Energy Security on a Barrier Island

Presented to
Energy Master Planning for Resilient Military Installations
December 6, 2017

Jerry A. Schuett, PE
Principal, Energy and Utilities
jschuett@aeieng.com
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
Hurricane Ike, September 13, 2008

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
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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.
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