Opportunities for Rural Providers in the Age of Distributed AI and Edge Compute

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Fiber Broadband ASSOCIATION
Middle Mile Working Group

When fiber leads, the future follows.

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EXECUTIVE SUMMARY

Rural ISPs and electric cooperatives sit on a strategic opportunity to capture growing demand for edge compute and data center capacity by repurposing existing assets—fiber, central-office white space, land easements, and substation headroom. This white paper refines the idea into a focused plan that emphasizes electrical realities: power intensity, demand stability, procurement, and mitigation strategies. It ranks eight business options by commercial value and power fit, recommends a pragmatic rollout sequence, and provides concrete operational, commercial, and financing actions to convert rural infrastructure into predictable revenue and community benefit.

Based on data from Data Center Hawk, a company focused on analyzing data center real estate transactions, more capacity than the 3X trend has already been commissioned for the next three years. However, various constraints could prevent such a three-year construction plan from reaching full fruition by the end of 2027.

The number of new hyperscale centers to be constructed annually is forecast to reach 225 by 2032. (See Figure 2 below.) This assumes that hyperscale centers will continue to increase in size over time, as measured in megawatts per data center.

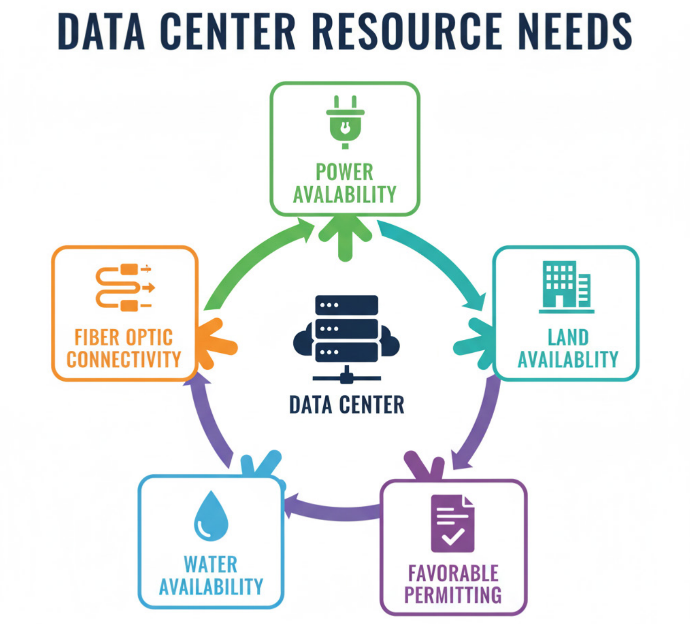
OPPORTUNITY

of communications and information flow supporting anchor institutions and homes. They have in front of them a large, national project to dramatically expand the broadband network to reach the underserved. This wave, driven by the internet service consumer shift from luxury to necessity, is being accelerated by funding from state, federal, low-cost debt, and private equity investment. It is incumbent upon leaders of internet service providers both execute on this expansion, and to lay out their strategy beyond this expansion wave so that they are prepared for the waves of investment that follow the broadband build-out.

One such incoming wave of investment that will touch the internet service provider market is the rapidly changing data center landscape. As demand for interconnection, co-location, and edge computing grows, ISPs are well-positioned to capitalize on this shift by repurposing available central office white space for network expansion or interconnection hubs.

Additionally, partnerships with data center providers offer ISPs a path to extend their reach, enhance service offerings, and participate more directly in the evolving digital infrastructure. These trends present a broader opportunity for ISPs to rethink their role in the ecosystem and unlock new value from existing assets while strengthening their position as a service provider.

The purpose of this white paper is to provide strategies that rural service providers can use to expand their opportunities in this untapped market.



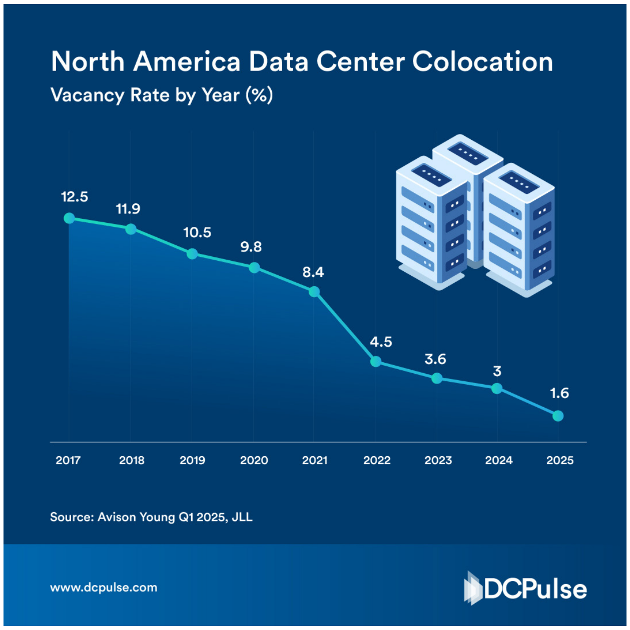
DATA CENTER MARKET NEEDS

A data center relies on a combination of real estate, power, water, and network resources for viable operation. Increasingly, operators are looking outside of traditional markets to place their data centers, driven especially by available power and the ability to secure large parcels of land near robust fiber routes. In established Tier 1 hubs, power constraints, long utility lead times, and land scarcity have created significant barriers to growth, forcing developers to explore secondary and emerging markets. These alternative locations often provide abundant, lower-cost power—frequently from renewable sources—along with access to water for cooling and favorable permitting environments. Additionally, advancements in long-haul fiber connectivity have made it possible for these regions to deliver the low-latency performance required for cloud and AI workloads. As a result, markets in the Midwest, Texas, and other power-rich areas are becoming strategic destinations for hyperscale and colocation providers seeking to balance cost, sustainability, and scalability.

The increasing demand for data center space is being driven by a convergence of trends in technology and business needs. Hyperscale cloud providers continue to expand aggressively to support global cloud adoption, while enterprises are migrating workloads from on-premises environments to colocation facilities for scalability and cost efficiency. At the same time, the explosive growth of artificial intelligence and machine learning applications has created unprecedented demand for high-density compute environments, which require significantly more power and cooling than traditional workloads. Streaming media, gaming, and IoT devices are also contributing to the surge, generating massive volumes of data that must be processed and stored closer to end users to reduce latency. These factors, combined with the rise of hybrid and multi-cloud strategies, have pushed colocation and hyperscale operators to rapidly expand capacity—yet supply has struggled to keep pace, resulting in record-low vacancy rates and long lead times for new builds.

1. Data Center Resource Needs, created with the assistance of Gemini, Google's AI tool

One metric is sufficient to highlight the constraints in the data center market: The vacancy rate for colocation data centers in the US has declined from 12.5% vacancy a decade ago to 1.6% vacancy in 2025. Even worse for those looking to secure available space, 72% of construction underway is pre-booked, meaning there is a long lead time for anyone looking to open or expand their leases. All options are on the table to expand available data center space and help expand the capacity for data center compute capacity, including building in secondary markets, repurposing existing industrial sites, and investing in modular or prefabricated facilities that can be deployed faster. Operators are also exploring partnerships with utilities to secure dedicated power capacity and leveraging renewable energy projects to overcome grid constraints. At the same time, network connectivity and access to long-haul fiber remain critical, influencing site selection even in emerging regions. These dynamics underscore a fundamental shift: the industry is moving from a model of abundant capacity to one where power, land, and connectivity dictate growth, forcing both providers and customers to plan years ahead.



The ongoing capacity needs will necessitate creative approaches as first-generation data center models meet with increasing challenges. As land, power, and water needs increase, opposition to large-scale data centers will likewise grow in many areas. This should usher in a new generation of sustainable data center models that will better match operator needs with local resources to improve community acceptance and adoption. These new, improved models will ensure we achieve sustainable computing and keep our country moving forward in the global race for dominance.

This is where rural providers like ISPs and their electric cooperative partners stand to win if they are prepared to capitalize. Rural providers have unique relationships within their local communities that can mean increased speed to market if these new models can meet certain criteria. For instance, if the data centers can be installed in smaller footprints, electric cooperatives can easily provide enough power to energize them within six months rather than six to ten years. Electric cooperatives and their ISP partners also have access to existing easements that can expedite additional dark fiber deployments if necessary.

Additionally, if each data center is installed with a diesel backup generator, it can become a load modifying resource, meaning that the data center load can be shifted to the backup generator during system reliability emergencies. This type of flexibility will allow grid operators to better manage intermittent resources like wind and solar. In short, these models would allow for more renewable generation while reducing the need for reserve margins and capacity markets and reducing the overall cost of wholesale and retail power.

Finally, there are new cooling technologies that greatly reduce or eliminate the need for ongoing water supplies. Use of these technologies could further improve local community sentiment and allow data centers to proceed more quickly. The trick is finding the right mix of new technologies paired with the resources that each participant can offer to create a mutually beneficial ecosystem.

2. North America Data Center Colocation Vacancy Rate by Year (%) - Voronoi

SERVICE PROVIDER RESOURCES

Rural providers have unique access to land, easements, citing flexibility, electric transformer capacity, and new fiber networks. Cooperatives generally have great relationships in their respective counties and can streamline property purchases, zoning exceptions, and approval processes to move projects forward in a few months rather than years.

These providers have excess capacity available on existing substation equipment. While they still need to purchase additional power, the substation equipment needed to supply that power is already in place. When we utilize the excess capacity available on existing substation transformers, we avoid the long lead times associated with ordering, manufacturing, and delivering these critical assets. This eliminates a yearslong process and allows data centers to be operational in a few months rather than years.

On the fiber front, these providers have existing and expandable networks with regional and national reach. Rural providers have worked together to provide unprecedented last-mile and middle-mile capabilities. Since 2018, most rural electric providers have either built their own fiber networks or partnered with a local fiber provider to bring greater connectivity to electric substations and other critical assets.

Now, these rural provider partnerships/consortiums can leverage that connectivity to offer the services of tomorrow sooner than later. These member-owned models enable shared infrastructure, dark fiber diversity, and revenue sharing. These networks offer points of presence at each member CO and are present at regional fiber campuses allowing for Tier 1 interconnection and scalability.

STRATEGIES

When evaluating Data Center (DC) load options there are both emerging and traditional business model paths to understand. Below is a list of some of these business models, along with guidance in selecting the technology to pursue based on the relevant attributes and tradeoffs of each selection:

Secure Edge AI Inferencing

An ISP gains strong strategic value from offering low-latency inference close to customers. This leverages existing network assets and POPs while creating differentiated, high-margin services for telecom, retail, industrial IoT, and automotive customers. Investments focus on distributed micro-datacenters, GPUs or accelerators, and hardened security. Revenue mixes include subscription, per-inference metering, and managed services. The model demands sophisticated orchestration, SLAs, and sales cycles to capture enterprise deals.

3. Local Assets for Data Center Growth, created with the assistance of Gemini, Google's AI tool

Federated AI Model Learning

Federated learning aligns with privacy-forward industries and positions the ISP as a trusted orchestration layer for distributed training. Value derives from platform fees, aggregation services, and partnerships with enterprises that cannot centralize data. It reuses edge compute and secure connectivity but requires strong encryption, attestation, and coordination software. Revenue grows as regulations favor privacy-preserving architectures, but commercialization is gradual and technically complex.

Crypto Mining Validation

Crypto hosting offers quickly monetizable, high-density revenue for available capacity, especially where power is less expensive. The ISP can sell hosting, power, and cooling to miners or operate validation nodes itself. Cash flow can be lucrative when crypto markets and block rewards are favorable. Downsides include regulatory uncertainty, commodity-level price volatility, potential reputational issues, and rapid hardware obsolescence that raises lifecycle costs.

Application-as-a-Service

Providing AaaS is a natural extension of ISP-managed hosting and network services. Value lies in recurring, sticky revenue from applications that demand predictable latency and bundled connectivity. Capital intensity is modest because the ISP can layer the offering on existing infrastructure. Operational focus shifts toward platform management, developer tooling, and customer support. Time-to-revenue is short when white-label or partner application stacks are used.

GPU Leasing

Leasing GPUs captures growing demand from AI development and inference. The ISP can monetize GPUs by the hour with dynamic scheduling and co-located network advantages. This yields high per-unit revenue but requires continual hardware refresh, strong utilization practices, and fine-grained billing. The business pairs well with edge AI and federated learning customers but exposes the ISP to rapid depreciation and heavy capital commitments.

Server Leasing

Dedicated server leases deliver stable, predictable revenue with lower technical novelty. This business leverages existing colocation competencies—power, network, physical security—and attracts customers wanting physical isolation without buying hardware. Margins are moderate, churn is low with multi-year contracts, and operational overhead is manageable. Competitive pressure is direct from established colocation providers.

Rack Space Leasing

Offering rack space and metered power is the lowest risk way to expand infrastructure monetization. This business scales incrementally, minimizes bespoke engineering, and converts footprint into steady cash flows. Rack leasing pairs with many customer segments and acts as a feeder into higher-value services such as managed hosting or GPU leasing. Margins are lower per unit than specialized services, but capital risk is limited.

Relative Prioritization and Recommended Focus

Highest strategic value for ISPs with network assets: Secure Edge AI Inferencing and Application-as-a-service. These use existing POPs and last-mile advantages to create high-margin, differentiated services and accelerate customer lock-in.

Best near-term low-risk expansion: Rack Space Leasing and Server Leasing. These convert footprint into steady revenue quickly and provide a foundation for upselling.

High upside but capital intensive: GPU Leasing. This offers high revenue per unit of use and large contracts but require heavy CAPEX and tight hardware lifecycle management.

Niche strategic plays: Federated AI Model Learning suits ISPs seeking platform differentiation in regulated industries and long-term partnerships.

Opportunistic and volatile: Crypto Mining Validation can generate rapid cash when conditions align but carries regulatory, market, and reputational risks that demand careful geographic and contractual strategies.

Financial and Operational Trade-offs

Pursuing specialized compute services like Secure Edge AI and GPU Leasing multiplies ARPU but increases CAPEX, OPEX, and required expertise. Success depends on utilization, billing sophistication, and hardware refresh discipline.

Colocation-centric models (rack, server, wholesale) prioritize occupancy and long-term contracts, delivering steadier returns and simpler operations. These models create strategic optionality to layer higher-value services later.

Platform and managed offerings (AaaS, Federated AI) require software, security, and sales investments but produce sticky revenue and higher lifetime value per customer.

Risk mitigation requires diversified revenue streams, flexible modular infrastructure, renewable or contracted power, and clear policy stance on crypto hosting.

An ISP should prioritize services that leverage its core network proximity and operational strengths while balancing capital exposure. For most ISPs the highest immediate strategic value is in Secure Edge AI Inferencing and Application-as-a-service because they deliver differentiated, high-margin revenue built atop existing assets. Rack Space and Server Leasing provide low-risk revenue that funds expansion. GPU Leasing and Wholesale Hall Leasing offer outsized returns for APACs ready to absorb heavy CAPEX. Federated AI is a strategic differentiator over the long run. Crypto hosting remains an opportunistic, high-volatility choice best pursued selectively.

Table 1: *Summary of ISP compute strategies*

Business Model	Strategic Fit	Revenue Potential	Capital Intensity	Operational Complexity	Risk Profile	Speed to Market
Secure Edge AI Inferencing	High	High	Moderate to High	High	Moderate	Moderate
Federated AI Model Learning	Medium	Medium to High	Moderate	High	Moderate	Slow
Crypto Mining Validation	Low to Medium	Variable High	High	Moderate	High	Fast
Application-as-a-service	High	Steady Medium	Low to Moderate	Moderate	Low to Moderate	Fast
GPU Leasing	Medium	High per-utilized GPU	High	High	Moderate	Moderate
Server Leasing	Medium	Steady Medium	Moderate	Moderate	Low to Moderate	Fast
Rack Space Leasing	High	Steady Medium	Low to Moderate	Low to Moderate	Low	Fast

ADDITIONAL BENEFITS

Data centers represent a great opportunity for rural providers, especially if they operate continuously. When they do this, they provide something called high load factors. High load factors are perfect for electric cooperatives because they greatly improve each cooperative's overall load mix, allowing the cooperative to buy more power at off-peak (cheaper) times, lower their average cost of power, and provide greater rate stability to their members. It is a win-win-win scenario for the data center operator, the electric cooperative, and the local community.

Finally, data centers allow for the greater use of renewable resources. Renewable resources are great on one hand and problematic on the other. Because of their intermittent nature, the electric grid has become less stable, and there is great concern about future electric reliability. One way that we can remedy this problem is by adding what are called "removable base-line loads" that raise the amount of average power used across the country but that can be shed during system emergencies.

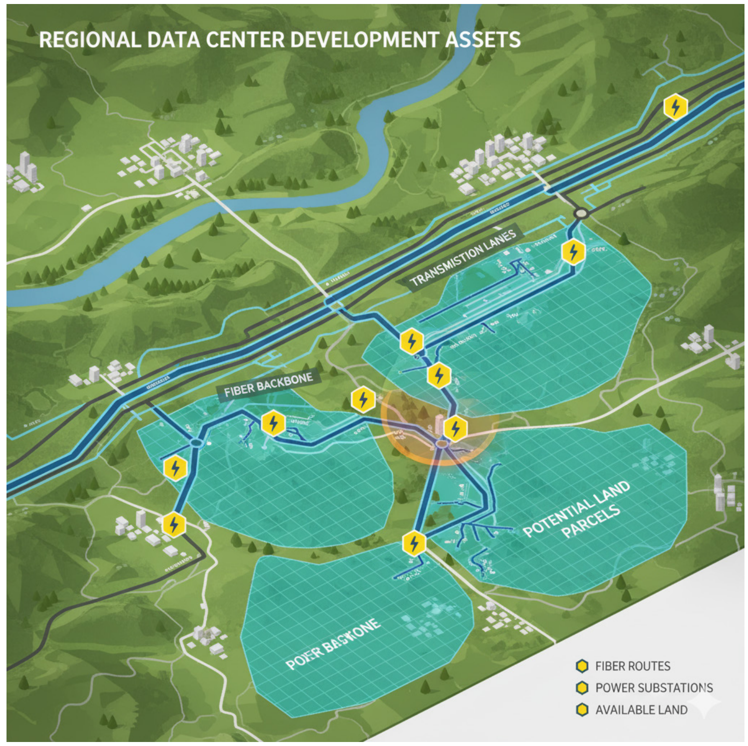
Our solution is to ensure that each data center has its own backup power supply (diesel, battery, etc.) to be used during system emergencies. When the grid recognizes a reliability event, the regional grid operator can send a signal to start the backup generation, and the data center can then be removed from the grid. Once that load is being served by its backup power source, it is effectively removed from the grid, and grid generation that was previously used for the data center can then be re-deployed to help with the system emergency. Under this scenario, rural data centers help solve our nation's grid reliability concerns.

HOW TO GET STARTED

For an ISP to consider leveraging resources for this market, the first step is understanding the landscape and assessing current assets. Begin by analyzing the existing network infrastructure, as robust fiber connectivity is one of the most valuable resources in colocation and edge deployments. Next, evaluate access to power—both in terms of capacity and reliability—since energy availability is the single largest constraint in today's market. Real estate is another critical factor: identify properties owned or that can be acquired that are near substations and fiber routes, as these locations can significantly reduce build-out costs and latency. Finally, study market demand in the region, including enterprise and cloud adoption trends, to determine whether to target wholesale colocation, edge computing, or hybrid solutions. By leveraging network strengths and strategically aligning with power and land opportunities, can position the organization to capture a share of this rapidly growing sector.

Perform scenario planning to pressure test existing middle mile capacity by modeling different growth trajectories and demand spikes that could strain the network. Start by mapping current fiber routes, interconnection points, and redundancy levels, then simulate scenarios such as rapid AI-driven traffic growth, edge deployments, or unexpected regional outages. This exercise helps identify potential choke points and informs whether it is needed to invest in additional routes, upgrade optical capacity, or partner with carriers for diverse paths. By stress-testing the middle mile under multiple demand and failure conditions, can ensure the infrastructure is resilient, scalable, and ready to support future data center or edge expansion without compromising performance.

At this point, consider what type of data center you want to pursue and who should be involved. All structures have a basic three-part ecosystem. The three primary players are the utility providers, the data center manufacturers, and the data center operators. In some cases, the same entity can fill all three roles for a more unified approach. This approach can work for simpler installations.



In more complicated cases, the greatest benefit can be gained by having separate players contribute what each of them does best. Under this structure, the three distinct players are the utility provider, the data center manufacturer, and the data center owner/operator. The utility provider helps the manufacture access land, power, fiber connectivity, and community support. The data center manufacturer is responsible for finding and selling their product to the data center operator, and for building the data center on site. The data center operator is the long-term owner and is responsible for ongoing operations, maintenance, etc.

CONCLUSION & CALL TO ACTION

ISPs and electric cooperatives already possess the critical building blocks—robust fiber networks, substation headroom, land easements, and local trust—that enable rapid entry into the data center colocation market to both fortify existing revenue streams and open high-margin new services such as edge AI, GPU leasing, and managed colocation.

To scale effectively and convert that latent value into sustainable market offerings, these providers must coordinate power and fiber resource availability across regions, match site tiers to appropriate workloads, and lock down long-term power agreements and shared fiber paths so capacity can be provisioned quickly and predictably.

To win meaningful market share and influence pricing, policy, and tenant decisions, rural providers must act collectively—forming consortia that present unified commercial terms, pooled procurement, and standardized modular deployments—so they are seen not as dozens of small vendors but as a single, reliable partner capable of meeting hyperscale and enterprise requirements.

Together, coordinated ISPs and cooperatives can turn local assets into regional data center capacity, stabilize community power economics, and shape the next wave of distributed compute in a way that benefits customers, communities, and members.

4. Regional Data Center Development Assets, created with the assistance of Gemini, Google's AI tool