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Challenging Traditions – Chasing Transitions: Water Reuse in the UK

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Oral presentation for theme: Addressing aging infrastructure in the transition to a city of the future

Abstract

A 'city of the future' will be founded upon sustainable urban planning and water management. Fundamental transitions in policy, technology and user behaviour will be necessary for this to happen. This paper identifies the potential transitions required in the United Kingdom to enable water reuse to transition from a novel concept to mainstream and the real and perceived challenges to this transition from a traditional urban water cycle to a sustainable urban water cycle.

Keywords

Behaviour, policy, quantification, reuse, transition

Background

There is an increasing global recognition that a transition to a more sustainable and integrated water management practices is necessary to meet our future water needs. With the recognition that traditional sources of water supply (rivers and groundwater) are severely stressed, alternate water sources are being considered fundamental in meeting our future water needs in a sustainable manner (Brown et al., 2005). Reusing stormwater (rainwater) and wastewater (greywater) are two such options that not only utilise what is normally considered as 'waste', but have the potential to transition the traditional urban water cycle to a more integrated and sustainable one. This paper focuses on grey and wastewater reuse (collectively referred to as 'water reuse' hereafter). The aim of this paper is to discuss the necessary transitions and the challenges in implementing them.

Discussion

A number of challenges need to be overcome in order to move from the more traditional and conventional practices to accommodate water reuse within United Kingdom. These include challenges with upgrading the water and wastewater infrastructure, stormwater drainage, urban flood management and more efficient usage of water within the buildings.

Political

The political system governing water management in the UK is complex and fragmented, with an array of legislations, regulations and policy guidance documents relating to water reuse (summarised in a table in the full paper). In contrast to other countries like Australia and USA, where individual states have more regional autonomy on their water management practices and have set targets for alternative water usage (Hatton-MacDonald and Dyack, 2004; Moddemeyer *et al.*, 2003), the system in the UK predominantly operates at a national level with little regional variability. These legislative, regulatory and policy tools in the UK (enforced by OFWAT and Environment Agency) currently do not incentivise water reuse (centralised or otherwise). At times these stringent requirements for water quality, level of service and best value for the customer can act as disincentives for adopting 'unproven' technology even on a pilot or trial basis.

Technological

Were there to be changes in the political arena, challenges remain in identifying and equating the scale of benefits from large-scale adoption of water reuse within our cities. Even with our current level of technological advancements, there is still a significant gap in knowledge and tools to model the impact of water reuse in capacity planning for a water or waste service provider. Simple and complex water calculators exist (CLG, 2009), but do they go far enough in estimating water reuse potentials? Furthermore, the technology necessary to ensure water reuse is fit for purpose is dependent on the scale of the installed system and the nature of the proposed end use. For example, in a domestic setting, shower water can be passed through simple filtration and reused for toilet flushing. However, for regional scale installations, the treatment and supply of water reuse is subject to the previously described regulatory and service level considerations. Additionally, there is also a significant challenge to the adoption of water use posed by enabling the construction industry and the general population to implement such techniques.

Behavioural

When it comes to the practices of water in everyday life, policy, legislation, regulation, and technological barriers, do not have an obvious influence. Instead it is the material configurations that surround people, which most strongly influence their interactions with water. For instance, a tap that does not stop running if left open, implies that there is a limitless supply of water in the system, therefore there is no reason to reduce water use or to reuse water. How then is it possible to challenge this daily-reinforced perception and transition to water reuse? Everyday practices do vary and the environmentally aware citizens, realising that rivers and aquifers have been over abstracted, are adopting a more sustainable lifestyle. But their efforts are hindered by lack of guidance from the regulators and policy maker and hampered by lack of easy to use tools and technology to assist them in making this transition. Would there be a greater uptake of alternative water technologies, such as water reuse, if the political and technological challenges could be resolved?

Conclusion

Aligning the areas described to facilitate the acceptance of water reuse as a non-novel technique requires challenging traditional views of policy, infrastructure and behaviour. It also requires each of these areas to accept the different views and needs of other areas and to chase transitions to more inclusive practice. New *cooperative* regulatory, assessment and innovation practices are required to meet the needs of the new *and* existing cities of the future. Further research is required to understand the full complexities of the process of transitioning from an old unsustainable to a new sustainable water management regime.

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