

60 Seconds
With Andrew Hughes

New Horizons
Welsh Energy Projects Flourish

Energy Expo 2017
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SPOTLIGHT

UK Energy After Brexit

How will Brexit affect UK
renewable energy?

ISSUE 02
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Contents

- 5/ BHA Annual Conference is at the Heart Of Hydro in the UK
- 6/ New Horizons in Community Energy
- 6/ Scottish Energy Minister Opens Innogy's Highland Hydro Scheme
- 7/ 4 New Build Hydro Plants in SW England Delivering Energy to the Grid
- 8/ The Steepest Scheme in Scotland?
- 9/ UK Renewable Energy Likely to Suffer After EU Exit
- 9/ Ham Baker Renewables and SPP Pumps Secure Pump-as-Turbine System for Hong Kong Water
- 10/ Italian Energy Producer Enel Green Power Turns to Dyrhoff to Modernise Cimina Facility With an Inflatable Spillway Gate
- 11/ Funding for small-scale hydro schemes in Scotland with Triple Point
- 12/ GoFlo for Low and High Head Hydro Systems in the UK and Overseas
- 13/ Radyr Weir Hydro Scheme Completed
- 14/ Energy Now Expo 2017
- 14/ 60 seconds with Andrew Hughes
- 15/ Market Report

ENERGY NOW

expo 2017

8-9 February 2017 Telford International Centre
The renewable energy event for farmers and landowners

The only renewable energy event organised exclusively for the agricultural and rural sectors



Growing for 2017, the event will include:

- An **EXHIBITION** of more than 200 product/service suppliers
- A 2 day, multi-streamed **CONFERENCE** featuring keynote presentations and energy-specific panels on the very latest developments in the renewable energy sector
Simon Hamlyn – CEO of the BHA, will be chairing the dedicated hydropower panel
- An **ADVICE CLINIC** where visitors can discuss their ideas and projects with experts, on a one-to-one basis
- The **NEW PRODUCT DEVELOPMENT ZONE** where companies will showcase innovative new technology

Interested in exhibiting at this event?

Contact a member of the team on **01905 616 665** to discuss your options.
For more information visit **www.energynowexpo.co.uk**

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WHAT MAKES US DIFFERENT?



I've been the BHA CEO for almost 3 years now and when I get asked, as I often do, "why should I join the BHA", my answer is always, as it has to be, comprehensive!

To be honest it would take a piece much longer than I have here to convey the full details of everything in which we are involved on behalf of our members and the wider hydropower community. What makes us different is our sole focus on hydropower, the expertise and knowledge that we have within our fantastic volunteer base and membership and the continuous one-to-one service we make available to members who can contact me or our Head Office team at any time, day or night.

We value all our members for their loyalty, support, advice, good humour and tireless commitment to hydropower, and look forward to continue working together with you all in taking the BHA forward, regardless of the many and varied challenges we will face.

Over the past year the industry has endured some drastic interventions by Government; the shameful, temporary removal of pre-accreditation; the way in which the comprehensive FiT review was conducted with DECC as it was then, ignoring independent high quality evidence produced through the BHA to support our submission; and the totally unexpected and shocking outcomes of that review for the sector. There was also the removal - without any consultation - of LEC's and the closing of Social Investment Tax Relief for hydro. The cumulative effect of all these interventions is significant and will continue to affect our membership. We have endured increases in Abstraction Licence costs

in Scotland and Wales and now face the prospect of a hike in rateable values from 1st April 2017 in England and Wales. Increases have already been in place in Northern Ireland and, since April, Scottish Government removed the rates subsidy from all hydropower schemes that are now paying rates and will almost certainly see an increase once the revaluation has been completed in Scotland by April 2017.

The BHA has fought all these battles and many, many more over the past year and will continue to do so, working tirelessly against the injustices that have been bought upon us by legislators and civil servants across the UK, many of whom fundamentally don't understand an industry over which they have so much control and influence.

We continue to enjoy the tremendous support of our members, old and new, whose loyalty and commitment means so much to the BHA. We have lost members over the past 12 months and recruited new ones and remain committed to ensuring that the work we do will promote and protect hydropower for this and future generations.

And finally, a very big 'thank you' to our team at Head Office, Lesley and Wendy, who provide that essential support and assistance to all our members on an everyday basis.

Simon Hamlyn, CEO, BHA



BHA Conference and membership news

Annual conference – 8/9th November

The BHA Annual Conference is our flagship event and the essential forum for the UK hydropower sector. This year we will enjoy a truly diverse range of sessions, which include marine energy, maximising hydro in a low-subsidy world, environmental impact assessments, permitting and associated issues, optimising economical water uses in hydropower systems, smarter grid technology, and storage opportunities such as pumped storage as well as battery and stored power for electric cars. If you are involved or have an interest in hydropower, this is the event you cannot afford to miss.

Paul Wheelhouse MSP, the Scottish Government Minister for Business, Innovation and Energy, will be delivering a keynote address on the morning of the 9th November.

This conference and exhibition sits at the heart of the hydropower industry in the UK and it represents an outstanding opportunity to meet and engage with industry professionals, hear from some of the sector's leading speakers and practitioners, and work together to overcome the challenges ahead and reflect on our changing hydropower landscape.

There is also the entertaining and stimulating conference dinner on the evening of the 8th November, providing a terrific opportunity to relax with delegates, colleagues and friends. This year we are delighted to be joined by our after-dinner speaker, the ex-England, Lancashire and Durham cricketer, Graeme Fowler, who will regale us with his wonderfully funny tales, from facing a cricket ball bowled at 90mph to biting Elton John's wife...

Members Forum

There is now a member's forum on the BHA web site! It is on the BHA web site home page and it can be accessed via the tab on the far right next to the FAQ's.

There are 3 main sections – The Forum [hydro news, events and jobs], Technical [low, medium and high head] and Equipment [items for sale, items free and items wanted].

As a member you have free access and can register just by inputting your BHA membership number, which if you don't have to hand, you can get from Wendy at BHA Head Office on 01258 840934.

So please register and get communicating with each other and enjoy another of the many benefits of BHA membership.

Do you want to be on TV?

Channel 4 is making a brand new consumer series with the working title Dave's Guide to Spending Money. In this episode the presenter Dave Fishwick (Bank of Dave; The Shoppers' Guide to Saving Money) will be investigating the benefits of renewable energy generators. We are looking for hydropower developers/suppliers/installers based in the Lancashire area who are in the midst of installing a hydro scheme, or who have completed an installation, to feature in their first episode. Channel 4 is particularly interested in small scale domestic hydro, but is willing to have a look at any options nearby.

If you can suggest any potential sites then please get in touch with Louise on 01273 224 800 or email dave@ricochet.co.uk

Tidal energy

The BHA is delighted that tidal energy specialists, North Wales Tidal Energy & Coastal Protection have joined the association. With the Hendry review report into tidal range technology to be published imminently it is excellent timing and we look forward to working with them in this new, exciting and developing sector.

Andy Billcliff said "North Wales Tidal Energy & Coastal Protection is pleased to join the BHA at the beginning of a new era in UK hydropower, an era that is poised to deliver Hydropower on a GW scale within the UK. Together we can help shape this huge new opportunity. Development of our proposals will not only deliver enduring, predictable, low-carbon energy, but will also provide significant economic uplift and environmental security to benefit the whole of North Wales for generations to come."

Support our event and support the UK hydro Industry.

We have no shareholders and we are funded entirely through membership and event revenues.

All proceeds from this event will be invested into developing the UK hydro industry.

New BHA Members

Bruce Stevenson
Insurance Brokers
Company Member
Buckny Hydro
Company Member
Canyon Hydro
Company Member
CMS Cameron McKenna
Company Member
GE Company Member
Hydromew Sp. Zo.o.
Company Member

Multiconsult
Company Member
2am Creative Ltd
Associate Member
Aquaspira
Associate Member
Berwyn Hydro Ltd
Associate member
Caernarvon Crown Slate Quarry
Associate Member
CLA Associate Member

Close Brothers
Associate Member
Community Energy Wales
Associate Member
DJ Media
Associate Member
Epico Srl
Associate Member
Jelf Insurance Brokers
Associate Member
Natural Energy Wyre
Associate Member

North Wales Tidal Energy & Coastal Protection
Associate Member
Tryweryn Hydro
Associate Member
TURBIWATT
Associate Member
Westflight Ltd
Associate Member
Erre Due UK
Private Member

Everhot
Private member
David Tucker
Private member
JBEL Environment Services
Private Member
Stroud and Burley Consultancy
Private Member
David Gayther
Private Member

Andrew Mellor
Private Member
Good Energy
Associate
Reading Hydro
Charity
Reading Hydro
Charity
Verbeia Energy
Private

New Horizons in Community Energy

Community Energy Wales is a not-for-profit membership organisation set up to provide assistance and a voice to community groups working on energy projects in Wales. Their objective is to help create the conditions in Wales that allow community energy projects to flourish, and communities to prosper.

With the current challenges being faced, the community energy sector is proving to be very resilient and innovative, none more so than in North Wales where Cyd Ynni (a group of local community energy organisations) are working with Energy Local and a range of partners to deliver a trial, offering local people the opportunity to buy their energy directly from locally owned hydropower schemes. This approach could well revolutionise the way energy is consumed and from where it is purchased and indeed, make local renewable schemes much more viable in the longer term.

I was therefore delighted to be able to attend the Community Energy New Horizons Conference on the 15th of September where I heard genuinely passionate and thought provoking presentations from some of the key players involved in this innovative trial, including by Mary

Gillie from Energy Local, Keith Jones from BHA member the National Trust, and Alun Hughes from Ynni Padarn Peris. In addition to this there were presentations considering the different ways that communities could generate energy in the form of heat, marine energy and storage.

The whole event was very well presented with a number of related exhibitors, including Naturesave and SP Energy Networks and it provided a great opportunity to network with some of the players in community energy.

I very much hope there are more events of this type which the BHA can support and promote. The good news is that the BHA and Community Energy Wales have agreed to arrange reciprocal memberships so that we can work closer together in the future.

Simon Hamlyn, CEO, BHA

For more details

visit: communityenergYWales.org.uk

Scottish Energy Minister Opens Innogy's Highland Hydro Scheme



Paul Wheelhouse MSP with Dr Hans Bunting at the Cia Aig intake weir

Cia Aig, Innogy UK's 3MW run-of-river hydro scheme, was officially opened in August 2016 by Paul Wheelhouse MSP, Minister for Business, Innovation and Energy together with Hans Bunting, Chief Operating Officer Renewables of innogy SE. Adrian Loening, Vice Chair of the BHA joined other invited guests, visiting the powerhouse and intake weir and viewing first-hand the detail of the completed scheme.

Located on the Abhainn Chia-aig river, at the eastern end of Loch Arkaig approximately 20 miles to the north of Fort William, Cia Aig took 24 months to construct at a cost of just under £12M, and became operational with the first turbine in February 2016.

Dr Hans Bunting, Chief Operating Officer Renewables of innogy International SE, was delighted to welcome the Minister to the inauguration, saying "Scotland is a great place to do business. We value the skilled supply chain that Scotland can offer and when developing our renewables projects, it is important to us that we are able to work with local companies and to maximise the economic benefits to the local economy."

Paul Wheelhouse MSP, Minister for Business, Innovation and Energy, said: "Congratulations to innogy on the inauguration of their hydro power station Cia Aig. This 3 MW

hydro scheme will help contribute to the growing importance of hydro generation in Scotland - the largest source of renewable power in Scotland after onshore wind.

"I welcome innogy's commitment to provide community benefit funding associated with their renewables schemes including their Cia Aig hydro development. The Scottish Government is committed to supporting the development of renewables - including hydropower - as part of Scotland's balanced energy portfolio, and we are already developing an overarching energy strategy, setting out what we can do to optimise the benefits of Scotland's significant energy resources and expertise through to 2030."

Simon Hamlyn, Chief Executive, British Hydropower Association said "We are delighted that another of our member's schemes is now in full operation and we welcome this opportunity to demonstrate to Scottish Government the positive impact the development of new hydropower has on Scottish communities.

"There is now more than 177MW of small-scale hydropower available in Scotland with approximately 1,700 people working in the sector in Scotland and increasingly many local communities are taking a stake. Small-scale hydropower

energy is a popular, long-term form of low carbon energy with a generation profile which matches demand and supports a significant Scottish supply chain.

"With the right support from Scottish Government, this industry can continue generating rural jobs and green energy in Scotland for many years to come."

Innogy



4 New Build Hydro Plants in SW England Delivering Energy to the Grid

Production at a series of 4 new micro hydro plants on Dartmoor in the UK has met expectations with over 1250MWh generated in little over a year. JLA & Co has manufactured all the turbines and supplied all powerhouse electromechanical equipment, with UK based GoFlo manufacturing the inlet screening apparatus. Site owners CGP (SW) and Tory Brook Hydro have completed the plants, during 2015 and 2016.

The turbines total over 300kW of capacity and construction work is now complete at all sites.

Chris Elliott, a director of Tory Brook Hydro and CGP (SW), commented *"We have been installing and operating JLA machines on sites in the UK for over a decade now and we have been impressed by their performance and build quality, so it was pleasing to receive these machines from JLA for use in our own sites. We have been very happy with the levels of production."*

The projects are all new build, on heads from 14 to 58m, and three of the plants are direct driven onto generators for simplicity and efficiency. The plants are all unattended and monitored & operated remotely.

UK manufacturer GoFlo supplied the inlet screening equipment for the plants, using their innovative

automated fine screens, which are specified in these locations to a maximum of 6mm gap to exclude fish of all life stages, and with a water washed screenings spray and bywash system. The screening arrangements are integrated into intakes which include automatically operated fish refuge and bywashing arrangements, and underwater camera fish monitoring. These technical innovations are unusual in the micro hydro market but can be necessary in sensitive locations.

Chris remarked:

"With the support of the design team and products from GoFlo we have complied with quite onerous environmental conditions on our licenses relating to screening and bywashing arrangements, using 6 of these screens across 4 locations."

Chris Elliott, CGP (SW)



About the firms involved:

- CGP (SW) owns and operates micro scale hydro plants at Huckworthy Mill and Becky Falls
- Tory Brook Hydro owns and operates micro scale plants at Portworthy in Devon

- JLA & Co are a Belgian turbine manufacturer of crossflow turbines and control equipment.
Web: jlahydro.be
- GoFlo is a screening system designer and manufacturer, part of UK based hydro design firm Renewables First.
Web: www.gofloscreens.co.uk



The Steepest Scheme in Scotland?

The steeper sections of penstock were laid using a walking excavator

Glen Lyon is well known for having a concentration of small hydro schemes and was one of the first hotspots of the resurgence of small hydro in Scotland.

These developments were facilitated by a collaborative approach from landowners and developers that saw the schemes share the cost of laying a new 33kV cable up the glen. Of the seven schemes that were originally identified in the feasibility stages, most were developed around the time that the cable was laid in 2009/2010. The remainder were soon snapped up by developers, but one scheme on the Allt Linttich burn remained. Why? Most thought that it was too difficult to build, or at least that the risk outweighed the potential return.

The challenges of the site are daunting; it is the steepest scheme in Glen Lyon and possibly the steepest in Scotland, with 360m head and a 1200m pipeline. It does not take much imagination to work out that significant sections are much steeper than the average 30% gradient. The working area is also very close to the Allt Linttich burn, which feeds the scheme and, combined with the gradient and Glen Lyon's rainfall patterns, this makes surface water management extremely difficult. As if that wasn't enough, the outflow of the Allt Linttich burn is just above a fresh water pearl mussel bed, which is now under even greater scrutiny following previous damage as a result of poor practice during construction of another scheme.

However, these challenges were not enough to put off Glen Hydro Development, who agreed the development of the scheme with the Landowner in 2013. With the combination of environmental sensitivities, the construction plans and associated applications needed to be particularly robust. Fortunately the local SEPA and Local Authority officers are no stranger to hydro. Working closely with the statutory bodies the necessary consents were quickly obtained, allowing construction to start in 2015. It wasn't until the responses from civil contractors were received that the key challenges began to bite. One experienced contractor took no more than a glance from their car up towards the intake location to conclude that they would not bid. The others returned prices that rendered the scheme completely unviable.

Undeterred, the Glen Hydro team decided that the only solution was to build the scheme themselves. Richard Haworth of Glen Hydro contends that this was *"probably the best decision that we made – it is hard to imagine how we could have completed this scheme within budget, ensuring the appropriate environmental control, if we had not been able to manage it on a daily basis ourselves"*. By acting as Principal Contractor and having close engagement with the ECoW from the starts, Glen Hydro was able to actively and effectively manage risk on site. It soon became clear that the most effective way to demonstrate compliance and good practice to SEPA was to invite them to site instead of perfecting documentation.

The construction process was never going to be easy. Various struggles for intake construction were considered, including the use of helicopters. This approach was complicated by a nearby raptor nesting site and, ultimately, the decision was taken to upgrade the existing argo track to a standard that was suitable for tracked vehicles and passable in dry weather by competent 4x4 drivers. The penstock itself was much steeper still, with sections in excess of 45 degrees gradient. The use of locking ductile iron pipe and a walking excavator provided a good solution to a seemingly impossible task.

Using locking pipe to avoid the need for thrust blocks was an important design choice and, unusually, allowed the pipe to be laid downhill. The steepness of the penstock required frequent trench breakers to avoid the contents of the trench becoming eroded before construction was completed.



Sections of the access track required serious attention prior to use in construction

The intake itself is a relatively small structure using a pre-fabricated screen chamber to reduce the amount of work required in the river. The morphology of the river, even above 500m altitude, is formidable, with large boulders regularly being mobilised in floods. One flood during construction damaged the intake whilst in a vulnerable semi-complete state. Regardless of activity elsewhere on site, the surface water management measures required attention a continuous basis.



The intake pool was filled with rock during a flood and had to be cleared with the walking excavator

By engaging a small core team that are used to working in such environments, and with specialist contractors being brought in for the more technical activities, the result has been a scheme built to a high standard at a cost typical of a much less complex site – and significantly less than the tendered price. This is not because anything was missed out or any corners cut, but as a result of managing the risk in-house and only paying for those risks that actually rose.

Construction of the Chesthill hydro schemes was started in August 2015 and the 300kW scheme was commissioned in May 2016. The project was regularly visited by representatives of SEPA and Perth & Kinross Council and has been referred to by them as a "good example of hydro construction".

Glen Hydro

UK Renewable Energy Likely to Suffer After EU Exit

Politics may change or shift; the demand for energy will not. The effects of climate change continue to threaten the environment, and although governments change and manoeuvre, prime ministers rise and fall, the planet still turns. The sun, the wind and the tides still offer sustainable solutions to our demand for energy, whoever is in power, and they are available to those with the vision and will to accept them.

But the will to exploit these renewable resources depends on politics, and it flourishes within the European Union. Through its Member States it has, and continues to pursue, a Europe-wide policy to develop renewable resources. The decision of the UK to leave the EU weakens the Union in general and in particular its Europe-wide strategy to develop RE. It weakens the UK's strategy too. The decision is likely to have profound and deleterious consequences for the UK's RE policy; ultimately the environment still suffers, something that concerns us all, whatever our country or city, and whatever our loyalties.

All the Member States have helped formulate the EU's RE policy, and in the process have modified, weakened or strengthened these policies according to their own political pressures, and balanced their own interests against the looming threat of carbon emissions and rising temperatures.

But they did establish agreed targets and target dates. Each country agreed to formulate these agendas and to honour them, some reluctantly, some slowly, others enthusiastically, but the shift towards a more sustainable energy future had begun. These targets, still being followed, have been strong motivators within the Member

States, and positively influenced the COP21 agreements.

The UK has played a significant part in shaping energy policies. It developed a strategy for liberalisation of its energy sector, which provided a model for a number of Member States. But it also drew on EU policies with regard to subsidies for RE. The 2001 RES-E Directive on the promotion of electricity from renewable energy sources was supported by the UK and helped determine the country's policies on renewables, providing help through direct grants, FITs or carbon credits. The UK and other Member States pursued a support policy for RE, in line with the Directive in a variety of ways, according to the particular circumstances of each country, but all with the same objective.

Now that the UK will not be bound by these mutually agreed policies, it may – and there are very strong indications that it will – weaken or reduce its commitment to RE. This had already begun well before the decision to leave the EU was taken, but had been mitigated by its commitment to 2001 RES-E Directive, with its aim on countering the effects of climate change. The mitigation will no longer apply, and the UK's renewable sector is likely to suffer.

The core of the 'Leave' campaigners' policy was a disdain for EU policies. A government influenced by 'leavers' is now likely to start to undermine the results of the EU Directives.

Compared with the 'remainers', the 'leavers' are less concerned with climate change. (Michael Gove, the UK's former Education Secretary, a prominent 'leave' supporter, had tried hard to drop climate change from the British schools' curriculum. He did not succeed, but may be more successful in the future.)

The journal Business Green recently referred to a poll by ComRes of 1,618 prospective voters, just before the referendum, which found that almost twice as many 'leavers' were likely to doubt man-made climate change, and were more likely to oppose clean energy developments.

A new British prime minister will axiomatically reflect the 'leavers' views and is likely to be more concerned about short-term investment benefits, which RE cannot offer. To bring RE into commercial reality does require large-scale and long-term investment. Nascent technologies may eventually burgeon into full-scale RE sources, but they may also fail when they reach full-scale deployment. The successes will compensate for the failures, and the money spent will be justified; however it is a long-term strategy. This view is supported by a number of studies. For example, the World Future Council argues that the cost of not investing in renewables is higher than that of investing in them.

The EU leavers' view is that the UK is now free to pursue its own policies, dictated solely by self-interest; as well as being unrealistic, such policies will deal a severe blow to the UK's indigenous RE industry.

Paul Drechsler, Head of the UK's Confederation of British Industry, speaking also to Business Green before the referendum, said: *"The adverse economic impacts likely to result from leaving the EU would make it much harder to attract investment in renewables."*

Author:

Fabian Acker, H&D Green Power Editor

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Ham Baker Renewables and SPP Pumps Secure Pump- as-Turbine System for Hong Kong Water



SPP Pumps, a leading manufacturer and distributor of centrifugal pumps together with Ham Baker Group a leading manufacturer and installer of water and wastewater equipment has won the contract to supply Sha Tin water treatment works (WTW) in Hong-Kong with a Pump as Turbine (PaT) system to generate hydro-electricity. The single PaT solution has been developed to produce a hydro-recovery system for Sha Tin WTW to generate its own power on-site.

The PaT solution from SPP and Ham Baker Renewables utilises the potential energy contained in the water entering the works (based on available flow & head), which runs from the supply reservoir to the head of the Sha Tin works. Previously the excess flow and pressure has been 'blown off' in a dissipation chamber prior to entering the works and by doing so wasting a natural resource of green energy. By harnessing the flow and pressure entering the works, via the PaT system, the resulting electricity generated can be used to supplement the power requirements of the water treatment works at Sha Tin.

Stuart Wallis is a Sales Manager for the Water division of SPP Pumps: *"What's attractive about our particular PaT solution is that it offers considerable cost savings over the traditional turbine-produced hydro power, in fact up to 50% reduction on capital investment is easily within reach on many sites."*

Ian Goddard, Business Development Director for the Ham Baker Group: *"Utility companies in particular, are waking up to the advantages that micro hydro-energy solutions can offer and our solution optimises small amounts of available flow & pressure. Anyone can run water backwards through a pump, that's technology which has been around for a long, long time, but through our partnership we have developed a sophisticated control which maximises power output over varying flows & pressures. With this complete packaged solution we are giving companies the opportunity to produce their own power on a micro level and become sustainable without a huge capital outlay."*

Ham Baker

Italian Energy Producer Enel Green Power Turns to Dyrhoff to Modernise Cimena Facility With an Inflatable Spillway Gate



The 90m long curved rubber dam supplied by Dyrhoff at Enel's Tagliuno site



Enel's pneumatic spillway gate at Ponte San Pietro

Leading Italian hydropower producer, Enel Green Power, recently commissioned British rubber dam and pneumatic gate specialist, Dyrhoff Ltd, to design, manufacture and supply a new spillway gate for its Cimena power plant, a historic facility located on the Po River in San Mauro Torinese, near Turin in the north west of the country.

This is the third project and the second pneumatic gate that the company has commissioned from Dyrhoff following the installation in 2012 of a 3.25m high x 32.0m wide pneumatic gate at the company's Ponte San Pietro facility, near Bergamo.

In 2007, Dyrhoff supplied a 1.6m high, 90.0m long water-filled rubber dam at Enel's Tagliuno hydropower plant on the River Oglio near Bergamo.

The new gate at the Cimena power plant measures 1.7m high and 38.0m wide and will provide additional upstream pondage at the hydropower plant. The bottom-hinged steel gate is raised and lowered by inflatable rubber bladders, secured to a concrete foundation using clamp plates and anchor bolts. It is actuated by means of an air compressor system via piping and valves. Through the use of water level sensors, the gate automatically regulates and maintains the upstream water elevation to the required level. The

air bladders and other rubber components were manufactured by Trelleborg Flexible Containment Solutions in Manchester after a 3-year programme of development between Dyrhoff and Trelleborg.

Visually a low-impact structure, the gate is designed to be operated automatically, requiring minimal manual intervention. It will raise the water level by 1.7m and maintain this level in normal flow conditions. This will be achieved by regulating the bladders' inner pressure, in turn maintaining the steel gate panels at the required height.

The gate will be operated manually from time to time for inspection, maintenance or other purposes. In exceptional circumstances or high flow events, the gate will be fully lowered. The pneumatic gate has been designed to fully inflate and deflate in 45 minutes.

As on the majority of its projects, Dyrhoff worked with local suppliers in order to keep production costs competitive and meet a very tight schedule. Installation of the Cimena pneumatic gate was completed within two weeks, while the river level was at its lowest. The gate will enter service in September this year.

Dyrhoff's inflatable rubber dams and pneumatic gates offer a number of unique benefits including low capital cost, low operating and maintenance costs, low environmental impact and simple operation.

Dyrhoff

Funding for small-scale hydro schemes in Scotland with Triple Point

Triple Point is an established private partnership founded in 2004. As a specialist investment business, we make more than just money for our clients; we create value. This value goes beyond simply delivering solid returns; it extends to the lasting partnerships we build and the integrity with which we conduct our business. We create value by building innovative products for investors and offering attractive funding solutions to a range of businesses and organisations in both the public and private sectors.

Our experience and precision-based approach enables us to unlock dynamic opportunities for our investors. We understand the investment needs of our clients, exploring client centric possibilities and finding unique combinations; from the deals we originate right through to the way we design our products. This enables us to match the requirements of private investors seeking capital security and liquidity with the needs of carefully vetted companies seeking funding in both the public and private sectors.

At Triple Point we believe in building long lasting partnerships with advisers and the businesses we fund. Over the last 12 years Triple Point has invested close to £1billion and raised more than £650m of funds. We have also invested in growing the UK economy by supporting more than 40,000 SME's.

Triple Point currently leads the Venture Capital Trust ("VCT") market in funding for small scale hydroelectric power schemes in Scotland.

Triple Point have been working in the hydro sector since 2011, initially funding a business that managed the planning and environmental impact studies for a portfolio of new run-of-the-river hydroelectric power installations in the Scottish Highlands.

Between 2014 and 2015 Triple Point raised a total of £38m to construct and operate a portfolio of hydroelectric power schemes in partnership with Forestry Commission Scotland and Green Highland Renewables. Triple Point now manages investments in 8 companies which own 11 hydroelectric schemes in the Scottish Highlands. Ten of the schemes were successfully commissioned during 2015 and 2016, and the final site, which is under construction, is due to be commissioned during the summer of 2017.

Triple Point is proud to be involved in this sector, creating value for our partners, the communities and our investors. Triple Point are continuing to seek long term partners in this space and are adept at offering tailored, innovative funding solutions for a range of businesses.

Triple Point

GoFlo for Low and High Head Hydro Systems in the UK and Overseas

GoFlo screens has grown out of Renewables First Ltd, who specialise in the feasibility, consenting, design and construction of low and high head hydropower (and wind power) systems all over the UK, and overseas.

Based in a beautiful old Cotswold water mill just outside Stroud in Gloucestershire, their team of twenty engineers and technical staff are constantly busy working on a diverse range of hydropower projects typically in the 100 kW to 1 MW range. They work with all head and flow combinations and turbine types, but have been particularly involved in low head / high flow projects where intake screening, and in particular how to keep the intake screen clear of debris, is vitally important for the hydropower system to operate efficiently and maximise energy production and income.



The GoFlo automatic self-cleaning rotating-mesh intake screen

Low head hydropower systems are often subjected to the full force of increasingly stringent fish and eel screening regulations. Gone are the days in the UK when 40 mm intake screens were acceptable and even 20 mm screens are becoming a distant memory – nowadays 10 and 12 mm intake screens are the norm and down to 2 mm screens are used at the most sensitive sites where fish fry and juvenile eels are present. This presents a significant problem for hydropower systems because it is not unusual for the majority of the flow in a river to pass through the hydro intake screens, which means as the screens become finer they increasingly get clogged with debris and renders the hydro system inoperable or operating inefficiently. Blocked screens lead to significant losses of income if they aren't quickly unblocked.

Intake screen-cleaning systems have been commonplace for years and come in a range of shapes and sizes, but they all begin to struggle as the bar-spacing reduces and ever-finer debris gets trapped and requires removal. From experience, Renewables First has learnt that the conventional intake screen-cleaners will always struggle with finer screens, so a fundamentally new approach was needed. As there didn't seem to be a suitable product available, they decided to develop their own automatic self-cleaning intake screen system and GoFlo was born! The first project was completed earlier in 2015 with a number of other commercial GoFlo screens

installed and operating successfully.

The design started by considering what a hydropower site needs, rather than the conventional thinking which is 'how do we retrofit this cleaning system on that screen'. The main design requirements were compliance with fish and eel regulations, long-term reliability, permanently clean operation, low maintenance costs and simple maintenance, visually unobtrusive and remote monitoring and control.

The system can use a mesh belt down to 2 mm bar-spacing which can cope with the most stringent screening regulations for glass eels, and any mesh size larger up to 50 mm. The most common sizes currently used in the UK are 12, 10 and 6 mm in that order. Not only does the mesh size need to meet the regulations, but also the gaps between the mesh and the machine's frame and rollers etc. The system is designed so that the largest non-mesh gaps are a maximum of 2 mm, so there will be no hidden gaps around the edges for eels to slither through.



Mesh sizes are available in any size from 2mm to 50mm bar-spacing

Long-term reliability comes down to a simple tried-and-tested design, rugged high-quality components and non-degradable materials (mainly stainless steel). The bearings are water-lubricated plain polymer bearings, so no separate lubrication system is required. The drive chain is sealed for life and the drive motor is outdoor rated, and can be fully-submersible rated (IP68) for an additional fee.

The screen stays still until integrated pressure sensors on the upstream and downstream sides detect a head loss across the screen, which triggers a cleaning cycle. Clearing debris is achieved by the screen mesh rotating, pulling trapped debris out of the water and dumping it into a flushing trough on the downstream side. Debris that doesn't freely fall off is blasted off with a spray boom that sprays outward from inside the mesh. Once debris is in the flushing trough, a pumped water supply which runs whenever the screen mesh rotates washes the debris down the trough back to the watercourse, downstream of the system. This is considered best practice for naturally-derived debris, because decaying leaves and natural debris form the bottom of the food chain in aquatic ecosystems. If required the debris can also be left in a heap for manual clearance.

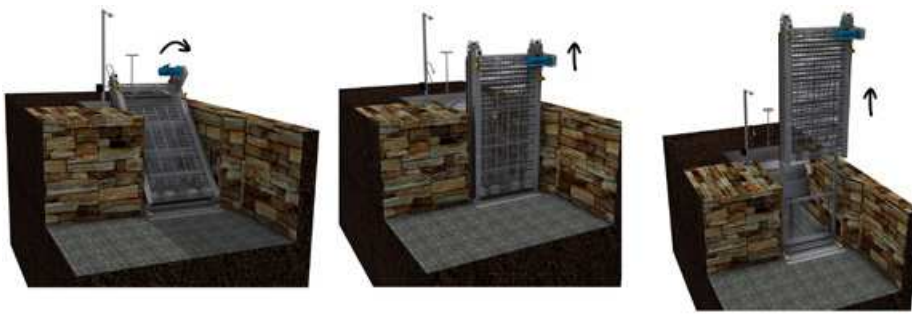


Even in the depths of Autumn the GoFlo screen can remove the heaviest debris loading!

Low operating costs come from having rugged construction, good quality materials and an efficient design that works well. The chassis is made entirely from 304 stainless steel (316 is an option), laser cut and folded and then welded into the finished structure. The resulting chassis is immensely strong and will never corrode. The rotating parts are either stainless steel or plastic, and the water-lubricated plain bearings are designed to last the life of the screen (25 years). If the screen needs to be removed for any reason this is quick and simple using a single vertical lifting operation; first the screen is pivoted to vertical on its integrated 'pivoting foot' and locked into the vertical position, then the quick-connect electrical umbilical cable is disconnected, then it is simply lifted out vertically. The whole screen is guided out on integrated sliders to ensure it doesn't swing around, and more importantly means it can be precisely reinstalled later. If required a blanking plate can be installed behind the screen using integrated guide channels which will keep debris out while the screen is removed and maintain gaps at less than 2 mm to meet stringent eel screening regulations. Also for multiple GoFlo screen intakes, the remaining intakes can be left in full operation while a single module is removed.

GoFlo screens have no overhead rake so are low-profile and visually unobtrusive. Due to the stainless steel construction they also look attractive, in a functional way!

The final, and one of its best design features, is the full remote access and control. The screen operates automatically, but unusual items can still get caught on intake screens so remote access is a useful feature. From your computer (or phone), anywhere in the world, you can login to your screen via the 'Goto my GoFlo' portal. The integrated day/night camera will show you your intake, and from the portal you can then initiate cleaning cycles or rotate the screen backwards and forwards as required to dislodge any awkward debris, and see the result instantly via the camera. All operating functions or control parameters can be accessed remotely just as though you are next to the screen.



The pivoting foot and guiderails allow a vertical lift and accurate, fast re-installation

The controller also logs a record of what the screen has been doing recently, sends critical alarms and monitors motor current and temperature, which can be invaluable when trying to diagnose any problems.



GoFlo Screen Control

Single GoFlo screens can be ordered in any size from 0.5 to 1.5 metres wide and from 1.5 to 4 metres tall. They are normally installed at 45 or 60 degrees from horizontal, though can be installed at any angle from 30 degrees to vertical. As the inclination angle increases additional 'flighting' is added to the mesh, which basically enables the mesh to grip the debris and raise it out of the water without it falling down the face of the screen. Larger intakes use multiple screens, and the screens are designed to fit tightly together and maintain the maximum 2 mm gap in between. Ideally three-phase power would be available at the intake, though single-phase can also be used with the addition of an inverter inside the controller cabinet. At very remote sites connecting a generator or solar power could be used to provide the power. An internet connection will be required at the controller location for the remote access - ideally this would be fixed-line broadband but suitable GSM mobile internet can also be used.

In addition to hydropower operators, GoFlo is also targeting water utility companies and other water abstractors to eliminate intake screen debris maintenance and reduce the manual labour costs of dealing with this.

If you would be interested in finding out more there is a lot more information on the GoFlo website at www.goflocreens.co.uk. On the website you will find a more detailed summary of the technical features, a budget price estimator and a detailed measuring-up guide so you can apply for a more accurate quote. If any readers would like more details, please either use the website or feel free to get in touch with the author directly.

GoFlo



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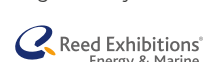
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Radyr Weir Hydro Scheme Completed

Cardiff Council has recently taken control of the newly completed hydro power plant at Radyr Weir on the river Taff in South Wales. The plant is a 391kW twin screw installation, the largest of its type in Wales, and includes a three flight Larinier fish pass with facilities for trapping and monitoring fish.

Following from the initial development of the project the scheme received its relevant consents in late 2013, guaranteeing the feed-in-tariff prevailing at the time, and setting a deadline for the commissioning of the scheme. Following a tendering process the contract for design and build of the plant was awarded to Dawnus Construction with hydro design by Renewables First, and generation equipment from Spaans Babcock.

The schedule was extremely challenging and the run up to it was in mid-winter leaving many weather risks, as well as limited sunlight for working. Due to a long term fish monitoring programme which was ongoing at the site it was necessary to install not just the new fish pass, but as an enabling work a temporary two flight Alaskan pass with trapping facility was installed. Following the commissioning of this, the temporary works could be installed around the site to protect the works against foreseen winter flows. For the sake of robustness this used extensive sheet piling, since no delays would be possible within the programme. Excavation started only 9 weeks prior to the accreditation deadline and works continued 24 hours per day until the deadline. It was necessary to prioritise tasks to ensure the key commencement of generation could occur prior to the completion of other peripheral aspects of the site. After meeting the deadlines the project proceeded in a more normal fashion allowing the wider works to be completed. Official opening happened later in 2016 following the completion of all aspects of the development, and the landscaping to accommodate the popular Taff Trail cyclepath which diverts around the facility. Fish are able to ascend the co-located three flight fish pass, and the top of this has a high quality fish trapping facility to allow NRW to continue their programme of science understanding the migration of fish up the river.

The plant is connected to the grid at 11kV and exports 100% of output into the local distribution network.

Renewables First





Energy Now Expo 2017

The Renewable Energy Event for Farmers and Landowners

Every year thousands of farmers and landowners descend upon the Telford International Centre, Shropshire to take part in the Energy Now Expo and keep up to date with the latest renewable energy sector developments.

The Energy Now Expo 2017 will take place on 8th & 9th February, once again in Telford. Being held in association with the NFU & CLA, with support from organisations including the BHA, Anglia Farmers, Woldmarsh Producers and STA, the event will contain the following attractions:

- A large exhibition containing 200 product and service suppliers
- A new product development zone, in which the latest technologies will be unveiled
- A renewables advice clinic, providing visitors with the chance to receive one-to-one advice from the experts
- A multi-streamed conference, featuring keynote presentations as well as sessions on AD & biogas, biomass, energy crops, energy

efficiency, finance, grid connections, heat pumps, hydropower, solar and wind. Organisers are pleased to confirm that Simon Hamlyn, CEO of the BHA, will be chairing the hydropower session, featuring discussions on the ways to future proof revenue streams, the importance of service and maintenance plans and the future prospects for the hydropower sector as a whole.

Also being added to the conference are daily sessions on energy storage, explaining the benefits, current situation and opportunities this exciting sector offers both new and existing renewable energy generators, and a debate on the Welsh renewable energy sector. With the support of the Welsh government, this debate will see key figures discussing the continued development of the low-carbon economy in Wales, the challenges being faced and the renewable energy activities being carried out.

Returning to the 2017 event will be the Energy Now awards – recognising and celebrating the achievement of UK farmers and landowners within the renewable energy and low-carbon

sectors. There will be 7 categories in total – best AD & biogas, biomass, heat pump, hydro, solar and wind schemes, plus the most carbon neutral farm award. Owners of systems that have been operational for more than 12 months should enter, with each winner receiving a £500 prize and the award itself on the night (8th February 2017). It is a chance to showcase best practices in the installation and deployment of renewable energy and organisers would encourage BHA members to apply in order to demonstrate the efficiency and importance of hydropower schemes.

To book your ticket to the show, to enter the awards, or for more information please visit www.energynowexpo.co.uk, or call a member of the Energy Now team on 01293 854 405. There is also a limited amount of space in the exhibition, so contact the team today if you wish to promote your company, products and/or services to this audience.



60 seconds with Andrew Hughes Head of Renewables, Deepbridge Capital

What is your connection with the BHA?

Deepbridge has been a member of the BHA for the past couple of years. As investors in renewable energy projects, we are always on the lookout for commercially viable projects and meeting fellow BHA members has been an invaluable experience – particularly hearing those horror stories from members about how not to do things! Prior to investment we require planning permissions and an offer of grid connection to be in place, but other than that we are happy to discuss projects with any BHA members.

How do you raise funds for investment?

We provide tax-efficient investment opportunities to individual investors and financial advisers. Previously this has involved the Enterprise Investment Scheme and now focusses on Business Relief qualification enabling investors to mitigate their estate against inheritance tax.

Why hydropower?

The hydropower sector is appealing for investors as river flows (or tidal flows) are relatively predictable which therefore means that revenue can be predictable. As an asset-backed and insurable investment opportunity, investors appreciate renewable energy as an asset-class. Having invested in other renewables, such as wind, for a number of years it has been a rewarding experience adding hydropower projects to our portfolio.

What projects have you invested in to date?

Our first hydropower project was energised in December 2015, near Inverary in Scotland, and was a great first scheme for us as not only did development proceed ahead of plan but performance so far has exceeded expectations. This project emphasised the importance of having developers and project managers that are engaged and proactive. We are currently working on other projects, and undertaking due diligence on further projects, and the lessons

from our first site are invaluable. We also have numerous wind turbines in our portfolio and continue to review other interesting renewable technologies.

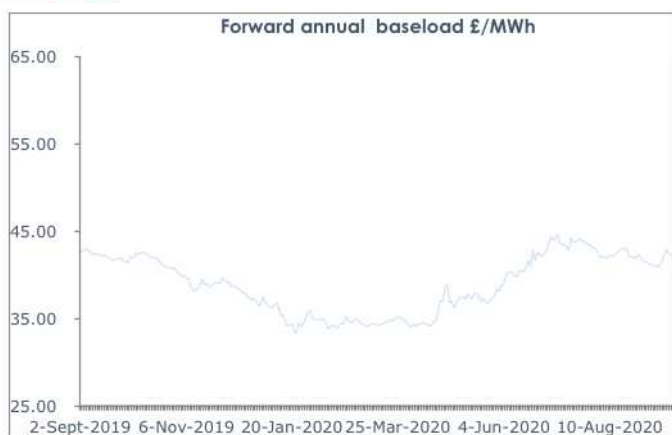
Are there any BHA members you are keen to speak with?

We are always keen to speak with landowners, developers or project managers who have impending projects that require third party investment. In reality, I'm happy to speak with anybody looking for funding and happy to discuss the commercials of projects to assess whether it could be appropriate for our investors. We have a strong pipeline (excuse the pun) of projects but always keen to discuss new opportunities.

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Recent months have seen wholesale energy prices in the UK rise on the back of supply issues including the major Rough gas storage facility going offline.

The market was also affected by a number of electricity generating plants shutting down. There are some signs of nervousness over winter margins.

Both gas and electricity prices spiked in the immediate aftermath of the Brexit referendum results, reaching their highest levels in nine months.

UK power prices finished up 25% at the end of the second quarter compared to the end of the first and the ICIS Power Index averaged £38.12 MWh over Q2, up 8.9% from the Q1 average.

Feed-in tariff update

The total number of hydro installations under the FIT scheme stood at 717 at the end of March 2016 with a total capacity of 104.5MW.

In the latest January to March quarter, there were 45 new FIT hydro installations, up from 40 in the previous quarter and a slight increase from the 44 seen in the same quarter last year.

The 14.14MW of hydro capacity installed in the January to March period was up from 7.17MW in the previous quarter and from 6.1MW in the same quarter last year.

Across all technologies there were 45,180 FIT installations during the latest quarter, with 356.7MW of capacity added. A total of £223m was claimed by

generators in FIT payments.

FIT hydro tariff rates from 1 October to 31 December are: Capacity of 100kW or less = 7.65p; 100kW to 500kW = 6.12p; 500kW to 2MW = 6.12p; 2MW+ = 4.43p.

The Government has said that under the latest tariffs it was targeting a 9.2% return for hydro, 5.9% for wind and 4.8% for solar.

According to the latest UK Energy Trends report, hydro generation increased slightly by 1.8 per cent in the first quarter of Q1 on a year earlier to 2.0 TWh; although average rainfall (in the main hydro catchment areas) decreased during the quarter, this followed the wettest December in four years.

ROC update

In the latest e-ROC auction in August, over 700 bids were placed and 75,296 ROCs were sold. The average price increased by 69p from July to reach £42.34. Although volumes were down on the last few months the number of ROCs sold was up over 20% on August 2015. The ROC recycle value for 2015-16 ROCs is expected to be close to zero, due to over-supply and supplier banking of ROCs from last year.

The dates of the upcoming e-ROC auctions are:

27 October 2016 | 25 November 2016 | 22 December 2016

Policy update

DECC was abolished by new Prime Minister Theresa May, with UK energy policy now merged into the Department of Business, Energy and Industrial Strategy, headed by former Communities Secretary Greg Clark MP.

The budget for the Levy Control Framework which covers renewable subsidies has currently been set until 2020/21 when the annual cap reaches £7.6 billion (2011/2012 prices). Trade association Energy UK has called for an "urgent review" of the LCF to provide clarity to developers and investors.

Annual new spending for the FIT scheme is capped at £100m per year to the end of 2018/19.

A Scottish minister has warned future investment and jobs are at risk unless the UK government improves the support regime for hydro, including pumped hydro schemes. Business, Innovation and Energy Minister Paul Wheelhouse called for the Scottish and UK governments to work closely to secure the future of the hydropower industry, which he said had been "overshadowed by bigger debates" about offshore renewable energy.

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Dates for the Diary

For more information on any of the BHA events below, or to register your interest, please contact us at:

info@british-hydro.org or Tel: 01258 840934

BHA Annual General Meeting

8th November – The City Hotel, Glasgow

For more details and to book your place (BHA Members only), contact BHA Head Office at info@british-hydro.org



BHA Annual Conference

8th – 9th November, The Glasgow City Hotel

Last minute bookings can be made at:
eiseverywhere.com/ehome/196270

www.british-hydro.org

BHA and Welsh Government Hydro Networking Event

Late January/Early February – Location TBC

This innovate hydropower networking event will be held in Builth Wells and BHA members will be notified of the details once they are finalised. It will provide those involved in the hydropower sector with the opportunity to hear from and network with Welsh Government and Natural Resources Wales staff during the course of the morning

Energy Now Expo 2017

8th and 9th of February – Telford

energy-now.co.uk/5361-2

Energy Storage: Connected Systems

8th and 9th of February – Olympia, London

This event is set to establish the role of Energy Storage in UK plc and the key role energy storage can play in upgrading our industrial strategy. The BHA will be facilitating speakers and chairing a session on utility scale storage.

escsevent.co.uk

BHA Annual Dinner 2017

30th of March – Grand Central Hotel, Glasgow

We'd be delighted for you to join us at the 2017 BHA Annual Dinner, where we gather to celebrate the achievements and accomplishments in the hydropower sector over the course of the last year. This event is a terrific opportunity to relax with friends and colleagues, entertain clients, reward staff and network with others working in the UK hydropower industry.

This unique hydropower event will take place at the historic Grand Central Hotel, located at the very heart of Glasgow's Style Mile. Pre-dinner drinks will be served from 7pm, followed by an enchanting three-course meal in the Victoria and Regent Suite. There will also be an auction of lots in aid of a deserving cause selected by the BHA board. Carriages are at 1am.

Dress code: black tie or national dress. The prices are: Individual (member) £115, Individual (non-member) £130, table of 10 (member) £1,100 and table of 10 (non-member) £1,250. All prices are exclusive of VAT. Sponsorship opportunities are readily available to those wishing to raise their profile and support this prestigious event. For more information please contact Simon Hamlyn at simon.hamlyn@british-hydro.org for all the details which we will tailor to suit your requirements. To book your place/s, please contact Wendy King at BHA Head Office at info@britishhydro.org or Simon Hamlyn.

All Energy 2017

10th and 11th of May – SEEC, Glasgow

all-energy.co.uk

BHA Hydro Network

29th of June

The Telford Whitehouse



Don't forget to visit our website where you can find a whole range of information and industry news, including career opportunities and details of forthcoming events in your area.

www.british-hydro.org

All BHA members receive our weekly e-Bulletins featuring current industry news items in the UK and internationally, with links to full stories. If you are not receiving these emails but would like to, please contact the BHA.

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Spotlight magazine keeps members up to date with news and updates on all BHA activities. Spotlight Plus is our monthly email newsletter which will keep you abreast of the current issues affecting hydro.