

Energy Performance Benchmarking for Army Installations

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Purpose

- **Update on Federal benchmarking requirements**
- **Review of how others are using benchmarking**
- **Explain Army tool that assesses installation energy performance**
- **Present installation performance scores**
- **Discuss “where to” from here**

Benchmarking (Federal): Required at "*Covered Facilities*"

- Agencies must ID "***Covered Facilities***" - Buildings/plants that comprise 75% of agency building energy use
- DOD "***Covered Facilities***" are installations
- At "***Covered Facilities***"
 - Must conduct audits (100% every four years)
 - Must benchmark energy performance of ***buildings***

Per Energy Independence & Security Act (EISA) 2007



Benchmarking: ASHRAE



- **Expected 2009: ASHRAE “Performance Measurement Protocols Guide” (energy, water, IEQ)**
- **Three energy performance assessment levels, basic (required) to advanced**
- **Basic level uses annual energy use benchmarking**
- **Allows use of special-purpose benchmarking tools**

Benchmarking: State/Local Gov't

- **State of California (coming)**
 - Used to qualify for photovoltaic incentives (building must be high performance)
 - Performance indicator required for commercial building at time of sale
- **State of New York (in use)**
 - Used to qualify for multi-family building energy improvement cash incentives




Benchmarking: Army MEDCOM

- **Using Energy Star Portfolio Manager* to collect, warehouse, and track energy use data and performance benchmark**
- **Performed at “*building*” level with focus on larger buildings where most practical**

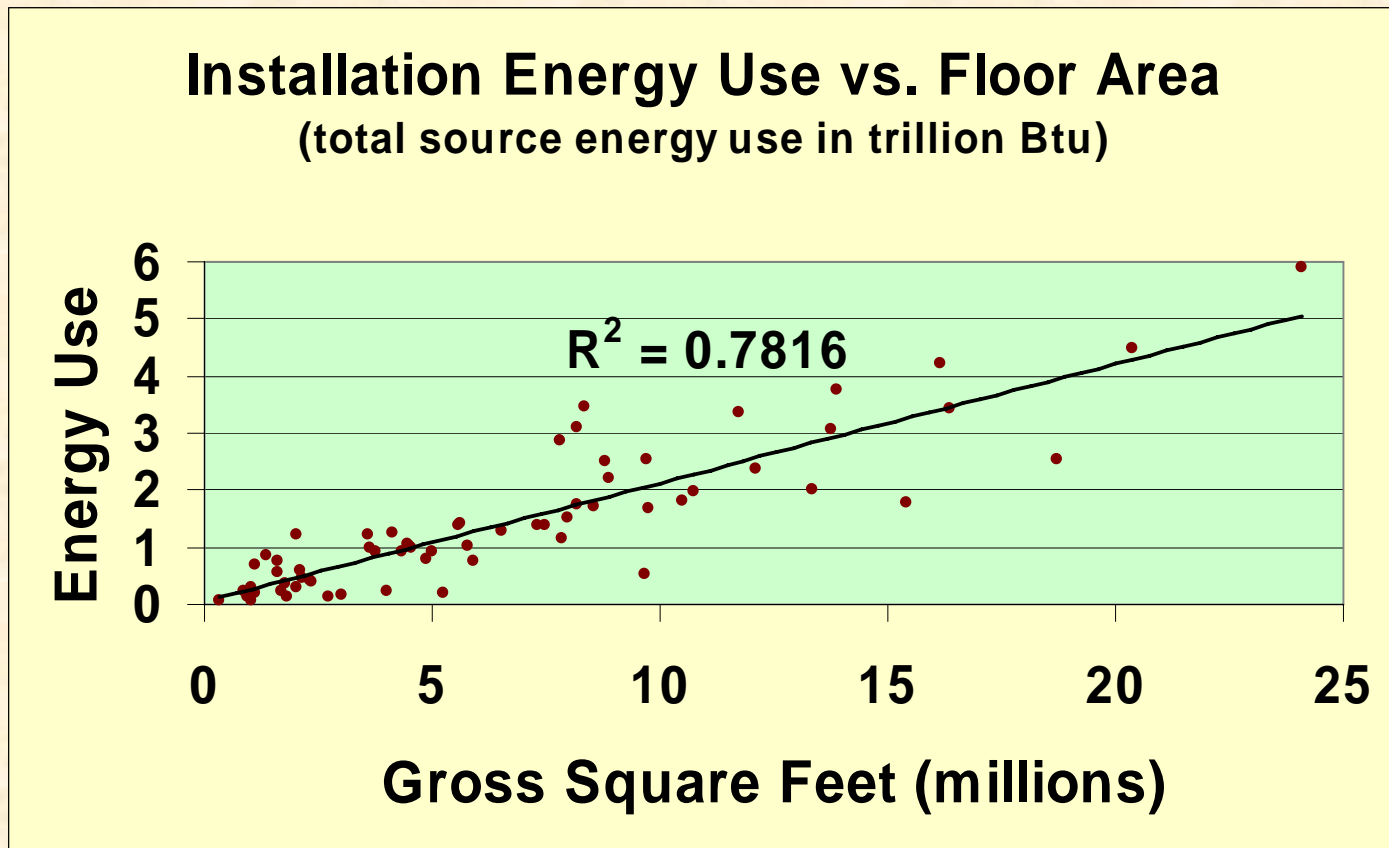
**Available at:*

http://www.energystar.gov/index.cfm?c=business.bus_index

Army Installation Benchmarking Tool

US Army Installation Energy Use Benchmarking Tool-1_3_08 Rev1_Unlocked formulas.xls									
U.S. Army Installation Energy Use Benchmarking Tool							  		
<p>This tool rates the energy performance of a user-defined installation relative to Army installations nationwide. ¹ It goes beyond simple, less accurate rating methods by normalizing for the differing mix of building types from installation to installation (a key driver of installation energy use) and for weather. A score of 75 equals performance at the top 25th percentile of installations. A 50 denotes mid-point performance. Scores below 25 suggest poor performance and may offer excellent energy and cost reduction opportunities. To use, you will need to calculate annual energy consumptions by fuel type at your installation. Type entries in white cells below to score your installation. Click underlined headings for help.</p>									
Installation Description							Weather Data at Your Site		
Installation: <input type="text" value="Fort Belvoir"/> <small>"optional entry"</small>							Typical		Actual
5-digit Zip Code: <input type="text" value="22301"/> <input type="button" value="Not Sure?"/>							Annual HDD:	4047	3984
Mapping Location: Alexandria, VA							Annual CDD:	1549	1583
<p><small>IMPORTANT: Actual annual weather data should correspond to the same time period as the annual consumptions reported below. If no entries are made, a less accurate score will be provided based on "typical" weather data shown.</small></p>									
<u>Input Installation Floor Areas by Facility Classifications (HELP?)</u>		<u>Operational & Training Facilities</u>	<u>Administrative Facilities</u>	<u>Housing & Community Facilities</u>	<u>Supply Facilities</u>	<u>Laboratory Facilities</u>	<u>Ammunition Storage Facilities</u>	<u>Production Facilities</u>	
Installation Total (ft ²)		1,345,700	2,489,187	1,760,102	795,357	1,192,694	6,403	0	
Annual Consumptions and Costs									
<u>Select Energy Units:</u>		Coal <input type="text" value="0"/> Tons	Electricity <input type="text" value="182,437"/> Mwh	Distillate Oil <input type="text" value="114,746,675"/> kBTU	Residual Oil <input type="text" value="0"/> BBLS	Other (light) Oil <input type="text" value="0"/> BBLS	Hydro <input type="text" value="0"/> kWh	Natural Gas <input type="text" value="373,309,635"/> kBTU	
Energy		0	182,437	114,746,675	0	0	0	373,309,635	
Cost (\$)								"optional entries"	
Calculated cost (\$/unit):									
<u>Select Energy Units:</u>		Photovoltaic <input type="text" value="0"/> kWh	Propane <input type="text" value="2,363,695"/> kBTU	Steam <input type="text" value="0"/> lbs	Hot Water <input type="text" value="0"/> lbs	Solar <input type="text" value="0"/> Mbtu	Wind <input type="text" value="0"/> kWh	Wood <input type="text" value="0"/> Tons	
Energy		0	2,363,695	0	0	0	0	0	
Cost (\$)								"optional entries"	
Calculated cost (\$/unit):									
Results									
		Fort Belvoir			Average				
<u>Score Against Peers</u>		52			50				
<u>Building Site Energy Use (MMBtu/year)</u>		1,113,077,486			1,132,314,161				
<u>Building Source Energy Use (MMBtu/year)</u>		2,515,322,382			2,558,793,246				
Site Energy Use Intensity (kBtu/ft ² -year)		126.5			128.7				
Source Energy Use Intensity (kBtu/ft ² -year)		285.9			290.8				
Energy Cost Intensity (\$/ft ² -year)									
Total Annual Energy Cost (\$/year)									

Tool Built Around Strong Energy Use to Size Relationship



What causes variation around line?

Drivers of Energy Use Variation

- **Real Property Facility Classes/ Subsets that drive energy use variations**
 - **Class 1 – Operational and training**
 - **Classes 4, 6, and 7 (Supply, Admin, and Housing)**
 - **Class 2 Subset – Production**
 - **Class 3 Subset – Laboratories**
 - **Class 4 Subset - Ammunition storage**

3 Steps to Benchmark

- **Quantify gross floor area of:**
 - Installation
 - Specific real property facility classes/subsets
- **Get bills--installation energy use by fuel type**
- **Enter information**

Optional: Collect climate (HDD/CDD) data if do not use defaults

Installation Scoring Results*

FORSCOM

FORSCOM	FORT HOOD	89
FORSCOM	FORT BRAGG	68
FORSCOM	FORT DRUM	59
FORSCOM	FORT RILEY	47
FORSCOM	FORT POLK	34
FORSCOM	FORT CARSON	32
FORSCOM	FORT LEWIS	22
FORSCOM	FORT IRWIN	13
FORSCOM	FORT CAMPBELL	10
FORSCOM	FORT STEWART	7

*Scores based on FY 2007 energy and descriptive data

MDW, MEDCOM, SDDC, SMDC

MDW	FORT MYER	96
MDW	FORT HAMILTON	84
MDW	FORT A P HILL	68
MDW	FORT BELVOIR	52
MDW	FORT GEORGE MEADE	34
MEDCOM	FORT SAM HOUSTON	84
MEDCOM	FORT DETRICK	5
MEDCOM	WALTER REED AMC	1
SDDC	MOT SUNNY POINT	66
SMDC	FORT GREELY	21

Note: Fort Myer/McNair data are combined to generate Fort Myer score.

USARC, USARPAC, USMA

USARC	DEVENS RFTA	99
USARC	PARKS CSTC	95
USARC	FORT BUCHANAN	93
USARC	FORT MCCOY	87
USARC	FORT HUNTER LIGGETT	85
USARC	FORT DIX	74
USARPAC	FORT WAINWRIGHT	99
USARPAC	FORT RICHARDSON	84
USARPAC	USAG HAWAII (SCHOFIELD BARRACKS)	69
USMA	WEST POINT MIL RESERVATION	55

TRADOC

TRADOC	FORT GORDON	70
TRADOC	FORT HUACHUCA	68
TRADOC	FORT MONROE	66
TRADOC	FORT LEE	54
TRADOC	FORT RUCKER	49
TRADOC	FORT EUSTIS	44
TRADOC	FORT SILL	43
TRADOC	FORT LEAVENWORTH	33
TRADOC	FORT BLISS	31
TRADOC	FORT KNOX	29
TRADOC	CARLISLE BARRACKS	28
TRADOC	FORT LEONARD WOOD	22
TRADOC	PRESIDIO OF MONTEREY	22
TRADOC	FORT JACKSON	21
TRADOC	FORT BENNING	15

AMC1

AMC	TOOELE ARMY DEPOT	95
AMC	SIERRA ARMY DEPOT	88
AMC	BLUE GRASS ARMY DEPOT	88
AMC	ROCK ISLAND ARSENAL	87
AMC	RADFORD AAP (GOCO)	84
AMC	HAWTHORNE AAP (GOCO)	83
AMC	WATERVLIET ARSENAL	73
AMC	FORT MONMOUTH	72
AMC	ABERDEEN PG	70
AMC	PICATINNY ARSENAL	58
AMC	MCALESTER AAP	48
AMC	REDSTONE ARSENAL	37

AMC2, ATEC

AMC	SOLDIER SYSTEMS CTR, NATICK	28
AMC	TOBYHANNA ARMY DEPOT	22
AMC	USAG DETROIT ARSENAL	18
AMC	RED RIVER DEPOT	14
AMC	LETTERKENNY ARMY DEPOT	10
AMC	LIMA JSMC	9
AMC	ADELPHI LABORATORY CTR	6
AMC	PINE BLUFF ARSENAL	5
AMC	DESERET CHEMICAL DEPOT	1
ATEC	WHITE SANDS MISSILE RANGE	84
ATEC	YUMA PROVING GROUND	71
ATEC	DUGWAY PROVING GROUND	50

Scoring Considerations

- **Army objective is to improve Army-wide**
- **Installation objective is to baseline and improve (everyone won't make 90)**
- **Target low scoring installations, they have the biggest opportunities**
- **Leverage lessons learned from high-scoring installations**
- **Look for unique situations that could bias score**
 - **LIMA JSMC has no equal (tank production)**
 - **Deseret Chemical Depot scoring currently includes incinerator energy use (needs exclusion)**

Benchmarking and Audit Considerations

- **Scores are “Level 1” energy audit -- can ID sites that don’t need Level 2 or 3**
- **Level 2 audits are supposed to be based on Level 1 prioritization**
- **More needs to be done to increase “smarts” in doing audits**
- **Benchmarking can help**

Where to from here?

- **Installations are invited to validate inputs, run tool, and communicate observations/results**
- **Use scores to:**
 - Establish baseline performance
 - Make case for action
 - Prioritize energy efficiency efforts
 - Set improvement targets
- **Consider scoring MACOMs (it's possible)**
- **Benchmark at building level when possible**
- **Additional tools to support Level 1 and guide Level 2 audits could be valuable**

Downloading Installation Tool

<http://eber.ed.ornl.gov/benchmark/tools.htm>



Oak Ridge National Laboratory

Buildings Technology Center

Tools for Better Benchmarking

U.S. Army Facilities

[Installation Benchmarking Tool \(Download\)](#)

[Administrative Buildings Benchmarking Tool \(Download\)](#)

[Barracks Benchmarking Tool \(Download\)](#)

Thank You!

QUESTIONS?

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