



THE IRISH ACADEMY OF
ENGINEERING

ENGINEERING & TECHNOLOGY

THOUGHT LEADERSHIP IN A TIME OF GREAT CHANGE

UISCE ÉIREANN

Irish Water Services in the 21st Century

A Review of Progress to Date and
a View of the Near Future

THE IRISH ACADEMY OF ENGINEERING

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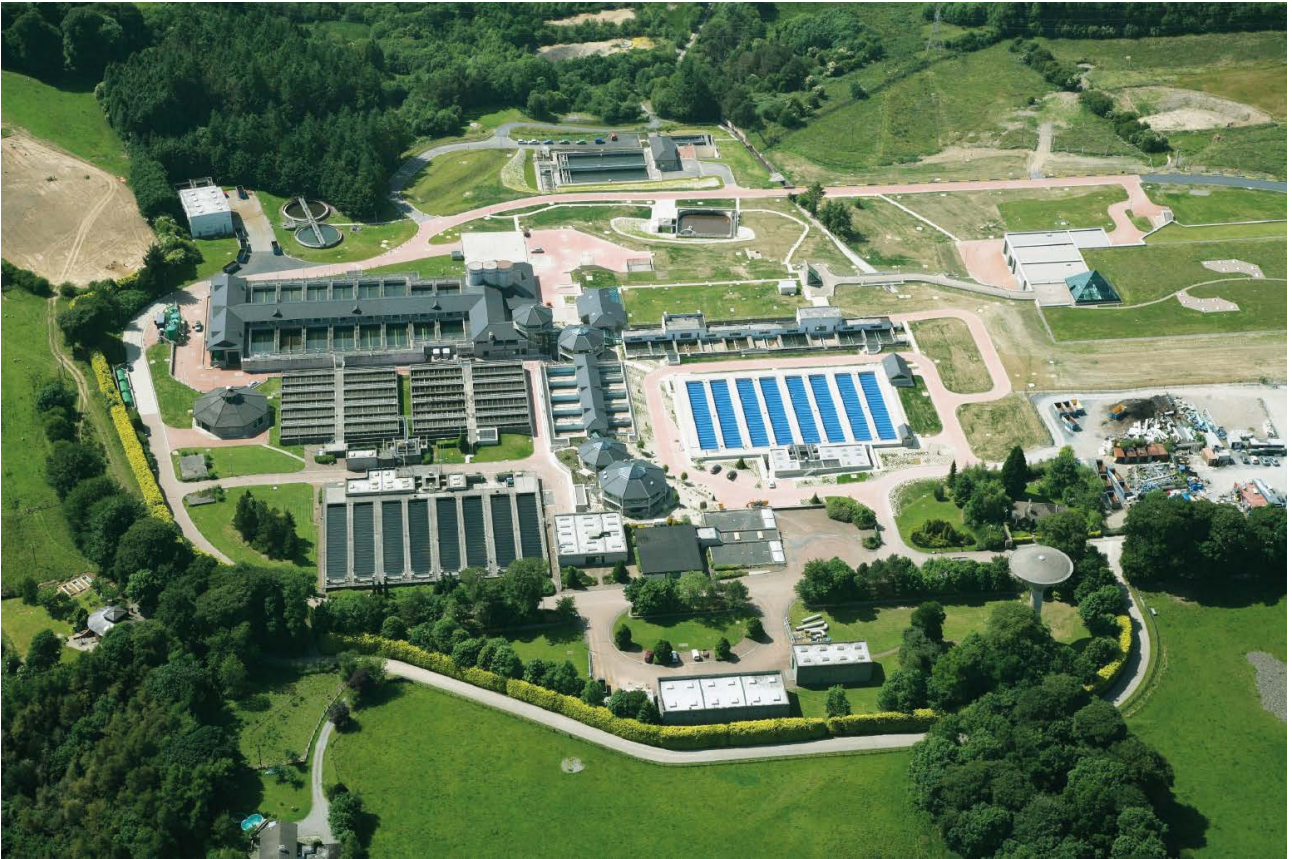
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Ballymore Eustace Water Treatment Plant

Courtesy of Irish Water/Uisce Éireann

1. INTRODUCTION

In this paper the Irish Academy of Engineering presents the findings of a high level strategic assessment of water services in the Republic of Ireland and specifically the role of Uisce Éireann/Irish Water (UÉ). The Academy's purpose is to review the progress made thus far in the life of the utility and to consider the challenges it is likely to face in the period to 2040. We offer some recommendations in relation to addressing the latter.

The aims of the paper are as follows:

1. To review the progress made in the period since the formation of the water utility, the original vision for the new body and the level of delivery achieved to date;
2. To review the regulation of water services;
3. To contribute to the public understanding of the risks and complexity of the challenges faced in delivering effective water services, including wastewater treatment; and
4. To consider emerging challenges and the changes needed to ensure a secure and resilient national water service over the duration of the current National Planning Framework while formulating a vision for the sector in the period to 2040.

The present paper will examine briefly the progress made over the intervening period. Its focus is restricted to the activities of UÉ and does not include any assessment of group or private water supplies.

The Academy is grateful to management and staff of UÉ, the EPA and the CRU for assistance rendered in preparing this paper. All organisations facilitated meetings with members of the study group as part of the information gathering on their respective functions and processes. These meetings allowed a deeper appreciation to be obtained of the responsibilities of these bodies and of their objectives in achieving their service delivery and regulatory functions.

The paper was informed by the experience of the past decade or more since the publication of the Academy's report of 2011, *Delivering Ireland's Water Services for the 21st Century*.¹ The latter set out areas that the Academy identified should be addressed and key recommendations were made under the main headings of Organisational Structure, Financial, Social Protection, and communication with consumers. Further details of the recommendations are in the paper which is available at Academy's website (www.iae.ie).

¹ Delivering Ireland's Water Services for the 21st Century <http://iae.ie/publications/environment-delivering-irelands-water-services-for-the-21st-century-feb-27-2012/>

2. BACKGROUND

An effective and efficient clean water supply infrastructure is essential both for ensuring the healthy lives of citizens and for the proper functioning of the economy. Similarly, wastewater services are critical in achieving sustainable development and a clean environment, as well as ensuring compliance with national and EU law.

Following a consultation period the Irish Government decided in 2013 to establish a single national utility to take over the water and wastewater responsibilities from the various local authorities then charged with the task.

Irish Water, as the utility was originally christened, was established as a national utility on 1st January 2014, taking over the responsibilities of 34 local authorities for the sustainable delivery of clean drinking water and the treatment and safe disposal of wastewater.

The body thus created, now called Uisce Éireann (UÉ), provides water services to some 3.3 million people. It produces some 608 billion litres of treated water annually and is also responsible for wastewater treatment facilities.

When UÉ was created in 2014 it was against a background of a significant and prolonged lack of investment in water services stretching back almost a century. Water services were funded directly through the Exchequer and even in good economic times never enough money was invested in the provision and maintenance of water-related infrastructure. In recessionary times investment was generally curtailed altogether and assets were often sweated to a point where they were left unfit for purpose.

In 2014 there was an assumption, based on limited available data, that bringing these assets to a basic level of fitness would require investment of €25bn to be expended over a period of several decades.

3. POLICY UNDERPINNINGS

Current policy with respect to the delivery of water services in Ireland is set out in the Water Services Policy Statement (WSPS) 2018–2025.² The purpose of the WSPS is to outline the Government's expectations for the delivery and development of water and wastewater services in the years ahead.

WSPS outlines four principles to guide the delivery of water services:

- ▲ one single, publicly-owned, national water services authority
- ▲ fair and efficient delivery with a customer focus
- ▲ priority health and environmental quality outcomes across the sector
- ▲ ways of working to support partnership and excellent stakeholder engagement.

WSPS also sets out a series of high-level objectives across three themes:

- ▲ **Quality**, to improve compliance with public health and environmental standards;
- ▲ **Conservation**, as a key part of a responsible environmental, social and economic policy, on the understanding that clean, usable water requires considerable investment of resources, energy, capital and labour; and
- ▲ **Future Proofing**, which recognises that public water supplies face long term pressures from increasing demand, due to anticipated economic and population growth and the impacts of climate change.

² Water Services Policy Statement 2018-2025; <https://www.gov.ie/en/publication/49364-water-services-policy-statement-2018-2025/>

4. CURRENT RESPONSIBILITIES

To begin it is useful to look at the current responsibilities of the stakeholders across the policy, delivery and regulatory areas. More details are set out in Appendix A.

4.1 Public Policy

Responsibility for public policy oversight rests with the Department of Housing, Local Government and Heritage (“the Department”).

Following the agreement on a Programme for Government (PfG) in 2019, the Water Sector Transformation Policy paper 2013, was published setting out in further detail a strategy entitled “Towards a National, Publicly-Owned, Regulated Water Services Utility” (see Appendix A for further details).

The Department is also responsible for the body of legislation underpinning water services in the State and for transposing relevant EU Directives into national law and overseeing their implementation.

The most important directives from a water services perspective are the [Water Framework Directive \(WFD\)](#), the [Drinking Water Directive \(DWD\)](#), and the [Urban Waste Water Treatment Directive \(UWWTD\)](#). The WFD sets the water policy framework across the EU, including appropriate charging and funding while all set out obligations in relation to environmental and quality standards in the provision of water services.

To aid understanding of the issues from a consumer/customer perspective, An Fóram Uisce (Water Forum)⁴ was established as a statutory body in June 2018. An Fóram represents all stakeholders with an interest in the quality of Ireland’s water bodies. It seeks to facilitate stakeholder engagement and debate on issues relating to water as a resource, water quality, rural water concerns, issues affecting customers of UÉ and issues associated with the implementation of the WFD.

4.2 UÉ’s Role

UÉ’s role is to ensure that drinking water is clean and safe, free from micro-organisms and parasites and any substances which may constitute a danger to health of consumers. The utility has responsibility also for the collection, treatment, and discharge of urban waste water in Ireland. The standards for treatment are based on EU Directives to protect the environment and biodiversity and public health.

UÉ meets its responsibilities to address immediate issues through a number of national programmes⁵, the most significant of which are:

National Leakage Reduction Programme: to conserve the drinking water resource through leakage control;

Lead Mitigation Plan: to minimise lead levels in drinking water through targeted orthophosphate dosing, pending replacement of all public lead pipework;

National Disinfection Programme: to upgrade and standardise disinfection systems across the country, to ensure drinking water is free from harmful bacteria and protozoa which can cause serious illness;

Sewer Rehabilitation Programme: working in partnership with local authorities to improve the sewer network nationally; and

the “Irish Water Growth and Development Programme”: includes projects to facilitate new development in areas currently inadequately serviced by water infrastructure.

³ “Water Sector Transformation Policy Paper; <https://www.gov.ie/en/publication/06326-water-sector-transformation-policy-paper/>”

⁴ An Fóram Uisce (Water Forum); <https://thewaterforum.ie/>

⁵ Uisce Éireann, National Programmes; <https://www.water.ie/projects/#national-programmes>



Mutton Island wastewater treatment plant, Galway Bay Courtesy of Irish Water/Uisce Éireann

A number of key plans are also of relevance to UÉ's role.

The Water Services Strategic Plan (2015)⁶ is described as “an integrated plan for the delivery of water services” setting out the challenges and strategic priorities. As required by Government UÉ has also prepared a *Strategic Funding Plan*⁷ and a *Capital Investment Plan 2020 to 2024*⁸ which set out the measures it proposes to undertake to implement the objectives of the Strategic Plan. The Funding Plan is submitted to the economic regulator to secure the required funding approval, as discussed below.

*The National Water Resources Plan*⁹ sets out public policies that frame the delivery of water, balancing demand and supply, and to identify how to provide a safe, sustainable, secure and reliable water supply to customers for now and into the future whilst safeguarding the environment.

*A National Wastewater Sludge Management Plan*¹⁰ (NWSMP) outlines its strategy for managing wastewater sludge over the next 25 years.

6 Uisce Éireann, Water Services Strategic Plan 2015: <https://www.water.ie/projects/strategic-plans/water-services-strategic/>

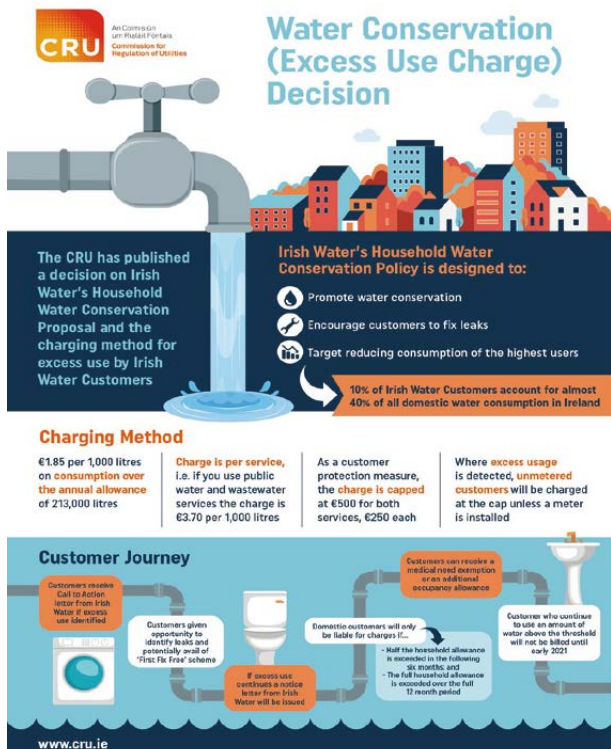
7 Irish Water Strategic Funding Plan: <https://www.water.ie/projects/strategic-plans/irish-water-strategic-fun/>

8 <https://www.cru.ie/wp-content/uploads/2019/07/CRU19148c-Irish-Water-Capital-Investment-Plan-2020-2024-October-2019.pdf>

9 National Water Resources Plan: <https://www.water.ie/projects/strategic-plans/national-water-resources/>

10 National Wastewater Sludge Management Plan: <https://www.water.ie/projects/strategic-plans/national-wastewater-sludge/>

4.3 The Economic Regulator’s Role



Good governance requires that a monopoly utility be regulated and in the case of UE this task is carried out by the Commission for the Regulation of Utilities (CRU). The CRU's key function is to protect the interests of UÉ's customers.

A funding model for the delivery of water services has been put in place which reflects a balance between the provision of adequate funding without the imposition direct of household bills.

The Irish Exchequer thus carries the burden of the regulatory tariff for the domestic sector and thereby reduces (or eliminates) the accountability of the individual customer for his or her consumption. The arrangement also significantly negates the economic benefit of having installed meters covering some 60% of consumers, as envisaged in the WFD.¹¹ This remains a key issue of compliance for Ireland.

4.4 The Environmental Regulator’s Role

The Environmental Protection Agency (EPA) was assigned the responsibilities of environmental regulator for UÉ in 2014. Its role includes inspecting and auditing drinking water treatment plants, monitoring the quality of water supplies and reporting on its findings and recommendations.

The Agency publishes a Remedial Action List (RAL), which is a register of public water supplies that need corrective action, usually at the water treatment plant and this is updated quarterly. The EPA requires UÉ to complete an action programme for each supply on the list.

In its role as environmental regulator the EPA also identifies treatment plants that are below the required standard and identifies corrective actions. Its priorities are the elimination of raw sewage discharges, protecting waters at risk of pollution and vulnerable habitats and improving collection systems.

In its quarterly reports¹² on UÉ's compliance with EU Directives the EPA sets out priority actions needed for collection systems and treatment plants to ensure protection of receiving water bodies from the effects of pollution. Specific targets are set to encourage UÉ to continue to step up its efforts to reach full compliance.

11 Water meters are used to detect leaks on the customer side; if flow of 6 litres per minute is continuous over a 24 hour period a leak alert is sent to UÉ; customers are offered a "first fix free" to eliminate the customer leak thus avoiding considerable water loss

12 Urban Waste Water Treatment in 2020: <https://www.epa.ie/publications/monitoring--assessment/waste-water/uww-report-2020.php>

5. UÉ'S PROGRESS TO DATE

Before considering future challenges it is instructive to review the progress achieved by UÉ since 2014.

Important elements of the process of transitioning from the legacy arrangements involving local authorities to a single utility have generally been successfully implemented to date.

These elements firstly include the formation of the company itself, as the national public water services authority operating on a nationwide scale, through a series of service level agreements (SLAs) with local authorities covering continuity of employment and other important operational matters.

As noted above, a funding model has been established which sees water services funded from a proportional mix of Exchequer funding for domestic services and capital investment and user charges for services provided to the non-domestic sector including industry and business.

The independent economic regulation of UÉ by the CRU ensures that the interests of citizens and customers are protected, while endeavouring to strike a reasonable balance between operational efficiency and ongoing capital investment.

The independent regulation of water quality and environmental matters by EPA also strengthens accountability for compliance with national and EU level standards.

The benefits of a national water utility service are restated in the Water Sector Transformation Policy Paper and include: the development of strategic plans thereby giving a national priority and focus to addressing the demands for services; the development of National Standards and programmes to address a range of issues such as leakage reduction and mitigation; and a national disinfection programme. Overall, a unified approach to standards and the prioritisation of projects nationally based on need is greatly facilitated.

It was essential to ensure the utility had a critical mass of expertise in order to secure cost efficient services from the private sector for the provision of design and construction services and consistent oversight of the Design Build Operate contractors as well as local authority operations. Other key professional tasks to be undertaken included process optimisation and targeted improvements to deliver enhanced outcomes in performance, health and safety and in energy consumption.

Ensuring a safe and secure water supply is clearly a central focus for UÉ. The EPA's recent report Drinking Water Quality in Public Supplies 2021¹³ acknowledges the progress being made in this regard with 99.7% success achieved in the treatment of drinking water.

Funding for works to be undertaken in the period 2020-2024 is considered reasonably secure as UÉ's budget for this period has been approved by the CRU in Decision 3.5.¹⁴

13 Drinking Water Quality in Public Supplies 2021: <https://www.epa.ie/publications/compliance--enforcement/drinking-water/annual-drinking-water-reports/>

14 Commission for Regulation of Utilities - Irish Water's Updated Capital Investment Plan–Revenue Control (RC3.5): <https://www.cru.ie/commission-for-regulation-of-utilities-publishes-irish-waters-updated-capital-investment-plan-revenue-control-rc3-5/>

6. FUTURE CHALLENGES

In its Strategic Funding Plan 2019-2024 UÉ recognises the challenges it faces in achieving compliance with regulatory standards, reducing leakage and losses from its systems, and increasing network and treatment capacity as the economy grows and societal needs increase. It recognises too the need to develop resilience in its systems to meet extreme events.

Challenges facing UE are both external and internal in nature.

One of the biggest external challenges faced by UÉ in recent years has been formulating an effective response to development needs - especially housing. That challenge is aggravated by gaps in capacity data, known deficits in strategic and local networks, the cost of creating strategic capacity and the matter of how that cost between UÉ and the developer should be shared. The challenges of ensuring the cost-effective delivery of projects is discussed in a later section (see Section 6.3).

Organisational changes will present internal challenges in the immediate term as UÉ absorbs and integrates staff transferring from local authorities while also giving effect to the decision to separate the utility from its parent Ervia.

Once completed and bedded in the internal changes can be expected to enhance the company's focus and effectiveness. Given their importance it is proposed to look in more detail at the issues involved in effecting the proposed organisational changes.

6.1 Organisational Restructuring

A number of organisational restructuring initiatives are currently underway in UÉ. On its establishment the utility agreed Service Level Agreements (SLA) with the 34 water services authorities (in effect the main local authorities) whereby the latter would continue to deliver operational services for UÉ for a period of time using existing resources.

This was a reasonable and workable interim arrangement maintaining continuity of service and capturing essential local knowledge but requiring transition to a single utility model in due course to achieve the accountability, expertise, and business structures necessary for a high-performance water utility.

Government has now directed that local authority water services staff transfer to UÉ. This change will give

UÉ full organisational control of the service delivery once it achieves full integration of the staff into its own organisational structure.

There are clearly issues associated with the geographical distribution of employees and facilities across the country and the likely need for some rationalisation in order to deliver necessary efficiencies. Such measures must be managed in such a manner to satisfy Government undertakings to staff and their associations regarding employment rights.

UÉ was originally set up as part of the Ervia group (previously Bord Gáis). Ervia is also the parent company of Gas Networks Ireland (GNI), another key national utility.

The Government has decided that Ervia should separate the two utilities and create two new independent utilities - a gas utility and a water utility. As part of this process Irish Water was renamed Uisce Éireann and is no longer a subsidiary of Ervia as of 1st January 2023.

Ervia was key to the setup of Irish Water, leveraging its own internal systems, processes, and utility structures as a successful national gas company.

Separation offers each company the flexibility to simplify governance, optimise their respective specialist expertise and processes while focusing their strategic planning on their very different agendas, both equally critical to the national interest.

6.2 Project Clarity

In 2019, the CRU agreed with UÉ that it would benefit from an external review of its progress. Scottish Water International (SWI), a commercial consultancy subsidiary of Scottish Water (SW), was appointed to carry out the work. There are clear similarities between UÉ and SW as public water companies with similar challenges and asset, and demographic conditions, albeit SW is more advanced in its development.

The Report was published in April 2020.¹⁵ It recognised the progress that UÉ has made and is making and suggests additional recommendations to improve delivery and governance.

The recommendations are categorised into two themes with a number of sub-themes, and key issues are identified for action.

Targeted improvements looking at areas which caused changes to the Regulatory submission and recommendations to prevent a recurrence.

- ▶ Scope Definition;
- ▶ Estimation, risk and uncertainty;
- ▶ Programme, portfolio and project risk; and
- ▶ Governance and Change Management

Wider improvements to develop Irish Water's capabilities further

- ▶ Investment Plan;
- ▶ Workshops and Project Tracker;
- ▶ Asset Planning as Asset Owners;
- ▶ Increased Involvement from Operations;
- ▶ Value Management;
- ▶ PMO and Reporting;
- ▶ Maturing Accountability and Ownership; and
- ▶ Contracting Models (Risk Sharing).

The CRU requested UÉ to develop an implementation plan for the recommendations and to provide quarterly reports on progress.

Project Clarity¹⁶ is the UÉ change programme to give effect to the SWI recommendations. Its stated approach is to ensure that the recommendations are carried out across the organisation, including processes, documentation, staff and systems. To this end, a work plan has been organised into four work streams with deliverables and a timeframe for each work stream.

In 2020, the CRU amended its framework metrics to monitor progress and performance of the recommendations of the SWI report to ensure that progress is sustained in achieving the improvements identified increasing the number of parameters measured to 22 across 5 areas. The progress in these areas can be monitored in the reports available on the CRU website.¹⁷

6.3 Delivery of Capital Projects

Past underinvestment in infrastructure in the Irish water sector has resulted in a legacy of inadequate or (on occasion) non-existent facilities. In order to meet target metrics for water and wastewater treatment plants and networks UÉ is required to deliver a very large number of capital projects.

Each of these projects requires design, planning, construction, and commissioning. Given the scale and complexity of the investment UÉ requires a capacity in project and programme planning, supply chain management and construction delivery on a level far above that of most, if not all, of the old water services authorities. It also requires a corresponding increase in the capacity of private sector design and construction capacity. Large-scale framework delivery arrangements, new uniform standards and contract models are all required while achieving CRU target efficiency savings.

Both sets of regulators have in the past criticised UÉ for having too frequently to revise the utility's project time and cost estimates in order to address priorities identified by them. Developing its in-house project management skills base and processes would build confidence UÉ's ability to bring its services into full compliance with legal requirements.

In common with other developers of major projects UÉ has had significant issues with planning system timelines – both the time taken in securing approvals and in subsequent Judicial Reviews of decisions, where these arise. Such delays are mostly outside the control of UE and revised programmes bring knock-on negative impacts on budget estimates and completion dates. This issue has attracted much public comment in recent times

¹⁵ Irish Water: Investment and Delivery Review - Summary Report <https://www.google.ie/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwIR2s2eoPT8AhUTUsAKHcStBA8QFnoECA4QAQ&url=https%3A%2F%2Fwww.cru.ie%2Fwp-content%2Fuploads%2F2020%2F08%2FCRU20085b-Scottish-Water-International-Report-IW-Investment-and-Delivery-Review.pdf&usq=AOvVaw2JHwUSMMMeMGxTWQjKOTI>

¹⁶ Irish Water Investment and Delivery Capabilities: <https://www.google.ie/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwJ3terdofT8AhUNQ0EAHSpLBIUQFnoECA0QAw&url=https%3A%2F%2Fwww.cru.ie%2Fwp-content%2Fuploads%2F2021%2F12%2FCRU21134a-Irish-Waters-Scottish-Water-International-Recommendations-Implementation-Plan.pdf&usq=AOvVaw14Kg-1EaOyq7HYRA3J4Kqg>

¹⁷ Irish Water Performance Assessment Framework 2020 Annual Report https://www.cru.ie/document_group/irish-water-performance-assessment/



Mutton Island wastewater treatment plant, Galway Bay Courtesy of Irish Water/Uisce Éireann

and the Academy has referred to it already in its paper *Review of Major Capital Projects*¹⁸.

UÉ might observe that the EPA's requirement for detailed delivery dates for completion of entire projects without allowing uncertainties in the planning process, land acquisition and other issues not under the direct control of the utility to be factored in can be unhelpful.

There is growing concern about the capacity of the sector to meet projected demands due to the disruption to supply chains and the availability of skilled labour in the construction sector in the environment caused by the disruption of the Covid-19 emergency and Brexit. Significant cost inflation and supply chain delays and disruption affected delivery and cost of projects in 2022 and is expected to continue into 2023 and beyond.

There is a need for UÉ, in common with other State agencies, to engage with their supply chains to develop a range of measures. These could include: better delivery strategies through mature risk allocation, collaborative working, the encouragement of innovation, the adoption of new technologies, apprenticeship schemes, graduate training programmes and other steps. In this way it should be possible to grow supply chain capacity, maximise value and optimise the delivery of projects and programmes.

An approach of this nature will also be required to promote the adoption of Circular Economy principles and mitigation of and adaptation to the effects of climate change.

6.3.1 Delivery of Capital Projects – Conclusions

Continued improvement in the accuracy of both cost and time estimates for its capital programme and projects will enable UÉ to build confidence and trust in its customer base and regulators and in its ability to ensure compliance with the requirements of national law and EU Directives.

Significant ongoing effort and innovation in its project management capability and delivery processes is needed to meet important target in its operations.

Regulators should be encouraged to make an appropriate allowance for issues outside the control of UÉ, including development and regulatory consents, when setting compliance parameters.

¹⁸ Irish Academy of Engineering, Review of Major Capital Projects, 2021: <http://iae.ie/publications/delivery-of-major-capital-projects/>

7. FUNDING MODEL

A funding model for the delivery of water services has been put in place and the level of funding is decided by the economic regulator, the CRU. In coming to its decision on the quantum of funding to apply the CRU carries out a benchmarking exercise to inform its decision and ensure that it is sufficiently resilient to meet unexpected challenges.

As noted earlier in this report, while the model is satisfactory from a funding point of view, it reduces the accountability of the customer for the management of their consumption, a key issue from a water conservation perspective. Direct charging of households for water supply notoriously failed to establish a social consensus in Ireland in the early days of the new water utility and it remains a political taboo. It nevertheless also remains a key issue for Ireland with respect to the WFD as this measure requires Member States not only to protect and improve water quality in all waters but also to maintain water pricing policies:

- ▲ that incentivise efficient use of water; and
- ▲ recover costs for water services in line with the polluter-pays principle.

The current position is that only those households using water above a fixed threshold are charged for “excess use”. The threshold was set in 2019 at 1.7 times the average daily use of 345 litres per household per day. Under this regime it was expected that about 80,000 households would face an annual charge of up to €500 for excess use.

The CRU’s benchmarking process draws heavily on UK data.¹⁹ This is understandable given the similarity between the two systems and the ready availability of information that extends back several years thus providing a reliable body of data for comparison purposes. UK data also covers the issues needed to assess the costs incurred by a utility service provider.

There are, however, some issues with this approach that bear further examination, particularly in the light of the exit of the UK from the EU. The English, Welsh and Scottish markets are all well-established mature services whilst the Irish utility is at an early stage in its development, with many decades of underinvestment to recover from before it can hope to achieve satisfactory levels of efficiency. The

population density of England and Wales is significantly greater than Ireland thus offering economies of scale that may not translate to the Irish situation without appropriate adjustment.

Some criticism has been made recently of a lack of investment by water companies in England and Wales to make provision for rare but arguably predictable events. In a recent paper the National Infrastructure Commission noted the need for a new framework, stating that:

*“..there is a need for a new framework for resilience which anticipates future shocks and stresses; improves actions to resist, absorb and recover from them by testing for vulnerabilities; values resilience properly; and drives adaptation before it is too late”.*²⁰

Care is thus also needed when benchmarking funding against UK data that the latter may not be making sufficient provision for developing resilient infrastructure. Given the maturity of the English, Welsh and Scottish utilities, and their varying funding models, the process of incorporating their data into the Irish methodology for assessment of appropriate levels of funding for UE operations should be continually reviewed.

UK water utilities are not uniform but fall into a number of different structural and institutional baskets. The main English-based companies are all public limited companies operated on a for-profit basis. The *Financial Times* recently reported that some £1.4bn was paid out in dividends to shareholders by the water companies in 2022.²¹ Given these arrangements UÉ has more in common with the non-English UK entities. Scottish Water is publicly owned while Welsh Water operates as a not-for-profit company. Northern Ireland Water is described as a “government-owned company”.

19 “...The Commission for Regulation of Utilities has found that the costs of supplying water [in Ireland] are up to 42 per cent higher than those of similar firms in Britain..”, *The Irish Times*, August 12, 2019

20 National Infrastructure Commission, Anticipate, React, Recover: Resilient infrastructure Systems, 2020 <https://nic.org.uk/studies-reports/resilience/>

21 17th May 2023

It is important to regularly review how each parameter of the CRU framework contributes to the understanding of the overall performance improvement of the service or its regulation. When needed, appropriate adjustments or refinements should be made or if necessary to discontinue those parameters which are not giving useful management or regulatory information.

While the existing economic regulatory model has worked well in driving efficiency to date, arguably a new model should now be considered. One based on true total expenditure funding, such as that employed by the British regulator Ofwat, offers a preferred approach. It is based on circular economy principles and can bring old assets back to functional condition while helping to promote low carbon technologies.

Sustainability, circular economy and decarbonisation considerations all require that investment decisions include the 'cost of carbon emissions'. This should include both embedded carbon in the design/ construction of infrastructure and facilities, and the operational emissions generated over the life of the facility.

Despite major progress, higher standards combined with the decarbonisation timeline imposed by policy and statute, pose very significant challenges and will not be addressed affordably by conventional 'business-as-usual' solutions.

The Academy believes there is a case to be made for an in-depth examination of the current regulatory approach of cutting operational expenditure for financial efficiency and favouring capital expenditure.

A more sustainable approach would favour retaining and refurbishing existing assets which may be nearing end-of-life and would incorporate innovative and emerging technologies to extend the useful operating life while reducing the both embedded and operational carbon emissions.

Allowing the utility company to come to decisions to include both emissions and financial benefit in its assessment of continued use of assets, using both OpEx (operating expenditure) and CapEx (capital expenditure) funding would broaden the opportunities for more effective control of emissions while ensuring value for money investments.

It is imperative that funding arrangements of UÉ's investment programmes are both secure and future proofed in order for the utility to continue to meet the very significant strategic issues and future challenges that lie ahead. This objective is likely to be increasingly threatened by inflationary pressures.

7.1 Funding Model – Conclusions

The Academy believes there is a case to be made for change in the current approach of separating OpEx and CapEx to one which provides flexibility to the Utility to take a more holistic approach to the management of its assets base.

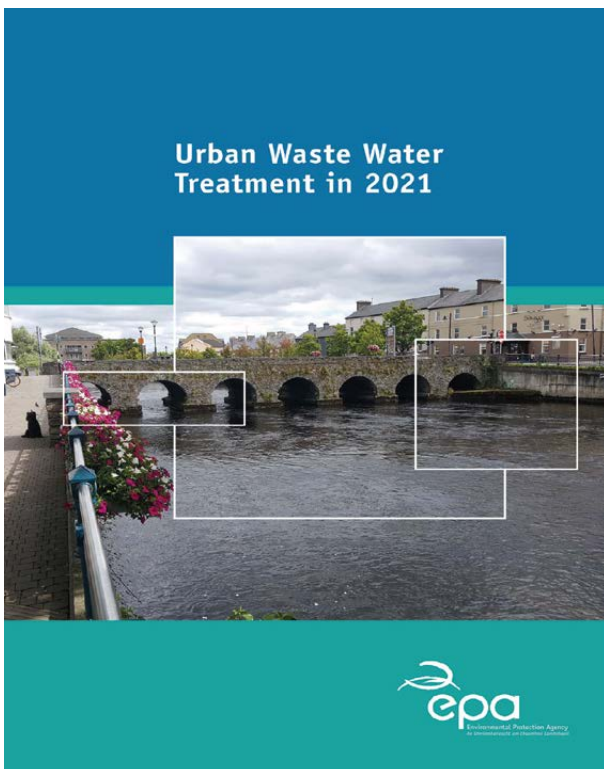
Developing a management approach that permits flexibility in the allocation of funding between operational and capital, with agreed parameters and limits, would provide benefits where the provider is seeking to address diverse criteria across economic, environmental and emissions objectives.

It would be prudent to utilise a wider pool of benchmarking comparator data from other EU jurisdictions, in addition to British data, so that more comprehensive comparisons can be achieved.

The effectiveness of parameters measured for the Revenue Control Process should be monitored to ensure each is identifying and measuring improvements in the utility's operations. This is important for both the utility and the regulator by providing management information to identify actions that can drive further efficiencies and improvements to the service delivery.

8. QUALITY

Quality refers to the achievement and maintenance of drinking water standards and emission standards for wastewaters discharged to the receiving environment. The WSPS identifies the provision of safe drinking water and the treatment of sewage effluent to protect receiving water bodies as essential to the day-to-day activities of households, communities, social services, and the economy. It recognises that significant capital investment, together with operational and management improvements, are required to optimise the performance of our water and wastewater systems. Failure to achieve drinking water quality standards or effluent pollution events are addressed in the first instance by UÉ and are investigated by the EPA.



8.1 Wastewater

Collected wastewater requires treatment to render it safe for discharge into natural water bodies be they rivers, lakes or coastal waters. The UWWD requires Member States to ensure all such discharges reach the quality standards set out before discharge. Ireland has not been in full compliance with the Directive and is subject to infringement proceedings by the Commission.

There is significant pressure on UÉ to address environmental risk and damage arising from discharges of raw effluent and effluent from treatment plants operating below standard. While UÉ operates a large number of treatment plants only some 12 plants account for nearly half of Ireland's population. It is imperative

therefore that these large plants are operated efficiently and effectively and that systems are continually improved to reduce the risk of failure or malfunction.

At present, micropollutants such as residues from pharmaceuticals and cosmetics are not covered by the UWWD and yet are frequently found in all our water bodies where they can have a detrimental effect on nature. The EU decided therefore to revise the UWWD²² to address these issues. Collection of data on viruses in wastewater is also included in the revised Directive as it can provide important information for public health decisions. Viruses can be tracked with high reliability in wastewaters, as was demonstrated during the Covid-19 emergency. The Directive also sets an energy neutral target for the sector to support the EU objectives for emissions reduction.

There is a particular focus on bathing waters post Covid as there has been a significant increase in open water swimming. This focus has drawn critical attention to Combined Sewer Overflows or Storm Water Overflows. Such overflows are a consequence of combined (i.e. rainwater and sewage) urban drainage infrastructure in Irish towns and cities largely dating from the late 19th and early 20th centuries. They are an essential component of these drainage systems as they allow for the diversion of excess flows of mixed rainwater and sewage from treatment plants in storm conditions. However they often result in large volumes of untreated dilute sewage being discharged into water bodies over a relatively short period of time.

Combined with stormwater runoff from hard urban surfaces, the effect is short-term contamination of waters and related swimming bans. This leads to understandable demands for much better control of such discharges though this cannot be achieved without significant investment. The English water companies

²² https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_6281

recently apologised for the amount of contaminated water they have been discharging into receiving waters and announced an investment programme costing £10bn to resolve the problem of storm overflows.

Climate change complicates the overflow issue as rainfall intensity has been increasing in recent years and will likely increase further in the future. In the absence of alternative strategies more intense rainstorms will inevitably lead to an increased incidence of overflow.

This problem also highlights a lack of understanding of the sources of pollution after periods of intense rainfall. In Dublin Bay, for example, regular swimming bans are blamed on overflows at Ringsend whereas these are highly diluted and partially treated, as compared with the much more significant impacts from network overflows from storm sewers carrying street runoff which may pollute local streams that feed into the bay.

As climate change advances other possible impacts include the increased vulnerability of sewer systems to flooding risk while a rise in summer drought conditions will result in restrictions in the availability of water for abstraction in order to protect riverine biosystems from extreme low flows.

In its most recent report on Urban Waste Water Treatment in 2021²³ the EPA expressed its concern at the length of time taken to achieve compliance with EU directives noting: *“At current levels of expenditure, it will take at least 2 decades to bring all treatment systems up to standard”*.

The Agency is critical also of UÉ's lack of firm plans for works and timelines to address the prioritised areas identified.

Unsewered agglomerations which currently depend on large septic tanks as the sole treatment will need to move to treated systems to ensure that effluent quality meets quality and safety standards and complies with EU and national regulations.

Ireland has a long history of difficulty implementing water-related EU Directives - a problem UÉ inherited on its establishment. There are pending and live enforcement proceedings by the European Commission against Ireland for its failure to meet targets set out in EU Directives aimed at protecting the environmental status of water bodies. It is conceivable that significant financial penalties may be imposed on Ireland, subject to Court decisions, for its failure to give effect to the Directives.

Capital Investment and the delivery of the required and identified actions are imperative to meeting the compliance standards set by the Directives and to avoiding infringement proceedings and subsequent fines being imposed by the European Court. Work programmes will be informed by the current programme of Drainage Area Plans (DAPs) being undertaken by UÉ to quantify the scale of work needed. Continued timely delivery of planned projects is essential for bringing Ireland into full compliance with EU Directives and to address the risk of additional infringement proceedings by the Commission.

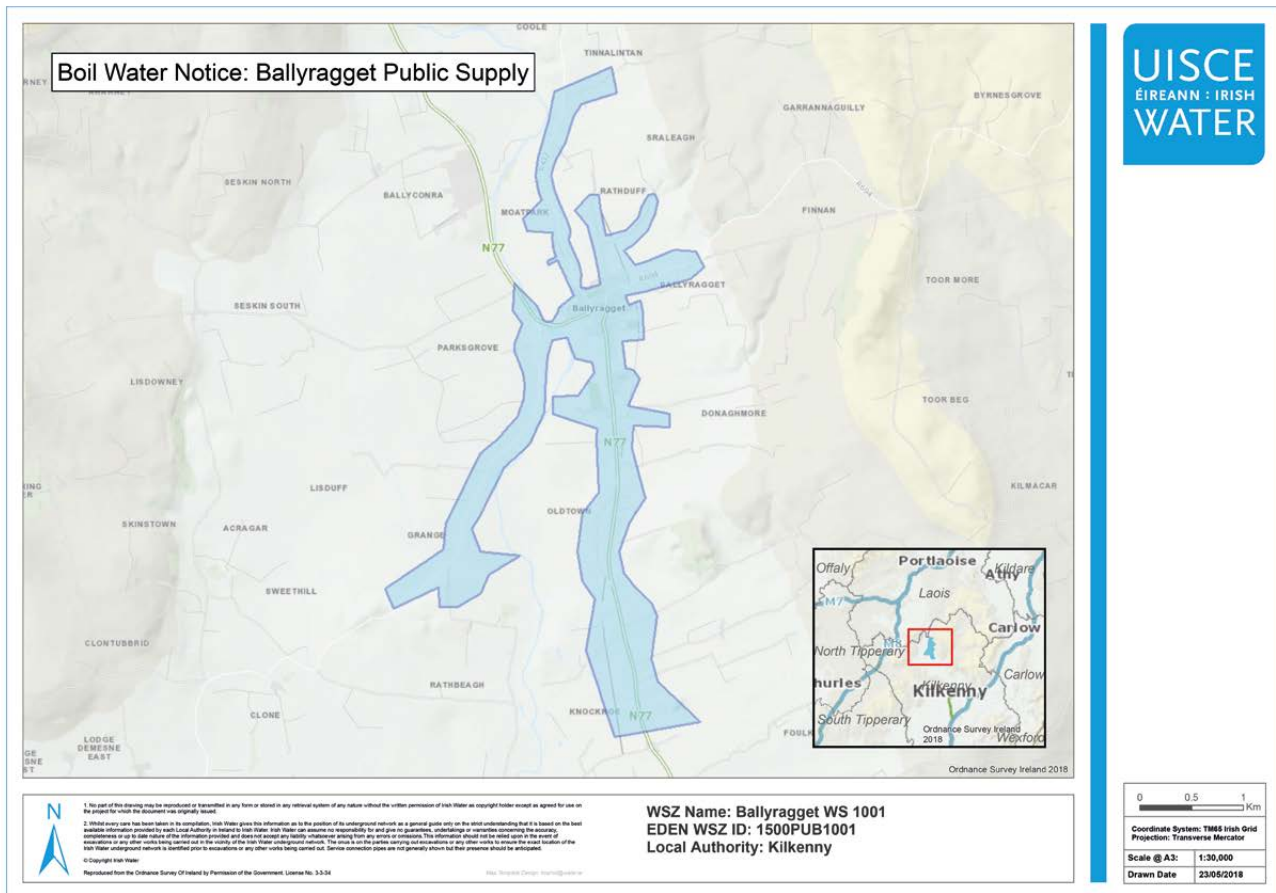
8.2 Drinking Water

Ensuring a safe and secure water supply is an essential element of the water utility's functions. The EPA's most recent report on Drinking Water Quality in Public Supplies 2021²⁴ acknowledges that progress is being made in this regard and that UÉ is achieving 99.7% success in its treatment of drinking water.

However, the Agency has expressed its concern at the rate at which progress is being made. It is also concerned about the resilience of the system and its ability to ensure continuing safety of the supply into the future. Despite major investment in new and upgraded plants, 'boil water' notices continue to affect a significant numbers of customers.

²³ EPA, Urban Waste Water Treatment in 2021, 2022: <https://www.epa.ie/publications/monitoring--assessment/waste-water/uww-report-2021.php>

²⁴ Drinking Water Quality in Public Supplies 2021: <https://www.epa.ie/publications/compliance--enforcement/drinking-water/annual-drinking-water-reports/>



Boil Water Notice

This issue speaks to a number of problems including protecting water sources from pollution; the need to bring all plants to a common standard of technology (appropriate to the local requirements) and the need for consistent expert operations. The latter should be supported by monitoring and technical oversight with effective timely reporting using modern SCADA and telemetry technology. These objectives will likely be further enabled following the integration of local authority operations and staff into the UE organisation.

Land use practices and climatic factors inevitably impact on the water and wastewater challenges faced by UÉ. It is recognised in the River Basin Management Plans (prepared under the WFD) that a catchment approach to the management of waterbodies involving engagement with all stakeholders (farming, industry, forestry, etc.) is necessary to minimise risks to water quality.

Once macro threats are minimised or eliminated residual issues and risks can be addressed by the treatment processes operated by the utility. It is clear that extreme

weather events can impact water services – be they droughts, high intensity rainfall, storms or freeze/thaw events. All result in increased pressures and risks and all require increased service resilience. Such resilience is reflected in additional treatment barriers, greater redundancy in capacity, increased storage and diversification of water supply sources to meet specified service standards.

The DWD which addresses the quality of water intended for human consumption and was adopted in 1998. A deadline of November 2003 was set by which date Member States were required to have taken the measures necessary to comply with the provisions of the Directive. The objective of the DWD is to protect human health from adverse effects of any contamination of water intended for human consumption by ensuring that it is wholesome and clean. It lays down the essential quality standards at EU level requiring suppliers to ensure safe, clean water free from harmful micro-organisms and parasites and from any substances which in numbers or concentrations constitute a potential danger to human health.



Lee Road Cork Courtesy of Irish Water/Uisce Éireann

A revised Drinking Water Directive²⁵ was adopted in 2020 to be transposed into national law by January 2023. The new Directive adopts a new approach based on the WHO principles of Water Safety Plans. These seek to consider the risks that may arise through the water supply system and will impose significant additional responsibilities on suppliers of drinking water. It has increased some of the parameter limits and reduced others. Tighter limits on parameter values will undoubtedly add to treatment costs and indeed may require a fourth order level of treatment to become the norm. It is intended that the new Directive will bring better clearer regulation of drinking water quality and a greater focus on environmental protection.

8.3 Quality – Conclusions

Programmes to bring water and wastewater treatment systems into compliance with EU Directives and EPA standards are underway and will require the continued deployment of resources over many years in order to reach full compliance.

The implementation requirements of revised Directives on Drinking Water and Urban Wastewater Treatment need to be addressed.

A National Wastewater Sludge Management Plan has been published and is being implemented.

UÉ should continue to seek further opportunities to identify emerging practices that permit the recovery of certain raw materials such as phosphorus from wastewater both to add value to the waste treatment process and support the circular economy.

A National Policy and Plan is required to address the need to move from large septic tanks to more advanced treatment systems to further support compliance with the WFD.

²⁵ The revised European Directive 2020/2184 on the quality of water intended for human consumption: <https://eur-lex.europa.eu/eli/dir/2020/2184/oj>

9. CONSERVATION

The WSPS recognises that the abstraction, treatment and distribution of potable water is a costly undertaking and is one that has impacts on the natural environment.

One of the WSPS's key objectives is that conservation be firmly embedded at the heart of water services policy to ensure responsible environmental, social and economic management in the delivery of the service.

A twin approach of supply and demand management is adopted by UÉ. Demand, in as far as practicable, is reduced through public education and information programmes to assist customers to manage usage and understand risk.

A leakage reduction programme seeks to minimise losses of treated water from the distribution network.

The UK National Audit Office²⁶ similarly recognised the need for a twin approach to be adopted to both managing and reducing customer demand and ensuring that a minimum volume is lost following treatment during distribution.

9.1 Leakage Reduction Programme

Given that water is a valuable and important resource that is costly to produce to make it safe for consumption it is imperative that conservation is central to national water policy. This includes a consideration of the management and protection of the source and the efficient use of treated water. Hence there is an inevitable focus placed on addressing the significant leakage of treated water from the network system. At the inception of UÉ leakage levels in Ireland were at levels far in excess of European norms and reached almost 50% nationally. This has since been reduced significantly to 38% and work continues to reduce the losses further.²⁷

By way of comparison, the UK Regulator Ofwat reports that the leakage in England and Wales is “*Currently around a fifth of water running through pipes is lost to leakage*”. The Ofwat website²⁸ states that the regulator has “*set companies stretching performance commitments to reduce leakage over the 2020-25 period and we expect them to adopt innovative approaches to deliver these reductions efficiently...the sector will cut leakage by 16% by 2025*”.

Denmark is a recognised benchmark countries for best practice in the field of leakage control with current reported losses of “...7.8 per cent on average”.²⁹ Danish water utilities report this low level of loss is due in part to the fact that “*providers use new technologies, methods, and knowledge. This makes it possible to measure and register water data and to quickly identify even the smallest pipeline leaks.*”

Among the methods and technologies identified as aiding a successful loss reduction programme are:

- ▲ early gains through upgrading and extending District Metering Zones;
- ▲ monitoring and reporting analytics which helped to target priority areas for action;
- ▲ pressure management is a very useful tool in reducing losses from existing leaks and control new leaks from forming.

Leak detection and repair intensity is key to getting control of leakage. The rate of detection and repair must be well in excess of new leak formation (including accelerated leak development in cold weather).

Lower targets require that trunk main leaks are targeted along with distribution, likely requiring advanced technologies for detection.

As leakage performance is better understood and targeted, the process will highlight those mains that must be rehabilitated by re-lining or replacement. Given the huge cost of laying new mains in urban areas, UÉ must utilise all appropriate technology in restoring the integrity of existing assets.

Leakage management is a major challenge for water utilities not least because it is poorly understood by the

²⁶ National Audit Office (UK), Report by the Comptroller and Auditor General, Water supply and demand management 10 June 2020

²⁷ OFWAT, Leakage in the Water Industry: <https://www.ofwat.gov.uk/leakage-in-the-water-industry/>

²⁸ OFWAT, Reducing Leakage: <https://www.ofwat.gov.uk/households/supply-and-standards/leakage/>

²⁹ Ministry of Environment of Denmark Identify sources of water loss: <https://eng.mst.dk/nature-water/water-at-home/water-loss/>

public. Even a very small pinhole will result in significant loss because it flows 24/7. However, leaks on this scale are often very difficult to detect so that thousands of such leaks can exist undetected for long periods even in well managed networks. It takes expert management, technology, monitoring, reporting, and analytics backed by substantial budgets for the operational and investment programmes needed achieve sustainable reduction in losses.

UÉ will require a relentless commitment to this work backed by sustained long-term funding, access to all available technologies and incorporating lessons learned in similar networks internationally.

Public perceptions are important in this task. Perhaps the perception has been that not enough is being done to address leakage problems. Information programmes detailing progress achieved and works underway will help to address mis-perception where these exist.

Whilst current leakage reduction efforts are showing success the current level of leakage at 38% of national output (1.7 billion litres per day) represents a significant loss of treated water that carries a costly price tag and reflects badly on UÉ. These levels of loss can also have a negative knock-on impact on efforts to persuade consumers to reduce their own water consumption.

In comparing Ireland with other countries with regard to leakage levels it is important to note that only the UK and parts of Cyprus share with Ireland a “low pressure indirect” water network where potable water is supplied at very low pressure sufficient to fill the attic storage tank of a two storey house during periods of low demand over a 24 hour day. This type of system is unfortunately very tolerant of lack of network reinvestment resulting in high levels of leakage.

Every other EU country uses a “high pressure direct” network. This requires regular network reinvestment because even a small leak results in thousands of customers being left without water on a high pressure water network.

The difference in operating systems is important to flag given the mandatory focus on leakage reduction in the revised Drinking Water Directive. In this context the UK experience, where averages of 20% leakage after 25 years of major investment overseen by a water regulator, compare very unfavourably with best in class EU leakage rates which have low single figure percentages. The intrinsic nature of the British (and Irish) system probably militates against the cost-effective achievement of EU level rates of leakage.

WSSP states that UÉ “...plan on reducing leakage across all schemes to ...30% by the end of 2027 and will work to achieve a sustainable economic level of leakage, by 2040”. Experience from the UK indicates that an economic level of leakage is in the region of 18-22% of water treated. The question arises therefore as to whether UÉ’s leakage reduction targets are ambitious enough, especially with rising cost of treatment linked to energy pricing. This is clearly a matter for UÉ management decision-making.

9.2 Demand Management - Reducing Water Use

An important conservation objective is achieving a reduction in the quantity of water used by both industrial and domestic customers. With this in mind UÉ has initiated a programme to raise public awareness of the issue and to encourage consumers to reduce their consumption over time.

As the national statutory body representing all stakeholders with an interest in the quality of Ireland’s water resources the role of An Fóram Uisce is important in this regard. An Fóram report on the subject was published in November 2021 and is entitled *A Framework for Improving Domestic Water Conservation in Ireland*.³⁰ The report sets out to identify how water conservation measures can be implemented in Ireland and how they may relate to national and EU legislation such as building standards and regulations. The report highlighted a lack of information on water usage and scarcity and sought incentives to support water saving behaviours by users.

30 An Fóram Uisce: <https://thewaterforum.ie/a-framework-for-improving-domestic-water-conservation-in-ireland-research-report/>

9.3 Energy - Use, Conservation and Reduction

UÉ's energy use must be considered in the context of the Irish national response to climate change.

The Climate Action and Low Carbon Development (Amendment) Act 2021 requires Ireland to achieve a 51% reduction in emissions by 2030, relative to 2018 levels, and net-zero emissions by 2050. Ireland must also:

- ▲ deliver annual climate action plans;
- ▲ implement a carbon budget programme; and
- ▲ define sectoral emissions ceilings.

Ireland's first carbon budget programme came into effect in April 2022. Sectoral emissions ceilings, which operate within the carbon budgets, were approved in July 2022.

Water and wastewater treatment processes are significant consumers of energy.

UÉ's demand for energy will inevitably increase in future given the utility's need to provide for ongoing population increase, economic growth and the impact of evolving national and EU legislative requirements. Such demands must be mitigated by the requirement to progressively decarbonise operations.

Both objectives can be advanced by greatly improving the efficiency of energy used and by enhanced reliance on renewable energy sources.

9.4 Conservation - Conclusions

9.4.1 Leakage Programme

UÉ must clearly maintain efforts to find and repair leaks and thereby reduce losses from its supply network and should set itself stretch targets in order to more closely approach the goal of EU norms in this field. Greater success in leakage control will help to mitigate economic loss while building public awareness of and sensitivity to the issue which in turn can assist in the goal of reducing consumption.

Consideration should also be given in this context to increasing the network rehabilitation programme. Rehabilitation as opposed to replacement can generate additional savings in energy consumption overall and in emissions generated. These factors may be included as benefits in the economic analysis (cost to benefit) undertaken to inform decision-making on the prioritisation and ranking of projects.

9.4.2 Reduced Usage

Encouraging consumers in their efforts to reduce water usage is an important component of the 'Conservation' theme. Smart water meters can give important information to customers in making decisions about their individual usage and encourage a more sustainable level of demand across the supply network. The use of smart meters should be encouraged wherever possible.

10. FUTURE PROOFING

Ireland is fortunate in having adequate resources of surface waters and groundwater. If managed responsibly these resources mean Ireland will not be among the water-stressed regions of the world as the impacts of climate change continue to emerge. That is not to say there are not pressures existing and emerging that will require to be carefully managed and resolved if they are not to result in crisis. Such pressures include increased water demand arising from economic growth and a projected population increase of about one million people by 2040 and a seemingly inexorable decline in the quality of the aquatic environment will challenge the ability of UÉ to deliver on its brief.



Parteen Weir on the River Shannon - source of the proposed Eastern and Midlands Supply Scheme

Courtesy of Irish Water/Uisce Éireann

10.1 Security of Supply

Raw water must be abstracted, treated, and distributed to where it is needed. A built-in resilience in the form of redundancy is required to cater for possible major interruptions such as source pollution, plant failure, pipe failure or spike in demand. As the economy and population grow demand the risk of failure without strategic redundancy will increase. It is anticipated for example that some 40% more water will be required in the Greater Dublin Area by 2044 as compared with 2020 to provide a sustainable and resilient supply.³¹

10.2 Growth and Development

One of the strategic aims of the National Planning Framework (NPF) is to share the anticipated increase in

population of one million by 2040 between the Greater Dublin Area and other population centres across the country. Target populations have been set for each major urban area. This expected urban growth and intensified development will clearly place considerable demands on the water utility for both water supply and wastewater treatment services. Such demands can only be met if investment in sourcing supply and in the upgrading of infrastructure at an appropriate level is maintained.

At present many urban water supplies do not have sufficient headroom to deal with the level of growth planned for in the NPF. In particular the Greater Dublin Area is recognised as being on a knife-edge with a major over-dependence on the River Liffey. Historically, Ireland's water services have been met from single sources,

³¹ The Water Supply Project Eastern and Midlands Region ("WSP-EMR"): <https://www.water.ie/projects/national-projects/water-supply-project-east-1/>



Courtesy of Irish Water/Uisce Éireann

usually reasonably proximate to the source of demand. By contrast, major cities in Europe typically have built-in resilience with multiple sources available which in combination can provide as much as double the normal daily demand.

Building such resilience into the Irish supply system will require the identification and development of multi-source supplies for larger towns and cities so that alternatives are available in the event of a major incident. This is not a trivial task and in many cases may not be even be practically possible. Even where options exist environmental concerns will likely mean securing development consents may be a fraught and long-drawn out process without a guarantee of success.

With expected population increases and consequent urban growth the capacity of both water treatment and wastewater treatment plants will come under pressure. Several of these areas have been at or close to service failure during a number of recent droughts. UÉ estimates³² that at present, over 50% of water supplies do not provide a sufficient level of service. Population growth and climate change will worsen this situation over time if nothing is done.

To meet such challenges the Water Supply Project Eastern and Midlands Region (“WSP-EMR”) has been proposed that will source a supply from the River Shannon. The project forms an essential part of the longer term plan to build a resilient supply for the Eastern and Midlands areas including the Greater Dublin Area.

32 Uisce Éireann, “National Water Resources Plan - Draft Framework: Plan”: <https://www.water.ie/docs/NWRP-SEA-Environmental-Report-NTS.pdf>

The current timeline for the construction of this important project is unclear at present. It is assumed a project plan will be made available in due course and updated at intervals as the project progresses.

10.3 Climate Effects – Sustainability of Supply

Predictions across the globe indicate that water availability is becoming a significant issue as the impacts of climate change advance with implications not only for economic growth but also for human health. Close to home an example of the difficulties that can result was witnessed during an extended dry weather spell in 2022 when reduced rainfall over a 12-15 month period had a significant impact on supply across the UK, particularly in England, during the summer and autumn of that year.

While there is sufficient water available in Ireland, climate effects are already evident here too in the form of reduced base flows in rivers in the Eastern and Midlands regions and in parts of the south-east and mid-west.

10.4 Source Protection

The quality of waterbodies used to source supplies for drinking and for industry is under pressure of deterioration from a number of sources. Residual chemicals such as pesticides, pharma products and antibiotics are now seen in increased quantities in such sources as well as in water supplies or in wastewater treatment processes not designed to remove these residual chemicals.

Likewise, land use and agricultural practices impact on the quality of the source of supply and therefore on the ability of the utility company and private supplies to comply with national and EU legislation on water quality.

Water sources need protection from pollutants and miscellaneous chemicals and fertiliser use must be controlled so that neither issue becomes a problem for downstream water treatment processes. These are problems outside of UÉ's control and their management is the responsibility of the EPA and local (planning) authorities and, in the case of the application of fertiliser to lands, individual farmers.

Groundwater sources provide 20-25%³³ of drinking water supplies in Ireland. In some counties this figure can be as high as 50%. In rural areas not served by the public water network groundwater from wells and springs is the only source of drinking water. UÉ sources some 18% of its supply from groundwater.

As with surface water bodies, groundwater is susceptible to pollution from land-use practices, distributed pollution sources, e.g. farming, and point sources such as the discharge from under-performing wastewater treatment plants or septic tanks.

A Groundwater Protection Scheme³⁴ published jointly in 1999 by the then Department of the Environment and Local Government, the Environmental Protection Agency, and the Geological Survey of Ireland provides guidelines for the planning and licensing authorities in carrying out their functions and a framework to assist in decision-making on the location, nature and control of developments and activities in order to protect groundwater.

The Scheme seeks to ensure that due regard is taken within the planning and licensing processes of the need to protect and maintain the beneficial use of groundwater.

Agencies and individuals seeking to develop a groundwater supply should ensure well drilling contractors employ suitably qualified personnel. Since 2020 South East Technological University (SETU) has co-ordinated a consortia-led Level 6 Apprenticeship in Geo Drilling with the Geological Survey of Ireland as sector lead. The curriculum includes modules on water-well drilling. The apprenticeship is supported inter alia by Engineers Ireland, UÉ, Geoscience Ireland and the National Federation of Group Water Schemes.

33 Geological Survey Ireland Water: <https://www.gsi.ie/en-ie/education/our-water/Pages/default.aspx>

34 Groundwater Protection Scheme Reports: <https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/projects/protecting-drinking-water/what-is-drinking-water-protection/county-groundwater-protection-schemes/Pages/Groundwater-Protection-Scheme-Reports.aspx>

10.5 Risk Management and Resilience

The provision of water services is a complex undertaking involving the management of significant risks not all of which are within the control or mitigation of the service provider. It is important therefore for the utility company to develop and deepen its level of understanding of those risks and options for their effective management.

Resilience is the ability of the system to recover from shock or disruption whether due to natural or man-made causes such as drought, freeze /thaw or asset failure. The level of risk that is deemed acceptable should be identified for each major potential source of failure or disruption and this will determine the extent of the redundancy required by the system. A point will be arrived at where the costs incurred in reducing relevant risk are balanced by the economic and other consequences of the particular failure or disruption.

10.6 Innovation and Technology Development

In facing current and future challenges UÉ should be prepared to take optimum advantage of innovative and emerging technologies wherever these offer preferred or desirable solutions. The company should also seek to employ the best engineering, scientific and management expertise.

An openness to the use of innovative technologies and the employment of recognised experts brings the additional benefit of inculcating a culture of high standards across the organisation with a corresponding increase in pride and commitment within the workforce.

The development and increased utilisation of resource recovery and circular economy approaches, particularly in wastewater treatment, is an example.

10.7 Future Proofing – Conclusions

The task of ensuring sufficient capacity for both water and wastewater treatment to cater for projected demand from domestic and industrial consumers is currently underway and needs to continue apace. The expected increased population will also put further demands on network capacity.

UÉ should continue to develop coordination with local and regional authorities through the medium of Development Plans and Regional Spatial and Economic Strategies (RSES) to ensure adequate provision of serviced land for development on a pre-emptive service provision basis.

UÉ should enhance its strategic longer term planning for the redistribution of water where an excess is available to areas of highest demand. This is a process that will likely take years, possibly even decades, to complete and bring into being.

UÉ should ensure that the water services sector is sufficiently resilient to enable it to cope with the anticipated effects of climate change including the development of integrated networks and multi-source supplies. A major priority in this regard is to progress the project to bring water from the Shannon basin to the GDA. A project plan for the Water Supply Project Eastern and Midlands Region should be developed and published and updated at intervals as the project progresses.

Innovative solutions are likely to be needed for many of the problems already identified in the sector and for those that are still to emerge. With this in mind it is proposed that UÉ might benefit from a formal collaborative engagement with academic institutions, domestic and international, that would complement the utility's own in house research and development work.

11. CUSTOMER FOCUS

Building and maintaining a high level of customer confidence in its operational capability and expertise is an important aim of any utility. It is arguably even more pressing in the case of UÉ given the legacy issues inherited from a prolonged period of under-investment in the sector.

It is important therefore that UÉ continues its efforts to strengthen this aspect of its role - particularly as it is in effect a monopoly public service provider.

A capacity to respond speedily to problems arising and for enhanced service requirements will likely increase as UÉ becomes a more customer focused organisation. This process will be made easier if the necessary technological and engineering solutions, plans and programmes are delivered in the agreed timeframe and efficient and cost-effective operations follow commissioning.

UÉ's customer base's appreciation of the complexity, challenges, and costs of delivering water supply and waste water services can be enhanced through public information programmes supported by a culture of transparency, accountability and ease of access to performance and project progress data. Such an appreciation can in turn lead to an improvement in the public's confidence in the utility's abilities across the board.

The CRU in its role as economic regulator monitors and reports to ensure that continual improvements are made in efficiencies and the cost management of service delivery with the overall aims of improving the quality of service and value for money. The regulator also continues to emphasise the importance of customer focus and continual improvement for the utility. The CRU website³⁵ offers information on its work in regulating and protecting the interests of UÉ customers.

To ensure that the customer is at the centre of its services and to support improved levels of service, the CRU developed two Customer Handbooks.^{36,37} One is for domestic customers and the other for non-domestic or business customers. The handbooks detail the required levels of customer service and customer protection measures that UÉ must include in its various Codes of Practice³⁸.

11.1 Customer Focus – Conclusions

UÉ needs clearer service level metrics designed to reassure customers that the utility is providing a satisfactory level of service.

It is proposed that a comprehensive, ongoing communications and public information programme is required to inform and educate all stakeholders of the range, scale and complexity involved in the provision of modern water services. This should include details on the nature of water services assets to be managed, the challenges to be faced (including rectifying legacy issues) in the providing for continued population growth and economic development to 2040 and beyond while addressing the demands of decarbonisation and adapting to climate change.

³⁵ CRU, Customer Protection: <https://www.cru.ie/home/customer-care/water/customer-protection-2/>

³⁶ <https://www.cru.ie/need-assistance/your-rights/>

³⁷ <https://www.cru.ie/home/customer-care/water/customer-protection-2/>

³⁸ <https://www.cru.ie/home/customer-care/water/customer-protection-2/>

12. RECOMMENDATIONS

Based on the assessment undertaken in this paper the Academy offers the following recommendations to UÉ.

Current Role:

The Academy, having advocated for a single national water utility in the past, greatly welcomes the advent of Uisce Éireann, commends it for progress achieved to date, wishes the organisation well for the future and recommends it continues to evolve to better fulfil its role.

Organisational Change:

The Academy recommends that UÉ continue to progress and complete:

- ▲ the integration programme for former local authority employees;
- ▲ formal and legal separation from former parent company, Ervia;
- ▲ continue to seek means to improve governance and internal processes; and
- ▲ Project Clarity.

Project Planning and Delivery:

The Academy recommends that the accuracy of both cost and time estimates in the capital programme require improvement if greater confidence is to be placed in the utility's project planning capabilities; similar improvement is required with regard to project delivery. We further recommend that regulators make appropriate allowance for issues outside the control of UÉ (e.g. legislative consents) when setting targets for monitoring parameters.

Funding Model:

The Academy believes there is a case to be made to change the current approach of separating operating expenditure (OpEx) and capital expenditure (CapEx) to one which provides flexibility to the utility to take a more holistic approach to the management of its assets base. This would involve developing an approach that allows flexibility in funding as between operational and capital expenditures, with agreed parameters and limits, especially where the provider is seeking to address diverse criteria across economic, environmental and emissions objectives.

It would also be prudent to examine a wider pool of benchmarking comparator data from a range of EU jurisdictions to allow for a more comprehensive comparison of benchmarks.

The effectiveness of each parameter measured for the Revenue Control Process should be monitored to ensure the process identifies and captures improvements in the utility's operations. This would benefit both the utility and its regulators in providing management information that identify actions capable of driving further efficiencies in and benefits to service delivery.

Quality:

It is recommended that programmes already underway to bring water and wastewater treatment systems into compliance with EU Directives and EPA standards should be continued and indeed accelerated in the coming years in order to achieve full compliance.

As part of this process the implementation requirements of revised Directives on Drinking Water and Urban Wastewater Treatment should be addressed.

UÉ should continue to seek opportunities to identify emerging practices such as the recovery of certain raw materials, e.g. phosphorus, from wastewater as a way to add value and promote circular economy principles.

To further support compliance with WFD a national policy and implementation plan should be developed to address the need to supercede the use of large septic tanks with treated systems.

Conservation:

Where leakage is concerned UÉ should continue its current efforts to find and repair losses from the supply network. If UÉ is to achieve results closer to EU norms it should set itself stretch targets to be achieved both to mitigate economic loss and to build public confidence and thereby to also support the aim of reduced consumption.

The programme to encourage consumers to reduce water usage is an important element in the conservation agenda. It is recommended that the continued expansion of smart water meters would give important usage

information to customers and encourage a more sustainable level of demand across the supply network.

Future Proofing:

The planning of future capacity for water supply and wastewater treatment is already underway but should be continued apace. Coordination with local and regional authorities through Development Plans and Regional Spatial and Economic Strategies should be further developed with the aim of ensuring adequate provision of serviced land for development is achieved on a pre-emptive service provision basis.

UÉ should enhance its strategic, long-term planning for the redistribution of water to areas of highest demand.

UÉ should ensure that resilience of the system is optimised to address the likely impacts arising from climate change and demographic and economic growth by integrated networks and developing multi-source supplies.

A major priority in this regard is to progress the project to bring water from the Shannon basin to the GDA. A project plan for the Water Supply Project Eastern and Midlands Region should be developed and published and made widely available with updates at intervals as the project progresses.

It is recommended that a more formal collaborative process be established with academic institutions to complement the work of UÉ in identifying industry best practice and in accessing technology innovation internationally. This could be achieved through formal arrangements and partnerships with local third level institutions and international organisations.

Customer Focus:

It is recommended that clearer service level metrics are developed and deployed to better inform customers about the service being provided.

UÉ should seek to achieve a comprehensive, ongoing communication programme is implemented that informs and educates both the general public and public representatives on all aspects of the water services provided including:

- ▲ the nature and scale of water services assets currently managed;
- ▲ the nature and the scale of the challenges to be faced in rectifying legacy issues;
- ▲ planning and providing for future population demand to 2040 and beyond; and
- ▲ in addressing the effects of climate change on raw sources while achieving net zero emissions.

13. CONCLUSIONS

The publication in 2015 of the Water Services Policy Statement 2018– 2025³⁹ set the public policy principles and themes for the delivery of water and wastewater services in Ireland over the period to 2025. Coupled with the Water Services Acts clear direction was given to strategic planning and decision making on water and wastewater services.

This was further reinforced in the Programme for Government (PfG) 2019 which included a commitment to “*retain Irish Water in public ownership as a national, standalone, regulated utility*”. The PfG further commits to ensuring that UÉ is sufficiently funded to make the necessary investment in drinking water and wastewater infrastructure. In addition, it mandates the utility to develop plans to ensure security of supply and sufficient capacity in drinking and wastewater networks to allow for balanced regional development.

Much of the water and wastewater infrastructure built to last century standards is now unfit for purpose. UÉ inherited massive legacy issues in the form of poor quality assets and poorly performing schemes, and, in many areas, a fragmented organisation model. Taken together with a historically deficient funding model the scale of the task to be addressed by the new utility was daunting.

To ensure the utility is capable of delivering assets that meet international standards of performance it must have long-term access to secure sources of adequate funding.

The consequences of climate change and the need to achieve net zero emissions by 2050 pose major challenges for all elements of society, including water services, and will require major innovation and technology development and the deployment of comprehensive asset management techniques (data analytics, real-time reports, etc.).

In common with other State bodies charged with meeting the targets in Project Ireland 2040 UÉ will need to pro-actively engage with private sector designers, manufacturers, and contractors in an ongoing manner in order to promote greater capacity and innovation in solutions. The latter should include developing collaborative arrangements that maximise synergies between key stakeholders and ensure access to and application of best international practices.

39 Water Services Policy Statement 2018-2025: <https://www.gov.ie/en/publication/49364-water-services-policy-statement-2018-2025/>

14. EPILOGUE: A VISION FOR THE WATER SECTOR

An effective and efficient national water utility is an essential component of any modern economy. Ireland too needs such a body to support and maintain national development goals and help meet the many challenges of the twenty-first century.

The Academy recognises the progress made to date by UÉ in achieving policy objectives and the vision originally set out for it. There have been many successes and some failures over the period since its inception. There have also been many complex societal, economic, and technological changes in that period. The company has weathered these changes as well as absorbing the many very considerable internal developments in the period.

It is to UÉ's credit that it has coped well with all of these changes and is now beginning to emerge as a standalone, State-owned utility of significance and with proven reserves of robustness and resilience. In a sense UÉ is coming of age after a decade of more of change, evolution and growth.

This success places the utility in a strong position to face into the many tasks that lie ahead. This paper has sought to identify some of the priority areas - be that responding to the needs of a growing population and economy or addressing the challenges posed by climate change and sustainability.

Subject to further evolution and ongoing improvement – of the kind sketched out in the foregoing sections – UÉ can become, and should aspire to becoming, by 2040 at the latest, a best-in-class, independent water utility of which the country can be proud.

APPENDIX A: ROLES AND RESPONSIBILITIES

A.1 Introduction

This appendix sets out the current responsibilities of organisations with a statutory role in the provision of water and wastewater services in Ireland.

Responsibility flows from the stated policy outcomes through the delivery organisation, i.e. Uisce Éireann, which is regulated to ensure compliance with both economic and environmental criteria.

A.2 Policy and Governance – the Department of Housing, Local Government and Heritage

Responsibility for public policy oversight rests with the Department. The Department is also for the body of legislation underpinning water services for the State and also for transposing relevant EU Directives into national law and overseeing their implementation.

Of most importance from a water services perspective are the [Water Framework Directive \(WFD\)](#), the [Drinking Water Regulations \(DWR\)](#), and the [Urban Waste Water Treatment Directive \(UWWD\)](#), which set out obligations for Member States in relation to environmental and quality standards in water services. The WFD sets the water policy framework across the EU, including appropriate charging and funding.

The Department has established two advisory bodies to inform policy discussion and decisions, viz. Water Policy Advisory Committee (WPAC) and Water Advisory Body (WAB) providing policy guidance and transparent accountability respectively.

A.2.1 Water Sector Transformation Policy Paper 2021⁴⁰

The Department published “Water Sector Transformation Policy Paper Irish Water - Towards a National, Publicly-Owned, Regulated Water Services Utility” in 2021. This sets out the Government’s policy on water service delivery following the 2020 Programme for Government (PfG) “Our Shared Future”.⁴¹ It sets out the Government’s expectation that Irish Water (as it then was) will integrate fully the day-to-day operation and delivery of water

services, ending the involvement of the local authorities. UE was to legally separate from Ervia group from 2023 and become a stand-alone national water services authority with its own Board and Executive.

A.2.2 Advisory Bodies

The Department is supported in its role by a number of advisory bodies.

- ▲ The Water Policy Advisory Committee (WPAC) membership consists of Government Departments and Agencies with responsibilities in the water sector and provides policy advice and assistance to the Minister on the implementation of the WFD and on broader water resource issues. WPAC is also responsible for providing advice on and support for the making of River Basin Management Plans, including the programme of measures as part of those Plans.
- ▲ The Water Advisory Body (WAB)⁴², is an independent body established under the Water Services Act 2017, to report to the Minister for Housing, Local Government and Heritage and to the Oireachtas on UE’s performance and on measures needed to improve its transparency and accountability. The Water Services (Amendment) (No. 2) Bill 2022 provides for the dissolution of the Water Advisory Body.
- ▲ An Fóram Uisce (Water Forum) was established as a statutory body in June 2018, representing all stakeholders with an interest in the quality of Ireland’s water bodies. It’s remit is to facilitate stakeholder engagement and debate on issues relating to water as a resource, water quality, rural water concerns, issues affecting customers of UE and issues associated with the implementation of the WFD.

A.2.3 Delivery and Operations – Uisce Éireann/ Irish Water

The national water utility was established as Irish Water on 1st January 2014, taking over the responsibilities of 34 local authorities for the sustainable delivery of clean drinking water and the treatment and safe disposal of wastewater.

40 Water Sector Transformation Policy Paper: <https://www.gov.ie/en/publication/06326-water-sector-transformation-policy-paper/>

41 <https://www.gov.ie/en/publication/7e05d-programme-for-government-our-shared-future/>

42 Water Advisory Body: <https://wateradvisorybody.ie/>

UE's strategic responsibilities are described and set out in number of documents while its day-to-day duties are delivered through a series of programmes.

- ▲ The Water Services Strategic Plan⁴³ is described as “an integrated plan for the delivery of water services” setting out the challenges and strategic priorities.
- ▲ UE, as required by Government, has also prepared a Strategic Funding Plan⁴⁴ and a Capital Investment Plan 2020 to 2024.⁴⁵ These set out the measures it proposes to undertake to implement the objectives of the Strategic Plan. The Funding Plan is submitted for approval to the economic regulator (see below).
- ▲ A National Water Resources Plan⁴⁶ sets out public policies that frame the delivery of water, balancing demand and supply, and to identify how to provide a safe, sustainable, secure and reliable water supply to customers for now and into the future whilst safeguarding the environment.
- ▲ A National Wastewater Sludge Management Plan⁴⁷ (NWSMP) outlines its strategy for managing wastewater sludge over the next 25 years.

UE meets its responsibilities to address immediate issues through a number of national programmes⁴⁸, the most significant of which are listed as follows:

- ▲ National Leakage Reduction Programme: to conserve the drinking water resource;
- ▲ Lead Mitigation Plan: to minimise lead levels in drinking water through targeted orthophosphate dosing, pending replacement of all public lead pipework;
- ▲ National Disinfection Programme: to upgrade and standardise disinfection systems across the country, to ensure drinking water is free from harmful bacteria and protozoa which can cause serious illness;
- ▲ Sewer Rehabilitation Programme: working in partnership with local authorities across the country to improve the sewer network across Ireland;
- ▲ the “Irish Water Growth and Development Programme” which includes projects to facilitate

new development in areas currently inadequately serviced by water infrastructure.

A.3 Economic Regulation – The Role of the CRU

The Commission for the Regulation of Utilities (CRU) is the independent economic regulator of UE. The CRU's key function is to protect the interests of the utility's customers.

The funding process operates follows. The Water Services Policy Statement (WSPS) sets out Government water policy objectives and priorities. UE prepares a Strategic Funding Plan outlining the costs of implementing the objectives of the WSPS and the CRU responds by developing a revenue control process to determine appropriate level of charges and revenue. It conducts the revenue control process, which includes benchmarking data from other jurisdictions, and decides the level of revenue UE is allowed for the revenue control period. The Department of Finance allocates the recommended funding to UE through the annual budgetary process.

The CRU also approves UE's Codes of Practice and advises the Minister on delivery of water services issues. It also cooperates with the EPA in its role as the environmental regulator.

The CRU monitors the utility to ensure it uses the revenue it receives (as allowed by the CRU) in the best interests of customers and to ensure effective and efficient operations are employed in line with stated objectives.

In order to ensure that UE uses the revenue it receives in the best interests of customers in 2016 the CRU developed a Performance Assessment Framework (“the Framework”) for monitoring performance and progress across a wide range of customer centred metrics. UE's Performance Assessment Report is published approximately every six months and allows the CRU to evaluate the utility's performance over time and also ensure that transparent data on the utility's performance. The Framework was reviewed during 2020/21 and revised metrics were issued in Sept 2021.

43 Water Services Strategic Plan: <https://www.water.ie/projects/strategic-plans/water-services-strategic/>

44 Irish Water Strategic Funding Plan: <https://www.water.ie/projects/strategic-plans/irish-water-strategic-fun/>

45 <https://www.cru.ie/wp-content/uploads/2019/07/CRU19148c-Irish-Water-Capital-Investment-Plan-2020-2024-October-2019.pdf>

46 National Water Resources Plan: <https://www.water.ie/projects/strategic-plans/national-water-resources/>

47 National Wastewater Sludge Management Plan: <https://www.water.ie/projects/strategic-plans/national-wastewater-sludge/>

48 National Programmes: <https://www.water.ie/projects/#national-programmes>

Under the [Water Services \(No 2\) Act 2013](#) the CRU approves UE's Water Charges Plan which sets out water services charges with regard to new connections, special meter reads, meter testing, and charges for provision of water and wastewater services to non-domestic customers.

A.4 Environmental Regulation – The Role of the EPA

The Environmental Protection Agency (EPA) was assigned the responsibilities of environmental regulator for Irish Water (as it then was) in 2014.

In relation to drinking water⁴⁹ UE is required to ensure that supplies are clean and safe, free from micro-organisms and parasites and any substances which may constitute a danger to health of consumers. The role of the EPA is to inspect and audit drinking water treatment plants, to monitor the quality of water supplies and report on its findings and recommendations.

The Agency publishes a Remedial Action List (RAL), which is a register of public water supplies that are in need of corrective action, usually at the water treatment plant. The EPA requires UE to complete an action programme for each supply on the list. The EPA updates the Remedial Action List at three monthly intervals.

The EPA also has enforcement powers (e.g. legally binding Directions) where it considers more robust action is justified.

With regard to waste water⁵⁰ UE is responsible for the collection, treatment and discharge of urban waste water in Ireland. Waste water must be treated before discharge into rivers, lakes or the sea. The standards for treatment are based on EU Directives to protect the environment and biodiversity and public health. The EPA, in its regulator role, identifies where treatment plants are below the required standard and reports on the corrective actions needed. Its priorities are the elimination of raw sewage discharges, protecting waters at risk of pollution and vulnerable habitats, and improving collection systems.

The EPA⁵¹ issues quarterly reports on UE's compliance performance with EU Directives, sets out its priority actions for the collection systems and the treatment plants in order to protect receiving water bodies from polluting effects. Specific targets are set to encourage improvements and reach full compliance.

A.5 Other Authorities

A number of other public authorities and organisations have responsibilities for aspects of environmental or public health policy affecting the provision of water services, and include the local authorities and the Health and Safety Executive (HSE).

Local authorities are the drinking water regulator for private water supplies, responsible for enforcing the Drinking Water Regulations for group water schemes and businesses with their own source of potable water. For Group Schemes see the [National Federation of Group Water Schemes](#) website.

The Geological Survey Ireland (GSI) provides information on groundwater vulnerability and quality⁵².

The Institution of Geologists of Ireland (IGI), provides Guidelines⁵³ on the safe construction and installation of water wells.

Since 2020, South East Technological University (SETU) has provided a Level 6 Apprenticeship in Geo Drilling which includes modules on water well drilling. The Apprenticeship is supported inter alia by Engineers Ireland, UE and the National Federation of Group Water Schemes.

The HSE is responsible for public health and must be consulted by UE or the local authority where there is a failure to meet the standards in the Drinking Water Regulations, or where there is a potential public health risk.

49 Drinking Water: <https://www.epa.ie/our-services/compliance--enforcement/drinking-water/>

50 Waste Water: <https://www.epa.ie/our-services/compliance--enforcement/waste-water/>

51 Urban Waste Water Treatment in 2020: <https://www.epa.ie/publications/monitoring--assessment/waste-water/uww-report-2020.php>

52 www.gsi.ie

53 <http://igi.ie/assets/files/Water%20Well%20Guidelines/Guidelines.pdf>

APPENDIX B: GLOSSARY

CRU	The Commission for the Regulation of Utilities
DAP	Drainage Area Plan
EI	Engineers Ireland
EPA	The Environmental Protection Agency
GNI	Gas Networks Ireland
HSE	Health Services Executive
IAE	The Irish Academy of Engineering
IGI	Institution of Geologists of Ireland
IW	Irish Water
LA	Local Authorities
NFGWS	National Federation of Group Water Schemes
NIC	National Infrastructure Commission
NPF	National Planning Framework
NWSMP	National Wastewater Sludge Management Plan
PfG	Programme for Government
RAL	Remedial Action List
SLA	Service Level Agreement
SW	Scottish Water
SWI	Scottish Water International
UÉ	Uisce Éireann
WAB	Water Advisory Body
WFD	Water Framework Directive
WPAC	Water Policy Advisory Committee
WSP-EMR	Water Supply Project Eastern and Midlands Region
WSPS	Government's Water Services Policy Statement
WSSP	Water Services Strategic Plan



Disclaimer

The members of the Taskforce and the contributors participated in extensive discussions in the course of a series of meetings, and submitted comments on a series of draft reports. This report represents the collective view of the Academy, and its recommendations do not necessarily reflect a common position reached by all members of the Taskforce and do not necessarily reflect the views of individual members of the Taskforce, nor do they necessarily reflect the views of the organisations to which they belong.



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