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Yesterday, 15:10

Ana De Almeida Kumlien ▾

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NEWSLETTER

16th January 2019



Welcome/Croeso/Fáilte

Welcome to our Winter 2019 newsletter bringing you up to date on the Dwr Uisce project. It has been a busy Autumn and will be an even busier Winter. In this edition, we are highlighting our Annual Conference news and the start of our demonstration sites construction and visits in Ireland and Wales. So, take a look to learn about this aspect of the project. We will also share updates about events, conferences, publications, business relations and support and much more. Enjoy!

Ana de Almeida Kumlien


Croeso i'n cylchlythyr Gaeaf 2019, sy'n rhoi diweddariad i chi ar brosiect Dwr Uisce. Bu'n Hydref prysur a bydd yn Aeaf prysurach fyth. Yn y rhifyn hwn, yr ydym yn tynnu sylw at ein Cynhadledd Flynyddol a'n safleoedd arddangos, ac ymweliadau i Iwerddon a Chymru. Byddwn hefyd yn rhannu newyddion am ddigwyddiadau, cynadleddau, cyhoeddiadau, cysylltiadau a chymorth busnes, a llawer mwy. Mwynhewch!

IN FOCUS - DEMONSTRATION SITES


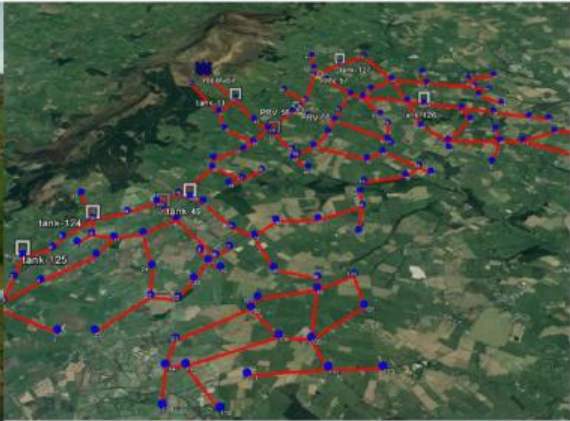
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A fundamental deliverable of our project is to plan, design, install and open for visits [four demonstration sites](#) in Ireland and Wales. Two will showcase micro-hydropower installations and two drain water heat recovery systems, one of each, are being installed in Ireland and Wales. Below we bring an update on their stage of construction and expected dates for the first visit, which is planned for April 2019. You can read more about how such [technologies operate at our website](#).




The Blackstairs GWS Ireland: up to 25% of energy used by their WTP



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



PRIFYSGOL
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Blackstairs Group Water Scheme ([micro-hydropower](#) installation) opening Spring 2019.

Do you want to visit the Blackstairs demo site? [Click here!](#)

The Blackstairs Group Water Scheme is a gravity-fed system supplied by a main reservoir located on the east face of Blackstairs Mountain, Co Wexford. It provides drinking water to 1037 households with a global average demand of 1500 m³/day. The piping system has an approximate total length of 117 km with diameters ranging from 50 to 150 mm. A previous investigation ([feasibility study](#)) from the Dwr Uisce project identified a significant potential for energy recovery on that water supply line leading into the raw water storage tank within the premises of the treatment works operated by [EPS Group](#) (see pics below: left-potential for energy recovery and right-storage tank).

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Such potential could most conveniently be exploited by installing a centrifugal [Pump As Turbine \(PAT\)](#) in the terminal section of the pipeline. A design flow rate and head of 18 l/s and 40 m respectively were selected, leading to an expected power output of around 4.3 kW. The PAT design algorithm being developed at Trinity College Dublin as part of Dwr Uisce research project has been applied on the selected site, and helped identifying the ideal characteristics of the main PAT and generator set to be chosen. If operated 24-h all year round such device would produce about 37,000 kWh of clean renewable electricity worth over 6,000€ and **reduce the energy consumption of the treatment works by 20-25%**.

Do you want to visit the Blackstairs demo site? [Click here!](#)

A collaboration between the Dwr Uisce project, the Blackstairs GWS and EPS Group has been established with the aim of building the energy recovery installation which has started in the end of 2018. Below you may see the exact location of where the pump-house is being installed and will be displayed for visitors. A camera has been installed there and provides live images which are monitored daily by our researcher (above). **Timeline:** visits are expected to start in April 2019.



Tŷ Mawr Wybmannt ([micro hydropower](#) installation) opening Autumn 2019.

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powerhouse the right one shows the historical farmhouse where the powerhouse of the micro hydropower installation will be located.

Ty Mawr Wybrnant Wales saving up to 19,000 kWh and 8 tons CO₂



The 16th century historical farmhouse of [Ty Mawr Wybrnant](#) is a renowned touristic site in Northern Wales managed by National Trust. It was the birthplace of Bishop William Morgan, first translator of the Holy Bible into Welsh. In an effort to reduce the energy consumption related to lighting and heating of the building a small hydropower installation has been proposed to generate about 4 kW from the water of the nearby Afon Wybrnant stream. The measured net hydraulic head corresponds to 35 m, and the design flow rate is 25 l/s. Despite the potential for small-scale hydropower development in Wales being significant, the [high upfront investment needed together with the decline in subsidies](#) contribute to making most of it economically nonviable. The novelty of the present approach is to reduce the complexity and cost of the scheme in order to demonstrate its feasibility even down to the "pico" scale (e.g. less than 5 kW of installed power). In order to do so it was decided to install instead of a "conventional" hydro turbine a Pump As Turbine (PAT) consisting of a regular centrifugal water pump with reversed flow direction as investigated under the Dŵr Uisce project. Being a standard and off-the-shelf available machine, such turbine is 4 to 10 times less expensive than traditional turbines of similar power output besides being easy to install and maintain. The system is expected to generate about 19,000 kWh of clean renewable electricity per year, equivalent to over 8 tons of CO₂ avoided per year. The main purpose of the installation is to demonstrate not only the environmental benefits of the scheme (low/null impact on the ecosystem and CO₂ savings) but also to prove the economic attractiveness of such small-scale distributed hydro generation. **Timeline:** the construction of the 4 kW generation scheme has started in late 2018. Visits to the demo site are expected to be schedule for Autumn 2019.

Kitchen drain in Penrhyn castle, Wales (drain wastewater heat recovery installation) (Autumn 2019)

[Read more about our demo site in Penrhyn Castle here](#)

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 BANGOR UNIVERSITY

saving up to 40% heating at Castle's kitchen



This National Trust demonstration site at [Penrhyn Castle in Wales](#) will be active in Autumn 2019. The site is on the contractual phase now, and construction is planned to start on the 25th January 2019.

Temperature monitoring of the drain water from the kitchen at Penrhyn castle has shown temperatures of up to 50°C, showing a clear waste of heat through the drain. Using 2 heat exchangers this demonstration site aims at showing direct heat recovery methods from kitchen drain water, and is testing different configurations of the [drain water heat recovery \(DWHR\) system](#).

The first configuration is the simplest one, directly preheating the incoming water. This low-cost and uncomplicated solution has the disadvantage of being vulnerable to mismatches in time between drain water heat availability and kitchen hot water demand (flow variations).

The second configuration attempts to counteract those mismatches by recirculating the preheated water, from a holding tank, through the heat exchanger in the drain. This has the advantage of ensuring that at every moment water flows through the drain part of the heat will be recovered. The disadvantage is the increased complexity of the system, and additional consumption in the circulation pumps.



First configuration of the DWHR system which preheats the mains water. You can visit more details about this [here](#).

The third configuration, combining both systems, is expected to recover the largest amount of heat. However, it's the most complex solution. The demonstrator will be used to make a trade-off between this increased complexity and the benefit of increased heat recovery, and observe the operation of such systems in real-world applications.

The system, regardless of its configuration is expected to provide about 40% of the heat consumption of the kitchen. This heat is currently provided by a main heating loop, where the heat is generated in a biomass boiler house, and then pumped to the rooms in the castle. The savings are thus expected to be twofold, not only will the pellet consumption of the boiler be reduced, but, more importantly, the electricity consumption, used for driving the pumps, will decrease as well. Expected greenhouse gas emission savings are in the range of technical savings 780 kilos, annually. **Timeline:** visits to this site will start in Autumn 2019.

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[Castle Pioneers waste-water heat capture technology](#)
[Wales-Ireland joint project explores energy efficient water solutions](#)
[Engineers trial new tech to stop energy going down the drain](#)

Wastewater heat recovery installation in the food industry in Ireland (Autumn 2019)



This demonstration site has passed the feasibility studies phase, and is on the contractual phase now. Site construction will start in Summer 2019.

INSIGHTS FROM THE 2nd WATER- ENERGY AND INNOVATION ANNUAL CONFERENCE



On the 23rd October, we held our second annual conference in Dublin, attracting over 75 attendees from a wide range of industries; water service providers, local authorities, academia, food and hospitality sectors and many more. This year's conference theme, *Water-Energy Innovation*, helped to address the challenges that our region faces in relation to water and energy demands. The conference was divided in [10 industry-academic pitches and 3 sessions](#) related to Dwr Uisce milestones which connect with challenges faced by stakeholders. Across the sessions our speakers looked at identifying opportunities for innovation in the sector, as well as the challenges such innovation faces; how to put innovative ideas into practice in different water intensive industries; and finally how the knowledge gained from such ventures can be shared with others through demonstration.

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University), project leader of Dŵr Uisce in Wales. The second section Innovation in Practice was chaired by Aonghus, and the last section Demonstrating Learning was chaired by Paul Coughlan (Trinity College Dublin).



Aonghus McNabola (Trinity College Dublin) opened the Water-Energy Innovation Dŵr Uisce conference in October 2018.



Prysor Williams (Bangor University) chaired the section Innovation Opportunities (Dŵr Uisce).



Paul Coughlan (Trinity College Dublin) chaired the section Demonstrating Learning (Dŵr Uisce).

The *Innovation Opportunities* section included speakers Paul O'Callaghan ([BlueTech Research](#)) and Mike Pedley ([Dŵr Cymru Welsh Water](#)) who looked at the success, failures and innovation opportunities globally in the water industry, and progress and challenges for energy in the UK water industry respectively. Both of these speakers highlighted not only the need for pioneering thinking when looking for innovation in the sectors, but also how some of the most simple innovations can be highly effective in reducing water use or the energy use associated with this water. This session ended with a selection of two minute presentations from different speakers mainly in industry and higher education on the theme of *Water, Energy and Innovation*; from the need to innovate due to climate change, to domestic water saving products, to chemical free water purification; this was a fast paced, varied and informative section of the day for all.

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Paul O'Callaghan, "Analysing successes, failures and opportunities in the water and energy nexus". BlueTech Research (Private Sector).



Mike Pedley. "Back to the future - via the present: progress and challenges for energy in the UK Water Industry". Welsh Water. (Private Sector).

Access conference presentations here

In our second section, Triona Collins ([Tipperary County Council](#)), John Durkan ([ABP Food Group](#)), Benny McDonagh ([EPS Group](#)) and John Gallagher ([Trinity College Dublin](#)) all spoke about putting innovation in to practice in a variety of sectors and ways. From innovative community engagement for water use awareness to extensive water reduction in water intensive beef production to innovation scorecards at the [National Trust](#) to ensure responsible future spending. This session highlighted the many methods already being used in an array of sectors to reduce the amount of water used, or the amount of energy associated with that water use.



Triona Collins, "Engaging with the rural water community: I must do Something". Water Services, Tipperary County Council. (Communities Sector).



Barry O'Donovan, "Doing more with less". ABP Food Group. (Food Sector). ABP is our fourth demo site and will feature a heat recovery technology.



Benny McDonagh, "Rethinking Energy". EPS Group. (Energy and Water Treatment Supply Sectors).



John Gallagher, "Innovating for low-carbon energy through hydropower". Trinity College Dublin. (Conservation Charity Sector).

The Demonstrating Learning section of the conference showcased our Dŵr Uisce Hydropower and Heat Recovery Demonstration sites, as well as how we are growing, interacting and bringing benefit to our wider Dŵr Uisce cluster. Irene Fernandez and Daniele Novara, researchers in our Trinity Team, spoke about the progress and details of our interesting hydropower developments at Blackstairs Groups Water

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they have been doing at Penrhyn Castle, Wales in relation to implementing a new drain water heat recovery system in the castle's café kitchen.



Dwr Uisce researchers at the discussion panel during the "Innovation in practice" section. From left to right: Daniele Novara, Isabel Schestak, Ana de Almeida Kumlien and Jan Spriet. Topics: **Daniele Novara** - "Dwr Uisce Hydropower demonstration sites in Blackstairs Group Water Scheme", Ireland and Tŷ Mawr Wybrnant, National Trust, Wales". **Isabel Schestak & Jan Spriet** - "Dwr Uisce heat recovery demonstration site in Penrhyn Castle, National Trust, Wales". **Ana de Almeida Kumlien** - "Demonstrating Cluster Growth: demonstrating learning in action in a water and energy smart specialisation cluster".



Nathan Walker presented about his work with water industry benchmarking, Bangor University (Dwr Uisce).



Richard Dallison presented about his work with climate change and hydrogeology, Bangor University (Dwr Uisce).



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Pictures of the #dwruiisce2018 Water-Energy and Innovation Conference. From the top to bottom clockwise: **Nilki Weerawardana**, **Richard Dallison** and **Nathan Walker**, PhD researches of Dwr Uisce (left top); **Tom Baur**, Blue BreadBoard (top right), **Djordje Mitrovic** PhD researcher REDAWN (bottom right), **Triona Collins**, Tipperary Water Services.

All of our demonstration sites will allow us in the future to share first-hand our learnings and knowledge on the implementation, practicalities and running of these types of installations with our cluster group through site visits. This just part of the aims for our cluster, which Ana Kumlien, a post-doctoral researcher in our Trinity team spoke about; and how we can collaboratively demonstrate learning in action through this. The Dwr Uisce team would like to thank all who attended the event, as well as all of our speakers for all of their informative and interesting talks.

VISIT TO ADNAMS BREWERY AND DISTILLERY



On November 23, four members of our Dwr Uisce team from Bangor and Dublin visited Adnams Brewery and Distillery in Southwold, East Anglia, UK. Isabel Schestak, Paul Coughlan, Daniele Novara, Jan Spriet were welcomed by Richard Carter, head of Finance and Sustainability, and Ben Orchard, Environmental Manager (figure above: from left to right Daniele and Jan speaking to Ben by the distillers).

Why Adnams? Adnams, a family business, is a leader and has made remarkable improvements in their sustainability profile in recent years. Their achievements have been acknowledged by many awards. Thinking strategically and operationally, they have tackled the various initiatives in a creative and systematic way right across the whole enterprise.

Richard Carter has been a wonderful supporter of the Dwr Uisce project since he spoke at our first Dwr Uisce conference three years ago. He and Ben introduced our team to their brewing and distilling facility in the historic heart of the seaside town of Southwold. The Dwr Uisce team learned how Adnams managed to halve the carbon footprint of their beer in the last years while doubling their market share. They were

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... as well as a closed water loop for the water from the recycling column in the distillery reduced water consumption and saved energy.

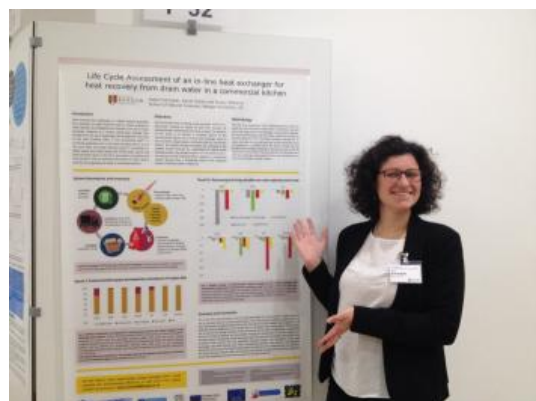
Everyone returned with a new store of knowledge for further research. The insights will be of great value for the Dwr Uisce project and feed directly into recommendations for cluster members and businesses in the Wales-Ireland convergence area. Also the learnings from this visit and the relationship between Dwr Uisce and Adnams can be shared during our future demonstration events as a case of success. Thanks again to Adnams, Richard and Ben.



From left to right: **Paul, Richard, Ben and Jan.**

MORE NEWS ON OUR WEBSITE

We update our website on a regular basis always to share the latest updates about what the Dwr Uisce team has been doing! Read our latest stories below...



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- [NOVEMBER 2018](#) (top figure)
- [Daniele Novara shares news about the 4kW turbine assembling for the first Dwr Uisce micro-hydropower installation in Blackstairs Group Water Scheme](#) (lower left figure)
 - [Isabel Schestak joins and presents at the Industrial Water Frankfurt 2018](#) (lower right figure)

WHAT DO WE DO?

A recap of what we do for new subscribers, Dwr 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 Ireland and Wales through: developing new [innovative, low-carbon technology platforms](#); undertaking [regional economic and environmental impact assessments](#); applying [eco-design and addressing the circular economy](#); identifying [auditing and benchmarking best practice](#) to identify opportunities to 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.

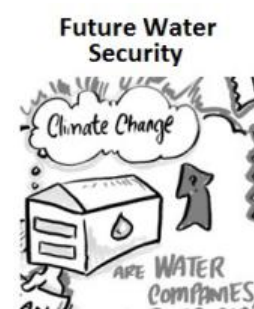
Combining these findings will help develop policy and best practice guidelines to facilitate the transition to a more energy efficient water sector. You can visit our specific work themes on our website via these links below.



Technological Solutions



Measuring Efficiency



RECENT PUBLICATIONS

de Almeida Kumlien & Coughlan, P. 2018. [Wicked problems and how to solve them-Energy-efficient water supply is a wicked problem – and we might have found a way to solve it](#). The Conversation UK

Novara, D. & McNabola, A. 2018. [A model for the extrapolation of the characteristic curves of Pumps as Turbines from a datum Best Efficiency Point](#). Energy Conversion and Management. Energy Conversion and Management, Volume 174, pp. 1–7

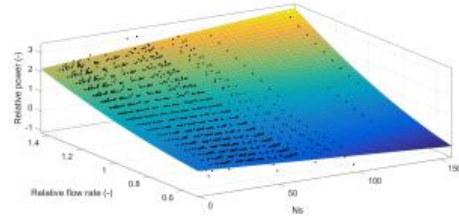
Schestak I, Styles D. Williams, P. 2018. [Life Cycle Assessment of an in-line heat exchanger for heat recovery from drain water in a commercial kitchen](#). Conference Poster, Industrial Water 2018, Frankfurt am Main, Germany.

Fernández García, I., Ferras D., McNabola A. 2019. [Potential of Energy Recovery and Water Saving Using Micro-Hydropower in Rural Water Distribution Networks](#). Journal of Water Resource Planning Management, Volume 145(3): 05019001

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[nyaropower: Enabling a conservation charity's transition to a low-carbon community](#), Creativity & Innovation Management, Volume 27, pp.375–386

Spriet, J. & McNabola, A. 2019. [Decentralized drain water heat recovery: A probabilistic method for prediction of wastewater and heating system interaction](#). Energy and Buildings. Energy & Buildings, Volume 183, pp. 684-696



(Left figure above) [A waste water treatment processing plant in North London](#) featuring in the article by Ana Kumlien and Paul Coughlan published at The Conversation UK. In the article they discuss about collaboration between sectors and the use of demonstration sites to bring innovation to the water industry (left figure). **(Right figure above)** A graph showing the published study by Daniele Novara and Aonghus McNabola. Among the main barriers to PAT technology diffusion is the unavailability of the characteristic curves of most hydraulic pumps on the market when used as turbines. In order to overcome this limitation, the published study offers a method to predict the full characteristic curves of PATs under variable flow rates.

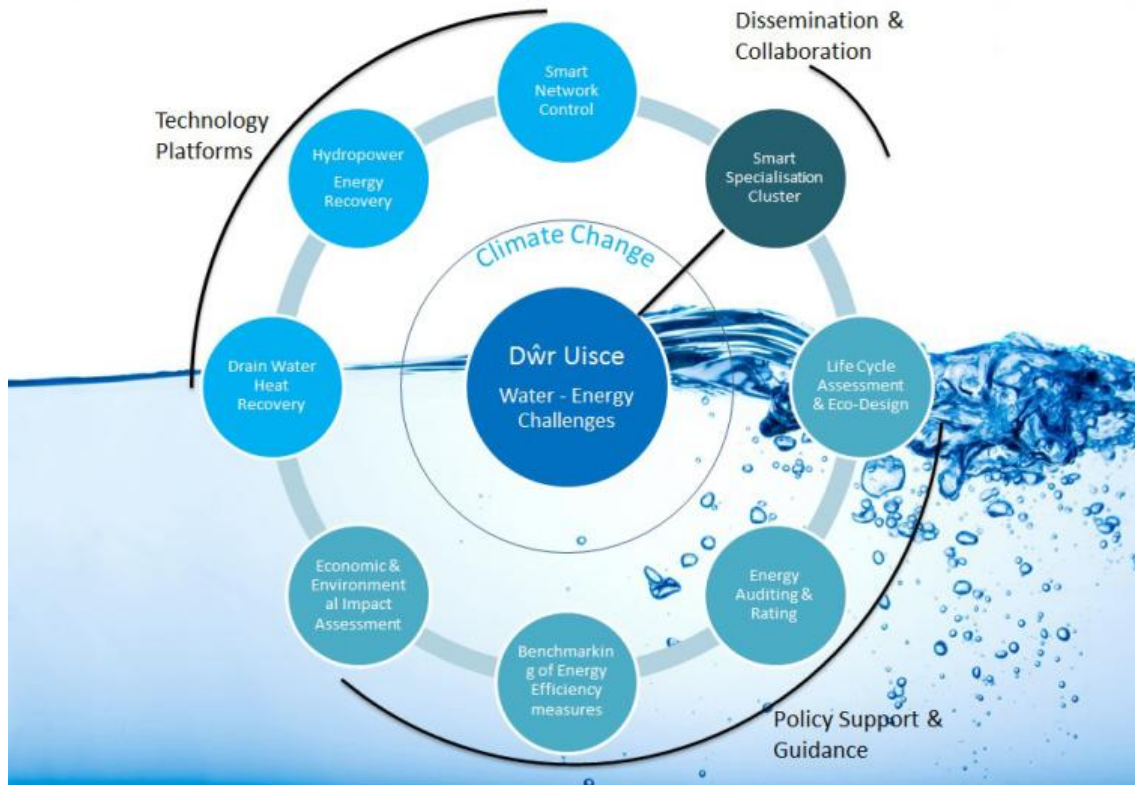
INNOVATION AND COMMERCIALISATION ACTIVITIES

We plan to exploit the opportunities emerging from the Dwr Uisce research through the establishment of a cross-border spin-out venture. This could provide expert training and consultancy services focused on the deployment of the technology platforms. In order to explore that ambition further, during the late 2018, we coordinated a project with students from the [Postgraduate Certificate in Creative Thinking, Innovation and Entrepreneurship with the Tangent Trinity's Ideas Workspace](#). The student team looked at potential avenues towards and characteristics of a future venture. Their thought-provoking presentation and well-written report delivered valuable insights. They gave us a solid steer as we think about a new-venture formation and positioning. Specifically, we now have a good idea of potential collaborators and strategic choices. We thank again both the student team and academic coordinators at Tangent for the opportunity to work together on this critical activity.

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OUR VIDEOS



You can now watch our Dwr Uisce videos at our website. Visit: www.dwr-uisce.eu.

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Let us help you to reduce your water and energy costs. For free!



Our aim is to support your business in saving water, energy, emissions and money, and thus making it more resilient for the future. We are a team from Trinity College Dublin and Bangor University, Wales, experienced in working with industry.

The free consultation we offer only involves a little time from your side - no financial investment is required.

We offer a minimum of six hours free consultation time to:

- Measure your current water and related energy use
- Identify opportunities to reduce your water and energy consumption
- Propose cost-effective solutions
- Advise on how to improve your environmental footprint, both in your business and along your supply and demand chains

Participation qualifies you to become part of the DWR UISCE network with the opportunity to link and learn from similarly-challenged businesses. You will hear about technology choices, cost and carbon savings, avoid the mistakes others have made and connect with trusted suppliers.

Send us an informal request and start benefitting from our expertise, our support and our network.

**Email: admin@dwr-uisce.eu
 Phone: +44 (0) 1248 38 3219 (Bangor)
 +353 (0) 1 896 1311 (Dublin)
 Web: www.dwr-uisce.eu/business-support**



DWR UISCE stands for *Distributing our Water Resources: Utilising Integrated, Smart and Low-Carbon Energy*. The project is contributing to improving the long-term sustainability of water supply, treatment and end-use in Ireland and Wales. DWR UISCE is funded by the European Regional Development Fund through the Ireland-Wales Cooperation programme.

JOIN (OR RECOMMEND) THE DWR UISCE WATER 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 City / Dun Laoghaire / Rathdown / Fingal / Kerry / Kildare / Kilkenny / Meath / South Dublin / 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.

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All project updates, progress, activities and events are posted regularly and shared widely on our [@Dwr_Uisce](#) Twitter account.

Follow also the hashtags: [#Dwruisce](#).

You can read more on our latest news @ our [News](#) section. Sign up for our newsletter [here](#).

WELCOME OUR NEW TEAM MEMBER!



In December 2018, Dr. Himanshu Nagpal has joined us as a postdoctoral research fellow. He has previous experience in environmental consulting acquired through two European Commission under 7th framework programme (EU-FP7) and has completed a PhD with the Civil Engineering Department in Trinity College Dublin and a MSc in Mathematics with the Indian Institute of Science Education & Research. Dr. Nagpal has extensive experience in calibrating building energy models and performing building energy analysis. He is going to work using model predictive controls to help deployment of the Dwr Uisce technology platforms (heat recovery, micro-hydropower and smart network control).

THANK YOU AND GOOD BYE!

In February 2019, we are saying good-bye to our wonderful colleagues Dr. Ana de Almeida Kumlien (left) and in October last we said good-bye to Dr. Irene Fernandez Garcia (right). Huge congratulations on their appointments to new academic positions! We wish Ana and Irene the best of luck and thank them for their commitment to our project!

(This picture was taken in September 2018 when Ana and Irene presented their work [at the National Conference of the National Federation of Group Water Schemes in Ireland](#)).



WE ARE HIRING

The Dwr Uisce team invites applicants for the position of [Research Fellow in Innovation, Networking and Learning in the Water Industry](#).

For further information please contact **Prof. Paul**

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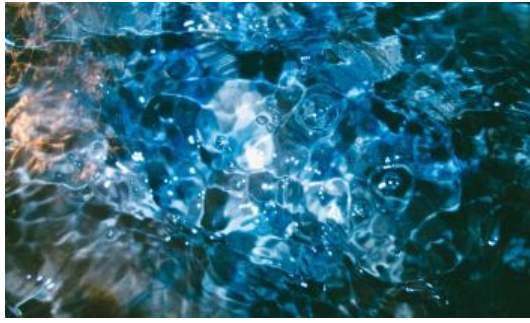


Photo by [Fátima Fuentes](#) on [Unsplash](#)

A FINAL WORD FROM THE EDITORS

We hope you have enjoyed reading our newsletter as much as we did putting it together for you!

Ana de Almeida Kumlien & Paul Coughlan



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Dŵr Uisce

Energy Recovery in Water Services
Adennill Ynni yn y Diwydiant Dŵr



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