# Ceres Power Holdings plc

## Asset-light licensor of solid oxide fuel-cell and electrolyser technology, now earning its first royalties as partners hit mass production.

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**ABSTRACT**

Ceres Power Holdings (ceres.tech) is a UK developer of solid oxide fuel cell (SOFC) and solid oxide electrolyser cell (SOEC) technology that licenses its stack designs to industrial manufacturers rather than building products itself. The distinctive asset, recently validated, is that a single solid oxide platform can be configured for either power generation or green hydrogen, and 2025 marked the first time a partner moved from licence to mass production. South Korean partner Doosan Fuel Cell commenced mass production of SOFC systems using Ceres' technology in July 2025, generating Ceres' first royalty income. The model's economics are high-margin but lumpy: revenue fell on the absence of large 2024 technology-transfer fees even as a recurring royalty stream finally began. Three implications follow: royalty scaling now hinges entirely on partner factory ramps Ceres does not control; AI data-center power demand has emerged as the near-term commercial pull; and partner concentration, sharpened by the 2025 Bosch termination, is the central risk.



*Keywords:* solid oxide fuel cell; SOEC; green hydrogen; IP licensing; royalties; data center power; Doosan; FTSE 250


## 1. Snapshot

Ceres Power Holdings plc develops solid oxide fuel cell (SOFC) and electrolyser (SOEC) technology and licenses it to global manufacturing partners for power generation and green hydrogen production. Founded in 2001 and headquartered in Horsham, West Sussex, it is a UK-listed developer of clean energy technology specialising in solid oxide fuel cells for power and electrolysers for hydrogen. It trades on the London Stock Exchange under ticker CWR, is a FTSE 250 constituent, and carries the LSE Green Economy Mark. The research bundle cites roughly 353 employees and a market cap near £1.56bn (date unverified; treat as a point-in-time snapshot). CEO is Phil Caldwell. The company is loss-making with no dividend. For diligence, key gaps remain: installed-unit/MW deployment scale, the full board and ownership register, and the durability of contracted versus speculative future revenue.

## 2. Thesis: Why This Company, Why Now

The bet is that solid oxide, long stuck in R&D and demonstration, has reached a genuine commercialisation inflection just as AI-driven power demand creates an urgent buyer. CEO Phil Caldwell framed 2025 as an unprecedented market change with an acute need for power to service AI data centres and electrification, coinciding with Doosan's start of mass manufacture and marking the transition from an R&D-led to a commercially focused business. What changed is concrete, not narrative: a partner actually started a production line. Ceres recognised its first royalties of £110,000 as Doosan began mass manufacturing of fuel cell stacks at a 50MW facility in South Korea.

The AI linkage is direct on the SOFC side, where natural-gas-fueled fuel cells can supply reliable on-site power to data centers, a market with near-term commercial pull. The SOEC hydrogen side depends on a slower, policy-contingent build-out. Ceres cites a large addressable market, but the reachable market today is narrow: it is the volume its handful of licensees can actually manufacture and sell.

## 3. The Core Idea in Plain English

Ceres does not make fuel cells; it designs the core electrochemical "stack" and licenses the recipe to industrial giants who manufacture at scale. Think of it as the Arm of clean-energy hardware: it owns the design IP and earns upfront fees plus per-unit royalties, while partners like Doosan and Delta bear the factory capex.

The clever part is reversibility. SOFC and SOEC are two applications of the same core solid oxide platform: the fuel cell generates clean power from various fuels for stationary applications, while the electrolyser runs in reverse, using power to produce green hydrogen. Old world: a company builds one product, one factory, one market. New world: one licensed platform addresses both power and hydrogen from the same production line.

## 4. The Technical Space

Solid oxide cells solve a fundamental efficiency problem in converting between chemical fuel and electricity. They run hot (typically 500-800°C), which lets them avoid expensive platinum catalysts and reach higher electrical efficiency than low-temperature (PEM) fuel cells, and to run reversibly as electrolysers. The standard rival approaches are PEM and alkaline systems, which operate cooler, start faster, and tolerate cycling better, but at lower efficiency.

On the dimensions that matter, "good" means a few things. First, efficiency: for electrolysis, lower energy per kilogram of hydrogen is the headline metric. Ceres and Shell's collaboration targets hydrogen at 600 kg per day with an industry-leading electrolyser module efficiency of 37kWh/kg of hydrogen. Second, durability and degradation under thermal cycling, the historic Achilles heel of high-temperature ceramics. Third, manufacturability and cost at volume, which determines whether a lab result becomes a sellable product. Fourth, integration into a full system (power electronics, thermal management, balance of plant), which is exactly the layer Ceres' partners supply. The credibility test for any solid oxide claim is not peak lab efficiency but proven stack life and yield on a real production line.

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

Ceres sits at the cell-and-stack layer of the stack, not the system. It designs the metal-supported solid oxide cell and the stack architecture, transfers that design to a licensee, and supports them to production. The platform is deliberately dual-purpose.

› **The metal-supported stack design.** Ceres' core IP is its cell and stack architecture, configurable for power or hydrogen. Its latest dual-purpose stack design can be configured for power or hydrogen, allowing partners to address both markets from the same platform and factory, a strategic differentiator. The genuinely proprietary element is the accumulated cell design, materials, and manufacturing know-how built since 2001, plus the patent estate.

› **Technology transfer and engineering services.** Ceres earns by transferring designs and supporting partners. Its revenue comprises technology transfers, development licences, engineering services, the provision of technology hardware and, for the first time, royalties as Doosan begun commercial production.

› **Validated efficiency at module scale.** The Shell SOEC result and the move to higher-power modules are the technical proof points. Ceres and Shell continue to collaborate on pressurised solid oxide modules that can scale from 1MW to 10MW, anticipated to lead to modular designs scalable to hundreds of megawatts.

What is replicable versus proprietary is the hard question. Solid oxide is not unique to Ceres; well-funded players (Bloom Energy among them) and foundation-style industrial labs have their own stacks. Ceres' defensibility rests on specific metal-supported cell engineering and two decades of degradation/manufacturing data, not on owning the category. The efficiency edge is real but narrow, and a competitor closing the durability-at-yield gap erodes it.

## 6. Business and Go-to-Market

The model is asset-light IP licensing: upfront technology-transfer and licence fees, engineering services, hardware, and now usage-based royalties. Partners build capacity, Ceres supplies technology and earns fees and royalties; royalty income is the most scalable and highest-margin part of the model. Margins are structurally high but revenue is lumpy. Revenue for 2025 was £32.6 million, compared with £51.9 million in the prior year, the reduction primarily reflecting the timing of 2024 revenues when up-front technology transfer activities were completed for Delta and DENSO.

The 2025 financials show the transition cost. Gross margin was a strong 70% with cash and investments of £83.3 million, but the adjusted EBITDA loss widened to £32.5 million and the operating loss to £47.6 million. Partner logos are blue-chip and global. Operating an asset-light, IP-licensing model, it partners with industrial giants such as Doosan, Delta, Denso, Shell, Weichai and Thermax to target AI data centres, commercial and industrial power, microgrids and hard-to-abate sectors. Forward visibility is improving but modest: current contracted group revenue for 2026 is approximately £45m before any new business. The unit-economics question is whether royalties compound fast enough to cross break-even before cash is strained.

## 7. Competitive Landscape and Moats

The comp set spans solid oxide specialists and the broader fuel cell/electrolyser field. The closest direct rival is **Bloom Energy**, the established solid oxide fuel cell player already selling systems into data centers, the exact market Ceres' partners now target.

**Where Ceres wins versus Bloom.** Asset-light scalability and dual-use flexibility. Ceres does not carry manufacturing capex and can address both power and hydrogen from one licensed platform, while its partners' efficiency benchmarks (the 37kWh/kg SOEC result) are competitive. **Where Ceres loses.** Bloom is vertically integrated, ships at commercial scale today, and controls its own go-to-market and quality, whereas Ceres only earns when partners actually produce and sell. Adjacent players matter less: PEM/alkaline electrolyser vendors compete on the hydrogen side, and integrated OEMs could in principle develop in-house stacks.

The moats, assessed honestly:

› **Accumulated stack and manufacturing data.** Real but bounded. Two decades of cell degradation and production know-how is hard to replicate quickly, yet it does not foreclose competitors with their own solid oxide programs.

› **Switching costs once a partner industrialises.** Genuine and strengthening. A licensee that tools a 50MW line around Ceres' design is locked in for that platform's life, which is why Doosan's ramp matters beyond the £110k of first royalties.

› **Distribution via blue-chip partners.** Asserted more than proven. The logos are real, but distribution is only a moat once units ship in volume, and Ceres does not control that pace. The 2025 Bosch termination shows the dependency cuts both ways.

## 8. Risks and Open Questions

The defining risk is partner dependency: Ceres earns only when licensees produce, and it cannot control their priorities. Since Ceres licenses its technology instead of manufacturing it, its success is tied to the performance and strategic priorities of partners, as demonstrated by the termination of the Bosch deal. Add to that hydrogen-market timing, AI-capex cyclicality (the data-center power thesis depends on a buildout that could slow), and explicit market scepticism. A critical short-seller report from Grizzly Research in December 2025 questioned the long-term viability of the business model.

Questions I would put to management:

- How concentrated is the 2026 contracted ~£45m, and how much depends on any single partner ramp?
- What is the realistic royalty-per-unit and the volume path to EBITDA break-even, given the widened 2025 loss?
- What specifically did Grizzly allege, and what is the rebuttal with evidence?
- How replaceable is Ceres' stack if a Doosan or Delta chose to develop in-house?

## 9. Bottom Line

The core read: Ceres is a credible IP licensor that just crossed from demonstration to first commercial royalties, but it is still pre-profit and structurally dependent on others' factories. The single biggest reason it could work is that Doosan's mass production validates the asset-light model and the AI-power tailwind is real and now; the biggest reason it might not is that lumpy fees, partner concentration, and a public short thesis leave little margin for execution slips. The one thing to watch: whether royalties scale across multiple partners in 2026, not just Doosan.

## 10. For the Nerds

The differentiation lives or dies on metal-supported cell technology, which is Ceres' specific bet within solid oxide. Metal-supported designs promise faster thermal cycling, mechanical robustness, and lower precious-metal loading versus all-ceramic anode-supported cells, advantages that matter enormously for data-center duty cycles and for manufacturability at a licensee's yield. The open question is long-term degradation: metal supports can suffer chromium poisoning and oxidation at operating temperature, and the real proprietary value is whatever coatings, interconnect chemistry, and operating-window control mitigate that over a multi-year stack life.

The deeper reversibility question is also unresolved at scale. Running the same stack as both fuel cell and electrolyser is elegant, but reversible solid oxide cells face distinct degradation mechanisms in each mode, and sustained cycling between them stresses seals and electrodes differently. The Shell collaboration on pressurised modules scaling from 1MW toward hundreds of megawatts is the test bed for whether efficiency holds as pressure and scale rise. If degradation-at-yield is solved, the licensing moat compounds; if not, the efficiency lead is a lab artifact.