

Military Energy Efficiency How to Speak “Building”

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Outliers

- Malcom Gladwell- Social Researcher- *Tipping Point*. What makes someone really good at their profession?
 1. Strong interest-Passionate about it
 2. Minimum level of skills
 3. 10,000 hours

Goals

- Provide useful “Tools” to be used at your base, including:
- How to identify waste?
- Energy Doctor looking at a patient. Buildings tell you what they need. Learn to speak “Building”
- Unusual energy usage
 - High heating consumption in the summer
 - high cooling/electrical use in the winter.
- Load shapes-What should they look like?
- Appropriate energy usage for the building size
- Low cost/no cost energy reduction tips

Energy is a “Currency”

- Think of buildings as “living system” and not a collection of individual parts.
- Energy in many forms can be converted from something that is a waste to something you can use elsewhere in the system.
- Use energy “currency” from one part for another such as heat recovery for domestic hot water and building re-heat.
- Energy waste = holes in your pocket

How much savings are possible?

- Approximately 50% of energy purchased by an installation is wasted.
 - Low delta Ts
 - Re-heat too hot
 - Chilled water too cold
 - Domestic Hot water too hot
 - Simultaneous heating and cooling
 - 3-way Re-heat and Pre-heat valves leak by
 - No evening and weekend setbacks
 - VFDs non-existent or in “hand”

How to locate potential savings or where to prospect

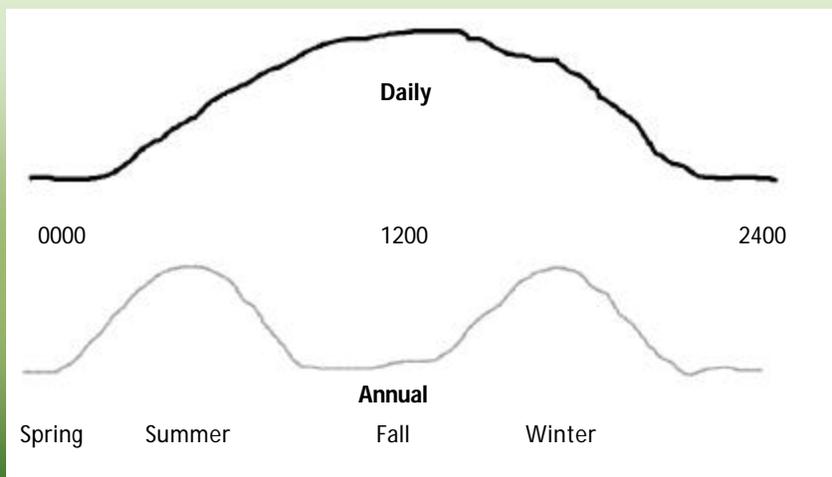
- Prioritize buildings
 - Top 20 largest users regardless of size or use
 - Unusual load shapes
 - Galleys- Cafeteria
 - Gym-Recreation with pool. Esp. heated outdoor
 - Cooling towers on in winter
 - Lots of windows open in winter
 - High usage for type of building-BTUs not \$\$s

Energy Use Index from EIA

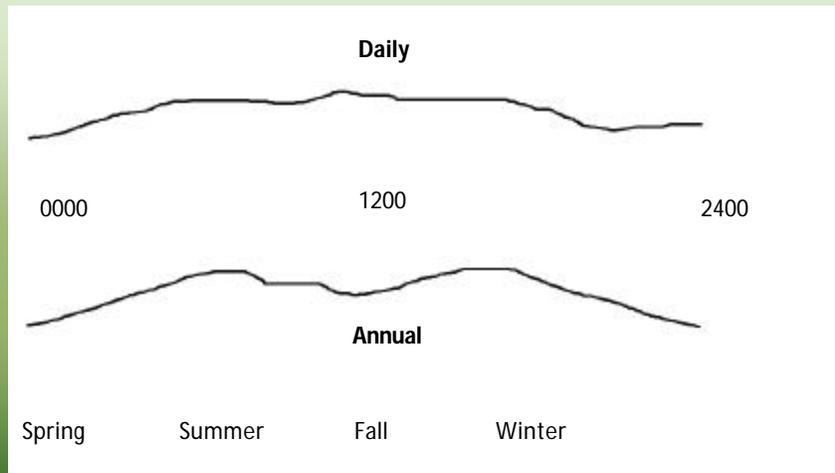
Table C12. Consumption and Gross Energy Intensity by Year Constructed for Sum of Major Fuels for Non-Mall Buildings, 2003

	Sum of Major Fuel Consumption (trillion Btu)			Total Floor space of Buildings (million square feet)			Energy Intensity for Sum of Major Fuels (thousand Btu/square foot)		
	1959 or Before	1960 to 1989	1990 to 2003	1959 or Before	1960 to 1989	1990 to 2003	1959 or Before	1960 to 1989	1990 to 2003
All Buildings*	1,488	2,794	1,539	17,685	29,205	17,893	84.1	95.7	86.0
Principal Building Activity									
Education	248	385	187	3,191	4,359	2,324	77.6	88.4	80.6
Food Sales	Q	116	Q	277	587	391	Q	197.0	Q
Food Service	89	152	187	613	524	517	144.4	290.1	361.2
Health Care	130	361	103	730	1,671	762	177.7	215.8	135.7
Inpatient	Q	311	Q	456	1,218	231	Q	255.3	Q
Outpatient	Q	50	45	273	453	531	Q	109.6	84.4
Lodging	109	286	114	1,236	2,564	1,296	Q	111.7	88.1
Retail (Other Than Mall)	76	115	128	1,026	1,804	1,487	73.9	63.5	86.4
Office	267	641	226	2,852	6,792	2,563	93.6	94.4	88.0
Public Assembly	90	156	124	1,455	1,450	1,035	62.0	107.6	119.7
Public Order and Safety	Q	39	Q	Q	385	453	Q	101.3	Q
Religious Worship	71	53	39	1,522	1,328	904	46.6	39.9	43.3
Service	66	168	78	1,057	1,954	1,040	62.8	85.9	74.8
Warehouse and Storage	166	156	134	2,029	4,014	4,034	81.6	38.8	33.3

Normal Load shapes



Abnormal Load Shapes



Domestic Hot water heater from building Chiller



Measure Usage first

Domestic Hot water
Heater for a hanger.

Currently heated by
Steam.

Is it possible to reduce
Steam usage and heat
This with another heat
Source?



Data Logger measures
inlet & outlet temps

Data logger set to 1
Minute intervals

How much energy (heat) do you need?



Where do you have an energy source?



Review

- Listen to buildings and they will tell you what they need. Learn to speak the language of "Buildings"
- **Approximately 50% of energy purchased is wasted.**
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