
CampusEnergy2021
BRIDGE TO THE FUTURE
Feb. 16-18 | CONNECTING VIRTUALLY
WORKSHOPS | Thermal Distribution: March 2 | Microgrid: March 16

Thermal Energy Storage (TES) – Ten Years Later

Steve Swinson

Thermal Energy Corporation (TECO)

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INTERNATIONAL
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Thermal Energy Storage – 10 Years Later

- The Process
- Why TES
- Installation
- Experience
- Lessons Learned

Who is TECO

- District Energy System Serving the Texas Medical Center
  - Texas Medical Center
    - Largest Medical Center in world
    - 10,000,000 million patient encounters per year
    - 180,000 +annual surgeries
    - 750,000 ER visits per year
    - 9,200 total patient beds
    - 13,600 +total heart surgeries
    - 106,000 +total employees
    - 8th largest business district in the U.S.

Texas Medical Center

Who is TECO

- Not-For-Profit, exclusively serving not-for-profit and government
- 120,000 tons of chilled water capacity
- 300,000,000+ ton-hrs./year
- 900,000+ lbs/hr steam capacity
- 48 MW CHP
- 35 miles of distribution piping, 12” to 60”
- Serving 50 buildings, 23.7 million sq ft
- 85% of peak load is considered critical
  - Patient care and Medical Research

TECO – P. G. Bell, Jr, Energy Plant

TECO – South Main Energy Plant

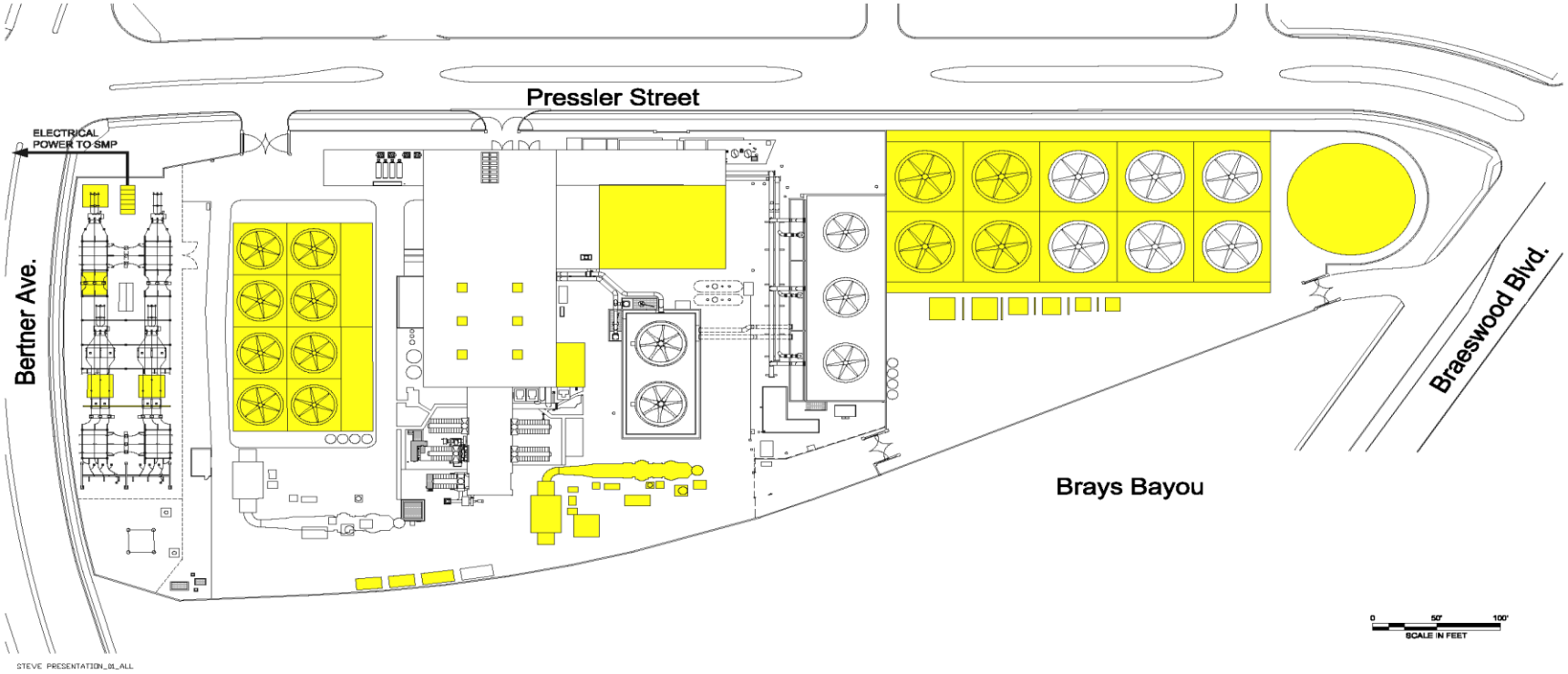
The Process

- 2006 to 2007 – Developed 30 Year Master Plan
  - Objectives
    - Further Improve Reliability
    - Maximize Energy Efficiency
    - New Capacity for TMC Growth
    - Continuing Operations
    - Maximize Use of Land for Expansion

Why TES

- Reliability
  - Less power requirements during peak periods
- Lower first cost for peaking capacity
- Land Benefit

Land Benefits



Why TES

- Reliability
  - Less power requirements during peak periods
- Lower first cost for peaking capacity
- Operational Benefits
- Expand Capacity converting to low temperature
- Land Benefit
- Emergency Water

Installation

- Design Build Contractor – Burns & McDonnell (BMcD)
  - Subcontractor – Chicago Bridge and Iron (CBI)
- Steel Tank, insulated
- 8,700,000 gallons
- 64,000 ton-hours
- Discharge Rate – 16,000 gpm
  - Designed to expand to 27,500 gpm
- 100 ft diameter, 150 ft tall
  - Tallest TES tank in the country

Installation

Experience

- Operational performance as planned
- Better than expected performance from the variable speed pumping
- Load response benefits
  - Power Consumption
  - Economic Benefit
- Levels chilled water generation load profile
- Tank inspection

Lessons Learned

- MAKE THE TES TANK BIGGER!
- Higher discharge capacity over a shorter period
- Let someone else select the aesthetic appearance!
- Be very specific about warranty expectations and life expectance of components
  - Siding and Insulation

TECO – Thermal Energy Storage Tank

?? QUESTIONS ??

Thank you!

Steve Swinson, P.E.