The Future for small-scale low-carbon generation

Opportunities and Challenges

Question 1 *- Have we accurately captured all the opportunities and benefits that small-scale low-carbon generation can provide to the UK energy system over the short, medium and longer-term? Are there any that we have missed? Please provide evidence.*

The British Hydropower Association (BHA) fundamentally disagrees that BEIS have accurately captured all the opportunities and benefits that small-scale low-carbon hydropower generation can provide.

1.1 There are a number of inaccuracies identified by the association in the BEIS Call for Evidence document, listed as follows:-

a) 1.7 [page 9] 1st bullet point - hydropower costs are not falling rapidly and cost reductions have not led to increased deployment. In fact the opposite is the case as there has been less deployment and since 2015 there has been a 50% reduction in hydro installations. The BHA is not aware of any hydropower scheme deploying without a support mechanism, or indeed of any other low carbon technologies doing so in significant numbers to date.

b) 1.7 [Page 10] 2nd bullet point – most hydropower schemes are 'run of river' with no storage and so, as they can only generate when there is water in the river, they are 'intermittent'.

c) However the natural attenuation of rain on the landscape results in a slower run-down of generation for hydropower resulting in a less intermittent operation than some other low carbon technologies.

   In addition, depending on the topography, some hydropower schemes can include natural water storage and therefore are not intermittent.

   The BHA notes it appears unfair that the focus seems to be on the intermittency of low carbon generation rather than the inflexibility of some thermal and nuclear generation.

d) 1.7 [Page 10] 3rd bullet point – hydropower is highly decentralised. Due to the nature of the energy source, schemes are not generally located close to larger centres of population and are therefore are less likely to be located 'behind the meter'.

e) 2.7 [Page 15] – The BHA believes that there is currently insufficient incentive to install electrical storage at a hydropower scheme unless the energy can be used on site. As hydropower is by its nature not usually located close to demand it is unlikely electrical storage will be economical.

f) 2.8 [Page 16] – as previously some hydropower schemes can include water storage in the form of water reservoirs - upstream from the generating plant. This type of storage is highly efficiency as it does not incur the significant energy losses (usually 20%) in the charging and discharging of other storage systems.

g) 1.15 [Page 13] The BHA agree that multiple solutions may be required in order to maintain a low carbon energy mix.

1.2 The BHA also believes that there are significant inaccuracies identified in the Impact Assessment accompanying the FiT consultation.

The key areas are listed as follows:-

a) The level of hydropower deployment stated - 4MW per year - cannot possibly happen without some form of support mechanism. The BHA estimates that near to zero deployment will occur once the FiT closes to new applicants in March 2019 unless some other support is provided.

b) The associated impact on consumer bills from closing the scheme to new applicants is estimated as a 'less than' £1 annual saving to an average UK household. The impact on consumer energy bills therefore cannot possibly be described as 'burdensome'.

c) The impact on the hydropower industry has not been properly considered compared to the loss of jobs. The impact on jobs is being assessed qualitatively; therefore it is not possible for BEIS to robustly quantify these effects.

The hydropower development industry is being shut down by BEIS on the back of wishy-washy, unsubstantiated, finger-in-the-air, 'assume-this, assume-that' statements.

d) In conclusion, the BHA believes that there are significant opportunities and benefits that small-scale low-carbon hydropower generation can provide to the UK energy system which we outline in the following sections.

1.2,1 Hydropower opportunities

a) Hydropower is an important and valuable contributor to the UK renewable energy mix and to achieving the UK's low carbon targets. Hydropower is the world's leading renewable energy source and the oldest method of harnessing clean electricity.

b) There is still the opportunity to develop hydropower in the UK. A recent resource study [Hydropower & Dams 2017] indicated that there is a practical potential for a further 2GW of hydropower development capacity in the UK.

1.2.2 Technical benefits

a) Hydropower is a renewable technology providing green electricity from which there are no direct CO2 emissions. As such, it provides a valuable contribution to meet both the UK's energy needs and CO2 reduction targets.

b) Hydropower is an extremely efficient technology with many hydro turbine efficiencies of more than 90%. A hydropower scheme can typically convert over 80% of the energy in the available water into electricity. This is more efficient than any other form of renewable generation.

c) Hydropower has a very long life when compared to other generators and so can offer long-term generation. While 35 years has been often been assumed for economic analysis, many schemes last between 70 and 100 years, and in some cases sometimes beyond. This compares to 25 years for wind, solar PV and AD; 35 years for nuclear.

   As well hydropower has minimal decommissioning costs, without the need to deal with hazardous waste material.

d) Hydropower provides energy security for the future as well as being a long-term, secure investment due to longevity of installation and maturity of technology.

e) While most hydropower schemes are 'run of river' with no storage – so can only generate when there is water in the river - the natural attenuation of rain on the landscape results in a slower run down of

generation for hydropower resulting in a less intermittent operation than some other low carbon technologies

f) Hydropower is the only renewable technology that can be used to store large quantities of energy in a clean environmentally-friendly way. Where the topography allows this is done by holding the water in reservoirs before it is used for generating. This process is not a net energy user, unlike other types of storage.

g) Hydropower tends to have much better availability at times when demand is highest - i.e. winter months - than some other renewable technologies.

h) Up to March 2017 1,063 FiT hydro schemes have been accredited - just 0.2% of the total number of FiT installations. However hydro punches well above its weight because the hydro FiT installed capacity was 184MW - which is 3% of all FiTs capacity – so hydro schemes are on average 15 times larger than other FiT schemes.

i) Using independent research - the Poyry report [2015] - we estimated that on average these FiTs hydro installations generate 767GWh per annum which is 8% of the total FiTs generation - so for every installed MW of hydro we generate 2.5 times more energy than the average.

1.2.3 Jobs and supply chain

a) The hydropower industry is committed to helping to tackle climate change. It supports 7,400 jobs [Department for Business Innovation and Skills – 2015 – 'Size and Performance of the UK Low Carbon Economy].

b) The Poyry report estimates that hydropower developers have spent c£1billion on building FiTs schemes and continue to spend c£30M annually on their operation.

c) The BHA estimates that on average c70% of the cost of a new UK hydropower scheme is in civil construction which is mostly procured in the local region. The majority of the FiT supported schemes have been located in relatively remote rural areas so their construction and operation is supporting local jobs, businesses and supply chain.

Case Study

One of the BHA's members in Scotland commissioned an economic assessment (a 'Local Multiplier 3' report) for a recently constructed 4MW hydro project. This was done by assessing the total project capex and looking at the geography of spending of two of the prime contractors and sub-contractors.

In summary, the report found that for every £1 that the hydro project invested in civil and plant contracts, an additional 56p was subsequently re-spent in the 'local' economy through the supply chain.

Considering Scotland as a whole, for each £1 of investment an additional 90p was subsequently re-spent within Scotland.

d) BHA estimates suggest that UK-based small-scale hydro turbine manufacturing companies enjoy c60% of the market share for supply of the generating equipment.

Export market

A significant benefit of sustaining a thriving UK hydropower industry is that the supply chain of manufacturers, consultants, developers and others can use this as a base to develop opportunities overseas.

In order to be credible in an export market, there needs to be a flourishing home market.

1.2.4 Consumer energy bills and community

Government has a commitment to maintaining wider public support towards the 2050 target of 80% reduction in C02 emissions.

a) The cost per kW of clean energy produced by hydropower is currently the lowest of all the renewable technologies when taken over the full lifetime of the installation. This is because it offers long-term generation beyond the subsidy period.

b) From a community hydropower perspective, as well as providing often much needed community funds which may be used to alleviate fuel poverty, hydropower offers a local, social investment opportunity; provides an excellent educational resource to communities, and can draw people to the river environment.

c) From the Poyry report the BHA estimates that an overall average of 10% - rising to 15% in the larger scheme bands - of the total cost of hydropower scheme construction is on the grid connection, therefore improving rural and community connectivity.

As this is often in remote areas, the hydropower sector has evidently made a significant contribution to upgrading the grid in many rural areas across the UK. Consumers will continue to benefit from this significant investment of c£100M.

Question 2 *- How can government help consumers benefit from small-scale low-carbon generation such as local communities, local authorities, and those in fuel poverty?*

The BHA believes Government support for hydropower will benefit consumers and government alike.

2.1 Climate change

a) In a 2017 survey by the Times newspaper, those voters aged 40 or under are keen for senior politicians to speak up about the effects of climate change and most strikingly, the top issue for 18 to 28 year-olds is also climate change.

b) The cost to the consumer for the continuation of the FiT scheme – 2019 – 2030 is <£1 per household. Where is there any evidence from BEIS to support the notion that the consumer does not want to pay this?

c) The FiT was specifically designed in a manner "to give the wider public a stake in the transition to a low-carbon economy". This has been very successful so why is there any need to remove it?

d) FiT has been very successful however it is not the only mechanism which would support the hydropower industry.

e) If the Government is serious about having a level playing field with fossil fuel generators some recognition of the damage caused by the CO2 emitted by fossil fuel generators must be made.

f) The BHA believes that government could develop further a mechanism, such as a stable and strong carbon price, that rewards hydropower - along with other renewable technologies – for not emitting C02.

g) With Government help / support the benefits of small-scale hydropower can continue on a sustainable basis.

2.2 Local Communities

a) The majority of new small-scale hydropower schemes are in remote rural areas, providing valuable energy and income in a way which is environmentally sensitive, with strong community support and involvement.

b) The development of hydropower provides wider benefits to the local communities via the generation of local economic activity during construction and operation and in financial benefits to the local communities and supply chain.

c) Government should support and promote the concept of smart peer-to-peer energy trading that will maximise the income to the generator.

d) While it's unusual for a hydropower scheme to be located 'behind the meter' in a home, many are located close to remote communities. If local hydropower projects could be linked 'peer to peer' via the national grid network to local population clusters, it could reduce distribution costs by using the power locally and have a positive impact on consumers energy bills.

e) Investment by local authorities in small-scale hydropower is a way of significantly reducing their carbon emissions, investing in local services and jobs and reducing their electricity costs through onsite usage.

f) By retaining the FiT, at least for schemes developed with local communities and local authorities and which are typically financed via share offers, it can create returns which will be reinvested back into the local community.

g) Rural areas in particular will struggle when petrol and diesel vehicles are taken from sale by 2040, so there is a significant opportunity for remote hydropower schemes to provide vehicle charging points in areas where it may not be financially viable otherwise.

h) The Government has ambitious plans to electrify the road network with 25 million PEVs forecast to be on UK roads by 2050. Hydropower can provide some of the much needed extra generation that will be required and the support for the required charging infrastructure.

Question 3 - *The introduction of enabling technology and systems such as the roll out of smart meters, and half-hourly settlement, will provide commercial incentives on energy suppliers to develop and offer tariffs. Will smart tariffs provide a viable route to market for small-scale low-carbon generation? If so over what time frame, and what are the possible barriers to these smart tariffs?*

The BHA does not believe that smart tariffs provide a viable route to market for small-scale hydropower.

a) Intermittency plays a big role in limiting the effectiveness of Time of Export (ToE) tariffs as small-scale low carbon would not be able to take advantage of such tariffs for example.

Question 4 - *Do you agree with the challenges we have identified? Are there any challenges small-scale low-carbon generation presents that you think we have missed? Please provide evidence.*

The BHA disagrees with some of the challenges identified

4.1 The BHA disagrees with the following challenges:-

b) 2.24 [Page 19] – the losses in transmission of hydropower from remote areas need to be offset against the losses in storage of local energy in batteries.

4.2 The BHA includes the following as challenges for the hydropower industry:-

a) Whilst technology costs are falling rapidly for some technologies, they are not falling for the hydropower sector. Nearly all hydropower technology and construction processes are well developed with very limited scope for further cost reduction.

b) This will make it impossible for new deployment of hydropower in the current market conditions without additional support. Hydropower technology varies significantly across schemes and therefore the benefits of scale are low.

c) Hydropower is unlike any of the other renewable technologies, as it can take up to 2 years to develop and up to 2 years to build a typical scheme. This makes it difficult to react to changes in conditions quickly.

d) When compared to other renewable technologies hydropower requires the addition of a water abstraction licence in addition to planning permission, providing an additional and in some cases a costly and significant hurdle with additional surveys and associated bureaucracy.

e) Grid connection costs are often prohibitively expensive. Based on the Poyry report small-scale generators have contributed an estimated c£100m towards the cost of the upgrade of the electricity network as an element of their scheme development costs.

f) There are some parties in the grid connection queue who are not currently deploying. For those parties who are ready to deploy these other parties are blocking the network for others, preventing timely connection dates being provided, or requiring expensive upgrades.

g) The potential removal of Generator Distribution Use of System (GDuoS) payments to generators will significantly reduce the income from hydropower schemes.

h) Distribution connected generators are not treated fairly. For example during periods of constraint, either brought about by work to the network and especially tree felling works, members are often required to cease or reduce generation.

   In the latter case, members are asked to reduce generation to 50kW, in all cases to date, per connection.

i) During these periods members are regularly reminded there is no requirement for them to be allowed any level of export during periods of network constraint. This has and continues to cost members millions of pounds of lost income annually.

j) Unlike many transmission-connected generators, Distribution-connected generators do not receive constraint payments, when unable to generate due to grid problems.

Question 5 - *How would you propose the small-scale low-carbon sector, suppliers, off-takers, network/system operators, and/or government can overcome the challenges presented?*

The BHA believes that some of these issues are being addressed through the Energy Network Association.

System inefficiencies are being addressed through the Energy Network Association's Open Network project which is looking at developing local markets for flexibility.

Question 6 - *What are possible ways to track and monitor behind the meter installations (we would appreciate specific suggestions in relation to how information can be sourced (e.g. direct from businesses and households) and the method for sourcing it (e.g. an annual survey))?*

The BHA believes that this is not a significant issue for the hydropower sector.

a) The majority of hydropower schemes are ½ hourly metered and not behind the meter and so this is not a significant issue for the hydropower sector.

b) The BHA believes that impractical though it may be, the only genuine way in which to track and monitor behind the meter installations is through installing sub-metering. An annual survey works in theory, but without an obligation to respond, both homes and businesses with such generation could easily forget or provide erroneous information. Ultimately the bureaucracy required could add unnecessary cost to consumers.

Question 7 *- What are the special considerations that should be made when attempting to track different kinds of behind the meter activity?*

No comment.

Question 8 *- How do we develop our tools to model and evaluate the system (including system costs and resilience) as decentralised generation and storage develop, specifically approaches to system modelling, data capture, forecasting demand and evaluation of value for money?*

No comment.

Levelling the Playing Field

Question 9 - *Are off-takers, suppliers, and aggregators able to lead the deployment of small-scale low-carbon generation currently? If so how will this occur, over what timescales, and what are the implications for deployment levels? How would deployment be supported by the capacity and ancillary services markets as well as the emerging corporate PPA market? Please provide evidence.*

The BHA does not believe off-takers, suppliers, or aggregators are able to lead the deployment of small-scale low-carbon generation.

a) Off-takers, suppliers, or aggregators are all very challenged businesses in the current market structure and they currently have too many regulatory burdens to be able to fashion a change in the market entrepreneurially. They are therefore not able to lead deployment of small-scale, low-carbon generation.

b) No timescale under the current arrangements of suppliers will fix things. Any deployment there is will come from elsewhere and could well be supported by the capacity and ancillary services markets, not to mention the emerging corporate PPA market.

c) Whilst costs may be falling for renewable generation, SSLCG have not yet reached grid parity in terms of their levelised cost of energy, meaning that off-takers, suppliers and aggregators and do not have the balance sheet to fund it and are not yet able to lead deployment as market forces do not allow it.

d) Very few, if any, subsidy-free installations have been deployed, but if they are to set any kind of precedent, then access to ancillary services (and more widely as many revenue streams as possible) appear to be key. With this in mind, we would support allowing renewables to participate in the Capacity Market subject to de-rating.

e) However the BHA is very concerned that BEIS is placing a great deal of store on the ancillaries markets. These are limited and the more participants the smaller the share of each participant. With this in mind the BHA do not believe that this would provide sufficient support for the Hydropower industry.

f) Government must create a level playing field for small-scale generation through implementing a wide range of changes to the tax regimes and the planning system.

Question 10 - *What would be the impact on jobs, deployment, and the supply chain, if deployment were left to market forces beyond 2019? Please support your answer with clear evidence.*

BHA believes that all new hydropower deployment will cease almost completely with no support mechanism beyond 2019

a) As indicated in our response to question 1, the BHA fundamentally disagrees with the deployment figures - 4MW of new hydropower per year through until 2025 with no form of support mechanism - BEIS have published in the Impact Assessment accompanying the current FiT consultation.

b) The government acknowledges in the FiT Consultation, paragraph 6, that "since early 2016 overall deployment has been lower than forecast at the time of the 2015 review", when the FiT was significantly reduced.

c) The Pöyry report provided the evidence regarding the necessity of FiTs support to support the industry in the future. While significantly reduced there is still activity in the hydropower industry and it is expected that despite the low deployment to date a significant proportion of the capacity allocated, estimated by the BHA to be as much as 45MW, will be used before April 2019.

d) However further hydropower deployment beyond April 2019 without other support will not happen. The long development timescales in the hydropower sector make it difficult to properly assess the level of activity in the industry however it is known that in Wales and Scotland, for example, there has been a significant fall in the number of abstraction licence applications and those businesses who work on the preparation of planning permissions and water licences are reporting empty order books.

   Without the any form of intervention, the development of any new hydropower schemes will cease after 2019 and the industry will rapidly fall into decline, with the loss of direct jobs and the associated supply chain, a significant reduction in local economic activity and the loss of very much needed green energy generation.

All of this impact on job losses, the crippling of an industry and the increased CO2 emissions is for the sake of a future saving of <£1 per year, per household on energy bills. How can that possibly be described - Impact Assessment paragraph 3 - as an "undue burden on consumer bills"?

e) The closure of the scheme will result in unsustainable losses for as significant number of companies and their associated supply chain partners who have grown successful businesses with the support of FiTs.

Question 11 - *In your view, are small-scale low-carbon generators currently able to deploy independent of subsidy e.g. through the PPA market? Does this vary for differing technologies and capacities of small-scale low-carbon generation e.g. domestic vs. commercial scale? If not, can you explain how long it will take for this market to emerge and if government intervention is required? Please provide evidence.*

BHA believes that currently hydropower cannot deploy independently from some form of support mechanism.

a) As previously outlined, suppliers cannot fund uncompetitive projects through a normal PPA. Whilst corporate PPAs are beginning to provide routes to market for new low-carbon generation, these are not currently viable on a small-scale.

b) Large users such as Apple, Google and Microsoft have recently signed Corporate PPA agreements for 280MW, 3GW and 178MW installations respectively. However, the economics of corporate PPAs are such that only large plant can be brought online in order to power corporations with a significant global presence. It is not yet viable for small-scale generation to be funded by smaller corporations.

c) Small-scale hydropower development is dependent on the support it receives currently from the FiT scheme and so further new development will disappear very quickly from March 2019 if the scheme closes.

d) For the UK hydropower development industry to survive it has to have a differentiated approach. Government have intervened to support nuclear generation because of its long-term nature. the BHA believe that something similar should be considered for the hydropower sector.

Question 12 - *What factors, including financial, affect your decisions to invest in small-scale low-carbon generation?*

BHA believes that two most important factors for investors are access to a future revenue stream and the cost of capital.

a) The most important factors influencing investment decisions in small-scale hydropower is a] access to a guaranteed future revenue stream – currently provided by the FiT scheme – and b] the cost of capital.

b) Very few investment committees, or banks providing debt financing, could reach a decision to adequately fund a project on the basis of no sufficient long-term revenue stream.

c) Without the FiT subsidy there is simply insufficient revenue available.

Question 13 - *Does government need to take regulatory intervention(s) to enable the development of competitive markets for small-scale low-carbon generation? If so, what and why? If these actions were taken, what benefits would this provide to consumers and the electricity system?*

BHA believes it is essential that government takes urgent regulatory intervention in a number of areas.

The BHA believes intervention by government is required in the following areas to support the future development of hydropower:-

13.1 Revenue

a) Currently hydro power development is supported by the FiT which is due to end to new applicants in March 2019. If the Government could continue with the FiT scheme, or similar provision (to a level dependent on the take up of the measures below), then hydropower could have a viable revenue stream.

b) Reduce red tape for allowing local supply to consumers 'peer-to-peer'.

c) Without the any form of intervention, the development of any new hydropower schemes will cease after 2019 and the industry will fall into decline, with the loss of direct jobs and the associated supply chain, a significant reduction in local economic activity and the loss of very much needed green energy generation.

13.2 Costs

a) Currently hydropower developers are making a significant contribution to upgrading the grid in many rural areas across the UK. If the Government could pay for the costs of grid connections directly then the hydropower sector would need less support.

b) Currently business rates for hydro are at a level which is unfair when compared with other renewable energy developments. If the Government could ensure that the system of business rates is properly reviewed to ensure a fair playing field then the net income for hydro schemes would increase.

c) Hydropower is unique among renewable generators in needing to pay water abstraction charges. While these are currently at a reasonable rate they are regularly reviewed and there is an ongoing risk that they will be increased to an unsustainable level.

13.3 Grace periods

a) When the ROC scheme was closed, grace periods were introduced to reduce the cliff edge for projects. If the Government could allow for the following two grace periods then the work on the schemes currently under development would not be facing such a devastating cliff edge.

i. Planning delay - A grace period of 6 months is requested where planning and water licences submitted at least 6 months before the pre-accreditation deadline, but has not yet been determined due to delays in the planning department. This is requested to alleviate the pressure in the planning and water regulator system.

ii. Grid connection delay - A grace period of 6 months is requested for those generating stations that meet the 'grid delay' condition.

These are generating stations that would have commissioned within their pre-accreditation window but have been subject to grid connection delays that were not due to any breach by the developer.

Question 14 - *How can we encourage and unlock private sector finance to enable market-led deployment?*

BHA believes that long-term low-cost Government or Local Authority loans would unlock private capital.

a) The provision of a low-cost, long term government or local authority loans over the long term, such as 40 years.

b) The presence of low-cost local authority capital, which can be deployed against long-term local infrastructure projects, will attract private capital in equal measure. And will pay very long-term returns for local authorities. This will be is especially valuable in the north of England and with those less well-off councils.

c) However without an adequate revenue stream, such as FiTS, the returns are still insufficient to be economically viable.

Question 15 - *How would a guaranteed route to market operating at a discount to the market price impact the transition of small-scale low-carbon generation to competitive markets? Please provide evidence to support your answer.*

BHA believes that this would not be sufficient to support new hydropower development.

a) BHA believes that this would not provide significant support at all as market prices (by which we understand you to mean wholesale prices) are currently insufficient to support new hydropower development, so it's unlikely to be economical below market prices.

b) The BHA believes that a guaranteed route to market model could work for hydropower, though through a significant increase in any new form of 'export tariff'.

Question 16 - *What innovative solutions would be required in the PPA market to bring forward small-scale low-carbon generation? Please provide evidence to support your answer.*

Peer to peer trading would help with Power Purchase Agreements.

a) Innovations to allow Peer-to-Peer electricity trading with minimal grid charges selling to local consumers over the local network, for example at 12p/kWh, whilst they pay 14p/kWh, with 2p grid charges, would be of significant advantage to the hydro sector.

Question 17 - *A guaranteed route to market would require costs to be robustly controlled for consumers, as outlined in the Control for Low Carbon Levies. How could this best be achieved, without creating 'boom and bust' cycles for the small-scale low-carbon generation sector?*

The BHA believes that a cap on deployment – similar to the current FiT – would be an effective way of preventing a 'boom and bust'.

a) If government is serious about avoiding 'boom and bust' cycles, then it would not stop the FiT overnight on 31/3/2019. Instead they would design and then implement a long-term transition period, whilst developing other incentives and regulatory changes in parallel.

b) Instead what we now have is a situation of a highly successful industry being shut down, as a fait accompli, whilst being asked to consult on what happens next because the government appears to have no ideas and no plans.

c) The BHA believes that the current cap system – where by the deployment is limited month-to-month with unused capacity rolled

over – is an effective method of avoiding boom and bust. It naturally forces a phased deployment.

Question 18 - *What would be the general challenges (including technical challenges) of designing a guaranteed route to market that offers a time of export tariff to support the aim of developing a smart and flexible network?*

BHA would support a 'time of export' route to market provided it was valued at a sufficiently high level for hydropower to be competitive.

a) The BHA believes that the challenge to BEIS will be in making the export tariff significant enough to make it attractive and to be commercially viable.

b) As most hydropower is already ½ hourly metered there would be fewer technical challenges for managing the time of export aspects.

Question 19 *- How long would a guaranteed route to market need to run for to help the development of competitive markets?*

BHA believes that the hydropower sector would require a route to market for at least 20 years.

a) The BHA estimate that a guaranteed route to market would need to run long enough - c20 years - to provide the stability required to develop competitive markets and support the small-scale hydropower sector.

Question 20 - *How could future regulations or other interventions be designed in order to capture the benefits of storage combined with small-scale low-carbon generation? If specific technical requirements are needed, please specify those as well.*

BHA recommends that any new market arrangements take account of hydropower water storage.

a) Where topography allows, hydropower provides the most efficient mechanism for long term storage. However the current mechanism does not incentivise use of water storage to the best advantage.

b) The BHA would therefore support a move toward a time of export tariff to encourage better use – and possibly additional installation – of water storage upstream from hydro schemes.

c) For example the regulation for energy storage operation needs to be developed and also new business models need to be proposed and understood in order to create the revenue streams for supporting the deployment of energy storage at multiple levels in the UK.

d) New market arrangements and mechanisms are need to be created in order to find the ways for compensating hydropower for the whole range of benefits that cannot be directly measured and monetised.

e) This will also require a mind-set change within government and other stakeholders that will face new charges derived from those benefits.

Question 21 - *If implemented what effect would the actions you outline have on the small-scale low-carbon generation sector and the benefits this sector brings to UK consumers?*

The BHA believes that there is a way forward for the small-scale hydropower industry if our recommendations are taken into account:-

The BHA believes that they have convincingly demonstrated in this Call for Evidence response that the small-scale hydropower industry has a place in a future decarbonised UK and we have clearly stated the opportunities and benefits that our unique and historic industry provides.

We have demonstrated that we face very different challenges to others in the small-scale low carbon sector and so – as BEIS has suggested in 1.15 of the Call for Evidence – we may need to take a different approach.

A differentiated approach

A differentiated approach to support the hydropower sector could include the following elements:-

- A revenue stream which – taking account of any of the other measures – is sufficient to support a long-term investment. This could include the wholesale price, carbon pricing, ancillary services combined with a supported guaranteed route for market (at a bespoke level for the hydropower sector).

- The removal of 'red tape' around 'peer-to-peer' trading to allow additional value for both generator and local consumers.

- Financial support for the cost of grid network upgrades associated with new hydropower developments.

- Implement appropriate changes to the non-domestic business rates system to ensure they are fairer and in line with other renewable technologies.

- The provision of FiT scheme grace periods to mitigate the imminent cliff edge of the 31/03/2019 or ensure there are alternative mechanisms in place by April 1st 2019 or through extending existing mechanisms.

- Provide access to long-term low-cost finance – such as via local authorities through the Public Works Loan Board or the Government.

- Provide time of export tariff which support generators which tend to operate more when demand is highest and encouraged good use of water storage.

- Create a level playing field for small-scale generation through implementing appropriate changes to the planning system.

- Change abstraction license fees from an annual payment for small-scale hydro to a single 'one off' payment.

- Recognise the longevity of hydro assets through supporting CAPEX cost reduction. This could be achieved through issuing loans for equipment to be paid off over longer timescales more in line with the lifetime of the asset.

- Utilise national and green banking structures to help reduce the cost of finance for projects.