

## *British Hydropower Association (BHA) response to Net Zero Review*

### **Background to the BHA**

The BHA is the leading trade membership association solely representing the interests of the UK hydropower industry, including tidal range (from micro to large scale).

Our membership encompasses all-scale hydro developers and generators, investors, consulting engineers, manufacturers and suppliers of equipment.

The technologies we represent are wide-ranging in both scale and the type of mechanism required to deliver them, but they all offer vital renewable energy today and can contribute significantly more.

We represent the following technologies:

- Pumped and traditional storage hydropower – is already delivering electricity storage to the grid. With the right support, it is able to provide a fast and scalable solution to how best to manage intermittent renewable technologies and also decarbonise heavy industries.
- Run of river hydropower – a centuries-old technology, it spans small and micro-projects that can often be the bedrock of local communities providing power for remote properties and communities, to full-scale projects that deliver power to towns and industries.
- Tidal range – able to provide real scale and is the only form of renewable generation that can provide predictable power on a scale of nuclear power.

At present 30% to 40% of the UK's renewable generation is provided by hydropower. The UK was a pioneer in hydropower development and has been involved with the export of equipment and services for about 150 years.

Today it is estimated that the UK has a total hydropower installed capacity of over 4,700 MW, including over 2,800 MW of pumped storage. Hydropower is a baseload generator that deploys nearly 70% of its energy generation during winter, at peak demand.

Over the past 30 years, the amount of electricity generated by hydropower has remained at circa 2 per cent of total power generation. Hydropower has been called upon to support the development of the UK's variable renewable sector by providing peaking, balancing and other grid services, especially as wind generation has increased over ten-fold since 2007.

Since 2010, with the introduction of the Feed-in Tariff (FiT) support mechanism, designed to accelerate investment in renewable energy technologies such as hydropower, by offering long-term contracts to renewable energy producers, there has been exponential growth in hydropower development across the UK. The FiT scheme was closed by the government at the end of March 2019, which has created a hiatus in the potential development of new UK hydropower.

Finally, BHA is fully aligned with the International Hydro Community in calling for the construction of new schemes and the re-purposing of older hydropower schemes to enable the integration of more Variable Renewable Energy on grid systems around the world.

## Executive Summary

The BHA welcomes the opportunity to input into the net zero review. It has been made clear by BEIS in other consultations that the current electricity market will not deliver the 2035 and 2050 net zero targets. Given that electricity is a fundamental part of achieving net zero significant focus and resources should be put into delivering an electricity system that can enable our homes, businesses and communities to also achieve net zero.

Hydropower is a ready-made solution. It already plays a vital role in keeping the lights on, with c.70% of generation during the winter months, and as a proven technology, ready to be scaled and able to be deployed relatively quickly this is a sector that can put the country back on track to achieve its targets while unlocking growth and investment.

We also wanted to highlight the unique challenge that we see in rural and remote locations in achieving net zero, as they are often 'off grid' and reliant on imported oil or gas. We would like to work with government to look at how hydropower projects can help be part of a rural net zero taskforce. Many of our members work in small and micro-hydro energy, which can provide vital power in remote locations and are often the cornerstone of their communities. In isolation, these projects can appear small, but collectively they provide a vital contribution to the energy mix. They are key in helping communities, and remote locations, displace high-emitting carbon alternatives. This makes their contribution and ongoing support vital. A great example of the benefit of this type of rural deployment is a 45kW hydropower project, displacing oil for heating, which gives the same CO2 savings as a 500kW solar farm.

BHA wants to work with the Government during this process to find a way to ensure these vital technologies are helping the Government achieve its objectives.

## Answers to questions

### Overarching questions

#### 1. How does net zero enable us to meet our economic growth target of 2.5% a year?

Net Zero as a target in isolation doesn't deliver economic growth, but when combined with a focus on investing in technologies and solutions that unlock growth, as well as delivering net zero, the BHA is confident it will deliver significant growth for the UK.

Hydropower projects, for example, have a high UK content so in increasing the deployment of these critical, renewable, energy projects then c.80% of project spend remains in the UK, benefiting a strong UK supply chain. Similar deployment in other technologies will deliver the same energy but around half of the benefit to the UK economy.

BHA would urge government to look at developing and maximising UK supply chain when supporting the infrastructure projects required to deliver net zero as the only way to meet the economic growth targets.

Achieving net zero and growth is not an either or but complimentary, when investment is made in the right technologies. Hydropower is one that can help achieve both and should be looked at urgently.

*The definition of Economic growth doesn't factor in the many co-benefits of the transition to Net Zero. The Net Zero transition will see electricity demand increase by 2.5 times as we electrify transport and heat. This whole system transformation will create new markets (digitisation of energy) create jobs and growth, but the switch to clean energy won't really feature in the current catch all GDP metric which is agnostic to how money is spent.*

*78.3% of energy consumption in the UK currently comes from Fossil Fuels. Correlating this to domestic energy spend alone, equates to ~£12 billion going to fossil fuels, ~£4.8 billion of this is for imported Fossil fuels, therefore, leaving the UK economy.*

*New UK Renewable energy installations displacing this imported fossil fuel spend, developed with UK investment, offers a huge growth opportunity. There will be a huge beneficial impact on the economy to build/ invest/ create revenue/ bring GVA including jobs and supply chain, which brings a multiplier effect for development and investment, that stays within the UK.*

*Co-benefits for the net zero transition are also hard to capture in the metric of GDP. Reduction in emissions from burning fossil fuels from cars & boilers will have significant health benefits and could [reduce costs to the NHS](#) by £6 billion. According to [the NEA](#) cold homes costs the NHS £1.5 billion. The Net Zero transition can bring energy security alongside affordable warmth and clean air.*

## 2. What challenges and obstacles have you identified to decarbonisation?

The key to unlocking investment in predictable power like hydropower is revenue support.

Currently the electricity market is technology agnostic and does not incentivise technologies that provide power when it is most needed. Fossil fuel generated electricity benefits from subsidies that skew the market and does not contribute towards the impact costs of rising carbon emissions.

Since the closing of the FiT scheme in 2019 there has been a hiatus of deployment and investment in Hydropower, which is a key technology. A mechanism such as Contracts for Difference would provide investors greater long term certainty and with such a revenue support mechanism, the industry has already demonstrated it can deliver. When the Government last provided revenue support back in 2010 the hydropower industry saw exponential growth and the BHA is confident that a new support mechanism will enable this to happen again. Hydropower, which generates 2/3s of it's power in the winter when GB needs it most, operates for 50+ years, but has high initial capital costs must be given a stable market in which investors can deliver.

There are currently huge constraints on the Grid infrastructure at both National and Distribution levels. Queues for grid connections are technology agnostic, meaning that diesel generation for the capacity market is ahead of renewable energy generation. Smart Local Energy Systems will be key to

delivering Net Zero within these current constraints. Hydropower, which matches the winter generation demand profile will be well placed to support this Net Zero transition at the Distribution grid, especially in rural areas where reinforcements to alleviate constraints are the costliest.

The BHA would also like to highlight the challenge of ensuring policies and solutions don't happen in isolation and also don't have unintended consequences. An example of policy in isolation is the drive to electrify heat and transport. In 2026 consumers in areas off the gas grid will have to replace their fossil fuel boiler with a low carbon alternative, people will also have to buy an EV rather than an ICE vehicle. Many communities in more rural areas will be unable to install either EV charge points or Heat pumps due to grid constraints. A solution to these grid constraints could be complete reinforcement (this will get socialised onto consumers bills and take a very long time) or Smart Local Energy Systems coupled with local generation such as Hydropower to match the electrification of heat, will be a cheaper and more timely solution. See the Communitheat project where a local solution for 1 village avoids grid reinforcement costs of £12 million.

We believe that hydropower projects can be the cornerstone and catalyst to decarbonise these remote locations and would like to work with the net zero team, BEIS and DEFRA in unlocking these projects with a community wide 'rural net zero' strategy.

### **3. What opportunities are there for new/amended measures to stimulate or facilitate the transition to net zero in a way that is pro-growth and/or pro-business?**

We support the work of BEIS to review the current electricity market arrangements. We think that a revised system that supports rural deployment, projects that deliver predictable power and large UK content should be prioritised. We think hydropower is also able to be scaled up relatively quickly given it's a proven technology, with an established and largely UK-based supply chain and large underutilised resources.

A recurring barrier to investment, especially around critical infrastructure is the time and cost associated with achieving relevant planning and environmental permits to build and operate infrastructure. These can vary depending on region and jurisdiction, with complexity and high cost and delays consistent with all. While the BHA fully supports the purpose of these bodies, to ensure that projects meet the highest standards, measures could be amended that would fast track and streamline the process for net zero required projects. Central funding could be made available to help local authorities and decision bodies to enable this. An amendment could also be added that applies a deadline for decisions to be made.

There is a huge market waiting to be unlocked in Local energy markets, that will allow peer to peer trading bringing the benefits of the digitisation of energy to consumers. The stimulation that: [P441 'Creation of Complex Site Classes' - Elexon BSC](#) could bring would unlock this market, encourage local generation and the investment that will bring, also local balancing and demand side management. This would also circumvent one of the major barriers to Net Zero transition which is the Grid constraints at the transmission grid.

### **4. What more could government do to support businesses, consumers and other actors to decarbonise?**

Much of the UK's net zero strategy is dependent on electrification of several sectors, which means that the decarbonisation and deployment of renewable power is key and should be prioritised and accelerated. Currently, the large deployment of intermittent generation is creating a system dependent on thermal generation to back up when not generating. These are high emitters and dependent on the import of fuel from increasingly volatile areas. BHA wants to work with government to ensure that the more predictable renewable solutions are deployed at scale, and also in rural areas. Hydropower can unlock decarbonisation in rural communities, in heavy industries and urban areas.

Peak demand and the capacity market remains a major issue to a well-balanced Net Zero energy strategy. Energy efficiency has the ability to reduce this peak demand and encourage local balancing through smart technology using latency in heating systems. Mechanism such as a feed in tariff for Megawatt hours can stimulate energy efficiency in the same way the FIT stimulated generation. Peaking plant is the most expensive energy, creating a reduction in load at peak times through incentives will be cheaper.

#### **5. Where and in what areas of policy focus could net zero be achieved in a more economically efficient manner?**

BHA would recommend government look at supporting electricity infrastructure that delivers wider benefits, like hydropower does. A policy that ensures the benefits of more predictable generation, combined with the ability to benefit rural, remote locations and the high UK content should be factored into government policy.

The avoided costs of a net zero transition need to be recognised and calculated. As mentioned, the Health, climate impact of carbon emissions, grid reinforcements and the cost of energy efficiency versus peaking plant all offer enormous avoided cost which are not significantly factored into Policy. [The Stern Review](#) in 2006 highlighted and costed the benefits of the Net Zero transition. This work should be considered within policy decisions.

Moving the green levies away from electricity, removing subsidies from Fossil Fuels are policy decisions that would stimulate the Net Zero transition.

The REMA consultation highlights the issues around meeting peak demand and the high costs that volatility and uncertainty of prices brings to the market. This comes partly from the UK being an importer of energy, which would be reduced by increasing domestic renewables capacity. It also comes largely from market unpredictability and traders seemingly panicking about keeping the lights on and therefore being willing to pay high prices for any future generation they can secure. Hydro mitigates this by being relatively predictable. Tidal even more so, by being very predictable.

#### **6. How should we balance our priorities to maintaining energy security with our commitments to delivering net zero by 2050?**

With hydropower, this balance is addressed as hydropower projects deliver both energy security and our net zero targets. Hydropower can deliver baseload power, predominately during the winter months, with little reliance on a non-UK supply chain and with no need for imported fuel.

The UK can achieve Net Zero with increased renewable energy installation, long duration storage, (including pumped hydro) bringing forward Tidal energy, energy efficiency and local balancing. This

will give energy security and deliver Net Zero by 2050. Scaling up is deliverable with key strategic decisions, such as low carbon heat roll out (including community scale shared ground loops) decarbonising transport, Hydrogen HGVs, replacing diesel trains with trackside battery and battery trains. The technologies are there, the key will be the significant increase in renewable generation. There will be enough latency across technologies to provide significant storage, including thermal store heating, urban batteries, (including EVs and battery trains).

This can be achieved with the mobilisation of patient capital to invest in generation, storage, low carbon heat infrastructure for heat and transport.

## **7. What export opportunities does the transition to net zero present for the UK economy or UK businesses?**

Hydropower is almost unique amongst renewable infrastructure as it has a very high UK content and a long established supply chain. Hydropower turbines are manufactured in the UK as well as many of the components, as well as the expertise in installing, maintaining and operating these projects. A hydropower project achieves around 80% UK content. This means there is real and rare opportunity to export both the products and the services. A strong and buoyant local market will provide a platform to deliver, and we are already seeing this from our members who use their expertise and knowledge gained in the UK to deliver international projects. The hiatus over the last few years has weakened this position but our members are confident that with a local market re-established we will quickly be able to export once again.

Net Zero is about systems thinking. Generation needs to be coupled with the end user or the ability to store. The BHA is working with many UK businesses who are looking at innovations where Hydropower can be utilized effectively. So many of these UK innovations can also enable Net Zero transition in other countries too. For example, the solid state sodium batteries (LiNA) at least half the price of traditional batteries and without the need for [critical rare earth minerals](#). Trackside battery and battery train operation (Smart Park- Othello) Solar generation direct to DC train line – Riding Sunbeams. Long duration energy storage (RHE energise). Peer to peer trading for local energy markets, Urban Chain. Thermal domestic batteries – Sunamp, now exporting to China.

### **Questions for businesses**

## **8. What growth benefits/opportunities have you had, or do you envisage having, from the net zero transition?**

The BHA has commissioned an independent academic report into the opportunities and the scalability of hydropower. The report is in its final stages but the BHA would like to share it with the net zero review team when it is ready.

Our members who deliver hydropower installations are reporting that they are getting very high volumes of enquiries. There is a lot of interest out there from people with physical potential to generate using hydro, with enquires meeting the demand seen when the FiT scheme was launched. However, regulator application fees and the lack of a route to a predictable long term price mean that almost all of this enthusiasm is quickly dissipated, to the cost of the whole country.

**10. Looking at the international market in your sector, what green opportunities seem to be nascent or growing?**

The demand for hydropower is only increasing, as countries around the world look for more predictable forms of renewable electricity generation that aren't dependent on imported carbon-emitting fuels. Whilst this demand is increasing, we are also seeing some countries prioritise security of supply over the decarbonisation agenda and look at high emitting, thermal solutions to deliver short-term energy security. These decisions will threaten the global ability to combat climate change. This is why the UK must continue to demonstrate leadership, especially in promoting a renewable energy system that utilises existing technologies to solve the predictability challenge and deliver true energy independence and security.

The UK has exported hydropower solutions (and ancillary services) for hundreds of years and continue to do so. There is still significant untapped Hydro potential and alongside Tidal, Hydropower can be the foundation of clean energy generation. The Hydropower industry continues to innovate and as above, works with other innovators across the Net Zero solution spectrum to bring forward a new Energy system.

**16. For clean power industry: what barriers to entry have you found in deploying new plant and technologies?**

All forms of electricity generation need some form of government intervention to ensure deployment. Hydropower needs a form of revenue support that will unlock the technology to be deployed quickly, and at scale, from micro community schemes to large 'power station' size tidal range projects. If government can provide an agreed fixed price through a Contracts for Difference mechanism, then the certainty this gives projects unlocks the funding to be able to build them.

The availability of cheap fossil fuels has been the biggest barrier to entry for the clean power industry. This skewed market that has never factored in the cost of climate change has significantly hampered the ability to bring forward solutions that will not cause costly climate change related problems that we are increasingly seeing. As stated in the above reference to the Stern Review, the long-term costs of fossil fuels are much higher than the shorter-term installation costs of clean technology. The incumbent advantage of an infrastructure built many decades ago, before the cost of climate change was understood, has also impacted on the ability for new technology to displace fossil fuels.

**17. How many green jobs do you estimate will be created in your sector by 2030?**

As highlighted the BHA has commissioned an independent study into the job opportunities created by Hydropower and will share this with the net zero team as soon as it is finished.