



OPTERRA
ENERGY SERVICES

Arapahoe County



Administration Building



The Opportunity

Arapahoe is Colorado's first county and one of its largest with a population of more than 572,000. The County owned and managed many aging facilities that were racked with continual equipment issues. Many buildings had been repurposed and were being used differently than what they were initially designed for, but the equipment and sequence of operations had not changed to match building use. In 2005, County leaders engaged in a project to modernize several County buildings that had significantly outdated heating and cooling systems, lighting, and controls systems.

The Partnership

Phase I: Making Strides Toward More Efficient Facilities

Arapahoe County leaders wanted to make these improvements through a single source and looked to OpTerra Energy Services for support. Through a comprehensive approach, a team of Colorado experts developed and implemented the energy upgrade program, facilitating project funding largely through guaranteed utility savings.

The scope included replacing heating, cooling and air distribution systems, building boiler plants, installing water softeners, and upgrades to the building control systems. Lighting retrofits improved lighting quality and efficiency throughout all facilities. Wise choices such as converting the Courthouse's old, constant volume, chilled water supply to variable flow resulted in a significant conservation of water.

Phase II: Capturing More Savings Through Energy Efficiency

With the County facing rising utility costs in 2014, OpTerra surveyed facility improvement opportunities for a second project phase. By this time, newer equipment technologies had become affordable and offered even more savings potential. Also, retrofits would be even more cost effective given available utility rebates for a variety of efficient lighting, pumps, and motors. County leaders realized that the longer they waited to implement further upgrades, the more money they would waste on utility budgets without offering improved services to staff and constituents. An improved workplace for County employees was paramount in their decision to quickly move forward with the second phase of upgrades.

Program Highlights

- Will save more than \$42MM over the 20-year program life
- High performance allowed the County to pay off first project phase five years ahead of schedule with excess utility and operational savings
- Promoted local workforce engagement by using 62% in-state contractors during program construction
- Decreases annual electricity use by over 7 million kWh removing as much carbon from the atmosphere as planting 4,200 trees
- Saves over 44 million gallons of water every year -enough to fill 66 Olympic-sized swimming pools
- Won an award through the Colorado chapter of the American Public Works Association in 2016 for Arapahoe County's innovative, sustainable approach to heating, cooling and domestic hot water production

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The Technical Scope

Comprehensive energy efficiency improvements across 23 County buildings, including:

Phase I - (2005-2006)

- Replaced boilers at five buildings along with chillers at one building
- Upgraded lighting system and installed state-of-the-art controls
- Upgraded energy management system
- Installed AC units to serve computer rooms and improved ventilation
- Installed variable frequency drives on fans
- Implemented water conservation measures, including irrigation controls and laundry services
- Installed water softeners and water side economizers

Phase II - (2015-2016)

- Retrofitted interior, exterior, and parking lot lighting with LED technology
- Provided insulation and weatherproofing upgrades
- Upgraded HVAC (geothermal systems, rooftop units, air-cooled condensers, and evaporative coolers) and installed ground source heat pump system at County Fairgrounds
- Installed new air handling units and new cooling tower
- Upgraded energy management systems, building controls, and thermostats
- Installed new pumps, motors, and blowers
- Implemented water efficiency measures

OpTerra's skilled team implemented facility improvements over a 15-month period with minimal impact to building occupants. Altura Plaza is an example of the upgrade and energy efficiency success, which received a deep mechanical retrofit in 2015. OpTerra replaced over 50 heat pumps, installed a new cooling tower, upgraded building controls and interior/exterior lighting, and implemented water efficiency measures in the facility. The County ensured that Altura Plaza, a facility heavily used by many public-facing departments and services, increased its reliability and occupant comfort.

OpTerra performed unique upgrades at the County Fairgrounds, including the installation of an innovative ground source heating and cooling system along with upgrades to lighting and building control systems. To highlight the improvements at the Fairgrounds and bring worthy recognition to the pioneering scope and substantial savings, OpTerra worked with the County to win an award through the Colorado chapter of the American Public Works Association in 2016.

The Impact

Two phases of energy efficiency and facility improvement upgrades over the last decade demonstrated Arapahoe County's wise stewardship of taxpayer dollars and environmental leadership. The successful long-term collaboration between facilities management, program directors, commissioners, finance managers, and OpTerra's team resulted in driving savings and modernizing facilities, all while keeping County buildings open and providing services to the public during implementation. Through this successful partnership, Arapahoe County expects to save \$42 million over the 20-year life of the program.

To learn more about OpTerra, visit www.opterraenergy.com

