Natural Hazards Research Australia

Call for Expressions of Interest

T7-A8: Strengthening energy networks to withstand severe wind and storms

Expressions of Interest due **5:00PM AEDT, 3 DECEMBER 2024**
to research@naturalhazards.com.au

Australian Government

Overview

Natural Hazards Research Australia (hereafter the Centre) is seeking expressions of interest from project teams for the following project:

T7-A8 Strengthening energy networks to withstand severe wind and storms

Project description	The objective of this project is to inform asset design and network investment decisions that strengthen Australia's energy networks and ensure long-term resilience under future severe wind scenarios. Further research into the increasingly emerging threat and impact of severe wind events (for example, straight-line winds, convective winds, and downbursts) on critical electricity infrastructure is imperative. The industry's critical knowledge gap in this area is the limited industry research on the frequency of future severe wind events to inform the asset design standards that will ensure long-term network resilience. This includes how such forecasts can be applied across different geographies and landscapes in relation to assets like transmission towers and distribution poles and wires. Further research into the severe weather risks electricity networks need to manage is needed at a national level to benefit all energy users and consumers fairly and equitably.
Estimated duration	18 months
Budget	The budget envelope for this project is $250,000 - $300,000 (ex GST) The research team should note that this is a competitive process. Expression of Interest submissions will be assessed on value for money and justification for any funds requested.
Related national research priorities[1]	→ Evidence-informed policy strategy and foresight → Resilient built environment → Learning from disasters
Related Centre research priorities for 2024–26[2]	→ Understanding and mitigating risk → Land-use planning and urban design → Next generation capability
Supporting organisations	→ Energy Networks Australia (ENA) → ENA Member Organisations: ▪ United Energy ▪ Essential Energy ▪ Powerlink Queensland ▪ Energy Queensland Limited
Centre contact	For any questions regarding this Call for EOIs, please email research@naturalhazards.com.au.

1 Natural Hazards Research Australia (2022) National research priorities for disaster risk reduction and community resilience to the impacts of natural hazards, accessible at www.naturalhazards.com.au/sites/default/files/2022-05/NatHazResAus ResearchPriorities FA02.pdf

2 Natural Hazards Research Australia (2024) *Biennial Research Plan 2024–26*, accessible at https://www.naturalhazards.com.au/sites/default/files/2024-07/NHRA%20ResearchPlan24%E2%80%9326%2004.pdf

Submission of EOI	EOIs must be prepared using the Centre's EOI submission form and Budget Template. EOIs are to be submitted to research@naturalhazards.com.au by **5:00pm AEDT, 3 December 2024.**

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Statement of requirements

Background and context

Network service providers (NSPs) play a central role within a complex and interdependent system of critical infrastructure sectors and particularly during and after natural hazards through joint agency coordination with emergency services, emergency management and land management organisations.

A common goal among all energy network service providers is the continued ability to provide safe and reliable electricity to their customers and communities. To achieve this effectively, electricity networks must understand the risks facing their critical infrastructure, particularly that of natural hazards affecting the built environment, such that they can be managed appropriately.

Extreme weather, in particular severe wind events and storms, represents an increasing threat to electricity network resilience with the potential to catastrophically damage electricity infrastructure causing reliability-based impacts, or power supply disruptions, to customers and the wider community.

Project description

The objective of this project is to inform asset design and network investment decisions that strengthen Australia's energy networks and ensure long-term resilience under future severe wind scenarios.

Further research into the increasingly emerging threat and impact of severe wind events (for example straight-line winds, convective winds and downbursts) on critical electricity infrastructure is imperative.

Some contemporary examples of damaging wind events include:

- **February 2024, Melbourne, Victoria (Ausnet Network)**: Severe storms and winds resulted in electricity transmission tower failures causing more than 500,000 customer outages and at least nine metro train lines impacted by closures across the majority of the eastern suburbs.
- **December 2023, South East Queensland (SEQ)(Energex Network)**: Severe thunderstorms including hail, mini tornados and heavy rain caused widespread damage across large parts of SEQ, particularly at Logan, the Scenic Rim and on the Gold Coast. This resulted in a peak of 130,000 Energex customers losing supply.
- **January 2022, Canberra, Australian Capital Territory (EvoEnergy Network)**: North and north-west Canberra suffered an intense and damaging 'supercell' thunderstorm event. At its peak, 21,672 homes and businesses lost supply. Supply was restored to 85% of customers within 24 hours with 100% restoration within six days.
- **March 2018, Darwin, Northern Territory (NT Power & Water)**: Tropical Cyclone Marcus crossed over Darwin with sustained winds of 95km/h and gusts greater than 130 km/h. Approximately 30% of customers in the Darwin region were without power after the cyclone passed. Half of these customers were restored within two days, with 90% of affected customers restored within three days. Restoration costs were in the order of $3 million in capital.

The critical knowledge gap the industry faces in this area is the limited industry research on the frequency of future severe wind events to inform the asset design standards that will ensure long term network resilience. This includes how such forecasts can be applied across different geographies and landscapes in relation to assets like transmission towers and distribution poles and wires. Further research into the severe weather risks electricity networks need to manage is needed at a national level to benefit all energy users and consumers fairly and equitably.

Expected outputs

Outputs are the products that are expected to be delivered by this project.

Core outputs

- A project plan co-designed with the Project Management Committee with milestones and expected timeframes.
- Development of an approach that forecasts future electricity infrastructure exposure (both severity and probability) to severe winds leveraging off current exposure knowledge.
- A report that reviews and quantifies the frequency, severity and form/nature of severe wind events across Australia that are likely to impact electricity infrastructure in the future by applying the approach developed.
- A report that quantifies this impact on the future market, customers and community as a result of supply disruptions or constraints.
- The approach developed should enable NSPs to produce the data needed as inputs into digital twins for justifying resilience investments.
- A model describing the future risk of severe winds across the National Energy Market/Wholesale Energy Market utilising Earth Science Information System's (EScIS) statistical diagnostic maps (current risk has already been captured and this will be shared with the research provider).
- Industry workshops to socialise outcomes.
- A final report – including identification of future research opportunities.
- Stakeholder presentation/s

Additional outputs

- Project plan and plain language statement
- Quarterly progress reports
- Project evaluation report
- Academic papers
- Relevant communications outputs including but not limited to a presentation, poster and a Hazard Note

Collaborative approach

Researchers are expected to undertake the research using a collaborative approach to assist in the translation and transfer of knowledge to end-users and to ensure the project meets their needs. Researchers are encouraged to outline their approach to ensuring effective collaboration which could include embedding researchers within end-user organisations for a period of time.

Energy Network Australia members will provide contextual material such as:

- case studies
- major incident or failure investigations
- relevant existing research material
- relevant standards
- any legislative obligations such as mandated Representative Concentration Pathways (RCPS) adoption or Security of Critical Infrastructure (SOCI) needs
- outage data related to wind events to correlate cause and impacts.

Anticipated outcomes

Through this project NSPs will develop a deeper understanding of the risks and impacts from severe wind events at a National Energy Market/Wholesale Energy Market level to underpin a consistent view and common approach across NSPs to evaluating severe wind risks to infrastructure and informing design and justification of investment to protect it.

Energy Networks Australia's members will achieve:

- Advancement in industry understanding of the frequency, magnitude and nature of severe wind events that affect electricity infrastructure and impacts on customers.
- Development of the evidence base to inform asset design standards that will ensure long-term network resilience to severe wind events.
- Development of the evidence base necessary for NSPs to justify capital and/or operating level investments to ensure long-term network resilience to severe wind events.

Quality control and reporting

The project will be overseen and supported by a Project Management Committee (PMC) comprising the Principal Researcher, a Centre representative and at least one stakeholder representative. Composition of the PMC will be determined in consultation with the Principal Researcher. The PMC will also report to the AFAC PSG Research Working Group for guidance and advice.

Reports

The Centre expects that the outputs delivered by this project will meet the highest scientific standards and will be suitable for publication on the Centre website and in industry newsletters, as well as in high-quality scientific journals.

The successful research organisation/s must prepare a project plan and project summary using the Centre's templates. The project summary should explain in plain language what the project is about, what questions it intends to answer and describe the expected practical outputs that will make use of the research findings. The project plan must be approved by the PMC and will become an attachment to the contract.

Reports (and any supporting material) must be submitted to the PMC's satisfaction and will be subject to review by PMC members. The project team will be required to ensure an internal peer review process is undertaken prior to the final report being submitted.

Milestone reporting

The project team must report all milestone deliverables and engagement activities into the Centre's Project Management System. This will include sufficient justification for the completion of milestones to the satisfaction of the PMC and the Centre.

Communication

To further assist with quality assurance, it is expected that:

- regular PMC meetings will be held
- the project team will use a consultative approach, documented in quarterly reports
- the Principal Researcher will give periodic presentations to key stakeholder groups to gain critical feedback on project milestones.

Additional quality control processes may be agreed as part of the project planning process.

Contractual arrangements

A copy of the Research Services Agreement, the proposed form of contract for the purposes of this project, can be found here.

The Centre reserves its rights to make amendments to the form of contract.

This agreement should be reviewed by applicants as part of the EOI submission.

If you would like to request amendments to any of the terms and conditions set out in the proposed form of contract, details of the proposed changes and the reason the changes are requested must be included in the EOI submission form. Requests for any changes will be at the sole discretion of the Centre.

Selection as a shortlisted or preferred provider does not give rise to a contract (express or implied) between the shortlisted or preferred provider and the Centre for the supply of goods or services. No legal relationship will exist between the Centre and the shortlisted or preferred provider until such time as a binding contract in writing is executed by both parties.

In the case of consortiums, the Centre requests that one consortium member be nominated as Lead Research Provider and take responsibility for subcontracting other parties.

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Submitting an Expression of Interest

Application and review process

Project selection and approval will be a two-stage process. The first stage is evaluation of the EOIs that are received. The second stage is development of a project proposal, where a preferred provider will be selected and offered an opportunity to co-develop a detailed project proposal with input from key stakeholders.

Key dates

5 November 2024	Call for EOIs opens
3 December 2024	Due date for EOIs
18 April 2025	Final due date for submitting co-developed project proposal

Submission requirements for this EOI

Project teams responding to this EOI are required to submit their response using the Centre's EOI submission form and Budget Template. Submissions must include:

- a statement of capability (max 600 words), including the proposed contributions of each research team member to the project
- a statement (max 400 words) about the diversity of the project team
- a statement (max 400 words) about the project's inclusion and respect of First Nations peoples, philosophies, cultures, rights and/or knowledges
- an outline (max 1000 words) describing how the project team intends to approach the project, strategies for effective collaboration and an indicative methodology
- an indicative schedule of work and interim milestones/project outputs as described in this document
- a proposed project budget in line with the budget envelope provided, including details of any in kind contribution from research organisation/s – a detailed budget to be provided using the downloadable Budget Template provided on the Centre's website
- a clear statement (max 400 words) describing the outcomes that will be delivered for this project and how they will be used by stakeholders
- a clear statement (max 400 words) describing the outputs that the proposed approach to this project will deliver and how the findings could translate into practice
- a statement (max 500 words) demonstrating the project team's relevant industry and stakeholder engagement
- a risk management statement (max 500 words)
- any requested changes to the Centre's proposed form of contract
- up to two-page CVs for each proposed project team member.

Additional information

In responding to this Call for Expressions of Interest, advice should be provided on any known or anticipated impacts of COVID or other pandemic restrictions or human resource risks on the timely delivery of the project. Where appropriate, risk management for the impacts of pandemic restrictions should be incorporated into the EOI.

Frequently asked questions

Additional information provided to individual respondents will also be published on the Centre's website to ensure access to all interested parties. Respondents are encouraged to check the website for any additional information via these published FAQs, prior to the closing date.

Evaluation criteria

After the closing date, the Centre will review submitted EOIs against the evaluation criteria below. The evaluation criteria provide an indication of those matters that should be included in the EOI and supporting material – details are provided in the table below.

The Centre reserves the right not to offer the work, or only allocate a proportion of the available funding, if a proposal does not meet the Centre's needs. The Centre reserves the right to invite any other specific researchers as it sees fit to submit proposals before or after the closing date.

Evaluation criteria	% weighting
Research capability: the capacity and capability to deliver an excellent research project in an Australian environment	20
Project approach: a demonstrated understanding of the project requirements and a proposed project approach and methodology that is appropriate, feasible and robust	20
Project outcomes and outputs: demonstrate a high-level understanding of the intentions of the project and how outputs/outcomes translate to practice	20
Industry engagement: strong track record of industry engagement with the ability to support and influence Australian disaster management at a national or state/territory level through interaction with key stakeholders	20
Value for money: delivery of required outcome within available budget along with the ability to leverage the funds provided with in-kind contributions or supplementary opportunities	20