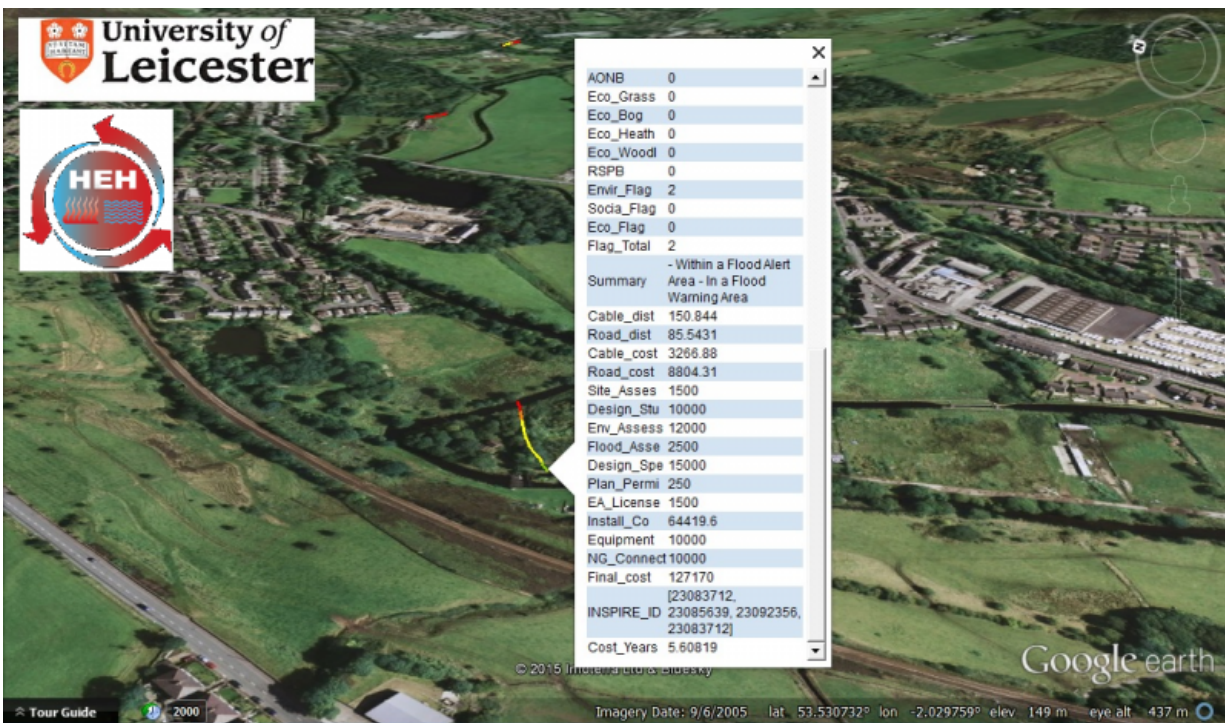


Big data technology finds ideal river locations to generate hydro-power

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Results of ISMORTASED displayed in Google Earth for a short stretch of the River Tame in E. Manchester. Clicking on the river shows the user information about the environmental considerations of this point on the river and estimated costs of installing and managing a hydro-power system.

A technology in development with the University of Leicester has the potential to revolutionise the sourcing of renewable energy from rivers.

A software app developed collaboratively by the University of Leicester and High Efficiency Heating UK Ltd. automatically selects appropriate locations in UK rivers to site a large range of micro renewable hydro-power turbines in UK rivers and determines the environmental sensitivity of the location.

This innovative prototype software saves thousands of pounds in initial survey costs: saves time and paper work, by making use of free publicly available data sourced from satellites to pinpoint the best locations in Britain's rivers for sourcing energy.

The news comes as the University of Leicester prepares to showcase its partnerships with industry at the first Innovate UK-funded Venturefest to be held in the East Midlands at the East Midlands Conference Centre, Nottingham (Tuesday 14 April).

Experts claim the technology has the power to shake up the micro hydropower industry.

The idea was the brainchild of a small [renewable energy](#) company based in Greater Manchester - "High Efficiency Heating UK Ltd.". Andy Baxter, MD of High Efficiency Heating, turned to the team at the University of Leicester to utilise their expertise in "Big Data" processing using data obtained from satellite and aircraft-based earth observation, following an initial meeting with the team at G-STEP, the University's SME support programme (part-funded European Regional Development Fund).

Andy Baxter said: "We had the idea of creating a tool that would radically change the way that hydropower opportunities are identified, and then qualified as "viable". If we could do this, it would be a truly market-disruptive development."

The project was funded by a grant from Innovate UK (formerly the Technology Strategy Board) for an initial 10-month feasibility project ISMORTASED (Identification of Sites for Micro-hydropower On Rivers Through Applied Satellite and Environmental Data) - No. 131545. Work focused on the River Tame to the East of Manchester and yielded multiple solutions for selected turbine specifications along much of the river. The tool makes use of a proliferation of free national-scale data sets collected by various Governmental organisations.

Dr Kevin Tansey, Reader in Remote Sensing and Principal Investigator at the University of Leicester said: "This tool pulls in collections of almost 30 national scale data sets that are available at no cost. We use Geographical Information Systems (GIS) tools to overlay these different information layers, including a high resolution digital elevation model from the Environment Agency to estimate slope downstream.

"We are delighted with the results. We carried out field tests on the River Tame to the east of Manchester in October 2014 and can honestly say that this tool does exactly what it says on the tin. We have built a very visual and interactive user interface in Google Earth to show the multiple solutions on offer at various locations and their cost. We can process the data in the office, or standing on the doorstep of a land owner or turbine manufacturer. We can run the tool to show potential locations nationally on any stretch of river.

"This kind of collaborative research, combining academic skills with ideas from industry and innovation funding from government is a clear winning formula for UK plc. We are already talking to organisations overseas to see how we can develop the tool for international markets, especially in developing countries."

Mr Martyn Cowsill, project consultant at Fluvial Bounty CIC, said, "During our work, we uncovered several significant market opportunities

and, more to our surprise, some innovative ways of exploiting the energy potential even in small rivers, especially those which run through urban areas.

"Hydropower is a cut-above solar and wind, in that the river runs 24/7, 365 days a year, and is a proven way of generating energy from rivers. The National Grid and Distribution Network Operators like Western Power Distribution, are very interested in hydropower's ability to help balance the grid. We could be talking about thousands of inexpensive 10kW - 20kW turbines, installed on urban rivers, close to the point of use, close to points of trouble-free connectivity to the grid, producing electricity during times of peak demand, and possibly also hydrogen for hydrogen vehicles at times of low demand."

The ISMORTASED team point to the many long-term benefits of their work. Andy Baxter said: "We hope that the widespread proliferation of "run-of-river" micro hydropower will help provide a solution to issues of grid balancing by combining electricity storage with a reliable and constant energy source. Hydropower through ISMORTASED provides half of the solution as it will provide a stable, green, constant and predictable supply of power in the next few years, unlike energy from wind and solar which are too erratic. ISMORTASED offers a good and efficient route offering both upstream and downstream commercial opportunities."

Mr Cowsill added: "ISMORTASED will enable manufacturers to mass produce hydro equipment, rather than manufacturing individual bespoke hydro turbines."

The team are currently seeking further funding from a range of potential investors to undertake a more robust national-scale validation campaign and develop a number of case studies.

Dr Kevin Tansey sees the completion of this stage of ISMORTASED as an excellent example of the application of University of Leicester's expertise to deliver novel commercial ideas, through a successful collaboration. He added:

"This was an exciting project to be working in to address the current and growing concerns around climate and energy.

"ISMORTASED offers an excellent example of University of Leicester's involvement with commercial and public sector organisations to develop tools that are applicable at the local scale globally."

Provided by University of Leicester

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