TA 10.1 Innovation-Supporting Evidence Technical Annex

September 2018
Version 1.0

Southern Water

Contents

Navigation: TA.10.1 – *Innovation: Supporting Evidence*

Purpose:

This technical annex provides information to support the Chapter 10 - Innovation, and addresses Ofwat's expectations regarding the role of innovation in creating new benefits for customers, companies and the environment. The expectation is that innovation contributes to resilience through better management of risks and opportunities and that it is embedded in the culture, the processes and the people of the company.

Table 1 - Relevant Ofwat test areas

Ref	Ofwat test	Comment
Test Areas	**Focus Areas**	
1	Innovative approach to customer engagement	
1	Innovative use of data	
1	Effective communication to customers on innovative approach adopted	
2	Innovate to ensure accessibility when supporting vulnerable sections of the society	
2	Innovation on social tariffs	
3	Illustration of innovative and sector leading performance commitments including innovation in seeking and assessing customer and stakeholder views	
3	Proposals for ODI incentive package which supports outstanding achievement and innovation as well as protecting customers against the risk of delivery	
3	Innovation to reduce leakages	
4	Innovative ways to be resilient including infrastructure investments, partnerships and catchment working	
4	Innovation applied to cost reduction	
4	Innovation applied to mitigation actions	
5	Demonstrated culture for innovation	
5	Innovation framework embedded in company's strategy	
5	Evidence of (1) actively looking for lessons learned and (2) innovation adopted for broader applications	
8	Evidence for improving past failures through innovation	

Innovation initiatives

Innovation initiatives that support internal culture

During AMP6, our culture has supported the organic development of initiatives which have, in turn, helped create a culture of innovation within our organisation.

Name of initiative	Description	Results
Innovation Week	5-day event to create awareness about the importance of innovation in addressing customer and business needs, share best practices, learn from success stories, and discuss new opportunities.	• 500 participants: staff and suppliers • 14 events • Raised awareness about innovation, engaged staff, built innovation networks and promoted a culture of innovation
R&D's Idea7Fund	Fund for providing support to employees who need a small amount of funding to develop a technical idea	• 7 new projects funded in the last year
Staff ideas for incremental innovation	All employees can use an online tool to submit an idea to a team who redirect the idea to the right manager	• 261 ideas since 2015 • 28% accepted and in the process of being implemented
Employee Brainstorms	Self-started initiative by staff to generate awareness of on-going innovative activities within the business. E.g.in January 2018, Wastewater Below Ground (WWBG) team advertised four drop-in events across our region aimed at creating awareness of our wastewater flooding targets and generating new ideas to help us reach these targets	• We see many of these workshops taking place across the company. • For the WWBG session, 200 people took part • Created awareness of flooding targets, and gathered ideas to improve processes
Innovation Database	Monthly meetings with multi-disciplinary teams to track innovation initiatives across the business incl. results from technical trials, technology assessments, feedback from conferences, etc. By listing, rating and discussing all innovations we are using, have used, are thinking of using, and have heard about, we can improve the quality of our decision making, knowledge sharing, and increase speed, while reducing risks	• 530 innovations listed • Better and faster decision making • Improved knowledge sharing
Using lessons learned to improve how we innovate	We have added a Lessons Learnt module into our Project Management tool PIM. Teams know the value of adding to the record. Lessons can be logged at any stage in a project. Searches can be done based on location, type of project, delivery partner, key words, and team members.	• Improved decision making and speed, facilitated by knowledge sharing
Employee Development Programme	Our Employee Development Programme puts staff through an intensive business and skill development programme aimed at how to be	• The staff innovation platform (section 10.4 of the Innovation chapter) was a

Southern Water

	more effective. Staff are encouraged to come up with and implement new innovations after the programme	suggestion from the 2017 EDP team. • Their business case was presented to our CEO
Internal communications	Our staff newsletters include innovation articles and success stories	• Encouraging a culture of innovation

Innovation initiatives with suppliers

We have carried out extensive collaborative projects with our suppliers through our R&D function, in which innovation has been at the forefront. These collaborations have encompassed water, wastewater and environment projects, condition monitoring, energy, retail and other sectors. For a detailed list of these projects, please refer to TA.12.MG04 - Research and Development.

Innovation initiatives through research collaborations

During AMP6, we have extensively developed innovative initiatives through our research collaborations. We have collaborated with governmental bodies, academic institutions, research forums and other bodies to harness innovation to deliver results for our organisation and wider society. For a detailed list of these projects, please refer to the TA.12.MG04 - Research and Development.

Innovation initiatives through joint project execution

During AMP6, we have developed projects in conjunction with other bodies to deliver results for our customers and stakeholders. We have developed joint projects with academic institutions, water companies, research organisations and other companies which have delivered tangible cost savings and efficiency improvements for both AMP6 and AMP7. We expect to foster these collaborations throughout AMP7. See TA.12.MG04 - Research and Development for a detailed list of these initiatives.

List of awards received in AMP6

Our organisation has received the following awards for their innovative initiatives in AMP6.

Award	Initiatives	Status
Water Industry Awards 2018	• Alliancing and partnership initiative – Woolmans Wood Mains Replacement, Southern Water and Clancy Docwra • Customer service initiative – One bill – one team, South East Water and Southern Water • Most innovative use of an existing technology – Soneco, combined use of electrolysis and ultrasound for effective P removal, Southern Water and Power and Water – UKWIR Initiative	Shortlisted
Utility Awards 2017	• Team of the year customer facing and back office	Shortlisted
Institute of Water Innovation Award 2017 (South East Region)	• Focusing on bat detection innovation	Winner
Corporate and Business Communications Campaign	• Gold Award for the Unflushables campaign	Winner

Southern Water

at the 2017 CIPR Pride Awards for the South of England		
Institute of Water South East Area Innovation Awards, 2018	• Waterbit – a digital tool to help customers reduce water use • Predicting Metaldehyde in Water Systems • Fat, Oil, Greases (FOG) and Unflushables Project	Finalist

List of conferences presented in AMP6

Our organisation has presented in the following conferences to share research and innovation findings in the water sector and beyond.

Conference	Role	Time and Location
Eco Technology Show	Delivering successful water efficiency partnerships - Southern Water and Brighton & Hove City Council	June 2015
WWT sustainability conference	Balancing PR14 affordability and emission reduction in AMP6	September 2015
WWT innovation conference	How Innovation Can Support a Better Customer Experience by Anticipating Failure	November 2015
OS conference	Future Opportunities for Spatial and GIS Analysis	March 2016
WWT Smart Water Conference	Supporting customers to understand their water usage and cut their consumption through water efficiency	March 2016
University of Surrey / Arcadis innovation conference	Infrastructure for the Future - A Water Company Perspective	March 2016
University of Portsmouth Research staff conference	Collaborative Working - Universities and Industry	April 2016
SWAN Conference	'Smart Water Efficiency & Affordability'	April 2016
World Water Tech	Harnessing the power of data to build the energy-optimised utility of the future	October 2016
WWT innovation conference	Innovation and the Circular Economy	November 2016
Smart Energy Europe & Future Utility Summit	Improving efficiency through smart innovation	February, 2017
BITC conference	Sustainability as an Opportunity: Approaches to Circular Economy	March 2017
Utility Week Consumer Deby Conference	Deploying targeted Water Efficiency measures to bring down debt liability and support customers	March 2017
WWT's 2nd Smart Water Networks Conference	Smart innovation in response to customer needs – smart metering	March 2017
SMi'S Smart Water Systems	Water Efficiency Programme	April 2017
Big Data London	Advisory Committee	May 2017
MDM London Presentation	Master Data Management	May 2017
Lowland Catchment Workshop	Understanding Catchment Risk	July 2017
Tech Leaders	Data Transformation	September 2017

Southern Water

Data Insights	Data Transformation	October 2017
AI Tech World	Artificial Intelligence and water sector	November 2017
Big Data London	Data the 4th industrial revolution / The Chief Data Officer's Playbook	November 2017
British Water Conference	Data Transformation	November 2017
CDO Summit	Data Transformation	November 2017
Dinner Round Table	The role of the CDO	November 2017
Green Halo Partnership launch - investing in our natural environment	Investing in Natural Capital	November 2017
IRMUK Conference - CIO Inspired	The role of the CDO	November 2017
Procurement Leaders Data Intelligence and TechX Forum	Data Evolution	November 2017
Future Water Networks event		December 2017
Informatica Event	Master Data Management	December 2017
Data & Analytics Focus Group (British Water)	Chairing British Water Data and Analytics Forum	January 2018, in PA Consulting
Dinner Debate - Speaker	Role of CDO	January 2018, in London
Page Executive - Webinar - Speaker	Role of CDO	January 2018, in London
British Water Reception		February 2018, in The House of Lords
Corinium CD & Analytics Office Summit	Role of CDO	February 2018, in London
DATA IQ - SPECIAL	Role of CDO	February 2018, in London
World Water Tech	"Industrial Symbiosis: Mobilising Cross-Sector Collaboration to Address Water Challenges" Chairing the session: To Nutrient Recovery and Beyond: Advancing Towards Closed Resource Cycles	February, 2018
Big Data World	Smart water networks and data innovation	March 2018, in Excel
CDO Exchange - Speaker	Data Transformation	March 2018, in London
CDO Summit UK	Data Innovation	March 2018
Digital Enterprise Festival - Speaker	CDO and customer	March 2018, in Birmingham
Predictive Analytics Innovation Summit	Data Innovation	March 2018, in London
Whitehall Media's Big Data Analytics Europe Conference	Role of CDO	March 2018
WWT Smart Networks Conference - Speaker	Smart water networks and data innovation	March 2018, in Birmingham
AI Global Expo event - Speaker	Artificial Intelligence in the water sector	April 2018, in London
CDO Summit	Data Transformation	April 2018
Data & Analytics Dialogue UK: Speaker	Data Transformation	April 2018, in London

Southern Water

IA for CS Forum		April 2018
Natural Capital Conference & Workshop	Integration and collaboration: Integrated water cycle management	April 2018
SMi's 7th annual Smart Water Systems conference	Case Study: Utilising smart meters and engaging communities to help incentivise customers to lower consumption	April 2018
SwiftScale		April 2018, in London
Catchment Resources Conference	Catchment First	May 2018
SWAN	Data and Smart water networks	May 2018, in Barcelona
World Procurement Congress	Data and procurement	May 2018, in London
3rd Big Data	Data Transformation	June 2018, in Frankfurt
ACE European	Presentation on how data strategy has transformed our business and increased customer satisfaction levels	June 2018, in London
CDO forum	Panellist: The evolving and maturing role of the CDO 20th - 0935 - GDPR Panel Discussion - GDPR Armageddon: was it really the end of the world?	June 2018,in Johannesburg
Data IQ		June 2018, in London
European Commission Week	Data and Knowledge Workshop	June 2018, in Brussels
Institute of Water Catchment Seminar	Catchment Management - the future of water treatment	June 2018
IoT Amsterdam	Panel: IoT and AI data analytics for intelligent decision making Presentation: How to build a team and get business value out of AI - Smart Energy and Cities Track	June 2018, in Amsterdam
Tech Town	Extracting Maximum Value from Data Assets,	June 2018, in London
AKJ Associates - AI	CNI AI: Impact of Machine Learning on Data Protection and Management in Critical National Infrastructure	July 2018, in Park Plaza Victoria
Data Analytics IoT	Presentation - Maximising asset life cycles and performance: modelling historical fault data Panel discussion - Upgrading equipment, processes, and people: turning data into information	July 2018, in London
European Wastewater Management Conference	Phosphorous Removal using Soneco Process	July 2018,in Manchester
Inspired Events - CIO Round Table and Dinner	The theme is how leaders manage cultural change in order to embrace innovation/new technologies.	July 2018, in The Holborn Hoxton Hotel
CBR Data Connect		September 2018, in London

Southern Water

CDO Frankfurt	Keynote with CC, Masterclass CDO Playbook: Getting the Basics Right	September 2018, in Frankfurt
FT Digital	Cross-Sector digital dialogue - Ensuring data integrity and trust	September 2018, in London
Telegraph Satellite Data Intelligence Conf.	Panel discussion: Embracing the new ecosystem of partnerships to shape tailor-made solutions	September 2018, in London
Data Leaders	'Achieving data enabled transformation: How can you derive deeper insights from company data to proactively tackle internal pain points, transform processes and boost operational efficiencies?''	October 2018, in NH Collection Tower
IIoT	IIoT data Strategies and Analytics	October 2018, in Prague
Tech Nova AI	Maximising the potential of AI: overcoming the barriers to development	October 2018, in Hilton Tower Bridge
The IT Directors' Forum		October 2018, in Herts.
AI for CX Forum		November 2018, in London
IoT Summit Europe	T3: Dinosaur Fighting: How Can Pilot Programmes And Prototypes Help You To Change Minds Internally?"	November 2018, in Munich
IRM UK		November 2018, in London
Utility Week Conference	Making failures acceptable	October 2018
Water Industry Technology	Co-creating digital solutions with customers and stakeholders	November 2018

Innovation underpinning our strategic initiatives and outcomes

We have developed and are delivering five transformational programmes (included below) to accelerate our progress towards a resilient future for water and create a bridge between 'Brilliant at the basics' and our shared long-term goals.

- Target 100 is an agreement with our customers. We will support and incentivise them to reduce average consumption to 100 litres per person per day, and we will reduce leakage by 15% by 2025 and 50% by 2050

- Catchment First will put catchments at the heart of our decision making to improve the resilience of our services and the environment we rely on. During AMP7 we will undertake studies in [three] catchments across our region to understand the impact of our operations and how we can improve the natural, social and economic capital of our communities

- Resource Hubs will transform our wastewater treatment works into community assets – generating energy, providing spaces for training and heating local amenities. Peachavenworks, near Brighton, will be the first Resource Hub

- Sustainable Drainage 2030 will ensure our wastewater networks continue supporting sustainable growth – by integrating planning, reducing pollution incidents and increasing the update of sustainable, blue / green infrastructure such as Sustainable Drainage Systems

- Networks 2030 will dramatically increase the resilience of our water supply networks by rationalising existing assets, commissioning 20 new assets and achieving a semi-autonomous network by 2030

An outline of how specific innovative initiatives will contribute towards delivering our strategic programmes is summarised in the next table.

Target 100	- Use innovative technologies and mass roll-out campaigns to monitor and inform water efficiency measures - Use market mechanisms and behavioural economics to model customer behaviour - Improve visibility of consumption data to help customers track their usage, incentivise water conservation while proactively supporting customers who struggle to make savings - Increase home visits to promote and enable water efficiency - Hold regular behaviour change events across the South East to promote and enable water efficiency - Extend visits to primary and secondary schools to reach even more customers of the future - Incentivise developers to build more water efficient homes - Progress water re-use with Fawley refinery.
Catchment First	Implement incentive mechanisms for farmers to reduce metaldehyde usage

Southern Water

	▪ Improve catchment resilience with river improvement projects ▪ Utilise satellite image analysis and catchment walkovers - part of our catchment monitoring project with the Environment Agency ▪ Instigate upstream activity with farmers and land owners ▪ Use pioneering models for catchments undergoing accelerated change – joint project with the University of Kent.
Resource Hubs	▪ Working with local councils using the hub approach in co-digesting food waste at our sites – using our land and facilities ▪ Develop innovative ways to generate electricity from sewage ▪ Recover nutrients and other resources from waste streams ▪ Sector-leading energy purchase and transmission mechanisms.
Sustainable Drainage 2030	▪ Design creative FOG public awareness activities as part of our Unflushables campaign ▪ Develop a smart sewer network with predictive analytics ▪ We'll use real-time information to carry out more regular and targeted mains flushing ▪ Predict blockages to identify target areas for jetting, raising customer awareness and promoting biological FOG removal ▪ Use proactive CCTV of sewers and innovative SmartBall assessment of rising mains.
Networks 2030	▪ Rollout of sensors and vaults to reduce leakage by 15% by 2025 ▪ Find and fix more leaks using satellite technology and drones ▪ Finalise automated water flow database where leakage, turbidity spikes and chlorine levels are detected, predicted and avoided ▪ Build new reservoir at Havant Thicket in joint venture with Portsmouth Water ▪ Replace lead pipes in our network and provide customers with grants to replace their lead pipes to reduce chemical dosing ▪ Investigate water trading schemes with other water companies to develop regional grid.

The next table shows our 10 strategic outcomes for AMP7 (see the Outcomes, performance commitments & ODIs chapter for more details), and examples of how specific innovative initiatives will support these outcomes. Further details can be found within the Water, Wastewater, Great Customer Service, Addressing Affordability and Vulnerability, and Transforming our Business and Resilience chapters.

Southern Water

Outcomes	Examples of innovations
The intention over the next five years is to become brilliant at the basics. These outcomes are largely grouped around the theme of the Customer Experience, including support for customers in vulnerable circumstances.	
We supply clean, safe and sustainable water	Improving our ability to monitor and control our water network through Networks 2030 Catchment First programme
The services we provide are effective and fit for the future	Our resilience assessment methodology
We support our customers in vulnerable circumstances	Continue to innovate our Reach and Support transformational proposition for supporting customers in situations of financial and non-financial vulnerability
We provide a refreshingly easy customer experience	Innovate our Make it Count proposition for improving the overall service delivery of our operation, speed of resolution and proactivity of keeping our customers informed. Innovate our Spring proposition for giving customers easier access to information and empowering them to take control of their usage.
We make sure our bills are affordable for all our customers	Innovate our AMP7 retail delivery model to enable us to deliver our retail plan at an efficient level of cost. Target 100 programme Networks 2030 programme
In addition to our five-year outcomes, we have identified five long-term goals to help drive our commitment to a resilient future for water. These goals demonstrate a step change in collaborative action with customers and stakeholders .	
Together, we aim to recycle every drop of water	Actively support water reuse options in three new development areas (Ebbsfleet, Fawley and Otterpool). R&D programmes on water reuse and resource recovery
We safeguard and enhance rivers, reservoirs and coasts for the future	Catchment First initiative R&D programmes on contaminant removal and bathing water modelling
By working together we can build a resilient economy for the South East	Havant Thicket collaboration Regional Water Grid Working with Portsmouth Water on joint-use of Havant Thicket reservoir More resilient supply systems as a result of smart technologies to monitor and control our water network Expand use of level monitors across critical parts of the sewerage network. bluewave co-creation initiatives
We innovate to create sustainable communities	Resource Hubs Using Peacehaven as the exemplar site, we will develop a community education and awareness facility Roll out heat from sewers pilot to other locations with partners Using food waste or energy crops to increase renewable energy generation bluewave community outreach events
We recognise the true value of water in our daily lives	Innovate our Valuing Water proposition - a community outreach and investment proposition centred on re-defining the value of water across the South East. Target 100 programme Customer incentives e.g. Partnering with Eastleigh Borough Council to trial an incentive scheme for 52,000 customers Trialling new metering technologies

Southern Water

Case Studies

Innovation in Data

We're shaking up the world of data in the sector by introducing world-leading methods and approaches to reveal exciting new uses and insights.

As with other water companies, we collate and share data with our regulators, whether that be scores of spreadsheets about the quality of drinking water or reams of reports about wastewater spillages. Going beyond this, we will now also release multiple data points behind each of these reported figures, not only to our regulators, but also into the public domain.

In this way, not only can our regulators make a more detailed inspection of what we do but other interested parties, such as universities, can produce dashboards, apps and analytics to give greater transparency and insight into water and wastewater in the UK.

Recognising this potential, six universities and two colleges are already on board to use the data for research projects, while seven other water and wastewater companies have already signed up to the new system, called the DataWell. From a concept just under a year ago, this is now a reality.

The possibilities are enormous. For example, all water companies calculate leakage differently, but multiple, unlimited layers of previously unavailable data will open up the opportunity for a new algorithm to be developed for the industry. This could take into account many new data sources and volumes of data, such as the age of a property, the demography of a household and the condition of an asset before producing a common, validated figure for leakage for each company.

Iconic data-driven organisations, such as Google and Solidatus, have joined us as technology partners to help the world of data come alive for a wider use.

Not only are we leading the UK water industry but, following a similar collaboration involving 20 water companies in California, we are leading the world in data openness and transparency.

By having data integrated across water companies, we can work more efficiently – giving us more time to focus on helping customers, the environment and wider society.

Innovation in Target 100

From a current average consumption of 129 litres per person per day, our *Target 100* programme aims to support customers to use 120 litres per person per day by 2025 and 100 litres by 2040.

These are ambitious targets, supported by customers. As leaders in water efficiency, we're confident of success - we were the first company in the UK to introduce Universal Metering, which has cut consumption by 16% - which the Environment Agency described as "a bold and progressive move".

We now have a host of industry-leading innovations which will reduce that figure further - vital in the water-stressed South East where population is rising.

We believe the best way to ensure that the water flows when the tap is turned on is to show customers what we are doing to save water - that most precious of natural resources - and then ask them to work with us. We talk to them about our innovations to reduce leakage, building new reservoirs, grey water recycling, novel methods of catchment management - and then incentivise them to join forces with us.

For example, we give free swimming lessons in return for improved water efficiency, as we did in the River Itchen Challenge, where consumption reductions of up to 8% were achieved. Future incentives include giving free coffee, shopping vouchers or membership of sports clubs when targets are met by a catchment. We are not aware of any other water company that does this.

A further example of innovation is the plan to offer free connections to developers who build new housing estates designed with water-efficient features, such as low-usage toilets and showers. Again, we believe this is a water company first.

We plan to incentivise 1.6 million customers during the next five years, with the message: "Work with us and we'll share the benefits with you because together we can ensure that the region has sufficient supplies."

Our **Target 100** programme is based on four pillars:

- the first two are incentives and behavioural change, where we shift society's views to value water more highly

- the third is face-to-face home visits to conduct water audits and leakage tests at customers' homes. We are on target to achieve 28,000 visits by 2020 and a further 100,000 visits by 2025

- the fourth pillar is smart metering, but our own novel version of it. Nearly 90% of our customers already have a meter. Instead of the expense and inconvenience of installing smart meters and masts, as other companies wish to do, we can simply clip a low-cost device on top of the existing meter and connect a receiver to the Wi-Fi in a customer's home so that they can track their usage from a portal, saving water, energy and money. Again, we are the first company in the UK water industry to adopt this approach.

We're working with Cisco, IBM, Siemens, Vodafone and the University of Southampton on a new intelligent city at Fawley, Southampton.1,500 new homes, commercial units and a marina at the largest brownfield site in Hampshire, in a dramatic setting at the mouth of Southampton Water will offer 'smart city' status - the first of its type in Europe or America.

Smart water systems will be built into the development from the outset.

Innovation in Water Networks

Imagine a water network where leaks are automatically detected, where weak spots are identified, and steps are taken to prevent leaks even occurring – a network which governs itself and runs more efficiently than ever before.

That's not a futuristic dream. It's a programme that we've already started and will become reality with significant coverage of our water network by the end of AMP7.

We will install 10,000 sensors to detect leaks. Traditionally, we have been leaders in leakage and per capita consumption and this initiative will keep us in the vanguard, reducing our leakage by 15% by 2025.

But what makes this project unique within the UK water industry is that we will also install 2,500 water quality sensors which will provide additional data about 11 water quality parameters – from pressure and chlorine levels to temperature and turbidity.

This fully-automated system, which will send data digitally to the cloud for secure storage and managed access, replaces the existing spreadsheet system and will bring an end to the present practice of depending on customers to tell us when, for example, their water supply is discoloured.

Presently, we sample water as it leaves our reservoirs, but on the journey to customers' taps there is no further monitoring. So, we are going to install sophisticated sensors – the smallest of their

type in the UK – to keep a closer eye on the millions of litres of water passing through our huge, 13,900 km network.

We know the technology works. Successful trials in the Rownhams water supply zone in the water-stressed area of Hampshire, involving 100 water quality and leakage sensors, have already taken place. We now aim to roll out this ground-breaking project to provide a truly smart network which will manage itself. We believe it will be the forerunner of what, in 10 years' time, will be the norm for all UK water networks.

Innovation in Sewers

Augmented-reality game

It may be the next battleground for technology companies, but we too are developing an augmented-reality game. The purpose of this game is to educate consumers and help keep sewers free from blockages. The game encourages players to think about what should be binned and what should be flushed down the loo or plughole by swiping left or right.

We demonstrate the technology whenever we visit schools or at public events, and the next stage is to make it freely available for download onto the majority of smartphones and tablet devices from mobile app stores.

Education on fat, oil and grease blockages

With a huge wastewater network there are thousands of avoidable blockages - two-thirds of which are caused by pouring cooking fats, oil and grease (FOG) and unflushable items such as wet wipes down the loo or sink, clogging the arteries of the sewer network, furring them into grimy submission.

We have won national awards for our creative efforts to spread public awareness to reduce the number of FOG blockages in hotspot areas, from giving 180 packets of lard to a renowned potter and commissioning him to sculpt "Lardy the Fatman" from this unusual material, to laying down a 3D carpet at shopping centres to give shoppers an image of a blocked sewer with advice on how to avoid it.

During the present AMP we have visited over 40,000 homes and advised 2,000 food businesses on what not to pour into the sewer, and we have trained staff from other water companies how to manage a successful FOG campaign. We have persuaded celebrities to join the fight against FOG and have given away thousands of plastic fat traps, while our "Unflushables" campaign won a Chartered Institute of Public Relations Gold award in 2017.

In the next five-year AMP we aim to reach every school in our region across Kent, Sussex, Hampshire and the Isle of Wight with downloadable FOG material and lesson planning notes for teachers.

Intelligent Sewer Network

To keep our sewers free-flowing, we are also seeking to create an Intelligent Sewer Network - another industry-leading step which, for example, will equip water butts in hotspot areas, which are sensitive to surcharge in storm conditions, with weather forecasting software so that they will automatically empty into combined sewers an hour before incessant rainfall.

This will give the sewer system a head start when rain comes, helping to prevent flooding. We are also trialling SMART Sewer, a disruptive technology for detection of blockages within the wastewater network, satellite imagery to identify defects in long sea outfalls, the use of a Smartball probe to detect leaks in rising mains, and a unique application of ultraviolet light to treat flooded sewer discharges.

All of these programmes are combining to keep us at the forefront of the innovative application of technology to deliver real benefits for customers.

Innovation in Protecting the Environment

Technology moves fast. We are staying ahead of the curve by trialling new technologies to protect the environment in ways that no other water company does.

We've established an Innovation Hub, a suite of laboratories and offices on the site of our Petersfield treatment works, where a full-time team from Portsmouth University test new technologies, providing on-site water sampling and detailed analysis in hours instead of days or weeks. No-one else has adopted this approach.

This work has great potential for the water industry. It includes trialling different types of material which eliminate phosphorus without using chemicals, allowing it to be removed from water at small sites. This is kinder to the environment and, with over 300 prospective sites in our region alone, offers a potential saving of £millions. Further trials include the recovery of metal and pesticides from wastewater

We collaborate with experts from home and abroad, working with specialist companies and the world of academia to bring the best brains to the table to help solve problems facing all water companies.

For example, our NEREUS Project sees us collaborating with a consortium of water companies, research organisations, consultants and universities in the Netherlands, Belgium and France to recover water, nutrients for agricultural use and energy from wastewater, transforming it into a valuable source while boosting the green economy.

Trials are planned at a stream at our Peel Common Wastewater Treatment Works while our partners conduct similar pilots at their sites.

The project, which involves nine wastewater plants in four countries and is backed by €700,000 of EU funding, is aimed at convincing decision-makers that recovering wastewater can help to ease the problem of Climate Change.

Closer to home, we are working with Southampton University to identify new applications, resulting in scores of cutting-edge ideas for further research already being presented to our managers, from district heating schemes to renewable energy recovery. This promotes the concept of Circular Economy, re-using what we already have. Phase 1 of the study has already concluded that it is feasible to recover and recycle what otherwise might be waste materials.

We test the ideas emanating from universities and the new technologies emerging from small companies, identifying innovative uses to be trialled.

Indeed, the way we work has caught the attention of judges at national innovation awards, not just identifying new technology but combining existing technologies for innovative uses – from the first ever combined use of smartphone and infra-red technology to protect bats to the pioneering successful use of electrolysis and ultrasound at wastewater treatment works to protect rivers.

We also engage with our customers, asking them to see what we do and work with us to protect the environment. Our award-winning Beauty and the Beach Campaign, for example, encourages the public to help look after their local beaches.

We are the first and only water company to publish a plastics policy, managing our internal use of plastics by reducing the amount of plastic cups we use on our sites and giving every member of staff a re-usable metal water bottle, while our research work aims to eliminate micro plastics that end up in marine environments from our wastewater treatment plants. Another 'first' is our sponsorship of a Micro Plastics PhD.

We go beyond what is expected of us, to do the right thing for our rivers, our wildlife and our communities by identifying high-tech, environmentally-friendly and cost-effective solutions to share with the rest of the water industry. We believe we are leaders in our efforts to demonstrate this.

Southern Water

Innovation in Catchments

We already manage our catchments in collaborative ways. For example, we pay farmers the difference in price between metaldehyde and more expensive non-metaldehyde slug pellets to reduce the risk of this toxic pesticide infiltrating our water sources.

Incentivising farmers in this way has prevented tonnes of metaldehyde from entering streams and rivers as run-off. Indeed, we are working with farmers in the Western Rother to make it metaldehyde-free by 2020. This has never been achieved before in the region. Realising this ambitious target would benefit the environment, specifically by protecting wildlife and improving river quality, and it would also save us and our customers the multi-million pound cost of constructing specialist treatment works to remove metaldehyde in that area.

We are investigating other industry-leading ways to improve the environment, while also protecting water resources. For example, we are investing in catchment resilience, exploring ways to help the environment to cope with extreme weather events such as droughts.

In a water-scarce area such as the South East, costly engineering solutions such as constructing desalination plants to supply enough water to meet the needs of a growing population might seem the most obvious solution, but we believe that investing in catchment resilience could be a complementary and more cost-effective remedy as part of a package of solutions.

We are leading the water industry in our efforts to demonstrate a triple-track approach to meeting some of the challenges that we face in catchment management.

To do this we are working with partners from catchments of the River Test, the Arun and Western Streams and the Medway on river improvement projects to examine more natural solutions. Weir removal, reconnecting flood plains and slowing river flows can help deliver a sustainable supply of high-quality drinking water, while also delivering wider benefits for biodiversity, flood-risk management, recreation, health and wellbeing.

These are pioneering projects, as is our work with the Environment Agency to develop an integrated catchment-monitoring project to produce a very detailed picture of how our catchments are performing. This involves using techniques such as satellite image analysis and catchment walk-overs to map all sources of risk in our drinking water catchments on a scale never achieved before.

We believe the best way to succeed is to work in partnerships. Our initiatives, some of which are reported above, involve us working with diverse stakeholders from farmers, community groups and local councils to Defra, Natural England and the Environment Agency, including detailed R&D support from universities and water sustainability experts.

We have two projects currently underway, aimed at reducing nitrate pollution to groundwaters around Brighton and Worthing - the Brighton Chalk Management Project (CHAMP) and the Arun to Adur Farmers Group (AAFG) project.

CHAMP is a major collaboration between Southern Water, South Downs National Park, Environment Agency, Brighton & Hove City Council and the University of Brighton - and covers the Brighton Chalk Block, north of Brighton and Hove. The AAFG project is a direct collaboration between Southern Water and a group of innovative and proactive farmers dedicated to enhancing biodiversity and protecting resources, such as groundwater quality.

Both projects involve liaising with farmers on the South Downs to understand how nitrate fertilisers are used, and to implement on-farm measures to reduce the risk of nitrate leaching to aquifers over winter. The CHAMP project is also investigating using SuDS (Sustainable Drainage Systems) to help control urban pollution of aquifers.

Innovation in Energy

We have long believed that water companies should support the local communities we serve, moving community support from the periphery to the heart of our business.

Imagine, then, a wastewater works where we generate electricity from the treatment of sewage and use it to power a local housing estate, allow the offices and facilities to be used for educational purposes by local communities, recycle water from the works to help local farmers grow their crops or neighbourhoods grow hanging baskets and pump water into local rivers to help recharge them.

These are just a few of the novel benefits being investigated by the creation of Resource Hubs at our treatment works where, in addition, we are looking at using heat from the sewers to warm local amenities such as pools at swim centres.

We are also developing our self-generation capability. Under our present Asset Management Plan for 2015-20 we have expanded the use of self-generation at our treatment works to 18% and will increase that figure to 21% by the end of the Plan. During the next five-year Plan we shall further expand self-generation and will investigate more innovative uses for the power we produce.

We are at the forefront in developing innovative solutions in the energy market. For example, we are one of only two companies in the water industry to be working with a partnering company to 'move' the excess power we produce at one treatment works for use at other local Southern Water sites. This peer to peer trial is being funded by the Ofgem innovation hub.

We are also industry leaders in the way we purchase power. We buy £45 million worth of power a year. No-one can foresee the world events which change power prices in a volatile market but we have made savings by managing risks better to ensure we purchase power during appropriate periods. Other water companies have models which study prices and times to inform when they should buy power but we have added a component to assess volatility.

We believe we are the first company in the water industry to have done this, leading to an estimated saving of £4.8 million during the past three years.

We are now investigating ways to deliver further savings, to benefit our customers, by adopting the same methodology to sell power back to our suppliers during appropriate windows.

On a local level, we are working with community energy groups such as Bhesco in Brighton and Hove, exploring opportunities to convert local food waste to biogas, using one of our Peacehaven digesters, to generate cheaper energy to help the fuel poor.

We are also looking at innovative ways to derive benefits from battery storage, working with a specialist company to explore the potential of storing a huge battery in a pilot scheme at our wastewater treatment works in Peacehaven. This would allow a megawatt hour of electricity to be stored for self-consumption, helping to make the site more resilient to the risk of volatility in energy markets or to store and sell the power at times of favourable market prices.

Energy storage for resilience support, reducing reliance on the National Grid, in addition to energy management benefits is genuinely innovative. It has the potential to eventually transform the power landscape with profound implications.

Innovation in Great Customer Service

■ **Case Study: Waterbit**

As the first water company to implement universal metering, we have installed meters for 87% of customers. To allow customers to take advantage of the benefits this offers them, we are piloting a scheme to provide Waterbit devices that allow customers to see their consumption each day. We are deploying this technology to all customers who receive a meter upgrade and request a device. Customers will be able to set targets for their own usage and, in conjunction with our advice and incentives on water efficiency, reduce the amount of water they use and bills they receive.

We are currently trialling different ways for customer to access their usage data e.g. through an in-home display or through an app.

■ **Case Study: Customer Discount Models**

We know that many of our customers like the convenience of being able to manage their water online. For us, this means that we can reduce back office costs; savings that we can pass on to customers. We've developed an innovative new discount model which shows customers how easily they can save money by using our online portal.

With our discount model, customers can choose the option that works best for them, and can see the discount they will receive as a result. Activities such as online sign-up, paperless billing, submitting meter readings, direct debit and paying balances full and on time can all contribute to a bronze, silver or gold discount.

■ **Case Study: Debt advice visits**

We developed an innovative approach to supporting customers struggling with debt. We have a team of highly trained agents who visit our customers' homes to offer advice and support with managing their debt. The agents are not there to collect money or make some pay who simply are not able to, rather they explain the support we can provide through our schemes and tariffs and provide a range of further information to help customers manage their personal financial circumstances.

Our agents take the time to understand what issues the customer might be facing, deep diving to get a true understanding of the barriers to payment. This helps us to deliver more tailored support but also helps our agents to identify further support such as food shopping vouchers that can provide short term relief while the customer liaises with an expert debt advice charity. We have completed around 230,000 debt advice visits and have not yet received a single complaint from a customer who has spoken to one of our agents.

Southern Water

■ **Case Study: Keep in touch notifications**

We always aim to resolve a customer's query the first time they contact us. However if we are not able to do that we will provide updates on the progress of the query via email or text. We are using customer feedback to understand the how frequently they would like updates for different types of query or problem.

Customer segmentation and cross industry analysis shows communication around a billing date can alleviate undue stress to some customers. We have piloted communicating pre and post billing date via text and email and received mixed feedback; some customers found this unnecessary while other found it useful. We are rolling out a universal tailored bill communication to allow our customers to decide if they want to receive electronic billing notifications and if so the frequency and channel they receive them.

■ **Case Study: Speech Analytics**

We have rolled out the use of speech analytics software across our call centres, which identifies customer dissatisfaction. If software detects dissatisfaction we will proactively contact the customer to check if their query has been satisfactorily resolved or if there is anything we could do better to help.

By using an automated process to do this, it removes the subjectivity of the call agent, helps to understand why customers may be dissatisfied and provide a standardised level of customer experience.

■ **Case Study: Valuing water**

We have used an innovate approach in co-creating a new proposition with our customers. Through a truly collaborative process we created a proposition which focused on 'giving back' to our local communities through partnering with our customers. The goal is to work with local organisations such as schools to help customers understand what we do, how we can all appreciate the value of water and give customers the opportunity to input to projects such as those that enhance the natural environment.

■ **Case Study: collaboration with outsourced providers**

We are working closely with our outsourced service providers, building an innovative service delivery model that incentivises good Customer Experience performance. Furthermore, our AMP7 service delivery model will drive a level of operational efficiency not possible under our current delivery model and thus an efficient cost base to deliver our AMP7 retail strategy.

Customers benefit from this innovative delivery model as they will experience a more consistent service across channels and interactions, an increase in their queries being resolved first time, fewer transfers and quicker resolutions.

Southern Water

Innovation in Affordability and Vulnerability

- **Case Study: Collaborating with our Regional Partners**

We are innovating in our approach to tackling vulnerability in our region through founding, creating and leading a cross-regional network of water services providers in the South East supporting customers facing financial and non-financial vulnerability. Our objective is to implement a common approach to supporting customers. This will increase the consistency of support across the region, removing unnecessary complexity and thereby allowing customers to access the support they require without having to contact multiple organisations. Our first area of focus is the alignment of our social tariffs and, through the course of AMP7, we will further integrate and align our support provision.

- **Case Study: Expert Panel Assessment**

Assessing the extent to which companies support their customers in vulnerable circumstances is challenging. We are setting the bar for performance monitoring and evaluation for supporting customers in vulnerable situations by establishing an independent panel of experts that will review our approach to vulnerability against a pre-defined and co-created framework. Established through our Vulnerability and Affordability Forum, the experts represent organisations such as Age UK, Mind, Huntswood, Step Change and county councils and will support us to continuously improve our support for customers in vulnerable circumstances.

- **Case Study: Facilitating Data Sharing**

We lead the sector in pioneering data sharing across the industry by lobbying the government to include the water sector in the provisions of the Digital Economy Act. This successful lobbying increases the likelihood that data sharing initiatives can be used to support customers in vulnerable circumstances across the water sector.

We are also piloting data sharing activities with EDF Energy and SSEN which will facilitate the identification of customers that need support from their energy and/ or water suppliers as a result of requirements induced from a variety of vulnerabilities.

- **Case Study: Tackling Transient Vulnerability**

Customers can move in and out of positions of vulnerability. Bereavement, job loss and temporary illnesses are just some examples of transient vulnerability which, our research suggests, can induce needs and requirements that are just as acute if not more disruptive than longer-term vulnerable circumstances.

We recognise that the sector needs to do more to deliver support to customers who face these short- term challenges. In AMP7, we are implementing a payment holidays scheme. For customers facing particular challenges, we will pause bills for a short period of time to give them breathing space. These cases will be managed by our specialist affordability team, and we will then provide support through a payment plan to help get the customer back on track.

Southern Water