Factory-Built Modular Power Generation Systems for Grid-Scale Electricity

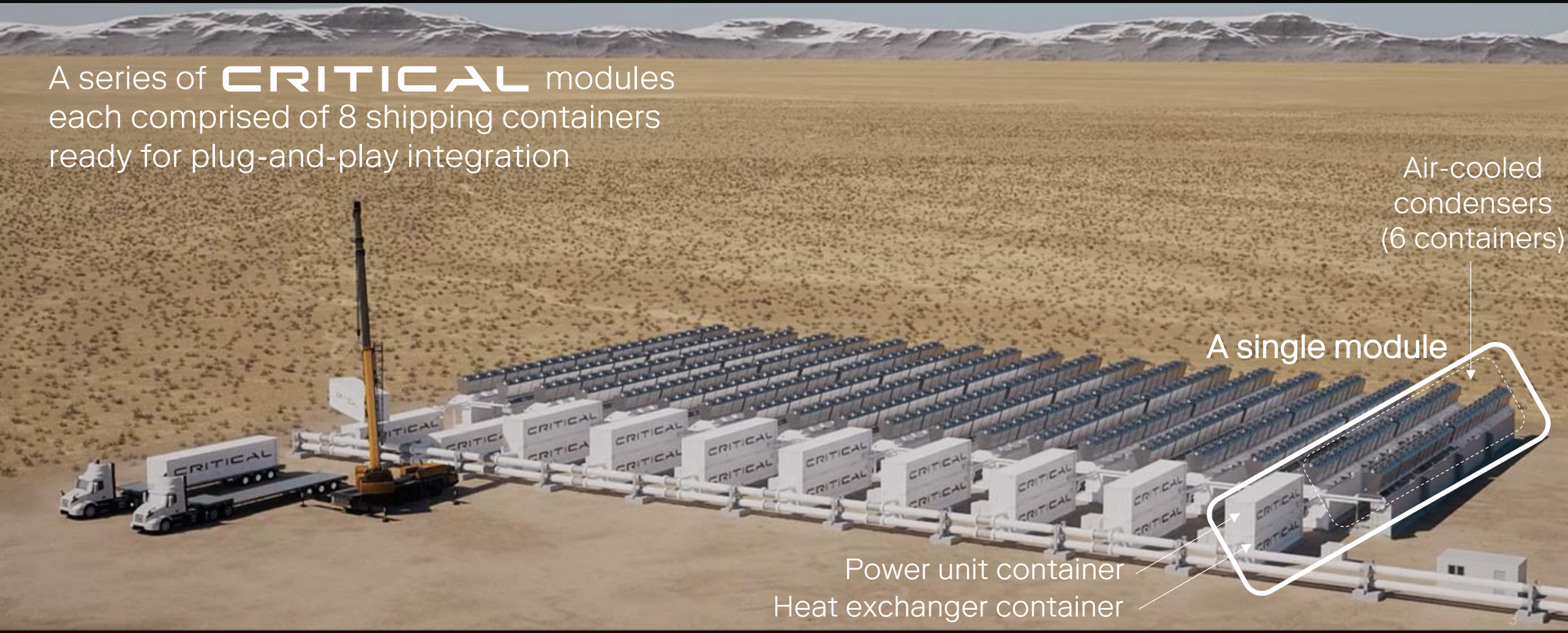
Company Snapshot

Founded	March 2024
Headquarters	Los Angeles, CA
Team	15 full-time (50+ yrs combined SpaceX experience)
Focus	Modular turbine-based heat to electricity conversion systems for geothermal and waste heat recovery from data center gas turbines
Product Status	50 kW demo operational in LA, scaling to 2 MW Cascade 1.0 unit for 2026 deployment
Core Competencies	Cycle thermodynamics, turbomachinery design, system integration & manufacturing

We Build Modular Power Plants

CRITICAL ENERGY

Factory-built turbine power generation systems are rapidly deployable in weeks not years, starting with geothermal & waste heat recovery



Why Modularity Wins

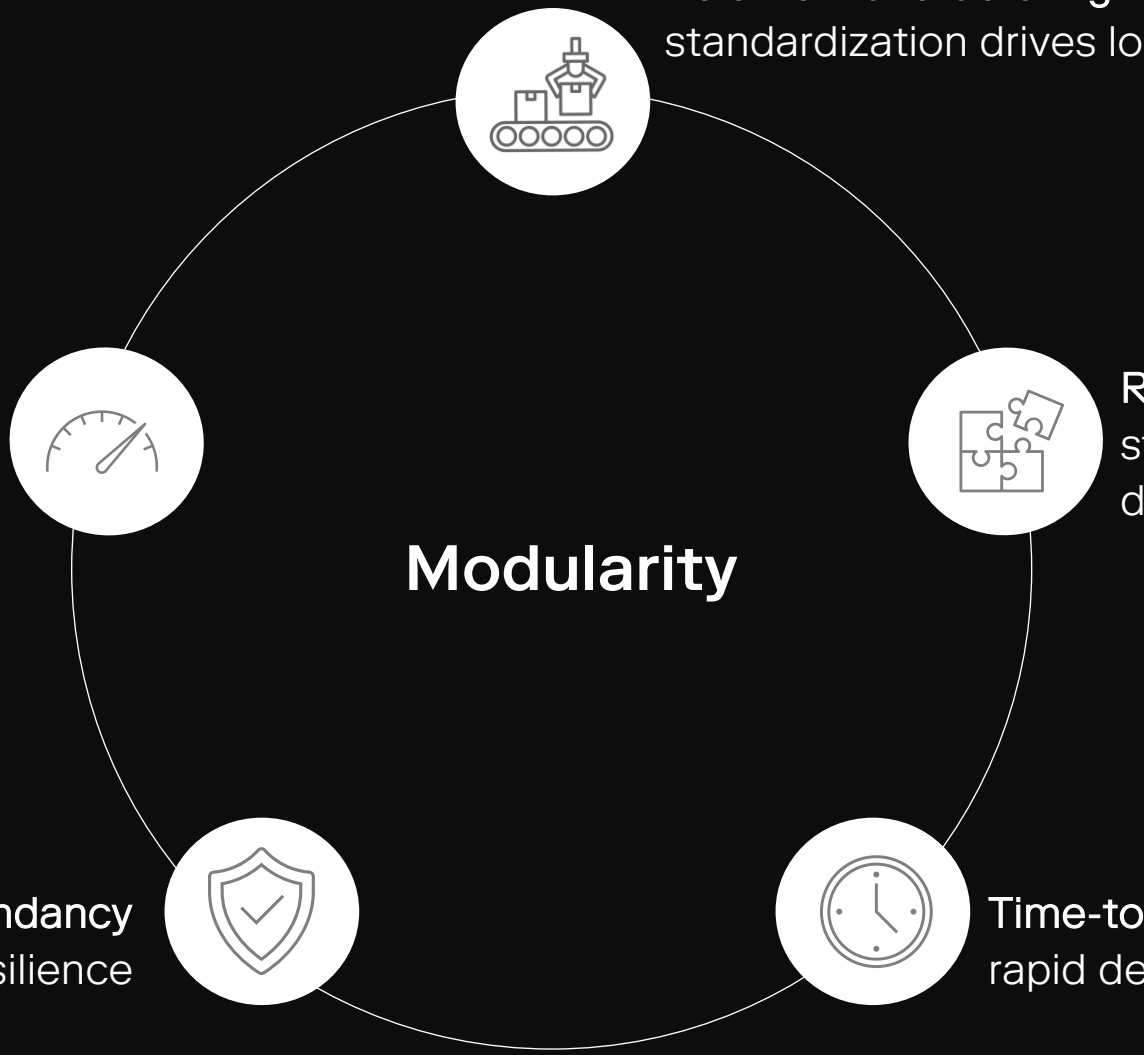
Volume manufacturing moat
standardization drives lower cost & speed

Risk-adjusted expansion
start small, scale smart
de-risk growth

Time-to-revenue advantage
rapid deployment, early revenue

System redundancy
high uptime & resilience

Operational performance
optimized across ambient
& load conditions



Value Proposition for Geothermal

Flexible scale-up

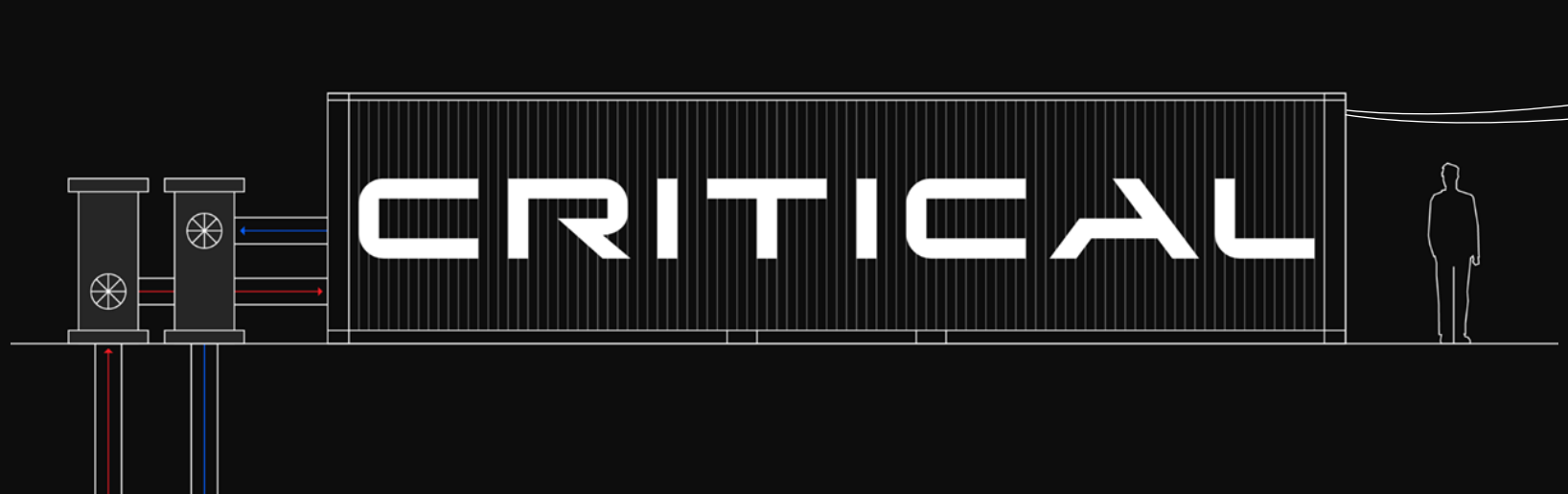
Generate MWs from first well pair to validate resource performance
Then expand modularly to any project size without redesign or new permitting

Deployment speed

Factory-built 2+ MW modules arrive ready to install in 2 weeks
Brings wells online earlier, accelerating time to first revenue

Cost reduction

Factory integration replaces custom EPC work, ~50% of total project capex today
Cuts onsite construction and engineering costs



Cascade – First Product Line

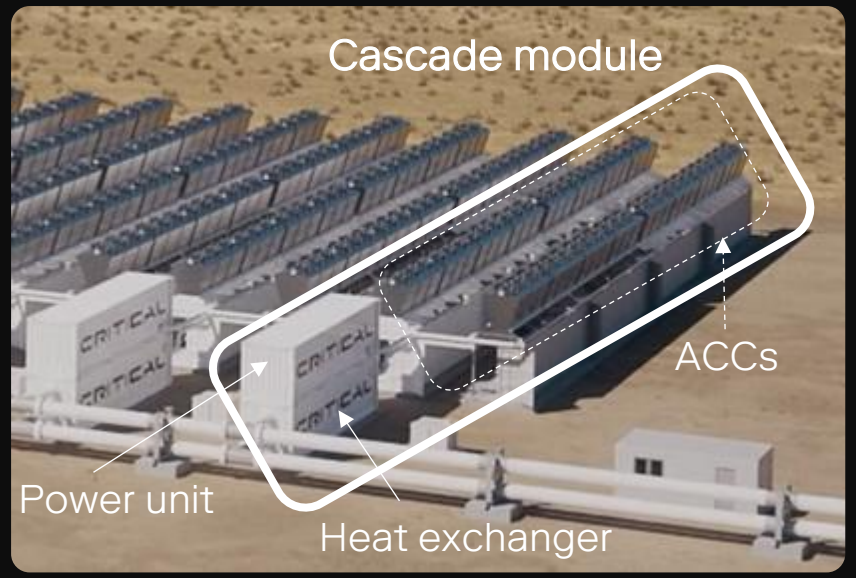
2+ MW Rankine Cycle system

Deployment

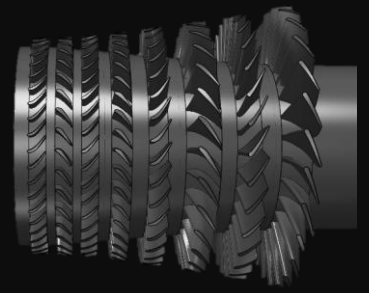
~2-week installation
0.2-acre footprint (8 standard shipping containers)
95% factory assembled, fully pre-ship tested
Integrates with existing geothermal wells

Technical specs

140-220°C starting operating range, up to 600°C in future units
2 MW net output at 200°C, scalable to 5 MW in future units
Four-stage axial turbine designed and assembled in-house
Efficiency competitive with industry standard
Closed-loop air-cooled condensers
No consumables required, install and forget



Four-stage axial turbine



Design Philosophy

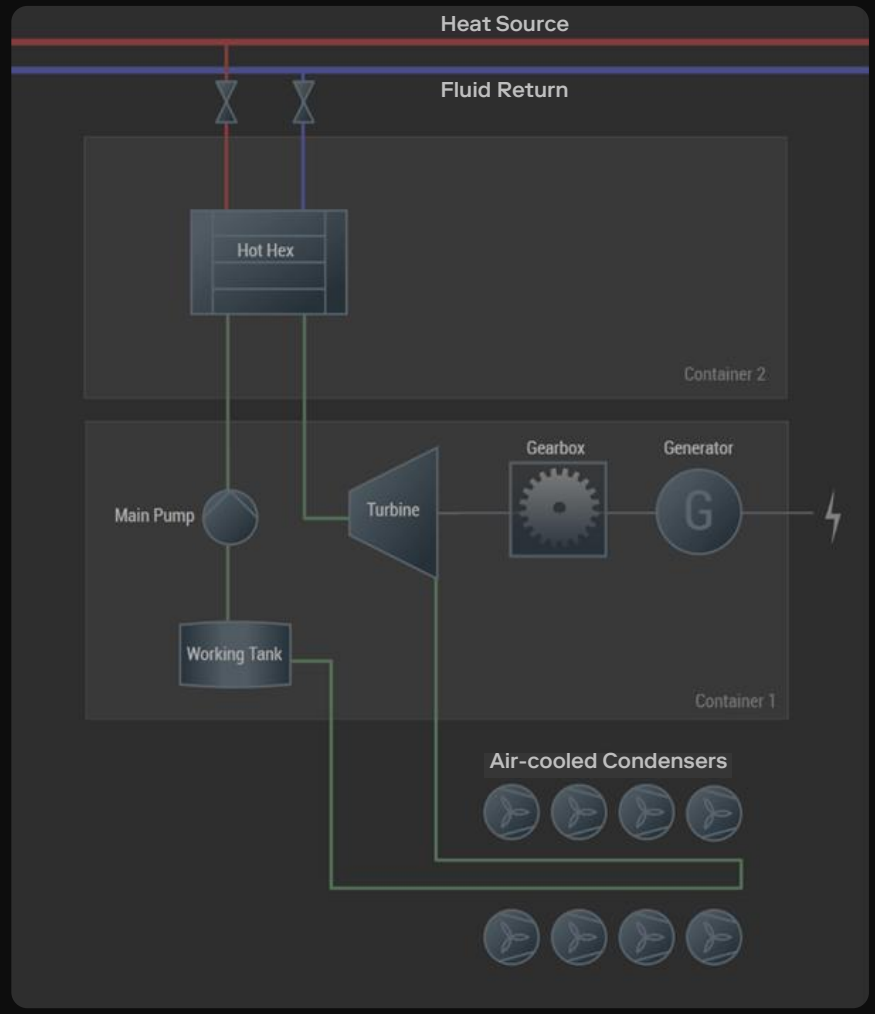
Optimizing for specific power & cost within real-world constraints

Specific power

$$\frac{\text{MW net}}{\text{kg/s}} \rightarrow \text{maximize power out from same heat source}$$

System cost per MW

$$\frac{\$}{\text{MW net}} \rightarrow \text{minimize for better project economics}$$



Engineering Approach

World-class turbomachinery meets SpaceX speed iteration

How we engineer fast (The Algorithm)

question requirements
delete
simplify
accelerate
automate

The Idiot Index – how we measure success

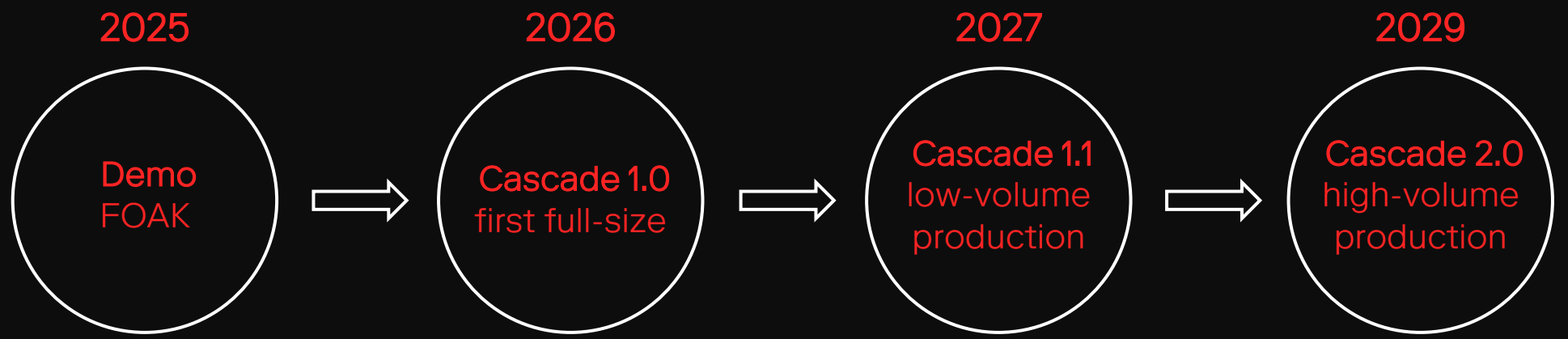
index = system cost / raw material cost – the lower, the better
results in turbines that are cheaper, faster to build & easier to scale

How we operate

test early & often at the lowest cost setting
manufacture in-house when it accelerates learning
treat every build as a data point, not a final product

Product Roadmap

2026 pilot partners → 2027 commercial deployments



	2025	2026	2027	2029
Capacity	50 kW	2 MW	2+ MW	2+ MW
Status	Demo 0.0 operational in LA, Demo 0.1 in production for Q1 2026 field pilot partners	First field-scale pilots for Q3 2026 partners	Commercial deployment (revenue-generating)	Automated, AI-driven manufacturing
Optimized for fastest path to	First power generation	First customer scale deployment	First sales	Lowest cost per kW
Learnings	Supply chain, assembly, turbine performance validation at small scale	Field integration, deployment logistics, cost optimization	Fleet operations, low volume manufacturing optimization	Design standardization for automated assembly + competitive cost structure

From Concept to Power Plant in < 1 Year

Validated core technology and de-risked scale-up to Cascade 1.0

- ✓ Built subsystem components – turbine, thermal loops, controls software
- ✓ Integrated complete system with generator
- ✓ Commissioned 50 kW system, spinning turbine and generating power
- ✓ Validated thermodynamic cycle, turbine performance, and controls integration
- ✓ Established scalable supply chain for all major components
- ▪ Demo 0.1 in production for Q1 2026 field deployment with pilot partner

Demo 0.0 – Los Angeles Facility, 2025

Spencer Jackson
Founder & CEO
Spencer@CriticalEnergy.com