KINETIC HYDRO

Newsletter 3: Spring 2022

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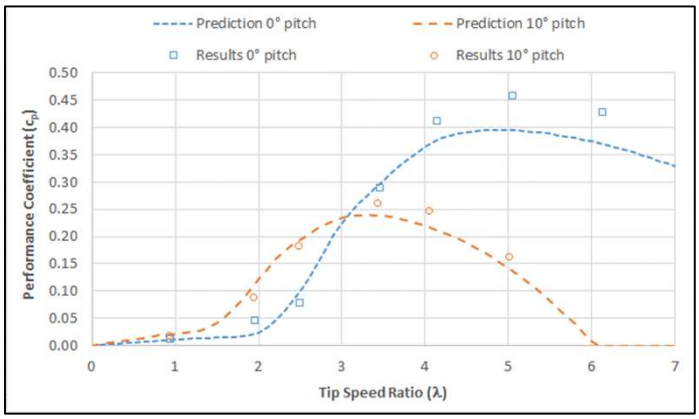
There has been no let up of activity at Kinetic Hydro over the first quarter of 2022, and fitting our news into a single page is proving a challenge in itself! We hope that you continue to find these communications interesting, but if you don't want to receive our newsletters please let us know by sending an email to info@kinetic-hydro.com.

Power Control and Electronics

The Kinetic Hydro river turbine will produce power for communities unconnected to national grids. We need to demonstrate that power can be provided at the AC voltage and frequency needed by appliances, or sent to a battery for later use. So, we have built a 'mini grid in a box', containing all of the key components that you would see in a village-scale mini grid.

This allows us to test our turbine completely independently of a mains supply, just as it will be used in a real deployment. We are using solar industry standard Power Control Electronics (PCE) which is important, not only because it keeps costs down, but because we can talk to mini grid developers (our future customers) about equipment that they know and understand. We can even connect a set of solar panels to illustrate 'hybrid' river turbine plus PV operation… and there's an outlet socket so we can plug in the site kettle!

Dump resistors (left), turbine control (center) and mini grid enclosures (right) at our Pinkston Watersports test site in early March.



Cp-lambda curves for the Mk-I turbine. The dashed lines represent our analytical predictions and the discrete points are test data.

Turbine Performance Testing

It took several months of hard work to get there, but by the beginning of March we were ready to put everything together and conduct our first performance tests in controlled flow conditions at Pinkston Watersports. The objective of these tests was to generate the hydrodynamic performance characteristics of our turbine, which are known as 'Cp-lambda' curves. These basically tell you how much power you can collect from a given water flow speed as you vary the speed of the turbine shaft.

Of course we already had analytical models of the turbine performance, but it is one thing believing in a computer model and quite another demonstrating it in practice, so we were understandably apprehensive. But our fears have not been realised. If anything we are seeing a slight uplift in performance and we now need to dive deeper into the data to understand these results and to ensure that we can capitalise on them in the future.

We were blessed with spectacularly good weather for our turbine performance tests in Glasgow. You can check out the video of our activities on our website: https://kinetic-hydro.com/videos

Researching the Market

It hasn't been all engineering. There is no point developing a technology if no-one wants it, they cannot afford it, or the policies are not in place to allow them to use it. We have been working with 2 groups from the University of Edinburgh to further research the business opportunities and challenges for river turbines.
A group of Masters students from the Business School have recently completed a deep dive into the potential market for river turbine mini grids in two of our target countries; Nigeria and Bangladesh. Their conclusions support our existing Business Case, and their work has led to active discussions with mini grid developers in both countries who may want to pilot our technology.

Meanwhile, Alice Farrelly, a PhD candidate at the Edinburgh Climate Change Institute (ECCI), has completed an internship with us, taking a broad-brush approach to assessing the policy environment for off-grid renewables in Africa. She has found encouraging government support in countries such as Nigeria, Ethiopia and Uganda.
We would like to take this opportunity to thank all our students for their hard work and enthusiasm.

UNIVERSITY OF EDINBURGH Business School
KINETIC HYDRO

Rwanda here we come!

We have just received the exciting news that we have been selected to join the Energy Catalyst International Brokerage Visit to Rwanda. Organised by Innovate UK the visit is tailored to exploring Rwandan energy access opportunities and finding collaborators and future partners. It is scheduled to coincide with the Sustainable Energy for All Forum to be held in Kigali: the premier global event for showcasing energy access solutions, brokering new partnerships and driving action towards realizing SDG7!