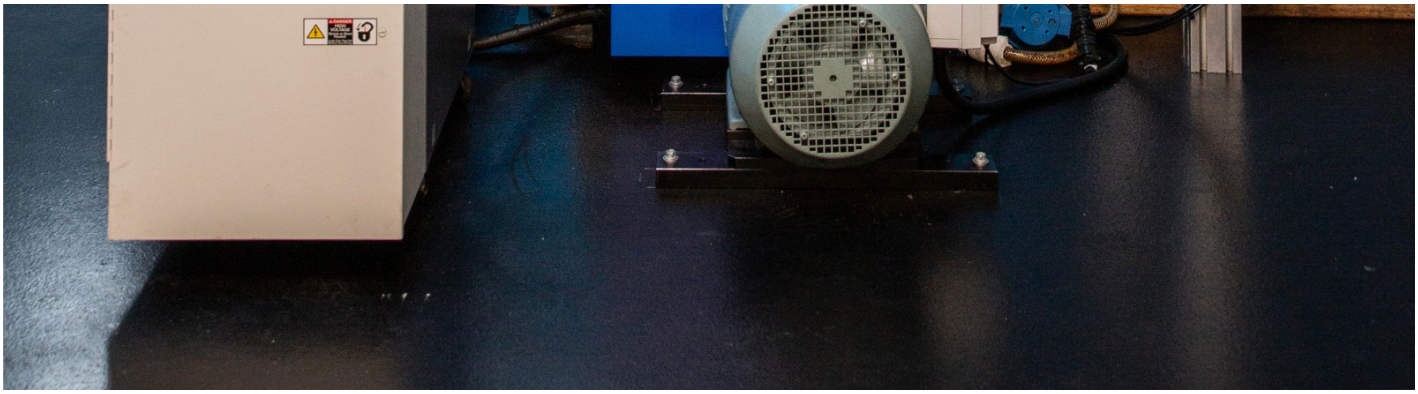
The University Of New South Wales Is Powering The Diesel Displacement Revolution

University of New South Wales



Expanding clean fuel use is one of the five decarbonization priorities for Australia to achieve net zero emissions. Yet this transition could cost trillions in global economic loss for those in the mining, transport, construction, and maritime industries who are currently operating fleets of diesel machines, often with 20 or more years of useful lifetime remaining. The University of New South Wales (UNSW) has found a solution with DeCarice, working to lower carbon emissions without the need to replace diesel engines.

DeCarice is a UNSW spinout accelerating the clean fuel transition by commercializing combustion research expertise and outcomes from the world-class UNSW Engine Research Laboratory in Sydney, Australia. Its innovation lies in the modification of existing industrial diesel engines with its unique clean fuel hybrid technology, directly reducing diesel demand and carbon emissions while retaining operational flexibility to run on diesel, demanded by today's businesses in the context of constrained and volatile clean fuel supply.

DeCarice's technology addresses a critical challenge: reducing carbon emissions without replacing entire fleets or retraining the machine operations and maintenance workforce. When operated with hydrogen, the system is capable of class-leading 95% hydrogen substitution, leading to more than 90% carbon output reduction with nitrogen oxides output at or below baseline levels, all without compromising engine performance or uptime. Clean fuel hybridization accommodates a range of business needs while addressing the immediacy of the climate problem. DeCarice is projected to generate more than $450M in gross domestic product (GDP) annually and create more than 3,000 jobs, particularly in regional and industrial communities, while abating over 35 megatons of CO_2 cumulatively to 2042. This business model unlocks productivity gains, extends the life of existing assets, and supports a pragmatic industry transition.

UNSW's Industry & Innovation (I&I) team, which oversees technology transfer, led the initial intellectual property (IP) protection, industry and investor engagement, spinout strategy and pre-seed funding – transforming lab innovation into a scalable climate tech solution. Collaborators and partners included TRaCE (Trailblazer for Recycling and Clean Energy), Virescent Ventures, and Investible's Climate Tech Fund.

Crucially, I&I identified and secured the foundational IP underpinning DeCarice's commercialization pathway. Following a formal invention disclosure, the office conducted a detailed patentability assessment, defined the scope of protection, and developed a targeted IP strategy aligned with commercial goals. I&I funded the initial patent filing and managed prosecution across key jurisdictions, resulting in a granted U.S. patent—an important milestone that strengthened DeCarice's market position and investor appeal, particularly as this unique technology is proving interesting to engine

manufacturers.

The licensing agreement was carefully structured to balance commercial flexibility with institutional value. DeCarice received an exclusive, royalty-free license covering core IP, future improvements, and technical know-how, while UNSW retained rights for research. The agreement included sublicensing rights and provisions for technical assistance, enabling collaboration with industry partners and facilitating co-investment in further research and development, together with a clear IP assignment pathway appropriate for later-stage company growth.

Through proactive engagement, strategic partnerships, and robust IP and licensing frameworks, I&I ensured DeCarice was positioned for scalable impact—commercializing clean fuel innovation to address the global challenge of $11T in stranded diesel assets.

This story was originally published in 2026.