



CASE STUDY

Albuquerque Public Schools – Building an energy conservation culture while maintaining an optimal environment for learning

Albuquerque Public Schools (APS) is the largest school district in the state of New Mexico, with 14,000 employees serving over 92,000 students at 160 properties. APS pursues an outreach energy and environmental conservation program for the district that will preserve natural resources and provide funds back to schools based on their energy savings. In 2013, APS's Water and Energy Conservation Committee developed a dedicated Energy Task Force to support the school district's goal of reducing 20% of water and energy usage over a 10-year period, across all its 160 schools and properties.

The Energy Task Force consists of five dedicated stewards who are specialists in education, water, energy and facility management, as well as one project manager responsible for coordinating the team and liaising with APS's administrative leadership. This team was challenged to find a way to reach the energy reduction target of 20% and navigate this effort within a network of 160 schools all working independently of each other. This was particularly difficult because each facility had its own habits and ways of operating, so standardizing systems was critical. Against these odds, the task force has been able to successfully meet 98% of its energy reduction goals in just five years, which is a remarkable achievement.

Now that APS and the Water and Energy Conservation Committee have nearly met their energy reduction targets, the challenge is to find ways to sustain this reduction for the long haul. Previous

experience has shown that, left unattended, energy usage could easily increase.

Collaborating to Provide a Comfortable Learning Environment

To maintain energy savings, APS participates in its utility's commercial and industrial demand response (DR) program. The Public Service Company of New Mexico (PNM) has been helping its customers save on energy consumption through the Peak Saver DR program since 2008 by providing incentives to reduce the amount of electricity they use during peak demand – typically the hottest days of the year. Though effective, traditional DR programs run the risk of disrupting customer operations, resulting in customer fatigue, dissatisfaction and program attrition.

First and foremost, APS is responsible for maintaining a healthy and comfortable environment for learning. It's the Energy Task Force's duty to find opportunities to eliminate waste without compromising this mission. "Energy saving programs cannot impact the learning environment negatively," said Tony Sparks, Energy Manager at APS. "We have to figure out ways to make programs like Peak Saver function in the school environment."

In 2018, PNM upgraded the Peak Saver program to an Enbala Virtual Power Plant (VPP) solution, with the goal of improving C&I customer demand management by providing constraint-

Using the Enbala VPP platform, APS is able to see its results for each individual property and in aggregate. "By using the Enbala VPP, individual schools can see the difference their participation in a DR event makes," says Tony Sparks. "For APS this transparency and visibility is a tool that allows local stakeholders (occupants and administrations) to visualize and conceptualize that their school, their facility, really matters." By itself, one school might only be making a small difference, but as part of the APS collective, with visibility in the aggregation and accumulation affect, stakeholders see the impact and the difference their facility is making.

Enbala is always prepared and eager to share with our team what they're doing, when they're doing it, and what the results are expected to be. This is a noticeable improvement over the previous program. – Tony Sparks, Energy Manager, APS

based automatic DR that could scale without impacting customer comfort. Enbala worked collaboratively with APS and its building management system control vendors to develop DR curtailment strategies that were unique to each property enrolled in the program, ensuring DR events would go unnoticed by APS's educators, students and employees. Enbala and the controls vendors also worked together to provide APS with an easy to navigate energy dashboard. This allows APS to visualize the performance of all its properties enrolled in the PNM Peak Saver program, giving the District's energy managers the option to easily opt out of events when necessary.

Seeing Results

With the number one priority being a healthy and comfortable learning environment, not everyone at APS is always sold on the idea of energy conservation – particularly during the summer months when most of APS's facilities are still bustling with activities and camps. However, with Enbala's constraint-based VPP, and a dedicated individual at the control station responsible for thoughtfully administering the Peak Saver program, APS is able to realize significant results without issues or complaints from its facilities' occupants.

In 2018, APS had 30 schools use Enbala's constraint-based, real-time monitoring and automatic control platform to participate in PNM's Peak Saver Program. In total, APS facilities participated in 12 events, saving on average 4.9 MWh per event and preventing a cumulative total of 40.5 tons of CO² into the atmosphere. By using Enbala's platform to participate in PNM's Peak Saver program, APS is doing its part in energy conservation to reduce the use of, and defer further construction of, peaking power plants.

Beyond the PNM Peak Saver Program, and the 20% reduction in water and energy goals, APS is trying to develop a culture throughout its schools where everyone feels responsible for, and actively participates in, conservation efforts. This is the long-term solution for sustainability and it's a big task. Sharing tangible results for conservation initiatives with teachers, students, staff and parents is one way APS tackles this task successfully.

Energy management was so random before and so unmanaged, whereas now there is a lot of visibility, control and opportunity... APS is pleased and surprised by the level of achievement seen at every event.

– Tony Sparks, Energy Manager, APS

Looking Toward the Future

With the positive outcomes from the current energy management initiatives, continuous construction improvements and the increased digitization through building management systems, APS is enthusiastic about future energy conservation possibilities.

By managing DR events with the Enbala VPP, APS is looking to extend the program to the next tier by including schools with smaller energy profiles to participate in load shedding events. This would benefit PNM without impacting APS or its facility occupants negatively.

A little bit by a lot of schools is just as good as a lot by one school - if a lot of little sites participate, that's still a valuable impact.

- Tony Sparks, Energy Manager, APS

One strategy for future building management overall is to have the ability to schedule occupied and unoccupied spaces at the zone level. Most of APS's schools have activities year-round, but not at full capacity. One of the more nuanced ways of administering the program would be to understand which part of a campus is being used (during summer) and which part is not. APS could then administer DR to take place on the portion of the campus that is not in use, while leaving the other area untouched for its occupants. This way, PNM and APS would get even greater benefit without impacting school operations.

Since APS is always in construction mode, they are constantly replacing old with new, and the newest get the latest and greatest technologies. APS has a Site Master Plan for most campuses, with a 10-15 year horizon (considering building age/condition and moving populations). There are some 12-14 construction projects at any given time, and most of them are a new building of some sort with building automation built into it. APS would like to develop a standard program for their building automation systems that accommodates the Peak Saver Program: a standardized control strategy that optimizes for demand response at every new and upgraded building automation system in the district.

If I have a say in it, we would have a 30% reduction goal in 10 years. It's ambitious but still realistic with the way APS is organized, with internal champions, collaborating with energy managers, facility managers, educators, administrators and students about the importance of waste reduction and conservation. - Tony Sparks, Energy Manager, APS

