

# Overcoming Global Barriers to Reuse as Part of an Integrated Water Portfolio

White Paper for Black & Veatch's Reuse Roundtable Series

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## Background

From October 2009 through June 2010, Black & Veatch conducted a series of six high-level roundtable discussions around the globe that brought together about 75 industry thought leaders to review the barriers to water reuse and to explore the solutions and processes needed for overcoming them.

The purpose was not only to delve deeper into issues commonly perceived as potential barriers to water reuse but also to provide a platform for networking and linking our clients, colleagues and business partners. By helping water and wastewater industry leaders think differently and more holistically about the challenges of recycled water, we wanted them to understand clearly what needs to be done to move the token forward with reuse. Discussions were far ranging and covered barriers to reuse not only for potable purposes, but also for other domestic, industrial or agricultural uses.



Each roundtable was held at or during a major industry conference:

- Water Environment Federation’s Technical Exhibition and Conference (WEFTEC) – 12 October 2009, Orlando, Florida
- Association of Metropolitan Water Agencies’ Water Climate Forum (WCF) – 28 January 2010, Washington, D.C.
- Australian Water Association’s Ozwater’10 (Ozwater) – 8 March 2010, Brisbane, Australia
- Global Water Intelligence’s Global Water Summit (GWS) – 26 April 2010, Paris, France
- American Water Works Association’s Annual Conference & Exhibition 2010 (ACE) – 23 June 2010, Chicago, Illinois
- Singapore International Water Week (SIWW) – 30 June 2010, Singapore

### *Links*



## Participants

Participants represented a wide spectrum of experience with reuse and included government officials; municipal and private water/wastewater utility leaders; financial advisers; technical experts, suppliers; non-profit agency representatives; manufacturers of food, pharmaceuticals and chemicals; trade association leaders and academics.

Representatives of leading agencies around the world came together to discuss common themes and specific regional differences in reuse practices. Some came from geographic regions with rapidly expanding populations, some from arid or water-stressed locations, and some from areas where water was plentiful. All came to share their knowledge, insights and best practices.

Taking part in the six conversations – three in the United States, two in Asia Pacific and one in Europe – were panelists from more than a dozen countries: Israel, Saudi Arabia, India, the United Kingdom, Germany, France, Mexico, the United States, Canada, Australia, Singapore, PR China and Hong Kong SAR.

Even though journalists were present at three of the events, not all of the participants wanted to be identified on the record; nevertheless, they all willingly shared their own lessons learned with fellow panelists. The partial list of participants is available under the “People” tab at [www.waterdialogue.com](http://www.waterdialogue.com).

## Overview of Findings

This white paper distils, in the thought leaders' own words, the most significant areas of discussion covered during the roundtable.

Throughout the six discussions, a broad range of barriers to reuse were mentioned; but participants agreed that none of these hurdles were insurmountable. Among the most commonly mentioned were the following:

- **Overcoming public perceptions of recycled water**
- **Financing and pricing of water resources**
- **Tackling regulatory challenges and systemic institutional issues**
- **Finding sustainable water resource solutions appropriate to a particular situation**
- **Understanding what technology can do to overcome concerns about the risks of reuse**
- **Having the right data on reuse available at the right time**

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Four key **recommendations** emerged from the various roundtable discussions for water utility and other industry leaders **to consider**:

- 1** Work together to overcome existing public misconceptions through clear, consistent and continuous **communications about water reuse** and its place within an integrated water portfolio.
- 2** Emphasize the **value of recycled water** as a sustainable resource that will help meet future demands on the water supply.
- 3** Take a more integrated and open-minded approach to **portfolio management** when developing water resources for customers.
- 4** Call for more streamlined **regulations and clearer guidelines** around standards in order to improve industry knowledge of the impact of water reuse.

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These four findings create a call to action not just for utility leaders, but for all leaders in the water and wastewater industry. To support utility leaders, we need to adopt a more integrative mindset about reuse and continue these types of dialogues so that we better understand and align water and wastewater viewpoints.

## Key Recommendations from All Roundtable Discussions

1. *Water utility and other industry leaders should work together to overcome existing public misconceptions through clear, consistent and continuous communications about water reuse and its place within an integrated water portfolio.*

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“We made a **decision** very early on that we **weren’t going to sugar-coat this.**”

— WEFTEC Participant

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The importance of proactive public outreach was a common theme throughout all six roundtable discussions. Participants agreed that public trust is of paramount importance in implementing a water reuse program, so it’s vital that communications are transparent, factually informed and open.

### **Tell it like it is to build community trust**

At WEFTEC one utility leader shared how his community successfully tackled reuse acceptance by not “sugar-coating” the topic. “We made a decision very early on that we weren’t going to sugar-coat this; we were going to tell it like it is,” he said. “If we were talking about reusing sewage water, we called it sewer water. We were right up front with people because we felt that if we didn’t get their buy-in early, we weren’t going to be able to make the investment we needed to make reuse work.”

Direct, honest communication with consumers was deemed to be an essential skill for utility leaders. A participant in the Ozwater dinner dialogue put it this way: “The most valuable asset a water utility has is the trust of community.”

The same participant pointed out how fragile that public trust can be. One of the most difficult situations for a utility leader to communicate is when circumstances change and a decision needs to be reversed. For example, he said, “Sometimes we have to go back to consumers with new data and say, ‘But now we know more.’”

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“The most valuable **asset**, a water utility has is the **trust of the community.**”

— Ozwater Participant

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Handling that type of situation is always a challenge; when dealing with public perceptions of recycled water, an extra layer of complexity is added because of the emotive aspects of the topic. The public is often concerned about the personal impact of reuse, so it’s important to educate consumers early and often to overcome potential misconceptions. Singapore’s NEWater Programme was cited as a best practice for that approach

## Start early

“We need to institute strong programs of public education in the schools that educate about water reuse,” an ACE panelist recommended. “These programs should carry the messages up from children to parents.”

One of the Ozwater participants explained the benefits of involving the public as early as possible: “Sometimes consumers wear two hats when they’re thinking about – or voting on – reuse topics. Wearing their ‘citizen hat,’ they tend to be concerned about the public good, which they generally trust the government to achieve. However, they may also be concerned about the personal impact of potable reuse,” he said. “By engaging consumers early, the gap between these two roles often can be minimized.”

Information about reuse should be provided early on in the discussion, but as much information as possible should also be provided about the alternatives and their advantages and disadvantages. “When you compare and contrast reuse with other alternatives, you find that there are tradeoffs, so we need to make the public aware of their options,” an ACE participant said.

Once the reuse option is selected, it must be introduced with confidence. One GWS participant pointed out, “We have to believe it can work – and then make it work – because any uncertainty clouds the issue.”

## Focus on the true value of water

Participants agreed that building a strong case for water reuse requires an ongoing communications strategy for educating consumers about the true value of water. Communication about water reuse cannot be sporadic, and it can’t just focus on the solution without raising awareness of the problem. According to one WEFTEC panelist, it’s essential first to educate people about the problem before touting the solution. A WCF participant also pointed out that there needs to be a greater focus on educating people about how much water they consume.

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“We have to believe it can work – and then **make it work**”

— GWS Participant

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“We need to raise awareness that it’s great to reduce water use to 155 litres per day per person, but consumers should recognize that their real water footprint might be 10 to 100 times more,” an Ozwater participant said.

Other participants reported that consumers often believe because water falls from the sky, having access to it is their human right; but they fail to consider factors like the treatment processes that water has to go through to make it suitable to drink again, as well as the conveyance of that water whether to treatment or to tap. Educating

consumers about the true value of water is of paramount importance in changing the perception of reused water, participants agreed.

### **Compare and contrast**

Sometimes a simple comparison to other household costs can be a persuasive argument for public acceptance of reuse. “What has the customer seen on their average bill?” a WCF participant asked. “How does it compare to their cable bill or their phone bill or whatever?”

Another WCF participant agreed: “Ultimately everybody’s looking at, ‘How much do I pay?’ They don’t really care whether it’s reused, recycled, desalted, native water, whatever. They just want to know what will be the cost at the end of the day, and you have to be able to make your case.”

Making the case isn’t always easy, as one GWS participant pointed out: “When we developed reused water to feed power utilities, it cost 40% less than desalinated water, but it was an uphill task to convince people to use reused water – it’s a very difficult sell.”

Utilities should be prepared to have scores of meetings and materials that educate the public about reuse on an ongoing basis, not just during periods of water scarcity.

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**“A crisis is a terrible thing to waste.”** — WCF Participant

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### **Be prepared for a crisis**

Times of drought, participants pointed out, are especially good times to educate consumers about the true value of water and about long-term alternatives for tackling water scarcity; but when the rains come again, the strength of the message about reuse can be eroded. During the GWS discussions, the Queensland, Australia, example was cited. “Queensland was in the middle of a catastrophic drought and wanted to introduce recycled water into the water supply,” a participant said. “The public was willing to accept that during the crisis; but then the rains came, and perceptions changed.”

Generally participants agreed that crisis situations bring water shortage to the forefront of the public mind, and utilities should not be afraid to use that opportunity to demonstrate the benefit of reused water and gain consumer buy-in for alternative water treatment methods. “A crisis is a terrible thing to waste,” one of the WCF participants stated. “You don’t want to make decisions in crises; however, a crisis can highlight a problem that enables you to come to a solution you might not have had otherwise.

“You should build ‘your story’ right from the beginning. If a crisis hits – low water, drought or otherwise – connect it to your story. You have to be ready to employ these communications tools while the media is watching you,” he said.

## **Remember your audience**

When water reuse isn't a necessity, it's not easy to overcome the barrier of public acceptance. In the words of one of the SIWW panelists, the "yuck factor" doesn't ever seem to go away. To the untrained ear, "reused water" has a negative connotation and gives the impression that water is being returned to the system immediately with no treatment between uses. Therefore, many participants pointed out, renaming this resource with a more descriptive word that suggests an action has taken place along the way – calling it "refreshed" water or "renewed" water, for instance – could help encourage public acceptance.

Recycled water also seems to be more readily accepted by the public when it is seen as being treated through a natural filter in addition to advanced water treatment, participants observed. One of the leaders at GWS pointed out another approach: "If you combine reused water with other water supplies, it's easier to get acceptance."

One suggestion that came up occasionally during the six events was that the industry should identify a compelling spokesperson who can explain in layman's terms the benefits and limitations of water reuse. A third-party advocate could be seen as more of a trusted advisor to the public with no commercial interest in progressing one option over the other, but instead providing a balanced point of view on the subject.

During the WCF discussion, the group mentioned the importance of finding appropriate water advocates who are credible and can push forward the reuse message even in the local marketplace. That kind of local advocate can help convince the public and persuade potential opponents that reuse is the right approach because it is appropriate and safe for its particular use.

## **Think local**

The local aspect is crucial, panelists explained. What is acceptable by the standards of one community may not be acceptable by another community's standards. Public outreach and communication approaches should be tailored to the local situation as people don't always want to settle for what works for others in another location. Knowing that other communities are comfortable using reclaimed water doesn't necessarily mean that someone elsewhere would be willing to accept the same. "To convince the public, you need a successfully operating project," a GWS participant said. "But that project needs to be undertaken locally as everyone is convinced each application is a different case."

Another GWS participant cited the Orange County Water District in California as a best-practice example because of its step-by-step approach to introducing recycled water to its consumers. However, he pointed out, "Even a hundred miles away, other communities won't accept the concept of water reuse."

That certainly isn't the case in developing countries, some participants pointed out. "In poorer countries without access to safe drinking water," an SIWW panelist from India explained, "water reuse is not only a concept but an absolute necessity."

### **Lead from the front**

Overall, participants agreed that the water industry needs to present a united front to consumers about the environmental benefits of reused water and its place within the integrated water portfolio. In doing so utility leaders should emphasize that, in order to meet future demand in areas of scarcity, perceptions of reuse must shift from being merely prudent to being an absolutely critical part of an integrated portfolio.

One of the SIWW panelists summarized it this way: "To be good stewards, we need to have the mindset that there is no wastewater, only wasted water."

2. *Water utility and other industry leaders should emphasize the value of recycled water as a sustainable resource that will help meet future demands on the water supply.*

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Clearly, participants felt that the focus needs to be less on recycled water as a way to get rid of treated wastewater and more on its value as a water resource in a wider water portfolio. According to one WEFTEC panelist, admitting the problem with customers' acceptance of reuse is the first step toward dealing with negative perceptions.

### **Be a myth buster**

Changing the public's understanding so that they view recycled water as a sustainable resource is key to the future success of reuse. "It's important that your grassroots efforts tie water reuse to water security, environmental benefits and sustainability," a GWS participant explained. "You can't just announce you want to go to water reuse as you'll meet much resistance."

The industry still needs to break down the misconceptions around reused water, participants said. Utility leaders should work with local communities to determine where and when consumers would be willing to accept reused water. This consultative approach will help to overcome any "yuck factor" that arises when people consider reused water only as a potable water source; they may be more open to its use as an alternative option for agricultural or industrial uses or for recreational purposes such as irrigating parks and golf courses.

Nearly all participants viewed reclaimed water as a vital component of a sustainable water portfolio for many communities – a step beyond the historical viewpoint of a “nice-to-have” part of the portfolio. It’s critical to be able to identify new water sources, like recycled water, as demand for water continues to increase while the population grows across the globe, they said.

“Reuse will be more commonly found as part of a community’s water portfolio in the next 10 to 20 years,” one ACE participant predicted, “so the challenge we have now is to find ways to get ahead of the issues that will arise.”

### **Anticipate changing needs**

Robust scenario planning should be used to paint a longer-term picture of water needs in the future. Such a plan should also demonstrate for consumers the variability and unpredictability of factors that influence the future supply of water. The problem is that it’s difficult to convince some communities to make a decision a decade or more in advance, especially if the data aren’t always available.

An Australian participant in the Ozwater event explained the challenge this way: “People think, ‘If dams are 80 percent full now, why should we go ahead and move to reuse?’ But the time for the debate to begin is now, even if it is raining. A period of five years of adequate rainfall can be followed by a decade or more of rainfall below normal levels.” He added, “And as the population increases, the difference between available supply and water demand increases, making climate change an even more critical issue.”

During scenario planning, consumers also need to be educated about how limited the supply really is and how they should change their behavior today to make a difference tomorrow. Whatever decision about reuse is made today, increasingly variable environmental factors mean that utility leaders may need to adapt their approaches in the future. That’s why solutions to current water problems should also be flexible enough to address the problems that could arise tomorrow, participants said.

“Sometimes we’re forced to make decisions for the short term as opposed to the long haul,” one utility leader explained at the WCF event. “But we have to make sure that there is still an opportunity to be flexible as there is no one-size-fits-all solution for integrating reused water into a water portfolio.”

### **3. *Water utility and other industry leaders should take a more integrated and open-minded approach to portfolio management as they develop water resources for their customers.***

Integrating reuse into the total water portfolio, participants agreed, requires a new way of thinking by all the stakeholders involved in the process of planning for future demand. The industry needs to think laterally about integrating reuse into existing systems, several panelists pointed out, as desalination is not the silver bullet that it is often portrayed to be.

Water portfolio options should not be viewed as mutually exclusive, participants said. For example, it shouldn't be desalination *vs.* reuse but desalination *and* reuse. It's not that reuse should become the only water treatment method; instead utility leaders need to decide when water reuse is acceptable and then look at how to go about building it into the infrastructure for those situations.

Reuse should be viewed as a vital component of comprehensive water supply planning. "It's an important opportunity that stacks up environmentally and adds diversity and value to society," an Ozwater participant pointed out. "But options like desalination and reuse aren't mutually exclusive."

### **Play well with others**

Creating a total water management approach that includes reuse requires alignment within the water/wastewater industry itself and with the various stakeholders feeding into it. "With more integrated resource planning, reuse can become an important part of the portfolio," an ACE participant said.

One of the SIWW panelists described a successful model of cooperation in terms of a three-legged stool: "Typically you've got a water agency that wants the public to conserve and reuse water. Then on the second leg of this three-legged stool, you've got the water quality agency that's concerned about the quality of this effluent. Then you've got the public utility commission, and they want water to be as cheap as possible. So if you can't put these three together; it won't work."

Issues arise when separate agencies are responsible for different elements of the water treatment process, so the industry needs a cooperative approach to water management if water reuse is going to find its place within the portfolio. "We need a holistic approach to dealing with flood management, water supply and wastewater rather than separate agencies dealing with them," an ACE panelist said.

Aligning the aims of disparate groups isn't always easy. As one WCF participant explained: "Two significant barriers for reuse arise when various departments within the same government body have competing missions and objectives and then when separately governed, special-purpose entities focus on only one aspect of water."

To illustrate that challenge, an ACE panelist raised the question: "Should drinking water agencies be forced to take out microconstituents from their water supply or should wastewater agencies be forced not to put them into the water supply at all?"

Answering that question satisfactorily would require a collaborative mindset among those types of agencies. Similarly, all agencies, bodies and groups that hold a stake in the industry need to work together to ensure that they are aligned in their overarching objective of establishing reuse as a credible and sustainable water resource for the future. In the words of an ACE participant, "With more integrated resource planning, reuse can then become an important part of the portfolio."

## **Integrate and adapt**

Utility leaders also need to work in partnership with local, regional, state and federal agencies to develop appropriate guidelines for water reuse that will work in their local areas. Again, that isn't always easy and reflects the specific situation in that location. "Setting guidelines for reuse is simpler in Singapore than in the United States because there is only a single level of government, not separate federal and state agencies," an SIWW participant observed.

Water utilities in Australia for drinking water and wastewater are combined, which creates another advantage for overcoming barriers to reuse. "The fact that they are integrated gives them more scale and a greater capacity to take on complex water projects," another SIWW panelist said. "We still have different sets of national guidelines dealing with recycled water, whether it's looking at recycled water for aquifer storage or for drinking."

"If we want to implement reuse, we need clear standards for acceptable levels of quality and the markets will reward that," a GWS participant pointed out.

#### ***4. Water utility and other industry leaders should call for more streamlined regulations and clearer guidelines around standards in order to improve industry knowledge of the impact of water reuse.***

Above all, guidelines for reuse should be tailored – both to a country and to a region, participants said. For instance, regulations regarding acceptable levels of particular compounds and microconstituents should be established at a more local level. What works in one country may not work in a neighbouring country.

## **Set reasonable targets**

Local communities that are considering reuse need to come to an agreement on what is suitable for them at a local level in terms of the levels of compounds and microconstituents that remain in the reused water. As technology advances, the ability to measure the levels of microconstituents also increases. Utility leaders need to decide what level of zero is acceptable and what level is affordable in these tough economic times.

This topic of acceptable levels of concentration of particular compounds in recycled water was discussed in several of the roundtables. During the ACE roundtable, one panelist said: "We all recognize that the technology exists today to manufacture water to extreme levels."

Another person agreed, saying, “We can measure microconstituents with greater accuracy. Not too long from now, zero won’t be zero anymore – what we don’t find today we will find tomorrow.”

Technology has an important role to play both today and in the future in terms of treating and processing recycled water. “There is no doubt that we have the technology to treat the water to protect public safety and health,” a GWS participant stated. “We now need to use the technology available to help the public to understand the implications from public health, risk, alternative approaches and cost-of-services perspectives.” And according to one Ozwater participant, even regulators don’t always understand the performance capabilities of new technologies.

In order to gain the trust and respect of the public, the politicians and the regulators, members of the water industry need to work together to build a bank of credible, robust data points that they can use to demonstrate continuously that reused water is safe and acceptable for public use, participants suggested.

### **Gather real-time data**

“We have nothing to ensure the quality of the water at any moment, so we need online, real-time, quality-monitoring systems,” one GWS participant pointed out. “The quality is then ensured on a continuous basis with continuous monitoring, which is especially important for process applications.”

Discussions at WCF and at Ozwater, in particular, often focused on the necessity of using good data and good science – and of considering the bigger picture – when making decisions about reuse. Participants felt that the body of knowledge available about reuse isn’t very mature and isn’t fully peer reviewed, so utilities and other water-related organizations need to make more of that information readily available.

“Now is the time to start gathering and sharing long-term data that proves water reuse is safe, environmentally sound and cost effective,” an Ozwater participant said. “Gathering and building a body of knowledge is important.”

Another person agreed, saying, “The greatest aid we can provide is to assist politicians who are putting their necks on the block by giving them information they need, for example, on levels of cancer drugs, hormones, radioactive residuals, etc., in recycled water.”

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“We need a **fully-loaded** cost analysis  
of all **alternatives.**”

—ACE Participant

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## **Build an economic database**

A more robust database that includes rigorous cost-benefit analyses would also help decision-makers objectively assess where reuse fits with other alternatives in their own water portfolio. “We need a better database with economics built in and best practice examples of where reuse works,” an ACE panelist suggested.

The costs incurred in producing highly treated reused water are often higher than traditional alternatives so there is a huge disconnect among price, cost and value. A comprehensive analysis of all viable alternatives would clearly demonstrate why water reuse should be included in a water portfolio and how it weighs in against all other options. This needs to consider the environmental costs of identifying another water source if reuse is deemed not to be an option.

“When someone asks, ‘Why aren’t you considering reuse?’ we can’t always tell them definitively,” another ACE participant said. “We need a fully loaded cost analysis of all alternatives.”

The option of desalination, for example, was discussed during the WEFTEC and the SIWW roundtables. “Desalination is not a silver bullet because it’s very costly and creates the vexing environmental challenge of what do you do with the concentrated brine that’s left over once you’ve completed the desalination process,” an SIWW panelist pointed out. “Also it uses enormous amounts of energy, which then reinforces the water-energy problem.”

## **Make sure the price is right**

The price point is a central strand of the argument around water reuse. Recycled water is often priced to promote its use, but to make it a sustainable option for the future, industry guidelines will need to take into account two variables: what are the associated costs for treating the water to appropriate standards and what are the alternatives.

One of the Ozwater participants gave this example: “Typically recycled water sources are being priced at a discount from potable sources at about 60 to 75 percent of prevailing rates. But these prices are not cost-based, nor are they linked to the ‘avoided cost’ of developing other sources. They’re just a way of promoting a market.”

The consensus in all of the discussions was that if reused water is to be taken seriously as a sustainable water source for the future, it needs to be priced realistically. Participants agreed that reused water is not only a sustainable method of water treatment; but also, when integrated correctly into the portfolio, it is a cost-effective alternative and one that should not be overlooked.

## Conclusion

Overall, participants in the six roundtable discussions agreed that adequate future water supply hinges on intelligent recovery and reuse. But advancing the option of water reuse will require new ways of thinking and new paradigms, like breaking down silos that inhibit greater cooperation and interaction among agencies working with water, wastewater and storm water.

Better controls, better data monitoring, better public education and better portfolio management – all should help overcome potential barriers to water reuse.

Panelists frequently emphasized the importance of learning continuously from best-management practices and models around the world. Roundtables like this series or the next cycle, which will focus on coping with unprecedented economic pressures, should help leaders to share their experiences more broadly with others in the industry.