approaching 100GWh/year from a variety of renewable energy sources (anaerobic digestion, hydro and solar PV). The costs of network and transmission are familiar to us as are the costs and benefits of embedded generation. We have participated in various demand response schemes and are also looking at the possibility of adding storage at some of our sites (but have not, as yet, actually installed any).

The scale of this consultation is unusually, indeed remarkably, broad yet still quite detailed. This has made it a challenge to respond to. We have set out our responses below against each question in the consultation. Yet each response could itself be expanded further. We, therefore, encourage BEIS to follow up this initial request for information with workshops or similar opportunities to discuss and develop particular aspects in more detail.

Yours sincerely,

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No	Section	Question	Response
1	Removing policy and regulatory barriers <i>Enabling Storage</i>	Have we identified and correctly assessed the main policy and regulatory barriers to the development of storage? Are there any additional barriers faced by industry? Please provide evidence to support your views.	<p>The most important of barriers to the take up of energy storage is, perhaps, the lack of technological stability and maturity given the wide range of technologies currently being developed. Organisations are reluctant to invest in something which may be superseded relatively quickly.</p> <p>Nevertheless, policy is also inhibiting development with a variety of schemes (e.g. frequency response) and uncertain financial revenues are significant factors given the current high capital cost of energy storage in relation to the schemes they can tap into for financial benefit (e.g. DSR schemes).</p> <p>The other key inhibitor is the position of DNOs who have networks under stress and see batteries as both generation and consumption making Grid availability a big issue.</p> <p>Given that a key use of batteries is for site / business resilience is considered to be the main benefit from energy storage – i.e. helping protect sites from black-out or brown-out. However, it may be a more efficient use of resources to focus battery installation on large scale Grid applications at the DNO level.</p>
2	Removing policy and regulatory barriers Enabling Storage	Have we identified and correctly assessed the issues regarding network connections for storage? Have we identified the correct areas where more progress is required? Please provide evidence to support your views.	Agree with the proposed. No more comments.
3	Removing policy and regulatory barriers Enabling Storage	Have we identified and correctly assessed the issues regarding storage and network charging? Do you agree that flexible connection agreements could help to address issues regarding storage and network charging? Please provide evidence to support your views, in particular on the impact of network charging on the competitiveness of storage compared to other providers of flexibility.	<p>We agree in principle with the proposal but the devil will be in the detail.</p> <p>Over the years much investment has gone into establishing infrastructure in Wales often in remote areas with poorer infrastructure than most areas of the UK. The particular challenge for us as a Water Company in this area is that it may only be once in ten or more years that we would need maximum electrical demand at a particular asset e.g. when switching to ‘backup’ sources of water supply at times of drought. There is a risk that we would find the capacity was simply not there during others taking up this flexible capacity.</p> <p>Perhaps one solution is to link flexible connections with the principle of some essential services customers paying more for ‘firm’ connections or getting discounts for ‘interruptible’ connections.</p>
4	Removing policy and regulatory barriers Enabling Storage	Do you agree with our assessment that network operators could use storage to support their networks? Are there sufficient existing safeguards to enable the development of a competitive market for storage? Are there any circumstances in which network companies should own storage?	Agree with the proposed. No more comments.

		Please provide evidence to support your views.	
5	Removing policy and regulatory barriers Enabling Storage	Do you agree with our assessment of the regulatory approaches available to provide greater clarity for storage? Please provide evidence to support your views, including any alternative regulatory approaches that you believe we should consider, and your views on how the capacity of a storage installation should be assessed for planning purposes.	It does not make sense for electrical storage to be treated as generation for licensing purposes; it should be defined separately as a new activity with a separate licence regime. Whilst this will introduce additional administrative processes in the short term, this should provide greater clarity for market participants around the process of developing a storage facility. This may need to be accompanied by an alternative approach / guidance for DNO's in their treatment of fault levels e.g. moving from an absolute or 'worst case' scenarios to more of a probability and risk assessment.
6	Removing policy and regulatory barriers Enabling Storage	Do you agree with any of the proposed definitions of storage? If applicable, how would you amend any of these definitions? Please provide evidence to support your views.	We prefer using the definition a. at paragraph 38 and then have additional legislation for the point c. of the same paragraph to be implemented. It is important to note however that support for energy storage should not be limited to electrical storage and other forms of storing energy should be given equal significance in policy making. Storage should primarily be seen as a mechanism for conserving energy, ideally generated on-site, for use as a form of balancing. It therefore does not make sense to limit support to electrical storage only.
7	Removing policy and regulatory barriers Aggregators	What are the impacts of the perceived barriers for aggregators and other market participants? Please provide your views on: ☐ balancing services; ☐ extracting value from the balancing mechanism and wholesale market; ☐ other market barriers; and ☐ consumer protection. Do you have evidence of the benefits that could accrue to consumers from removing or reducing them?	Whilst we have no direct relevant experience and are not an aggregator, the key barrier in the area of demand response is generally the lack of economic stability and certainty in the available schemes making a commitment to investment difficult.
8	Removing policy and regulatory barriers Aggregators	What are your views on these different approaches to dealing with the barriers set out above?	N/A
9	Removing policy and regulatory barriers Aggregators	What are your views on the pros and cons of the options outlined in Table 5? Please provide evidence for your answers.	N/A
10	Removing policy and regulatory barriers Aggregators	Do you agree with our assessment of the risks to system stability if aggregators' systems are not robust and secure? Do you have views on the tools outlined to mitigate this risk?	N/A
11	Providing price signals for flexibility System Value Pricing	What types of enablers do you think could make accessing flexibility, and seeing a benefit from offering it, easier in future?	The key enablers in our view are certainty for suppliers/consumers, steady revenue/savings stream, security of supply and network reliability.

12	Providing price signals for flexibility System Value Pricing	If you are a potential or existing provider of flexibility could you provide evidence on the extent to which you are currently able to access and combine different revenue streams? Where do you see the most attractive opportunities for combining revenues and what do you see as the main barriers preventing you from doing so?	<p>We have an internal Energy Team and budget for investment into energy projects. This budget can be focused on generation, efficiency, storage optimisation or tariff/demand response.</p> <p>Our objectives are always to go for projects which produce the most reliable long terms returns for the business and (as a not-for-profit organisation) our customers. The most attractive opportunities those who offer a steady revenue stream, with attractive payback period and without risking our core operations providing a water and waste water service to customers.</p> <p>More transparency is needed both around schemes available, what assets can participate and whether alternative schemes (e.g. demand response, tariff optimisation) can be combined.</p>
13	Providing price signals for flexibility System Value Pricing	If you are a potential or existing provider of flexibility are there benefits of your technology which are not currently remunerated or are undervalued? What is preventing you from capturing the full value of these benefits?	Companies like ourselves with a very steady demand profile and limited flexibility to deviate (yet we are making use of it under certain schemes like frequency response and DSBR) should see a benefit from having a predictable import and not adding pressure to an already stressed system. There is nothing in place to reward us for this predictable behaviour (e.g. reduced system charges).
14	Providing price signals for flexibility System Value Pricing	Can you provide evidence to support changes to market and regulatory arrangements that would allow the efficient use of flexibility and what might be the Government's, Ofgem's, and System Operator's role in making these changes?	Government should focus on providing incentives to domestic consumers and small businesses. Ofgem should make sure at all times of the transparency and integrity of the market (it feels that's not always the case with some schemes like Capacity Market Auctions). System Operator should find a way to reward participants that are not adding pressure to an already stressed system.
15	Providing price signals for flexibility Smart Tariffs	To what extent do you believe Government and Ofgem should play a role in promoting smart tariffs or enabling new business models in this area? Please provide a rationale for your answer, and, if you feel Government and Ofgem should play a role, examples of the sort of interventions which might be helpful.	N/A
16	Providing price signals for flexibility Smart Tariffs	If deemed appropriate, when would it be most sensible for Government/Ofgem to take any further action to drive the market (i.e. what are the relevant trigger points for determining whether to take action)? Please provide a rationale for your answer.	N/A
17	Providing price signals for flexibility Smart Tariffs	What relevant evidence is there from other countries that we should take into account when considering how to encourage the development of smart tariffs?	N/A
18	Providing price signals for flexibility Smart Tariffs	Do you recognise the reasons we have identified for why suppliers may not offer or why larger non-domestic consumers may not take up, smart tariffs? If so, please provide details, especially if you have experienced them. Have we missed any?	N/A

19	Providing price signals for flexibility Smart Distribution Tariffs - Incremental Change	Are distribution charges currently acting as a barrier to the development of a more flexible system? Please provide details, including experiences/case studies where relevant.	<p>Not exactly a barrier, but more like a counter incentive. Any flat-rate tariff creates obstacles as it doesn't reflect the underlying value and is not giving sufficient stimulus to react.</p> <p>As a larger non-domestic consumer, we do take distribution and transmission charging into account when making long term investment decisions for energy management or energy reduction projects. Clarity of long-term policy approach would help support forward budgeting and preparation of business cases.</p> <p>Our energy budgeting and management systems have been comprehensively linked to the current CDCM and EDCM charging methodologies. The fixed times have resulted in our telemetry systems and PLCs being modified to demand shift away from peak periods. If we were to have these distribution peak charges removed or made variable or 'smart' there would be significant cost to modify systems and equipment across our many sites (500+) compatible with active/real time demand side response. As a not-for-profit company we are committed to not increasing our bills above the rate of inflation despite the upward pressures of energy (which comprises up to 15% of our operational cost base).</p>
20	Providing price signals for flexibility Smart Distribution Tariffs - Incremental Change	What are the incremental changes that could be made to distribution charges to overcome any barriers you have identified, and to better enable flexibility?	<p>It is difficult to see an solution optimum for all users. There should be a cost for using the distribution system whenever it is used (i.e. a fixed sum per unit or fixed sum per capacity) and a variable element that changes with time of day.</p> <p>To promote flexibility in the system, we need to move away from 'super profiles' towards individual pricing signals to encourage consumers to take action. Instead of looking at incremental changes, a more fundamental review of network operation charges (to incorporate both distribution and transmission) is needed. A tariff structure that reflects the cost of generating and distributing energy (at national and regional network level) at different times of day seems like the best method of controlling demand profiles.</p> <p>As more consumers engage with load shifting, and the demand profiles shift, the cost impacts currently seen – e.g. in the 'red' periods will dissipate and a smart energy system with constant balancing between generation, storage and supply will develop. Success in this will be driven through the meter and users, whether small or large, will need metering that displays to users in a clear and easy to understand manner, the price impact of using power at certain times of day.</p> <p>At SME and domestic levels, this must be combined with a concerted educational effort explaining the reasons for price differentials and how the end-user can respond (e.g. through the adoption of smart assets or engaging with demand side response).</p> <p>Any initial scheme would need careful piloting to encourage consumers to become more reactive to price signals and ensure participation is voluntary and prices are live (i.e. next HH interval).</p> <p>The current system gives certainty but initially a customer could be given the option to select either fixed "red-</p>

			<p>amber-green” tariffs or elect to be billed on a ‘near real-time’ variable tariff based on, say, variable red-amber-green tariffs notified a day ahead – with the protection for users that the average tariff cost over a year or a month will not exceed a set value.</p> <p>Looking further into the future smart appliances would enable this to become more of a real time reaction in the way that frequency response currently operates.</p>
21	Providing price signals for flexibility Smart Distribution Tariffs - Incremental Change	How problematic and urgent are any disparities between the treatment of different types of distribution connected users? An example could be that that in the Common Distribution Charging Methodology generators are paid ‘charges’ which would suggest they add no network cost and only net demand.	Charges under CDCM and EDCM should continue to bear in mind the proportional use of NUF points. If infrastructure is required in addition to those for any import requirement for generators costs should be incurred. If there are benefits likewise revenues should be paid.
22	Providing price signals for flexibility Smart Distribution Tariffs – Fundamental Change	Do you anticipate that underlying network cost drivers are likely to substantively change as the use of the distribution network changes? If so, in what way and how should DUoS charges change as a result?	<p>Yes we are anticipating network cost drivers to change as the market environment will become more reactive to charges, a closer monitoring will be required and education needs to be providers to take consumers through this journey.</p> <p>DUoS charges could become more flexible, charges updated monthly or weekly to reflect seasonality of use and general condition of the network as a stepping point towards near-real-time ‘smart’ charging. Such changes would need careful regulation to ensure average tariffs did not rise and be introduced over a prolonged period with support offered to industrial and struggling domestic users to mitigate the costs of any technology needed to effectively support and manage this change in pricing.</p>
23	Providing price signals for flexibility Smart Distribution Tariffs – Fundamental Change	Network charges can send both short term signals to support efficient operation and flexibility needs in close to real time as well as longer term signals relating to new investments, and connections to, the distribution network. Can DUoS charges send both short term and long term signals at the same time effectively? Should they do so? And if so, how?	The long term aspect will be reflected on the fixed element of the charge (as proposed above) which could be adjusted too according to new needs, but in a less frequent base (e.g. quarterly). Changes should be made gradually over a period of years.
24	Providing price signals for flexibility Smart Distribution Tariffs – Fundamental Change	In the context of the DSO transition and the models set out in Chapter 5 we would be interested to understand your views of the interaction between potential distribution charges and this thinking.	N/A
25	Providing price signals for flexibility Other Government Policies	Can you provide evidence to show how existing Government policies can help or hinder the transition to a smart energy future?	<p>The variety and complexity of Demand Response related products and their short term horizon serves to hinder the transition. For example we participated in DSBR and Demand Turn-Up but were limited in the range of opportunities we could offer because schemes were only for 1 year and so could not support the use of sites needing significant changes in metering or control systems.</p> <p>In summary the key lies in clarity, simplicity and longevity of schemes.</p>

26	Providing price signals for flexibility Other Government Policies	What changes to CM application/verification processes could reduce barriers to flexibility in the near term, and what longer term evolutions within/alongside the CM might be needed to enable newer forms of flexibility (such as storage and DSR) to contribute in light of future smart system developments?	There appears to be confusion in how the CM sites with other forms of flexibility; what can be combined and what schemes are mutually exclusive.
27	Providing price signals for flexibility Other Government Policies	Do you have any evidence to support measures that would best incentivise renewable generation, but fully account for the costs and benefits of distributed generation on a smart system?	<p>As an operator of 'small' (under 5MW) embedded generation (60 sites) we are supportive of measures that incentivise varying generation output based on the needs of a smart network. A key factor for companies such as ourselves is to keep the range and complexity of schemes to a minimum as well as clarify the relationship between schemes aimed at generation or those aimed at consumption. Indeed measures that work for both (as TNUOS charging does now) is ideal as it gives end users such as ourselves the choice of increasing generation or reducing consumption or both.</p> <p>So whilst a number of factors can feed into generation needing (from a Grid perspective) to be increased or decreased: Frequency, Transmission or Distribution pressure, the ideal would be to minimise the range of schemes that an end user must consider.</p>
28	A system for the consumer Smart Appliances	<p>Do you agree with the 4 principles for smart appliances set out above (interoperability, data privacy, grid security, energy consumption)?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No (please explain)</p>	N/A – we are focused on industrial scale processes.
29	A system for the consumer Smart Appliances	<p>What evidence do you have in favour of or against any of the options set out to incentivise/ensure that these principles are followed? Please select below which options you would like to submit evidence for, specify if these relate to a particular sector(s), and use the text box/attachments to provide your evidence.</p> <p><input type="checkbox"/> Option A: Smart appliance labelling</p> <p><input type="checkbox"/> Option B: Regulate smart appliances</p> <p><input type="checkbox"/> Option C: Require appliances to be smart</p> <p><input type="checkbox"/> Other/none of the above (please explain why)</p>	N/A – as above
30	A system for the consumer Smart Appliances	<p>Do you have any evidence to support actions focused on any particular category of appliance? Please select below which category or categories of appliances you would like to submit evidence for, and use the text box/attachments to provide your evidence:</p> <p><input type="checkbox"/> Wet appliances (dishwashers, washing machines, washer-dryers, tumble dryers)</p> <p><input type="checkbox"/> Cold appliances (refrigeration units, freezers)</p>	N/A – as above

		<input type="checkbox"/> Heating, ventilation and air conditioning <input type="checkbox"/> Battery storage systems <input type="checkbox"/> Others (please specify)	
31	A system for the consumer Smart Appliances	Are there any other barriers or risks to the uptake of smart appliances in addition to those already identified?	N/A – as above
32	A system for the consumer Smart Appliances	Are there any other options that we should be considering with regards to mitigating potential risks, in particular with relation to vulnerable consumers?	N/A – as above
33	A system for the consumer Ultra Low Emission Vehicles	How might Government and industry best engage electric vehicle users to promote smart charging for system benefit?	N/A – as above
34	A system for the consumer Ultra Low Emission Vehicles	What barriers are there for vehicle and electricity system participants (e.g. vehicle manufacturers, aggregators, energy suppliers, network and system operators) to develop consumer propositions for the: <input type="checkbox"/> control or shift of electricity consumption during vehicle charging; or <input type="checkbox"/> utilisation of an electric vehicle battery for putting electricity back into homes, businesses or the network?	N/A – as above
35	A system for the consumer Ultra Low Emission Vehicles	What barriers (regulatory or otherwise) are there to the use of hydrogen water electrolysis as a renewable energy storage medium?	N/A – as above
36	A system for the consumer Consumer Engagement with DSR	Can you provide any evidence demonstrating how large non-domestic consumers currently find out about and provide DSR services?	Through consultants, other market participants or through attendance and interaction with groups such as DCUSA, Elexon, National Grid, UKWIR and other working groups as well as our own water Industry Energy Forums.
37	A system for the consumer Consumer Engagement with DSR	Do you recognise the barriers we have identified to large non-domestic customers providing DSR? Can you provide evidence of additional barriers that we have not identified?	Table 6 provided on page 66 is very comprehensive and included all barriers we have encountered as a large non-domestic customers providing DSR.
38	A system for the consumer Consumer Engagement with DSR	Do you think that existing initiatives are the best way to engage large non-domestic consumers with DSR? If not, what else do you think we should be doing?	<p>The awareness barrier in place (i.e. lack of understanding how energy markets work) doesn't allow even large non-domestic consumers to participate. Schemes need to be more transparent and processes to be simplified so more companies can identify the opportunities in place and engage.</p> <p>In terms of promotion and awareness the Power Responsive campaign works relatively well; however there are further actions that could be taken:</p> <ol style="list-style-type: none"> 1. Simplification of the various DSR schemes, making these easier to understand and to access 2. Longer-term contracts, potentially at a lower price point, would enable forward budget forecasting and business case preparation and thereby assist energy managers to gain corporate sign-off to engage in DSR schemes

			<p>3. Focus in literature and at Power Responsive events on the benefits available to the end-user</p> <p>4. Metering DSR equipment and paying a revenue based on avoided consumption might be attractive to some end-users.</p>
39	A system for the consumer Consumer Engagement with DSR	When does engaging/informing domestic and smaller non-domestic consumers about the transition to a smarter energy system become a top priority and why (i.e. in terms of trigger points)?	Once a financial incentive is provided combined by suitable technology to enable consumers to feel they can effectively manage and benefit from the change.
40	A system for the consumer Consumer Protection and Cyber Security	<p>Please provide views on what interventions might be necessary to ensure consumer protection in the following areas:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Social impacts <input type="checkbox"/> Data and privacy <input type="checkbox"/> Informed consumers <input type="checkbox"/> Preventing abuses <input type="checkbox"/> Other 	N/A
41	A system for the consumer Consumer Protection and Cyber Security	Can you provide evidence demonstrating how smart technologies (domestic or industrial/commercial) could compromise the energy system and how likely this is?	N/A
42	A system for the consumer Consumer Protection and Cyber Security	What risks would you highlight in the context of securing the energy system? Please provide evidence on the current likelihood and impact.	N/A
43	The roles of different parties in the system and network operation	Do you agree with the emerging system requirements we have identified (set out in Figure 1)? Are any missing?	N/A
44	The roles of different parties in the system and network operation	<p>Do you have any data which illustrates:</p> <p>a) the current scale and cost of the system impacts described in table 7, and how these might change in the future?</p> <p>b) the potential efficiency savings which could be achieved, now and in the future, through a more co-ordinated approach to managing these impacts?</p>	N/A
45	The roles of different parties in the system and network operation	<p>With regard to the need for immediate action:</p> <p>a) Do you agree with the proposed roles of DSOs and the need for increased coordination between DSOs, the SO and TOs in delivering efficient network planning and local/system-wide use of resources?</p> <p>b) How could industry best carry these activities forward? Do you agree the further progress we describe is both necessary and possible over the coming year?</p> <p>c) Are there any legal or regulatory barriers (e.g. including appropriate incentives), to the immediate actions we identify as necessary? If</p>	N/A

		so, please state and prioritise them.	
46	The roles of different parties in the system and network operation	<p>With regard to further future changes to arrangements:</p> <p>a) Do you consider that further changes to roles and arrangements are likely to be necessary? Please provide reasons. If so, when do you consider they would be needed? Why?</p> <p>b) What are your views on the different models, including:</p> <p>i. whether the models presented illustrate the right range of potential arrangements to act as a basis for further thinking and analysis? Are there any other models/trials we should be aware of?</p> <p>ii. which other changes or arrangements might be needed to support the adoption of different models?</p> <p>iii. do you have any initial thoughts on the potential benefits, costs and risks of the models?</p>	N/A
47	Innovation	Can you give specific examples of types of support that would be most effective in bringing forward innovation in these areas?	Support in the form of loans, grants or subsidy for early adopters in each area may help but with numbers capped to limit costs to the tax-payer and ensure this support is limited to genuine 'pilot' projects. An alternative approach would be to grant temporary exemption (e.g. 3 or 5 year) from elements of energy charges e.g. reduced or exempt distribution charging for introducing an 'approved' or 'accredited' innovation
48	Innovation	Do you think these are the right areas for innovation funding support? Please state reasons or, if possible, provide evidence to support your answer.	Yes, these broadly represent the current challenges and opportunities. As with all technological developments this list needs to remain under 'review'