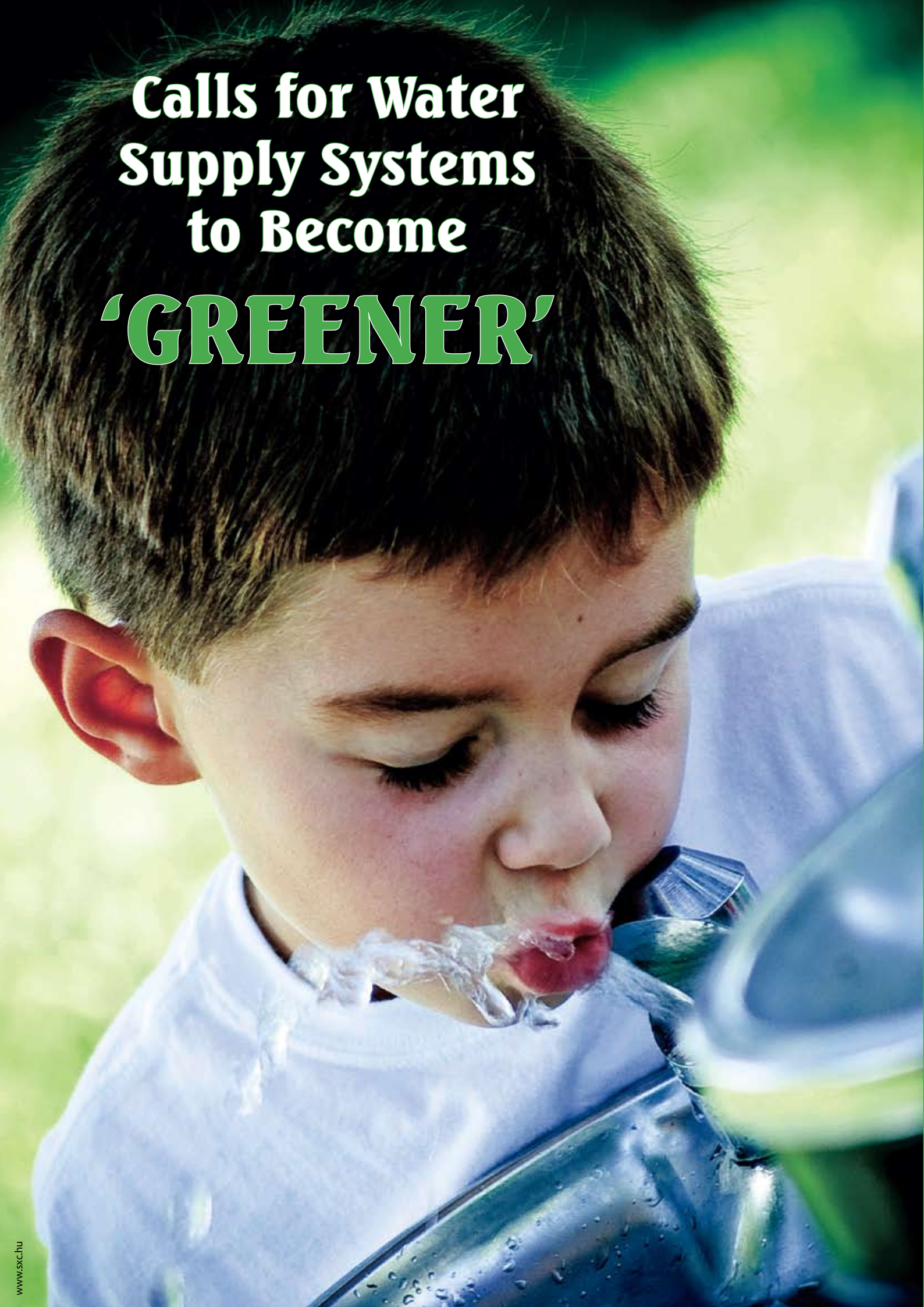
Calls for Water Supply Systems to Become 'GREENER'



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More pressure will be placed on water services providers in future to improve the sustainability of urban water distribution systems, especially in lieu of pressing climate change. This was one of the main messages emanating from the 10th Annual Water Distribution Analysis (WDSA) Conference, held in the Kruger National Park in August. Lani van Vuuren reports.

The latest international WDSA conference, considered one of the foremost forums on water distribution systems in the world, was the first to be held outside the US. It attracted around 200 experts from all over the world, including the USA, Australia, Canada and the UK. Among others the conference encouraged and fostered debate on new ways to supply drinking water, control distribution system water quality and improve and maintain safe drinking water in every part of the world.

Delegates heard how the sustainability of urban infrastructure is starting to attract significant attention, especially in developed countries. The water supply industry's present focus is on the potential ways in which the effects of climate change will influence the supply of water, for example, through changes in the hydrologic cycle and extreme events (droughts and floods). This is especially so because the effects of climate change on water distribution systems are not well known.

COMPLEX FUTURE CHALLENGES

However, there are increased calls for water services authorities to pay more attention to their water distribution systems' own contribution to global warming. "Modern drinking water and wastewater treatment systems are considered among the top five engineering achievements of the twentieth century," reported Dr Steven Buchberger, Interim Department Head of Civil & Environmental Engineering at the University of Cincinnati, in the US. "Countries, especially those in the developed world who have vast networks of ageing infrastructure, are faced with the challenge of repairing and restoring existing water distribution systems (and installing new systems), in a manner that promotes economic and environmental sustainability while protecting human health and preserving the environment for future generations."

"This daunting assignment is exacerbated by the emergence and convergence of global trends involving changing climate, shifting demographics (i.e. urbanisation), economic transformations and evolving regulations," noted Dr Buchberger. To mitigate these challenges, the US Environmental Protection Agency, for example, has launched the Water Resources Adaptation Programme for Infrastructure to identify and evaluate innovative approaches to improve the planning, design, operation and maintenance of the country's water resources infrastructure going forward.

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How do water distribution systems contribute to climate change? According to Prof Angus Simpson of the School of Civil, Environmental and Mining Engineering at the University of Adelaide, Australia, the manufacture, transport, installation and decommissioning of water distribution systems all lead to the production of greenhouse gases, which have been blamed for global warming. In addition, greenhouse gases arise from pumping during operations when electricity is derived from burning fossil fuels.

MULTI-OBJECTIVE APPROACH

Thus, the water supply sector has been called upon to adopt a more 'multi-objective' approach. "The traditional methods of optimising water distribution systems consider local concerns such as the cost of pipe, pump and tank upgrades, and meeting minimum pressure head and maximum velocity requirements," explained Dr Ives Filion, Assistant Professor at the Department of Civil Engineering at Queen's University in Ontario, Canada. "Although these concerns remain important, engineers are beginning to realise that environmental impact should also be included in water distribution system optimisation. This is owing to the growing recognition that

Dr Steven Buchberger, Interim Department Head of Civil & Environmental Engineering at the University of Cincinnati was one of the speakers at the recent Water Distribution Systems Analysis conference.

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Dr Filion noted that this dependency led to environmental impacts that manifested themselves outside the physical and jurisdictional boundaries of a water distribution system over time. "Therefore, added to traditional local concerns of minimising cost and meeting hydraulic requirements are regional and global concerns of material and energy use, greenhouse gas emissions, and toxic releases associated with the production of network components and their continued operation."

WATER DISTRIBUTION AND CARBON TRADING

One of the measures to mitigate global warming is carbon emissions trading schemes. Under an emission or carbon trading scheme, some businesses may need to buy permits to cover the greenhouse gases they emit, while others may be able to sell excess permits they own on the carbon market, if they can reduce their emissions by employing advanced technology. Prof Simpson, who presented a paper on water distribution system accounting for a range of future possible carbon prices, maintained that many industries, including the water supply industry, would be affected by the price of carbon. "To meet this challenge, water suppliers will have to consider a new paradigm for the design of water distribution systems under an emission trading scheme."

The Australian government, for example, has adopted a carbon trading approach, and currently, a national emissions trading scheme is being developed to start no later than 2010. What does this mean for water distribution systems? "Water suppliers will have to look at, for example, the best combination of pump size and pipe size to deliver the minimum average peak-day flow while minimising the total cost and greenhouse gas emissions of the network during its design life," noted Prof Simpson. Research by the professor and his team has also shown that different pump materials contribute different levels of greenhouse gases into the atmosphere, with cast iron pipes generally contributing more to greenhouse gases in its manufacture than polyvinyl chloride (PVC) pipes.

In view of dwindling fresh water resources amid an ever growing demand for water, it is clear that in the near future supplying water will be about much more than building a pipeline.

Selection of pipe sizes and materials will in future be determined by the contribution to greenhouse gases and environmental degradation, not just based on cost.

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