



Australian Government

Australian Research Council

Linkage Learned Academies

Special Projects

Funding Rules for funding commencing in

2006

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Acronyms

The following acronyms are used in ARC Funding Rules.

AEST	Australian Eastern Standard Time
AEDT	Australian Eastern Daylight Saving (Summer) Time
AIMS	Australian Institute of Marine Science
ANSTO	Australian Nuclear Science and Technology Organisation
APA	Australian Postgraduate Award
APAI	Australian Postgraduate Award (Industry)
APD	Australian Postdoctoral Fellowship
APDC	Australian Postdoctoral Fellowship (CSIRO)
APDI	Australian Postdoctoral Fellowship (Industry)
APF	Australian Professorial Fellowship
ARC	Australian Research Council
ARCIF	Australian Research Council International Fellowship
ARF	Australian Research Fellowship
AVCC	Australian Vice-Chancellors' Committee
CI	Chief Investigator
CoE	College of Experts
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DSTO	Defence Science and Technology Organisation
ECR	Early Career Researcher
GA	Geoscience Australia
GAMS	Grant Application Management System
GST	Goods and Services Tax
HECS	Higher Education Contribution Scheme
KCTR	Key Centre for Teaching and Research
LASP	Linkage Learned Academies Special Projects
LIEF	Linkage Infrastructure Equipment and Facilities
LIF	Linkage Industry Fellowship
NC	Network Convener
NCGP	National Competitive Grants Program
NHMRC	National Health and Medical Research Council
NP	Network Participant
PI	Partner Investigator
QEII	Queen Elizabeth II Fellowship
SRC	Special Research Centre
URL	Universal Resource Locator

Key Date

Closing time/date for applications – 5:00 pm AEST Friday, 14 October 2005

Contacts

The ARC deals with thousands of applications each year. Where possible, applicants should direct requests for information to the Research Office or equivalent unit within their organisation.

Enquiries about the *Linkage Learned Academies Special Projects* scheme may be addressed to:

LASP Coordinator
Australian Research Council
GPO Box 2702
CANBERRA ACT 2601

Email: pcg@arc.gov.au
Phone: 02 6284 6600
Fax: 02 6284 6638
Web: www.arc.gov.au

or other contacts/addresses as may be advised by the ARC from time to time.

Australian Research Council
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1 Introduction

1.1 Funding Rules

- 1.1.1 This document sets out the funding rules (the Funding Rules) for *Linkage Learned Academies Special Projects* (LASP), a scheme funded under the Australian Research Council's National Competitive Grants Program (NCGP), which comply with the requirements of the *Australian Research Council Act 2001* (the ARC Act).
- 1.1.2 Applicants should read and understand the entire Funding Rules and the ARC's standard Funding Agreement [which is available at <http://www.arc.gov.au>] before submitting an application to the ARC. Applicants are responsible for ensuring that their applications are complete and accurate.
- 1.1.3 These Funding Rules come into effect when they are approved by the Minister for Education, Science and Training.

1.2 NCGP Objectives

- 1.2.1 The Australian Research Council (ARC) is an Australian Government statutory authority established under the ARC Act. The primary functions of the ARC, as specified by the ARC Act, are to make recommendations regarding the funding of research programs, to administer funding to support research programs, and to provide policy advice related to research.
- 1.2.2 The ARC has established a range of competitive funding schemes for the support of research and research training under the framework of the NCGP. A list of current NCGP funding schemes is available on the ARC web site at <http://www.arc.gov.au>.
- 1.2.3 By the operation of a range of funding schemes under the NCGP, the ARC aims to:
- a. Maintain and build on existing research and research training;
 - b. Build the scale and focus of research and research training;
 - c. Encourage cross-disciplinary approaches to research and research training;
 - d. Facilitate collaborative approaches to research and research training; and
 - e. Support research and research training in the following National Research Priority Areas:

- i. An Environmentally Sustainable Australia;
- ii. Promoting and Maintaining Good Health;
- iii. Frontier Technologies for Building and Transforming Australian Industries; and
- iv. Safeguarding Australia.

1.2.4 Descriptions of these National Research Priority Areas and their associated Priority Goals can be found in Appendix 1, and on the ARC web site (<http://www.arc.gov.au>). Assessment of the degree to which a proposed project would contribute to National Research Priority Areas and Priority Goals may be used as part of the selection process in NCGP schemes.

1.3 Linkage Learned Academies Special Projects

1.3.1 LASP funds the Learned Academies and the National Academies Forum (the Academies) to undertake research-related projects. Applications are accepted from the Academies. These Academies are listed in Appendix 2.

1.3.2 These Funding Rules are written on the basis that it is the Academy who is the applicant.

1.3.3 The objectives of the LASP scheme are to support projects undertaken by the Academies which:

- a. capitalise on their unique capabilities;
- b. assist programs of research undertaken by organisations; and
- c. may be expected to have results of broad benefit for research and scholarship in the natural and applied sciences, technological development and applied technology, the social sciences and the humanities.

1.3.4 The Australian Research Council is particularly interested in supporting activities in areas of demonstrable national importance.

2 Fundamental principles and requirements

2.1 Ethics and Research Practices

2.1.1 The National Health and Medical Research Council (NHMRC) website, <http://www.nhmrc.gov.au>, provides a series of documents which outline the principles of ethical conduct in research. All funding proposals (Proposals) and subsequently funded projects (Projects) under ARC-funded schemes should conform with the principles outlined in the following documents (and any updates thereof):

- a. the Joint NHMRC/AVCC *Statement and Guidelines on Research Practice* (1997);

- b. as applicable, the NHMRC's *National Statement on Ethical Conduct in Research Involving Humans*; and
- c. as applicable, the principles outlined in the NHMRC's codes on animal research.

2.2 Duplication

- 2.2.1 The ARC will not provide financial assistance to meet the costs of research already funded by the Commonwealth. The ARC reserves the right to determine whether a Proposal would duplicate or overlap with research or other activities already being funded by the Commonwealth. In order to assist its consideration of whether similarity or overlap between research would occur, the ARC may seek further information from applicants or liaise with third parties if required.
- 2.2.2 The ARC may recommend that the Minister not approve any, or that he or she approve reduced, funding for a Proposal which is the same as, or bears similarity to or overlaps significantly with, research already funded by the Commonwealth.

2.3 Conflict of Interest

- 2.3.1 All parties involved in or associated with Proposals and Projects have an obligation to disclose affiliations with or financial involvement in any organisation which has, or is likely to have, a direct interest in the subject matter or outputs of the Project. Such parties have an obligation to disclose at the time of submission of Proposals, or reporting on Projects, any conflict of interest which has the potential to influence, or appear to influence, their research and activities, publications and media reports, or applications for funding.

2.4 Acknowledging ARC support

- 2.4.1 Research and other activities funded by the ARC must be appropriately acknowledged. When, at any time during or after completion of a Project, the applicant or any other party publishes or produces material such as books, articles, newsletters or other literary or artistic works which relate to the Project, acknowledgement must be given, at a prominent place in the publication, to the support of the ARC in a form acceptable to the ARC. Similar efforts should be made to acknowledge ARC support when participating in television and radio programs, and when interviewed by the print media.
- 2.4.2 Advice on acceptable forms of acknowledgement and use of the ARC logo is provided on the ARC website at <http://www.arc.gov.au>.

3 Changes from last year

- 3.1.1 A number of clarifications and revisions have been made in the 2006 LASP Funding Rules. Significant changes from the 2005 LASP Funding Rules are listed below:

- a. The requirement for applicants to submit an application each year for ongoing projects as defined by the ARC has been removed. (This requirement was previously stipulated in section 5.1 of the 2005 LASP Funding Rules);
- b. Whereas previously each Academy was permitted to submit up to four expressions of interest to conduct Special Projects, a limit of two applications per Academy applies in this funding round (see section 4.3);
- c. There is a new requirement that every application must have at least one person named as a chief investigator (section 4.3.1(b));
- d. There is no longer a two-stage application process. Expressions of interest are no longer required for LASP applications (section 7);
- e. Consistent with other ARC schemes, a requirement has been stipulated that proposals must be submitted as a mature plan ready for implementation and the application must contain all the information necessary for assessment of the project (section 7.1.1);
- f. Clarification is provided that funding may be awarded subject to sufficient funds being available under the applicable funding cap(s) and funding split determinations(s) (section 4.1.1);
- g. Consistent with other ARC schemes, a requirement has been stipulated that all details in the application, including employment details, must be current at the time of submission of applications (section 7.1.3);
- h. A requirement has been added that all applications must be signed by the Academy Secretary or similar officer who has the power to make and vary contracts on behalf of the Academy (section 7.6.2);
- i. Provision is made for the ARC to vary contact details and address details for delivery of applications from time to time (see “Contacts” in the preamble section and section 7.6.3);
- j. Some scope has been made for the ARC to accept late applications. However, this will be at the ARC’s absolute discretion and will be exercised only in exceptional circumstances (section 7.8.1);
- k. Clarification is made in the first of the selection criteria that the first criterion is based on the extent to which the Proposal meets one or more of the LASP objectives (section 8.1);
- l. The last of the selection criteria in the 2005 LASP Funding Rules, which dealt with the level of cash and in-kind support from sources other than the ARC, has been deleted. However, this factor may still be considered in the assessment process as part of any consideration being given to “budget justification” which forms part of the second of the selection criteria (section 8.1);
- m. Consistent with other ARC schemes, clarification is provided that in assessing applications the ARC has the right to make recommendations solely on the basis of its expertise and it may assess, rank and recommend applications, consider budgets, assign independent readers/assessors to review the

applications and seek applicants' comments on assessors' reports (section 8.2);

- n. Consistent with other ARC schemes, confirmation is provided in section 8.2 that the ARC has processes in place to manage conflicts of interest in the selection/assessment process;
 - o. There has been a slight re-wording to clarify the recommendation/approval process (section 8.3);
 - p. An additional circumstance has been added to the list of circumstances where the ARC may vary the Funding Approval. That is, in addition to the previous circumstances listed in the 2005 Funding Rules, the Funding Approval may be varied where the ARC considers and recommends that the particular circumstances of the project warrant variation of the Funding Approval, providing such variation is reasonably justified upon the facts of the case and any variation or change to the project accords with the LASP objectives (section 10.3.3(e));
 - q. Whereas previously the ARC made provision for applications to be able to be made available to assessors, the provision has been broadened in these Funding Rules to enable applications to be given to "third parties" for assessment purposes and confirmation is provided that the ARC will require third parties to maintain confidentiality of the material (sections 7.1.4 and 11.2.1 refer);
 - r. Section 11.3.1 of these Funding Rules provides clarification that, in making public information about a Proposal approved for funding, the ARC may exercise its discretion to use a Project description, including title and summary, that may differ from that provided in the Proposal;
 - s. Consistent with other ARC schemes, the submission by an applicant of similar or duplicate applications may now result in the exclusion of all applications involving that applicant (section 4.3).
- 3.1.2 The ordering of a number of sections and subsections has been altered as part of an ongoing initiative to enhance consistency and common terminology across all NCGP funding schemes. Minor changes in wording and dates have been introduced throughout the Funding Rules.

4 Funding

4.1 Duration of Funding

- 4.1.1 Funding for LASP Proposals may be awarded for 1 to 3 years, subject to sufficient funds being available under the applicable funding cap(s) and funding split determinations(s).
- 4.1.2 The ARC may recommend funding for a Proposal for a duration different from that requested.

4.2 Areas of investigation/work not supported

- 4.2.1 Normally, financial assistance will not be provided to Projects directed at specific research problems, since these are funded more appropriately through other ARC or Commonwealth Government funding programs.
- 4.2.2 LASP does not support the following work:
- a. clinical medicine and dental research and training and public health research and training that are covered by the NHMRC;
 - b. activities leading solely to the creation or performance of a work of art, including visual art, musical compositions, drama, dance, designs and literary works, for which Commonwealth Government support is provided through the Australia Council for the Arts; and
 - c. production of teaching materials, even though some research may be involved in their production.

4.3 Number of Proposals funded and applications

- 4.3.1 The following limits apply to the submission of Proposals and Projects funded under LASP:
- a. Each Academy may submit up to two applications in this funding round to conduct Special Projects.
 - b. Every application must have at least one person named as a chief investigator for the Proposal.
 - c. Submitting similar or duplicate applications may result in the exclusion of all applications involving those applicants. The ARC reserves the right to determine whether applications are duplicates or sufficiently similar to warrant exclusion.

5 Organisational types, roles and eligibility

5.1 Eligible organisations

- 5.1.1 To be eligible for consideration, each application in LASP must be submitted by an organisation which is eligible to receive and administer ARC financial assistance (an Eligible Organisation). Appendix 2 lists the Eligible Organisations for LASP.

6 Cross-scheme funding

- 6.1.1 Subject to section 2.2.1, research funding received or sought elsewhere (outside the LASP scheme) has no impact on eligibility for funding within the LASP scheme.

7 Application process

7.1 Applications

- 7.1.1 Applicants must submit their proposal as a mature plan ready for implementation. The application must contain all the information necessary for assessment of the Proposal without the need for further written or oral explanation, or reference to additional documentation unless requested by the ARC or its College of Experts.
- 7.1.2 Applications for funding under LASP must be submitted to the ARC by 5.00 pm AEST **14 October 2005**. Applications are expected to contain:
- a. a detailed statement of the purpose of the Project, the method proposed and the planned outcomes;
 - b. a description of the ways in which the Proposal contributes to the objectives of the *Linkage Learned Academies Special Projects* scheme;
 - c. the name of the Project leader, and details of the staff and resources involved in the Project, including staff and resources to be used in organisations other than the host Academy;
 - d. the curricula vitae of key personnel involved in the Proposal, not exceeding one page per person, including name, qualifications and current appointment, employment history, relevant experience and other relevant information;
 - e. a detailed timeline of the activities involved in the proposed Project and its planned milestones;
 - f. an indication of the intellectual property issues which may arise from the proposed Project and the intention of the Academy with respect to the publication of findings; and
 - g. a detailed budget which indicates how ARC funds will be spent. It should show any other sources of funding for the Project and how those funds will be spent as well as any income which the Academy expects to be generated by the Project. Each activity should be assigned a priority ranking according to whether that activity is considered essential, desirable or beneficial to a successful outcome of the Project, and should be justified. Funding for direct costs of administration (eg travel costs, external meeting costs, publication costs) related to the conduct of the Project may be requested (and must be fully justified); general administrative overheads must be met by the host Academy.
- 7.1.3 All details in the application, including employment details, must be current at the time of submission.
- 7.1.4 In submitting an application, applicants are consenting to the application's being assessed under the ARC's peer assessment procedures and, accordingly, agree to the release of the application to third parties for assessment purposes.

7.2 Certification

- 7.2.1 It is the responsibility of the Academy to obtain signatures of all participants named in Part A3 of the application form. These signatures are to be retained by the Academy which must provide these certifications if requested. A pro forma is available for this purpose on the ARC web site (<http://www.arc.gov.au>).

7.3 Submission of applications

- 7.3.1 Applications under LASP must be completed using the Application Form available on http://www.arc.gov.au/apply_grants/linkage_learned.htm.

7.4 Application format

- 7.4.1 All documents must be written in English and must comply strictly with the format and submission requirements.
- 7.4.2 All pages of additional text should be in black type, use a single column and 12-point font size on white A4 paper, be printed on one side only and unbound, with at least 2 cm margins on each side.

7.5 Application form and instructions to applicants

- 7.5.1 Applicants must use the application form available on the ARC web site.

7.6 How to complete and submit applications

- 7.6.1 LASP application forms are produced from the ARC's website. Applicants should complete the form and submit their applications by the closing date.
- 7.6.2 All applications must be signed by the Academy Secretary or similar officer who has the power to make and vary contracts on behalf of the Academy.
- 7.6.3 Applications should be sent:

by mail, to

LASP Coordinator
Australian Research Council
GPO Box 2702
CANBERRA ACT 2601

or by courier, to

LASP Coordinator
Australian Research Council
1st floor
8 Brindabella Circuit
CANBERRA AIRPORT ACT 2609

or such other address as might be notified by the ARC from time to time.

7.7 Number of copies

- 7.7.1 An original and four identical paper copies are required. The application must be clipped with NAL clips, not stapled.

7.8 Closing date for applications

- 7.8.1 Paper originals of the applications for LASP must be received by the ARC by 5.00 pm AEST **14 October 2005**. Applications may be withdrawn but may not be changed after submission. Additions, deletions and modifications to applications will not be accepted after submission. Subject to this subsection, applications received after 5.00 pm (AEST) **14 October 2005** will not be accepted. The ARC may, in its absolute discretion, and only in exceptional circumstances, accept late applications.

8 Selection and approval process

8.1 Selection criteria

- 8.1.1 All applications for LASP financial assistance which meet the eligibility criteria will be assessed and merit ranked using the following criteria:
- a. the extent to which the proposal satisfies one or more of the objectives of the Scheme, as described in section 1.3 of these Funding Rules;
 - b. the merit of the proposal in relation to goals and potential outcomes, the project plan and budget justification;
 - c. the relevance of the proposal to issues of national significance and importance; and
 - d. the relevance of the proposal to National Research Priorities.

8.2 Assessment and selection procedure

- 8.2.1 Assessment of applications is undertaken by the ARC, which has the right to make recommendations solely on the basis of its expertise, and which may:
- a. assign independent readers/assessors to review the applications;
 - b. seek applicants' comments on assessors' reports;
 - c. rank each application relative to the others on the basis of the application, the assessors' reports and the applicant's rejoinder/response to these assessments;
 - d. assess and recommend budgets; and
 - e. prepare funding recommendations that are submitted to the ARC Board.
- 8.2.2 The ARC has procedures for managing organisational and personal conflicts of interest experienced by College of Experts members, and for enabling members to withdraw from the assessment process of particular applications.

- 8.2.3 The ARC reserves the right to negotiate amendments to the applications where it believes the Proposal or Project outcomes will be improved by such changes. An Academy is not obliged to accept amendments, but the ARC may decline to recommend funding assistance, notwithstanding whether or not amendments are made.
- 8.2.4 Proposals which do not satisfy the eligibility criteria will not be recommended or approved for funding.

8.3 Recommendations

- 8.3.1 The ARC's recommendations will be submitted in accordance with the *Australian Research Council Act 2001* to the Minister for Education, Science and Training (the Minister) for consideration.
- 8.3.2 The Minister determines which proposals will be offered funding and the amount and timing of financial assistance to be paid to successful applicants.

8.4 Offer of funding

- 8.4.1 Successful Academies will be notified in a letter of offer that will indicate the funding to be provided and include the draft Funding Agreement.

9 Appeals process

- 9.1.1 Appeals will be considered only against administrative process issues and not, for example, against committee recommendations or assessor ratings and comments.
- 9.1.2 Appeals must be made on the appeals form available from the ARC website (<http://www.arc.gov.au>). The form must be lodged through the Academy's secretariat. Appeals must be received by the ARC within 28 days of the date on the letter notifying the outcome of the application.
- 9.1.3 Appeals must be addressed to:

The Appeals Officer
Australian Research Council
GPO Box 2702
CANBERRA ACT 2601

10 Administration of funding

10.1 Funding Agreement

- 10.1.1 Funding assistance may not be expended before the Funding Agreement is signed by the Academy and the ARC, and until then the ARC will not recognise the Project as having begun.
- 10.1.2 Successful applicants should familiarise themselves with the Funding Agreement.

Subject to a request under section 10.2 being approved by the ARC, an applicant must accept the terms of the Funding Agreement. All funding assistance will be paid to the Academy in respect of its proposal on the terms of the Funding Agreement.

10.1.3 Projects must commence as required by the Funding Agreement.

10.1.4 Academies should note that the Funding Agreement covers post-award management, including reporting and financial management requirements. The draft Funding Agreement can be viewed on the ARC website (<http://www.arc.gov.au>).

10.2 Varying the Funding Agreement

10.2.1 Any requests to vary the Funding Agreement must be forwarded in writing by the Academy's Secretariat to the ARC. Forms are available on the ARC website (<http://www.arc.gov.au>) for variation requests.

10.3 Varying the Funding Approval

10.3.1 Any requests to vary the Funding Approval must be forwarded in writing by the Academy's Secretariat to the ARC.

10.3.2 The Funding Approval may be varied by varying the amount of financial assistance, the duration of financial assistance, the name of the person leading the research program and the name of the organisation receiving financial assistance.

10.3.3 The Minister may vary the terms of a Funding Approval where:

- a. the Academy's involvement with the Project ends or substantially changes;
- b. the Project changes so that it is no longer consistent with the description in the Funding Approval;
- c. the person named in the funding approval as the person leading the Project ceases to lead the Project;
- d. association with any of the collaborating partner organisations involved in the Project ends, or the collaborating partner organisation(s) substantially changes its involvement with the Project; or
- e. the ARC considers and recommends the particular circumstances of the Project warrant variation of the Funding Approval, providing such variation is reasonably justified upon the facts of the case and any variation or change to the Project accords with the LASP objectives.

10.4 Reports

10.4.1 Academies are required to submit to the ARC reports concerning Projects, in the format and by the due dates detailed in the Funding Agreement.

11 Other matters

11.1 Applicable law

11.1.1 The ARC is required to comply with the requirements of the *Privacy Act 1988* and the *Freedom of Information Act 1982*.

11.2 Confidentiality

11.2.1 Information contained in applications is regarded as confidential unless otherwise stated. Subject to the need to provide applications to third parties for assessment purposes, and statutory requirements for the ARC to provide information to Parliament or other parties, applications will be received and treated as confidential. Where information contained in applications is made available to third parties for assessment purposes the ARC will require the third parties to maintain the confidentiality of the material.

11.2.2 Notwithstanding the above, the ARC may publicise and report offers or awards of funding, including information about the proposed research or activity, the name and organisation of any applicant or other parties associated with the Project, the identity of the administering organisation and any other parties involved in or associated with the Project, the title and summary descriptions of the Project and its intended outcomes, and the level and nature of financial assistance from the ARC.

11.3 Project Description

11.3.1 In making public information about a Proposal approved for funding, the ARC may use a Project description, including title and summary, which may differ from that provided in the Proposal.

11.4 Intellectual property

11.4.1 Applicants must agree to comply with the *National Principles of Intellectual Property Management for Publicly Funded Research* (available at <http://www.arc.gov.au>) and act in accordance with any intellectual property policies of the Academy.

11.5 Incomplete or misleading information

11.5.1 It is a serious offence to provide false or misleading information to the Commonwealth.

11.5.2 If an application is incomplete, inaccurate or contains misleading information, it may be excluded from any further consideration for funding.

11.5.3 If the ARC believes that omissions or inclusion of misleading information are intentional, or if there is evidence of malpractice, the ARC will refer the matter for investigation with a view to prosecution under Commonwealth criminal law. The Commonwealth is committed to protecting its revenue, expenditure and property from any attempt, by members of the public, contractors, sub-contractors, agents, intermediaries or its own employees, to gain financial or other benefits by deceit.

11.5.4 Examples of malpractice include, but are not restricted to:

- a. providing fictitious track records; or
- b. falsifying claims in publications records (such as describing a paper as accepted for publication when it has only been submitted).

11.6 Insurance and liabilities

11.6.1 Academies are subject to the liability, indemnity and insurance provisions of the Funding Agreement. The draft Funding Agreement can be viewed on the ARC website (<http://www.arc.gov.au>).

Appendix 1: Descriptions of National Research Priorities and associated Priority Goals

Research Priority 1: An Environmentally Sustainable Australia

Transforming the way we utilise our land, water, mineral and energy resources through a better understanding of human and environmental systems and the use of new technologies

Natural resources have traditionally fuelled our national and regional economies. They have the potential to generate further wealth and employment opportunities in the future. But our natural resources and biodiversity must be used on a sustainable basis so that the benefits continue to be enjoyed by future generations.

Australia faces significant environmental challenges:

- Efficient and sustainable water use is a critically important issue for our economic and social development;
- Significant land degradation issues, such as salinity, need to be arrested to underpin our agricultural production systems;
- Climate change can be expected to have complex, long-term consequences for the environment, for our agricultural and marine production systems and for communities; and
- The cleanliness and efficiency of our energy production systems should be enhanced.

There is substantial effort underway to develop more efficient water utilisation practices, to protect our rivers and groundwater resources, and to protect and remediate our fragile soils.

Our agricultural and mining industries are being transformed through the adoption of new technologies, and the development of new types of foods.

This will help to revitalise our regional communities and generate substantial export earnings for the nation over the coming decades.

The Government is committed to meeting the greenhouse gas emissions target set for Australia at Kyoto.

Australia is well placed to take an international lead in developing new and improved energy technologies and in capturing and ‘sequestering’ carbon dioxide.

Other opportunities lie in managing and using our unique, rich land- and marine-based biodiversity, and in developing our deep earth resources.

Australia has a strong record of achievement in research in fields in the natural sciences, such as agriculture, natural resource management, climate change, horticulture, forestry, mining, energy, and marine sciences, as well as in the social sciences and humanities.

We must build on these strengths to improve our competitive advantages while enhancing our understanding of natural systems and the interplay of human activities.

In particular, there needs to be an increased understanding of the contributions of human behaviour to environmental and climate change, and on appropriate adaptive responses and strategies.

To understand and manage these complex interactions better will require significant collaboration within the research community and with other stakeholders.

Priority goals for research fall in the seven areas of water utilisation, transforming resource-based industries, overcoming land degradation, developing cleaner, more efficient fuels and energy sources, managing biodiversity, deep earth resources and responding to climate change and variability.

Priority Goals

- **Water – a critical resource**

Sustainable ways of improving water productivity, using less water in agriculture and other industries, providing increased protection of rivers and groundwater and the re-use of urban and industrial waste waters.

Australia is one of the driest continents and is dependent upon access to freshwater supplies for economic and social development. It has a complex geological structure, a highly variable climate, unique ecosystems, flora and fauna and a distinctive indigenous and settler history. Enhancing our understanding of the links between these factors and water availability will result in a better understanding of sustainable water management practices.

- **Transforming existing industries**

New technologies for resource-based industries to deliver substantial increases in national wealth while minimising environmental impacts on land and sea.

Resource-based industries underpin much of Australia's prosperity and have the potential to do so in the future. For example, Australia remains highly prospective for minerals discoveries and highly attractive for the development of new era foods from agricultural and marine sources. Our competitive advantage and national well being will depend on research and on the development and adoption of new technologies.

- **Overcoming soil loss, salinity and acidity**

Identifying causes and solutions to land degradation using a multidisciplinary approach to restore land surfaces.

The Australian landscape is fragile: soil salinity, acidity, and nutrient levels pose significant, long term challenges for agriculture and the environment. Research is helping to find solutions to these problems. For example, the National Land and Water Resources Audit shows the extent of salinity, soil erosion and soil acidification in the Australian environment and illustrates Australia's leading edge in national mapping of critical resource data. Further multidisciplinary effort is required to develop sustainable land management practices that are appropriate for Australian conditions and mitigate major land degradation processes and increase biodiversity.

- **Reducing and capturing emissions in transport and energy generation**

Alternative transport technologies and clean combustion and efficient new power generation systems and capture and sequestration of carbon dioxide.

Australia is well positioned to produce world class solutions to reduce and capture greenhouse gas emissions and the Government is committed to meeting the emissions target set for Australia at Kyoto. We are also well placed to develop alternative energy technologies and ecologically sustainable transport and power generation systems.

- **Sustainable use of Australia's biodiversity**

Managing and protecting Australia's terrestrial and marine biodiversity both for its own value and to develop long term use of ecosystem goods and services ranging from fisheries to ecotourism.

Australia has a unique and rich flora and fauna. Many of our complex ecosystems – on which our agricultural, fisheries and tourism industries depend - have adapted to events such as drought and fire, and have been shaped by indigenous and settler management practices. There is a need for a more comprehensive understanding of these natural systems and the interplay with human activities, and the effects of management and protection measures.

- **Developing deep earth resources**

Smart high-technology exploration methodologies, including imaging and mapping the deep earth and ocean floors, and novel efficient ways of commodity extraction and processing (examples include minerals, oil and gas) while minimising negative ecological and social impacts.

Many of Australia's known mineral assets may be nearly exhausted within the next decade. New land-based deposits are believed to be buried deeper in the crust and the deep marine areas surrounding Australia are also largely unexplored. New technologies, such as remote sensing, indicate scientists are on the brink of being able to 'see' inside the earth and identify deeply buried deposits.

- **Responding to climate change and variability**

Increasing our understanding of the impact of climate change and variability at the regional level across Australia, and addressing the consequences of these factors on the environment and on communities.

Australia already has a highly variable climate, and climate change can be expected to have further significant impacts. It is important to enhance our understanding of the consequences of climate change and variability at the regional level across Australia, and the implications for the environment and for communities. It is also important to explore beneficial adaptation strategies to climate change and variability to ensure ongoing social, economic and environmental well being.

Research Priority 2: Promoting and Maintaining Good Health

Promoting good health and well being for all Australians

Average life expectancies have increased markedly in recent decades. Australians also expect to lead longer and healthier lives in the future, and to remain productive and independent over an extended period.

Enabling individuals and families to make choices that lead to healthy, productive and fulfilling lives will yield economic and social benefits and add materially to national well being.

Australians expect that their children and grandchildren should have a healthy start to life.

Developing strategies to promote the healthy development of young Australians, and addressing the causes and reducing the impact of the genetic, social and environmental factors which diminish their life potential will be critical.

A revolution is also underway at the other end of the life cycle. Australia, like many other developed nations, is undergoing a major demographic shift involving significant growth in the aged population.

To meet this challenge, it will be important to promote healthy ageing by developing better social and medical strategies to ensure that older Australians enjoy healthy and productive lives.

Informed insights into the causes of disease and of mental and physical degeneration will contribute to the achievement of this goal.

All Australians stand to benefit from preventive healthcare through the adoption of healthier attitudes, habits and lifestyles.

Evidence-based preventive interventions may help reduce the incidence and severity of many diseases, including major health problems such as cardiovascular and neurodegenerative diseases, mental ill-health, obesity, diabetes, asthma and chronic inflammatory conditions. These could include interventions that reduce exposure to contamination of the physical environment (eg air pollution).

Improvements in the health and well being of the young, of older Australians and in preventive healthcare will be underpinned by research.

However, while Australia has an enviable record in health and medical research, the research effort is spread across the many universities, hospitals and health and medical research institutes, resulting in critical mass only in limited areas of research.

There is also a need to draw on multidisciplinary approaches that include research contributions from the social sciences and humanities.

This priority is designed to promote health and prevent disease through a more focused and collaborative effort.

Priority goals for research fall in the four areas of a healthy start to life, ageing well, ageing productively, preventive healthcare and strengthening Australia's social and economic fabric.

Priority Goals

- **A healthy start to life**

Counteracting the impact of genetic, social and environmental factors which predispose infants and children to ill health and reduce their well being and life potential.

Human health in the developing foetus and in early childhood is critical to the future well being of the adult. Research shows that health and well being in early childhood is predictive of later positive outcomes, and that health in middle and late childhood is also crucial. This goal supports the Government's National Agenda for Early Childhood initiative.

- **Ageing well, ageing productively**

Developing better social, medical and population health strategies to improve the mental and physical capacities of ageing people.

Australia's population is ageing, with a significant projected increase in the number of people aged over 65 and over 85. While Australia is relatively well placed compared with many OECD nations, major shifts in cultural expectations and attitudes about ageing are necessary to respond constructively, at both an individual and population level. A healthy aged population will contribute actively to the life of the nation through participation in the labour market or through voluntary work. This goal supports the Government's National Strategy for an Ageing Australia.

- **Preventive healthcare**

New ethical, evidence-based strategies to promote health and prevent disease through the adoption of healthier lifestyles and diet, and the development of health-promoting products.

Preventive healthcare research will improve the prediction and prevention of disease and injury for all Australians through the adoption of healthier behaviours, lifestyles and environments. Research will generate an improvement in the design, delivery and uptake of programmes such as exercise-based rehabilitation. There are several major disease targets amenable to immediate study, such as cardiovascular health, neurodegenerative diseases, mental ill-health, obesity, diabetes, asthma and chronic inflammatory conditions. Research on prevention will emphasise interdisciplinary approaches, including research on ethics, drawing on contributions from the social sciences and humanities, as well as from the health and medical sciences. It will also focus on developing new health promoting foods and nutraceuticals. This goal supports the Government's Focus on Prevention initiative.

- **Strengthening Australia's social and economic fabric**

Understanding and strengthening key elements of Australia's social and economic fabric to help families and individuals live healthy, productive, and fulfilling lives.

Living in today's society involves a complex web of choices, yet many of the traditional support structures are weaker than they have been in the past. Enabling people to make choices that lead to positive pathways to self reliance and supportive family structures is more important than ever. The interactions between the social safety net, social and economic participation, financial incentives and community and private sources of support are critical in helping people maximise their potential and achieve good, healthy, lifetime outcomes. In the decade ahead, it will be vital to understand and support the drivers for workforce participation and the broader social and economic trends influencing Australian families and communities. This goal supports the Government's welfare reform and participation agendas. Research in this area will emphasise interdisciplinary approaches, drawing on contributions from the economic, behavioural and social sciences

Research Priority 3: Frontier Technologies for Building and Transforming Australian Industries

Stimulating the growth of world-class Australian industries using innovative technologies developed from cutting-edge research

Progress and wealth often derive from the unforeseen application of new discoveries. Australia must be at the leading edge if it is to stay abreast of international developments and take advantage of opportunities.

Our national capabilities in emerging sciences and their underpinning disciplines determine our capacity to develop and implement new technologies. Australia has a strong base of expertise, skills and technological capacities in the fundamental sciences and key technologies.

Our strengths are in a wide range of areas such as biotechnology, material sciences, information and communications technology (ICT), photonics, nanotechnology and sensor technology.

ICT is currently the critical enabling technology and is a major contributor to national productivity and growth.

But breakthrough science underpins technological advancements in many areas and Australia needs to foster an environment that stimulates creativity and innovation.

Applications for frontier technologies are potentially very large. Australia has the capacity to exploit niche markets for new products and services.

Australia also has an enviable track record as an innovator and developer of advanced materials and must grasp the opportunity to stay ahead.

Smart information use involving improved data management, intelligent transport systems and digital media to develop creative applications for digital technologies provides huge opportunities to improve the performance of key Australian industries.

Australia needs to invest in this research area as it is fundamental to our future competitiveness and well being.

This priority will help to strengthen the capacity of Australian researchers to participate in new areas of research, enhance Australia's international scientific reputation, stimulate local expertise, and help create vibrant new industries.

A better understanding of the conditions that are conducive to innovation will ensure that Australia's investment in research will maximise the benefits for Australia.

Enhanced research effort will also be achieved through initiatives that develop a critical mass of researchers in key areas.

Priority goals for research fall in the five areas of breakthrough science, frontier technologies, advanced materials, smart information use, and promoting an innovation culture and economy.

Priority Goals

- **Breakthrough science**
Better understanding of the fundamental processes that will advance knowledge and facilitate the development of technological innovations.

Breakthrough science underpins technological innovation across a range of industries critical to maintaining Australia's position as a developed country. Some examples include bio-, cultural- and geo-informatics, nano-assembly and quantum computing. Technological advances are often unexpected and a strong foundation in mathematics and the fundamental sciences will provide an

environment that fosters creativity and innovation. Early participation in leading edge areas of research will enable Australian researchers to benefit more fully from international developments.

- **Frontier technologies**

Enhanced capacity in frontier technologies to power world-class industries of the future and build on Australia's strengths in research and innovation (examples include nanotechnology, biotechnology, ICT, photonics, genomics/phenomics, and complex systems).

The potential applications of frontier technologies across a range of industries in Australia are vast. Australia has significant capacity to exploit niche markets for new products and services emerging from frontier technologies. Australia has world-class research expertise in many such areas. Some examples include nanotechnology, biotechnology, ICT, photonics, genomics and phenomics. Also important are advanced frameworks such as complex systems in which these technologies are applied. Future directions in this priority area need to target the cutting-edge science critical for each emerging technology.

- **Advanced materials**

Advanced materials for applications in construction, communications, transport, agriculture and medicine (examples include ceramics, organics, biomaterials, smart material and fabrics, composites, polymers and light metals).

The development of advanced materials will underpin growth in many areas of industrial and economic activity in Australia. Australia has substantial infrastructure in this area and an enviable track record as an innovator and developer of advanced materials. The era of advanced materials is just beginning, in spite of the tremendous progress in recent years. Substantial scientific and technological challenges remain ahead, including the development of more sophisticated and specialised materials. Some examples include ceramics, organics, biomaterials, smart materials and fabrics, composites, polymers, and light metals.

- **Smart information use**

Improved data management for existing and new business applications and creative applications for digital technologies (examples include e-finance, interactive systems, multi-platform media, creative industries, digital media creative design, content generation and imaging).

ICT applications are providing huge opportunities to deliver new systems, products, business solutions, and to make more efficient use of infrastructure. Examples include e-finance, multi-media, content generation and imaging. Improved data management is central to the future competitiveness of key industries such as agriculture, biotechnology, finance, banking, education, transport, government, and health and 'info-tainment'. The ability of organisations to operate virtually and collaborate across huge distances in Australia and internationally hinges on our capabilities in this area. The media

and creative industries are among the fastest growing sectors of the new economy. Research is needed to exploit the huge potential in the digital media industry.

- **Promoting an innovation culture and economy**

Maximising Australia's creative and technological capability by understanding the factors conducive to innovation and its acceptance.

Understanding the factors that lead to highly creative and innovative ideas and concepts, and the conditions that lead to their introduction, transfer and uptake is critical for any nation that aspires to lead the world in breakthrough science, frontier technologies, and in other forms of innovation. Promoting an innovation culture and economy requires research with a focus on developing and fostering human talent, societal and cultural values favourable to creativity and innovation, and structures and processes for encouraging and managing innovation.

Research Priority 4: Safeguarding Australia

Safeguarding Australia from terrorism, crime, invasive diseases and pests, strengthening our understanding of Australia's place in the region and the world, and securing our infrastructure, particularly with respect to our digital systems.

The importance of security and safety to Australia has been underscored by recent events. Australia has to be capable of anticipating and tackling critical threats to society, strategic areas of the national economy and the environment.

The threats can potentially come from within and outside Australia.

The world is now characterised by the widespread and rapid movements of people, digitally coded data, goods and services, and exotic biological agents.

Critical infrastructure in Australia is increasingly dependent on digital technology for its management and integration.

Information protection and the integrity of security systems are now more important than ever before.

It is also necessary to protect the status of Australia as a nation free of many of the diseases affecting primary production around the world.

Terrorism has emerged as a very real global threat and crime is taking a significant toll on Australian society and economy.

Maintaining the operational advantage of Australia's defence forces through superior capabilities is also fundamental to our national security.

Enhancing our nation's understanding of social, political and cultural issues will help Australia to engage with our neighbours and the wider global community and to respond to emerging issues.

Leading edge research in Australia is already yielding high dividends and as a national research priority will improve the effectiveness of that contribution.

Stronger research capabilities will ensure that solutions are tailored to Australia's unique circumstances, reflecting its geographic features and small population.

Greater collaboration within the research community and with other stakeholders will allow us to better understand and manage potential threats to Australia.

Harnessing the knowledge and capabilities across Australia offers us the best chance of developing innovative and rapid solutions to serious threats.

Australia's international relations and its regional influence will be strengthened through new collaborative approaches and new science and technologies that enhance security and safety.

The heightened interest in personal and electronic security across the world also provides opportunities for Australian solutions.

Priority goals for research fall in the five areas of critical infrastructure, understanding our region and the world, protecting Australia from invasive diseases and pests, protecting Australia from terrorism and crime, and transformational defence technologies.

Priority goals

- **Critical infrastructure**

Protecting Australia's critical infrastructure including our financial, energy, communications, and transport systems.

Protecting our critical infrastructure is important to national security and to the social and economic well being of Australia. An important aspect of this priority goal is e-security which is an enabler of e-commerce. Maintaining a critical mass of research in e-security will be essential in providing Australia with the tools to protect our way of life.

- **Understanding our region and the world**

Enhancing Australia's capacity to interpret and engage with its regional and global environment through a greater understanding of languages, societies, politics and cultures.

Social, cultural and religious issues are of growing significance due to the insecurities of globalisation and the increasing role of non-state players in the security environment. Australia's capacity to interpret and engage with its regional and global environment will be substantially improved by enhancing its research base in apposite languages, societies and cultures. An approach that enhances Australia's capacity to interpret itself to the rest of the world is also needed.

- **Protecting Australia from invasive diseases and pests**

Counteract the impact of invasive species through the application of new technologies and by integrating approaches across agencies and jurisdictions.

Australia is free of many of the pests and diseases affecting primary production around the world. This status needs to be protected as the introduction of exotic species has the potential to adversely affect our exports and the environment. Australia already has strong skills and expertise in this area of research and further work will offer immediate benefits to the community. A greater level of coordination of our research effort will mean that Australia can more effectively develop innovative and rapid solutions to serious threats.

- **Protecting Australia from terrorism and crime**

By promoting a healthy and diverse research and development system that anticipates threats and supports core competencies in modern and rapid identification techniques.

Protecting Australia from terrorism is now more important than ever before in light of recent events and our involvement in the 'war on terror'. The new threat requires a more sophisticated response which should harness Australia's research capabilities, and which will focus on all phases of counter-terrorism; prevention, preparedness, detection, response and recovery. Crime takes a significant toll on Australian society and economy. The June 2000 report from the Prime Minister's Science, Engineering and Innovation Council estimated that crime costs Australia at least \$18 billion per annum. Personal identification, information protection and the integrity of security systems are fundamental towards ensuring the national security of Australia. An effective solution will include building on Australia's existing strengths in rapid detection using new analytical technologies and managing significant data collections.

- **Transformational defence technologies**

Transform military operations for the defence of Australia by providing superior technologies, better information and improved ways of operation.

Australia has a small defence force to protect a large continent and a substantial maritime region of responsibility. Its operational advantage has been maintained through a superior capability which is dependent on leveraging innovative technologies. Although some benefits can be gained from overseas research, Australia has to conduct its own research to address uniquely Australian demands. A systems approach which harnesses the research capabilities of all stakeholders is essential to the successful development and introduction of innovative technologies.

Appendix 2 : Eligible Organisations

Academy of the Social Sciences in Australia

Australian Academy of the Humanities

Australian Academy of Science

Australian Academy of Technological Sciences and Engineering

National Academies Forum