Deep Energy Retrofit of Buildings
Technical and Business Strategies

Army Policies for Energy Efficiency in Existing Buildings

Honorable Katherine Hammack
Assistant Secretary of the Army
Installations, Energy and Environment
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.
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
West Point Barracks Upgrade

Energy Model Results by End Use:

<table>
<thead>
<tr>
<th>End Use</th>
<th>Proposed Case</th>
<th>Baseline Bldg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Energy MBtu/yr</td>
<td>Energy MBtu/yr</td>
</tr>
<tr>
<td>Interior Lights</td>
<td>625</td>
<td>852</td>
</tr>
<tr>
<td>Exterior Lights</td>
<td>12</td>
<td>31</td>
</tr>
<tr>
<td>Receptacle Loads</td>
<td>1,721</td>
<td>1,721</td>
</tr>
<tr>
<td>Heating</td>
<td>4,425</td>
<td>9,725</td>
</tr>
<tr>
<td>Cooling</td>
<td>890</td>
<td>225</td>
</tr>
<tr>
<td>Pumps/Aux</td>
<td>76</td>
<td>20</td>
</tr>
<tr>
<td>Fans</td>
<td>2,047</td>
<td>2,722</td>
</tr>
<tr>
<td>Service Hot Water</td>
<td>1,216</td>
<td>2,750</td>
</tr>
<tr>
<td><strong>Total Consumption</strong></td>
<td><strong>11,011</strong></td>
<td><strong>18,046</strong></td>
</tr>
</tbody>
</table>

EPACT Improvements 43%

Sustainable Strategies:
- Sustainable Design/LEED
- Energy Efficient Design
- High Indoor Environmental Quality
- Design of Scale
• 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.