WEBER THOMPSON
SUSTAINABILITEAM

Occupant Engagement Pilot Project:

AN EXPERIMENT ON PLUG LOAD ENERGY CONSUMPTION AT THE TERRY THOMAS

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INTRODUCTION

While the efficiency of heating, cooling and lighting systems has been increasing due to code mandates and standards, plug loads are steadily becoming a larger percent of overall energy consumption in commercial office buildings. The percentage share of plug loads is increasing in the energy distribution and so is the absolute amount. Based on the *Pilot Study of a Plug Load Management System* by S. Poll and C. Teubert, 2012: "*In minimally code compliant office buildings, plug loads may account for up to 25% of total energy consumption. But in high efficiency buildings, plug loads may account for more than **50%** of the total energy consumption*."

As a firm conscious of its energy footprint both in client projects and within internal office operations, Weber Thompson (WT) – the architecture firm responsible for the design of the high performing, mid-size, commercial class A building, The Terry Thomas, completed in 2008 – was keen on evaluating the plug load energy consumption. As both the building's designer and occupant, we sought a deeper understanding of ways to further impact the energy reduction rooted in building operations. From the two possible approaches to curbing power draw – one centered around technology upgrades and the other reliant on occupant behavior we chose to explore behavioral intervention. This was because we believe occupant education and the resulting engagement are key to materialize the long term success of a low-tech passive green building such as The Terry Thomas.

To this effect, a three week long experiment based on gamification of behavior modification was designed and carried out in the spring of 2016 on WT-occupied floor two of The Terry Thomas. The overarching objectives included occupant education and engagement, the investigation of the relationship of occupant and floor plug load energy consumption, and an evaluation of collected data for patterns that could lead to recommendations for long-term implementation of behavior modification measures or future improvements to the game.

BUILDING BLOCKS GAME

The experiment revolved around *Building Blocks*, a two week long occupant energy awareness game, wherein they had to catch and tag (as red dot stickers) other occupants' unnecessary use of monitors, task lights and common area overhead lighting with the fun element of building a wooden block tower (using components from the popular game *Jenga*). The occupants were divided into four teams; each were given 'ownership' of one of the conference rooms and a *Jenga* tower. Each team was scheduled for walkthrough observations during the game period to observe workstation monitors, task lights and common area lights unnecessarily left on. The team with defaulting workstations lost blocks, which would get added to the tower of the observing team. At the end of the game period,the team with the most blocks won. The game design was intent upon creating an environment where co-workers felt accountable to their team while prompting behavioral change using a game-like element, the wooden block tower, as a form of motivation.

A week before the initiating the game, observation walkthroughs were carried out by WT volunteers to gain an insight into baseline occupant behavior. During the game, an awareness progression log was maintained to document the game activity and measure the number of blocks gained or lost by each team.

To measure the impact to power consumption from controlling the monitors, task lights and common area lighting, the values monitored were:

- Workstations – the tested floor accommodates 56 workstations of which five (5) representative workstation configurations were identified. The energy consumption of their components (monitor, computer, task light & charging device/other) belonging to these five (5) workstations were individually monitored using Enmetric Plug Load monitoring devices (Smart Plug Strips).

- Floor energy readings – the total energy readings, including energy drawn by office equipment, appliances, mechanical and lighting load in addition to plug loads, were measured throughout the baseline and the game period using a Fluke Power Meter.

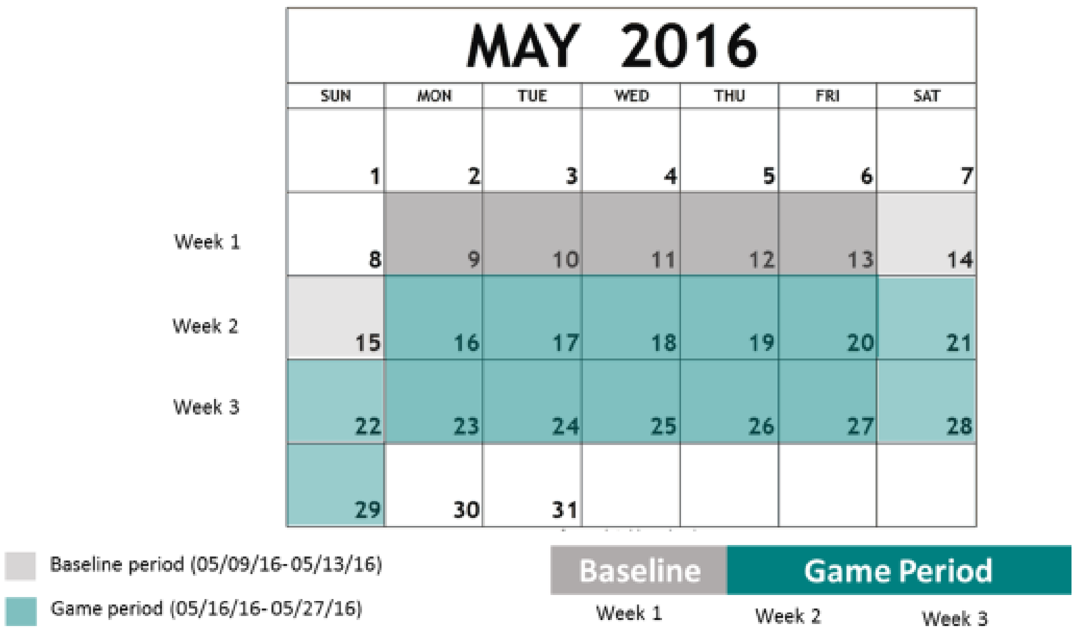


Figure 1: Timeline

Figure 2: Team division of WT Level 2 occupants

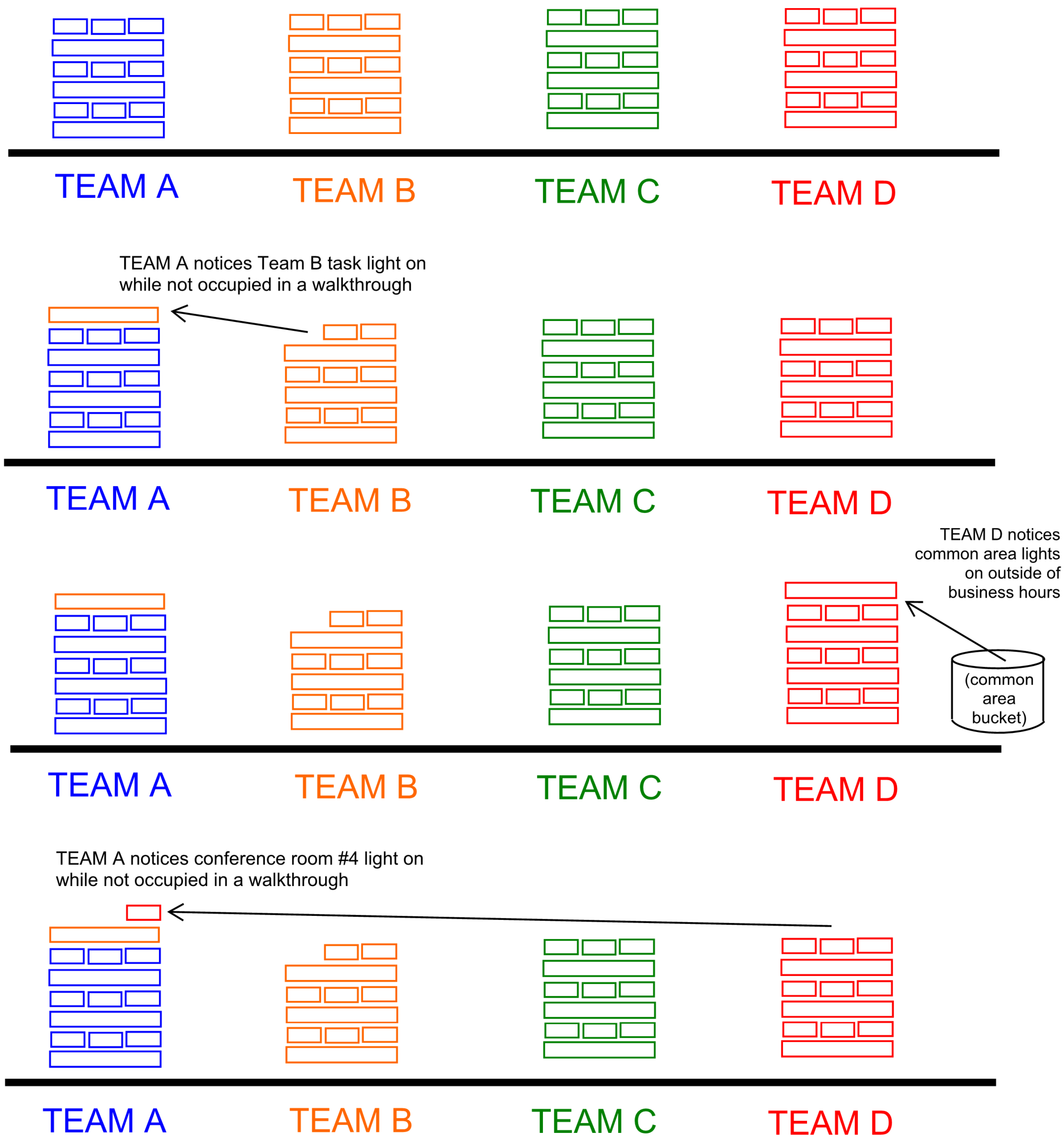


Figure 3: *Jenga* Blocks as game incentive

•L2 Monitors

•L2 Task Lights

•L2 Common Area Lighting

Figure 4: Equipment controlled during Baseline & Game Period

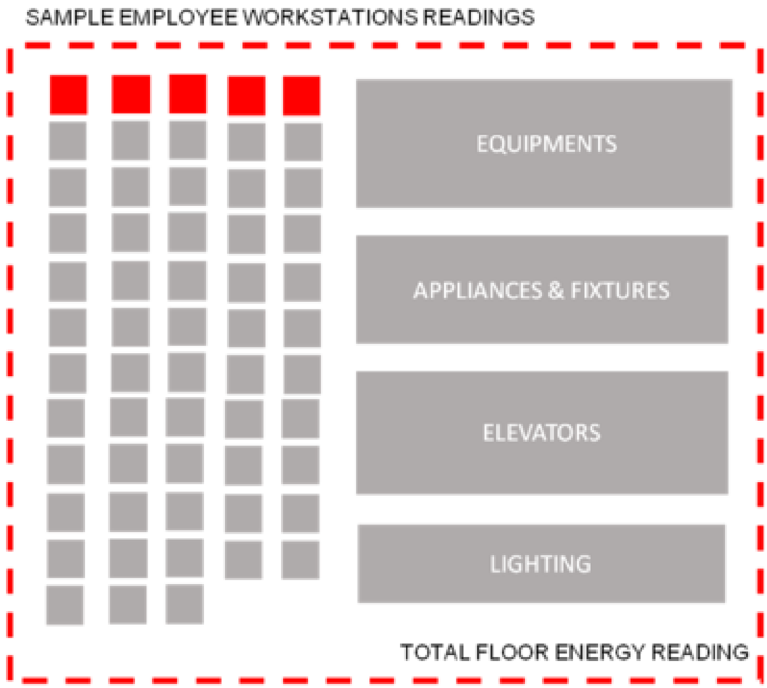


Figure 5: Values measured

W/K sample set	Equipment					# W/Ks on floor
	Large Monitor	Small Monitor	Surface	Task Lights	Other	
A	●			●	●	19
B		● ●		●	●	9
C		● ●	●	●	●	3
D	●	●		●	●	22
E	●		●	●	●	3

Table 1: Sample workstation configuration

Figure 6: Distribution of sample workstation profiles across the floor

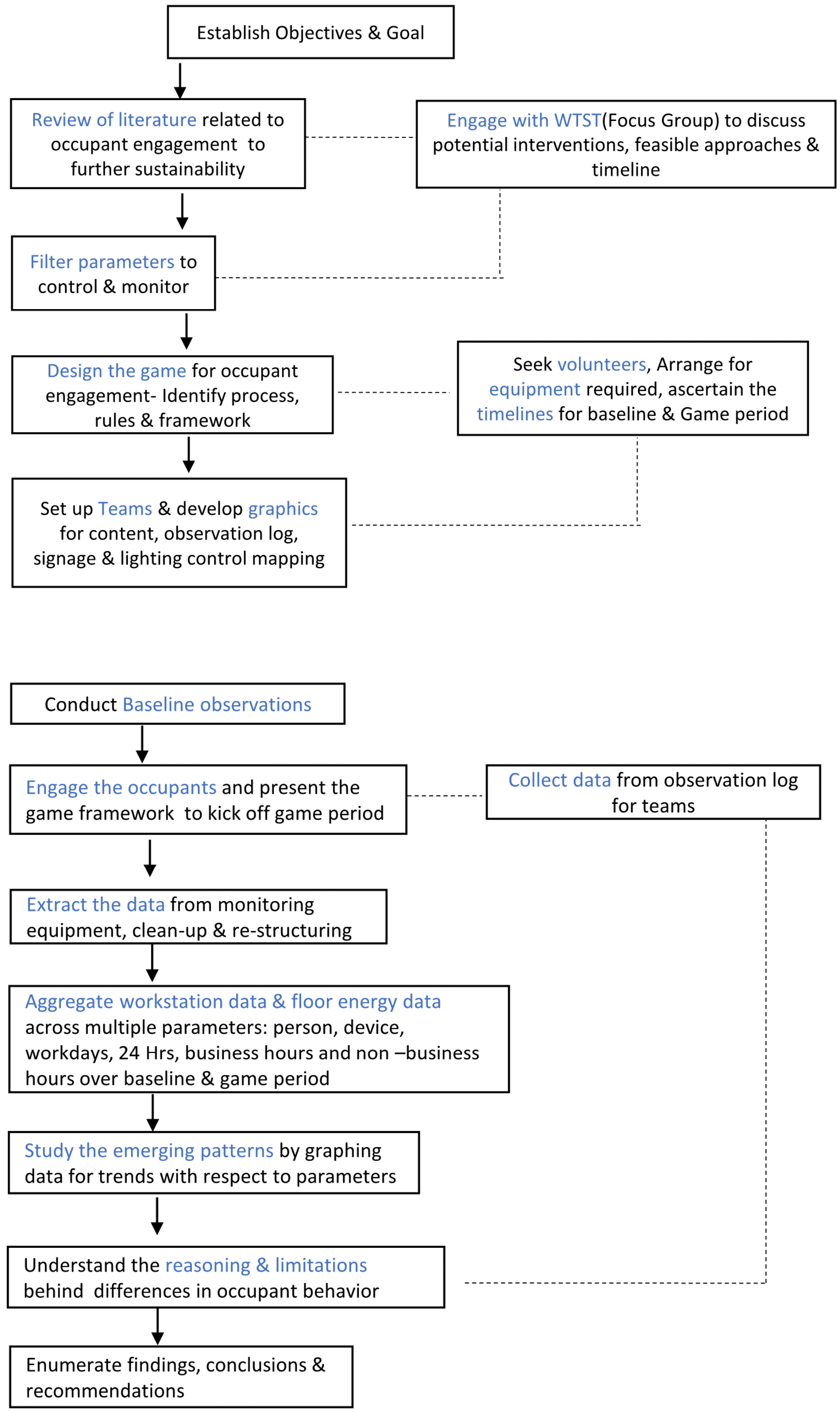
METHODOLOGY

STAGE I- Pre-Field Work
April'16

STAGE II- Field Work
May'16

STAGE III- Analysis
Oct'16-Jan'17

STAGE IV- Synthesis
Feb'17



DATA ANALYSIS

At the end of the game period, the data relevant to energy consumption was extracted, cleaned and restructured for analysis. It was separated in multiple ways and combinations for trend analysis for business and non-business hours, comparing sample employee(individual workstation) consumption to the total floor consumption and comparing individual employee profiles to each other.

a) 24 hour Analysis

In the graph (Fig. 7) below, both the total floor energy readings and sample employee (workstation) energy consumption over 24 hours per day during the three week period have been superimposed for comparison. The difference in the scale notwithstanding, the energy profile patterns follow one another closely in crests and troughs. Evident from this graph is the regularity of the work week and weekend. Energy consumption of sample employees increased by 16% and 26% in Week 1 and Week 2 of the game respectively and floor energy consumption also experienced an increase, though insignificant.

Upon breaking down the sample employee energy value into user profiles (Fig. 8), we see that the only profile which exhibits reduced energy consumption during game period is C. The energy consumption of all profiles is minimal during the weekends except for Profile B, which seems to be quite active throughout, and thereby has the largest share (38-40%) of the total employee consumption.

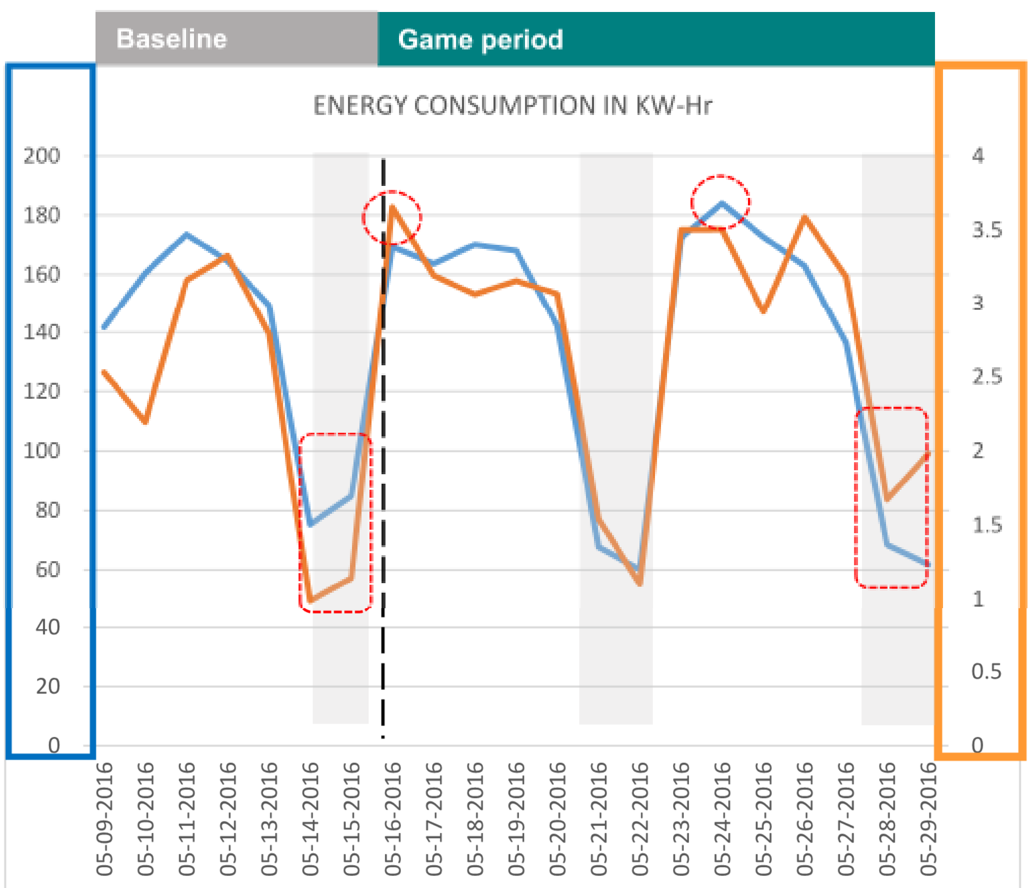


Figure 7: Floor readings superimposed over sample employee readings (24Hr)

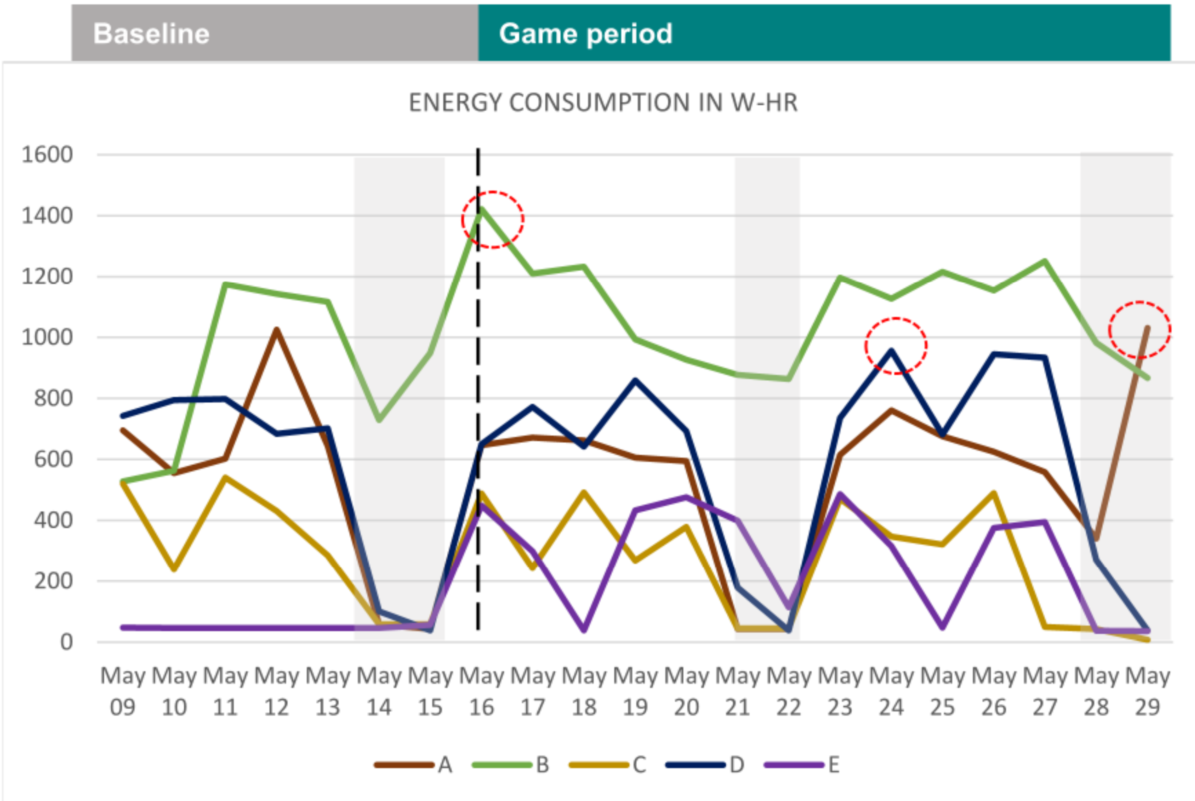


Figure 8: Energy consumption of each user profile (24Hr)

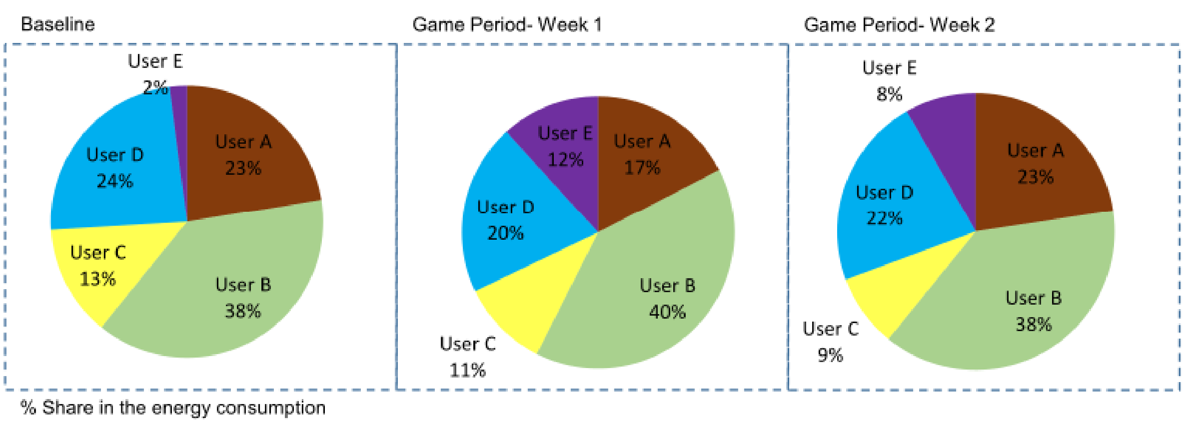


Figure 9: % Share in Energy Consumption (24Hr)

b) 12Hr-Business hour analysis

We saw value in analyzing the energy use during the full 24-hour day, as well as the twelve hours that best represent the office work day. The floor energy readings were plotted along with sample employee energy consumption, throughout the three week period from 8AM to 8PM. Both the graphs (Fig.10) follow each other in certain segments and deviate in others, unlike the 24 hour analysis.

The employee consumption increased by 14% in Week 1 and 22.5% in Week 2 of the game, and the floor energy consumption experienced a reduction in Week 1 but an increase in Week 2. Except for Profile C, which exhibited reduced energy consumption, and Profile A, whose energy use remained unchanged, all other users exhibited an increase during the game period. The energy comparison shows an enormous increase for Profile E during the game period as it was inactive during the baseline, and hence should be ignored as an outlier. While Profile B had the highest increase in energy during game period, Profiles A,D & B exhibit a similar share in energy consumption values in all three weeks. Profiles C & E consumed the least energy of all 5 profiles and hence, had the smallest share in the pie. This can be directly attributed to their computer hardware – both Profiles C & E used a Microsoft Surface tablet as their primary computer, while other employees used traditional tower CPUs.

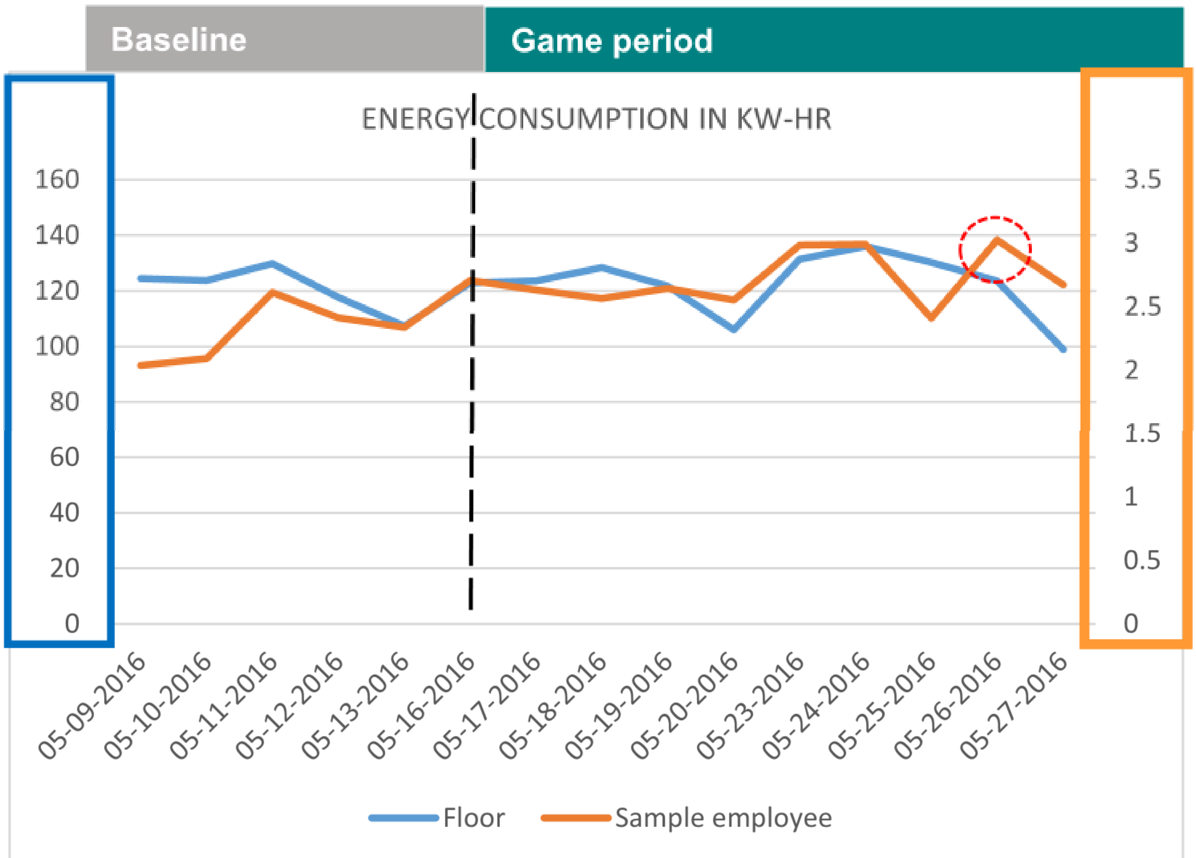


Figure 10: Floor readings vs sample employee readings (12Hr- Business Hours)

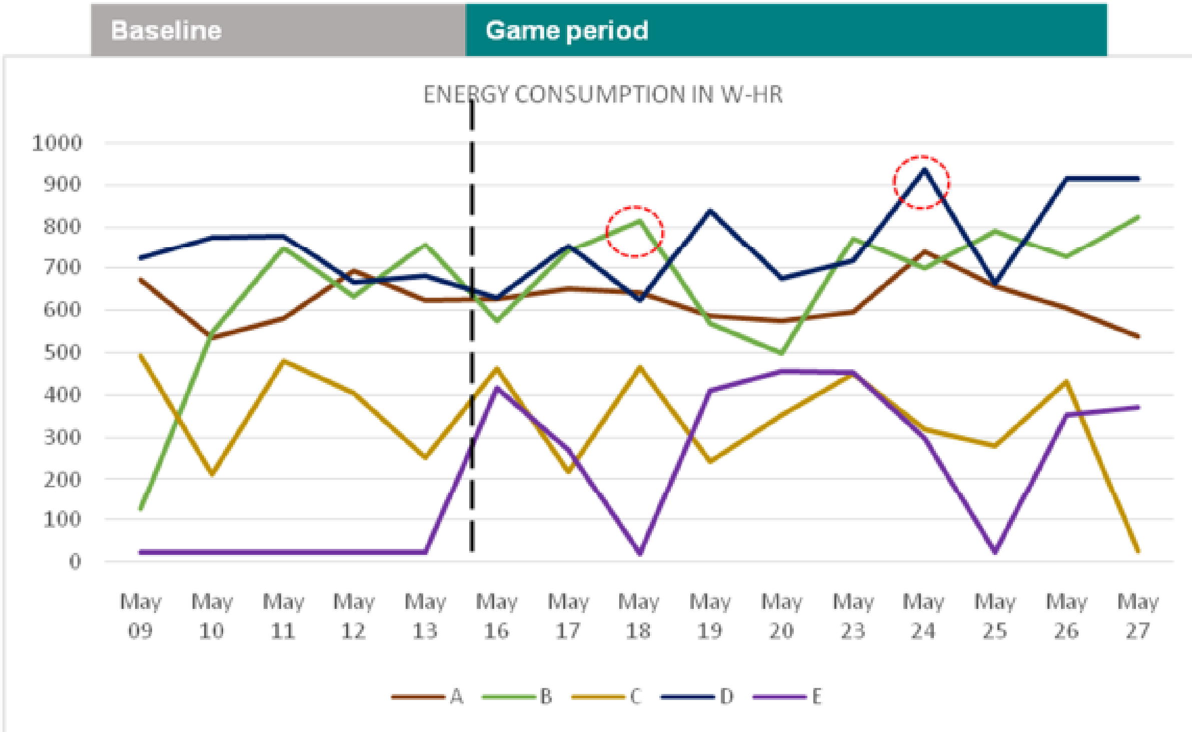


Figure 21: Energy consumption of each user profile (12Hr-Business Hours)

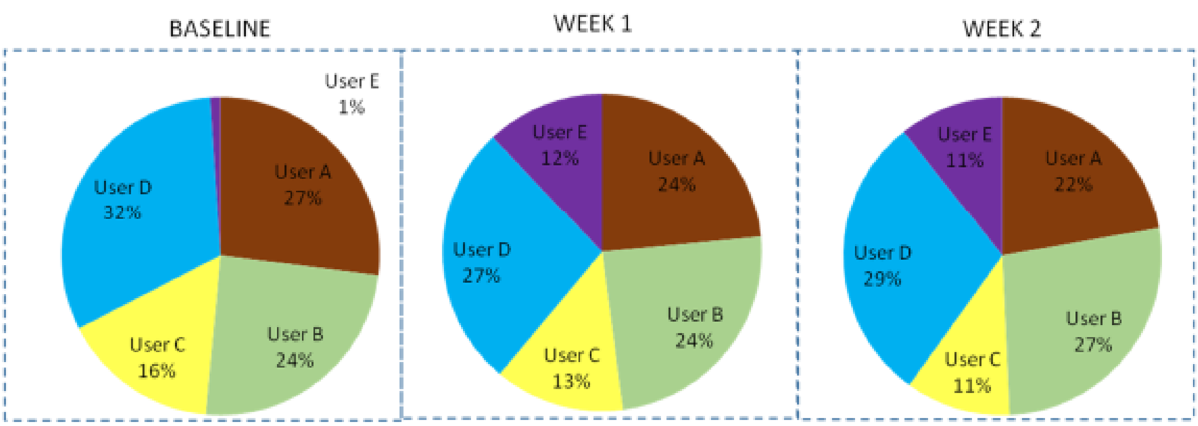


Figure 12: % Share in Energy Consumption (12Hr- Business Hours)

c) 12Hr Non-Business hours analysis

Now that we have analyzed the 24-hour energy use profile and the 12-hour work day profile, the twelve non-business hours are valuable to assess the impact in the absence of occupants. To look beyond the short-term external factors (such as deadlines, and days off) which may have been influencing the energy consumption during business hours, the floor energy readings were plotted along with sample employee energy consumption throughout the baseline and game periods during the hours 8PM-8AM. Weekends were intentionally excluded to eliminate the irregular behavior of some monitored occupants who were working on weekends.

Here is the most fruitful finding in the data analysis – the graphs are starkly different in their trends. The total energy consumption of sample employees increased by 21% in Week 1 and 5% in Week 2 of the game; floor energy consumption also experienced increases by 9% and 11%, respectively. Except for profiles A & B, all profiles consumed negligible energy in non-occupied hours, compared to business hour energy use. Profile B was mostly active throughout the baseline and game periods and had the highest portion of the energy consumption pie. The profiles A, C, D & E had a similar share in energy consumption, in sharp contrast to the business hour analysis. Even though it was Profiles C & E which had the most energy efficient workstations, Profiles A & D consumed just as much energy during the non-business hours. User B and User A exhibited the highest increase and the highest reduction in energy consumption, respectively.

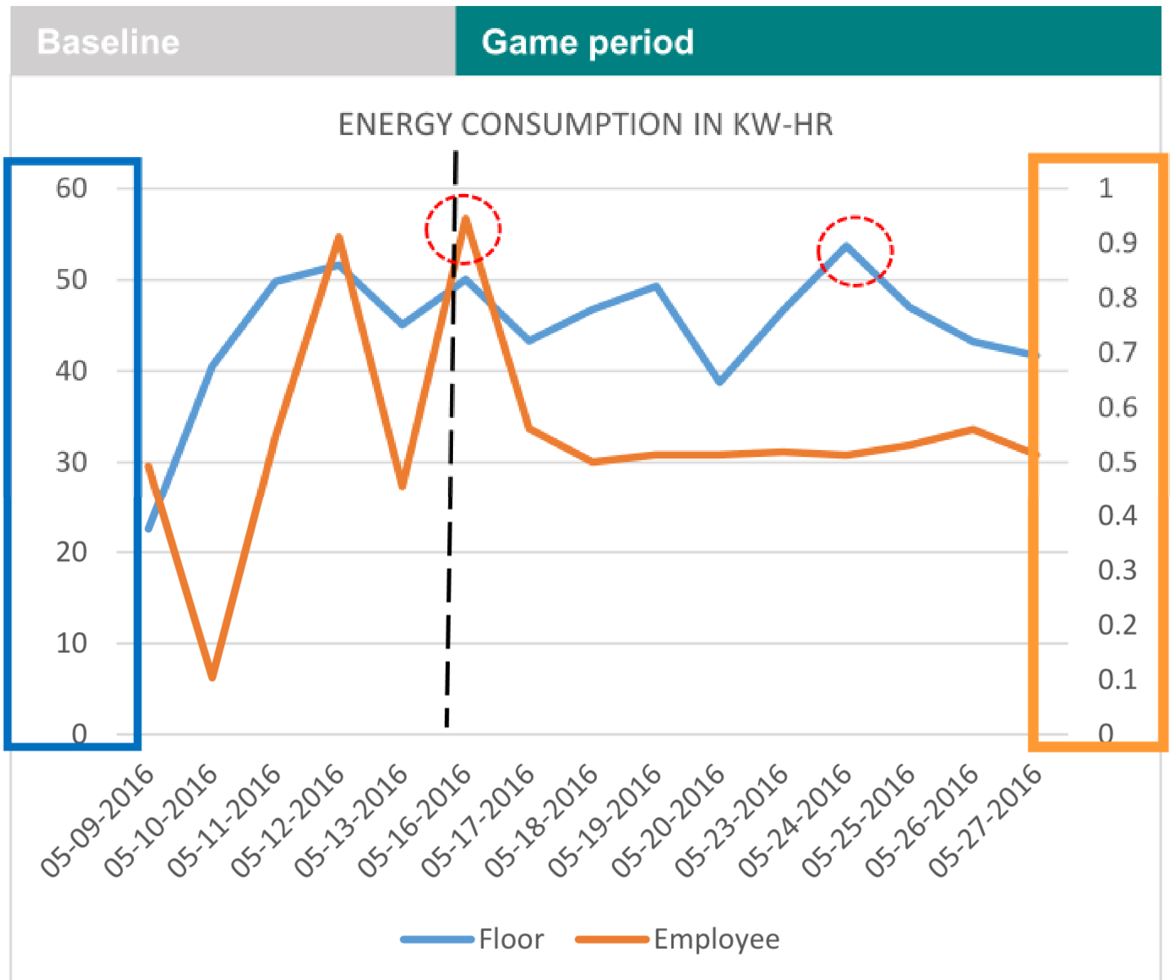


Figure 33: Floor readings vs sample employee readings (12Hr-Non Business Hours)

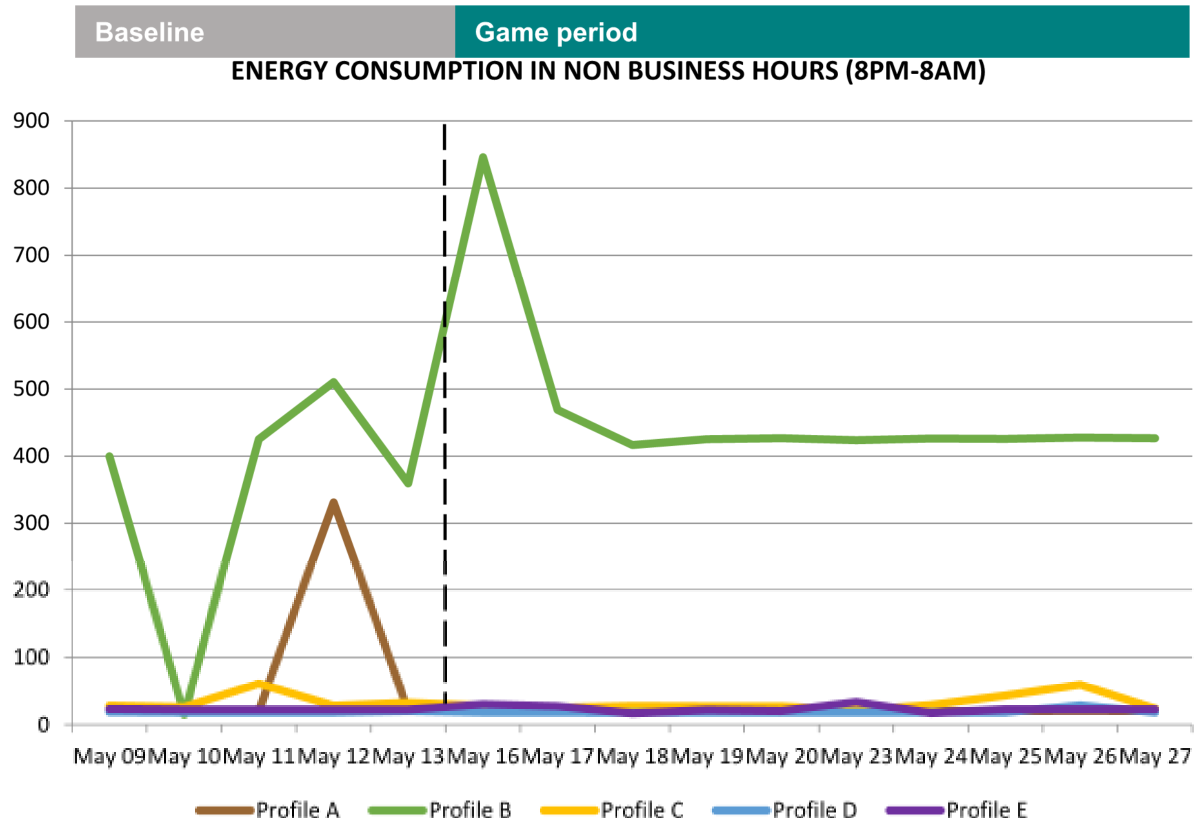


Figure 44: Floor readings vs sample employee readings (12Hr- Non Business Hours)

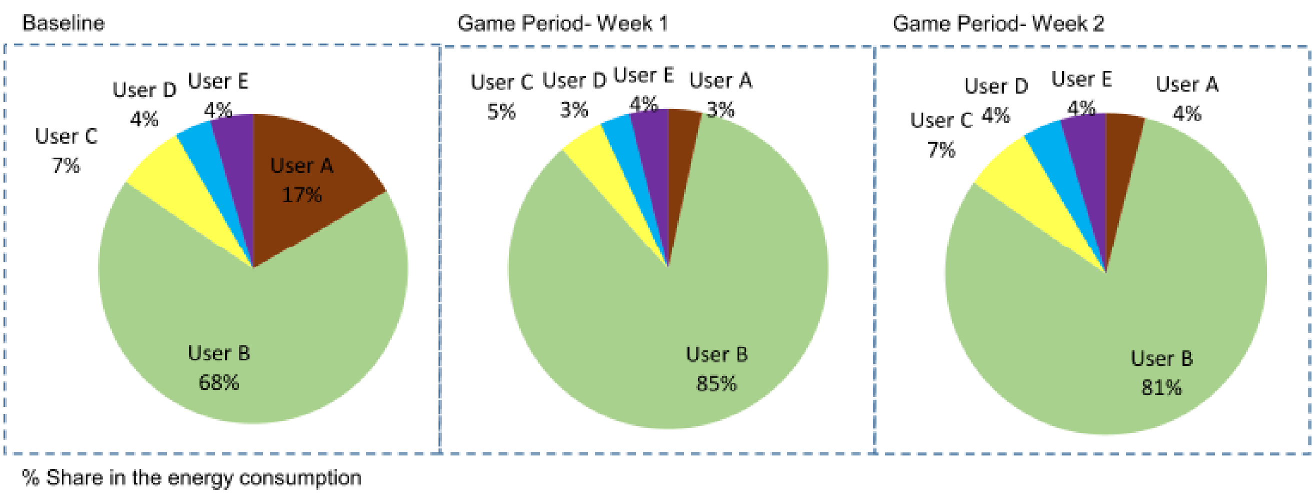
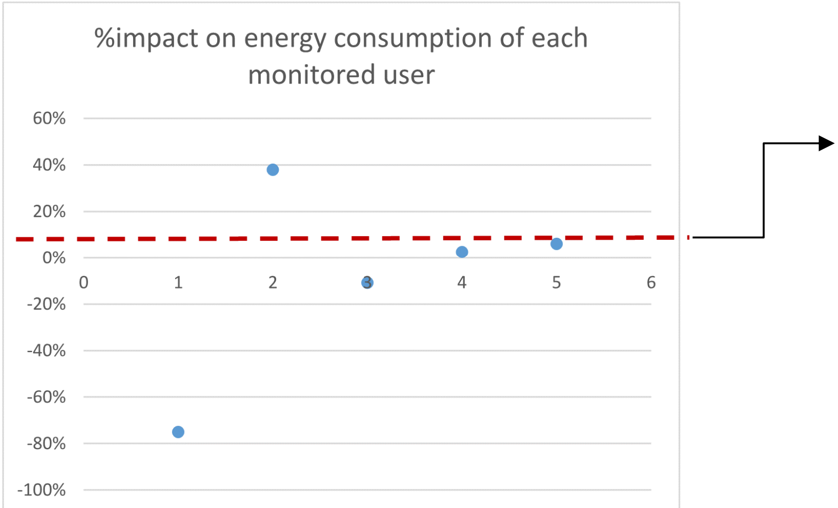


Figure 55: % Share in Energy Consumption (12Hr- Non Business Hours)



8% mean reduction in energy based on user behavior in Non-Business hours

Figure 66: Mean reduction in energy consumption

If we are to look at the percentage reduction of the individual employee workstations, and the impact of the game were considered normally distributed (Fig. 16 above) across the office population engaged in the game, Profile B & A would represent the extreme ends of the bell curve. The mean percentage reduction in energy consumption would be **8%**, based on the user behavior of the observed employees in the non-business hour analysis.

d) AWARENESS PROGRESSION LOG

A log was maintained during the game to document the observed number of monitors and overhead lights, based on which blocks were removed/added. The values plotted for the three week period indicate a drastic reduction of observed lights and monitors 'on' during the game period, probably due to the conscious behavior of the occupants and enthusiastic teams conducting the walkthroughs. It is also likely that the interest of participants possibly tapered off towards the end and the observations were not as robust. Because observations documented only erroneous lights on (when they should not be), and not the total count of lights off (when they should be), the lower number of monitors and overhead lighting in the game period do not necessarily mean a real time reduction, and therefore may not represent better behavior.

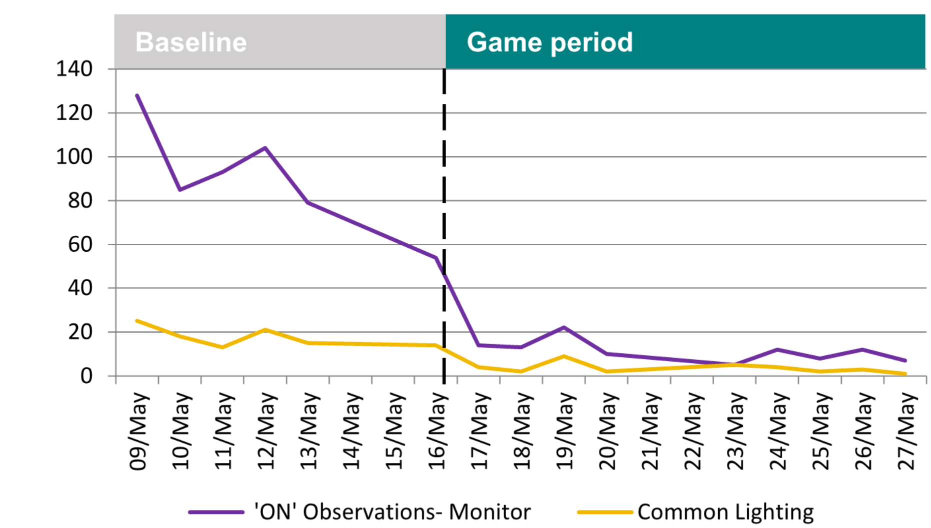


Figure 77: Observation Log prepared during the game

CONCLUSIONS

In the power consumption trends in 8AM-8PM (Business Hour) analysis, the two aspects that surfaced as driving factors of energy consumption were the energy efficiency of the workstations and computational intensity of tasks being performed. The power consumption by Microsoft Surface devices (Profiles C & E) is significantly less than tower/desktop computers. The monitored occupants (Profile A & D) who were performing CPU-intensive data rich operations on power heavy hardware exhibited higher energy consumption. This ever changing computational intensity of tasks performed by the users on their workstations results in significant variation of the power draw, as exemplified by week 2 of the game period. Both these factors have a strong role and unfortunately are beyond the scope of the game design, and perhaps most occupant behavior measures.

There is good news, however. The data trends in 8 pm-8 am (Non-Business Hour) analysis bring forth the high weight occupant behavior carries in energy consumption outside the typical work day. Despite different hardware configurations and the tasks of each user, all of them (except one) exhibited negligible energy consumption in the off hours. The shaded area under the plotted line of Profile B (Fig.:18), clearly outlines the opportunity to save energy. The gap (in red) highlighted in the average energy consumption of the users (Fig.: 19, 20, 21 and 22) brings forth the energy saving potential by the means of behavior modification.

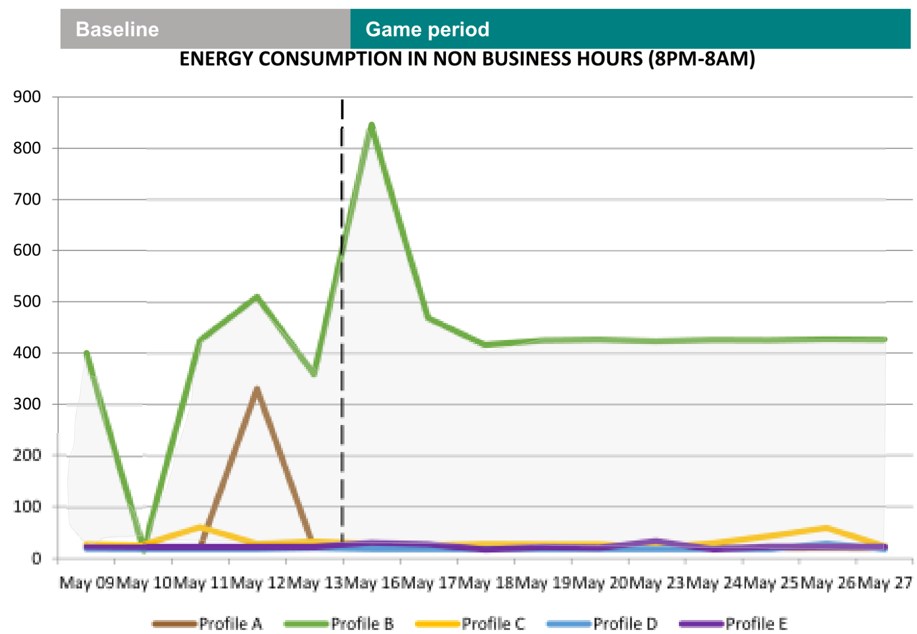


Figure 88: Shaded portion represents the energy consumption of Profile B (W-Hr) during Non-Business hours

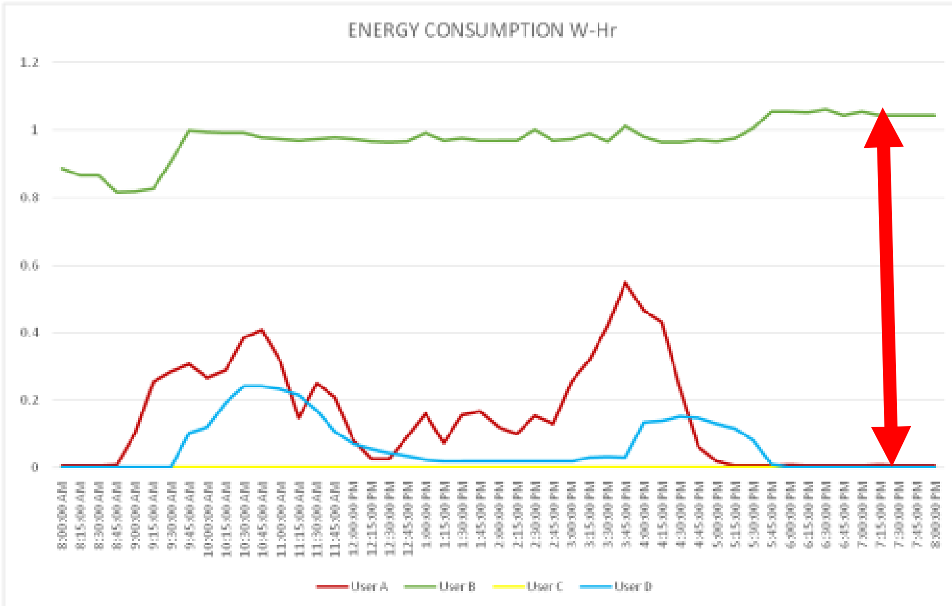


Figure 99: Average user energy consumption (W-Hr) of Charging Device/other during- 04/21-05/15

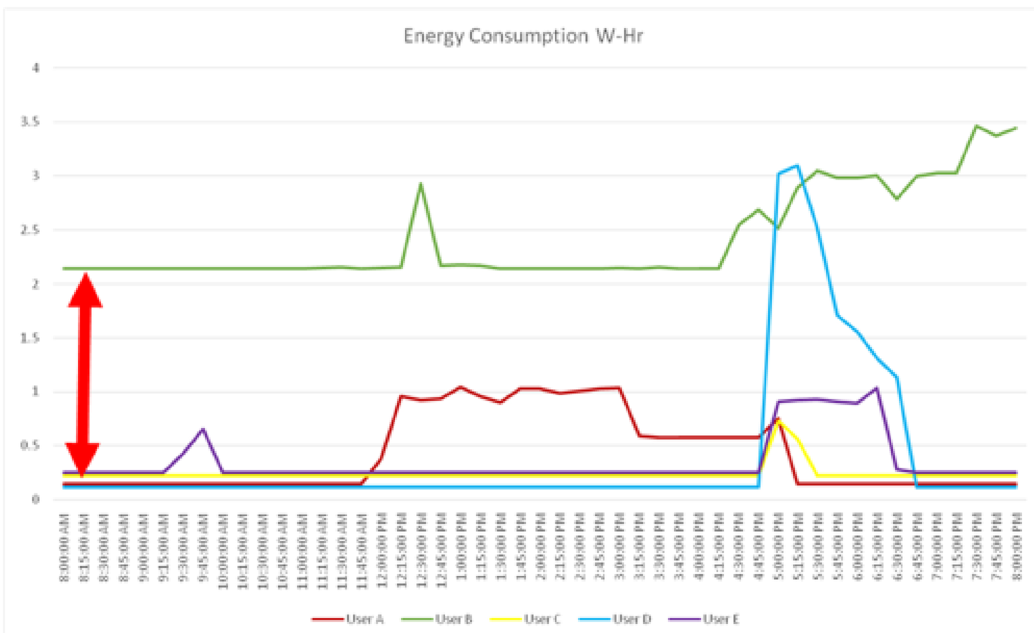


Figure 20: Average user energy consumption (W-Hr) during weekends- 04/21-05/15

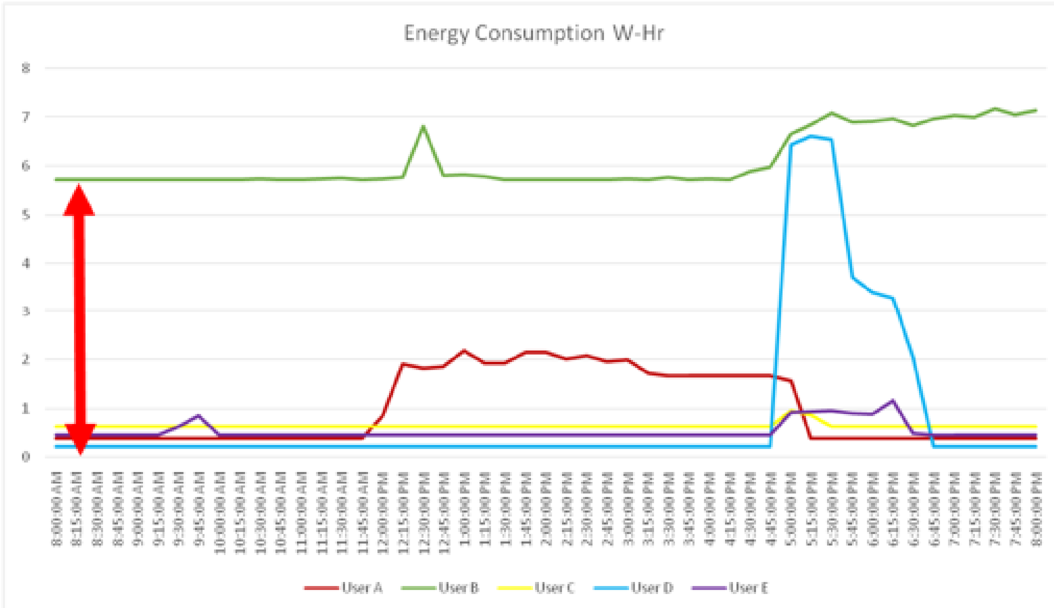


Figure 21: Average user energy consumption (W-Hr) of Tower/Surface computer during weekends- 04/21-05/15

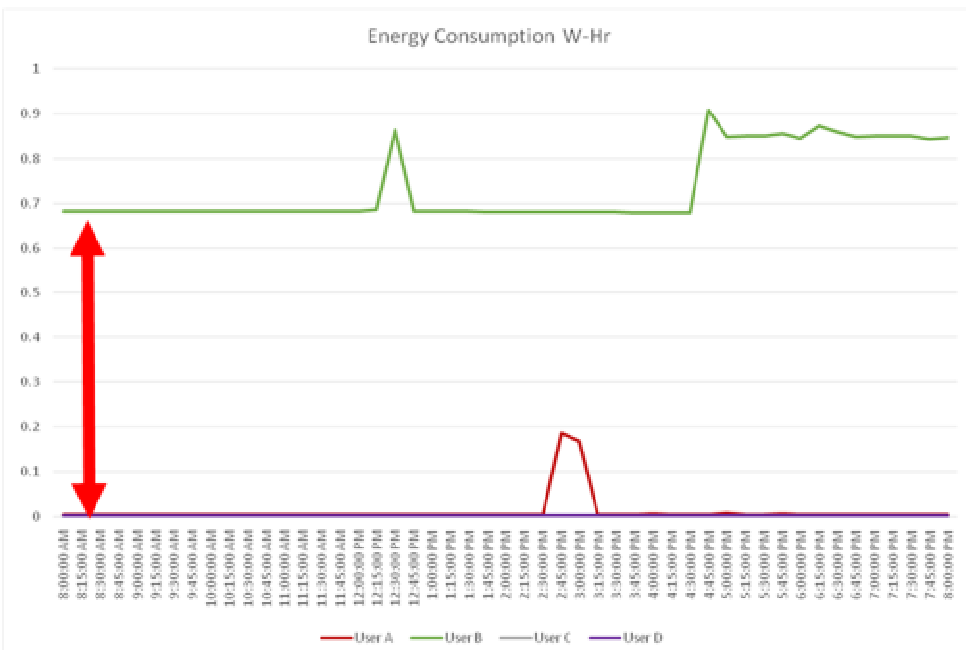


Figure 22: Average user energy consumption (W-Hr) of charging device during weekends- 04/21-05/15

It is here that the potential of greatest impact lies with the individual user, wherein the user could rise to the occasion and seize control. The most straightforward way (outside of technological upgrades) towards achieving this goal lies in effective management of 'Sleep mode/Power saver mode' settings or just turning off the equipment when not in use.

RECOMMENDATIONS FOR FUTURE STUDIES AND INTERVENTIONS

Longer observation period: the two weeks of game period & one week of baseline observation were insufficient to normalize the impact of external factors such as deadlines and day offs (beyond the scope of this study) on individuals' energy consumption. The extraordinary behaviors, such as working late and working during the weekends, tend to get focused in such short timeframes by presenting as spikes in energy consumption. The resulting skewed datasets make it difficult to differentiate between exceptional and regular energy consumption of an occupant. In order to smooth out the irregular and short lived intensive computational needs in addition to energy drops due to occupant absence, the observation period needs to be long enough to even out the lopsided energy values. Increasing the duration of the study will also capture the seasonal variation in the daylight levels, which directly impacts the usage of task lights at each workstation.

Higher number of monitored profiles: In order to identify the relationship between the sample workstation power consumption and 'typical' (8 am-5 pm) user behavior, the number of monitored workstations should be a greater percentage of the total to help identify outliers in both categories. The small sample size prevented the extrapolation of the findings to the remaining office population. This would help towards establishing an oft-used metric – *average* workstation energy consumption.

Metering other office equipment, including appliances, lighting and electrical fixtures, would help plug in the other pieces of the overall floor energy consumption pie. Intuitively, the bigger buckets of power consumption lie beyond workstations; monitoring their power consumption could possibly yield higher benefits with less effort. A better understanding of the relative power draw would help identify the most strategic interventions for reducing overall electricity use.

Introducing computer towers as another game control: Based on the individual user workstation profiles (see appendix), on a typical workday, towers and monitors drew over 60% and 25% of workstation energy respectively. For Microsoft Surface users these values are 30%-40% for the computer and up to 50% for monitors. Future occupant engagement games could include computer towers as an additional control to reap in further energy saving benefits.

Introduce non-work hour behaviors to the game: one criticism heard after the game period was complete, and may have contributed to lower engagement, was the potential anxiety attached to either leaving one's workstation momentarily and, or not knowing whether an individual was actually still working at their workstation, and whether it was appropriate to tag their station. This could be resolved, along with improved efficacy of the game because of the results cited above, by focusing on behaviors that impact non-work hour energy consumption (i.e. turning off equipment when one has left for the day).

Focus on passive measures instead of active measures for the game/intervention: rather than actively track each individual behavior to conserve energy (such as switching equipment off), the game could involve passive measures whereby changing settings on equipment would have a longer term impact. For example, changing sleep settings on computers and using timed or occupancy-sensing receptacles.

Reduce the dependence on a large pool of volunteers to observe and track behavior: rather than a rotating group of volunteers to provide observations, or members of the teams participating in the game, a dedicated individual or group neutral to the game should be tasked with observations, for consistency of data, and to better correlate observations with energy usage.

Track work time logged by users: In order to tie the energy consumption to *actual* workstation usage, future studies could explore the relationship of the workstation energy values with the users' work time logged. This could help differentiate between actual work hours (system is on as it is being used, perhaps even during non-typical work hours, on a project deadline for example) and erroneous energy consumption (system is on when it doesn't need to be).

Better strategies could be worked out to engage the occupants for longer periods, possibly by introducing tangible incentives, or adding more fun and engaging aspects to the game design. As the game period becomes longer, this aspect becomes increasingly important.

ACKNOWLEDGEMENT

Stephanie Randall Cooper, South Seattle College Practicum Intern, for organizing, planning, and designing the experiment; engaging with the occupants and encouraging us all in becoming active participants.

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Zachary Stevens, Building Performance Specialist, WSP, for an informal review of data analysis and findings.

APPENDIX

1. Comparison between daily (24Hr) Floor & Sample Employee workstation energy consumptions

Baseline	Avg. Consumption	Peak load	Total Consumption
Floor (KW-Hr)	135.74	173.55	950.16
Sample Employees (KW-Hr)	2.31	3.33	16.14

Game Period (Week 1)	Avg. Consumption	Peak load	Total Consumption	% Increase
Floor (KW-Hr)	134.47 ↓	170.20 ↓	941.30	-0.93%
Sample Employees (KW-Hr)	2.68 ↑	3.65 ↑	18.78	16.38%

Game Period (Week 2)	Avg. Consumption	Peak load	Total Consumption	% Increase
Floor (KW-Hr)	136.96 ↑	184.06 ↑	958.72	0.90%
Sample Employees (KW-Hr)	2.91 ↑	3.59 ↑	20.37	26.24%

2. Breakdown of Sample Employee workstation energy (24Hr) into individual configurations

	Baseline				Game Period (Week 1)				Game Period (Week 2)			
	Avg. Consumption (W-Hr)	Peak load (W-Hr)	Total Consumption (W-Hr)	% Share of total Sample employee consumption	Avg. Consumption (W-Hr)	Peak load (W-Hr)	Total Consumption (W-Hr)	% Share of total Sample employee consumption	Avg. Consumption (W-Hr)	Peak load (W-Hr)	Total Consumption (W-Hr)	% Share of total Sample employee consumption
User A	516.88	1024.73	3618.13	22%	562.07	1030.78	↓ 3263.83	17%	657.87	1030.78	↑ 4605.10	23%
User B	885.69	1174.09	6199.81	38%	1094.15	1421.58	↑ 7525.04	40%	1113.29	1250.71	↑ 7793.06	38%
User C	304.33	540.29	2130.28	13%	263.34	491.03	↓ 1958.82	10%	246.85	489.56	↓ 1727.97	8%
User D	551.26	798.26	3858.80	24%	599.24	956.04	↑ 3830.98	20%	651.20	956.04	↑ 4558.39	22%
User E	47.50	55.76	332.47	2%	278.20	486.23	↑ 2204.79	12%	241.44	486.23	↑ 1690.07	8%

	User A	User B	User C	User D	User E
% change in energy consumption from Baseline to Game period	+8.7%	+23.5%	-13.5%	+8.7%	+485.7%

3. Comparison between daily Business Hours (8:00 am to 8:00 pm) Floor & Sample Employee workstation energy consumptions

Baseline	Avg. Consumption	Peak load	Total Consumption
Floor (KW-Hr)	120.58	129.74	602.88
Sample Employees (KW-Hr)	2.30	2.61	11.49

Game Period (Week 1)	Avg. Consumption	Peak load	Total Consumption	% Increase
Floor (KW-Hr)	120.52 ↓	128.42 ↓	602.58	-0.05%
Sample Employees (KW-Hr)	2.62 ↑	2.71 ↑	13.10	14.00%

Game Period (Week 2)	Avg. Consumption	Peak load	Total Consumption	% Increase
Floor (KW-Hr)	124.03 ↑	135.96 ↑	620.13	2.86%
Sample Employees (KW-Hr)	2.82 ↓	3.03 ↑	14.08	22.54%

4. Breakdown of Sample Employee workstation energy consumptions into individual configurations for daily Business Hours (8:00 am to 8:00 pm)

	Baseline				Game Period (Week 1)				Game Period (Week 2)			
	Avg. Consumption (W-Hr)	Peak load (W-Hr)	Total Consumption (W-Hr)	% Share of total employee consumption	Avg. Consumption (W-Hr)	Peak load (W-Hr)	Total Consumption (W-Hr)	% Share of total employee consumption	Avg. Consumption (W-Hr)	Peak load (W-Hr)	Total Consumption (W-Hr)	% Share of total employee consumption
User A	620.59	693.73	3102.95	27%	615.08	650.40	3075.38 ↓	23%	626.03	739.90	3130.14 ↑	22%
User B	562.86	757.83	2814.32	24%	640.39	816.14	3201.93 ↑	24%	762.80	824.12	3813.98 ↑	27%
User C	366.83	490.61	1834.13	16%	345.89	462.52	1729.47 ↓	13%	299.60	448.60	1497.98 ↓	11%
User D	724.90	779.64	3624.48	32%	704.50	840.63	3522.48 ↓	27%	829.39	937.53	4146.93 ↑	29%
User E	23.51	23.76	117.55	1%	314.74	455.60	1573.70 ↑	12%	299.12	452.10	1495.60 ↑	11%

	User A	User B	User C	User D	User E
% Reduction in energy consumption	0.0%	24.6%	-12.0%	5.8%	1205.5%

5. Comparison between daily Non Business hours (8 pm-8 am) Floor & Sample Employee workstation energy consumptions

Baseline	Avg. Consumption	Peak load	Total Consumption
Floor (KW-Hr)	41.93	51.61	209.66
Sample Employees (KW-Hr)	0.50	0.91	2.51

Game Period (Week 1)	Avg. Consumption	Peak load	Total Consumption	% Increase
Floor (KW-Hr)	45.64	50.04	228.18	8.83%
Sample Employees (KW-Hr)	0.61	0.95	3.04	20.84%

Game Period (Week 2)	Avg. Consumption	Peak load	Total Consumption	% Increase
Floor (KW-Hr)	46.44	53.72	232.20	10.75%
Sample Employees (KW-Hr)	0.53	0.56	2.64	5.00%

6. Breakdown of Sample Employee workstation energy consumptions into individual configurations for daily Non-Business Hours (8:00 pm to 8:00 am)

	Baseline				Game Period (Week 1)				Game Period (Week 2)			
	Avg. Consumption (W-Hr)	Peak load (W-Hr)	Total Consumption (W-Hr)	% Share of total employee consumption	Avg. Consumption (W-Hr)	Peak load (W-Hr)	Total Consumption (W-Hr)	% Share of total employee consumption	Avg. Consumption (W-Hr)	Peak load (W-Hr)	Total Consumption (W-Hr)	% Share of total employee consumption
User A	83.19	331.00	415.95	17%	20.62	20.77	103.11	3%	20.79	20.94	103.97	4%
User B	341.77	510.19	1708.87	68%	516.55	846.00	2582.74	85%	425.87	425.87	2129.35	81%
User C	35.70	60.80	178.51	7%	27.77	28.81	138.84	5%	35.89	35.89	179.47	7%
User D	19.13	20.38	95.63	4%	18.50	18.80	92.49	3%	20.71	20.71	103.54	4%
User E	22.66	23.45	113.30	5%	23.73	30.91	118.65	4%	24.33	24.33	121.66	5%

	User A	User B	User C	User D	User E
% Change in energy consumption from Baseline to Game period	-75.1%	+37.9%	-10.8%	+2.5%	+6.1%

7. Awareness progress log documentation from the game

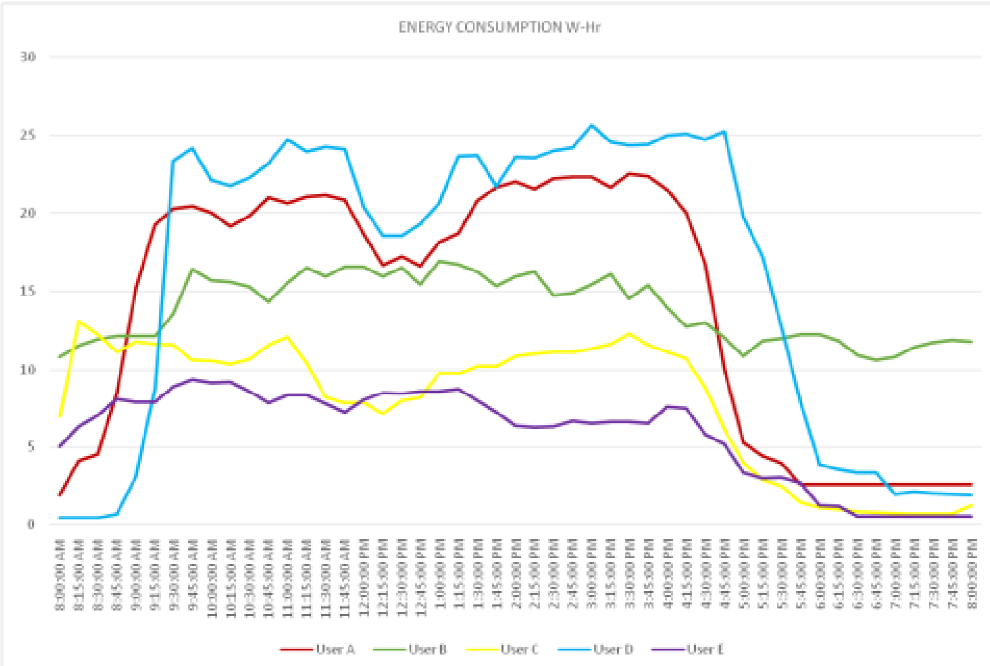
8. Awareness progress log values from the documentation

Baseline	Josh			Neha			Stephanie & Burton			Amanda			Stephanie		
	9-May			10-May			11-May			12-May			13-May		
	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm
Monitors	36	50	42	33	22	30	35	14	44		104		21	30	28
Task lights	3	4	3	0	0	0	0	0	1		2		0	0	0
Common area lights	7	8	10	6	6	6	6	5	2		21		8	5	2

Week 1	16-May			17-May			18-May			19-May			20-May		
	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm
	Steph	Steph	B	C	D	A	B	C	D	A	B	C	D	A	B
Monitors	19	26	9	1	8	5	1	3	9	4	18	0	1	4	5
Task lights	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common area lights	6	6	2	0	2	2	0	1	1	6	2	1	0	1	1

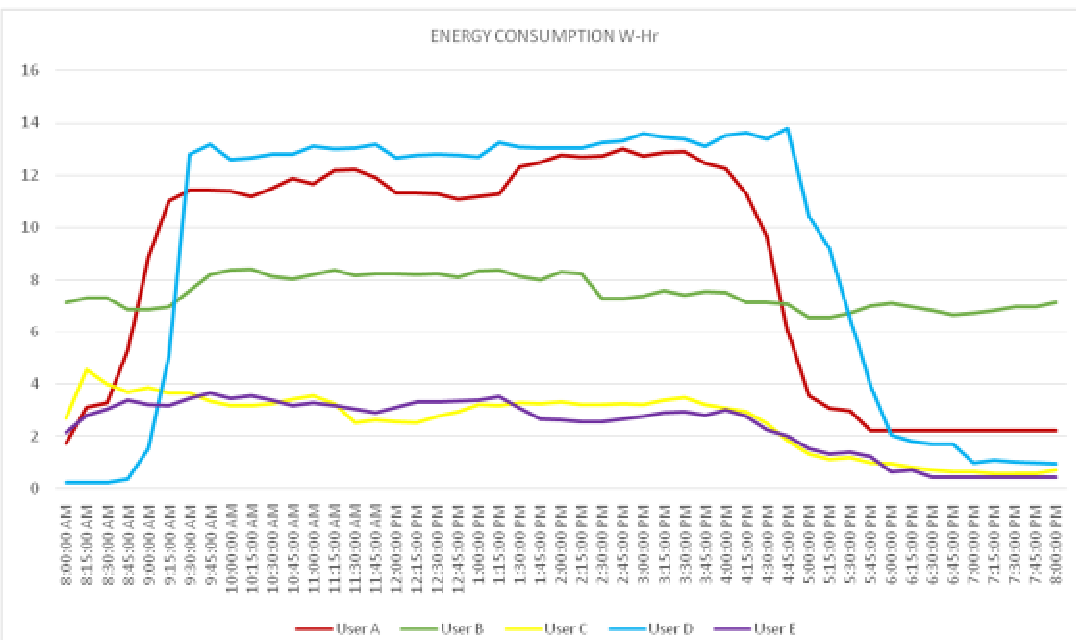
Week 2	23-May			24-May			25-May			26-May			27-May		
	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm	8-9am	12-1pm	5-6pm
	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A
Monitors	2	0	3	4	7	1	1	5	2	1	10	1	3	3	1
Task lights	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Common area lights	0	4	1	1	1	2	0	1	1	1	0	2	0	1	0

9. Average user energy consumption (W-Hr) of during- 04/21-05/15



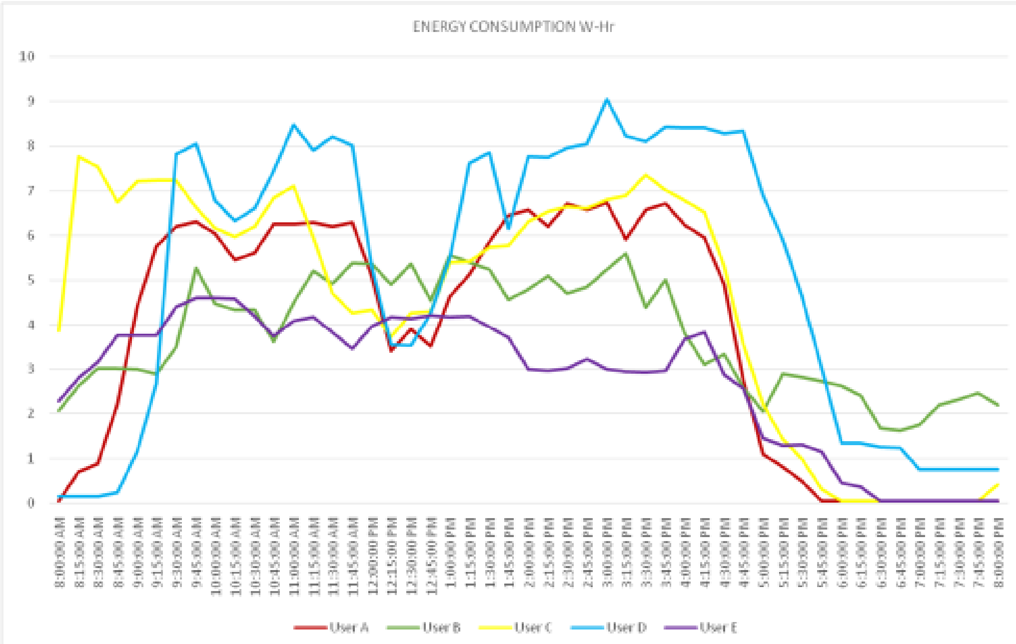
	User A	User B	User C	User D	User E
Avg. Energy Consumption (W-Hr)	14.10	13.90	7.93	16.13	5.88

10. Average user energy consumption (W-Hr) of Tower/Surface during- 04/21-05/15



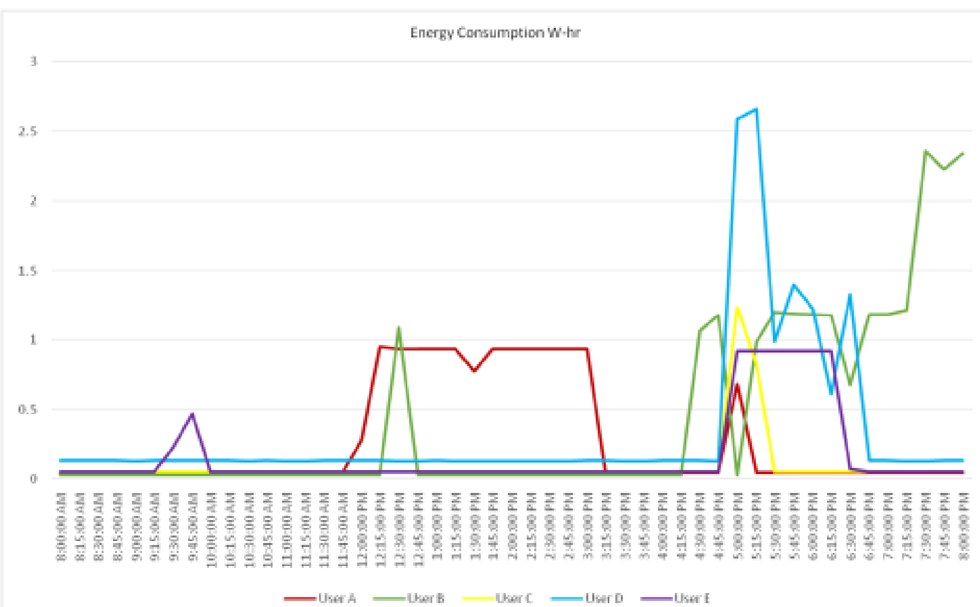
	User A	User B	User C	User D	User E
Avg. Energy Consumption (W-Hr)	8.47	7.54	2.55	9.03	2.39

11. Average user energy consumption (W-Hr) of Monitors during- 04/21-05/15



	User A	User B	User C	User D	User E
Avg. Power Consumption (W-Hr)	3.83	3.79	4.55	5.14	2.80

12. Average user energy consumption (W-Hr) of Monitors during weekends- 04/21-05/15



	User A	User B	User C	User D	User E
Avg. Energy Consumption (W-Hr)	0.28	0.43	0.09	0.33	0.00

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