WATER INFRASTRUCTURE FINANCE AUTHORITY

FY 2017 Annual Report

The *Mission* of the **Water Infrastructure Finance Authority** is to maintain and improve water quality in Arizona by providing financial assistance and technical assistance for water infrastructure.

Water Infrastructure Finance Authority

ANNUAL REPORT

OVERVIEW OF WIFA

The Arizona Legislature established the Water Infrastructure Finance Authority of Arizona (WIFA) in 1989. WIFA works to maintain and improve water quality in the state by financing the construction, rehabilitation and improvement of drinking water and wastewater facilities and nonpoint source pollution projects.

Maintaining water quality in Arizona requires communities to make large investments in drinking water and wastewater infrastructure. State revolving funds are the primary resources for helping communities meet their continuing and significant water infrastructure needs. WIFA maintains Arizona's revolving loan fund programs, capitalized by the Environmental Protection Agency (EPA), to provide low cost financing for water infrastructure projects.

As of August 6, 2016, WIFA became part of the new Arizona Finance Authority, a one-stop shop for financing that supports expanding and relocating businesses, communities' infrastructure needs and first-time homebuyers.

Sustainable Infrastructure

The effective management of water infrastructure is one of the main challenges faced by water systems across the nation and in Arizona. Sustainable infrastructure and systems are essential to ensuring the environmental and economic sustainability of communities.

Sustainability can be achieved through strong infrastructure planning and management practices. To help communities in Arizona, WIFA provides low-interest loans and planning and design technical assistance funding for drinking water and wastewater projects designed to ensure safe, reliable drinking water and

FY 2017 Highlights

- **23 WIFA-funded projects were completed in FY 2017** for Arizona's communities (17 drinking water projects and 6 wastewater projects totaling over $143 million in infrastructure projects) (See FY 2017 Completed Projects list at the end of report for a summary of each project)
- Approved **eight new loans** and provided **$68 million** in financial assistance to cities, towns, and private water companies
- Maintained "AAA" credit ratings (the highest level of ratings) due to demonstrated commitment to responsible fiscal fund management
- Co-financed five projects with contributions from other agencies and local entities
- Processed loan documents, on average, in less than one week - from Board action (loan resolution approval) to distribution of loan documents
- Provided $14 million in funding to maintain or achieve compliance to protect public water quality
- Assisted **disadvantaged communities** by providing **$17,964,500** in financing for six projects and nearly $**3 million** in forgivable principal
- Provided outreach and assistance to small and rural communities – 60% of drinking water loans were provided to small systems serving less than 10,000 people. For wastewater projects, 100% of new clean water loans were provided to communities serving fewer than 50,000 people

proper wastewater treatment. Most of WIFA's funding is directed toward its loan program which can assist with design, improvement, construction and acquisition. WIFA's technical assistance program is available for the planning and design phase of an infrastructure project. A wide variety of drinking water and wastewater projects can be funded through WIFA.

Example projects include storage tanks, meters, wells and booster pumps, arsenic treatment systems, water and sewer distribution line replacement, solar, new wastewater facilities, plant upgrades, and reclaimed water projects. WIFA can also fund watershed restoration, stormwater management and green infrastructure projects.

Organization

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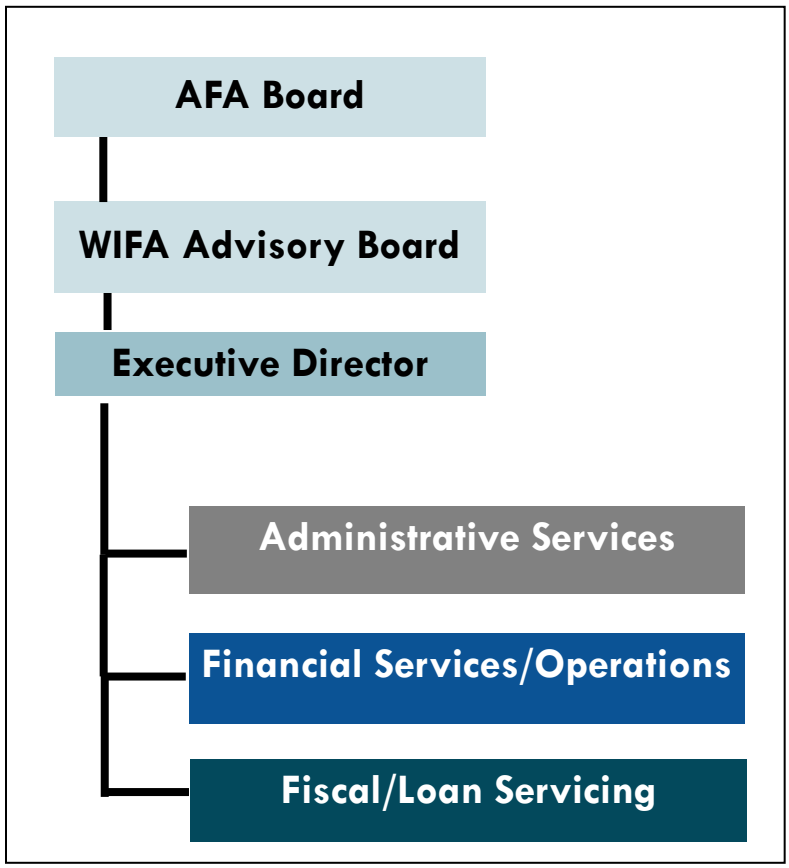


AFA Board

The Arizona Finance Authority is governed by a five-member board appointed by the Governor:

- Victor Riches, Chairman
- Michael Godbehere
- Jim Keeley
- Lea Marquez Peterson
- Doug Yonko

The Board's business-focused approach gets borrowers to deal-closing and ground-breaking more quickly.

WIFA Advisory Board

WIFA's Advisory Board provides expertise and leadership on WIFA's policies, loan approvals and various other actions. The Advisory Board makes recommendations to the newly-formed Arizona Finance Authority (AFA) Board of Directors. The AFA Board of Directors meets approximately one week after the WIFA Advisory Board to take action on their recommendations.

- **Misael Cabrera, Chairman** - Arizona Department of Environmental Quality
- **Stanley Gibson, Vice Chairman** - Municipalities with population less than 50,000 and counties less than 500,000
- Alan Baker - Municipalities of more than 50,000 residents
- Paul Gardner - Water systems which serve more than 500 customers
- William Garfield - Water systems which serve less than 500 customers
- Mark Heberer - Sanitary Districts from counties with population less than 500,000
- Ray Montoya - Counties with population more than 500,000
- Del Smith- Arizona Corporation Commission
- Lynne Smith- Arizona Department of Water Resources
- Keith Watkins - Arizona Commerce Authority

WIFA's Advisory Board

WIFA is administered by Executive Director, Trish Incognito; Controller, Jane Thompson; and Chief Financial Officer, Dan Dialessi, and a strong team of 11 staff. WIFA's friendly and helpful staff has broad state and local government experience as well as private sector business and finance experience. WIFA's staff is committed to providing exceptional service to Arizona's communities.

Trish Incognito	**Executive Director**
Jane Thompson	**Controller**
Dan Dialessi	**Chief Financial Officer**
Susan Craig	Communications Director
Julie Flores	Accounting Supervisor
Rebecca Gomez	Accountant
Ruby Hernandez	Administrative Service Officer I
Sara Konrad	Senior Program Administrator
Yolanda Mendoza	Business Manager
Brandon Nguyen	Environmental Program Specialist
Nicole Petker	Environmental Engineer
Angelica Romero	Accountant
Chris Unnewehr	Network Administrator
Angie Valenzuela	Senior Loan Officer

WIFA's Credit Profile

WIFA maintained "AAA" credit ratings (the highest level of ratings) from Moody's, Standard and Poor's, and Fitch. The ratings are based on:

- Program structure that provides significant over-collateralization to the bonds
- Strong credit quality of the local borrowers
- Loan portfolio and investments with the ability to withstand substantial losses to revenue
- Large size and diversity of loan portfolio
- Strong management practices and policies

These ratings support WIFA's low cost of borrowing from investors when WIFA issues bonds. In turn, this allows WIFA to pass on the benefit to its borrowers and the citizens of Arizona in the form of low interest loans. In FY 2017, WIFA's average interest rate for public entities was **2.28%**.

At the close of the fiscal year, WIFA had **$456.9 million** invested. The increase over FY 2016 is primarily due to additional prepayments of various loans. In FY 2015, WIFA's total amount had increased significantly due to the prepayment of multiple loans by Lake Havasu City of approximately $211 million. Dollars invested are primarily used to originate loans to WIFA borrowers and provide security for WIFA's bond portfolio. Interest generated from the invested funds helps subsidize WIFA borrower rates.

WIFA is able to maintain a diverse portfolio of borrowers by balancing the needs of low-credit borrowers with high-credit borrowers. The presence of strongly rated borrowers within the portfolio benefits all program participants.

Another indicator of WIFA's responsible fiscal fund management is the annual audit performed by Henry & Horne, LLP. WIFA's 2017 Audited Financial Statements are attached and available on WIFA's website - www.azwifa.gov/publications. In FY 2017, WIFA's net position increased by $14.7 million, primarily due to the reduction in outstanding bonds. WIFA continues to keep administrative expenses as low as possible while still performing its mission.

LOW-INTEREST LOAN PROGRAM

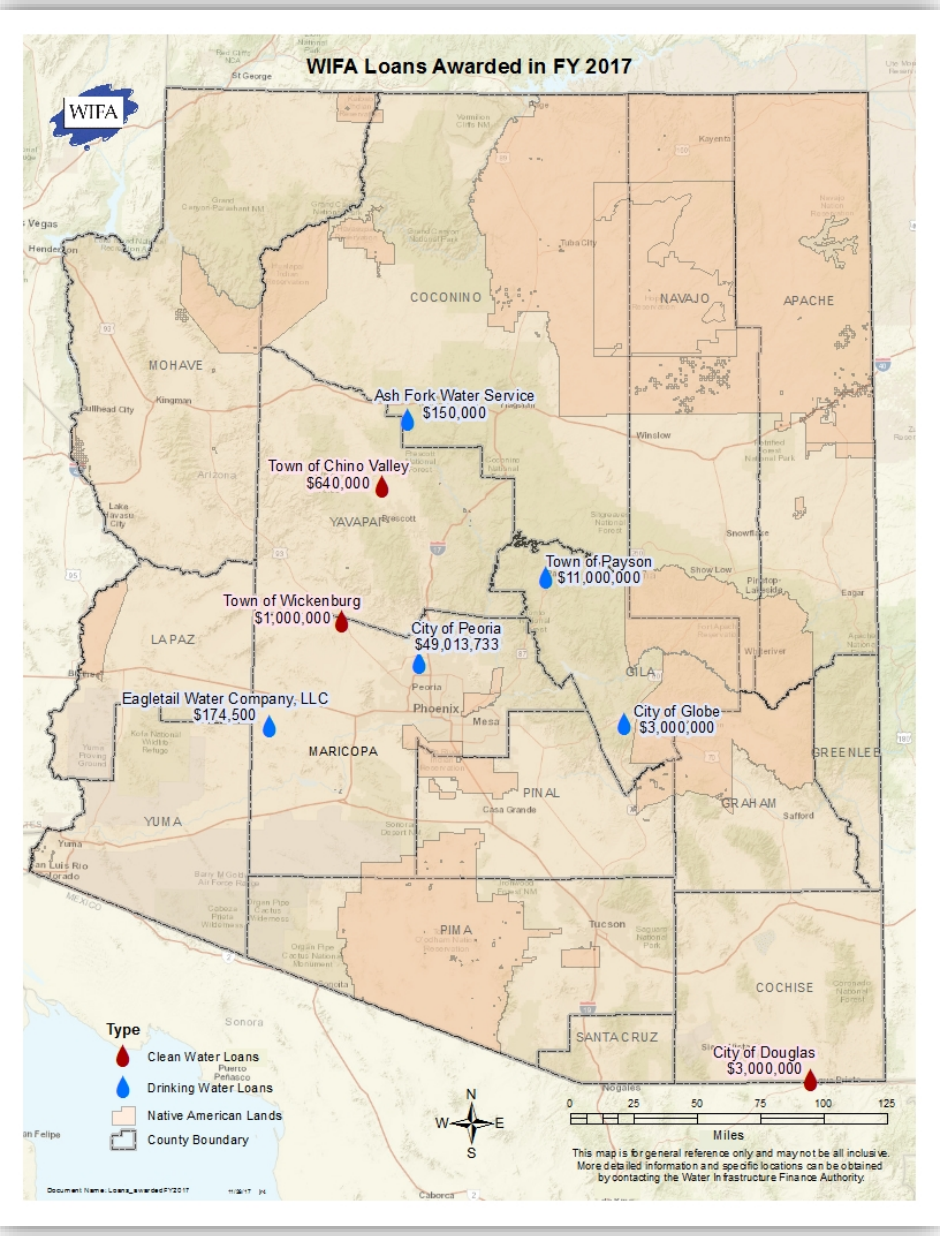
WIFA operates as a "bond bank" and is able to issue water quality bonds on behalf of communities for water and wastewater infrastructure. Through an active portfolio and sound financial management, WIFA provides significant savings to borrowers by offering loans with below market interest rates.

WIFA's means for providing low interest financial assistance are the Clean Water Revolving Fund (for publicly-held wastewater treatment facilities) and the Drinking Water Revolving Fund (for both publicly and privately-held drinking water systems). Both funds were established by the EPA and are funded by federal capitalization grants, state matching funds, loan repayments and WIFA bond proceeds.

WIFA is making a difference in Arizona. Over $2 billion has been invested in the state since WIFA's inception in 1989, and WIFA has funded more than 400 projects across the state. Each project results in the creation of construction and engineering jobs.

Loan Agreements Executed in FY 2017

WIFA provides funds for both rural and urban communities, and has financed projects all over the state. In FY 2017, WIFA executed eight new loans, including five drinking water loans for a total of **$63,338,233** and three wastewater loans for a total of **$4,640,000**.



The following water and wastewater service providers obtained financing through WIFA in FY 2017:

Borrower	Project Title	Amount
Drinking Water Loans		
Ash Fork Water Service	Arsenic Treatment AF #2	**$150,000**
Eagletail Water Company, LLC	Storage Tank Replacement	**$174,500**
City of Globe	2017 Water System Improvements	**$3,000,000**
Town of Payson	CC Cragin Water Supply Project	**$11,000,000**

Borrower	Project Title	Amount
City of Peoria	Pyramid Peak Water Treatment Plant Expansion	**$49,013,733**
Wastewater Loans		
Town of Chino Valley	Center Street Sewer from Highway 89 to Molly Rae - Continuation Loan	**$640,000**
City of Douglas	Wastewater Treatment Plant Facility Improvements	**$3,000,000**
Town of Wickenburg	Mariposa Drive and Kerkes/Hassayampa School Stormwater Drainage Improvements	**$1,000,000**
Drinking Water Total		**$63,338,233**
Wastewater Total		**$4,640,000**
TOTAL		**$67,978,233**

TECHNICAL ASSISTANCE PROGRAM

In addition to loans, WIFA also offers planning and design technical assistance funding. Once a year, funding awards are made to eligible wastewater and drinking water systems for the planning or design phase of a project. The purpose of the program is to help prepare water and wastewater facilities for the construction of a capital improvement project.

Funding for Planning and Design

WIFA provides planning and design technical assistance funding to cities, towns, special districts, tribal communities and Arizona Corporation Commission-regulated private water companies to help prepare water and wastewater facilities for capital improvement project construction. Awards are targeted toward communities with limited resources that need assistance in completing the planning and/or design phase of an infrastructure project. Funding is provided to employ the services of an engineer or other consultant to complete these activities. Awards are capped at $35,000 per project. Project examples include:

- Feasibility Studies
- Rate Studies/Financial Audits
- District Formation
- Capital Improvement Plans
- Preliminary Engineering Reports
- Environmental Assessments
- Engineering Plans and Specifications

The following planning and design technical assistance awards were made in FY 2017:

Awardee	Project Title	Amount
Drinking Water Technical Assistance		
***City of Williams**	Water Resource Recovery Evaluation	**$35,000**
***City of El Mirage**	Original Town Site Water Loss and Leak Detection Analysis	**$35,000**
Rancheros Bonitos Water Company	Rancheros Bonitos Water Company	**$10,000**
Centennial Park Domestic Water Improvement District	Well #8	**$25,200**
City of Nogales	Camino del Sol Water System Improvements Design	**$16,431**
Wastewater Technical Assistance		
***City of Flagstaff**	Green Stormwater Infrastructure Watershed Planning and Design	**$35,000**
***Town of Marana**	El Rio Riparian Restoration Project	**$35,000**
City of Apache Junction	Public Works Stormwater Basin	**$29,924**
***City of Sierra Vista**	Environmental Operations Park Energy Audits	**$34,400**
Drinking Water Total		**$121,631**
Wastewater Total		**$134,324**
TOTAL		**$255,955**

* Green project

Projects of the Year

Awards are presented in recognition of exemplary project management and commitment to public health protection through the improvement of drinking water and wastewater infrastructure.

Apache Junction Water Utilities Community Facilities District | Superstition Area Water Plant | $9 Million

With the completion of this project, the District designed and built a 1.5 million gallons per day water treatment facility and is able to more fully utilize their primary source of water, Central Arizona Project. As a result, they were able to reduce their reliance on groundwater supplies and the cost of water deliveries. When the District stated providing water service to their customers, over 90 percent of its supply came from groundwater. Today, over 90 percent of the District's supply comes from surface water. The District's employees and consultants demonstrated exemplary teamwork and organization in the construction of the facility.

Award presentation at WIFA Advisory Board meeting 2-15-2017

Town of Springerville | Sewer Rehabilitation Project | $696,000

This construction project allowed Springerville to replace a lift station, rehabilitate wastewater collection lines, and repair two backup generators. Overall functioning and cost-effectiveness of the sewer system has improved as a result of the project. According to the Town's Public Works Director, Tim Rasmussen, customer sewer problem complaints have dropped by 85 percent. In addition to excellent project management, the project was selected based on advances made to ensure system reliability and commitment to protecting public health through investments in water infrastructure.

Award presentation at Town Council Meeting 3-1-2017

> "Customer service problem complaints have dropped by 85 percent."
> - Tim Rasmussen, *Town of Springerville Public Works Director*

RURAL WATER INFRASTUCTURE COMMITTEE (RWIC)

WIFA has continued its leadership of the Rural Water Infrastructure Committee (RWIC), an informal partnership of various federal and state agencies that provides loans, grants and technical assistance to Arizona's rural communities. RWIC serves as a "One-Stop Shop" for rural communities with a population of less than 10,000.

RWIC core members include:

- WIFA
- Arizona Corporation Commission (ACC)*
- Arizona Department of Environmental Quality (ADEQ)
- Arizona Department of Water Resource (ADWR)*
- US Environmental Protection Agency (EPA)
- USDA Rural Development (USDA-RD)
- North American Development Bank (NADBank)
- Border Environment Cooperation Commission (BECC)
- Rural Water Association of Arizona (RWAA)
- Rural Community Assistance Corporation (RCAC)
- Bureau of Reclamation (BOR)
- Department of Housing and Urban Development (HUD)
- Arizona Department of Housing (ADOH)

*New member joined in FY 2017

RWIC: One-Stop Shopping in Arizona

- A resource for applicants to locate federal, state and local financial assistance programs
- Affordable funding solutions and technical assistance to small, rural communities throughout Arizona

In FY 2017, RWIC held regular quarterly meetings to provide a platform for small communities to present about their project needs. Executive Committee members then discuss and follow-up with available assistance options. The following RWIC meetings were held in FY 2017:

- RWIC meeting, September 2016 - Executive Committee members met to discuss projects, improvements to project coordination and provide partner updates on upcoming training and funding opportunities. There were no project presentations during this meeting.
- RWIC meeting, December 2016 - During the first half of the meeting, one small private water co-op representative presented to the group. The presentation was followed by a brief discussion on potential assistance partners could provide and the follow-up that would be provided. The second half of the meeting was for Executive Committee members only.

- RWIC meeting, March 2017 – During the first half of the meeting, representatives from three small water systems, including one tribal utility, presented to the group. The presentation was followed by a brief discussion on potential assistance partners could provide and the follow-up that would be provided. The second half of the meeting was for Executive Committee members only.
- RWIC meeting, June 2017 – There were no project presentations, only a meeting of the Executive Committee members.

MARKETING AND OUTREACH

Outreach Efforts:

- WIFA presented at 21 conferences and outreach events throughout the year and reached nearly 700 people and potential borrowers. Highlights include:
    - Sponsored Financing Sustainable Water Workshop hosted by Arizona Municipal Water Users Association Alliance for Water Efficiency (September 2016)
    - Presented to 15 elected officials on Water Infrastructure & How to Pay for It at Kyl Center for Water Policy Leaders Roundtable (September 2016)
    - Hosted and partnered with EPA on three Drought Response and Water Loss Control Workshops (November 2016)
    - Presented to the Governor's Water Augmentation Council – Recycled Water Committee (December 2016)
    - Presented to the Governor's Water Augmentation Council – Finance Committee (May 2017)
    - Presented at the Arizona Corporation Commission's Water Workshop (June 2017)
    - Presented at the Environmental Finance Center Navigating Water Infrastructure Funding Programs Workshop for Small Water Systems (June 2017)

Marketing Highlights:

- E-mail distribution: WIFA Takes the Gold in Financing e-mailed to WIFA's distribution list (approximately 700 recipients) (August 2016)
- Arizona Water Association Kachina News publication: New Initiatives – New Project: Town of Wickenburg – WIFA provides $200,000 in forgivable principal for stormwater management projects (Fall 2016)
- E-mail distribution: WIFA Invests $118 Million in Water Infrastructure Projects to announce and present WIFA's 2016 Annual Report (December 2016)
- EPA Publication: Arizona Uses the Water Infrastructure Finance Authority to Provide Funding for Infrastructure Projects that Address Climate Impacts (January 2017)
- E-mail distribution: WIFA wishes you a Happy Earth Day and Water Awareness Month to spotlight WIFA's Projects of the Year (April 2017)
- Arizona Water Association Kachina News publication: Kw (h20) – Using Sunshine to Power Arizona's Water Future - A Survey of Arizona Water Operators with Solar (Spring 2017)

MAKING A DIFFERENCE IN ARIZONA

Below is a summary of the projects that have been completed during the year, through construction loans and planning and design technical assistance funding.

23 projects completed

- **Total dollar amount: $143,406,379**
  - 14 loans totaling $143,154,677
  - 9 planning and design technical assistance projects totaling $251,702
- 17 drinking water projects
  - 10 completed by small/rural communities (less than 10,000 population)
- 6 clean water (wastewater) projects
  - 2 completed by small/rural communities (less than 10,000 population)

Completed Loans

Q3 2016

City of Prescott
Population: 12,965
Airport WWTP Upgrades
Loan Amount: $43,202,549
Project Results: The Airport WWTP will be expanded to a treatment capacity of 3.75 mgd to accommodate current flows and account for growth in the area since the previous upgrade in 1998 (brought capacity to 2.25 mgd). This capacity allows the City of Prescott to meet current and near-term needs from a flow and regulatory standpoint and results in an increased ability to reliably treat the City of Prescott's current and future wastewater flows and reliably produce Class A+ reclaimed water.

City of Buckeye
Population: 25,000
Downtown to Sundance 16" Waterline Interconnect
Loan Amount: $5,065,000
Project Results: WIFA financing allowed the City of Buckeye to construct approximately six miles of 16" waterline. As a result of the project, Buckeye is now able to blend two water sources thereby improving the water quality to the downtown area and eliminating the need for treatment.

Apache Junction Water Utilities Community Facilities District
Population: 13,657
Water Treatment Facility
Loan Amount: $9,077,296
Project Results: The WIFA loan allowed Apache Junction Water Utilities Community Facilities District to build another treatment facility and reduce costs of water deliveries. The District designed and constructed an additional water treatment plant to treat 1.5 million gallons of water per day.

Truxton Canyon Water Company
Population: 2,132
Arsenic Treatment
Loan Amount: $350,950
Project Results: WIFA financing was used for critical infrastructure improvements including the installation of a centralized arsenic treatment system and a structure to house the treatment facility. Truxton Canyon Water Company resolved arsenic exceedances and is now able to provide water to customers that meets drinking water quality standards.

Lake Havasu City
Population: 52,844
Mulberry Effluent Basin Expansion and Refinance
Loan Amount: $60,269,432 ($58M refinance of the City's 2005 Greater Arizona Development Authority loan; $1.2M project construction)
Project Results: As a result of the project, Lake Havasu City modified the existing effluent basin and suction line to allow for the reuse pump station to pull sufficient effluent from the Mulberry Wastewater Treatment Plant to supply reuse. The effluent will be used to expand the City's effort to reduce potable water use at city parks.

Q4 2016

Picacho Peak Water Company
Population: 300
Nitrate Treatment Project
Loan Amount: $150,000
Project Results: The Company installed reverse osmosis point of use devices to treat for nitrates inside the homes where drinking water is most likely dispensed. For the residential customers, these treatment units are under the kitchen sink, while the larger commercial customers received point of entry devices.

City of Tucson
Population: 529,770
Well Equipping and Upgrade Program
Loan Amount: $2,750,000
Project Results: This project enhanced the productivity and extended the life of numerous potable wells by replacing column pipes, line shafts, and pumps. The project also included Phase I equipping of several recently drilled Southern Avra Valley Storage and Recovery Project (SAVSARP) wells. Equipping the production wells provided an additional renewable potable resource to the community`s water system. Upgrading existing wells improved production and reliability, and enabled the City to meet customer demand.

City of Somerton
Population: 14,287
Water Meter/MXU Retrofit
Loan Amount: $912,000
Project Results: The City replaced 2,000 meters and equipped them with meter transceiver units to eliminate the monthly meter read time and accurately measure water use. The cost of the labor savings is estimated at more than $60,000 per year. The new meters also measure water use more accurately so that the utility's revenues are reflective of actual water consumption.

Town of Chino Valley
Population: 4,277
Design - Center Street Sewer from Highway 89 to Molly Rae
Loan Amount: $50,354
Project Results: This loan was used to design approximately one mile of sewer line from an existing trunk line to a subdivision. The ultimate result is that all future construction within the subdivision will be tied into the Town's sewer system. A second WIFA loan has been issued for the construction of the sewer line.

Q1 2017

City of Buckeye
Population: 25,000
Airport Well Project
Loan Amount: $3,617,450
Project Results: The City rehabilitated Well #2 to restore optimal service conditions and provide better quality water to historic downtown Buckeye, the airport, and redundancy to the Hopeville water system. Rehabilitation of Well #2 included replacing the well casing, deepening the well from 305 feet to approximately 850 feet, and installing a new well pump. A transmission main was installed to connect to the Hopeville well and historic Buckeye water supply. Included in the site design is a 1,000,000 gallon steel storage tank and booster pump station. These major water distribution improvements have brought reliability and efficiency to the City of Buckeye water system while reducing operating costs.

City of Williams
Population: 3,145
Supplement to Water Supply Project
Loan Amount: $900,000
Project Results: This loan provided funds for cost overruns from the City's previous WIFA loan. Included in these costs was the rehabilitation of both the Dogtown 1 Well and the Rodeo Well to working status. The overall project resulted in water supply improvements needed to address critical shortage in water supply to meet current demand.

Q2 2017

Town of Florence
Population: 15,306
Tertiary Treatment of South Plant and Engineering for System Expansion
Loan Amount: $1,300,000
Project Results: The Town expanded its wastewater treatment plant capacity including design and installation of a UV disinfection system with membrane bioreactor (MBR) filtration. For increased solids handling, the Town installed a new belt filter press. The expansions allowed the plant to increase capacity while minimizing the impact of its footprint.


Town of Payson
Population: 17,682
CC Cragin Water Supply Project
Loan Amount: $11,000,000
Project Results: Funding provided through this loan was for the C.C. Cragin Project, a multi-phase regional project which will ensure a source of high quality water for Payson and its neighboring communities. This third loan funded constructing the upper section of the Raw Water Penstock Pipeline and two sections of treated transmission/distribution water line, equipping the Aquifer Storage and Recovery (ASR) wells, purchasing a hydroelectric generator, and installing SCADA equipment. The overall project is expected to continue through 2019.


Town of Chino Valley
Population: 4,722
Center Street Sewer from Highway 89 to Molly Rae and Refinance
Loan Amount: $4,509,646
Project Results: The Town used $3,925,000 to refinance a United States Department of Agriculture – Rural Development (USDA-RD) loan. The refinance provided a significant cost savings through WIFA's lower interest rate. The Town used the remaining funding to extend the sewer collection to areas previously served by septic. Areas include a housing development, Mollie Rae Estates subdivision, located on West Center Street, and Mountain View Mobile Home Park and Serenity Court subdivision located on South Road 1 West. The decommissioning of these residential septic systems is estimated to result in almost 200 new connections.

Completed Technical Assistance Projects

Q3 2016

Town of Oro Valley
Population: 41,388
Green Stormwater Infrastructure Action Plan
TA Amount: $35,000
Project Results: Technical Assistance funding was used to produce a written Green Stormwater Infrastructure Action Plan report. This report included training materials, conceptual designs for parks with green stormwater infrastructure features and documentation showing the cost/benefit analysis for the Town parks.

Q4 2016

City of Goodyear
Population: 45,067
Demonstration Concentrate Management Wetlands
TA Amount: $19,760
Project Results: The City utilized WIFA's TA funding, as well as City and Bureau of Reclamation (BOR) funding, to create a Design Concept Report for the Goodyear Brine Management Wetlands Demonstration project. A pilot project has been operated at Goodyear's RO facility since 2010 to evaluate using vertical flow wetlands to remove regulated constituents, such as arsenic and selenium, from the concentrate. The City has worked with BOR on an innovative approach to manage the concentrate discharge from the City's RO facility.

The study results from this TA project provided pros/cons for using three different water sources as a blending supply for the treated brine concentrate. Goodyear now has a sustainable solution for disposing of brine concentrate. Wetlands will be added to the Estrella Mountain Regional Park, saving potable water that would otherwise be needed to create green space and water will be provided to the El Rio River Restoration project.

Q Mountain Mobile Home Park
Population: 400
Pipeline Replacement and Upgrade
TA Amount: $30,000
Project Results: The Mobile Home Park retained an engineering firm for hydraulic modeling, water loss calculations, and rate analysis. In addition, the firm completed a design and cost estimate for the replacement of distribution and metering systems for 245 consumers. The final work product was a Preliminary Engineering Report and development of a program for a complete meter replacement.

Q1 2017

Town of Clarkdale
Population: 4,097
Upper Town Water Main Replacement Project
TA Amount: $35,000
Project Results: The Town utilized WIFA's TA funding to create construction design plans for Water Main improvements in Upper Town, including expansions to 8 inch and 12 inch water mains. With these plans the Town of Clarkdale has received an Approval to Construct from Yavapai County Developmental Services. The Town utilized a WIFA loan to fund the construction of the water main replacement project. The construction is nearly complete, allowing the Town to improve efficiency and reliability to the water distribution system.

Monte Vista Water Company
Population: 85
Arsenic Removal System Design, Permitting, and Training
TA Amount: $30,865
Project Results: With this technical assistance award, Monte Vista Water Company created an arsenic treatment system and tank design plan to address arsenic MCL exceedances. With the deliverables, the Company plans to install an arsenic treatment system to reduce arsenic to acceptable levels, providing safe and reliable drinking water to the community.

Q2 2017

Town of Eagar
Population: 4,885
12th Street Water and Tank Rehabilitation
TA Amount: $20,997.60
Project Results: Three of the Town's water tanks are in a dilapidated condition and in need of rehabilitation. Technical Assistance funding was used to create a Basis of Design Report to evaluate the water storage evaluation options, produce a Tank Inspection Report for the current tank conditions, and develop specifications for rehabilitation. The Town will use these deliverables to make much-needed rehabilitation and repairs to three of their water tanks.

Horizon Six Improvement District
Population: 593
Horizon Six Booster Station Analysis and Design
TA Amount: $34,280
Project Results: The water system, including the booster station, is over 40 years old and at the end of its service life. Due to its age, the District has seen a sharp increase in the amount of maintenance and repairs required to the booster station, including leaking pipes, pressure tank deterioration and pump and check valve failures. Technical Assistance funding was used to create a technical memorandum of the water system's current conditions and to recommend improvements. The primary recommended improvement is a new booster pump station to replace the deteriorated one which, in its deteriorated condition, no longer allows permanent repairs.

Kachina Village Improvement District
Population: 2,622
Kachina Village Improvement District Water Master Plan
TA Amount: $35,000
Project Results: By supplementing WIFA's Technical Assistance award, the Kachina Village Improvement District created a Water Master Plan. This Master Plan details the current quality of existing infrastructure, demand projections, and a recommended timeline for capital improvements. The District will use this Master Plan to develop a long-term strategy for success, especially as it relates to increased efficiency and financial responsibility.

Harrisburg Utility Company, Inc.
Population: 959
Planning and Design for Replacement of Failing Water Storage Tank
TA Amount: $10,800
Project Results: One of the utility's three water tanks is seriously deteriorated and is leaking. This tank has been taken out of service but needs to be replaced so the utility has sufficient storage capacity. With the deliverables, the Company plans to install a new storage tank to replace the old one that is no longer in use. Reliable storage will reduce the frequency of water outages.

WATER INFRASTRUCTURE FINANCE AUTHORITY

MARKETING HIGHLIGHTS

From: Susan Craig [mailto:SCraig@azwifa.gov]
Sent: Thursday, August 11, 2016 11:16 AM
To: Susan Craig
Subject: WIFA takes the gold in financing

And the Gold Medal Winner is… WIFA

Olympic Highlights

Low-Cost Financing:	WIFA demolished last year's record with a **2.04%** average interest rate* for governmental entities. Current interest rates continue to remain incredibly low. Apply now - loan applications are accepted year-round.
Expanded Project Eligibilities:	Even more projects to protect Arizona's water future: energy efficiency, water conservation, stormwater management, habitat restoration, desalination, groundwater and surface water protection, planning, watershed restoration (streambank stabilization, forest thinning) and more.
Forgivable Principal:	Forgivable principal ***up to 50% of eligible project costs*** is available to disadvantaged communities and for green projects.
Technical Assistance Funding:	Through WIFA's technical assistance program, funding *up to* ***$35,000 per project*** is available for drinking water, wastewater and stormwater infrastructure planning or design projects. Applications are due **August 31st at 3 p.m.**

**WIFA's Combined Interest and Fee Rate*

More information on WIFA's Olympic Coverage at azwifa.gov.

WIFA FINANCING UPDATE

WATER INFRASTRUCTURE FINANCE AUTHORITY

Arizona's water and wastewater funding source

100 North 15th Avenue, Suite 103, Phoenix, Arizona 85007 | azwifa.gov | (602) 364-1310

NEW INITIATIVES

WIFA is spearheading initiatives to direct some of its funds to address serious threats to Arizona's water supply, nonpoint source pollution (including watershed protection and forest restoration) and stormwater.

Natural landscapes filter pollutants and protect water quality. Floodplains and natural landscapes minimize the area and impacts of floods, reduce the burden on public drainage infrastructure, and increase groundwater recharge. These types of projects ensure a resilient water infrastructure system, and can reduce capital costs to supply clean drinking water and to treat wastewater.

NEW PROJECT: Town of Wickenburg

WIFA provides $200,000 in forgivable principal for stormwater management projects

In August, WIFA closed a **$1 million loan** with the Town of Wickenburg for two projects that will address flooding and stormwater management issues that have caused one school to flood and destroyed roadway embankments and culverts in town.

One of the projects will address the repeated flooding at Wickenburg's Hassayampa Elementary School by rerouting stormwater flows around the school site into a constructed vegetated swale. The vegetated swale serves a dual purpose, preventing flooding and trapping pollutants that may otherwise make their way into the Hassayampa River.

To encourage stormwater management and green projects, WIFA can offer **incentives**, including forgivable principal for eligible project costs. In Wickenburg's case, WIFA was able to provide **$200,000 in forgivable principal** to offset the cost of the loan.

Wickenburg will also use the loan to repair damage from last summer's flooding event, which caused storm flows to overtop the road and severely damage the headwalls, roadway embankments and culverts along Mariposa Road. To prevent erosion and sediment transport to the nearby washes, Wickenburg will rebuild and enhance two roadway crossings.

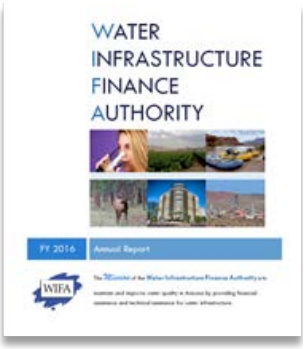
For more information, please visit WIFA's Media Releases webpage at www.azwifa.gov/media-releases.

From: Susan Craig [mailto:SCraig@azwifa.gov]
Sent: Thursday, December 22, 2016 4:12 PM
To: Susan Craig
Subject: 2016 Review: WIFA Invests $118 Million in Water Infrastructure Projects

Water Infrastructure Finance Authority

Investments in infrastructure are essential for delivering clean water and maintaining a vibrant and sustainable economy. WIFA is pleased to provide you with our 2016 ANNUAL REPORT, which highlights the past year's accomplishments and showcases the big impact our organization has on protecting Arizona's water.

With your support, WIFA has invested over $2 billion in water projects for Arizona. In fiscal year 2016, WIFA executed **15 new loans** totaling nearly **$118 million**, and averaged a **2.04% interest rate** for loans provided to public systems. Thank you for all you do to ensure Arizona's sustainable water future.



Wishing you and your family a wonderful holiday season and a happy and healthy 2017!

Sincerely,

the WIFA team

www.azwifa.gov

Arizona Uses the Water Infrastructure Finance Authority to Provide Funding for Infrastructure Projects that Address Climate Impacts

Overview

Arizona is pushing the boundaries of establishing sustainable infrastructure in the Southwest portion of the country. The Water Infrastructure Finance Authority (WIFA) of Arizona is providing financial incentives and technical assistance to promote innovative water conservation, efficiency, and reuse projects; as well as an approach to reduce water loss. WIFA is additionally pursuing energy efficiency practices as a way to help reduce water use and costs, along with using green stormwater infrastructure and facility redesign to provide resiliency in a changing climate. These programmatic efforts are helping utilities, homes, and communities invest in a water supply future that is both sustainable and affordable.

Background

The Water Infrastructure Finance Authority of Arizona (WIFA) was established by the State legislature in 1989. WIFA works to maintain and improve water quality in Arizona by financing the construction, rehabilitation, and improvement of drinking water and wastewater facilities and nonpoint source pollution projects through both the Clean Water and Drinking Water Revolving Funds. WIFA also has a Planning and Design Technical Assistance Program designed to help water and wastewater facilities prepare for future infrastructure project construction.

WIFA's *2015 Annual Report* recognized sustainable infrastructure as essential to maintain the environmental and economic sustainability of communities. *The FY17 Intended Use Plan* set the most recent priorities for clean water and drinking water funds, emphasizing projects that promote sustainability through efficient resource use, green infrastructure, and environmentally innovative activities. Outside of the Green Project Reserve, the State Revolving Funds (SRFs) are broadly promoting conservation activities by expanding eligible projects to those that embrace water reclamation and reuse, stormwater management, nonpoint source pollution, and watershed protection. Each project is scored according its green components, as WIFA gives priority to projects that are completely or primarily green.

Program Partners: Arizona Water Infrastructure Finance Authority (WIFA), Arizona Department of Water Resources (ADWR), Arizona Department of Environmental Quality (ADEQ), Arizona Corporation Commission

State Agency Contact: Susan Craig, WIFA Communications Director, (602) 364-1236, SCraig@azwifa.gov

Project Date: 2010

The Water Infrastructure Finance Authority of Arizona (WIFA)

Like other SRF programs, WIFA currently supports four categories of eligible green projects: water efficiency, energy efficiency, environmentally innovative, and green stormwater infrastructure. Green Projects have been funded since 2009, and include projects under both the drinking water and clean water SRFs. WIFA continues to emphasize and provide support for non-traditional projects surrounding flood control, watershed protection, forest restoration, and water and energy efficiency (Figure 1). Water efficiency projects include water audit and conservation plans expected to result in a capital project, water reuse projects that replace potable sources with non-potable sources, and gray water/wastewater effluent reuse systems. Green Stormwater infrastructure projects support stormwater harvesting and reuse, as well as the creation or repair of riparian buffers, floodplains, wetlands, and other natural features. Energy efficiency projects and design strategies are also eligible, as they help reduce resource demand for both energy and water.

The Program is further promoting long-term efficiency and sustainability efforts through new loan recipient requirements and incentives:

- For clean water projects funded on or after October 1, 2015, loan recipients must develop a Fiscal Sustainability Plan that evaluates ongoing energy and water use efficiency improvements over the life of an asset, as well as gain

- certification that the facility will implement these conservation efforts.
- Clean Water SRF recipients must complete a Cost and Effectiveness Analysis to demonstrate how an awarded project will maximize efficient water use, reuse, conservation, and energy conservation over its lifetime.
- WIFA is offering financial incentives for green projects in the form of reduced interest rates and forgivable principal if the majority of project costs are related to green components. Recently funded drinking water and clean water projects focused on water audits and leak detection surveys, smart meter installation, flood mitigation, water recycling and effluent reuse, solar installation, and green infrastructure action plans.

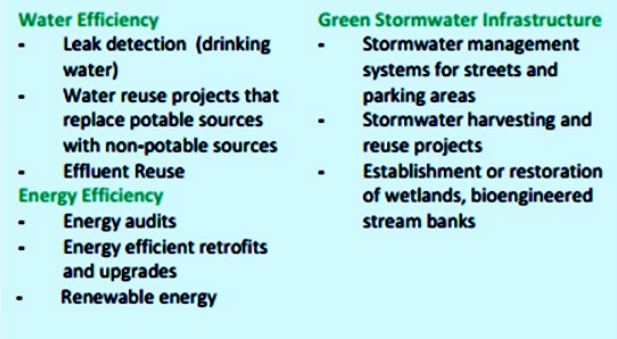


Figure 1. Examples of projects for water efficiency, energy efficiency, and green stormwater infrastructure.

Using the State Revolving Funds to Provide Technical Assistance

In addition to loans, WIFA is offering funding for technical assistance with the planning and design of infrastructure, and professional consultation through their Planning and Design Technical Assistance Program. The Program helps both clean water and drinking water facilities prepare for future infrastructure construction. Program funding priorities include projects that prevent or correct a public health or water quality concern, in addition to projects with a significant portion of green components. A recent project in the City of Mesa focused on creating a Low Impact Development Toolkit to help design and construct infrastructure improvements that lessen flooding impacts and polluted stormwater released to natural waterways. WIFA also encourages climate resilient infrastructure designs that incorporate energy and water efficiency features, as well as consider extreme weather events. Both drinking water and clean water projects are eligible for 100% of the total funding cost up to $35k, depending on the portion of a project identified as green. WIFA will use FY17 technical assistance funding to help complete the annual Water and Wastewater Rates Survey and interactive Rates Dashboard tool, which, among other comparisons, helps utilities encourage efficient water use among ratepayers. The Survey analyzes residential drinking water and wastewater data from nearly 90% of Arizona's utilities, and contains features such as a cost recovery dial for each utility, a dial to determine if rates are encouraging conservation, and climate zone and watershed comparison groups.

Innovations to Address Drought and Ensure Resilient Water Systems

WIFA has new initiatives to direct funding to address serious threats to Arizona's water supply from nonpoint source pollution and stormwater. Floodplains and natural landscapes not only filter pollutants and protect water quality, but also minimize the impacts of floods, reduce burden on public drainage infrastructure, and increase groundwater recharge. These restoration projects help maintain a resilient water infrastructure system, and can decrease capital costs to supply clean drinking water and treat wastewater.

For example, several projects in Tucson have focused on water supply and the use of green infrastructure to mitigate flooding. Two WIFA loans provided the City with $20 million in financing to increase water recovery, reduce reliance on limited groundwater supplies, and prevent over-drafting of the Southern Avra Valley aquifer. WIFA also provided $35,000 through its Technical Assistance Program for a green infrastructure project to assess green stormwater infrastructure (GSI) alternatives and analyze cost-benefit comparisons of using conventional stormwater management and GSI. Results from modeling the benefits of GSI throughout Tucson's Airport Wash area showed GSI can have a significant impact in reducing flooding, runoff, and pollution from both large and small storm events.

WIFA is enhancing their conservation efforts by partnering with ADWR to start up a water loss control program. WIFA will draw upon SRF set asides to hire contractors that can work directly with utilities to implement American Water Works Association procedures. Utilities throughout Arizona will receive training in analyzing and managing non-revenue water, and learn AWWA water loss auditing and validation practices to improve system efficiency.

From: Susan Craig [mailto:SCraig@azwifa.gov]
Sent: Thursday, April 20, 2017 2:06 PM
To: Susan Craig
Subject: WIFA wishes you a Happy Earth Day and Water Awareness Month

Happy Earth Day and Water Awareness Month

This Earth Day, WIFA would like to pay tribute to the great work being done around the state and give a big shout out to our Project of the Year Award recipients.

WIFA's Projects of the Year

Awards are presented in recognition of exemplary project management and commitment to public health protection through the improvement of drinking water and wastewater infrastructure.

Apache Junction Water Utilities Community Facilities District | Superstition Area Water Plant | $9 Million

With the completion of this project, the District designed and built a 1.5 million gallons per day water treatment facility and is able to more fully utilize their primary source of water, Central Arizona Project. As a result, they were able to reduce their reliance on groundwater supplies and the cost of water deliveries. When the District stated providing water service to its customers, over 90 percent of its supply came from groundwater. Today, over 90 percent of the District's supply comes from surface water. The District's employees and consultants demonstrated exemplary teamwork and organization in the construction of the facility.

Award presentation at WIFA Advisory Board meeting 2-15-2017

Award presentation at Apache Junction Water Board meeting 2-21-2017

Town of Springerville | Sewer Rehabilitation Project | $696,000
This construction project allowed Springerville to replace a lift station, rehabilitate wastewater collection lines, and repair two backup generators. Overall functioning and cost-effectiveness of the sewer system has improved as a result of the project. According to the Town's Public Works Director, Tim Rasmussen, customer sewer problem complaints have dropped by 85 percent. In addition to excellent project management, the project was selected based on advances made to ensure system reliability and commitment to protecting public health through investments in water infrastructure.

Award presentation at Town Council Meeting 3-1-2017

A few other goodies in celebration of Earth Day…

Using Sunshine to Power Arizona's Water Future: A survey of Arizona water operators with solar

This excellent article, written by Janet Bunchman and Daniela Panfil, provides a comprehensive look and conveys real-life experiences and lessons learned in managing solar projects at water and wastewater facilities in Arizona (many financed through WIFA).

WIFA uses financial incentives and technical assistance to promote innovate water conservation, efficiency and reuse projects

Produced by EPA, this document highlights WIFA's use of financial incentives and technical assistance to promote innovative water conservation, efficiency, and reuse projects.

We would love to hear about your successes and help fund future investments for your community. Please contact us to discuss potential savings WIFA can offer.

Thank you,
WIFA

www.azwifa.gov
(602) 364-1310

KW (H20) – USING SUNSHINE TO POWER ARIZONA'S WATER FUTURE A SURVEY OF ARIZONA WATER OPERATORS WITH SOLAR

By Janet Bunchman, ECM, CDSM, MBA and Energy Conservation Coordinator (Retired) City of Mesa, Member of the AZ Water Energy Management & Sustainability Committee; and, Daniela Panfil, Engineer in Training and Assistant Engineer Hazen and Sawyer

The Environmental Protection Agency (EPA) estimates drinking water and wastewater systems account for 3 to 4 % of energy use in the United States and 3% of the nation's energy consumption costing nearly $4B annually (U.S. EPA, 2012b). The Energy Management & Sustainability (EM&S) Committee of the AZ Water Association formed in 2014 to educate and collaborate with professionals in the water industry on the water-energy nexus and sustainability best practices. Recently the EM&S Committee conducted a survey of city officials, water operators and energy managers in Arizona with solar installations at water and wastewater plants. The survey sought to identify how much solar energy exists at Arizona water facilities; key decision factors driving solar implementation; and their experiences, including any valuable "lessons learned."

Solar Beginnings and Declining Costs

On April 25, 1954, scientists at Bell Labs in New Jersey announced the invention of the first practical silicon solar cell (APS Physics, April 2009). They demonstrated their solar panel by powering a small toy Ferris wheel with a solar powered radio transmitter. The New York Times commented "the silicon solar cell may mark the beginning of a new era, leading eventually to ….the harnessing of the almost limitless energy of the sun." A year later Western Electric licensed commercial solar cell technologies and Hoffman Electronics created a 2% efficient commercial solar cell priced at $1,785/watt.

Today solar costs approach $2.00 /watt nationally (Solar Energy Industry Association (SEIA), 2016) – Figure 1. In the last five years solar costs declined by 64% in Arizona and utility scale solar now averages between $0.03 and $0.05/kWh. (SEIA, December 2016). Two of the cities surveyed with 2017 installations over 1 MW reported fixed solar power costs of under $.06/kWh and $.055/kWh – highlighting solar costs continue to decline even without utility incentives.

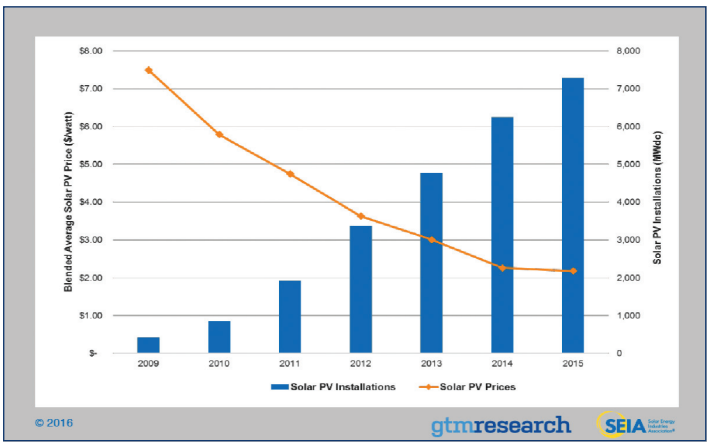


Figure 1. Solar Cost and Installations

Solar in Arizona

Arizona ranks 3rd nationally in solar deployment with 2,965 megawatts (MW) of installed capacity. Solar at Arizona water plants accounts for about 6% of commercial solar installations statewide. Figure 2 profiles Arizona water plant solar sizes, production and operational dates from Peoria's 59.6 kW turn up in 2010 to Scottsdale's 2.3MW installation with Tesla batteries later this year. Solar capacity at Arizona water plants totals 24.5MW and is expected to generate nearly 50M kWh annually. This amount of clean energy production is equivalent to reducing CO2 emissions from 18,748 tons of coal; or 3,953,900 gallons of gas; or 81,354 barrels of oil.

Arizona Water Plants with Solar Systems Community	Project Completion *Anticipated*	Size kW-DC	2016 kWh Production *(Estimated via PV Watts)*	Lease/Purchase
Bisbee	8/1/13	400.0	*700,000*	Purchase
Douglas	2/1/16	297.6	494,098	Purchase
Flagstaff[1]	12/19/13	818.4	1,371,365	SSA
Gila Bend	12/1/12	460.0	*832,000*	Purchase
Gilbert	11/1/11	2,257.9	4,426,361	SSA
Globe	12/21/12	495.5	*895,000*	PPA
Kingman	12/20/12	50.0	*92,000*	Purchase
Peoria - Beardsley Water Plant	1/1/10	59.9	107,585	Purchase
Phoenix	1/1/13	7,500.0	15,200,000	PPA
Pima County	2010, 2011	2,000.0	3,450,000	PPA
Prescott Valley	4/1/12	1,460.0	2,263,645	PPA
Scottsdale - (under design)	*8/1/17*	2,300.0	4,783,839	SSA
Somerton	2013	272.0	274,000	Purchase
Tempe - South Water Treatment	3/1/14	924.0	1,600,000	SSA
Tempe - Johnny Martinez	*3/20/17*	1,200.0	1,820,000	SSA
Tucson - Central Avra Valley Storage and Recovery Program (CAVSARP)	3/2011 & 12/2013	4,000.0	11,010,000	PPA
Totals		**24,495.3**	**49,319,893**	

1 Flagstaff 2015 production data

Figure 2. Profile of Communities in Arizona with Solar at Water Plants

Communities with Owned Solar

Six Arizona communities purchased solar systems. A key factor in decisions to own their solar were low interest loans from the Water Infrastructure Finance Authority (WIFA). WIFA offers a "green project" program using EPA grant monies for sustainable construction like water and energy efficiency, green storm water and other environmentally innovative projects. An attractive financial incentive for green projects can involve debt forgiveness – sometimes over 50% for economically disadvantaged communities. The following communities secured WIFA loans for their solar construction:

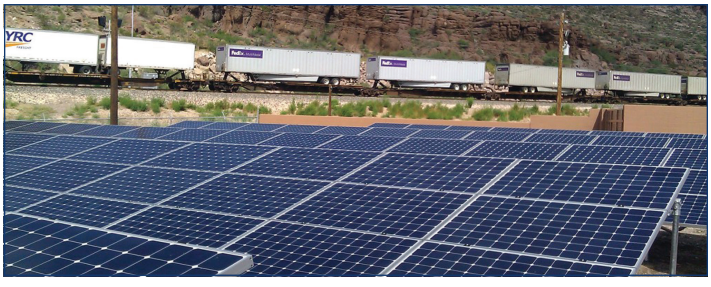
Solar at Beardsley Water Reclamation Facility Operations Building
City of Peoria

Peoria's Beardsley Road Water Reclamation Facility (4MGD) – Peoria secured a loan for overall plant upgrades involving clarifiers and UV disinfection and constructed a 59.6 kW system, producing

about 20% of plant energy in 2016. Savings and Incentives totaled $14,000 last year and are expected to be over $300,000 for the life of the solar system.

Somerton's Water and Wastewater Treatment Plants received $3.2M in WIFA loans and $1M in debt forgiveness to construct a 272 kW concentrated photovoltaic (CPV) tracking system. CPV trackers produce greater generation than ground mount systems requiring less land. However, they're more complex needing proprietary software and equipment to maintain alignment to the sun. Somerton's solar vendor went bankrupt and systems soon lost alignment, drastically lowering solar generation. City Manager Bill Lee considers Somerton "…lucky in finding someone with expertise to reverse engineer the system. We're now producing about 60% of what was promised." Mr. Lee praised the electrical contractors who installed the system, saying, "They stood by Somerton throughout and even bought surplus equipment stock from the vendor at auction." A major storm in 2015 flooded the plant damaging inverters, transformers and arrays. Somerton salvaged equipment and used surplus stock to restore the system. They plan a future repair with an adjunct tracking system to enable production to get back on track. Despite difficulties, Somerton still benefits from solar savings as their credit per kWh for on-site generation ranges from $.08 to $.12/kWh.

Gila Bend used $1.5M of their loan for a 460 kW solar system installed in March 2013 and received significant debt forgiveness. The fixed-tilt system located at the town's **Reverse Osmosis Water Treatment Plant** provides nearly 86% of the energy needs for the plant. According to Stacey Young, Finance Director, "Initially Gila Bend was not seeing much savings. The solar plant was overbuilt in regards to the amount of power the arrays were producing versus the amount of power on each utility interconnection, which determines customer credit for solar. We were fortunate Arizona Public Service (APS) greatly assisted us with adding interconnections for two wells consuming large amounts of power." Last year's solar savings were $97,000 including utility incentives.



Kingman received a WIFA loan in 2012 for construction of their **Downtown Wastewater Treatment Plant** (.5MGD) including a 50 kW-DC solar system. Engineer Phil Alred indicates, "Solar has been a good addition to the plant," meeting 20% of the plant's energy needs and is virtually "plug and play" to maintain. While Kingman had no comparative savings with the new plant, he said WIFA's debt forgiveness helped "solar show a good ROI."

Bisbee's San Jose Wastewater Treatment Plant (2MGD) – Bisbee officials decided on a 400kW solar system to offset costs at their plant. WIFA granted a loan of $1.6M with debt forgiveness of $0.4M. Bisbee water operators received certification training from a solar vendor on maintenance for inverters, panels and the electrical interconnection. Post installation, plant managers conducted an energy audit with help from APS and Tucson Water. Energy efficiency improvements in UV disinfection and pump operations reduced energy use by 30%. Public Works Director Andy Haratyk said, "Putting in solar was one of the best things we ever did" as maintenance of the system is easy and "energy savings - solar and efficiency savings less the annual WIFA loan payments - are $12,000 annually."

Douglas' WWTP (2MGD) received a WIFA loan of $1.3M with debt forgiveness of $0.4M. The project also included a new 3000 amp Service Entrance Section (SES) to upgrade reliability and provide adequate service. Luis Pedrosa, City Finance Director and Treasurer indicated savings of $25,000 were seen in 2016 with a system lifetime savings between $400,000 and $500,000. Douglas water operators manage the solar system.

Communities with Leased Solar PPA's/SSA's

According to survey respondents with leased solar, initial motivations included incentives from power utilities, no "upfront cost" Power Purchase Agreements (PPA's) or Solar Services Agreements (SSA's) and energy cost savings. With PPA's and SSA's the solar vendor offers a contracted solar power $/kWh rate over a 20-25 year term, a guaranteed annual production, and ongoing maintenance. Solar financers take advantage of the solar tax credit of 30% of project value authorized by the Energy Policy Act of 2005. The solar tax credit was extended in 2016, declining gradually to 10% in 2022 for commercial solar. The following communities with leased solar are Town of Gilbert, City of Tucson, Pima County, City of Flagstaff, Town of Prescott Valley, City of Phoenix, City of Tempe, and City of Scottsdale.

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Gilbert's Neely Wastewater Treatment Plant (11MGD) solar at 2.2 MW mounted panels in the facility's' recharge basin and adjusted panel height accordingly. Gilbert received a rate of $.075/kWh with a 2.5% annual escalator and utility incentives. Gilbert's Wastewater Manager Mark Horn indicates savings close to $2M were initially projected. He expects most savings to occur in the last 10 years of their contract but that "will depend on future utility rate increases."

Tucson's Central Avra Valley Storage and Recovery Program (CAVSARP) – (63MGD), a recharge and pumping facility, expanded their initial solar project to a 4 MW system in 2013. It produces 25% of CAVSARP's electrical use. Two PPA's were involved with differing costs for solar power and incentives from the local power company. Pumping loads have seen recent reduction with excess solar generation sold back to the utility at lower, wholesale rates. Tom Arnold, Lead Management Analyst indicates a "break-even" average cost of solar, comparable to existing utility rates. He mentioned saving money was not the sole reason for Tucson's decision to invest in solar. Rather providing "green energy with little or no increase in overall power cost" and reducing the City's carbon footprint" as other factors.

Pima County's Tres Rios WRF (50MGD) and Aqua Nueva WRF (32MGD) both site a 1MW solar system. Eric Nelson, Technical Program Manager for the Pima County Regional Wastewater Reclamation Department (PCRWRD) said, "As peak 15 minute demand is not reduced by solar, extensive analysis indicated PCRWRD could save approximately $270k per year on a better fit of plant loads with solar diurnal load profiles and a time of use (TOU) rate plan. He added, "If a viable cost effective storage option were available for solar, it might be a 'game changer'" for reducing demand charges during peak periods.

In 2017, PCRWD plans completion of the Corona de Tucson WRF solar project. Once completed, solar power will account for about 9% of total electrical power purchased by PCRWRD. The department also beneficially reuses biogas produced in its anaerobic digesters. PCRWRD expects to meet the County's renewable energy goal of 15%, ahead of its 2025 goal. PCRWD estimates their savings from renewable energy projects to exceed $4.5 million over 20 years, dependent on increases in power rates.

Flagstaff installed 818 kW of solar at their **Aquaplex, Rio de Flag and Wildcat Wastewater Plants** in 2013. The cost for the system was $2.9M. The annual energy savings from solar power, plus utility incentives, less the solar cost resulted in $40,160 savings in 2015. Cash flows estimate a savings of $2.4M to Flagstaff over 25 years, dependent on future rates. Flagstaff's City Council in 2010 passed a resolution promoting City-wide energy efficiency and renewable energy at their facilities. The City goal is to meet 35% of energy consumption by 2020; and 50% by 2050 through renewable generation or purchases. A report to the Council on electrical costs cited "rising energy costs and the City's reliance on predominately groundwater based utility system" as rationales for the resolution.

Prescott Valley's Tank Farm and Booster Station's two solar systems (695 kW) provide 50% of the power demand for the facility. The Town's **Advanced Wastewater Treatment Plant (2.6MGD)** two solar systems (765 kW) provide 30% of demand. Prescott Valley's solar footprint is 1.460 MW. Projects completed in April 2012 and

the solar provider owns and operates the system on land owned by the Town. Most surveyed communities saw no snafus with solar equipment. But Utility Director Neil Wadsworth reported meters for two systems switched and interconnected to the wrong solar systems during construction. Two incidents occurred where a solar power bus bar got excessively hot and burned up, taking a month for each repair. While plant operations were not affected, solar power was not available during that period. The Town realizes overall savings from a combination of solar power, time of use electrical rates, and control and optimization through improved SCADA systems. Mr. Wadsworth suggested, "To take full advantage of solar power pricing, future process changes require consideration to try to limit increases in the kW demand of the plant equipment, or time them to match peak solar production."

The Phoenix Lake Pleasant Water Treatment Plant (LPWTP) at 7.5 MW- DC is by far the largest on-site solar generation facility of Arizona water plants surveyed. The LPWTP photovoltaic complex began operation in January 2013 and produces about 15.2 million kWh per year. Surplus power generated is pushed back into the APS system. APS provides credits for the surplus energy, which can then be used at night, or on cloudy days. The solar was designed to meet 70% of LPWTP's energy needs at a water production rate of 50 MGD; but LPWTP is currently producing only about 27 MGD. Thus a surplus of solar credits is accumulated over the year. At the end of the year, APS pays Phoenix the prevailing wholesale rate (about $0.03 per kWh) for the accumulated credits. The LPWTP solar provider charges about $0.07 per kWh, so this arrangement results in a $0.04 per kWh for the accumulated credits. Though the LPWTP solar facility will likely be financially beneficial for Phoenix in the long run, Andy Terrey, Project Coordinator for the Water Services Department, stresses "Water utilities need to thoroughly understand how solar impacts the cost of power delivered from the grid, and how that impacts their bottom-line energy costs."

Tempe's South Water Treatment Plant (50MGD) solar sized at 924 kW became operational in March 2014 and the **Johnny G Martinez Water Treatment (80MGD)** Plant at 1.2MW plans to be operational in March 2017. Solar panels are expected to provide 15% of the South WTP's and 30% of the Johnny G Martinez WTP's energy needs. Estimated savings over the 20 year SSA's are $1M and $0.530M, respectively. A comparison of Tempe solar projects over time provides insight regarding utility rates and solar costs. The South WTP project received an incentive of $.04/kWh from its utility provider with a $.05/kWh cost of solar power. Thus the solar company received $.09/kWh to construct and maintain Tempe's 1st project. Solar power costs for Tempe's 2nd project are fixed at $.055/kWh with no incentives. In three years time, solar provider cost declined dramatically but Tempe's cost rose marginally by $.005/kWh. This and changes in utility rate structures – reductions in $/kWh rates but increases in demand charges – led to more conservative savings forecasts for the 2nd project. Grace Kelly, Energy Coordinator for Tempe likes "the use of SSA's as the City gets a facility powered by renewable energy with no upfront capital costs and ease of a "turnkey" system for design, build and maintenance." The City also has solar at its Library and Police/Courts complexes. Ms. Kelly cited Tempe's City Council resolution to power 20% of municipal operations from renewable energy by 2025 as a major driver for solar in the City.

Scottsdale's Water Campus plans a 2.3 MW solar installation in 2017 to generate 4.8 MWh annually and between 10 to 15% of their water (70MGD) and wastewater (20MGD) plants electrical needs. According to Chris Hassert, Water Resources Planning & Engineering Director, "Telsa Battery Storage is an integral part of our strategy. Solar alone does not shave cost. A solar with battery combination allows cost savings in demand charges and is estimated to save $1.4M over a 20 year period." He adds, "Solar also benefits the water campus by diversifying the power supply portfolio and adds additional redundancy."

Lessons Learned

1. **Right Size the Solar System –** Douglas' Luis Pedrosa counsels it's best to maximize energy efficiency opportunities prior to solar implementation and operators should as a first step"… identify and employ operational efficiency strategies and audits to ensure the facility is being operated as designed." This would mitigate lessons learned for some communities who found their solar systems sized too large or not balanced between separately metered plant loads. Others experienced reductions in MGD or pumping loads. Phoenix's Andy Terrey warns, "Never size solar generating system larger than the facility's minimum anticipated monthly energy use." While solar vendors perform historical analysis of a facility's energy use, its incumbent on water managers to provide plant forecasts or impacts affecting long-term energy use to solar providers. Power utilities can also provide valuable guidance and support in this effort.

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2. **Understand Utility Rate Structures and Plans –** Power utilities employ either kW or kWh values to determine the appropriate rate plan for the plant. Solar reduces overall kWh load and may reduce kW demand (if peak demand occurs diurnally). This can result in a change to a lower usage utility rate plan with higher costs. Or as PCRWRD discovered, a TOU utility plan may be a better fit than a standard plan. Knowing differences between "export" rate and "offset" rate and how solar billing works is also important. Tempe's Grace Kelly, after navigating these complexities, suggests "Hiring a third-party consultant familiar with utility rates to vet solar proposals, assess utility rate impacts and determine the best financial outcome" can be key to a successful solar implementation.
3. **Have a Plan and a Back-up Plan –** Pima County, Flagstaff, Tempe, and Tucson developed plans or goals for renewable energy. As gleaned from survey responses, sustainability goals foster a longer term systemic approach to energy saving opportunities. While the survey found successful outcomes for all solar projects, detailed technical and financial planning occurred more often in communities with plans and goals. Another byproduct of systemic planning appears to be development of staff depth of knowledge and expertise to perform analyses for continued improvement. Several respondents commented on taking advantage of solar benefits - like demand reduction; integration with SCADA schedules; or rate plan analyses to maximize savings. Hopefully all communities will plan to optimize plant processes as expertise increases with solar. A back-up plan refers to weighing alternatives or options available if projects "don't always turn out according to plan." Somerton's securing expertise and procurement of surplus equipment for system repair; and Gila Bend's experience of adding on site load offer good examples of managing unanticipated project contingencies.
4. **Pay Attention to Policies –** Recent utility rate case policies on charges and net metering led to often contentious disagreements between power utilities and the solar industry. This created uncertainty for customers on future utility and solar costs. On March 1, 2017, Arizona Public Service (APS) and Solar Industry groups in Arizona reached a settlement agreement, providing more certainty for solar in Arizona. APS' original proposal sought demand charges for all residential ratepayers, elimination of retail net metering for rooftop solar and provisions a $.03/kWh rate for energy exported to the grid. In the settlement, APS rooftop solar customers who apply by June are grandfathered under current retail net metered rates for 20 years. The compensation for future rooftop solar customers would be at an export rate of $.0129/kWh (residential) – declining over a 10 year period. *(Commercial solar information was not able to be reviewed by the time this article went to press).*

The Arizona Department of Revenue in 2014 proposed property taxes on leased solar. Two of the state's largest solar providers lodged a complaint which is still under review in Arizona court. An outcome is expected later this year.

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