Standing Committee on State Development

Science and its commercialisation in New South Wales

Final Report

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Terms of Reference

That the Standing Committee on State Development inquire into and report on science and its commercialisation in New South Wales, and in particular review:

a) existing scientific efforts and programs in NSW public sector organisations,

b) the opportunities for commercialising the results of scientific research,

c) the opportunities for NSW public sector administered programs in meeting policy objectives,

d) the BioFirst program and the opportunities it provides for the commercialisation of research discoveries.

Committee Membership

Hon Tony Burke MLC **Australian Labor Party (Chair)**

Hon Patricia Forsythe MLC **Liberal Party (Deputy Chair)**

Hon Tony Catanzariti MLC **Australian Labor Party**

Hon Christine Robertson MLC **Australian Labor Party**

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Chair's Foreword

I am pleased to present this report on science and its commercialisation in New South Wales by the Standing Committee on State Development. The Committee approached the issues and made its deliberations in a non-partisan manner.

While the report recognises the importance of commercialisation, this must be matched with a commitment to basic research. The Committee also recognises the need for careful risk assessment whenever Government is supporting commercial opportunities.

There are examples of world-class science being conducted in the New South Wales public sector. Science is more than a job for scientists; it is a passion and a challenge. While financial reward is generally not the main driver for scientists, entrepreneurship should be rewarded.

As Chair of this inquiry, I am pleased that the Government has recognised that there remain many opportunities in science and innovation. The Committee sees the new portfolio of Science and Medical Research as the catalyst for comprehensive advancement in the support of science and the science community in New South Wales. I am confident that this report, and its recommendations, will help to provide the Minister with a platform to achieve this end.

For the new portfolio to realise its potential there needs to be a dedicated group within the public service focussing on science and innovation. This would provide the resources to help coordinate the research already conducted within various Government departments. It is appropriate for the primary responsibility for the research itself to remain with the relevant Government departments.

The Committee acknowledges the work of BioFirst but believes it is appropriate to now substantially review its operation. The creation of the new portfolio provides a clear opportunity for science to be supported in areas that are of strategic importance to New South Wales and where it has a competitive advantage. The Committee believes that the creation of the position of Chief Scientist is a first and very public step towards further involving the science community.

Education was a key concern of the science community. Like the science community, the Committee is committed to fostering interest in science and innovative thinking among young people. The Committee has identified several important issues, and calls on the Government to establish a taskforce to set a strategic direction for science education in New South Wales.

The Committee also recognises the importance of bringing scientific issues to the forefront of Government thinking. The Committee has recommended that the Government initiate an annual Science in Parliament Day to provide access to Parliament and Government decision-makers, and facilitate valuable information exchange.

One model of commercialisation that stood out was the Cooperative Research Centre (CRC) model. In recognition of the evidence presented to the Committee on the value of the CRC program, the Committee held a Forum at Parliament House on 21 October 2003. The Forum was an extremely successful initiative that provided the Committee with a novel means of receiving evidence. The Committee would like to thank the CRC Association and the NSW Council of CRCs for their invaluable and enthusiastic assistance in organising the forum.

The Committee was particularly impressed by those CRCs where commercial returns in fact support the CRC in doing public good research. The Committee supports this approach. The Government must give CRCs the long-term commitment and strategic support that they need to flourish.

The key strength of the CRC model is its capacity to bring scientists, business interests, and Government agencies together. The policy of calling on scientists to think in more commercial terms has limitations. The best outcomes will be found in bringing the experts together. This is why the Committee recommends that a new Ministry for Science and Innovation designate one officer for liaison with CRCs. Further, the Committee calls on the Minister to examine different models of brokerage to help create links between researchers and capital.

It is up to Government to implement the recommendations contained in this report. The Committee recognises that the Government will need to again call for assistance from the science community in implementing these recommendations and building a strong platform for science and its commercialisation in New South Wales. The Committee encourages the science community to make the most of this opportunity. I am confident that the commitment and passion of the sector, and their preparedness throughout this inquiry to give freely of their time to provide the Committee with expert advice, means the science community will rise to the challenge.

As a new Chair, I particularly appreciate the considerable input and support of my fellow Committee members. I would like to make special mention of the Deputy Chair, the Hon Patricia Forsythe MLC, whose committee and parliamentary experience has been invaluable throughout the inquiry.

I would also like to take this opportunity to thank the Committee Secretariat particularly the acting Director, Mr Bayne McKissock, acting Project Officer Ms Cathy Nunn, and Project Officer, Ms Madeleine Foley for their assistance in producing this final report. Their research and analysis has been invaluable. Mention should also go to Ms Jill Galvin and Ms Laura Milkins for their administrative support.

Hon Tony Burke MLC

Chair

Summary of Recommendations

Recommendation 1 **p27**

That the Minister for Science and Medical Research undertake a review of the BioFirst Strategy to determine how best to broaden the NSW Government's focus on science and innovation. The review should examine the priorities, focus, scope and funding of the BioFirst strategy and develop a new strategy to meet the NSW Government's policy objectives in science, technology and innovation.

The new strategy should include:

- a website providing information on all programs and application processes
- transparent, publicly advertised selection criteria for all programs
- an independent selection panel
- publication of successful applicants and funding allocations
- a feedback process for unsuccessful applicants
- annual evaluation of all programs, and competitive benchmarking to be made publicly available.

Recommendation 2 **p27**

That the Minister for Science and Medical Research establish an Innovation Awards program. Based on the platform established under the existing BioFirst Awards program, the Innovation Awards would supersede the BioFirst Awards by:

- encompassing all areas of science and innovation
- extending the program to offer flexible short-term postings for Australians living abroad
- including people with significant experience in commercialisation.

An independent and transparent selection panel should be appointed to determine the Innovation Awards.

Recommendation 3 **p30**

That the Minister for Science and Medical Research establish an administration and policy coordination body within the science portfolio with sufficient resources to assist the NSW Government to meet its policy objectives. That the administration of scientific research remain within each Government portfolio with the proposed body to provide coordination, liaison and effective communication across portfolios.

Recommendation 4 **p33**

That the Minister for Science and Medical Research establish an Office of the Chief Scientist. The Chief Scientist should report directly to the Minister for Science and Medical Research. The primary role of the Chief Scientist would be to act as an advisor to Government, as well as a conduit between the science community and the Government.

Recommendation 5 **p35**

That the Minister for Science and Medical Research convene a Science Leadership Group with a short-term role advising the Minister when reviewing the Committee's recommendations. The Science Leadership Group's primary function would be to oversee the implementation of the proposed Ministry for Science and Innovation. The Group should consist of, but not be confined to, representatives from:

- NSW Government
- science, technology and innovation sector
- environmental sciences
- NSW Council of Cooperative Research Centres
- education sector.

That, in the long-term, the proposed Chief Scientist chair the Science Leadership Group to provide the Minister with high level advice on issues of strategic importance to New South Wales.

Recommendation 6 **p36**

That the responsibility and administration of the NSW Innovation Council transfer from the Minister for State and Regional Development to the Minister for Science and Medical Research.

Recommendation 7 **p43**

That the Minister for Science and Medical Research develop intellectual property management and contract guidelines for adoption across all agencies in the New South Wales public sector.

Recommendation 8 **p45**

That the NSW Premier's Department initiate discussions with the relevant employee organisations and public sector agencies to review the Research Scientist Classification, Policy and Guidelines, or equivalent classification. The review should examine the viability of amending the Classification to further acknowledge and reward excellence in science, technology and innovation in the public sector, in particular, commercialisation.

Recommendation 9 **p48**

That the NSW Government initiate an annual NSW Science in Parliament day. A parliament sitting day should be devoted for the purpose, and should incorporate:

- a theme for the day
- the involvement of all Members of both Houses of Parliament and the Parliament's Presiding Officers
- the involvement of the NSW Chief Scientist
- a focus on scientists meeting with parliamentarians, with formal and informal opportunities for networking
- attendance by young scientists, teachers and students
- effective communication between government and the science community prior to, during and after the event
- an evaluation process to ensure the future success of the initiative.

Recommendation 10 **p52**

That the Minister for Science and Medical Research and the Minister for Education convene a government taskforce to determine the direction of science and technology education in New South Wales. The taskforce would, in light of the National Review of Education:

- identify strategies for attracting and retaining quality science and technology teachers
- review the New South Wales science and technology curriculum for K-6 and Year 7-12
- develop a science awareness program within New South Wales schools.

Recommendation 11 **p53**

That the NSW Government approach the Federal Government with a proposal to introduce a program to co-fund a business studies module within undergraduate science courses in selected New South Wales universities.

Recommendation 12 **p59**

That the Minister for Science and Medical Research consider introducing an infrastructure loans scheme for start-up companies and small to medium enterprises in the New South Wales science, technology and innovation sector. That the loans be:

- strictly for the purposes of purchasing, or building, facilities
- determined on the viability of a business plan submitted to a government selection panel
- made available with a flexible repayment plan, subject to the business plan.

That the size of the loan be subject to the viability of the business plan and the value of the asset, which would be held as security by the Government until the loan was repaid.

Recommendation 13 **p66**

That the proposed Ministry for Science and Innovation include a Cooperative Research Centre liaison position. The position would be responsible for providing advice to Cooperative Research Centres located in New South Wales concerning NSW Government agencies, NSW Government science policies and Federal Government funding programs.

Recommendation 14 **p69**

That the Minister for Science and Medical Research examine the appropriateness and feasibility of the New South Wales public sector participating in a national commercialisation brokerage or establishing a State based brokerage for New South Wales. The Minister should examine:

- the National Commercialisation Brokerage proposed by the Australian Institute for Commercialisation
- examples of international commercialisation brokerages such as the British Technology Group in England.

Abbreviations and glossary

AIC	Australian Institute for Commercialisation
ANZAAS	Australian and New Zealand Association for the Advancement of Science
ARC	Australian Research Council
ATP	Australian Technology Park
ATSE	Australian Academy of Technological Sciences and Engineering
BIF	Biotechnology Innovation Fund (Commonwealth)
Bioinformatics	Development of technologies for storing, extracting, organising, analysing, interpreting and utilising biological information. Bioinformatics is an emerging discipline at the convergence of computing and the life sciences.
Biotechnology	The term for a group of technologies that pursue the understanding and use of organisms and biological processes for health, social, environmental or economic applications or outcomes.
BITS	Building on IT Strengths (Commonwealth)
BTG	British Technology Group
COMET	Commercialising Emerging Technologies (Commonwealth)
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scienctific and Industrial Research Organisation
DSRD	Department of State and Regional Development (NSW)
FASTS	Federation of Australian Scientific and Technological Societies
ICT	Information and Communications Technology
IP	Intellectual Property
MNRF	Major National Research Facility
NANO	Nanostructual Analysis Network Organisation
Nanotechnology	The creation and use of materials, devices and systems that exploit novel properties arising from the structure and function of matter in the nano-metre range.

NHMRC	National Health and Medical Research Council
NICTA	National ICT Australia
Photonics	The control, manipulation, transfer and storage of engery and information using photons, the fundamental particles of light. The goal of photonics research is to utilise the almost limitless capacity of optical fibres to transmit large volumes of information.
Proof of concept	Activities associated with demonstrating the feasibility of a research idea.
Public good	The benefit to society as a whole through the delivery of social, environmental or economic benefits. Public good includes improved human health or safety, reduced pollution, and lower production costs and more competitive industry.
R&D	Research and Development
SARDI	South Australian Resarch and Development Institute
SME	Small to Medium Enterprise
UTS	University of Technology, Sydney

Chapter 1 Introduction

On 3 July 2003, the Standing Committee on State Development (the Committee) was requested by the Hon Frank Sartor MP, Minister for Energy and Utilities, Minister for Science and Medical Research, Minister Assisting the Minister for Health (Cancer), and Minister Assisting the Premier on the Arts, to inquire into and report on science and its commercialisation in New South Wales. The terms of reference for this inquiry are detailed on page *iv*. The Committee resolved to report on the inquiry by December 2003.[1]

Commercialisation and basic research

1.1 Commercialisation of scientific research can be broadly defined as activities undertaken in order to turn existing viable research results into new or improved products, processes or services which can be manufactured or marketed.

1.2 The Australian Institute for Commercialisation (AIC) has stated that:

> At its simplest, "commercialisation" is the transformation of ideas into successful economic outcomes.
>
> These outcomes can range from a new-technology company's profits to significant effects, over time, on a country's GDP.[2]

1.3 Based on submissions to the inquiry, the Committee notes that the definition of commercialisation varies. The NSW Department of Agriculture also defined commercialisation as 'the widespread dissemination of [research] results so that you get behavioural and management changes...'[3]

1.4 The terms of reference for this inquiry focus primarily on the commercialisation of scientific research. Submissions to the inquiry and witnesses appearing before the Committee stressed that commercialisation must complement and not compete with basic research. The Committee supports this principle. Dr Merilyn Sleigh, formerly Dean of the Faculty of Life Sciences, University of New South Wales, referred to the importance of basic research:

> Basic research is a fundamental for effective research training, as well as a generator of potentially valuable new ideas, the opportunities for future commercial development.[4]

1.5 Professor Beryl Hesketh, Pro-Vice Chancellor, College of Science and Technology, University of Sydney, warned against the assumption that commercialisation could be successfully pursued without 'feeding the engine room' that is research:

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1 Minutes No 1, 3 July 2003 (See Appendix 7)

2 Submission 23, AIC, p2

3 Ms Scott-Orr, Executive Director, Research Advisory and Education, New South Wales Department of Agriculture, Evidence 18 August 2003, p7

4 Dr Merilyn Sleigh, Submission to the Australian Science Capability Review, 1999, p2, *www.isr.gov.au/science/review/ChanceSubmissions/ReviewSubs/sub58aDeanLScUNSW.doc* (accessed 12 September 2003)

> Worldwide, the number of patents and the income from commercialisation is strongly correlated with research expenditure. So, that is a message we want to get across: The reason we are successful now is probably because of research that was done 10, 15 years ago. If people think it is a quick route to commercialisation, I do not believe that is the case. We have to invest in deep research infrastructure and fund basic research so that the sorts of ideas can bubble up from that, and it places people in a position where they can capitalise on that.[5]

Inquiry overview

1.6 To establish the context of the inquiry, the Committee needed to identify and clarify the issues essential to science and innovation in NSW.

1.7 Leading scientists, innovators, public sector agencies and members of the public provided submissions and appeared before the Committee, generously giving their time and ideas to assist the Committee in this endeavour.

1.8 The Committee has a responsibility to inform the Government and make recommendations based on a balanced examination of the evidence, realising that there are limitations to what Government alone can achieve. While the recommendations are clearly addressed to the Government and are aimed at assisting the Government to develop science and innovation policies, they also require direct involvement by the science community and from industry in order to succeed.

1.9 Throughout this inquiry scientists have identified the barriers to commercialisation of scientific research, and made considered suggestions on how these barriers could be overcome. The barriers to commercialisation are not unique to New South Wales. There are concerted efforts both nationally and internationally to address these issues. New South Wales needs to make a solid contribution to overcoming these barriers, to attract talent and investment to the State.

1.10 The appointment of the Minister for Science and Medical Research has provided an opportunity not only to demonstrate the commitment of Government to innovation, but to put in place the concrete means with which to foster that innovation, recognising the distinct challenges facing the science and innovation sectors.

1.11 The Committee recognises the progress already made by the Government, for example, the BioFirst Strategy, which has provided building blocks for innovation in some sections of industry. More, however, needs to be done. The Minister for Science and Medical Research has begun the process of broadening the Government's approach by first starting to take stock of initiatives and programs already in place, through this inquiry and through other measures such as the Review of Medical and Health Research in New South Wales.

1.12 The Committee has heard from the science community that in order to create diverse, self-sustaining innovation there must be a strong science research and commercialisation platform within the public sector.

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[5] Professor Hesketh, Evidence, 18 August 2003, pp26-27

Conduct of the inquiry

1.13 On receipt of the terms of reference, the Committee resolved to call for submissions from relevant government, public and private organisations, and to advertise the inquiry more broadly through the media. In mid July 2003, the inquiry was advertised in the major metropolitan and regional print media in New South Wales, in the *New Scientist* and on the NSW Parliament website (www.parliament.nsw.gov.au).

1.14 The Committee received 60 submissions from a range of individuals, Government agencies, industry groups and research organisations. A list of submissions is provided in Appendix 4. The submissions have provided a broad spectrum of opinions on issues relating to the inquiry terms of reference. The quality and depth of submissions reflects the concern and interest of individuals and organisations and has assisted the Committee to make 14 recommendations to the Government in this report.

1.15 Public hearings were conducted at Parliament House on 18 August, 8 September and 19 September 2003. Representatives from The Cabinet Office, NSW Agriculture, NSW Health and the Department of State and Regional Development (DSRD), a number of New South Wales universities, and relevant peak organisations appeared before the Committee. A full list of witnesses appears at Appendix 5.

1.16 A public hearing was also held at the Australian Technology Park (ATP) in Sydney on 10 November 2003. Of particular interest to the Committee was the newly established Biotechnology precinct at the ATP, which is funded by the Government's BioFirst Strategy.

1.17 In addition to public hearings, the Committee conducted a number of site visits to gather information and to provide insight into the level of government involvement in science research and commercialisation in New South Wales.

1.18 The Committee travelled to Wagga Wagga, Griffith, Leeton and Yanco in September 2003 to meet with a number of representatives from different publicly funded and public-private funded organisations. The Committee recognised the need to look beyond the Sydney metropolitan area given the importance of established and emerging research and development centres throughout New South Wales. The Committee was interested to hear from individuals and organisations directly involved in science research to understand their perspectives of the current situation and to identify necessary changes.

1.19 The Committee met with representatives from Charles Sturt University, Wagga Wagga and Griffith City Councils, the National Wine and Grape Centre, the Cooperative Research Centre (CRC) for Viticulture, the CRC for Sustainable Rice Production, CSIRO, NSW Agriculture and the Ricegrowers' Association.

1.20 The Committee also travelled to Brisbane in September 2003 to meet with representatives from the Queensland Department of State Development and the Department of Innovation and Information Economy. From these meetings, the Committee was able to understand the processes that the Queensland Government has considered and implemented to best support and promote science commercialisation in that state. The Committee also met with the Chief Executive Officer of the Australian Institute for Commercialisation (AIC) at Brisbane Technology Park. The AIC provided the Committee with a model of a commercialisation brokerage, which is discussed in Chapter Six of this report.

1.21 Evidence obtained by the Committee indicated the importance of programs such as that establishing the CRCs. In recognition of this, the Committee resolved to hold a Forum for CRCs on 21 October 2003 at Parliament House. The event was organised by the Committee with the assistance of the CRC Association and the NSW Council of CRCs. Chief Executive Officers, Business Managers and Chairs of CRCs attended from New South Wales and interstate. Representatives from government, including the Hon Frank Sartor MP, industry and students were also present.

1.22 The Committee saw the forum as an innovative means of receiving evidence by allowing stakeholders to present and debate the central issues before the Committee. The forum was a successful initiative and the key outcomes are discussed in Chapter Six of this report. In conjunction with the NSW Council of CRCs, the Committee has produced a DVD containing highlights of the CRC Forum. A copy of the DVD has been provided inside the back cover of this report.[6]

Structure of the report

1.23 This report is divided into six chapters. Chapter Two outlines the ways in which New South Wales currently engages in science research commercialisation.

1.24 Chapter Three examines the BioFirst Strategy in detail, which underpins current NSW Government involvement in commercialisation.

1.25 Chapter Four considers the portfolio responsibilities of the Minister for Science and Medical Research and the possibilities the portfolio holds for a more coordinated approach to science and commercialisation.

1.26 Chapter Five considers methods of encouraging commercialisation through addressing some of the impediments faced by researchers.

1.27 Chapter Six examines the opportunities and the different models of support for commercialisation, including current models and those that may be implemented in future.

[6] This recording forms part of the official proceedings of the Standing Committee on State Development. No part may be used or reproduced without the permission of the Legislative Council.

Chapter 2 Science and commercialisation in New South Wales

> Innovation…continually doing new and smarter things…is central to securing a thriving and resilient economy, thereby ensuring that all NSW citizens enjoy a high standard of living even in tough times.[7]

There have been a number of significant developments in science and innovation in New South Wales, including the creation of the new portfolio of Minister for Science and Medical Research. The evidence presented to the Committee provided an insight into the capacity and potential of the NSW Government to stimulate innovation and commercialisation. The NSW Government must win the confidence of the scientific community by recognising the need for, and providing broader support of, science and innovation.

Current NSW Government initiatives

2.1 The Federal Government has overall responsibility for science and innovation, including primary responsibility for funding infrastructure and research and development (R&D), determining areas of national priority and strategic planning. Commercialisation of scientific research within the public sector is a relatively new focus in Australia. Increasingly, state governments are developing policies and building infrastructure in order to attract business and investment to science and innovation.

2.2 The Committee, after examining submissions and taking evidence, recognises the significance of NSW Government support and assistance in complementing Federal programs. State Government support of science, technology and innovation, particularly commercialisation, is imperative to maximise the opportunities and benefits for the New South Wales science community, and the economic and social benefits to New South Wales. At present, Ministers in portfolios as diverse as Agriculture and Fisheries, Health, State and Regional Development, Mineral Resources, Lands, State Forests, Environment, Energy and Commerce administer this research. A list of NSW Government agency scientific research programs, which the Committee has identified from submissions, is detailed at Appendices 1 and 2. A large percentage of research activity cannot be published due to commercial-in-confidence.

NSW Innovation Council

2.3 In 1996, the NSW Government established the NSW Innovation Council as a statutory authority to 'assist in the creation of jobs, investment, exports and interstate trade by raising the level of innovation activity in New South Wales'.[8] The NSW Innovation Council is the only body that provides whole of government advice to the Government regarding opportunities in science and innovation. In evidence before the Committee, Mr Michael

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7 NSW Innovation Council, *Growth Through Innovation: A strategy for NSW*, November 1999, p2, *www.innovation.nsw.gov.au* (accessed 4 August 2003)

8 Submission 47, Department of State and Regional Development (DSRD), p6

O'Sullivan, Executive Director, Industry, Department of State and Regional Development (DSRD), outlined the structure of the Innovation Council:

> The Innovation Council is a ministerial advisory body established basically to help jobs, investment and export through increased innovation in the private and public sectors. The Council advises the Minister and the Government on potential programs that it might look at … The Council comments on Government initiatives to promote public and private sector innovation … basically, the Council provides general intelligence and information on issues of concern relating to innovation.[9]

2.4 The Minister for State and Regional Development is currently responsible for the NSW Innovation Council, with DSRD providing administrative support. The functions of the NSW Innovation Council are:

- investigate issues relevant to the promotion of innovation in the private and public sectors of New South Wales
- provide an ongoing source of intelligence, information, comment and analysis to the Department, the Minister and the Government on issues relevant to the promotion of innovation in the private and public sectors of New South Wales
- facilitate the communication of information about innovation between the Government, industry and the research community
- cooperate with the Department in support of programs established by the Department, where the objects of the program are similar to the object of the Council
- promote and take part in activities and programs so as to increase the understanding in the private and public sectors of New South Wales of the importance of innovation in improving the international and interstate competitiveness of New South Wales businesses and in improving public sector efficiency in New South Wales
- provide the Minister and the Department with guidance on issues relevant to the conduct of R&D in New South Wales, having regard to their effect on public and private sector innovation in New South Wales
- advise the Minister and the Department on appropriate Government responses to trends in the provision of education and training, having regard to the impact of those trends on future levels of innovation
- advise the Minister and the Department on activities and programs that promote the demonstration and commercialisation of new technology in New South Wales and, where appropriate, to institute or participate in the institution of, such activities or programs (in a manner consistent with the other functions of the Council)
- promote activities and programs in such a way as to coordinate so far as practicable, those activities and programs with any Commonwealth Government initiatives, the objects of which are similar to the object of the Council
- alert the private and public sectors of New South Wales to any new business opportunities that arise from the exploitation of technology

[9] Mr O'Sullivan, DSRD, Evidence, 8 September 2003, p38

- advise the Minister and the Government on programs that the Government could undertake for the purpose of increasing the ability of new firms in New South Wales, in particular, small to medium size enterprises, to assess technology and to manage innovation
- provide a source of independent advice to the Government in relation to applicants for Government funding under innovation-related assistance schemes administered by the Department.[10]

2.5 In November 1999, the NSW Innovation Council published *Growth Through Innovation – A strategy for NSW*. The Innovation Strategy was developed in order to 'provide a blueprint for making a hallmark of the NSW economy and our industrial base.'[11] DSRD, in referring to the focus on biotechnology in innovation in New South Wales, stated:

> Many Sydney and NSW companies lead the world in their field. The large pool of highly educated and skilled employees includes a high proportion of multilingual graduates. Strategic initiatives for fostering biotechnology industry growth create many opportunities. This unique combination of advantages makes a compelling argument for basing your operations in Sydney and NSW. You'll find yourself in very good company.[12]

BioFirst Strategy

2.6 In August 2001, the NSW Government announced the BioFirst Strategy, with the intent to position New South Wales as a leader in biotechnology and to maximise the social, environmental and economic benefits of biotechnology. The Strategy was allocated $68 million of new expenditure over five years (2001-2006) and covers four programs across four agencies:

- research – BioPlatform (*lead agencies, NSW Health and NSW Agriculture)*
- commercialisation – BioBusiness (*Department of State and Regional Development*)
- a BioEthics Program (*The Cabinet Office*)
- establishment of the BioUnit (*The Cabinet Office*).

2.7 The NSW Government's launch of the BioFirst Strategy, and the formation of the BioUnit within The Cabinet Office, was largely acknowledged in submissions as a positive and welcome policy initiative for New South Wales. BioFirst has placed the biotechnology sector in New South Wales in a better position to develop the interest, investment and resources required for commercialisation. Chapter Three examines the BioFirst Strategy in further detail. BioFirst programs and funding allocations appear at Appendix 2.

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10 Correspondence from DSRD to the Committee, 3 October 2003, p3

11 NSW Innovation Council, *Growth Through Innovation – A strategy for NSW*, November 1999, p2

12 Brochure, DSRD, 'Sydney and New South Wales, Leading Biotechnology in the Asia Pacific', 2001

Minister for Science and Medical Research

2.8 The appointment of a Minster for Science and Medical Research on 2 April 2003 was an important step in strengthening the NSW Government's commitment to science and innovation. The Hon Bob Carr MP, Premier of New South Wales, stated that the new portfolio would:

- maximise the potential of scientific and medical research to deliver quality of life improvements for people with conditions like spinal cord injury, motor-neurone disease, stroke, Parkinson's, Alzheimer's and asthma
- ensure that science becomes one of the key drivers for economic development in New South Wales, attracting national and international investment to biomedical R&D
- chair the Biotechnology Committee of Cabinet
- be responsible for Commonwealth/State negotiations in relation to research funding (eg, Centres of Excellence, National Health and Medical Research Council funding)
- develop a State research and investment strategy that leverages Federal and private funding into areas of State priority.[13]

2.9 Based on submissions to the inquiry, the Committee concludes there is widespread support from the scientific community for the Government's decision to create a NSW Minister for Science. The Minister for Science and Medical Research has the opportunity to identify New South Wales as a leading marketplace for science and innovation, both nationally and internationally.

2.10 Developments in science, technology and innovation are occurring at a significant rate. In this environment the Minister for Science and Medical Research has the opportunity to set the direction for public sector scientific research in New South Wales, and to stimulate appropriate opportunities for commercialisation.

Portfolio responsibility

2.11 The Committee notes that a number of witnesses expressed concern that the Minister for Science and Medical Research held other portfolios, including Energy and Utilities, Assisting the Minister for Health (Cancer), and Assisting the Premier on the Arts. The University of Sydney, in congratulating the NSW Government on the initiative, expressed its concern over the collection of responsibilities:

> This new portfolio adds real value in concentrating State-driven innovative activities in science, technology and medicine. We hope that the sequential conflation of the portfolio, shifting from a 'Science Minister' to a 'Minister for Science and Medical Research' to a 'Minister for Energy and Utilities, Science and Medical Research' does not overly diffuse the focus from scientific and medical research.[14]

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13 Hon Bob Carr MP, Premier, Minister for the Arts, and Minister for Citizenship, 'Carr Announces Minister for Science and Medical Research,' *Media Release*, 9 March 2003

14 Submission 13, University of Sydney, p1

Administrative structure

2.12 In announcing the new Minister for Science and Medical Research the Government stated that responsibility would 'include activity currently being undertaken within the Departments such as Health; Agriculture; State and Regional Development; the Environment Protection Authority and The Cabinet Office.'[15] The Minister for Science and Medical Research does not, however, have a dedicated department to administer science in the public sector. Resources and support to this portfolio appear to function on an ad hoc basis with administrative and advisory support provided by the BioUnit, through The Cabinet Office. The Science and Medical Research portfolio is discussed further in Chapter Four.

Science in the public sector

2.13 Submissions from the public sector, private industry, industry associations and employee groups regard the standard of scientific research conducted in New South Wales, and Australia in general, to be world-class. AusBiotech, a peak body representing the biotechnology industry, stated:

> NSW supports science through an innovative science curriculum, high quality science teachers and lecturers in schools and universities, expert scientists in Cooperative Research Centres and the CSIRO to advance scientific endeavour. This investment in research has resulted in Australia, and New South Wales, having world-class capabilities in scientific research.[16]

Managing commercialisation

2.14 The Director General of NSW Agriculture, Dr Richard Sheldrake, and the Director General of DSRD, Mr Loftus Harris, outlined their Departments' commitments to commercialisation and the structures developed to support researchers. Dr Sheldrake informed the Committee that:

> NSW Agriculture has a clear mandate to pursue commercialisation strategies for appropriate technologies. The Department actively encourages commercialisation revenues, and does in fact make allowances in its budget projections for the generation of intellectual property [IP] and its anticipated commercialisation …
>
> Over the last 10 years the Department has developed a sophisticated system for dealing with commercialisation processes. A legal and commercial technology transfer grid has prepared draft agreements dealing with complex intellectual property issues, including project agreements, licences, copyright agreements, confidentiality agreements and assignment agreements, which must be continually updated to incorporate changes to the law. Each proposal is considered on its own merits and officers are required to submit details of proposals to the project manager and to the legal officers in order that suitable documentation is prepared. The submission lists the commercialisation pathways the Department has adopted, including patents,

15 Hon Bob Carr MP, Premier, Minister for the Arts, and Minister for Citizenship, 'Carr Announces Minister for Science and Medical Research,' *Media Release*, 9 March 2003

16 Submission 38, AusBiotech, p2

> royalties, licences, consultancies, laboratory services, contract research, short courses, publications, use of trade marks and copyright.[17]

2.15 Mr Harris indicated to the Committee that, as DSRD is essentially a business development agency, it took a broader interest in supporting commercialisation:

> We take a keen interest in the earlier stages in terms of science research and development but our particular areas of interest are commercialisation and how to help companies grow to develop a sustainable business.[18]

2.16 The Department's submission to the inquiry stated that:

> DSRD delivers a diversity of programs and undertakes a range of activities to commercialise science and technology, and encourage innovation within industry. The Department has a particular focus on the commercialisation of research, and its use by individual NSW companies to enhance their international competitiveness.[19]

Extent of commercialisation in New South Wales

2.17 The Committee received contrasting evidence in relation to the relative success of commercialisation in New South Wales. While NSW Government Departments and a number of universities reported significant levels of commercialisation, a number of other organisations and witnesses before the Committee stated that commercial opportunities within science and innovation in the public sector are under-utilised. Organisations such as the Federation of Australian Scientific and Technological Societies (FASTS) were not confident that the public sector has the procedures in place to effectively commercialise the results of scientific research. Professor Chris Fell, President, FASTS, informed the Committee that:

> We are very concerned, generally, about the commercialisation of public sector research throughout Australia and particularly in the State of New South Wales. It is relatively poorly handled by international standards. Universities tend to have either specialist arms doing this or handle it through a business office. The ability to secure and get full value from intellectual property [IP] is not as good as it should be, in part because of the makeup of the companies or alternatively the experience of people doing it. Researchers are quite keen to get funds to continue their work but do not consider the long-term implications of leakage of IP.[20]

2.18 While Australia produces innovative science from a small funding base when compared internationally, AusBiotech stated that 'Australia also has a reputation for an inability to commercialise this country's excellence in research, based on the rate of commercial outcomes compared to research opportunities.'[21]

2.19 The Committee observed that a significant amount of what the agriculture sector defines as commercialisation is primarily for public good or industry benefit, rather than direct monetary

17 Dr Sheldrake, Evidence, 18 August 2003, pp2-3

18 Mr Harris, Evidence, 18 August 2003, p33

19 Submission 47, DSRD, p6

20 Professor Fell, Evidence, 8 September 2003, p22

21 Submission 38, AusBiotech, p2

gain. The Committee's visit to the CRC for Sustainable Rice Production (Rice CRC) at Yanco in September 2003 provided a good example of public sector funded scientific research providing benefit to industry and the State through environmental and efficiency gains. The Rice CRC indicated that it aims to:

> provide research, education and technology transfer to underpin the future of the Australian rice industry. The $800 million industry is substantially based in NSW and is vital to the economic health of the Murrumbidgee and Murray regions.[22]

2.20 The Rice CRC informed the Committee that its programs are aimed particularly at improving water use efficiency, managing groundwater accessions, reducing the impact of low temperatures and improving processed rice products. Rice CRC projects have already contributed to better water management by growers and irrigation companies and developed focused education programs to sustain the industry. The Rice CRC, in a submission by the CRC Association (CRCA), outlined the benefits arising from its scientific efforts:

> Outcomes from the Rice CRC program will include contributions to more sustainable irrigation, an average saving to industry of $20 million per annum in reduced cold damage, potentially lower pesticide use, new value added rice products and an educated human resource base.
>
> The Rice CRC has indicated that it has spent $15 million in cash in NSW overall and the value of the CRC to the rice growing region over the life of the CRC has amounted to $60 million in cash and in-kind.
>
> The CRC underpins and supports its SMEs [small to medium enterprises] - the 2,130 rice farmers - who have a combined farm annual income of $1.06 billion, of which $0.5b is due to rice.[23]

2.21 The Committee supports the positive public good impact of research such as that conducted by the Rice CRC. The economic and trade benefits that are derived from this joint publicly and privately funded research are also a positive for New South Wales.

2.22 The Committee considers, however, that there are significant further opportunities for direct commercial benefit from the commercialisation of public sector research. Organisations such as Unitract and Medsaic are promising examples of how State Government support can assist scientists and researchers acquire monetary gain from commercialisation. These companies received Proof of Concept grants from the NSW Government and utilised the research and experience from universities in New South Wales. The majority of profits from such commercialisation are often invested in further research and development (R&D).

2.23 Ms Regina Fogarty, General Manager, Strategic Review, NSW Agriculture, informed the Committee that much of the scientific research conducted by NSW Agriculture is directed towards public good or industry benefit, rather than towards commercialisation:

> A lot of our research funding comes from the industry funding bodies. If you look at the way they fund now compared with even 10 or 15 years ago, they are very much

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22 Submission 19, CRCA, Attachment A – *Value of CRCs to NSW - November 2001, A snap shot from ten of the CRCs with Headquarters in NSW*, p13

23 Submission 19, CRCA, Attachment A, p13

> more farmer-focused driven, so a lot of the research is not pure research heading towards patents or some intricate piece of science that will be expensive for farmers to apply. It is what farmers want, so they are driving a lot of the research and they are looking for research they can apply. So perhaps that issue is less now than it was. When we started to commercialise and make money out of that, that is when it became a big issue, but the way research and researchers in Australia are funded, particularly through those funding bodies, is much more farmer-focused than it would have been in many other industries.[24]

2.24 Dr Richard Sheldrake, Director General, NSW Agriculture, stated that the income stream in any organisation from royalties and IP is relatively small. Rather, Dr Sheldrake informed the Committee:

> The big payback is getting that science and technology adopted, in our case, by the farming sector. That is where the payback to the community is. That goes for both environmental research and production research.[25]

2.25 The Committee's information gathering has identified across-the-board opportunities for commercialisation within publicly funded scientific research. Such opportunities hold the potential for extensive economic, environmental and social benefits for New South Wales:

> In undertaking their environmental responsibilities, agencies within the Environment Portfolio need to ensure that environmental decisions are credible and defensible. Science is fundamental to ensuring that our decisions have this basis.[26]

2.26 In 2001, the NSW Government announced that its focus in science, innovation and commercialisation would be on biotechnology, with the introduction of the BioFirst Strategy, which is considered in the following chapter.

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24 Ms Fogarty, Evidence, 18 August 2003, pp8-9

25 Dr Sheldrake, Evidence, 18 August 2003, p9

26 Submission 50, Environment Portfolio, p1

Chapter 3 BioFirst Strategy

> BioFirst was a tremendous initiative in the sense it was the first step. You have to take your first step and improve and get better and better. It was a fantastic initiative. It was the first step.[27]

The Government's BioFirst Strategy is one part of the wider policy framework needed to support the development of science and innovation. It plays an important role in supporting companies and public sector agencies to conduct research and develop and commercialise innovation in biotechnology and related fields. It is important to ensure that BioFirst is responsive to the needs of the science community and is as effective as possible in meeting those needs.

The BioFirst Strategy

3.1 When launching BioFirst, the Hon Bob Carr MP, Premier of New South Wales, described it as 'the Government's plan to expand and promote the NSW biotechnology industry – one of the fastest growing sectors in the State.'[28] The then Health Minister, the Hon Craig Knowles MP, stated that BioFirst was designed to place New South Wales at the forefront of the biotechnology sector:

> NSW has many natural advantages as a centre for the development of biotechnology. It is already home to the lion's share of biotechnology companies in Australia and enjoys a strong, vibrant and internationally regarded biomedical research community.
>
> Nevertheless, we can never allow ourselves to grow complacent – we must always believe that we can do better and achieve more.
>
> Our focus must be at the global level. We should look beyond our shores and seek to be world leaders in biotechnology. We can do this, and indeed we already are.[29]

3.2 BioFirst was welcomed by the science community as a way of supporting and enhancing New South Wales' capacity for innovation. The Australian Society for Medical Research noted that:

> the NSW BioFirst Strategy, particularly the BioFirst Awards are an excellent vehicle with which to support initiatives intended to improve the social, health, environmental, and economic benefits of biotechnology in NSW.[30]

3.3 BioFirst was also welcomed as an opportunity to raise the profile of biotechnology in New South Wales:

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27 Dr Deborah Kuchler, Chief Executive Officer, BioMed North, Evidence, 10 November 2003, p40

28 Hon Bob Carr MP, Premier, Minister for the Arts, and Minister for Citizenship, 'Carr releases $220 million biotech plan – Includes attracting expatriate Australians for cutting-edge research,' *Media Release*, 15 August 2001, p1

29 Hon C Knowles MP, Minister for Health, Chair NSW Cabinet Committee on Biotechnology, NSW Government, *BioFirst – NSW Biotechnology Strategy 2001*, New South Wales, 2001, p3, *www.biofirst.nsw.gov.au/files/strategy/biofirst-strategy.pdf* (accessed 4 December 2003)

30 Submission 15, Australian Society for Medical Research, p2

> The University of Sydney congratulates the State Government on the NSW Biotechnology Strategy, and BioFirst in promoting the biotechnology sector in NSW.[31]

3.4 Others, such as the Australian and New Zealand Association for the Advancement of Science (ANZAAS), saw the announcement of BioFirst as an important first step, noting that 'ANZAAS strongly supports the announcement of the BioFirst program, and we look forward to it taking shape.'[32]

3.5 As at November 2003, the BioFirst funding of $68 million over five years was allocated as follows:

- $47.3 million – BioPlatform, research
- $16.1 million – BioBusiness, commercialisation
- $1.8 million – BioEthics, provide advice on ethical issues, support the Bioethics Panel, education and awareness raising
- $2.9 million – BioUnit, dedicated biotechnology unit to drive the implementation and ongoing rollout of BioFirst, provides policy advice on biotechnology issues.[33]

3.6 A full list of programs and funding is provided at Appendix 2.

3.7 The Committee notes that no information is publicly available on how the Government determined the funding allocation for each BioFirst program. The Committee is therefore unable to make an informed comment on the reasoning behind the policy decision to allocate two-thirds of the funding to research (BioPlatform), which is almost three times the funding allocated to commercialisation (BioBusiness).

3.8 The Committee is of the opinion, however, that, as the profits from commercialisation are often reinvested into research and development, the percentage of funding allocated to commercialisation should be enhanced.

Effectiveness of BioFirst

3.9 The Committee notes that the BioUnit is charged with ensuring the effective implementation of the BioFirst Strategy by measuring NSW performance in biotechnology and benchmarking it against comparable economic regions.[34] Ms Kerry Doyle, Director of the BioUnit, informed the Committee, however, that the BioUnit has 'not undertaken a formal benchmarking activity

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31 Submission 13, University of Sydney, p8

32 Submission 6, ANZAAS, p6

33 Submission 39, The Cabinet Office, p 2&5; Supplementary submission 39a, The Cabinet Office, p1

34 'The BioUnit will also evaluate the benefits gained through the implementation of Bio*First*. Evaluation will involve a review of the strategy's appropriateness, efficiency and effectiveness … It will also benchmark NSW's performance in biotechnology against that of comparable economic regions in countries such as Canada, Ireland, Israel, Singapore and the USA.', NSW Government, *BioFirst – NSW Biotechnology Strategy 2001*, New South Wales, 2001, p3

at the moment, deeming it too early relative to the roll-out of the strategy to be particularly informative …'[35]

Proof of Concept program

3.10 While no formal evaluation has been conducted, the Committee heard evidence of BioFirst success stories. For example, FLUOROtechnics, a Sydney-based company that develops and manufactures fluorescent compounds and fluorescence-based detection kits for the global biotechnology industry, received funding under the Proof of Concept Program[36] and the Non-Research Establishment Costs/High Growth Business Program.[37] In its submission, FLUOROtechnics described how this funding assisted it with market analysis, intellectual property protection, proof of concept activities, approval for the technology, briefing for management staff and networking events. According to FLUOROtechnics:

> The tangible benefits are clear. FLUOROtechnics has signed a product supply and licensing agreement with the global distributor Amersham …
>
> FLUOROtechnics has grown in a little over 16-months from 1 to 16 members of staff (10 full-time).[38]

3.11 Another success story is Ultrasonic Cardiac Output Monitors (USCOM), a Coffs Harbour-based firm that has developed a safe and non-invasive device that uses sonar technology to accurately measure the flow of blood from the heart. USCOM received funding under the Proof of Concept Program.[39] According to the Chairman of USCOM, Mr Rob Phillips:

> From the point of view of an inventor, having conceived the idea and got the patents in place, I didn't know what to do next. All the big companies knocked me back …
>
> The cash flow wasn't there and the grants allowed us to focus on getting the product ready.[40]

3.12 In October 2003, USCOM won the Global Entrepolis Award at the Asian Innovation Awards in Singapore, where it was selected from 142 companies as the entry that best applied technology to a strong business model.[41] USCOM listed on the stock exchange in December 2003.

3.13 While the science community welcomed the announcement of BioFirst, it is no longer receiving the necessary support from the science community. Some of the programs operating under BioFirst are discussed below.

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35 Ms Kerry Doyle, Director, BioUnit, Evidence, 8 September, p14

36 Supplementary Submission 39a, The Cabinet Office, p8

37 Submission 47, DSRD, p23

38 Submission 57, FLUOROtechnics, p2

39 Supplementary Submission 39a, The Cabinet Office, p8

40 Horan M, 'Boost for biotechs,' *Sunday Telegraph*, 16 November 2003, p109

41 *www.uscom.com.au/news.htm* (accessed 25 November 2003)

BioPlatform

3.14 Of the various programs funded under BioPlatform, three have funding to assist New South Wales research institutes and universities:

- St Vincent's Research Precinct - $20 million over four years
- Westmead Research Hub - $8 million over four years
- BioFirst Awards - $6 million over five years.[42]

St Vincent's Research Precinct

3.15 The St Vincent's Research Precinct is a formal alliance of the Garvan Medical Research Institute, the Victor Chang Cardiac Research Institute and St Vincent's Hospital Research Groups. The alliance involves the extension and refurbishment of existing buildings to provide infrastructure support within the precinct.[43]

3.16 The Garvan Institute is the largest medical research institute in New South Wales. It is internationally recognised as a leader in gene based medical research and focuses on delivering new insights into major diseases and novel ways to prevent and treat these disorders.[44] The Victor Chang Cardiac Research Institute aims to foster understanding of the fundamental mechanisms of cardiovascular biology in health and disease. The Institute conducts research into all forms of heart disease, with a primary focus on the prevention, diagnosis and treatment of heart muscle diseases.[45]

3.17 The St Vincent's Research Precinct will co-locate these world renowned research institutes and St Vincent's Hospital in one state-of-the-art precinct with a shared infrastructure, providing purpose-built laboratories, a biological testing facility and enhanced teaching facilities. It will offer opportunities for future development within the private and public sectors and further strengthen and integrate the links between research, teaching, clinical and patient care.[46]

Westmead Research Hub

3.18 The Westmead Research Hub is a formal alliance of the Westmead Millennium Research Institute, the Westmead Hospital Research Group, the Westmead Children's Hospital and the Children's Medical Research Institute. The project involves providing a facility to meet the growing demand for physical space for research and development.[47]

3.19 The Westmead Millennium Institute is one of Australia's premier, internationally recognised medical research institutes, which focuses on biomedical research in a range of areas.[48] The

42 Supplementary Submission 39a, The Cabinet Office, pp2-3

43 Supplementary Submission 39a, The Cabinet Office, p2

44 *www.garvan.org.au/garvan.asp* (accessed 28 November 2003)

45 *www.victorchang.com.au/institute/birth.html* (accessed 28 November 2003)

46 *www.garvan.org.au/garvan.asp?articleid=701* (accessed 28 November 2003)

47 Supplementary Submission 39a, The Cabinet Office, p3

48 *www.wmi.usyd.edu.au/aboutus/index.html* (accessed 28 November 2003)

Children's Medical Research Institute was founded to perform scientific research to better treat and, where possible, prevent childhood illness and disability. The Children's Medical Research Institute 'explores the very foundation of human development,' which involves 'studying how body cells change from the time of conception.'[49]

3.20 The Westmead Research Hub forms a critical mass of research excellence. The establishment of the Hub will allow the sharing of high technology equipment, human applications laboratories, information technology and bioinformatics, animal care facilities, clinical research centres and further commercialisation of medical research.[50]

3.21 The Government's support for the St Vincent's Research Precinct and the Westmead Research Hub is a positive development. Funding for these two projects totals $28 million of the $68 million available under BioFirst. The Committee understands that, although this funding was allocated in 2001, work on both projects is still 'in the early planning stages.'[51]

3.22 In evidence before the Committee, Dr Mark Bradley, Chief Executive Officer, Australian Technology Park Innovations, stated:

> I think the question to ask is what is the money to be used for, because if it is for infrastructure, that is one thing, but if it is about trying to develop emerging technologies and really trying to capitalise on IP, we cannot wait around for two years for money to be spent. We really need to move fast in this because the world is passing us by.[52]

3.23 The Committee considers the Government's ability to support existing and emerging opportunities in science and commercialisation under BioFirst was hindered when almost 60% of BioPlatform funding was allocated to infrastructure projects that remain 'in the early planning stages.'

BioFirst Awards

3.24 The $6 million BioFirst Awards aim to recruit up to five world-class researchers every year to New South Wales, providing funding for each researcher of $100,000 each year for three years.[53] The initiative aims to 'attract 15 expatriate Australians and international experts to pursue cutting edge research at NSW universities and institutes.'[54] Between 2001 and 2003, five researchers were recruited, two to the Garvan Institute, and one each to the Victor Chang Cardiac Research Institute, the ANZAC Research Institute and the University of Sydney.

3.25 The Committee believes that the BioFirst Awards are a positive initiative. Australian science and innovation must not lose the intellectual capacity that it nurtures and develops.

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49 *www.cmri.com.au/about.php* (accessed 9 December 2003)

50 *www.wmi.usyd.edu.au/aboutus/annual_report_2002.pdf* (accessed 28 November 2003)

51 Supplementary Submission 39a, The Cabinet Office, pp2-3

52 Dr Bradley, Australian Technology Park Innovations, Evidence, 10 November 2003, p20

53 Submission 39, The Cabinet Office, p2

54 Hon Bob Carr MP, Premier, Minister for the Arts, and Minister for Citizenship, 'Carr releases $220 million biotech plan – Includes attracting expatriate Australians for cutting-edge research', *Media Release*, 15 August 2001, p1

Establishing avenues for expatriate Australians to share experiences and impart knowledge is imperative for the continued growth and sustainability of science and innovation in New South Wales.

3.26 The BioFirst Strategy states that 'two of the five awardees must work in the area of 'modern biotechnology'… one in bioinformatics, and no more than three in any one year in health/medical research.'[55] The Committee considers that this initiative should be extended beyond the life sciences to science and innovation in general, encompassing a broader range of disciplines than originally envisaged.

3.27 Throughout the inquiry, the Committee has heard that, in general, money is not the motivator for scientists. Facilities, resources, opportunities, critical mass and most significantly, the science, are the primary motivators. Considering this, the Committee believes that recipients of programs such as the BioFirst Awards must not also have to establish the resources, develop critical mass, and negotiate their way through administrative procedures.

3.28 Much of the evidence presented to the Committee discusses the shortage of Australian scientists with experience in commercialising technology, with the Australian Institute for Commercialisation (AIC) noting that 'Australia has a lack of serial entrepreneurs.'[56] Dr John Nutt, Chair, NSW Division of the Australian Academy of Technological Sciences and Engineering (ATSE), emphasised the significance of international experience in developing commercialisation skills:

> Australians, because of the lack of an industry base of any strength here – you can only teach part of it, but you learn your entrepreneurship by sitting in an environment where it happens, and you learn it best if you sit at the feet of a master or champion who has done it well. To send young Australians overseas to experience that in other environments is a very important aspect of it. The key thing is: How do you get them back? I reckon that governments must take that initiative.[57]

Expanding the BioFirst Awards

3.29 The Committee considers that the BioFirst Awards should be expanded to include not only world-class researchers but also people with international experience in commercialisation.

3.30 The Committee was interested in the evidence presented by Professor Beryl Hesketh, Pro-Vice Chancellor, College of Sciences and Technology, University of Sydney, who described a pilot program introduced by the University:

> This year we piloted an expatriate return fellowship … Our plan was to bring back young Australians, not for a whole year because many of these people have jobs overseas and they do not want to come back permanently, but they do not want to lose contact with Australia. So we put up this program where we bring them back for two to three months over the northern summer period when they do not get paid anyway in a lot of institutions.

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55 NSW Government, *BioFirst – NSW Biotechnology Strategy 2001*, New South Wales, 2001, p17

56 Submission 23, AIC, p2

57 Dr Nutt, ATSE, Evidence, 8 September 2003, p5

> With minimal advertising we put that out before Christmas. I was absolutely inundated with wonderful applications in all sorts of areas, not just from people in research but also from some industry people. It made me realise that there is an incredible resource. Australian expatriates who are scattered throughout the rest of the world in top jobs actually quite like coming back to Australia. We have not got a mechanism for locking them in. Potentially, some BioFirst awards in that area could bring back these young Australians for two to three months. That would be terrific.[58]

3.31 The Committee agrees with Professor Hesketh that such an award 'provides us with the link to those large international facilities, which will help our whole area of research.'[59]

3.32 The Committee supports the creation of an expanded awards program based on the BioFirst Awards. The fact that two and a half years into a five-year program, only five researchers have been recruited is not adequate, considering the depth of talent among expatriate Australian researchers and the eagerness with which they would be welcomed by New South Wales-based organisations.

3.33 The Committee considers that the NSW Government must provide flexible means for expatriate Australians and international scientists to work in New South Wales. The awards should encompass all areas of science and innovation and be open to both research scientists as well as people with experience in commercialisation. They should provide short-term employment opportunities in New South Wales for Australians living overseas. The Committee has addressed this issue in Recommendation 2 below.

BioBusiness

3.34 Of the various programs funded under BioBusiness, five have funding over five years to assist New South Wales companies with commercialisation:

- Proof of Concept Program - $4 million
- High Growth Business Program - $4 million
- Non-Research Establishment Costs Program - $2.1 million
- Biotechnology Precinct - $2.5 million
- Marketing and International Promotion - $250,000.[60]

3.35 The Proof of Concept Program is for businesses receiving funding under the Commonwealth Biotechnology Innovation Fund (BIF). The program allows businesses to test the feasibility of research prior to bringing the technology to market. Funding of $2.9 million has been offered to 32 projects, with financial support of up to $100,000 or 20% of project cost.[61]

3.36 The BioFirst segment of the High Growth Business Program assists established, high growth businesses, while the Non-Research Establishment Costs Program assists non-established

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58 Professor Hesketh, University of Sydney, Evidence, 18 August 2003, p33

59 Professor Hesketh, Evidence, 18 August 2003, p33

60 Supplementary Submission 39a, The Cabinet Office, pp6-11

61 Submission 47, DSRD, p21

businesses. Both programs provide financial assistance for intellectual property protection and licensing, strategic marketing, business planning and developing management capacity. Under both programs funding of $1.5 million has been offered to 88 companies. [62]

3.37 In evidence before the Committee, witnesses suggested that the funding available for commercialisation activities was inadequate, given the high costs of commercialising research ideas in the biotechnology sector. According to Dr Mark Bradley, Chief Executive Officer of Australian Technology Park Innovations:

> Of the $63 million that was allocated, it is my understanding that $20 odd million had already been allocated at the time of the announcement, so that left $40 odd million. There has been some money coming into the bioprecinct here, obviously money goes into the BioBusiness stuff that state and regional areas do, but in terms of actual cash out there for various programs, there is not a lot.[63]

BioPrecinct

3.38 The $2.5 million BioPrecinct is a business incubator program based at the Australian Technology Park (ATP) and managed by Australian Technology Park Innovations. The aim of the incubator is 'to assist companies to fast track the commercialisation of their technologies.'[64] The first stage of the BioPrecinct was completed in February 2003 with the opening of six fully equipped office and laboratory suites in the ATP's Biomedical building. The Treasurer, the Hon Michael Egan MLC, noted that:

> There are more than 60 small to medium-sized biotechnology companies wholly focused on biotechnology in NSW and the key to growing the biotechnology industry is to satisfy the significant demand for facilities that will enable these small companies to develop and commercialise the first-class research.[65]

3.39 While the Committee welcomes this initiative to support small and medium-sized enterprises to commercialise their technologies, the Committee has concluded that the BioPrecinct incubator has not yet met expectations. At the time of the Committee's visit on 10 November 2003, only two of the six suites in the Biomedical building had been occupied.[66]

3.40 The Committee also notes that BioFirst funding awarded to Australian Technology Park Innovations is being paid as rent to the ATP. As the Sydney Harbour Foreshore Authority manages the ATP, this money for the vacant suites is effectively being transferred out of the program. The Committee is of the opinion that payment of funding for facilities that are not providing a current benefit for science in New South Wales reduces the impact of the $68 million originally allocated to BioFirst.

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62 Submission 47, DSRD, pp22-23

63 Dr Bradley, Australian Technology Park Innovations, Evidence, 10 November 2003, p18

64 Hon M Egan MLC, Treasurer, Minister for State Development, and Vice President of the Executive Council, '$3.5 million BioFirst biotech business incubator gets the go ahead,' *Media Release*, 21 August 2002

65 Hon M Egan MLC, Treasurer, Minister for State Development, and Vice President of the Executive Council, 'New labs support biotech companies,' *Media Release*, 5 February 2003

66 Australian Technology Park, site visit by Committee, 10 November 2003, and *www.atp-innovations.com.au/home/profile.asp?DocumentID=651*

Marketing and promotion

3.41 Of the funding available under the BioBusiness program, $250,000 is allocated to marketing and international promotion. Witnesses emphasised the need to actively market New South Wales as a world class science centre. The BioMed North submission in particular emphasised the importance of marketing to the future competitiveness of New South Wales:

> Many cities and large research hubs around the world have taken to profiling and branding to lift the image and status of research and its commercialisation in the community and with politicians. For example, the City of Durham in the USA has branded itself as the City of Medicine; North Carolina has its Research Triangle and A State of Mind; Queensland, the Smart State; and, Singapore 'Biopolis'. Most of these brand names have taken or will take at least twenty years to create. Thus, New South Wales has sufficient concentration of research activities to offer up opportunities for strategic branding and since a well-recognised brand takes years to develop, the process should commence now.[67]

3.42 DSRD described marketing and promotion as 'a key element of the BioFirst strategy,'[68] but this was in relation to marketing and promotion of individual New South Wales-based biotechnology companies, rather than New South Wales as a world class centre of science and innovation.

3.43 The 'Smart State' marketing initiative of Queensland was referred to by a number of witnesses and in submissions, with a number highlighting the importance of marketing and branding in a competitive marketplace.[69] According to BioMed North, BioFirst is failing to market New South Wales as a 'leading destination for science collaboration and commercialisation.'[70]

The BioUnit

3.44 The BioUnit was established within The Cabinet Office as a dedicated biotechnology unit to drive the implementation and ongoing rollout of the BioFirst Strategy and provide advice on biotechnology issues affecting NSW.[71]

3.45 The BioFirst Strategy established the framework for the BioUnit, stating that its outcomes would be:

- high level Government leadership driving implementation and further development of the BioFirst Strategy
- rigorous evaluation of policy and regulatory framework and industry outcomes
- engagement with the community on biotechnology-related issues

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67 Submission 53, BioMed North, pp23-24

68 Submission 47, DSRD, p24

69 Submission 37, ATSE, pp2-3; Submission 45, State Chamber of Commerce (NSW), p3; Submission 10, Dr Merilyn Sleigh, pp1-2; Submission 53, BioMed North

70 Submission 53, BioMed North, p1

71 Submission 39, The Cabinet Office, p2

- increased dialogue among all involved in biotechnology – science, industry, business, finance, manufacturing, government and the community.[72]

Awareness of BioFirst and access to BioUnit

3.46 The Director of the BioUnit considered its accessibility to be an important function:

> We are also fairly active and present at any of the major conferences, seminars so we are available. We have a web site where people's individual inquiries can come in. I have had personal contact with most of the key stakeholders and many of them approach me directly on issues.[73]

3.47 Some stakeholders, such as Australian Technology Park Innovations, indicated their good relationship with the BioUnit. Dr Mark Bradley, Chief Executive Officer, Australian Technology Park Innovations, told the Committee that in his experience the BioUnit was very accessible and that he found the staff 'professional and very competent in what they do.'[74]

3.48 By contrast, other stakeholders emphasised a lack of awareness in the science community of the opportunities available under BioFirst. The University of Technology, Sydney (UTS) noted that:

> The NSW Government has established or supported a number of references to commercialisation vehicles, such as BioLink and BioMed North. It would be good to understand how these vehicles, and others, operate and what is the extent of their roles, given that they have substantial financial assistance from the NSW Government.[75]

3.49 The University of Western Sydney said of the programs operating under BioFirst:

> While commercialisation and research managers might be aware of these programs, there is probably little awareness amongst researchers at the 'coal face.'[76]

3.50 This lack of awareness has led to difficulties in accessing appropriate BioFirst funding programs, as demonstrated in a submission by AusBiotech:

> While NSW has introduced initiatives through its BioFirst Program, the NSW biotechnology community appears to largely not be aware of the activities, resources, outcome and deliverables of the BioFirst Program … awareness, engagement and participation are issues that need to be addressed.[77]
>
> Where various aspects of the BioFirst strategy are being implemented, including the establishment of Clusters or Biohubs, staging of outgoing international missions, and the commencement of outreach programs to regional biotechnology stakeholders, it

72 NSW Government, *BioFirst – NSW Biotechnology Strategy 2001*, New South Wales, 2001, p30

73 Ms Kerry Doyle, Director, BioUnit, The Cabinet Office, Evidence, 8 September 2003, p21

74 Dr Bradley, Australian Technology Park Innovations, Evidence, 10 November 2003, p18

75 Submission 36, UTS, p4

76 Submission 43, University of Western Sydney, p7

77 Submission 38, AusBiotech, p3

> appears that either the community is unable to utilise or access these resources effectively, or they are not being marketed effectively.[78]

3.51 Where there is awareness of funding programs operating under BioFirst, there is confusion among sections of the science community as to the program objectives. Of the $1.5 million allocated to Bioinformatics and Convergence Technologies, Dr Mark Bradley commented that:

> there was money recently released for something that confused a lot of people, and this was called a bioconvergence, biomedical convergence project, and it was really to do with access to the internet and it really didn't seem a very appropriate use of money in many people's opinion. It wasn't very clear to people what was trying to be achieved by that.[79]

3.52 While some stakeholders are aware of the opportunities available under BioFirst and have a good relationship with the BioUnit, the BioUnit does not appear to be adequately engaging with the science community or providing leadership to the biotechnology sector. The Committee is concerned that there is no established system or procedure for accessing the BioUnit, thus hindering the effectiveness of the BioUnit.

3.53 According to AusBiotech, this is undermining broader achievements in biotechnology:

> It appears that awareness of achievements under BioFirst is inadequate and therefore the benefits of what BioFirst has already delivered, or can deliver, is not known in the community. This results in an apparent gap between the achievements of the NSW Government with respect to advancing biotechnology, in comparison to the more aggressively marketed states of Queensland and Victoria.[80]

3.54 The perceived inability of BioFirst to drive innovation in biotechnology, considering that it is now over two years into the five year program, has reinforced the perception that New South Wales is not performing as strongly as other eastern states. ATSE noted that:

> NSW, as the premier financial state in Australia, should lead the nation in innovative ways to commercialise scientific research. However, there is a widespread perception among industry participants that the NSW government is a follower rather than a leader. This perception is reinforced by well publicised initiatives by other states.[81]

3.55 Dr Merilyn Sleigh elaborated on the power of such perceptions to damage the credibility of New South Wales as a centre of scientific excellence:

> There is a widespread perception that NSW is a follower rather than a leader in introducing innovative ways to underpin and foster scientific research and its commercialisation. I am aware that the NSW Government has contributed to many important initiatives in the State, including support for Major National Research Facilities, CRCs etc. However, these initiatives are not seen by many as coming from the well-considered strategic position that appears to drive activities in other States. As

78 Submission 38, AusBiotech, p4

79 Dr Bradley, Australian Technology Park Innovations, Evidence, 10 November 2003, p19

80 Submission 38, AusBiotech, p11

81 Submission 37, ATSE, p2

> a result the momentum building elsewhere for a thriving science-based industry sector is not perceived to be occurring in NSW … In the longer term, this negative perception of NSW, **even if it does not wholly reflect reality**, will damage NSW's ability to attract talented researchers, research funding and infrastructure, and investment capital leading to new jobs and businesses.[82]

Contestability and transparency

3.56 Lack of awareness of the opportunities available under BioFirst, and difficulties in accessing information on these opportunities, has led to a perception that BioFirst is not sufficiently transparent. In its submission, BioMed North recommended reform of BioFirst so that it is 'delivered on a contested basis and is more transparent.'[83] In particular, BioMed North emphasised the need for BioFirst to have a:

> competitive funding mechanism and public transparency so that uncontested selective funding to individual organisations does not occur, as has happened in the past.[84]

3.57 Professor Mark Sceats, Chief Executive Officer, Australian Photonics Cooperative Research Centre, also noted the need for accountability and transparency:

> the Government, I think, should be very clear that it should, through its processes, select winners and be prepared to countenance the challenges of those who have lost in such a process and be strong and to some extent united about it.[85]

3.58 In evidence, Dr Kuchler elaborated on the need for a more 'professional' approach to BioFirst. [86] In answer to a question on whether she had applied for funding under BioFirst, Dr Kuchler replied:

> No, I haven't, but I have gone off overseas. I didn't think BioFirst was big enough actually to tell you the truth, and it is also not run on a competitive basis. They don't have an ad in the paper which says "BioFirst is looking for submissions" or "We have got this grant. When you put a submission in, it is assessed competitively." It is very back-doorish the way you get access to it.[87]

Program criteria and funding

3.59 The majority of submissions commended BioFirst for providing much-needed funding for science and innovation but also suggested the need for a more comprehensive and flexible approach. Unisearch, the commercialisation arm of the University of New South Wales, stated that:

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82 Submission 10, Dr Merilyn Sleigh, p1

83 Submission 53, BioMed North, p21

84 Submission 53, BioMed North, p20

85 Professor Sceats, Australian Photonics CRC, Evidence, 10 November 2003, p9

86 Dr Kuchler, BioMed North, Evidence, 10 November 2003, p36

87 Dr Kuchler, Evidence, 10 November 2003, p35

> The BioFirst programme in our experience offers a number of good opportunities for new businesses to establish themselves by obtaining assistance from the NSW Government.
>
> In relation to assisting the commercialisation of science we would recommend the need to extend the programme to recognise the extended timeframes to bring new scientific research to be a commercial success.[88]

3.60 Professor Beryl Hesketh, University of Sydney, noted BioFirst was a step in the right direction, although contended more flexibility is required:

> I believe that BioFirst assisted, for example, with NANO [Nanostructural Analysis Network Organisation]. I think the BioFirst Awards are useful. They might need to be a little more flexible and a little bigger to help us to attract people back.[89]

3.61 The University of Newcastle suggested more funding is required from the NSW Government for the strategy to fulfil its purpose:

> From the point of view of a University interested in commercialisation, the NSW Government provides little support. The BioFirst strategy is a welcome change in approach for the State, but it is a small contribution compared with the investments of other eastern states.[90]

3.62 The Committee supports the view expressed in these submissions that programs such as BioFirst need to be more flexible in providing support for science and innovation. Flexibility is particularly important if the Government is to foster wide-ranging innovation across all areas of science. The Committee believes that a central coordination body is required and has addressed this issue in Recommendation 3 below.

3.63 In order to make the most of innovation the NSW Government must ensure that flexibility and the ability to adapt to changing circumstances are fundamental aspects of public science policy and programs. This involves recognition that the pace of change in science and innovation has made the BioFirst Strategy alone an inadequate driver of innovation in New South Wales.

Future of BioFirst

3.64 When the NSW Government announced the BioFirst Strategy and established the BioUnit, biotechnology was seen as the area with the greatest scope and potential for commercialisation in Australia, and the area in which New South Wales had a competitive advantage.

3.65 The Committee notes the evidence of Ms Kerry Doyle, Director of the BioUnit, who referred to a wider Government focus than biotechnology:

> it is important to note that the Department of State and Regional Development runs a range of programs that are designed to foster innovation and commercialisation of

88 Submission 8, Unisearch Limited, pp4-5

89 Professor Hesketh, University of Sydney, Evidence, 18 August 2003, p33

90 Submission 34, University of Newcastle, p4

> technology. This [BioFirst] should be seen as a targeted program within a range of other programs, not simply one thing that is occurring in government.[91]

3.66 The majority of submissions to the Committee, however, do not acknowledge 'a range of other programs' offered by the NSW Government. Rather, they call for a more wide-ranging attention to science, technology and innovation:

> Given the relative success of BioFirst, The University of Sydney would like to see this concept expanded to strategically target other areas where research investment would be of benefit to the future development of the State.[92]

3.67 The Committee, having visited areas of regional New South Wales and having considered the evidence before it, understands the perception in New South Wales that there has been a particular focus on biotechnology. It therefore welcomes a move towards broader support for science, technology and innovation, as indicated by Mr John Schmidt, Deputy Director General, The Cabinet Office:

> With the appointment of Minister Sartor to the new portfolio, obviously, the scope of the organisation of the operation has been a broadened BioUnit…So that brief has been expanded following the last election.[93]

3.68 The Committee recommends that the Minister for Science and Medical Research undertake a review of the BioFirst strategy. The review would examine how to create a broadened funding program to provide wide-ranging support for science and innovation. This review should consider the most appropriate allocation of funds to specific areas of focus, including research and commercialisation.

3.69 The Committee supports the view of many stakeholders that a program such as BioFirst needs to be publicly advertised, with clear application criteria and guidelines and fixed application dates. The Committee recommends that funding decisions be made on a transparent basis by an independent body, with the body accountable for its decisions. The results of grant applications and funding allocations should be made publicly available, with unsuccessful applicants provided with feedback on their applications.

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91 Ms Doyle, BioUnit, The Cabinet Office, Evidence, 8 September 2003, p14

92 Submission 13, The University of Sydney, p9

93 Mr Schmidt, The Cabinet Office, Evidence, 8 September 2003, p14

Recommendation 1

That the Minister for Science and Medical Research undertake a review of the BioFirst Strategy to determine how best to broaden the NSW Government's focus on science and innovation. The review should examine the priorities, focus, scope and funding of the BioFirst strategy and develop a new strategy to meet the NSW Government's policy objectives in science, technology and innovation.

The new strategy should include:

- a website providing information on all programs and application processes
- transparent, publicly advertised selection criteria for all programs
- an independent selection panel
- publication of successful applicants and funding allocations
- a feedback process for unsuccessful applicants
- annual evaluation of all programs, and competitive benchmarking to be made publicly available.

Recommendation 2

That the Minister for Science and Medical Research establish an Innovation Awards program. Based on the platform established under the existing BioFirst Awards program, the Innovation Awards would supersede the BioFirst Awards by:

- encompassing all areas of science and innovation
- extending the program to offer flexible short-term postings for Australians living abroad
- including people with significant experience in commercialisation.

An independent and transparent selection panel should be appointed to determine the Innovation Awards.

Chapter 4 A framework and vision for science

The appointment of the first NSW Minister for Science and Medical Research is an essential step in developing the policy framework needed for science and innovation to flourish. The new Minister provides an opportunity to develop a whole of government vision for science and innovation, with special focus on the need to turn Australian innovation into commercial success. For the new Minister to build a strong policy framework and develop the vision, the Minister needs to have the necessary resources, and be supported by leading figures in the science community.

Minister for Science and Medical Research

4.1 The Government's decision to appoint a NSW Minister for Science and Medical Research for the first time has received enthusiastic support from the science community. The Minister has the opportunity to promote New South Wales as a centre of excellence for science and innovation.

Portfolio responsibility

4.2 The Committee supports the establishment of a Science and Medical Research portfolio. Australian Technology Park Innovations noted that:

> The appointment of Frank Sartor as the Minister for Science and Biomedical Research has been welcomed by all and is a major positive development for the sector. It has sent a strong message to the community and the industry about the government's level of commitment to biotechnology.[94]

4.3 Although strongly supporting the creation of the new ministry, many submissions and witnesses suggested that it would be beneficial to have a Minister solely dedicated to the science portfolio.[95] While the Committee notes this concern, it is important to recognise that the Minister for Science and Medical Research is within Cabinet. The Minister for Police and the Minister for Health are the only Ministers within Cabinet with a dedicated portfolio. The Committee considers that it would be an error to view the sharing of science with other portfolios as being of any significant disadvantage to the promotion of science within New South Wales.

4.4 The Committee also notes that the title of 'Science and Medical Research' signals an area of responsibility much broader than biotechnology, which the Committee views as a positive development.

4.5 At present, the BioUnit within The Cabinet Office is the only central coordination body for science within the NSW Government, and as outlined in Chapter Three, the BioUnit has a

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94 Submission 2, Australian Technology Park Innovations, p1

95 Dr John Nutt, Chair, NSW Division, ATSE, Evidence, 8 September 2003, p3; Submission 37, ATSE, p2; Submission 13, University of Sydney, p1; Dr Mark Bradley, Chief Executive Officer, Australian Technology Park Innovations, Evidence, 10 November 2003, p20; Professor Carol Pollock, Director, BioMed North, Evidence, 10 November 2003, p37

discrete focus on biotechnology. Given the scope of the Science and Medical Research portfolio, the Committee considers that the BioUnit is no longer the most appropriate mechanism to support the Government's focus on science and innovation.

Need for a central coordination body

4.6 The Minister for Science and Medical Research requires sufficient resources to administer and promote science in New South Wales. Without these resources the Minister will be unable to set the overall vision for public sector science and innovation in New South Wales or play a coordinating role for science in the public sector. Without sufficient resources, the Minister will also be unable to seize the commercial opportunities presented by the substantial research conducted by publicly funded bodies in New South Wales, of which only a small percentage is currently being commercialised.

4.7 The Committee's investigations have revealed strong support for a coordinating body to oversee the administration of science and innovation in New South Wales. As Dr Doreen Clark, Vice President, Australian Academy of Technological Sciences and Engineering (ATSE), stated:

> I am sure there are other pockets of very good work going on all over the place, but nobody knows what is happening in other places. So the notion of some coordinated office within government that actually knows who is doing what to whom around the place would be a very valuable thing, to get that coordination right, so you are not doing things twice or having people beavering away very diligently but not seeing the big picture.[96]

4.8 Dr Clark's statement was supported by Dr Merilyn Sleigh:

> There is a strong need for co-ordination of activities across Departments within this single strategic framework, analogous to co-ordinating structures at the Federal level, so that the State Government can be seen to speak with a single voice on science and innovation issues.[97]

4.9 Professor Mark Wainwright, Deputy Vice Chancellor (Research), University of New South Wales emphasised the advantages of a coordinating body in applying for Federal funding:

> I think it would be better for all funding bodies in Canberra – and they are diverse for a wide range of activities, such as CRCs, major national research facilities, centres of excellence, federation fellows, et cetera – if we could get a more coordinated approach through one government ministry which could then help us through the others.[98]

4.10 In support of a new coordinating body, Professor Chris Fell, President of the Federation of Australian Scientific and Technological Societies (FASTS), maintained that the commercialisation of public sector research in New South Wales has been poorly handled by

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96 Dr Clark, ATSE, Evidence, 8 September 2003, p4

97 Submission 10, Dr Merilyn Sleigh,p2

98 Professor Wainwright, University of New South Wales, Evidence, 18 August 2003, p16

international standards, and added: 'we would see benefit in there being a State body that looks after commercialisation, to give the critical mass.'[99]

4.11 The Committee supports the view that the Minister needs a broadened administration and policy coordination body to assist the Minister in promoting and supporting science and innovation in New South Wales. For the purposes of this report the Committee has referred to this body as a Ministry for Science and Innovation.[100] The Committee considers that the Government is best placed to determine the necessary resources to administer the new portfolio.

4.12 The Committee notes the importance of retaining the administration of scientific research within discrete government portfolios, as is the current arrangement. This will allow government departments to retain their expertise in their areas of focus, and facilitate direct contact between stakeholders and departments. The Committee is of the opinion that the Minister for Science and Medical Research will play a coordinating role for scientific research in government departments, ensuring effective liaison and communication between agencies, without hindering the effectiveness of current research arrangements.

Recommendation 3

That the Minister for Science and Medical Research establish an administration and policy coordination body within the science portfolio with sufficient resources to assist the NSW Government to meet its policy objectives. That the administration of scientific research remain within each Government portfolio with the proposed body to provide coordination, liaison and effective communication across portfolios.

Chief Scientist

4.13 The Committee considers that in addition to the leadership provided by the new Minister for Science and Medical Research, the New South Wales science community would benefit from having a leading scientist to act as their representative in Government. This representative would be a Chief Scientist, who would act as a conduit between Government and the science community.

Why do we need a Chief Scientist?

4.14 Submissions to the Committee highlighted the advantages that New South Wales has in attracting leading scientists, researchers, business and investment - the key components for successful commercialisation. Mr Loftus Harris, Director General, DSRD, spoke of these advantages in evidence before the Committee:

99 Professor Fell, FASTS, Evidence, 8 September 2003, p22

100 The proposed body is referred to in this report as the 'Ministry for Science and Innovation' for ease of usage only. This does not reflect a predisposition on the part of the Committee towards any particular structure for the new body.

> One of the most important factors for New South Wales lies in that commercialisation area, because with 70% of national financial institutions based in New South Wales, with the venture capital groups essentially based here, and expertise in intellectual property protection based in New South Wales, it is part of a continuum that provides a national benefit.[101]

4.15 Complacency, however, is considered a real barrier to scientific research and its commercialisation in New South Wales. A number of submissions and witnesses before the Committee cited such complacency in the lack of support provided by the NSW Government for science and innovation.[102]

4.16 The perception by sections of the science community that New South Wales is complacent may, in part, be due to the absence of a science representative in the NSW Government. Dr Shanny Dyer, Team Leader, Commercialisation, University of Technology, Sydney (UTS), expressed concern that there is insufficient knowledge and understanding of science in lead agencies such as the BioUnit and DSRD:

> There was a level of duplication in what the DSRD was doing and the other body that was being brought in to supposedly coordinate the work. That brought in bureaucrats who did not understand the play. I think that was a mistake. It could have worked well, but you need the right people in there.[103]

4.17 Dr Merilyn Sleigh noted how a New South Wales science representative could change perceptions of complacency:

> To develop a sense of cohesion and momentum for the NSW science community, as well as to drive external perceptions, NSW needs a single high profile political figure to lead the State's science and technology momentum …[104]

4.18 The Executive Director of FASTS, Mr Thomas Gascoigne, noted that there is a science representative in government in other states and at a national level:

> We have a chief scientist nationally, Robin Batterham, and he plays a major role in being a focus of attention for science, being a conduit between the scientific community and government … Queensland has a chief scientist, Dr Joe Baker, who is also the ACT Commissioner for the Environment. He does that on a part-time basis. Victoria has engaged a firm of four people as chief scientist. That group is headed by John Stocker, who was CEO of CSIRO before Malcolm McIntosh. Gus Nossal, who was president of the Academy of Science, is another member of that team. That firm is called Foursight and it is engaged as the chief scientist of Victoria. New South Wales might consider having a chief scientist to act in this conduit role between the scientific community and the government itself.[105]

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101 Mr Harris, Evidence, 8 September 2003, p42

102 See Professor Brien Holden, Chief Executive Officer, Cooperative Research Centre for Eye Research and Technology, Evidence, 18 August 2003, pp42-43; Submission 33, FASTS; Submission 37, ATSE, and Submission 53, BioMed North.

103 Dr Dyer, UTS, Evidence, 8 September 2003, p60

104 Submission 10, Dr Merilyn Sleigh, p2

105 Mr Thomas Gascoigne, Executive Director, FASTS, Evidence, 8 September 2003, p24

4.19 BioMed North strongly supported the appointment of a Chief Scientist of New South Wales. According to Dr Deborah Kuchler, Chief Executive Officer, BioMed North:

> The Office of the Chief Scientist is essentially an office that brings together a lot of competitive parties to work on one project which works to the benefit of all parties that will make them more efficient.[106]

4.20 Professor Carol Pollock, Director, BioMed North, in explaining the benefits of a Chief Scientist, noted that 'if there was a person who we could say, "Can you deal with two or three different Ministers and get them on the same wavelength," it would make our job much easier.'[107]

4.21 Participants at the Committee's Cooperative Research Centre Forum of 21 October 2003 also strongly supported the need for a science representative in Government, and recommended the appointment of a Chief Scientist of New South Wales.[108]

4.22 The Committee envisages that the Chief Scientist's primary role would be to act as a source of knowledge and advice within Government and to facilitate a two-way flow of information between Government and the science community. The creation of a Chief Scientist position would:

- give the Government access to expert advice on science and innovation
- keep the Government aware of the ongoing and emerging issues in the science community
- raise awareness in the science community of the issues facing Government, including its functions, available resources and constraints on action
- promote linkages between Government, science and industry.

4.23 Considering the strength of support for a Chief Scientist of New South Wales, the Committee is of the opinion that the Minister for Science and Medical Research must address this issue as a priority. By appointing a Chief Scientist of New South Wales, reporting directly to the Minister, the Committee considers that it will, in part, address the perception of Government complacency as well as the lack of sufficient scientific knowledge in public administration.

4.24 As with the new Minister, a Chief Scientist would require sufficient resources to undertake the position. The Committee recommends that an Office of the Chief Scientist be established within the Ministry for Science and Innovation to support the work of the Chief Scientist. The Office would be under the responsibility of the Ministry for Science and Innovation, ensuring coordination between the work of the Office and the Ministry.

4.25 In order to address the concern raised by some stakeholders that New South Wales is perceived to be lagging behind the achievements of other states, the Committee considers that the Office of the Chief Scientist should quantify the true extent of scientific efforts and programs in NSW public sector organisations. The Committee believes that the Office of the

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106 Dr Kuchler, Evidence, 10 November 2003, p37

107 Professor Pollock, Evidence, 10 November 2003, p37

108 Minutes of Working Groups, CRC Forum, Parliament House, 21 October 2003

Chief Scientist should have an important role in marketing and promoting the quality and level of scientific activity in New South Wales.

Recommendation 4

That the Minister for Science and Medical Research establish an Office of the Chief Scientist. The Chief Scientist should report directly to the Minister for Science and Medical Research. The primary role of the Chief Scientist would be to act as an advisor to Government, as well as a conduit between the science community and the Government.

Administrative structure of Ministry for Science and Innovation

4.26 The administrative structure of the new Ministry for Science and Innovation is critical in building a supportive policy framework for science and innovation. The Committee notes the existence of departments of innovation in various forms in other States. Mr John Schmidt, Deputy Director General, The Cabinet Office, identified the factors which need to be taken into account when establishing a new administration body:

> There is an interesting tension when determining structures within government, as to whether you set up a discrete department by itself or whether you try and adopt the model that we have here, which is linked to a central agency level but which is able to go across all government agencies. There are ups and downs. There is danger, if you have a discrete agency, that it can become siloed in the way it operates and it can have its focus clearly delineated between agencies that have their own turf. On the other hand, if you have a broader approach there is a possibility for the strategy to spread more evenly across all those agencies that may be doing scientific research, medical research or whatever the target area is for the Government at the time. So there are arguments for and against different structures. But, ultimately, it is a matter for the Government.[109]

4.27 Considering Mr Schmidt's evidence, the Committee acknowledges that the Government is best placed to determine the structure of the Ministry for Science and Innovation referred to in Recommendation 3.

Ministerial assistance in establishing new Ministry

4.28 In deciding on the most appropriate structure for the Ministry for Science and Innovation, and in implementing the Committee's other recommendations, the Committee recognises that the Minister will require assistance from the science community. Dr Merilyn Sleigh recommended that the Government:

> Engage leaders in setting and driving the strategy – NSW is home to many individuals who have taken leading roles in fostering science and innovation nationally (eg Peter Wills, Bill Ferris, Tim Besley etc). Bring these leaders into a single, high level body to

[109] Mr Schmidt., Evidence, 8 September 2003, p15

> help the Government develop the vision, overcome parochial concerns and "sell the vision" to the science and business communities to make it happen.[110]

4.29 This view was supported by scientists who attended the Committee's Cooperative Research Centre Forum, who suggested the establishment of a scientific advisory committee to provide advice to the Minister and the Premier on research and commercialisation.[111]

4.30 The Committee recommends that the Minister put in place a mechanism to facilitate the free flow of advice from the science community in the form of a Science Leadership Group. The Science Leadership Group would include expert representatives from the NSW Government, the science, technology and innovation sector, the NSW Council of Cooperative Research Centres, and the education sector. The Group would advise the Minister when reviewing the Committee's recommendations, with a particular focus on establishing a Ministry for Science and Innovation.

4.31 Beyond the establishment phase, the Group would act as an independent resource providing at-call advice to the Minister on issues of strategic importance to New South Wales, when requested to do so by the Minister. The Group would provide immediate high-level advice on issues as and when they arise. This capacity is critical considering the rapid pace of change in science and innovation, and the speed at which issues emerge and assume strategic importance. The creation of the Group would ensure that Government has access to the highest quality scientific advice when making decisions of long-term importance to New South Wales.

4.32 In the longer term, the proposed Chief Scientist of New South Wales would chair the Science Leadership Group. This would bring more scientific expertise into Government and further the consolidation of a core of scientific expertise within the Office of the Chief Scientist. The location of the Science Leadership Group within the Office of the Chief Scientist would also assist in cooperation and communication between Government and the science sector.

4.33 The Committee does not envisage that the Group would be involved in policy development or community consultation, which would remain the responsibility of the Innovation Council. In the proposed framework, the role of the Science Leadership Group would remain distinct from that of the Office of the Chief Scientist and the Innovation Council:

- Innovation Council – primary body for policy development and community consultation
- Office of the Chief Scientist – central locus of expert scientific opinion within Government
- Science Leadership Group – at-call advice on issues of strategic importance as they arise, additional scientific knowledge in Office of the Chief Scientist.

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110 Submission 10, Dr Merilyn Sleigh, p2

111 Minutes of Working Groups, CRC Forum, Parliament House, 21 October 2003

Recommendation 5

That the Minister for Science and Medical Research convene a Science Leadership Group with a short-term role advising the Minister when reviewing the Committee's recommendations. The Science Leadership Group's primary function would be to oversee the implementation of the proposed Ministry for Science and Innovation. The Group should consist of, but not be confined to, representatives from:

- NSW Government
- science, technology and innovation sector
- environmental sciences
- NSW Council of Cooperative Research Centres
- education sector.

That, in the long-term, the proposed Chief Scientist chair the Science Leadership Group to provide the Minister with high level advice on issues of strategic importance to New South Wales.

Innovation Council

4.34 As outlined in Chapter Two, the Innovation Council provides Government with advice on programs and initiatives promoting science and innovation. The members of the Innovation Council represent all areas of the science community, from research to education to industry to venture capital. A full list of current members is provided at Appendix 3.

Opportunities for the Innovation Council

4.35 Dr Doreen Clark, Vice President, ATSE, suggested that the Innovation Council has been under-utilised by Government in policy development, for example, with the BioFirst strategy:

> I was a member of the New South Wales Innovation Council for four years, and during that time I do not think we produced anything of value. The BioFirst initiative happened over there, without really any consultation with the Innovation Council.[112]

4.36 Dr Clark went on to suggest that the Innovation Council has not had the resources or support to function effectively, stating 'it just did not have any oomph, push, guts, or whatever you want to call it.'[113]

4.37 The passivity of the NSW Innovation Council contrasts with what is happening in other States. The work of the Queensland Innovation Council is described by Dr Deborah Kuchler, Chief Executive Officer, BioMed North, and a former member of the Queensland Innovation Council:

112 Dr Clark, ATSE, Evidence, 8 September 2003, p4

113 Dr Clark, Evidence, 8 September 2003, p5

> When Mr Beattie came up with Smart State they came to the Innovation Council and said: Okay, you tell us, Innovation Council, what is a Smart State. That was a 12 month job, to define what is a Smart State, and once the Department got that document back from the Innovation Council, they then work on it, refining it and they keep working and bring it back to the Innovation Council in 12 months time and say: This is where we are at and say do you still think this is what a Smart State is.[114]

4.38 Dr Kuchler went on to describe the functions of the Queensland Innovation Council. These include forming working groups on particular issues, which produce 10-12 policy papers per year with recommendations for Government action. These recommendations consider the benefits and disadvantages of different policies, and are based on consideration of what is happening elsewhere in the world as well as extensive community consultation.[115]

4.39 The Committee agrees with Dr Clark of ATSE that the NSW Innovation Council has been under-utilised as a resource for policy development and community consultation. The Committee considers that the Innovation Council should become an integral part of a new framework to support science and innovation in New South Wales, as it has the potential to be a highly effective mechanism for community consultation and policy development.

Shift of responsibility for Innovation Council

4.40 The Minister for State and Regional Development is currently responsible for the NSW Innovation Council, with DSRD providing administrative support. The Committee is of the opinion that with the appointment of the Minister for Science and Medical Research, responsibility for the Innovation Council should shift from the Minister for State and Regional Development to the Minister for Science and Medical Research.

4.41 This shift would assist the Minister for Science and Medical Research in creating a centralised coordination body to administer science and innovation in New South Wales. This shift would also assist the NSW Innovation Council in becoming a dynamic policy development body, supporting and promoting science and innovation in New South Wales.

4.42 Coming under the responsibility of the new Minister for Science and Medical Research would provide the Innovation Council with an opportunity to work with the Minister to fulfil its potential. Considering the depth of talent, expertise and commitment evident among the Council's membership, the Committee recommends that the Minister take an active role in engaging with the Innovation Council and supporting it to fulfil its potential.

Recommendation 6

That the responsibility and administration of the NSW Innovation Council transfer from the Minister for State and Regional Development to the Minister for Science and Medical Research.

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114 Dr Deborah Kuchler, BioMed North, Evidence, 10 November 2003, p39

115 Dr Kuchler, Evidence, 10 November 2003, pp38-39

State vision for science and innovation

4.43 There is general agreement in the science community that New South Wales requires a vision for science and technology. BioMed North noted that 'existing scientific efforts and programs within NSW Public Sector organisations lack a common vision and the starting point for reform should be an accepted whole of State vision.'[116]

4.44 Dr Merilyn Sleigh also advocated a 'Big Vision' for New South Wales, recommending that the Government:

> Develop a whole-of-government vision and strategy to guide government investment in science and science-based industry development, with a 10 year time horizon. We need a Big Vision for NSW in Science that matches our pre-eminence in other areas.[117]

4.45 The Committee is of the opinion that, in addition to establishing a supportive framework, the Minister needs to develop and articulate a clear vision for science and innovation in New South Wales.

4.46 In evidence Mr John Schmidt, Deputy Director General, The Cabinet Office, warned of the dangers for government in 'picking winners:'

> In a broad sense the Government must be careful that it is not in the process of running a business or directing where research might go. The Government's job is to get an environment that fosters research and, on occasion, provides funding and other resources that might give people a boost where they might have had some deficiencies. Putting people in contact with other people working in the same field is one of the prime thrusts of the new alliance between the eastern jurisdictions. There is a tension that if government becomes too hands on it can be seen as directing research away from other areas, and that might not be appropriate. The Government is not there necessarily to pick winners. In fairly competitive circumstances it should offer grants or other assistance that might be of benefit to organisations that come up to a mark when that money is being made available.[118]

4.47 Notwithstanding this valid point, the Committee is of the opinion that it is vital for New South Wales to have a state-wide vision for science and innovation and believes it is possible to develop one that avoids this pitfall. The Committee supports the sentiments expressed in a report examining science and innovation in the UK:

> The Government needs to be an effective investor, facilitator and regulator. But we need to be clear what this commitment to active public policy means. It does not mean going back to a situation where Government attempted to pick winners. We have learned costly and important lessons about the limitations of the state as a direct investor in companies and as a manager. But equally we have learned that the market alone will not generate the basic investment in research, the networks and the public

116 Submission 53, BioMed North, p11

117 Submission 10, Dr Merilyn Sleigh, p2

118 Mr Schmidt, The Cabinet Office, Evidence, 8 September 2003, p15

> confidence needed for innovation to prosper. Standing to one side and doing nothing will not deliver in the knowledge-driven economy.[119]

4.48 This vision must be flexible and have the capacity to evolve, allowing New South Wales to keep up with, or be ahead of, the pace of change within the international scientific community. This is critical in ensuring the international competitiveness of New South Wales' science, technology and innovation.

4.49 Given the pace of change, the Government cannot necessarily predict where breakthroughs in science and technology will be made. This is demonstrated by photonics, for example, which is now one of Australia's most promising innovation areas:

> So often, the things that emerge as the most successful are things that, to be truthful, we would not necessarily have even picked or thought of, for instance, the work that Redfern Photonics has done. I am sure that all the members of the Committee are keenly and clearly aware of all the issues surrounding photonics, but we may not have actually determined that photonics was an area of higher prospectivity.[120]

4.50 Participants at the Committee's CRC Forum emphasised the risk involved in narrowly-focused research, as such research is too reactive.[121] Professor Pollock, Director, BioMed North, noted the need to have broad-based support for science and innovation in order to keep up with the pace of change:

> I think a good idea is a good idea. You might look at biotechnology as being the next wave of opportunity that is coming through. We will always be behind if that is all we focus on and we do not focus on nanotechnology, et cetera. There are going to be opportunities that spring out of nowhere and we have to encourage that.[122]

4.51 Commercialisation across a number of areas in science and technology is currently being pursued in New South Wales. New South Wales is seen, by those involved in the sciences, as having particular strengths in areas other than biotechnology, for example, in information and communications technology (ICT)[123] and in the convergence of science and technology, for example in biomedical engineering:

> That interaction between medicine and science – life science and engineering – will really drive a lot of future research.[124]

4.52 In setting a vision for science in New South Wales, Professor Pollock noted that 'if you think too narrowly you will miss out on opportunities.'[125] In fact, there are dangers with setting priorities that are either too broad or exclusionary:

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119 UK Department of Trade and Industry, *Excellence and opportunity: A science and innovation policy for the 21st century*, p11, *www.ost.gov.uk/enterprise/dtiwhite/index.html* (accessed 28 November 2003)

120 Mr Loftus Harris, Director General, DSRD, Evidence 8 September 2003, p45

121 Minutes of Working Groups, CRC Forum, Parliament House, 21 October 2003

122 Professor Pollock, BioMed North, Evidence, 10 November 2003, p36

123 Professor Mark Wainwright, Deputy Vice Chancellor (Research), University of New South Wales, Evidence, 18 August 2003, p14

124 Professor Wainwright, University of New South Wales, Evidence, 18 August 2003, pp24-25

125 Professor Pollock, BioMed North, Evidence, 10 November 2003, p36

> The question remains however as to the need and value for setting very broad priorities and conversely what happens to those unfashionable areas which can give rise to novel ideas and technologies.[126]

4.53 The need for a more coordinated strategic direction for science and innovation is not unique to New South Wales. The rapid development of technology and innovation has proven a challenge for governments internationally.

4.54 The Committee supports the view of participants at the Committee's CRC Forum, who noted that the vision must intersect with the State's competitive advantages, as well as be informed by expert scientific opinion.[127] Dr Merilyn Sleigh is one of many who believe that a strategic vision for New South Wales needs to 'build on our current strengths.'[128]

4.55 In setting strategic priorities for science and innovation in New South Wales, the Minister for Science and Medical Research must strike a balance between focusing on promising areas of strength, while ensuring that priorities remain broad enough to provide for opportunities to emerge.

Science – a different 'business'

4.56 DSRD made it clear that it does not treat commercial opportunities from the science sector any differently to those from other industries or sectors.[129] There is a strong argument against requiring DSRD to have different approaches to different industries. Such an approach may prevent the Department from maintaining its focus on the commercial development of New South Wales as a whole.

4.57 There is a strong argument, however, for facilitating access to Government through a single point of contact for those involved in scientific research. This single point of contact would assist researchers with the commercialisation process from an early stage, by helping scientists to access funding assistance and support. The Ministry for Science and Innovation would be best placed to perform this role. This body would be in a better position to provide expert advice on intellectual property management, industry investment and Federal government programs.

4.58 In encouraging commercialisation of public sector research, the NSW Government must change the way it administers science and innovation by developing a stable and transparent policy framework to facilitate access to Government. The Government must also recognise that most researchers do not have the requisite skills to commercialise their discoveries, and that Government has an important role in developing these skills, and in removing what researchers see as the current impediments to commercialising their work.

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126 Hopper K and Thorburn L, *2002 BioIndustry Review – Australia & New Zealand*, p45

127 Minutes of Working Groups, CRC Forum, Parliament House, 21 October 2003

128 Submission 10, Dr Merilyn Sleigh, p2

129 Mr Loftus Harris, Director General, DSRD, Evidence, 8 September 2003, p47

Chapter 5 Encouraging commercialisation

This chapter examines the impediments to commercialisation of public sector science research and the means identified by which the Government can assist in removing these impediments. Central to encouraging the commercialisation of science is the need for science and technology to have more prominence in the community generally, and for the achievements and potential in the sciences and technologies to be properly recognised, encouraged and rewarded. The imperative to commercialise is a relatively new challenge. The Committee believes that the measures put forward in Chapter Four will provide the platform to meet these challenges.

Barriers to commercialisation

5.1 The pursuit of innovation through science has unique characteristics. These characteristics need to be recognised by Government in developing the policy platform to assist that innovation. The Committee recognises that often the driver behind individuals undertaking research is discovery, as indicated by Professor Beryl Hesketh, Pro-Vice Chancellor, College of Sciences and Technology, University of Sydney:

> Researchers are motivated by the sheer joy of discovery and the lengths that they will go to to continue to be able to do that is sometimes quite remarkable.[130]

5.2 While discovery may provide the initial impetus to pursue science, other considerations may emerge as scientists progress, as Professor Jim Piper, Deputy Vice-Chancellor (Research), Macquarie University, indicated:

> What drives students, interestingly enough, is that they are usually pretty much curiosity-motivated in the first place. That is what drives them to do high-degree studies. I think they become progressively aware of the potential outcomes.[131]

5.3 Mr Thomas Gascoigne, Executive Director, Federation of Australian Scientific and Technological Societies (FASTS), referred the Committee to a national survey undertaken by FASTS,[132] which asked scientists why they were not commercialising their work:

> Interestingly it was not as though there was a mountain between them and commercialisation; it was like bumpy foothills. As they got over each hurdle another was looming. First, they had to sort out what to do about the IP and then they might have to sort out the venture capital. Then they might have to work out an arrangement with their employer, if they work for a public sector research agency.[133]

5.4 The survey revealed that commercialisation of science seemed to be at a relatively immature stage in Australia. While progress has been made, these predominantly cultural barriers remain. Therefore, if the Government is to encourage commercialisation, it is appropriate that

130 Professor Hesketh, University of Sydney, Evidence, 18 August 2003, p28

131 Professor Piper, Macquarie University, Evidence, 18 August 2003, p55

132 T Gascoigne & J Metcalfe, *Scientists commercialising their research*, FASTS Occasional Paper Series, No 2, April 1999, w*ww.fasts.org/Fsite/News/reports/occasionalpapers/occ_paper_two.pdf* (accessed 25 September 2003)

133 Mr Gascoigne, FASTS, Evidence, 8 September 2003, p23

a sufficient level of public administrative and infrastructure support is provided to assist public sector researchers to overcome these hurdles.

Intellectual property management

5.5 Intellectual property (IP) management was identified throughout the inquiry as an issue requiring further attention. The Australian Institute for Commercialisation (AIC) stated that:

> A major impediment to technology-based innovation is proper management of IP. Clear ownership and exploitation rights are needed if IP is to be successfully commercialised.[134]

5.6 The FASTS survey indicated that researchers did not feel they had the requisite skills to properly identify and value IP they were producing:

> Scientists find it difficult to put a value on their IP, or even to recognise when they have discovered something of value. They can over-value IP, and have difficulty in defining or valuing IP when it comes to public good research.[135]

5.7 The impact of government policy on IP management has become evident throughout this inquiry. The University of Technology, Sydney (UTS), is encouraged to commercialise its research, indicating in its submission that:

> The University of Technology Sydney Act 1989 [NSW], states that 'the University may exercise commercial functions comprising the commercial exploitation or development … of any facility, resource or property of the university or in which the University has a right or interest … whether alone or with others.'[136]

5.8 This was also raised by Dr Deborah Kuchler, Chief Executive Officer, BioMed North:

> Seven years ago the Commonwealth Government changed the legislation and brought about policies which said that universities had to commercialise their IP, so the [Business Liaison Office, University of Sydney] is now highly successful.[137]

5.9 The Committee took evidence from the main NSW Government agencies involved in science and medical research regarding their approach to IP management. Dr Richard Sheldrake, Director General, NSW Department of Agriculture, stated that:

> Over the last 10 years the Department has developed a sophisticated system for dealing with commercialisation processes. A legal and commercial technology transfer grid has prepared draft agreements dealing with complex intellectual property issues, including project agreements, licences, copyright agreements, confidentiality agreements and assignment agreements, which must be continually updated to incorporate changes to the law. Each proposal is considered on its own merits and officers are required to submit details of proposals to the project manager and to the

134 Submission 23, AIC, p5

135 T Gascoigne & J Metcalfe, *Scientists commercialising their research*, p7

136 Submission 36, UTS, p1

137 Dr Kuchler, BioMed North, Evidence, 10 November 2003, p31

> legal officers in order that suitable documentation is prepared. The submission lists the commercialisation pathways the Department has adopted, including patents, royalties, licences, consultancies, laboratory services, contract research, short courses, publications, use of trade marks and copyright.[138]

5.10 Ms Robyn Kruk, Director General, NSW Department of Health, advised the Committee of the Department's IP policy objectives:

> The Department has developed a comprehensive intellectual property policy for health research undertaken within the public health system. It recognises the value of this research and the important role of public health organisations in the acquisition and dissemination of research, knowledge and skills. The objects of the policy are: firstly, to encourage health research in the public health system and the acquisition and dissemination of knowledge and skills; secondly, to manage intellectual property with potential commercial value in a manner which benefits the public health system as a whole; third, to foster an environment within which intellectual property issues can be identified and developed; and finally—and I think this is a critical aim—to recognise and reward innovation by staff of public health organisations and so to provide the right incentive structure.[139]

5.11 The Committee recognises the significant efforts made by NSW agencies to develop and implement IP policies. It also recognises that Government must, however, make improvements in areas where difficulties continue to arise.

5.12 One key difficulty brought to the attention of the Committee is that of inconsistencies in approach to IP management between organisations involved in research and commercialisation collaborations. In particular, a number of submissions and witnesses referred to the difficulties experienced when negotiating with NSW Health to commercialise health and medical research.[140] This is a significant issue, given the move towards greater collaboration that characterises much research now undertaken.

5.13 The Committee has identified the need for Government Departments to implement consistent IP management policies in relation to commercialisation as a major priority for the NSW Government. The Committee believes that the Government needs to be proactive in ensuring that, in collaborations with other agencies, Departments have a consistent and transparent approach in IP negotiations. As Professor Chris Fell, President, FASTS, stated:

> It is up to the Government to give leadership to both sides to come up with sensible compromises that will work at the State level. These are all State instrumentalities, both the universities and the health system.[141]

5.14 The Committee recommends that the Government develop intellectual property management and contract guidelines to assist public sector organisations to identify and manage intellectual property.

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138 Dr Sheldrake, Evidence, 18 August 2003, p3

139 Ms Kruk, NSW Department of Health, Evidence, 19 September 2003, p2

140 Submission 8, Unisearch; Submission 36, UTS; Dr Kuchler, BioMed North, Evidence, 10 November 2003, p31

141 Professor Fell, FASTS, Evidence, 8 September 2003, p28

Recommendation 7

That the Minister for Science and Medical Research develop intellectual property management and contract guidelines for adoption across all agencies in the New South Wales public sector.

Commercialisation skills and industry knowledge

5.15 Commercialisation is a relatively new imperative for the public sector. Therefore, the opportunity for scientists to gain training and experience in commercialisation has been limited.[142] On its site visit to Wagga Wagga, the Committee held discussions with scientists engaged in public sector research. During those discussions, researchers indicated that there was uncertainty over what could be commercialised, particularly in situations where they are conducting what is largely seen as public good research. This has been echoed in other evidence to the Committee. For example, Ms Kruk, Director General, NSW Health, indicated that in a Research Australia survey:

> only half of health and medical researchers said that they knew how to go about getting help if they identified commercial potential in their research.[143]

5.16 The notable exception that has come to the attention of the Committee during the inquiry has been the Cooperative Research Centre (CRC) Program. Chapter Six of this report examines the CRC Program and the opportunities it presents. Support for organisations in the commercialisation process is discussed at paragraph 6.59.

Incentives

5.17 A number of universities provide direct incentives by channelling funding back to the units where the research originated. The University of Newcastle, for example, allocates 50% of the net benefit from commercialisation to the staff involved, 25% is allocated to the department from where the commercialised research was derived, and 25% goes to The University of Newcastle Research Associates (TUNRA), the University's commercialisation arm.[144] NSW Agriculture also indicated that it offers 'incentives in terms of the program within the department where [scientists] might be working.'[145]

5.18 While the majority of witnesses and submissions have stated that financial reward is secondary to the science and discovery, recognition of individual effort is nevertheless an important issue. Mr Robert Lewis, Executive Director, South Australian Research and Development Institute (SARDI), informed the Committee of the challenges presented by the issue of rewards for scientists in the public sector:

142 T Gascoigne & J Metcalfe, *Scientists commercialising their research*, pp5-7

143 Ms Kruk, NSW Department of Health, Evidence, 19 September 2003, p1

144 Submission 34, University of Newcastle, p3

145 Dr Sheldrake, NSW Agriculture, Evidence, 18 August 2003, p5

> We try to do rewards through de facto ways by letting people go to conferences, redirecting some of the revenue streams we get into increased capacity in the various laboratories, et cetera, with increased material, et cetera, but we hope in the not too distant future we would like to have a contemporary intellectual property management and commercialisation policy which would have attached to it an inventor reward policy …
>
> We think we are successful in being able co-locate, collaborate, change the culture and the skilling of our people so they recognise there is benefit gained through both the traditional publication as well as through technology transfer and commercialisation, which is really a learning journey that people have to go on.[146]

5.19 The Committee enquired whether NSW Government agencies and the major universities in New South Wales provide direct incentives to staff to commercialise their research. Professor Mark Wainwright, Deputy Vice-Chancellor (Research), University of New South Wales, referred to the incentives provided by the University and its commercialisation arm, Unisearch:

> we at the university have a history of being quite generous to our staff in relation to the commercialisation of research. In other words, Unisearch assists in the research through costs, patents and so on, and then shares the results of that commercialisation with the inventors. That is a university policy that is handled by Unisearch. I think some government departments have not been so enlightened in this area. That is one of the issues for us. I think you will get greater commercialisation of research if you can be more generous to scientists on the outcomes.[147]

5.20 In NSW Government agencies there is no mechanism in place to directly reward researchers for commercialisation. However, Dr Richard Sheldrake, Director General, NSW Agriculture, informed the Committee that:

> [We] do not offer personal incentives … It is certainly recognised in the promotional possibilities within the research scale that they are employed on. They are employed on a scale called the Research Scientist Qualification …[The Research Scientist Classification Committee] takes account of and recognises things like royalties and patent applications in their application when they are being assessed for their grading.[148]

5.21 The Research Scientist Classification is designed to recognise the importance and value of science in the public sector by providing a career structure for research scientists employed in the public service. There are currently three levels within the Classification – Research Scientist, Senior Research Scientist and Principal Research Scientist. Entry to the Classification, and progression and continuation within the Classification, is subject to peer review. Entry to the Classification is open to research scientists in all fields of scientific research, including novel, innovative fields.

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146 Mr Lewis, SARDI, Evidence, 10 November 2003, p23

147 Professor Wainwright, Evidence, 18 August 2003, p17

148 Dr Sheldrake, Evidence, 18 August 2003, p5

5.22 The Australian and New Zealand Association for the Advancement of Science (ANZAAS) recommended the addition of another, higher level of reward within the existing Research Scientist Classification, in order to:

> provide greater incentive to attract and retain outstanding scientists ... [and] provide a means of acknowledging the achievements of the very best scientists in the public sector.[149]

5.23 The Committee supports this approach to the recognition of excellence in research, and recommends that the Research Scientist Classification be reviewed. The review is necessary in order to ensure that the increasing onus on scientists to commercialise their research is reflected appropriately in rewards available to them. A structure that requests scientists to be entrepreneurial must reward that entrepreneurship.

Recommendation 8

That the NSW Premier's Department initiate discussions with the relevant employee organisations and public sector agencies to review the Research Scientist Classification, Policy and Guidelines, or equivalent classification. The review should examine the viability of amending the Classification to further acknowledge and reward excellence in science, technology and innovation in the public sector, in particular, commercialisation.

Leveraging Federal funding

5.24 Some researchers seeking appropriate commercial outcomes for their research have expressed frustration with the lack of NSW Government support, in a competitive environment, when applying for Federal grant funding. Professor Peter Booth, Deputy Vice-Chancellor, Academic, UTS, stated that there is no doubt that the Queensland Government support of companies seeking to access Federally funded research initiatives in the past few years has directed research grants to Queensland:

> They have by leveraging up enabled their universities to tap sources of funds that we cannot tap because most of the large funds require some level of industry or other money. We have to put in university money and someone else's money. Queensland did that by putting in State money. We are trying to get industry bodies together to coordinate a deal. Beattie put $5 million on the table and they get grants. We find that very frustrating.[150]

5.25 Professor Wainwright stated that this lack of support in leveraging for Federal funding indicated a lack of coordination across NSW Government agencies:

> One of the issues in New South Wales is that research organisations and universities do not have a real focus or anywhere to go to obtain help, in particular in relation to the leverage of funding. A lot of Federal Government funds are available …

149 Submission 6, ANZAAS, p3

150 Professor Booth, UTS, Evidence, 8 September 2003, p56

> I think we need a co-ordinating role with some funding for leverage in the last round for centres of excellence and major national research facilities.[151]

5.26 Based on the evidence to the inquiry, the Committee considers that there is a need for New South Wales to step-up its involvement in leveraging federal funding. The Government can play a pivotal role in attracting research and commercialisation funding to New South Wales. Committing Government funds alone, however, does not guarantee success. The Hon Frank Sartor MP, Minister for Science and Medical Research stated that 'New South Wales must do better. We must work smarter and fight harder for a bigger share of the research funding cake.'[152]

5.27 The Commonwealth has a number of programs providing funding for research and development and for commercialisation. These include:

- Research Infrastructure Block Grants Scheme
- Australian Research Council (ARC) Grants
- National Health and Medical Research Council (NHMRC) Grants
- Major National Research Facility (MNRF)
- National Centres of Excellence
- Cooperative Research Centre (CRC) Program
- The Building on Information Technology Strengths (BITS) Incubator program
- Commercialising Emerging Technologies (COMET) program
- R&D Start
- Biotechnology Innovation Fund (BIF) program

5.28 These Federal programs provide funding across a range of sciences and technologies in various industries and sectors, and they are targeted variously to publicly funded research organisations and agencies and to the private sector, or to a combination of these.

5.29 In order to maximise the funding available to New South Wales based organisations, there needs to be a greater focus on assisting organisations to identify the appropriate programs for their needs, and proactively attracting those funds to New South Wales:

> Perhaps the most important point is the role of the NSW Government in helping the universities to leverage funding from the Commonwealth. We have examples of success there with NICTA and the major national research facility (MNRF) so there have been good examples where the State Government has assisted us. As we move now into the next version of Backing Australia's Ability, it will be crucial that we are all very quick-footed in taking whatever advantages might emerge out of the submissions currently being put forward to the five different reviews related to research being undertaken by the Commonwealth Government. That whole-of-State, team approach from New South Wales is something we would really welcome so that

151 Professor Wainwright, University of New South Wales, Evidence, 18 September 2003, pp15-16

152 Hon Frank Sartor MP, Minister for Science and Medical Research, Legislative Assembly, *Hansard*, 3 July 2003, p2861

> we can make sure that we leverage as much money as possible out of the Commonwealth Government for all sorts of components of research, from the basic infrastructure through to the funding of research.[153]

5.30 The proposed Ministry for Science and Innovation and the Office of the Chief Scientist, as recommended in Chapter Four of this report, would provide the necessary resources and support to assist researchers and organisations in New South Wales access Federal programs.

Science in Parliament

5.31 In addition to policies and programs that address issues within the science community, the Committee has been provided with much evidence of the need for Government to have a leadership role in promoting the wider benefits of science and innovation to New South Wales. As has been stated to the Committee:

> Perhaps the single biggest obstacle to adopting technology as an economic development driver is getting both science and science commercialisation attention in parliament. Such parliamentary attention is needed both for policy adoption and financial support and is not currently given due to the lack of understanding and knowledge of the portfolio by parliamentary ministers. Both the Commonwealth Parliament and the Queensland State Parliament have addressed this issue and have made significant progress in solving it by delivering over the past three years, a "Science in Parliament" program which brings scientists and science commercialisation experts into the parliament on sitting days. A social mixing process has seen the transfer of understanding from both sides, whereby the scientists and commercialisation experts get to understand the machinery of parliament and ministers get to understand the process and value of science and its commercialisation. The educating of Ministers on science commercialisation matters has been crucial to the passing of the Smart State initiative in the Queensland parliament.[154]

5.32 The science community strongly supports the national Science Meets Parliament Day, and would be very supportive of a state-based program.[155] During the CRC Forum at Parliament on 21 October 2003, representatives of Cooperative Research Centres listed an annual 'NSW Science in Parliament' day as a measure to better the understanding of both scientists and Members of Parliament, as well as closing the perceived gap between the science community and the general population.

5.33 In evidence to the Committee, FASTS commented that:

> The State Government could benefit greatly from having this interaction with scientists. It is not the case of scientists lobbying members of Parliament, it is about sharing knowledge and ideas. It is a useful two-way flow of information.[156]

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153 Professor Hesketh, University of Sydney, Evidence, 18 August 2003, p27

154 Submission 53, BioMed North, pp21-22

155 Submission 33, FASTS, Submission 6, ANZAAS, Submission 19, CRCA, Submission 53, BioMed North, Submission 37, ATSE.

156 Dr Darryl O'Connor, Secretary, FASTS, Evidence, 8 September 2003, p32

5.34 For both the Queensland and Federal events, the government and parliament work with a number of representative organisations to bring scientists and politicians together to discuss current and emerging issues in the sciences.

5.35 Given the strong support from the science community, the Committee proposes that New South Wales initiate its own Science in Parliament program. This could be conducted in association with those organisations involved in the Commonwealth event, as well as providing for the opportunity to tailor the program for the New South Wales science community.

5.36 Based on the feedback provided in evaluations of both the Federal and Queensland Science in Parliament days[157] and additional information provided by FASTS, the Committee believes that the day should adopt a key theme of relevance to New South Wales. The NSW Science in Parliament Day should have the direct support and involvement of the Premier, the Minister for Science and Medical Research and the NSW Chief Scientist. It should encourage the active participation of all Members of Parliament, scientists from all disciplines, teachers and students.

Recommendation 9

That the NSW Government initiate an annual NSW Science in Parliament day. A parliament sitting day should be devoted for the purpose, and should incorporate:

- a theme for the day
- the involvement of all Members of both Houses of Parliament and the Parliament's Presiding Officers
- the involvement of the NSW Chief Scientist
- a focus on scientists meeting with parliamentarians, with formal and informal opportunities for networking
- attendance by young scientists, teachers and students
- effective communication between government and the science community prior to, during and after the event
- an evaluation process to ensure the future success of the initiative.

Education

> [I]n the longer term it is not just the issue of producing more scientists to assist in commercialisation, it is an issue about raising the general awareness of what sciences are about and can deliver, and having that science awareness in the minds of lawyers, businessmen and other people in the community. It gives an opportunity to improve

157 Queensland Science in Parliament Interdepartmental Working Group, *Science in Parliament Final Report 2002,* and *www.fasts.org.au*

> the awareness of what science can do and how science does it and also improve the uptake of new ideas and technology.[158]

5.37 A theme that has emerged during this inquiry is the significance of education to science and innovation in New South Wales. The Committee recognises the importance of long-term intergenerational support for science and commercialisation, which can be fostered through education, as the ATSE submission stated:

> The basis of a strong science and engineering based community is a sound foundation at primary school, building on it at secondary school with further extension at the tertiary level. Without this, there is little hope of producing entrepreneurs to commercialise scientific discoveries.[159]

Primary and secondary science programs

5.38 The quality of students' education is seen as integral to their future interest in science and innovation and potential involvement in science-based careers:

> Attention needs to focus on the schools science experience. The teaching of science and mathematics in schools by science and maths teachers and their fostering of student interest in science and maths are also an important contributor to future industry needs.[160]

5.39 This has been comprehensively examined in a national review of teaching and teacher education conducted by a Review Committee chaired by Professor Kwong Lee Dow, Deputy Vice Chancellor, University of Melbourne. The first phase of the review focused on issues related to attracting and retaining teachers of science, technology and mathematics. The second phase focused on developing an innovative capacity in students and a culture of innovation in schools. The Review Committee's report, released in November 2003, recommends a range of actions to achieve these ends.[161]

5.40 The evidence presented to the Committee, together with the findings of the national review of teaching and teacher education, have highlighted a number of issues that need to be addressed if New South Wales is to be successful in its aim to foster innovation.

5.41 For school students, the main issues that need to be addressed are the decline in student participation in core science subjects such as physics, chemistry and biology. ATSE argued that: 'The school system in New South Wales, at all levels, is failing to stimulate students to study science, engineering and technology related subjects.'[162]

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158 Dr O'Connor, FASTS, Evidence, 8 September 2003, p22

159 Submission 37, ATSE, p6

160 Submission 21, Science Industry Australia, p4

161 Information on the Department of Education, Science and Training Review of Teaching and Teacher Education, the Interim and Final Report are available at *www.dest.gov.au/schools/teachingreview* (accessed 8 October 2003 and 1 December 2003)

162 Submission 37, ATSE, p5

5.42 A key strategy for addressing this decline is to educate students about the diverse, and rewarding, range of science-based careers. As Dr Wallace Bridge outlined in his submission to the inquiry, this could involve:

> highlighting in primary and secondary school curricula more positive views on how scientists and science benefit the community and economy and how scientists can enjoy many varied and financially rewarding career paths.[163]

5.43 Dr Doreen Clark, Vice-President, ATSE, noted that while there is an excellent K-6 syllabus, there are insufficient primary school teachers in science, technology and mathematics.[164] It has been recognised that there is an immediate need for additional training in these specialist areas for primary and secondary school teachers.[165]

5.44 Evidence to the Committee has been strongly supportive of the approach that some other States have taken. As part of its Smart State vision, the Queensland Government is implementing a number of strategies to address the decline in the number of students pursuing careers in science and technology. Some of these strategies include:

- establishing Technology, Maths and Science Centres of Excellence in schools
- starting a Science on Saturday program, an out of school science program for students 7 to 14 years of age
- educating young people about careers in science and technology, through camps, mentoring programs, career expos, and the Smart Future website which profiles a range of science and technology careers
- raising community awareness, through the Queensland Museum's Science Roadshow and the Queensland University of Technology Innovation Train.[166]

5.45 A New South Wales strategy for science education could incorporate elements of the Queensland school science education strategy, but also build on successful New South Wales initiatives such as the NSW Literacy and Numeracy Plan 2001-2003.[167] The Plan, which focuses on improving the basics, has been recognised as highly effective in improving literacy and numeracy skills. Key principles of the Plan could be used to underpin an effective science education strategy, such as:

- creating a supportive, purposeful and stimulating learning environment
- supporting teachers through professional development and training

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163 Submission 7, Dr Wallace Bridge, p1

164 Dr Clark, ATSE, Evidence, 8 September 2003, p7; the shortage has also been identified in the Department of Education, Science and Training National Review of Teaching and Teacher Education, *www.dest.gov.au/schools/teachingreview* (accessed 1 December 2003)

165 Department of Education, Science and Training National Review of Teaching and Teacher Education, *www.dest.gov.au/schools/teachingreview* (accessed 1 December 2003), p111

166 See *Investing in Science: Research, Education and Innovation*, Queensland Department of Innovation and Information Economy, 2003

167 The NSW State Literacy and Numeracy Plan 2001-2003, *www.curriculumsupport.nsw.edu.au/literacy/files/Lit_State_Literacy_2001-03_v18.pdf* (accessed 8 October 2003)

- targeting students who need additional support and encouraging high performing students to excel
- developing effective partnerships with parents and the wider community.

5.46 The Committee has addressed this in Recommendation 10 below.

Teacher education and professional development

5.47 The NSW Government has recognised the need to have sufficient suitably qualified science and technology teachers in New South Wales schools:

> Ensuring the future supply of quality teachers is one of the key challenges facing the New South Wales Government and governments across Australia and, in fact, right across the developed world … That is why the Government is implementing a series of measures to address potential teacher shortages before they occur.[168]

5.48 For example, Accelerated Teacher Training Programs have been introduced to encourage people with science and technology related experience and education to become teachers. The programs target:

> people with related qualifications, industry knowledge and expertise who would make excellent teachers in the areas of mathematics, science or technology, specialising in either industrial arts, food technology, computing studies or agriculture.[169]

5.49 The programs, offered through Charles Sturt University, the University of Newcastle and the University of Sydney, combine both face-to-face and online delivery of teacher training. Graduates of the program receive one of the following qualifications, depending on the discipline:

- Bachelor of Education (Technology and Applied Studies)
- Bachelor of Education (Mathematics)
- Bachelor of Education (Design and Technology)
- Bachelor of Science/Diploma in Education (Secondary). [170]

5.50 The Department has also received an Australian Research Council Linkage grant to research the design and implementation of systemic, sustainable, school-based teacher professional development for Kindergarten to Year 6 (K-6) teachers in Science and Technology using e-learning approaches. The project is being conducted over a three year period, and the expected outcomes are:

- sustainable, systemic, future-oriented model for teacher self-renewal in K-6 Science and Technology. Such a model will integrate a recently recognised paradigm change

168 Hon John Watkins MP, Minister for Education, Legislative Assembly, *Hansard*, 14 March 2003, p521

169 NSW Department of Education website, *www.det.nsw.edu.au/employment/teachnsw/acc_ttp.htm* (accessed 19 November 2003)

170 NSW Department of Education website, *www.det.nsw.edu.au/employment/teachnsw/acc_ttp.htm* (accessed 19 November 2003)

(embedding professional development in teachers' day to day work in school communities, collaboratively with outside experts) with the growing exploration of e-learning contexts for professional development

- A set of e-learning solutions for professional development in K-6 Science and Technology, together with the case study records of how they were generated.[171]

5.51 In addition to such initiatives, the Committee believes that the Government should conduct an education review that takes into consideration the recommendations of the national Review of Teaching and Teacher Education. The Committee also believes that direct involvement between the Minister for Education and the Minister for Science and Medical Research is necessary to ensure that science and innovation are further promoted in the New South Wales education system.

Recommendation 10

That the Minister for Science and Medical Research and the Minister for Education convene a government taskforce to determine the direction of science and technology education in New South Wales. The taskforce would, in light of the National Review of Education:

- identify strategies for attracting and retaining quality science and technology teachers
- review the New South Wales science and technology curriculum for K-6 and Year 7-12
- develop a science awareness program within New South Wales schools.

Higher education

5.52 The Committee has been provided with much evidence of the extensive involvement of universities in developing and commercialising intellectual property. Universities have encouraged students at the post-graduate level to be involved in research, either within the university or with a research partner, that is being, or will be, commercialised.[172]

5.53 Given that many contributors to this inquiry have stressed the importance of developing skills and interest as early as possible in science students, the Committee believes that more attention could be paid to students at the undergraduate level. Dr Wallace Bridge indicated in his submission that:

> The traditional education of the average Australian research scientist involves the study of scientific fundamentals at undergraduate level and a more focused and specialised study of scientific fundamentals at postgraduate level. Most science based PhD graduates, have undertaken formal tertiary study for a minimum of 7 years, yet during that period the majority will never have had exposure to any commercial aspects of science.

171 Department of Education website, *www.det.nsw.edu.au/research/currentprojects/e_learning.htm* (accessed 19 November 2003)

172 Professor Piper, Macquarie University, Evidence, 8 September 2003, p55

> The Australian and state governments then expects these graduates to find research jobs in government funded research agencies or industry and before long come up with discoveries that are ready for commercialisation.[173]

5.54 At present, undergraduate and postgraduate students undertaking science studies may not be receiving the necessary business training to prepare them for the process of commercialisation. According to Dr Bridge, 'those graduates who are successful in creating science based businesses will have had to develop their business acumen and entrepreneurial mindset on the job.'[174] Dr Bridge stated that the sort of skills these students will require include:

- strategic communication and negotiation
- financial principles and metrics
- high technology business models
- planning and management
- intellectual property management
- government regulations and administration and
- legal contracts and agreements.[175]

5.55 The Committee recommends that the NSW Government approach the Federal Government with a proposal to introduce a co-funded business studies module within undergraduate science courses in selected New South Wales universities. The Committee considers that the module, if implemented, should be reviewed within five years to determine the appropriateness of an advanced module for postgraduate courses.

Recommendation 11

That the NSW Government approach the Federal Government with a proposal to introduce a program to co-fund a business studies module within undergraduate science courses in selected New South Wales universities.

173 Submission 7, Dr Wallace Bridge, p12

174 Submission 7, Dr Wallace Bridge, p12

175 Submission 7, Dr Wallace Bridge, p12

Chapter 6 Seizing opportunities

The science and innovation sector in New South Wales has been lacking the necessary resources to take advantage of commercial opportunities that exist. The Committee believes that by implementing the recommendations of this report and harnessing the opportunities of the Science and Medical Research portfolio, the NSW Government will provide the necessary platform for both public and private sector researchers and businesses to realise these opportunities. This chapter examines the different models of support for commercialisation, including those currently in operation and those that may be used in future.

Opportunities for commercialisation

6.1 Submissions to the inquiry indicate that a substantial amount of scientific research is being undertaken throughout public sector agencies in New South Wales. In the areas of agriculture, health, manufacturing, engineering and technology, and energy and utilities, scientific research is being conducted internally, across agencies and across industries.

6.2 Realisation of the commercial potential of these endeavours, however, is not so evident. The Cooperative Research Centre Association (CRCA) noted that:

> A major criticism levelled at Australian scientific research is that ideas and inventions developed here are lost to overseas interests, with little or no benefit returning to Australia. A second major criticism is that Australian researchers are isolated from the needs and demands of industry.[176]

6.3 In their submission to the inquiry, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) stated that successful commercialisation of scientific research requires:

- specialised skills responding to changing requirements
- world class facilities, in some cases virtual or by extension
- financial support embedded with entrepreneurial discipline
- shared market knowledge including on a global scale
- specialised innovation sector services infrastructure, and
- world class IP regulatory framework.[177]

6.4 CSIRO referred to these as components of 'naturally emerging industry clusters that enable new entrants and technologies to compete successfully by leveraging focus and expertise.'[178] According to CSIRO, if government can stimulate these aggregating industry clusters it has the potential to 'improve industry networked collaboration; strategic R&D; access to finance, training and recruitment; specialised services; and global market intelligence.'[179]

176 Submission 19, CRCA, p3

177 Submission 35, CSIRO, p11

178 Submission 35, CSIRO, p11

179 Submission 35, CSIRO, p11

Clusters

6.5 The Committee received a number of submissions that supported the value of clusters to science and innovation, in particular, to the commercialisation process. A United Kingdom parliamentary report on clusters defined them as 'geographic concentrations of interconnected companies, specialised suppliers, service providers, companies in related industries, and associated institutions.'[180] Dr Merilyn Sleigh described clusters as the 'geographic focus for science':

> It is generally agreed that clustering of research, research infrastructure, research commercialisation and new and existing businesses is the most effective means to develop the critical mass needed for a self-sustaining enterprise community.[181]

6.6 The United Kingdom report by Lord Sainsbury, Minister for Science, cited the critical factors for cluster development:

- strong science base
- entrepreneurial culture
- growing company base
- ability to attract key staff
- availability of finance
- premises and infrastructure
- business support services and large companies in related industries
- skilled workforce
- effective networks
- supportive policy environment.[182]

Significance of clustering

6.7 It is widely agreed that clusters are an important component for the successful commercialisation of the results of scientific research.

6.8 In its submission to the Committee, CSIRO referred to the significance of clusters for Australian industries and technologies if they are to be competitive in global markets.[183] The Australian Business Foundation made a similar statement in its submission:

> Clusters go some way to meeting the challenges of scale that can inhibit Australia's economic development. Clustering blends nimbleness of small firms with the broadly based capacities that would otherwise require much larger organisations and as such

180 Lord Sainsbury, *Biotechnology Clusters*, August 1999, p3

181 Submission 10, Dr Merilyn Sleigh, p2

182 Lord Sainsbury, Minister for Science, *Biotechnology Clusters*, United Kingdom, August 1999, p4

183 Submission 35, CSIRO, p11

> offers a valuable mechanism for the successful commercialisation of scientific research.[184]

6.9 ATSE highlighted clustering as a mechanism through which government influence can create positive outcomes in the commercialisation of science and the delivery of innovation.[185] Professor Mark Sceats, Chief Executive Officer, Australian Photonics Cooperative Research Centre (CRC), referred to the relocation of CRC activities from the University of Sydney campus to the Australian Technology Park (ATP), Redfern:

> I cannot emphasise how important that culture shift of taking a university group from a campus into an environment like the technology park has been. It is the thing that has caused 80 per cent of the spin-off companies to come from one research group. One research group has given rise to eight spin-off companies. I think that is a remarkable thing, and why, it is because of the environment, the creation of that cluster that we have here.[186]

6.10 During a public hearing at the ATP, Dr Deborah Kuchler, Chief Executive Officer, BioMed North, referred to the significance of scale:

> When you have a physical entity recognised as a hub, you start to bring about a cultural change where the people in that start to think collaboratively. In the absence of that formerly recognised hub, people do not think collaboratively. They think very much in silos. No-one is forcing them to think collaboratively.
>
> For example, in Queensland Peter Beattie said 'here will be no Government grants going to anyone unless I get four or more institutions collaborating, so forget it.' That is how he got collaboration to work.
>
> When you say let us have this large physical area and let us go and create a brand name like the Australian Technology Park, and when we go for tendering things, let us go under that brand name as a collaborative force, at the Commonwealth level if you have a collaborative project you will get funding way over head. It is very difficult to get a single entity project funded by the Commonwealth Government. So once you say this area will be a hub, first of all it takes on its brand name, it takes on a profile, the people within it start to relate to it, they want to make that work, they think of projects that will make it work, they can go for Government grants which are collaborative, and it is also a show case, so when people come you can show them something.[187]

6.11 Dr Kuchler, however, stated that New South Wales does not yet have the necessary infrastructure for collaboration:

> when we have a delegation come into New South Wales, we don't really have anything to show them.
>
> When I was in Berlin we went to Berlin Bauch, which is a very large, $600 million technology park that they built outside Berlin and it involves a hospital, a university, a

184 Submission 16, Australian Business Foundation, p4

185 Submission 37, ATSE, p3

186 Professor Sceats, Evidence, 10 November 2003, p2

187 Dr Kuchler, Evidence, 10 November 2003, pp34-35

> huge thing, and you think 'wow'. So you can bring them here [ATP], but this is still only tiny, on a world scale this technology park is fairly tiny.[188]

Risks to the success of clusters

6.12 While a number of submissions referred to the advantages of clustering for the purposes of commercialisation, many also acknowledged that it has generally been unsuccessful in Australia. For example, Dr Sleigh noted that:

> New South Wales has some opportunities to further foster clustering which is emerging at the ATP, Westmead, and North Ryde but at present none of these areas is physically linked with a major, consolidated research activity.[189]

6.13 Dr Doreen Clark, Vice President, ATSE, referred to the lack of infrastructure support and a long term strategy to ensure the success of clustering:

> The Australian Technology Park, very nicely funded in its establishment, is now more a real estate activity than a technology park. The Sydney Harbour Foreshore Authority took over under circumstances that were probably less than ideal. The technology-driven aspect to it has not gone by any means but is subjugated to the idea of an industrial park; a real estate type of thing.[190]

6.14 The Committee recognises the significance of clusters to the long-term growth and sustainability of innovation in New South Wales. It is, however, concerned that terms such as 'clusters', 'hubs' and 'precincts' have been used quite liberally, often with little justification. Dr Mark Bradley, Chief Executive Officer, Australian Technology Park Innovations reinforced the Committee's view while appearing before the Committee on 10 November 2003:

> I have spoken and written extensively on clusters and the view I have promulgated is I do not believe we have clusters yet in Australia. It is a word that is often misused.[191]

6.15 In describing impediments to the establishment of meaningful clusters in Australia, the University of Western Sydney asserted that:

> Australia suffers generally from the 'syndrome' where every state and every university wants to have the same types of programs and support as every other state and university.[192]

6.16 AusBiotech highlighted that there appears to be a growing number of 'hubs' in New South Wales and that 'there is a general perception that "fragmentation" of limiting resources may be occurring and therefore there is a need to "manage" these activities in NSW.'[193] Clearly,

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188 Dr Kuchler, BioMed North, Evidence, 10 November 2003, p35

189 Submission 10, Dr Merilyn Sleigh, pp4-5

190 Dr Clark, ATSE, Evidence, 8 September 2003, p11

191 Dr Bradley, Australian Technology Park Innovations, Evidence, 10 November 2003, p15

192 Submission 43, University of Western Sydney, p6

193 Submission 38, AusBiotech, p3

duplication of programs is counter-productive as it 'militates against the development of 'critical mass' in specific locations.'[194]

6.17 Managing the 'connectivity' of emerging clusters and bio-hubs was identified by AusBiotech as a major issue in terms of utilisation of resources and opportunities.[195] Delegates at the Committee's CRC Forum supported the concept of 'cluster-to-cluster' relationships, which recognised the emergence of various 'hubs' of sciences and technologies and the need to establish networks between these.[196]

6.18 Dr Clark informed the Committee that the coordination of infrastructure development could foster the formation of clusters in New South Wales:

> As I understand it the ability to fund infrastructure for those groups is not covered by the Commonwealth or by the State. Our fellow who advised on that topic thought that the State could step in and make clustering a priority in some of its support mechanism.[197]

The role for government

6.19 The Committee is of the opinion that the NSW Government must provide the necessary strategic direction and planning for the creation of innovation clusters in New South Wales, of significant scale, to ensure critical mass is developed.

6.20 Given the importance of fostering a commercial culture in science and innovation the Committee considers that the NSW Government should provide incentives that would allow for significant growth in infrastructure as well as encourage geographic networks. It is equally important that these incentives not only be in the form of a grant or subsidy.

6.21 Many submissions to the inquiry stated that infrastructure and facilities were a significant issue for many start-ups and small to medium enterprises. Mr Duncan Veal, Chief Executive Officer, FLUOROtechnics, informed the Committee that:

> For a company that is moving from start-up to SME I feel the only area that requires more attention is to provide incentives for installation of plant for manufacturing of high value products. Currently, we are going through the financial pains of establishing a world-class biotechnology production facility.[198]

6.22 The Committee considers that the NSW Government should examine the feasibility of introducing a loans scheme for start-up companies and small to medium enterprises for the purposes of purchasing or building facilities and equipment. Loan applicants would be required to submit a detailed and independently costed business plan to a government selection panel. The business plan should be a comprehensive planning document that clearly describes the business development objective of an existing or proposed business.

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194 Submission 43, University of Western Sydney, p6

195 Submission 38, AusBiotech, p4

196 CRC Forum, Working Group, Parliament House, 21 October 2003

197 Dr Clark, ATSE, Evidence, 8 September 2003, p11

198 Submission 57, FLUOROtechnics, p2

6.23 As the Committee believes that the Government should only lend against the value of the asset, it recommends that the repayment plan be flexible and long-term recognising that it takes up to ten years for a new innovation company to become profitable.[199]

Recommendation 12

That the Minister for Science and Medical Research consider introducing an infrastructure loans scheme for start-up companies and small to medium enterprises in the New South Wales science, technology and innovation sector. That the loans be:

- strictly for the purposes of purchasing, or building, facilities
- determined on the viability of a business plan submitted to a government selection panel
- made available with a flexible repayment plan, subject to the business plan.

That the size of the loan be subject to the viability of the business plan and the value of the asset, which would be held as security by the Government until the loan was repaid.

Cooperative Research Centre Program

6.24 Established in 1990, the CRC Program is a Federal Government initiative for promoting collaborative research between industry, research organisations, education institutions and government agencies. There are 71 CRCs across Australia, 16 of which are currently headquartered in New South Wales. Six industry sectors are represented in the CRC Program:

- manufacturing technology
- information and communication technology
- mining and energy
- agriculture and rural-based manufacturing
- environment and tourism
- medical science and technology.[200]

6.25 The objectives of the CRC Program are to enhance:

- the contribution of long-term scientific and technological research and innovation to Australia's sustainable economic and social development (the *research* objective)
- the transfer of research outputs into commercial or other outcomes of economic, environmental or social benefit to Australia
- the value to Australia of graduate researchers

199 *Bioscience 2015 – Improving National Health, Increasing National Wealth, A Report to Government by the Bioscience Innovation and Growth Team*, United Kingdom, p68

200 Submission 19, CRC Association, p2

- collaboration among researchers, between researchers and industry or other users, and to improve efficiency in the use of intellectual and other research resources.[201]

6.26 The CRC Association outlined the CRC structure as 'virtual organisations,' typically with headquarters in one location and often geographically dispersed nodes and participants. This means the funds for the CRC Program are generally used for projects rather than for bricks and mortar for new buildings.[202]

6.27 Initially, each CRC is granted a seven-year life span and all are reviewed regularly (at one, two and five years) to assess whether they are meeting their key objectives. CRCs seeking an extension of their lifespan beyond seven years must also compete against other CRCs seeking extensions and new applications in the selection process.[203]

6.28 Professor Brien Holden, Chief Executive Officer, Vision CRC, representing the CRC Association, outlined the intent of the program:

> it was an attempt to try to harness the intellectual resources at our universities and the CSIRO into partnership with industry to create opportunities of social and economic benefit to Australia. The cement was to be money, and by putting a CRC grant on the table they hoped to bring together those three components and rescue all the knowledge and ideas that existed within universities and the CSIRO and attempt to bring them into commercial reality.
>
> The industry research organisation and educational institution tripartite agreement was the core of the CRC program.[204]

6.29 The Federal Government provided initial funds to the program in 1991 to encourage participation from various organisations. Professor Holden explained:

> You will see that from the $7 billion total that has been invested over the last 12 years about $1.8 billion has been invested by the Commonwealth Government and the rest is invested by various organisations, including universities, the CSIRO and industry participants.[205]

6.30 Professor Holden related the success of the Vision CRC to the initial Federal funding[206]:

> In the case of my own CRC, our $17.5 million of Commonwealth Government support ended up with $165 million worth of resources being poured into our programs …

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201 Howard Partners, *Evaluation of the Cooperative Research Centres Programme*, July 2003, p3, *https://sciencegrants.dest.gov.au/CRC/HTMLDocuments/Documents/PDF/Report_CRC_Prog_Eval_July2003.pdf* (accessed 25 September 2003)

202 Submission 19, CRCA, p6

203 Submission 19, CRCA, p6

204 Professor Holden, CRCA, Evidence 18 August 2003, p37

205 Professor Holden, Evidence, 18 August 2003, p37

206 Initial funding in 1991 was provided to the CRC for Eye Research and Technology (CRCERT), the predecessor of the Vision CRC

> I ran a group at the University of New South Wales called the Cornea and Contact Lens Research Unit, and for 20 years we did research for a pittance for all sorts of organisations. We invented a contact lens that subsequently sold $1 billion worth of product, and I think we received a grant of $20,000 for it back in the 1970s. This gave us an opportunity to step up to big companies like Johnson & Johnson and CIBA Vision and say, 'We have $1 million worth of government funding; why don't you go into partnership with us?' In fact, that strength of having the dollar to invest in partnership with industry has made an enormous difference. Two of our products on the market at the present time, and the royalties from those two products flowing back to Australia, will be about $500 million.[207]

6.31 The CRC program was used as an illustration of a strategy that has ensured a close relationship between research and industry requirements, and a smooth transition between research and commercial phases.[208] Professor Holden stated that this strategy has also been a catalyst for change:

> It also changes the attitude and philosophy and in fact the jobs of many researchers who get involved. In the old days, nobody left the sinecure of a CSIRO job, or even a university job, because they were there for life and that was it. Many of my colleagues have now gone off into start-ups, they are involved in start-ups, and it has changed the way people think.[209]

Risks to the success of the CRC Program in New South Wales

6.32 There have been two criticisms of the CRC Program. Firstly, that it lacks strategic direction, and secondly, that the Program does not focus sufficiently on commercialisation, especially in public good CRCs.

Coordination and a strategic direction

6.33 Inadequate planning or the absence of a strategic approach is a significant problem affecting the value of the CRCs to NSW Government programs. Professor Holden noted that while State government support has been forthcoming, it has been on an ad hoc basis:

> This is not to say that New South Wales individual departments have not been interested from time to time. My own CRC got a $2.3 million grant from the State Government to start it off in 1990, so we appreciate those isolated efforts. However, as far as I know there is no strategic effort to harness this program.[210]

6.34 According to Professor Holden, the most recent round of CRC grants, in which 4 out of 30 grants were allocated to New South Wales, indicated the NSW Government has failed to recognise the opportunities that the CRC Program offers:

> With regard to New South Wales, in my experience there has not been a co-ordinated effort from the NSW Government to understand the power and to have a strategic

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207 Professor Holden, CRCA, Evidence, 18 August 2003, p37

208 Submission 19, CRCA, p4

209 Professor Holden, CRCA, Evidence, 18 August 2003, p38

210 Professor Holden, Evidence, 18 August 2003, p38

> plan for CRCs … New South Wales is slipping behind quite substantially in competition with Victoria and Queensland ...
>
> If you look at the layout of these various sectors it is also clear that there is an opportunity for the State of New South Wales to try to plan for the types of activities it wants to encourage in the CRC program in this State. For example, in manufacturing technology there are seven CRCs in Victoria and only one in New South Wales...in terms of the last round and the overall balance of CRCs, New South Wales has 24 per cent of the CRCs, versus one-third of Australia's population, and in the last round Queensland had $140 million worth of grants in its new and continuing CRCs, compared to New South Wales $98 million.[211]

6.35 Professor Darrell Williamson, Chief Executive Officer, CRC for Smart Internet Technology, called for state governments to have input into the strategic direction for science and innovation within their domain:

> it is strategic for the States to ascertain the areas they wish to emphasise across the various industry sectors. Different States will have priorities across various sectors but in the case of New South Wales, if there is high level linkage between policy objectives of government and the sectors that the CRCs cover, and in particular the CRCs in New South Wales that live within that sector, it provides an opportunity for everyone to win, especially in that commercialisation stage.[212]

6.36 By contrast, a number of universities were concerned that, from their experiences, the lack of strategic planning and direction was an internal issue within the CRC program. Their concern was that the success of a CRC depended on the management structure and personnel.

6.37 Ms Gillian Turner, Managing Director, Unisearch, argued that the success of a CRC program can be largely attributed to program leaders. Ms Turner stated that the CRC program generally 'becomes a pool of funds in research and does not necessarily go anywhere.'[213] According to Ms Turner, it is not necessarily the program which has been successful, rather:

> if you have individuals who are really driving it and the ownership is quite clear, you can have different outcomes. From my experience it really depends on the individual CRC rather than the program as such.[214]

6.38 Dr Shanny Dyer, Team Leader, Commercialisation, Research and Development Office, University of Technology, Sydney (UTS), in response to a question form the Committee on the success of the CRC Program, stated that:

> Some are good and some are bad. The main issue is the management and governance of those incorporated entities and exactly what the outcomes are supposed to be.[215]

6.39 Professor Holden, however, indicated that it was often the university that was restricting the CRC:

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211 Professor Holden, Evidence, 18 August 2003, p38

212 Professor Williamson, CRCA, Evidence 18 August 2003, p39

213 Ms Turner, Unisearch, Evidence, 18 August 2003, p21

214 Ms Turner, Unisearch, Evidence, 18 August 2003, p21

215 Dr Dyer, UTS, Evidence, 8 September 2003, p58

> we have a board of nine individuals who are not representing anybody. Some are nominated by core partners. There are five independents and four other nominees, and that will be an incorporated company limited by guarantee that has very great independence. That is difficult for the universities and the CSIRO to deal with, especially the universities, because it means they do not have control and if they are a member of a company where they do not have control through the council of the university it creates governance problems for them, so they have dropped off as core partners to supporting partner level for that reason, which is fine.
>
> My point here is that it needs to be flexible. There is a tremendous push for incredible strictness of governance, which, in many cases, is totally inappropriate for research organisations at all levels.[216]

Effectiveness of the CRC Program

6.40 The *Evaluation of the CRC Programme 2003,* commissioned by the Federal Government concluded that in the area of commercialisation and technology, the CRC Program 'must be seen as disappointing.'[217]

6.41 Professor Beryl Hesketh, Pro-Vice Chancellor, College of Sciences and Technology, University of Sydney, while generally supportive of the CRC Program, expressed a similar view to the other universities who appeared before the Committee:

> I think it is a bit early to know whether the CRCs have resulted in massive commercial returns to anyone. I suspect it is a mixed bag. I do not know that that is the major driver for universities. They obviously want to invest in that, but it is more an opportunity for the researchers to participate with industry, to develop relationships. That is what certainly motivates the researchers who seek to get involved in the CRCs. Maybe that is something that should change. But mostly what is driving them is opportunities to do the research—of a commercial flavour, because that is what they become interested in.[218]

6.42 The Committee supports the notion that knowledge transfer is as important as commercialisation. It also recognises that community benefit and efficiency gains in industry that lead to an increase in Gross Domestic Product are forms of commercialisation. It also notes that the extent of commercialisation in New South Wales is enhanced by a large percentage of public good research and product delivery, primarily to industry.

6.43 What concerns the Committee is that this form of commercialisation is reliant on government funding. Recent experience has been that business is reducing its already low research and development (R&D) budgets in Australia. Multi-national corporations have been steadily closing their in-house research arms. Governments in Australia will continue to provide R&D funding, but the Committee questions whether the burden will increase and continue to make it more difficult for Australia to be internationally competitive. This would place financial

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216 Professor Holden, CRCA, Evidence 18 August 2003, p45

217 Howard Partners, *Evaluation of the Cooperative Research Centres Programme*, July 2003, p76, *https://sciencegrants.dest.gov.au/CRC/HTMLDocuments/Documents/PDF/Report_CRC_Prog_Eval_July2003.pdf* (accessed 25 September 2003)

218 Professor Hesketh, University of Sydney, Evidence 18 August 2003, p 35

strain on the CRC Program as some CRCs would potentially continue to seek increased government funding, effectively preventing the emergence of new CRCs.

6.44 The dual focus of some CRCs, public good and monetary gain, impressed the Committee. The Vision CRC has performed ground-breaking research in understanding the eye and developing new vision correction and care systems. It has helped industry improve its products and has participated in a worldwide alliance established by the World Health Organisation to eliminate blindness. At the same time, it has been reinvesting royalties from its products back into R&D, building on its successful commercialisation.[219]

6.45 Another example is the CRC for Waste Management and Pollution Control (now called the Environmental Biotechnology CRC), which has significantly reduced waste at all levels of material production and improved the detection and control of contaminants. The CRC has been directly involved in the establishment of five small to medium sized enterprises (SMEs) with a total value in excess of $40 million. One SME has gone to public float, capitalised at $30 million, another is preparing to float, and three spin-off companies have been established. Investment in R&D has been multiplied by an initial government grant based on the CRC's commercial success.[220]

6.46 Public good research is a positive form of commercialisation, but the success and sustainability of the CRC Program will depend on individual CRCs producing a significant amount of commercial return that can be reinvested in R&D. This is the strategic direction the NSW Government can assist in developing: getting the balance right.

6.47 The Committee acknowledges that the outcomes of some CRCs, in terms of commercialisation, have been mixed. The Committee also notes the potential of the CRC Program to deliver significant commercial returns from the results of scientific research. Science Industry Australia, a business representative organisation, acknowledged the potential of the CRC Program:

> The Cooperative Research Centre (CRC) concept continues to lead to significant commercialisation successes and this program needs more support as, in our view, it yields the best likelihood of commercial success and the possibility of the new knowledge-based industries that NSW and Australia require.[221]

6.48 Considering that as it is internationally recognised that it takes up to ten years for even the best innovation companies to reach profitability,[222] the thirteen-year-old CRC Program is on track to be the major vehicle for the commercialisation of public sector scientific research in Australia. For this to occur, further government support is required to help determine the way forward.

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219 Submission 19, CRCA, p16; Professor Holden, CRCA, Evidence, 18 August 2003

220 Submission 19, CRCA, p18

221 Submission 21, Science Industry Australia, p 2

222 *Bioscience 2015 – Improving National Health, Increasing National Wealth, A Report to Government by the Bioscience Innovation and Growth Team*, United Kingdom, p68

NSW CRC Forum – a way forward

6.49 Professor Holden noted that there was insufficient communication between collective CRCs and local agencies. He suggested that a forum was required to progress research industry issues:

> There has never been a State meeting of CRCs. There are three chief executive officers [CEOs] of CRCs here [today]. There are 71 of them. I have been to hundreds of meetings in my life. The best meeting of the year is when these 71 guys get into a room and start talking about how they can change the face of Australia, change the face of their industry. We do not have a forum. We are not making use of that brainpower.[223]

> I think that is where there needs to be a CRC forum with State departments. Some person with some level of authority and influence from each department should sit down with the CRCs—there are 16 in New South Wales. The 16 chief executive officers [CEOs] need to sit down with the Department of State and Regional Development and the other departments and say, 'Okay, here is what we are about, here are our issues, what can you guys help us with, or how can we help you guys do your jobs?'[224]

6.50 Subsequent to their appearance before the Committee, the Chief Executive Officers of New South Wales CRCs formed the NSW Council of CRCs (the Council). The Committee supported the Council in establishing a coordinated approach for addressing CRC issues. Accordingly, the Committee invited the Council and its members, interstate CRCs, government representatives and industry to participate in a NSW CRC Forum, in the Legislative Council Chamber, NSW Parliament on 21 October 2003. The CRC Forum was intended to assist the CRCs to determine future benefits and opportunities based upon leveraging CRCs to meet both State Government and CRC goals in research, commercialisation, research education and public good.

6.51 The CRC Forum gave the Committee a strong indication that, provided that there is further support from government in New South Wales, the CRC program is best placed to capitalise on the opportunities in innovation.

6.52 A number of CRC Chief Executive Officers addressed the forum, presenting their perspectives on science, research, commercialisation and the opportunities that exist in New South Wales. The Committee was impressed with not only the passion the speakers had for the science, but the rational analysis of how the State Government could support not only CRCs, but science and innovation and its commercialisation generally.

6.53 Both the Hon Frank Sartor MP, Minister for Science and Medical Research, and Dr Col Gellatly, Director General, Premier's Department, addressed the forum, and outlined the efforts the Government was making in science and medical research.

6.54 Forum delegates, including representatives from NSW Government Departments, CRCs, PhD students and industry, participated in 'breakout groups' in order to provide the Committee with detailed analysis on issues such as:

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223 Professor Holden, CRCA, Evidence, 18 August 2003, p43

224 Professor Holden, Evidence, 18 August 2003, p46

- national and state priorities
- bridging the gap between CRCs
- State Government, industry and SMEs
- government and commercialisation
- regional development.

6.55 The productive results of these breakout groups assisted the Committee notably during its final deliberations. The groups identified key issues and suggested a number of actions the Government could take to further support science, technology and innovation in New South Wales. Reinforced by submissions and witness evidence, the Committee has recommended to the Government a number of the key suggestions from participants in the breakout groups.

6.56 Representatives from CRCs acknowledged that government resources are finite. Therefore, while identifying funding as an issue, delegates were primarily seeking communication channels with Government Departments and agencies. Establishing relationships between CRCs, universities, business and government is an important focus for the CRCs. It was also pointed out that the Government needs to improve cross-portfolio collaboration and coordinate cross-agency objectives.[225]

6.57 The new Science and Medical Research portfolio presents the opportunity for the Government to improve the communication with the science community. The Committee believes the proposed Ministry for Science and Innovation and the Office of the Chief Scientist will provide the platform for the necessary communication channels to be established. By the conclusion of the forum, the Committee supported the need for formal communication channels between Government and CRCs to 'bridge the gap'. The Committee recommends that a CRC coordinator within the proposed Ministry for Science and Innovation be established to act as a conduit between the Government and the CRCs in New South Wales.

6.58 High-level State Government commitment to the program would provide the necessary support to focus CRCs on commercialisation, and improve their overall commercial output.

Recommendation 13

That the proposed Ministry for Science and Innovation include a Cooperative Research Centre liaison position. The position would be responsible for providing advice to Cooperative Research Centres located in New South Wales concerning NSW Government agencies, NSW Government science policies and Federal Government funding programs.

Commercialisation brokerage

6.59 A particular theme throughout the Committee's inquiry has been the lack of experience of scientists and research bodies to be able to successfully commercialise their research, or, more

225 CRC Forum Highlights, DVD, inside back cover of this report

commonly, a lack of desire to do so. Most scientists are not focused on issues such as intellectual property management, securing investors, dealing with industry and the restrictions on publishing research. Dr Merilyn Sleigh noted that:

> Commercialisation of science can often delay publication and divert effort away from original research, and so can be such a disincentive.[226]

6.60 As noted in Chapter Five, a national survey commissioned by the Federation of Australian Science and Technological Societies (FASTS) in 1998, found that if these hurdles were removed, the majority of scientists surveyed would be more likely to pursue commercial opportunities for their research.[227]

6.61 The Committee met with Dr Rowan Gilmore, Chief Executive Officer, Australian Institute for Commercialisation (AIC), in Queensland and conducted a teleconference during hearings at the ATP to discuss the Committee's inquiry and models to assist scientists through the commercialisation process.

6.62 AIC was launched in May 2002, and describes itself as 'a national, not-for-profit company that delivers programs to improve the commercialisation of Australia's research investment.'[228] The Queensland Government, at present its sole shareholder, underwrites the AIC. Dr Gilmore informed the Committee that part of the underwriting of the Queensland Government required the AIC over a period of time to leverage their funding with that from other States and the Commonwealth.[229]

6.63 The Committee was particularly interested in AIC's National Commercialisation Brokerage, which was developed to assist in all levels of the commercialisation process. A five year plan, the Brokerage is designed to:

- leverage existing skills and experiences from the top-performing commercialisation companies and units associated with our best R&D institutions across the country to increase national commercialisation capability
- provide broader access and better utilisation of these skills through a franchise model. The AIC will act as a national facilitator, creating Regional Hubs for local delivery of commercialisation improvement services and assistance close to the institution or agency to be served, ensuring skills transfer and improvement of capability
- over a 3-4 year period, provide to all participating institutions, particularly the smaller organisations, such as some CRCs and regional universities that lack the scale to excel in commercialisation, a program of learning-by-doing with two main components:
  - (1) Capability enhancement services, including systems, procedures and training to increase the commercialisation skills base and to produce more and higher quality "primary" deal flow
  - (2) Project development services, to demonstrate how to take projects from the "bench" to an early proof of concept in a way that makes the project

226 Dr Merilyn Sleigh, Submission to the Australian Science Capability Review, p6

227 Mr Thomas Gascoigne, Executive Director, FASTS, Evidence, 8 September 2003, p16

228 Submission 23, AIC, p1

229 Dr Gilmore, AIC, Evidence, 10 November 2003, p41

attractive to investors and demonstrates best practice to the project proponents

- provide information for small to medium enterprises (SMEs) about research programs and researchers available to meet their needs for appropriate R&D programs
- bring together funding from State and Commonwealth Governments and from leading research organisations, to support the Program beyond the scope possible for any one organisation, region or State acting alone.[230]

6.64 Dr Gilmore stated that the brokerage was subject to the AIC obtaining Federal funding:

> The AIC itself is underwritten $10 million over five years by the Queensland Government and out of that $10 million allocation, year one about $500,000 would go into the brokerage … but I must stress at this stage we have no commitments other than understandings that the program would proceed if we obtained Commonwealth funding.
>
> At the moment we have a proposal in to the Commonwealth for $20 million over four years and we believe, in talking with the States, that there is a good case to make for matching State contributions.
>
> In the case of New South Wales, of the $20 million I would expect probably if New South Wales were to match the Commonwealth provision, maybe $4 million over four years, in that order of magnitude.[231]

6.65 The Committee was also informed of successful brokerages in Europe and the United States of America. The British Technology Group (BTG) was specifically mentioned by a number of witnesses as a model that had obtained significant recognition. BTG specialises in the commercialisation of novel technologies, and operates in Europe, North America and Japan.

6.66 BTG attempts to combine a strong commercial focus with technical understanding to develop innovation, enhance intellectual property and achieve commercial success. BTG stated that this combination of skills allows it to effectively capture value from technologies through licensing the rights or by developing new business ventures.[232]

6.67 BTG states on its website that its business is to 'maximise the commercial potential of significant new technologies that fill unmet market needs.' The brokerage is structured so that any profits are split between BTG, their shareholders and the researchers or company that seeks their services.[233]

6.68 The Committee considers that the Minister for Science and Medical Research should examine the possibility of a commercialisation brokerage for New South Wales, including whether participation in a national model is more feasible.

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230 AIC, *AIC National Commercialisation Brokerage*, 2003, Executive Summary, pp1-2

231 Dr Gilmore, AIC, Evidence, 10 November 2003, p41

232 *http://www.btgplc.com/about/profile.php* (accessed 11 November 2003)

233 *http://www.btgplc.com/portfolio/how_license.php* (accessed 11 November 2003)

Recommendation 14

That the Minister for Science and Medical Research examine the appropriateness and feasibility of the New South Wales public sector participating in a national commercialisation brokerage or establishing a State based brokerage for New South Wales. The Minister should examine:

- the National Commercialisation Brokerage proposed by the Australian Institute for Commercialisation
- examples of international commercialisation brokerages such as the British Technology Group in England.

Appendix 1 Scientific programs in NSW Government agencies

This Appendix contains information provided in submissions and evidence on science programs in NSW Government agencies. Please note that BioFirst programs are included in Appendix 2.

Agency	Program	Year	Partners
Department of Mineral Resources	Studies into the processes and products of regolith alteration in the Cobar and broken Hill regions	2000-04	CRC for Landscape Evolution & Mineral Exploitation
	Studies into the development and assessment of new exploration technologies	2002-04	CRC for Predictive Mineral Discoveries
	Lead isotope signatures of mineralisation and host rocks at Broken Hill	2000-03	CSIRO as part of CRC for Predictive Mineral discoveries
	Extension to previous project on the origin and metallogenesis of Ordovician volcanic belts in NSW	2001-03	Centre for Ore Deposit and Exploration Studies (CODES) of the University of Tasmania
	Ordovician biostratigraphic correlations and continental linkages	1997-03	International Geological Correlation Project no. 410, Macquarie University, Geoscience Australia, Australian Museum
	Segmentation of the Tamworth Belt, New England Orogen	2000-03	ARC with researchers from UNSW, Newcastle University and CSIRO
	Palaeo-magnetism of the Tasmanides	2000-04	Geophysical Institute, Ludwig Maxmillians University, Munich. Part of the Gondwana Project
	Sulphur isotope studies of Silurian massive sulphide deposits	1999-02	Newcastle University
	Evolution of East Gondwana margin	2000-03	International Geological Correlation Project no. 436, University of Canterbury NZ
Department of Health	Infrastructure grant – Garvan Institute		
	Infrastructure grant – Prince of Wales Medical Research Institute		
	Infrastructure grant – Centenary Institute of Cancer Medicine and Cell Biology		
	Infrastructure grant – Westmead Millennium Institute		
	Infrastructure grant – Victor Chang Cardiac Research Institute		
	Infrastructure grant – Kolling Institute of Medical Research		
	Infrastructure grant – Centre for Vascular Research		

Agency	Program	Year	Partners
	Infrastructure grant – Children's Medical Research Institute		
	Infrastructure grant – Centre for Immunology		
	Infrastructure grant – National Centre in HIV Epidemiology and Clinical Research		
	Infrastructure grant – ANZAC Research Institute		
	Infrastructure grant – Woolcock Institute of Medical Research		
	Infrastructure grant – Children's Cancer Institute Australia for Medical Research		
	Infrastructure grant – The Heart Research Institute		
	Infrastructure – special grant – Hunter Medical Research Institute		
	Infrastructure grant – phase out funding – Save Sight Institute		
	Infrastructure grant – phase out funding- Melanoma and Skin Cancer Research Institute		
	Infrastructure grant – phase out funding – Institute of Magnetic Resonance Research		
	Infrastructure grant – phase out funding – Institute for International Health		
	Infrastructure grant – phase out funding – Institute of Dental Health		
	Capacity Building Infrastructure Grant – Australian Rural Health Research Collaboration		
	Capacity Building Infrastructure Grant – Centre for Health Service Development		
	Capacity Building Infrastructure Grant – Newcastle Institute for Public Health Research		
	Capacity Building Infrastructure Grant – Centre for Infectious Diseases and Microbiology Public Health		
	Capacity Building Infrastructure Grant – Centre for Health Informatics		
	Capacity Building Infrastructure Grant – Consortium for Social and Policy Research on HIV, Hepatitis C and Related Diseases		
	Capacity Building Infrastructure Grant – special grant – Centres for Primary Health and Equity		
	Capacity Building Infrastructure Grant – special grant – Primary Health Institute		
	Capacity Building Infrastructure Grant – phase out funding – Centre for Health Economics Research and Evaluation		
	Capacity Building Infrastructure Grant – phase		

Agency	Program	Year	Partners
	out funding – Centre for Clinical Governance Research in Health		
	Capacity Building Infrastructure Grant – phase out funding – Macarthur Health Service		
	Capacity Building Infrastructure Grant – phase out funding – Effective Healthcare Consortium		
	Capacity Building Infrastructure Grant – phase out funding – Centre for Perinatal Services Research		
	Capacity Building Infrastructure Grant – phase out funding – Australian Centre for Health Promotion		
	Capacity Building Infrastructure Grant – phase out funding – Centre for family Health and Midwifery		
	Capacity Building Infrastructure Grant – phase out funding – Centre for Nursing and Health Services Research		
Rail Infrastructure Corporation	Development of asset management software tools, used by a variety of government agencies		
Department of Commerce	Applied research at technology and project level, for water, wastewater and environmental services		
	UNIFIED version of extended aeration wastewater treatment technology		CRC for Waste Management and Pollution Control
	Development of system analysis methods as part of the integrated water cycle management process		Ministry of Energy and Utilities
	Development of improved decanting units for IDEA (Intermittent-decant extended aeration) sewage treatment plants		
	Optimisation of the IDEA cycle		
Department of Agriculture	Research programs are detailed in publication, *NSW Agriculture – Excellence in Science & Technology*		
Department of State and Regional Development	Funding for NSW – based Major National Research Facilities		Commonwealth, Universities and private sector
	Funding for NSW - based ARC Centres of Excellence	5 years	ARC, Universities and Industry
Department of Lands	Public Sector Mapping Agencies Aust Ltd (PSMA) – facilitates access to seamless national datasets, commercialises standard topographical and cadastral datasets, developing Geocoded National Address File		
	Developing the concept of Virtual Australia, inserting research and commercial innovation in spatial information		CRC for Spatial Information
	Spatial Maintenance System Project – upgrade of NSW Spatial Data Information		

Agency	Program	Year	Partners
	Emergency Information Coordination Unit – geospatial issues related to counter-terrorism, geospatial needs of emergency service organisations		
	Global Positioning Systems –SydNET system for precise positioning tasks		
	Geospatial Positioning Systems – Geocoded Urban and rural Address System (GURAS)		
State Forests	Tree Improvement program – to supply genetic expertise, coordinate and implement applied genetic research and develop and deploy genotypes		CSIRO, Queensland Forestry Research Institute, NZ Forest Research
	New Forests Program – environmental services, developing methods for quantifying carbon sequestration, quantifying salinity control and carbon sequestration, developing environmentally sound forest management methods		CRC for Greenhouse Accounting, NSW Salinity Strategy, Natural Heritage Trust
	Silviculture Systems – sustainable management of industrial forests		
	Forest Health Management – long term sustainability of non-timber values within forests and plantations		
	Forest Biodiversity – research to provide a scientific basis for maximising biodiversity values in managed forests		
Environment Protection Authority	Forensic science – eg field investigations, laboratory analysis, analysis of evidence, statements of environmental effects, expert testimony		
	Investigations into the state of the environment – eg ambient air quality monitoring, impact of pollution, pesticides in irrigation areas, complex environmental processes		
	Development of scientific tools – eg new ways of assessing and classifying waste		
	Environmental Trust – promotes research into environmental problems by community groups, unis, research institutions on water and catchments, atmosphere, environmental noise, social issues, sustainability		
National Parks and Wildlife Service	Predicting biodiversity outcomes in agriculture landscapes		
	Pest management impacts on non-target native species and the impacts of pests on ecology		
	Effectiveness of bushfires hazard reduction and responses of species to different management strategies		
	State-wide waterbird census surveys		
	State-wide wetland mapping and development		

Agency	Program	Year	Partners
	of CD-ROMs		
	Native vegetation mapping, assessment and modelled evaluation of conservation and clearing options		
	Research on threatened species and ecological communities		
	Development of systematic conservation planning methodologies and biodiversity benchmarks for ecological communities		
	Effects of salinity on native vegetation		
	Assessing impacts of park users		
Sydney Catchment Authority	Nutrients and sediments, climate forecasting, pathogens, bacterial source tracing and viral source tracing, quantifying animal faecal deposition, integrated water quality planning, quantifying prevalence & human infectivity of cryptosporidium and giardia oocysts on catchments and fauna, long-term fire history and water quality impacts of recent fires, stream flow forecasting		Unis, research institutions
Resource NSW	Potential use of recovered vegetative and other wastes for the beneficial re-use in agriculture, horticulture, viticulture and dry and salinity remediation		NSW Agriculture, UNSW
	Developments of specifications, testing methodologies and trials to facilitate the use of materials in products or processes, direct them from landfill disposal, displace the use of virgin material		NSW Agriculture, UNSW
Royal Botanic Gardens Trust and Domain Trust	Systematics – to discover, document and classify plants, and understand their relationship and evolution		
	Horticulture research – to study the biology of Australian plants, create and maintain an ex situ collection of NSW plants, relieve pressure from exploitation on wild populations		
	Fungi and plants – research into harmful and beneficial fungi and related organisms		
	Ecology – surveying, monitoring and classification of vegetation communities		
	Botanical information – making available data from the Trust		
Zoological Parks Board of NSW	Research and breeding programs for the preservation of endangered species and conservation and management of other species, eg little penguins, rhinos, platypus, wombats, kangaroos		
	Australian Registry of Wildlife Health – investigates outbreaks of wildlife disease and operating information service		
	Australian Marine Mammal Research Centre		Sydney UNI

Agency	Program	Year	Partners
	Australian Wildlife Health Network		NSW Agriculture
	Australian Shark Attack File		
Fisheries	Conservation Technology Unit – development and testing of Bycatch Reduction Devices and alternate fishing gears and practices in wild harvest fisheries		
	Research Assessment Unit – stock assessments and monitoring of key commercial and recreational fish species		
	Commercial and Recreational Research Unit – biological fisheries assessments of fisheries		
	Recreational fish catches – size and composition		
	Oyster research – eg commercial hatchery and improved growth and disease resistance for Sydney rock oysters etc		
	Abalone – hatchery and nursery production techniques		
	Prawns – health management programs		
	Silver perch – winter disease problems, breeding programs		
	Research centre – develop technology to utilise saline groundwater foe aquaculture, to establish major new industries for farming marine and estuary species in inland NSW		Murray Irrigation Ltd
	Marine protected Areas – assembly of natural resource information for marine bioregions for bioregional assessments		
	Habitat Protection and Rehabilitation program – eg evaluation of responses of fish populations to changes in environmental flow regimes in rivers		
	Threatened species program – includes surveys of population status and development of recovery plans		
	Aquatic Pests – eg sampling in major ports, developing control techniques to limit the spread of invasive seaweed		
SafeFood NSW	Risk analysis – for dairy, meat, seafood, goat and sheep milk and higher risk plant industries		

Appendix 2 BioFirst programs and funding

The information in this Appendix was provided by the The Cabinet Office as a Supplementary Submission on 6 November 2003.

BioFirst Program

It should be noted that:

BioFirst funding is quarantined;

There has been reallocation of funds, as follows:

$1.25 m for the Biotechnology Precinct (incubator) from the BioEthics program; and

$800,000 for the BioLink project from the BioEthics program.

There has been an additional injection of funds to the amount of $1.8 m from NSW Health for the BioLink project.

These reallocations are reflected in the attached table.

The BioFirst Strategy consists of 4 programs:

BioPlatform –	$47.305 m over 5 years;
BioBusiness –	$16.070 m over 5 years;
BioEthics –	$1.8 m over 5 years; and
BioUnit –	$2.95 m over 5 years

BIOPLATFORM

Program	Purpose and achievements to date	2001/02	2002/03	2003/04	2004/05	2005/06	Total allocation
BioFirst Awards (Health)	To recruit up to five emerging world class researchers every year to NSW providing funding of $100,000 per annum for three years, to each researcher. To date, 5 world class researchers have been attracted to NSW. These are: Dr Bryce Vissel at the Garvan Institute; Dr Colin Dunstan at the ANZAC Research Institute; Dr Peter Currie at the Victor Chang Cardiac Research Institute; A/Prof Shane Grey at the Garvan; and Professor Izuru Matsumoto, University of Sydney.	500,000	1 m	1.5 m	1.5 m	1.5 m	$6 m / 5 years
St Vincent's Research Precinct (Health)	A formal alliance of the Garvan Medical Research Institute, the Victor Chang Heart Research Institute and St Vincent's Hospital Research Groups. The project involves the extension and refurbishment of existing buildings and will provide infrastructure support within the precinct. Work is in the early planning stages.		5 m	7.5 m	5 m	2.5 m	$20 m / 4 years
Westmead Research Hub (Health)	A formal alliance involving the Westmead Millennium Research Institute, the Westmead Hospital Research Group, the Children's Hospital at Westmead and the Children's Medical Research Institute. The project will provide infrastructure support for biotechnology at the Westmead Research Hub resulting in a facility that will meet the growing demand for physical space for conducting research and development at Westmead. Work is still in the early planning stages.		1 m	2.5 m	3.5 m	1 m	$8 m / 4 years
The Agricultural Genomics Centre (Agriculture)	The NSW Centre for Agricultural Genomics was established in March 2002 and is an unincorporated joint venture between NSW Agriculture, CSIRO Plant Industries and the Australian Proteome Analysis Facility at Macquarie University. The Genomics Centre will	450,000	1.75 m	2 m	2 m	1.05 m	$7.25 m / 5 years

Program	Purpose and achievements to date	2001/02	2002/03	2003/04	2004/05	2005/06	Total allocation
	identify genes for use in Australia's agriculture and protect them through patenting and other intellectual property protection mechanisms. The technologies will be used for wheat, rice, barley, cotton, canola and grain legumes. The Genomics Centre also receives funding from other sources, including a Commonwealth Major National Research Facilities grant of $14.2 million. Centre staff have been recruited, a number of manuscripts have been published and the Centre is attracting other important projects.						
Register of Genetic Material (Agriculture)	To assist in the conversion of data on insect and mite collections held within NSW Agriculture's Scientific Collections Unit into an electronic format to make the information on the occurrences, identities, host ranges and distribution of pests, mites and insects into a more accessible format. A significant amount of data has been converted to electronic format and is now available for use in a manageable and controlled web environment.	50,000	150,000	150,000	150,000	100,000	$600,000 / 5 years
Bioinformatics and Convergence Technologies (Health)	To provide successful applicants from research institutions with high bandwidth network connections. Funding and implementation will commence this financial year.		287,500	392,500	387,500	387,500	$1.455 m / 5 years
The Australian Proteome Analysis Facility (DSRD)	The Proteome Facility is a project within the Commonwealth's Major National Research Facilities program. The Facility will provide the specialist platform technology referred to as proteomics and collaborate with academic and commercial researchers in Australia and overseas. Possible outcomes include the development of novel pharmaceuticals to fight diseases such as cancers,	300,000	500,000	500,000	350,000	350,000	$2 m / 5 years

Program	Purpose and achievements to date	2001/02	2002/03	2003/04	2004/05	2005/06	Total allocation
	diabetes, allergies and arthritis.						
Nanotechnology (DSRD)	The Nanostructural Analysis Network Organisation (NANO) is a project within the Commonwealth's Major National Research Facilities program. NANO will provide national resource sharing for new and existing instrumentation in microscopy and microanalysis. Staff have been recruited, design and development of experiments has progressed and equipment has been purchased to assist with collaborative research between NANO staff and researchers across Australia.	300,000	500,000	500,000	350,000	350,000	$2 m / 5 years
Total							**$47.305 m**

BIOBUSINESS

(DSRD)

Program	Purpose and achievements to date	2001/02	2002/03	2003/04	2004/05	2005/06	Total allocation
Marketing and International Promotion	To promote biotechnology businesses, prepare marketing material and support biotechnology companies to participate in trade missions. The following activities have been undertaken: Dissemination of information, such as through the BioBusiness e-newsletter and the monthly events email; The development of new marketing materials, including banners ; Active participation in domestic events; Trade Mission Programs, including BIO2002 and BIO2003, as an exhibitor, facilitator of the NSW delegation and coordinator of business events at BIO;	50,000	50,000	50,000	50,000	50,000	$250,000 / 5 years

	Partnering with key industry associations; and Partnering with Commonwealth and other State Government's. Formal acknowledgment of the potential for greater interstate cooperation was made in June 2003 with the signing of the Australian Biotech Alliance between the Premier's of NSW, Vic and Qld.						
High Growth Business Program	The High Growth Business program aims to facilitate the successful commercialisation of NSW biotechnology innovations by established businesses in sectors covered by the BioFirst Strategy. Financial assistance is provided to eligible companies undertaking pre-approved projects involving activities such as export documentation, e-commerce strategies, quality assurance and product development support. Provision of assistance with these activities will ensure established biotech companies can capitalise on research and development outcomes and technical developments - ensuring the growth of the biotechnology sector in NSW. Assistance under this program can be used for: regulatory approvals required to take bio-products into specific markets; business planning and business process development; financial systems development; market development and research, including export markets; and other agreed management skills development projects. Recipients include: BioTechnology Frontiers; Chrodogenesis; Imaxeon; Muskel Health; Novogen; Proteome Systems;	50,000	550,000	1 m	1.4 m	1 m	$4 m / 5 years

	Sunshine Heart Company; Sydney Cancer Centre; Value Added Wheat CRC; VRI BioMedical.						
Proof of Concept Grants	To assist biotechnology companies to establish the commercial feasibility of their research prior to their first attempts at raising venture finance. The proof of concept grants – each up to $100,000 over two years –are offered to NSW companies eligible under the Commonwealth's Biotechnology Innovation Fund. Grants have been given to the following companies: BioLateral; Proteome Systems; USCOM; Vaporex; Biosignal; Medsaic; Techmin; FLUORItechnics; ACYTE; AIMedics; CenTec; Madry Technologies; Advanced Metal Coatings; Chinese Medicines Scientific Consultants Pty, Ltd; Matrix Gene Pty Ltd; G2 Therapies Ltd; Tecra Ltd; Portland Orthopaedics; DermaTech Laboratories; BioAg Pty Ltd; Droneon Pty Ltd; ViroTarg; EnGeneIC Drug Delivery Systems; PacMab;	400,000	900,000	1 m	1 m	700,000	$4 m / 5 years

	Unitract; Colocare Research; Daltray; and VRI BioMedical.						
Fostering connections between investors and the biotechnology sector	To increase opportunities for connection between biotechnology companies and the investment community and to recruit a Manager dedicated to biotechnology. This initiative is fully operational.	60,000	90,000	90,000	90,000	90,000	$420,000 / 5 years
Non-research establishment costs program	Activities covered by the program include assistance in establishing financial management systems, providing accounting services, support for intellectual property protection issues and business planning activities. Recipients include: AFRA Design; Analytica; Ashwyn; Baribunma Holdings; BioInnovations; Bioacumen; Canxell; EvoGenix; Fiberscan; GNP Australia; Hunter Surgical; Minomic; Nucleics; ObjectiVision; Vast Audio; and Vertical Orthotics.	100,000	425,000	500,000	550,000	550,000	$2.125 m / 5 years

Promotion of leadership and training	To help develop outstanding leaders in the biotechnology industry. Specifically, the program involves assisting companies to attend professional development courses, such as the NSW Enterprise Workshop Biotech Stream.	50,000	138,000	275,000	425,000	575,000	$1.463m/ 5 years

Program	Purpose and achievements to date	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Total allocation
Biotechnology Precinct (incubator)	After conducting a $12,000 feasibility study into the need for incubator facilities in NSW, Govt agreed to fund this initiative. Accordingly, the Cabinet Standing Committee on Biotechnology agreed to the internal re-allocation of BioFirst funds. Incubation services include economical access to laboratory space on an as-needs basis, reduced business operation overheads, access to mentoring services and assistance with graduation from the incubator environment. Additionally, the BioFirst Incubator will deliver a range of services to biotechnology companies in the regions through a regional outreach program. Foundation tenants include: Nucleics Pty Limited; E-Nose Pty Limited; Medcare Systems Pty Limited; AI Medics Pty Limited; and Medsaic Pty Limited. As Precinct tenants graduate, outcomes will be measured to determine the effectiveness of the	12,000	830,000	417,500	417,500	417,500	417,500	$2.512 m/ 5 years

	BioFirst Biotechnology Precinct operation.							
Bio-Link	Bio-Link is a new business alliance created to expedite the commercialisation of life science research in NSW. The foundation members of Bio-Link are the Garvan Institute for Medical Research, the Westmead Research Hub and the Hunter Medical Research Institute. Bio-Link services include: Identification of intellectual property; Protection of intellectual property (including, where appropriate patent subsidies); Assistance with identifying the most appropriate commercialisation mechanism (licensing or spin-off company); Assistance in identifying and accessing markets; and Assistance with marketing.		200,000	200,000	200,000	200,000		$800,000 (Note this is a $2.6m initiative/4 years - $1.8m is allocated from within the Health budget)
New initiative (yet to be announced)			500,000					$500,000
Total							$16.070 million	

BIOUNIT

Program	Purpose and achievements to date
BioUnit	The Unit became fully operational in January 2002. Key activities/achievements include: Developing the BioFirst website; Organising the Vice-Chancellors Seminar on Biotechnology; Organising the Premier's Forum on Stem Cell Research, attended by a number of prominent research scientists; Providing administrative and research support to Committees constituted to implement the BioFirst strategy; Support to the NSW Biotechnology Patron (Lucy Turnbull); Driving the implementation of the BioFirst strategy; Stakeholder liaison (BIO2002 and 03, Ausbiotech, Science and Discovery Conference, NSW Stem Cell Network, Young Garvan, National Stem Cell Conference, JBWere Investment Seminar); and Policy and administrative support to Premier and Minister for Science and Medical Research (eg NSW Embryo Research and Human Cloning Legislation).

Appendix 3 NSW Innovation Council members

Name	Occupation
Professor Dennis Wade (Chairman)	
Dr Bruce Cornell	Director, Ambri Pty Ltd
Dr David Fisher	Managing Director, Brandon Capital Pty Ltd
Professor Roger Holmes	Vice Chancellor, University of Newcastle
Mr Christopher Janssen	Managing Director, GPC Electronics
Mr Adam Liberman	Partner, Freehills
Ms Liza-Jayne Loch	Director, Republic Consulting
Dr Wanda Mackinnon	National Manager, Commercialising Emerging Technologies Program (COMET)
Professor Jane Marceau	Pro Vice Chancellor (Research), University of Western Sydney – City Research Centre
Ms Vivian McCarron	Partner, PricewaterhouseCoopers
Mr David Robinson	Managing Director, Bishop Manufacturing Technologies Pty Ltd
Dr Merilyn Sleigh	Managing Director, EvoGenix
Dr Soozy Smith	Chief Executive Officer, TUNRA Ltd

Appendix 4 Submissions

No	Author
1	BCP Investments
2	Australian Technology Park Innovations Pty Ltd
3	Australian Manufacturers' Patents Industrial Designs, Copyright and Trade Mark Association (AMPICTA)
4	The Hon Kerry Hickey, NSW Minister for Mineral Resources
5	Mr Jason Hopkins
6	Australian and New Zealand Association for the Advancement of Science (ANZAAS)
7	Dr Wallace Bridge
8	Unisearch Ltd
9	The University of New South Wales
10	Dr Merilyn Sleigh
11	NSW Institute of Sport
12	Australian Nuclear Science and Technology Organisation (ANSTO)
13	The University of Sydney
14	Cornucopia
15	Australian Society for Medical Research
16	Australian Business Foundation
17	Australian Electrical and Electronic Manufacturers' Association (AEEMA)
18	University of Wollongong
19	Cooperative Research Centre Association
20	Macquarie University
21	Science Industry Australia
22	Australian Museum
23	Australian Institute for Commercialisation (AIC)
24	Bayer CropScience Pty Ltd
25	The Medical Device Network, NSW branch
26	Avcare
27	Powerhouse Museum
28	Hunter Water Corporation
29	Rail Infrastructure Corporation (RIC)
30	Australian Venture Capital Association
31	The Hon John Della Bosca, NSW Special Minister of State, Minister for

No	Author
	Commerce, Minister for Industrial Relations, Assistant Treasurer, and Minister for the Central Coast
32	Charles Sturt University
33	Federation of Australian Scientific and Technological Societies (FASTS)
34	University of Newcastle
35	CSIRO
36	University of Technology, Sydney
37	Australian Academy of Technological Sciences and Engineering (ATSE)
38	AusBiotech Ltd
39	NSW Cabinet Office
40	The Royal Australian Chemical Institute
41	The Hon Dr Andrew Refshauge MP, Deputy Premier, Minister for Education and Minister for Aboriginal Affairs
42	Westmead Millennium Institute
43	University of Western Sydney
44	NSW Department of Lands
45	State Chamber of Commerce
46	NSW Ministry for the Arts
47	The Hon Michael Egan MLC, Treasurer , Minister for State and Regional Development
48	State Forests of New South Wales
49	Phoenix Biologix
50	NSW Environmental Protection Authority
51	The Hon Ian Macdonald MLC, NSW Minister for Agriculture and Fisheries
52	Ndarala Group
53	BioMed North Limited
54	Confidential
55	The Hon Bob Debus MP, NSW Attorney General and Minister for the Environment
56	Dr Katherine Woodthorpe
57	FLUOROtechnics Pty Ltd
58	Upton Consulting
59	NSW Department of Health
60	C-Qentec Diagnostics Pty Ltd

Appendix 5 Witnesses

Date	Name	Position and Organisation
Monday 18 August 2003	**Dr Richard Sheldrake**	Director General, NSW Agriculture
	Ms Helen Scott-Orr	Executive Director, Research Advisory and Education, NSW Agriculture
	Dr Regina Fogarty	General Manager, Strategic Review, NSW Agriculture
	Professor Mark Wainwright	Deputy Vice-Chancellor (Research), University of New South Wales
	Ms Gillian Turner	Managing Director, Unisearch Ltd
	Professor Beryl Hesketh	Pro Vice-Chancellor, Colleges of Science and Technology, University of Sydney
	Professor Brien Holden	Representative, Cooperative Research Centre Association (CRCA)
		CEO, Vision CRC (formerly CRC for Eye Research and Technology)
	Dr Colin Chipperfield	Representative, CRCA
		CEO, CRC for Welded Structures
	Professor Darrell Williamson	Representative, CRCA
		CEO, CRC for Smart Internet Technology
	Professor Jim Piper	Deputy Vice-Chancellor (Research), Macquarie University
	Mr Iain Rothwell	Director, Office of Business Development, Macquarie University
		Managing Director, Macquarie Research Limited
Monday 8 September 2003	**Dr Doreen Clark AM**	Vice President, Australian Academy of Technological Sciences and Engineering (ATSE)
	Dr John Nutt AM	Chair, NSW Division, ATSE
	Dr Chris Roberts	Representative, ATSE
	Ms Kerry Doyle	Director, BioUnit, The Cabinet Office
	Mr John Schmidt	Deputy Director-General, The Cabinet Office
	Ms Katy Reade	Senior Policy Officer, The Cabinet Office
	Professor Chris Fell	President, Federation of Australian Scientific and Technological

Date	Name	Position and Organisation
		Societies (FASTS)
	Dr John O'Connor	Secretary, FASTS
	Mr Thomas Gascoigne	Executive Director, FASTS
	Mr Loftus Harris	Director General, Department of State and Regional Development (DSRD)
	Mr Michael O'Sullivan	Executive Director, Industry Division, DSRD
	Professor Peter Booth	Deputy Vice Chancellor, University of Technology, Sydney (UTS)
	Mr Stephan Wellink	Director, Research and Development Office, UTS
	Dr Shanny Dyer	Team Leader, Commercialisation, Research and Development Office, UTS
Friday 19 September 2003	**Ms Robyn Kruk**	Director-General, NSW Health
	Dr Greg Stewart	Deputy Director General, Public Health
		Chief Health Officer, NSW Health
Monday 10 November 2003	**Professor Mark Sceats**	Chief Executive Officer
		Australian Photonics Cooperative Research Centre
	Dr Mark Bradley	Chief Executive Officer
		Australian Technology Park Innovations
	Mr Robert Lewis	Executive Director
		South Australian Research and Development Institute (SARDI)
	Dr Deborah Kuchler	Chief Executive Officer
		BioMed North Limited
	Professor Carol Pollock	Director
		BioMed North Limited
	Dr Rowan Gilmore	Chief Executive Officer
		Australian Institute for Commercialisation (AIC)

Appendix 6 Site Visits

Date	Location
22 September	Faculty of Science and Agriculture, Charles Sturt University, Wagga Wagga
	Wagga Wagga Agricultural Institute, Wagga Wagga
	National Wine & Grape Industry Centre, CRC for Viticulture, Wagga Wagga
	Ricegrowers' Association field trip, Whitton (via Leeton)
	Griffith City Council
23 September	CSIRO Land and Water, Griffith
	NSW Agriculture Centre for Irrigated Agriculture, Griffith
	CRC for Sustainable Rice Production, Yanco
24 September 2003	Australian Institute of Commercialisation (AIC), Brisbane
	Qld Department of Innovation and Information Economy, Brisbane
	Qld Department of State Development, Brisbane
10 November 2003	Australian Technology Park, Eveleigh

Appendix 7 Minutes

Minutes No 01

Thursday 03 July 2003
Room 1108, Parliament House at 1.00 pm

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Mr Catanzariti
Ms Forsythe	Ms Robertson
Ms Pavey	Mr Cohen

2. CORRESPONDENCE –

Item 1
Third annual report to the Standing Committee on State Development on progress in implementing the *Pesticides Act 1999*.

The Committee proceeded to consider the draft report.

The Committee deliberated.

Resolved, on the motion of Mr Cohen: that the report be tabled.

Item 2
Inquiry into science and its commercialisation in NSW
Letter from the Hon Frank Sartor, Minister for Energy and Utilities, Minister for Science and Medical Research, Minister Assisting the Minister for Health (Cancer), Minister Assisting the Premier on the Arts, requesting the Standing Committee on State Development establish an inquiry into science and its commercialisation in NSW.

The Committee proceeded to consider the draft Terms of Reference for the inquiry.

Resolved, on the motion of Ms Robertson: that the Terms of Reference as referred be adopted.

Resolved, on the motion of Ms Forsythe: that the Committee reports by 4 December 2003.

INQUIRY - CALL FOR SUBMISSIONS

The Committee resolved:

- to call for submissions by 15 August 2003;
- on the motion of Ms Forsythe: that the Committee advertise the Terms of Reference and call for submissions in Major metropolitan and Major regional press and identified stakeholders.

3. CONSIDERATION OF PROCEDURAL MOTIONS

The committee proceeded to consider the following draft procedural motions:

1. That in accordance with the resolution of the Legislative Council of 11 October 1994 the Committee authorises the sound and television broadcasting as appropriate, of its public proceedings, unless the Committee decides otherwise.

2. That arrangements for the calling of witnesses and for visits of inspection be left in the hands of the Chair and Director after consultation with the Committee.

3. That media statements on behalf of the Committee be made only by the Chair, if possible after consultation with the Committee.

4. That the Chair and Director be empowered to advertise and/or write to persons, bodies and organisations inviting written submissions relevant to the terms of reference for the Committee's inquiries.

5. That in accordance with section 4 of the *Parliamentary Papers (Supplementary Provisions) Act 1975* and under the authority of Standing Order 252, the Committee authorises the Director to publish the transcript of evidence taken at public hearings, unless the Committee decides otherwise.

6. That in accordance with section 4 of the *Parliamentary Papers (Supplementary Provisions) Act 1975* and under the authority of Standing Order 252, the Committee authorises the Director to publish minutes of the Committee's proceedings after the minutes have been confirmed by the Committee, unless the Committee decides otherwise.

7. That the Director be empowered to respond to correspondence on behalf of the Committee, where the correspondence concerns routine or administrative matters. In all other cases the Chair must approve replies to correspondence.

8. That if by leave of the House the Committee meets while the House is sitting the meeting be suspended during any division or call for quorum in the House.

9. That where a government response to a Committee report is received, the Chair or Director forward a copy of the response to all people who made a submission to the relevant inquiry, unless the Committee decides otherwise.

The Committee deliberated.

Resolved, on motion of Ms Forsythe: that the procedural motions be adopted

4. ADJOURNMENT

The meeting adjourned at 2:10 pm until the next meeting at 8:30am, Tuesday 26 August 2003, Parliament House.

Bayne McKissock
A/Director

Minutes No 02

Monday 18 August 2003
Jubilee Room, Parliament House at 9:00 pm

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Mr Catanzariti
Ms Forsythe	Ms Robertson
Ms Pavey	Mr Cohen

2. INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW

The public were admitted.

Dr Richard Sheldrake, Director General, NSW Department of Agriculture, Ms Helen Scott-Orr, Executive Director, Research Advisory and Education, NSW Department of Agriculture, Ms Regina Mary Fogarty, General Manager, Strategic Review, NSW Department of Agriculture, were sworn and examined.

Evidence concluded and the witnesses withdrew.

Professor Mark Wainwright, Deputy Vice-Chancellor (Research), UNSW, Ms Gillian Turner, Managing Director, Unisearch Ltd, Mr Warren Bradey, Director (Finance and Operations) Unisearch Ltd, were sworn and examined.

Evidence concluded and the witnesses withdrew.

Professor Beryl Hesketh, Pro Vice-Chancellor, Colleges of Science and Technology, University of Sydney, was sworn and examined.

Evidence concluded and the witness withdrew.

Professor Brien Holden, CEO Vision CRC, Representative CRCA, Dr Colin Chipperfield, CEO CRC for Welded Structures, Representative CRCA, Professor Darrell Williamson, CEO CRC Smart Internet Technology, ATP, Representative CRC, were sworn and examined.

Professor Holden tabled a document supporting his evidence.

Resolved, on the motion of Ms Forsythe: That the Committee accept this document.

Evidence concluded and the witnesses withdrew.

Professor Jim Piper, Deputy Vice Chancellor (Research), Macquarie University, Mr Iain Rothwell, Director, Office of Business Development, Managing Director, Macquarie Research Ltd, were sworn and examined.

Resolved, on the motion of Ms Pavey: That the Committee accept this document.

Evidence concluded and the witnesses withdrew.

3. CORRESPONDENCE –

Item 1
Inquiry into science and its commercialisation in NSW – Replacement submission from AMPICTA
The Committee proceeded to consider a request from AMPICTA, that the Committee accept a revised submission to replace the original submission.

The Committee deliberated.

Resolved, on the motion of Ms Forsythe: that the revised submission be accepted, and that it replace the original submission.

4. ADJOURNMENT

The meeting adjourned at 4:10 pm until the next meeting at 8:50am, Monday 8 September 2003, Parliament House.

Bayne McKissock
A/Director

Minutes No 03

Tuesday 26 August 2003
Jubilee Room, Parliament House at 8:45 pm

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Mr Catanzariti
Ms Forsythe	Ms Robertson
Ms Pavey	

2. APOLOGIES

Mr Cohen

3. INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW – Site Visits

Resolved on the motion of Ms Forsythe: that Minutes No 01 and No 02 be adopted.

Resolved, on motion of Ms Forsythe: that the Committee conduct a site visit to Wagga Wagga, Griffith and surrounding districts as part of its inquiries into science and its commercialisation in NSW, on Monday 22 and Tuesday 23 September 2003.

The Committee considered the proposal for a sub-committee to undertake research and information gathering exercise to Brisbane, Queensland on 24 September 2003.

The Committee deliberated.

Resolved, on motion of Ms Forsythe: that, subject to approval by the President, that a sub-committee conduct the proposed research and information gathering exercise to Queensland on Wednesday 24 September 2003.

4. ADJOURNMENT

The meeting adjourned at 8:55am until the next meeting at 9:00am, Monday 08 September 2003, Parliament House.

Bayne McKissock
A/Director

Minutes No 04

Tuesday 02 August 2003
Room 1008, Parliament House at 5:30 pm

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Mr Catanzariti
Ms Forsythe	Ms Robertson
Ms Pavey	Mr Cohen

2. INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW

Resolutions:

Resolved on motion of Ms Forsythe: That the Committee conducts a public forum with CRC representatives in order to focus on generating a greater understanding of how CRCs can best work with government agencies and industry to ensure outcomes of social and economic benefit to NSW.

Resolved on motion of Ms Forsythe: That the Chair writes to the President, seeking approval to conduct the CRC Forum in the LC Chamber.

Resolved on motion of Ms Robertson: That invitations to participate in the CRC Forum be extended to appropriate public sector agencies such as the Department of State and Regional Development.

Resolved on motion of Mr Catanzariti: That the Chair and Secretariat be permitted to plan and coordinate details of the CRC Forum

3. ADJOURNMENT

The meeting adjourned at 5:45am until the next meeting at 9:00am, Monday 08 September 2003, Parliament House.

Rob Stefanic
Clerk

Minutes No 05

Monday 8 September 2003
Jubilee Room, Parliament House at 9:00 am

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Mr Catanzariti
Ms Forsythe	Ms Robertson
Ms Pavey	Mr Cohen

2. INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW

The public were admitted.

Dr Doreen Clark, Vice President, Academy of Technological Sciences and Engineering, Dr John Nutt, Chair, NSW Division, Academy of Technological Sciences and Engineering, Dr Christopher Roberts, Fellow, Academy of Technological Sciences and Engineering were sworn and examined.

Evidence concluded and the witnesses withdrew.

Ms Kerry Doyle, Director, BioUnit, The Cabinet Office, Mr John Schmidt, Deputy Director General, The Cabinet Office, Katy Reade, Senior Policy Officer, The Cabinet Office, were sworn and examined.

Evidence concluded and the witnesses withdrew.

Dr Darryl O'Connor, Secretary, Federation of Australian Scientific and Technological Societies, Professor Christopher Fell, President, Federation of Australian Scientific and Technological Societies, Dr Thomas Gascoigne, Executive Director, Federation of Australian Scientific and Technological Societies, were sworn and examined.

Evidence concluded and the witnesses withdrew.

Mr Loftus Harris, Director General, Department of State and Regional Development, Mr Michael O'Sullivan, were sworn and examined.

At 2:25pm Mr O'Sullivan requested the Committee briefly continue hearing evidence in-camera.

Resolved on the motion of Ms Forsythe: that the Committee continue in-camera.

Public hearing resumed at 2:35pm

Evidence concluded and the witnesses withdrew.

Professor Peter Booth, Deputy Vice-Chancellor, Academic, University of Technology, Sydney, Dr Shanny Dyer, Head of Commercialisation, University of Technology, Sydney, Mr Stephan Wellink, Director of Research and Development, University of Technology, Sydney, were sworn and examined.

Evidence concluded and the witnesses withdrew.

The Chair informed Members of the Committee that he would shortly be looking at submitting an interim report to the Committee for deliberation.

3. ADJOURNMENT

The meeting adjourned at 4:10 pm until the next meeting at 1:00pm, Friday 19 September 2003, Parliament House.

Bayne McKissock
A/Director

Minutes No 06

Friday 19 September 2003
Room 814-815, Parliament House, at 1:00 pm

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Ms Robertson
Ms Forsythe	Mr Cohen

2. APOLOGIES

Mr Catanzariti	Ms Pavey

3. INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW

Resolved on the motion of Ms Forsythe: that Minutes No 03-05 be adopted.

The public were admitted.

Ms Robyn Kruk, Director General, New South Wales Department of Health, and Dr Greg Stewart, Deputy Director General Public Health, Chief Health Officer were sworn and examined.

Evidence concluded and the witnesses withdrew.

4. ADJOURNMENT

The meeting adjourned at 2:22 pm until the next meeting at 9:30am, Monday 22 September 2003, Charles Sturt University, Wagga Wagga.

Bayne McKissock
A/Director

Minutes No 07

Monday 22 September 2003
Charles Sturt University, Wagga Wagga, at 9:30am

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Ms Robertson
Mr Catanzariti	Ms Pavey

2. APOLOGIES

Mr Cohen	Ms Forsythe

3. SITE VISIT CHARLES STURT UNIVERSITY, WAGGA WAGGA

A site visit was conducted at Charles Sturt University, Wagga Wagga and briefings were given, including by the following people:

Professor Jim Pratley, Dean, Faculty of Science & Agriculture, Charles Sturt University

Mr Gary Wells, Director, Commercial Response Unit, City of Wagga Wagga

Ms Helen Scott-Orr, Executive Director, Research, Advisory and Education, NSW Agriculture

Mr Steve Sutherland, Regional Manager, NSW Agriculture

Dr Alison Bowman, A/Director, Wagga Wagga Agriculture Institute

Mr Terry Harden, Head of School, node of CRC for Viticulture

Prof Geoffrey R Scollary, Director, National Wine & Grape Industry Centre, Wagga Wagga

Mr John Oliver, Program Leader, Crop Improvement and Biotechnology

A site visit was conducted at the property of Mr Rob Houghton, Junior Vice President, Rice Growers Association, Leeton, and briefings were given, including by the following people:

Mr Matt Linnegar, Executive Director, Rice Growers Association

Mr Rob Houghton, Junior Vice President, Rice Growers Association

Mr Daryl Gibbs, Chairman, Rice R&D Committee, RGA

Mr Jeff Davis, Research Manager, Rural Industries Research and Development Corporation

Mr Laurie Lewin, Director, CRC for Sustainable Rice Production

Ms Helen Scott-Orr, Executive Director, Research, Advisory and Education, NSW Agriculture

Mr Steve Sutherland, Regional Manager, NSW Agriculture

4. ADJOURNMENT

The meeting adjourned at 5:30pm until the next meeting at 9:00am, Tuesday 23 September 2003.

Bayne McKissock
A/Director

Minutes No 08

Tuesday 23 September 2003
CSIRO, Griffith, NSW Agriculture Centre for Irrigated Agriculture, Griffith, and CRC for Sustainable Rice Production, Yanco at 9:30am

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Ms Robertson
Mr Catanzariti	Ms Pavey
Mr Cohen	Ms Forsythe

2. SITE VISIT CSIRO, GRIFFITH

A site visit was conducted at CSIRO, Griffith, and briefings were given, including by the following people:

Mr John Blackwell, Officer in Charge, CSIRO

Dr Shabhaz Khan, Research Director, Sustainable Irrigation Systems, CSIRO

Mr Mike Neville, Mayor of Griffith City Council

Mr Bob Laing, General Manager, Griffith City Council

Mr David Tull, Director of Infrastructure Projects, Griffith City Council

Ms Helen Scott-Orr, Executive Director, Research, Advisory and Education, NSW Agriculture

Mr Steve Sutherland, Regional Manager, NSW Agriculture

3. SITE VISIT NSW AGRICULTURE CENTRE FOR IRRIGATED AGRICULTURE, GRIFFITH

A site visit was conducted at the NSW Agriculture Centre for Irrigated Agriculture, Griffith, and briefings were given, including by the following people:

Mr Bill Moller, Site Manager, NSW Agriculture Centre for Irrigated Agriculture, Griffith

Mr Peter Melville, Horticulturist, NSW Agriculture Centre for Irrigated Agriculture, Griffith

Ms Helen Scott-Orr, Executive Director, Research, Advisory and Education, NSW Agriculture

Mr Steve Sutherland, Regional Manager, NSW Agriculture

4. SITE VISIT CRC FOR SUSTAINABLE RICE PRODUCTION, YANCO

A site visit was conducted at the CRC for Sustainable Rice Production, Yanco, and briefings were given, including by Dr Laurie Lewin, Director, CRC for Sustainable Rice Production.

5. ADJOURNMENT

The meeting adjourned at 3:30pm until the next meeting at 9:00am, Wednesday 24 September 2003.

Bayne McKissock
A/Director

Minutes No 09

Wednesday 24 September 2003
Brisbane Technology Park, Department of Innovation and Information Economy and Department of State Development, Brisbane, at 9:30am

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Ms Robertson
Ms Forsythe	Ms Pavey

2. APOLOGIES

Mr Catanzariti	Mr Cohen

3. MEETING WITH THE AUSTRALIAN INSTITUTE FOR COMMERCIALISATION, BRISBANE

9:30am

Briefings were given at the Australian Institute for Commercialisation, Brisbane, including by the following people:

Dr Rowan Gilmore, Chief Executive Officer, Australian Institute for Commercialisation

Mr Stewart Gow, Director, Venture Capital Unit, Qld Department of State Development

Ms Christina Vincent, Venture Capital Unit, Qld Department of State Development

The meeting concluded at 10:30am, the Committee adjourned until 11:00am

4. MEETING WITH THE QLD DEPARTMENT OF INNOVATION AND INFORMATION ECONOMY, BRISBANE

11:00am

Briefings were given at the Department of Innovation and Information Economy, Brisbane, including by the following people:

Mr John Kenny, Executive Director, Commercialisation and Development, Department of Innovation and Information Economy

Mr Patrick Bell, A/Program Director, Science, Research and Innovation, Department of Innovation and Information Economy

The meeting concluded at 12:30pm, the Committee adjourned until 2:00pm

5. MEETING WITH THE QLD DEPARTMENT OF STATE DEVELOPMENT, BRISBANE

2:00pm

Briefings were given at the Department of State Development, Brisbane, including by the following people:

Mr Mike Heffran, Executive Director, Industry Development, Department of State Development

Mr John Strano, Executive Director, Investment Division, Department of State Development

Mr Ray Kelly, A/Director, Investment Attraction, Department of State Development

6. ADJOURNMENT

The Committee adjourned at 3:00pm until the next meeting.

Bayne McKissock
A/Director

Minutes No 10

Monday 20 October 2003
Room 1153, Parliament House, at 5:00 pm

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Ms Pavey
Mr Catanzariti	Ms Forsythe
Mr Cohen	

2. APOLOGIES

Ms Robertson

3. INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW – CRC FORUM AND DINNER

The Committee proceeded to consider the agenda for the CRC Forum on 21 October 2003.

The Committee deliberated.

Resolved, on motion of Ms Forsythe: that the Committee adopt the agenda.

Resolved, on motion of Ms Forsythe: that the Committee issue a media release notifying the media of the CRC Forum on 21 October 2003 as part of its inquiries into science and its commercialisation in NSW.

4. ADJOURNMENT

The meeting adjourned at 5:15pm until the next meeting at 9:15am, Tuesday 21 October 2003.

Bayne McKissock
A/Director

Minutes No 11

Tuesday 21 October 2003
Parliament House, at 9:15am

1. MEMBERS PRESENT

Mr Burke	Ms Robertson
Mr Catanzariti	Ms Forsythe
Mr Cohen	Ms Pavey

2. INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW – CRC FORUM

The Chair opened proceedings.

The following people attended the forum:

Dr	Mingan Choct	Australian Poultry CRC
Mr	Tony Hill	Capital Hill Consulting
Mr	Guy Roth	CRC for Australian Cotton
Prof	Murray Scott	CRC for Advanced Composite Structures
Ms	Nicky Schick	CRC for Australian Cotton
Mrs	Bridget Jackson	CRC for Australian Cotton
Dr	Chris Scott	CRC for Australian Photonics
Mr	David Simmons	CRC for Australian Sheep Industry
Prof	James Rowe	CRC for Australian Sheep Industry
Dr	Doug Hawley	CRC for Bioproducts
Prof	Bernie Bindon	CRC for Cattle and Beef Quality
Dr	Robert Cowan	CRC for Cochlear Implant and Hearing Aid Innovation
Dr	David Garman	CRC for Environmental Biotechnology
Mr	Mack Williams	CRC for Environmental Biotechnology
Mr	Garth Brown	CRC for Environmental Biotechnology
Dr	Chris Mitchell	CRC for Greenhouse Accounting
Dr	Andy Rigg	CRC for Greenhouse Gas technologies
Dr	Clive Davenport	CRC for Microtechnology
Ms	Felicia Larsen	CRC for Mining
Mr	Christopher Buller	CRC for Pest Animal Control
Dr	Ian Dagley	CRC for Polymers
Prof	Darrell Williamson	CRC for Smart Internet Technology
Mr	Neville Roach	CRC for Smart Internet Technology
Dr	Laurie Lewin	CRC for Sustainable Rice Production
Mr	Russell Barratt	CRC for Sustainable Rice Production
Mr	John Herbert	CRC for Sustainable Rice Production
Mr	Tony Griffin	CRC for Sustainable Tourism
Mr	Peter Vaughan	CRC for Value Added Wheat
Ms	Amanda Davis	Vision CRC
Prof	Brien Holden	Vision CRC
Ms	Evette Waddell	Vision CRC
Ms	Kylie Evans	Vision CRC
Prof	Mark Wilcox	Vision CRC
Prof	Debbie Sweeney	Vision CRC

Dr	Daniel Deere	CRC for Water Quality and Treatment
Prof	Peter Robinson	CRC for Welded Structures
Mr	Sangarapillai Suntheraraj	CRC for Welded Structures
Mr	Rod Manns	Department of Education, Science and Training
Mr.	Shane Coombe	Dept of State & Regional Development
Mr	Jamie Callachor	Dept of State & Regional Development
Mr	Kaustuv Mukherjee	Dept of State & Regional Development
Mrs	Jill Baltzer	Distributed Systems Technology Centre
Mr.	Andrew Wood	Distributed Systems Technology Centre
Mr.	Mark Gibson	Distributed Systems Technology Centre
Mr.	Greg Crocetti	Environmental Biotechnology
Hon	Frank Sartor MP	Minister for Energy and Utilities, Minister for Science and Medical Research, Minister Assisting the Minister for Health (Cancer), and Minister Assisting the Premier on the Arts
Mr.	Ric Clark	NICTA
Ms	Helen Scott-Orr	NSW Agriculture
Ms	Joanne Finlay	NSW Agriculture
Ms	Rowena Tucker	NSW Health
Dr	George Morstyn	NSW Ministerial Review of Medical and Health Research
Mr	Greg Wood	NSW Ministerial Review of Medical and Health Research
Dr	Col Gellalty	Premiers' Department
Mr.	Bill Trestrail	SGI Australia/NewZealand
Ms	Lisa Keay	Student - Vision CRC
Mr.	Alex Nicholson	Student - CRC for Welded Structures
Ms	Jackie Tan	Student - Vision CRC
Mr	Tim Conibear	Student - Vision CRC
Ms	Kate Hegarty	The Cabinet Office
Ms	Shanthi herd	The Cabinet Office

ADJOURNMENT

The meeting adjourned at 4:45pm until the next meeting.

Bayne McKissock
A/Director

Minutes No 14

Wednesday 29 October 2003
Parliament House, Room 1136, at 10:05am

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Ms Robertson
Mr Catanzariti	Ms Forsythe
Mr Cohen	Ms Pavey

2. INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW

Resolved, on the motion of Ms Robertson: that the Committee conduct a public hearing at the Australian Technology Park, 10 November 2003. Witnesses to be arranged by the Chair and Secretariat, but to include representatives of Australian Technology Park Innovations and BioMed North.

3. ADJOURNMENT

The meeting adjourned at 10:20am until the next meeting.

Bayne McKissock
A/Director

Minutes No 15

Monday 10 November 2003
Australian Technology Park, Redfern, at 9:30 am

1. MEMBERS PRESENT

Mr Burke (in the Chair)	Ms Pavey
Mr Catanzariti	Mr Cohen

2. APOLOGIES
Ms Robertson
Ms Forsythe

3. INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW – PUBLIC HEARING

The public were admitted.

Prof Mark Sceats, Chief Executive Officer, Australian Photonics CRC was sworn and examined.

Evidence concluded and the witnesses withdrew.

Dr Mark Bradley, Chief Executive Officer, Australian Technology Park Innovations was sworn and examined.

Evidence concluded and the witnesses withdrew.

Mr Rob Lewis, Chief Executive Officer, South Australian Research and Development Institute, via teleconference, was sworn and examined.

Evidence concluded and the witnesses withdrew.

Dr Deborah Kuchler, Chief Executive Officer, BioMed North, Professor, Carol Pollock, Director BioMed North were sworn and examined.

Evidence concluded and the witnesses withdrew.

Dr Rowan Gilmore, Chief Executive Officer, Australian Institute for Commercialisation, via teleconference, was sworn and examined.

Evidence concluded and the witnesses withdrew.

4. ADJOURNMENT

The meeting adjourned at 5:00pm until the next meeting.

Bayne McKissock
A/Director

Minutes No 16

Monday 15 December 2003
Room 1108, Parliament House at 9.30am

5. MEMBERS PRESENT

Mr Burke (in the Chair)	Mr Catanzariti
Ms Forsythe	Ms Robertson
Ms Pavey	Mr Cohen

6. INQUIRY INTO SCIENCE AND ITS COMMERCIALISATION IN NSW - CONSIDERATION OF DRAFT FINAL REPORT

The Chair submitted his draft report entitled "Science and its commercialisation in New South Wales – Final Report", which, having been circulated to each Member of the Committee, was accepted as having been read.

The Committee proceeded to consider the draft report.

Resolved on the motion of Mr Cohen that the DVD highlights of the CRC Forum be included in the Final Report.

Chapter 1 read.

Resolved on the motion of Ms Forsythe: That the Committee Secretariat be permitted to correct stylistic, typographical and grammatical errors.

Resolved on motion of Ms Pavey: That in paragraph 1.10 the word 'excellent' be deleted.

Resolved on the motion of Ms Pavey: That in paragraph 1.11 the word 'achievements' be replaced with 'progress'.

Chapter 1, as amended, agreed to.

Chapter 2 read.

Resolved on the motion of Ms Pavey: That in paragraph 2.21 before the word 'publicly' insert the word 'jointly' and after the word 'publicly' the words 'and privately' be inserted.

Resolved on the motion of Mr Cohen: That after paragraph 2.25 insert the following paragraph:

> In undertaking their environmental responsibilities, agencies within the Environment Portfolio need to ensure that environmental decisions are credible and defensible. Science is fundamental to ensuring that our decisions have this basis. (Submission 50, Environment Portfolio, p1)

Chapter 2, as amended, agreed to.

Chapter 3 read.

Resolved on the motion of Ms Pavey: that the heading 'BioFirst Successes' be deleted and instead insert:

Proof of Concept program

Chapter 3, as amended, agreed to.

Chapter 4 read.

Resolved on the motion of Ms Forsythe: that in the introduction 'a vital' be deleted and 'an essential' be inserted.

Resolved on the motion of Ms Robertson: that Recommendation 3 have inserted:

That the administration of scientific research remain with each Government portfolio within the proposed body providing coordination, liaison and effective communication across portfolios.

Resolved on the motion of Mr Cohen: that Recommendation 5 be amended by inserting following bullet point:

Environmental sciences

Chapter 4, as amended, agreed to.

Chapter 5 read.

Resolved on the motion of Ms Robertson: that Recommendation 7 be amended to read:

That the Minister for Science and Medical Research develop intellectual property management and contract guidelines for adoption across all agencies in the NSW public sector.

Resolved on the motion of Ms Robertson: that Recommendation 8 be amended with the insertion after 'Research Scientist Classification, Policy and Guidelines':

or equivalent classification.

Chapter 5, as amended agreed to.

Chapter 6 read.

Chapter 6, as circulated, agreed to.

5 CONFIRMATION OF MINUTES

Resolved on the motion of Ms Forsythe; Minutes of meetings no.6-15 be adopted.

6 ADJOURNMENT

The meeting adjourned at 11.10am until the next meeting.

Bayne McKissock
A/Director

Appendix 8 Previous reports and discussion papers

Item	Title	Date
Discussion Paper 1	Public Sector Tendering & Contracting in New South Wales: A Survey	May 1989
Report 1	Public Sector Tendering & Contracting in New South Wales: Supply of Goods and Services	August 1989
Report 2	Public Sector Tendering & Contracting in New South Wales: Local Government Tendering & Contracting	October 1989
Discussion Paper 2	Coastal Development in New South Wales: Public Concerns & Government Processes	November 1989
Discussion Paper 3	Public Sector Tendering & Contracting in New South Wales: Capital Works Tendering & Contracting: Management Options	June 1990
Report 3	Public Sector Tendering & Contracting in New South Wales: Capital Works Tendering & Contracting. Volume A	April 1991
Report 4	Coastal Planning & Management in New South Wales: A Framework for the Future. Volume 1	September 1991
Supplement to 4	An Alternative Dispute Resolution Primer	September 1991
Report 5	Public Sector Tendering & Contracting in New South Wales: Capital Works Tendering & Contracting. Volume B	December 1991
Report 6	Payroll Tax Concessions for Country Industries. Volume I	December 1991
Report 7	Public Sector Tendering & Contracting in New South Wales: Supply of Goods and Services: Follow Up Report	June 1992
Report 8	Coastal Planning & Management in New South Wales: The Process for the Future. Volume II	October 1992
Report 9	Public Sector Tendering & Contracting in New South Wales: Local Government Tendering & Contracting: Follow Up Report	April 1993
Discussion Paper 4	Regional Business Development in New South Wales: Trends, Policies and Issues.	August 1993
Report 10	Regional Business Development in New South Wales: Achieving Sustainable Growth: Principles for Setting Policy. Volume I	May 1994
Report 11	Regional Business Development in New South Wales: Achieving Sustainable Growth: Initiatives for Setting Policy. Volume II	November 1994
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