POLICY BRIEF FOR AN FÓRAM UISCE

A FRAMEWORK FOR IMPROVING DOMESTIC WATER CONSERVATION IN IRELAND

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October 2021

The Water Forum

AN FÓRAM UISCE

EXECUTIVE SUMMARY

In recent years, Ireland has experienced shortages in households' water supply which are forecast to become more frequent. This brief was produced in response to An Fóram Uisce's Open Research Call, addressing a need to identify how water conservation measures can be implemented in Ireland.

Saving water has societal, environmental & economic benefits. Approximately 19% of the energy used in Irish homes is used for heating water [1]. A small reduction in household water use (of 20%) could lead to reductions of up to 0.45 kg-CO_2e /property/day [2] saving hundreds of thousands of tonnes of greenhouse gas emissions a year if scaled up across homes in Ireland. A reduction in domestic water use would also lead to a reduction in the volume of wastewater discharged to the sewer network, helping to mitigate existing capacity issues.

The average person uses 133 litres of water per day in Ireland [3]. Much of the advice on water conservation points towards behaviour change. However, homeowners frequently incorrectly estimate the amount of water they use [4]. The cumulative effect of water-saving devices offers huge potential for water conservation, when delivered alongside a sustained and consistent programme of education. But without regulatory drivers, the uptake of such technologies may be limited.

Smart metering can be impactful as an awareness strategy, providing a mechanism to inform and influence water-using behaviours. Domestic water use has been shown to decrease when users have immediate feedback on their use. Metered households use around 20% less than unmetered households [5][6].

Current building regulations provide guidance on water conservation measures, but it remains at the discretion of the owner whether to incorporate them. Stronger mechanisms - such as the integration of water efficiency in the BER certificate; or amendments to the building regulations to include minimum fittings standards - may better incentivise water conservation. The introduction of a mandatory water label could lead to consumer preference for efficient devices, product innovation, and reductions in per capita consumption [7]. Lessons can be learned from the intention to introduce a mandatory, government-led water label in the UK [8].

Ten recommendations are made to strengthen regulation and policy, facilitate agencies to engage with water conservation, enhance awareness & further research.

RECOMMENDATIONS

There is a need for **sustained Government-led buy in** to support the following policy recommendations:

1. **IMPLEMENT A MANDATORY, GOVERNMENT-LED WATER LABELLING SCHEME** linked to revised building regulations and fittings standards.

2. **UPDATE BUILDING REGULATIONS** to specify total water use per building and maximum ratings for fittings.

3. **INTRODUCE SMART METERING** as a non-pricing strategy to raise awareness on how and where water is used.

4. **INCLUDE WATER USE IN THE BER CERTIFICATE** creating alignment between water and energy efficiency at the building scale.

5. **ESTABLISH A NATIONAL WATER CONSERVATION TEAM** comprised of all agencies and partners responsible for water, to share best practice, skills and knowledge in Ireland.

6. **RETHINK WATER EDUCATION** to support a bottom-up understanding of water (from the processes that underpin treatment and supply, to the energy and resources required to produce drinking water) linked with national curriculum.

7. **IDENTIFY FUNDING FOR RETROFITTABLE WATER-SAVING KITS** to be provided free of charge to all domestic households.

8. **EXPLORE THE MULTIPLE BENEFITS OF WATER CONSERVATION** in contributing to net zero carbon targets, Housing for All/Project Ireland 2040 development targets and in reducing wastewater flows.

9. **FACILITATE AGENCIES AND PARTNERS TO ENGAGE** through the delivery of workshops on systems-thinking on water conservation.

10. **SUPPORT FURTHER RESEARCH** into the barriers and opportunities for technologies, the cost-benefit of water conservation education campaigns, and methods to quantify water savings.

INTRODUCTION

Ireland's water resource availability is under pressure from population growth, increasing demand and the effects of climate change. The areas with the lowest rainfall are the most densely populated. There are multiple agencies responsible for supplying water to domestic households in Ireland. The majority (82%) of the population receives their drinking water from Irish Water, with 12% receiving their drinking water from private wells or small private supplies; and 6% receiving drinking water from group water schemes [9]. Irish Water manages 539 independent water supply systems (known as water resource zones) serving populations between 30 and 1.7 million people. Many of these are vulnerable to water supply deficits [10].

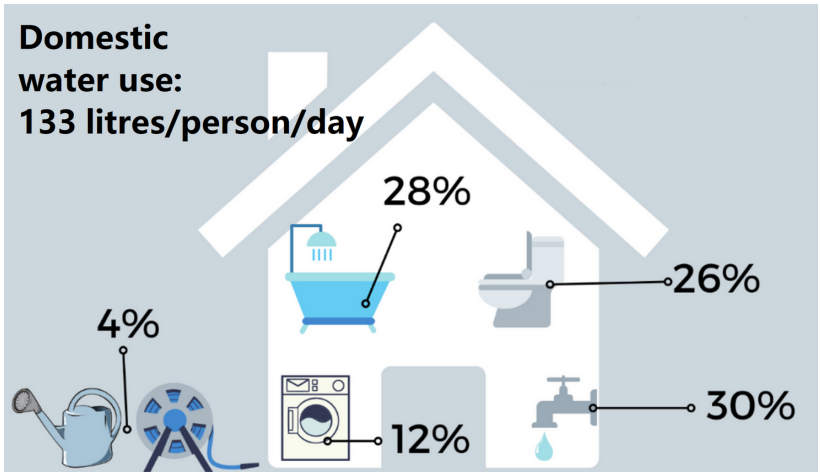
MORE THAN HALF (58%) OF IRELAND'S WATER RESOURCE ZONES ARE IN A SUPPLY-DEFICIT IN NORMAL CONDITIONS. TWO-THIRDS (66%) ARE IN DEFICIT IN A SUMMER DROUGHT.

Three of the past four years (2018-2021) in Ireland have seen some level of water conservation requests or restrictions, ranging from night-time pressure restrictions at the county level to national Water Conservation Orders lasting multiple weeks.

The challenges Ireland's water infrastructure faces are likely to become exacerbated by population growth (a projected increase of 21% in 25 years) and forthcoming abstraction legislation required to meet obligations in the Water Framework Directive [10]. This may reduce the amount of water that can be withdrawn from rivers and groundwaters in the future.

Furthermore, the amount of water used directly affects the amount of wastewater generated. Capacity issues in the sewer network are an ongoing issue; raising questions over the viability of new housing [11] required to meet population growth and Government efforts to boost regional development, and exacerbating pressures resulting in flooding or pollution events when combined sewer systems overspill [12].

Approximate water use in a typical Irish household. Adapted from [3]



IRELAND RANKS 10TH HIGHEST OUT OF 25* OF 27 EU COUNTRIES FOR DOMESTIC WATER USE

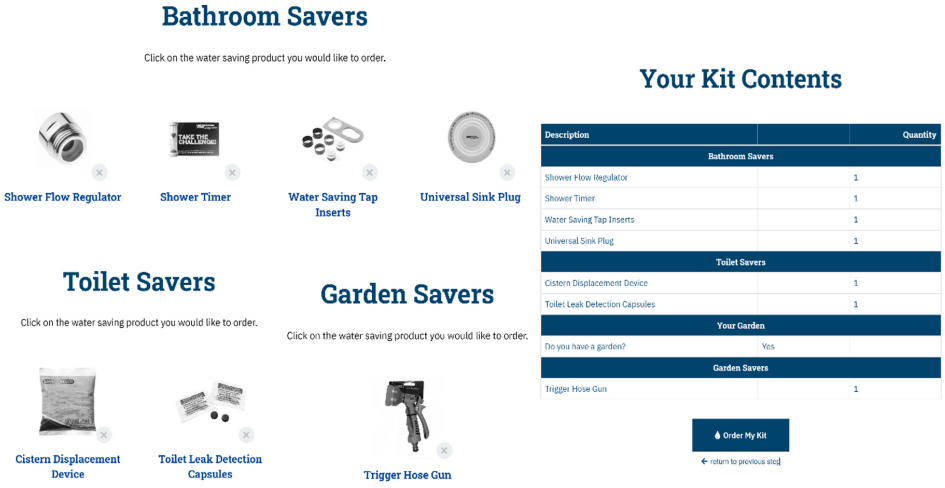
**data missing for Latvia & Lithuania [13].*

Domestic water use in the European Union varies between 80 - 220 litres/person/day [13]. Actual use varies due to the type of fittings and appliances present in the home, and due to other factors such as the behavioural habits of the occupants, plumbing losses, and the weather.

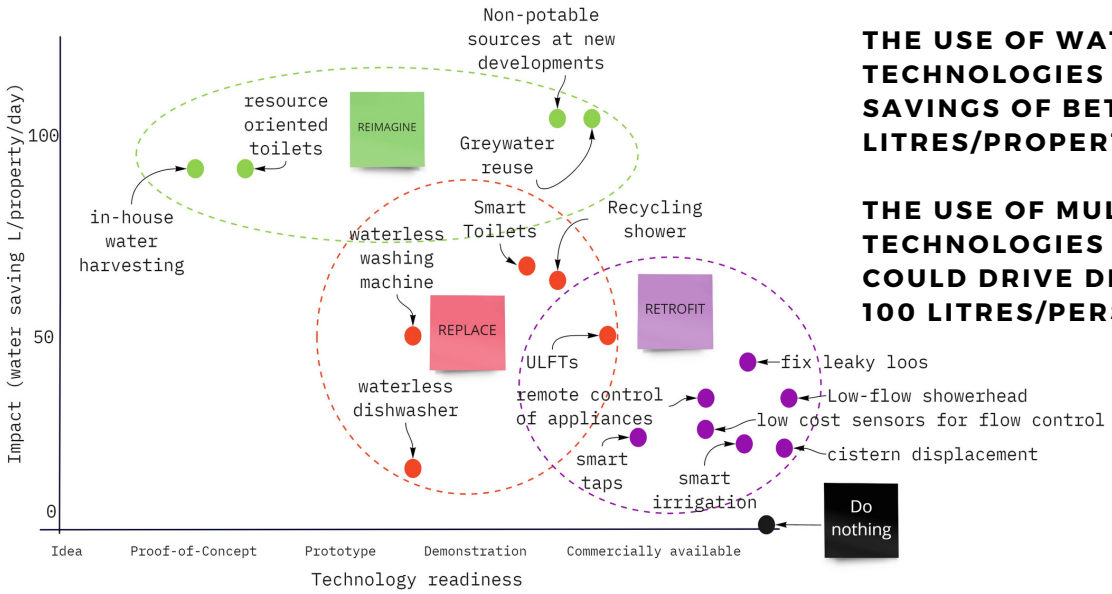
TECHNOLOGY

If user behaviour is unchanged, the introduction of water-saving devices should lead to a reduction in total water use. Retrofittable water-saving technologies include items such as toilet cistern bags, shower timers, or aerated taps/showerheads. Irish Water's website states these "are available from DIY stores or garden centres. You can contact a plumber for advice on what water saving devices are suitable" [3]. However, Waterwise found that 95% of UK water suppliers distributed "free of charge home water efficiency devices to homeowners" [14].

An example (Northumbrian Water) is shown (left). This is **supplied free of charge to the customer.** The cost price of the items is roughly €30. Individually, these solutions may only deliver a 10 - 20 litre/property/day saving, but they are cost-effective, readily available, and easy to install. A combination of technologies, rather than any one in isolation, is likely to deliver a greater impact in litres/property/day.



Greywater reuse or community-level rainwater harvesting could deliver significant savings (of up to 39 litres/person/day, or 100 litres/property/day) if greywater or rainwater is reused for toilet flushing, outside use and clothes washing [15]. In the UK, rainwater reuse was deployed at scale following introduction of the Code for Sustainable Homes. However, when this was withdrawn in 2015 the rate of domestic rainwater harvesting uptake fell accordingly. Now, uptake tends to occur where there is a planning and building regulation specification to stay below a given level of per capita consumption (e.g. 110 litres/person/day [16] - see next page). The largest savings may be achieved when implemented in multi-occupancy buildings [17][18].



THE USE OF WATER SAVING TECHNOLOGIES COULD LEAD TO SAVINGS OF BETWEEN 20 – 100 LITRES/PROPERTY/DAY.

THE USE OF MULTIPLE TECHNOLOGIES TOGETHER COULD DRIVE DEMAND BELOW 100 LITRES/PERSON/DAY.

Technologies (above) are grouped as: (i) 'retrofit' solutions, which can be easily installed by the homeowner; (ii) options to 'replace' or upgrade existing fittings with efficient alternatives; or (iii) a "re-imagining" of water-use in the home with multiple alternative sources of water or innovative technologies.

REGULATION

One of the key regulatory instruments for water in Ireland and the EU is the Water Framework Directive (WFD), which reflects the need to conserve adequate supplies of water, along with protecting and preserving water quality. Water conservation was also one of three key themes set out by the Irish Government in the Water Services Policy Statement 2018–2025. However, stronger mechanisms could still be deployed across national policy to improve domestic water conservation, including the use of revised building regulations with minimum fittings standards, or a labelling scheme linked with energy efficiency.

The relevant Irish **building regulations** include Part G (S.I. No. 335/2008), Part H (S.I. No. 561/2010) and Part L (S.I. No 292/2019 - European Union (Energy Performance of Buildings) (No.2) Regulations 2019), which state:

- **Part G - Hygiene:** "sanitary conveniences shall be of such design as to facilitate efficient use of water for flushing",
- **Part H (S.I. No. 561/2010) – Drainage and Wastewater Disposal:** no relevant reference to water conservation or surface water reuse,
- **Part L – Conservation of Fuel and Energy:** "providing and commissioning energy efficient space and water heating systems with efficient heat sources and effective controls".

There are currently no specific targets for fittings or whole-building water use in Ireland.

Irish Water's Code of Practice for Water Infrastructure suggests:
"Developers, in the interest of water conservation, are encouraged to adopt... the use of dual flush water cisterns, low flow taps etc." This is not supported by any specific targets.

In contrast, **Approved Document G building regulations in England & Wales** [16] provides:

- specific component level targets, specifying the flow rate of individual fixtures and fittings (see table below); and
- whole-building outcomes, specifying the building's total water use.

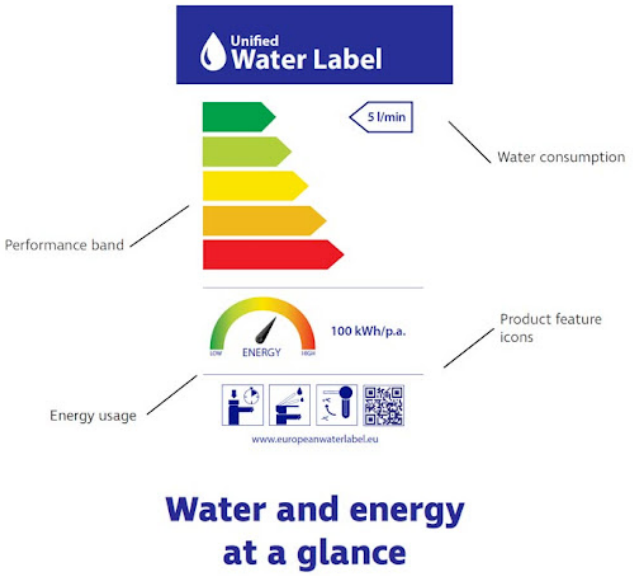
It states that "reasonable provision must be made by the installation of fittings and fixed appliances that use water efficiently for the prevention of undue consumption of water" and that water use must not exceed 125 litres/person/day in new dwellings, or 110 litres/person/day in dwellings in water-stressed regions [16]. The specific targets are outlined below:

	125 litres/person/day	*110 litres/person/day*
Fitting/Fixture	**Maximum fitting consumption**	
WC	6/4 litre dual flush 4.5 litre single flush	4/2.6 litre dual flush
Shower	10 litres/minute	8 litres/minute
Bath	185 litre capacity	170 litre capacity
Dishwasher	1.25 litres /place setting	
Washing Machine	8.17 litres / kilogram	
Sink Taps	8 litres/minute	6 litres/minute
Basin Taps	6 litres/minute	5 litres/minute

A study by Water UK found that without changing building regulations it would not be possible to cost effectively reduce domestic water consumption below 115 litres/person/day [19].

Water efficiency labelling refers to programmes that provide an indication as to whether the amount of water used by fittings and appliances is efficient. A 2019 review of water efficiency labelling found there are four mandatory schemes (in Australia, New Zealand, UAE and Singapore) and 14 voluntary schemes globally [7]. Since the review was published, the UK Government announced the intention to introduce a mandatory, government-led water efficiency label in July 2021 [8], linked with building regulations and fittings standards. In Ireland, there is a voluntary, industry-led scheme: the EU Water Label.

Mandatory labelling schemes tend to have a higher uptake than voluntary schemes and produce larger water savings [20]. In a cost-benefit analysis of water labelling scheme scenarios, water savings in the government-led, mandatory scheme were predicted to be 31.4 litres/person/day within 25 years [20]. The cost of implementing a government-led strategy was less than a third of the cost of implementing an industry-led, voluntary scheme relative to the amount of water saved, and the potential for water-savings was expected to be 70% higher than a voluntary, government-led scheme, or 95% higher than a voluntary, industry-led scheme (i.e. the business as usual case) [20].



Singapore introduced a mandatory, government-led scheme, linked with minimum standards for water fittings in 2009. Since then:

- sales of more efficient (3-tick) washing machines increased by 51% in 5 years;
- the rating system was updated to introduce a fourth tick, due to an increase in the amount of efficient appliances in the market, and
- per capita consumption decreased by 13% [7].

A POTENTIAL ROUTE TO IMPLEMENTING A WATER EFFICIENCY LABEL IS TO COMBINE WITH THE BUILDING ENERGY RATING (BER) CERTIFICATE.

The **Building Energy Rating (BER)** evaluates the energy performance of a home on a scale between A and G. This is a legal requirement, specified in Directive 2002/91/EC. The methodology for calculating building energy performance may differ at a regional scale, but should follow a common approach to enable transparency in comparisons across the market.

19% OF THE ENERGY USED IN IRISH HOMES IS USED FOR HEATING WATER.

Almost a fifth of household energy use in Ireland is from heating water [1]. Carbon emissions arising from the abstraction, pumping and supply of water, its use in the home (including hot water for showers, taps, baths, washing machines and dishwashers) and the collection and treatment of wastewater amounts to approx. 2.5 kg-CO_2e/property/day [2].

If per capita consumption was reduced by just 20% to 110 litres/person/day, there could be savings of 0.45 kg-CO_2e/property/day [2]. A reduction to 80 litres/person/day could save more than a third of all water-related emissions [2]. There is therefore a need for greater integration between water and energy efficiency, adopting a “whole house” efficiency approach through integration of water efficiency in the BER certificate.

EDUCATION

In the absence of volumetric water charges, water conservation policy relies upon public awareness, standards and legislation. There is a cumulative effect with non-pricing strategies whereby the value of multiple interventions together is considerably greater than the sum of its parts [21]. Whilst Denmark has one of the highest average water prices in Europe, their price-based strategies are supported by substantial non-price based mechanisms such as support for installing water-saving toilets, a two-year awareness campaign, mandatory water metering, and extensive rainwater and greywater reuse. Water consumption in the city of Copenhagen is now less than 100 litres/person/day [6]; ~ 25% less than the average in Ireland.

Educational campaigns can lead to a longer and deeper change in behaviour than traditional policy instruments. However a number of key barriers remain, including:

- insufficient information about personal water use,
- insufficient information about water scarcity, and
- difficulty changing habits [19],

Homeowners frequently incorrectly estimate their water use [4]. Compounding this, the variation in water used between minimum and maximum users is more significant than for other utilities (i.e. gas or electricity) [22]. Smart metering leads to greater awareness by identifying norm-based data and presenting options to achieve water savings [23]. Research has shown that unmetered households use more water than metered households (e.g. 40 litres/person/day or 25% more in the UK [5]; up to 20% more in Denmark [6]).

DOMESTIC WATER USE DECREASES WHEN USERS HAVE IMMEDIATE FEEDBACK

METERED HOUSEHOLDS USE APPROXIMATELY 20% LESS THAN UNMETERED HOUSEHOLDS

Learnings from a target-based awareness campaign in Australia [24] revealed that there was:

- a lack of understanding around how critical the need was to conserve water,
- a misunderstanding around which sector was primarily responsible for water consumption (with residents believing it was industry) and
- a lack of appreciation for the difference they could make as an individual.

This highlights a need for education and awareness not only on how much people are using, but also what motivates them to save water, why water conservation is necessary and who should be responsible for addressing gaps in knowledge and understanding.

A KEY CHALLENGE INVOLVES ADDRESSING SYSTEMIC BARRIERS IN UNDERSTANDING ABOUT WATER

The lack of public awareness around: (i) the processes that underpin water treatment and supply, (ii) the amount of energy and resources required to produce drinking water, and (iii) the amount of water an individual uses, hinders attempts to introduce water conservation measures. If there is no perceived need to save water, due to a lack of information on water scarcity or water supply vulnerability, there is little incentive to do so. To address this, there are a range of strategies that can be used to promote water conservation behaviour including knowledge transfer, enhancing self-efficacy, the use of social norms, framing, tailoring, the use of emotional shortcuts, priming and nudging [25]. However, the way in which this is delivered is extremely important. Research has found that if people don't trust others to conserve water, they will use this to justify their own lack of motivation [26]. Furthermore, if there is a lack of institutional trust in the authority delivering the messaging, people will be less inclined to cooperate and save water [27]. Therefore, a collaborative effort, delivered by multiple agencies, may be the most effective approach for any future awareness campaigns.

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