Pacific Fusion

Modular pulsed-power fusion, financed milestone by milestone

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A fusion-energy startup building a modular pulsed-power system to demonstrate net facility gain by 2030.

COMPANY	Pacific Fusion	HEADQUARTERS	Fremont, California, USA
OWNERSHIP	Private	PRESIDENT	Will Regan
CTO	Keith LeChien		
TOTAL RAISED	More than $900 million (Series A, disclosed 2024)		

ABSTRACT

Pacific Fusion is a 2023-founded company attempting to reach fusion energy via pulsed magnetic fusion, using arrays of impedance-matched Marx generators (IMGs) to deliver fast, high-current electrical pulses that compress and heat fusion fuel. Its distinctive bet is structural as much as scientific: a milestone-gated Series A of more than $900 million, led by General Catalyst, releases capital only as the company hits predefined technical targets. The architecture is modular, combining a fast electric pulser, a meter-scale fusion chamber, and centimeter-scale fuel capsules, with a Demonstration System built from roughly 150 shipping-container-sized modules. The approach shares lineage with inertial-fusion work at U.S. national laboratories, particularly Sandia's Z facility and MagLIF program. The company aims to show "net facility gain" — fusion energy output exceeding the energy stored in the system — by 2030, and a first commercial system in the mid-2030s. Those remain projections, not results, which makes the financing discipline and the unproven physics the two facts that matter most.

Keywords: pulsed magnetic fusion; impedance-matched Marx generator; net facility gain; MagLIF; General Catalyst; milestone financing; inertial fusion; Sandia Z facility

1. Snapshot

Pacific Fusion (pacificfusion.com) is a fusion-energy startup founded in summer 2023 and headquartered in Fremont, California, that is building a modular pulsed-power system to compress and heat fusion fuel. It emerged from stealth on October 25, 2024, with a milestone-based Series A of more than $900 million led by General Catalyst, in which capital is unlocked as predefined technical milestones are met. Its named leadership includes Will Regan (President), Keith LeChien (CTO and co-inventor of its core pulser technology), and Carrie von Muench (COO). One account names Eric Lander as a co-founder and founding CEO, but that designation appears in a single source and his current role is not confirmed, so it should be treated as unverified. For a private company at this stage, the key unknowns are material: post-Series A valuation, revenue (none expected for years), and precise headcount are not publicly settled.

2. Thesis: Why This Company, Why Now

The bet is that fusion's bottleneck is no longer "can the physics work in principle" but "can someone afford to iterate the engineering," and that a modular, mass-manufacturable pulsed-power machine is the cheapest path to a relevant demonstration. Pacific Fusion's defining move is financial architecture as much as physics. Rather than raising one large check against a distant promise, it structured a Series A of more than $900 million that releases capital only as predefined technical milestones are met, aligning investor risk with demonstrated progress.

What makes the timing plausible is lineage: the approach builds on inertial fusion concepts already demonstrated at U.S. national laboratories, particularly Sandia's Z facility and its MagLIF program (magnetized liner inertial fusion, a hybrid that adds a magnetic field to inertially compressed fuel). That lineage is genuine but confers no special bar-clearing credibility: the cited lab programs have not themselves reached breakeven, and pulsed magnetic fusion sits alongside several other unproven approaches. The reachable market today is not power sales but milestone completion. The claimed market, abundant clean baseload power, is real but a decade-plus away and entirely contingent on physics the company has not yet shown.

3. The Core Idea in Plain English

Pacific Fusion is trying to crush and heat a tiny fuel capsule hard enough to make its nuclei fuse, using a sudden, enormous pulse of electricity rather than lasers or steady magnets. Think of it less like a continuously running engine and more like a camera flash scaled to industrial size: many small power units charge up slowly, then dump their energy together in a single, precisely timed burst.

The old-world version of this is a handful of giant, bespoke, expensive machines at national labs. The new-world claim is that you can instead build the pulser out of roughly 150 identical, shipping-container-sized modules, manufacture them like products, and assemble them into a system, trading exotic one-offs for repeatable units.

4. The Technical Space

Fusion's central problem is reaching the temperature, density, and confinement time where fuel releases more energy than was put in. Pulsed magnetic and inertial approaches solve this by compression: deliver a colossal burst of energy to a target fast enough that the fuel implodes and fuses before it can fly apart. The competing families are magnetic confinement (tokamaks and stellarators, which hold plasma steadily in magnetic fields), laser-driven inertial confinement (as at the National Ignition Facility, a laser-based facility at Lawrence Livermore), and pulsed-power or magnetized inertial systems like Sandia's Z facility.

On the dimensions that matter, "good" comes down to a few unforgiving variables. First, gain: how much fusion energy you get out relative to what you put in, and crucially which inputs you count. Second, implosion quality: uniform compression with low mode growth, adequate magnetization to suppress heat loss, and fast current rise with minimal ringing. Third, repeatability and cost per shot, since a power plant must fire continuously and cheaply, not once. Pulsed-power systems have historically excelled at delivering huge currents but struggle with shot rate and component survival under repeated firing. No program in this class has yet demonstrated facility-level gain, so the entire category is measured against research targets rather than operating results.

5. How Their Technology Works (and What's Proprietary)

Pacific Fusion's system decomposes into three parts, and the differentiation lives mostly in the first.

› **The pulser.** This is the heart of the design: arrays of impedance-matched Marx generators (IMGs), a circuit topology co-invented by CTO Keith LeChien. A Marx generator charges capacitors in parallel, then switches them into series to multiply voltage; the "impedance-matched" refinement keeps the driver

looking into a near-constant load so it delivers fast, high-current pulses efficiently with minimal reflections and ring-down. The Demonstration System uses roughly 150 of these modules (sources give figures of approximately 150 to 156; the exact count is not reconciled publicly), each the size of a shipping container.

- **The chamber.** A meter-scale fusion chamber where the energy is focused onto the target.
- **The fuel.** Centimeter-scale capsules that are compressed and heated toward fusion conditions.

The genuinely proprietary asset is the IMG architecture and the discipline of making it modular and manufacturable rather than a single monolithic machine. The underlying physics is not exclusive: it shares lineage with inertial fusion concepts demonstrated at national labs, particularly Sandia's Z facility and MagLIF. That lineage cuts both ways. It de-risks the science but means a well-funded competitor or a national lab could pursue similar pulsed-power physics. Recent work shows the engineering is still evolving: in February 2026, with Sandia National Laboratories, the company reported a simplified target design using plastic and aluminum that eliminates the need for external magnetic coils. The inference worth noting is that removing those coils simplifies manufacturing but shifts the magnetization burden onto the target physics or driver pulse shaping. Separately, in April 2025 it announced a collaboration with General Atomics to test a production-scale pulser module intended to drive fuel toward high-yield (over 100 MJ) fusion conditions. Note the precision: that figure describes the conditions the module aims to enable, not a guaranteed per-shot output of the Demonstration System.

6. Business and Go-to-Market

There is no business model in the conventional sense yet, and that is the honest starting point. Pacific Fusion has no product, no pricing, and no revenue; its "customers" today are its own investors, and its go-to-market is hitting technical milestones that release the next tranche of its more than $900 million Series A. The first commercial system is targeted for the mid-2030s, which places any actual power sales well beyond the current horizon.

The most concrete commercial development is physical infrastructure. On September 26, 2025, the company announced a $1 billion Research and Manufacturing Campus at Mesa del Sol in Albuquerque, New Mexico, to house the Demonstration System, with construction beginning in 2026; its headquarters and existing operations remain in Fremont, California. Importantly, this campus is for research and manufacturing, not power generation. The financing structure also deserves scrutiny: the $1 billion figure is a projected scale conditioned on performance-based incentives and roughly $776 million in city-issued industrial revenue bonds, not an already-deployed private check. That structure signals something beyond money: Pacific Fusion is already managing a stakeholder map that includes state governments, national laboratories, and federal energy policy, the exact muscle any novel power source will need later for site permits, grid interconnection, and regulatory approval. Until net facility gain is demonstrated, every unit-economics or margin question is hypothetical, gated entirely on whether the underlying physics works at all.

7. Competitive Landscape and Moats

Pacific Fusion sits in a crowded private-fusion field, and no single rival is cleanly its mirror image. The most adjacent pulsed and alternative-confinement plays include Zap Energy (sheared-flow stabilized Z-pinch) and Helion Energy (pulsed magneto-inertial field-reversed configuration), with the dominant magnetic-confinement camp led by Commonwealth Fusion Systems (tokamak) and laser-inertial efforts such as Xcimer Energy on the other flank. These compete less on identical physics than for the same milestone capital, talent pool, and policy attention. The honest read is that pulsed magnetic fusion is one unproven approach among several, none of which has demonstrated facility gain.

Against the nearest pulsed-electrical peers, **where Pacific Fusion could win** is scale-out: a multi-module driver that raises shot energy by adding synchronized containers, plus a target lineage tied to MagLIF-class implosions and a capital base few rivals match. **Where it could lose** is complexity: simpler single-channel architectures present fewer synchronization surfaces and may reach repetition or engineering simplicity sooner, while laser-driven inertial fusion can point to the National Ignition Facility's ignition result in an adjacent regime as a proof point Pacific Fusion lacks.

On moats, be skeptical. Three are worth naming.

- **Capital and milestone structure.** A more than $900 million commitment few competitors can match is a real but conditional advantage: miss a milestone and the capital can stop.
- **Manufacturing and shot-data accumulation.** If the modular thesis holds, the know-how from building and firing roughly 150 repeatable modules, and the time-correlated driver and target data that high-cadence firing produces, could compound into a cost and reliability edge over bespoke machines.
- **Facility and incentives footprint.** A large, permitted, bond-financed campus creates local alignment and schedule inertia a later entrant would have to recreate. This is not regulatory capture, but it is not nothing.

The asserted moat to discount is scientific exclusivity. On top of the IMG engineering edge, the core physics is shared lab heritage that a national lab or rival could also pursue.

8. Risks and Open Questions

The risks here are unusually fundamental: the central product has never been demonstrated, so technical risk dominates everything else. The questions worth putting to the founders:

- **Net facility gain accounting:** which inputs are counted in the denominator, and does it include pulser charging losses, cryogenics, controls, and site electrical demand? Sources use materially different definitions, and no audit-ready methodology is public.
- **2030 achievability:** what independent technical validation, if any, supports the 2030 facility-gain milestone, given that no pulsed-magnetic program has reached this bar?
- **Synchronization and repetition:** can roughly 150 modules be fired together with tight enough timing, and can they survive repeated firing at a power-plant cadence, not just once?
- **Target manufacturability:** what is the per-unit cost and yield of the February 2026 simplified target at production volume, and how many shots can the chamber take between maintenance?
- **Financing dependency:** what happens to the New Mexico campus and the milestone capital if an early technical target slips, given the bond-and-incentive structure rather than a deployed private check?

9. Bottom Line

Pacific Fusion is one of the more credibly structured fusion bets, pairing pulsed-power physics with a milestone-gated war chest that forces honesty about progress. The single biggest reason it could work, or fail, is the same: everything hinges on demonstrating net facility gain by 2030, a bar no comparable program has cleared, and which the company itself frames as a goal rather than a result. The thing to watch next is the New Mexico Demonstration System: whether construction starts on schedule in 2026 and whether early module tests with General Atomics and Sandia validate the modular thesis at production scale.

10. For the Nerds

The crux is the gain denominator. "Net facility gain" is softer than scientific breakeven, and the sources do not agree on its accounting: the General Atomics framing pegs it to fusion output exceeding energy stored in the capacitors, while the company's broader framing references all energy stored in the system. Those denominators differ by potentially large factors once you include charging inefficiency, cryogenics, and controls, so the headline milestone could be technically true and commercially meaningless depending on the boundary drawn.

There is also a taxonomy question with teeth. The company brands this pulsed magnetic fusion, while the General Atomics collaboration is framed around inertial fusion energy and trade coverage calls it pulsed-power inertial. The literature treats MagLIF-class systems as magnetized inertial confinement, a genuine hybrid, so no clean label fully fits. The deeper open problem is whether eliminating external magnetic coils (the February 2026 Sandia result) simplifies manufacturing without sacrificing the magnetization that makes the fuel easier to compress. If the magnetization burden shifts onto target physics or pulse shaping, the question becomes whether that tradeoff survives at high yield across many coordinated modules, a regime no public source has yet characterized. That gap is where the physics risk actually lives.

WHERE SOURCES DISAGREE

The definition and accounting of "net facility gain"

One primary source (the General Atomics release) defines it narrowly as fusion output exceeding the energy stored in the capacitors. Another framing, used on the company's own site and in the governor's announcement, describes it broadly as more energy out than all the energy stored in the system

Unresolved: no public source publishes an audit-ready accounting methodology specifying which inputs (pulser charging losses, cryogenics, controls, site electrical demand) are counted, and the two denominators differ materially

Whether the technology is "pulsed magnetic" or "pulsed magnetic inertial" fusion

The company's technology page brands the approach as pulsed magnetic fusion, while the General Atomics collaboration is titled around inertial fusion energy and trade coverage calls it pulsed-power inertial fusion

Unresolved: the technical literature treats magnetically driven systems like MagLIF as a hybrid—magnetized inertial confinement—so no single clean label is supported by the evidence

Whether the "$1 billion campus" is a firm private investment or a projected, incentive-contingent figure

The headline describes a $1B Research and Manufacturing Campus. The underlying New Mexico authorizing materials structure the support as performance-based incentives plus roughly $776 million in city-issued industrial revenue bonds, with benefits received only as the company meets job and capital-investment commitments

Unresolved: no public source documents a binding $1B private capital-expenditure commitment separate from the bond-and-incentive financing envelope

The number of pulser modules in the Demonstration System

The General Atomics release states roughly 150 modules; American Nuclear Society reporting states 156

Unresolved: the sources give different figures and no document reconciles them; the exact count should not be stated with false precision

Eric Lander's role as founding CEO

One account names Eric Lander as co-founder and founding CEO. Other materials list only Will Regan (President), Keith LeChien (CTO), and Carrie von Muench (COO) among the leadership

Unresolved: the founding-CEO designation appears in a single source and no document clarifies his current involvement

The post-Series A valuation

The financing is reported at over $900 million

Unresolved: no public source discloses the resulting company valuation; it is explicitly noted as unknown in the available materials