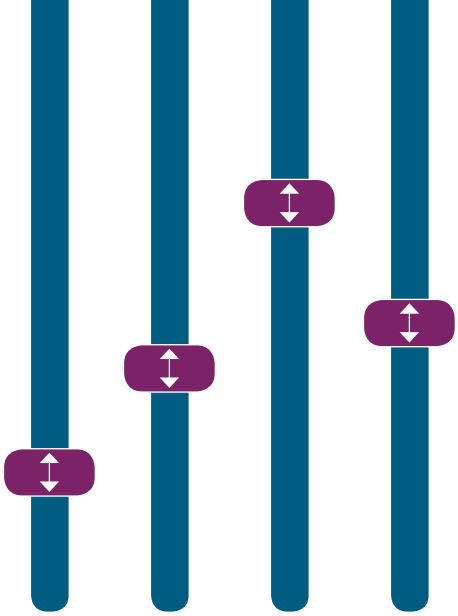


Laying the Groundwork for Industrial Water Reuse

Research projects focus on disconnects & potential

By Justin Mattingly

In recent years, the use of high-quality recycled water has been increasing in many regions of the country. In addition to traditional applications such as landscape irrigation, many industrial facilities are utilizing recycled water for a number of purposes, including cooling towers and boiler feed systems. This can include both external water reuse using recycled water from municipal providers, as well as onsite reuse in which process water is used, treated and reused on site. The WateReuse Research Foundation has long been engaged in the field of water reuse, but in the past few years it has begun to focus more closely on issues directly related to industrial reuse, with the primary goal of promoting the fit-for-purpose concept, in which the right water is used for the right purpose without overtreatment. Recently, two research reports were released to empower utilities and industrial water users to better understand and overcome the drivers and barriers to water reuse.

Discerning the Disconnect

The first project, titled "Evaluation of Historical Reuse Applications and Summary of Technical/Regulatory Issues and Related Solutions for Industrial Reuse Projects," completed by RBF Consulting and Transform Communications, looks at the disconnect that can exist between producers and users of recycled water. Potential industrial customers often are not familiar with the regulations governing water reuse nor the amount of time needed to complete the regulatory process and secure permits. At the same time, utilities often do not fully recognize the speed at which business moves, nor the differences in decision making between public utilities and businesses. This project aims to close some of these gaps to increase communication and encourage the continued development of industrial water reuse applications.

The primary outcome of this research project is a model template that can be used by public agencies and industrial partners to develop mutually beneficial industrial reuse projects. This template details the five distinct phases that comprise a water reuse project:

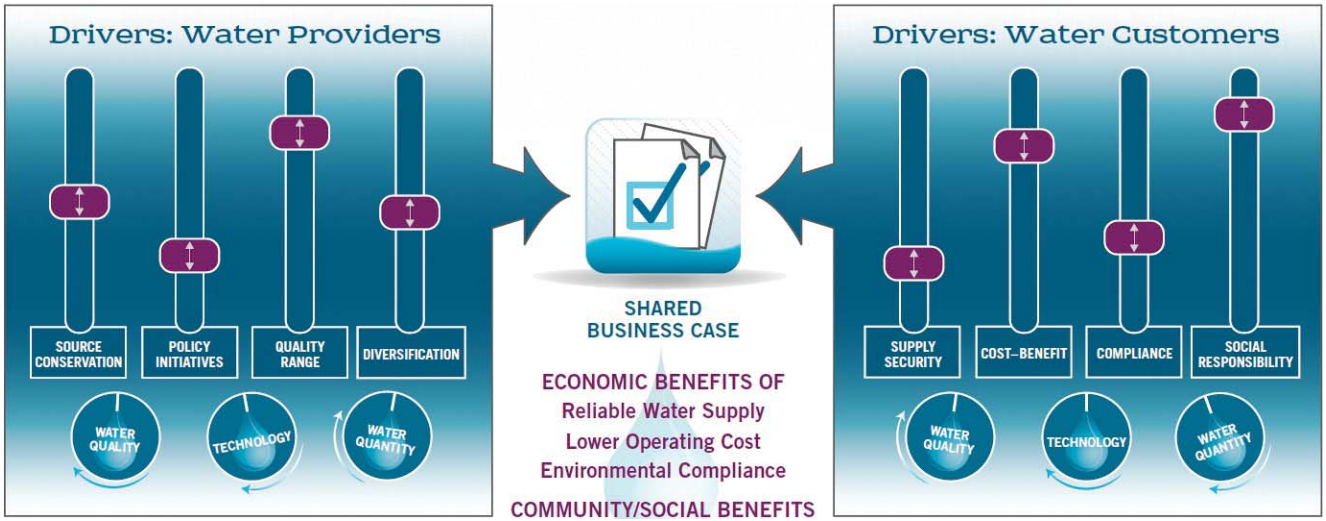
1. **Identification:** Explore the full possibilities of industrial reuse to determine the full scope of opportunity.
2. **Feasibility:** Determine the cost-effectiveness and practicality of water reuse options.
3. **Definition:** Develop water reuse project options and select the optimal concept.
4. **Execution:** Plan and manage the selected project concept to completion.
5. **Operation:** Start and operate a water reuse system to meet the user's operational and business goals.

This project also includes a charter to help document and guide the discussion between a public agency and potential industrial customer through the aforementioned five phases of a water reuse project. The goal of the model template and project charter is to bring together the relevant stakeholders for an industrial reuse project and work through any potential issues early in the planning process to prevent problems before they occur.

Investigating Onsite Water Reuse

The second project from WateReuse—"Drivers, Successes, Challenges and Opportunities of On-Site Industrial Water Reuse," completed by MWH Global—was initiated to develop

Figure 1. Onsite Water Reuse Factors



a more complete understanding of the potential for onsite water reuse for a variety of industrial applications in different industrial sectors. Onsite water reuse is less understood in the industrial sector than it is in the municipal sector due to the diversity of industrial processes, the proprietary nature of industrial corporations, the range of constituents that can be present in industrial process-generated wastewater, and the greater need for a rapid return on capital investments or subsidized economic incentives. This project identifies similarities and differences between industries for onsite water reuse; opportunities, drivers and challenges; and potential solutions. For this project, the following industrial sectors were investigated:

- Food and beverage;
- Cooling towers;
- Manufacturing;
- Mining;
- Oil and gas; and
- Power.

The results of this project show that the primary drivers for investments in water reuse tend to be driven in the short term by regional water supply concerns or wastewater discharge limitations, with the latter as the primary driver in regions with adequate and inexpensive water supplies. When the gap between the treatment needs for discharge requirements and those to reuse the water narrows to demonstrate a two- to three-year return on investment, water reuse opportunities can become economically advantageous. In general, the factors that must be taken into consideration for the implantation of onsite water reuse fall into the categories summarized in Figure 1.

Aside from the issues that cross sectors, each sector often has characteristics that are unique. The sector that may have the most potential to implement onsite water reuse is the mining industry, since operations often are located in water-scarce locations. In addition, fracking operations have concerns related to wastewater disposal, and the ability to implement water reuse practices with zero liquid discharge may help mitigate those concerns. In the power industry, where the predominant use of water is in cooling towers, a 5% to 20% overall reduction in water consumption can be achieved through the implementation of onsite water reuse of blowdown and process water. Other industries, especially manufacturing and food and beverage, are site specific and can be highly influenced by local conditions. Greater detail on these industries is available in the complete report.

An Ongoing Project

These two research projects are the first that specifically focus on industrial reuse from WateReuse. There is another project that is wrapping up to develop a framework for onsite industrial reuse, as well as a project that is developing an "economics scorecard" to help industrial facilities evaluate the economics of water reuse. WateReuse also has an industrial and commercial reuse committee primarily composed of representatives of utilities and consulting firms to share information and resources. More information can be found at www.watereuse.org. **iWWD**

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