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WHITE PAPER ON POWER DENSITIES – OFFICE DEVELOPMENTS

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WHITE PAPER ON POWER DENSITIES – OFFICE DEVELOPMENTS

1.0 EXECUTIVE SUMMARY

The purpose of this paper is to assist in updating the present lighting and equipment power densities in our policy MEP-07 (Electrical Network Design). With the increasing use of the energy efficient equiments and lighting there was an opportunity to optimise the numbers, however the impact of increasing occupancy (from existing policy (7sqm/person and 0.9 diversity) to market trends (45sqft/person) were also considered in this exercise.

Basis of recommendations:

1. Excelus survey/audit data
2. External benchmarks

2.0 INTRODUCTION

The lighting and power densities considered in our policy presently are:

Description	Density W/sqft	Diversity	Diversified W/sqft
Lighting	1	0.8	0.8
Power - ithink, Supremus	3.2	0.88	2.816
Power - Excelus	3.6	0.88	3.168

Lighting Densities – reasons for update:

1. As we are going for LEED ratings in all the office buildings, we are mandated to consider the lighting density maximum of 80% of ASHRAE 90.1 levels, which itself is 0.88 (excluding diversity)
2. This also on actual terms is lower due to present use of LEDs, as will also be evident in the subsequent sections.

Power Densities – reasons for update:

1. Our present power densities translates to an equipment load of 250W-300W per seat, which was a norm until a few years ago, however it has now reduced to sub 100W per laptop and remains close to 250W per work station.
2. While the per seat load can be considered low, we must account for tighter occupancies as seen in recent leasing scenarios (e.g. HDFC at Palava 1 – iThink A, @45sqft/person)

3.0 ANALYSIS

The analysis in this report is based on the actual Excelus data as well as external feedback.

3.1 External Feedback

- Infosys considers an LPD of 0.6W/sqft and EPD of 1.5W/sqft (for occupancy of 100sqft/person)
- BH considers an LPD of 0.8W/sqft and EPD of 2.5W/sqft on their other projects (occupancy 80sqft/person)
- AECOM is considering an LPD of 0.6W/sqft and EPD of 1.7W/sqft on their latest TRIL commercial development (for occupancy of 80sqft/person)

- Various other references, where the lighting densities are within 0.8W/sqft and equipment power densities within 2.5W/sqft

3.2 Excelus data

In the recent energy audit at Excelus (final overall report awaited), we have found that the above benchmarks are relevant when compared to our actual consumption patterns, as follows:

Description	Unit	7th floor	8th floor	9th floor	10 floor	Overall
Lighting (MD)	kW	10.6	21.9	10.4	16.9	59.8
Equipment Power (MD)	kW	29	46	40	37	151.8
Area	sqft	19,884	19,884	15,732	18,233	73,734.1
Lighting power density	W/sqft	0.53	1.10	0.66	0.93	0.81
Equipment power density	W/sqft	1.45	2.34	2.52	2.02	2.06
Occupancy	nos	261	377	249	290	1177
Lighting	W/person	40.5	58.0	41.9	58.2	50.79
Equipment, Power	W/person	110.3	123.3	159.3	127.0	128.94
Occupancy	sqft/person	76.2	52.7	63.2	62.9	62.65

Insights:

- Lighting – Lighting densities of our 7th and 9th floor which were finished later and have larger proportion of LED lights are much lower
- Power – Average equipment power per person is 130W/person

3.3 Occupancy adjustments

If we consider the recent lease trends where the tenants are having occupancies close to 45sqft/person, we can infer as follows:

- Lighting densities remain same for the overall floor, even if the occupants increase or decrease. It is safe to consider a scenario where the diversified lighting density in a project will be close to 0.7W/sqft
- Power densities if extrapolated considering a per seat average of 125W, can be considered as 125/45=2.77W/sqft

4.0 RECOMMENDATION

The above analysis helps us to recommend as follows:

	Present			Recommended		
Description	Density W/sqft	Diversity	Diversified W/	Density W/sqft	Diversity	Diversified W/sqft
Lighting	1	0.8	0.8	0.8	0.9	0.72
Power - ithink, Supremus	3.2	0.88	2.816	3	0.9	2.7
Power - Excelus	3.6	0.88	3.168	3	0.9	2.7

This will help with marginal decrease in load, however sufficient for expected higher populations in future.