

# Working together in the water sector

**wrc** 

independent | trusted | innovative

The Economy of a Water City

Wroclaw 2018

**Andy Blackhall**

Director of Corporate Growth Strategy





## group

Established leaders in innovation, we are trusted by a wide range of stakeholders to add value at every level.



## water

Sustainable and robust solutions for water utilities, industry and regulators and their customers.



## gas

Facilitating transformational change for the UK's gas distribution networks in the path to a low carbon future.



## environment

Generating valuable evidence that transforms resource recovery in an evolving circular economy. Strategic consultancy, solutions and technologies to meet a wide range of environmental challenges.



## network

Deployment of innovative technologies for inspection, monitoring and management of pipeline infrastructure.

# The wrc Vision & Values

## independent

Our independence is valued by all our stakeholders. Regardless of the changing demands of the commercial world, our independence is never compromised.

## trusted

We have earned the trust of industry, government, academia and the public as a centre of excellence. This drives our continued commitment to deliver world class technical and scientific expertise.

## innovative

Throughout our history, we have built our business upon science and engineering excellence, and a foundation of innovation. Whatever the challenge, we nurture and encourage collaboration and new ways of thinking.

“

**At WRc, we aim to add value in all that we do. We work with our clients to develop innovative and effective outcomes to help them meet their technical challenges and provide a world-class service to their customers**

Mark Smith  
CEO, WRc plc

**wrc**  
wrcplc.co.uk

# 90 years of wrc 1927 – 2017



1989

The UK's water industry is privatised. **WRc plc** is created with staff owning 57% of the voting shares.

1974

**Water Research Centre (WRc)** is created from the WPRL, WRA and WRB.

**WRc WATER RESEARCH CENTRE**

1953

**Water Research Association (WRA)** established to study drinking water treatment and distribution. The following year post-war expansion of WPRL results in a new, permanent laboratory in Stevenage.



**WATER RESEARCH CENTRE**

1927

**Water Pollution Research Board (WPRB)** is created as part of the Department of Scientific & Industrial Research.



**Water Pollution Research Laboratory (WPRL)** opens.

1940

1997

**WRc approved** – fit for purpose certification scheme.

1992

Explosive atmospheres **FLIDS** methodology.



**WRc**

1973

The Water Act is the catalyst for industry-wide reorganisation.



1963

Spiralling water consumption prompts the Government to establish the **Water Resources Board (WRB)**.



2007

The first national **FOG** in Sewers Research Programme – Fats Oils and Grease project.

1994

First release of the urban pollution management manual, origin of the **SIMPOL** model.



1990

Major investment is made in our Swindon HQ. Subsidiaries are opened in Europe, Asia and America.



2017

Today, **WRc Group** employs over 150 environmental scientists, engineers, chemists, economists, policy advisers and business analysts.

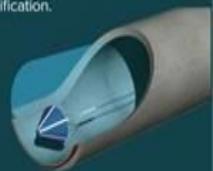
**WRc**

2015

Cured in place lining (**CIP**) in Gas Sector, the new option for pipe replacement.

2000

**Sahara**® – in pipe inspection, leak pinpointing and quantification.



**wrc**

independent | trusted | innovative



# Economy of a Water City

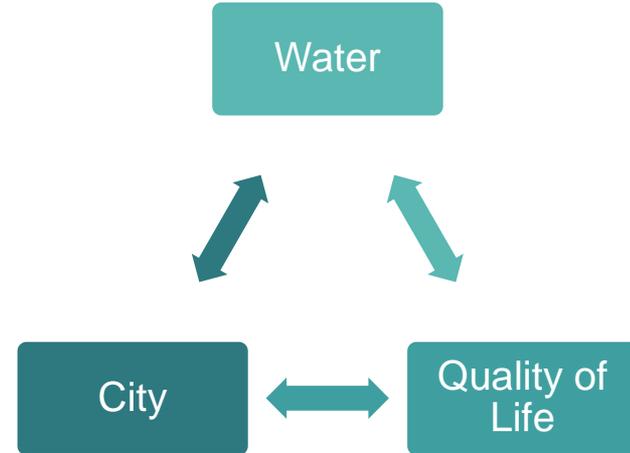
 Population in thous. <b>38413</b> <small>June 2016</small>	 Live births per 1000 population <b>10.3</b> <small>June 2016</small>	 Natural increase per 1000 population <b>0.6</b> <small>June 2016</small>
 Age dependency ratio (non-productive population per 100 working-age population) <b>63</b> <small>June 2017</small>	 Unemployment rate in % <b>5.9</b> <small>July 2016</small>	 Average paid employment in enterprise sector in thousand <b>6290.1</b> <small>August 2016</small>
 Average gross value added in enterprise sector in Pln <b>4798.27</b> <small>August 2016</small>	 Average monthly gross retirement and other pension from non-agricultural social security system <b>2223.39</b> <small>June 2016</small>	 Basic amount in <b>3731.13</b> <small>2017</small>
 State budget revenue in N Zł <b>154 058.6</b> <small>January-May 2016</small>	 Deficit (balance) of the public finance sector in mln Pln <b>9 585.3</b> <small>January-May 2016</small>	 Total expenditure of the public finance sector in mln Pln <b>164 623.2</b> <small>January-May 2016</small>
 Price indices of consumer goods and services <b>100.0</b> <small>August 2016</small>	 Dwellings completed <b>114802</b> <small>January-August 2016</small>	 Price index of construction and assembling production <b>102.3</b> <small>January-August 2016</small>
 The synthetic indicator of the business tendency <b>109.0</b> <small>August 2016</small>	 Price per capita in <b>48 366</b> <small>2016</small>	 PNB per capita in <b>48 366</b> <small>2016</small>
 Area of special natural value legally protected in % of country area <b>32.5</b> <small>2016</small>	 Price of a square meter of stable floor space of a residential building <b>4 296</b> <small>July quarter of 2016</small>	 Total water consumption for the needs of national economy and population in dm <sup>3</sup> <b>9 656 342.5</b> <small>2017</small>
 Total emissions of carbon dioxide in thous.t <b>370 639</b> <small>2016</small>		



Total water consumption for the needs of national economy and population w dam<sup>3</sup>

**9 656 342,5**  
2017

<http://stat.gov.pl/en/basic-data/>

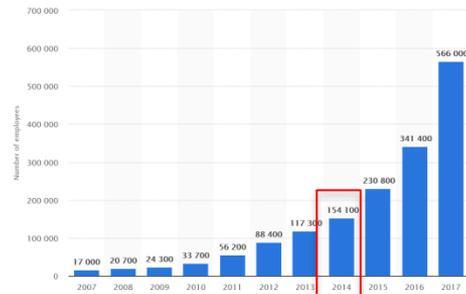




## 'We wrote the book' on supply chain circular economy

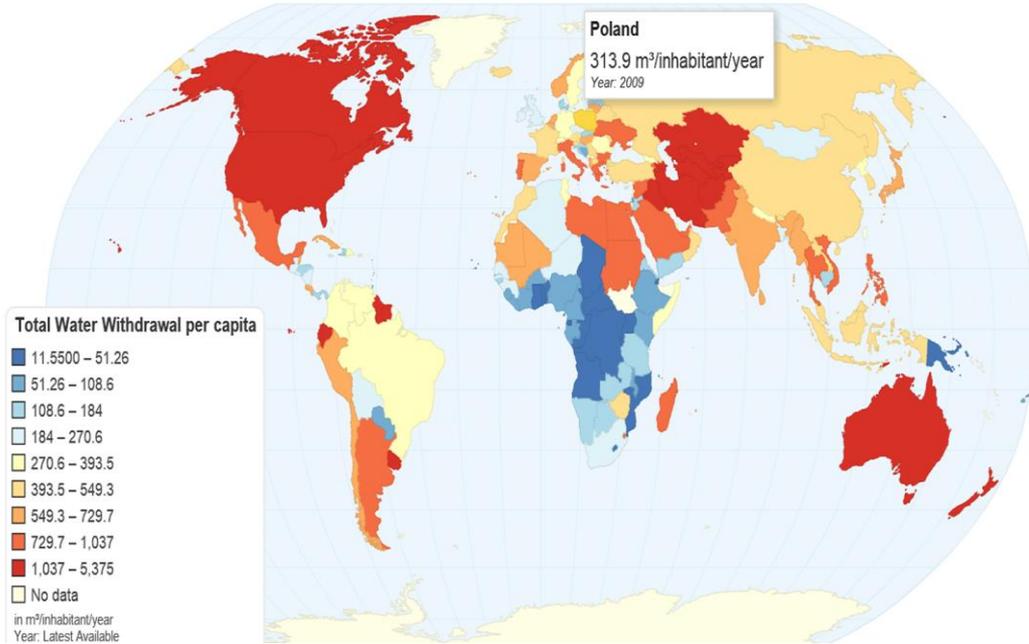
- SUEZ, WRc and GJF Fabrications sponsored a piece of work on moving the UK Supply Chain model to a more sustainable footing
- WRc undertook the review of the UK utilities sector identifying that in 2013:
  - The UK Water Sector alone amounts to an estimated total economic impact of £15bn (GDP of Georgia)
  - A combined workforce of 166,000 people
  - £5bn was spent on operating expenditure
  - Turnover of £11.4bn
- However:
- End of life utilisation of Assets remains a challenge.
- Can there be a better use of space, equipment and technology or co-locating and reuse of end of design life assets?
- Information sharing and competitive risk may be limiting development.

Number of Amazon.com employees from 2007 to 2017



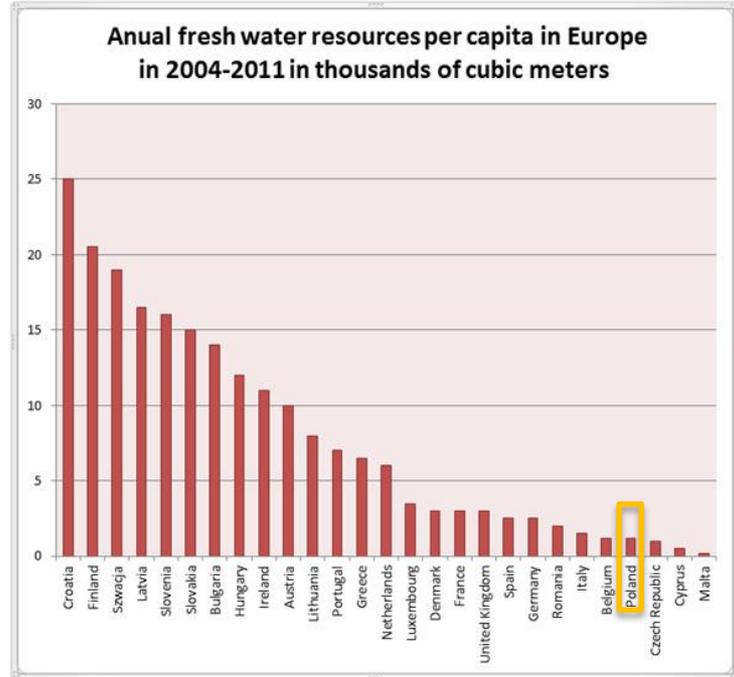
# Middle of the Pack?

Total Water Use per capita by Country



<http://chartsbin.com/view/1455>

Annual fresh water resources per capita in Europe in 2004-2011 in thousands of cubic meters



Source: Analysis EY, 2015

## Future Drivers for Change

- Population
- Regional Economic Development
- Variability of climate, 'not enough when you need it, too much when you don't'.
- Change of customers relationship with water – greater customer (or consumer) opinion about standards they receive.
- Increasing costs for treatment and distribution
- Competing demands for supplies

Poland: Total population from 2012 to 2022 (in million)

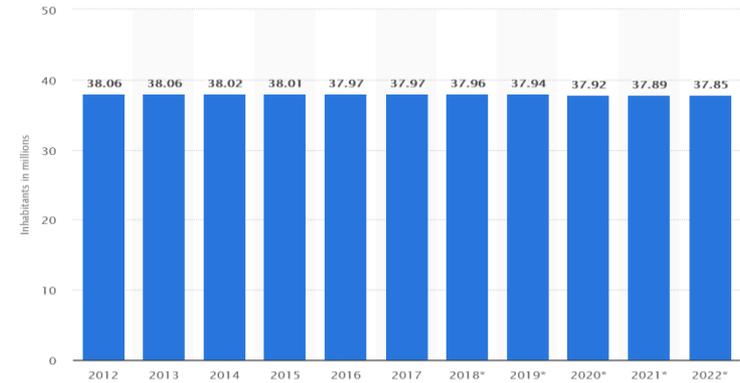
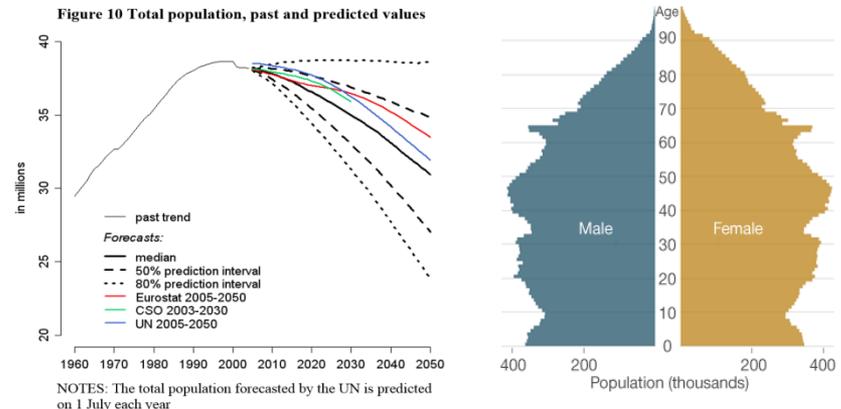


Figure 10 Total population, past and predicted values





# What does it mean to Individual Customers?

discolouration  
 communications  
 quality environment  
 Bills need customer tackle  
 taste water affordable  
 odour  
 tackling protect network  
 maintain bursts  
 education  
 leakage  
 improve

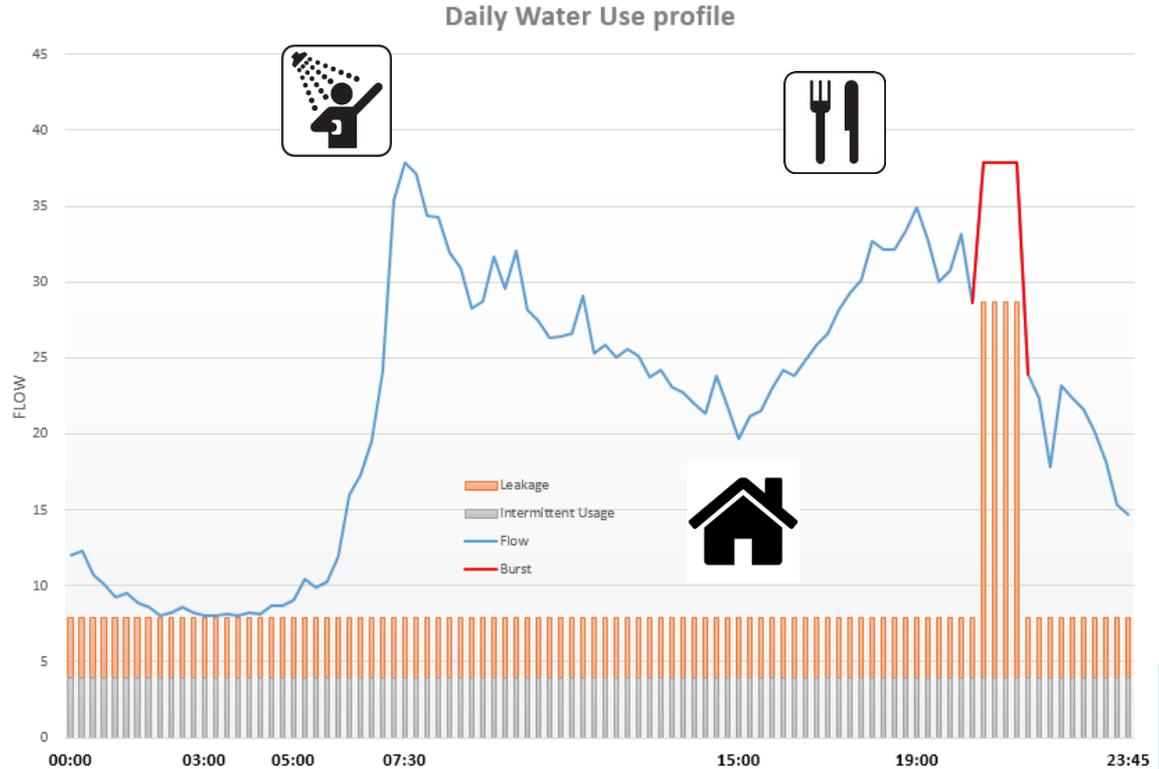
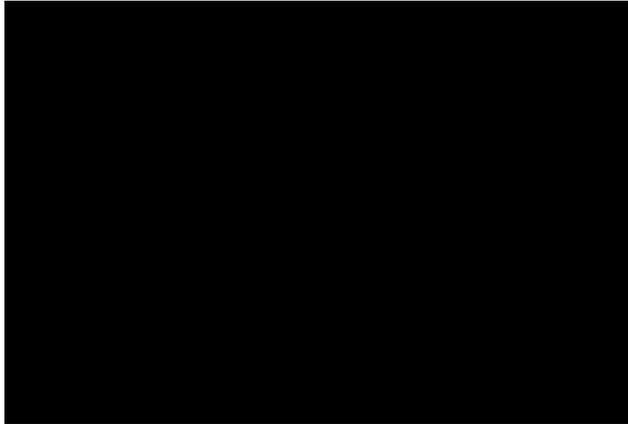
## Your Welsh Water

A lot of hard work goes into every drop of water on its journey to and from your home. Here's how your Welsh Water works:



# What drives demand?

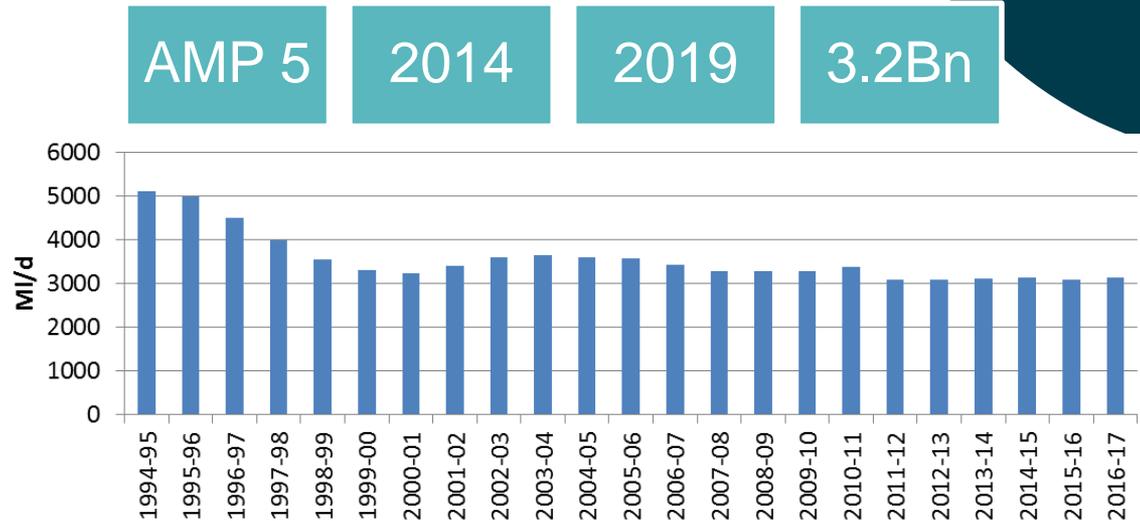
- Showers are expensive!
- 15 minute resolution too high
- Intermittent 'estimates' of demand
- Its only a leak if we say so
- Current methods aren't cutting it.





## The UK Leakage Ambition to 2019

- At Asset Management Period 5 (2014), England & Wales utility level of ambition resulted in a intended leakage level of 3.2Bn Litres per day at 2019.
- Leakage is used as the base planning component of Water Resource Management Plans
- It is the area of demand we have most control over.



**Figure 1.1** Leakage in England and Wales from 1994-05 through to 2016-17. Adapted from sources: Water UK (2017), HM Government (2008), Ofwat (2008), Ofwat (2009), Ofwat (2010)



## The 2019 Price Review

- Inconsistencies of calculation methodologies between companies
- Outcome Delivery Incentives leading to concerned customers and stakeholders
- Regulator commissioned a 'Consistency' project to re-align the way the UK reports leakage.
- Regulator established 'discover water' to improve confidence and comparability
- Changes in reported leakage as high as 30% by some companies.

Discover Water.co.uk

Find out how water companies in England & Wales are performing

< Go Back

# Leaking pipes

## Getting water to your home

Water is brought to your homes through thousands of kilometres of underground pipes. For various reasons, pipes can leak and some water is lost between the treatment works and your home.

342,877 km

Length of water pipes (mains) owned by water companies

Equivalent to



8.5 times  
around the equator

Source: Water UK; England and Wales, Apr 2016 - Mar 2017

3,123

Million litres of water leaked each day

Equivalent to

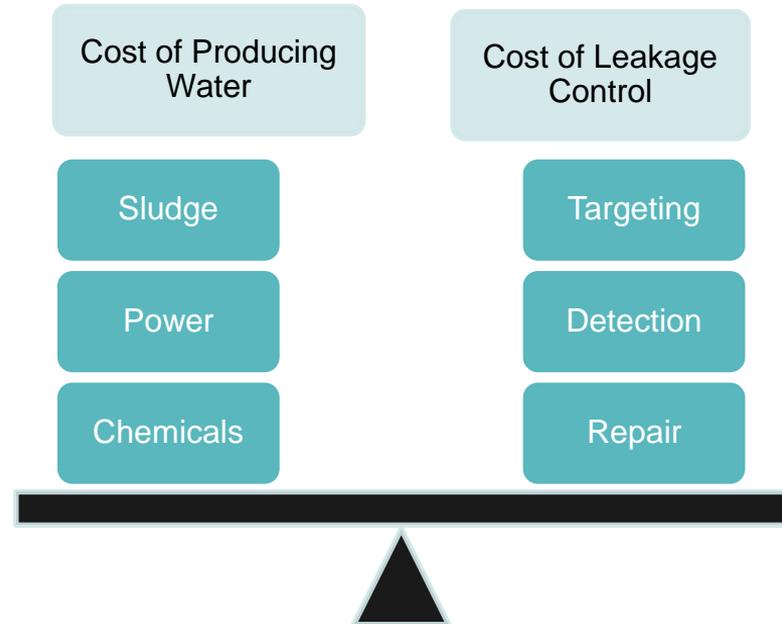


1,249  
Olympic swimming pools per day



## Sustainable Economic Level of Leakage planning

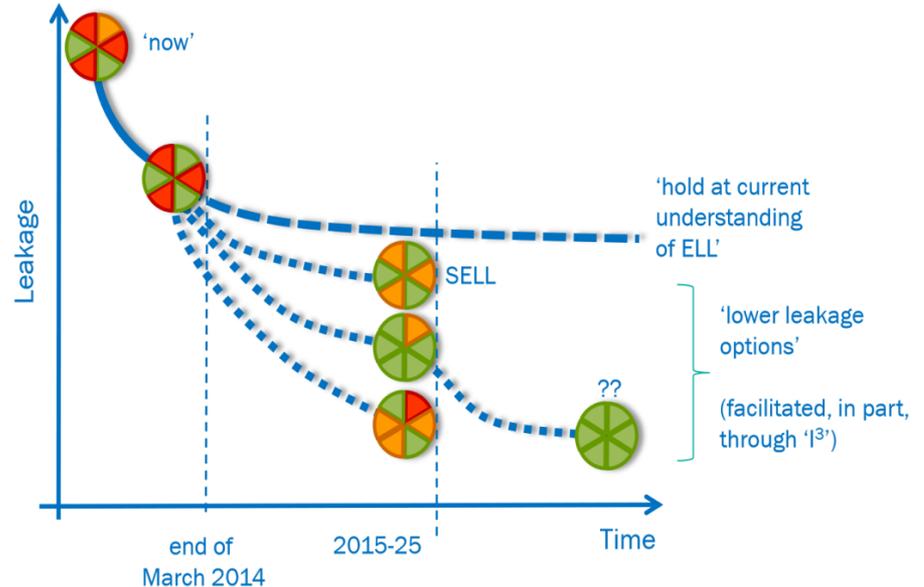
- A short term (typically 5 year) assessment of direct operational costs
- Requires some historic costs, other strategies can be deployed to get you started on the leakage path
- All costs are variable, and are impacted by external factors



## Planning for what? Not resilience...

- SELL if used incorrectly can result in a conceited position
- Lack of leadership, or ambition on delivering leakage can be justified by poor planning
- SELL provides annual levels of leakage, it doesn't provide a resilience measure against short term impacts
- Challenging the components of SELL highlights the research needs and sensitivity of components.

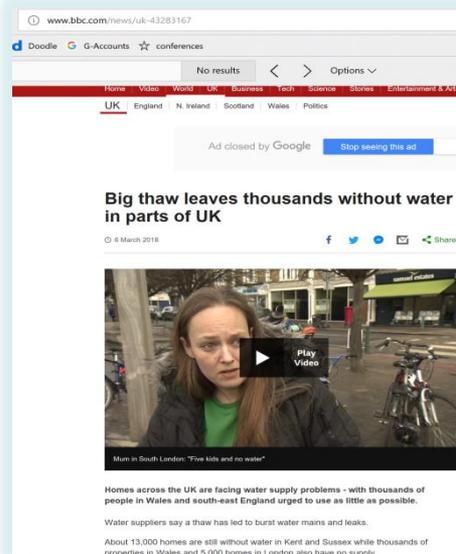
## Determining an 'acceptable' level of leakage



Source: WICS' Presentation to Water UK's Annual Leakage Conference (2010)

# Resilience - Freeze Thaw Impacts

- Colder Winters,
- Drier winters,
- Drier Summers.
  
- Over 13,000 customers impacted in England's main capital city.
  
- This is in a regulated, developed country



We encourage everyone to follow the advice of their water company and use water wisely.

The National Drought Group (NDG), chaired by the Environment Agency's Chief Executive, brings together government departments, water companies, environmental groups and others to coordinate action to maintain water supplies and manage the other risks associated with drought. The NDG convened today (Monday 23 July) to assess the present situation and coordinate plans for the weeks ahead.

## The present situation and the prospects

We are in a continuing period of prolonged hot and dry weather. June 2018 was the driest June since 1925, with a rainfall total for England of only 15 mm.

One water company, United Utilities, has announced its intention to impose a hosepipe ban ("Temporary Use Ban") in parts of the North West from 5 August. The other water companies do not currently intend to introduce hosepipe bans, and there is no threat to essential public water supplies. But continued dry weather into autumn could see the risk of some further restrictions and further environmental impacts across the country.



## The 2019 Price Review

- Ofwat mandate a minimum 15% reduction in current level of leakage by water utilities over next 5 year planning horizon
- Reduction of 1.5Bn Litres proposed by the industry over 5 years (EA, 2018)
- 2018 Freeze/Thaw event in the UK see's 1000's of customers without supplies for a period of up to 1 week.

*We are challenging companies to set stretching leakage performance commitment levels to:*

*• achieve forecast **upper quartile performance** (in relation to leakage per property per day and leakage per kilometre of main per day) where this is not being achieved – or justify why this is not appropriate;*

*• achieve **at least a 15% reduction** in leakage (one percentage point more than the largest reduction commitment at PR14) – or justify why this is not appropriate; and*

*• achieve the **largest actual percentage reduction** achieved by a company since PR14 – or justify why this is not appropriate.*

*Companies should also justify their leakage performance commitments relative to the minimum level of leakage achievable.*



## Water companies in England and Wales to produce Drainage and Wastewater Management Plans by 2022

- A Drainage Strategy should help customers and other stakeholders understand how a water and sewerage company intends to deliver its functions over the long term
- A Drainage Strategy should also explain how a water and sewerage company will do this in conjunction with other organisations (e.g. The Environment Agency, Natural Resources Wales, local authorities, highways authorities, housing developers) and how the company, in turn, will support these organisations in delivering their own responsibilities as well.
- The Drainage and Wastewater Management Plan framework provides the basis for more collaborative and integrated long term planning by companies, working with other organisations that have responsibilities relating to drainage, flooding and protection of the environment.
- The water and wastewater companies in England and Wales will produce Drainage and Wastewater Management Plans using the framework by the end of 2022, to support their business plans for the 2024 Price Review.

Tuesday, 18 September 2018 09:17 Print

### Environment Agency issues new guidance to water firms on permits for storm and emergency overflows

font size | Print | Email

The Environment Agency has issued detailed new guidance to water companies on environmental permits for storm overflows and emergency overflows – on issues ranging from drainage strategy, screens, telemetry systems, pumping systems and connections for new developments.

Key issues included in the guidance include:

- Use of urban pollution management (UPM) and a partnership approach
- Design standards for storm overflows
- Water quality standards for freshwaters, bathing waters, shellfish waters, estuaries and coastal waters
- Solutions for unsatisfactory overflows
- Permits for new emergency overflows
- Reporting
- Notification of failures

The Environment Agency regulates intermittent discharges from sewer overflows and waste water treatment works (WWTW) through environmental permits.



Water companies are required to design, construct and maintain sewerage systems according to best technical knowledge not entailing excessive cost (BTKNEEC), together with limiting pollution from storm



# **Asset Management**

**Assuring asset resilience  
for future generations**





# wrc

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Sharing **Innovation** & driving  
change in the water industry



**wrc** portfolio

# Knowledge Transfer

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The latest WRC collaboration opportunities **for asset solutions**



# WRc Portfolio 2018: Tailored, Collaborative Industry Research



## Key to icons



Clean water



Regulatory compliance



Innovation



Customer bills affordability



Waste water



Customer engagement



Long term asset view resilience



Leakage

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