

ARUP



ARUP RESPONSE TO CONSULTATION QUESTIONS

Consultation on Ofwat's emerging strategy:  
Driving transformational innovation in the  
sector



## Executive Summary

The water sector in England and Wales, as elsewhere in the UK and the world, is facing considerable challenges from climate change, population growth, tightening environmental standards and continuously rising customer expectations.

There is a growing momentum to meet these demands through innovation, with Ofwat challenging water companies to be ambitious in how they deliver more of what matters for customers, along with a more overt social purpose. Ove Arup and Partners (Arup) welcomes the opportunity to respond to Ofwat's consultation on driving transformational innovation in the sector.

Arup is at the heart of innovation in the water sector. We cover the entire knowledge value-chain, from understanding future trends and identifying areas for development, to delivering industry-leading research and data-driven solutions. We work with organisations, large and small, which strive for excellence and innovation and, via our involvement in formulating innovation strategies and plans for water companies, in addition to working with water industry organisations including the UK Water Partnership, Water Industry Forum, British Water and Future Water Association. We are also currently delivering the Hydro Nation Water Innovation Service in Scotland. We therefore have a firm grasp of the sector challenges spanning policy to practical deployment of innovation, as well as the regulatory and investor implications of trying new approaches to challenges.

In preparing our response to the consultation questions, we consulted widely across our global firm, drawing contributions from specialists working across the water cycle including those specialising in: regulation, economics, strategy, asset management, resilience, technology innovation and R&D, all of whom are involved in advising clients on driving change through innovation.

We look forward to playing our part in supporting the realisation of transformational innovation in the water sector.



**Dr Mark Fletcher FREng**

Director & Arup Fellow  
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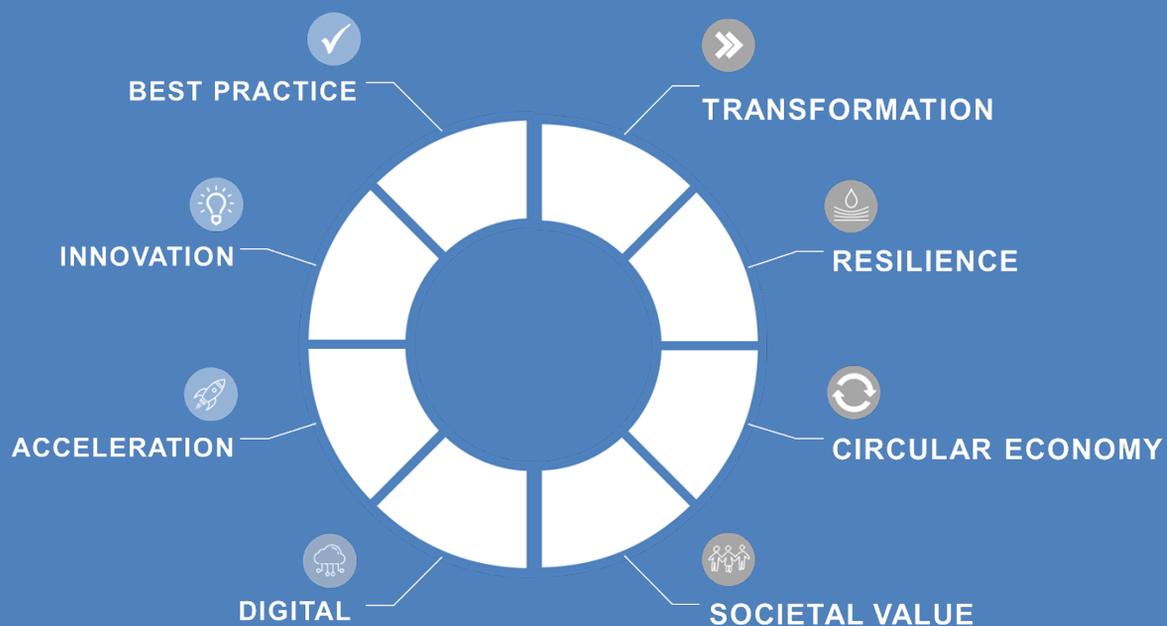
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# INNOVATION IN THE WATER SECTOR

## ENABLERS

## OUTCOMES



The following points outline Arup's responses to the consultation questions on Ofwat's emerging strategy: Driving innovation in the sector

## Innovation in the water sector – our challenge to water companies

### Question 1: What are the main barriers to innovation in the sector and why?

There are factors which act as potential barriers in the regulatory, company and supply chain domains. While we recognise that these interact with each other, we have outlined barriers to the individual areas below.

#### Companies

- Risk aversion / fear of failure (see also regulatory blockers) – the services provided fundamentally relate to public health, so risk tolerance let alone risk appetite is low.
- Corporate culture / employee behaviours – few companies have incentives for employees to innovate (although this is beginning to show change, based on some companies' PR19 narratives); processes for employees to navigate to progress their innovations are onerous. Water company employees are focused on their business-as-usual activities and rarely have the time and space to innovate.
- A technology fixation – perhaps this was inevitable due to the science and engineering foundations of the sector, and reinforced in the past by having to be able to point to acquired, compliant assets and their outputs. However, there's an emerging recognition of the value of social and natural interventions in achieving outcomes, and hopefully this will be facilitated further in Ofwat's incentives.

#### Regulators

- Funding - the energy sector has had a dedicated innovation fund for 10 years (in some shape or form), while the water sector has not. The programme can encourage competition or collaboration depending on how it's structured.
- Regulatory cycles – the innovation process from incubation through to implementation and learning is often lengthy, and inevitably not all ideas make it through the full process as some are shown to not be viable. The ODI regime as it currently is framed struggles to deal with the combination of any 'payback' (be that cost saving and/or performance gain) being long-term along with not all innovation effort resulting in an output/outcome. This also relates to supply chain delivery barriers, below.
- Universal compliance – there is abundant evidence from the great inventors and leading edge companies that innovations inevitably involve some degree of failure – “success is on the far side of failure”, as IBM's Thomas Watson succinctly put it. Recognising the public health nature of what the sector delivers for society, it would be helpful to provide some regulatory 'sandpits' in which innovations can be tried out. The double jeopardy of legal action from quality regulators if compliance is not achieved everywhere, all the time, and the financial disincentives of underperformance under the ODI regime, reinforce company decision makers' risk averse tendencies.

## Supply chain

Related to risk aversion - the delivery partner is usually left owning the risk (time delays and cost increase) of implementing innovative technologies. Implementing risk sharing (or even risk owning) arrangements would be helpful, as would less onerous Intellectual Property clauses.

- Delivery cycles - the delivery partner contract is usually for the AMP period with options for extension. This means the delivery partner is only interested in implementing innovation that is ready for roll out. They are not encouraged to consider innovation development that might take more than an AMP cycle to mature. The delivery partner contract rarely includes gain/pain share incentives for operational innovation. The delivery partner is therefore not interested in developing innovation that could impact on the asset for its entire operational life, unless there is a respective capital cost saving. There are exceptions e.g. Welsh Water's Alliance in AMP6 and for AMP7 does have an OPEX gain incentive.
- Academia – as one part of the ‘supply chain’ – although academic institutions and water companies have increasingly developed links, there is still a need to bridge between university research and the implementation of innovations in practice. The most successful university innovation projects are partnerships between the water companies and universities. Alternatives like accelerator programmes and incubators could also improve the status quo.

## Additional financing support for innovation

### Question 2: Do you think that the financial support cited in section three is required to stimulate innovation in the sector?

Considering that self-funding risk is a key blocker (and the challenging draft determinations that companies have been given may exacerbate this tendency), funding should help to reduce that risk resulting in more innovation, particularly for long-term challenges.

Water companies are seeking to be more collaborative in their research and development. However, the pace of collaboration and its beneficial impact on the sector/customers is generally slow. Using central financial support should kick start collaboration and speed up the delivery of beneficial impacts.

The water companies are prioritising their innovation/R&D budgets to reduce financial capital and/or operational costs. There is insufficient incentive for them to consider the benefits from the social and natural aspects. These aspects are being captured as only secondary benefits where the primary benefit on CAPEX/OPEX are commercially favourable.

The welcome developments in the sector in exploring and quantifying the non-Financial / Manufactured Capital benefits of activities could be applied in this area, to assess returns on investment.

In the same way that some companies have been successful in attracting investors using sustainability criteria to articulate investor returns, opportunities for investors to provide funding for programmes of innovation could also be framed in social returns on investment, in keeping with the sector's direction of a Social Contract / Public Interest Commitment.

### If so, what do you believe is the appropriate amount of funding and why?

Innovate UK's 2019 Delivery Plan states that the government's Industrial Strategy sets a 2027 target of 2.4% of GDP being invested in research and development. Currently the UK invests c.1.7% of GDP, which places the UK 22nd on the OECD countries and lags behind the EU average of just over 2%.

If the sector is to be brought in line with this direction, around 2% of turnover would seem to be a practical level. £200m is a low number for an industry of this size, however, considering the framework set-up will take time, it could work for an initial period because it is likely that it will not be actively used in the first year or two of the price control.

In principle, there may be efficiencies of synergy through this funding, such as avoiding the same approaches / technologies being trialled separately multiple times by several companies. The central fund should at least equate to this efficiency. However, additional funding which would increase customers' bills is also required for activities that the water companies have historically been more reluctant to consider.

### Question 3: Do you agree that our proposed draft principles for additional financial support will effectively safeguard the interests of customers?

In principle, yes, with some nuances.

All England and Wales customers will incur an increase in their bills, but this is only appropriate if 100% of the centrally funded projects are relevant to 100% of the water companies. There may be projects that have a disproportional benefit on some of the water companies compared to others. It should be possible to track which water companies will benefit from each centrally funded project, with the aim of seeking a fair balance by the end of the AMP period.

Another option is that water companies should be required to at least match fund the investment.

As previously noted, water companies need to be able to fail without facing the risk of Ofwat clawing back funding. Otherwise, companies are not incentivised to be open about the level of success of the initiatives.

Limiting the time period to 2020-2025 is not consistent with creating a long-term sustainable funding pathway for innovation and means that innovation projects which span multiple AMPs may not be funded.

### Collectively-funded innovation competition

#### Question 4: What are your views on the collectively funded innovation competition model which we describe in section three?

Collective funding allows for better collaboration between the companies. We have observed this model driving greater collaboration in the energy sector. However, it can lead to more siloed innovation teams who work across the industry but less so with their own organisations. This results in some good projects, but doesn't necessarily deliver the cultural change that Ofwat is looking to encourage.

The method of seeking the water companies to set up the framework is appropriate but may take considerable time to agree due to the complex legal and commercial aspects, e.g. reaching agreement on Intellectual Property Rights will be a challenge in particular for the water companies and their supply chain, especially where parties bring existing IP. The framework will need to efficiently allow projects to be submitted that in themselves may involve consortia/JVs etc made up of water companies and their supply chain. IPR will need to be set up that will encourage the water companies and their suppliers to innovate and retain appropriate commercial rights to their core intellect.

We agree that Ofwat is not an expert in innovation, hence the competition should be run by an independent entity with experience in innovation. The framework is to include a single independent expert entity (SIEE) to assess the projects, but Ofwat also wants to retain strategic control or oversight over processes and decisions. Does this mean that Ofwat will also need its own technical advisors? The responsibilities of the SIEE are not clear. Who approves the outcome of each competition, SIEE or Ofwat? Does the SIEE support the project parties to overcome technical challenges or act as an approver (on behalf of Ofwat) of the proposed means to overcome the challenges?

#### What other key considerations not highlighted should we take into account in designing/ implementing the competition?

- One of the challenges that the water sector faces is in moving at pace to scale, from innovative trials into implementation. The proposals around this competition don't appear to address that.
- How are variations to the project (outcomes, cost and programme) agreed and financed? Does the SIEE approve, Ofwat or is the project self-governed?
- It's important not to make the competition process too burdensome/bureaucratic for companies because that will stifle innovation. Having a portal instead of circulating files would be a helpful and innovative approach. There should be a minimum pot set aside for culture change and environmental innovations, to prevent all the funding being focussed narrowly on technological / physical infrastructure solutions.
- What will be the role of the existing water industry research groups?
- How will the supply chain engage in this especially if they are bringing their own IP?

### End-of-period innovation roll-out

#### Question 5: What are your views on the end-of-period innovation roll-out reward we describe in section three?

It is not clear whether innovation that has not been developed through the fund would be eligible for this reward. Doing so would be a good way to reward companies that are already innovating prior to having access to the fund, rather than disadvantaging them because they were first movers.

It doesn't allow for failure of an innovation, which is equally as important as success. It seems to us that more work is needed to define what innovation is and how this would be measured in delivery – e.g. for potential innovations that fail to progress through to implementation, how would these count / would there need to be criteria to describe the reasons why they were terminated?

Providing the reward at the end of the AMP period does not necessarily promote faster roll out other than within the AMP period. The water companies may roll out in the 5<sup>th</sup> year.

There are alternatives e.g. rather than an end of period reward, the reward could be agreed for each identified implementation programme/project on an annual basis. The reward could be tapered rewarding the earliest implementers the highest reward.

The rewards scheme could also consider a 'pain' element for the water companies who have not implemented the expected schemes in the AMP period. The reasons for not implementing which remove the pain share e.g. not commercially viable for the specific site, will need carefully setting out.

Any monies collected from 'pain' could form part of the reward to the companies which have successfully implemented innovations. The size of the reward needs to be carefully considered and be in proportion to the size of the benefits implemented. Quantifying the benefits will need to include not only CAPEX/OPEX but also social and natural capital benefits.

Company brand promotion on the back of receiving the rewards could be significant in the eyes of their customers, but the rewards needs to be big enough financially to assist balancing the risk and reward equation the companies go through in rolling out the innovation.

The risk of adopting sub-optimal solutions too quickly may impact on the customers whilst the water company and shareholders will still receive the rewards.

Assuming a sound approach to risk-sharing between parties, the rewards should go to all of the parties involved in delivering the projects as well as pain being shared.

What other key considerations not highlighted (e.g. whether it should be collectively funded or individually funded) should we take into account in designing/implementing the reward?

Covered above.

### Question 6: What other potential alternative mechanisms for funding/ rewarding innovation not discussed do you think we should be considering?

Some alternatives include:

- a specific Innovation allowance - this is not discussed here. The reasons for it being discounted would be helpful as it is a significant tool in the energy sector;
- providing the collective funding to a water research body to set up an incubator / accelerator;
- the number of water companies that will benefit from a given project. The aim is clearly for all 100% but many projects will not be applicable to all;
- Speed of delivery within the AMP period, as noted in our response to Question 5.

### Which financial support mechanism or combination of mechanisms should we introduce and why?

Both should be introduced, but they should apply to different stages of innovation i.e. the competition route for new innovation and funding at the start, and the reward being for innovations already developed before/outside the fund but in the process of being rolled out to a wider scale in AMP7.

### What would be an appropriate split of available funding/ reward?

Given other in-period price control pressures, funding should form the majority of the pot to reduce the cash and financeability pressures on companies.

### Other potential industry activities

#### Question 7: Do you think the potential industry activities discussed in section four could help drive innovation?

##### **Innovation strategy**

The concept of a single innovation strategy is very powerful. However, to get all water companies to agree would require a very high level strategy. This may mean the strategy has insufficient direction in it to be useful. Each water company already has its own innovation strategy, or it is covered across a number of other strategies. It would be powerful to align company strategies with the joint innovation strategy, albeit potentially requiring an extensive liaison to get it right. There may be a role for an industry body such as InnovateUK, the NIC or UKWP to facilitate the creation of a water innovation strategy with the water companies that they have to adopt.

There is a risk that an industry innovation strategy would be too restrictive to the competition. It might be more appropriate to allocate this responsibility within companies, so innovation can be tailored to business and industry drivers.

##### **Centre of Excellence**

We agree that the innovation water centre for excellence would help drive innovation. An example exists in the water sector in Scotland, which has successfully established the Centre of Expertise for Waters (CREW), which links into to the network of innovation centres, the Hydro Nation Water Innovation Service, Scottish Water Development Centres and the Hydro Nation International Centre.

It is not clear whether the centre of excellence could also provide the single independent expert entity (SIEE) role or whether these will always be separated.

We see incubators as a good idea – and potentially several regional incubators like the water resource groups to ensure that the innovation meets the local need.

It is unlikely that one single centre could provide all of the required diverse range of trial/test/demonstration/field piloting facilities. However, a network of centres across the UK could. In mainland Europe, organisations such as the Water Alliance join up universities with test facilities and other expert organisations. Potentially England and Wales could create a network of centres which also link into Scotland, Northern Ireland, Republic of Ireland and mainland Europe to tap into their expertise.

The 4th industrial revolution for data is well underway, but the water sector seems to us to still be a relatively closed shop. Some data are openly available, but currently are of little value. Each water company is undertaking its own data analytics, but little sharing is undertaken in this area.

A regulatory steer to be “open by default” is a good direction, and would enable more ‘real time’ regulation rather than being dominated by price reviews.

Are there other activities not identified which you think the industry should be considering?

### **Sectoral behaviours**

There needs to be a recognition that the goal of innovation isn't just about reducing costs, but it is about efficiency (delivering more output per unit input) and delivering better value for customers (looking more widely than Financial Capital and improving Natural, Social, Human and Intellectual Capitals).

Likewise, water companies are beginning to show signs of adopting learning from start-up culture, and this should be encouraged and facilitated.

### **Innovation isn't just technology**

For instance –

- mobilising social capital by engaging customers as part of managing networks;
- innovative financing such as green and sustainability bonds;
- active regulatory participation in exploring new models of regulation.

### **Information & analysis**

The energy sector has a dedicated Energy Data Taskforce to formalise the need for data improvements and data-focused innovation. While such a body may not be strictly required for water, there is a role for data which needs to be elevated on the water sector agenda.

For instance, there would be performance and efficiency benefits from standardisation, and this could also further Ofwat's intention to make some elements of its work more 'real time'/in-AMP rather than price review driven.

### Regulation as an enabler for innovation

#### Question 8: Do you think the proposals in section five will help drive innovation?

Yes – we see those as minimum requirements.

The principles stated in section 5 are all steps forwards, but do not mention Scotland, Northern Ireland and the wider EU countries. There are many lessons to be learnt from these other neighbours' regulators, with whom we should seek to work more closely.

For instance, innovations in regulatory approach such as ethics-based regulation would sit well with Ofwat's advocacy for social contracts in the sector.

#### Are there other activities not identified which you think Ofwat should be considering?

Cross-sector coordination through UKRN, for example, would also be beneficial so that water and energy companies can share lessons learned from innovation

Similarly, the water companies and their delivery partners all independently collect lessons learnt and innovation stories. A national level register, perhaps administered by the entity appointed to drive the national innovation strategy or by the SIEE, would bring another level of knowledge to delivery partners and the supply chain.

# We shape a better world

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