White Paper

Power, Capital and the Future of Data Center Infrastructure

Executive Summary

The rapid expansion of AI and data center infrastructure has reached a structural inflection point. While demand for digital capacity continues to accelerate, the limiting factors are no longer technology or real estate. Instead, power availability, regulatory friction, environmental accountability and the ability to govern capital-intensive programs at scale have become the dominant constraints.

Insights from Pacific Telecommunications Council (PTC) 2026 make one reality clear: data centers are no longer isolated digital assets. They are long-lived infrastructure portfolios operating at the intersection of energy systems, capital markets, regulation and community impact. Decisions once made at the project level are now portfolio-level tradeoffs with material financial, political and societal consequences.

Global electricity load is expected to grow by approximately 45–60% by mid-century, driving the need for large-scale additions of new power generation capacity. Yet grid infrastructure, permitting timelines and supply chains were not designed for this pace or scale.

A critical shift is underway: speed to power now outweighs cost to power. Waiting years for grid interconnection carries significant opportunity cost, driving increased adoption of behind-the-meter generation, hybrid energy portfolios and alternative sourcing strategies. These choices elevate decisions from operational procurement to board-level capital tradeoffs.

The limiting factor for data center growth is no longer technology or real estate. It is power availability and the ability to govern capital at infrastructure scale.

Contruent

Across the United States, Europe and the Asia-Pacific region, the common requirement is confidence: confidence in forecasts, scenarios and decisions made under pressure. As capital commitments move earlier in the lifecycle, organizations face greater cost exposure, risk and scrutiny, often with limited visibility across complex, multi-year programs. Those that succeed will move beyond project-level cost tracking to portfolio-level governance, enabling faster, more defensible decisions in an increasingly complex infrastructure environment.

The Power Imparative

Demand Is Outpacing the Grid

Global electricity demand is projected to increase by roughly 45–60% by 2050, driven by electrification, digital infrastructure and industrial growth. This growth will require sustained, large-scale additions of new generation capacity worldwide over the coming decades, depending on regional mix and policy scenarios.

The current grid infrastructure is aging and was designed for a very different demand profile. Utilities and transmission systems were not planned for AI-scale growth. Interconnection backlogs, long permitting cycles and under-investment have created structural delays that conflict directly with hyperscale and enterprise deployment timelines.

Speed to Power > Cost to Power

One of the clearest signals from PTC 2026 was a reprioritization of decision criteria. Speed to power now outweighs cost to power. The opportunity cost of waiting is reflected in lost revenue, delayed AI capacity and missed market windows. These losses often exceed marginal differences in energy pricing.

As a result, power sourcing decisions have shifted from operational procurement choices to strategic capital allocation decisions made at the executive and board level, often across multiple programs and regions simultaneously.

Power sourcing decisions have shifted from operational procurement to strategic capital allocation made at the executive and board level.

Behind-the-Meter and Hybrid Generation

To bypass grid constraints, many operators are accelerating adoption of:

- Natural gas and fuel cells
- Energy storage
- Hybrid portfolios combining grid and on-site supply
- Long-term exploration of small modular reactors (SMRs)

These approaches improve predictability and resilience but introduce new layers of capital complexity, regulatory exposure and stakeholder scrutiny. The evaluation lens has expanded from unit cost to total cost of energy and portfolio-level opportunity cost.

The Evolving Data Center Ecosystem

From Digital Asset to Infrastructure Participant

Data centers are increasingly expected to function as infrastructure stewards supporting grid stability, contributing community value and aligning energy strategies with regional needs. Innovation is not the

limiting factor; regulatory alignment and stakeholder coordination now define feasibility and speed.

Data centers now function as active participants in energy and infrastructure ecosystems. In many regions, they are being asked to fund grid upgrades, secure independent generation capacity and operate as stabilizing assets rather than passive consumers. This shift blurs traditional boundaries between utilities, developers, operators, regulators and communities.

Cost, Capacity and Carbon

Three variables dominate strategic decision-making:

- Cost: increasingly volatile due to inflation and supply-chain constraints
- Capacity: the primary constraint and gating factor
- Carbon: important, but often secondary to speed and reliability

No single energy technology can meet demand alone. Hybrid portfolios balancing speed, flexibility and regulatory feasibility are becoming the norm.

Environmental and Community Accountability

Environmental impact is no longer a downstream compliance item. As behind-the-meter generation and hybrid energy strategies expand, air quality, emissions, water usage and land impact are increasingly shaping whether infrastructure programs move forward at all.

Community perception has become a first-order delivery risk, influencing permitting outcomes, site viability and long-term operating certainty.

What was once addressed late in the delivery lifecycle is now an early-stage program risk with direct implications for schedule certainty and capital allocation.

Key pressures emerging across regions include:

- Air quality and emissions scrutiny tied to on-site generation
- Water usage constraints, particularly in water-stressed regions

- Land-use and zoning opposition at the community level
- Expanding disclosure expectations tied to sustainability and ESG commitments

From Perception to Proof

For decades, data centers operated largely out of public view. Today, they are highly visible and widely debated, often without a clear understanding of their role, impacts or benefits. In the U.S., this shift has brought increased scrutiny from local governments, utilities and residents concerned about power use, reliability and land impact.

As a result, community perception has become a first-order delivery risk, influencing permitting outcomes, site viability and long-term operating certainty. Successful programs demonstrate tangible local benefit, not just compliance.

Community resistance is increasingly shaped by expectations for evidence. Regulators and governing bodies expect leaders to demonstrate why specific infrastructure and delivery strategies were selected, how environmental, social and community impacts were evaluated, and how risks will be mitigated over time.

Leading organizations are moving from reactive engagement to proactive education, helping communities understand how data centers can strengthen local infrastructure rather than strain it. Examples include funding grid upgrades that improve reliability for surrounding neighborhoods, participating

in demand-response programs that reduce peak stress on the grid, or co-investing in energy infrastructure that supports broader community growth.

This shift requires organizations to support their claims with clear documentation rather than relying on narrative alone. Decision rationale must be transparent, traceable and defensible.

Environmental Accountability as a Governance Challenge

Environmental impact now intersects directly with capital governance. Program leaders must manage environmental risk alongside financial exposure, delivery risk and multi-year regulatory change. Organizations that integrate environmental considerations into portfolio-level governance are better positioned to preserve schedule certainty and social license to operate.

Regional Perspectives

United States

In the U.S., power availability is increasingly dictated by interconnection queues, aging transmission infrastructure and regional market rules. PJM Interconnection, which manages power markets across much of the Mid-Atlantic and Midwest, illustrates how data center delivery is often constrained by speed to power, not demand. While generation capacity may exist regionally, interconnection queues, required transmission and substation upgrades, cost-allocation debates, and permitting timelines often delay when power can be delivered to a specific site. In practice, power availability is determined by how quickly infrastructure can be approved, funded and built.

Across regions, the challenge is rarely demand for digital infrastructure. The constraint is how quickly power and supporting infrastructure can be approved, funded and delivered.

As a result, data center owners are increasingly asked to fund grid upgrades, justify power consumption publicly and demonstrate community benefit. These pressures are accelerating interest in behind-the-meter generation and hybrid power strategies as a way to reduce delivery risk.

Increasingly, regulators and utilities expect large data centers to operate as active grid participants rather than passive consumers, contributing to reliability, resilience and long-term system planning.

Europe

Europe presents a highly fragmented operating environment, with national power markets, regulatory and approval processes, and sovereignty requirements varying widely. Sovereign cloud and AI initiatives are driven primarily by regulatory and data-residency mandates rather than pure demand.

Speed to market in Europe is largely determined early through planning, capital discipline and navigation of local political dynamics. Clean power availability, particularly in Nordic regions, remains a key differentiator for data center development and investment.

Asia Pacific

Across much of APAC, generation capacity exists but transmission and grid readiness lag. Power acquisition timelines can extend for years, with wide variability by country.

Policy clarity, water usage, workforce readiness and modular, flexible design approaches are critical differentiators. Not all announced projects will be viable, reinforcing the need for disciplined portfolio planning.

Implications for Capital Program Leaders

From Projects to Portfolios

The consistent message from PTC 2026 is that infrastructure decisions are no longer isolated project choices. They are interconnected portfolio decisions with long-term consequences across energy, finance, regulation, environmental impact and community trust.

Confidence as a Strategic Asset

In an environment defined by uncertainty, leaders require forecast integrity, scenario planning and transparent, defensible decision frameworks. Confidence in decision-making, supported by clear visibility into cost, risk and outcomes, has become a competitive advantage.

Why Contruent

As infrastructure portfolios grow in size and complexity, leaders are being asked to make earlier, higher-stakes decisions under greater scrutiny. Power constraints, regulatory fragmentation, environmental accountability and delivery risk are no longer isolated challenges. They are interconnected forces shaping capital outcomes.

Contruent supports capital program leaders by providing portfolio-level visibility, forecast integrity and decision confidence across complex infrastructure environments. By connecting cost, schedule and risk into a single, defensible view, Contruent enables organizations to:

- Evaluate tradeoffs across programs and regions
- Understand the cost and impact of delay
- Defend decisions with transparent, data-backed rationale
- Govern capital with confidence as conditions change

In an environment where speed, accountability and certainty matter more than ever, Contruent helps leaders move faster—without sacrificing control or credibility.

Conclusion

The next decade of data center and AI infrastructure growth will be shaped less by technological capability and more by the ability to govern capital under constraint. Power availability, regulatory complexity, environmental accountability and delivery speed are converging to redefine how infrastructure portfolios are planned and defended.

Organizations that move beyond cost tracking toward integrated portfolio governance will make faster, more confident decisions, and sustain growth in an increasingly complex infrastructure landscape.

Contruent

55 Shuman Blvd. Suite 200
Naperville, IL 60563
+1 630-318-0444
www.contruent.com

Contruent