4. TECHNICAL CALCULATION

4.1. COOLING LOAD BREAKDOWN CALCULATION

External heat gains have been calculated using software liNear according to ASHRAE 2013 – Nonresidential Cooling Load Calculation; for more information see Appendix 1: LINEAR COOLING LOAD CALCULATION.

NOTES:

- It is assumed that batteries inside the Power Room will be cooled down throughout the 24 hours after discharge.
- Ventilation latent heat load created by supplying outdoor air to the rooms is equal to:
  - **1,1 kW** for Power Room
  - **0,6 kW** for MV Room
- All mechanical equipment can support design IT load at design input parameters listed in Table 4 and Table 5**Error! Reference source not found.**. If design input parameters change, additional calculation must be made to confirm if cooling capacity of mechanical equipment is sufficient.

Table 4: Cooling Load Calculation – Power Room

COOLING LOAD BREAK DOWN CALCULATION							
SPACE NO.	SPACE NAME	EQUIPMENT TYPE	EQUIPMENT NO.	EQUIPMENT UNIT	EQUIPMENT ΣSENSIBLE HEAT [kW]	ΣREQUIRED GROSS SPACE SENSIBLE COOLING CAPACITY [kW]	NOTE
GIUSSAGO /LISCATE							
-	POWER ROOM	UPS EXL S1 1250kVA	1	pcs	56,60	103,34	_N CONFIG.
		UPS EXM2 250kVA	1	pcs	10,15		
		MDB	1	pcs	12,80		
		DB UPS	1	pcs	1,00		
		GPL	1	pcs	0,30		
		BATTERY HEAT GAINS	9	pcs	1,13		
		MISC. ELECTRICAL EQUIPMENT AND CABLES LOSSES			8,50		
		LIGHTING (A ≈ 51m2)	10	W/m²	0,51		
		PDX FAN HEAT LOAD	4	pcs	10,4		
		VENTILATION HEAT LOAD			0,86		
		EXTERNAL HEAT GAINS			1,09		

LV POD heat load looks excessive and shall be rationalised, 78kW per POD was considered at stage-03.
Chiller has got no spare capacity to support additional cooling load.

1. Can we apply a utilisation factor to rationalise the equipment heat gain ?
2. CRAH's fan heat gain seems high (around 11%), any chance to enhance the unit's efficiency? our expectation is 5% max.
3. Cable heat gain seems high, can you double check please ?

Table 5: Cooling Load Calculation - MV Room

COOLING LOAD BREAK DOWN CALCULATION

SPACE NO.	SPACE NAME	EQUIPMENT TYPE	EQUIPMENT NO.	EQUIPMENT UNIT	EQUIPMENT ΣSENSIBLE HEAT [kW]	ΣREQUIRED GROSS SPACE SENSIBLE COOLING CAPACITY [kW]	NOTE
		GIUSSAGO /LISCATE					
-	**MV ROOM**	RMU	1	pcs	2,00	**27,96**	**_N CONFIG.**
		DRY TRANSFORMER	1	pcs	21,56		
		GPL	1	pcs	0,25		
		MISC. ELECTRICAL EQUIPMENT AND CABLES LOSSES		pcs	1,50		
		LIGHTING (A ≈ 20m2)	10	W/m²	0,20		
		PDX FAN HEAT LOAD	1	pcs	1,47		
		VENTILATION HEAT LOAD			0,43		
		EXTERNAL HEAT GAINS			0,55		

Can we apply a utilisation factor to rationalise the equipment heat gain ?