MDMS UPDATE

~ METER DATA MANAGEMENT SYSTEM ~

US Army Corps of Engineers®

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FROM THE PROGRAM MANAGER

Welcome to our August - September 2020 issue of the *Meter Data Management System Update (MDMS),* designed to keep you informed on the growth and latest developments of the Meter Data Management System and the Army Metering Program.

Training continues to go strong with 14-16 sessions being offered each month. Two new Advanced Analytics courses were created and offered twice in late September: 4th Level Benchmarking and Advanced Metrics for Systems. These sessions were recorded and will be added to the Video Library in MDMS soon. Brief abstracts of the two new courses are described below in the MDMS Training Update article.

This issue focuses on the two classes that were added in April of this year and have continued to be offered monthly with great attendance. The classes detailed on the following pages are: 3rd Level Benchmarking and Setting Up for Energy Projects. Both of these classes are very in-depth and targeted towards advanced users of MDMS. Both classes pull data from MDMS into Excel spreadsheets to produce scatter plots and to develop financial analysis tables for developing projects. These charts help Energy Managers and Resource Efficiency Managers benchmark buildings for low-cost/ no-cost energy savings and to identify systems and/or potential audit candidates for Energy Conservation Measurement (ECM) projects.

As always, our mission is to improve the MDMS experience for end users. Your input is valuable, and we welcome your feedback via the Army Meter Service Desk (AMSD) at: usarmy.coe-huntsville.cehnc.mbx.armymeterhelp@mail.mil

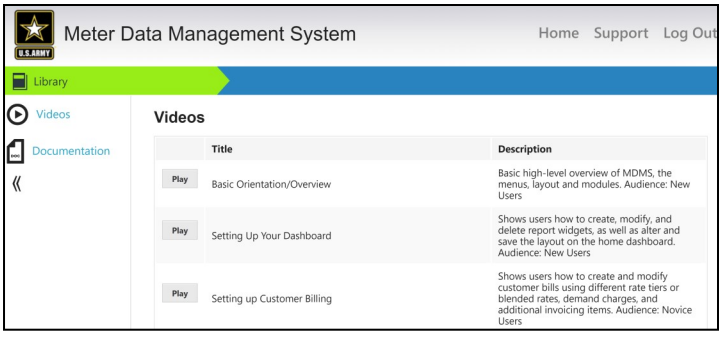
MDMS TRAINING UPDATE

The MDMS Outreach Team continues to provide many training opportunities and conducts 14-16 webinars on a monthly basis. Reporting through Q3 FY 2020, there were 111 sessions offered with 1322 in cumulative attendance and 20 special sessions conducted, including one-on-one sessions. Two new Advanced Analytics courses were created and offered twice in late September: 4th Level Benchmarking and Advanced Metrics for Systems.

The 4th Level Benchmarking class covers benchmarking the last system, Air Conditioners. We will use the scatter plots of the hourly intervals to generate the waterfall of values for each system during duty and non-duty hours. These will show the kWh usage of the air-conditioning systems, benchmark those systems and determine the efficiency of those systems.

The Advanced Metrics for Systems course combines a series of three metrics together into a stop-light chart. Each chart is tied to a category code for the 30 largest category codes in the Army. Then the charts are color coded for each of the three metrics to show where they fall compared to their peers. There is an if-then logic for each category to tell you if your meter is bad, where you stand against other buildings i.e. top 25% or bottom 25 %, etc.

The full list of courses, including their corresponding abstracts and training session recordings, can be found on the MDMS Library page under Videos. Users may watch the recorded training sessions by selecting the Play button to the left of the course of interest. We expect to have the two new courses added to the library in October.

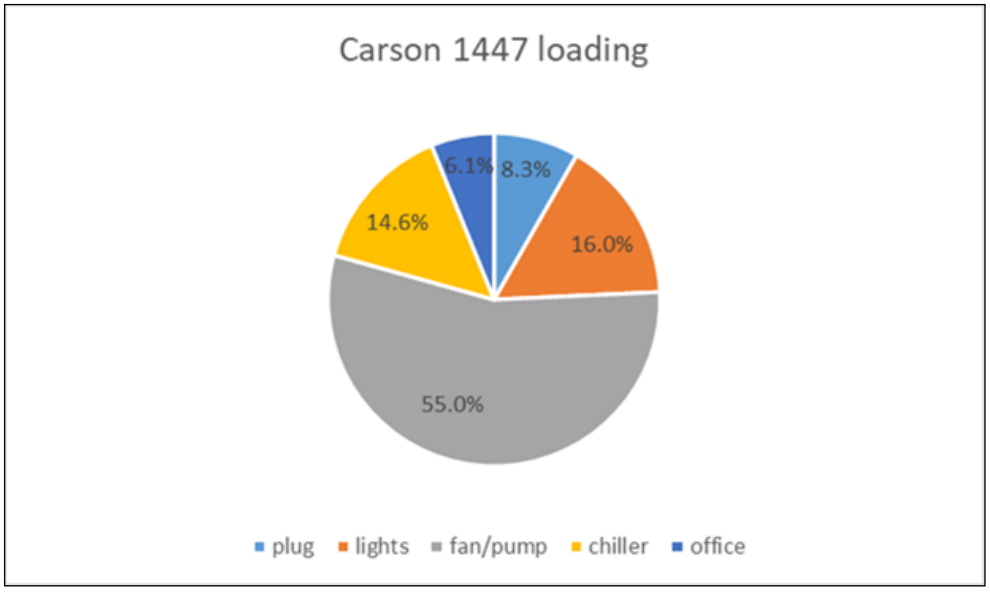


3RD LEVEL BENCHMARKING

The 3rd Level Benchmarking training class was first offered on 22 April 2020. Since its inception, this class has welcomed 45 attendees from 27 different sites. The importance of this class is that it builds on the 1st and 2nd Level classes to benchmark the usage on the next level of building systems, specifically lights, fans and pumps.

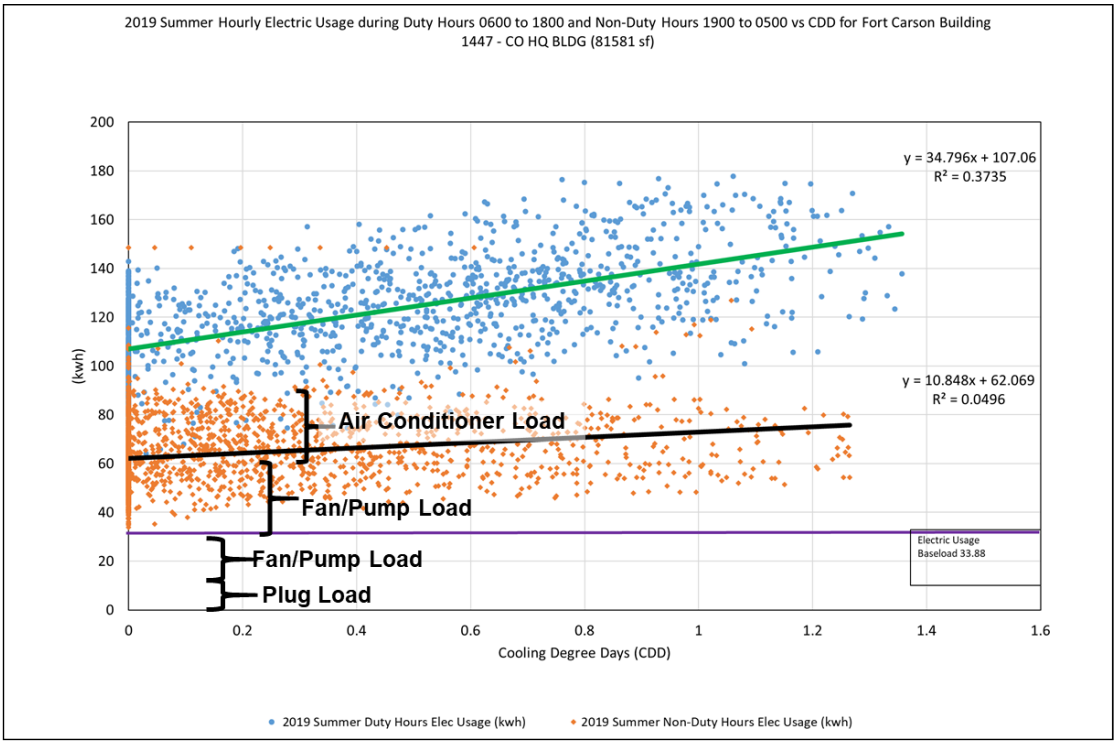
Before we detail the 3rd Level course, let's look at how we have assembled the building blocks for understanding all of the benchmarking classes (4th Level Benchmarking was offered for the first time on 29 September 2020):

- Level 1 Benchmarking
  - How to set up
  - Overall relationship of all components
  - Understanding the base load
- Level 2 Benchmarking
  - Base load and plug load
  - Metrics for base and plug
- Level 3 Benchmarking
  - Lights
  - Fans and pumps
- Level 4 Benchmarking
  - Air Conditioner (AC) baseline
  - AC efficiency metrics



For system breakdown, pie chart examples are utilized that break out the 4 major components of usage: lights, fan/pump, chiller (AC), and office/plug load (shown as separate wedges on the chart). An example of the system breakouts is shown above for an 81,581 SQFT Company HQ building at Ft. Carson.

Most courses utilize daily scatter plots of kWh (kilowatt hours) vs. CDD (cooling degree days) for normalization. We use hourly scatter plots to show the impact of usage during duty vs. non-duty hours. These hourly scatter plots also allow us to easily break out the various systems loads, as shown below. The blue dots represent electric usage in kWh during duty hours and the orange dots represent non-duty hours. The purple line is the baseload. This example shows the off-duty usage breakdown by system for CO HQ building 1447 at Fort Carson during the summer of 2019.



We then show the same breakdown of system usage for the duty hours in the chart below. *(Continued on pg. 3)*

3RD LEVEL BENCHMARKING (CONT. FROM PG. 2)

We apply the same process to the winter non-duty and duty hours. This enables us to know when and what loading the systems use throughout the year.

Winter Non-Duty Fan Pump @ Baseload & < 45 degrees (kWh)		4,119.62
Winter Non-Duty Fan/Pump > Baseload & < 45 degrees		9,913.50
Total Non-Duty fan/pump load < 45 degrees where system must be on		14,033.12
Annual Non-Duty Chiller above baseload		2,103.74
Annual Non-Duty fan/pump baseload		35,411.24
Annual Non-Duty fan/pump above baseload		56,489.16
Total Non-Duty fan/pump & chiller used in non duty hours that is potential savings		94,004.14
Difference of Total non duty hours on minus kwh required for cold weather = potential savings kwh		79,971.02
Potential % savings		30.7%

This data enables us to build a waterfall chart of the usage for each system for each time period to determine the excess usage during non-duty hours, which are potential savings for the user. The following is a summary of the waterfall that includes the sum of the various time periods to total the nonduty fan/pump and AC loading of 94,4004 kWh. If you take away the times that fan system must run to maintain a setback temperature of 55 degrees when the Outdoor Air Temperature (OAT) is below 45 degrees, then you calculate the system usage is 14,033 kWh during that time. If you subtract the total usage for those systems minus the system requirements below 45 degrees OAT then you have 79,971 kWh in potential savings available. That's a possible 30.7% savings of the overall electrical energy usage. This does not include the synergistic savings generated from the gas system in the winter.

The conclusion to the course breaks down metrics for lights and fans/pumps. These systems are converted into metrics for benchmarking as shown on the chart below. The median values for the systems are shown on the yellow highlighted line. Lights are .774 and fan/pumps are 3.643 kWh/SQFT/YR. These are the medians for all those surveyed so far. We have found that the medians do not vary much over time regardless of updates to the meters, so these are good starting points to benchmarking your systems that should stand the test of time.

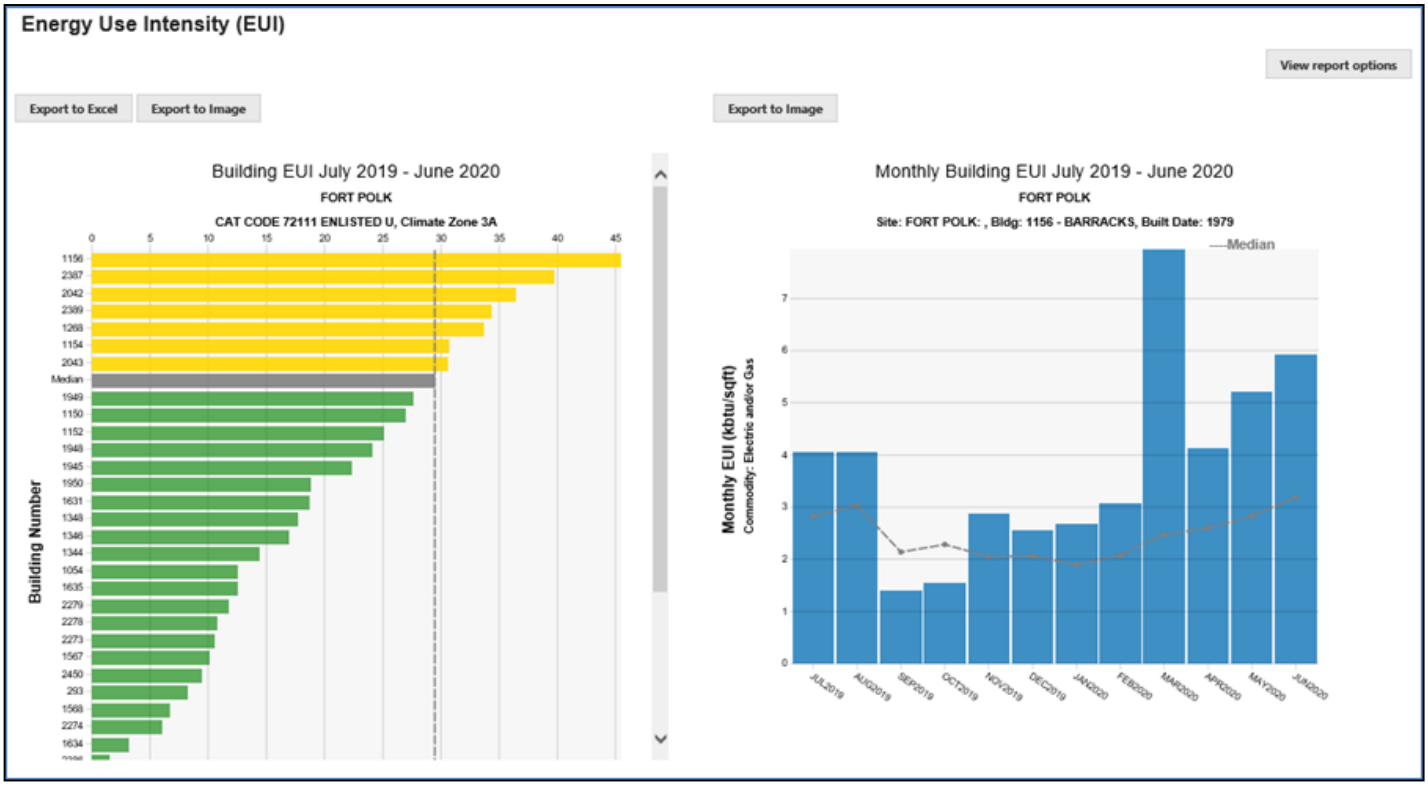
					Ave				0.920	4.971	1.573	
					Median				0.774	3.643	1.100	
	medians	0.301		43.742	15.866					kwh/sf		
Cat Coc	Base Load (KW)	Watts/S	12 Months Consumption (kWh)	Baseload as % Consumption	12 Months EUI (Electric	Cli ma te	On Chiller/ Heater Plant	On Geother mal	lights	fan/pun	chiller	office/plug
BN HQ BLD	36.600	1.355	498653.311	64.296	63.013	3A			0.114	12.901	4.069	1.292
ADMIN GE	30.000	1.318	417,330.448	63.144	62.571	3A			0.774	12.281	3.972	1.292
ADMIN GE	185	1.573	1813895.345	89.588	52.629	3A			1.137	11.891	2.622	1.292
ADMIN GE	144.320	0.983	2027810.089	62.345	47.11	3A			0.344	11.029	2.058	1.292
ADMIN GEN	(61050)					3A			1.050	10.788	3.715	1.292
HEALTH CL	28.658	0.828	652173.866	38.493	64.269	3A			1.292	10.175	6.384	1.291
ADMIN GEN	(61050)					3A			0.973	8.733	1.197	1.292
ADMIN GEN	(61050)					3A			1.516	8.533	1.920	1.292
CO HQ BLD	14.690	0.532	303,342.30	42.42	37.48	5B	No	No	0.460	7.622	1.877	1.292
ADMIN GE	20	0.565	386616.797	31.163	37.273	3A			2.557	6.973	3.707	1.292
CO HQ BLDG	(14185)					5B	No	No	1.371	6.878	0.871	1.292
CO HQ BLD	18.547	0.398	574,612.10	28.27	42.06	5B	No	No	1.752	6.607	1.605	1.292
ADMIN GEN	(61050)					3A			1.060	6.577	1.130	1.292
CO HQ BLD	3.060	0.478	77842.536	34.436	41.502	3A			2.362	6.549	1.825	1.292
CO HQ BLDG	(14185)					5B	No	No	1.420	6.344	0.804	1.292
ADMIN GE	72	0.773	687274.609	75.177	25.162	3A			0.772	6.040	1.036	1.292
CO HQ BLD	8.000	0.401	158,873.81	44.11	27.14	5B	No	No	-0.222	5.787	1.013	1.292
CO HQ BLD	18.241	0.511	339,666.79	47.04	32.44	5B	No	No	1.515	5.745	1.220	1.292
ADMIN GE	5.553	0.331	120433.117	40.391	24.488	3A			-0.087	5.523	0.941	1.292

SETTING UP FOR ENERGY PROJECTS

The Setting Up for Energy Projects training class was also first offered on 22 April 2020 and has had 54 attendees from 34 different sites. This class covers different methods for identifying areas of potential savings, such as EUI, Base Load Comparison report with extrapolated EUI, block approach from the Cat Code Performance Metrics report, and finally dissecting individual buildings' usage into systems. Each of these methods cover energy impact with the first method starting at the general overall approach to establish worst case buildings, then each additional method getting more granular until we get to the individual building method. These methods cover the magnitude of savings and even give examples to show the breakdown for potential savings. We will brief each of these methods below.

Energy Use Intensity (EUI)

This graph which can be exported into Excel is the first method covered in the course. This shows the worst-performing buildings for the selected report options at the top left in yellow, as compared to a median EUI (the dotted gray line) of the buildings in that weather region. Buildings reporting zero KBTU for the month will be excluded from the Median EUI profile calculation. The monthly details for your selected building on the left is shown on the right of the report so you can see if there was a problem on reporting for any particular month, as shown in the example below. For this particular example you can see September and October was underreported which will require more detailed analysis. However, that will not negate the fact that this building used excessive energy as the worst Enlisted Barrack for that Category Code. This method is good for deciding which buildings are the highest target to perform an energy audit.



Base Load Chart Extrapolated EUI

This report is similar to the EUI report, as it also shows the worst candidates and gives a target for audits, while highlighting the highest potential savings candidates. The extrapolated chart provides a more accurate picture for buildings where the building meter was new or did not report for some portions of the year. The missing data is extrapolated so you have a full year of data to compare against the other buildings. The report also shows how much of the data was extrapolated so you can determine if this method is applicable to use in this situation. This particular method is designed to put focus on audit candidates so it does not directly provide costs/savings potential. The screenshot below shows an example of an installations' Company HQ buildings *(Continued on pg. 5)*

SETTING UP FOR ENERGY PROJECTS (CONT. FROM PG. 4)

extrapolated and filtered (highlighted in yellow) for potential audit candidates. This method gives you a more reliable comparison than the previous method, which has data missing for various reasons throughout the year.

Site	Building	RPAUI	Square Footage	Cat Code	Base Load (KW)	Watts/SF	12 Months Consumption (kWh)	Baseload as % Consumption	12 Months EUI (Electric)	12 Months Extrapolated EUI (Electric)	% of Data Available	Climate
FORT CARSON	517 - COMPANY OPERATIO	1077649	16710	CO HQ BLDG (14185)	3.168	0.19	927529.222	3	189.399	188.882	100.274	5B
FORT CARSON	2757 - CO HQS BLDG/ADMI	613233	24000	CO HQ BLDG (14185)	32	1.333	408806.507	68.758	58.121	57.962	100.274	5B
FORT CARSON	9427 - CO HQ BLDG	1077645	46613	CO HQ BLDG (14185)	18.547	0.398	609270.911	26.739	44.6	44.478	100.274	5B
FORT CARSON	7450 - CO HQ BLDG	611198	27613	CO HQ BLDG (14185)	14.69	0.532	280545.578	45.994	34.667	34.572	100.274	5B
FORT CARSON	7416 - CO HQ BLDG	592301	35730	CO HQ BLDG (14185)	18.241	0.511	319730.59	50.114	30.534	30.45	100.274	5B
FORT CARSON	1447 - CO HQ BLDG	996786	81581	CO HQ BLDG (14185)	33.88	0.415	704856.531	42.222	29.481	29.4	100.274	5B
FORT CARSON	1280 - CO HQ BLDG	1171980	46608	CO HQ BLDG (14185)	14	0.3	374738.952	32.816	27.434	27.359	100.274	5B
FORT CARSON	7464 - CO HQ BLDG	994738	19972	CO HQ BLDG (14185)	8	0.401	157485.982	44.621	26.906	26.832	100.274	5B
FORT CARSON	7473 - CO HQ BLDG...	1330475	65939	CO HQ BLDG (14185)	10.713	0.162	441363.118	21.322	22.839	22.777	100.274	5B
FORT CARSON	7418 - CO HQ BLDG	573122	35730	CO HQ BLDG (14185)	10.75	0.301	236083.657	39.998	22.546	22.484	100.274	5B
FORT CARSON	1456 - CO HQS BLDG	306101	16107	CO HQ BLDG (14185)	6.829	0.424	101708.011	58.982	21.546	21.487	100.274	5B
FORT CARSON	704 - CO HQ BLDG	1040727	32341	CO HQ BLDG (14185)	6.523	0.202	191614.048	29.902	20.216	20.161	100.274	5B
FORT CARSON	9090 - COMPANY OPS	1030419	51906	CO HQ BLDG (14185)	16.644	0.321	306761.647	47.659	20.166	20.11	100.274	5B
FORT CARSON	2610 - CO HQ'S BLDG	984377	66673	CO HQ BLDG (14185)	25.948	0.389	371642.714	61.329	19.02	18.968	100.274	5B
FORT CARSON	750 - CO OPS BLDG	578097	10107	CO HQ BLDG (14185)	1.598	0.158	55689.393	25.202	18.801	18.749	100.274	5B
FORT CARSON	9487 - CO HQ BLDG	1077651	73007	CO HQ BLDG (14185)	18.07	0.248	400600.195	39.622	18.723	18.672	100.274	5B
FORT CARSON	2158 - CO HQ BLDG	588485	18967	CO HQ BLDG (14185)	3.986	0.21	99052.292	35.344	17.819	17.771	100.274	5B
FORT CARSON	2457 - ADMIN & SUPPLY	613232	23617	CO HQ BLDG (14185)	5.833	0.247	122360.222	41.871	17.678	17.63	100.274	5B
FORT CARSON	515 - COMPANY HEADQUAR	996782	41401	CO HQ BLDG (14185)	7.404	0.179	214154.194	30.369	17.65	17.602	100.274	5B
FORT CARSON	1454 - CO HQS BLDG	601843	10048	CO HQ BLDG (14185)	1.668	0.166	51637.901	28.367	17.535	17.488	100.274	5B
FORT CARSON	2620 - CO HQ'S BLDG	984378	87254	CO HQ BLDG (14185)	22.331	0.256	420597.524	46.638	16.448	16.403	100.274	5B
FORT CARSON	1210 - CO HQ BLDG	1034099	78946	CO HQ BLDG (14185)	16	0.203	378903.139	37.092	16.377	16.332	100.274	5B
FORT CARSON	2157 - ADM & SUPPLY BLDG	598219	18967	CO HQ BLDG (14185)	3.972	0.209	90938.831	38.364	16.36	16.315	100.274	5B
FORT CARSON	1220 - ADMIN/CO HQS	593507	51867	CO HQ BLDG (14185)	9.38	0.181	246813.568	33.383	16.237	16.193	100.274	5B

Block-off Category Code Performance Metrics

This reporting method indicates the median, highest 25 percentile and lowest 25 percentile giving you a relative position for any building for each Category Code in the Army. It also shows the worst candidates and gives a target for doing audits. This focuses on highest potential savings candidates and helps prioritize direction but does not directly give you costs/savings potential. The example below shows the results for AMC Garrisons. Note the Army medians for Bottom 25th Percentile EUI, Top 25th Percentile EUI and Median EUI are highlighted at the top of the chart in yellow. In this example we highlighted the cutoff range based on these medians in the bottom/middle of the list for Company Headquarters. Anything above the top 25th percentile is either a bad meter or an excessive user of *(Continued on pg. 6)*

IMCOM Category Code Performance Metrics											
	30 Cat Codes over 30 bldgs	3204	0.165	0.639	0.354	17.019	47.868	30.448	22.393	56.996	38.443
Category Code	**Category Code #**	**Building Count**	**Bottom 25th Percentile Watts/SF**	**Top 25th Percentile Watts/SF**	**Median Watts/SF**	**Bottom 25th Percentile EUI**	**Top 25th Percentile EUI**	**Median EUI**	**Bottom 25th Percentile Baseload as % of Consumption**	**Top 25th Percentile Baseload as % of Consumption**	**Median Baseload as % of Consumption**
COMMO CTR	13120	39	1.389	11.232	4.628	132.165	522.738	340.108	29.541	69.634	63.260
EXCHANGE B	74050	41	0.350	2.397	1.162	36.386	173.485	87.365	20.403	64.985	40.599
DINING FAC	72210	78	0.464	1.404	0.861	45.422	146.376	89.361	16.667	45.384	28.961
LAB/TST BL	31920	52	0.479	1.905	0.825	30.579	115.265	60.447	37.582	70.572	48.950
FIRE STATI	73010	30	0.342	1.105	0.734	27.871	62.607	48.467	29.169	68.392	51.823
HEALTH CLI	55010	65	0.312	0.961	0.554	33.974	75.036	50.470	21.838	59.478	44.070
CDC UNDER	74017	52	0.269	0.902	0.502	31.694	81.905	51.576	24.512	48.411	36.432
BDE HQ BLD	14182	78	0.336	0.822	0.496	29.549	61.323	41.473	25.410	59.313	40.563
FH JR NCO/	71116	41	0.184	1.065	0.462	22.590	110.236	40.124	24.670	54.247	33.344
BN HQ BLDG	14183	186	0.234	0.688	0.438	19.046	69.199	38.586	17.330	57.930	37.293
ADMIN GEN	61050	421	0.213	0.753	0.390	19.094	55.167	33.708	24.700	63.078	42.757
TRAINEE BK	72181	62	0.250	0.455	0.358	5.117	22.737	7.239	43.078	208.838	59.994
ENLISTED U	72111	550	0.153	0.496	0.357	17.130	41.121	27.120	23.238	61.482	41.222
PHYS FIT C	74028	75	0.158	0.618	0.356	21.761	74.309	41.277	15.417	40.459	25.101
GEN INST B	17120	110	0.136	0.716	0.354	11.171	48.289	28.498	26.044	56.062	38.375
ARMY LODGI	72010	35	0.127	0.499	0.354	9.026	40.714	29.183	28.490	62.595	44.963
CHAPEL	73017	34	0.159	0.801	0.347	19.337	72.898	43.134	17.252	46.567	34.928
TRANS UPH	72122	31	0.209	0.596	0.335	3.624	30.046	11.612	40.337	233.767	62.133
VEH MAINT	21410	319	0.170	0.516	0.333	17.686	47.446	31.188	20.877	52.006	33.775
CO HQ BLDG	14185	395	0.175	0.497	0.293	16.908	49.591	29.708	19.042	47.917	34.221
SEP TOIL/S	73075	33	0.091	0.966	0.286	12.342	44.734	31.550	12.103	67.102	42.459

SETTING UP FOR ENERGY PROJECTS (CONT. FROM PG. 5)

energy. Anything between the median and the top 25th percentile is using more energy than most and therefore must be assessed to see if you can save energy economically. Anything below the bottom 25th percentile is doing exceptionally well or the meter is not reporting accurately.

Base Load Stop Light Chart

Utilizing this report, the probability of whether or not there is a potential project in descending order (75%) can be determined by asking the following:

- Is the building above the top 25% for the Army? If yes, then a project is probable.
- Is the building above the top 25% for the climate zone? If yes, then a project is probable.
- Is the building above the top 25% for installations? If yes, then a project is probable.
- Is the building above the median, but less than the 75% for the Army? If yes, then a project might be warranted but an economic analysis is required.
- Is the building above the median, but less than the 75% for the climate zone? If yes, then evaluate, but the economics will be tough unless it is a low-cost/no-cost project.
- Is the building above the median, but less than the 75% for installations? If yes, then it will be difficult to justify a project unless the electric rates are high.

Individual Buildings

For dissecting the individual buildings' metrics, we go back to the Base Load Comparison report and pull the system usage ratios from a scatter plot. With this method we allocate the actual energy use by energy system for the installation. We then calculate the cost for each system by multiplying that usage by the average cost of electricity on the installation. You can see under the yellow highlighted columns the % of usage for that system now applied as a cost for each building. This method allows you to work the project analysis backwards by determining which buildings have enough potential savings to justify the capital costs. This eliminates a lot of unnecessary audit time by determining which buildings have the potential of a project being successful based on the cost savings that are potentially available.

													$11,773,768.53		$41,098,014.36		$15,506,850.12		$ 13,956,165.11	$ 102,339,856.62
						$0.0576	Plug Load off duty		11%	Reduced fan %	Redcued Chiller %		15%		55%		16%		14%	
Site	Building	12 Months Consumption (kWh)	Baseload as % Consumption	12 Months Extrapolated EUI (Electric	% of Data Available	elec cost annua	% Off Duty Base Load - Plug Loa	Overrides of schedule				Revised Chiller % Load	Chiller Loadin	Revised Fan/Pump % Load	Fan/Pump	Revised Lts % Load	Lights	Revised Plug % Load	Plug	Sum check
ABERDEEN P	120 - LAB/T	22,270,892.529	68.972	896.065	100.274	$ 1,282,803.41	41%	$ 522,054.09	33.8%	6.9%	8%	$ 98,540.10	21.2%	$ 272,236.98	16%	$ 205,248.55	14%	$ 184,723.69	$ 1,282,803.41
FORT RUCKE	5302 - CLAS	16,647.906	62,554.894	3.631	65.753	$ 958.92	43906%	$ 421,021.36	36441.8%	7464.0%	0%	$ -	0.0%	$ -	16%	$ (221,085.49)	14%	$ (198,976.94)	$ 958.92
FORT BRAGG	82312 - INS	12,460,193.564	84.596	1,378.317	100.274	$ 717,707.15	52%	$ 370,799.04	42.9%	8.8%	6%	$ 41,749.41	12.1%	$ 86,975.73	16%	$ 114,833.14	14%	$ 103,349.83	$ 717,707.15
ABERDEEN P	4600 - 3104(	4,166,010.713	115.577	41.033	100.274	$ 239,962.22	105%	$ 250,945.29	86.8%	17.8%	0%	$ -	0.0%	$ -	16%	$ (5,780.56)	14%	$ (5,202.51)	$ 239,962.22
LANDSTUHL	3711 - 5101(	9,920,626.148	61.276	262.048	100.274	$ 571,428.07	35%	$ 201,678.40	29.3%	6.0%	9%	$ 49,143.17	25.7%	$ 146,892.36	16%	$ 91,428.49	14%	$ 82,285.64	$ 571,428.07
FORT BRAGG	81808 - Con	22,562,999.098	25.694	118.710	100.274	$ 1,299,628.75	15%	$ 190,967.45	12.2%	2.5%	12%	$ 157,281.33	42.8%	$ 556,292.83	16%	$ 207,940.60	14%	$ 187,146.54	$ 1,299,628.75
ROCK ISLAN	350 - BLDG	8,507,479.081	44.522	63.299	100.274	$ 490,030.80	34%	$ 164,268.12	27.8%	5.7%	9%	$ 43,618.92	27.2%	$ 133,174.40	16%	$ 78,404.93	14%	$ 70,564.43	$ 490,030.80
REDSTONE A	5201 - INFO	5,688,501.126	79.559	506.686	100.274	$ 327,657.66	48%	$ 157,696.45	39.9%	8.2%	6%	$ 21,029.62	15.1%	$ 49,323.66	16%	$ 52,425.23	14%	$ 47,182.70	$ 327,657.66
ROCK ISLAN	220 - BLDG	7,350,760.313	44.185	43.854	100.274	$ 423,403.79	33%	$ 140,506.55	27.5%	5.6%	9%	$ 37,930.84	27.5%	$ 116,251.65	16%	$ 67,744.61	14%	$ 60,970.15	$ 423,403.79
FORT MYER	410 - HQ 4B	1,180,828.928	292.577	216.547	63.014	$ 68,015.75	198%	$ 134,444.72	164.1%	33.6%	0%	$ -	0.0%	$ -	16%	$ (34,962.62)	14%	$ (31,466.36)	$ 68,015.75
REDSTONE A	6263 - LIFE	5,612,107.760	69.010	149.184	74.520	$ 323,257.41	41%	$ 131,640.18	33.8%	6.9%	8%	$ 24,816.75	21.2%	$ 68,530.23	16%	$ 51,721.19	14%	$ 46,549.07	$ 323,257.41
FORT BRAGG	C6039 - REI	57,647,658.316	16.558	25,933.969	100.274	$ 3,320,505.12	4%	$ 129,556.68	3.2%	0.7%	14%	$ 462,769.11	51.8%	$ 1,718,745.77	16%	$ 531,280.82	14%	$ 478,152.74	$ 3,320,505.12
FORT MYER	251 - UEPH	1,809,496.750	185.193	217.603	100.000	$ 104,227.01	122%	$ 127,452.42	101.5%	20.8%	0%	$ -	0.0%	$ -	16%	$ (12,223.90)	14%	$ (11,001.51)	$ 104,227.01
FORT MYER	59 - HEADQ	1,147,813.684	263.627	187.433	62.740	$ 66,114.07	177%	$ 117,249.43	147.2%	30.1%	0%	$ -	0.0%	$ -	16%	$ (26,913.35)	14%	$ (24,222.02)	$ 66,114.07
FORT HOOD	1001 - UNIT	3,941,634.207	62.018	69.760	62.192	$ 227,038.13	51%	$ 115,830.31	42.3%	8.7%	6%	$ 13,456.41	12.7%	$ 28,731.81	16%	$ 36,326.10	14%	$ 32,693.49	$ 227,038.13
ABERDEEN P	6010 - ADM	4,272,483.251	57.925	103.486	25.753	$ 246,095.04	47%	$ 115,480.10	38.9%	8.0%	7%	$ 16,298.26	16.1%	$ 39,503.79	16%	$ 39,375.21	14%	$ 35,437.69	$ 246,095.04
ABERDEEN P	E3400 - 310	6,633,563.414	44.492	127.639	100.274	$ 382,093.25	24%	$ 89,835.41	19.5%	4.0%	11%	$ 40,513.59	35.5%	$ 135,587.90	16%	$ 61,134.92	14%	$ 55,021.43	$ 382,093.25
FORT JACKS	11953 - 3-34	2,389,120.000	102.258	2,741.433	4.384	$ 137,613.31	64%	$ 88,159.38	53.2%	10.9%	4%	$ 5,104.45	1.8%	$ 2,515.04	16%	$ 22,018.13	14%	$ 19,816.32	$ 137,613.31
ABERDEEN P	E3549 - BEF	4,241,503.895	61.083	96.174	100.274	$ 244,310.62	35%	$ 85,895.38	29.2%	6.0%	9%	$ 21,067.14	25.8%	$ 63,077.68	16%	$ 39,089.70	14%	$ 35,180.73	$ 244,310.62
REDSTONE A	7804 - ELEC	3,146,724.073	75.928	104.889	100.274	$ 181,251.31	46%	$ 82,613.36	37.8%	7.7%	7%	$ 12,418.42	17.2%	$ 31,119.13	16%	$ 29,000.21	14%	$ 26,100.19	$ 181,251.31
REDSTONE A	6264 - AC/F	3,120,341.401	74.845	104.024	74.520	$ 179,731.66	45%	$ 80,554.28	37.2%	7.6%	7%	$ 12,546.60	17.8%	$ 31,992.37	16%	$ 28,757.07	14%	$ 25,881.36	$ 179,731.66
FORT JACKS	4420 - 3-13	2,886,358.075	56.609	32.406	100.274	$ 166,254.23	46%	$ 75,826.89	37.9%	7.8%	7%	$ 11,382.55	17.1%	$ 28,503.51	16%	$ 26,600.68	14%	$ 23,940.61	$ 166,254.23

The next table takes the usage as shown above and breaks it down by projected savings blocks of 10, 20 and 30%. These savings over the actual usage allow you to determine if there are enough savings to justify a project. It then takes those categories of savings and translates that into a construction cost to enable you to see if this project is possible as a financed project. This one report will save the Energy Manager countless hours evaluating buildings that will never meet the payback standards for Energy Conservation Measures. *(Continued on pg. 7)*

SETTING UP FOR ENERGY PROJECTS (CONT. FROM PG. 6)

	Electric rate	$0.0576	Plug Load off duty	11%	15%		55%		16%		14%						
Site	Building	elec cost annually	% Off Duty Base Load - Plug Load	Overrides of schedule	Chiller Loading	Revised Fan/Pump % Load	Fan/Pump	Revised Lts % Load	Lights	Revised Plug % Load	Plug	10	20	30	Construction Costs supportable and 20 Years payment for 10% saving	Construction Costs supportable and 20 Years payment for 20% saving	Construction Costs supportable and 20 Years payment for 30% saving
ROCK ISLANI	350 - BLDG	$ 490,030.80	34%	$ 164,268.12	$ 43,618.92	27.2%	$133,174.40	16%	$ 78,404.93	14%	$ 70,564.43	$ 4,361.89	$ 8,723.78	$13,085.67	$ 43,618.92	$ 87,237.83	$130,856.75
FORT BRAGG	82312 - INS	$ 717,707.15	52%	$ 371,008.87	$ 41,713.74	12.1%	$ 86,801.57	16%	$ 114,833.14	14%	$103,349.83	$ 4,171.37	$ 8,342.75	$12,514.12	$ 41,713.74	$ 83,427.47	$125,141.21
FT BUCKNER	104 - 1-1ST	$ 279,031.27	0%	$ -	$ 40,738.57	55.0%	$153,467.20	16%	$ 44,645.00	14%	$ 40,180.50	$ 4,073.86	$ 8,147.71	$12,221.57	$ 40,738.57	$ 81,477.13	$122,215.70
ABERDEEN P	E3400 - 31(	$ 382,093.25	24%	$ 89,886.25	$ 40,504.95	35.5%	$135,545.70	16%	$ 61,134.92	14%	$ 55,021.43	$ 4,050.50	$ 8,100.99	$12,151.49	$ 40,504.95	$ 81,009.90	$121,514.86
FORT MYER	214 - OFFI(	$ 288,567.31	6%	$ 18,181.19	$ 39,040.02	49.8%	$143,621.63	16%	$ 46,170.77	14%	$ 41,553.69	$ 3,904.00	$ 7,808.00	$11,712.01	$ 39,040.02	$ 78,080.05	$117,120.07
ROCK ISLANI	220 - BLDG	$ 423,403.79	33%	$ 140,506.55	$ 37,930.84	27.5%	$116,251.65	16%	$ 67,744.61	14%	$ 60,970.15	$ 3,793.08	$ 7,586.17	$11,379.25	$ 37,930.84	$ 75,861.68	$113,792.52
SCHOFIELD B	1580 - WAT	$ 247,419.48	0%	$ 509.20	$ 36,036.68	54.8%	$135,658.08	16%	$ 39,587.12	14%	$ 35,628.40	$ 3,603.67	$ 7,207.34	$10,811.00	$ 36,036.68	$ 72,073.36	$108,110.04
FORT BRAGG	C1722 - RC	$ 238,667.13	0%	$ -	$ 34,845.40	55.0%	$131,266.92	16%	$ 38,186.74	14%	$ 34,368.07	$ 3,484.54	$ 6,969.08	$10,453.62	$ 34,845.40	$ 69,690.80	$104,536.20
FORT BLISS	56 - INFO S	$ 244,225.06	11%	$ 27,553.24	$ 30,972.81	45.6%	$111,454.60	16%	$ 39,076.01	14%	$ 35,168.41	$ 3,097.28	$ 6,194.56	$ 9,291.84	$ 30,972.81	$ 61,945.62	$ 92,918.42
FORT BRAGG	53845 - LAI	$ 207,292.55	2%	$ 4,844.17	$ 29,441.20	53.1%	$109,990.24	16%	$ 33,166.81	14%	$ 29,850.13	$ 2,944.12	$ 5,888.24	$ 8,832.36	$ 29,441.20	$ 58,882.41	$ 88,323.61
TORII COMMU	100 - 1-1ST	$ 196,605.18	0%	$ -	$ 28,704.36	55.0%	$108,132.85	16%	$ 31,456.83	14%	$ 28,311.15	$ 2,870.44	$ 5,740.87	$ 8,611.31	$ 28,704.36	$ 57,408.71	$ 86,113.07
FORT BLISS	1613 - SNA	$ 193,358.18	0%	$ -	$ 28,230.29	55.0%	$106,347.00	16%	$ 30,937.31	14%	$ 27,843.58	$ 2,823.03	$ 5,646.06	$ 8,469.09	$ 28,230.29	$ 56,460.59	$ 84,690.88
FORT BRAGG	X3429 - DIN	$ 194,478.02	3%	$ 4,875.28	$ 27,564.99	52.9%	$102,916.43	16%	$ 31,116.48	14%	$ 28,004.84	$ 2,756.50	$ 5,513.00	$ 8,269.50	$ 27,564.99	$ 55,129.99	$ 82,694.98
FORT BRAGG	A3275 - A3	$ 188,535.50	0%	$ -	$ 27,526.18	55.0%	$103,694.52	16%	$ 30,165.68	14%	$ 27,149.11	$ 2,752.62	$ 5,505.24	$ 8,257.85	$ 27,526.18	$ 55,052.36	$ 82,578.55
FORT HOOD	21022 - CE	$ 225,770.32	15%	$ 33,222.60	$ 27,314.62	42.8%	$ 96,598.91	16%	$ 36,123.25	14%	$ 32,510.93	$ 2,731.46	$ 5,462.92	$ 8,194.39	$ 27,314.62	$ 54,629.25	$ 81,943.87
FORT HOOD	36000 - NO	$ 186,733.26	0%	$ -	$ 27,263.06	55.0%	$102,703.30	16%	$ 29,877.32	14%	$ 26,889.59	$ 2,726.31	$ 5,452.61	$ 8,178.92	$ 27,263.06	$ 54,526.11	$ 81,789.17
FORT BRAGG	H4630 - FR	$ 183,560.63	0%	$ -	$ 26,799.85	55.0%	$100,958.35	16%	$ 29,369.70	14%	$ 26,432.73	$ 2,679.99	$ 5,359.97	$ 8,039.96	$ 26,799.85	$ 53,599.70	$ 80,399.56
FORT MYER	248 - UEPH	$ 182,015.97	2%	$ 3,504.30	$ 25,978.60	53.4%	$ 97,200.21	16%	$ 29,122.56	14%	$ 26,210.30	$ 2,597.86	$ 5,195.72	$ 7,793.58	$ 25,978.60	$ 51,957.20	$ 77,935.80

So, in summary, these methods are good indicators for ranking projects for detailed analysis. In general, for determining where to audit, use the EUI, Extrapolated EUI charts or Cat Code Performance Metrics. For determining the ability to finance, use the dissection of individual buildings' data to determine if it is feasible and in the ballpark range. This still requires some level of audit determination, but because these methods get you in range, it avoids wasting your valuable time.