



**Figure 2:
Typical Tier Attributes**

	Tier 1	Tier II	Tier III	Tier IV
Building Type	Tenant	Tenant	Stand-alone	Stand-alone
Staffing	None	1 Shift	1+Shifts	"24 by Forever"
Useable for Critical Load	100% N	100% N	90% N	90% N
Initial Build-out Gross Watts per Square Foot (W/ft ²) (typical)	20-30	40-50	40-60	50-80
Ultimate Gross W/ft ² (typical)	20-30	40-50	100-150 ^{1,2,3}	150+ ^{1,2}
Class A Uninterruptible Cooling	No	No	Maybe	Yes
Support Space to Raised Floor Ratio	20%	30%	80-90+% ²	100+%
Raised Floor Height (typical)	12"	18"	30-36" ²	30-36" ²
Floor Loading lbs/ft ² (typical)	85	100	150	150+
Utility Voltage (typical)	208, 480	208, 480	12-15 kV ²	12-15 kV ²
Single Points-of-Failure	Many + human error	Many + human error	Some + human error	None + fire and EPO
Annual Site Caused IT Downtime (actual field data)	28.8 hours	22.0 hours	1.6 hours	0.8 hours
Representative Site Availability	99.67%	99.75%	99.98%	99.99%
Typical Months to Implement	3	3-6	15-20	15-20
Year first deployed	1965	1970	1985	1995
Construction Cost (+ 30%) ^{1,2,3,4,5} Raised Floor Useable UPS Output	\$220/ft ² \$10,000/kW	\$220/ft ² \$11,000/kW	\$220/ft ² \$20,000/kW	\$220/ft ² \$22,000/kW

¹ 100 W/ft² maximum for air-cooling over large areas, water or alternate cooling methods greater than 100 W/ft² (added cost excluded).

² Greater W/ft² densities require greater support space (100% at 100 W/ft² and up to 2 or more times at greater densities), higher raised floor, and, if required over large areas, medium voltage service entrance.

³ Excludes land; unique architectural requirements, permits and other fees; interest; and abnormal civil costs. These can be several million dollars. Assumes minimum of 15,000 ft² of raised floor, architecturally plain, one-story building, with power backbone sized to achieve ultimate capacity with installation of additional components or systems. Make adjustments for NYC, Chicago, and other high cost areas.

⁴ Costs are based on 2005 data. Future year costs should be adjusted using ENR indexes.

⁵ See *Institute White Paper entitled Dollars per kW plus Dollars per Square Foot Is a Better Data Center Cost Model than Dollars per Square Foot Alone* for additional information on this cost model.