' INDUSTRY COMMENT

WATER AND DEMOCRACY

Localism and distributed solutions are gaining ground. PyTerra's David Arscott looks at the implications for water and suggests how water companies could feel comfortable with communities in the driving seat.

David Arscott is founder and director of water innovation company PyTerra.

Following the major floods in Cumbria in 2015 and Somerset Levels in 2014, local communities were vocal about their sense of inadequate protection. MPs were held to account and intense scrutiny was placed by the press on the authorities. Over in California, local tensions have been mounting as their drought continues into its fifth year, though there there has been less attention given to those disadvantaged communities most badly affected. Often living in the older urban areas where water infrastructure has been failing, for example in the San Francisco Bay area, these communities have had to face both poor services and rising utility costs, both exacerbated by the drought. However, community action has led more recently to a participatory research project on drought and equity to find solutions to this problem.

There is no shortage of examples where communities feel they have been let down or forgotten by those responsible for authorising water infrastructure. One in ten people lack access to safe drinking water across the world. More people have a mobile phone than a toilet. By 2060, more than a billion people worldwide will live in cities at risk of catastrophic flooding as a result of climate change. As global water problems increase against a backdrop of insufficient investment, this feeling will inevitably increase with the potential for civil insurrection. Even if investment is increased, it is the global scale of these water problems which particularly creates such immense challenges for those who commission water infrastructure.

In order to deliver solutions at a sufficiently large scale, projects either need to be big (think of Thames Water's reservoir plan at Abingdon) or they need to be distributed. Building big will always have a place, but big projects are slow to commission, can typically have an enormous impact on local communities and if their design parameters are superseded by changing events they can become a liability. Building smaller but in more places can be more complex to design, implement and control. Yet this approach may resolve many of the social, environmental and economic issues associated with big projects.

Here we consider how changes in communities' sense of rights, as well as development in technology, could help infrastructure developers adopt a new business model.

Localisation

"Water and sanitation are a human right! Water is a public good, not a commodity!" So said a policy agreed by the United Nations General Assembly in 2010. The first successful European Citizen's Initiative in 2014 sought to create legislative support for this policy and campaigners were very clear that such fundamental rights should not be left to market forces. The response from the European Commission (EC) was somewhat watered down, only issuing guidance on how water companies could provide clearer data on water quality and water services. This initiative nevertheless flagged a growing sense that communities could hold the authorities to account over their water rights.

For those making decisions about water infrastructure investment, understanding people's rights can be difficult. Nestlé chair Peter Brabeck, who also chairs the 2030 Water Resources Group, has commented on this. People need 1.5% of the total water available for personal hydration and hygiene and that is a right. It is not viable to treat the remaining 98.5% as a right and indirectly undervalue its use because this has led to the irresponsible use of water in the past and makes future water budgeting very difficult.

However, without a consensus on how the 98.5% is allocated, effective policy and resource allocation is very difficult to achieve. In fact, the idea of any single central authority making decisions on this allocation is part of the problem. The CBI in its report of 2014 said: "Our inability to garner grassroots support for major projects threatens the construction and upgrading of vitally important national infrastructure... Too often when making the case for major infrastructure projects government and industry focus too heavily on future benefits to the nation as whole, ignoring the impact on the local community... In the UK, the research by Ipsos MORI indicates that in the public's eyes, even the largest project is perceived through a local lens."

A switch from central to local decision making is taking root in the UK. The innovation charity NESTA has a programme called Mass localism – a way to help small communities solve big social challenges. It identifies a problem with the delivery of localism policy; government has traditionally found it difficult to support genuine local solutions while achieving national impact and scale. NESTA's answer is "mass localism", making local solutions effective through local specificity, and the ability of groups to tailor solutions to local contexts. It also published in 2014 a report called Making sense of the collaborative economy where it concluded: "The holy grail of the collaborative economy is helping the economy, the environment and society simultaneously by unlocking the value of idle assets while also rebuilding social capital." In effect, this is a formula for turning oppositional forces into collaborative energy, whilst also making efficient use of resources.

We are gradually moving from a world of "done to" or "done for" to a world of "done with" and occasionally "done by". Innovation here can also be seen in the way that civic projects are funded through the use of community crowd funding services, such as Spacehive in the UK. The renewable energy sector has also seen innovation in community participation. Energy4All, for example, was established by Baywind Energy Co-op to develop green energy schemes owned by the various wind Co-operatives around the UK.

> ' We are gradually moving from a world of "done to" or "done for" to a world of "done with" and occasionally "done by".

Technology and community

Turning to how technology can support new approaches to infrastructure development, there are innovations which allow the realisation of distributed schemes which themselves are more resilient to risk and more acceptable to local communities.

Infrastructure resilience is created when risks can be addressed in multiple ways; if one part of the water network fails, the remaining parts can provide cover. If the network has insufficient capacity as demand increases, it can be incrementally grown without causing network failure. Also, a flexible and adaptive network can deliver multiple services – for example water supply, flood prevention, water treatment, energy creation and biodiversity enhancement. All this implies a distributed, networked and adaptive system which uses sensors, data analytics, automation and optimised controls – the very stuff that the Internet of Things is promoting and around which an industry is now growing.

Distributed systems also have another very attractive feature: they can be applied locally. In fact, they can be applied across many localities until they create a grid able to service entire catchment areas and then connect to grids in neighbouring catchments. They can also be built as hierarchies, with smaller parts feeding larger parts and so on. Finally, they can use both natural and artificial components within an overall system, linking rural networks with urban networks so that the complete catchment water cycle is harnessed to meet both strategic and local needs.

For local communities, distributed systems are more capable of meeting their local needs and more capable of being initiated and implemented through their involvement. They also have another potential benefit: they can be designed as closed loop systems allowing a water network to continually recycle water to avoid wastage. This concept is gaining a lot of interest as it coincides with the Circular Economy agenda as well as providing the opportunity for integration with other systems, such as energy generation and recovery.

Distributed solutions

The growing demand from communities to engage in infrastructure projects in their back yard, and the ability of technology to deliver distributed solutions, may create a stronger argument for supporting a distributed approach to infrastructure development. But development will not happen at scale unless driven by business, and for this to happen, new business models will need to be used.

Business guru Michael Porter is an exponent of business creating large scale resources for environmental benefit when they can meet a need at a profit. This profit allows the solution to be infinitely scaled and self-sustaining. However, he believes that businesses need to change the way that they see themselves, and communities need to change the way they see business.

At the heart of this challenge is the linear approach that economies take towards infrastructure development: start with a specific need, identify a solution, consult, gain permits, implement and operate. There is an alternative approach which uses a circular model: identify needs, create ideas, filter ideas through community collaboration, develop, review impact – repeat. This may seem a quick route to anarchy, but that view underestimates the ability of human networks to bring order to chaos if it serves their purpose. A bee colony is very efficient at sending out instructions all the way from the queen down to every individual bee, and bringing back information back up the hierarchy. Can human networks also work as efficiently if needs are understood at every level within a community and all branches of the community network can contribute towards the realisation of solutions? This more organic approach has the potential to create solutions at scale and at speed.

To make this circular model work, Porter's advice to both businesses and communities needs to be considered carefully. Businesses, for example, would need to think how they can both brief communities on their needs as well as provide seed funding to them in order to initiate a cycle of the circular model. Communities, for their part, would then need to see this process and the relationship with business as part of the motivation for resolving their own problems. Both businesses and communities then need to have sufficient trust in each other to work together to deliver projects, creating a sufficiently risk-free and scalable process into which investors can feel confident to invest.

How might this look in practice? Here is a theoretical example. A shale gas developer wants to establish water services for six planned 10-bore well pads in an area of approximately 70 square kilometres. It wants to minimise the reliance on piped water and significantly reduce exporting truckloads of produced water off site. These needs are shared with the local authority which approaches local community groups with the message that fracking will take place, but it's a question of what is the best approach for local communities and is there an opportunity here to jump-start investment into water infrastructure which can deliver a range of local water needs.

The local authority uses an independent broker to bring together key stakeholders (e.g. water companies, businesses, agencies, land owners) as shareholders in a new Community Interest Company (CIC) in order to commission and develop new water infrastructure on behalf of the community. The broker is then used by the CIC to engage with the community to offer individuals a shareholding, invite ideas and secure crowd funding. This new legal entity can then commission projects, including those which will support the development of a local shale gas industry, as well as attract investment. Such an approach can be called a Private Public Community Participation initiative.

Conclusion

Times are changing in terms of how communities are expressing their perceived rights over local services and how the call for greater localism and more distributed solutions is growing. But time is running out to address the world's major water issues. Businesses such as water companies need to deliver solutions at scale and quickly, but they must find a way to feel comfortable in having at least part of the process being driven by communities. There is risk facing businesses if they do not pick up this challenge: householders refusing to pay their bills, communities blockading factories, or legal challenges to permitting. As Porter said, businesses need to change the way they see themselves. While communities also need to change the way they see business, they will inevitably conclude that they have a right to subject water services to democratic scrutiny.