

WHITE PAPER The Short One AI Power Consumption: The Coming Crisis (Short Analysis – December 2025)

Executive Summary

Global data center electricity demand is exploding, driven by AI. Current consumption: ~860 TWh/year (~98 GW average load). Projections show doubling by 2030 and tripling by 2035. By mid-century, AI alone could require 400-600 GW — more than the current electricity consumption of the UK, France, and Germany combined.

Earth's announced projects cover only ~30-50% of projected demand. The result: a widening "GW canyon" that risks stalling AI progress unless new infrastructure paradigms emerge.

Key Projections Table (Mid-Range GW Capacity Needs)

Earth Supply Reality

Announced mega-projects (Stargate, Colossus, Hyperion, etc.) deliver ~157 GW by 2042. After that, terrestrial buildout plateaus due to grid constraints, permitting delays, water scarcity, and land competition. Cost per GW on Earth: \$25-50 billion, with ongoing electricity/cooling opex in the billions annually.

The Canyon

Post-2035, demand outstrips known supply by hundreds of GW. Without innovation, AI scaling hits a hard wall — compute rationed to highest bidders, frontier model training becomes uneconomic.

Pathways Forward

Efficiency gains help but trigger Jevons Paradox: cheaper compute creates more demand. The release valve: resilient, low-opex alternatives that bypass Earth's physical and regulatory limits.

This isn't speculation — it's math. The crisis is coming. The opportunity is now.

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Year	AI/Data Center Demand (GW)	Notes/Sources
2025	~100	Gartner/IEA baseline
2030	150-250	IEA, Goldman Sachs, Gartner
2035	200-350	BNEF, IEA Lift-Off scenario
2042	300-450	Moderate extrapolation
2052	400-600	Tapered high scenario with efficiency gains