Using Alternative Financing to Achieve Deep Energy Retrofits

Mark "Dusty" Wheeler, Honeywell
Phil Smith, Honeywell
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The Issue

- Budget Pressure / Capital Funding Constraints
- Repurposing of Federal Property Holdings
- Energy Efficiency / Sustainability Mandates
- Energy Security / Reliability Concerns
- Accountability for Energy Performance

The Challenge

Combining Renovation with ESPC

- Energy retrofits are less costly to implement during major building renovations, but renovations and energy upgrades are usually performed separately
- Combining them requires a method of integrating the performance of a general contractor (performing renovations) and an ESCO (installing energy conservation measures)
- Not easy to coordinate the activities of the two contractors…

Case Study – UESC at ICC-B

Keys to Success

- Coordination
- Partnership
- Innovation
- Reliability
- Flexibility
- Value

ICC-B UESC Development Team

Owner
- Office of Director of National Intelligence

Executive Agent
- Defense Intelligence Agency

Program Management Office (PMO)
- Markon Solutions

SATOCC

US Army Corps of Engineers
BALTIMORE DISTRICT

WT WHITING-TURNER

URS

UESC

US Army Corps of Engineers
U.S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE

WGL Energy
A WGL Entity

Honeywell

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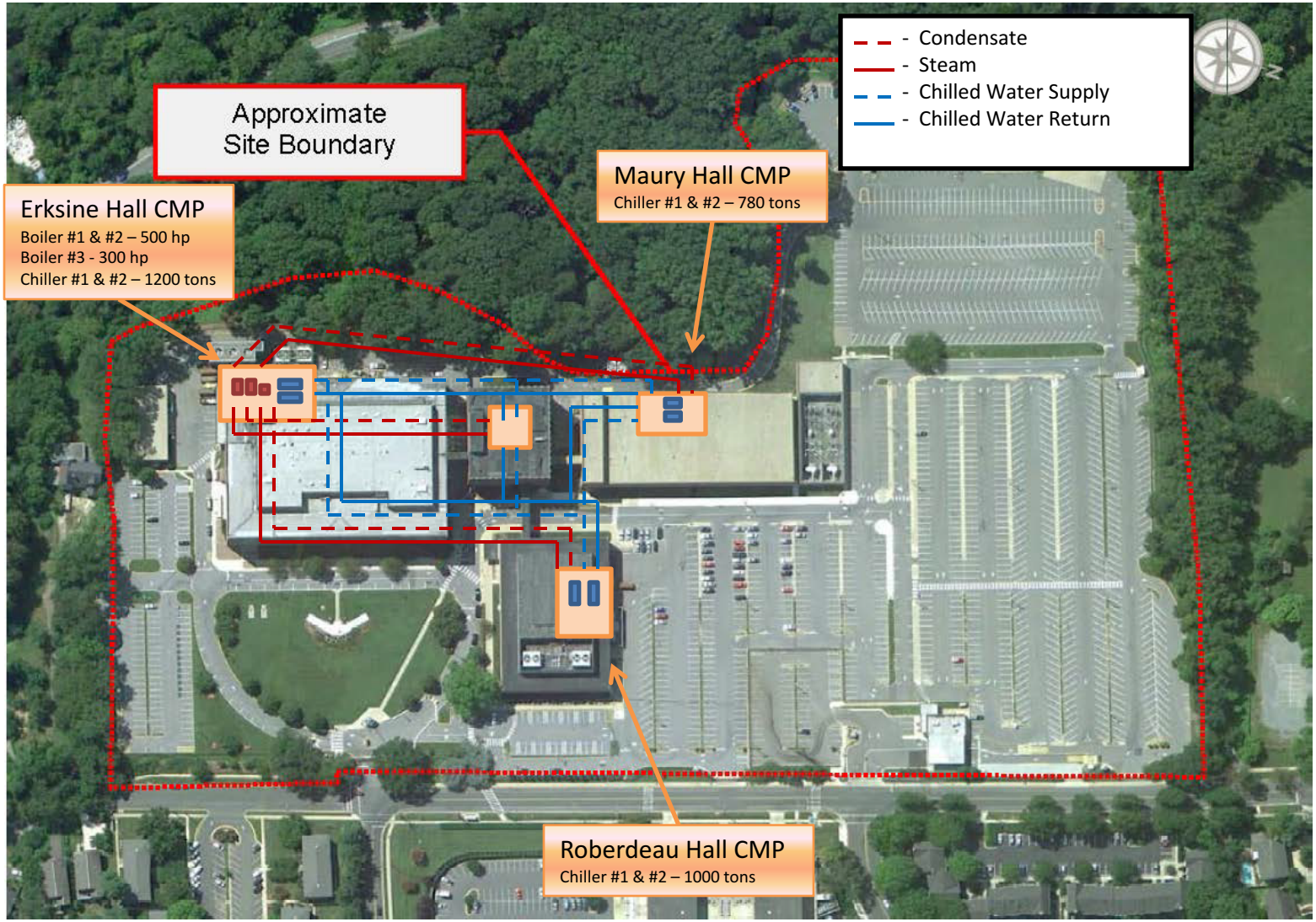
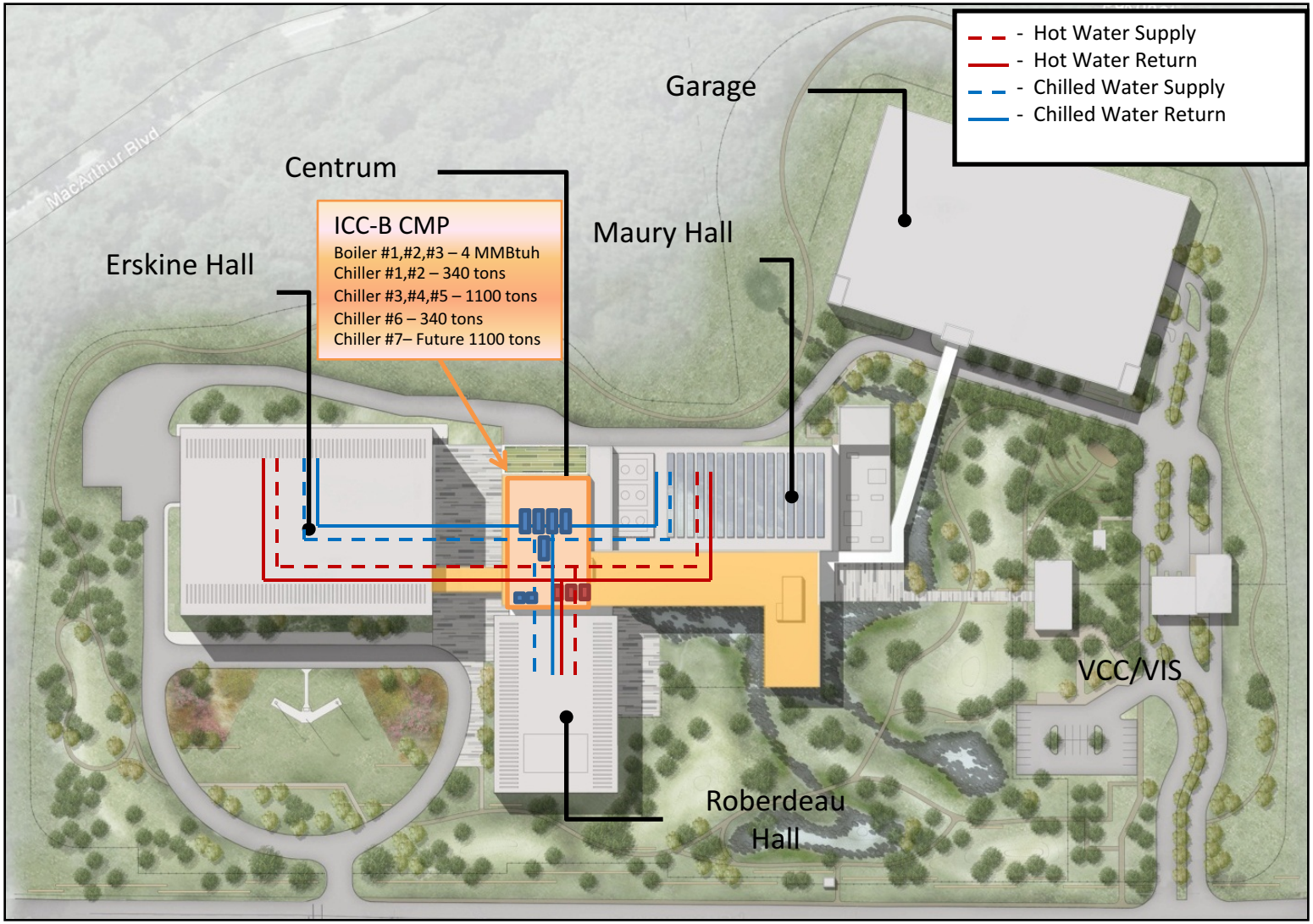
Former NGA Sumner Campus



ICC-B Campus Vision



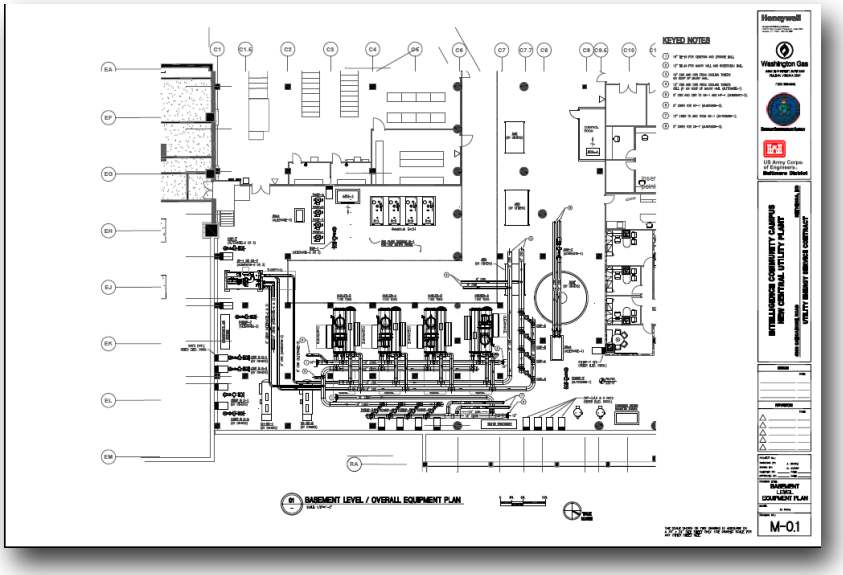
ICC-B ECM Descriptions

ECM #	ECM Description
ECM-1	New Central Utility Plant (CUP)
ECM-2	New AHUs and Fan Powered Terminal Devices with Control Strategies
ECM-3	Airside Energy Recovery
ECM-4	Upgrade Campus Wide Energy Management System (EMS)
ECM-5	New Gas Fired Water Heaters
ECM-7	Lighting Upgrades and Lighting Controls
ECM-8	New Backup Generators
ECM-11	Photovoltaic (PV) Systems
ECM-13	Solar Domestic Hot Water Generation
ECM-15	Operations and Maintenance (O&M)
ECM-18	Additional Back-Up Chiller for Maury Hall
ECM-19	Smart Power Strips

ICC-B UESC Program Elements

UESC Structure

- Phase I (Base): CUP Construction
- Phase II: Roberdeau Hall ECMs
- Phase III: Erskine Hall ECMs
- Phase IV: Maury Hall ECMs & PV

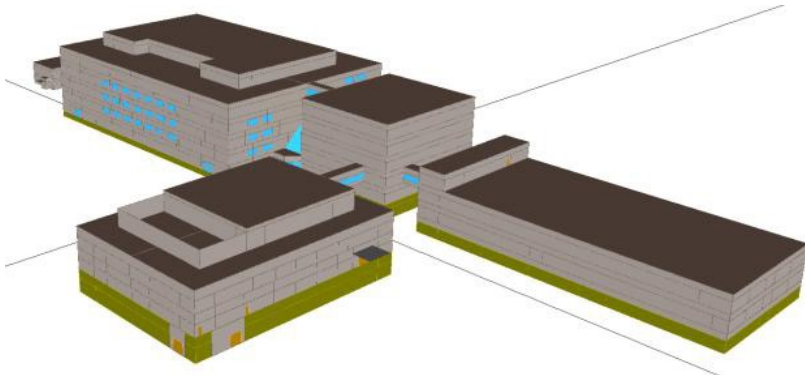


Savings Goals

- Reduce up front costs
- Energy efficiency
- Maintenance & Repair cost avoidance

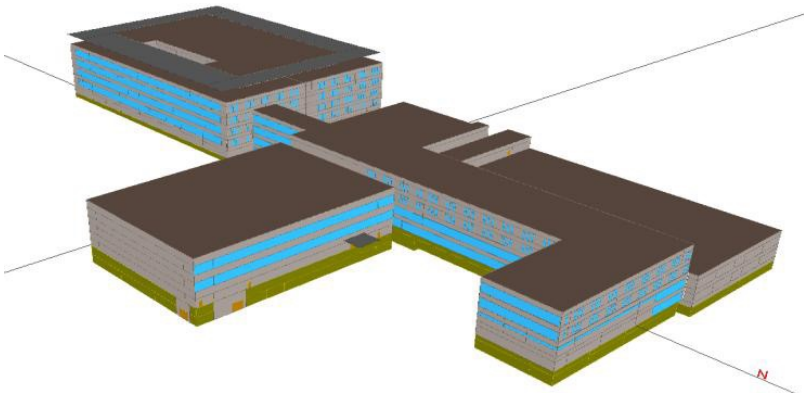
2008 Baseline Campus Model

- Model includes all original campus buildings
- Original distributed chilled water distribution (5,285tons)
- Original central steam system (1,200BHP)
- Mostly 24hr operating schedule
- High internal gains from analyst stations / computer rooms



Adjusted Baseline

- Added the Centrum Building
- Upgrades to building envelope thermal performance
- Expanded 3rd floor RH
- Significant increase in window –wall ratio
- Space use based on projected tenants
- Buildings served by existing chilled water / steam system



ECM Modeling Results

- 39% energy usage reduction from 2008 Baseline
- ~ $2,000,000/yr cost savings from 2008 Baseline
- 47% energy usage reduction from Adjusted Baseline
- ~ $1,100,000/yr cost savings from Adjusted Baseline

Energy-related (O&M) Savings

Baseline / Existing Conditions

- Multiple Plants (3 separate locations)
- Vintage Equipment; “Breakdown” Maintenance following BRAC decision
- High Pressure Steam Boilers (24/7 monitoring)
- Actual O&M Expenditures, FY2009 (NGA)

Savings Opportunities

- Consolidate Plant Equipment
- Capture Near-Term Repair/Replacement Cost Avoidance
- Condensing Boilers => Manpower Reductions
- Bottoms-up Performance-Based Costing

O&M Savings Value

- $2.4M for Central Plant (Year 1 value)
- $2.1M for Campus Buildings (Year 1 value)

Lessons Learned

Combined Financing contributed to the mission capabilities of the Campus

Earlier Calibration with all stakeholders

- Contractual Requirements
- Design Efforts
- Scope Gaps

Scheduling Constraints

Required Instant and Continuous Communication

Additional Examples

Humphreys Engineering Center

USACE Managed Site Adjacent to Ft Belvoir

Combination of Secure/Non-Secure Facilities

Aging Infrastructure

- Large Capital Improvement Needs

Detailed Feasibility Study 2015

- Focused on Cude/Cude Annex Renovation

Proof of Concept for Multi-phase DER Project using Combined Financing

HEC Financial Summary

#	ECM Title	Utility Savings (USD)	Operational Savings (USD)	Total Savings (USD)	Price (USD)	Simple Payback (yrs)
1.1	Install Condensing Boilers	$22,486	$0	$22,486	$833,756	37.1
2.1	Chiller Plant Optimization	$57,182	$0	$57,182	$290,311	5.1
3.1	Programmable Thermostats	$3,290	$0	$3,290	$3,420	1.0
3.2	BAS Upgrade	$72,322	$110,210	$182,532	$1,172,369	6.4
4.1	AHU Replacement	$79,490	$0	$79,490	$4,479,996	56.4
12.1	WaterConservation: Lowflow Toilets, Sinks	$11,752	$0	$11,752	$114,238	9.7
12.3	NonChem Water Treatment	$14,444	$0	$14,444	$169,410	11.7
	Cost of Feasibility Study				$340,149	
	Project Totals	$260,965	$110,210	$371,175	$7,403,649	19.9

Required $1.2M Capital Contribution => 50% Energy Savings

Conclusions

- Energy Performance Contracting (EPC) represents a viable means for enhancing energy performance in Federal new construction and/or major renovations
- EPC can be used to provide funding for Deep Energy Retrofits that might otherwise be unaffordable
- Blending of EPC and appropriated funding is challenging on many levels – needs buy-in from all stakeholders
- Specific methodology can be adapted during execution to meet evolving program requirements
- Early consideration of blending EPC with appropriations in facilities acquisition strategy development is recommended

Questions?

Phillip L. Smith P.E.
Honeywell Building Solutions

phil.smith2@honeywell.com

Phone: 770-632-0672
Cell: 770-633-6171

Dusty Wheeler P.E.
Honeywell Building Solutions

dusty.wheeler@honeywell.com

Phone: 703-789-3265
eFax: 703-842-8364