

Solving the Data Center Power Gap with Scrap Aluminum

A modular, fuel-based approach to multi-day firm power for AI data centers



The Numbers at a Glance:

3TWH/Yr.

Of Low-Cost Scrap Aluminum
Exported From The US

31GW

Of Firming Power For Data Center
Loads @100 Hours/Yr.

Rapidly Scalable Fuel Disc™ Production:

**AlumaPower's
Aluminum
Producer Partner
Can Scale:**

150GWH/Yr.

Per Order On A 2-Year Lead Time

Firm Power is the Bottleneck

AI workloads are rapidly increasing data center electricity demand, but firm power options are not scaling fast enough. Grid interconnections often take five to seven years, diesel generation faces emissions and permitting constraints, and batteries become costly and inflexible when sized for multi-day outages or the final percentage of uptime. As a result, data center operators face a growing reliability gap that existing solutions struggle to address.

Multi-Day Firm Power for AI Data Centers

AlumaPower's Galvanic Generator™ converts solid aluminum fuel directly into electricity and operates as a generator rather than a rechargeable battery. Using existing U.S. scrap aluminum exports, approximately three terawatt-hours per year of energy could firm about thirty one-gigawatt data center campuses for roughly one hundred hours per year. Deployed alongside solar and batteries or other generation mixes, aluminum-to-energy systems address the most challenging reliability hours while reducing extreme overbuild and enabling near-term deployment.

An Untapped Energy Resource

$4\text{Al} + 3\text{O}_2 + 6\text{H}_2\text{O} \rightarrow 4\text{Al}(\text{OH})_3 + \text{energy}$

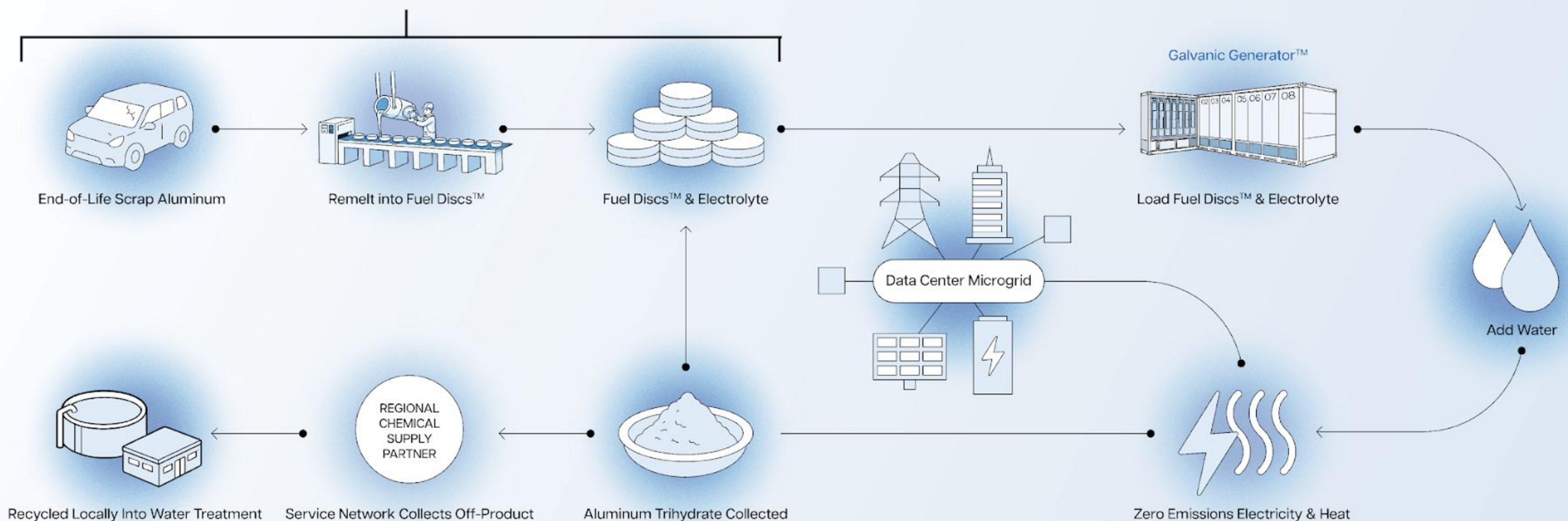
Scrap aluminum contains recoverable chemical energy that can be converted directly into electricity. At the system level, a practical planning value of approximately 2 kilowatt-hours per kilogram can be used for long-duration firming analysis. The United States exports roughly 1.2–1.6 million tonnes of aluminum scrap per year, corresponding to about 3 terawatt-hours of firm, dispatchable energy annually. Today, this energy value is disregarded – AlumaPower unlocks it.

System Integration & Role

The system is designed to complement solar, other generations sources, and battery storage rather fully than replace them. Batteries manage fast transients over seconds to hours, while aluminum supplies energy over minutes to days, reducing deep cycling and extreme oversizing of battery systems. Backed by a top global aluminum production partner, facilities supporting one-gigawatt data centers can be brought online within roughly two years and can guarantee supply security throughout the United States.

Partnership with Top Global Aluminum Producer

Capable of Giggawatt scale production from scrap to finished Fuel Discs™



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