



The Texas Medical Center has 162 buildings on nearly 1,000 acres.  
*Photo courtesy of Thermal Energy Corporation*

# Combined Heat and Power System Enables 100% Reliability at Leading Medical Campus

## Recovery Act Funding Supports CHP

Thermal Energy Corporation (TECO) is demonstrating a high-efficiency combined heat and power (CHP) system at the Texas Medical Center in Houston, Texas. TECO received \$10 million in U.S. Department of Energy funding from the American Recovery and Reinvestment Act (ARRA) of 2009 for this demonstration. Private-sector cost share totaled \$62 million.

In order to meet rapidly growing thermal energy loads, TECO installed:

- A new high-efficiency natural gas-fired CHP system capable of producing 48 megawatts (MW) of on-site generation and 330,000 pounds of steam per hour;
- A 75,000 ton-hour (8.8 million gallon) thermal energy storage tank; and
- An additional 32,000 tons of chilled water capacity.

The CHP system can operate as a baseload system to serve 100% of the TECO plant peak electrical load and 100% of TECO customers' peak process and space heating loads.



Thermal Energy Corporation installed a natural-gas fired CHP system at the Texas Medical Center in 2010.

*Photo courtesy of Thermal Energy Corporation*

The CHP System at the Texas Medical Center is capable of producing 48 MW of on-site generation.

*Photo courtesy of Thermal Energy Corporation*



“When efficiency, economics, the environment, and reliability are considered, the most effective way to achieve them is with CHP.”<sup>1</sup>

– Steve Swinson, *TECO President and CEO*

## Benefits Fit the Bill

**Jobs:** This project created immediate engineering, manufacturing, and construction jobs, as well as long-term maintenance and servicing positions, supporting the U.S. economy.

**Efficiency, Emissions, Cost Savings:** The CHP system has increased overall fuel conversion efficiency, reduced carbon dioxide emissions, and saved millions of dollars.

**Reliability:** The system enables the entire TECO plant to continue operations and provide uninterrupted energy services to TECO customers in the event of a prolonged grid outage.

“Investments in energy efficiency like the combined heat and power plant at the Texas Medical Center are helping to create new jobs, expand U.S. manufacturing and strengthen 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 power reliability of one of the country’s top medical campuses.”<sup>2</sup>

– Dr. Steven Chu, *Secretary of Energy*

<sup>1</sup> “TECO Dedication Unveils 48 MW CHP.” Newsletter No. 14, U.S. Department of Energy Gulf Coast Clean Energy Application Center, Aug. 24, 2010.

<sup>2</sup> “Texas Medical Center Completes New Energy Efficiency Project.” EERE News, U.S. Department of Energy, May 17, 2011.

## CHP System in Action

On August 23, 2010, the demand on the Texas electrical grid—nearly 66,000 MW—was at an all-time high. Thanks to the 48 MW CHP system, TECO did not need a single watt of electricity from the grid.

The CHP system generated all the power needed to supply chilled water and steam to The University of Texas MD Anderson Cancer Center, Texas Children’s Hospital, and 16 other institutions at the Texas Medical Center.

TECO did not have to worry about blackouts, increased electricity prices, or failing to meet the medical center’s thermal energy needs.<sup>3</sup>

## Estimated Benefits

<b>Efficiency</b>	80% operating efficiency (increase from 42%)
<b>Emissions Reductions</b>	302 tons/yr. NO <sub>x</sub> 305,000 tons/yr. CO <sub>2</sub> 83,000 tons/yr. carbon  (Equivalent of taking 52,000 cars off the street or planting 83,000 acres of new forest annually)
<b>Cost Savings</b>	\$200 million over 15 years (including reduction in customer rates)
<b>Reliability</b>	Ability to serve 100% plant peak electric load

<sup>3</sup> “A Texas-Sized District Energy System: The Energy Behind What’s Next at the Texas Medical Center,” District Energy, Third Quarter 2011, International District Energy Association.

## Secretary Chu Champions CHP

On February 2, 2012, Dr. Steven Chu, Secretary of Energy, visited TECO, emphasizing that a strong infrastructure can create new jobs and promote local energy use.



Secretary of Energy Steven Chu tours the CHP plant and district energy system with Steve Swinson, President and CEO of TECO.

*Photo courtesy of “Energy Secretary Chu Visits TECO CHP Project, Highlights CHP in Senate Testimony,” The Baseline No. 34, U.S. Department of Energy Gulf Coast Clean Energy Application Center, Feb. 27, 2012.*

As stated by TECO President and CEO Steve Swinson: “Dr. Chu’s decision to tour TECO’s district energy system and combined heat and power plant validates how important these technologies are to our country’s energy future.”<sup>4</sup>

On February 16, 2012, Secretary Chu provided testimony to the Senate Energy and Natural Resources Committee.

During his testimony, Secretary Chu “affirmed the Department’s support for increased deployment of CHP and cited increased efficiency, reduced strain on the electrical grid and lower operating costs as key advantages of this proven technology.”<sup>5</sup>

<sup>4</sup> “Energy Secretary Chu Visits TECO CHP Project, Highlights CHP in Senate Testimony,” The Baseline No. 34, U.S. Department of Energy Gulf Coast Clean Energy Application Center, Feb. 27, 2012.

<sup>5</sup> “Energy Secretary Steven Chu, Department of Energy ‘Bullish’ on Combined Heat and Power,” PRWeb, Feb. 16, 2012.



The Texas Medical Center has the largest chilled water district energy system in the United States.

*Photo courtesy of Thermal Energy Corporation*

## Value of CHP in Critical Hospital Operations

TECO operates the largest chilled water district energy system in the United States at the Texas Medical Center. Hospitals are ideal candidates for the installation of CHP/district energy systems because hospitals operate 24/7 and always need a steady supply of electricity and hot water. Sustaining hospital operations, especially during emergency incidents, is always a high priority to ensure essential emergency response services can be provided.<sup>6</sup>

“District energy systems are clean energy infrastructure that are ‘built to last’. Today, hundreds of district energy systems operating in cities, campuses and communities across the US, have potential to add CHP, just like TECO did in 2010, and generate immediate energy, economic, and environmental benefits.”<sup>7</sup>

*– Rob Thornton, President and CEO  
of the International District Energy Association*

<sup>6</sup> “Hospitals,” *The Contribution of CHP to Infrastructure Resiliency in New York State*, New York State Energy Research and Development Authority, April 2009.

<sup>7</sup> “Energy Secretary Steven Chu, Department of Energy ‘Bullish’ on Combined Heat and Power,” PRWeb, Feb. 16, 2012.

<sup>8</sup> Texas Medical Center website.

## Quick Stats—Texas Medical Center

The Texas Medical Center—the largest medical center in the world—has:

- 52 member institutions
- 162 buildings on nearly 1,000 acres
- 6,900 hospital beds
- 400 bassinets
- 92,500 employees
- 7.1 million patient visits annually
- 16,000 international patient visits annually
- 350,000 surgeries annually
- 28,000 babies delivered annually<sup>8</sup>

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