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Siemens partners with a booming Utah Valley city to achieve facility and infrastructure upgrades

City of Orem, Utah

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# Siemens Guaranteed Performance-based Solutions helps fast growing U.S. city upgrade infrastructure at a projected savings of \$11.4 million over 15 years.

The City of Orem is located in Utah Valley, 45 minutes south of Salt Lake City. The city is bordered by Utah Lake on the west and the Wasatch Mountains on the east. Utah's emerging technology industry along the Wasatch Front, and the continuing expansion of Utah Valley University, the largest public university in the State of Utah, are key factors tied to the area's boom. In 2015, *Forbes Magazine* ranked the Provo-Orem area number one in the nation for job growth among medium-size cities.



Growing job opportunities, relatively affordable housing and recreational amenities make Orem, nicknamed "Family City USA," an attractive place to live. As of July 1, 2015, Orem's population was an estimated 94,457, an increase by 6,192, or 6.9 percent, since April 2010. Orem's recent development and growth have made it the fifth-largest city in Utah and one of the fastest growing cities in the U.S.

## Client Objectives

Support was needed to keep pace with the city's rapid growth. A diverse and growing list of facility improvements spurred the city to develop an RFP for an Energy Performance Contract.


Based on their worldwide and national reputation as well as local references, the Building Technologies Division of Siemens Industry, Inc., was selected from several pre-

authorized respondents. The proposal included a Siemens-guaranteed Performance Contract that would help the city finance multiple facility and infrastructure improvements. The initial project phase of this performance contract would allow Orem to use new technologies to make necessary facility improvements in order to meet the needs of its growing population and continued economic development. Siemens Financial Services (SFS) was selected as the lending institution through an RFP process managed by the city of Orem and their financial advisor. According to Bill Bell, the City of Orem's Development Services Director, SFS provided the most competitive interest rate proposal for the term. The work Siemens proposed, and the city approved, was financed under an energy savings performance contract (ESPC) using a tax-exempt municipal lease. Once the project is completed, Orem will use the savings generated, estimated at \$11.4 million over 15 years, from the energy infrastructure upgrades to pay back the loan.

## Siemens Solution

An Investment Grade Audit (IGA) was conducted between January and June 2015 to establish a prioritized list of facility improvement measures (FIMs) and finalize the scope of work. Siemens began working on infrastructure improvements in March 2016.

One of the most impactful energy-efficiency measures was upgrading the city's 5,182 high-pressure sodium and metal halide streetlights with LED replacements that were designed specifically for various applications throughout the city.



Rocky Mountain Power (RMP) supplies the city's electricity and offers some of the lowest commercial rates in the nation. Upgrading outdated equipment with new, energy-saving replacements allowed the city to take advantage of lower rates and also qualify for a one-time utility incentive.

Energy-saving, long-lasting LED lamps offer longer lamp life, which generate savings by reducing energy consumption, consolidating lamp inventory, and minimizing the labor needed to replace lamps.

Lighting was upgraded to more efficient lamps and ballasts and programmable controllers and occupancy sensors were installed inside the City Center, Public Works, Public Safety, Senior Center, and fire stations.

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“Our older buildings with single pane windows and bad insulation needed to be more energy efficient; we also wanted to become a ‘greener’ city. By partnering with Siemens, we were able to achieve our goals within 18 months and enjoy the savings,”

**Taggart Bowen, Senior Engineer  
and Project Manager for the City of Orem**

Building automation system (BAS) modifications were made at the Fitness Center and outdated pneumatic controls are in the process of being upgraded to Digital Direct Controls at the Senior Center, City Center, Library, and Public Safety buildings and integrated into the Siemens APOGEE® Building Automation System. To maximize energy efficiency, Siemens engineers designed control strategies for economizer cooling that capitalizes on Orem's fair climate, plus nighttime temperature setbacks, demand control ventilation, proper boiler/chiller staging, and variable volume pumping controlled with VFDs. Building envelope improvements were made citywide to diminish the escape of conditioned air and wasted energy.

Fans were running at full speed on air handling units (AHUs) at the Senior Center. Variable Frequency Drives (VFDs) were installed to reduce electrical consumption and optimize building setpoint control and occupant comfort.

Higher humidity levels at facilities with pools were pinpointed as a cause of occupant discomfort and maintenance issues. To address this, Siemens recommended increasing the humidity setpoint to 60% to control pool water evaporation. A liquid pool cover was applied to the pool. This non-toxic, molecular compound, which is lighter than water, rises to the surface

when the water is calm and spreads out in an extremely thin layer to slow evaporation and heat loss. A dedicated pump, controlled with an automated timer, adds the liquid to the pool.

Lifeguards were entering the mechanical room daily to operate the leisure pool's pump switch and would oftentimes forget to turn it off. A timer switch was added to the pool deck for easier control by the lifeguards and the pump was programmed through the BAS to operate only when needed to reduce energy.

An on-site hypochlorite generator (OSHG) was installed to serve the lap pool and spa at the Fitness Center and Scera Park Pools. OSHG utilizes salt as its only raw material to produce enough chlorine to treat the water, eliminating the need for any additional chlorine tablets or feeder system. The installed units are capable of producing 40-lbs. of chlorine per day. This improvement will produce significant chemical savings for the city and greatly reduces facility staff exposure to sodium hypochlorite, a toxic chemical widely used for disinfection.

Poor air flow in the data center was causing the computer room air conditioning (CRAC) unit to experience failures which incurred maintenance costs of over \$3,000 per year. The CRAC, used to maintain the temperature, air distribution and humidity in the data center, was a downflow unit with a flooded return and mixed airstreams. Siemens recommended replacing the CRAC with a glycol fluid economizer unit and implementing hot aisle containment. The reconfigured distributed air system saves 5,067 kilowatt hours (kWh) annually.

#### Client Results

Infrastructure upgrades were achieved with a focused, single-source partner in a budget-neutral manner. The streetlights with LED bulbs are projected to deliver annual savings of \$246,247. An improved infrastructure, with new equipment and systems properly matched to building load, are expecting to reduce operating and energy costs, saving the city an estimated \$11.4 million in energy costs over 15 years.

“This project means a lot to our city,” said Orem City Manager Jamie Davidson. “We’re looking forward to bringing more upgraded facilities to our community, and we’ll be able to make these improvements based on the savings we are generating. We’re confident that these upgrades will allow us to sustain growth in our city for years to come.”

Siemens and the city will continue to partner to ensure Orem stays ready to meet today's needs with the ability to adapt for the future. Infrastructure improvements on the horizon include upgrades to elevators, boilers, and generators, as well as water-saving technologies that will contribute to further utility savings and sustainability goals.

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