

40,000

That's how many LED Siemens technicians installed in Houston's traffic lights to replace the old incandescent light bulbs in just over one year. This modern technology lowers electricity consumption, reduces operating costs and protects the climate by reducing CO₂ emissions.



Becoming America's greenest big city

Houston is widely viewed as the world capital of the oil industry. But considering the rise of renewable energies and the debate surrounding climate change, top city officials realized a few years ago that this title is a dubious distinction, at best. As part of a radical paradigm shift, Houston set itself the goal of increasing the quality of life for its citizens and becoming the “greenest” metropolis in the United States.

The city has already made considerable progress on the way to that goal. Wind farms in Texas generate 33 percent of municipal electricity consumption and nearly 800 local government vehicles run on hybrid technology. And the city plans to expand the first rapid-transit line that opened in 2004 using Siemens light rail cars by building an urban rail network covering more than 60 kilometers. Siemens technology also reduces the electricity consumption of the municipality. And there's an added benefit: The costs of modernizing the city's traffic light system can be recouped through energy cost savings within only a few years.



- < Houston operates nearly 2,400 traffic lights to ensure the safe flow of motor vehicle and pedestrian traffic.
- < With LED lighting technology from OSRAM, costly maintenance is a thing of the past. For example, the LEDs installed in the city's traffic lights need to be replaced only on an average of every six years compared to the previously used incandescent bulbs, which had to be replaced annually.


Houston is modernizing every traffic light in the city to reduce their environmental impact and save money at the same time. Though it may sound like magic, that success is a very real and typical experience for a Siemens customer. But there is one magic idea involved here: energy savings contract.

Houston's strong commitment to environmental protection and sustainability quickly spread to the entire municipal government. Rather than settle for small steps, city officials looked for maximum solutions to reduce energy consumption. The city's Transportation Department began its efforts in that direction by scrutinizing the traffic light system.

The question was: Can the installation of ultra-modern technology reduce energy consumption and energy costs far enough to recoup the related investments? Based on detailed calculations, Siemens engineers submitted a convincing proposal to the city: By converting the traffic lights to LED technology, Houston could reduce its energy costs by US\$14 million and lower its operating costs by another US\$5.5 million over a period of ten years. The necessary investment would be US\$12.4 million. In fact, Siemens contractually guaranteed the potential savings in the framework of an energy-savings contract.

Work to modernize the city's 2,396 traffic lights and pedestrian signals began in 2009. Siemens technicians replaced more than 40,000 incandescent light bulbs with modern light-emitting diodes (LEDs). In the course of that work, they also replaced many of the old 8-inch traffic lights with larger, easier-to-see 12-inch models. In addition, many of the more than 7,700 pedestrian signals were also replaced with larger models.

Besides saving the city nearly 9.8 million kilowatt hours of electricity consumption per year, the new LED lamps also last considerably longer than incandescent light bulbs, so they need to be replaced only every six years, rather than once a year. As part of that project, Siemens also set up a traffic light database to lower operating costs even further. This database consists of detailed data on the location, technology, inspections and repairs of all the city's traffic lights.



That's how much electric power Houston
saves every year by having installed OSRAM's
LED technology in its traffic lights.

9.8 m kWh



- < The Metropolitan Multi-Service Center in Houston is a municipal sports facility and rehabilitation center for people with physical disabilities.
- < Energy-saving lighting elements supplied by Siemens subsidiary OSRAM flood the athletic facility with brilliant light. The costs of retrofitting the lighting system will be recouped in the form of reduced energy costs within a period of 13 years.

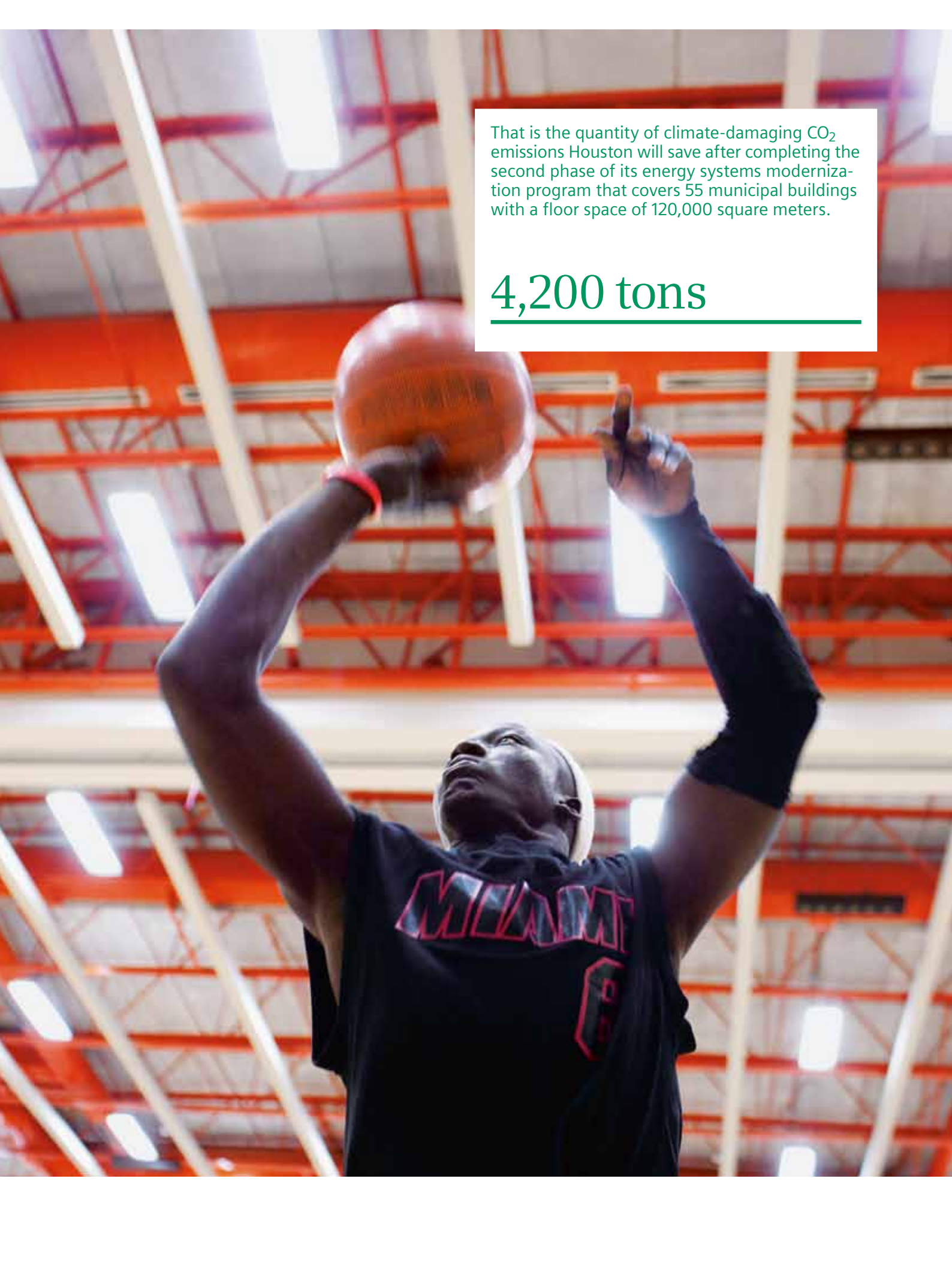
In Houston, sustainable growth begins with thriftiness. The city is aiming to reduce the energy consumption of all municipal buildings by 20 to 30 percent. And it plans to reach that goal without making any investments of its own, thanks to Siemens energy-savings contracts.

Houston is a partner city of the *C40/Clinton Climate Initiative* (CCI), under which some of the world's biggest cities have joined forces to combat climate change. The core activities of this initiative involve programs aimed at promoting energy efficiency and renewable energy. They all aim at reducing greenhouse gas emissions. Top officials in Houston decided that the city should serve as a role model for private homeowners and resolved to modernize and optimize the energy systems of all municipal buildings. The city launched the first phase of the project with a number of smaller projects.

Siemens handled the energy system modernization of a fire station and the Metropolitan Multi-Service Center, a municipal sports facility and rehabilitation center for people with physical disabilities. Siemens experts calculated that modernizing this approximately 3,500 square meter facility would cost around US\$750,000; however, this investment will be amortized in the form of reduced energy and operating costs within a period of 13 years. To cement the deal, Siemens guaranteed those savings in an energy-savings contract. The necessary modernization work was completed by April 2010. Now

equipped with modern lighting systems, motion-activated light switches, a solar heating system for the therapeutic swimming pool and new high-efficiency air-conditioning systems, the city will save 550 megawatt hours of electricity and 119 megawatt hours of natural gas a year in those two buildings alone. In addition, annual maintenance costs will be reduced by US\$26,000 over the term of the contract.

This positive outcome encouraged the city to undertake more ambitious projects. In the second phase of the program, Siemens will modernize the energy systems of 55 municipal buildings, comprising total floor space of 120,000 square meters. This energy-savings contract is worth US\$26 million over a period of 13 years. In this contract, Siemens must meet various complex challenges such as lighting sports facilities, increasing the use of rainwater and employing energy-saving window films. A third phase involving modernization of the energy systems in 90 buildings is already in the planning stage. With these projects, Houston will be able to lower the energy consumption of its municipal buildings by 20 to 30 percent within only a few years, without having to make any investments of its own.



That is the quantity of climate-damaging CO₂ emissions Houston will save after completing the second phase of its energy systems modernization program that covers 55 municipal buildings with a floor space of 120,000 square meters.

4,200 tons

Interview

Laura Spanjian,
Sustainability Director Houston

Siemens Sustainability Report: Ms. Spanjian, the City of Houston has done a lot on sustainability. What do you see as your biggest challenges?

Laura Spanjian: I see challenges as opportunities. We've done much sustainable work in many different areas: The City of Houston is now the number one municipal purchaser of renewable energy in the country, and we are number 6 overall in the country. 33 percent of our energy comes from wind farms in Texas and we are hoping to increase that percentage to 50 percent soon. In 2007, we had less than ten LEED-certified buildings in Houston, now we have over 115. We also recently launched the Green Office Challenge, a very successful program with 310 participants and growing. On the energy efficiency side, we have programs in every sector. For municipal projects, we're working with Energy Efficiency Performance Contracts, and we use the energy savings to pay back the initial capital investment. That's been very successful for us – we just approved a US\$12 million tranche for Siemens. In addition, in another important area for Houston, we are now working diligently to ramp up our recycling efforts because so far we are diverting just 26 percent of our waste from the landfill.

How are you embedding this ethic throughout the city and getting people motivated to join?

Houstonians are very motivated to become more sustainable. They want and need support, resources, tools and ideas to move their issues forward. Mayor Annise Parker and our Office of Sustainability provide those resources. We bring people together and partner on every project we work on. Partnerships are what will help put Houston on the map as the greenest city in the US.

Does the current financial crisis affect your sustainability agenda?

Yes, it's probably the most difficult budget year yet. But at the same time, we continue to work as fast as we can to educate Houstonians about our initiatives because they not only have environmental benefits, but they help people save money. Using less resources, less energy, less water, having less waste go to the landfill – if you're using less, you're spending less. Over and over again, one can continue to make the case for why these projects should actually be increased during an economic downturn.

Is there a demographic group in the city that tends to be most motivated about your initiatives?

Similar to many cities, the younger generation is pushing much of this work. Young professionals want to live in a city

where they can recycle, take public transportation and work in a green building, and we are excited to be the number one city for young professionals, as ranked by Forbes Magazine. We need help educating all sectors of the population, and it's great to have young professionals push and promote some of these initiatives.

What would a city like Houston expect from the private sector, especially from Siemens?

We're providing benefits and financial incentives and calling on the private sector to do things voluntarily. We try to do as many things as we can to receive support and buy-in.

Siemens has shown the City that these initiatives work, and the more Siemens can be a cheerleader for that in Houston, the better. The more the City has partners working on sustainable projects and educating the private sector, the better it is for Houston. Siemens has been a tremendous partner. Let's keep going!

"Our sustainability initiatives are bringing people together."



Laura Spanjian, in charge of developing a sustainability strategy for Houston

4.7 tons of CO₂ is the per capita emission per year

5.6 million people live in the greater area of Houston

2,138 is the number of people Siemens employed in Houston in 2010

US\$67,000 is the per capita GDP per year

563 liters is the daily per capita water consumption

Houston at a glance

Other sustainable Siemens projects in Houston

Sustainability means ensuring our quality of life over the long term – sometimes in long strides, sometimes in incremental steps. The essential thing is never to be satisfied with what you have achieved.

Mobility LIGHT RAIL LINE ENHANCES QUALITY OF LIFE

In 2004, 64 years after shutting down its last streetcar line, Houston opened a new rail-based mass transit system. The Metrorail Redline extends 12.1 kilometers, connecting the downtown business district with Reliant Park, a popular sports and recreation complex. As the light rail market leader in North America, Siemens supplied the 18 light rail trains and the line's complete infrastructure, including signaling and communication systems, power supply and overhead lines. Since its inauguration, the Redline has become a genuine economic factor. New offices and businesses have sprung up around the line stops and rental units routinely advertise "close to Metrorail" – which is good for rent stability. And this success story is still being written: Two new light rail lines are under construction and are scheduled to open in 2014, and two additional lines are being planned.

Recreation SUSTAINABLE TECHNOLOGY FOR PARKS

The citizens of Houston have enjoyed the 180-hectar Hermann Park since 1914. This green oasis in the middle of the city is a popular place for picnicking, walks, biking, paddle-boating, golfing and many other activities. Siemens is responsible for modernizing the park's energy system. The controllers of the watering system are being updated to better use natural rainfall for irrigating lawns and flower beds. The controllers will automatically irrigate based on soil moisture and weather forecasts. The park's buildings also use considerably less energy for heating, ventilation and air conditioning because they are now controlled automatically, rather than manually, based on outdoor temperatures. The lighting system was also modernized, using thrifty OSRAM technology and motion detectors.

Building COOL HEADS AT THE FIRE DEPARTMENT

Houston's Fire Station No. 50 also needed to have its energy system modernized. In the past, the air conditioning system ran constantly and kept the rooms much colder than necessary. Today, an energy management and controlling system keeps the building more comfortable while also using less energy. And the new OSRAM lighting system makes the work areas brighter while using much less electricity.