Background or Rationale
In response to the pressure of population growth coupled with an arid environment, Arizona has conventionally addressed water challenges by increasing supply. This case study demonstrates how decision-makers are reconsidering the other side of the equation – alleviating water demand, especially through conservation, recycling, and reuse. In particular, the expanding practice of water reuse has become the centerpiece of efforts to achieve sustainability.

Blue Ribbon Panel on Water Sustainability
In 2009, Arizona Governor Jan Brewer announced formation of the Blue Ribbon Panel on Water Sustainability (BRP) to focus on water conservation and recycling as strategies to improve water sustainability in Arizona. The BRP was jointly chaired officials responsible for regulation and management of water resources: Ben Grumbles, Director, Arizona Department of Environmental Quality (ADEQ); Herb Guenther, Director, Arizona Department of Water Resources (ADWR); and Kris Mayes, Chairperson, Arizona Corporation Commission (ACC), Arizona’s constitutionally established regulatory body for privately owned utilities. Additionally, 40 members representing diverse water interests in Arizona were appointed to the BRP, including representatives of large and small cities, counties, agriculture, industry, Indian Tribes, environmental interests, universities, legislative leaders, and other experts. The BRP held its first meeting in January 2010 and was challenged to identify and overcome obstacles to increase water sustainability. The initial goal was to agree upon a succinct purpose statement:

To advance water sustainability statewide by increasing reuse, recycling, and conservation to protect Arizona’s water supplies and natural environment while supporting continued economic development and to do so in an effective, efficient and equitable manner.

Members agreed to provide recommendations on statute, rule, and policy changes that, by the year 2020 in Arizona, would significantly;

1. Increase the volume of reclaimed water reused for beneficial purposes in place of raw or potable water,
2. Advance water conservation, increase the efficiency of water use by existing users, and increase the use of recycled water for beneficial purposes in place of raw or potable water,
3. Reduce the amount of energy needed to produce, deliver, treat, and reclaim and recycle water by the municipal, industrial, and agricultural sectors,
4. Reduce the amount of water required to produce and provide energy by Arizona power generators, and
5. Increase public awareness and acceptance of reclaimed water uses and the need to work toward water sustainability.

BRP Working Groups
Five working groups were formed, chaired by BRP members, with participation open to the public, to facilitate discussion of issues and involve broadest broad spectrum of stakeholders and technical expertise. Working groups were chaired by Arizona representatives from Pima County Regional Wastewater Reclamation; Arizona WateReuse Association; National WateReuse Association; Arizona Municipal Water Users Association; and Pinal County to explore:

- Public perceptions related to reclaimed water reuse quality,
- Regulatory and policy changes to further promote reuse and recycling,
- Reclaimed water infrastructure and retrofit best practices,
- Conservation/efficiency and energy/ water nexus issues, and
• Economic and funding opportunities, including both public and private mechanisms.

The chairs and working group participants accomplished substantial work from January through November 2010. Cumulatively, 58 meetings were held, involving some 320 individuals. The working groups identified 40 separate issues, which the BRP condensed and prioritized. The working groups were directed to write "white papers" analyzing these challenges and provided recommendations based on the analyses. Priority issues included a diversity of subjects, including public perception, education, research needs, regulatory impediments, efficient use of water supplies, expanded use of rainwater and storm water, the interface between water and energy, funding and incentives.

BRP White Papers
Subsequent panel meetings were used to provide an overview of the 26 issues and to present the recommendations developed in the white papers. The BRP reviewed recommendations and consolidated them into categories: (1) education/outreach, (2) standards, (3) information development and research agenda, (4) regulatory improvements, and (5) incentives.

BRP Final Report and Recommendations
Although the Final Report contains too many recommendations to summarize here, several involving data collection and management stand out because they cross all three agencies chairing the BRP. Accurate information is essential to promoting a common understanding of Arizona’s water supplies and the extent to which water sustainability is achieved. Development of rational policies and regulations that encourage use of recycled water while protecting public health and safety, and fostering public confidence depends on appropriate, timely, and accurate data. In addition to data management, a few select recommendations of the Panel, relevant to reuse are presented.

Data Management. Most generators and end users of reclaimed water submit data manually, which is time-consuming and often involves more than one permit or application. Data may be submitted to one agency and the same data or data in a slightly different form may be required by another report or agency. Agencies store this information in paper files and multiple electronic databases, which are hard to access and often difficult to compare. This creates administrative complexity and added costs for both the regulatory agencies and the regulated community, and is not conducive to expanding the use of recycled water in Arizona.

The BRP recommended streamlining data submission and management as a means of reducing administrative burden and improving data quality. ADEQ and ADWR would initiate a process to review and revise permit and non-permit data submittal requirements for frequency, consistency, and relevance. Electronic data submittal should be standard, and agencies should develop common data management systems available to regulators, permittees, contractors, and the public. The system also should incorporate data needs of the ACC in support of their application and review process. The BRP also recommended that agencies utilize expertise of independent information technology professionals and share costs of developing data management system(s).

Regulatory Programs. Ultimately, the BRP recommended no new regulatory programs for reuse and water sustainability or major reconstruction of existing programs. Instead, less dramatic adjustments to Arizona’s existing toolbox of water management, education, and research capabilities are highlighted. The BRP concluded that current programs administered by ADWR, ADEQ, and the ACC constitute an exceptional framework within which water sustainability and reuse can be pursued.

No major new programs were recommended for addressing reuse; this reflected the success of transformative rule changes adopted by ADEQ in January, 2001. At that time, following more than two years of stakeholder involvement, ADEQ adopted rules for reclaimed water permits for end users, reclaimed water conveyances, and reclaimed water quality standards. Simultaneously, ADEQ adopted rules requiring modern, high-performance, tertiary treatment for new or expanding WWTPs under BADCT (Best Available Demonstrated Control Technology) provisions of its Aquifer Protection Permit program. The BADCT requirements provide that the high-quality, reclaimed water produced is suitable for reuse. This allows the permitting
program for end users to be simple, concentrating on operation, maintenance and reporting matters, because end users are delivered high quality reclaimed water. Arizona’s modern approach to wastewater treatment, combined with comprehensive but relatively simple requirements, has incentivized reuse throughout the state. Arizona’s rules governing reclaimed water and prescribing high-performance WWTPs constitute a framework for regulating reclaimed water that can be used as a model for other states developing their own regulatory programs.

**Reclaimed Water Infrastructure Standards.**
ADEQ adopted criteria for reclaimed water distribution systems in 2001 for both pipeline and open water conveyances; however, these criteria, which pertain to design and construction, are quite limited. For example, they do not address retrofit situations, including conversions of drinking water system piping to reclaimed water or vice versa. They insufficiently address cross connection control and do not address augmentation of the reclaimed water system with other sources, such as pumped groundwater. The BRP recommended convening a stakeholder group to compile a matrix of state, regional and local specifications and infrastructure standards to identify similarities, inconsistencies, and gaps and develop recommendations on a suite of standards to provide a common foundation of safety and good engineering practices.

**Indirect Potable Reuse (IPR) Guidelines.**
Recognizing trends in other states, the BRP saw a need to develop definitions and guidance for IPR to clarify and facilitate drinking water source approval and local and state agency permitting requirements. The BRP believed that IPR guidance would facilitate a standardized and efficient approach to design, permitting and operation of advanced treatment operations with the intent of IPR and suggested that regulations be established to address water quality standards (regulated and unregulated constituents), hydro-geological circumstances of recharge and recovery, and multiple/engineered barriers needed to obtain approval. Thus, the BRP recommended creation of an IPR Multi-Agency Steering Committee comprised of diverse membership with the mission to develop approaches to streamlining agency reviews, incorporating new technologies, and devising a statewide policy on IPR. The policy would define the objectives of IPR; clarify how recharged reclaimed water can become acceptable for potable purposes; and outline the process for issuing approvals for IPR facilities.

**Next Steps**
Each BRP recommendation can be moved forward by the Governor, Legislature, the ACC, ADEQ, and ADWR. However, many recommendations involve implementation by ADEQ and ADWR, which will be a challenge in light of budget cuts that have reduced staff and program capabilities. Accordingly, agency efforts have recently focused on recommendations with university involvement to increase collaboration and move forward some of the research issues identified by the BRP, ranging from investigations in public perception to determinations of the linkages, if any, between residual trace organic compounds in treated wastewater effluents and impacts on the environment and human health.

Although implementation will take time, a clear punch list exists. As the agencies begin work, resulting progress in water conservation and reuse will benefit all the citizens of Arizona and stand as a tribute to the dedication and intellect of the participants who contributed long hours to the BRP process.

**References**
Arizona Administrative Code, A.A.C. Title 18, Ch. 9, Art. 6, R18-9-601 through 603
Arizona Administrative Code, A.A.C. Title 18, Ch. 11, Art. 3, R18-9-301 through 309
Arizona Administrative Code, A.A.C. Title 18, Ch. 9, Art. 7, R18-9-701 through 720
Arizona Administrative Code, A.A.C. Title 18, Ch. 9, Art. 2, Part B, R18-9-B201 through B206
Arizona Revised Statutes, A.R.S. 49-203(A)(6)