



Building Resilience Through Reuse

For more than five decades, the city of Phoenix has embodied the principles of the Circular Water Economy by treating wastewater and transforming it into valuable products that generate revenue and reduce operational costs. These efforts have also supported regional water sustainability by reducing withdrawals for agriculture and energy production. The City's 23rd Avenue Wastewater Treatment Plant delivers approximately 30,000 acre-feet (37.02 million m³) of reclaimed water annually to the Roosevelt Irrigation District, granting Phoenix 20,000 acre-feet (24.67 million m³) of surface water rights from the Salt River Project that can be treated and distributed citywide. The remaining 10,000 acre-feet (12.33 million m³) is allocated to the Salt River Pima-Maricopa Indian Community as part of a water rights settlement. Now the city is prioritizing an advanced water purification initiative to generate a new supply of drinking water from treated effluent that was previously discharged and lost.



REDUCE



RECOVER



REGENERATE



PHOENIX, ARIZONA, USA



WASTEWATER



INDUSTRIAL

CHALLENGES FACED

Implementing Phoenix's circular water economy required overcoming complex multi-stakeholder coordination, regulatory compliance, and infrastructure integration challenges. The City had to align diverse partners, customize treatment for various reuse needs, and develop markets for recovered resources like biosolids and biogas.

TECHNOLOGIES & SOLUTIONS USED

Reclaimed water for non-food crops and power plant cooling is treated using the Ludzack-Ettinger process followed by chlorine disinfection. Biosolids are stabilized via mesophilic anaerobic digestion, dewatered with centrifuges, and hauled by Synagro for land application. Raw digester gas is converted to renewable natural gas and injected into the regional pipeline by a third-party contractor who compensates the City. The 180-acre (72.84 ha) Tres Rios Wetlands uses plant effluent for ecological restoration, flood control, and final water polishing.

IMPACT & INSIGHTS



Phoenix's circular water program delivers substantial environmental and economic returns by transforming wastewater into high-value resources.

Key Benefits

- Over \$20 million USD in annual economic benefits shared by the City and Sub-Regional Operating Group partners.
- Reuse of 110,000 acre-feet (~136 million m³) of reclaimed water per year, easing pressure on regional water supplies and reducing wastewater discharge.
- The biogas recovery system at 91st Avenue captures 580,000 MMBtu/year, generating \$2.5 million USD annually in clean energy revenue.

LESSONS LEARNED



Effective circular water management requires strong partnerships, clear agreements, and flexibility to serve diverse end users. Meeting the varied needs of end users demanded flexible infrastructure and treatment processes—from Arizona Department of Environmental Quality (ADEQ) Class A+ reclaimed water for agricultural exchanges to softened cooling water for Palo Verde Generating Station and polished wetland effluent for environmental restoration. Phoenix's experience shows the importance of aligning infrastructure with evolving reuse goals, maintaining regulatory compliance, and building public confidence in reclaimed resources.

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Through the City of Phoenix's Circular Water Economy, what was once considered waste is now a resource—supporting agriculture, energy, and future drinking water supplies.

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