EMERGING ENERGY TECHNOLOGIES

Fusion, Natural Hydrogen & Concentrated Solar

Three technologies where the evidence has moved - but commercial proof remains uneven.

FUSION	NATURAL H2	CSP / CST
From target gain to integrated net electricity	From occurrence to sustained commercial deliverability	From technical proof to application-specific bankability

STATUS CHECKED

24 AUGUST 2026

Australian angle for each technology | Government and peer-reviewed sources prioritised | Company claims labelled

FUSION	NATURAL H2	CSP / CST
11	**~5.6 trillion t**	**8.422 GW**
NIF ignition experiments	modelled in-place geologic H2	global CSP power capacity

OVERVIEW

Three technologies, three different evidence gates

THE QUESTIONS HAVE MOVED

Fusion has moved from proof of target-level fusion gain to the much harder problem of integrated net-electric, reliable and financeable plants. Natural hydrogen occurrence is established, but commercial-rate and repeatable reservoir deliverability is not. Conventional CSP with thermal storage is commercially proven; the question is where dispatchability, storage or direct heat creates enough value to justify capital.

Technology	2026 maturity	The decisive proof point	Most credible role	Main caveat
Nuclear fusion	Pre-commercial	Integrated net electricity, availability and lifetime cost	Potential future firm, high-density low-carbon electricity	No fusion plant has produced net grid electricity
Natural hydrogen	Exploration / early resource definition	Sustained high-purity flow, repeatability and reserves	Potential low-emissions primary hydrogen supply	Lifecycle performance and commercial flow remain unproven
CSP / CST	Commercial in established configurations	Application-specific economics and financing	Dispatchable power, thermal storage and industrial heat	Gen3/high-temperature concepts remain demonstration-stage

REALITY CHECK

Technology	Common dismissal	What the evidence supports	Verdict
Fusion	"It is always 30 years away."	Repeated target-level ignition and major private/public programmes are real. No net-electric commercial plant exists.	Stale cliché; caution remains justified.
Natural hydrogen	"Useful hydrogen does not occur underground."	Occurrence is well established and Mali has long-running pilot-scale use. Published commercial-rate evidence is still absent.	Existence proven; commerciality unproven.
CSP / CST	"It was tried and failed."	Conventional CSP/TES operates commercially. Industrial CST is deployed but still a small market. Gen3 concepts are not yet bankable products.	Technically proven in established forms; commercially selective.

EVIDENCE STANDARD

This briefing separates government/regulator evidence, peer-reviewed research, industry datasets and company disclosures. Company funding, schedules, exploration results and forward targets are described as company-reported where material. Scenario CAPEX and modelled resource figures are not presented as forecasts or reserves. The scope is decision-oriented: it prioritises material evidence and Australian relevance rather than attempting a census of every project worldwide.

01 NUCLEAR FUSION

The long-horizon technology moving from physics towards engineering

11	US$14.24bn	2034
NIF ignition experiments achieved through June 2026 [1]	Cumulative funding in FIA's July 2026 survey [2]	ITER Start of Research Operations baseline [5]

WHAT IT IS

Fusion releases energy when light nuclei combine. Most power-plant concepts use deuterium-tritium (D-T) fuel in magnetic-confinement tokamaks or stellarators, while other developers pursue laser-driven inertial confinement and alternative pulsed or hybrid architectures. [8]

Fusion is fundamentally different from fission: it does not rely on a self-sustaining fissile chain reaction. A D-T plant would nevertheless remain a nuclear facility. High-energy neutrons activate structures, tritium must be controlled and bred or supplied, and activated or tritium-contaminated materials require managed treatment and disposal. [8]

Alternative fuels change the engineering challenge

D-T is favoured because useful reaction rates are reached at lower plasma temperatures than for other candidate fuels. D-He3 and proton-boron-11 can greatly reduce high-energy neutron production from the primary reaction and avoid a conventional lithium tritium-breeding blanket, but they require much more demanding plasma conditions and are not literally radiation-free systems. [8]

WHERE IT STANDS IN 2026

In December 2022, the US National Ignition Facility (NIF) became the first controlled fusion experiment to achieve target gain above one. By June 2026 NIF had achieved ignition 11 times. The record remains the 7 April 2025 shot: 8.6 MJ of fusion yield from 2.08 MJ delivered to the target, a target gain of 4.13. The eleventh ignition on 20 June 2026 produced 7.9 MJ, a target gain of about 3.8. [1]

This is target-level scientific gain, not power-plant breakeven. A commercial facility must deliver net electricity after its own heating, magnets or drivers, pumping, cryogenics and other balance-of-plant loads, while achieving acceptable repetition rate or steady-state operation, component life and availability. No fusion system has demonstrated that full chain.

Private-sector momentum is real, but the proof point is still ahead

The Fusion Industry Association reported US$4.48 billion of new funding in the twelve months covered by its 2026 survey and US$14.24 billion cumulatively since the survey began. The report was published on 13 July 2026. Commonwealth Fusion Systems (CFS) then announced a separate US$1 billion equity raise on 30 July, taking its own reported total capital raised to US$4 billion. The two figures should not be mechanically added because their survey cut-offs and disclosure timing differ. [2][3]

Helion reported in February 2026 that its Polaris prototype had produced measurable D-T fusion and reached plasma temperatures of 150 million degrees Celsius. This is a company-reported machine milestone, not a demonstration of net fusion gain or electricity from fusion. [44]

CFS says its SPARC tokamak is approaching 80% completion and targets plasma gain Q > 1 in 2027. SPARC is a demonstration device, not a grid-connected power plant. Type One Energy submitted an initial byproduct-material licence application in Tennessee in January 2026, an early regulatory step for its proposed stellarator project rather than approval of an operating plant. [45][46]

POLICY SIGNAL, NOT TECHNICAL PROOF

The US Department of Energy finalised its Fusion Science & Technology Roadmap in June 2026 to support pilot plants and commercial fusion in the mid-2030s. The roadmap is a programme target dependent on future public-private partnerships and appropriations, not evidence that commercial plants will meet that timetable. [39]

France, commercial risk and the Australian pathway

FRANCE: PUBLIC ANCHOR, EMERGING PRIVATE ECOSYSTEM

ITER remains France's major public fusion anchor. In July 2026 the sixth of nine approximately 1,100-tonne tokamak sector modules was installed, placing two-thirds of the torus core. ITER continues to target installation of the final sector in 2027. Under the revised baseline, Start of Research Operations is planned for 2034, with later commissioning milestones leading towards deuterium-tritium operation around 2039. [4][5]

At CEA's WEST tokamak, a hydrogen plasma was sustained for 1,337 seconds in February 2025, still the tokamak pulse-duration record as of August 2026. The significance is long-pulse operation and tungsten plasma-facing-component performance, not net energy production. [6]

Grenoble-based Renaissance Fusion adds a private stellarator programme. The company reports more than EUR 60 million of funding, including a EUR 15.5 million seed round, a EUR 10 million France 2030 grant and a EUR 32 million Series A1, and says its workforce exceeded 100 people in late 2025. [9]

THE REMAINING COMMERCIAL PROBLEM

For D-T systems, plasma performance is only one link in a longer chain: neutron-resistant materials, plasma-facing components, tritium breeding and recovery, remote maintenance, recirculating power, heat conversion, plant availability, licensing and financing all matter. Pulsed architectures add power-conditioning and cyclic-load requirements.

Economics remain exceptionally uncertain. A 2026 Nature Energy analysis found published and elicited first-of-a-kind fusion CAPEX estimates spanning roughly US$1,400-US$43,000/kW and argued that analogue-based experience rates may be around 2-8%, lower than the 8-20% often used in optimistic projections. This is one analytical framework, not a settled cost forecast. [7]

THE AUSTRALIAN ANGLE

Australia's fusion ecosystem is small but substantive. HB11 Energy is developing laser-driven hydrogen-boron fusion. In 2025 HB11, Defence Trailblazer and the University of Adelaide's DualTech-USPL group signed an A$8.2 million collaborative research agreement covering high-power laser development and sovereign Australian laser-manufacturing capability. It is an R&D and industrial-capability programme, not a commercial fusion facility. [10]

UNSW's AtomCraft is a student-led programme to design, build and operate a small tokamak as an engineering and workforce platform. UNSW's 2025 reporting records progress from primarily theoretical design into tested prototypes, pulsed-power hardware, diagnostics, controls and system integration. Type One Energy also has an Australian presence focused on engagement with governments, customers and investors across Australia and Southeast Asia. [11][12]

Regulation: precision matters

Section 140A of the Environment Protection and Biodiversity Conservation Act 1999 prevents the Commonwealth Environment Minister from approving an action involving construction or operation of a "nuclear power plant". The Act does not expressly define a fusion-specific power-plant pathway. In a March 2024 response to a parliamentary petition, the Commonwealth Government stated that this prohibition "does not differentiate between nuclear technologies" and that it had no plans to change the moratorium. [13][40]

The defensible conclusion is therefore not simply that the statute expressly names and bans fusion. Rather, under the Commonwealth Government's published interpretation, a commercial fusion power plant does not presently have a clear federal approval pathway and would require regulatory clarification and, if that interpretation is maintained, legislative or policy change. [13][40]

SIGNALS TO WATCH

Independent or sufficiently disclosed private-machine gain results, especially SPARC and other integrated systems. [46]	Credible evidence on tritium breeding, neutron-resistant components, maintenance intervals and plant availability.
Conversion of developer offtakes and site announcements into fully financed, licensed and constructed power plants.	In Australia, whether a fusion-specific legal and regulatory framework is created. [13][40]

02 NATURAL HYDROGEN

A real geological resource with an unproven commercial model

~5.6 trillion t	5	7.9 PJ
USGS modelled most-probable global in-place endowment - not reserves [14]	French exclusive exploration permits reported June 2026 [18]	Mt Kitty reported 2C contingent resource in Australia [20]

WHAT IT IS

Natural, geologic or "white" hydrogen is molecular hydrogen generated and accumulated in the subsurface rather than manufactured in an electrolyser or reformer. Major generation mechanisms include water-rock reactions involving iron-bearing minerals, including serpentinisation, and radiolysis of water associated with naturally radioactive elements. [16]

Generation does not by itself create a producible field. A viable accumulation needs source, reservoir and seal, plus adequate pressure, saturation, composition and deliverability. USGS uses source, reservoir and seal as the core elements of its prospectivity framework. Stimulated geologic hydrogen, where operators seek to accelerate subsurface hydrogen-forming reactions, is a related but distinct pathway with different technical and commercial risks. [15]

WHERE IT STANDS IN 2026

A USGS stochastic model published in 2024 estimated a most-probable global in-place endowment of about 5.6 trillion tonnes of geologic hydrogen, within an exceptionally wide uncertainty range. USGS stresses that most is likely to be impractical to recover. This is a modelled geological quantity, not an estimate of economically recoverable reserves. [14]

In 2025, USGS published the first public continental-scale geologic-hydrogen prospectivity map for the contiguous United States. Parts of the midcontinent and central California rank highly, but prospectivity is a screening result, not evidence of a commercial accumulation. [15]

Mali proves production is possible - not that commercial scale is repeatable

Bourakebougou in Mali remains the best-documented example of long-running natural-hydrogen production. A shallow well has supplied a small electricity-generation installation since 2012, and published work reports no pressure decline over the observed operating period. That demonstrates that producible and potentially recharging accumulations can exist. [41]

Scale is the caution. A 2026 Scientific Reports analysis compiled published hydrogen flow data and argued that modelled commercial projects generally require wellhead hydrogen flows around 10^7-10^8 m3/year at high purity, sustained over decades. It cites the documented Bourakebougou well at roughly 5.5 x 10^5 m3/year. These are analytical benchmarks, not a universal commercial threshold, but they show why concentration headlines cannot substitute for deliverability. [42]

FRANCE: ENCOURAGING CONCENTRATIONS, FLOW STILL UNPROVEN

The French Government reported in June 2026 that five exclusive natural-hydrogen exploration permits had been granted, mainly in the Pyrenees and Lorraine. The Trois-Eveches permit in Lorraine was awarded to La Francaise de l'Energie (FDE) in January 2026. [18]

FDE completed the PTH-2 well to 3,655 m in March 2026 and reported hydrogen in numerous intervals with 58 samples collected during drilling. In June, FDE then reported in-situ dissolved-gas hydrogen concentrations of 36.1% at 2,242 m and 49.6% at 2,426 m. The company plans in-situ flow characterisation in the second half of 2026, targets first independent resource certification in 2027 and states a target for initial production in late 2028 or early 2029. [19][38]

WHAT THE FRANCE RESULT DOES - AND DOES NOT - PROVE

The June concentrations are important company-reported appraisal data, but they are not a commercial flow test. The French Government's response published on 25 June 2026 explicitly said it remained too early to know whether measured flows would be sufficient for future exploitation. Flow, reservoir extent and recovery economics remain the decisive gates. [18][38]

Commercial filters and the Australian exploration frontier

THE COMMERCIAL QUESTIONS

- Flow and purity must be assessed together. A high hydrogen concentration with low total gas flow can still be uneconomic; concentration measurements alone do not establish producible volumes. [42]
- Processing can be material. Saleable gas may require separation, purification and compression, while transport can dominate economics if the resource is remote from an offtaker. There is no established sector-wide commercial cost curve.
- The petroleum-system analogy is useful but incomplete. Hydrogen is highly mobile and reactive, and microbial consumption plus seal performance can materially affect preservation and production. [16]
- Natural hydrogen should not automatically be called renewable. A 2025 Nature Reviews Earth & Environment review concluded that continental generation generally occurs over thousands to millions of years and should not be considered renewable on decadal-to-centennial timescales. [16]
- Hydrogen leakage matters to lifecycle climate performance. Hydrogen is not a direct greenhouse gas, but a 2026 review estimated an indirect 100-year global warming potential (GWP100) of about 12 ± 6 because atmospheric hydrogen affects methane lifetime, ozone and stratospheric water vapour. The estimate remains uncertain. [17]

THE AUSTRALIAN ANGLE

Geoscience Australia's 2026 assessment describes Australia as prospective for natural hydrogen and identifies the Ramsay wells on Yorke Peninsula as the country's first dedicated natural-hydrogen wells. It records Central Petroleum's Mt Kitty project in the Amadeus Basin as Australia's only reported 2C contingent natural-hydrogen resource in 2025: 7.9 PJ, 22 Bcf or about 66,000 tonnes. A contingent resource is not a reserve. [20]

Gold Hydrogen continues appraisal at Ramsay. Its July-August 2026 ASX releases reported helium flow, separation and purification at Ramsay-1, followed by an announcement that flow testing was set to commence at Ramsay-2. These are company-reported appraisal activities and do not constitute a declared commercial natural-hydrogen reserve. [24]

International capital is entering Australia. Koloma announced a US$23.8 million financing alongside the launch of Koloma Australia in February 2025. Buru Energy completed the transfer of its 2H Resources subsidiary to Koloma Australia on 7 August 2025, including South Australian, Tasmanian and Western Australian natural-hydrogen and helium interests, while a separate Western Australian asset transaction remained subject to completion. [21][22]

South Australia established an early legal pathway in February 2021 by declaring hydrogen a regulated substance under its petroleum-style regime, now the Energy Resources Act 2000. The state reports more than 40 exploration licence applications primarily targeting natural hydrogen, with granted licences including Gold Hydrogen and H2EX. [25]

A useful counterweight to exploration hype

HyTerra's McCoy-1 production test in Kansas illustrates the difference between a gas show and commercial deliverability. In August 2026 the company reported an estimated gas flow of about 0.1 Mscf/day and low gas saturation in the tested zone; a planned second-zone test did not proceed at that stage. The result is company-reported, but it is precisely the kind of flow-test evidence needed to calibrate exploration claims. [23]

SIGNALS TO WATCH

A dedicated well demonstrating sustained commercial-rate hydrogen production at high purity and repeatable reservoir behaviour. [42]	Independent resource classification and, ultimately, reserves based on demonstrated recovery and economics.
Ramsay-2 and subsequent Australian flow tests, Mt Kitty appraisal and the first results from Koloma Australia. [20][24]	FDE's planned deep flow measurements in Lorraine and whether concentration translates into productive flow. [18][38]

03 CONCENTRATED SOLAR POWER & THERMAL

Proven technology, changing value proposition

8.422 GW	43	18 MWth
Global CSP power capacity at end-2025 [26]	Chinese CSP projects operating or under construction by May 2026 [29]	Mars Wodonga industrial CST project under development [34]

WHAT IT IS

Concentrated solar technologies use mirrors to focus direct sunlight onto a receiver and create heat. The market should be separated into concentrated solar power (CSP), where heat drives a power cycle to generate electricity, and concentrated solar thermal (CST), where heat is delivered directly to an industrial process.

Established architectures include power towers, parabolic troughs and linear Fresnel systems. Thermal storage may use molten salts, water or steam systems and, in newer designs, solid particles or other high-temperature media. The critical solar resource is high direct normal irradiance (DNI), not simply "sunny weather".

WHERE IT STANDS IN 2026

IRENA reports 8,422 MW of operational CSP electricity capacity worldwide at the end of 2025. The fleet is tiny relative to solar PV, but conventional CSP is an established commercial generation technology. [26]

China is the main growth centre. By May 2026, the SolarPACES-China Solar Thermal Alliance database recorded 43 Chinese CSP projects operating or under construction: 26 operating and 17 under construction. These projects include thermal energy storage. Increasingly, CSP is being deployed as a dispatchable storage-and-generation component within larger renewable developments rather than as a stand-alone daytime competitor to PV. [29]

COSTS: LONG-RUN DECLINE, THIN-MARKET VOLATILITY

IRENA reports that the global weighted-average LCOE of newly commissioned CSP fell 77% from 2010 to 2024, from US$402/MWh to US$92/MWh. The 2024 sample contained only five projects after several years with just one annual commissioning, so the global average is inherently volatile. [27]

IRENA's 2025 global weighted average increased to US$115/MWh, compared with US$44/MWh for solar PV, US$33/MWh for onshore wind and US$78/MWh for offshore wind. This does not establish a reversal in technology learning. It shows the instability of a weighted average in a thin, geographically concentrated market. [28]

Raw LCOE is also an incomplete comparison when CSP supplies time-shifted, dispatchable electricity. CSP generally struggles against PV for undifferentiated daytime energy; for evening or overnight supply the relevant comparison is with PV plus storage and other firming or long-duration options.

FOUR DISTINCT MARKET PROPOSITIONS

Application	2026 maturity	Strongest value proposition	Principal constraint
Stand-alone CSP + TES	Commercial	Dispatchable solar electricity and multi-hour storage	High CAPEX and financing risk versus PV plus storage
Hybrid PV/wind + CSP/TES	Commercial; scaling in China	Firming large renewable bases and shifting output into evening/night	Complex integration and value of firming services
Industrial CST	Commercially deployed at moderate temperatures; early Australian deployment	Direct renewable process heat with thermal storage	DNI, site integration, land and competition from electrified heat

Application	2026 maturity	Strongest value proposition	Principal constraint
High-temperature / Gen3 CST	Demonstration	>700 C heat, advanced cycles, minerals, chemicals and fuels	First-of-a-kind reliability and bankability

Industrial heat is a separate commercial pathway

Industrial CST avoids the turbine and generator entirely. Heat can be supplied directly to steam or process systems, potentially avoiding conversion losses and, at some constrained sites, expensive electrical-network upgrades. The key metric is delivered $/MWhth at the required temperature and availability, not electricity LCOE.

Australia: demonstration, financing failure and a second pathway

MARS WODONGA: INDUSTRIAL HEAT, NOT WHOLESALE ELECTRICITY

ARENA is supporting Mars Petcare's Wodonga project with A$17.2 million toward a reported A$39.3 million total project cost. The project is designed around an 18 MWth parabolic-trough CST plant and up to 150 MWh of pressurised-steam thermal storage. It remains under development as at 24 August 2026, not an operating commercial plant. [34]

Mars reported in June 2026 that, once complete, the CST system is expected to meet more than half of the site's annual process-heat requirement and reduce natural-gas use by more than half. The same site already operates electric thermal energy storage (eTES), which Mars says has reduced gas consumption by about 20%. This is a useful reminder that direct solar heat and electrification can be complementary rather than mutually exclusive. [35]

THE AUSTRALIAN CSP/CST STORY

Jemalong - technical demonstration

ARENA supported Vast Solar's Jemalong pilot in New South Wales: a 6 MWth modular plant with about 1.1 MWe electrical output, five solar modules, roughly 3,500 heliostats and about three hours of thermal storage. Grid connection, export and commissioning occurred across 2017-18. [30][31][32]

The pilot demonstrated multi-array control, steam generation and grid-connected electricity production. Its knowledge report also records that an early low-cost heliostat-facet design did not achieve the required optical performance. Jemalong therefore proved important integrated functions, but it did not prove commercial economics. [32]

VS1 - the commercialisation bridge failed

Vast later sought to scale through the 30 MW / 288 MWh VS1 project at Port Augusta. The project did not reach final investment decision before Vast Renewables and related Australian entities entered voluntary administration on 13 November 2025. KPMG's administrators ceased trading the group in December 2025. The distinction is critical: a successful technology demonstration and a bankable first commercial project are separate gates. [33]

Aurora - site and infrastructure value survived the CSP thesis

In July 2026, 1414 Degrees announced a Heads of Agreement with an Australian data-centre operator for up to 1 GW of AI data-centre infrastructure at the Aurora Energy Precinct. The ASX announcement describes a staged concept beginning with an indicative 17 MW campus, then a 200 MW anchor campus and a longer-term gigawatt pathway. It also states that the Heads of Agreement is non-binding except for specified provisions and remains subject to due diligence, approvals and definitive agreements. [36]

The precinct includes an approved 140 MW / 280 MWh Stage 1 BESS, but the BESS still requires completion of commercial transmission-access negotiations before a transmission connection agreement can be executed. The current Aurora proposition is therefore based on firmed renewables, storage, land and grid infrastructure, not a committed CSP revival. [36]

THE NEXT TECHNICAL FRONTIER

Conventional molten-salt CSP typically operates around the mid-500 C range. Higher-temperature particle systems aim to improve conversion efficiency and extend CST into harder-to-electrify industrial applications. The EU-funded Powder2Power project at France's Themis tower is developing a MW-scale TRL7 particle system including a 2 MWth receiver, particle storage, a 1.2 MWe hybrid Brayton-cycle turbine and operation around 750 C. It is a demonstration programme, not a bankable commercial product. [37]

THE REAL CHALLENGES

- High upfront capital and financing risk remain the main barriers for utility-scale CSP, especially in markets with little recent deployment experience.
- High DNI and contiguous land constrain siting more than PV. For industrial heat, the footprint comparison depends on the alternative architecture, including PV, electric heating and storage.
- Steam-cycle cooling can create material water demand in arid high-DNI regions. Dry cooling can sharply reduce water use but can also reduce thermal-to-electric conversion efficiency; detailed design and ambient conditions matter. [43]
- Thermal storage is not synonymous with molten salt: steam accumulators, solid particles and other media have distinct freezing, corrosion, containment, handling and integration risks.
- The competitive set is wider than lithium-ion batteries: grid CSP/TES competes with pumped hydro and other long-duration options; industrial CST competes with electric boilers, heat pumps where suitable, electric thermal storage and renewable fuels.

SIGNALS TO WATCH

Operating performance and financing structures for China's new hybrid CSP fleet. [29]	Mars Wodonga commissioning, utilisation and delivered heat cost, including interaction with the existing eTES system. [34][35]	Whether high-temperature particle systems move from TRL7 demonstrations to financed commercial assets. [37]

IN SUMMARY

Three different evidence gates

The evidence supports continued serious evaluation of all three technologies, but they are not at the same maturity. Conventional CSP/TES is already a commercial power-generation technology. Fusion remains pre-commercial. Natural hydrogen remains an exploration and early-resource proposition whose commercial deliverability has not yet been demonstrated.

Technology	What is demonstrated	What is not	Australian relevance
Fusion	Repeated NIF target-level ignition; long-pulse plasma control; major private programmes	Integrated net electricity, closed D-T fuel cycle, plant availability and competitive lifetime cost	Laser/materials capability, workforce and commercial links; unclear current federal power-plant pathway
Natural hydrogen	Geological occurrence; long-running pilot-scale use in Mali; formal exploration and one Australian 2C resource	Repeatable commercial-rate production, reserve base and demonstrated lifecycle economics	Ramsay, Mt Kitty, Koloma Australia and an early South Australian regulatory pathway
CSP / CST	Commercial electricity generation, multi-hour thermal storage and direct solar heat	Universal competitiveness is not demonstrated; Gen3/high-temperature bankability remains open	Jemalong technical learning; VS1 financing failure; Mars industrial-heat route; Aurora infrastructure pivot

THE COMMON LESSON

Technology readiness is only one gate. Fusion must cross from scientific and machine-level performance to integrated net-electric and commercial operation. Natural hydrogen must cross from occurrence and concentration to sustained, repeatable production. CSP/CST must show a bankable application in which storage, timing or direct heat creates enough value to justify capital.

IMPLICATIONS FOR DECISION-MAKERS

- Separate physical feasibility from commercial proof. A technically successful pilot can still fail at first commercial scale.
- Match the metric to maturity. Use target gain and integrated plant tests for fusion, well flow and composition for natural hydrogen, and observed LCOE or delivered heat cost for CSP/CST.
- Assess the competing service, not the technology label. Compare CSP with other ways to deliver firm electricity, CST with other industrial heat options, natural hydrogen with delivered hydrogen alternatives, and fusion with future firm low-carbon generation.
- For Australia, the nearer-term opportunities often sit adjacent to the headline technology: fusion supply-chain and workforce capability, natural-hydrogen exploration/helium services, and industrial thermal decarbonisation.

WORK WITH US

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GG Advisory helps investors, corporates and project developers translate emerging energy technologies into screened, decision-ready options: which developments are material, which claims stand up to scrutiny, where Australian opportunities and risks sit, and what a credible entry, partnership or watching brief looks like.

For emerging technologies, the objective is neither to follow hype nor to wait until every uncertainty is resolved. It is to know which uncertainties matter, what evidence would resolve them and when positioning early creates value.

START A CONVERSATION

gg-advisory.com.au | antonin@gg-advisory.com.au | linkedin.com/in/antonindemazy

SOURCES

Key sources and status

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43 GOV U.S. Department of Energy: 2022 SETO Peer Review - dry cooling can reduce water use but may reduce cycle efficiency. **Source**

44 CO Helion Energy: Polaris D-T fusion and 150 million C milestone announcement, 13 February 2026. **Source**

45 CO Type One Energy: Initial licensing application for the Bull Run fusion project, 29 January 2026. **Source**

46 CO Commonwealth Fusion Systems: SPARC project status and 2027 Q > 1 target; SPARC is not a grid-connected power plant. **Source**

IMPORTANT NOTE

This briefing is general information only and is not legal, financial or investment advice. Information is indicative and current as at 24 August 2026. Early-stage technology results, company schedules, exploration outcomes and project statuses can change rapidly. Company-reported figures and targets are identified where material. Verify any load-bearing figure or live project status directly against the primary source before acting.