

## Introduction

Northern Ireland Water (NI Water) provides essential water and wastewater services throughout Northern Ireland.

In doing so, NI Water manages an extensive infrastructure network that includes 27,000 km of water mains, 16,000 km of sewerage mains, 23 water treatment works, and 1,030 wastewater treatment works. The company's operations are vital for maintaining public health, environmental protection, and supporting economic growth.

NI Water welcomes this opportunity to respond to the Utility Regulator's (UR) consultation on their Draft Determination of NIE Network's (NIEN) Transmission and Distribution 7<sup>th</sup> Price Control (RP7).

As outlined in NIEN's Business Plan and the UR's Draft Determination, the RP7 period will be transformational for Northern Ireland's energy sector and associated infrastructure.

Given the policy backdrop of the Northern Ireland Executive's 2021 Energy Strategy and subsequent Climate Change Act (Northern Ireland) 2022, this represents a once in a generation opportunity to put in place the building blocks of the energy system of our future in a manner that is sustainable, both from an environmental and economic growth perspective.

The same could also be said of NI Water's task of creating, maintaining and operating NI Water's infrastructure of the future.

With this in mind, NI Water is focused on substantial investment plans to ensure the sustainability and efficiency of its services for future generations, which align well with the ultimate policy objectives as outlined in NIE Network's RP7 submission.

Specifically, NI Water has some key synergies with RP7 that should be considered within this consultation:

- NI Water is the largest single electricity consumer in NI.
- NI Water is the 2<sup>nd</sup> largest landowner in NI.
- NI Water has 1900 grid connected sites that are geographically dispersed throughout NI. Many with significant connection capacity and adjacent to large population centres.
- NI Water has 90MW of existing standby generation that will need to be decarbonised.
- NI Water has flexibility opportunities and potential energy storage capacity within the existing water network and the potential to provide much more.
- NI Water has physical security, cybersecurity, and IT networks consistent with the operation of critical national infrastructure.
- NI Water's sponsoring Department (Department for Infrastructure) has responsibility for street lighting and the future of transport.

## Response

NI Water supports NIE Network's vision of 'Delivering a sustainable energy system for all', which in practical terms means providing an electricity network that can facilitate Northern Ireland's overall plan to address climate change by achieving net zero carbon affordably and decoupling our society's reliance on fossil fuels with their attendant price volatility. NI Water is the largest electricity user in Northern Ireland and also recognises that the plan will impact the cost of service provision for the business.

In its 'Power of Water'<sup>1</sup> report, NI Water similarly recognises the need to build a zero-carbon NI economy through both greening the generation of electricity and the way in which companies such as NI Water use it. Further, that the distributed use of renewable generation technologies, such as solar, wind, hydro, biomass etc, are a means to significantly increase the efficiency of power generation, its use and affordability.

These shared visions are fully compatible with the Northern Ireland Executives 2021 Energy Strategy and subsequent Climate Change Act (Northern Ireland) 2022.

Within NIEN's Business Plan there is the recognition that NI's Net Zero vision for the future must be a shared vision, that NIEN are part of the energy ecosystem and whole system thinking will be required.

From a whole energy system perspective, NI Water, as well as the broader Northern Ireland public sector, can significantly contribute to the Net Zero vision through a variety of strategies and initiatives. These actions can serve as both direct and indirect mechanisms for reducing greenhouse gas emissions, promoting renewable energy sources, and enhancing energy efficiency across the region.

To do so will clearly require a collaborative approach, ideally with the public sector leading by example by utilising publicly owned assets to support the cost-effective development of the building blocks of our future net zero energy systems.

In Oxford Economist Dieter Helm's book Net Zero<sup>2</sup>, the principle of 'the provision of public goods' is introduced as being central to understanding how various organisations, such as NI Water and the public sector more widely, can contribute to the overarching goal of achieving net zero emissions.

Public goods are defined as commodities or services that provide benefits to all members of a society, often with characteristics of non-excludability and non-rivalry, meaning that no one can be effectively excluded from their benefits and one person's use does not diminish availability to others.

NI Water is central to the consumption and management of water resources in Northern Ireland, which are in turn intrinsically linked to energy consumption and greenhouse gas emissions. The relevance of 'the provision of public goods' principle to NI Water in the context of facilitating the development of 'delivering a sustainable energy system for all' includes several key aspects:

## Energy Efficiency and Reduction of Carbon Footprint (1.3 a & b)

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<sup>1</sup> <https://www.niwater.com/the-power-of-water-report/files/assets/common/downloads/Northern%20Ireland%20Water%20The%20Power%20of%20Water%20Report.pdf>

<sup>2</sup> <https://www.new.ox.ac.uk/news/net-zero-how-we-stop-causing-climate-change>

Water treatment and distribution are energy-intensive processes. By adopting more energy-efficient technologies and practices, NI Water has been working to reduce its carbon footprint. This aligns with the public good of environmental protection and contributes to the broader goal of achieving net zero emissions. The development of a sustainable energy system, and in particular a smart electricity grid which efficiently manages energy use and integrates renewable energy sources, can be deeply supported by NI Water through demand response programs and energy management strategies that align water treatment and distribution activities with periods of low electricity demand or high renewable energy production.

### **Integration with Renewable Energy (1.3 a & b)**

As the 2<sup>nd</sup> largest landowner in Northern Ireland, with 1900 grid connections distributed throughout the region, NI Water can play a key role in the integration of further quantities of renewable energy onto the grid by accelerating its investment in renewable energy sources such as solar, wind and hydro power, both to support critical business operations and provide grid support services. This not only reduces NI Water's reliance on fossil fuels but also contributes to the stabilisation and resilience of the electricity grid through distributed energy resources. This provision of renewable energy aligns with the public good by reducing emissions and facilitating a transition to a cleaner energy system.

### **Water as a Storage Medium and Energy Storage (1.3 c)**

NI Water could make a key contribution to the development of a more sustainable grid through innovative solutions such as pumped hydroelectric storage, which uses excess electricity to pump water to a higher elevation for storage and later generates electricity by releasing the stored water through turbines. This form of energy storage can act as an enterprise scale buffer for the NI smart grid of the future by balancing supply and demand and integrating greater quantities of highly intermittent renewable energy sources.

In addition, due to the critical nature of NI Water's operations, NI Water has some of the most resilient grid connections and over 90MW of standby generators distributed throughout the region. These assets could be decarbonised, enhanced, centrally controlled and utilised for wider public benefit.

### **Data Sharing and Collaboration (1.3 e)**

The principle of providing public goods would also extend to the sharing of data and collaboration between NI Water and NIE Networks. By sharing data on water usage patterns, energy consumption, and operational efficiencies, NI Water can, with appropriate funding, assist with optimising Northern Ireland's electricity grid of the future, particularly at local distribution level, by improving energy forecasting, and facilitating more effective integration of renewable energy.

### **Decarbonisation of Heat**

NIE Networks has quite rightly identified that the decarbonisation of heat in Northern Ireland will inevitably entail the widespread adoption of heat pumps.

Wastewater, constantly flowing from residential, commercial, and industrial sources, maintains a relatively stable temperature year-round, typically warmer than the surrounding air in winter and cooler in summer. This thermal consistency makes wastewater an attractive source for heat extraction. Consequently, the concept of using heat from wastewater networks to provide domestic and commercial heating through heat pumps is a promising sustainable energy solution.

Heat pumps are devices that transfer heat from one place to another by using a small amount of external energy. In the context of wastewater heat recovery, heat pumps play a crucial role in extracting thermal energy from the wastewater and upgrading it to a higher temperature suitable for heating purposes.

Wastewater heat pumps can achieve higher coefficients of performance (COP) compared to air-to-air heat pumps, especially in temperate and colder climates. This is because the temperature of wastewater is generally higher and more stable than ambient air temperatures during the winter, reducing the energy required to upgrade the heat to useful temperatures.

The higher efficiency of wastewater heat pumps translates into lower operational costs. Since these systems require less electricity to extract and upgrade heat, the cost of heating per unit of energy delivered is lower compared to using air-to-air heat pumps, which often struggle with efficiency in cold weather.

Scottish Water Horizons<sup>3</sup> are already utilising wastewater heat pumps as critical components of the Scottish Government's Stirling Low Carbon Heat Project, and a number of other public buildings.

## **Decarbonisation of Transport**

NI Water manages an extensive network of distributed assets, including water and wastewater treatment plants, pumping stations, reservoirs, and pipelines that occupy strategic locations throughout Northern Ireland's urban and rural areas.

These assets could, with appropriate funding, play a pivotal role in supporting the decarbonisation of transport by facilitating the establishment of key clusters of electric vehicle (EV) charging and hydrogen refuelling infrastructure.

### *Supporting EV Charging Infrastructure*

**Utilising Existing Locations:** NI Water's sites could serve as strategic locations for EV charging stations. Their widespread distribution allows for the placement of charging points in areas lacking infrastructure, thereby encouraging EV adoption by improving accessibility and convenience for users. This could include providing public sector users with ultra-rapid charging (>100kW) in the first instance.

**Power Supply:** NI water's sites have a robust electrical infrastructure to support their operational needs. This can be utilised to provide the necessary power for EV charging stations without the need for significant additional investment in power supply systems. In some cases, NI Water may only need to upgrade existing connections to accommodate the additional load.

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<sup>3</sup> <https://www.scottishwater.co.uk/about-us/energy-and-sustainability/renewable-energy-technologies/heat-from-waste-water>

Renewable Energy Integration: NI water has been investing in renewable energy sources, such as solar, wind and hydro, to power our business operations sustainably.

The principle of 'the provision of public goods' underscores the importance of collaborative effort and the important role the public sector has to play in supporting environmental sustainability and the transition to a smart, resilient, and low-carbon energy sector. Through energy efficiency, renewable energy integration, innovative storage solutions, and collaborative practices, NI Water and the public sector more widely can significantly contribute to the public good by helping to mitigate climate change and promote sustainable development.

## Conclusion

- The UR's Draft Determination and NIEN's Business Plan recognises NIEN's challenge throughout the RP7 period to simultaneously digitally transform the business, build DSO capability, and deliver appropriate cyber security initiatives to facilitate the move towards a low-carbon economy.
- This challenge will require a whole system approach and collaboration with a wide range of stakeholders.
- The NI public sector should be a particularly important stakeholder given the scale of its combined primary energy use, legal mandate to decarbonise its activities, financial attractiveness, distributed asset base and leadership role.
- NI Water, as the single largest consumer of electricity in Northern Ireland, possesses a unique set of technical capabilities and infrastructure that can, if funded appropriately, be utilised to lead the public sector to underpinning the transition to a low carbon energy system. Leveraging its significant operational scale and technical expertise, NI Water can spearhead initiatives and serve as a model for renewable energy adoption, energy efficiency, and innovative carbon reduction practices.

Leveraging NI Water's capabilities in support of the RP7 Draft Determination's aims could, if appropriately funded, include:

### *1. Renewable Energy Production and Integration*

Utilising Existing Assets for Renewable Energy: NI Water can use its extensive land and property assets to host renewable energy projects such as wind turbines, solar PV panels, and small-scale hydroelectric installations. These projects can not only supply renewable energy to NIW's business operations but also potentially feed excess power back into the grid, supporting the wider energy network.

Innovative Energy Generation: With its expertise in water management, NI Water can explore innovative renewable energy solutions like hydrokinetic energy from water flow in pipes or energy recovery from wastewater treatment processes.

### *2. Energy Storage Solutions*

NI Water's operations could benefit from the integration of energy storage systems, such as pumped hydro and battery storage, to manage energy loads more effectively and store excess energy generated from renewable sources. This can help balance the grid and ensure a steady supply of renewable energy, even during periods of low generation.

### *3. Smart Grid Technology and Demand Response*

By implementing smart grid technologies, NI Water can play a crucial role in demand-side management. With its significant energy usage, it could shift consumption patterns in response to grid demands, helping to stabilize the grid and facilitate the greater integration of intermittent renewable energy sources.

#### *4. Energy Efficiency Measures*

NI Water can lead by example in implementing state-of-the-art energy efficiency measures across its operations, from advanced water treatment technologies that reduce energy use to retrofitting facilities with energy-efficient equipment. This not only reduces its own carbon footprint but also sets a benchmark for other public sector entities.

Leveraging its technical capabilities, NI Water can collaborate with academic institutions, technology companies, and other stakeholders in R&D projects aimed at developing new low carbon technologies or improving existing ones. This can include innovations in water treatment, energy generation, and waste management.

#### *6. Training and Capacity Building*

Through its technical expertise, NI Water can lead training and capacity-building initiatives within the public sector, sharing knowledge and practices related to energy efficiency, renewable energy, and sustainability. This can help elevate the overall technical capability across the public sector for implementing green initiatives.

#### *7. Collaboration and Partnerships*

NI Water can forge partnerships with other public sector entities, private sector companies, and non-governmental organizations to pilot and scale up low carbon technologies and practices. These collaborations can help leverage additional expertise, resources, and funding for broader impact. With NI Water acting as a central repository for 'real world' data and costs, these collaborations and partnerships would also prevent duplication of effort and a fragmented approach to decarbonisation across the public sector with attendant cost savings.

#### *8. Evidence Based Policy and Leadership*

With its understanding of the technical and operational aspects and 'real world costs of transitioning to a low carbon energy system, NI Water could play a key role in providing supporting evidence to inform policy and regulation. This could include structured engagement with policymakers to develop incentives for renewable energy, energy efficiency, and the adoption of innovative technologies across the public sector.

By capitalising on its technical capabilities and scale, NI Water can significantly influence the transition to a low carbon energy system in Northern Ireland. Through direct action, serving as a model for sustainable practices and central repository of 'real world' data, NI Water can lead the public sector in embracing renewable energy, enhancing energy efficiency, and contributing to the overarching goals of decarbonisation and climate change mitigation at scale.