Do water and energy mix?

With major changes ahead in energy and water there is a growing need to look across sectors. There have always been inter-dependencies but the focus on net zero creates new opportunities and risks. There needs to be more dialogue and joint planning. With Strategic Policy Statements being developed for water and energy the time is right to think afresh about these interactions and for the regulatory framework to evolve to support a cross sector approach.

One of the mantras in regulatory circles at the minute is the need to focus on "whole systems". Over recent years Ofgem has been expanding its thinking from simply "whole electricity system" to "whole energy system" to a position now where transport and heat are being brought into the picture. However, looking more widely still the strategic cross-sector issues between energy and water rarely get discussed. This Viewpoint aims to highlight where some of the important overlaps lie as a basis for encouraging more truly whole systems thinking.

While we recognise that there are other important nexus issues – for example with telecommunications – this Viewpoint focuses on energy and water in the interests of making the issues manageable.

There have always been interactions

Water needs electricity. Treating and distributing water and dealing with waste water are energy intensive activities – whether for abstraction, distribution (pumping) or treatment most water companies use significant amounts of energy and have for many years had an eye to how they can manage those costs. We have also seen how major energy disruptions such as those in 2019 can lead to water supplies being jeopardised if back-up power supplies fail.

A focus on increased resilience in water requires thought about how to deal with power outages.

Customers who are struggling will likely be struggling on all fronts. In the last few years – and prompted in part by the NAO report[1] on Vulnerable Consumers in Regulated Industries – utility companies have been looking at how to share information about customers in vulnerable circumstances to ensure that they get the help they need across the piece. Given growing inequalities and the impacts of the pandemic, this focus needs to be strengthened, and to become more strategic and joined up.

Energy efficiency and water efficiency have been promoted for a number of years with some efforts to link the two issues more closely. Saving water will always save energy (as less water has to be produced) but saving hot water delivers a double whammy. Current messaging around water efficiency does not always give that additional focus to hot water usage that it might.

Co-ordinated roadworks. The disruption caused by roadworks has been a long-running issue with regular calls for improved co-ordination. SGN and Cadent are taking forward work with the GLA as part of RIIO GD2 to build on previous initiatives and to improve co-ordination with water companies in the London area to minimise disruption to local residents.

Both sectors are facing fundamental change

In energy the talk is about the energy transition and net zero. We will see more renewable generation, much connecting at a local level with flexibility (storage, demand side response) becoming increasingly important to keep the system in balance. Decarbonisation of heat will require a move away from natural gas to either biogas / hydrogen or a move to electrify heat instead.

[1] NAO (2017) Vulnerable consumers in regulated industries

In water there is an industry commitment to meet net zero by 2030 but also a growing emphasis on the threats placed by climate change – floods and droughts – on ensuring there is adequate water to meet the needs of a growing population (whilst recognising that 'new' sources of water tend to be more energy hungry) and also a growing focus on biodiversity and water catchments.

Both sectors increasingly rely on digitally enabled communications which is itself dependent on electricity.

With the significant changes in both sectors there is a need to think afresh about the nature of the interactions – the opportunities and risks – and to ensure they are considered in the wider debate in line with a "whole systems" philosophy.

Thinking about resilience needs to look at risks across sectors

The increased risk of flooding creates an adaptation challenge for the energy sector. The Climate Change Committee in their latest report[2] on adaptation highlighted both the interdependencies and the need for the power sector to do more. Finding solutions that benefit both sectors is an opportunity that should be explored.

The risk of energy supply disruptions (or even just voltage disturbances which can affect equipment) has wider ramifications for water as another essential utility – as well as for communications and transport. In thinking about whether to support funding for investment to improve energy system resilience, Ofgem should factor in these wider impacts. The approach it uses to calculate the "**value of lost load**" which underpins such assessments is in urgent need of updating to take account of our growing societal dependence on electricity.

These crucial interactions around resilience have been highlighted[3] by the National Infrastructure Commission and need to be built into future thinking on price controls. But also companies themselves need to do more to share resilience plans and understand the risks as each other sees them.

> *"All sides need to develop a better understanding of the interdependencies and potential cascade risks that can exist between sectors.*

Net zero gives water companies a new interest in energy

With the water sector looking to decarbonise its own operations – as reflected in Water UK's Net Zero Routemap[4] - many water companies are investing in **renewable generation** at their sites. However, the changes being driven through by Ofgem on transmission charging reportedly mean these plans are no longer viable. The changes are designed by Ofgem to ensure that the fixed costs of the networks can be recovered in a fair way (as the water companies still need the networks to be there even if they don't plan to use them except in emergencies). Water companies are not unique in facing these challenges but this highlights the importance of them keeping close to developments in energy regulation.

Where there may be more opportunities for water companies is in the huge growth expected in **flexibility** and the potential for water companies to adjust usage at times when there is either too much or too little energy on the system. The Power Responsive[5] programme which Sustainability First helped establish for National Grid provides a way for companies – including water companies – to understand the future needs of the grid and the commercial opportunities that presents.

Attempting to put this into practice, a network innovation project led by National Grid ESO working with United Utilities looked at the scope for water management services to be used to provide flexibility services to the grid by how they manage their catchment. The innovation funding now

[2] The Climate Change Committee (2021) UK Struggling to keep peace with climate change impacts

[3] National Infrastructure Commission (2019) Summer disruption highlights need to understand 'cascade effect' on resilience of inter-connected infrastructure systems

[4] Water UK (2020) Net zero roadmap

[5] Power Responsive

being provided by Ofwat could provide a further opportunity for developments in this space.

Other interactions include water companies, like Northumbrian Water[6], starting to generate green gas from sewage and Scottish Water[7] continuing to build on its history of using its water resources for hydro-generation.

Major strategic changes need to be seen from a whole systems perspective

Hydrogen needs water. There is a clear expectation that hydrogen will be an important part of decarbonising our energy system – providing an alternative to natural gas for industrial heat and potentially some domestic heat as well as heavy goods transport. Plans are being developed for a number of hydrogen hubs. But the production of hydrogen needs water and the implications of a shift to hydrogen do not seem to be fully built into water resource plans. The Climate Change Committee highlighted in their adaptation report the risks to hydrogen production of increased drought. However, it is hard to find wider discussion of this inter-dependency and stress testing of plans.

Water resource plans can impact on energy demand. Water companies are all updating their water resource plans which aim to ensure they can cope with climate change, population growth and also place less demand on extraction from chalk aquifers on environmental grounds. Alternatives such as de-salination plants are very energy intensive and likely require new electricity network infrastructure to support. However the alternative of reservoirs – which could provide benefits to the energy system through hydro power – require a lot of concrete, creating other issues. In developing their water resource plans water companies, regulators and government need to look strategically at the options and the wider ramifications.

Which all points to a greater need for dialogue and joint planning..

With more interactions and more radical solutions being considered to deal with climate and other challenges, the need to take a whole system view is more crucial than ever.

This requires the companies from different sectors to do more to work together to understand each other's businesses, the strategic challenges they face and where there might be win-win solutions and solutions that deliver wider co-benefits.

For many years the energy networks did not really care what sort of business sat at the end of their pipes and wires but that needs to change. It is why Ofgem has placed a strong emphasis on customer engagement informing Business Plans. Very few (if any) energy networks can yet say they know who all their major customers are – or what business they are in - but they are increasingly acknowledging that they need to do this to understand likely future demand trends on their networks, to help shape that demand where there are choices and to understand the potential for these customers to provide flexibility services.

This shifting dynamic requires the regulators to more strategically engage and to address cross-sectoral impacts in their policy decisions. The work done through the UK Regulators Network on some issues is a start but there are clearly wider risks and opportunities that need to be addressed.

Ofgem as energy regulator "may" have regard to impacts of its decisions on water customers – but does not have to consider them and those impacts will always be secondary to the impacts on electricity or gas customers. The same applies the other way round in water. In its Regulation report[8] the National Infrastructure Commission (NIC) called for regulators to be given a duty to collaborate on cross-sector initiatives. Sustainability First has supported that call which now seems to be more needed than ever.

Conclusion

The introduction of Strategic Policy Statements in energy and water is an opportunity for government to provide a

[6] Water UK, Green Gas

[7] Scottish Water, Hydropower

[8] National Infrastructure Commission (2019) Strategic investment and public confidence

clear steer about the importance of cross- sector thinking. In its Response[9] to the NIC Regulation Study Treasury said that

"Government will publish a policy paper in 2021 which will consider the benefits of a cross-sectoral strategic policy statement to complement the sector specific statements." They acknowledged the role that a strengthened UKRN could play and said that as part of the overarching policy paper, the government would consider broader collaboration between the regulators, including through duties.

We look forward to seeing their thinking and hope that this Viewpoint has helped reinforce the importance of a cross-sector perspective. There I much that companies can do and are already doing but the regulatory framework needs to evolve to promote cross-sector co-operation in tackling the strategic challenges we face.

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[9] HM Treasury (2020) Response to regulation study: Strategic investment and public confidence