



ARLINGTON VALLEY ENERGY FACILITY

**2017 Annual Report for the
Arizona Environmental Strategic Alliance**

A silhouette of a power plant facility at sunset, with the sky transitioning from orange to dark blue. The plant's structures, including tall chimneys and various buildings, are reflected in a body of water in the foreground.

COMBINED CYCLE POWER GENERATING STATION

- Facility utilizes two natural gas-fired generating turbines to generate power directly
- Each gas turbine has a Heat Recover Steam Generator (HRSG) that produces steam which is used to generate more electricity through a steam turbine generator, dramatically increasing efficiency of the overall design
- Total power production capacity is 580 MegaWatts, which is enough power for nearly half a million homes
- Combined cycle natural gas plants are more than twice as efficient on an emissions basis (CO_2) than conventional simple cycle electric production plants, and even more so than coal plants



CONSERVATION & POLLUTION PREVENTION

- Arlington Valley Energy Facility was designed and built to minimize water use and discharges to the environment
- Trip Reduction of the gas turbines minimizes the higher emissions experienced during shutdown and start up.
- The plant processes have been optimized to reduce waste of all types, and the site is a conditionally exempt small quantity generator (CESQG) of hazardous waste
- Despite being an electricity generator, the plant is always looking for best practices in the use and conservation of electricity
- Arlington Valley Energy Facility has restored a vast amount of former agricultural land, and has created and maintains a wetland area for the support of migratory water fowl in the Hassayampa River basin

A wide-angle photograph of an industrial facility, possibly a power plant or refinery, silhouetted against a bright sunset sky. The sun is low on the horizon, creating a golden glow that reflects on the calm water in the foreground. The facility's structures, including towers and piping, are dark against the light sky. The overall mood is serene yet industrial.

RECYCLE AND WASTE REDUCTION

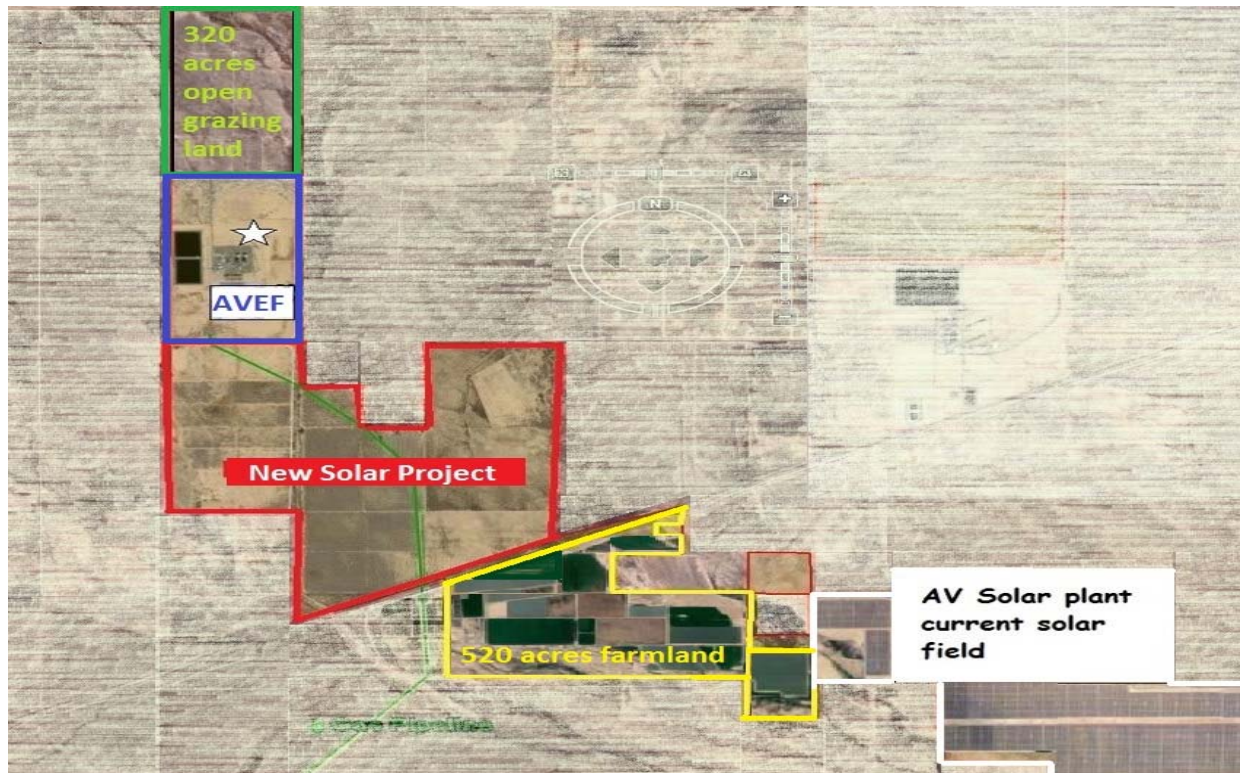
- More than 4,500 lbs of electronics and office waste was recycled, increased from the previous year due to upgrades.
 - We were also able to repurpose over 300 lbs of electronics by reusing switches and relays in non-critical areas.
- AVEF recycled 38,000 lbs of large battery banks
 - 120 facility backup batteries failed for the second time in 4 years, which is well before their expected end of life. Investigation showed that the installed battery charger system did not match design specs. We recycled the batteries and modified the system to ensure that the new batteries will last for their design life of 7-10 years before replacement is required. Although unexpected, we should not have to recycle this 26,000 lbs again until 2025.
 - We also recycled 12,000 lbs of wet cell generator backup batteries that were replaced on the gas turbines. The new batteries chosen have a 20 year life span which is 25% longer than the previous version. This was a planned evolution.
- Work is ongoing for changing plant lighting from sodium and fluorescent to LED
 - An additional 40 fluorescent lamps have been removed from service and recycled. Due to our efforts in this area over the last two years, we only had to recycle the 40 bulbs upgraded this year
 - Each fluorescent lamp replaced by an LED lamp saves nearly 40 Watts in power consumption



WATER CONSERVATION

- AVEF is designed for maximum water and power efficiency
 - Combined Cycle plants use considerably less water than conventional steam generating plants
- AVEF has a complex water treatment system that provides for significant recycling and reuse of the cooling water, which reduces water makeup requirements
 - AVEF has implemented a number of projects this year that allowed the facility to use the same amount of water as we have averaged over the last 2 years despite a 10% increase in power production over the same period.
 - In general terms, water usage is proportional to power production. AVEF has used 10% less water
 - AVEF water usage reduction was coupled with a few projects to minimize waste water to our evaporative ponds. As a zero liquid discharge facility, AVEF has hard limits on how much waste water we can produce. The facility was able to minimize the amount of waste water to the ponds while achieving our record setting power production year.
 - AVEF is still evaluating water recycling technologies to reduce our water usage and waste water production further. **One of those technologies is a pilot program that EPRI conducted at a similar facility.**

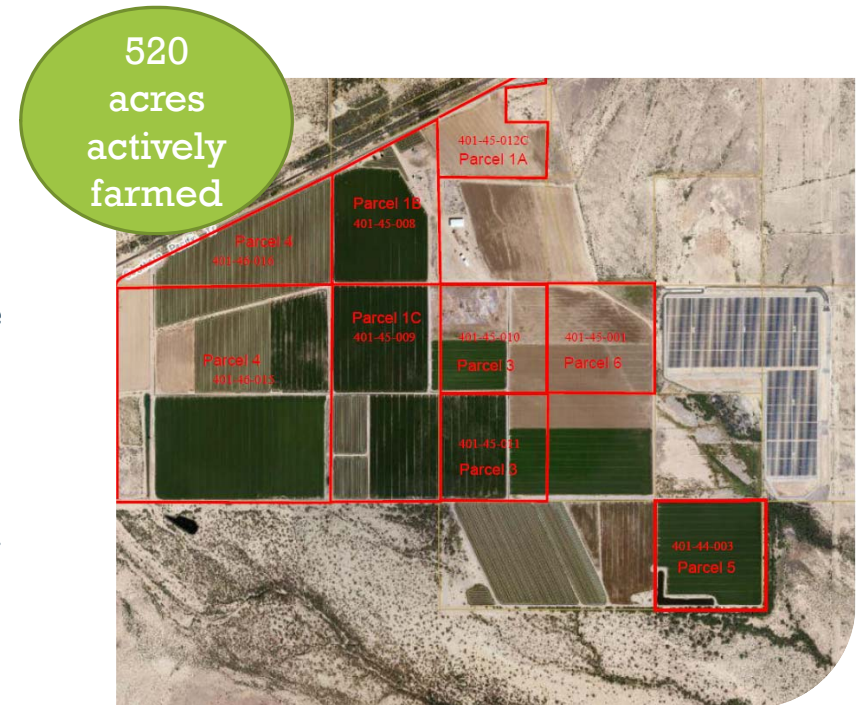
RENEWABLE ENERGY EFFORTS



AVEF entered into a lease with Sempra to build an additional solar power generation field on 890 acres of our property . This project will double the amount of solar fields supported by our land.

AGRICULTURAL LAND RECLAMATION

- AVEF maintains a 17 acre wetland that is utilized by a number of species of waterfowl, many of which are identified as Birds of Management Concern
 - Of note, the facility has increased the amount of water to the wetlands and changed the timing of the wetlands flooding. We have seen an increase in the number of Migratory waterfowl in the last few years and they are coming earlier in the season. We now flood the wetlands from late October until March of each year.
- More than 1,200 acres of the 2,800 site have been recovered and restored to a natural state of which approximately 320 acres is used as open grazing pasture for nearby ranchers
- AVEF renewed our lease allowing over 520 acres of the 2,800 site to be used for farming





EDUCATION AND MENTORING

- **Arlington Valley Energy Facility works with many organizations to share ideas that will enhance all parties' environmental achievements**
- **Arlington Valley has taken part in the Clean Power Plan stakeholders' process with the ADEQ in order to maximize the positive impact of the final ruling on Arizona businesses**
- **Arlington Valley was an original member of the California Climate Registry, and continues to support this innovative effort**
- **Our most exciting mentoring project has been to have summer interns from various universities run "What If" projects on site which greatly contributed to our water conservation efforts this year.**



POWER PLANT & ENVIRONMENTAL CHEMISTRY COMMITTEE

- The PPEC is a research group focused on advances and best practices in the areas of chemistry and environmental management at power plants
- The PPEC maintains a membership of approximately 120 professionals from all across the United States and abroad
- Affiliated with and supported by the Electric Power Research Institute



ARLINGTON'S NEIGHBORS

- **AVEF personnel take part in numerous training events, and maintain open informational exchange with our neighbors, both geographically and industrially in order to share information and best practices so that we can all find new ways to improve our policies in safety and environmental management.**
- **AVEF participated in a national range land study of portions of our land conducted by the US Department of Agriculture Natural Conservation Services. They are taking an inventory of natural resources and habitats around the country.**



ORGANIZATIONAL ENVIRONMENTAL POLICIES

- **Arlington Valley Energy Facility has produced and maintains a comprehensive environmental management system and audit program**
- **Since 2010, there has been an extensive review and update to AVEF environmental policies**
- **The plant has undergone several third-party environmental program reviews with no significant findings in any case**

A wide, horizontal photograph showing the silhouette of an industrial facility, possibly a refinery or power plant, against a sunset sky. The facility's structures, including towers and pipes, are reflected in a body of water in the foreground. The sky is a mix of orange, yellow, and dark grey, indicating twilight.

AVEF ENVIRONMENTAL POLICIES

- **AVEF has several posted EH&S policies that are strictly adhered to and advocated by management**
- **Extensive training processes are in place to ensure that employees and contractors understand the expectations of maintaining an environmentally conscious workplace**

A wide, horizontal photograph showing the silhouette of an industrial facility, possibly a refinery or power plant, against a sunset sky. The facility's structures, including tall chimneys and complex piping, are reflected in the calm water in the foreground. The sky transitions from a bright orange near the horizon to a darker, overcast grey at the top.

OTHER TOPICS TO REPORT

- **AVEF strives to maintain an open relationship with regulatory agencies and personnel**
- **We have had no environmental violations during the past year, and we look forward to continuing that record into the future**



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¿ QUESTIONS ?

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