

Commercial Data Center Load Calculator

Turns rack count, rack load, PUE, UPS efficiency, voltage, phase, and growth allowance into data-center load and capacity planning values.

Generated October 10, 2026

<https://www.elecatrix.com/commercial-industrial-loads/commercial-data-center-load-calculator/>

Inputs

Input	Value	Unit
Rack count	100	racks
Average IT load per rack	8	kW/rack
IT utilization	75	%
PUE	1.4	x
UPS efficiency	0.95	x
Facility power factor	0.95	PF
Growth scenario margin	25	%

Results

Result	Value	Unit
IT load	600	kW
Facility load	840	kW
UPS input context	884.2105	kW
Facility apparent power	884.2105	kVA
Growth scenario facility load	1050	kW

Calculation details

Detail	Value	Unit
Calculation basis	IT load is rack count times average IT kW per rack times utilization. PUE converts IT load to facility load; UPS efficiency and power factor provide planning context.	

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Capacity boundary

Scenario estimate only; no UPS, generator, cooling, redundancy, utility service, interconnection, short-circuit, or final data-center design result is made.

Formulas

$$P_{IT} = N_{rack} \times P_{rack} \times (u/100)$$

$$P_{facility} = P_{IT} \times PUE$$

$$P_{UPS,in} = \frac{P_{facility}}{\eta_{UPS}}$$

$$S_{facility} = \frac{P_{facility}}{PF}$$

$$P_{growth} = P_{facility}(1+(g/100))$$

Warnings and limitations

This is an early capacity scenario, not a data-center electrical design. Rack diversity, cooling, UPS topology, redundancy, generator loading, utility service, harmonic current, and project requirements need separate engineering review.