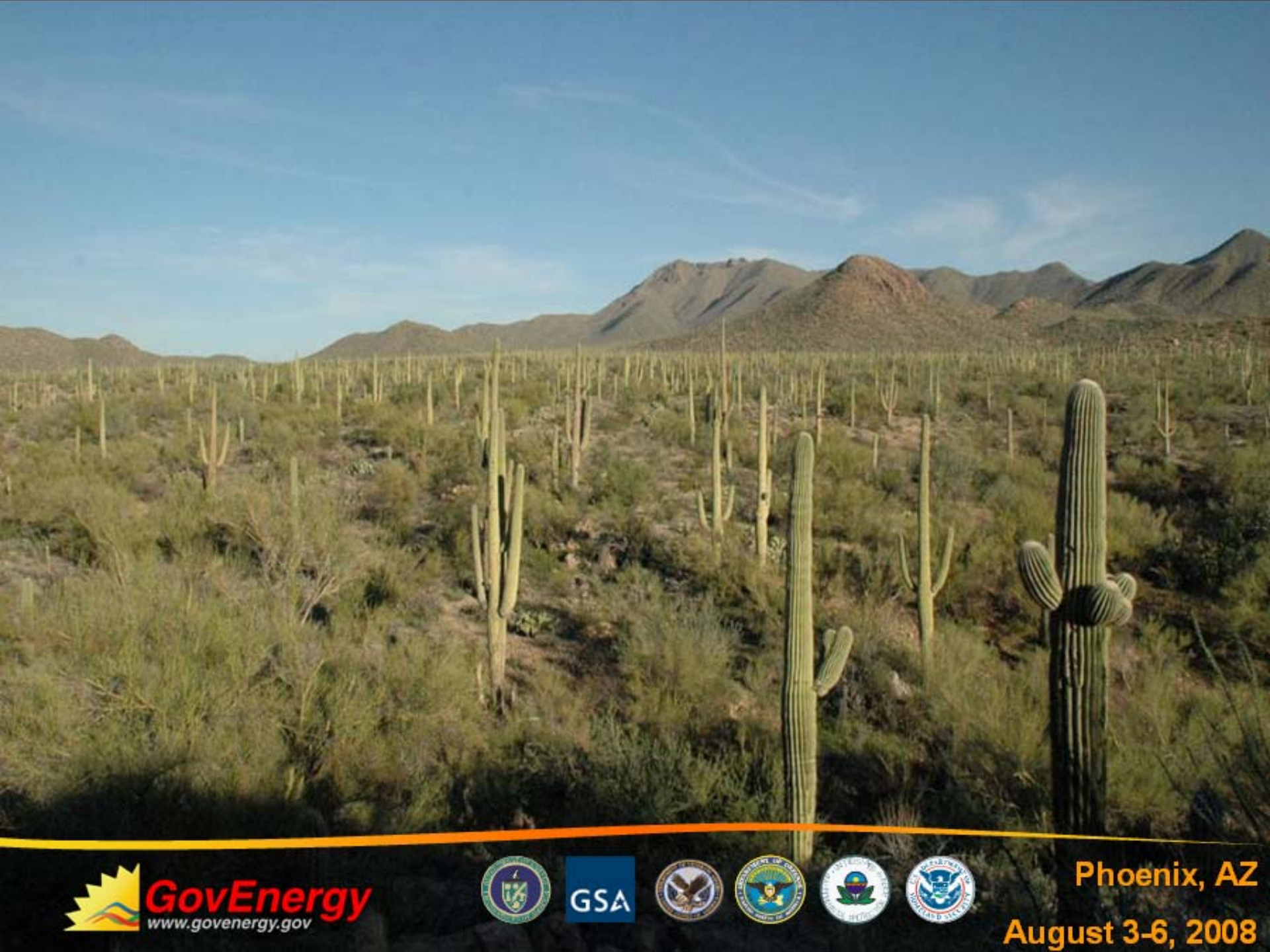
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GSA
Phoenix, AZ
August 3-6, 2008

Fort Detrick
Central or Cogeneration Utility Plant

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Fort Detrick

- 2005 Maryland and Senate Quality Award Honorable Mention
- In Top 5 of all Army Installations in 2005 Army Community of Excellence Competition

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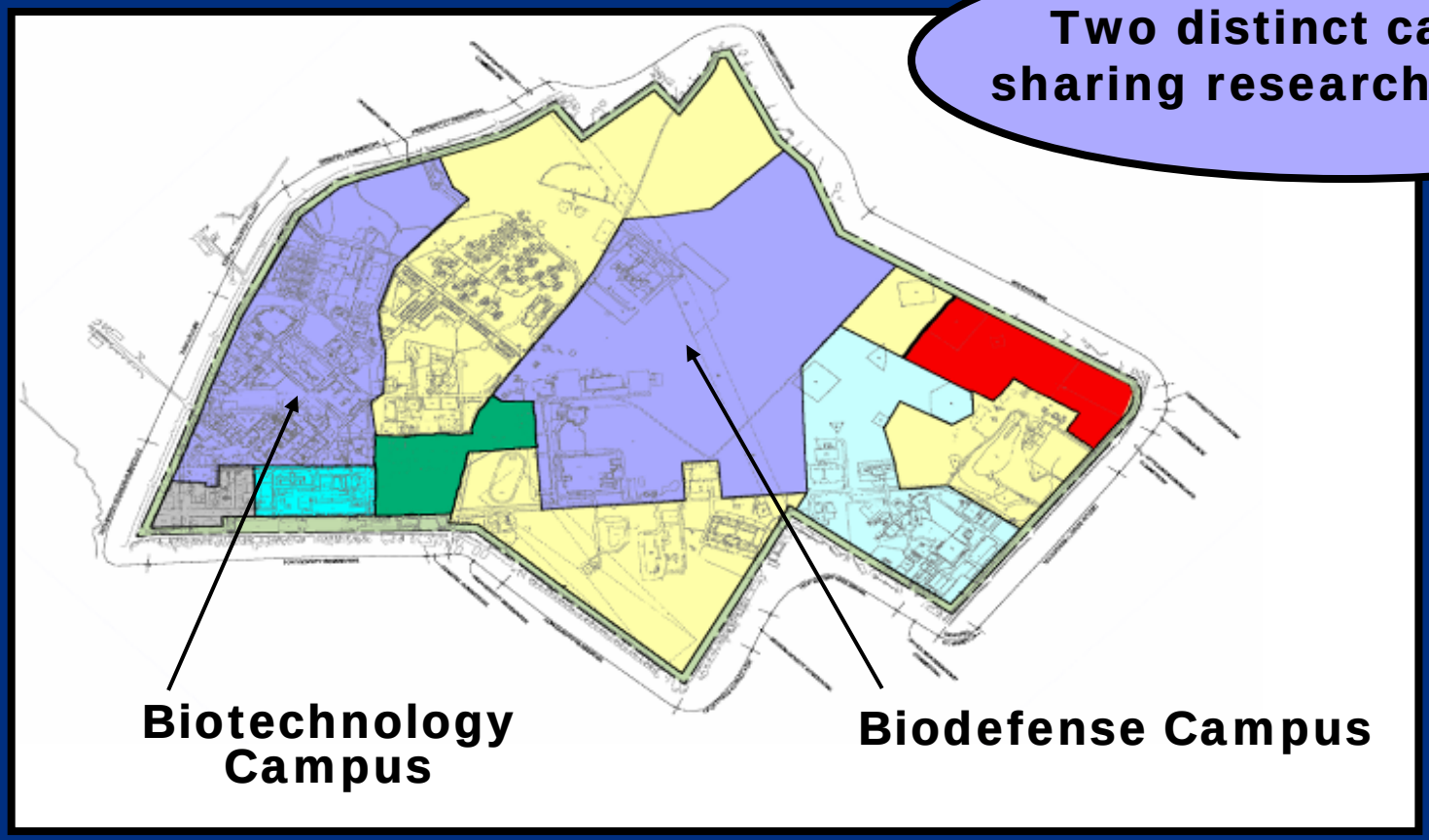
Fort Detrick Master Plan



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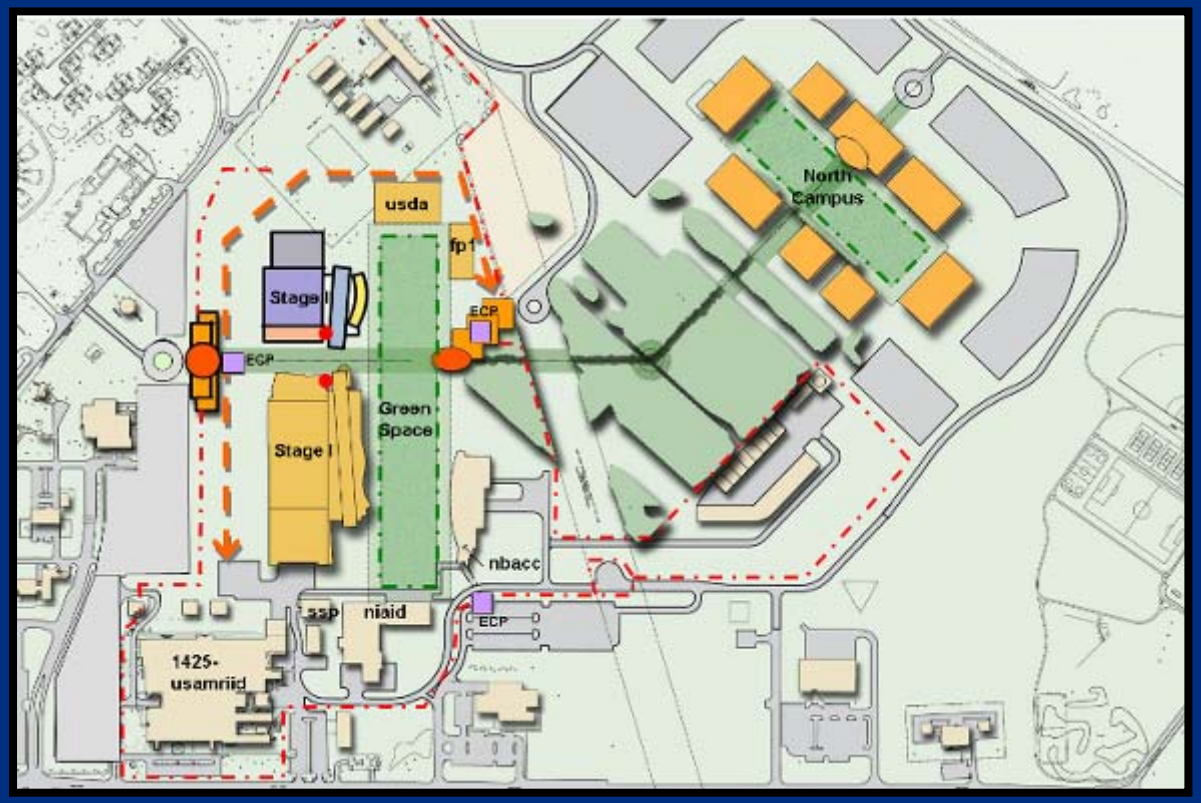
NIBC Master Plan (Full Build Out)



Proposed National Interagency Biodefense Campus (NIBC) Final Facility Buildout

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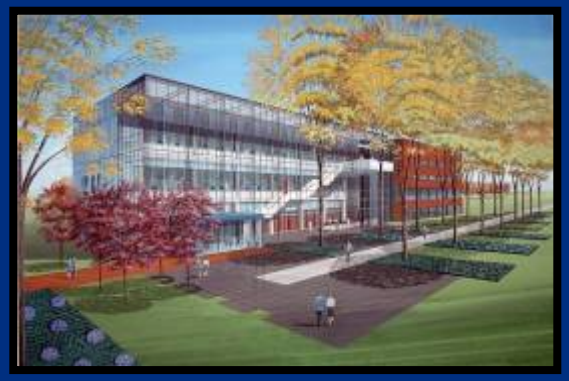
NIBC Facilities

Construction moving at a rapid pace!



NIAID IRF
95% Constructed / Est. Completion Fall 2008

NBACC
Completion Winter 2008 (est.)

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Present Campus Development

DHHS
National Institute Allergy and Infectious Diseases – Integrated Research Facility NIAID-IRF

DHS
National Biodefense Analysis and Countermeasures Center NBACC

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Army's Initial Project Requirements

- Co-generation utility plant for the new NIBC.
- Sale of energy to off-post users to generate revenue back to project.
- Sustainable and environmentally-sound solution, while providing utility services in a secure campus setting.
- Army would receive fair "consideration" in lieu of rent for the long-term use of the real property.

Solution: Army selected the team of Keenan Development and Chevron Energy Solutions out of a field of 11 participants.

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Enhanced-Use Lease Utility Plant Considerations

- Development of the project was requirements-driven
  - Reliability and redundancy to support unique utility requirements of world-class labs
  - Cost-effective expansion designed in
  - Capable of meeting tight construction timelines
- Project considerations
  - Environment
  - Public Utility Commission
  - Public perception

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CUP: Balanced Project Approach
(Fort Detrick)

Land and EUL Contracting
Coordination of Government Users
Procurement and Acquisition Coordination

Government Labs Load Requirement
Competitive Procurements
Unparalleled Capital Purchasing Power
Efficient Plant Operation

Existing Infrastructure
Steam System Electrical System
New Building Cooling Systems

CUP: Balanced Project Approach
(Commercial Partner)

Reasonable Rates
Competitive Procurements
Unparalleled Capital Purchasing Power
Efficient Plant Operation

Reliable
Availability Warranties
Smart Redundancy
Analytical Approach

Renewable
Pragmatic Approach:
Solar, Biomass, Micro Wind, Biofuels

Project Approach

- Two phase process:
  - Phase I: A fast-tracked CUP producing thermal energy (steam & chilled water) and conditioned, back-up power.
  - Phase II: An expanded CUP to provide energy to the second phase of the NIBC – the new US Army Medical Research Institute for Infectious Diseases (USAMRIID).

- What the labs needed was reliability and quality Cogeneration would be reconsidered when thermal load justified investment

- Cogeneration was not feasible due to:
  - Smaller thermal load than estimated. Without a substantial and steady thermal load, the high cost of natural gas and resulting commodity rates would not justify the capital investment.
  - Cogeneration required a year-long permitting process.
  - Schedule driven - development, design, and construction of the CUP needed to synch-up with the first NIBC labs.

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CUP Phase 1 Capabilities

Steam

- Five, dual-fuel, high-efficiency boilers, producing 41,000 lb/hour at 125 psig steam

Chilled Water

- Two, dual-compressor, 1,800-ton electric centrifugal chillers
- 2.5 million gallon, 27,000 ton-hours thermal energy storage tank, producing 6,000 equivalent tons of chilled water capacity.

Power Conditioning and Back-up Generation

- Five 1.67-MVA diesel uninterruptible power supply (UPS) units mechanically coupled to rotary flywheels and two 2.0-MVA diesel generators.

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CUP: Business Structure

- Construction cost: $103 million
- Designed/built in 18 months – April 1, 2008 in commercial operation
- Project executed through DoD's enhanced-use leasing authority (10 USC 2667)
  - 36-year outlease, with 14-year option
- Energy services provided through a FAR-based utility contract
  - 10 years with two renewable periods
- Financed through privately-offered revenue bonds
  - 25-year revenue bond issue

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Enhanced-Use Lease Utility Plant Lessons Learned

- Unique approach – (No good deed goes unpunished)
- Dedicated team – committed to the process
  - Diverse group (commander, facility engr, legal, contracting, real property, env office, senior management & COE) partnered a top notch energy firm
- Co-generation size dependant
- Generated cash flow – Expect delayed expectation
  - In-kind services
  - Sale of energy

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Central Utility Plant (CUP)

- State-of-the-art
- Clean, conditioned, un-interruptible power
- Lower environmental impact over traditional utility plants
- “...the most secure district plant in DOD inventory”
- Designed to meet technical requirements of one-of-a-kind, Congressionally-directed, national asset supporting homeland security and the warfighter

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Summary

- CUP designed to support $1 billion federal investment in highly-visible, world-class science campus
- Requirements-driven approach
  - Reliability
  - Efficiency
  - Load optimization
  - Cost-effective operations and expandability
  - Minimal expansion-related disruption to ongoing operations
- Leveraging load diversity while adding demand will optimize existing investment and reduce unit rates

Unique Development & Delivery Requirements

Requirement #1 – Schedule

CUP needs to “catch and pass” NIBC construction projects already underway.

- NIAID progress photo at time of CUP EPC start date – Aug ‘06
- Need secure ops in 18 months

Solution: Fast-track Design-Build-Operate (DBO) project delivery

- Intrinsic value of DBO – Availability “culture”
- Leveraged procurement early in design
- Simultaneous tasking

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Unique Development & Delivery Requirements

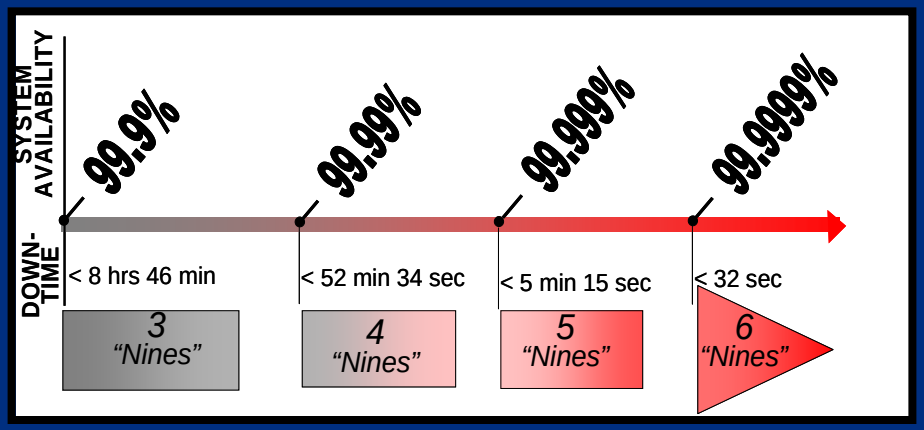
Requirement #2 – Energy Reliability & Security

CUP needs to serve:

- 3 utilities to 5 buildings w/18 individual, isolated, simultaneously active and secure points of connect.
- UFC 4-010-01 anti-terrorism/force protection compliance

Solution: Smart Redundancy

- Data-driven Probabilistic Risk Analysis (PRA)
- Proven expertise, equipment and operations
- Cutting-edge approaches and topologies
- Operating availability warranties up to 99.999% (5 nines) backed by liquidated damages



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Unique Development & Delivery Requirements

Requirement #3 – Competitive Cost, High Efficiency, Low Emissions

Utility unit rates should:

- Be competitive with district energy rates
- Minimize variable fuel charges by maximizing efficiencies
- Reduce Garrison thermal production carbon footprint

Solution: Maximize Energy Engineering

Thermal Energy Storage	Series Counterflow Chillers	Variable Primary CHW
LoNox Burners	Economizers	Daylight Harvesting
Solar Lighting	Iso-Parallel Redundancy	Heat Recovery

Unique Development & Delivery Requirements

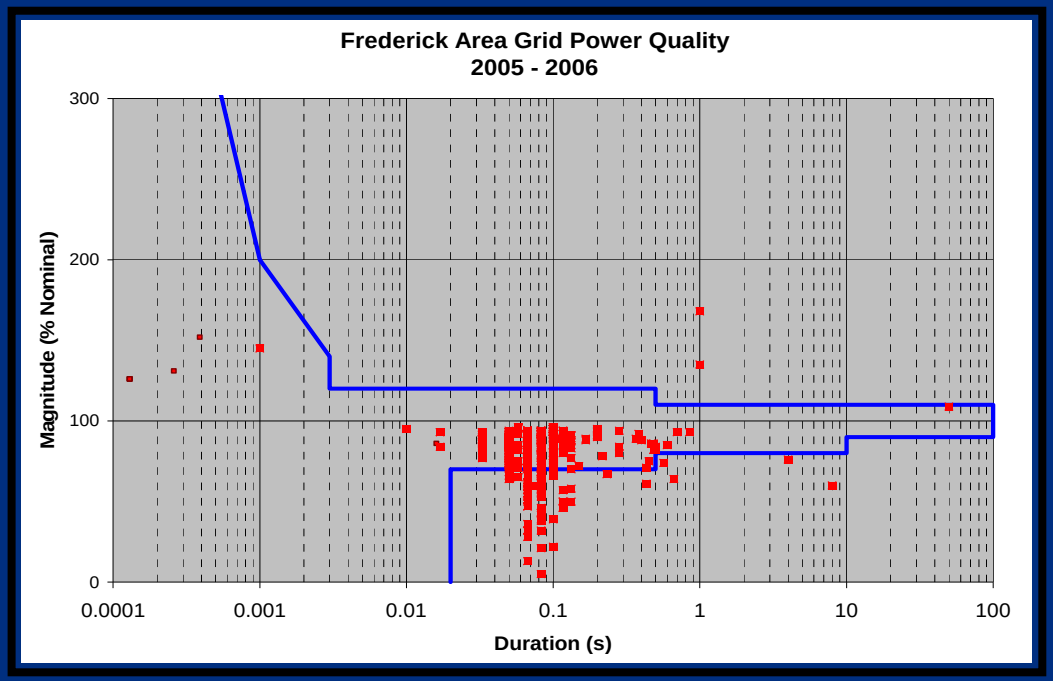
Requirement #4 – Provide High Quality & Stable Energy Flow

Energy feeds to labs insulated from:

- Grid events
- Inter-building events
- Intra-building events

Solution: Enhance Quality

- Electrical energy conditioned to ITIC (CBEMA)
- Isolated topologies (Iso-Parallel)
- Utilize CHW storage



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Unique Development & Delivery Requirements

Requirement #5 – Provide for Low-Cost, Low-Impact Utility Extension/Expansion

NIBC ***HIGHLY*** dynamic

- New labs baseload/ operational ramp
- New / exist. building load potential
- Sensitive operations w/ long cycle-times

Solution: Demand-driven generation delivered by robust distribution

- “Big pipes” and “low losses”
- Underground infrastructure supports Master Plan Growth
- Future loop capability

Fort Detrick Solution Details

Leveraged Procurement for Energy Projects

- Schedule Critical Path ALWAYS runs through equipment
  - 6- to 14-month lead time commonplace
- Dedicated & early equipment engineering focus
- Pre-purchase of equipment & distribution systems
- Manufacturing slot reserves (using massive buying power)

Procurement Results:

- No equipment lead-time >6 months

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Fort Detrick Solution Details

Probabilistic Risk Analysis for Mission Critical Systems

- Quantitative analysis necessary for reliability decision making
- Data-centric process avoids qualitative specification (“N+1”)
- Mandatory for strict operating warranties w/ non-performance penalties
- Requires specialized disciplines w/ archive of operational metrics

Detrick Reliability Results:

- Most secure district energy plant in DOD
- Only district energy plant providing comprehensive long-term availability warranties (up to 99.999%) backed by liquidated damages.
- Long term islanding capabilities

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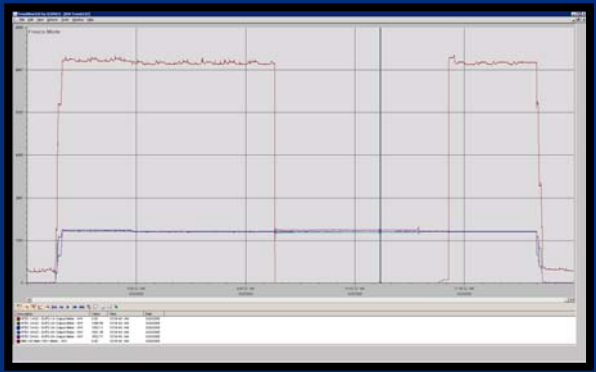
Fort Detrick Solution Details

“Rock Solid” Electrical Supply for Stable Operations

- Diesel UPS (rotary or “flywheel”)
  - Filters utility disturbances
  - Spikes/sags/transients
  - Seamless utility transition
- Iso-parallel electrical topology
  - Shared redundancy
  - Turns 2 into 5 feeders
  - Security & flexibility



Detrick Reliability Results:

- Only district energy plant providing ITIC (CBEMA) level power quality warranties on each and every feeder.
- Since commercial operations (April, 2008) 2,354 utility events logged including 2 major outages – ZERO impact to secure busses

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Fort Detrick Solution Details

“Rock Solid” Thermal Supply for Critical Environments

- Thermal Energy Storage
  - Immune to utility bumps
  - Seamless islanding
  - Peak smoothing
- Boiler Redundancies
  - N+N feedwater
  - Duel-fuel capability

Detrick Reliability Results:

- 100% availability

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Fort Detrick Solution Details

Modular Construction for Demand-Driven Growth

- Generation Growth Capability
  - DUPS 8.5 to 17.0 MW
  - DG 4 to 8 MW
  - CHW (w/ TES) 5,000 to 8,600 Tons
- Distribution Capability
  - STM 200 to 600 KPPH
    - CHW to 12.000 Tons

Detrick Growth Potential:

- ~ 2X without “brick & mortar”
- ~ 3X without interruptions

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Fort Detrick Solution Details

ATFP in Parallel w/ NIBC Aesthetics

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Fort Detrick Solutions Details

Questions?

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For More Information

Would you like to know more about this session?

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