



Australia's National  
Science Agency

# Global Centers: Use- Inspired Research Addressing Global Challenges in Climate Change and Clean Energy

Program Guidelines

(Revised May 2023)

# Contents

Contents	1
1	Global Centers: Use-Inspired Research Addressing Global Challenges in Climate Change and Clean Energy Program (Global Centers) ..... 3
2	About the grant program..... 3
3	About the Global Centers ..... 4
4	Grant amount and grant period ..... 4
4.1	Grants available ..... 4
4.2	Project period ..... 4
5	Eligibility and selection criteria..... 5
5.1	Who is eligible?..... 5
5.2	Who is not eligible? ..... 5
5.3	Selection criteria..... 5
6	What the grant money can be used for..... 6
6.1	Eligible grant activities..... 6
6.2	Ineligible grant activities..... 6
7	How to apply..... 6
7.1	Timing of grant opportunity ..... 7
8	The grant selection process ..... 7
9	Announcement of grants..... 7
10	Post-award process..... 8
10.1	CSIRO grant agreement ..... 8
10.2	Legislation, policies and industry standards ..... 8
10.3	How the grant is paid ..... 8
11	How your grant activity is monitored ..... 9
11.1	Keeping CSIRO informed ..... 9
11.2	Reporting ..... 9
11.3	Independent audits ..... 11
11.4	Grant variations ..... 11
11.5	Grant termination..... 11
11.6	Grant evaluation..... 12
12	Probity 12

12.1 National security.....	12
Attachment A – Application and decision-making process .....	15
Attachment B – About the Global Centers Program .....	15
Attachment C – Definition of ‘Research’ .....	21
Attachment D – Eligible expenditure .....	23

# 1 Global Centers: Use-Inspired Research Addressing Global Challenges in Climate Change and Clean Energy Program (Global Centers)

These guidelines contain additional information specific to Australian proposals and grants to Australian institutions and researchers for the *Global Centers: Use-Inspired Research Addressing Global Challenges in Climate Change and Clean Energy*.

The application and decision-making process for the Global Centers program is at **Attachment A**.

## 2 About the grant program

The Global Centers program (the program) is an ambitious new initiative to fund international, interdisciplinary collaborative research centers that will apply best practices of broadening participation and community engagement to develop use-inspired research on climate change and clean energy – CSIRO is the Australian Funding Partner Agency in the Global Centers program. It will support projects that deliver on the objectives of CSIRO Missions and enable ecosystem wide collaboration.

Australia's participation (via CSIRO) in the Global Centers program is supported by the Science and Industry Endowment Fund (SIEF).

The program is being delivered as part of CSIRO's Missions Program and will support research that delivers on objectives of one or more Missions in CSIRO's Missions Program.

The program demonstrates CSIRO's commitment to:

- developing use-inspired research on climate change and clean energy
- establishing research collaborations and partnerships across the national and global innovation ecosystem that support areas of national interest and priorities and national challenges
- supporting projects that deliver on the objectives of Missions in the CSIRO Missions Program.

This is the first round of the program. There may be future rounds of the program.

The NSF Solicitation Document for the Global Centers Program (NSF Solicitation Document) stipulates the Global Centers program objectives.

Further details on the Global Centers program, including requirements specific to Australian-based applicants are at **Attachment B**.

## 3 About the Global Centers

The Global Centers is a collaborative program between:

- United States National Science Foundation (NSF)
- UK Research and Innovation (UKRI)
- Natural Sciences and Engineering Research Council of Canada (NSERC)
- Sciences and Humanities Research Council of Canada (SSHRC)
- The Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia's national science agency.

The program will prioritise research collaborations fostering team science, community-engaged research, and use knowledge-to-action frameworks. The proposed research work should maximize the benefits of international, interdisciplinary collaborations; support research and development aligned to CSIRO Missions; address national priorities and/or national challenges and deliver impactful science and research outcomes for the national benefit.

The [NSF Solicitation Document](#) contains detailed information on the Global Centers Program.

## 4 Grant amount and grant period

A total of \$AUD 7 million is available over 5 financial years from 2023-24 to 2027-28 for Australian-based applicants.

### 4.1 Grants available

The grant amount will be up to 100 per cent of the budget requested by Australian-based applicants.

There is no minimum or maximum grant amount, but grants cannot exceed the amount of available funds and there is an expectation that grants will be in the vicinity of \$AUD 3 to 7 million in total per project.

The applicant is responsible for the remaining eligible and ineligible project costs.

### 4.2 Project period

The [NSF Solicitation Document](#) stipulates the funding period timeframe for Global Centers.

Projects must be within this time period as per the terms of the grant agreement between CSIRO and the Australian-based applicant.

## 5 Eligibility and selection criteria

The NSF Solicitation Document sets out eligibility, merit review principles and criteria. Additional requirements for Australian-based applications are stipulated below.

### 5.1 Who is eligible?

To be eligible to apply, you must be an Australian-based participant in the project application, directly associated with educational or research activities, and must be:

- a university identified as Table A or Table B provider under the *Higher Education Support Act (2003)* or
- an Australian Publicly Funded Research Agency (PFRA) or
- a corporate Commonwealth entity (including CSIRO) or
- a Cooperative Research Centre (CRC) or
- a non-profit, non-academic organisation directly associated with educational or research activities.

### 5.2 Who is not eligible?

You are not eligible to apply if you:

- are any organisation not included in section 4.1
- have a project partner included on the National Redress Scheme's website on the list of 'Institutions that have not joined or signified their intent to join the Scheme'
- have a project partner that is an employer of 100 or more employees that has not complied with the *Workplace Gender Equality Act (2012)*.

### 5.3 Selection criteria

The program expects applicants to propose projects that address the program objectives listed in **Attachment B**.

The following additional selection criteria apply to Australian-based applications:

#### Indigenous Engagement

Proposals will particularly be welcomed from Australian-based applicants who seek to work with Indigenous communities and organisations to create Indigenous-driven science solutions. Applicants are encouraged to summarise how the project will respectfully partner with Aboriginal and Torres Strait Islander communities, including:

- how the Global Center will benefit from the cultural, economic, and scientific contributions that Indigenous Australians can bring to bear on addressing national challenges

- how the Global Center project/activity values, recognises and incorporates Indigenous knowledge systems to help ensure the project/activity achieves its objectives.
- how the Global Center project/activity contributes to addressing the challenges and aspirations of Indigenous communities.

## 6 What the grant money can be used for

### 6.1 Eligible grant activities

The NSF Solicitation Document sets out allowable costs for US-based applicants.

Eligible activities must directly support the Global Center and related projects and research activity and in accordance with any additional special conditions in the grant agreement.

For Australian-based applicants, funding will only be available for activities that fall under the definition of 'Research'.

Definition of 'Research' is at **Attachment C**.

Guidance for eligible expenditure is at **Attachment D**.

### 6.2 Ineligible grant activities

The program does not support applications that involve medical research.

Grant funding cannot be used by Australian participants for clinical trials.

While Australian-based applicants are encouraged to participate in other complementary programs that support and/or contribute to the Global Centers program objectives, grant funding through the Global Centers cannot be used to fund the same activities previously funded or currently being funded through any other Commonwealth grant.

Activities that are not supported by the grant funding are at **Attachment C**.

## 7 How to apply

The NSF Solicitation Document sets out the application process.

Applications will be submitted to the NSF by the eligible US-based collaborating applicant by 10 May 2023.

For purposes of eligibility and compliance checking and for preparing for grant agreement negotiations, CSIRO may contact Australian applicants to request information and application details.

Australian-based applicants are responsible for making sure their application is complete and accurate. Giving false or misleading information is a serious offence under the *Criminal Code Act*

1995 (Cth). If you find an error in your application after submitting it, you should contact CSIRO immediately at [globalapplications@csiro.au](mailto:globalapplications@csiro.au).

## Management of personal and confidential information

As part of the application process, you may provide personal information to either CSIRO or to NSF. By contributing to, or submitting, an application to the program, you are consenting to disclosure of your personal information overseas and acknowledge that CSIRO is no longer required to comply with *Australian Privacy Principle 8* in relation to that personal information. You must ensure any other people whose personal information is provided in connection with an application is also aware of, and consents to collection, use and disclosure of their own personal information.

CSIRO's *Privacy Policy* describes how CSIRO protect and manage personal information, including sensitive information, consistent with our obligations under the *Privacy Act 1988 (Cth)* (*Privacy Act*) and the Australian Privacy Principles (APPs). More particularly, it explains:

- how and why we may collect your personal information
- how it is used
- when and how we might share it with others
- how you can access and seek to correct your personal information
- how to make a complaint about our privacy practices and how your complaint will be handled.

CSIRO Privacy Policy is available at <https://www.csiro.au/en/About/Access-to-information/Privacy>.

To find out more about how CSIRO manage personal information please contact [privacy@csiro.au](mailto:privacy@csiro.au).

## 7.1 Timing of grant opportunity

The NSF Solicitation Document sets out the application submission dates.

# 8 The grant selection process

The NSF Solicitation Document sets out the merit review process.

# 9 Announcement of grants

The NSF Solicitation Document outlines the process for notification of application outcomes.

For Australian-based successful applications, non-sensitive details of successful projects may be published on [csiro.au](http://csiro.au), on the National Science Foundation Global Centers - CSIRO web page and on the SIEF website. This information may include:



- name of the organisation and partners
- title of the project
- description of the project and its aims
- amount of grant funding awarded
- project location/s

## 10 Post-award process

The NSF Solicitation Document outlines the process for notification of application outcomes.

### 10.1 CSIRO grant agreement

The NSF Solicitation Document outlines the post-award management process.

Successful Australian-based applicants will enter into a grant agreement with CSIRO.

The CSIRO grant agreement will specify the terms and conditions of grant funding.

### 10.2 Legislation, policies and industry standards

Australian-based grantee(s) must comply with all relevant laws, regulations and Australian Government sanctions in undertaking their project. They must also comply with the specific legislation/policies/industry standards that follow. It will be a condition of the grant funding that you meet these requirements. CSIRO may include these requirements in the grant agreement.

Australian-based participants will be required to comply with:

- State/Territory legislation in relation to working with children; and
- the *Australian Code for the Responsible Conduct of Research (2018)* (the 2018 Code).

### 10.3 How the grant is paid

The CSIRO grant agreement will stipulate the terms and conditions of how grant funding will be paid:

- the amount of grant that will be paid
- when grant instalments will be paid, required milestones and deliverables
- proportion of eligible expenditure covered by the grant (grant percentage) if relevant
- any in-kind contributions you will make, if relevant
- any financial contribution provided by you or a third party, if relevant.

Payments are subject to demonstrating satisfactory progress on the project.

# 11 How your grant activity is monitored

The NSF Solicitation Document outlines the reporting requirements for Global Centers.

Additional reporting requirements of Australian-based grantees will also be required and will be included in the grant agreement.

## 11.1 Keeping CSIRO informed

For Australian-based grantees, you should let CSIRO (as Funding Partner Agency in the Global Centers program) know if anything is likely to affect your project or partner organisation. CSIRO needs to know of key changes to your project team or activities, particularly if they affect your ability to complete your project, carry on business and pay debts due.

You must also inform CSIRO of any changes to details of the Australian-based grantee:

- name
- addresses
- nominated contact details
- project partners

If you become aware of a breach of terms and conditions under the grant arrangement, you must contact us immediately.

## 11.2 Reporting

For Australian-based grantees, reports will be submitted in line with the CSIRO grant agreement. Reporting requirements will be provided in the grant agreement and include obligations to ensure that projects are aligned with CSIRO Missions through:

- inclusion of schedules/clauses in grant agreements that stipulate program objectives in relation to partnerships between institutions nationally and internationally to advance science and research in specific areas of interest in relation to one or more of CSIRO's Missions and/or CSIRO's strategic priorities; and
- milestones and deliverables specifically demonstrating progress towards delivering activities that align with the objectives of one or more of CSIRO's Missions and/or strategic priorities, which will be linked to payment instalments under the grant agreements.

You are expected to report on:

- progress against agreed project milestones
- project expenditure, including expenditure of grant funds
- contributions of participants directly related to the project (if relevant).

The amount of detail you provide in your reports should be relative to the project size, complexity and grant amount.

Reporting requirements, including the treatment of confidential information, will be outlined in the grant agreement

We will monitor the progress of your project by assessing reports you submit and may conduct site visits to confirm details of your reports if necessary. Occasionally we may need to re-examine claims, seek further information or request an independent audit of claims and payments.

Subject to the terms and conditions of the funding offered, funding may be withheld until required reports have been received and assessed as satisfactory.

### **11.2.1 Progress reports**

Progress reports must:

- include details of your progress towards completion of agreed project activities
- show the total eligible expenditure incurred to date
- be submitted by the report due date (you can submit reports ahead of time if you have completed relevant project activities).

Grant payments will only be made when satisfactory progress reports have been received as determined by the Program Delegate, who is the CSIRO officer responsible for administering the funding agreement with successful Global Centers program grantee.

You must discuss any project or milestone reporting delays with CSIRO as soon as you become aware of them.

### **11.2.2 End of project report**

When you complete the project, you must submit an end of project report.

End of project reports must:

- include the agreed evidence as specified in the grant agreement
- identify the total eligible expenditure incurred for the project
- include a declaration that the grant money was spent in accordance with the grant arrangement and to report on any underspends of the grant money
- be submitted by the report due date.

### **11.2.3 Ad-hoc reports and communication**

You may be asked for ad-hoc reports and information about your project. This could be requested in written or verbal form. This may be for input into marketing and promotion communications materials, or to provide an update on progress, any significant delays or difficulties in completing the project.

## 11.3 Independent audits

You may be asked to provide an independent audit report. An audit report will verify that you spent the grant in accordance with the grant agreement. The audit report requires you to prepare a statement of grant income and expenditure. The report template will be provided directly to you for use should it be stipulated that an audit is required.

## 11.4 Grant variations

It is recognised that unexpected events may affect project progress. In these circumstances, you can request a variation to your grant agreement, including:

- changing project milestones
- extending the timeframe for completing the project but within a maximum two-year period
- changing project activities
- increasing grant funds.

If you want to propose changes to the grant arrangement, you must put them in writing before the project end date. You can submit a variation request directly to the CSIRO Missions Program Office via email at [globalapplications@csiro.au](mailto:globalapplications@csiro.au).

If a delay in the project causes milestone achievement and payment dates to move to a different financial year, you will need a variation to the grant agreement. Funds can only be moved between financial years if there is enough program funding in the relevant year to allow for the revised payment schedule. If the funds cannot be moved, you may lose some grant funding.

You should not assume that a variation request will be successful. Any request will be considered based on factors such as:

- how it affects the project outcome
- consistency with the program policy objective, grant opportunity guidelines and any relevant policies of the department
- changes to the timing of grant payments
- availability of program funds.

## 11.5 Grant termination

Funding under the program may be terminated early for a variety of reasons including (but not limited to):

- by consensus agreement between the recipient and Program Delegate
- for failure to comply with the grant agreement.

Under some circumstances, terminated funding may be transferrable to a new recipient. Grantees should contact the Missions Program Office to discuss this.

## 11.6 Grant evaluation

The program will be evaluated to measure how well the outcomes and objectives have been achieved. Information may be used from your application and project reports for this purpose. You may also be interviewed or ask for more information to help understand how the grant impacted you and to evaluate how effective the program was in achieving its outcomes.

You may be contacted up to two years after you finish your project for more information to assist with this evaluation.

Grant evaluation requirements will be outlined in the grant agreement.

## 12 Probity

These guidelines may be changed from time-to-time by CSIRO. When this happens, the revised guidelines will be published on [csiro.au](http://csiro.au) and on the National Science Foundation Global Centers - CSIRO web page.

CSIRO is committed to conducting the affairs of the organisation with integrity and in the national interest consistent with the functions of CSIRO as set out in the *Science and Industry Research Act 1949 (SIR Act)*, the *Public Governance, Performance and Accountability Act 2013 (PGPA Act)* and other relevant legislation.

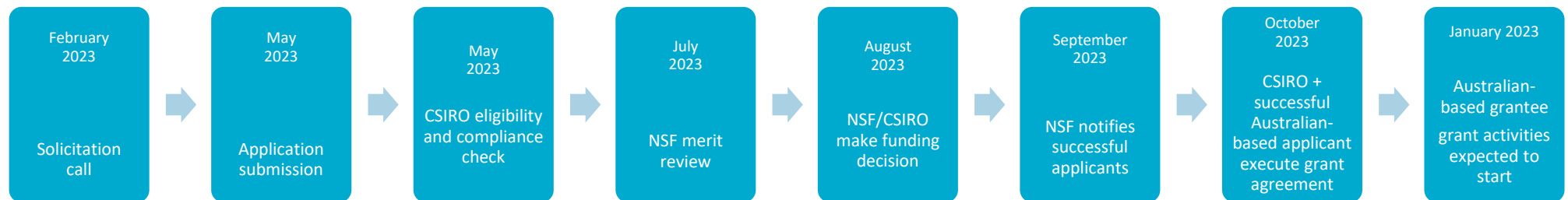
### 12.1 National security

Collaboration with foreign entities must be transparent, undertaken with full knowledge and consent, and in a manner, that avoids harm to Australia's national interests. It is your responsibility to consider the national security implications of the proposed project and identify and manage any risks, including risks relating to the unwanted transfer of sensitive knowledge technology.

You should ensure that you are informed about who you are collaborating with by undertaking appropriate due diligence, proportionate to the risk and subject to available information, of your global partners and their personnel participating in the project. This should consider any potential security, ethical, legal, and reputational risks, and, where necessary, you should be prepared to demonstrate how you will manage and mitigate any identified risks.

You and any entities participating in the project must disclose all foreign ownership (including foreign government ownership), affiliations with foreign governments, organisations, institutions or companies, or membership of foreign government talent programs. You must report any material changes in the nature of the activity or key personnel involved, including affiliations/links with foreign governments or companies.

# Attachment A – Application and decision-making process



# Attachment B – About the Global Centers Program

In addition to the program objectives specified in the NSF Solicitation Document, applicants that include Australian participants must address national priorities and/or national challenges and demonstrate strong alignment with at least one of the CSIRO mission related themes listed below. Projects must be complementary to rather than competing with the science that is being undertaken by CSIRO Missions.

## CSIRO Mission Alignment

### **Pathways to Net Zero**

**Related Mission:** Towards Net Zero

**Context:** Deep decarbonisation requires us to tackle all sources of emissions. While the hard to abate sectors will significantly benefit from decarbonisation of the electricity grid there is significant work to adapt industrial processes and to deal with other greenhouse gas emissions to achieve net zero.

As part of this process cost competitiveness will change and supply chains may be reconfigured impacting advantageous industry configurations and interdependencies and cascading effects on to regional economies.

Industrial decarbonisation will be occurring simultaneously to other actions to decarbonise economies including changing energy price structures and needs for transmission capacity, scaling of negative emissions technologies to contribute to net zero goals, increasing demand and broader use of land and natural feedstocks to drive the bioeconomy and exogenous price influences on critical inputs and labour.

Foresight and purposeful planning can allow for supporting policy and incentives to capture opportunities and minimise unintended consequences of the net zero transition. It is critical to develop integrated decarbonization pathways at multiple scales (regional to national) to guide actions.

**Topics:** CSIRO seeks proposals that directly address the challenge of lowering carbon emissions whilst building regional energy and resource security by directly identifying decarbonization (emission reduction) options and pathways along with their interaction with land use, economy, and socio-economic values. Of particular interest are approaches to downscaling to sub-regional areas, and intercomparison of approaches to anticipating impacts.

All proposals aligned with this theme should contain a section that clearly describes how the proposed solution is complementary to CSIRO's Towards Net Zero Mission.

### **Net Zero Regional Transitions**

**Related Mission:** Towards Net Zero

**Context:** Whilst the transition is occurring economy wide, it is playing out in place-based situations. This is particularly the case for the hard-to-abate sectors where heavy industry can be the economic driver for a region, or where sectors like agriculture and the fabric of regional communities.

The development of net zero regions or precincts are emerging as communities either driven by industrial transformation or looking to capture collective advantage by the net zero transition seek advantage through identity and renewal, market differentiation or supporting foundational industry narratives.

These niche activities are creating new patterns of industrial symbiosis, pioneering new market mechanisms for insetting and identifying governance arrangements to support shared value creation. There is much to learn from these early experiments, and innovation, technical and policy support can de-risk and accelerate these regional and precinct transitions.

**Topics:** CSIRO seeks proposals that can help identify approaches and frameworks that identify opportunities and vulnerabilities of regions and precincts in net zero transition and in particular that support:

- innovation and market support mechanisms (including enabling digital technologies) for net zero precinct and region transitions
- comparative analysis of governance arrangements and how these affect success, resilience and equity
- typologies and analytics that identify readiness of regions to transition and expose the aspect of support (for example leadership, industry options, capital etc) that could improve success
- all proposals aligned with this theme should contain a section that clearly describes how the proposed solution is complementary to CSIRO's Towards Net Zero Mission.

## **Reducing Methane Emissions**

**Related Mission:** Towards Net Zero

**Context:** Many nations have now signed the global methane pledge recognising that decreasing methane emissions can have a swift effect of climate warming. Attribution of methane emission is difficult, and action remains hard.

Fugitive emissions from coal mines and coal seam gas are poorly quantified and methane capture technology only just emerging. Livestock methane remains a significant contributor to global warming and while some feed supplements hold promise delivery mechanisms for extensive grazing systems where a significant proportion of emissions are generated remains unsolved as a technological challenge and are a long way from cost effective.

**Topics:** CSIRO seeks proposals that improve accounting and identify emissions baselines and that allows industry to experiment with mitigation strategies, in the areas of but not confined to:

- integrated mapping and sensorisation to better baseline and attribute methane emissions
- capture technology from mines and coal seam gas
- livestock methane reduction with a focus on delivery mechanisms to support extensive grazing systems
- all proposals aligned with this theme should contain a section that clearly describes how the proposed solution is complementary to CSIRO's Towards Net Zero Mission.



## **Integrated Energy Systems Intelligence**

**Related mission:** Smart Energy

**Context:** The energy transformation is an urgent, complex, and multifaceted problem that cuts across technological, environmental, economic, organisational and social domains.

Large-scale, cross-system changes are needed while maintaining operational performance. Not only must multi-energy systems decarbonize to net-zero by 2050, but they must also do so reliably, affordably, and equitably in a changing climate. Three interwoven recognitions must be considered:

- First, the disciplines associated with historically siloed energy domains (electricity, hydrogen, natural gas, oil, and coal) are becoming increasingly interdependent. Electrification, for example, has become an enabler and driver for decarbonisation in other sectors along with alternative fuels and industry emission reduction technologies. There are more dependencies and more dynamics emerging in the system across a wide range of spatial and temporal scales.
- Second, the energy end-user can no longer be considered a passive participant served by infrastructure operators but rather an integral and active participant in the multi-energy system's operation and transformation.
- Finally, the ubiquitous availability of digital technologies opens unprecedented opportunities for data-driven and physically informed analysis and artificial intelligence methods that can enhance energy system forecasting and real-time operation as well as enable a range of multi-energy system scenarios and futures to be explored.

**Topics:** CSIRO is seeking proposals that draw on the latest advances in fields such as energy systems and power systems engineering, environmental science, social science, complex systems modelling, digital systems, and physics-informed artificial intelligence to address one or more of the following areas:

- Integrated multi-energy system transformation including the practical realities of installed assets and carbon, water and land-use constraints.
- Integration and optimisation of Distributed Energy Resources (assets, data and services) with specific focus on system performance, social acceptance, and energy equity.
- Multi-energy system digitalisation (data, connectivity, algorithms and control) considering architecture, data access, interoperability, security, privacy, and computational efficiency aspects.

All proposals aligned with this theme should contain a section that clearly describes how the proposed solution is complementary to CSIRO's Smart Energy Mission.

## **Critical Energy Minerals and Energy Storage**

**Related mission:** Renewable Energy Powerhouse

**Context:** This area encompasses development and deployment of the basic technologies to generate renewable energy and the associated storage systems, and also to intelligently integrate these into society's and industry's needs.

Urgent action is required to avoid catastrophic climate change. Viable pathways to decarbonise, and to accelerate these technologies, are the top priority of this Mission. Australia's abilities to create and deploy these technologies hinge largely on its endowment of critical minerals required for decarbonisation, and the development of secure and diverse supply chains to manufacture and deploy technology solutions.

Australia, and the world, need to develop and deploy these technologies sooner rather than later. At this time, the value-adding transformations in supply chains of critical minerals and technologies are concentrated in a small number of locations with an equally small number of companies, and that is a risk to Australia and partner nations that seek to adopt renewable energy technologies. Most of the raw materials required for these supply chains are available in Australia, but most are barely processed in-country before export. Australia needs to become more self-sufficient in these supply chains, alone and in concert with its trading partners, to ensure a diversity of supply options for renewable energy materials and technologies.

This Mission seeks to:

- lengthen and strengthen the supply of critical energy minerals in Australia
- create supply chains of manufactured goods that are essential for the growth of renewable energy, and
- demonstrate renewable energy technologies that are adaptable and fit for purpose in Australian cities and towns, for remote and bespoke applications.

These will also be applicable to our near neighbours in the Asia and Pacific regions, where reliable and renewable energy is currently in poor supply.

#### **Topics:**

CSIRO is seeking proposals that could address any of the following areas.

- **Supply, demand, economic resource and criticality assessment tools:** Develop demand forecasting, economic resource and assessment tools that are sensitive to a variety of scenarios concerning industrial use, supply concentration, location and the nature of resource and likely recycling rates. Determine measures of criticality based on these scenarios (perhaps referencing USGS methodology) to inform governments and investors with measures of supply chain health, and suggested interventions. This includes resource inventory tools that consider social and environmental science factors in scenarios of likely development. Consider how at regional scales these tools could form economic corridors.
- **Critical Minerals for Renewable Energy Technologies:** Australia has an abundance of critical minerals which are integral to Australia and the world's energy transformation. The development of mineral processing technologies is important to reduce the environmental footprint of critical mineral processing. Further, the development of battery active materials are currently multi-step processes and can be energy intensive. We are seeking to development methods to produce these materials that are faster and less energy intensive. The development of innovative energy storage solutions is critical to the continuing expansion of renewable energy. These solutions need to have a lower cost (\$/kWh), improved cycle-life and designed for recyclability and can span from (electro)chemical, thermal, mechanical and other solutions.

- **Secondary sources:** Assessment of mine waste streams, tailings, and landfill to determine the richest secondary sources of critical minerals. The assessment will also need to cross-reference with existing process routes for recovery to determine economic viability. Gaps in economic viability need to be flagged as opportunities for process development to recover these resources.
- **Systems and integration:** The challenge for Australia to move toward a decarbonised energy sector is unparalleled in scope and scale. The energy transformation globally, and in the Australian context, requires novel technology integration solutions. Research needs to be conducted to implement energy resolutions for (electrical) networks, and unique (and remote) application cases. Identifying resource materials, appropriate energy storage solutions, and behavioral studies of end use, and supply-chain improvements all will assist to navigate the increasing demands on the grid.

All proposals aligned with this theme should contain a section that clearly describes how the proposed solution is complementary to CSIRO's Renewable Energy Powerhouse Mission.

### Scaling Clean Hydrogen Markets

**Related mission:** Hydrogen Industry Mission

**Context:** Countries around the world are pursuing the use of hydrogen as a means of decarbonising their industry, energy and transport sectors in line with emissions reduction targets.

In late 2019, Australia adopted a National Hydrogen Strategy to develop a hydrogen industry which will enhance our energy security, create jobs and build an export industry valued in the billions.

The strategy recognises that Australia has the major elements needed to create this new industry, access to clean energy resources, expertise, infrastructure and committed clean energy trading partners.

The goal of CSIRO's Hydrogen Industry Mission is to enable a globally competitive Australian hydrogen industry comprising both domestic and export value chains by 2030. This will support the decarbonisation of the energy, transport and industry sectors and help Australia transition to a net zero emissions future while creating new jobs, capabilities and spill over benefits into other industries.

A thriving Australian domestic hydrogen industry will create a stepping-stone to the world's first clean energy export industry.

**Topics:** CSIRO seeks proposals that support the development and uptake of hydrogen technologies in the following key areas:

- Mobility as an early target market for hydrogen industry development - increasing efficiency and cost-competitiveness in hydrogen storage and distribution and refuelling technologies, e.g., compression, low- and high-pressure hydrogen storage, hydrogen liquefaction, and hydrogen refuelling.
- Hydrogen utilisation in heavy industry as a longer-term demand driver – feasibility studies and technology developments leading to hydrogen utilisation in industrial processes to

support industry decarbonisation transition, e.g., green metals and green chemicals production.

- Hydrogen energy systems integration – resolving barriers to hydrogen supply and demand value chains at scale (e.g., in hydrogen hubs) e.g., technoeconomic and life cycle analysis, studies which inform regulatory and standards development, resolving complex hydrogen energy systems integration and sector coupling challenges.

All proposals aligned with this theme should contain a section that clearly describes how the proposed solution is complementary to CSIRO's Hydrogen Industry Mission.

#### Updates to Attachment B

*08/05/2023: the theme 'Critical Energy and Minerals Storage' was labelled as 'Renewable Energy Powerhouse' in previous versions. This was incorrect, and the theme is now correctly labelled. This change has no material impact to the guidelines.*

*08/05/2023: the mission 'Renewable Energy Powerhouse' was listed as 'Critical Energy and Minerals Storage' in previous versions. This was incorrect, and the mission is now correctly listed. This change has no material impact to the guidelines.*

# Attachment C – Definition of ‘Research’

**Research** comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications (source: OECD Frascati Manual 2015 Guidelines for Collecting and Reporting Data on Research and Experimental Development).

**Research** covers three activities:

1. **Basic research** is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view.
2. **Applied research** is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.
3. **Experimental Development** is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed. The primary objective is to make further technical improvements on the product or process.

Research does **not** cover the following:


- Routine activity or any non-R&D activity (for full details refer OECD Frascati Manual Guidelines for Collecting and Reporting Data on Research and Experimental Development)
- If the product, process or approach is substantially set and the primary objective is to develop markets, do pre-production planning or get a production or control system working smoothly
- Education and training - research by students at the PhD level is acceptable
- Other related scientific and technological activities
  - general purpose data collection
  - testing and standardisation
  - patent and licence work
  - routine software development
- Other industrial activities
  - other innovation activities
    - commercialisation
    - acquisition of technology (embodied and disembodied)
    - tooling up
    - industrial engineering, industrial design
    - other capital acquisition

- production start-up
- marketing for new and improved products
- production and related technical activities
  - industrial preproduction and production
  - distribution of goods and services
  - using social science disciplines, such as market research
- Administration and other supporting activities
  - purely R&D-financing activities
  - indirect supporting activities

## Attachment D – Eligible expenditure

Eligible expenditure are:

- Employment of personnel, which may include:
  - salary support for Global Center Australian-based personnel who perform research or activities that support the research (including on-costs up to 30%)
  - stipends for Higher Degree by Research (HRD) students at an appropriate level for the Australian-based Eligible Organisation
  - travel costs essential to the Global Center research program
  - expenditure on field research essential to the Center, including technical and logistical support, travel expenses (including accommodation, meals and incidental costs)
  - limited equipment (and its maintenance) and consumables essential to the Center only (not purchase, operation or maintenance of moderate to large equipment) and
  - other, which may include:
    - access to national and international research and infrastructure facilities, including specialist archives, collections and databases
    - access to technical workshop services necessary for the Center (for example, machine tools and qualified technicians)
    - specialised computer equipment and software essential to the Center
    - workshops, focus groups and conferences that are essential for the conduct of the Center
    - reasonable essential costs to allow a participant who is a carer, or who personally requires care or assistance, to undertake travel essential to the Center and
    - professional development and training for students and early career researchers only



**As Australia's national science agency and innovation catalyst, CSIRO is solving the greatest challenges through innovative science and technology.**

CSIRO. Unlocking a better future for everyone.

**Contact us**

1300 363 400  
+61 3 9545 2176  
[csiro.au/contact](https://www.csiro.au/contact)  
[csiro.au](https://www.csiro.au)

**For further information**

CSIRO Missions Program Office  
Grants Manager  
[globalapplications@csiro.au](mailto:globalapplications@csiro.au)  
[www.csiro.au/en/about/challenges-missions](https://www.csiro.au/en/about/challenges-missions)