Ascend Analytics
MARKET INSIGHTS

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Data Centers and US Energy Markets: The Need for Speed

Sitting squarely at the epicenter of the AI revolution, data centers are driving immense load growth in energy markets.

This creates significant renewable energy growth opportunities for developers and utilities as these large corporate consumers with clean energy goals scramble to secure supply as quickly as possible. At the same time, energy markets face a number of challenges, such as supply chain issues, jammed interconnection queues, and 'Black Swan' events such as the recent DeepSeek announcement, that threaten to derail growth rates.

In a recent webinar, Dr. Gary Dorris, CEO at Ascend Analytics, joined Paul Saferstein, CFA, Senior Advisor for Data Centers, and Robert LaFaso, Director of Valuation and Forecasting, to discuss how data centers are impacting US energy markets, how developers and utilities can align power procurement and project development activities with data center needs, and how to monetize renewable energy development opportunities in a rapidly evolving landscape.

Key Takeaways

- Artificial intelligence in energy markets mean significant growth opportunities for renewable project development as the AI era advances. Potentially, more than 80 GW of capacity will need to be built to keep up with data center demand, IT refresh and computing needs, and distributed network buildout.

- Given robust demand and the high profitability of data centers, hyperscalers (the big 5-6 large corporate cloud service providers that rely on data centers as a fundamental component of their business) currently prioritize speed to market over carbon reduction and cost.

- In accordance with Jevons' Paradox, an economic phenomenon in which gains from energy efficiency result in increased resource use, IT efficiency has driven adoption and consumption during the past 20 years. Energy consumption, however, has been flat until the start of the AI era. The coming IT refresh cycle will likely drive trillions in IT spending.

- AI graphic processing units (GPUs) serve as the key driver for data center load growth. Energy intensity increases will replace silicon efficiency gains while more linear power-driven gains will replace chip-level exponential improvements. For data centers, energy load growth would likely follow IT industry S-curve precedents if it were not for supply chain bottlenecks.

- While data centers have traditionally clustered in fiber-rich, low-latency locations such as northern Virginia, Dallas, or northern California, new data center development will transition toward regions, such as the central US, that offer low-cost, low-emissions resources along existing fiber routes.

- Leveraging analysis from Ascend Market Intelligence™, the webinar offers tips on where to build and optimize for cost, as well as help utilities navigate negotiations underscored by the 'inconvenient truth' that hyperscalers are able to fund all of their generation, transmission, and distribution requirements (the 'inconvenience' being lower marginal returns of such energy infrastructure investment).

Power Market Reality: Hyperscalers Prioritize Speed Over Carbon, Cost

As the AI era advances, significant opportunities exist for clean energy development. Potentially, more than 80 GW of capacity will be needed to keep pace with skyrocketing demand driven by data centers, IT refresh, computing needs, and distributed network buildout.

In the context of data centers, which sit at the heart of the AI revolution, speed to market has become the top priority. Companies such as Microsoft, Google, Meta, and Amazon are seeking capacity quickly – ideally within three years. However, limited capacity and backlogged interconnection queues, among other challenges, currently hinder the ability to maximize growth rates.

Carbon reduction remains important, although as a secondary priority. Data centers continue to maintain commitments to sustainability and 24/7 clean energy in the long term; in reality, any power source will be utilized if it can help data centers come online quickly. Though cost of energy and total cost of ownership (TCO) remain important, cost serves as a tertiary consideration to speed and carbon reduction, given the high profitability of hyperscalers.

Data Center Demand and Supply: Navigating Uncharted Territory

In the near term, the specifics of what AI-driven demand growth might entail remain unclear. For example, estimated expected load growth during the next 3-4 years results in 100% variability – which obviously proves unhelpful for utilities, developers, or investors. Several factors, such as a lack of clarity with regard to AI monetization, limited publicly available data, and a wide range of untested assumptions, limit the ability to precisely understand how the demand side might evolve within the next several years.

Other challenges exist, as well, that could derail growth rates. These include supply chain issues, jammed interconnection queues, and limited engineering, procurement, and construction (EPC) availability. They also include 'Black Swan'-style uncertainties such as the recent DeepSeek announcement from China that appeared to undercut many fundamental assumptions related to AI development time, GPU/energy intensity, and cost.

Full Speed Ahead for Energy Load Growth

Even with possible challenges, it remains highly probable that the AI infrastructure buildout will continue in earnest. Data centers, and specifically AI GPUs, serve as a primary driver of load growth. During the AI era, Moore's Law, in which the number of transistors on a computer chip doubles every two years or so with minimal cost increases, no longer applies. Instead, energy intensity increases

replace silicon efficiency gains while more linear power-driven gains replace chip-level exponential improvements. For data centers, S-curve energy load growth would be likely if it were not for supply-chain bottlenecks.

Other factors play a key role, too. In accordance with Jevons' Paradox, an economic phenomenon in which gains from efficiency result in increased resource use, IT efficiency has driven adoption and consumption during the past 20 years. During that same period, energy intensity remained flat. Following the start of the AI era, however, energy intensity has increased, along with a need for

New Data Center Build Will Follow Low-Cost Power

Since the Industrial Revolution, industry location has followed cheap power. Today, cheap power is coupled with the notion of zero-carbon power. Thus, data centers will transition away from the places they have historically clustered – fiber-rich, low-latency markets such as those in northern Virginia or northern California – and move toward locations that offer low-cost, low-emissions resources and fiber routes.

Ultimately, power availability drives data center location. Latency for AI model 'training' becomes less important. The central US offers an abundance of low-cost renewable resources. Accordingly, a significant amount of recent data center development has been occurring in ERCOT and SPP.

Data Center Showdown: Utilities vs. Hyperscalers

Many utilities, however, have pushed back on data center requests, driven by multiple concerns: Should a regulated business take on merchant risk? Should a 'public good' cross-subsidize private enterprise? What about impacts to interconnection queues? In many power markets, tension is mounting between utilities and off-takers over who will pay for transmission upgrades and incremental capacity build.

In this context, an inconvenient truth emerges: hyperscalers have the ability to fund all of their generation, transmission, and development requirements while taking a very minimal capital expenditure hit. Whether a willingness exists to do so, however, remains rightly questionable since these are for-profit corporations.

Interested in Learning More?

Access the full webinar recording, which offers actionable solutions for developers, utilities, and corporate off-takers. The webinar also offers insights on where to build, how to plan for emissions, and how to optimize for cost.

AscendMI™ (Ascend Market Intelligence) delivers proprietary power market forecasts that have been trusted in hundreds of projects and resource planning activities, supporting over $25 billion in project financing assessments. Contact us to learn more.

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Ascend Analytics is the leading provider of market intelligence and analytics solutions for the power industry. The company's offerings enable decision makers in power development and supply procurement to maximize the value of planning, operating, and managing risk for renewable, storage, and other assets. From real-time to 30-year horizons, their forecasts and insights are at the foundation of over $50 billion in project financing assessments. Ascend provides energy market stakeholders with the clarity and confidence to successfully navigate the rapidly shifting energy landscape. Visit us at ascendanalytics.com

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