ASX Announcement

14 September 2026

ECT Secures Defence-Use Licence for FJH-Produced MXenes

Highlights:

- ECT's acquisition target, Xenica Inc has secured a sublicence from MXene Inc. to produce and sell MXenes for military and defence end-uses.
- MXene Inc. holds an exclusive military-use licence to produce Mxenes for military end-use applications from Drexel University.
- Enhances ECT's MXene stack: FJH synthesis technology (Rice), US reactor production platform (Metallium), US precursor supply, and now defence market rights.
- Defence demand exceeds supply: MXene Inc. has publicly confirmed production remains at kilogram scale and is targeting metric-ton capacity by 2027 to meet existing defence contracts.
- US Executive Order 14415 restricts foreign sourcing waivers from 1 January 2027 and mandates qualification of new domestic material sources – a direct tailwind for US-produced MXenes.
- Initial applications: EMI shielding, infrared camouflage and thermal management. Radar-absorbing materials alone are a US$4.3 billion market by 2033, ~47% defence.
- Next milestones: repeatable production at Gator Point, independent characterisation, customer samples, defence qualification.
- Revenue subject to completion of the Xenica acquisition, repeatable scale-up and customer qualification.

Environmental Clean Technologies Limited (ASX: **ECT**) ("**ECT**" or "**Company**") is pleased to announce that Xenica Inc (a wholly owned subsidiary of its acquisition target Xenica Pty Ltd ("**Xenica**")) has secured a sublicence with MXene Inc. ("**MX**"), which will allow Xenica Inc to produce, use or sell MXenes for military applications and defence related end-use (**Sublicence**).

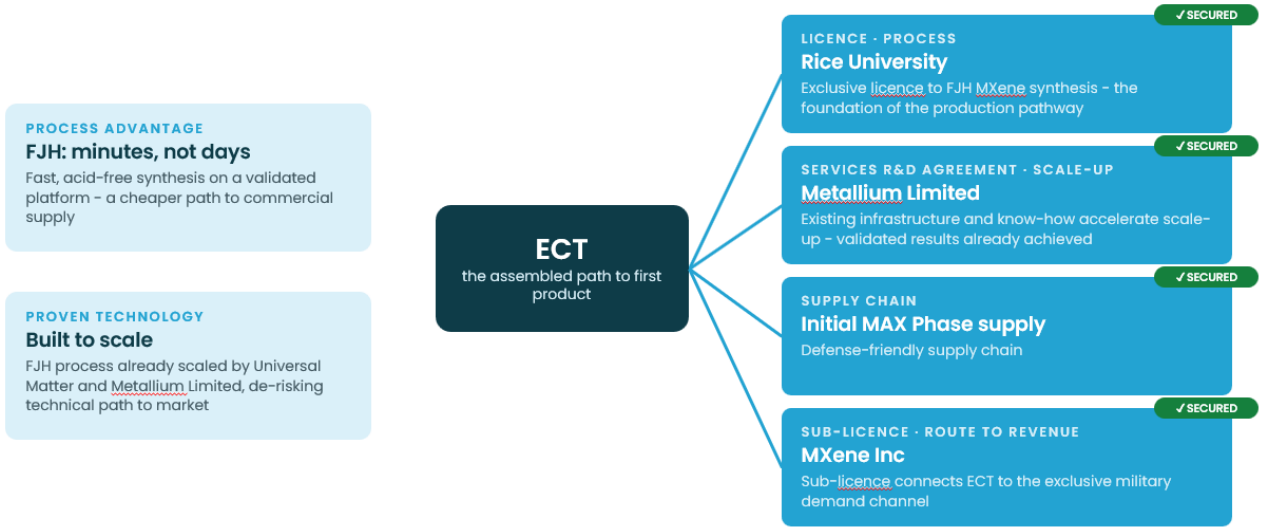
The Sublicence with MX brings together the market-access component of ECT's MXene strategy which includes:

(i) Its proposed acquisition of Xenica, which holds an exclusive licence from Rice University to use Flash Joule Heating (FJH) to produce MXenes and two-dimensional amorphous carbon, subject to shareholder approval, the Acquisition is expected to complete on or around 22 October 2026 (refer to ECT's ASX announcement dated 4 August 2026);

(ii) Access to Metallium Ltd's (ASX: MTM) commissioned Gator Point FJH reactor platform under the R&D and Engineering Agreement (refer to ECT's ASX announcement dated 4 August 2026); and

(iii) ECT's initial supply of US-sourced MAX Phase precursor (refer to ECT's ASX announcement dated 19 August 2026).

Together, these elements establish a defined pathway from production scale-up to defence customer qualification. Any revenue remains subject to completion of the Xenica acquisition, successful and repeatable scale-up, production of material meeting customer specifications, and customer qualification.



The MXene Opportunity and the Defence Market

What are MXenes

MXenes are a rapidly emerging family of two-dimensional advanced materials that combine metallic electrical conductivity with a surface chemistry which can be precisely tuned for a specific end use. This combination of properties has made MXenes a focus of sustained research and commercial interest across sectors such as defence, aerospace, electronics, energy storage, advanced coatings and environmental technologies. Underpinned by exceptional electrical conductivity, hydrophilicity and highly tuneable surface chemistry, MXenes have proven to be highly desirable across a range of industries, yet this potential has remained substantially unrealised.

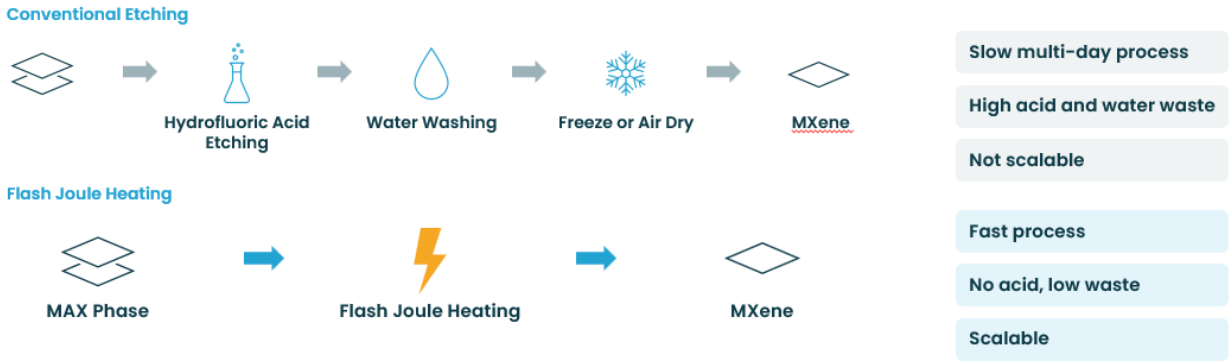
The main bottleneck facing MXenes is its high cost of production. Conventional MXene synthesis relies on hydrofluoric-acid or fluoride-salt etching of a MAX Phase precursor: a multi-day batch process generating substantial fluoride-containing waste and consuming significant water per unit of product[1]. Additionally, the conventional methods have scalability issues, with the development of alternative methods being a requirement to transition from laboratory development to industrial deployment.

ECT is developing its proprietary FJH technology as an alternative pathway for the rapid conversion of MAX-Phase precursor materials into MXenes. Rather than attempting simply to improve the conventional multi-stage wet-chemical flowsheet, ECT's development program is investigating whether the unique characteristics of FJH can provide a fundamentally different manufacturing pathway.

The characteristics of the FJH process are materially different: it reaches reaction temperature in seconds, eliminates bulk acid handling and materially reduces waste. Initial FJH testing through ECT's work with

[1]Mei, J., Bai, J. & Dou, S. (2026), 'Process-optimized synthesis of MXene derivatives for advanced battery materials', *Renewable and Sustainable Energy Reviews*, 239, 117147.

Metallium has produced MXene material in a fraction of the time required by conventional routes. ECT's near-term objective is to demonstrate that this result is repeatable at scale at Gator Point.



Why defence first

ECT considers defence to be the most appropriate initial target market for FJH-produced MXenes for two reasons:

- Procurement is performance-led: defence buyers select materials on capability, not cost.
- Demand exceeds supply: high-quality, Western-produced MXene is not available at scale.

Demand exceeds supply today

MXene Inc., the counterparty to the Sublicence and the only exclusive military-use MXene licensee, has stated publicly[2] that:

- Historically, high-quality MXene production has been confined to small batches, limiting adoption;
- it holds defence contracts that establish its commercial foundation;
- it has scaled from grams to kilograms of monthly production and is targeting metric-ton capacity by 2027; and

These comments emphasise that the constraint is domestic production capacity, not demand.

Sovereign supply is now a compliance requirement

ECT's MXene strategy also aligns with US policy measures supporting secure domestic defence supply chains. US Executive Order 14415, *Securing America's Defence Supply Chains and Ensuring Domestic Acquisition of Critical Materials*, signed 20 July 2026, directs the Department of War to:

- restrict waivers for covered materials from non-compliant sources from 1 January 2027;
- require prime contractors and subcontractors at every tier to map supply chains back to raw-material origin; and
- accelerate the qualification of alternative domestic material sources.

A qualified, US-produced MXene, is the type of supply this policy is designed to bring forward. ECT has sourced an initial 4 kg of MAX Phase precursor from a US defence-aligned source and is progressing discussions to expand precursor supply as the programme scales (refer to ECT's ASX announcement of 19 August 2026).

[2] MXene Inc. company profile, Argonne National Laboratory Chain Reaction Innovations program (2025 cohort).

High-quality US-produced MXenes are currently offered at prices exceeding US$100 per gram, and higher for electronics- and research-grade material[3]. Realised pricing and revenue will depend on product specification, production consistency, customer qualification and contracted volumes.

Initial potential applications

Modern platforms and personnel are detected across three bands at once: radar, infrared, and the electromagnetic emissions of their own electronics. Each has traditionally required a different material. MXenes are notable because a single material family, applied as a thin coating, film or composite filler, has demonstrated solid performance across all three. ECT will initially focus on:

- **EMI shielding –** MXene films have been shown to outperform metal foils at comparable thickness[4]. Applied as a sprayable or printable coating to enclosures, cable harnesses and composite structures. Use-cases: unmanned systems, soldier-worn electronics, communications and electronic-warfare equipment.
- **Radar absorption –**MXene composite aerogels have demonstrated similar performance at a fraction of the density of conventional ferrite absorbers[5]. Use-cases: low-observable coatings for aircraft, unmanned systems and naval superstructures; radomes. The radar-absorbing materials market was US$2.4 billion in 2025 and is forecast to reach US$4.3 billion by 2033, with defence approximately 47% of demand[6].
- **Infrared camouflage –** Research has found that MXene coatings reduce apparent target temperature by more than 40%, with stabilised coatings retaining performance over approximately eight months of outdoor exposure[7]. MXene Inc. reports emissivity comparable to polished gold for its commercial material[8]. Use-cases: uniforms, vehicle and shelter covers, camouflage netting, thermal masking of engines and electronics.
- **Thermal management –** High in-plane thermal conductivity in a coatable film supports heat-spreading layers for high-density electronics, directed-energy and electronic-warfare systems. The same film functions as a resistive heater for de-icing sensors, antennas and airframe surfaces[9].

Performance figures above are from published research on specific laboratory formulations. ECT has not yet produced material to these specifications; independent characterisation is a near-term milestone. Market figures are third-party estimates of total end-markets and are provided as context only.

Pathway to defence revenue

The Sublicence gives Xenica Inc the right to supply defence end-uses; it is not a customer contract. ECT's remaining path to MXene revenues includes:

- repeatable production at Gator Point;
- independent characterisation against defence-relevant specifications;
- sample delivery to prospective customers; and
- customer and programme qualification.

ECT will update the market as each milestone is achieved.

[3] PW Consulting (2025), Ti3C2Tx MXene Dispersion Market Report.
[4] Shahzad, F. et al. (2016), Science, 351, 1137; Global Market Insights (2025), MXenes Market Analysis.
[5] Chen, J. et al. (2025), ACS Applied Materials & Interfaces, 17, 31265.
[6] Grand View Research (2026), Radar Absorbing Materials Market Report.
[7] Nano Research (2023), asymmetric ANF/MXene aerogel film for infrared thermal camouflage; Advanced Science (2024), MXene-based composites for long-term infrared stealth.
[8] MXene Inc., published product specifications.
[9] Nano Research (2023), asymmetric ANF/MXene aerogel film for infrared thermal camouflage; Advanced Science (2024), MXene-based composites for long-term infrared stealth.

Executive Chairman Faldi Ismail said: *"This agreement adds a critical market-access component to the MXene strategy we have been assembling. Subject to completion of the Xenica acquisition, ECT will have brought together FJH synthesis technology, access to a commissioned US reactor platform, US-sourced precursor and, through MXene Inc., rights to supply the defence market.*

"The opportunity exists because the potential of MXenes has been demonstrated for more than a decade, while production at consistent commercial scale remains a significant constraint. Our focus now is straightforward: demonstrate repeatable production at Gator Point, independently characterise the material and progress customer qualification. If the early FJH results can be replicated at scale, we believe ECT has the potential to address one of the key bottlenecks limiting MXene commercialisation."

Sublicence

MXenes were first discovered at Drexel University in 2011, and MXene production is protected by various patents. MX holds a licence to enable it to produce MXenes for military applications and defence-related end uses (subject to certain exceptions). The licence is worldwide (except for South Korea and countries prohibited under the International Traffic in Arms Regulations (ITAR)), has an initial term of five years and automatically renews for successive one-year periods unless terminated by either party and provides that MX is entitled to a royalty payment on any future sales.

With the FJH production route, access to a commissioned US reactor platform, initial precursor supply and a potential defence channel now brought together, ECT has assembled the key inputs required to commence scale-up and customer qualification. The next value-creating milestones are repeatable production, independent product characterisation, customer sample delivery and defence qualification.

Breaking the MXene Production Constraint

Whilst defence applications represent an attractive initial market, ECT's longer-term strategy is to expand the commercialisation of FJH-produced MXenes across a broad range of industrial sectors through additional end-use licensing arrangements over time.

The markets beyond defence are far larger, but they are also far more demanding on cost, throughput and consistency. Energy storage, printed and flexible electronics, RF and antenna systems, thermal management and industrial coatings have all been extensively researched for MXene use.

Defence revenue funds and validates the production platform whilst simultaneously solving the manufacturing problem, unlocking access to the broader commercial markets. This strategy aligns with recent research published in the Renewable and Sustainable Energy Reviews which proposed a phased MXene commercialisation approach targeting high return on investment (ROI) military and medical applications before larger markets such as energy storage[10].

[10]Mei, J., Bai, J. & Dou, S. (2026), 'Process-optimized synthesis of MXene derivatives for advanced battery materials', Renewable and Sustainable Energy Reviews, 239, 117147.

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