Energy Security on a Barrier Island

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Energy Master Planning for Resilient Military Installations
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Agenda

- UTMB Galveston circa 1890’s
- Hurricane Ike
- A Three Step Solution
- Hurricane Harvey
Galveston Island, circa 1890’s

UTMB Photos: Old Red/John Sealy
The Great Storm of 1900

UTMB Photos: Old Red/John Sealy
Water/Storm Surge –
Approximately 17 ft to 18 ft based on the information gathered to date. NOAA

Image courtesy: noaa.gov
Hurricane Ike, September 13, 2008

Image courtesy: noaa.gov
Hurricane Ike, September 13, 2008

Diagram showing the flooding levels during Hurricane Ike, with labels indicating the flood levels at 1st floor - 12.3', 2nd floor - 11.7', and 3rd floor - 13.1'. The central plant (M40) and west end chiller plant (M66) are highlighted, along with steam and chilled water systems.
Hurricane Ike, September 13, 2008
Impact of Ike

- Cost of stabilization: $14,000,000
- Unable to operate hospital: 90 Days
- Lost business revenue: $2,000,000/day
- Cost of evacuation
- Underground steam distribution system a complete loss
- Lost research materials
- Over 1 million sf of campus buildings damaged
- Estimated over 1 billion dollars in damages
A Three Step Solution
Step One  Go Away from Buried Steam Pipe

- Convert most buildings to heating hot water.
- Distribute steam overhead to research buildings.
Step Two  Elevate the Boilers and Chillers
Step Two  West Plant Flood Walls
Step Three  Produce On-Site Electricity via Combined Heat & Power (CHP)

Combined heat and power systems are approximately 50% more efficient than traditional systems.
Hurricane Harvey vs. UTMB Galveston

• Local utility lost two electrical feeders due to a flooded transformer vault, *no problem*
  • The East Plant CHP system operated trouble free in “Island Mode”
• Heavy rainfall caused minor street flooding, *no problem*
  • For the new overhead steam and underground heating hot water distribution systems “It was just another day at the office”.
• As a precaution, the gates in the new floodwall surrounding the older West Plant were secured.
Energy Security on a Barrier Island

QUESTIONS

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