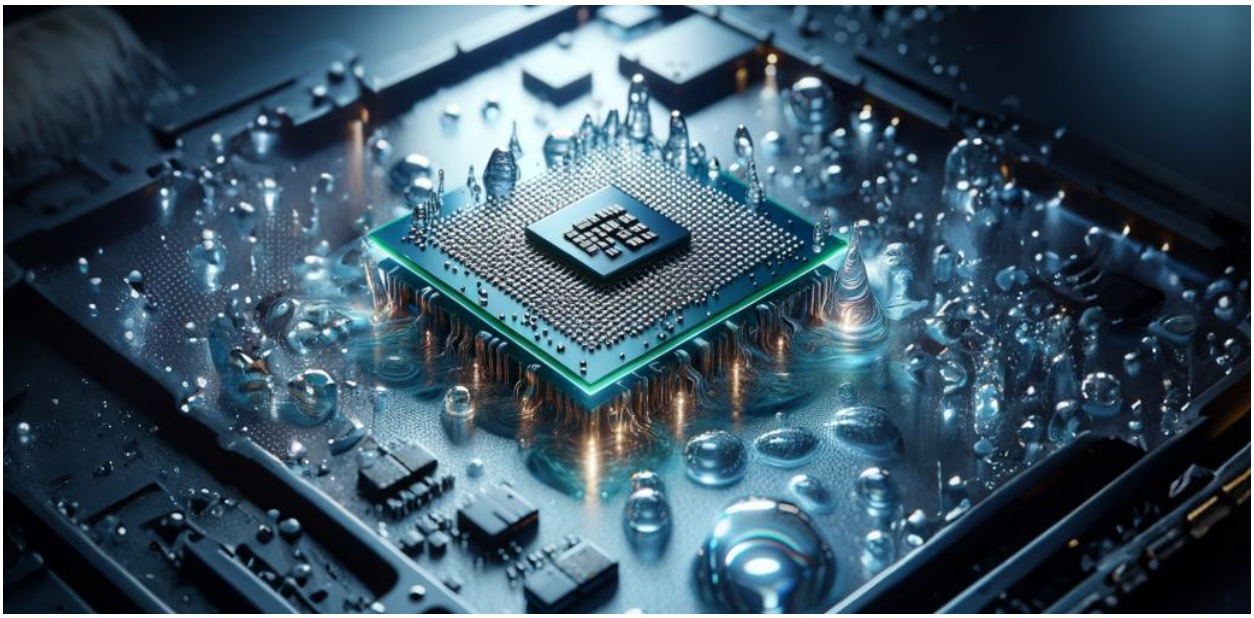
Case Study

ITB Quantum Rise RSE 1A Data Center

Oklaunion, Texas (Wilbarger County)



Executive Summary

The ITB Quantum Rise RSE 1A Data Center represents Quantum Rise's strategic entry into purpose-built AI infrastructure. Quantum Rise, an AI-native consultancy and product development firm, is developing this facility in Oklaunion, Texas (Wilbarger County, near Vernon) in partnership with the Yates-Moody Construction Team (Quantum Rise Joint Venture with Yates Construction and partners).

This early-stage Project leverages the region's exceptional renewable energy resources, existing high-voltage substation infrastructure from the retired Oklaunion Power Plant site, abundant rural land, and Texas's pro-business regulatory environment. It is optimized for high-density AI, High-Performance Computing (HPC), and enterprise workloads using advanced liquid cooling from day one.

Key differentiators include:

- Smaller building footprints enabled by high rack densities (50–150+ kW/rack initially, future-proofed to 200+ kW).
- Superior power usage effectiveness (PUE) through liquid cooling.

- Strong focus on sustainable operations aligned with regional renewable abundance.
- Proactive community and local supplier engagement.

The Project contributes to Texas's emergence as a Global AI Data Center powerhouse while delivering economic revitalization to a rural area impacted by the 2020 closure of the Oklaunion coal-fired power plant.

Nearby projects (Sabey Oklaunion campus, Genesis Digital Assets Rowdy Data Center expansion, and Google's Wilbarger County air-cooled facility with AES co-located clean energy) confirm the area's strategic appeal.

Background and Project Overview

Quantum Rise specializes in "Consulting 2.0" AI transformation, automation, and enterprise-grade platforms (QR/OS). In early 2026, the company acquired Brazil-based Dhauz to expand its global capabilities and is now extending into physical AI infrastructure to secure dedicated, high-performance compute capacity for clients and internal innovation.

The project was announced through local Wilbarger County channels. A high-profile Business-to-Business (B2B) Outreach Event was held on April 16, 2026, at the Wilbarger Events Center, inviting local businesses to participate in construction and operations support. Additional engagement included Workforce Solutions job fairs and presentations at Vernon High School by project leadership (e.g., Kurt Hansen, Project Executive).

RSE 1A (likely Renewable/Sustainable Energy Phase 1A or a similar internal bid/package designation) is the initial modular phase of what is expected to become a larger multi-building campus. It builds directly on the site's industrial heritage - the former Oklaunion Power Station (retired 650 MW coal plant) now hosts or is adjacent to Genesis Digital Assets' Rowdy Data Center and benefits from the existing Oklaunion Substation.

Yates Construction brings proven Data Center expertise (including recent HPC-ready facilities with liquid cooling support, such as DataBank projects in Texas). The partnership combines Quantum Rise's AI domain knowledge with world-class construction execution.

Site Selection Criteria

Oklaunion was chosen for several compelling reasons that address the core challenges of AI Data Centers, power availability, cost, scalability, and sustainability:

- **Renewable Energy Hub**: Situated at the midpoint of extensive wind and solar farms in North Texas, the site offers access to low-cost, clean power. It is equidistant from Dallas and Oklahoma City, providing fiber connectivity while avoiding metro-area constraints.
- **Existing Infrastructure**: Proximity to the Oklaunion Substation (and its historical power plant site) enables rapid grid interconnection within the ERCOT market, with potential benefits from ERCOT-SPP (Southwest Power Pool) HVDC (High Voltage Direct Current) ties for enhanced reliability and renewable integration.
- **Land Availability and Scalability**: Rural acreage supports multi-building campuses with room for future expansion, smaller building footprints enabled by liquid cooling, and minimal community density conflicts.
- **Economic and Regulatory Climate**: Texas's pro-business environment, including data center incentives, combined with local government support (evident in the Vernon B2B (Business-to-Business) event), facilitates faster permitting and community buy-in.
- **Strategic Fit for AI**: The location supports Quantum Rise's focus on transformative AI solutions by providing the dense, sustainable compute required for training and inference workloads.

These criteria mirror broader trends seen in Sabey Data Centers' nearby Oklaunion campus plans and Google's Wilbarger County announcement.

Technical Design and Innovations

Full engineering specifications for RSE 1A remain under development (consistent with its early-2026 planning stage). The design philosophy prioritizes AI workload optimization, efficiency, and future-proofing.

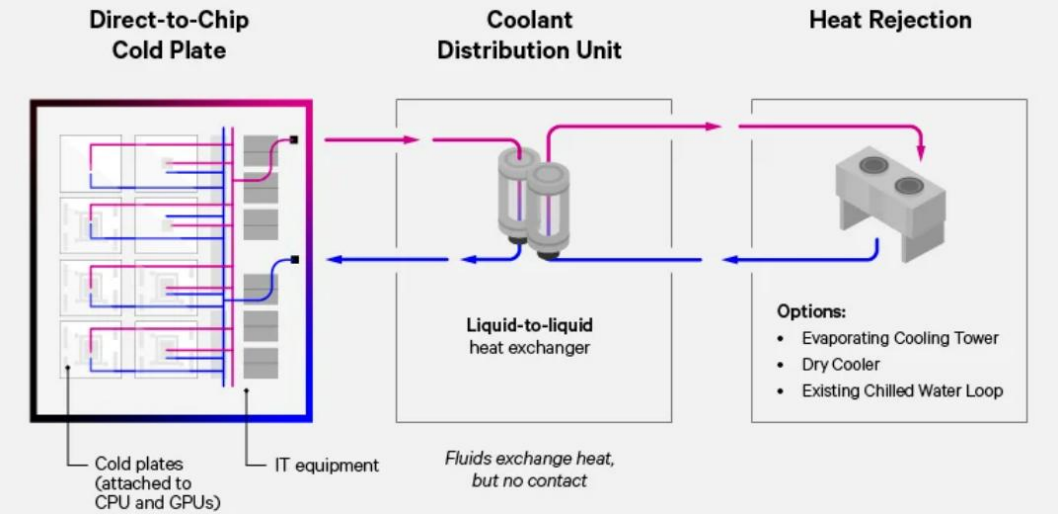
Liquid Cooling Focus (Core Innovation)
From day one, the facility emphasizes advanced liquid cooling (direct-to-chip primary, with hybrid and full liquid-to-chip options) to support high rack densities of 50–150+ kW/rack initially, with headroom for 200+ kW racks as GPU/accelerator technology advances.

This enables:

- Dramatically smaller building footprints compared to traditional air-cooled designs.
- Superior thermal management for dense AI clusters.
- Lower overall Power Usage Effectiveness (PUE targets in the 1.1–1.3 range vs. 1.5+ for air-cooled legacy facilities).
- Reduced acoustic noise and improved reliability.

Key Liquid Cooling Architecture Elements (Anticipated):

- Direct-to-Chip (DTC) cold plates on GPUs and high-power CPUs.
- Rack- and row-level Coolant Distribution Units (CDUs).
- Facility-level heat rejection via high-efficiency dry coolers or hybrid systems (minimizing or eliminating evaporative water loss).
- Closed-loop primary coolant systems with high-purity fluids.
- Optional immersion cooling for ultra-dense zones in later phases.
- AI-driven monitoring and dynamic optimization for predictive maintenance, workload-aware cooling, and energy efficiency.



AI-Optimized Operations

As an AI-native developer, Quantum Rise plans to integrate advanced Agentic AI for facility operations: dynamic power and cooling management, predictive analytics, automated workload orchestration, and self-optimizing systems—leveraging the company's core expertise.

Sustainability Features

Targets include Scope 1 and 2 carbon-free or near-carbon-free operations through renewable procurement, potential on-site or co-located generation, and high-efficiency liquid cooling. Early air-permitting activity (including for portable concrete plants) demonstrates proactive environmental compliance.

Modular & Scalable Construction

ITB processes emphasize modular, repeatable designs for rapid deployment. RSE 1A serves as a proof-of-concept for larger campus rollout.

Power Availability – Detailed Plans

Power is the project's primary strategic advantage.

Primary Grid Connection

Direct access to the Oklaunion Substation provides robust ERCOT interconnection. The substation's history supporting large-scale generation (former 650 MW coal plant) offers existing transmission infrastructure, reducing interconnection timelines and costs compared to greenfield sites.

Anticipated Capacity & Phasing

RSE 1A is expected as an initial phase with significant IT load (hundreds of MW range typical for such AI-optimized early phases; exact figures under study). The broader campus has multi-hundred MW to GW-scale potential, consistent with regional trends and ERCOT large-load interconnection activity.

Renewable Integration & Procurement

Abundant local wind and solar enable competitive, carbon-aware power. Options include:

- Long-term Power Purchase Agreements (PPAs) with nearby renewable projects.
- Potential behind-the-meter or co-located generation (modeled on Google/AES Wilbarger approach).
- Participation in ERCOT markets for flexibility and cost optimization.

Backup & Redundancy
N+1 or 2N redundancy via:

- Uninterruptible Power Supplies (UPS) with battery or flywheel systems.
- On-site backup generation (diesel or natural gas generators with emissions controls, consistent with air permitting).
- Potential future integration of energy storage or grid-stabilizing technologies.

Grid Considerations
As a large flexible load in ERCOT, the project will undergo rigorous interconnection studies. Recent Texas policy directions encourage large loads (including Data Centers) to contribute to or fund necessary grid upgrades to protect ratepayers. The project's location and existing substation infrastructure position it favorably.

Reliability Target
Design for 99.999%+ uptime suitable for mission-critical AI workloads.

Cooling Infrastructure – Detailed Plans

Primary Technology: Advanced Liquid Cooling
Direct-to-chip liquid cooling is the cornerstone, enabling the high densities required for modern AI accelerators while improving efficiency.

System Architecture (Proposed):

- IT Equipment Level: Cold plates directly attached to high-power components (GPUs, CPUs, memory). Manifolds distribute coolant at rack level.
- Row/Facility Level: Coolant Distribution Units (CDUs) manage flow, temperature, and filtration. Secondary loops transfer heat.
- Heat Rejection: Primary preference for dry coolers or adiabatic/dry hybrid systems to minimize water consumption. Evaporative options only where justified by climate and efficiency modeling.
- Controls: Integrated Building Management System (BMS) with AI/ML for real-time optimization, predictive maintenance, and dynamic response to workload and ambient conditions.

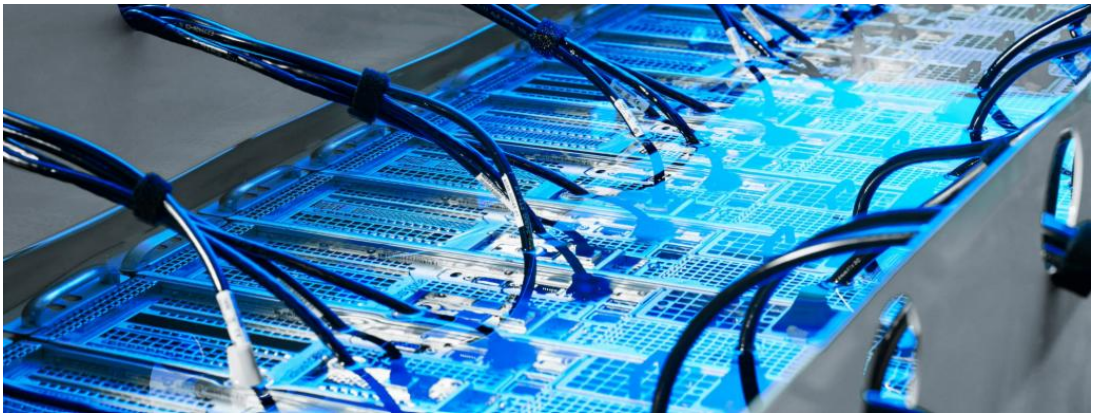
Performance Benefits:

- Supports rack densities 3–5× higher than traditional air cooling.
- Significantly lower PUE and energy costs.

- Reduced facility footprint (smaller mechanical yards and buildings).
- Improved component longevity and reliability under sustained high loads.
- Lower total cost of ownership for dense AI deployments.

Water Usage Optimization
Unlike traditional air-cooled or evaporative designs, advanced liquid cooling with dry rejection can achieve very low Water Usage Effectiveness (WUE). The design will prioritize closed-loop systems and water-conserving heat rejection technologies. This contrasts with, but complements, Google's nearby Wilbarger County air-cooled approach, which eliminates operational cooling water use entirely (limited to kitchens and critical functions).

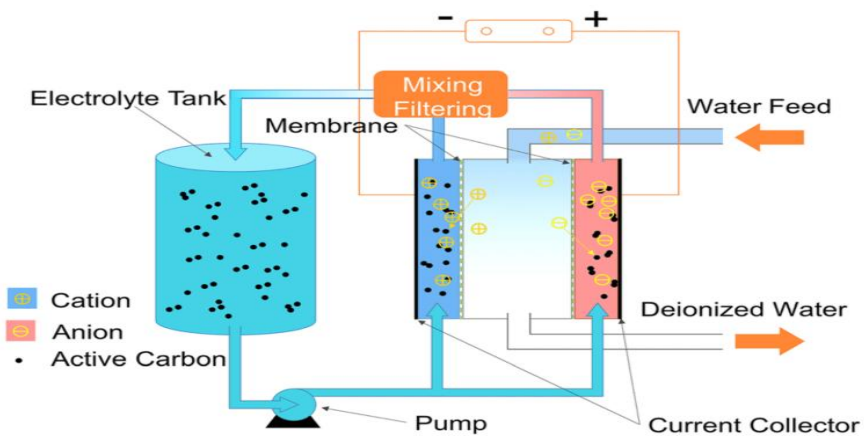
Future-Proofing
Infrastructure designed for easy upgrades to higher-density configurations and emerging cooling technologies (e.g., two-phase immersion or advanced cold plates).



Water and Sewer – Site Access and Infrastructure Plans

Construction Phase
Rural location necessitates proactive water management:

- Bulk potable water delivery for construction crews, dust control, and concrete operations.
- High-purity (RO/deionized) water for initial cooling system fills and commissioning.



- On-demand supply for fire suppression systems. Local providers (e.g., specialized bulk water services) are already positioned to support Data Center projects in Vernon/Oklaunion.

Operational Phase – Water

- **Primary Cooling:** Closed-loop liquid systems with dry or hybrid rejection minimize evaporative losses and makeup water needs.
- **Process & Facility Water**: Low-volume requirements for humidification (if any), cleaning, and domestic use. On-site storage, treatment, and recycling systems planned.
- **Supply Strategy**:
  - Extensions or dedicated lines from Vernon municipal water where feasible.
  - On-site groundwater wells (subject to permitting and aquifer studies).
  - Long-term bulk or treated water contracts as backup.
- **Sustainability Goals**: Target very low WUE; participation in regional water replenishment or watershed improvement programs (aligned with Google's Texas commitments).

Sewer & Wastewater

- Sanitary wastewater from facilities will connect to municipal sewer systems or use on-site advanced treatment.
- Any process wastewater (minimal from closed-loop cooling) will undergo pretreatment before discharge or recycling.
- Stormwater management: On-site detention, treatment, and controlled release per environmental permits.

Economic and Strategic Impact

The Project delivers multifaceted benefits:

- ✓ Local Economy: Construction and operations are expected to create high-paying jobs and revive economic activity in a region impacted by the 2020 power plant closure. The April 2026 B2B event proactively includes local suppliers, fostering small-business growth and tax revenue.
- ✓ Regional Development: As part of Wilbarger County's emerging data center cluster (alongside Sabey, GDA, and Google projects), it enhances North Texas's position in the Global AI supply chain.
- ✓ Strategic Value for Quantum Rise: The facility secures dedicated, sustainable capacity for its clients' AI initiatives, reducing reliance on third-party Hyperscalers and accelerating innovation in automation and decision-support tools.
- ✓ Broader Texas Impact: Contributes to the State's projected dominance as the World's Largest Data Center market, driven by AI demand.

Learned and Future Outlook

Early Lessons (from public indicators):

- ✓ Community-first engagement (via B2B events) builds goodwill and accelerates permitting/supply chains in rural areas.
- ✓ Early air and environmental permitting demonstrates proactive compliance in a region sensitive to growth impacts.
- ✓ Partnership models (Quantum Rise + Yates-Moody construction expertise) combine domain knowledge with execution speed.

Future Outlook

RSE 1A is the foundation for significant campus scaling through 2030+. Potential advancements include higher-density liquid cooling, on-site energy storage, advanced AI operations platforms, and deeper renewable integration (including possible co-location models). Challenges such as ERCOT grid upgrade coordination, rural skilled labor attraction, and long-term water stewardship will remain focus areas—but the project's fundamentals are exceptionally strong.

Quantum Rise's AI expertise positions this as a potential benchmark for "intelligent" data centers that optimize themselves in real time.

Conclusion

The ITB Quantum Rise RSE 1A Data Center exemplifies the convergence of AI innovation, renewable-powered infrastructure, advanced liquid cooling, and rural economic revitalization in Texas. By capitalizing on Oklaunion's unique advantages—existing substation infrastructure, renewable energy abundance, and scalable land—while prioritizing community partnership and sustainability, the project addresses critical AI infrastructure needs while generating lasting local value.

As construction advances following 2026 outreach activities, RSE 1A stands as a forward-looking model for AI-native data center development: efficient, scalable, water-conscious, and deeply integrated with its community and the broader Texas AI ecosystem.

This initiative reinforces Texas's position at the epicenter of global AI infrastructure growth.

Ted J. Pappas, Director of Operations