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Artificial Intelligence (AI) Data Center Costs and Build Schedules

The AI data center market is experiencing rapid expansion, with new $1 billion to $2 billion facilities announced almost weekly across the United States and international markets. In the next 5 years, approximately 2,500 new AI Data Centers are forecast to be built worldwide! Capital expenditures (CAPEX) in this sector continue to accelerate as demand for AI infrastructure grows. Current forecasts project that global investment in AI data centers will exceed $1 trillion across 2026 and 2027.

It is important to recognize that geographic location plays a major role in determining the overall construction cost of AI data centers. For example, projects in China and parts of Southeast Asia can be 30% to 40% less expensive to build than comparable AI facilities in the United States.

Although there are 195 countries worldwide, only approximately 30 to 35 have the technical capabilities, infrastructure, and skilled workforce required to develop advanced AI data centers. Today, the United States represents roughly 50% of the global market, while China accounts for nearly 40%. The remaining 10% is distributed across countries including the United Kingdom, Canada, Germany, France, Singapore, Japan, South Korea, India, and Australia.

Real estate and land acquisition costs vary dramatically across the United States and global markets, ranging from as little as $25,000 per acre to more than $1 million per acre. Key cost drivers include proximity to population centers, access to the electrical grid, and the availability of reliable large-scale power sources. Countries such as India and China often benefit from significantly lower land costs, providing a substantial economic advantage for large AI data center developments.

AI Data Centers are categorized into (4) basic tiers—Tier I, Tier II, Tier III, and Tier IV—each defined by their capacity, redundancy, sophistication and fault tolerance, which significantly impacts their availability and permissible downtime and cost.

Tier I (Lowest Cost) - These facilities are suitable for basic AI data / office IT applications, providing protection against human error and allowing complete shutdowns for maintenance. However, they lack safeguards against unexpected failures. It is forecast that approximately 125 of these types of facilities will be built worldwide in the next 5 years.

Tier II (Mid-Range Cost) - Designed for more critical environments than Tier 1. AI Tier II facilities allow component removal without shutdowns, although unexpected shutdowns could still occur. It is forecast that approximately 125 of these types of facilities will be built worldwide in the next 5 years.

Tier III (Mid-Range Cost) - **Approximately 40% of all new Data Centers will be Tier III type facilities:** In a Tier III AI data center, any part can be taken offline without affecting overall operations. This tier of facility will have much less down time per year than the previous tiers. It is forecast that approximately 1,000 of these types of facilities will be built worldwide in the next 5 years.

Tier IV (Highest Cost) - **Approximately 50% of all future Data Centers will fall into this category:** Represents the highest level of fault tolerance in an AI data center. These facilities are highly sophisticated, fault-tolerant and ensure continuous operations with complete redundancy for power and cooling. This highest tier level results in almost zero down time per year. It is forecast that approximately 1,250 of these types of facilities will be built worldwide in the next 5 years.

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Artificial Intelligence Tier I – IV Benchmarks:

General Description	Tier I	Tier II	Tier III	Tier IV
Data center Size Small (Square Feet)	10,000 to 100,000	10,000 to 100,000	10,000 to 100,000	10,000 to 100,000
Data center Size Large (Square Feet)	500,000 to 2,500,000	500,000 to 2,500,000	500,000 to 2,500,000	500,000 to 2,500,000
EPC effort - Small Facility	12 to 24 months	12 to 24 months	12 to 24 months	12 to 24 months
EPC effort - Large Facility	24 to 36 months	24 to 36 months	24 to 36 months	24 to 36 months
Total Facility SF $ Cost - low	**700**	**900**	**1,100**	**1,500**
Total Facility SF $ Cost - high	**800**	**1,000**	**1,200**	**1,700**

Cost Breakdown of Tier I – IV Data Centers:

Cost Breakdown Tier I – IV Facility	%
Land Purchase as a % of final cost	5% - 10%
Sitework incoming utilities / parking / fencing / landscaping / irrigation system as a % of final cost	5% - 10%
Building Shell & Core - external walls, windows, roof, internal offices / support offices – areas / cafeteria / reception area / visitors area / raised floors as a % of final cost	15% - 20%
Mechanical / Plumbing Systems / Toilet facilities / Fire detection systems as a % of final cost	10% - 15%
HVAC / AHU's / Ductwork / HEPA Filters / Balancing system as a % of final cost	10% - 15%
Sophisticated Cooling Water / Fluid systems as a % of final cost	20% - 25%
Electrical Power Infrastructure / Computer hardware, power distribution / cables, racks, rack equipment / servers / lighting / internet UPS / Switchgear / Sub- Stations / MCC's Transformers as a % of final cost	20% - 25%
Engineering / Detailed Design as a % of final cost	10% - 15%
Project & Construction Management / Commissioning as a % of final cost	5% - 10%
Total	**100%**
Cost per MW Low ($ million)	$8- $12
Cost per MW High ($ million)	$12- $22