# **Example of Electrical Load Estimation (for total power supply capacity)**

(For illustration only, data might not be practical.)

## (1) <u>Estimation of Electrical Loading</u>

### A. Landlord Services

	1. Lifts & escalators	<b>7</b> 50 1 1 1
	- lifts (15 nos. x 50 kVA) $(10 \times 10^{-10} \text{ kVA})$	750 kVA
	- escalators (10 nos. x 25 kVA)	250 kVA
	2. Water services	200 1-374
	- include fresh water & flush water pumps, fire &	300 KVA
	sprinkler pumps, sump pumps, etc.	
	5. General lighting and power	200 1-374
	- plant rooms, int lobbles, stars, shopping	200 K VA
	aracades, refuse area, etc.	1500 1-1/4
	Sub-total	1500 K VA
	Taking diversity of 0.95 -	1425 kWA
		1423 K VA
в	A/C Chiller Plant	
D.		
	- assume 1.2 kVA/TR and diversity of 0.95.	
	2484 TR x 1.2 kVA/TR x 0.95	2832 kVA
		========
C.	HVAC Equipment	
	- assume 0.6 kVA/TR and diversity of 0.8:	
	2484 TR x 0.6 kVA/TR x 0.8	1192 kVA
D.	Tenant Loads (O/I = office/industrial)	
	1. $O/I$ Tower = 25425 sq.m x 0.16 kVA/sq.m	4068 kVA
	2. Commercial Floors = $8096 \text{ sq.m x } 0.1 \text{ kVA/sq.m}$	810 kVA
	Sub-total	4878 kVA
-		
E.	Basement Carparks	
	0.001344/	
	- assume 0.02 kVA/sq.m:	
	3806 sq.m x 0.02 k vA/sq.m	/6 KVA

#### Summary:

	Loading	No. of Tx
A. Land Services	1425 kVA	1 Tx
B. A/C Chiller Plant	2832 kVA	2 Tx's
C. HVAC Equipment	1192 kVA	)
D. Tenant Loads	4878 kVA	) 4 Tx's
E. Basement Carparks	76 kVA	)
Total maximum demand	10403 kVA	7 Tx's

Taking demand factor of 0.95, peak demand is estimated to be: 10403 x 0.95 = 9883 kVA

Therefore, 7 nos. of 1.5 MVA transformers are provided.

Total installed capacity =  $7 \times 1500 = 10500 \text{ kVA}$ 

Spare capacity =  $(10500 - 9883) / 9883 \times 100\% = 6.2\%$ 

The spare capacity prepares for future expansion and addition of loading in the building.

#### (2) Estimation of Essential Loads

		Estimated Loads
1.	Firemen's lift (1 no.)	50 kVA
2.	Fire pumps & sprinkler pumps	100 kVA
3.	Essential lighting & exit signs	50 kVA
4.	F.S.control, PABX, central monitoring	40 kVA
5.	Essential ventilation & staircase pressurization	100 kVA
6.	Others	40 kVA
	Total =	380 kVA

An emergency generator of **400 kVA** will be installed to maintain the essential services during mains power failure.

#### (3) <u>Electrical Supply Arrangement</u>

The electrical supply distribution system comprises the landlord and the tenant systems.

Three arrangements of Tx rooms for the 7 nos. Tx's are considered:

(a)	in three Tx rooms	 3, 3, 1 Tx's
(b)	in three Tx rooms	 3, 2, 2 Tx's
(c)	in four Tx rooms	 2, 2, 2, 1 Tx's

Options (b) & (c) occupy slightly more floor space. Also, considering the division of tenant and landlord loads, option (a) is proposed and the loading of the Tx's will be arranged as follows:

i.	Landlord Tx room	 landlord services chiller plant	1 Tx 2 Tx's
ii.	Tenant Tx rooms	 O/I tower Commerical floor & B/F	3 Tx's 1 Tx