

TECO'S KEY TO SUCCESS IS CONSISTENTLY OPERATING AT THE HIGHEST LEVEL.



THERMAL ENERGY CORPORATION'S CENTRAL PLANT - THE PAUL G. BELL, JR. ENERGY PLANT - IS LOCATED ON THE CAMPUS OF THE TEXAS MEDICAL CENTER ALONG THE BRAYS BAYOU IN HOUSTON, TEXAS. THE COMPANY'S 48 MW COMBINED HEAT AND POWER PLANT IS LOWER CENTER. COURTESY THERMAL ENERGY CORPORATION. PHOTOGRAPHER PAUL HOWELL.

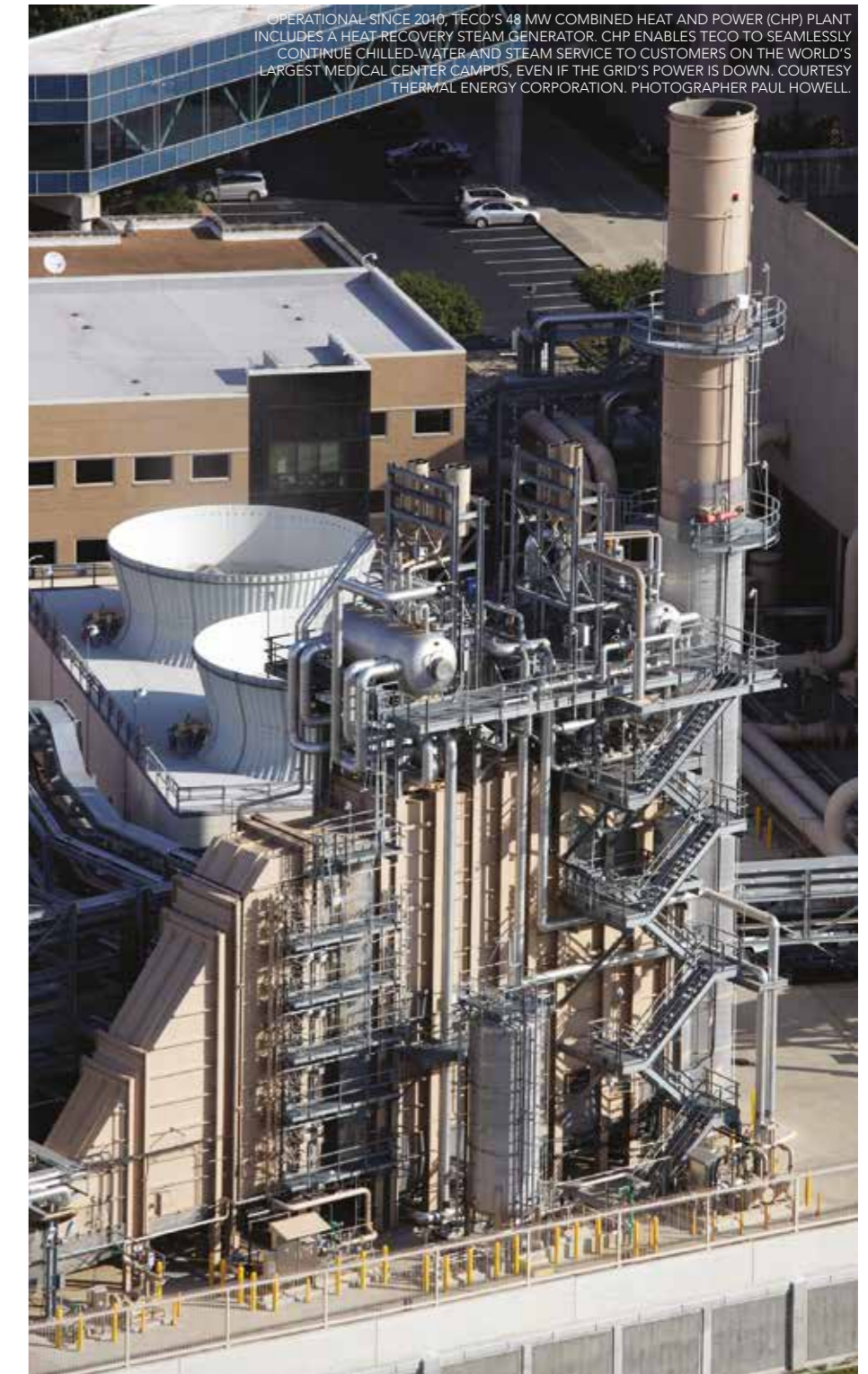
services, you need to be invested in 1% of our equity; if you're using 20%, you need to be invested 20%. Nobody is subsidizing anyone else. Everybody pays the same rate, and everybody gets a vote on the board, regardless of size. Because our customers give us an aggregated load, we can maximize resulting efficiencies."

Today, TECO serves customer institutions that represent 7,000 hospital beds and a billion and a half dollars of annually

funded medical research – and since 2010 it has used combined heat and power (CHP) to do so.

RELIABILITY, EFFICIENCY, SUSTAINABILITY

In anticipation of growth among TMC member institutions, TECO developed its own master plan in 2006. "There were several specific things we decided to focus on," says Mr. Swinson. "Reliability was – and continues ▶



OPERATIONAL SINCE 2010, TECO'S 48 MW COMBINED HEAT AND POWER (CHP) PLANT INCLUDES A HEAT RECOVERY STEAM GENERATOR. CHP ENABLES TECO TO SEAMLESSLY CONTINUE CHILLED-WATER AND STEAM SERVICE TO CUSTOMERS ON THE WORLD'S LARGEST MEDICAL CENTER CAMPUS, EVEN IF THE GRID'S POWER IS DOWN. COURTESY THERMAL ENERGY CORPORATION. PHOTOGRAPHER PAUL HOWELL.

CRITICAL LOAD



STEVE SWINSON, PRESIDENT AND CEO OF TECO.

Sustainable Business Magazine speaks to Steve Swinson, President and CEO of Thermal Energy Corporation (TECO), about providing reliable, cost-effective energy to the world's largest medical center. www.tecothermalenergy.com

The Texas Medical Center (TMC) is the largest medical center in the world, consisting of numerous hospitals, medical schools, dental schools, nursing schools, research facilities, and other institutions. More than 110,000 people work on the

TMC campus, with the average daytime population increasing to 250,000 people, including patients and other visitors.

In 1968 Houston Natural Gas (HNG) built a district energy plant to provide chilled water and steam to institutions on the TMC

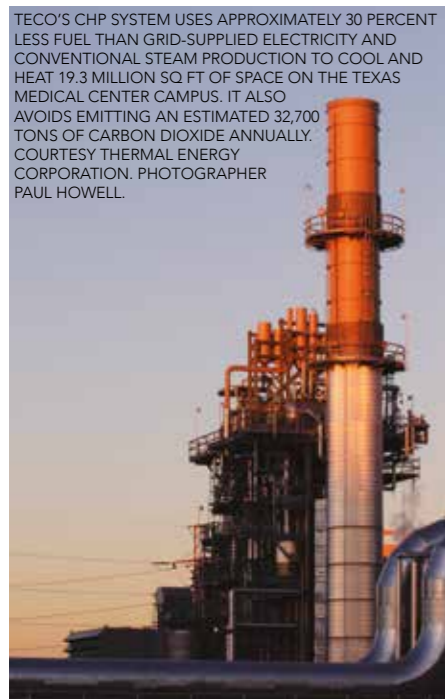
campus. In 1975, TMC's member institutions joined together as a cooperative to purchase the district energy system from HNG and formed Thermal Energy Corporation (TECO). Although TECO became a 501(c)(3) not-for-profit corporation in 2003 to access tax-exempt financing, it is still governed using the cooperative business model.

"Everybody's in this together," explains Steve Swinson, President and CEO of TECO. "We're really just an extension of the customers we serve. They comprise our board, set our rates, and approve everything we do. Each institution is invested in TECO the same percentage as its usage. So if you're using 1% of TECO's



THEN U.S. SECRETARY OF ENERGY DR. STEVEN CHU TOURED TECO'S CHP PLANT AND EXPANDED DISTRICT ENERGY SYSTEM IN FEBRUARY 2012. DR. CHU STATED THAT, "INVESTMENTS IN ENERGY EFFICIENCY LIKE THE COMBINED HEAT AND POWER PLANT AT TEXAS MEDICAL CENTER ARE HELPING TO CREATE NEW JOBS, EXPAND U.S. MANUFACTURING AND STRENGTH AMERICAN COMPETITIVENESS GLOBALLY. BY REDUCING THE ENERGY NEEDED TO POWER MULTIPLE FACILITIES, THIS PROJECT IS SAVING MILLIONS OF DOLLARS AND REDUCING CARBON POLLUTION, WHILE IMPROVING THE RELIABILITY OF ONE OF THE COUNTRY'S TOP MEDICAL CAMPUSES." PHOTOGRAPHER CHRIS CURRY.

TECO'S CHP SYSTEM USES APPROXIMATELY 30 PERCENT LESS FUEL THAN GRID-SUPPLIED ELECTRICITY AND CONVENTIONAL STEAM PRODUCTION TO COOL AND HEAT 19.3 MILLION SQ FT OF SPACE ON THE TEXAS MEDICAL CENTER CAMPUS. IT ALSO AVOIDS EMITTING AN ESTIMATED 32,700 TONS OF CARBON DIOXIDE ANNUALLY. COURTESY THERMAL ENERGY CORPORATION. PHOTOGRAPHER PAUL HOWELL.



to be – extremely important for us. 85% of the 19 million square feet of building space we serve is classified as critical load – either clinical care for patients or research that's environmentally sensitive. On top of that, we're only 50 miles due north of the Gulf of Mexico. It's been a few years, but hurricanes come through here on a regular basis.

"We also wanted to use the most efficient way of converting fuel to useful energy. We have no control over the cost of fuel, but we can control how efficiently we use it. Plus, we wanted to make sure the people we serve are never at a disadvantage; we always want to be energy competitive. Our customers also care a lot about environmental responsibility, and efficiency helps us to be environmentally responsible."

HUGE SAVINGS

TECO decided to implement a combined heat and power system to achieve these

goals. "TMC is a very concentrated, very condensed campus, which makes district energy and CHP such a great fit here," says Mr. Swinson. "CHP gives you great efficiency, but it also gives you reliability. Our plant is designed to withstand sustained 110-mile-an-hour winds. Now, on top of that, we're totally self-sufficient in terms of energy because we can produce enough of our own power to keep chilled water and steam service running even if the electricity grid goes down. Basically, our emergency generator runs the whole time, so we are ready for any disaster. Also, our plant went from being about 40% efficient, in terms of fuel in to useful energy out, to almost 70% now, which means huge economic savings for our customers."

And now that the CHP plant is up and running, TECO has been able to share the financial savings with its customers. "In the



TECO'S EXPANSION AND NEW EQUIPMENT MEANT ADDITIONAL EQUIPMENT MONITORING AND CONTROLS, WHICH RESULTED IN A NEW CONTROL ROOM, SHOWN HERE AT THE MAIN PLANT. EQUIPPED WITH 24 FLAT-SCREEN MONITORS, TECO'S CONTROL ROOM IS STAFFED 24 HOURS A DAY YEAR-ROUND. COURTESY GE POWER & WATER. WOODALLEN PHOTOGRAPHY.

past five years, we've been able to return \$20 million of the revenue they've paid us in large part because of savings realized through CHP," says Mr. Swinson. "And the rebates have only been part of the savings. In our budgeting process, we plan

for other savings that result in lower rates to our customers." CHP has also reduced greenhouse gas emissions and regional air pollutants, equal to the emissions produced while generating electricity for more than 4,000 homes.

STRONG PARTNERSHIPS

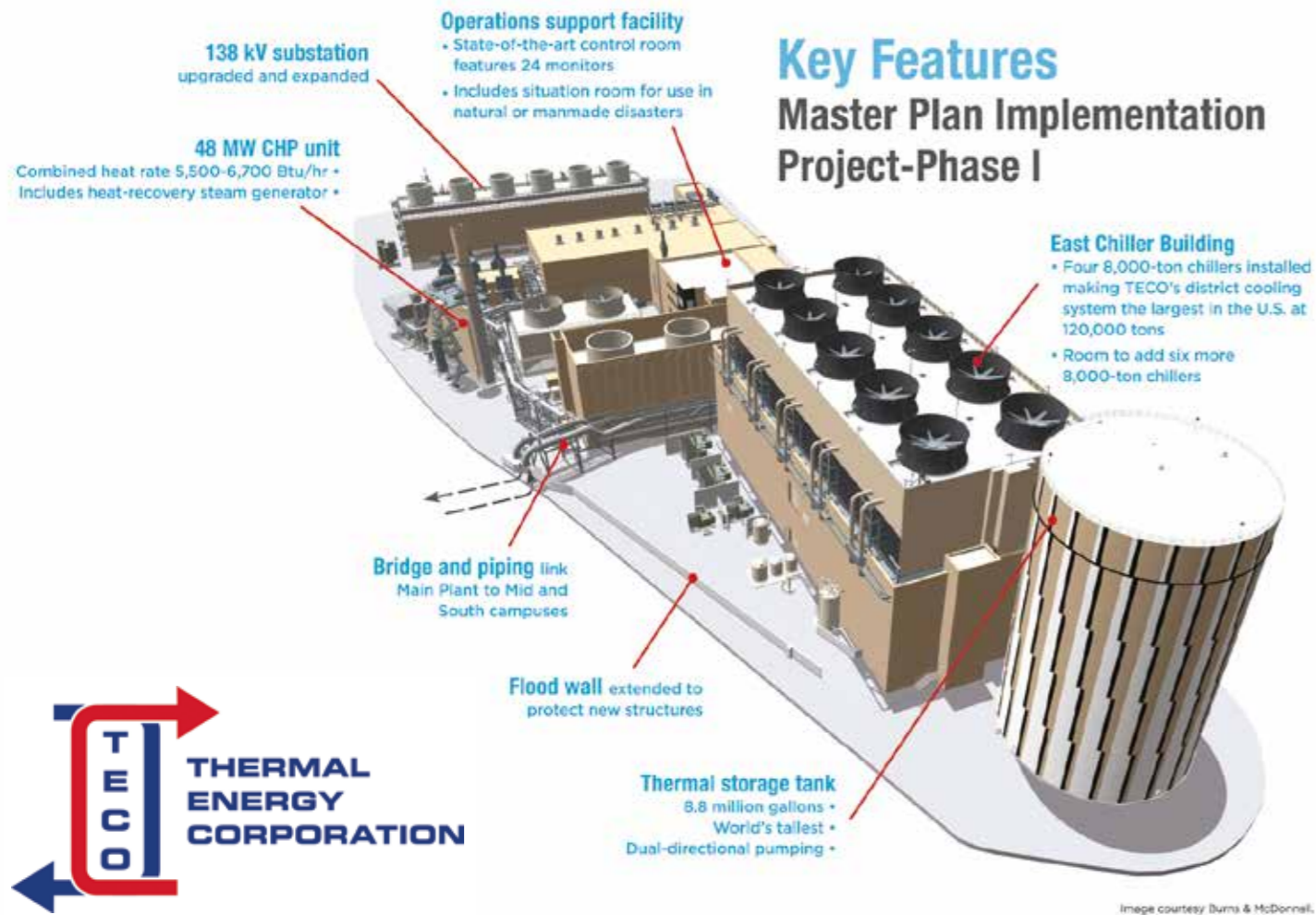
TECO's expansion project had a value of almost \$380 million. "We're normally an \$80 million business," says Mr. Swinson. "We undertook a project that was four times our size, which meant it was impor-▶



TECO'S SYSTEM EXPANSION REQUIRED EXTENSIVE EXCAVATION TO MAKE ROOM FOR 42-INCH SUPPLY AND RETURN PIPES IN 2010. COURTESY THERMAL ENERGY CORPORATION.



AS PART OF ITS SYSTEM EXPANSION, TECO INSTALLED 42-INCH CHILLED-WATER SUPPLY AND RETURN PIPES IN 2010. COURTESY THERMAL ENERGY CORPORATION.



tant we had partners who appreciated our mission and would take it as seriously as we did. Burns & McDonnell did a great job at the design-build and start-up, and we worked very closely with GE on the CHP project. We also worked with Johnson Controls/York, Marley Cooling Towers, Tower Engineering for cooling towers, ChemTreat for water treatment services, and Toshiba for instrumentation and controls."

One expansion project challenge was keeping construction on track while keeping the existing plant running. "It's like doubling the size of your kitchen while you're still cooking in it," says Mr. Swinson. "Failure just wasn't an option for us. And it's an extraordinarily tight site. It's the equivalent of the deck on an aircraft carrier. We didn't have a place for trucks to park or a bunch of materials to be laid down and waiting, so

it meant we had to do a really good job of planning and preparing."

VITAL MISSION

With expansion construction well behind it, TECO's key to success is consistently operating at the highest level. "We continue to optimize operational excellence," says Mr. Swinson. "We try to be proactive in forecasting what's going to happen instead ▶



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THE UNIVERSITY OF TEXAS MD ANDERSON CANCER CENTER – A TECO CUSTOMER – HAS BEEN NAMED ONE OF THE TOP TWO U.S. HOSPITALS FOR CANCER CARE CENTERS IN U.S. NEWS & WORLD REPORT'S "BEST HOSPITALS" SURVEY EVERY YEAR SINCE THE SURVEY BEGAN IN 1990. PHOTOGRAPHER GETSHORTY23.



TEXAS MEDICAL CENTER INSTITUTIONS PERFORM 180,000 SURGERIES EVERY YEAR, WHICH EQUATES TO STARTING ONE SURGERY EVERY THREE MINUTES. COURTESY THERMAL ENERGY CORPORATION.



of waiting until it happens and reacting to it. We want to schedule maintenance; we don't want maintenance scheduling us."

Mr. Swinson attributes much of TECO's success to diligent employees who understand the gravity of their work. "We're the largest chilled-water district energy system in North America, and if our services go down, people's lives or research that's been decades in development can be lost. We have a great group of passionate people who really appreciate the importance of our mission, and they take it very seriously. They function every day knowing if they make

a mistake, it could be devastating, and so they're very thoughtful, they plan, and they stay focused."

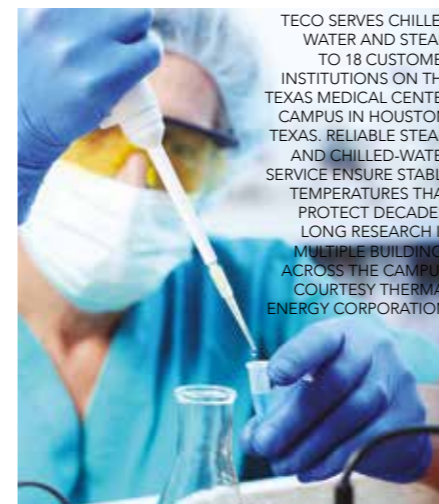
"Every day, the people at TECO are contributing to healing sick kids, curing cancer, and educating the next generation of healthcare professionals in the Texas Medical Center. I know the patients don't know who we are, and a lot of the physicians, the healthcare providers, the educators, the researchers – they don't know who we are. But we know, and we know that if we don't do what we do, they can't do what they do. That's all that counts." □

A TECO CUSTOMER, TEXAS CHILDREN'S HOSPITAL, IS A NOT-FOR-PROFIT ORGANIZATION WHOSE MISSION IS TO CREATE A HEALTHIER FUTURE FOR CHILDREN AND WOMEN BY LEADING IN PATIENT CARE, EDUCATION AND RESEARCH. IT CONSISTENTLY RANKS AMONG THE TOP CHILDREN'S HOSPITALS IN THE UNITED STATES. COURTESY TEXAS CHILDREN'S HOSPITAL.



TECO HAS APPROXIMATELY 90 EMPLOYEES, ALL OF WHOM RECEIVE TRAINING AND EDUCATIONAL OPPORTUNITIES TO ENSURE THEIR TECHNICAL SKILLS AND KNOWLEDGE BASE KEEP THEM UP-TO-DATE ON THE LATEST PROCESSES AND TECHNOLOGIES. COURTESY THERMAL ENERGY CORPORATION. PHOTOGRAPHER JULIAN BREWSTER.

MEMORIAL HERMANN-TEXAS MEDICAL CENTER IS A TECO CUSTOMER AND ONE OF THE NATION'S BUSIEST LEVEL I TRAUMA CENTERS. IT ALSO SERVES AS THE PRIMARY TEACHING HOSPITAL FOR THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT HOUSTON MEDICAL SCHOOL. COURTESY MEMORIAL HERMANN.



TECO SERVES CHILLED WATER AND STEAM TO 18 CUSTOMER INSTITUTIONS ON THE TEXAS MEDICAL CENTER CAMPUS IN HOUSTON, TEXAS. RELIABLE STEAM AND CHILLED-WATER SERVICE ENSURE STABLE TEMPERATURES THAT PROTECT DECADES-LONG RESEARCH IN MULTIPLE BUILDINGS ACROSS THE CAMPUS. COURTESY THERMAL ENERGY CORPORATION.