



SIEMENS

“As one of the owner’s reps, I will say that the Siemens team has been in the top five performers that I have ever worked with in my 26 year career with the City. The project/program has been well planned and professionally implemented thus far. Our Siemens project team has been very in touch with the details and always helpful and responsive. Hats off....A+.”

Mark Ross, Parks & Recreation, Deputy Director,
Facilities Management & Development

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City of Houston

Siemens implements cost-effective, energy-efficient programs to improve the City’s critical infrastructure.

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Answers for infrastructure.

As the largest city in Texas and the fourth largest in the U.S., Houston has complex operations and infrastructure challenges.

Since 2008, the City of Houston has awarded several projects to Siemens to optimize energy efficiency for City properties. Siemens first undertook a multi-phase project to improve efficiency among 5.5 million square feet of City facilities, and then maximized energy efficiency across the City's nearly 10,000 traffic and pedestrian signals.



Improving efficiency of municipal buildings

Project Background

The City of Houston is a partner city for the Clinton Climate Initiative (CCI). Through a competitive procurement process under Texas Local Government Code 302 and in conjunction with CCI, Siemens Industry, Inc., was awarded a multi-phase performance contract that consisted of 5.5 million square feet of buildings. This program focused on retrofitting facilities for the City's Health & Human Services, General Services Department, Solid Waste and Parks & Recreation departments.

Facilities' Objectives

The first phase of the Energy Efficiency Building Retrofit program involved retrofitting the Metropolitan Multi-Service Center and Fire Station #50 totaling 37,499 square feet. The second phase covered 55 facilities, totaling 1.3 million square feet. The City of Houston's priorities included:

- Addressing infrastructure needs in the City's buildings, parks and service facilities.
- Improving energy efficiency and conservation efforts.
- Reducing operational costs; electricity, natural gas and water consumption; and CO₂ emissions.

Siemens Solution

Through a \$20 million guaranteed performance contract, Siemens provided turnkey design, engineering and construction to address Houston's critical infrastructure improvements. Siemens implemented the following solutions to meet Houston's objectives:

- *Solar thermal collector installation* – Siemens provided and installed new solar thermal collectors to provide supplementary heat to therapeutic swimming pools.
- *Irrigation controls and replacements* – Siemens provided and installed new web-based irrigation controls and retrofitted distribution systems including pumps and end devices.
- *Building water fixture retrofits* – Siemens retrofitted high-flow devices with low-flow devices to conserve water.

- *Comprehensive lighting upgrades* – Siemens retrofitted all T12 lamps and magnetic ballasts with T8 and T5 lamps and electronic ballasts.
- *Ballpark and outdoor field lighting* – Siemens installed master controls and retrofitted park and field lighting to improve energy efficiency and reduce operational costs.
- *HVAC efficiency improvements* – Siemens replaced a variety of packaged rooftop units and split systems with high-efficiency units.
- *Solar window film* – Siemens installed solar window film in select areas of facilities.
- *Energy management systems* – Siemens installed a new building automation system in several facilities and expanded others.

Project Results

Siemens completed the first phase of the retrofit program in April 2010, and began the second phase in May 2010. The anticipated results include:

- Annual electricity savings of more than 8,800,000 kWh.
- Annual natural gas reduction of 960 MMBtu.
- Annual water savings of 57,440 kgal.
- Annual CO₂ reduction of 9,267,208 pounds.
- Annual operational savings of \$907,665.
- Overall energy savings in excess of \$30 million over the 13-year contract.

“Our experience with Siemens has been exceptional because Siemens has such vast knowledge and experience working with public facilities, some of which operate 24 hours a day. Siemens' Project Manager, working in conjunction with the Project Engineer, has always kept buildings functional and open to the public and City staff.”

Wes Phillips, General Services Dept., Sr. Project Manager

Maximizing traffic signal energy efficiency

Traffic Department Background

The Traffic Department at the City of Houston is a sub-division under Public Works and Engineering. Under a separate performance contract not associated with CCI, Siemens was awarded a project to retrofit the City's traffic signals. The City of Houston was looking for a way to save significant electrical costs while reducing operational expenses. This was achieved by upgrading the existing 8-inch signal heads to 12-inch signal heads for the City's nearly 2400 traffic signals and 7,000 + pedestrian signals. Prior to 2009, the City used incandescent bulbs, which were both energy and operationally inefficient, thereby costing more to operate and maintain.

Traffic Department Objectives

The City of Houston established the following objectives for this project:

- Significantly reduce the amount of electricity used annually, thereby reducing utility costs.
- Use the latest technology in signal bulbs and pedestrian signals.
- Boost operational savings by reducing the traffic department's bulb replacement cycle.
- Obtain guaranteed savings that will pay for the cost of the project.
- Replace all 8-inch signal heads with larger 12-inch signal heads in order to improve safety for drivers.

Siemens Solution

Siemens addressed critical infrastructure improvements through a guaranteed performance contract. The \$12.3 million contract was broken down into multiple work orders to complete the project faster. The first work order started with an audit that identified locations, quantities and the types of traffic signals the City owned. As the audit was completed, multiple work orders were issued so that implementation could begin quickly and savings could be achieved faster.

As part of the contract, Siemens guarantees an annual utility savings of approximately \$1.4 million in electric savings and an additional \$500,000 in annual operational savings over 10 years. By replacing the incandescent lamps with light-emitting diode (LED) lamps, the frequency of signal lamp replacement is greatly reduced.

Siemens implemented the following solutions to meet the City of Houston's objectives:

- Surveyed more than 2,400 intersections and created a master electronic database that included lamp and signal quantities, GPS coordinates, controller information, meter information and pictures of intersections.
- Retrofitted more than 40,000 lamps (red, yellow, green, arrows, etc.).
- Replaced existing 8-inch traffic signal heads with new 12-inch traffic signal heads.
- Retrofitted more than 7,700 pedestrian signals.
- Replaced a variety of older pedestrian signals with new countdown signals and larger sizes.

Traffic Department Results

The project was substantially completed by December, 2009, and the results included:

- Annual electricity savings of nearly 10 million kWh.
- Annual electrical cost savings of over \$1.3 million with a projected savings of approximately \$14 million over the 10-year term of the contract.
- Annual operational savings of more than \$550,000 with a projected savings of approximately \$5.5 million over the 10-year term of the contract.

As a result of these savings, Siemens obtained a rebate from the local utility company and presented the mayor with a check for more than \$810,000.

“Siemens has helped the City save millions of dollars by helping us implement programs and install new technologies that save money!”

Laura Spanjian, Director of Sustainability for the City of Houston