Applied Research Grants Priority Areas

TAFE Centre of Excellence
Clean Energy Batteries

Instruction to Applicants

The first round of the TAFE Centre of Excellence Clean Energy Batteries Applied Research Grants invite applicants to submit a Proposal that aligns with one of the following seven focus areas under Stream 1 and Stream 2, or one of the targeted calls for research outlined in Stream 3.

As outlined in the **Clean Energy Batteries Applied Research Grants Opportunity Guidelines**, the focus areas and targeted call for research directly contribute to education and training for the clean energy battery workforce, realising the opportunities and addressing challenges in the industry, and enhancing diversity, equity and inclusion in the workforce.

Applicants are strongly encouraged to engage and partner with relevant organisations to ensure that applied research projects will respond to emerging workforce needs of the clean energy industry and support education and training organisations to deliver a skilled workforce.

Before starting your Proposal, please refer to the **Clean Energy Batteries Applied Research Grants Guide for Writing Proposals** which provides details on the required information and tips for writing your Proposal.

In this document, the TAFE Centre of Excellence Clean Energy Batteries will be referred to as 'Centre' or 'Clean Energy Batteries', the Applied Research Grants for this Centre will be referred to as 'Grants', and the clean energy battery industry will be referred to as the 'CEB' industry.

Applied Research Focus

Applied research at the Centre aims to generate evidence-based solutions for skills training and education in the clean energy battery workforce (e.g., developing training products to address emerging skills needs). Ensure that your proposed research clearly demonstrates the potential to translate findings into a **skilled workforce** and/or the development of **inclusive, accessible training**.

Reporting Requirements

Successful Grantees will be required to submit progress updates, including a Commencement of Research Project Report, an Interim Report, and a Final Report. Further details regarding these reporting requirements are outlined in the Grant Opportunity Guidelines and will be stipulated in the Letter of Offer.

Stream 1: Education and Training

The rapid transition to clean energy and the growing demand for advanced battery technologies require a skilled workforce with specialised knowledge and practical expertise. In 2020, the Clean Energy Council (CEC) estimated 1,700 people worked in the clean energy battery (CEB) industry, with the majority being small-scale battery installers. Depending on the pace of decarbonisation scenarios, there could be over 14,000 jobs created in the industry by 2025, with electrical trades workers being the most needed occupation. Most of the occupations are already experiencing a shortage, and the talent pipeline is not enough to meet the growing demand. To address increasing workforce needs in the industry, innovative education and training should be developed to attract students and reskill and upskill the existing workforce. The education and training should be inclusive and accessible for all students so that disadvantaged and underrepresented groups can participate, including First Nations peoples, women, people in regional and remote areas, people with disability, and those with culturally and linguistically diverse backgrounds.

There are three thematic areas under Stream 1. Follow the links below for more details on each theme:

1.1 New Delivery and Pedagogical Models

1.2 Culturally Appropriate and Safe Training

1.3 Growing and Retaining Skilled Trainers

Stream 2: Industry Needs and Innovations

For Australia to strengthen its sovereign capability throughout the battery value chain, the CEB industry needs a strategic approach to both lead and adapt to changes. Applied research can assist the industry in addressing technical, operational and workforce-related issues by providing evidence-based insights and practical solutions.

There are four thematic areas under Stream 2. Follow the links below for more details on each theme:

2.1 Attracting Future Workforce

2.2 Workplace Culture and Diverse Workforce

2.3 Transition Pathways for Existing Workforce

2.4 Linking Emerging Skills with Training

Stream 3: Targeted Call for Research

Stream 3 of the Grants is a targeted call for research and is designed to stimulate research in a particular area of clean energy battery skills training to the benefit of the industry and VET sector. It complements the broader areas and themes in Stream 1 and Stream 2 by providing a mechanism to respond to emerging needs of skills training and prioritising potential topics according to relative urgency and impact.

Applicants interested in the specific projects should develop and submit a Proposal that is clearly aligned with specified objectives, expected outcomes, and suggested approaches provided. For the purpose of rapid translation of research findings into the development of training products and pilot testing, successful grantees in Stream 3 should submit a report on initial findings within 6 months of the project start date.

There are three targeted calls for research within round 1 of the Grants. Follow the links below for more details:

3.1 Current Practices of Battery End-of-Life Cycle Management

3.2 Building battery workforce in regional areas

3.3 AI-driven battery innovation and emerging workforce

New Delivery and Pedagogical Models

To remain competitive and sustainable in the context of the rapidly evolving clean energy battery (CEB) industry, education and training must be adaptable to emerging technologies across battery manufacturing and assembly, battery energy storage systems (BESS) and grid integration, and battery recycling and end-of-life management, as well as safety requirements across these battery life cycles. Increasing automation in battery manufacturing requires a workforce skilled in operating, maintaining and troubleshooting robotic systems. AI and machine learning in battery testing and quality assurance requires employees to be trained in data analytics and AI-assisted testing methods. To ensure that the workforce can keep pace with these technological advancements, training must leverage innovative teaching methods such as virtual reality (VR) and augmented reality (AR), to enhance practical training by providing real time simulations.

Applied research that supports the development of new training products for emerging skills needs and the methods for educating and training the evolving technologies will be particularly welcomed. Potential opportunities for applied research may include, but are not limited to:

- What innovative teaching strategies can be used to adapt education and training to the rapid advancements in the CEB industry? For example, what innovative approaches can be used to train workforce in the safe removal, testing, and refurbishment of end-of-life batteries?
- How can virtual and augmented reality tools enhance practical training and skill acquisition for the CEB workforce?
- How can education and training be tailored to learners in regional and remote areas and to address local workforce needs in the CEB industry?
- What partnerships are most effective between education and training institutions and industry in providing hands-on experience for the future CEB workforce?
- How can industry and academic partnerships contribute to the co-development of training products that address current and future skills shortages?

Applied research that involves partnerships among key stakeholders is recommended, including university and research institutions, industry, and VET institutions.

Culturally Appropriate and Safe Training

According to a Jobs and Skills Australia (JSA) report, the clean energy workforce is characterised by underrepresentation of women, First Nations peoples, people with disability, and overseas-skilled migrants. Increasing participation of the underrepresented groups in education and training should be the first step to achieve greater workforce diversity, leading to innovation and resilience. JSA also found that diverse workforce participation, for instance gender balance, could contribute to minimising workforce shortages. Therefore, culturally appropriate and safe training is both a moral imperative and a strategic necessity for building a resilient and skilled workforce in the clean energy battery (CEB) industry.

Applied research that supports the development of culturally appropriate and safe education and training for underrepresented groups in the CEB industry will be welcomed. Potential opportunities for applied research may include, but are not limited to:

- How can education and training be designed to integrate cultural knowledge, practices, and values specific to First Nations peoples?
- How can education and training institutions retain the CEB teachers and trainers from diverse backgrounds?
- How does culturally safe training and education for the CEB influence learner outcomes, including completion rates, and workforce retention?
- How can the CEB industry and education/training providers work together to create inclusive environments that support learners from the underrepresented groups?

Applied research that involves partnerships with one or more of the underrepresented groups and/or their advocacy groups is particularly encouraged.

Growing and Retaining Skilled Trainers

As Australia scales up its clean energy battery (CEB) workforce, the shortage of trainers and teachers in the VET institutions presents a major challenge. The VET trainers and teachers play a crucial role in bridging industry expertise with skills development, ensuring that the workforce is prepared for the technical demands across the CEB industry. However, JSA noted that there are several barriers that limit the supply of skilled trainers and educators including, but not limited to, incentives and remuneration. If these challenges are not addressed, the industry will face a major bottleneck in its workforce development.

Applied research that supports and address the shortage of skilled trainers and teachers in the CEB industry will be highly regarded. Potential opportunities for applied research may include, but are not limited to:

- What recruitment models can successfully attract industry professionals into training and education for the CEB workforce?
- How can short-term industry secondments or "train the trainer" initiatives encourage industry professionals to transition into the CEB training and teaching roles?
- How can joint industry-academic training programs (e.g., co-teaching models, dual-industry roles) improve the supply of trainers in the CEB?

The involvement of existing, former and future trainers to codesign and conduct applied research is strongly encouraged.

Attracting Future Workforce

While demand for a skilled clean energy battery (CEB) workforce continues to rise, the existing workforce in relevant industries is ageing faster than new talent is entering the sector (PSA, 2024; MASA, 2025; MISA, 2024). The mature workforce brings decades of expertise, making their retention and knowledge transfer critical to building a sustainable workforce. To future-proof the CEB industry, targeted retention strategies, mentorship programs, and reskilling pathways must be developed to enable mature workers to contribute to the next generation in their training, advisory, and quality assurance roles. These initiatives should be done in conjunction with attracting new workforce into the industry.

Applied research focusing on addressing the challenges of an ageing workforce and attracting a future workforce will be encouraged. Potential opportunities for applied research may include, but are not limited to:

- How can informal and structured mentorship programs enhance the skills of the new workforce in the CEB industry?
- How can companies incentivise knowledge-sharing among mature workers to ensure a sustainable talent pipeline for the CEB industry?
- What barriers prevent an ageing workforce from transitioning into the VET sector and how can these be addressed?

Applied research that engages with employers, employees, and unions in the CEB and relevant industries is encouraged.

Workplace Culture and Diverse Workforce

A positive perception of a particular industry could shape the new workforce's decision to enter the industry. While the clean energy battery (CEB) industry is still emerging, there are positive indications that it could benefit from its association with advanced technology and science. An increasing number of female students are studying electrotechnology, engineering, and manufacturing, and are set to transform the scenes of their respective industries. However, the increasing diversity in education and training is yet to translate into the diversity in the workforce and changes in the workplace culture due to persistent issues such as workplace culture and maternity-related barriers.

Applied research that supports the inclusion and diversity in the CEB industry will be welcomed, with the potential to inform education and training programs. Potential opportunities for applied research may include, but are not limited to:

- How could mentorship help increase female representation in leadership roles in the CEB industry?
- What best practices can be implemented to increase First Nations employment in the CEB industry, particularly in regional and remote areas?
- What role do apprenticeships, traineeships, and return-to-work programs play in improving workforce diversity in the CEB industry?

Applied research that engages with First Nations-owned businesses, peak bodies for diverse communities, unions, and employees from underrepresented groups is encouraged.

Transition Pathways for Existing Workforce

The transition to a clean energy economy may present risks of job displacement for many workers in emissions-intensive industries. However, given the presence of transferable skills across the battery value chain, the clean energy battery (CEB) industry could offer opportunities for affected workers to reskill and transition to the emerging industry.

Applied research needs to generate insights into the challenges and incentives for workforce transitions and to support the development of training models and industry partnerships. Potential opportunities for applied research may include, but are not limited to:

- How can regional and remote training hubs support displaced workers in areas for the CEB industry?
- How can cultural and knowledge gaps be addressed for a transitional workforce to thrive in the CEB industry?
- How can coal and gas companies be supported to create structured transition programs?

Applied research that engages with employees in emissions-intensive industries, unions, and training organisations will be encouraged.

Linking Emerging Skills with Training

The opportunities presented by the clean energy battery (CEB) industry are driven not only by existing occupational shortages but increasingly by emerging skills and technological advancements. As the industry rapidly evolves, aligning emerging technical and operational skills with effective and timely training is critical.

Applied research that identifies and maps emerging technical skills directly to training requirements is essential for maintaining the workforce and creating a seamless connection between skills and training. Potential opportunities for applied research may include, but are not limited to:

- What are innovative technologies and practices in the CEB industry, and gaps in existing education and training?
- What collaborative models between industry and training institutions effectively identify and incorporate emerging technological skills into existing training frameworks?
- How innovative technologies and practices in the CEB industry can contribute to remote and regional areas?

Applied research that engages with industry partners developing new technologies and practices will be encouraged.

Current Practices of Battery End-of-Life Cycle Management

Background

As the clean energy transition accelerates, end-of-life batteries management has become just as important as manufacturing and maintaining them. Given the significant carbon footprint embedded in the production of batteries, recycling is crucial for maximising the battery industry's contribution to the overall net-zero effort throughout the entire lifecycle of batteries (Linder et al., 2023). This ensures a sustainable lifecycle by recovering valuable materials and preventing environmental hazards from battery wastes, enabling "urban mining" and a circular economy.

Currently, there is no regulatory framework and industry-wide standard practice of managing batteries at the end of its lifecycle, especially in relation to safe handling, dismantling, transport and storage. The issues are especially pertinent for lithium batteries, which are commonly used for electric vehicles (EVs) and energy storage systems. Unlike other types of batteries, such as lead acid, the lithium batteries are treated as other hazardous wastes, which is not only an unsafe practice but also an economically missed opportunity.

The proposed objectives

- Better understand current industry practices of managing end-of-life lithium BESS and EV batteries.
- Further develop the evidence base to inform best practice and industry standard for end-of-life BESS and EV batteries management.
- Inform the battery manufacturing industry of designing for recycling.
- Better understand qualifications, skills and knowledge required for workforce participating in end-of-life battery management.
- Inform the development of skills training for workforce participating in end-of-life battery management.

The expected outcomes

- Comprehensive overview of priorities and gaps in existing processes of end-of-life battery management.
- A set of clearly defined recommendation for establishing industry-wide training requirements for end-of-life BESS and EV battery management. This should draw as much as possible on existing materials.
- Detailed descriptions of workforce needs, including the required skills and knowledge for different stages of reverse logistics chain (e.g. deinstallation of consumer BESS, automotive repair and dismantling, de-energisation), safe handling during transport/storage to recyclers (e.g. what's needed for fire safety), electrochemical knowledge (e.g. safe handling of electricity), general chemical knowledge to manage hazardous risks, understanding of automotive industry for EVs, knowing where to send end-of-life batteries.
- Training needs for reusing and repurposing batteries.

Suggested approach

- Literature review and stakeholder consultation to map out existing end-of-life battery management practices in Australia, Europe, US and China.

- Structured interviews and/or focus group with key industry stakeholders including battery manufacturers, BESS operators including residential and grid-scale batteries, battery recyclers, policy makers.
- Surveys and interviews among industry stakeholders to capture workforce capabilities, skills gaps and trainings needs.

Building battery workforce in regional areas

Background

BESS have been rolled out in regional and remote areas, aiming to augment intermittent renewable energy sources. This inevitably requires building local capabilities and capacities to operate and maintain BESS beyond the construction stage.

While there are energy-related VET qualifications tailored to the unique needs of remote and First Nations communities (e.g. UEE21420 Certificate II in Remote Area Power Supply Maintenance and UET30921 Certificate III in Electricity Supply Industry – Very Remote Community Utilities), they have not been used by learners due to a lack of awareness. Moreover, the deletion of unit from the core qualification offering further discouraged its uptake by First Nations learners, as the unit is considered critical component without which the utility of the qualification is diminished. There are also limited training providers with these qualifications on scope (PSO, 2025).

The proposed objectives

- Better understand current clean energy battery training options for learners in regional and remote areas, including First Nations peoples.
- Identify systemic barriers to enrolment and completion of battery-related VET qualifications in regional and remote contexts.
- Understand the workforce demand and skills requirements across the lifecycle of BESS, including installation and integration, maintenance, and end-of-life management.
- Inform the development or improvement of training units/modules to incorporate emerging industry needs such as battery recycling, safety protocols, and culturally appropriate delivery methods.
- Inform the building and management of “skill ecosystems” in remote and regional areas for increased workforce mobility and sustainability within the clean energy batteries sector.

The expected outcomes

- Comprehensive overview of current clean energy battery-related training options available for learners in remote and regional areas.
- Detailed descriptions of workforce needs in remote and regional areas, as well as challenges in retaining the workforce.
- Successful cases of innovative skills training tailored to the needs of remote and regional stakeholders.
- A set of recommendations for supporting and scaling regional training delivery, including provider capability, flexible delivery models, and culturally safe practices.

Suggested approach

- Literature review and targeted consultations with regional stakeholders, including learners, employers and training providers, to map out existing clean energy batteries training options for remote and regional learners.
- Co-design a research project with Elders and community members, if a proposed scope is likely to impact First Nations communities, ensuring culturally appropriate engagement, shared decision-making, and respect for Indigenous data sovereignty.

- Case studies of successful and underutilised training programs to identify success factors and barriers.
- Pilot studies of innovative training for remote and regional learners.

AI-driven battery innovation and emerging workforce

Background

Artificial Intelligence (AI) has been emerging as a transformative force across the battery value chain, from manufacturing and designing to testing and management, as well as disposal and recycling. AI applications are enabling smarter battery management systems (BMS), optimising battery testing through high-throughput methods, and accelerating materials recovery from used batteries.

Given the rapid rollout of small and large-scale BESS and EVs across Australia, AI application in operation and maintenance of batteries, as well as in manufacturing and installation will increase. Therefore, AI-driven innovation necessitates a highly skilled workforce equipped with both battery-specific skills and application of AI in battery manufacturing and management.

The proposed objectives

- Investigate current industry adaptation of AI across the battery life cycle and identify implications for workforce skills.
- Map existing qualification and training options for AI application across the battery life cycle.
- Define skills, knowledge and capabilities required by learners and trainers engaging with AI in the CEB industry.

The expected outcomes

- A workforce capability framework outlining AI-related skills in elements of the battery value chain.
- Applied learning models that simulate current industry workflows.
- Practical recommendations for updating or designing new training products for AI-application in battery manufacturing, testing, and maintenance.

Suggested approach

- Literature review of trends in AI applications in battery technologies.
- Stakeholder consultation with battery and AI industries, training providers to identify current and future skills needs, qualifications, and training gaps.
- Case studies of AI applications in battery industry such as smart BMS systems and AI-enabled battery testing.
- Pilot studies of AI-integrated training that reflect real-world tasks and decision-making processes in battery-related roles.