NESP 2 hub research scope overview

Sustainable Communities and Waste Hub

The Sustainable Communities and Waste Hub form, function and high-level research requirements are outlined below to assist applicants prepare collaborative consortia that can deliver the objectives of the next phase of the National Environmental Science Program. This document is supplementary to the Grant Opportunity Guidelines and should be read in conjunction with the overarching description of the program.

The 'Sustainable Communities and Waste' Hub will deliver research that supports:

- targeted information and management tools to reduce the impact of plastic and other material on the environment
- applied scenario modelling to support sustainable people-environment interactions in communities including urban heat island impacts and liveability analysis
- effective and efficient management options for hazardous waste, substances and pollutants throughout their lifecycle to minimise environmental and human health impacts
- maintained and improved air quality
- cross-hub coordination for the 'waste impact management' functional mission to support decision maker policy development, program management and regulatory processes in both marine and terrestrial environments.

See the high-level research requirements outlined below for a guide to potential research needs.

Form

Regional Nodes

The Sustainable Communities and Waste Hub should have a national presence and capability. Applications should consider both regional and urban communities. Though the Sustainable Communities and Waste Hub's research has a strong focus on urban areas, where appropriate this capability should be delivered via regional centres.

Applicants are encouraged to provide a 'Diagram of proposed hub organisational structure' (this is an optional attachment referred to under Section 7.1 of the Grant Opportunity Guidelines) to assist with the assessment of collaborative partnerships.

Indigenous Participation

Indigenous leadership is embedded throughout the program. The Sustainable Communities and Waste Hub must have at least one senior Indigenous Facilitator who will sit on all senior hub leadership committees to build trusted relationships and ensure engagement with Indigenous Australians. The senior Indigenous Facilitator will form part of the cross-hub Indigenous Facilitation Network, which will be supported by the department to drive Indigenous inclusion at the program level.

Appropriate advice and engagement should be sought from traditional owners and Indigenous communities when designing the Sustainable Communities and Waste Hub governance structure. This will ensure the cultural safety of the Indigenous Facilitator and other advisors, and culturally appropriate governance processes that meet the research interests and needs of Indigenous people.

Applicants for the Sustainable Communities and Waste Hub must be able to demonstrate an ability from the start of the program to establish and maintain long-term, two-way partnerships with traditional owners and Indigenous communities. This means Indigenous knowledge must be treated with respect and

reciprocated in culturally appropriate ways in the form of shared practical research outcomes for traditional owners, communities and land managers, and capacity building for Indigenous communities. The Sustainable Communities and Waste Hub must include mechanisms to nurture the next generation of Indigenous researchers including in remote regions.

Applications for the Sustainable Communities and Waste Hub that do not have Indigenous representation and true on-ground partnerships with Indigenous people will not be competitive.

Functions

The national Sustainable Communities and Waste Hub will deliver applied scientific products and advice to meet end-user requirements as agreed by the department including:

- synthesis reports of current and emerging knowledge for senior decision makers
- applied science research, analysis, process studies and models to support policy makers, program managers and regulators
- integrated management decision tools inclusive of scalable state of the environment monitoring and evaluation systems
- long-term foundational science to support end-users understand and adapt to our climate.

The Sustainable Communities and Waste Hub must have a Mission Leader for waste impact management research. The Mission Leader should have the expertise in the mission and the capability to lead mission research within and across the hubs. The new mission setup is designed to facilitate cross-hub collaborations and consideration of the environment as an integrated whole. Applicants must also ensure that their consortia have individual specialists and the broad capacity to support the other cross hub missions led by the other national hubs as outlined in the Grant Opportunity Guidelines and summarised below.

Mission	**Lead Hub**
Threatened and migratory species and ecological communities	Resilient Landscapes
Protected place management	Marine and Coastal
Waste impact management	Sustainable Communities and Waste
Climate adaptation	Climate Systems

Requirements

The high-level research requirements outlined below provides a guide to potential research needs to assist applicants. However, detailed research plans will be co-designed with successful applicants and end-users at the start of the program and then on an annual basis.

Hub Research:

- Applied scenario modelling to support sustainable people-environment interactions in communities including liveability analysis:
    - Effective management of people-species conflicts in urban settings
    - Develop options for more water sensitive urban design
    - Understand the benefits and complexities of urban greening measures, including analysis of the socio-economic and environmental outcomes
    - Minimise urban heat island impacts

- Targeted information and management tools to reduce the impact of plastic and other material on the environment:
    - Assess the effectiveness of using recycled material in new products and buildings
    - Reduce impacts of fishing waste on the marine environment
    - Understand and manage the effects of artificial light on species and ecological communities

- Effective and efficient management options for hazardous waste, substances and pollutants throughout their lifecycle to minimise environmental and human health impacts:
    - Identify entry of chemicals of concern in the environment including Per- and Poly-fluoroalkyl substances and heavy metals
    - Understand the impact of chemicals of concern on our natural ecosystems
    - Methodologies for calculating toxicity or potency equivalence factors
    - Contemporary environmental contamination detection technologies
    - Develop and update standards and frameworks both for monitoring existing and emerging chemicals of concern, including baselines and trends for environmental levels
    - Improve waste-water treatment technologies to reduce environmental impact

- Maintained and improved air quality:
    - Transfer of international air quality science to the Australian environment
    - Effective new technologies aimed at reducing the concentration of air pollutants
    - Evaluate local planning and zoning regulations to reduce air pollutants
    - Ambient air quality monitoring

Mission Research:

The Sustainable Communities and Waste Hub will ensure the delivery of **Waste impact management Mission** via a focus on:

- Innovative methods for reuse of materials, including proof of concept demonstration;
- Options for improved construction and demolition waste management;
- Baseline and ongoing recycling measures in the Australian economy;
- Socio-economic analysis to assist with waste reduction and increased use of recycled materials;
- Improved material sorting and re-processing; and
- Options for the management and quantification of waste stockpiles.

The Sustainable Communities and Waste Hub will also provide the following support for the:

Threatened and migratory species and ecological communities Mission (coordination led by the Resilient Landscapes Hub)

- Understand the impact of chemicals of concern, waste and pollution on threatened and migratory species and ecological communities, and remediation options
- Evaluate the direct and indirect impacts of chemicals and pollutants on terrestrial and freshwater ecological communities

Protected place management Mission (coordination led by the Marine and Coastal Hub)

- Implant strategies to build resilience in urban wetlands, in line with requirements under the Ramsar Convention on Wetlands
- Contribute information and develop strategies to improve biodiversity in urban green spaces

Climate adaptation Mission (coordination led by the Climate Systems Hub)

- Model the interaction between waste management methods and greenhouse gas emissions
- Examine how a changing climate and emissions reduction measures will impact sources of air pollution and secondary pollutant formation

All research products will be made publicly available and in a form that can be integrated with relevant open information management systems to build knowledge for future stakeholders unless specifically agreed at the start of a research project.

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Applicants must be able to demonstrate flexibility and adaptability to respond to emerging priorities. This should include the ability to rapidly scale output via applied research in regional and urban areas if additional resources are made available – this should include mechanisms to bring in external researchers as required.