CABINET - SUBJECTS FOR CONSIDERATION, 04 SEPTEMBER 2003 9:30 AM

Out of Scope

6 **Cabinet Notes**

601 RESPONSE TO COMMONWEALTH GOVERNMENT SCIENCE, TECHNOLOGY AND INNOVATION REVIEWS

Out of Scope

TO: PREMIER FOR CABINET TO NOTE

RE: RESPONSE TO COMMONWEALTH GOVERNMENT SCIENCE, TECHNOLOGY AND INNOVATION REVIEWS

1. PROPOSAL

It is proposed that Cabinet note that:

1.1. The Commonwealth Government has initiated a series of reviews intended to inform future planning and resource allocation under *Backing Australia's Ability Mark II.*

1.2. Two reviews were considered of strategic importance to South Australia. They are:

- National Strategy on Research Infrastructure.
- Review of Research Collaboration.

1.3. The Science, Technology and Innovation Directorate of the Department of Further Education Employment, Science and Technology, in consultation with other government departments and agencies has prepared responses to the reviews.

1.4. The Minister for Science and Information Economy will submit responses to the Commonwealth reviews of *National Strategy on Research Infrastructure* and *Review of Research Collaboration.*

2. BACKGROUND

2.1. The Commonwealth Government has initiated a series of reviews intended to inform future planning and resource allocation under *Backing Australia's Ability Mark II.* The relevance to the State is that these reviews will guide the Commonwealth's future science, technology and innovation investment and they provide a window of opportunity for South Australia to influence the national innovation agenda.

2.2. There are three key reviews. These are

2.2.1. *National Strategy on Research Infrastructure* – to develop a nationally integrated research infrastructure strategy, which will apply to public higher education institutions and all publicly funded research agencies.

2.2.2. *Review of Research Collaboration* – to examine the scope for greater collaboration between universities and four publicly funded research agencies (CSIRO, DSTO, Australian Nuclear Science and Technology Organisation and Australian Institute of Marine Science),

2.2.3. *Evaluation of Knowledge and Innovation Reforms* – a comprehensive evaluation of the operation of university block funding schemes focusing on the operation of the Research Training Scheme, the Institutional Grants Scheme and the Research Infrastructure Block Grants Scheme.

2.3. All of the reviews are due to be completed by the end of November 2003 to enable input into the next Federal Budget and shape the coming national research agenda.

3. DISCUSSION

3.1. Two reviews are considered to be of strategic importance to South Australia:

- National Research Infrastructure Strategy;
- Review of Research Collaboration.

3.2. Submission of responses to both reviews was due on 29 August 2003.

3.3. At a meeting held between the Science, Technology and Innovation Directorate, University and CSIRO representatives, it was agreed that State Government responses should be prepared for both the National Research Infrastructure Strategy and the Review of Research Collaboration, in view of the potential significant impact these reviews could have on research infrastructure funding and access in this State. It was agreed that a response to the Evaluation of University Block Funding Schemes would be best dealt with by the individual submissions being developed by the universities.

3.4. Individual organisations such as the three universities, Defence Science and Technology Organisation and the CSIRO will be submitting their own submissions.

3.5. Responses to nominated reviews have been developed following limited consultation with other government agencies including Bio Innovation SA, SARDI, Department of Human Services, Department of Business, Manufacturing and Trade and Department of Premier and Cabinet.

3.6. A copy of the responses to the reviews is provided in:

3.6.1. Attachment 1. *National Strategy on Research Infrastructure*

The submission expresses support for the development of a national strategy on research infrastructure and suggests an approach to redressing deficiencies with the Commonwealth's Major National Research Facilities program.

3.6.2. Attachment 2: *Review of Research Collaboration*

The submission expresses strong support for the establishment of National Research Priorities to focus future research investment and maximise returns on this investment. Efforts to strengthen national research collaboration is encouraged with the submission identifying a number of South Australian models of clustering and collaboration.

3.7 The attached submissions will be the only opportunity to provide written input to the two reviews. The Commonwealth will be undertaking targeted consultation in September and early October prior to the public release of a Research Infrastructure Strategy and the final report of the Review of Research Collaboration by the end of November 2003.

4. RECOMMENDATION

It is proposed that Cabinet note:

4.1. The Commonwealth Government has initiated a series of reviews intended to inform future planning and resource allocation under *Backing Australia's Ability Mark II.*

4.2. Two reviews were considered of strategic importance to South Australia. They are:

- National Strategy on Research Infrastructure
- Review of Research Collaboration

4.3. The Science, Technology and Innovation Directorate of the Department of Further Education Employment, Science and Technology, in consultation with other government departments and agencies has prepared responses to the reviews

4.4. The Minister for Science and Information Economy will submit responses to the Commonwealth reviews of *National Strategy on Research Infrastructure* and *Review of Research Collaboration.*

Hon Jane Lomax-Smith MP
MINISTER FOR SCIENCE AND INFORMATION ECONOMY

7/9/2003

In Cabinet

- 4 SEP 2003

NOTED
Paul Holloway
a/ PREMIER

Dr Mike Sargent AM
National Research Infrastructure Taskforce
Department of Education, Science and Training
Location 121
GPO Box 9880
CANBERRA ACT 2601

Dear Dr Sargent

Thank you for the opportunity to provide input into the National Research Infrastructure Strategy.

The South Australian Government fully supports the development of a nationally integrated strategy for major research infrastructure, which will be critical for the long term future of Australia's research base by ensuring a coordinated and strategic approach to research infrastructure investment. We cannot continue to fund major pieces of research infrastructure on an ad hoc basis.

The South Australian Government, in conjunction with the Premier's Science and Research Council, is currently developing a 10 year Vision for science, research and innovation for the State. A key element of the Vision will be to build on the State's research capabilities involving a more strategic approach to research infrastructure development in South Australia. Therefore, in moving forward, there is a significant opportunity to build a closer alignment between Commonwealth and State research infrastructure development in South Australia.

Set out below are our initial comments addressing the key points set out in the issues paper.

Australia's Future Research Infrastructure Needs

South Australia has a number of significant research strengths that align with the National Research Priorities. The continued growth and success of the nation's research capabilities is dependent on access to cutting edge research infrastructure and national data sets.

In conjunction with the development of a 10 year Vision for science, research and innovation, the South Australian Government will be conducting an audit of major research infrastructure in the State as well as identifying the key research infrastructure needs for the next five years. We look forward to working with the Commonwealth

Government to ensure a more strategic approach to investment in research infrastructure.

One recent example of where there has been a lack of adequate alignment between State and Commonwealth interests in the provision of research infrastructure is in the area of broadband telecommunications. The Centie and GrangeNet networks were established with Commonwealth funding to provide an integrated telecommunications backbone for Australia's research needs. However, due to the fact that this network by-passed Adelaide, the South Australian Government has now budgeted substantial funds for 2003/04 to upgrade the State's high performance computing facilities and ensure that they are properly embedded within the national research environment. The South Australian Government strongly supports the Australian Research and Education Network (AREN) concept and believes that other national initiatives of this type, which adequately address regional research issues, are critical to the development of a truly national approach to major infrastructure provision.

Commonwealth's Research Infrastructure Funding System

The issues paper sets out the major research infrastructure funding programs that comprise the research infrastructure funding system. The Major National Research Facilities program is the key program for funding of major research infrastructure in Australia with the majority of programs focused on smaller scale research infrastructure. The MNRF program involves a relatively small amount of funding compared to other sources of infrastructure funding.

A national strategy on research infrastructure is critical to address a number of deficiencies arising out of the funding of research infrastructure under the current Major National Research Facilities program. These deficiencies include:

- the lack of a strategic approach to investment in major research infrastructure;
- the uncertainty generated by the ad-hoc nature of the MNRF program;
- the extremely tight timeframes for the submission of proposals does not allow for the development of high quality, integrated proposals that facilitate national and international collaboration, and hampers the ability for co-investment by industry and State Governments;
- lack of congruence between Commonwealth and State/Territory infrastructure funding arrangements and the failure of the Commonwealth to address critical infrastructure needs in particular states and regions;
- whether the competitive nature of the MNRF and other major infrastructure funding programs limits rather than promotes the development of strategic and collaborative national initiatives;
- inadequate attention to providing clear access to MNRFs by the public and private research sector, not directly involved in the MNRF;
- the lack of Commonwealth support for recurrent funding for the ongoing operation, maintenance and upgrade of MNRF facilities;

- a lack of integration of the MNRF program with other Commonwealth science programs including Cooperative Research Centres (CRCs), the ARC's Centres of Excellence program, NHMRC research, CSIRO and DSTO investment in research facilities and with State Government programs.

From the South Australian perspective, a key determining factor governing investment in infrastructure should be that of research performance. Despite having the highest per capita competitive research earnings in Australia, along with around 5.6% of CSIRO's total workforce and approximately 60% of DSTO's total workforce located in this State, South Australia has lagged behind in the Commonwealth funded schemes intended to support more expensive infrastructure and facilities – the MNRF program and the Systemic Infrastructure program. This has significant implications for the capacity for research growth in South Australia and indicates a failure of existing research infrastructure programs to build upon existing national research strengths. For example, of the 15 MNRFs funded in the most recent round, only one is headquartered in South Australia (National Wine Industry Research Cluster), although the State is home to two significant nodes (Australian Proteome Analysis Facility and Australian Genome Research Facility) and one minor node (National Networked Tele-Test Facility for Integrated Systems). Also, one MNRF from the previous round – Airborne Research Australia – was headquartered in South Australia.

There is a need for a high profile national infrastructure program, which facilitates co-investment from State and Territory Governments and, where appropriate, industry and international interests. The South Australian Government would support the establishment of a national database of major research infrastructure (including the utilisation rate of such infrastructure and highlighting areas of deficiency or over-supply) to enable better coordination of research infrastructure development. As outlined above, the State Government will be conducting an audit of major research infrastructure in the State and is keen to work in partnership with the Commonwealth and other States in this area.

Acquisition, Development and Operation of Research Infrastructure

A national research infrastructure strategy will need to differentiate between institutional, state and national infrastructure needs. It is suggested that a multi-tiered approach to infrastructure investment is required along the following lines:

- infrastructure grants ($1 to $5 million) funded through existing granting agencies to provide infrastructure at the institutional level;
- infrastructure requiring State based collaborative facilities that are linked nationally (in the order of $5 to $10 million) funded by the Commonwealth Government with co-investment from other parties;
- major infrastructure investment (greater than $50 million) to involve a strategic whole of nation approach funded by the Commonwealth Government with co-investment from other parties;
- one-off nationally significant infrastructure investments (eg Synchrotron, Square Kilometre Array) to involve recommendations to a Ministerial Council with

expert advice provided regarding the international context including strategies for access of the infrastructure.

A national research infrastructure strategy needs to address the opportunity for partnership between public and private sectors to invest in common infrastructure needs. This represents a path to encourage increased investment in research and development by the business sector in collaboration with the public research sector, improve industry and research linkages and improve industry access to research and testing equipment and facilities.

More effective use of existing facilities and equipment will improve the utilisation of existing infrastructure. The recent move to establish a whole of state strategy for bioscience infrastructure through the establishment of Adelaide Integrated Bioscience Laboratories (AIB Labs – see Appendix 2) is a South Australian-based example of the benefits of collaboration and use of industry-innovation clusters to share existing research infrastructure. A national audit of both public and private facilities and equipment that is made public may provide a tool through which research facilities are matched with research needs and improve sharing of common infrastructure.

It is suggested that a national research infrastructure strategy should focus on common infrastructure requirements that have application and use across more than one discipline, industry or research sector. Infrastructure specific to a discipline or sector may be resourced in natural collaborative arrangements with researchers and industry.

With the vast majority of global investment in research infrastructure being outside of Australia, a national strategy should look at a number of programs to facilitate international sharing of overseas research facilities. This reduces Australia's investment in duplicated facilities and equipment and promotes international collaboration.

It is noted that there is currently no Ministerial Council for Science and Research in Australia. In view of the importance of science and innovation to economic growth, the South Australian Government would be supportive of the establishment of such a Ministerial Council. One key focus of the Ministerial Council would be to ensure the coordination of major research infrastructure in Australia and be linked with Prime Minister's Science, Engineering and Innovation Council (PMSEIC) and the Commonwealth, State and Territories Advisory Council on Innovation (CSTACI) to ensure a coordinated national approach is adopted to research infrastructure.

Processes for Domestic Research Infrastructure Collaboration and Access

High quality networks and linkages between university and education providers, research institutes, businesses and government are critical to successful innovation. Creating these networks and linkages, and fostering collaboration between the various organisations in the networks, are key elements in the science, technology and innovation policy frameworks of modern industrialised nations.

South Australia is recognised as a leader in promoting cluster development and collaboration between universities, research institutions, businesses and government. A

number of examples of successful collaboration involving research infrastructure include:

- Adelaide Integrated Bioscience Laboratories (AIB Labs);
- Adelaide Microscopy;
- Waite Research Precinct;
- the South Australian Partnership for Advanced Computing.

Further information on these is provided in Attachment 1.

The South Australian Government is prepared to work in partnership with the Commonwealth in developing models of collaboration, given our strengths in this area, which can be progressed nationally.

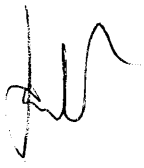
Processes for International Collaboration and Access

The State Government agrees that international collaboration is essential to provide access for Australian researchers to research infrastructure that is not available in Australia. The South Australian Government is keen to work with the Commonwealth in strengthening international collaboration.

I look forward to the opportunity to provide further input into the development of the National Research Infrastructure Strategy.

Should you wish to discuss any of the issues raised above, please do not hesitate to contact Dr Craig Fowler (Executive Director, Science, Technology and Innovation Directorate of the SA Department of Further Education, Employment, Science and Technology) on (08) 8303 2140 or Mr Neil Grant (Director, Office of Innovation, STI Directorate) on (08) 8303 2109.

Yours sincerely



Jane Lomax-Smith
MINISTER FOR TOURISM
MINISTER FOR SCIENCE AND INFORMATION ECONOMY
MINISTER FOR EMPLOYMENT, TRAINING AND FURTHER EDUCATION

2 /4/03

APPENDIX A

SOUTH AUSTRALIAN COLLABORATION IN RESEARCH INFRASTRUCTURE

- Adelaide Integrated Bioscience Laboratories (AIB Labs)

The biotechnology sector is of increasing importance to the South Australian and Australian economies. South Australia is at the forefront of the development of this industry sector and is home to three ASX listed biotechnology companies, Bresagen, GroPep and Bionomics, all of which are founded on South Australian research. The three South Australian universities have also made a significant contribution to the training of scientists who are now in key leadership roles within the Australian biotechnology industry. While South Australia has achieved world recognition for the quality of its biosciences research, it is under equipped to move forward in the post-genomics era. Major deficiencies identified are in access to mass spectrometry, X-ray crystallography, advanced protein separation techniques, and high throughput robotic combinations of all of these techniques.

In 2002, the State Government conducted a stocktake of all major bioscience research equipment (purchase price greater than $200,000), undertaken across all academic and research institutions. With a 95% response rate, a number of issues were raised including:

- overall lack of awareness of what equipment was available;
- duplication of some equipment across institutions;
- under-utilisation of some equipment;
- insufficient technical resources and facilities to make equipment available to users outside the institution;
- some 'clustering' of like equipment with service protocols clearly developed;
- operational funding inadequate for maximal services and maintenance;
- limited adoption of GLP protocols.

To address these deficiencies, the State's research organisations have come together with the State Government to develop a whole of state strategy for bioscience infrastructure through the establishment of AIB Labs. AIB Labs provides a mechanism for the delivery of some infrastructure support to SA university based biotechnology research through more effective collaboration and sharing of equipment.

This 'virtual facility' across multiple sites aims to ensure that new and existing major bioscience research equipment can be shared by the bioscience research community and core competencies established in certain locations. The objective is to provide local internationally competitive research programs with the necessary infrastructure to maintain their competitive edge.

The AIB Labs model will be beneficial in building on the State's bioscience research capability by:

- maximising the availability of equipment across institutions by ensuring efficient workflow arrangements between different user groups and setting up equipment and technical support configurations to avoid downtime and achieve efficient operation of the integrated facility;
- promoting the sharing of technical expertise, building the pool of technical capabilities and maintaining an overall maintenance and support schedule to maximise user productivity;
- increasing interaction between researchers across institutions and with industry;
- increasing the transparency of collaboration and broadening the pool of potential collaborators;
- delivering first class teaching and research training to the bioscientists of the future;
- contributing positively to the quality of bioscience publications;
- creating laboratory facilities that will be attractive to industry users and address an identified shortage of laboratory space and access in Adelaide for biotechnology start up companies.

Four nodes were initially established for the AIB Labs, these being at:

- *Flinders University* – to provide high level support in chemical and physical analysis and medical nanotechnology and foster collaboration between researchers in the physical biological and medical sciences;
- *Adelaide Central* (University of Adelaide, University of South Australia - School of Pharmacy, IMVS/Hanson Institute, Child Health Research Institute, and the proposed Adelaide Medical Research Institute for Women's Children's Health) – major laboratories to support post-genomic research and research training building on existing genomics facilities (Adelaide Microscopy, GENSA and the Adelaide Microarray Facility);
- *The Waite* (University of Adelaide, Australian Genome Research Facility, Australian Centre for Plant Functional Genomics, Australian Wine Research Institute and the South Australian Research and Development Institute) – to train other research scientists to generate crystals and solve 3D structures - genomics and proteomics focus;
- *Mawson Lakes* (Ian Wark Research Institute, University of South Australia) – the characterisation of materials surfaces and the interaction between materials and biological molecules and systems – cross-disciplinary interaction with DSTO.

The four nodes of AIB Labs are managed by an Advisory Committee representing key research institutes and industry and will have primary responsibility for

ensuring transparent access across all institutions, promoting interaction between researchers across institutions and industry and for the diffusion of the technology to industry, particularly via postgraduate student links.

- Adelaide Microscopy

The University of Adelaide, through its centralised facility for microscopy and micro-analysis, Adelaide Microscopy, has established a model for the provision of access to high cost instrumentation to all South Australian researchers as well as interstate and international users. The facility has an extensive range of microscopes with a replacement cost in the vicinity of $17 million. It also has a staff of competent microscopists with a broad range of applications experience that are able to train, assist and advise users in the best methods of use of the equipment.

Over nearly a 15 year period this facility has maintained its excellence and through wise investment in equipment and success with competitive grants, the centre has evolved into a state resource for the provision of the broad range of high cost equipment it houses. Adelaide Microscopy draws its users from the research students and staff of the University of Adelaide, the other two universities in South Australia, CRCs, other government institutions, industry and other universities from within and outside of Australia.

The success of this facility to date has been due to several factors:

- the facility houses state-of-the-art equipment maintained in excellent working order;
- the facility is autonomously funded and managed and is not driven by its own research outcomes;
- the facility has a customer service approach and an access policy that provides 24/7 access to those users who can demonstrate their competency in the use of the various instruments;
- the facility has staff who are recognized for their excellence in their various fields of microscopy and who can demonstrate their willingness to train, assist and advise users in their various applications;
- a management structure ensures that all stakeholders have input into decision making with respect to policy and direction.

The need to maximize the efficient usage of such high cost equipment and thereby minimize the per hour cost of providing such equipment, has been behind the philosophy of Adelaide Microscopy and remains one of the most important considerations for funding such research infrastructure. There are specific cases where individual high cost instruments should be allotted to a single project (eg fear of contamination in infectious disease research facilities) but in most cases sharing such resources is not only more economic but it can provide a researcher with a broader understanding of the capabilities of the equipment.

The centralisation of this facility within the State has provided further savings in instrument purchases, through lack of duplication, and the support staff needed to effectively manage them. It has also provided the mechanism for a coordinated approach to both the State and Federal Governments for contributions towards the funding of such instrumentation. This approach has seen South Australia as a leader in the introduction of Environmental Scanning Electron Microscopy, X-ray Microtomography and MultiPhoton Scanned Laser Microscopy into Australia. Adelaide Microscopy has been a lead node in the Adelaide based 'Regional Facility for Surface and Microstructure Analysis' which was nationally awarded the largest ARC Linkage Infrastructure Grant in 2002.

Access to this kind of instrumentation is and will always be one of the major concerns for researchers who, under experimental conditions, often need to use the instrumentation at short notice and outside of normal hours. Adelaide Microscopy, through its training, accreditation process and web based booking system ensures that all users can maximize their use of the equipment. Adelaide Microscopy, as part of its role, maintains contact with other centres in Australia and overseas. It is then able to advise users of techniques and instrumentation that may be applicable to their research, which are not available in Adelaide and provide introduction to contacts in the other centres.

A proposal to build on this foundation and develop the Centre into an Australian Centre for Microscopy under the MNRF program was not supported by the Commonwealth in 2001. The opportunity to further develop this unique combination of instrumentation and enhance researcher access to important infrastructure away from the established centres on the eastern seaboard has not yet been fully realised.

- Waite Research Precinct

The Waite Precinct is recognised worldwide as a centre of excellence in plant research. Co-location of many research institutes including the CSIRO, University of Adelaide, South Australian Research and Development Institute and the Australian Wine Research Institute has created a strong sense of cooperation and collaboration within the precinct.

The precinct also includes two Major National Research Facilities - the National Wine Industry Research Cluster and the South Australian node of the Australian Genomics Research Facility. The precinct is being further reinforced by the establishment of the $63 million Australian Plant Functional Genomics Centre (currently under construction), which will establish the Waite in the top three plant research centres in the world.

The Centre for Natural Resource Management, a research broker, is located at the Waite Precinct and connects South Australia's natural resource management regional groups with science, business and industry.

The Waite Precinct is an example of a successful long term collaboration between universities and other research institutions. The long standing linkages with CSIRO in the area of agricultural and environmental research at the Waite Precinct go back to 1930 when CSR Soils was first located at the Waite. Today, around 260 CSIRO staff are located at the Precinct in three Divisions - Land and Water, Plant Industry and Mathematical and Information Sciences together with over 400 university staff and postgraduates.

A key to the Waite's success was the strategic plan for the Precinct established in 1992, which involved the commitment of the partner organisations to align their activities for the next 10 years.

- South Australian Partnership for Advanced Computing

The South Australian Partnership for Advanced Computing (SAPAC) provides advanced High Performance Computing (HPC) facilities and services for use in science and engineering applications in South Australia. It is an unincorporated joint venture of the three South Australian universities; the University of Adelaide, Flinders University and the University of South Australia. In September 2002 SAPAC was accepted as a partner into APAC (Australian Partnership for Advanced Computing).

SAPAC aims to achieve the following goals and activities:

- *Facilities and Infrastructure*: SAPAC will seek funding, and cooperatively manage and operate high-performance computing platforms, to support the needs of the State's researchers needing access to high-performance computing facilities.

- *Education and Training for Researchers*: This includes both researchers and postgraduate students and will be across a broad range of disciplines and problem types in advanced and high-performance computing techniques, including grid-based computing.

- *Support for Undergraduate Education Programs*: This will broadly build capability in the use of advanced, high-performance and grid-based computing techniques by introducing key concepts and expertise at the undergraduate level.

- *Technology Diffusion*: For industrial applications of advanced and high-performance computing, including relevant training and other forms of assistance for personnel in industry.

- *Expertise and Research Program*: As funding permits, SAPAC will itself carry out research in selected areas of expertise to be determined by the SAPAC Management Committee in consultation with the SAPAC Steering Committee. Members and users of SAPAC facilities, in addition, bring extensive knowledge and research expertise in a wide variety of areas.

Mr Donald McGauchie
Research Collaboration Review Secretariat
Department of Education, Science and Training
Location 742
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Dear Mr McGauchie

Thank you for the opportunity to provide input into the Review of Closer Collaboration between universities and major publicly funded research agencies.

The South Australian Government is a strong supporter of the recent initiatives of the Commonwealth Government to build the nation's research and innovation capabilities. In particular, I applaud the establishment of the National Research Priorities, which will focus the nation's future research investment to ensure that we achieve the scale and focus required and maximise the return on our investment.

To achieve measurable impacts in the National Research Priorities will require operating in non-traditional ways to maximise the effectiveness of collaboration. The fundamental change that needs to occur is a shift away from a vertical approach (discipline based) to a horizontal approach (goal driven), whilst preserving the culture of the research organisations involved.

The State Government has taken a strategic approach to supporting such collaboration with the formation of the Premier's Science and Research Council. The Council is co-chaired by the Premier and Dr Tim Flannery and includes high-level representatives from each of our three universities, the CSIRO, and local industry as well as the Chief Defence Scientist. The South Australian Government believes that the structure and agenda of the Council promotes collaboration and effective participation of key stakeholders in the State's research community across all aspects of science, technology and innovation policy and program development in South Australia, including infrastructure development.

The South Australian Government, in conjunction with the Premier's Science and Research Council, is currently developing a 10 year Vision for science, research and innovation for the State. The Vision has a number of key elements including building on the State's research capabilities, focusing on retaining and building on the critical research capability of the DSTO and CSIRO. It will also support collaborative research activities between research organisations, researchers and industry and the formation of industry-innovation based clusters.

For example, over 60% of the DSTO's research activities are undertaken in South Australia. This is supported by the largest concentration of defence company headquarters in the southern hemisphere and an active defence industry cluster as well as underpinning other key industry sectors such as the automotive industry. There has been a recent focus on developing strong collaborative linkages between the DSTO and the State's universities.

As outlined in the issues paper, DSTO has sponsored two Chairs at the University of Adelaide in Photonics and Microwave Radar. The Chairs will oversee the establishment of centres of expertise in each area to address a national shortfall in these niche technologies. The Chairs will be responsible for the coordination of research activities at the university including initiating new, and expanding existing, research programs with DSTO and developing linkages with industry, as well as providing post-graduate research supervision.

The South Australia Government will be working with CSIRO to build on the State's research strengths with the aim of attracting key CSIRO Divisions to the State. We are already working with the CSIRO P-Health Flagship program that is headquartered here to build on the State's strengths in health informatics and social demographics.

High quality networks and linkages between university and education providers, research institutes, businesses and government are critical to successful innovation. Creating these networks and linkages, and fostering collaboration between the various organisations in the networks, are key elements in the science, technology and innovation policy frameworks of modern industrialised nations.

South Australia is recognised as a national leader in promoting cluster development and collaboration between universities, research institutions, businesses and government. The State has several nationally recognised precincts focused on linking industry with centres of research excellence and there are many successful models of collaboration between universities and major publicly funded research agencies (in particular, DSTO and CSIRO) in the State. These include:

- Waite Precinct

  The Waite Precinct is recognised worldwide as a centre of excellence in plant research. Co-location of many research institutes including the CSIRO, University of Adelaide, South Australian Research and Development Institute and the Australian Wine Research Institute has created a strong sense of cooperation and collaboration within the precinct.

  The precinct also includes two Major National Research Facilities – the National Wine Industry Research Cluster and the South Australian node of the Australian Genomics Research Facility. The precinct is being further reinforced by the establishment of the $63 million Australian Plant Functional Genomics Centre (currently under construction), which will place Waite in the top three plant research centres in the world.

The Centre for Natural Resource Management, a research broker, is located at the Waite Precinct and connects South Australia's natural resource management regional groups with science, business and industry.

A key to the Waite's success was the strategic plan for the Precinct established in 1992, which involved the commitment of the partner organisations to align their activities for the next 10 years.

- Thebarton Bioscience Precinct

The Thebarton Bioscience Precinct, located 4 km from Adelaide's city centre is home to many of South Australia's biomedical companies including listed companies GroPep, Bionomics and BresaGen, together with a range of service and diagnostic support companies. Along with a number of other related bioscience companies in the nearby University precinct, this group of firms comprise the largest cluster of commercial medical bioscience companies in Australia, employing nearly 350 science and technology graduates. The recent decision to extend the precinct to over 6 hectares is expected to lead to the establishment of over 50 new bioscience companies in the State by 2010, with a turnover of over $100 million.

- Technology Park

Technology Park at Mawson Lakes is home to some world-class technological education and research facilities. It incorporates the CRC for Sensor Signal and Information Processing (involving the three South Australian universities and DSTO), the CRC for Satellite Systems, the Institute of Telecommunications Research, the University of South Australia's science and engineering campus and the Ian Wark Research Institute.

- Defence Teaming Centre

The Defence Teaming Centre (DTC), is a joint initiative of the South Australian Government and the defence industry, which has the mission of improving the competitiveness of South Australian small to medium enterprises (SMEs) in bidding for Defence projects and conducting Defence-related exports. The cluster plays an important role in the development of market opportunities from the State's strong defence research base, including the headquarters of the DSTO.

- Wine Industry

The Australian wine industry is perhaps the best known example of a successful, internationally focussed industry-based cluster group in which South Australian businesses, research organisations and individuals, particularly those in regional areas, have played a leading role. This has resulted in the "transformation of grapes and wine into a value-added knowledge-based product with inputs from

education, research, production and marketing, supplemented by continuous benchmarking and technology transfer."[1]

- Water Industry Alliance

  The Water Industry Alliance is another example of South Australian excellence in cluster development. The Alliance includes around 170 South Australian based companies and related organisations seeking to develop their export markets, or wishing to form strategic alliances with other water related organisations in Australia and offshore. It includes international water companies, national firms and well established local companies. A growing R&D sector involving universities, international water companies and Government agencies, with direct links to the Water Industry Alliance, supports this industry base.

- Cooperative Research Centres (CRCs)

  The CRC for Sensor Signal and Information Processing (CSSIP) headquartered in South Australia is an excellent example of a CRC that has demonstrated a collaborative approach involving five universities and the DSTO to deliver advanced training and education programs across the country and overseas. The CRC for Water Quality and Treatment is a core partner in the Water Industry Alliance cluster providing much needed research and technology transfer capacity to the water industry. These two examples highlight the collaborative nature of CRCs that should be encouraged and possibly expanded outside of the direct CRC participants to the wider industry sector in which a CRC operates.

- Rural Development Corporations

  Rural Development Corporations provide an excellent vehicle for industry linkages with research activity. They promote collaboration between what may have been otherwise competitive research organisations towards common industry lead strategic goals with outcomes that are focussed on achieving tangible benefits for their industry sector. Examples of this include the partnership between the Grains Research and Development Corporation (GRDC) and the Australian Research Council to establish the Australian Plant Functional Genomics Centre in South Australia and the Grape and Wine Research and Development Corporation, working with the Australian Wine Research Institute and the CRC for Viticulture, all of which are headquartered in the State.

The key to the State's success in fostering collaboration and the development of clusters is due to actively using intermediaries that bridge both the industry and research communities. These intermediaries range from industry associations, government agencies, public-private agencies and key champions. We have developed a body of knowledge, a track record of experience and success and a culture of collaboration that supports the establishment of clusters and cooperative activities across research organisations as well as industry.

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[1] "The Australian Wine Industry, Success Through Innovation" Occasional Paper No. 3, Prime Minister's Science, Engineering and Innovation Council (1999)

This collaboration provides significant benefits including:

- improved industry global competitiveness;
- maximising commercial outcomes from research and development;
- excellence in research that directly benefits our economy and wider society.

A direct outcome of this industry-research collaboration has been for the State to achieve the highest per capita competitive research earnings in Australia.

The key to successful collaboration includes alignment of interests to provide the ability to work across cultures without changing the culture of each organisation. For example, the Waite Precinct has been successful because it has a common goal and brings together complementary skills, given the different core capabilities and competencies of the organisations involved.

The real drivers of collaboration between any organisations are the perception of mutual benefit arising from synergies that result in a win / win outcome for all parties and a degree of alignment in the objectives of the organisations.

The State Government does not support broadening access by publicly funded research agencies to competitive public research funding. The Government considers that increasing competition between publicly funded research agencies and universities is likely to work against collaboration.

South Australia provides a powerful model for collaboration and the formation of clusters that support improved research outcomes to the economic and social benefit of the community. This model should be considered nationally to enable national and international collaboration to benefit Australia.

Should you wish to discuss any of the issues raised above, please do not hesitate to contact Dr Craig Fowler (Executive Director, Science, Technology and Innovation Directorate of the SA Department of Further Education, Employment, Science and Technology) on (08) 8303 2140 or Mr Neil Grant (Director, Office of Innovation, STI Directorate) on (08) 8303 2109.

I look forward to the outcome of this important review.

Yours sincerely

Jane Lomax-Smith
MINISTER FOR TOURISM
MINISTER FOR SCIENCE AND INFORMATION ECONOMY
MINISTER FOR EMPLOYMENT, TRAINING AND FURTHER EDUCATION

2/9/03