



An Coimisiún  
um Rialáil Fónais  
Commission for  
Regulation of Utilities



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# Water Services Innovation Fund

## Annual Report 2019

### Information Paper

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## Summary

Irish Water provides public water and wastewater services in Ireland. As part of its role as economic regulator, the CRU sets the revenue Irish Water can recover to deliver water and wastewater services over a period of time known as a ‘revenue control period’. This includes the money that Irish Water requires to efficiently abstract, treat and distribute water and to collect and treat wastewater and return it safely to the environment.

The Water Services Innovation Fund (the Fund) was established by the CRU in 2015<sup>1</sup> to encourage Irish Water investment in research projects – outside of ‘business as usual’ activities – that have the potential to improve how water services are delivered. These projects may be undertaken in collaboration with research partners such as universities or consultancy firms. As these innovative projects are riskier by nature and may not deliver defined outcomes, a separate fund is provided outside of normal operating costs and Investment Plans.

The proposed projects under the Fund must further at least one of the following objectives:



The CRU allowed Irish Water access to €4 million under the Fund over 2015-2019. As at end 2019, Irish Water spent just over €600,000 and accessed a further budget of €2.4 million. For the period 2020-2024, the CRU has allowed €4 million under the Fund.

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<sup>1</sup> [CER/15/076](#) Water Services Innovation Fund Information Paper

This report provides an update on the projects undertaken in 2019 that are supported by the Fund. To date, three projects have been completed. *Meter Data Collection Pilots – Multi-Unit Developments (MUDs)* and *Research on promoting sustainable household water consumption* were completed in 2017 and 2018 respectively. Both were completed on time and in budget. Further information on these projects is available in previous Water Services Innovation Fund Annual Reports<sup>2</sup> and on Irish Water’s website<sup>3</sup>.

The third project completed under the Fund, *Climate Change Adaptation - Identification of Climate Sensitive Catchments*, has been completed in 2019 on time and in budget. A final report has been submitted and is published on Irish Water’s website<sup>3</sup>. The results of this project are being used to inform Irish Water’s National Water Resources Plan<sup>4</sup>. This project will be discussed further in this information paper.

In 2019, the *Investigating Novel Sensing Techniques for Monitoring Trade Effluent* project was still ongoing and the *Enhancing Existing Wastewater Treatment Plants Through Aerobic Granular Sludge Addition* project had been approved. This information paper provides an update on the progress of these projects as at the end of 2019.

Project	Approval Date	Status at End 2019
Climate Change Adaptation – Identification of Climate Sensitive Catchments	December 2016	Complete
Investigating Novel Sensing Techniques for Monitoring Trade Effluent	March 2017	Ongoing
Enhancing Existing Wastewater Treatment Plants Through Aerobic Granular Sludge Addition	July 2019	Approved

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<sup>2</sup> [CRU](#) Water Services Innovation Fund Document Group

<sup>3</sup> [Irish Water](#) Research & Innovation Webpage

<sup>4</sup> [Irish Water](#) National Water Resources Plan Webpage

## **Public/Customer Impact Statement**

By publicly reporting on Irish Water's activities under the Water Services Innovation Fund, the CRU helps to ensure Irish Water operates efficiently and effectively and performs its functions in an open and transparent manner.

This paper provides an update on the projects undertaken under the Fund as at the end of 2019. It provides transparency around the project activities carried out and sets out the benefits Irish Water expects to achieve as a result of undertaking the projects. This paper also supports accountability regarding the use of monies spent under the Fund.

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# 1. Introduction

## 1.1 The CRU's Role

The CRU's role is to provide effective economic regulation of Irish Water to deliver secure, efficient and sustainable outcomes in the public interest. In its position as economic regulator, the CRU sets the revenue Irish Water can recover to deliver water and wastewater services over a period of time known as a 'revenue control period'. This revenue includes the money that Irish Water needs to efficiently abstract, treat and distribute water and to collect and treat wastewater and return it safely to the environment. The CRU established the Water Services Innovation Fund (the Fund) as part of Irish Water's first revenue control (2014-2016)<sup>5</sup>.

## 1.2 The Water Services Innovation Fund

The purpose of the Fund is to encourage Irish Water to implement and invest in research projects that would not otherwise be funded under the allowed operating costs or Investment Plans.

A separate allowance to fund innovation is commonly used by economic regulators to encourage regulated entities - in this case Irish Water - to find new ways to provide and improve the services provided to customers outside of 'business as usual' activities. This is because innovative projects tend to be riskier and may not result in defined outcomes for customers. Successful projects may allow Irish Water to become more efficient and effective in its day-to-day operation. However, research projects that do not achieve their desired outcomes are still of benefit as they allow Irish Water to better understand its assets, activities and customers. This contrasts with activities included in investment plans where a regulated entity is required to deliver defined outputs and outcomes for the money invested. Where the regulated entity does not deliver, the regulator may disallow the expenditure. A separate allowance for innovative projects is therefore appropriate to promote innovation while still managing the risk to customers.

In order to qualify for the Fund, proposed projects must have a reasonable probability of delivering defined, tangible benefits to Irish Water customers in a defined timeframe should the

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<sup>5</sup> [CER/14/746](#) Water Charges Plan Decision Paper

project be successful. The potential benefits must outweigh the costs of the project. Projects must also further at least one of the following objectives:

- Provision of safe, secure, and reliable water services.
- Increased understanding of customer behaviours and their drivers and effective customer engagement.
- Enhanced energy savings in the provision of water services.
- Achievement of relevant environmental standards and the objectives of the Water Framework Directive.
- Mitigation of negative climate change impacts.
- Provision of water services in an economic and efficient manner.
- Improved conservation of water resources.

The CRU allowed €4 million under the Fund as part of Irish Water's first Revenue Control (IRC1 2014-2016) and access to this continued into the second Revenue Control (IRC2 2017-2019). As at end 2019, Irish Water has spent just over €600,000 and has accessed a further budget of €2.4 million. €4 million has been allowed under the Fund as part of Irish Water's third Revenue Control (RC3 2020-2024).

### **1.1.1 Related Documents**

- [CRU15076](#) Water Services Innovation Fund Information Paper
- [CRU17345](#) Water Services Innovation Fund Annual Report 2017
- [CRU19123](#) Water Services Innovation Fund Annual Report 2018
- [CRU19148](#) Irish Water Revenue Control 3 (2020 –2024) Decision Paper

More information on the projects supported by the Fund, including the final reports of completed projects, can be found on Irish Water's dedicated webpage [here](#).

Information on the CRU's role and relevant legislation can be found on the CRU's website at [www.cru.ie](http://www.cru.ie).

## 2. Innovation Fund Projects

### 2.1 Overview

Since the Fund's establishment in 2015, six proposed projects have been approved under the Fund by the CRU. These are as follows:

Project	Approval Date	Status at end 2019
<b>IF-01</b> Pilot Technology Trials of Water Metering Systems for Multi-Unit Developments	September 2015	Complete
<b>IF-02</b> Promoting Sustainable Household Water Consumption	December 2015	Complete
<b>IF-03</b> Universal Water Meter Display Platform	December 2015	Not progressed
<b>IF-04</b> Climate Change Adaptation – Identification of Climate Sensitive Catchments	December 2016	Complete*
<b>IF-05</b> Investigating Novel Sensing Techniques for Monitoring Trade Effluent	March 2017	Ongoing*
<b>IF-06</b> Enhancing Existing Wastewater Treatment Plants Through Aerobic Granular Sludge Addition	July 2019	Approved*

\* Updates on these projects are provided in Section 2.2 below.

Further information on all projects can be found on Irish Water's dedicated Research & Innovation webpage (available [here](#)), and in previous CRU Water Services Innovation Fund Reports (available [here](#)).



## 2.2 Innovation Fund 2019

### 2.2.1 Climate Change Adaptation – Identification of Climate Sensitive Catchments

#### Research partner

- Irish Climate Analysis Research UnitS (ICARUS), Maynooth University

#### Potential Benefits

- Safeguard water resources against negative climate change impacts
- Help provide safe, secure and reliable water services

#### Project Description

This project was approved by the CRU in December 2016 with the aim to identify river catchments sensitive to current and future climate change impacts.

The project assessed the sensitivity of 206 river catchments in Ireland to climate change induced low flows, i.e. the flow of water in a river or stream during prolonged dry weather. It assessed the current and future sustainability of water abstractions from these catchments for public consumption and use. The findings of this research project are being used to inform Irish Water's National Water Resources Plan<sup>6</sup> which will in turn inform decision-making around Irish Water's investment with the intent to provide a safe and reliable service to customers.

Traditional methods used to conduct research in catchment sensitivity take a 'top down' approach. This is where global climate models project future climate and then estimate a catchment's response to these projections. However, these 'top down' approaches are linked to many uncertainties. In order to reduce these uncertainties, this research project applied a 'bottom up' or scenario-neutral approach. This meant that the research began with a detailed look at the characteristics of each catchment examined in order to identify what is currently impacting on catchment vulnerability. Then, future climate projections were applied to identify catchment responses to potential climate change scenarios.

The project identified five catchment types into which the 206 catchments could be classified. Of these, catchments generally located in the midlands and east are characterised as drier, low

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<sup>6</sup> [Irish Water](#) National Water Resources Plan Webpage

lying and have a greater natural storage to withstand reduced summer rainfall. The remaining catchments, typically located along the western seaboard and uplands, have poor natural storage capacity and are the most sensitive to changes in the seasonality of rainfall due to climate change.

The above results provide the foundation for developing more strategic adaptation plans. It is recommended in the findings of the report that these adaptation plans should be designed to address local vulnerabilities on a catchment by catchment basis to minimise unnecessary and costly low-flow mitigation measures in areas of low sensitivity.

Limitations recognised by this project have highlighted the potential for further research in this area. For example, the catchment sample does not include heavily modified catchments, such as the River Liffey and the River Shannon, due to a lack of good quality information at the time of project scoping in 2015. The research also notes that the catchment sample used under-represented smaller, more responsive systems that are typically located in upland areas and along coastal margins. Thus, the report notes it may be worth identifying these catchments' sensitivities to climate change induced low flows to further inform planning and decision-making.

This project was completed on time and in budget. The final report is available on Irish Water's website [here](#).

## **2.2.2 Investigating Novel Sensing Techniques for Monitoring Trade Effluent**

### **Research Partner**

- Dublin City University

### **Potential Benefits**

- Better management of the wastewater network
- Real-time monitoring for improved environmental protection

### **Project Description**

This project was approved by the CRU in March 2017. The aim of this project is to characterise high-risk trade effluent from three sectors: food and drink, waste, and pharma-chemical.

The project will attempt to characterise the trade effluent (wastewater that requires a licence to allow it to be sent to the public sewer) from five companies in each of the above sectors. The

project will then attempt to associate the levels of the constituents with markers that are more easily measured by the sensors (such as turbidity/cloudiness, conductivity, etc.).

This research will be used to better inform Irish Water's monitoring of trade effluent that enters its wastewater network. It aims to characterise the trade effluent quicker and without requiring site visits, sampling and lengthy lab-based analysis of the effluent.

This project also has the potential benefit of assisting Irish Water in its management of the wastewater treatment process. It could provide real-time monitoring data and allow Irish Water to take preventative measures to help protect its wastewater treatment processes and, ultimately, the environment.

Analysis of trade effluent for the food and drink, waste, and pharma-chemical sectors has been completed. The project is currently carrying out tests with commercially available off-the-shelf sensors. This will determine the sensors' ability to monitor and characterise the trade effluent.

The project remains on track to be completed on time and in budget in 2020.

### **2.2.3 Enhancing Existing Wastewater Treatment Plants Through Aerobic Granular Sludge Addition**

#### **Research Partner**

- Royal HaskoningDHV

#### **Potential Benefits**

- More efficient and effective wastewater treatment at appropriate sites
- Reduce future investment needs in wastewater treatment plants at appropriate sites
- Contribute to achievement of relevant environmental standards and the objectives of the Water Framework Directive

#### **Project Description**

This project was approved by the CRU in July 2019. The aim of this project is to identify if and how the addition of aerobic granular sludge from dedicated wastewater treatment plants could improve conventional wastewater treatment plant capacity and/or performance.

The majority of wastewater treatment plants operated by Irish Water use conventional wastewater treatment methods. Some of these plants are approaching or exceeding their capacity to treat the wastewater they receive. A small number (4) of wastewater treatment plants operate with a process using aerobic granular sludge, a comparatively newer treatment process.

Aerobic granular sludge has been proven, in certain circumstances, to provide effective treatment of wastewater in a more cost-efficient and space-effective manner than the conventional treatment methods. During the operation of the plant a surplus of this sludge is produced as a by-product of this wastewater treatment process.

This project will validate whether this surplus aerobic granular sludge can be transferred to and used in plants that treat wastewater using conventional methods. This is to increase their capacity to treat wastewater and/or improve the treatment performance.

The first step in this project is to undertake a preliminary desktop study to identify possible donor and recipient wastewater treatment plants to carry out this research. This project, approved in 2019, will commence in Q1 2020.

### **3. Next Steps**

The CRU has allowed €4 million for the Water Services Innovation Fund over 2020-2024 as part of Irish Water's third Revenue Control (RC3). Irish Water may continue to submit research project applications under the Fund. Potential applications will be reviewed by the CRU and approved where the projects are found to meet the qualifying criteria.

The CRU will provide an update detailing the ongoing research carried out this year in the Water Services Innovation Fund Annual Report 2020. This will be published in 2021.

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