

# Arqiva Submission: ‘Ofwat – Creating tomorrow, together: Consulting on our methodology for PR24’

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## **Executive Summary**

Ofwat’s price review 2024 (PR24) methodology comes at a time where the UK’s water resources are under increased pressure, and there are heightened concerns that future demand might outstrip supply. This year is the driest on record for nearly half a century. Hosepipe bans have been introduced in several regions, and parts of the UK are now officially in drought. Looking further ahead, an estimated additional 4 billion litres of water per day will be needed for public water supplies by 2050.<sup>1</sup> The pressure on water resources from climate change and a growing population require all stakeholders to work constructively towards securing the UK’s long-term water resiliency.

It is therefore crucial that Ofwat gets PR24 right. The water sector already has in place several targets to reduce water consumption and in doing so, shore up the country’s water resources. The Leakage Routemap<sup>2</sup> establishes the goal to halve leakage levels by 2050 and DEFRA has called for a 20% reduction in the use of public water supply in England per person by 2037.<sup>3</sup> Water companies’ ability to invest in solutions to meet these long-term targets will be determined through PR24. It is essential that Ofwat enables and incentivises water companies to invest in solutions with clear benefits for the environment and water customers over the long-term. Any uncertainty around how Ofwat will treat investments in this and future price review periods, and any undue complexity in securing support for existing technology solutions, could result in material delays in investment and worse outcomes for future customers.

Arqiva supports the overarching objectives of the PR24 draft methodology. It is essential that investments in water demand reduction today are informed by a longer-term outlook. Arqiva agrees with Ofwat’s call for a “powerful outcomes framework” and the plans to ensure water companies’ performance commitments for water demand reduction. For this to result in meaningful action by the sector, Ofwat’s implementation of the PR24 framework is key. Ofwat must ensure that it looks favourably on investments that water companies put forward to meet performance commitments and that it incentivises investments in the most effective technology solutions available.

Arqiva is the UK’s only large-scale provider of smart water metering infrastructure and we have seen through our customers the significant benefits smart metering has in reducing water consumption. The hourly data points provided by Advanced Metering Infrastructure (AMI) smart water metering delivers the level of insight needed to act quickly on leaks, engage with customers so they understand their water usage and how to reduce consumption, and target water efficiency interventions. Other metering options, including manual and Automated Meter Reading (AMR) meters, cannot match the level of insights delivered by AMI and the capacity it provides water companies to take ambitious action to reduce overall water consumption.

Smart water metering has a key role to play in meeting the objectives set out in the PR24 methodology and the targets set by the Government and the Environment Agency. This includes

reducing water use, identifying leaks, and giving individual households the information they need to reduce their usage and bills. We therefore consider it vital for Ofwat to build in thinking about how smart water metering will be enabled within the PR24 methodology.

Key considerations include:

- Ofwat should look favourably on smart water metering proposals put forward by water companies and provide the financial flexibility to enable them to invest.
- Crucially, the right forms of smart metering need to be incentivised to unlock the greatest benefits. The regulator should scrutinise and challenge any plans which propose ‘dumb’ or other metering investments which only provide limited data and would restrict long-term benefits. Ofwat should reflect this in the language of the methodology, including reference to ‘smart water metering’ instead of ‘metering’.
- Ofwat should not penalise water companies that are progressive in adopting smart metering by setting tougher targets for them where they have qualified for enhancement spend. Ofwat should be mindful of the risks of creating disincentives to invest in smart metering and err on the side of caution to enable greater investment and better outcomes.
- Ofwat should recognise AMI as a ‘low regret’ solution under an adaptive planning framework, with the capacity to deliver significant benefits within different future demand and climate scenarios. Ofwat should include a specific performance commitment for smart metering to ensure that it gets the focus required.
- Long-term investments over multiple price review periods must be enabled. Water companies require certainty from Ofwat that investment in smart water metering can be recouped across the review periods required to establish and operationalise the network.

These points are expanded on below.

### ***Ofwat should look favourably on smart water metering proposals from water companies***

Whilst the objectives set out by Ofwat are sensible, the methodology put forward is complex and there is a risk that the objectives will not be achieved due to how the methodology is interpreted and implemented.

Ofwat will ultimately be judged on the outcome of the process. Will water companies have been encouraged and enabled to invest in the right areas to meet the water shortage challenge we face as a nation? Will water companies which put forward investment plans for a smart water meter rollout be supported or will the methodology result in proposals being rejected?

To avoid an outcome where the sector does not invest, the methodology needs to ensure smart water metering proposals are supported. To achieve this, we ask for maximum flexibility in the methodology and that Ofwat is not overly prescriptive in how it permits water companies to capture investment in smart water metering. For example, we would like to see the rules around Direct Procurement for Consumers (DPC) clarified and it made explicit that a water metering investment could be captured under the DPC framework if required by water companies. Equally, if a water company puts forward proposals for smart metering expenditure which are not within base expenditure these should be looked on favourably by the regulator.



***Ofwat needs to ensure that the right forms of metering are encouraged and supported***

Whilst the Ofwat methodology is technologically neutral, it is important that the regulator recognises that not all technologies deliver the same outcomes. Ofwat needs to scrutinise plans put forward and support those proposals which deliver the maximum long-term benefits.

This is particularly important in relation to investments in water metering. Not all water metering technologies are the same – ‘dumb’ meters and ‘drive-by’ Automated Meter Reading (AMR) meters collect data infrequently, while always-on Advanced Metering Infrastructure (AMI) meters provide hourly data points, which better enable action to modify customer behaviour, fix leaks and be ambitious in transforming how water companies operate. It also gives households the information they need to manage their water use and bills, which will be vital as we enter a period of rising households bills across sectors.

The value of AMI is evidenced by a significant body of research and experience. Artesia and Frontier Economic recently found that an AMI rollout could deliver up to £2.2bn in net benefits across England and Wales relative to only £0.4bn achievable using AMR meters.<sup>4</sup> Previous research from the same organisations found a positive cost benefit to rolling out AMI even when focussing on just private costs and benefits (i.e., excluding societal benefits such as reduced carbon emissions) and that these benefits would equate to saving for households (at about £3 per household per year).<sup>5</sup>

Evidence<sup>6</sup>, compiled with Waterwise, estimated that if just one million smart water meters were to be fitted in the UK each year for the next 15 years, then by the mid-2030s savings of at least one billion litres of water a day (1,000 Mld) could be made. This could reduce the UK’s current total annual greenhouse gas emissions by up to 0.5% (2.1MtCO<sub>2</sub>e). That is a significant contribution to the UK’s Net Zero targets if the regulator enables the right decisions and investments to be made.

Further, Thames Water has highlighted that smart water metering reduces household water use by 12-17%.<sup>7</sup> They have also found that at least 8% of homes have leaks with an average continuous flow of 280 litres per day; an issue which is more quickly identified through smart water metering.<sup>8</sup> Thames Water has further demonstrated the capacity to use smart water metering data to support targeted water efficiency interventions that assist vulnerable customers in cutting their water bills. In its December 2021 report on ‘Smarter ways out of water poverty,’ Thames Water found that customers consuming more than 500 litres per day could cut their bills by between 8-17%. That was equivalent to a saving of between £40 and £166 per year through water efficiency interventions.<sup>9</sup>

We support Ofwat’s focus on delivering “best value” solutions. The regulator needs to ensure that it scrutinises the investments put forward by water companies in relation to water metering. Business plans which do not put forward a metering proposal or propose investments in inferior forms of metering to AMI should be challenged.

***Water companies should not be penalised for investments in smart water metering***

There is a risk within the proposed methodology that water companies progressing investment in a smart water meter rollout, including the replacement of manual or AMR meters, are penalised. Ofwat needs to be mindful of this and ensure that does not happen to support the realisation of the significant benefits of smart water metering.

In particular, Ofwat should consider the impact of targets on companies that secure enhancement spend for smart water metering. To avoid an inefficient outcome and encourage the right levels of ambition, Ofwat should not set stricter targets for companies that secure funding for smart

metering. Furthermore, Ofwat should signal this in the methodology to encourage water companies to pursue proposals.

Equally, when assessing the base costs of companies and the potential impact of investments in smart water metering, Ofwat needs to ensure that it is cautious and does not overestimate potential savings if these are included within base spend. Ideally, to ensure the right outcomes, it should not seek to amend base costs for any spend on metering captured as enhancement spending.

Ofwat should also not disincentivise investment in replacing manual or AMR meters with AMI meters, which offer significantly greater benefits. As highlighted above, AMI has been found to offer far greater benefits for customers and the environment than other metering options – it has been estimated AMI can deliver up to £2.2bn in net benefit across England and Wales compared to only £0.4bn achievable using AMR meters.<sup>10</sup> It would be a mistake to prevent water companies from replacing old meters with the best value option available today, or to delay investment so that the benefits of smart metering take far longer to be realised.

***The benefits of smart water metering within an adaptive planning framework need to be recognised and explicit performance commitments for smart metering considered***

The Ofwat methodology highlights the importance of working within an adaptive planning framework and ensuring that water companies are prepared and can react to changing external circumstances, for example worsening climate change scenarios. It is not clear in the methodology how Ofwat will ensure that this approach is followed, and how water companies’ proposed investments in solutions that would enable them to meet future challenges would be enabled and supported.

A smart water metering investment is a key tool which water companies can draw on that fits within an adaptive planning framework. This was highlighted in a recent report by Frontier and Artesia looking at the role of AMI metering.<sup>11</sup> A full rollout of AMI smart meters provides water companies with the data and means to enhance customer interaction and experience, approach to pricing, reaction time to leaks, and supports operational resiliency. Crucially, metering also provides consumers with the information they need to manage their usage and ultimately their water bill.

Ofwat needs to ensure that sufficient focus is applied to how companies will respond in the event of more extreme climate scenarios and evaluate their plans in relation to this. We would like to see an explicit performance commitment for a smart water metering rollout included.

***Ofwat needs to support investments spanning multiple price review periods***

Arqiva welcomes Ofwat’s desire for water companies to set out their “five-year business plan in the context of a 25-year delivery strategy”. However, the continual structuring of Ofwat’s economic controls in 5-year funding cycles means that a risk remains that water companies will focus on making more incremental changes, rather than displaying the long-term ambition needed.

In our view, the draft methodology remains vague on how precisely demand reduction solutions that may take longer than a 5-year funding cycle to implement will be funded across the 25-year delivery strategy range.

We ask that Ofwat makes clear in its final guidance that it expects water companies to put forward proposals that align with long-term targets and ambitions for the sector and that the regulator will implement its methodology with long-term targets in mind. This should include a commitment from the regulator that it will support investments which span across multiple price review periods in the future, where these investments support the delivery of long-term targets.



## **Arqiva’s response**

### **Background on Arqiva**

Arqiva is the UK’s only large-scale provider of smart water metering infrastructure. We work with some of the UK’s largest water companies including Anglian Water, Thames Water and Northumbrian Water to deliver always-on, connected smart water metering that provides the insight needed to make a meaningful change in reducing water consumption.

Arqiva provides ‘Advanced Metering Infrastructure’ (AMI) smart water metering. Unlike other forms of metering, AMI provides hourly data points on water usage. With this level of insight, companies can act far more quickly to stop leaks wasting valuable water resources. Companies also gain greater insight into customer usage, so they can better target water efficiency interventions that save water and reduce customer bills. We have installed over one million AMI meters to date, and have seen the significant, positive outcomes that water companies can derive through smart water metering data.

The complete rollout of AMI across a water distribution network and integration of its data into internal processes is a strategic undertaking that can cross over regulated price review periods. AMI meters also deliver benefits over regulated periods, with a working life of approximately 15 years. Our engagement with our customers to date has made it clear that it is essential to have regulatory support for investment in technology solutions, and greater certainty for investments spanning multiple price review periods.

### **Comments on Ofwat’s draft PR24 methodology and supporting documents**

#### ***Water resources (Section 3.3)***

We were disappointed to see in Section 3.3 that there was a focus on supply side infrastructure, markets, and trading in relation to water resources, and much less focus given to water demand reduction. Reducing water demand could halve the estimated 4 billion litres a day of water resource deficit anticipated by 2050.<sup>12</sup> The need for greater focus on demand reduction was highlighted by the Senior Water Demand Reduction Group (SWDRG) for England when it announced its closure, which stated amongst other points that “The SWDRG consistently noted the absence of any budget for it to commission new work, in contrast with the significant budget allocated to RAPID to drive supply-side measures – despite the fact that demand management is expected to make up a larger part of England’s water needs in the near and further future.”<sup>13</sup> Infrastructure solutions, such as smart water metering, are crucial enablers to water demand reduction, and must be supported.

#### ***Metering options to meet water efficiency targets***

In Appendix 6, Ofwat accurately assesses that “water companies have a significant role in water efficiency” though providing “the right metering”, “communicating with customers” and “providing more direct support to help customers reduce their water demand.” Smart water metering can deliver benefits across all three of these areas. Arqiva recently installed our one millionth smart water meter in the UK, a significant milestone for both us and our customers. According to our figures, AMI “could be saving over 66 million litres of water a day through improved leak detection, more detailed insight into water consumption and greater consumer engagement – with the associated environmental benefits.”<sup>14</sup>

Whilst we welcome the reference to metering in Appendix 6, the methodology needs to be far more specific about the most effective forms of metering that water companies should be encouraged to invest in. To avoid “poor quality meters being delivered in an uncoordinated way” in PR24, Ofwat should be clear about the benefits of smart metering, specifically AMI, over other forms of metering. Given the mounting evidence, which is highlighted in this submission, there is a clear distinction to be made between the benefits on offer from AMI, compared to that of manual or AMR meters. In its discussion of metering, the methodology’s language should reflect this distinction.

When moving to finalise the PR24 methodology in December 2022, Ofwat should ensure that water companies’ business plans do not favour short-term water metering options, such as AMR. Instead, Ofwat should enable sufficient investment by water companies in the solutions with the greatest, long-term, cumulative benefits, that are most effective under adaptive planning scenarios, such as AMI.

Once set up, smart water meters have an asset life of approximately 15 years, meaning investments made in 2025 will deliver benefits through to the early 2040s. If Ofwat’s PR24 determinations do not incentivise sufficient investment and confidence for a period equivalent to multiple funding cycles, this will risk water companies implementing more limited and “incremental changes [and solutions] rather than displaying the long-term ambition”<sup>15</sup> the challenges ahead necessitate.

There is a significant body of evidence on the benefits of AMI compared to other metering solutions.<sup>16</sup> For example, Thames Water has highlighted that smart water metering reduces household water use by 12-17% and that 8% of homes were found to have leaks with an average continuous flow of 280 litres per day.<sup>17</sup> Thames Water further demonstrated in their 2021 ‘Smarter ways out of water poverty’ report that smart water metering can assist targeted water efficiency interventions, helping vulnerable customers save on their water bills.<sup>18</sup> Ofwat should support water companies in identifying technology solutions which would have the greatest impact on meeting sector targets, such as AMI.

### **Specific responses to Ofwat questions**

We have chosen to answer the relevant consultation questions posed by Ofwat out of order, beginning with questions relevant to Chapters 5 and 6, given their relevance to smart water metering, before addressing issues raised by Chapters 2, 3, and 4.

#### **Chapter 5. Delivering outcomes for customers**

**Question 5.1:** *Do you agree with our proposed package of common performance commitments? Is water demand best incentivised through separate performance commitments on household and domestic consumption and leakage or through a performance commitment measuring total demand?*

Given the challenges facing the water sector over the coming decades, it is vitally important that PR24 motivates and enables water companies to deliver long-term strategies to secure plentiful water supplies.

We agree with the methodology’s call for a “simple” and “powerful outcomes framework” when determining performance commitments for companies. We further support an approach to keep



performance commitments “outcomes focused,” backed by financial incentives to ensure the sector is focused on the long-term.

We support the proposal to include a common performance commitment on reducing water demand. However, we disagree that a single performance commitment measuring total water demand would be the best route forward at this stage. We consider that there is a risk with a single performance commitment that action on either leakage, per capita consumption, or business customer demand is not progressed as needed. Each of these areas requires commitment and focus for the foreseeable future. We would expect Ofwat to assess whether and how a single performance commitment for water demand would impact progress towards reducing leakage, per capita consumption or business demand.

A performance commitment on the rollout of smart water metering should be included, given this is a key enabler for reducing demand and engaging with customers. As highlighted in this response, various research has shown the significant long-term benefits of smart water metering to the environment and society broadly. AMI could deliver up to £2.2bn in positive net benefits across England and Wales and is more resilient to higher impact climate and water demand scenarios in the future.<sup>19</sup> Ofwat should enable and encourage an accelerated rollout of smart water metering across the country, or there is a risk that the full benefits of this technology are delayed or not fully realised.

We further support Ofwat’s proposal to include a new common operational GHG emissions performance commitment, but it is important to note that the vast majority of water-related emissions arise from how the product that the water companies sell is used in homes and businesses.<sup>20</sup> We would like to see this recognised by Ofwat and the overall level of emissions (scope 3 emissions) associated with water use considered. This is important given the sector’s wider role and responsibility in helping its customers and society get to Net Zero. Arqiva supports the recommendations from the Senior Water Demand Reduction Group that companies should be required to set out the carbon impact of their entire business plan.<sup>21</sup> Here, smart water metering has an important role to play and can support an overall reduction in water and energy use in the home, thus helping to reduce carbon emissions.

## Chapter 6. Setting expenditure allowances

**Question 6.9:** *Do you agree with our proposed approach to encouraging companies to deliver best value through our cost assessment?*

We support Ofwat’s focus on delivering “best value” schemes that “generate the greatest economic benefit for customers, the environment and society, compared to costs, over the long-term.”

We consider that comparing options using benefit to cost ratios with a longer-term outlook would support decision-making around investments offering the greatest benefit to the environment and society broadly.

Research into the benefits and costs of water metering options has already been conducted to support water companies’ decision-making. New research<sup>22</sup>, from Frontier Economics and Artesia, commissioned by Arqiva, has identified the potential for AMI to deliver up to £2.2bn in positive net benefits across England and Wales relative to only £0.4bn achievable using AMR meters. Benefits are derived from reduced water consumption, leakage, and lower carbon emissions. Furthermore, the findings show that AMI is a ‘low regret’ investment under an adaptive planning framework, and

resilient to high impact future climate and water demand scenarios. In fact, the comparative net benefit of an AMI rollout increases further compared to AMR in more severe scenarios.

## Chapter 2. Regulating through the price review

**Question 2.1:** Do you agree with the challenges facing the sector and the ambitions for PR24 we have identified?

With Ofwat acting within the goalposts of the Strategic Policy Statements from both the UK and Welsh Governments, Arqiva welcomes the regulator’s overarching goals for PR24, which effectively identify the challenges facing the sector and the long-term ambition needed in response.

Encouraging water companies to develop their plans in the context of a 25-year delivery strategy is essential. The UK’s water sector and Ofwat are confronted by significant challenges, including increased water demand from a growing population, boosting the resilience of water supplies in the face of environmental deterioration, and ensuring water bills remain affordable for consumers. It is estimated that an extra 4 billion litres of water per day will be needed for public water supplies in 2050.<sup>23</sup>

Despite the performance commitments highlighted in our response to Chapter 5, there remains a risk that companies will make more “incremental changes rather than displaying the long-term ambition”<sup>24</sup> Ofwat is seeking for PR24, due to the structuring of Ofwat’s economic controls in five-year funding cycles.

Arqiva recognises Ofwat’s commitment to ensuring a long-term approach whilst sticking to five-year funding models. Ofwat highlights that it seeks to provide “greater clarity on the treatment of multi-period investments and outcomes”. In Chapter 6, Ofwat states that they “want to facilitate efficient long-term investment so the right interventions are delivered,” recognising that “some investments span multiple price control periods, notably where schemes take several years to design, construct and commission.” Beyond these commitments, the methodology needs to provide greater certainty to support investment in the most effective demand reduction solutions, such as smart water metering.

Currently, Appendix 6 includes a commitment to use Price Control Deliverables (PCDs) to incentivise delivery if “additional expenditure” is made available for metering programmes. Given that smart water metering infrastructure often requires a longer timeframe to deploy and operationalise, the final methodology for PR24 should provide more financial certainty to ensure its benefits are fully captured. For example, Thames Water, who are already committed to an AMI smart meter rollout, estimate it will take until 2035 to have meters fitted “to all suitable homes,”<sup>25</sup> a period spanning multiple price review periods.



### Chapter 3. Design and implementation of price controls

**Question 3.6:** *Do you have any views on any other aspect of our proposals in relation to: a) The design of price controls; b) Water resources; c) Developer services; d) Retail activities; e) Bioresources; f) Other controls; g) The revenue forecasting incentive mechanism; or h) Direct procurement for customers?*

As noted above, Arqiva welcomes the commitment to addressing environmental, net zero and resilience priorities as outlined in the PR24 draft methodology. We agree that “water efficiency and reducing leakage provide part of the solution.”

Ofwat’s Appendix 9 highlights that the regulator expects “all companies to make progress towards the UK government target of 50% leakage reduction by 2050, either individually, or by securing agreement with other companies to deliver the 50% reduction jointly”. Progress towards leakage and per capita consumption reduction is critical, with water resources anticipated to come under significant pressure in the future.

Smart water metering, specifically AMI, is a powerful tool to gain insights enabling significant reduction in leakage and per capita consumption and should be a priority in PR24. For example, evidence<sup>26</sup> compiled with Waterwise estimates that if just one million smart water meters were to be fitted in the UK each year for the next 15 years, then by the mid-2030s, savings of at least one billion litres of water a day (1,000 Mld) could be made, and the UK’s current total annual greenhouse gas emissions could be reduced by up to 0.5% (2.1MtCO<sub>2</sub>e).

We therefore encourage Ofwat to consider how price controls and enhancement expenditure allowances will either support or discourage investment in smart water metering and remove any barriers that might delay the realisation of AMI’s benefits. For example, Ofwat proposes specific enhancement expenditure to reduce greenhouse gas emissions and net zero challenge funding. Technologies that reduce water consumption and related carbon emissions, including smart water metering, have a key role to play in meeting these targets. However, given the critical importance of reducing water consumption, Ofwat should consider similar measures to support specific water consumption reduction initiatives such as smart water metering, which would have a material impact on reaching long-term targets.

In relation to Direct Procurement for Consumers (DPCs) we would like to see the rules clarified and amended if needed to ensure that a water company could include an investment in smart metering within the DPC framework if that is the route it chose to go down to procure the investment.

### Chapter 4. Reflecting an understanding of customers and communities

**Question 4.1:** *Do you agree with our approach to making sure that companies’ price review submissions and our determinations reflect an understanding of customers’, communities’ and environmental concerns?*

Ofwat rightly identifies affordability concerns for customers as a central pillar of the methodology, stating in Chapter 4 that “we expect price review submissions to recognise and address the needs and priorities of the generality of current and future customers. Water companies need to ensure that their plans are affordable, both now and into the long-term, and ensure that there is support

for those who struggle, or are at risk of struggling, to pay their water bills.” Here, smart metering can play a crucial role as without the data from a smart meter a household has no mechanism to take action to reduce its bill.

Whilst we agree that the draft methodology’s approach should reflect an understanding of consumer concerns, Ofwat must ensure that PR24 does not inadvertently favour short-term water demand reduction options. It is crucial and in the interests of consumers that PR24 incentivises investment in longer-term demand reduction solutions which have the greatest cumulative benefits for society and the environment.

Evidence shows that smart water metering can play a role in engaging with consumers around saving water and reducing water bills. Research conducted by Waterwise and Arqiva in 2021<sup>27</sup>, found that “the information generated by smart water meters helps customers better understand water use, and makes it easier for water companies to engage with consumers,” whilst “residents (with smart water meters) were more aware of the water scarcity challenge and more focused on saving water.” The research found that 37% of residents with smart water meters reported these meters had helped them to reduce their water consumption.

Research from Frontier Economics and Artesia in 2021 has also found that there is a strong cost-benefit case for rolling out smart water meters even when focussing on just private costs and benefits (i.e., excluding broader societal benefits, such as reduced carbon emissions), and that these benefits equate to savings for households (at nearly £3 per household per year).<sup>28</sup>

This evidence highlights the importance of the regulatory framework promoting sufficient investment in long-term water demand reduction solutions which support consumers in reducing their household water use and bills, in addition to delivering better environmental outcomes.



- <sup>1</sup> Environment Agency, [‘Review of England’s emerging regional water resources plans’](#) (May 2022)
- <sup>2</sup> Water UK, [‘A Leakage Routemap to 2050’](#) (2022)
- <sup>3</sup> The Department for Environment, Food and Rural Affairs, [‘Consultation on environmental targets’](#) (May 2022)
- <sup>4</sup> Artesia and Frontier Economics, [‘Unlocking Benefits Through Data and Metering. A case for investment in AMI’](#) (May 2022)
- <sup>5</sup> Artesia and Frontier Economics, [‘Report: Cost benefit analysis of water smart metering’](#) (November 2021)
- <sup>6</sup> Arqiva and Waterwise, [‘Smart water metering and the climate emergency’](#) (April 2021)
- <sup>7</sup> The Chartered Institution of Water and Environmental Management, [‘Smart water metering: unlocking the benefits’](#) (webinar) (June 2022)
- <sup>8</sup> The Chartered Institution of Water and Environmental Management, [‘Smart water metering: unlocking the benefits’](#) (webinar) (June 2022)
- <sup>9</sup> Thames Water, [‘Smarter ways out of water poverty’](#) (2021)
- <sup>10</sup> Artesia and Frontier Economics, [‘Unlocking Benefits Through Data and Metering. A case for investment in AMI’](#) (May 2022)
- <sup>11</sup> Artesia and Frontier Economics, [‘Unlocking Benefits Through Data and Metering. A case for investment in AMI’](#) (May 2022)
- <sup>12</sup> Environment Agency, [‘Review of England’s emerging regional water resources plans’](#) (May 2022)
- <sup>13</sup> Waterwise, [‘Senior water efficiency group for England winds up’](#) (August 2022)
- <sup>14</sup> Arqiva, [‘The evidence base is burgeoning for investment in AMI to make the cut at PR24’](#) (April 2022)
- <sup>15</sup> Artesia and Frontier Economics, [‘Unlocking Benefits Through Data and Metering. A case for investment in AMI’](#) (May 2022)
- <sup>16</sup> See Artesia and Frontier Economics, [‘Unlocking Benefits Through Data and Metering. A case for investment in AMI’](#) (May 2022); Artesia and Frontier Economics, [‘Report: Cost benefit analysis of water smart metering’](#) (November 2021); Arqiva and Waterwise, [‘Exploring public attitudes towards smart water metering’](#) (November 2021); Arqiva and Waterwise, [‘Smart water metering and the climate emergency’](#) (April 2021).
- <sup>17</sup> The Chartered Institution of Water and Environmental Management, [‘Smart water metering: unlocking the benefits’](#) (webinar) (June 2022)
- <sup>18</sup> Artesia and Frontier Economics, [‘Report: Cost benefit analysis of water smart metering’](#) (November 2021)
- <sup>19</sup> Artesia and Frontier Economics, [‘Unlocking Benefits Through Data and Metering. A case for investment in AMI’](#) (May 2022)
- <sup>20</sup> Arqiva and Waterwise, [‘Smart water metering and the climate emergency’](#) (April 2021)
- <sup>21</sup> Waterwise, [‘Advice from Chair of the Senior Water Demand Reduction Group’](#) (December 2021)
- <sup>22</sup> Artesia and Frontier Economics, [‘Unlocking Benefits Through Data and Metering. A case for investment in AMI’](#) (May 2022)
- <sup>23</sup> Environment Agency, [‘Review of England’s emerging regional water resources plans’](#) (May 2022)
- <sup>24</sup> Artesia and Frontier Economics, [‘Unlocking Benefits Through Data and Metering. A case for investment in AMI’](#) (May 2022)
- <sup>25</sup> Thames Water, [‘Thames Water hits half a million smart meter milestone’](#) (April 2021)
- <sup>26</sup> Arqiva and Waterwise, [‘Smart water metering and the climate emergency’](#) (April 2021)
- <sup>27</sup> Waterwise and Arqiva, [‘Exploring public attitudes towards smart water metering’](#) (November 2021)
- <sup>28</sup> Artesia and Frontier Economics, [‘Report: Cost benefit analysis of water smart metering’](#) (November 2021)