



Deep Energy Retrofit of Buildings Technical and Business Strategies

Army Policies for Energy Efficiency in Existing Buildings

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Sustainable Design and Development



- For all upgrades and new construction
- Energy security as a mission objective.
- Requirement to achieve highest energy efficiency
 - lifecycle cost effective within budget
- Adds Energy Use Intensity (EUI) targets (similar to ASHRAE 100)
 - separate EUI tables for new/post-2008 & existing (pre-2008) facilities.
- Post-occupancy monitoring requirements.
- Goal of increasing the resiliency of facilities and installations.



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Fort Knox Historic DER



- Constructed July 1934; Cost \$187,962; 66,577 sqft
 - ✓ fun fact - pink batten insulation patented in 1938
 - ✓ fun fact - A/C was added to some parts in 1958 for \$2,264
- Building had double masonry walls and concrete floors and ceilings
- Basement with huge coal fired boiler and large coal chute into an interior storage space in the basement



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West Point Barracks Upgrade



Energy Model Results by End Use:

End Use	Proposed Case		Baseline Bldg	
	Energy MBtu/yr	Peak kBtu/h	Energy MBtu/yr	Peak kBtu/h
Interior Lights	625	53.7	852	73.2
Exterior Lights	12	0.9	31	2.4
Receptacle Loads	1,721	147.9	1,721	147.9
Heating	4,425	992.0	9,725	3186.0
Cooling	890	133.5	225	37.2
Pumps/Aux	76	7.1	20	2.0
Fans	2,047	68.5	2,722	91.1
Service Hot Water	1,216	239.0	2,750	540.0
Total Consumption	11,011		18,046	

EPACT Improvements 43%

Sustainable Strategies:

- Sustainable Design/LEED
- Energy Efficient Design
- High Indoor Environmental Quality
- Design of Scale





Closing Remarks



- Army will continue the path to do more deep energy retrofit sustainable designed projects.
- We have to be more creative and take advantage of proven technology systems.
- To achieve greater energy savings we want to do a pilot project in the not too distant future combining an ESPC and SRM project, to try to obtain even greater savings.