

WICKENBURG HIGH SCHOOL REAPS REWARDS OF ARIZONA PUBLIC SERVICE FUNDED RETROCOMMISSIONING PROGRAM



APS PROGRAM INCENTIVES

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AESC ENGINEERING TEAM

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WICKENBURG HS SAVINGS

ARIZONA PUBLIC SERVICE (APS) PAVES THE WAY

Retrocommissioning [RCx] is a process that optimizes a building's heating, ventilation and air conditioning [HVAC] system performance to improve efficiency while meeting operational needs. With support from the APS Schools Pilot Program and RCx Program, AESC performed a comprehensive energy audit at the Wickenburg High School campus. The objectives of the audit were to identify opportunities to reduce energy use, improve occupant comfort and prolong equipment life.

After reviewing the audit findings with APS and the Wickenburg staff, AESC then conducted an in-depth assessment of the HVAC system, developed an RCx plan with the school's facility staff and managed the implementation of the recommended changes through the school's preferred controls vendor.

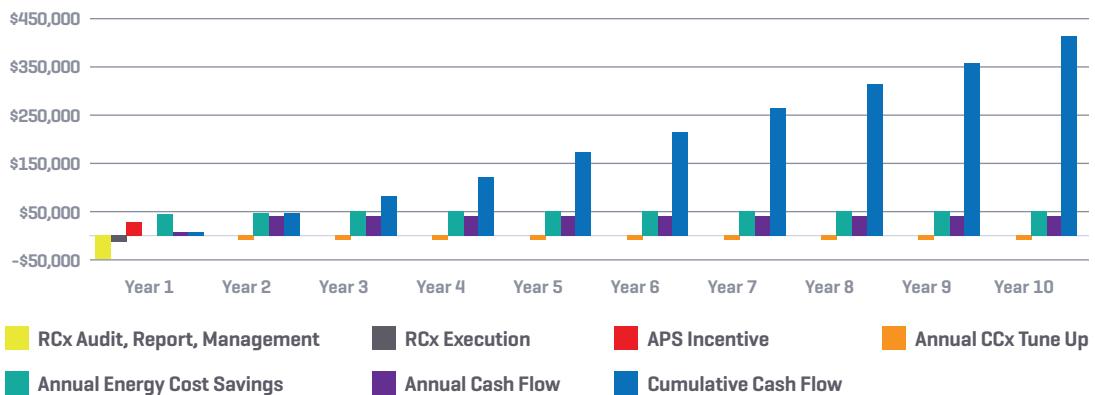
SIGNIFICANT SAVINGS | MODEST INVESTMENT

As a result of this joint effort, Wickenburg High School has completed a comprehensive RCx project that will provide a 15% reduction in electric use and an 11% reduction in natural gas use annually.

The project, which will pay for itself in less than a year, will reduce the school's utility bills by \$44,000 annually, allowing precious funds to be reallocated to other critical expenditures, such as education.

TEN-YEAR SAVINGS PROJECTIONS = \$405,456

WICKENBURG PROJECT CASH FLOW



[Initial RCx plus Annual Continuous Commissioning (CCx), Market Cost Basis, 3% Inflation]



FACILITY OCCUPANT FOCUS

AESC tailored the RCx project approach to meet the school's specific needs throughout the project cycle:

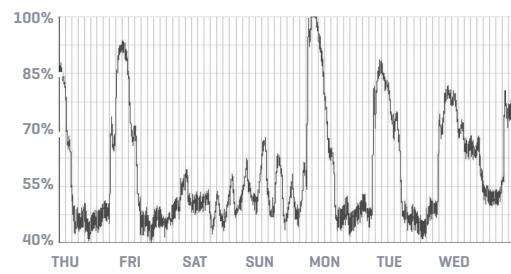
1. The investigation and implementation process had little to no impact on students and staff.
2. The project team worked closely with the school and district staff to understand the school's unique requirements. For example, extreme summer heat in the Phoenix area threatens the integrity of the gymnasium's wood floors as well as precision instruments in the performing arts center, which made precise temperature control a priority in these areas.
3. The school's preferred controls vendor was utilized to implement new set points, upgrade certain control systems, change zone schedules and fix communication issues with the building automation system [BAS].
4. Training was provided on the recommissioned systems and ongoing maintenance requirements to ensure continued benefits.

RCx-DRIVEN ENERGY SAVINGS

The 150,000 square-foot, nine-building campus is located north of Phoenix in Wickenburg, Arizona. Most of the campus is heated and cooled by water source heat pumps supported by a central plant and managed by a BAS. During the initial energy audit, AESC discovered a variety of BAS hardware and software problems that drove the heating and cooling systems and pumps to operate at near maximum capacity, even during unoccupied hours.

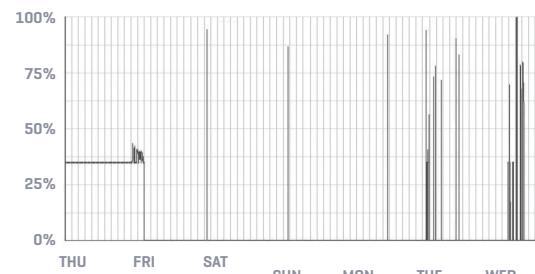
As illustrated in the example below, AESC made recommendations and oversaw changes that have significantly improved the campus' overall HVAC operations. This is just one of dozens of similar high-impact RCx findings that were implemented within the project.

BEFORE: PUMP #1 VFD SPEED



Prior to RCx, this HVAC condenser water pump's minimum speed never fell below 38% regardless of occupancy, resulting in significant energy waste.

AFTER: PUMP #1 VFD SPEED



With the RCx completed, the primary pump meets the differential pressure requirement while this secondary pump rarely runs, eliminating significant energy waste.

MULTIPLE BENEFITS

The project result is a recommissioned facility that meets the requirements of students, educators, administrators and plant operators alike, while delivering these performance enhancements:

- **Increased Comfort** enhances the education environment
- **Reduced Energy Use** generates less pollution and climate impacts
- **Prolonged Equipment Life** eases maintenance burdens and delays capital expenditures
- **Cost Savings** allows facilities budgets to be redirected to education expenses

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