Dŵr Uisce

Energy Recovery in Water Services
Adennill Ynni yn y Diwydiant Dŵr

NEWSLETTER SPRING 2018

Welcome/Croeso

Welcome to our Spring 2018 newsletter bringing you up to date on the Dŵr Uisce project. It has been a busy winter and and will be an even busier Spring. In this edition, we are highlighting the environmental science dimension of the project. So, take a look to learn about this aspect of the project.

Croeso i'n cylchlythyr Gwanwyn 2018 i'ch diweddaru ar brosiect Dŵr Uisce. Bu'n aeaf prysur ac fe fydd yn wanwyn mwy prysur fyth. Yn y rhifyn hwn, rydym yn rhoi sylw i ochr amgylcheddol y prosiect. Felly, darllenwch i gael gwybod mwy am yr agwedd hon o'r prosiect.

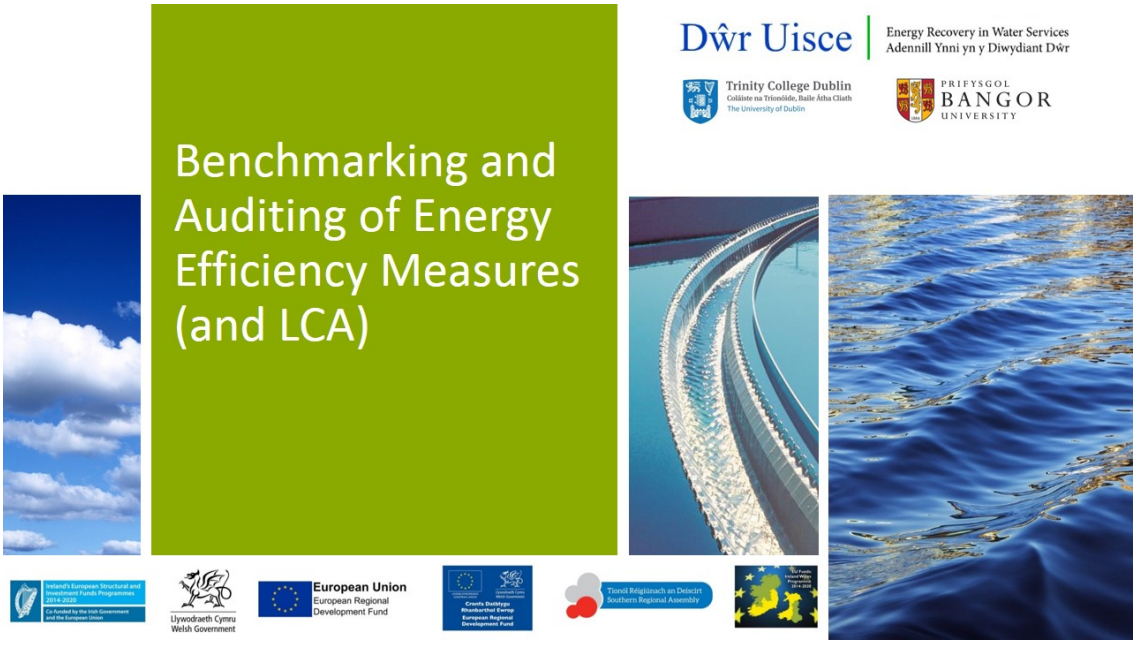
Prysor Williams

IN FOCUS - ENVIRONMENTAL SCIENCE

Here at Bangor University, our focus is on the environmental costs and benefits of implementing measures to reduce energy usage or recover generated energy. We know that the supply and treatment of water is an energy-intensive process, which comes at considerable economic costs, but the associated carbon costs are also significant. Increasing efficiency of production can therefore generate "win–win" economic and environmental benefits.

Staff at Bangor specialise in a number of different relevant areas. For instance, we have in-house expertise in carbon footprinting and Life Cycle Assessments (LCA). Whilst the former approach calculates the carbon costs, and saved, of implementing measures that reduce energy usage or energy generated (therefore carbon offset), previous work we have done found that this approach can often be too narrow in focus to generate a comprehensive assessment of the costs and benefits. An LCA will take into account factors such as eutrophication potential (e.g., where a process is likely to lead to nutrient enrichment of water bodies); resource depletion potential; and acidification potential. Such a comprehensive analysis will reduce the likelihood of 'unintended consequences' (where unforeseen negative impacts arise due to solely focusing on one

systems; building materials is another area. For the water and renewable energy sectors, considerably less work has been completed. Working with project stakeholders such as Dwr Cymru Welsh Water and The National Trust, the project team at Bangor University hope to address some of this shortfall by completing an LCA on real examples through the project demonstration sites. This will be done alongside potentially viable sites identified through our digital mapping and through discussions with other project stakeholder.



Many companies are now benchmarking their performance from an economic perspective, as it has been shown to lead to efficiency gains and the sharing of best practice. As technology develops, there is likely to be considerable scope to reduce the expenditure on energy but also to harvest energy where opportunities exist, from both pre-supply and post-use of water. There may also be good practice that can be applied from other industries (e.g. the food sector) – such opportunities should be exploited, where possible. Two members of the Bangor team are focusing on the role that benchmarking can play to help the industry, going forward.

Lastly, climate change is projected to alter rainfall patterns, with more extreme periods of drought and floods likely to impact the flow of water into catchments and ultimately into water supplies. This can make it difficult to determine the size and system of energy recovery that should be installed into a hydropower scheme. The Bangor team are investigating how modelling of an altered climate could help assess the viability of potential schemes by altering the supply of water. In addition, population growth and increased (or decreased) industrial activity could have implications for demand patterns. Much work is needed to ensure the long-term viability of hydropower schemes in order to instill confidence in the sector to invest.

Over the coming years of the project, work by colleagues at Bangor University, in collaboration with Trinity College Dublin and input from key external stakeholders will help inform where investments to reduce the environmental impact of water distribution and use should be prioritised.

NEWS AND PROJECT UPDATE

A recap of what we do for new subscribers, DŴR UISCE stands for *Distributing our Water Resources: Utilising Integrated, Smart and Low-Carbon Energy.*

Our work will contribute to improving the long-term sustainability of water supply, treatment and end-use in

maximise efficiency; and understanding the future impact of climate change on our water resources. However, the success of our project depends on the development of our Ireland-Wales water-energy network, which will help share our project outputs and strengthen the region as a leader for promoting efficiency in the water-energy nexus.

Combining these findings will help develop policy and best practice guidelines to facilitate the transition to a more energy efficient water sector. You can visit our specific work themes on our website via these links below.

Technological Solutions

Measuring Efficiency

WATER & ENERGY SAVINGS WORKSHOP IN WALES

Friday 26th January 2018, Newtown, Powys

The NRN-LCEE (National Research Network for Low Carbon, Energy and Environment) funded workshop '*Enhancing the Resilience of Businesses in Wales: Achieving Water and Energy Savings*' took place in Newtown on Friday 26th of January 2018. It was organised by Bangor University, in collaboration with Aberystwyth University and Cardiff University. Our team delivered the workshop and represented the Dwr-Uisce project. Invited speakers also represented Center of Alternative Technology, Waterwise, Adnams Southwold, Dulas, Bangor Sustainability Lab and Trinity College Dublin. The event aimed to discuss energy and water, it's value to Wales, what the future holds for these resources, and consider what direction the region is taking to ensure their continued availability. The detailed programme is available here. The workshop and exhibition provided a unique platform for cross-sectoral sharing of ideas and expertise, and to learn about technologies and services that will help you achieve water and energy savings.

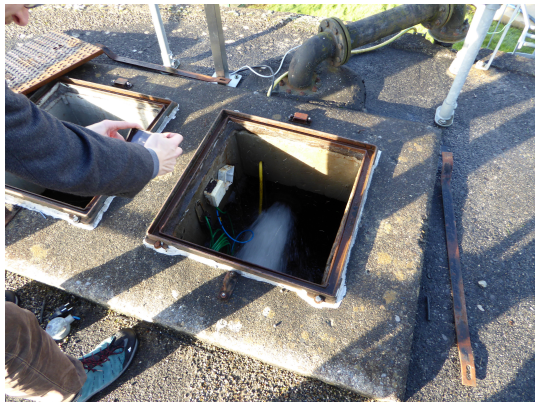
Other participants from across Wales who attended were representing businesses who primarily deliver energy solutions, and several organisations who work with businesses to enhance their market growth, with less representation evident for expertise and prioritization of water efficiency. This was possibly the message reflected in the day, that energy is being discussed and is actively addressed, and perhaps water needs just as much focus. Another important point outlined by several speakers was the **behavioural change aspect** is so important to future sustainability of energy and water resources, and **technological solutions will only take us so far**.

and it is hoped that these connections and support will be made in the coming months. This can develop useful case studies for enhancing the resilience of the businesses, through measures to achieve these energy and water savings.

All presentations from the conference can be found at our Cluster area. To join the Dŵr Uisce cluster, please contact us.

DEMONSTRATION SITES ARE GOING LIVE

We will soon have something to "show and tell" our partners about how to deploy our technology platforms in real-world scenarios. A number of field trials of our hydropower PAT (pump-as-Turbine) and heat recovery technology platforms are currently being tested and installed at our demonstration sites in Wales and Ireland. Those include the following sites: **Blackstairs Group Water Scheme** (PAT) in county Wexford, Ireland; **Penrhyn Castle** (heat recovery) and the **Ty Mawr Wybrnant** (PAT) both at the National Trust in Wales. Check out our news and twitter to learn more about them.



Visiting our demonstration sites in Wales (left) and Ireland (right). More news coming soon.

RECENT PUBLICATIONS

Fernández García, I., Ferras, D. & Mc Nabola, A. Potential micro-hydropower generation in community-owned rural water supply networks in Ireland. *3rd EWaS International Conference on "Insights on the Water-Energy-Food Nexus"*, Lefkada Island, Greece, June 23rd - 30th 2018.

Novara, D. & Mc Nabola, A. The development of a decision support software for the design of Micro-Hydropower schemes utilizing a Pump as Turbine. *3rd EWaS International Conference on "Insights on the Water-Energy-Food Nexus"*,Lefkada Island, Greece, June June 23rd - 30th 2018.

Spriet, J. & Mc Nabola, A. Decentralized drain water heat recovery: interaction between wastewater and heating flows on a single residence scale. *3rd EWaS International Conference on "Insights on the Water-Energy-Food Nexus"*, Lefkada Island, Greece, June June 23rd - 30th 2018.

Dallison, R., Patil, S. & Williams, P. Analysing the historic supply-demand dynamics of public water supply across catchments in Wales, UK. *European Geosciences Union General Assembly 2018*, Vienna, Austria, April 8th - 13th 2018.

10th April 2018, Trinity Week "Energy from Water" Dublin, Ireland

The Trinity team and the extended researcher group will be presenting for local citizen scientists in Dublin an event featuring the story of how the Dŵr Uisce project was born. During Trinity Week academic and scholarly achievements of Trinity staff and students are celebrated and shared.

The Dŵr Uisce project will be sharing news about this event through media channels and you are invited to attend. Read more...

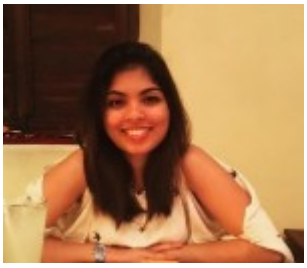
26th April, "Water from Energy in Rural Communities" Workshop, Kilkenny, Ireland

The Dŵr Uisce team in Ireland is collaborating with the National Federation of Group Water Schemes in organising the workshop "Water and Energy in rural communities" in Kilkenny (Hotel Kilkenny) on April 26 next.

The objective of the workshop is to enhance the connection between members of the GWS, researchers of the Dŵr Uisce and local legislators and practitioners. The workshop will present case-studies in the area of energy recovery from water distribution systems and wastewater systems, and create learning and sharing opportunities to member of our Smart Specialisation Cluster. For further information read more here.

Register

More news for you in May 2018. Watch this space!



Nilki Weerawardana

Nilki joined the project Dŵr Uisce as a PhD student working for Smart Water Networks Control with Prof Biswajit Basu and Prof Aonghus Mc Nabola.She graduated from Queens University of Belfast (first class) in Electrical and Electronic Engineering.

For the past year she has worked for the software industry and brings in programming experience. Nilki's work will contribute to optimally design and control of Water Distribution Networks in Ireland and Wales.

Dr. Ana de Almeida Kumlien

Ana joined the team as a Postdoctoral Research Fellow in Innovation, Networking and Learning in the Water Industry. She brings 12 year's of experience as an inter-sectorial water scientist acquired from both industry and research institutions internationally.

She will be working with Prof. Paul Coughlan using "Action Learning" and "Lean Thinking" to build and expand the Dwr Uisce network and impact through the Smart Specialisation Cluster. Her focus will include stakeholders relations, commercialization, dissemination and communication activities.

UPCOMING WATER AND ENEGY EVENTS

Welsh Water's Annual Innovation - 19 April, 2018 Cardiff Wales

Ireland Power - 24 April 2018, Dublin Ireland

Water Ireland - 25 April 2018, Dublin Ireland

WWT Water Industry Energy Conference - 12 June 2018, Birmingham UK

WWT National Sustainability Expo - 26 June 2018, Coventry UK

THANK YOU IVY VOLUNTEERS!

Michele worked with us for a period of four months and has now returned to Italy. We wish him very best luck and success!

Aida was also volunteer with us and has now returned to Spain to complete here PhD in Cordoba University.

Do you want to know what is like to work with us? This video tells the experience of our INTERREG Volunteer Youth (IVY) volunteers, Michele Tapparello and Aida Merida, who worked with Dwr Uisce team between 2017 and 2018. Their host, Dr. John Gallagher from Trinity College Dublin, is also featuring in the video. You can read more about them here and contact us for more information.

JOIN THE DŴR UISCE SPECIALISATION CLUSTER

Are you a company, a consultant, a university, a scientist interested in saving water and energy? Are you in one of the regions in Ireland or Wales covered by the INTERREG funding initiative:

- Ireland - Carlow / Cork / Dublin / Kerry / Kildare / Kilkenny / Meath / Tipperary / Waterford / Wexford / Wicklow
- Wales - Carmarthenshire / Ceredigion / Conwy / Denbighshire/ Flintshire / Gwynedd / Isle of Anglesey / Pembrokeshire / Swansea / Wrexham

You may eligible to join our SMART SPECIALISATION CLUSTER and benefit from a range of services we offer. Click here for more information.

CONNECT US

All project updates, progress, activities and events are posted regularly and shared widely on our @Dwr_Uisce Twitter account. You can read more on our latest news in the News section of our website or sign up for our newsletters here.