



**FIRE +  
RESCUE**

# CALL FOR EXPRESSION OF INTEREST

SAFETY OF  
ALTERNATIVE AND  
RENEWABLE ENERGY  
TECHNOLOGIES  
(SARET) RESEARCH  
PROGRAM



## BACKGROUND

The Australian Federal Government announced in October 2021 that it will commit to achieving net zero emissions by 2050 and around \$20 billion to support renewable and low emissions technologies, including clean hydrogen, carbon capture, energy storage and solar power.

Over the past decade, Lithium-ion batteries (LiBs) have proliferated to become a +US\$40 billion a year industry. As the cost of the technology has decreased, the demand for larger scale applications, including electric vehicles, residential and commercial energy storage has surged. The rapid uptake of new technologies is often associated with new risks and challenges to public safety. The growth in LiB technology use has seen a comparable increase in reported LiB-related fires and casualties worldwide. While the risk of cell failures is relatively low (1-10 ppm), there are several known mechanisms related to thermal, mechanical, and electrical abuse, including manufacturing defects, ageing, and auxiliary system faults.

For emergency responders, LiB-related fires pose a number of challenges related to the intensity of thermal runaway events, exposure to toxic gases, explosion risk in confined environments, stranded electrical energy risks, difficult and protracted extinguishment and cooling, risks of secondary ignitions, and containment of potentially contaminated firewater.

While there are various sources of research and published data to draw upon, there are a number of research gaps that have been identified in the Australian landscape. Several industry and government stakeholders have reached out to FRNSW to assist in acquiring test data and recommendations.

As one of the world's largest urban fire services, FRNSW has a duty to minimise the risk and impact of fire on the public and our firefighters. FRNSW Research's purpose is to deliver impactful research that supports evidence-based policy and decision making, informs our fire prevention activities in the community and in the built environment, and enhances our response capabilities. Our Fire Research Program is augmented by a dedicated, purpose-built Fire Testing and Research Facility in Londonderry, NSW, with state-of-the-art sensors and testing equipment. Our research team has a unique capability to design and conduct robust experimental programs to enable a better understanding of fire behaviour.

## OBJECTIVES

With a view to foster and strengthen research collaborations, to avoid duplication of effort, and to maximise value and return for the research dollar, FRNSW is looking to partner with industry, government, research institutions and other fire services to support this vital program over **24 months from June 2022**. The SARET Research Program will comprise a suite of testing projects designed to address our priority research questions, which include in broad terms:

1. How do we mitigate the risks related to stranded electrical energy when responding to battery-related incidents?
2. How do we best extinguish fires involving alternative energies such as those related to Lithium-ion batteries and battery systems?
3. What are the risks related to toxic effluents, including venting gases and containment of fire water run-off?
4. How do we mitigate the risks related to secondary ignitions in Lithium-ion battery fires and how they can be rendered safe following fire service response?
5. What fire safety measures and requirements are appropriate for buildings and infrastructure housing Lithium-ion battery systems including electric vehicles?

## PROGRAM SCOPE AND LIMITATIONS

The SARET Research Program will be conducted at the FRNSW Fire Testing and Research Facility in Londonderry, NSW by a high-calibre team of researchers drawn from our Fire Investigation & Research Unit, Fire Safety, Operational Capability, Rescue and Hazmat teams.

The Program will be designed specifically to address the research questions defined and prioritised by the Project Steering Committee, which will include representation by our project partners and stakeholders.

As a public service, FRNSW does not engage in commercial R&D projects and will not endorse any products used in testing. As such, the Program will be limited to projects that will contribute to public knowledge and be utilised for public good.

Below is a list of potential projects to be included in the program, which is subject to the availability of sufficient resources. FRNSW is also open to other projects related to the research objectives outlined above.

- A. Efficacy of various extinguishing agents and methods on LiB-related fires
- B. Efficacy of specialty tools and equipment for use in the management of LiB-related incidents
- C. Electric vehicle fire behaviour and fire brigade response in parking garages
- D. Fire propagation in alternative energy storage systems
- E. Impact protection requirements for stationary battery energy storage systems
- F. Lithium-ion battery-related fire and explosion risk in battery recycling collection programs
- G. Performance of first responder personal protective clothing and equipment in LiB-related incidents
- H. Safe handling, storage and transportation of damaged LiBs and battery systems

### REGISTER YOUR INTEREST

Please register your interest by filling out the online Expression of Interest form at: <https://forms.office.com/r/jcEhsjPTjP> by C.O.B. **Friday 28th January 2022**.

If you have any questions or concerns, please contact us at [Research@fire.nsw.gov.au](mailto:Research@fire.nsw.gov.au).