Building a Resilient *Local Grid:*

How Modern Data Centers Support Communities

Behind-the-Meter *Microgrids*

- **On-Site Power Generation:** On-site, behind-the-meter microgrids generate power locally, reducing or eliminating data center dependence on the municipal grid. It acts like an on-site power and battery setup, similar to rooftop solar plus a home battery, but scaled for an entire facility. Rehlko has deployed more than 2 GW of off-grid power and storage capacity,[1] approximately the annual electricity needs of more than 1.6 million households.[2]

- **Protecting Local Residents:** Taking the data center off the public grid allows microgrids to relieve strain on local utilities. Taking the data center off the public grid allows microgrids to relieve strain on local utilities, helping support power availability and grid stability while reducing strain on local utility infrastructure.

- **Fuel-Flexible Transition:** Modern microgrid controls allow engines to transition smoothly from traditional fuels to blended, low-carbon, or renewable alternative fuels over time, helping lower emissions compared to conventional fuel configurations, depending on operating conditions.

- **Save on Water:** Leverage our natural gas engine solutions, which are designed to reduce water consumption in many applications. Compared to popular natural gas turbines. Certain Rehlko gas engine configurations may use less water than certain turbine-based alternatives, depending on system design and operating conditions.[3]

[1] Based on aggregate Rehlko deployed off-grid generation and storage capacity to date.

[2] Household equivalency calculated using 2022 data by the U.S. Energy Information Administration.

[3] Water-use observations are based on internal engineering calculations and product design specifications for radiator-cooled, closed-loop engine systems. A typical 3 MW engine contains approximately 1,000 liters of coolant comprising a 50:50 glycol-water mixture (approximately 500 liters of water). Comparative turbine water-consumption estimates are derived from publicly available industry data for combined-cycle facilities employing evaporative cooling. Actual water use varies by technology, cooling configuration, operating profile, climate, and site conditions. No third-party verification has been conducted.

Battery Energy Storage *Systems (BESS)*

- **AI Load Smoothing:** Battery Energy Storage Systems (BESS) are collections of rechargeable batteries. They act like large smartphone batteries, providing storage to smooth out the sharp power demand spikes from AI workloads. This helps reduce stress on local electricity infrastructure, helping support local grid reliability and resilience.

- **Stabilizing the Local Grid:** BESS can help reduce peak demand charges and may enable participation in applicable capacity markets and demand response programs, subject to local market rules and utility requirements.

- **Real-World Proof:** Rehlko is already deploying massive-scale grid stabilization infrastructure, including two 50MW/100MWh BESS systems in Scotland[5] and a 40MW system in Newport, U.K.[4], demonstrating experience deploying grid-support infrastructure at scale.

[4] https://www.clarke-energy.com/2025/clarke-energy-and-trina-storage-helps-power-south-wales-with-field-collaboration-2

[5] https://www.clarke-energy.com/2025/clarke-energy-appointed-principal-contractor-for-third-grid-resilience-bess-project-with-field/





Recycling Heat: How We Double-Use *Energy*

- **Combined Heat & Power (CHP):** Also called cogeneration, CHP systems act like an energy recycling system. Think of it like opening the oven door after baking to warm up your kitchen on a cold day; the heat was already generated, you are simply reusing it.
- **Double the Fuel Efficiency:** Repurposing this natural thermal exhaust heat In certain CHP applications, overall system efficiency can approach 90% by capturing and utilizing thermal energy that would otherwise be wasted, increasing the amount of energy used from the same fuel.
- **Proven Cogeneration:** Rehlko deploys CHP systems designed to improve overall energy utilization through heat recovery, including a landmark project with Elasco Electronic in Romania that captures exhaust heat, redirecting it to provide heating for surrounding to support regional energy networks.
- **Reducing Energy Demand:** Utilizing recovered heat reduces the electricity required for facility cooling, lowering the data center's Power Usage Effectiveness (PUE) and shrinking its environmental footprint in the neighboring community.

The Structured *Transition Model*

- **Reliability First:** Rehlko's Structured Transition Model is a lifecycle-oriented framework built on a simple premise: decarbonization must not come at the expense of uptime and emergency readiness.
- **A Realistic Roadmap:** The model provides a practical, multi-phase pathway, similar to climbing a three-rung ladder. It allows data centers to start with a stable, highly reliable on-site power foundation today, and seamlessly integrate hybrid renewables, battery storage, and clean fuels rung-by-rung tomorrow as local infrastructure matures.
- **Preventing Obsolete Infrastructure:** This phased approach ensures power assets remain flexible and compatible with future technologies, while consistently protecting local investments and transforming data centers from passive energy consumers into active grid partners.

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