

CSIRO Annual Report 2008–09

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Our purpose

By igniting the creative spirit of our people, we deliver great science and innovative solutions for industry, society and the environment.

Responsible Minister



Senator the Honourable
Kim Carr
Minister for Innovation,
Industry, Science and Research

Governing legislation

CSIRO is an Australian Government statutory authority constituted and operating under the provisions of the *Science and Industry Research Act 1949* (SIR Act).

This annual report is prepared in accordance with the requirements of the SIR Act and section 9 of the *Commonwealth Authorities and Companies Act 1997* (CAC Act).

CSIRO Board

The CSIRO Board is responsible to the Australian Government, through the responsible Minister, for the overall strategy, governance and performance of CSIRO. Further details of the CSIRO Board are on page 59.

About CSIRO

CSIRO – the Commonwealth Scientific and Industrial Research Organisation – is one of the largest and most diverse scientific organisations in the world. It has over 6,500 staff located across 55 sites throughout Australia and overseas.

Our history

The Council for Scientific and Industrial Research (CSIR) was established in 1926 with its primary research devoted towards agriculture. In the late 1930s this was extended to include industrial research.

In 1949, the CSIR was reconstituted as CSIRO, and gradually expanded its activities so that its research was related to almost every field of primary, secondary and tertiary industry in Australia.

Today, CSIRO is a trusted source for creative ideas and practical technologies to deliver impact for the nation.

What we do

CSIRO carries out scientific research in areas including energy, the environment, information technology, health, mining, manufacturing, agriculture, and natural resources. We seek to make a difference and generate impact by focusing on the nation's big challenges and opportunities. Our research delivers:

- integrated solutions to help address major national challenges
- technologies to transform or create new markets for Australian industry
- innovative technologies to improve the competitiveness of existing industries
- advice, information and research to meet specific community needs
- knowledge-based services to governments and businesses.

Cover image – Next generation solar cells. Discovery of new small molecules that deliver benchmark performance in high power conversion efficiencies is at the heart of CSIRO's advances in the commercial development of flexible, large area, cost-effective, reel-to-reel printable plastic solar cells. Developed with our partners in the Victorian Organic Solar Cell Consortium, flexible plastic solar cells are much cheaper and more efficient to produce, and have the potential to replace silicon in the next generation of solar collectors, supporting Australia's transition to a low carbon economy. Commercial printing trials of these printable-plastic solar cells commenced six months ahead of schedule, and were a major milestone of the Victorian Organic Solar Cell Consortium's three year R&D program. CSIRO Future Manufacturing Flagship's Dr Scott Watkins holds a sample of the plastic solar cells produced during the print trials at Securrency International. Photo: Tracey Nicholls

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Senator the Hon Kim Carr
Minister for Innovation, Industry, Science and Research
Parliament House
CANBERRA ACT 2600

We have pleasure in submitting to you, for presentation to Parliament, the sixty-first Annual Report of the Commonwealth Scientific and Industrial Research Organisation (CSIRO). This report has been prepared in accordance with the requirements of the *Science and Industry Research Act 1949* and in accordance with section 9 of the *Commonwealth Authorities and Companies Act 1997* (CAC Act).

Under section 9 of the CAC Act, CSIRO Board members are responsible for producing an annual report in accordance with the rules laid down in Schedule 1 of this Act, including a 'Report of Operations' prepared in accordance with the Finance Minister's Orders.

This report presents fairly the information required by the Minister for Finance and Deregulation as set out in the *Commonwealth Authorities and Companies (Report of Operations) Orders 2008*.

The report has been approved for presentation to you, signed this 19th day of August 2009 in accordance with a resolution of the Board members.

The report includes an appendix comprising a report from the Chief Executive of CSIRO, as trustee of the Science and Industry Endowment Fund (the Fund) established under the *Science and Industry Endowment Act 1926*, on the operations of the Fund together with a report by the Auditor-General on the accounts of the Fund.

Since 30 June 2009, no developments have arisen that have significantly affected or may significantly affect CSIRO's operations or state of affairs.

We commend the Organisation's achievements to you.

A handwritten signature in black ink, appearing to read 'John W Stocker'.

John W Stocker, AO
Chairman of the Board

A handwritten signature in black ink, appearing to read 'Megan Clark'.

Megan Clark
Chief Executive

October 2009

Highlights of 2008–09

Recent highlights of CSIRO's science and its application include:

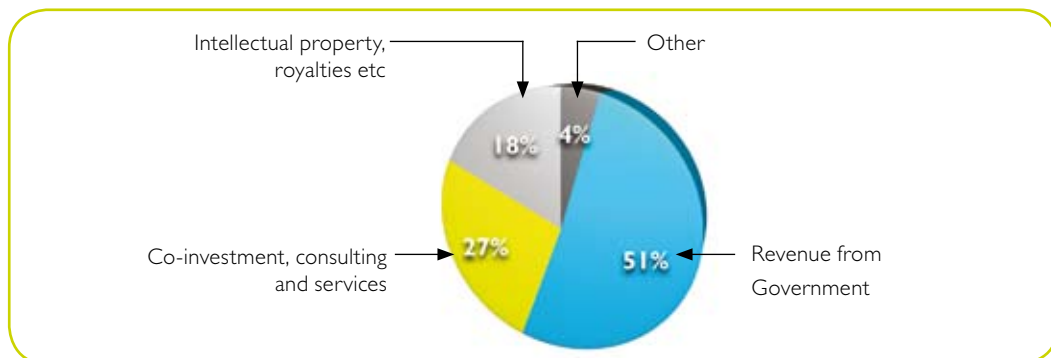
- returning very significant royalties for Australia from CSIRO's patented wireless technologies, which are used worldwide in hundreds of millions of mobile computing devices, including notebook computers, wireless access points, games consoles and printers
- an online tool, *Your Development*, which provides practical information on how to create sustainable urban residential developments
- the commercialisation of CSIRO's UltraBattery
- scientific input to policies which have reduced overfishing in Commonwealth waters
- world leading efficiencies from second generation solar cell materials
- an increase in the growth rate of Black Tiger prawns by 38 per cent when fed a novel aquafeed ingredient
- CSIRO's Healthy Heart Program, a 12 week lifestyle program for lowering cholesterol and maintaining a healthy weight
- reductions of 20 per cent in perfluorocarbon emissions events with a new aluminium production technology
- science contributions to the \$200 million Reef Rescue package released by the Australian Government
- a new technology to date the age of a common crystal as a new technique for diamond exploration
- successfully sequencing the bovine genome as part of an international consortium

- a three-year collaborative agreement with the Victorian Government to better understand the State's petroleum basins
- the discovery of two new greenhouse gases and increasing methane levels in 2007 and 2008, adding to confirmation of an increase in carbon emissions, which is influencing US and European policy
- the commercialisation of CSIRO's smart sensor network technology – CSIRO FLECK™
- the signing of licensing agreements by five longwall mining manufacturers, which will return approximately \$2 million in fees to CSIRO over the next five years.

These successes were achieved notwithstanding emerging economic challenges affecting national and international research and development (R&D) collaborators and investors and their markets. We are responding to these challenges by developing new and sustained collaborative and commercial R&D relationships to achieve growth and build research capacity.

A further challenge is to maintain and grow our science capability in order to meet the increasing demand for CSIRO's expertise and technological solutions in areas of national challenges – such as energy, climate change and water management. In order to do this we continue to actively prioritise our research activities, consolidate our operations, and simplify CSIRO's processes and management arrangements.

Figure 1: CSIRO revenue in 2008–09



Financial Performance 2008–09

CSIRO's financial performance for 2008–09 is summarised in Table 1.

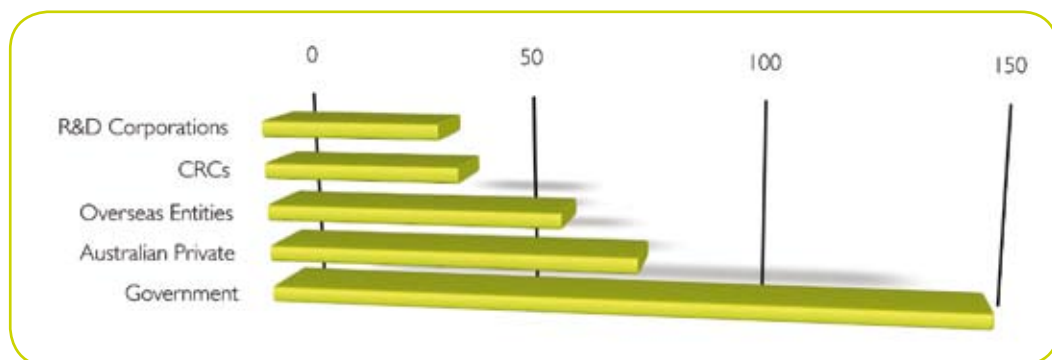
CSIRO's operating result for the year to June 2009 was a surplus of \$122.0 million, against a budgeted deficit of \$34.2 million. This comprised total revenue of \$1,302.9 million (above budget by \$214.0 million) and total expenses of \$1,180.9 million (above budget by \$57.8 million).

Total external revenue of \$634.8 million exceeded the budget of \$420.6 million by \$214.2 million, primarily the result of intellectual property settlement revenues.

Table 1: Financial performance – Five years at a glance

| Revenue by source | 2004–05 | 2005–06 | 2006–07 | 2007–08 | 2008–09 |
|---|---------------|--------------|--------------|---------------|----------------|
| | \$m | \$m | \$m | \$m | \$m |
| Co-investment, consulting and services | | | | | |
| Australian private sector | 63.9 | 67.6 | 58.0 | 68.2 | 76.3 |
| Australian Governments | 89.7 | 96.5 | 116.0 | 119.5 | 148.3 |
| Research and Development Corporations | 48.0 | 44.3 | 43.2 | 30.2 | 36.5 |
| Cooperative Research Centres | 35.2 | 35.2 | 39.8 | 38.2 | 40.3 |
| Overseas entities | 33.5 | 36.4 | 37.2 | 35.3 | 61.0 |
| Work in Progress/Deferred Revenue Adjustment | (9.7) | (8.0) | (8.5) | (1.4) | (14.5) |
| Total co-investment, consulting and services | 260.5 | 272.0 | 285.8 | 290.0 | 347.9 |
| Intellectual property, royalties, etc | 22.0 | 32.4 | 30.6 | 81.7 | 229.6 |
| Total research and services revenue | 282.5 | 304.4 | 316.3 | 371.7 | 577.5 |
| Other external revenue (including interest) | 33.7 | 43.9 | 44.5 | 41.3 | 40.1 |
| Gain/(Loss) on sale of assets | 0.0 | 15.5 | 2.7 | 4.8 | 17.2 |
| Other fair value gains and reversals | 3.1 | 0.0 | 0.1 | 10.8 | 0.0 |
| Total external revenue | 319.3 | 363.8 | 363.6 | 428.6 | 634.8 |
| Revenue from Government | 577.1 | 593.9 | 610.1 | 663.2 | 668.1 |
| Total revenue | 896.4 | 957.7 | 973.7 | 1091.8 | 1,302.9 |
| Less: expenses (excluding value of assets sold) | 917.2 | 947.8 | 972.7 | 1044.1 | 1,180.9 |
| Operating result | (20.8) | 9.9 | 1.0 | 47.7 | 122.0 |

Figure 2: Source of CSIRO's co-investment, consulting and services revenue 2008–09, \$m



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Foreword by the Chairman



During a time of severe economic conditions, it is gratifying that the Australian Government has retained its focus on the National Innovation System and has increased its investment in

research. These initiatives reflect the importance of science as a driver of sustainable development, and the contributions science can make to policy, nation building, industry competitiveness and jobs.

This Report reveals the breadth of CSIRO's scientific excellence, and our expertise in applying this to help define, inform and address many of the challenges facing humanity.

The year has seen a number of accomplishments. Results from our research in plant and animal breeding will boost production and reduce the environmental impact of agriculture and aquaculture. There have also been many achievements in improving and protecting our food supply while dealing with changing environmental conditions and disease threats.

Australia's response to a changing climate has required a broad effort from CSIRO. We have advised governments and industry on water, carbon trading, sea levels, fisheries and much more. Discoveries have also been made that will improve efficiency and reduce carbon dioxide emissions from the minerals, oil, gas and coal industries and from energy generation. Building on the plastic banknote technology released in 1988, CSIRO and its partners this year instigated the commercial trial of printable solar panels, bringing cheap solar cells a step closer. CSIRO itself has been actively reducing its own carbon footprint, with the Newcastle Energy Centre demonstrating how offices can use 60 per cent less energy and reduce greenhouse emissions.

CSIRO's expertise has also been sought in relation to the management and impact of natural disasters. Given CSIRO's depth of knowledge in bushfire

research, for example, we are responding to the issues raised by the Victorian bushfire disaster.

CSIRO's depth of talent and capability to mount large multidisciplinary projects came to the fore this year with the publication of *Water Availability in the Murray-Darling Basin Report*. This multi-party research project – one of the largest undertaken by CSIRO – provides the core information that is needed to manage the Basin sustainably.

Most of the projects described in this Report have taken many years to transform from concept to the point where they have a real impact on people's lives. For instance, a core technology underpinning wireless local area networks (LANs) was developed by CSIRO in 1992. Building on past research in radio astronomy, our scientists found a solution to a key problem which was holding back the development of wireless LANs. Today this technology is used in almost every wireless LAN in the world. Many other discoveries in astronomy, information and computing technology, nanotechnology and manufacturing are detailed in this Report.

I am pleased to welcome our new Chief Executive, Dr Megan Clark. Her broad scientific and industrial experience is already helping us refine our 15-year strategic plan for the challenges ahead.

We acknowledge the dedication and fine leadership Dr Geoff Garrett provided as Chief Executive over a period of eight years. During the year another one of our long-serving Board members, Professor Suzanne Cory, completed her term. We thank her for her valuable contributions.

On behalf of the Board of CSIRO, I congratulate and thank the management and staff of CSIRO for their contribution to the Organisation and to Australia's future.

A handwritten signature in dark ink, appearing to read 'John W Stocker'.

Dr John W Stocker AO
Chairman of the CSIRO Board

Chief Executive's Report



Since I joined CSIRO in January 2009, an economic downturn and tragic bushfires in Victoria have challenged us to respond as a nation. In contributing to these responses,

CSIRO has drawn on its key strengths of scale, breadth and multidisciplinary science. The financial crisis has created a renewed focus on the importance of innovation now and in the future, while the bushfires further highlighted the importance of scientific knowledge and information for managing and learning from such tragic occurrences.

This year, CSIRO has continued to shape its research to respond to complex global research challenges in population growth and climate change, and national challenges in water, energy security, competitive industries and health and wellbeing for Australians.

CSIRO's strategy is to bring together the very best scientists to undertake new discovery focused on these challenges, as well as apply all our skills to help our industry partners compete.

As an organisation with goals and values that go beyond our science, we know we will be successful when our people always go home safely at night; our collaborators and partners realise lasting value from our science and describe working with us as a pleasure; our people share a sense of discovery; and we remain a trusted advisor to the people of Australia. We remain committed to the integrity of our science, which has been a foundation for the Organisation since our beginnings over eighty years ago.

I am also proud of CSIRO's commitment to managing scientific assets on behalf of the nation – such as the Australia Telescope National Facility, the Marine National Facility research vessel *Southern Surveyor* and the Australian Animal Health Laboratory – and of our many

programs that bring science and scientists into the lives of young people around the nation. Our aim is to bring the wonder of science directly to over a million young Australians every year.

Our Performance

CSIRO has performed strongly in the face of significant challenges, delivering substantial scientific impact and a strong financial result in the current climate, as well as transitioning to a new Chief Executive. We successfully licensed CSIRO's wireless local area network technology to most major global manufacturers of wirelessly-enabled products, including around half the global laptop computer market. This year we reached a record 161 active licenses for our technologies and discoveries.

During this year, our five operational Groups increased the impact of their science for economic, social and environmental benefits, some of which are highlighted below. In the body of this Report you will find many more examples of scientific excellence achieved and impact delivered. I commend these to you.

The **Agribusiness Group** has continued to improve agricultural productivity, food industry efficiency and human health outcomes. Substantial improvements in productivity and yield have been delivered for industries including prawns and wheat. CSIRO scientists also participated in completion of an international project to sequence the cow genome. In the health area, imaging research through CSIRO's Australian Imaging, Biomarkers and Lifestyle Flagship Study of Ageing Collaboration Fund Cluster, has brought forward the detection of Alzheimer's disease by potentially 18 months, we have initiated the Healthy Heart Program with our partners, and the CSIRO-developed anti-flu drug Relenza is part of the global arsenal against influenza H1N1 (swine flu). Our Australian Animal Health Laboratory assisted the national response to swine flu and we supported our industry partner in preparing a vaccine.

The **Energy Group** is tackling the challenges of sustainable energy production and use, as well as leading research aimed at more sustainable utilisation of our vast ocean resources. CSIRO teams have modelled emission trading impacts and future technology scenarios, commissioned four carbon dioxide capture plants in Australia and China, and reduced offshore drilling risk while increasing oil availability to save one of our partners close to half a billion dollars.

Our environmental surveys have been used by the Western Australia government to support infrastructure decisions on a liquified natural gas precinct and the United Nations has recognised our work with Australia's Northern Prawn Fishery as a global model for sustainable fisheries management.

The **Environment Group** works to understand how Australia and the globe will be affected by climate change and to address Australia's water availability challenges. CSIRO led an acclaimed multidisciplinary research project on water availability in the Murray-Darling Basin and we are now undertaking similar studies in northern Australia, south-west Western Australia and Tasmania. As part of the nation's response to the Victorian bushfire tragedy, fire protection systems developed with our partners are now used in response vehicles to protect the lives of fire-fighters and CSIRO continues to support the Victorian Bushfires Royal Commission.

The **Information and Communication Sciences and Technology Group** brings together CSIRO's world-leading strengths in Information and Communication Technologies, mathematics and radio astronomy with a focus in applying these key underpinning disciplines for national benefit. A most significant achievement through this Group – already highlighted above – has been the successful licensing of our wireless local area network (WLAN) technology to manufacturers of wirelessly-enabled devices. This technology is now used in almost every WLAN enabled device sold throughout the world.

CSIRO astronomers at the Australia Telescope Compact Array have revealed the face of an enormous galaxy called Centaurus A, which emits a radio glow covering an area 200 times bigger than the full moon. We also celebrated the 40th anniversary of the Apollo 11 moon landing and the role of teams at Tidbinbilla Tracking Station in Canberra and Parkes Observatory in relaying images of this moment.

The **Manufacturing, Materials and Minerals Group** felt the greatest impact of the global financial crisis, with the minerals industry adjusting to reduced commodity prices and Australian manufacturing facing pressure from exports from China. Nevertheless, we demonstrated increased iron ore production efficiency and our strategic partnership with Boeing led to a cost-saving paint process for their 737 fleet. We continue to develop an automated longwall coal mining system and commenced trials for manufacturing solar cells using printing technology similar to that used for polymer banknotes.

Collaboration and Partnering

The CSIRO National Research Flagships are a most important way of catalysing collaboration to address national challenges and opportunities. The Flagships continue to make excellent progress toward their goals. With collaboration a central and vital component of the Flagship model, it was pleasing to see that during this year the Flagship Collaboration Fund approved funding for seven new research clusters. In total the 20 Flagship clusters now have partnerships with over 30 universities, two CRCs and several publicly-funded research agencies.

Our People

The effort and commitment by all our people has been extraordinary. I am extremely proud to be leading the 6,500 people who have contributed to our successes and discoveries. To our staff, I reinforce the responsibility of every person in CSIRO to ensure scientific excellence, to build trust and respect each day with partners, to take

the initiative to explore new horizons, consistently do what we say we will do and strive towards a healthy, safe and sustainable future.

I would like to thank Dr Geoff Garrett for his enthusiasm and fine leadership of the Organisation over the last eight years and for his help in ensuring a smooth transition during the year.

Looking Forward

There is still much to do. We aim to become one of the most respected research and development organisations in the world. We will continue to catalyse a response to national challenges, working with universities and research organisations, industry, the community and government. We are proud to manage national facilities that are used by national and international scientists. We will work with industry to provide competitive advantages and build platforms that can assist whole new industries in this country.

In the coming year we will sharpen our focus on manufacturing and better integrate our energy work to develop future energy options. To address the challenges of global food security with reduced carbon footprint, we have formed a new National Research Flagship in sustainable agriculture. In health we will continue to take a long-term view to address the substantial challenges of obesity, Alzheimer's disease and colorectal cancer. We will continue to build our understanding of our water resources by extending work on the Murray-Darling Basin to river systems across Australia and build an integrated picture of the nation's carbon footprint and future options.

I look forward to an exciting 2009–10.



Megan Clark

Chief Executive

September 2009



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Part one – Performance

CSIRO Strategy and Operations

Part one: Performance

CSIRO Strategy and Operations

As Australia's national science agency, CSIRO is a powerhouse of ideas, technologies and skills for building prosperity, growth, health and sustainability.

CSIRO's research activities improve industry, the environment and community wellbeing. We do this by providing advice, information and solutions, including the delivery of new and improved technologies, management systems, intermediate and final products and services for business.

We deliver research outcomes across the breadth of the National Research Priorities agenda (Figure 1.1) and the National Innovation System (Figure 1.2).

Our roles in the National Innovation System

- Generating new or significantly transforming industries
- Catalysing a scientific response to major national challenges
- Advancing frontiers of science/Managing national facilities and collections
- Delivering incremental innovation for existing industries
- Science-based solutions for the community
- Science outreach and education/Scientific publication and advice.

Figure 1.1: CSIRO's alignment to National Research Priorities

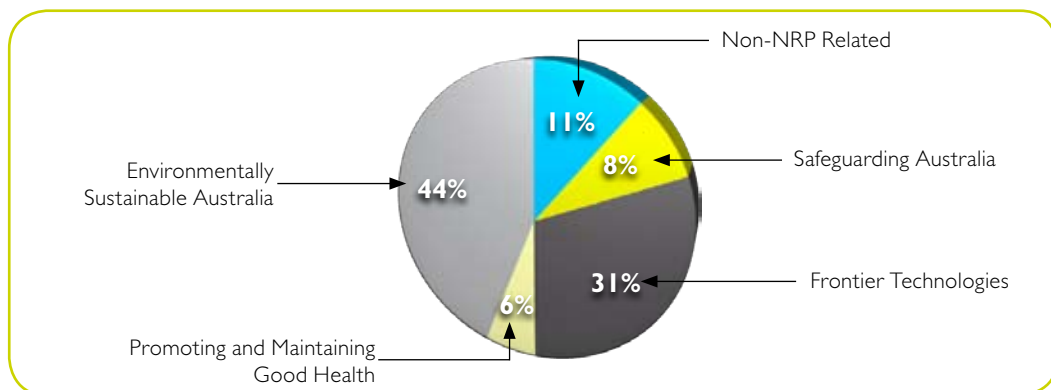
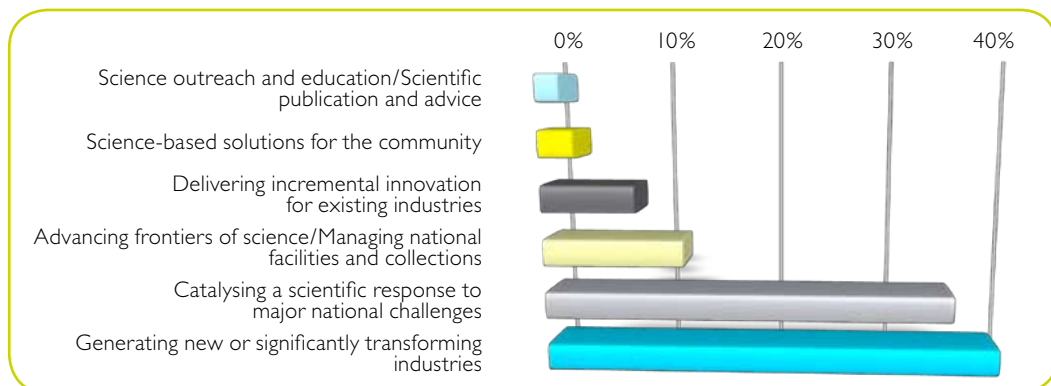


Figure 1.2: CSIRO's work allocation to National Innovation System roles



CSIRO strategy 2008–09

Consistent with the roles listed above, CSIRO's strategy for 2007–2011 is designed to ensure that we grow our impact by delivering great science and innovative solutions for industry, society and the environment.

Early in 2009, the CSIRO Executive Team and Board undertook a mid-term review of CSIRO's Strategic Plan 2007–2011. This review confirmed that the strategy remains a robust guide for the Organisation, but identified the opportunity to adopt a clearer expression of the core elements of the strategy. The practical implication of this was an expansion of the strategic elements from three to five (see Figure 1.3), the articulation of key organisational objectives and a new structure of our outcome domains. These will take effect in 2009–10 and are presented in the CSIRO 2009–10 Operational Plan, which is available at: www.csiro.au/operational-plan

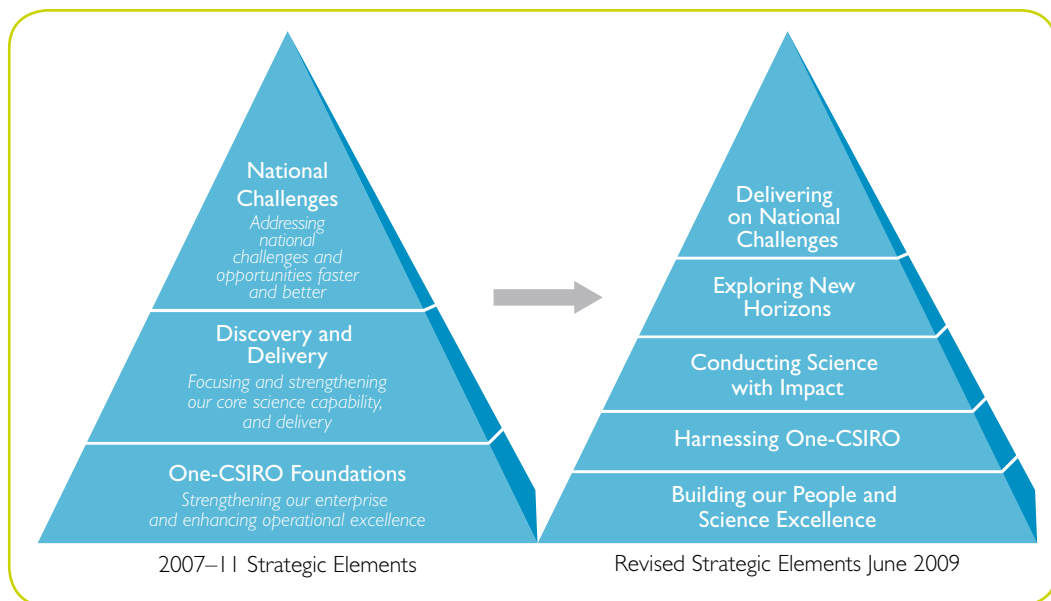
Strategy implementation 2008–09

Our strategy is delivered through the coordination and realisation of a number of powerful strategic initiatives with specific objectives.

In 2008–09, we focused our efforts on three enterprise-wide strategic initiatives designed to address some specific challenges in relation to: (a) developing relationships with external organisations; (b) the need to balance the delivery of impact with the need to maintain science capability; and (c) simplifying our processes and management arrangements.

The first initiative was aimed at developing new and sustained collaborative and commercial R&D relationships to achieve growth and build research capacity. Termed **external engagement**, this initiative clarified our processes of, and activities around, engaging organisations outside of CSIRO. During 2008–09, we improved our external engagement by:

Figure 1.3: CSIRO's strategic elements



- developing more integration between our research and functional areas. This was done by assigning staff within our Business Development area to specific research areas.
- streamlining our contractual processes. We have sought to improve transaction times by increasing the use of standard agreements; conducting training; better scheduling of transactions and deployment of legal and contract management resources; and implementing new enterprise systems for managing legal and contract processes.

The second initiative was aimed at balancing the delivery of impact with the need to maintain science **capability** in the long-term. A science capability is an integrated combination of people (skills, experience and know-how), assets (research equipment and facilities) and relationships. Maintaining capability in science is important to uphold CSIRO's position as Australia's premier, mission-oriented, strategic research organisation (further details on capability are provided on pages 75–76). In 2008–09, CSIRO:

- completed development of its capability management framework. This framework aligns and integrates capability related activities around people, infrastructure and organisation.
- expanded the scope of metrics used to measure the health of our science. These have become part of our regular reporting processes.
- completed a survey of science leadership and science leadership succession. This survey identified future gaps in our capability, addressed to mitigate the risks such gaps present to the Organisation.

The third strategic initiative was aimed at improving the effectiveness and efficiency of CSIRO by **simplifying** our business processes, practices, procedures, governance arrangements and structures. This initiative was delayed due to the transition to a new Chief Executive and there

were few tangible outcomes from the initiative this financial year. However, a framework for simplifying CSIRO has been prepared and important foundations have been laid to increase the pace of implementation in 2009–10.

Managing our research

CSIRO's research and services are managed and delivered through Research Groups. Each Group is led by a Group Executive who is a member of the Executive Team. All Groups are committed to pursuing their objectives through partnerships in the private and public sectors, both within Australia and internationally. They also nurture the development of a range of research capabilities and manage their deployment to research 'Themes', each of which is designed to deliver specific benefits to Australia. There are five Research Groups:

The **Agribusiness Group** (see page 34 for more information) includes the following entities:

- Food Futures National Research Flagship
- Preventative Health National Research Flagship
- Agricultural Sustainability Initiative
- Entomology Division
- Food Science Australia* / Human Nutrition
- Livestock Industries Division
- Plant Industry Division

The **Energy Group** (see page 36 for more information) includes the following entities:

- Energy Transformed National Research Flagship
- Wealth from Oceans National Research Flagship
- Energy Technology Division
- Petroleum Resources Division

**Joint venture with the Victorian Government*

The **Environment Group** (see page 38 for more information) includes the following entities:

- Climate Adaptation National Research Flagship
- Water for a Healthy Country National Research Flagship
- Land and Water Division
- Marine and Atmospheric Research Division
- Sustainable Ecosystems Division

The **Information and Communication Sciences and Technology Group** (see page 40 for more information) is comprised of the following entities:

- Australia Telescope National Facility (ATNF)
- Information and Communication Technology Centre
- Mathematical and Information Sciences Division

The **Manufacturing, Materials and Minerals Group** (see page 42 for more information) includes the following entities:

- Future Manufacturing National Research Flagship

- Light Metals National Research Flagship
- Minerals Down Under National Research Flagship
- Exploration and Mining Division
- Materials Science and Engineering Division
- Minerals Division
- Molecular and Health Technologies Division

Performance

This section outlines our performance against the government's annual Portfolio Budget Statements.

Our portfolio budget statement outcome and outputs

All Australian Government agencies that receive revenue from government are required to develop an 'outcomes and outputs' framework that provides the context for their corporate governance, management and reporting systems. Table 1.1 outlines our outcome-outputs framework as agreed with the Australian Government.

Table 1.1: CSIRO's outcome-outputs framework

| Outcome | | | |
|--|--------------------------------------|--|--|
| Australia has a strong capability in scientific research and development that delivers ongoing economic, social and environmental benefits and provides science and technology solutions relevant to current and emerging national challenges and opportunities. | | | |
| Output Group 1 | Output Group 2 | Output Group 3 | Output Group 4 |
| National Research Flagships See pages 7–29 | Core Research See pages 30–43 | Science Outreach: Education and Scientific Publishing See pages 44–47 | National Research Infrastructure: National Facilities and Collections See pages 48–52 |

National Research Flagships (Output Group 1) and Core Research (Output Group 2) represent the majority of CSIRO's appropriation. These two output groups are the key mechanisms for undertaking strategic and applied research to benefit industry, the environment and the community.

Science Outreach (Output Group 3) and National Research Infrastructure (Output Group 4) complement and enhance the impact of Output Groups 1 and 2. In addition to the direct value they generate for users, they are of major importance in building Australia's long-term capability and capacity to perform science and generate scientific solutions.

Performance framework

CSIRO's research outcome focus is primarily dependent on delivering results with relevance and impact for Australia. **Impact** through demonstrated benefits to industry, the environment and the community is the ultimate measure of CSIRO's success. Due to the nature of scientific research and development, the delivery of impact is – on average – five to 15 years. We have, therefore, developed a performance framework which uses lead indicators to monitor the path-to-impact. These include performing high-quality **science**, building and maintaining strong **relationships** and effective **resourcing** of activities.

Taken together, indicators of performance over time in these crucial dimensions will provide an indication of the overall effectiveness of CSIRO's strategy, and for this reason these four dimensions are reflected within the performance indicators for CSIRO's four outputs. This Annual Report provides evidence of our performance within each output group using the performance indicators outlined in the Portfolio Budget Statements.

Output Group I – National Research Flagships

CSIRO's National Research Flagships Program brings together the best and the brightest from across the Australian innovation system. Flagships address Australia's major research challenges and opportunities. They apply large-scale, long-term, multidisciplinary science and aim for widespread adoption of solutions.

The Flagships are one of the largest scientific research programs ever undertaken in Australia, with a total investment to 2010–11 estimated to be about \$2 billion.

The goals of the nine Flagships are based on a deep understanding of community and industry needs. In 2008–09, the six original Flagships (Energy Transformed; Food Futures; Light Metals; Preventative Health; Water for a Healthy Country; and Wealth from Oceans) continued to make substantial progress towards their goals.

In the 2007–08 Federal Budget, three new Flagships were announced (Climate Adaptation; Niche Manufacturing (now known as Future Manufacturing); and Minerals Down Under). These have now been established and are focusing on major challenges facing Australia today.

The roadmap diagrams included in the following sections for each Flagship provide the overall context for the 2008–09 achievements listed on pages 12–29 and demonstrate how the work contributes to the Flagship's overall long-term goal.

Portfolio budget statement performance summary

Table 1.2 presents a summary of performance against the 2008–09 Portfolio Budget Statement performance indicators and targets.

Table 1.2: National Research Flagships performance

| Performance indicator: Impact | |
|---|---|
| Target | Progress in 2008–09 |
| Demonstrated adoption and impact of Flagship outputs in relation to, for example: <ul style="list-style-type: none">• marketed products and services• human health, safety and skills• natural resource management. | See pages 12–29 for a showcase of the work and achievements of CSIRO's National Research Flagships. |
| All Flagships have developed a 'path-to-impact' with reference to major scientific/technical milestones and to the development of relationships or events critical to the achievement of Flagship goals. | All Flagships have developed a 'path-to-impact' expressed as a roadmap. The roadmap for each Flagship is shown on pages 12–29. The Flagship's current position along the roadmap is also indicated. |

Performance indicator: Science^(a)

| Target | Progress in 2008–09 |
|--|---|
| Maintain or increase the number of refereed publications and new inventions per researcher. | <p>The number of refereed publications per researcher in CSIRO is 2.89; this is consistent with the five year average of 2.8. Trend data is shown in Table 1.3 (see page 10).</p> <p>The number of new inventions per researcher is 0.047 which is a 1.5 per cent increase compared to 2007–08 figures. Trend data is shown in Table 1.4 (see page 10).</p> |
| Maintain the quality and impact of CSIRO's publications (compared with relevant benchmarks) as indicated by CSIRO's average citation rate and average 'impact factor' of journals in which CSIRO papers are published. | <p>The average citation rate for CSIRO's research publications is 12.56 in 2008–09.^(b) Trend data is shown in Table 1.3. CSIRO's average number of citations per paper is the highest of any Australian institutions that publish across a broad range of research fields. The Australian National University (ANU) follows CSIRO with an average of 11.93 citations per paper. The Australian average is 10.37 and the world average is 9.43.</p> <p>The average impact factor of journals in which CSIRO papers are published for the last five year period is 2.19; this is an increase on the previous five year period, where the average impact factor was 1.76.</p> |

(a) Publications and inventions data are for CSIRO as a whole entity. Our information systems did not allow us to separate the data into Output Group 1 and Output Group 2. They are presented here for both Output Groups.

(b) Data updated as of 1 May 2009 to cover a ten-year plus two-month period, 1 January 1999–28 February 2009.

| Performance indicator: Relationships | |
|--|--|
| Target | Progress in 2008–09 |
| Continued financial support by Flagship partners. | Financial support by Flagships partners is shown by the amount of external earnings received by Flagships each year. In 2008–09, the external earnings are \$128.8 million compared to \$94.3 million in 2007–08. |
| Clusters and other partnerships within each Flagship established as per agreed plan. | To support delivery on their goals, the nine Flagships integrate essential capability from across the National Innovation System through the Flagship Collaboration Fund. For each Flagship, collaborative partnerships are supported through postgraduate scholarships, visiting fellowships, research projects and research clusters. Of these, clusters operate at the largest scale, providing \$3 million over three years to publicly funded research institutions, both in Australia and overseas, matched by equivalent co-investment. In 2008–09, seven new clusters involving over 20 national and international universities plus industry partners were approved for funding. This brings the total number of clusters for which funding has been committed since the inception of the Fund to 20. |
| Performance indicator: Resources | |
| Target | Progress in 2008–09 |
| Maintain total investment in National Research Flagships. | The total investment in National Research Flagships in CSIRO was \$420,634 in 2008–09 compared to \$379,405 in 2007–08. |
| Investment as per the Flagship Collaboration Fund. | In line with maintaining the momentum of the Flagship Collaboration Fund, at the end of 2008–09 almost \$36 million has been disbursed from the Fund, and approximately \$88 million out of the initial \$114 million 2007 Federal Budget funding has been committed to approved scholarships, fellowships, projects and clusters. |

Table 1.3: CSIRO publications by type (Output Groups 1 and 2)

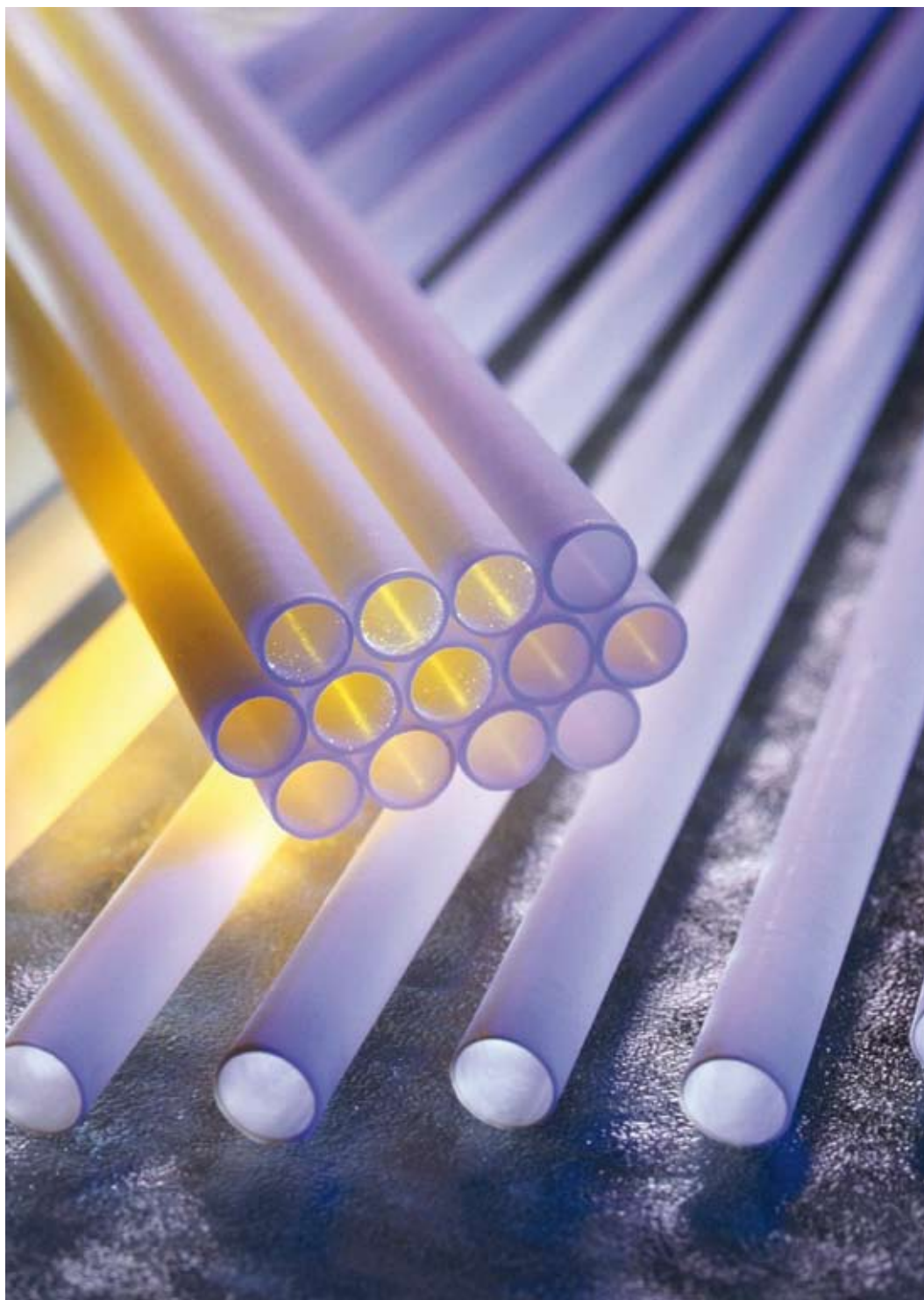
| Publication type ^(a) | 2004 | 2005 | 2006 | 2007 | 2008 |
|-----------------------------------|--------------|--------------|--------------|--------------|----------------------|
| Journal articles | 1,858 | 1,945 | 2,198 | 2,239 | 2,542 |
| Books/chapters | 267 | 238 | 227 | 234 | 363 |
| Conference papers | 1,713 | 1,852 | 1,830 | 1,525 | 1,911 |
| Technical reports | 277 | 620 | 676 | 613 | 145 ^(c) |
| Total | 4,115 | 4,655 | 4,931 | 4,611 | 4,961 |
| Citations per paper | 9.87 | 10.46 | 11.09 | 12.17 | 12.56 ^(b) |
| Total publications per researcher | 2.60 | 2.92 | 3.00 | 2.81 | 2.89 |

(a) See glossary page 159 for definition of publication types. (b) Data updated as of 1 May 2009 to cover a ten-year plus two-month period, 1 January 1999–28 February 2009. (c) The decline in technical reports is due to a problem with data collection for this item and is subject to revision.

Table 1.4: CSIRO intellectual property by type

| IP category ^(a) | Sub-category | 2004–05 | 2005–06 | 2006–07 | 2007–08 | 2008–09 |
|-------------------------------|--------------------------|---------|---------|---------|---------|---------|
| Patents | Current PCT applications | 95 | 74 | 91 | 111 | 97 |
| | Granted | 2,048 | 2,113 | 2,067 | 1,933 | 1,929 |
| | Live cases | 3,919 | 4,084 | 3,922 | 3,787 | 3,710 |
| Inventions | Patent families | 745 | 780 | 734 | 741 | 743 |
| | New | 79 | 90 | 84 | 67 | 80 |
| Trade marks | Australian | 306 | 281 | 287 | 291 | 265 |
| | Foreign | 100 | 91 | 104 | 113 | 130 |
| Plant breeder's rights | Australian | 80 | 113 | 119 | 122 | 122 |
| | Foreign | 21 | 17 | 25 | 25 | 25 |
| Registered designs | Australian | 3 | 2 | 3 | 2 | 2 |
| | Foreign | 12 | 12 | 12 | 11 | 10 |
| New inventions per researcher | | 0.057 | 0.056 | 0.053 | 0.041 | 0.047 |

(a) IP categories are defined in the glossary (page 159).



Ceramic membrane tubes for separating pure oxygen from air or other gases. Photo Mark Fergus

Climate Adaptation Flagship

Flagship goal:

To equip Australia with practical and effective adaptation options to climate change and variability and in doing so create \$3 billion per annum in net benefits by 2030.

Research expenditure 2008–09: \$26.5 million

Objectives

- Develop methods to assess vulnerability to economic, environmental and social impacts of climate change.
- Develop tools for better planning and adaptation to the consequences of extreme climatic events.
- Integrate consideration of climate adaptation in conservation policy and natural resource management.
- Develop new land uses and livelihood options where agriculture, forestry or fisheries may no longer be viable.
- Actively collaborate with international partners.

Progress in 2008–09

- Collaborated on a prize winning vulnerability study of Victoria's Western Port region.
- *Your Development* – an online tool provides practical information to create sustainable urban residential developments; see: www.yourdevelopment.org
- Provided the latest research on bushfires and climate change to the Victorian Bushfires Royal Commission.
- Delivered a report to the Australian Government on implications of climate change for marine fisheries and aquaculture; available at: www.climatechange.gov.au/impacts/publications/fisheries.html
- Investigated Asian and Pacific vulnerability and implications for climate adaptation in a strategic partnership with AusAID.

Background

The Climate Adaptation Flagship was launched on 9 July 2008 to assist Australia to adapt more effectively to the impacts of climate change and variability. CSIRO's leading scientists are working in partnership with governments, industries and communities to address this urgent national challenge. The Flagship focuses on regional and national scale climate change projections and vulnerability assessments to support adaptation.

Projects are addressing urban coastal vulnerability in settlements by developing design, infrastructure and management solutions

to enhance adaptive capacity. Conservation strategies are being developed to maximise resilience in marine and terrestrial ecosystems threatened by climate change. As well as developing effective adaptation options for Australia's primary industries and rural regions we are supporting our neighbours in the Asia-Pacific in their efforts to adapt to climate change.

Achievements 2008–09

- The Marine Climate Change Impacts and Adaptation Report Card is the result of a collaboration between 70 Australian and international scientists, bringing the physical

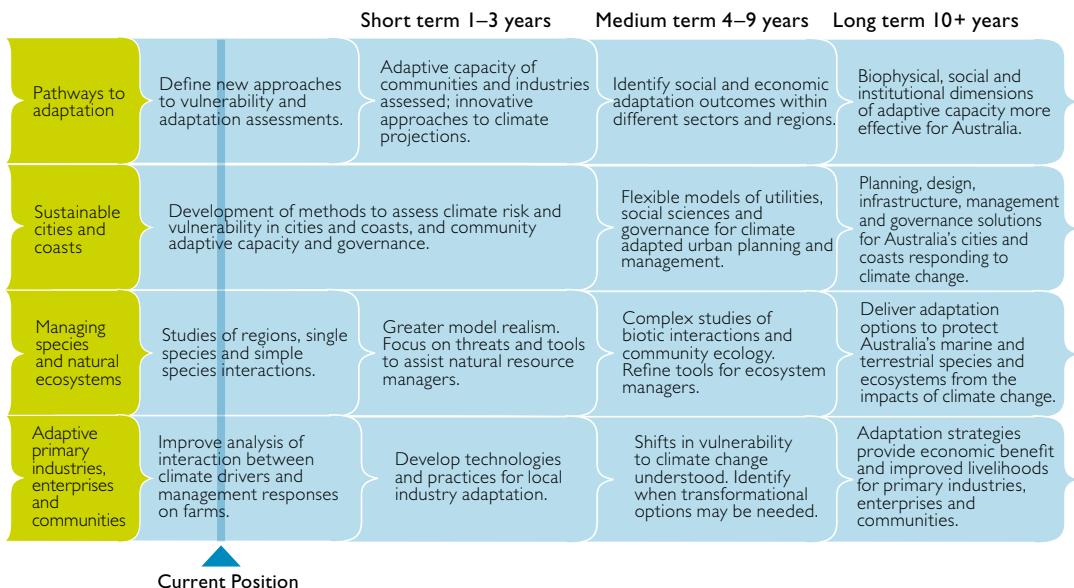
science of ocean climate impacts together with ecosystem vulnerabilities. It documents the state of knowledge, identifies gaps in the research, and provides options for adapting marine systems to future climate change.

- Five local governments in Victoria are developing strategies to adapt their assets and infrastructure to changing conditions, based on a collaborative vulnerability assessment of the region. The research won the 2009 Victoria Coastal Council's prize for innovation.
- NSW catchment management authorities have implemented targets to enhance biodiversity and ensure better use of land and water resources, based on a collaborative project by the Flagship and the NSW government.
- The Flagship improved the accuracy of seasonal rainfall forecasts in Australia. The research highlights the importance of Southern Ocean interactions to Australian rainfall patterns in different parts of Australia.



CSIRO is addressing the vulnerability of urban coastal settlements, such as this Gold Coast beach gouged by coinciding storms and king tide. Photo: © Bruce Miller

Climate Adaptation Flagship Roadmap



Energy Transformed Flagship

Flagship goal:

To halve greenhouse gas emissions and double the efficiency of the nation's new energy generation, supply and end use, and to position Australia for a hydrogen economy.

Research expenditure 2008–09: \$57.3 million

Objectives

- Supply the capability to develop a range of techno-economic scenarios for the stationary energy and transport sectors to 2020 and beyond.
- Achieve cost-effective, progressive reductions in greenhouse gas emissions from large-scale, stationary energy generation (fossil fuel and renewable systems) by five per cent to 2020, 15 per cent by 2030 and 25 per cent by 2050.
- Develop innovations in mobile energy storage systems and alternative transport fuel strategies that will progressively reduce greenhouse gas emissions from the transport sector by 37 per cent to 2020, 60 per cent by 2030 and 80 per cent by 2050.
- Develop small energy technologies and distributed energy (DE) system solutions to enable cost-effective, large-scale deployment of DE which will reduce greenhouse gas emissions by five per cent to 2020, 14 per cent by 2030 and 22 per cent by 2050.

Progress in 2008–09

- CSIRO contributed to the modelling team, brought together by the Treasury, to project the impact of emission trading on Australia for the Garnaut Review and Carbon Pollution Reduction Scheme.
- The Flagship installed and commissioned pilot scale post-combustion capture facilities at power stations in New South Wales, Victoria and China.
- Commercialisation of CSIRO's UltraBattery continues to expand, with commercial production through Furukawa Batteries (Japan) expected by December 2009. These activities will substantially contribute to increasing the reliability and reducing the cost of hybrid electric vehicles.
- The Flagship developed an improved control system for managing heating ventilation air conditioning in buildings. The system improves energy efficiency and occupant comfort, and reduces running costs, and is being commercialised for domestic and commercial use.

Background

The Energy Transformed Flagship was launched on 31 October 2003 and established to address the national priority of reducing greenhouse gas emissions from Australia's stationary energy and transport sectors, which are responsible for 49 per cent and 14 per cent respectively of Australia's carbon emissions.

The Flagship addresses this challenge by forming multidisciplinary teams assembled across four themes:

- Energy Futures** – modelling Australia's energy and transport futures.
- Low Emission Energy** – developing low-emission technologies for Australia's largest carbon polluters and simultaneously developing renewable energy technologies.
- Low Emission Transport** – developing low-emission alternative fuels and hybrid electric vehicle technologies.

- iv **Low Emission Distributed Energy** – developing the low-emission technologies and management systems for a new paradigm in energy distribution and use.

Achievements 2008–09

- The Maine's Power Project partnered CSIRO with local Castlemaine businesses and major energy users to assess ways to collectively reduce the town's greenhouse gas emissions by 30 per cent by 2010. CSIRO identified options to reduce energy consumption and increase energy efficiency, and suggested alternative energy generation technology. The project featured in the Garnaut Review.
- CSIRO has played a major part in the CRC for Greenhouse Technologies' successful Otway pilot project for demonstrating carbon dioxide storage. The program provides experimental data which will be invaluable for modelling commercial scale deployment by industry syndicates over the next five to ten years.



CSIRO's Dr John Wright at the launch of the post-combustion capture plant at Munmorah Power Station in New South Wales. Photo: Delta Electricity

Energy Transformed Flagship Roadmap

| | Short term 1–3 years | Medium term 4–9 years | Long term 10+ years |
|---------------------------------|--|--|--|
| Energy futures | Develop techno-economic model to inform government policy, industry and research programs. Produce landmark reports. Undertake social attitude mapping. Hold a stakeholder energy forum. | Incorporate Real Options Theory into CSIRO model. Hold international modelling forums. Undertake longitudinal social analysis studies. Commercialise software. | Develop a range of techno-economic scenarios for the stationary energy and transport sectors to 2020 and beyond. |
| Low emission electricity | Develop, core technologies and strategies for engagement with government and industry for CO ₂ capture and storage and large-scale renewable technologies. | Progress to pilot scale demonstration of significant technologies for third and fourth generation technologies. Expand national and international collaboration. | Cost-effective reductions in greenhouse gas emissions from large-scale stationary energy generation by 5% to 2020, 15% by 2030 and 25% by 2050. |
| Low emission transport | Establish programs in hybrid electric vehicles, intelligent transport systems and mobile energy storage. | Develop alternative fuels research program. Continue to engage partners and commercialise research outcomes. | Innovations in vehicle technologies and traffic management systems to reduce greenhouse gas emissions by 37% to 2020, 60% by 2030 and 80% by 2040. |
| Low emission distributed energy | Develop low-emission distributed energy technologies. Identify and begin engagement with partners. | Expand the scale of technical initiatives. Develop distributed model to inform government and industry. Commercialise technologies. | Develop a stationary technology and system solutions to enable cost-effective, large-scale deployment of distributed energy. |

Current Position

Food Futures Flagship

Flagship goal:

To transform the international competitiveness of the Australian agrifood sector; adding \$3 billion annually, by applying frontier technologies to high potential industries.

Research expenditure 2008–09: \$46.4 million

Objectives

- Increase the value of returns to Australia from the grain, grain-based food and feed industries by \$550 million.
- Apply advanced breed engineering techniques and technologies to boost the value of Australia's animal-based food industries by \$350 million for beef and \$550 million for seafood.
- Increase the value of the Australian food manufacturing and production industry by \$700 million.
- Develop a biosensor to understand, measure and optimise food and beverage flavour; adding \$75 million per annum by 2013 rising to over \$1 billion by 2020.

Progress 2008–09

- The Flagship achieved a 30 per cent increase in wheat yield in glasshouse trials.
- An increase in growth rate of Black Tiger prawns (*Penaeus monodon*) by 38 per cent was achieved when fed a novel aquafeed ingredient.
- World first lambs were produced using testis stem cell transplantation technology, proving the technique is viable and paving the way for novel approaches to cross-breeding cattle.
- The first successful production of sterile, all-female *penaeid* prawns was achieved, ensuring high-quality prawn production and protecting valuable intellectual property.
- Salt and sugar has been reduced by up to 70 per cent in experimental foods without affecting taste. This paves the way for production of healthier foods that still taste good.
- New environmentally friendly separations technology has been developed in collaboration with Monash University to recover molecules from agricultural and food waste, generating valuable bioactive components for use in food products and enabling more sustainable use of resources.

Background

The Food Futures Flagship was launched in March 2004. The Flagship is developing healthier ingredients, delivering higher quality food products and improving production possibilities for farmers and manufacturers.

The Flagship is achieving this through the development of innovative technologies that enhance existing agrifood industries and create new opportunities for Australia. The Flagship's research teams form collaborative partnerships with industry and research organisations to deliver the latest science and technological innovation to Australia's agribusiness sector.



One of the prawns (*Penaeus japonicus*) used in the Food Futures Flagship's aquaculture research into sterility and gender control. Photo: Darren Jew

Only this integrated and interdisciplinary approach can create the paradigm shifts required to significantly transform these industries.

Achievements 2008–09

- The grains research team discovered a novel mechanism for increasing yield in wheat using CSIRO’s RNAi technology. Glasshouse trials have increased yield by 30 per cent and a field trial has been approved by the Office of the Gene Technology Regulator. This technology could add more than \$1 billion annually to the value of the Australian wheat industry at market maturity in 2025.
- The ‘fruity’ character in wine has been found to depend on levels of the so-called ‘grassy C6’ compounds in grape juice, enabling control of this characteristic. Fruitiness is a character valued by consumers in some styles of wine, so it is important that winemakers can control the level of fruitiness.
- The Flagship, in collaboration with industry partners, has significantly improved the growth rates of farmed Black Tiger prawns via

selective breeding. The new breeds yield 60 per cent greater harvest than non-selected stocks. Farmers now need not rely on seasonal and erratic supply from wild stocks. This research could increase yearly earnings by up to \$40 million by 2015.

- A novel aquafeed ingredient, currently undergoing commercialisation, has been developed from renewable raw materials. This new aquafeed has improved growth rates in Black Tiger prawns by 38 per cent when compared to conventional diets.
- A new separation technology, referred to as molecular imprinted polymers (MIPs), has been developed in partnership with Monash University to extract valuable molecules from agricultural waste materials. These molecules are normally present in very low concentrations and can be extracted using MIPs from plant, meat and dairy waste streams for use in the functional food and ingredients industries.

Food Futures Flagship Roadmap

| | Short term 1–3 years | Medium term 4–9 years | Long term 10+ years |
|--------------------------------|--|--|---|
| Future grains | Optimise carbohydrate in grains, optimise omega-3 oils in plants and investigate genetically modified traits for improved quality. | Combine beneficial traits for farmers and consumers, breed and commercialise omega-3 oils in plants, and commercialise quality traits. | Increase returns to Australia by \$550 million per annum through enhanced grain quality attributes and human health benefits. |
| Breed engineering | Animal management systems adopted and breeding technology developed with commercial partners. | Industry adoption of testes cell transfer techniques, success of aquatic breeds and novel feeds and optimal genetics in livestock and aquaculture. | Boost the value of Australia’s animal-based food industries by \$350 million per annum for beef and \$550 million per annum for seafood. |
| Designed food and biomaterials | Low fat foods, bioactives and separations achieved, biopolymer formulation rules created and naturally structured foods developed. | Design rules for new biomaterials and processing, healthier low-energy foods designed and commercialised. | Design healthier foods and reduce food production waste, increasing the value of Australian agrifood industry by \$700 million per annum. |
| Quality biosensors | Development of test technology, odours predicting grape and wine quality identified. | Biosensor developed and commercialised, objective measurement of flavour and aroma preferences adopted by grape and wine industry. | Develop biosensor and improve current technology to optimise flavour in food and beverage value chain, adding \$750 million per annum. |

▲

Current Position

Future Manufacturing Flagship¹

Flagship goal:

To provide transformational innovation for the Australian manufacturing industry, enabling outcomes that will enhance the manufacturing value chain and deliver high-value export-oriented products to global markets.

Research expenditure 2008–09: \$18.5 million

Objectives

- Design, develop and test new materials in the area of flexible electronics based on new groups of materials.
- Increase efficiency of printable solar cells based on CSIRO technology.
- Improve the manufacture and processing of carbon nanotubes to enable the development of new products.
- Engage with national and international organisations to understand the full life cycle of manufactured nanomaterials.

Progress in 2008–09

- The Flagship designed and developed over 30 new materials from five new families of polymeric materials.
- World-leading efficiencies have been achieved from the Flagship's second generation solar cell materials.
- A new technique for processing carbon nanotubes into yarns to maximise properties of strength and conductivity was developed, and a new larger-scale reactor designed for increased yarn production.
- In partnership with the National Industrial Chemicals Notification and Assessment Scheme (NICNAS), the Flagship has established an Australian consortium and is coordinating the safety testing of nanoparticles in a program led by the Organisation for Economic Co-operation and Development (OECD) Working Party on manufactured nanomaterials.

Background

The Australian manufacturing industry operates in a highly competitive global marketplace, with increasing competition from low-cost producers and global supply chains. There is also a need to develop environmentally responsible manufacturing processes and technologies to support sustainable manufacturing into the future. These challenges represent significant emerging opportunities for Australian manufacturing.

The Future Manufacturing Flagship was launched on 21 September 2009. The Flagship's research aims to incubate new or significantly transform existing high value-adding, export-oriented sectors to improve the future competitiveness

¹ Formerly known as Niche Manufacturing



Dr Chris Fell demonstrating flexible solar cell modules. Photo: CSIRO

of Australian manufacturing, ensuring innovation drives success across the key sectors of the manufacturing economy.

In partnership with industry it has refocused its research on emerging opportunities in flexible electronics, clean technology, biomedical manufacturing and nanosafety, to deliver significant impact to the Australian manufacturing sector by 2020.

Achievements 2008–09

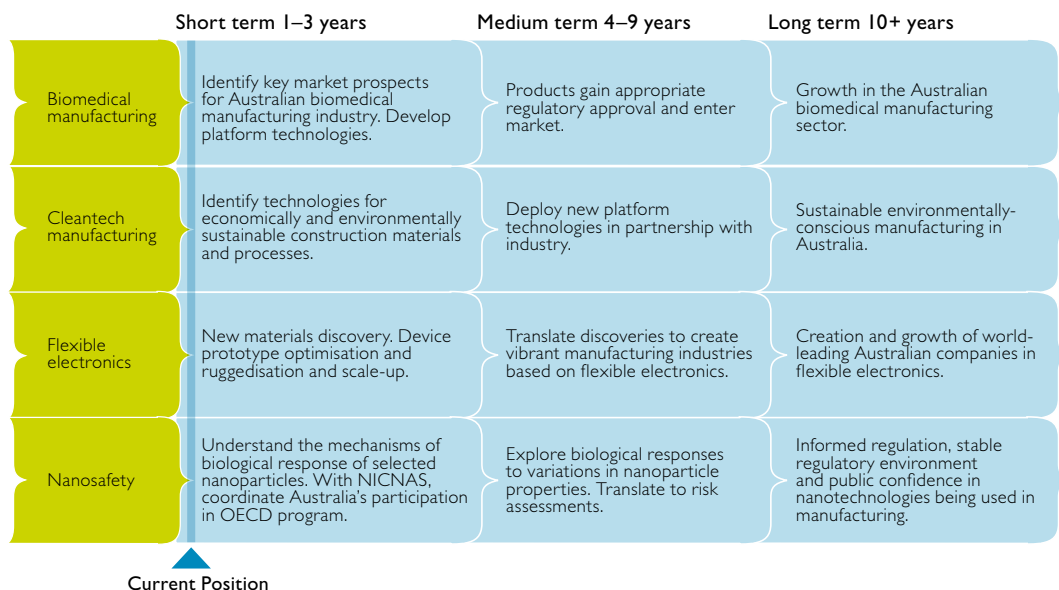
- CSIRO's Carbon Nanotube Yarns are now stronger and more electrically conductive. The technology should lead to the manufacture of products that incorporate leading-edge, high-tech materials. These property improvements will significantly increase the opportunity for manufacturers to develop new products in the high value-add industries of biomedical devices and scientific instrumentation.
- Our research into nanosafety has developed methods to measure the distribution of manufactured nanoparticles in Australian soils.

Understanding the full life cycle of nanoparticles (production, to use, to disposal) will allow Australia to capture the benefits of nanotechnology in a safe and socially responsible way.

- Novel chemicals are required for large-scale, low-cost solar cells. Our research has identified five new families of chemicals that show amongst the highest power conversion efficiencies for these types of chemicals reported to date. These chemicals are readily available in bulk quantities, their conversion into materials suitable for solar cells is straightforward, and initial tests show they are amenable to simple printing processes.
- Commercial printing trials of our printable-plastic solar cells have commenced six months ahead of schedule. Developed with our partners in the Victorian Organic Solar Cell Consortium, flexible plastic solar cells are much cheaper and more efficient to produce, and have the potential to replace silicon in the next generation of solar collectors, supporting Australia's transition to a low carbon economy.

Future Manufacturing Flagship Roadmap

Originally established as 'Niche Manufacturing', the Future Manufacturing Flagship, in consultation with industry, has undergone a portfolio realignment in line with evolving industry needs. This roadmap represents revised roadmap goals.



Light Metals Flagship

Flagship goal:

To lead a global revolution in light metals, doubling export income and generating significant new industries for Australia by the 2020s while reducing environmental impact.

Research expenditure 2008–09: \$33.1 million

Objectives

- Develop titanium and magnesium technologies that will create new industries for Australia.
- Lower manufacturing costs by 50 per cent.
- Increase energy efficiency by 30 per cent
- Increase asset productivity by 30 per cent.
- Reduce life cycle impact by 50 per cent.

Progress in 2008–09

- The Flagship's novel titanium and magnesium metal production processes are undergoing feasibility assessments for pilot scale production.
- One of our Flagship technologies can double the strength of high pressure die-cast aluminium components, enabling an estimated 20–40 per cent saving in materials and manufacturing costs.
- A Flagship aluminium production control technology has delivered a reduction in perfluorocarbon emissions events by 20 per cent.
- The Flagship's alumina research and development has delivered improved process measurement technology and modelling, enabling asset productivity improvements of approximately five per cent.

Background

The Light Metals Flagship was launched on 27 June 2003. The Flagship's research on new metal production processes aims to create new Australian industries in titanium and magnesium. The Flagship also provides Australia's alumina, aluminium and transport industries with competitive advantages generated through superior technology leading to improved efficiencies.

The Flagship's research impacts across the value chain of light metal production, from increasing efficiency in resource processing to value-added processes for sophisticated manufacturing end-users in transport industries. We work collaboratively with both commercial end-users and university researchers to generate productive outcomes for industry.

Projects undertaken in the Light Metals Flagship are multidisciplinary and access a range of

skills and specialised capabilities within CSIRO and other research partners in the fields of metallurgy, automation, process engineering and development, chemistry, powder metallurgy, alloy development and behaviour, statistics, computational modelling, and materials science and materials characterisation.

Achievements 2008–09

- MagSonic is a novel process for carbothermal production of magnesium using a supersonic nozzle to rapidly cool magnesium vapour and produce magnesium powder. Two new approaches have been introduced to progress the process in the past year: Computational Fluid Dynamics and Laser Induced Breakdown Spectroscopy. The team have secured external investment to progress the MagSonic technology to an upgraded rig and the design of a pilot plant.

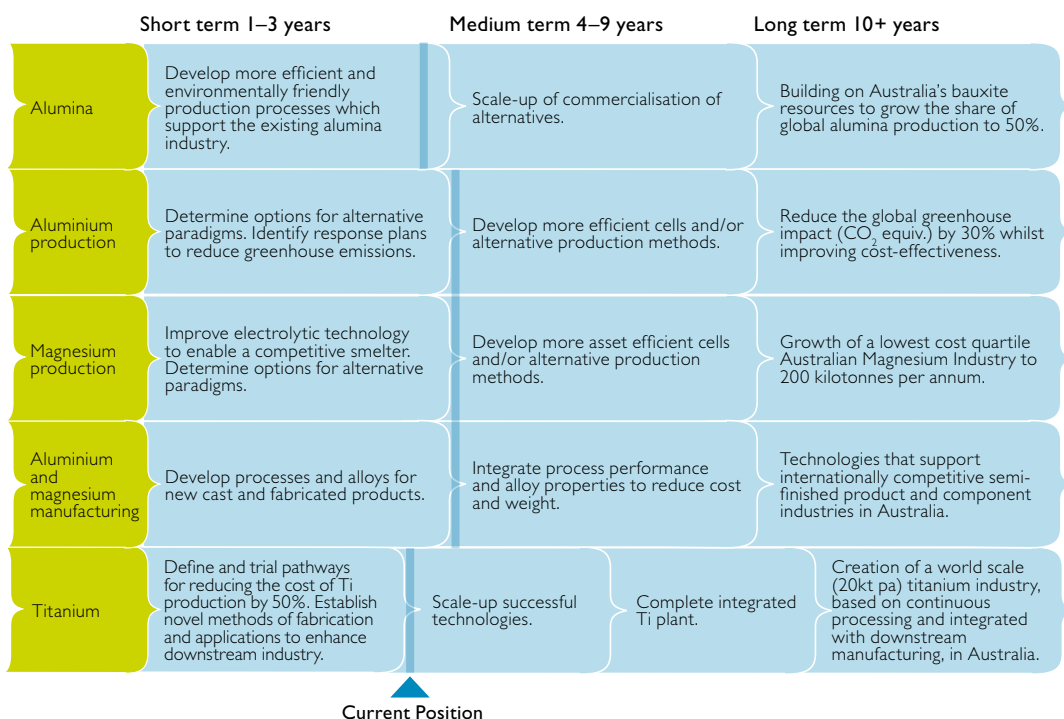
- According to BHP Billiton Worsley Alumina, an on-line analyser, adapted through the Light Metals Flagship for measuring the size of alumina particles, has the potential to save the company substantial annual processing costs, as well as improving quality control.

CSIRO's Ultra PS analyser has been successfully adapted to withstand the extremely corrosive conditions of the alumina production process. This has allowed the Ultra PS analyser to be used to measure the size of alumina particles, providing an immediate 'snapshot' of production process conditions. Plant operators can adjust conditions immediately to produce optimally-sized alumina particles and improve the quality of the alumina product. Alumina is an important export for Australia, which has delivered approximately \$6–8 billion per annum in export earnings in recent years.



Dr Leon Prentice, project leader of the MagSonic project, explaining the operation of the experimental plant. Photo: Steve Tassios

Light Metals Flagship Roadmap



Minerals Down Under Flagship

Flagship goal:

To assist the Australian minerals industry to exploit new resources with an in-ground value of \$1 trillion by the year 2030 and more than double the associated services and technology sector to \$10 billion per year by 2015.

Research expenditure 2008–09: \$49.3 million

Objectives

- Facilitate the discovery of \$250 billion of new mineral resources by 2030.
- Help transform the Australian mining industry by developing and applying safe, geologically intelligent, mining systems of the future.
- Assist industry to unlock the hidden wealth of Australia's mineral deposits to release \$650 billion of in-ground value by 2030.
- Reduce average unit greenhouse gas emissions, average unit water usage and average unit residue production by 20 per cent of 2007 levels by 2025.

Progress in 2008–09

- The Flagship is leading the AuScope Grid consortium, which is beginning to provide online, on-demand access and manipulation of national geoscience and geospatial data distributed across many institutions, disciplines and jurisdictions.
- A new technology, based on the use of thermochronology to date the age of zircons (a common crystal), is emerging as an exciting new technique for diamond exploration.
- The Flagship has successfully demonstrated long distance telerobotic control of mining machinery at several Western Australian sites. The technology will enable mining companies to operate facilities at a number of remote sites from one central location. Commercial technology transfer is underway.
- A novel Flagship process to remove impurities from iron ore offers the possibility of unlocking the value in eight billion tonnes of Australian high-phosphorus iron ore that is currently not economically viable.
- A techno-economic assessment of a new steel making process for heat recovery and dry granulation of melts or slags indicates benefits of about \$300 million for Australian operations and about \$30 billion worldwide.

Background

To ensure the future of our resources industry, Australia needs to discover new ore bodies to replace those that have already been mined, become more efficient in the way we mine and process ores, and improve on its health, safety and environmental outcomes.

The Minerals Down Under Flagship, launched on 27 May 2008, is focusing on transformational change to dramatically improve Australia's productivity and international competitiveness in this global industry.

The Flagship harnesses R&D capabilities that exist across CSIRO, the university sector and government agencies such as the Australian Nuclear Science and Technology Organisation, Geoscience Australia and the state and territory geological surveys.

Achievements 2008–09

- For the first time, scientists have discovered the presence of a natural deep earth pump that is a crucial element in the formation of ore deposits and earthquakes. The research will

help in the development of predictive models for large-scale targeting of ore systems. Results of the research were published in *Nature* – a prestigious science journal.

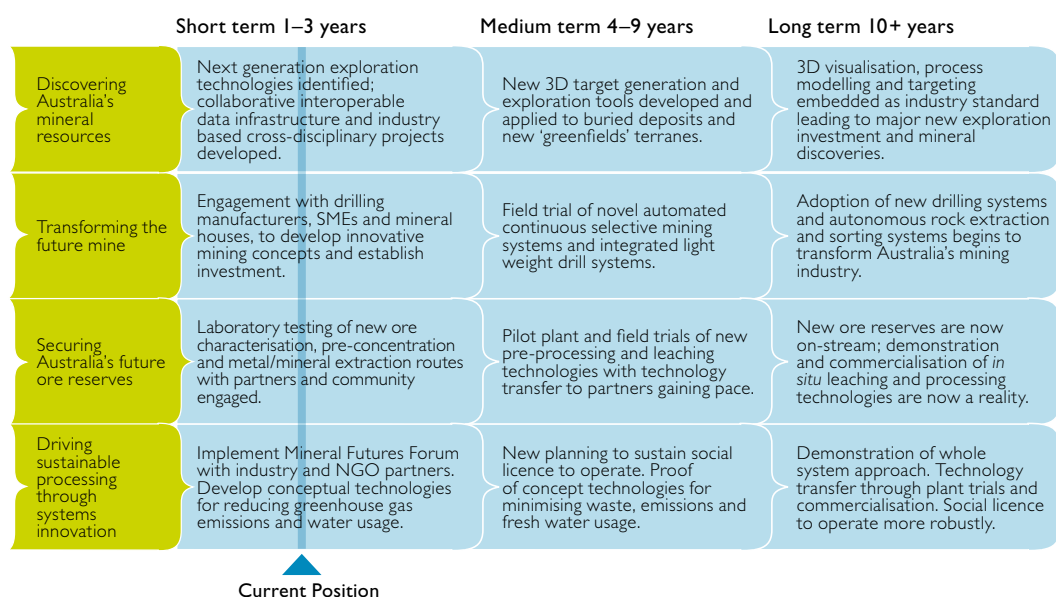
- A study of the characteristics of gold nuggets from around Australia by Minerals Down Under researchers has overturned many years of accepted wisdom on how nuggets form. The study revealed the gold nuggets formed deep underground at high temperature. This knowledge will help explorers decide where to search for the precious metal.
- Flagship researchers have achieved a much improved fundamental understanding of how the mineralogy of nickel laterites affects their processing performance under a variety of conditions. Improved processing of nickel laterites could mean billions of dollars of previously uneconomic deposits could become viable.
- For the first time, Minerals Down Under scientists have successfully used an electronic



Dr Rob Hough with an eight kilogram gold nugget sample used in his ground breaking research on how ore deposits arrived at their location.
Photo: Daryl Peroni

listening post to track and control a drill operating more than 300 metres below the Earth's surface. The use of 'microseismics' technology has significant potential in delivering cost savings and efficiency improvements in the directional drilling process. Drilling is a critical component of both exploration and mining. It contributes approximately 20 per cent of exploration cost and ten per cent of mining cost.

Minerals Down Under Flagship Roadmap



Preventative Health Flagship

Flagship goal:

To improve the health and wellbeing of Australians and save \$2 billion in annual direct health costs by 2020 through the prevention and early detection of disease.

Research expenditure 2008–09: \$34.2 million

Objectives

- Reduce the incidence of colorectal cancer by ten per cent and increase five year survival from five per cent to 65 per cent.
- Lower the impact of inflammatory and infectious gut disease by ten per cent.
- Delay the onset of Alzheimer's disease and other neurodegenerative diseases in Australia by five years by 2020.
- Contain the social and economic burden of obesity through prevention strategies.

Progress in 2008–09

- A collaboration between the Flagship, the Ludwig Institute for Cancer Research and the University of New South Wales attracted funding from the American Association for Cancer Research to conduct a research program on improving our clinical ability to deliver accurate prognoses for patients with colon cancer.
- A feature article by CSIRO scientists on resistant starch and factors affecting gut health received international attention, and our capability in human gut research attracted interest from leading Australian clinicians working in the area of inflammatory bowel disease, resulting in the submission of four new collaborative grant applications in 2009.
- The Flagship's inaugural Collaboration Fund Cluster (the Australian Imaging, Biomarkers and Lifestyle Flagship Study of Ageing) secured its first collaborative research agreement with a major strategic alliance partner, Pfizer Australia.
- CSIRO Tasmanian ICT Centre and Verdant Health Pty Ltd have developed a Weight Management Mentor, an electronic mentoring system supporting consumers on pharmacy-based weight management programs. This partnership is supported by the Tasmanian Innovations Advisory Board and the Research Partnerships Program.

Background

The Preventative Health Flagship was launched on 24 September 2003 and is addressing our national health challenges in colorectal cancer and gut health; neurodegenerative diseases; mental disorders and brain health; and obesity and health.

In addressing these national health challenges, the Flagship's research teams are focusing on detecting neurodegenerative disease with imaging and physics; better screening for and early detection of colorectal cancer with enhanced sensitivity and specificity; improved



Preventative Health Flagship and Tasmanian ICT Project Leader, Mr Dipak Bhandari, with the Weight Management Mentor. Photo: David McClenaghan

understanding of how diet and lifestyle contribute to disease; new protective foods and personalised nutritional and lifestyle approaches to disease prevention; and better ways to monitor and measure health, incorporating improved use of health data.

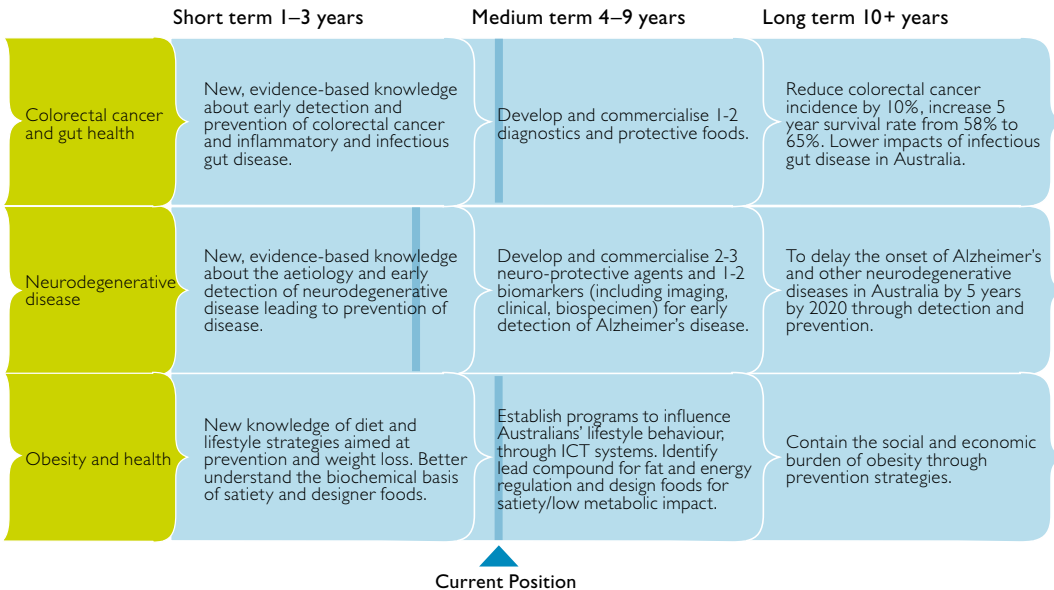
Achievements 2008–09

- The Flagship and University of South Australia researchers undertook the most comprehensive survey ever taken of Australian children's diet and activity. The objectives of the survey were to assess the reported food and nutrient intake, physical activity levels, and the weight, height and waist circumference of a sample of randomly selected children aged 2–16 years.
- The Preventative Health Flagship and the Cancer Council South Australia (SA) developed a web-based tool to help individuals over the age of 50 make informed decisions about bowel cancer testing. The program interacts with participants on a personal level, collecting information on understanding and attitudes towards bowel cancer testing.

The web site can be found at:
<http://bowelcancerscreening.csiro.au>

- CSIRO and partners, Clinical Genomics Pty Ltd and Flinders University, found a novel biomarker panel that can clearly differentiate colorectal adenoma and carcinoma tissues from normal colon epithelium. These biomarkers put us a step closer to an improved diagnostic test for early-stage bowel cancer.
- In September 2008, the CSIRO Healthy Heart Program was published. The 12-week lifestyle program includes recipes and exercises for lowering cholesterol, lowering blood pressure, and reaching and maintaining a healthy weight.
- The Flagship, together with the SA Government and Royal Institution of Australia, held a national Science Experience for Teachers. Science teachers toured laboratories across Australia gaining an insight into current science research, which they then relayed to students, inspiring young Australians to study science at university level.

Preventative Health Flagship Roadmap



Water for a Healthy Country Flagship

Flagship goal:

To achieve a tenfold increase in the social, economic and environmental benefits from water by 2025.

Research expenditure 2008–09: \$83.3 million

Objectives

- Delivery of the Sustainable Yields projects to the Australian Government.
- Developed methods for life cycle assessment of energy usage and greenhouse gas emissions across the total urban water cycle.
- Demonstration of capacity to carry out large-scale integrated assessments to support policy development in the Great Barrier Reef region.
- Improved skill and accuracy of daily and seasonal water forecasting for use in river operations, irrigation and environmental watering.

Progress in 2008–09

- The first ever audit of surface and groundwater resources in the Murray-Darling Basin is informing water policy at national and state level. Three follow-on water assessments in northern Australia, south-west Western Australia and Tasmania will be completed by the end of 2009.
- The Flagship developed and demonstrated a south-east Queensland wide life cycle assessment of energy and greenhouse gas emissions for the Queensland Water Commission.
- CSIRO science contributed to the Tully Water Quality Improvement Plan (WQIP) as part of the Great Barrier Reef's WQIPs, which resulted in the \$200 million Reef Rescue package released by the Australian Government in 2008.
- The Bayesian joint probability prediction system developed by the Flagship is being operationalised by the Bureau of Meteorology to provide a national seasonal streamflow forecasting service, which will begin in December 2009.

Background

Launched on 27 May 2004, this Flagship focuses its research and development efforts on four fundamental needs expressed in the Australian Government's National Water Initiative:

- i revolutionise the way water resources information is collected, interpreted and reported via the establishment of a national Water Resources Observation Network
- ii provide greater confidence in our national assessments of current and future water resource availability
- iii equip river managers with the science and tools to significantly enhance the health of aquatic ecosystems via judicious allocation

of environmental flows and water quality management

- iv affect a step-change in urban water management and treatment technologies that will make recycling a feasible option in our cities, to address a projected water supply shortage of 1,000 gigalitres a year in 2030.

Achievements 2008–09

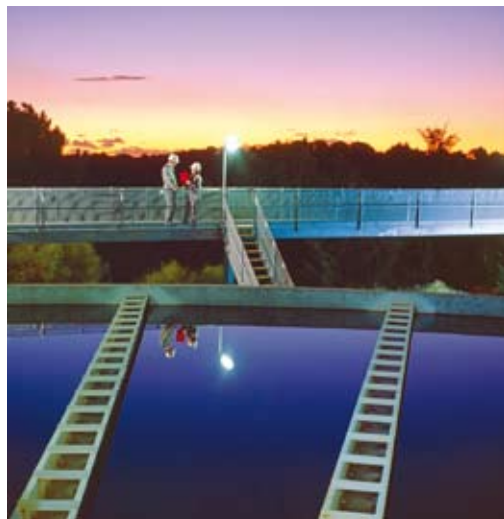
- In a world first, the Water for a Healthy Country Flagship and partners have shown that urban stormwater can be harvested to produce water of drinking standard. The Aquifer Storage Transfer and Recovery project in Adelaide pumps stormwater into aquifers, allows it to be 'polished' as it moves through

the aquifer, and recovers it from another part of the aquifer. Using stormwater this way has a number of benefits: it puts less pressure on the Murray River system; prevents polluted stormwater going out to sea; and lowers our carbon footprint.

- As reported in our Annual Report 2007–08, CSIRO, through the Water for a Healthy Country Flagship, completed a series of reports which assessed the current and future water availability in the Murray-Darling Basin. This was the world's largest basin-scale investigation of the impacts on water resources of catchment development, changing groundwater extraction, climate variability and climate change ever undertaken. The final report (*Water Availability in the Murray-Darling Basin Report*), released in November 2008, was the culmination of the largest single project in CSIRO's history, see:

www.csiro.au/partnerships/SYP.html

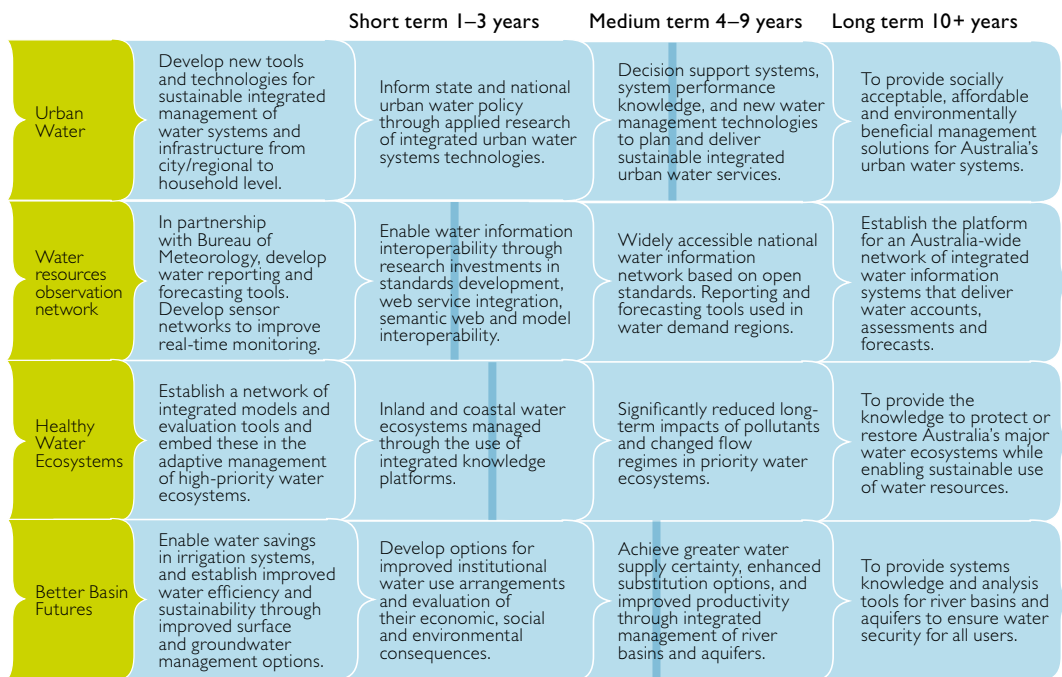
The outcomes of the project are now informing water policy at national and state level.



CSIRO researchers monitoring conditions in a water treatment plant in Western Australia.

Photo: Robert Garvey

Water for a Healthy Country Flagship Roadmap



Current Position

Wealth from Oceans Flagship

Flagship goal:

To position Australia by 2020 as an international benchmark in the delivery of economic, social and environmental wealth based on leadership in understanding ocean systems and processes.

Research expenditure 2008–09: \$72.0 million

Objectives

- Recognised national leaders in ocean climate research.
- Marine scientists recognised as leaders in innovative technologies for offshore hydrocarbon recovery, evidenced by significant and ever-increasing engagement with major global oil companies.
- Science-based strategies used to underpin coastal and marine regional development.
- Science-based strategies used to support environmentally and commercially sustainable fisheries.
- A risk-based monitoring framework that indicates the health of marine ecosystems in place for all Commonwealth waters.

Progress in 2008–09

- The Flagship published estimates of the components of sea level rise associated with climate change that show improved agreement between observed and predicted data.
- One client estimates around \$460 million saved by reduced offshore hydrocarbon exploration risks.
- The Flagship conducted an extensive environmental survey that helped in deciding where to site the new liquified natural gas precinct in Western Australia to minimise the environmental impact.
- Fisheries harvest strategy policies, underpinned by Flagship research, have reduced overfishing in Commonwealth waters.
- The Flagship's risk-based approach for marine ecosystems is feeding into marine management and national marine policy development.

Background

Australia is a marine nation, with the third largest ocean territory in the world. CSIRO's Wealth from Oceans Flagship, launched on 27 August 2004, provides research and technology to enable Australia to derive enduring social, environmental and economic wealth from its coasts and oceans.

The Flagship now brings together almost the full breadth of CSIRO's marine research output, harnessing expertise from climatology, geology and petrochemical engineering to physical oceanography, biogeochemistry, microbiology, marine ecology and taxonomy. The team delivers CSIRO's contribution towards national challenges where oceans play a central role.

Achievements 2008–09

- The Flagship – working with several museums and using the Marine National Facility Research Vessel *Southern Surveyor* – discovered 274 new marine species and 80 undersea mountains in a project to monitor the South-East Commonwealth Marine Reserve Network.
- Using an underwater sensor network in Tasmania's Derwent estuary region, the Flagship is researching the effects of industrial and human activities in our estuaries. The network's combination of intelligent, autonomous submarine vehicles and innovative sensors will revolutionise the tracking of nutrient loads and pollutants. The outcomes will guide the Flagship's development of a

national system for measuring and predicting the health of Australia's coastal environments.

- The United Nations Food and Agriculture Organization identified Australia's Northern Prawn Fishery (NPF) as a 'global model' for sustainable fisheries management. CSIRO's long-running partnership with government and industry has helped achieve this standard. The NPF adopted a bioeconomic model developed by the Flagship, the Australian Bureau of Agriculture and Resource Economics and the Australian National University, to set harvest levels that maintain prawn productivity while maximising fishery returns.
- In partnership with ten industry sponsors and five research collaborators, the Flagship successfully developed models to reduce oil and gas exploration risk, and optimise well placement. The science outcomes have been adopted by the project sponsors, providing a competitive advantage in their operations.



A species of *Ophiacantha* brittlestar – one of the 274 new species discovered during the Voyages of Discovery in the South-East Commonwealth Marine Reserve Network. Photo: CSIRO

Wealth from Oceans Flagship Roadmap

| | Short term 1–3 years | Medium term 4–9 years | Long term 10+ years |
|---|--|--|---|
| Dynamic ocean | Gaps and opportunities identified, tools being developed, partners committing funding. | Improved ocean and climate prediction, reliable forecasting systems, operational delivery to clients and public. | Oceans-climate knowledge delivery social, environmental and financial, wealth to Australians. |
| Blue GDP | New opportunities identified, models and tools developed, partners engaged, field testing. | New marine industry opportunities developed, improved technical, economic feasibility of previously inaccessible offshore resources. | Delivering transformational technologies to new and existing ocean based industries, aiding Australia's wealth creation, energy security and lower emissions. |
| Marine nation | Methods to support multiple-use management being developed in regional case studies. | New observation tools and sensor networks implemented, multiple-use management strategies applied. | Sustainable, science-based multiple-use development and management of Australia's coastal and marine regions. |
| Sustainable Australian fisheries and ecosystems | Development, implementation of harvest strategies, spatial management and by-catch reduction strategies. | Coupled biophysical and socio-economic models applied, ecosystem-based fishery management implemented. | Australian and regional fisheries transformed to economically and environmentally sustainable base. |
| Marine conservation and biodiversity management | New multidisciplinary integrated tools being developed for biodiversity and threatened species assessment. | Market based instruments developed, national biodiversity management program established, national system of protection of threatened species. | Conservation and sustainable management of Australia's marine biodiversity. |

Current Position

Output Group 2 – Core Research

CSIRO's core research activities improve industry, the environment and community wellbeing. They do this by providing advice, information and solutions; delivering new and improved technologies, management systems, intermediate and final products and services for business.

CSIRO's core research is managed and delivered through five Research Groups. Each group is led by a Group Executive. The five research groups are:

- Agribusiness
- Energy

- Environment
- Information and Communication Sciences and Technology
- Manufacturing, Materials and Minerals.

Portfolio budget statement performance summary

Table 1.5 presents a summary of performance against the 2008–09 Portfolio Budget Statement performance indicators and targets.

Table 1.5: Core research performance against PBS key performance indicators

| Performance indicator: Impact | |
|---|--|
| Target | Progress in 2008–09 |
| <p>Demonstrated adoption and impact of core research outputs in relation to, for example:</p> <ul style="list-style-type: none"> • marketed products and services • human health, safety and skills • natural resource management. | <p>See pages 34–43 for a showcase of the work and achievements of CSIRO's core research.</p> |
| <p>Maintain revenue from intellectual property.</p> | <p>In 2008–09, we achieved a record result of \$229.6 million in revenue from intellectual property. This was a substantial increase compared to \$81.7 million in 2007–08 and \$30.6 million in 2006–07. The record result was primarily due to legal settlements from the Wireless Local Area Network (WLAN) patent litigation case where we agreed to licence our technology to 15 companies.</p> |
| <p>A minimum of 8,000 client-focused reports.</p> | <p>CSIRO produces client reports covering such things as testing whether a novel product developed by a company meets an industry standard or the application of a CSIRO technology to a specific problem in private industry. The number of client reports has declined from 11,187 in 2007–08 to 9,727 in 2008–09. This decline is due to the closure of the Division of Textile and Fibre Technology.</p> |

| Performance indicator: Science ^(a) | |
|--|---|
| Target | Progress in 2008–09 |
| Maintain or increase the number of refereed publications and new inventions per researcher. | For information in relation to this performance indicator, see page 10 in Output Group 1. |
| Maintain the quality and impact of CSIRO's publications (compared with relevant benchmarks) as indicated by CSIRO's average citation rate and average 'impact factor' of journals in which CSIRO papers are published. | For information in relation to this performance indicator, see page 10 in Output Group 1. |

(a) Publications and inventions data are for CSIRO as a whole entity. Our information systems did not allow us to separate the data into Output Group 1 and Output Group 2.

| Performance indicator: Relationships | |
|---|---|
| Target | Progress in 2008–09 |
| Positive customer feedback and continued financial support by partners. | <p>A quantitative measure of customer satisfaction was not available for this period as the customer value survey was not undertaken in 2008–09.</p> <p>Instead, feedback obtained during 2007–08 from interviews with senior executives of our key clients has guided a number of internal initiatives during 2008–09 to improve CSIRO's systems and behaviours in dealing with external parties. Our intended process for gathering feedback from our clients and partners has been integrated into a Client and Partner Feedback Framework, and broadened to include a survey of all CSIRO's stakeholders. This framework will be finalised and implemented in 2009–10, providing easier methods of analysis and feedback in future.</p> |

| Performance indicator: Resources | |
|--|---|
| Target | Progress in 2008–09 |
| Demonstrate shifts in investment in accordance with CSIRO's broad direction setting and specific science investment portfolio decisions. | <p>Changes in investment implemented as a result of CSIRO's broad direction setting process for 2008–09 were:</p> <ul style="list-style-type: none"> • increased funding for Transformational Capability Platforms • funding redirected to provide capability leaders with a greater capacity to optimise the competitiveness of the Organisation's current and future capabilities • increased funding for research on water, energy, climate and materials • appropriation funding redirected from near-market and incremental research in the area of food production and supply, to address issues affecting the long-term viability of Australian agriculture and food. |
| Maintain staffing profile in line with effective delivery of strategic initiatives. | <p>In response to trends identified in the annual broad direction setting update in November 2008, CSIRO has implemented initiatives to:</p> <ul style="list-style-type: none"> • strengthen its world-class environmental research capability with particular emphasis on water, climate change and carbon • direct its world-class marine capability to deliver oceanographic, geo-scientific, fishery and ecosystem research and ensure vital integration between ocean, land and atmospheric research, with respect to climate change • build underpinning capability platforms in transformational biology, advanced materials, sensor network technologies and computational and simulation sciences, and use e-enabled technologies in how we conduct research • combine environmental sustainability expertise with research into agricultural productivity, leading to higher value agricultural products, and increase its research intensity into food production and food security. |



CSIRO is working on ways to integrate more renewable energy, such as wind and solar, into Australia's energy mix.
Photo: istockphoto

Research group aim:

To achieve outcomes for Australia along the value chain of food and fibre production for economic, social and environmental benefits. The Agribusiness Group strives for excellence in animal, plant and microbial sciences to deliver enduring solutions in agriculture, food, health and the environment.

Research expenditure 2008–09: \$255.8 million*

Objectives

- Develop innovative processing technologies for a sustainable food industry and for human health.
- Deliver solutions to enable Australia's livestock and allied industries to be globally competitive.
- Develop profitable and sustainable agrifood, fibre and horticultural industries.
- Develop the knowledge and tools needed to balance agricultural profitability and sustainability.
- Reduce the impact of invasive pests/weeds and possible future biological threats.

Progress in 2008–09

- CSIRO scientists identified a threat to Australian honey bees from a second species of *Varroa* mite from Papua New Guinea and Indonesia.
- Using CSIRO expertise, the US port-of-entry test for Australian beef was reduced from 200 samples to 25.
- CSIRO scientists were key members of an international team to successfully sequence the cow genome, published in April 2009 in the US journal *Science*.
- In collaboration with international partners, CSIRO has isolated the first durable, broad-spectrum, disease resistance gene in wheat.
- CSIRO assessed potential greenhouse gas sequestration/mitigation options for rural land use in Queensland.

Background

The Agribusiness Group is refocusing and redirecting its work to allow it to move into the big challenges facing food production and supply in the years ahead. The Group has responded to a strong demand for science-based solutions to global problems for humanity (food security, response to climate change, human health) that have a significant dependence on advances in biology. Through the Agricultural Sustainability Initiative, formed in July 2007, we pursued research into increasing the economic value of Australia's agriculture and forestry, while reducing its ecological footprint. The Group has strengthened its work in underpinning technologies in plant and animal breeding and

applied biological knowledge to a range of opportunities in biomaterials and biosecurity. During the reporting period, we undertook significant rebuilding and restructuring by merging forest biosciences capabilities and consolidated our presence in regional laboratories.

Achievements 2008–09

- Australia's rigorous approach to antibiotics used in the food animal industries was validated by research demonstrating that antibiotic resistant bacteria are rare in Australia's food supply. A CSIRO study tested food samples from across Australia for the presence of bacteria resistant to antimicrobials such as antibiotics and found relatively low-levels of both resistant and non-resistant bacteria.

* Excludes Flagship expenditure

- International collaborative research, using a CSIRO dataset, showed that when invasive weeds and other organisms are moved to new ecological conditions they can change their life history strategies (such as longevity and reproductive capacity) to suit these novel environments. This discovery helps us understand how species adapt to new environments as a mechanism for successful invasion. The results were published in the *Proceedings of the National Academy of Sciences of the United States of America* in July 2008, see: www.pnas.org
- Technology developed at CSIRO to improve the way fruit juices and food products are pasteurised is being used commercially in a new Melbourne food processing facility opened in April 2009 by Victorian Premier John Brumby. CSIRO's involvement was essential to the start-up of Preshafood Ltd, which now markets its high-pressure processed 'Preshafruit' juices and fruit ingredients nationally.
- New varieties of wheat suitable for Australia's high rainfall zone have been commercialised by AWB seeds. These wheats can be sown earlier than most main season wheats and provide farmers with more options. CSIRO has developed these new wheat varieties in partnership with New Zealand Plant and Food (a Crown Research Institute) via the joint venture company HRZ Wheats Pty Ltd.
- We have seen the rapid uptake by farmers of CSIRO's recommendations on Electromagnetic Soil Mapping technology, a method of assessing variability in soil properties within and between paddocks and farms. Its use in the spatial management of soils and land capability in the Victorian Mallee, for example, has increased from about 20,000 hectares in 2006 to more than 160,000 hectares in 2008.



Rust fungi (pictured) cause major crop diseases threatening global food security. CSIRO scientists have identified and cloned key genes that control immunity in crops to diseases caused by rust fungi by studying flax and the fungi that infect them. Photo: Carl Davies

Energy Group

Research group aim:

To develop new energy science and technology that will increase the security, sustainability and wealth creating capacity of Australia's solar energy, coal and gas resources. It also aims to maximise Australia's oil self-sufficiency by ensuring continued profitable and secure access to petroleum resources, particularly onshore, beyond 2015.

Research expenditure 2008–09: \$25.7 million*

Objectives

- Develop new energy efficient technologies through R&D advances in energy conversion, storage and supply.
- Develop advanced methods for the quantification and evaluation of gaseous and particulate emissions from emerging fuel and energy technologies.
- Optimise the management of coal preparation plants by developing robust sensors and smart sensing to decrease the need for human intervention.
- Conduct research to reduce the risk in exploration for oil and gas in Australia, particularly in onshore areas and in frontier basins offshore.
- Develop new methods for the successful development of Australia's unconventional gas resources, such as coal seam gas and tight gas reservoirs.

Progress in 2008–09

- CSIRO's National Solar Energy Centre has been expanded with two unique facilities for solar cell research – a large fabrication facility for organic solar cells and a facility for measuring solar cell performance to international standards.
- The 'Intelligent Plant' project has allowed the coal industry to optimise the management of coal preparation in industrial plants, increasing the amount of saleable coal, adding significant value to the Australian coal industry.
- CSIRO has started a new three-year collaborative research program with the Victorian Government to better understand the State's petroleum basins, improving the chances of finding new oil and gas resources in Victoria.
- Research on gas flow mechanisms in coal has improved our knowledge of gas production and will lead to higher yields of coal seam gas from reservoirs.

Background

Energy is currently a topic of unprecedented community, government and industry interest globally. The Energy Group aims to contribute to a clean, secure and wealth-creating energy future for Australia and the surrounding region that is underpinned by Australian energy and technology leadership. Technologies that utilise Australia's rich endowment of fossil and renewable energy resources have an important role to play in Australia's energy future.

* Excludes Flagship expenditure

Research and development efforts in these areas will contribute to Australian priorities in accelerating large-scale reduction in greenhouse gas emissions, securing our access to energy resources, while supporting a smooth transition to new energy futures.

Achievements 2008–09

- CSIRO research has provided a fundamental insight into the behaviour of electrical charges in nanoporous electrodes for generating energy from sunlight. CSIRO's work explains

in detail, for the first time, why titanium dioxide electrodes perform better in strong acid solutions. The findings are an important step toward the design of a viable device for generating hydrogen directly from water, and also have significance for the development of solar cells.

- Extracting gas from unconventional gas reservoirs, such as tight gas, coal seam gas and shale gas reservoirs, has been made more reliable through CSIRO's research. Extracting gas from these reservoirs has previously been difficult, costly and time consuming. CSIRO's modelling and experimental results have resulted in improved hydraulic fracturing techniques which allow enhanced stimulation of these reservoirs resulting in increased gas production. These gas resources are important for Australia's future domestic gas supplies.
- CSIRO's expertise in atmospheric research is playing an important role in the development of effective control strategies to reduce photochemical air pollution. Technical expertise in the development of chemical mechanisms and airshed models – which predict the air quality

of a given region – provide the only available scientific basis for making quantitative estimates of changes in air quality resulting from changes in emissions. There are only a few scientists in the world who are able to provide such scientific advice to international governments and industry as they develop emissions control standards.

- CSIRO technology has helped in the discovery of a large new gas reservoir in Papua New Guinea (PNG). Working closely with InterOil, CSIRO developed a geological model of rocks in the Papuan Basin. The model was a critical component in InterOil's successful exploration strategy, locating a reservoir which potentially holds 11 trillion cubic feet of gas, valued in excess of \$60 billion and equivalent to approximately half the yearly gas consumption in the USA. The discovery confirms PNG as a significant oil and gas province and has the potential to make PNG an important gas supplier in the Asia-Pacific region.



CSIRO geoscientist, Mr Tony Allan, conducts field examinations with local staff in eastern PNG. The field observations enabled development of a highly accurate model of rocks in the Papuan Basin which led to a significant new gas discovery in PNG. Photo: CSIRO

Environment Group

Research group aim:

To develop and to apply leading-edge environmental research that will underpin the economic, environmental and social future of Australia.

Research expenditure 2008–09: \$89.5 million*

Objectives

- New knowledge of Australia's climate, which supports adaptation responses to increasing climate change and variability and informs mitigation strategies.
- Continued development of the Australian Community Climate Earth Science Simulator (ACCESS) to provide climate predictions at a smaller scale and within shorter timeframes.
- Improved national regulations and guidelines which protect human and ecosystem health and allow safe use of chemicals and disposal of wastes.
- Development of predictive models to develop national and regional biodiversity management plans.
- Sustainable and wealth-creating use of natural, built and human resources.

Progress 2008–09

- CSIRO's contribution to the discovery of two new greenhouse gases and increasing methane levels in 2007 and 2008, and confirmation of increasing carbon emissions, is influencing US and European policy.
- ACCESS has reached a milestone with successful integration with other international meteorological and climate models.
- CSIRO-developed frameworks have been provided for the national regulation of contaminants in fertilisers and pesticide residue management in Tasmania.
- CSIRO provided investment decision support for the Australian Government's Reef Rescue initiative.
- Low carbon economy employment forecasts were produced for Indigenous land management, carbon abatement and 'green collar' jobs.

Background

By taking a systems perspective, the Environment Group and its partners aim to increase the understanding of the operation and interaction of entire ecosystems, regional economies and societies, now and into the future. It is anticipated that CSIRO's continued investment in the environment domain will result in a more internationally competitive Australia.

CSIRO's Environment Group focuses its investment in climate, biodiversity, oceans, water and cities. Climate and water investment is focused in the Climate Adaptation and Water for a Healthy Country Flagships respectively.

* Excludes Flagship expenditure

Achievements 2008–09

- An international research team, led by scientists from CSIRO and the Scripps Institution of Oceanography in the US, has discovered two new greenhouse gases accumulating in the atmosphere. Currently the level of these gases is low, but their concentration is growing. These gases have significant global-warming potential. Research results were presented at the Greenhouse 2009 conference and are likely to affect the revision of the Kyoto Protocol.
- After eight years of near-zero growth, CSIRO research with international partners has found that global methane levels rose again in 2007 and 2008. This research suggests the increase

was due to wetland sources, following rapid Arctic and tropical climate changes, and has been used in policy decisions in the United Nations, and by governments in the UK, European Union and the US.

- As a part of the Tasmanian River Catchment Water Quality Initiative, led by the Department of Environment, Water Heritage and the Arts, CSIRO developed a software tool, *Pesticide Impact Rating Index – Tasmania (PIRI-Tas)*. The tool assists pesticide users and regulators make informed decisions about the offsite effects of pesticides on the environment. The tool, designed by CSIRO, the University of Tasmania, Forestry Tasmania and the Tasmanian Department of Primary Industries and Water, is being distributed by the Tasmanian Government, with over 40 public and private agencies now licensed to use it.
- CSIRO's report *Growing the Green Collar Economy* investigates the skills, innovation and workforce dimensions of the transition to a

more environmentally sustainable society, with a particular focus on the challenges involved in achieving deep cuts in greenhouse emissions. The report led to an inquiry by the Australian House of Representatives and contributed to Senate committee meetings on fuel and energy. It can be viewed online at: www.csiro.au/resources/GreenCollarReport.html

- Thirty years of ecological research in one of Australia's most intensively farmed agricultural landscapes – the Western Australia wheat-belt – has culminated in a landmark publication, *Enhancing biodiversity persistence in intensively-used agricultural landscapes: a synthesis of 30 years of research in the Western Australian wheatbelt*, see: www.sciencedirect.com. The report discusses the impacts of six major anthropogenic causes of biodiversity decline in the area, and evaluates practical options for overcoming these limits. It is being used by Australian governments in the management of biodiversity in agricultural landscapes.



The wind blown ice surface at Law Dome Antarctica where high resolution ice cores have been extracted for greenhouse gas analysis. Photo: Tas van Ommen

Information and Communication Sciences and Technology Group

Research group aim:

To work with partners to solve national challenges, drive the productivity of Australian industries, and deliver public good outcomes through the innovative application of mathematical, statistical, information and communication sciences and technology.

Research expenditure 2008–09: \$108.2 million*

Objectives

- Improve the performance of the Australia Telescope Compact Array by completing technical upgrades to enhance international competitiveness.
- Develop globally applicable technologies to respond to genuine needs in the Information and Communication Technologies (ICT) and service domains.
- Develop innovative technologies and services through mathematical and information sciences research.
- Build and strengthen the Organisation's eResearch capabilities to accelerate delivery on national challenges by increasing research productivity and enabling data-driven collaborative science.

Progress in 2008–09

- Upgrades to the Australia Telescope Compact Array in Narrabri, NSW, have provided greater bandwidth and increased dataflow for the six antennas, increasing the chances of new discoveries.
- Established in 2006, the Tasmanian ICT Centre is delivering innovative outcomes in areas such as water resource information systems, tailored wellness information delivery, facilitating improved genomic research, marine observation networks, improving aquaculture efficiency and distributed energy management. TasICTC is working with the Tasmanian industry to commercialise technologies such as the FLECK™ wireless sensors.
- CSIRO, the Department of Climate Change and the Australian National University won the 2008 Australian Museum Eureka Prize for Environmental Research for the jointly developed world-leading National Carbon Accounting System (NCAS), (see page 53).
- Implementation of the organisational eResearch Strategy will commence in late 2009.

Background

The Information and Communication Sciences and Technology Group contains the core of CSIRO's research focus in the sectors of astronomy, information and communication technologies and mathematical services.

The aims of the operational units in the Group are to:

- understand the universe and its origins
- develop globally applicable technologies to respond to genuine needs in the ICT and service domains

- develop innovative technologies and services through mathematical and information sciences research and prototypes.

Achievements 2008–09

- In 2009, through a combination of negotiation and litigation, CSIRO reached settlements with 15 technology companies to pay for use of CSIRO's patented high-speed wireless networking (WLAN) technology in the devices they sell. CSIRO's invention lies at the heart of most commonly used high-speed wireless networks used to connect computers to each other.

* Excludes Flagship expenditure

In 1992, CSIRO patented a solution to the problem of radio waves bouncing off walls and furniture in rooms and creating multiple signal paths. The patent is necessary for the implementation of three of the four main standards used for WLANs developed by the global standards body IEEE.

To date more than a billion devices incorporating CSIRO's patented WLAN technology have been sold. By 2013 the total is expected to be over four billion.

- The ICT Centre is to join forces with the Beijing University of Post and Telecommunications to establish the Australia–China Research Centre for Wireless Communications.
- Upgrades to the Australia Telescope Compact Array in Narrabri, NSW, have provided greater bandwidth and increased dataflow for the six antennas. The seven-year \$12 million upgrade has resulted in an instrument that is four times more sensitive to the faint signals of the universe. At its core is a digital signal processing system based on a novel Polyphase Digital Filter Bank structure developed at CSIRO's Australia Telescope National Facility.

- CSIRO, the Department of Climate Change and the Australian National University jointly developed a world-leading National Carbon Accounting System (NCAS). The Australian-developed NCAS monitors and predicts greenhouse gas emissions, and the effects of land use and management activities, covering all of Australia. It is more comprehensive and reliable than systems developed elsewhere in the world.

- CSIRO's smart sensor network technology is being commercialised by an Australian company, The Powercom Group. The smart wireless sensor network technology comprises nodes, called FLECK™, that work independently to record environmental conditions and cooperate with each other to set up an ad hoc network to wirelessly transfer data to a database. They have applications in diverse large-scale environmental data collection tasks from water resource management to livestock control.



CSIRO's Dr Warwick Wilson, Dr Megan Clark (Chief Executive) and the Australia Telescope National Facility Acting Director, Dr Lewis Ball, with a new signal processing board in front of two antennas of the Australia Telescope Compact Array. Photo: Paul Mathews Photographics

Manufacturing, Materials and Minerals Group

Research group aim:

To be a catalyst in developing new technologies to support high value-adding, export-oriented segments of the Australian manufacturing and minerals sectors.

Research expenditure 2008–09: \$167.6 million*

Objectives

- To achieve a 15 per cent increase in Australia's annual export revenue of polymer nanocomposites by 2015, and capture 25 per cent of the plastics market with a new generation of clean and green bioplastics by 2030.
- Grow high technology biomedical industries over the short, medium and long term through the application of novel materials in health technologies.
- Develop high-value-add engineered components and generate new business investment and employment opportunities for the Australian manufacturing industry.
- Expand the globally competitive resource base available to the Australian minerals sector by discovering new mineral resources, increasing known ore reserves by transforming mining and processing methods, and minimising energy and water consumption and waste streams.

Progress in 2008–09

- CSIRO's terahertz imaging system uses highly sensitive high-frequency waves, capable of penetrating a range of materials including plastics, fabrics and human tissue. The scanner may be used to detect concealed weapons and substances or tumours beneath the skin and, unlike x-ray systems, is completely safe for people. To make the system cost-effective, researchers increased the temperature at which terahertz imaging superconductor junctions operated, resulting in the first system of its kind.
- Biotechnology companies founded on CSIRO technology have increased to 11 with Adventus Technology Inc formed to commercialise two ophthalmic technologies developed by CSIRO and our partners Vision CRC.
- Welding tips technology has been transferred to an Australian manufacturer, MIGfast Pty Ltd. The tips, which provide significant benefits in welding productivity, use 50 per cent less energy and last five times as long as conventional tips. Estimates of 27 per cent improved productivity gains have been recorded by Australian manufacturers.
- CSIRO-developed technology to automate underground longwall coal mining has increased productivity in mines by up to 15 per cent and improved safety by moving miners away from hazardous areas. The technology has been licensed to five equipment manufacturers.

Background

The manufacturing and minerals industries are hugely significant to Australia. In the past year, the manufacturing sector contributed ten per cent to Australia's gross domestic product. It provides jobs for about ten per cent of all employees and revenues have grown at an average rate of three per cent over the past two decades. It creates value in many different

sectors and there is a high level of integration between manufacturing and the rest of the economy. The minerals sector generates exports of over \$100 billion dollars annually and employment numbers in the sector have grown by 66 per cent in the last five years.

CSIRO's Manufacturing, Materials and Minerals Group supports Australia's manufacturing sector by developing and transferring innovative and transformational technologies. We provide

* Excludes Flagship expenditure

support to the minerals sector by developing technologies to assist in mineral exploration, identify ore bodies, improve mining and maximise value from mineral processing.

Achievements 2008–09

- Methane, a significant greenhouse gas, is present in exhaust ventilation air from underground coal mines. CSIRO has developed a new technology that, for the first time, can use the small percentage of methane in ventilation air to generate usable energy. The technology can work with dusty ventilation air and reduces greenhouse gas emissions.
- Measuring less than ten millionths of a millimetre in diameter, carbon nanotubes are immensely strong. Now CSIRO scientists, along with a visiting scientist from the University of Tokyo, have built a device to measure the strength of individual nanotubes and how they interact with other materials. This is essential to perfect the synthesis of this remarkable material and in the development of practical applications. The device is used inside a scanning electron microscope so the nanotubes can be seen and manipulated. It is the first of its kind in Australia and will help to position CSIRO as a world leader in high-tech materials.
- Underground longwall coal mining involves large machines that move back and forth to cut into a coal face. CSIRO-developed technology automates the process to increase productivity and improve safety by moving miners away from noisy, dusty and hazardous areas. Up to 15 per cent increases in productivity result from increased cutting rates and reduced downtime. In 2008–09, five longwall equipment manufacturers signed licensing agreements with a return to CSIRO of approximately \$2 million in fees over the next five years.
- BHP Billiton has co-located researchers from its carbon steel materials group to CSIRO's Queensland Centre for Advanced Technologies in Brisbane. With declining high-grade



Mr Mike Peterson examining iron ore samples.
Photo: Jason Starr

resources in Australia, but enormous reserves of lower-grade ores, improved ways of utilising these ores are necessary.

- CSIRO invented a polymer system for use in medical devices called Elast-Eon™. AorTech Biomaterials acquired this technology and developed a state-of-the-art manufacturing facility in Melbourne to produce the material for multiple uses, especially for the insulation of pacemaker leads. More than one million patients have been implanted with this technology in various devices. The devices have improved reliability, thereby reducing the need for additional surgical procedures. AorTech employs 30 people. The total market for devices currently under development by AorTech is more than US\$2 billion.

Output Group 3 – Science Outreach: Education and Scientific Publishing

Communicating scientific research helps raise the profile of science and CSIRO within the community. CSIRO conducts a range of science education programs for primary and secondary school students and their teachers and hosts the CSIRO Discovery Centre in Canberra.

CSIRO's postgraduate scholarship program provides opportunities in science and engineering for outstanding graduates who enrol at Australian tertiary institutions as full-time postgraduate students for research leading to the award of a PhD. PhD students at CSIRO are co-supervised by a university, allowing students to maintain and develop their university connections while being exposed to research in a working environment.

CSIRO also operates CSIRO Publishing as an independent science and technology publisher with a global reputation for quality products and services covering a wide range of scientific disciplines, including agriculture, chemistry, the plant and animal sciences, and environmental management.

Performance summary – education

CSIRO continued to enhance its profile, delivering a diverse range of outreach programs. Table 1.6 presents a summary of performance for these programs against the 2008–09 Portfolio Budget Statement key performance indicators, projected targets and progress to date.

'I really appreciate the influence that the Double Helix Club had on my choice of career as I'm really happy in this field and feel that I'm doing something worthwhile.'

(Student – CSIRO's Double Helix Science Club)

'After attending a CSIRO presentation at her Primary School ... she decided she loved science ... She then chose biology, chemistry and physics as Higher School Certificate subjects and hopes to study in the genetics course at Sydney University next year.'
(Parent – CSIRO Science Education Centres)



Scientists in Schools participants at John Septimus Roe Community College, Perth, discover biotechnology.
Photo: Tony Ashby

Table 1.6: Education programs

| Performance indicator: Delivery of quality postgraduate student supervision and teacher and student-centred CSIRO Education programs. | |
|---|---|
| Target | Progress in 2008–09 |
| Maintain or increase the number of participants and visitors in CSIRO Education programs. | <ul style="list-style-type: none"> • Participation increased in most programs, with significant growth for the Creativity in Science and Technology (CREST) and Scientists in Schools programs, and at CSIRO's Discovery Centre. • Visitation to the visitor centre at Parkes radio telescope was influenced by the reduced volume of traffic on the Newell Highway. • Visitation and participation numbers are shown in Table 1.7. |
| Maintain or increase the number of postgraduate students sponsored and/or supervised. | <ul style="list-style-type: none"> • CSIRO remains committed to postgraduate training, in partnership with university colleagues. During the reporting year, CSIRO increased the number of sponsored postgraduates by 34 per cent and increased the number of supervised postgraduates by 17 per cent. See Table 1.8. • The number of postdoctoral fellows increased steadily in the last five years to 304 in 2008–09. See Table 1.8. |
| Maintain high levels of positive feedback from participants, visitors and students. | <ul style="list-style-type: none"> • CSIRO's outreach programs were well received with strong positive feedback from teachers, students and the general public. The Parkes visitors centre alone received more than 2,500 positive written comments during the year. • An external evaluation of the Scientists in Schools program indicated the impact on students was significant, showing scientists as real people, increasing students' knowledge of contemporary science and raising their interest in a science-related career. Teachers also benefited, with a marked increase in the confidence of those teaching science in primary schools. As at 30 June, the program had 1,249 partnerships. |

Table 1.7: Science outreach: visitation and participation numbers

| Science outreach program | 2004 | 2005 | 2006 | 2007 | 2008 |
|--|---------|---------|---------|---------|---------|
| Parkes radio telescope | 118,345 | 109,879 | 94,305 | 104,783 | 92,369 |
| Canberra Deep Space Communication Complex | 69,071 | 63,615 | 65,467 | 62,162 | 67,538 |
| CSIRO Science Education Centres | 332,568 | 363,463 | 369,919 | 383,499 | 390,947 |
| CSIRO Discovery Centre | 38,444 | 50,235 | 60,581 | 73,772 | 80,555 |
| Double Helix Science Club | 15,688 | 16,813 | 18,945 | 19,545 | 20,253 |
| Science by Email | 9,075 | 13,915 | 20,689 | 28,516 | 29,560 |
| Creativity in Science and Technology (CREST) | 5,355 | 5,549 | 6,509 | 5,999 | 8,355 |

Table 1.8: Science outreach: CSIRO's postgraduate students

| Sponsored postgraduates ^(a) | 2004–05 | 2005–06 | 2006–07 | 2007–08 | 2008–09 |
|---|------------|------------|------------|------------|--------------------------|
| PhD | 232 | 259 | 256 | 241 | 338 |
| Masters | 11 | 8 | 4 | 18 | 9 |
| Honours | 2 | 10 | 16 | 13 | 17 |
| Total | 245 | 277 | 276 | 272 | 364^(b) |
| Supervised postgraduates ^(a) | 2004–05 | 2005–06 | 2006–07 | 2007–08 | 2008–09 |
| PhD | 463 | 352 | 582 | 523 | 629 |
| Masters | 32 | 40 | 31 | 48 | 56 |
| Honours | 43 | 31 | 61 | 63 | 58 |
| Total | 538 | 423 | 674 | 634 | 743 |
| Postdoctoral Fellows | 283 | 290 | 294 | 301 | 304 |

(a) As at 31 May each year. A student may be either sponsored, supervised or both. The total number of individual students sponsored and/or supervised as at 31 May 2009 was 772, including more than 77 supervised in collaboration with CRCs. See glossary page 159 for definition of sponsorship and supervision.

(b) Includes 130 students fully sponsored and 234 students partially sponsored by CSIRO.

Performance summary – scientific publishing

CSIRO Publishing is an information business operating within CSIRO on a commercial basis on behalf of authors and customers in Australia and overseas. Table 1.9 presents a summary of performance against the 2008–09 Portfolio Budget Statement key performance indicators and corresponding targets.

'My confidence as a science teacher has increased profoundly and I have renewed passion for teaching and learning science. This enthusiasm is contagious and my students are picking it up too!' (Teacher – Scientists in Schools program)

Table 1.9: CSIRO scientific publishing

| Performance indicator: Delivery, through CSIRO Publishing, of innovative, quality information products and services in the science, technical, health and education sectors. | |
|--|--|
| Target | Progress in 2008–09 |
| CSIRO Publishing returns a positive net revenue result. | The net revenue from CSIRO Publishing was \$700,000. Total revenue for the year grew by 4.5 per cent from \$11 million in 2007–08 to \$11.5 million in 2008–09. The main drivers for this increase were strong international subscriptions for journals and co-publishing rights sales for book product. |

Performance indicator: Delivery, through CSIRO Publishing, of innovative, quality information products and services in the science, technical, health and education sectors.

Target

Progress in 2008–09

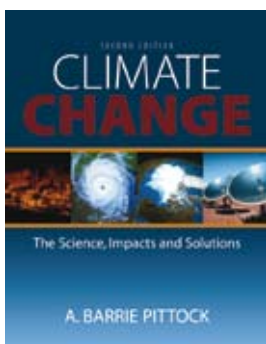
Increase the range and number of publications (comprising journals, books, multimedia and magazines).

Twenty-five peer-reviewed research journals were published in partnership with the Australian Academy of Science and other societies. International submissions continue to grow at 15–20 per cent annually and impact factors as measured by the Institute for Scientific Information, the internationally accepted ranking agency continue positive growth trends.

Forty-four new books were published during 2008–09, bringing the catalogue to over 1,200 titles. Scholarly works such as *Sharks and Rays of Australia* and *Dust Mites* represented excellent outcomes of CSIRO research, and works such as *Field Guide to Frogs*, *Climate Change* and *Ten Commitments* positioned CSIRO and its work in sustainability debates with the broader Australian community.

Two magazines are published, with *ECOS* providing leadership and positioning for CSIRO in the sustainability area and generating massive readership growth for the online version, and *Preview* produced on behalf of the Australian Society of Exploration Geophysicists.

Multimedia continues to deliver web-based science and maths learning objects for the national schools curriculum project under contract to The Learning Federation. CSIRO's film archive is being released on YouTube to provide awareness of CSIRO's heritage.



From left to right: Cover of the second edition of Barrie Pittock's *Climate Change: The Science, Impacts and Solutions*. Design by James Kelly with photos (left to right) from iStockphoto, NASA, NASA and the Australian National University. CSIRO's *ECOS* magazine celebrates 35 years reporting on the science behind sustainability in the environment and industry. Cover photo Sandra Zicus, Antarctic Climate and Ecosystems CRC. *Boom or Bust*, edited by Libby Robin, Robert Heinsohn and Leo Joseph won the coveted Whitley Medal for zoological publishing for 2009. Design by James Kelly, cover art from Gould's *The Birds of Australia*.

Output Group 4 – National Research Infrastructure: National Facilities and Collections

CSIRO manages two types of national research infrastructure: National Research Facilities and National Biological Collections.

National Research Facilities

CSIRO operates a range of specialised laboratories, scientific and testing equipment, and other research facilities which are available for use by both Australian and international researchers. There are three major National Research Facilities:

- **The Australian Animal Health Laboratory (AAHL)** – located in Geelong, Victoria, is a national centre of excellence in disease diagnosis, research and policy advice in animal health. It is Australia's front-line defence, helping to protect Australia from the threat of exotic and emerging animal diseases.
- **The Australia Telescope National Facility (ATNF)** – is made up of radio telescopes at three observatories, near the towns of Parkes, Coonabarabran and Narrabri in New South Wales. About 90 per cent of radio astronomy research in Australia is undertaken using the Australia Telescope.
- **The Marine National Facility (MNF)** – is made up of a 66 metre blue-water research vessel, *RV Southern Surveyor*, a package of unique scientific equipment and instrumentation, and a collection of 25 years of marine data. It has the scientific, technical and administrative expertise required to safely, effectively and efficiently manage an ocean-going research platform. The vessel is particularly suited to multidisciplinary research projects in the deep oceans surrounding Australia.

National Biological Collections

CSIRO is the custodian of several collections of animal and plant specimens that contribute to discovery, inventory, understanding and conservation of Australia's plant and animal biodiversity. These include the:

- Australian National Insect Collection (ANIC), specialising in Australian insects
- Australian National Wildlife Collection (ANWC), specialising in land vertebrates
- Australian National Fish Collection (ANFC), specialising in marine fishes
- Australian National Herbarium (ANH), specialising in our native plants.

Together, they support a significant part of the country's taxonomic, genetic, agricultural and ecological research. They are vital resources for conservation and the development of sustainable land and marine management systems. Good science and sound decisions on biodiversity and natural resource management require correct identification of Australia's native species.

Performance summary – National Research Facilities and National Biological Collections

Table I.10 presents a summary of performance against the 2008–09 Portfolio Budget Statement key performance indicators, projected targets and progress to date.

Table I.10: National research infrastructure performance

| |
|--|
| Performance indicator: Impact |
| Target: Demonstrated high-quality scientific contributions in support of CSIRO research. |
| <ul style="list-style-type: none"> • See pages 51–52 for examples of National Research Infrastructure contributions that support CSIRO's research. |
| Target: Effective response (and preparedness to respond) to national events. |
| <ul style="list-style-type: none"> • AAHL completed the Diagnostic Emergency Response Laboratory complex in 2008 to meet the needs of a large disease outbreak. This \$5 million specialised laboratory will enable AAHL to respond effectively to a large-scale outbreak of highly infectious diseases such as foot and mouth disease or influenza. • AAHL has taken the lead in establishing the Laboratories for Emergency Animal Disease Diagnosis and Response network, which will enhance the concept of a National Animal Health Laboratory System with the AAHL facility as an essential component. |
| Performance indicator: Relationships |
| Target: Continued high rates of access to and utilisation of the collections and facilities. (Utilisation rates are tailored to the specific activities of each facility or collection). |
| Utilisation rate of Facilities |
| Australian Animal Health Laboratory |
| <ul style="list-style-type: none"> • AAHL has operated 24 hours a day, seven days a week for the past four years despite interruptions such as major upgrades to the air handling and effluent treatment systems. |
| Australia Telescope National Facility |
| <p>The ATNF exceeded its target of 70 per cent, reaching 76 per cent of time allocated to observations across the three telescopes.</p> <ul style="list-style-type: none"> • Three per cent of time was lost due to equipment failure (well under the five per cent target). Eleven per cent of non-use was due to maintenance/testing, two per cent was due to bad weather and eight per cent was idle time. • Twenty per cent of telescope time was allocated to ATNF staff, 30 per cent to other Australian researchers and 50 per cent to international researchers. • More information can be found in ATNF's Annual Report at: www.atnf.csiro.au/AR2008 |
| Marine National Facility |
| <p>In 2008–09, the MNF provided 99 days of ship time grants. New funds announced by the government to operate the research vessel will increase the facility's availability over the next few years.</p> <ul style="list-style-type: none"> • More information can be found in the MNF Annual Report at: www.marine.csiro.au/nationalfacility |
| Utilisation rate of National Biological Collections |
| <p>Combined, the Collections have:</p> <ul style="list-style-type: none"> • dispatched over 7,800 specimens in 138 outward going loans • sent around 3,300 tissue samples through 79 grants • hosted 155 visitors for a combined total of 403 research days • hosted 47 tours with a total of 535 people. |

Performance indicator: Resourcing

Target: Progress toward the development of effective management arrangements that promote long-term financial viability of, and access to, the National Facilities and Collections. (Management is tailored to the specific activities of each facility or collection)

Management of facilities**Australian Animal Health Laboratory**

- Three separate external reviews in 2008 concluded that risks associated with biosecurity, health and safety and engineering services were being managed effectively. Ninety-five per cent of all recommendations were completed.
- The AAHL Senior Management Committee is overseeing the effective delivery of diagnostic services and research outputs, including the management of additional Australian Government funding of \$16.8 million allocated in 2008–09 for increased scientific resources.
- AAHL received \$12 million of the Australian Government's National Collaborative Research Infrastructure Strategy funding for laboratory extensions for use by non-CSIRO scientists from 2010 onwards.

Australia Telescope National Facility

- To promote its long-term financial viability while increasing its world-class scientific impact, the ATNF is increasingly implementing automation, remote control and pipeline processing for its existing telescopes.
- ATNF's new radio telescope, the Australian SKA Pathfinder (ASKAP), will be controlled remotely and highly automated, and data will be made available to all astronomers via a public archive.

Marine National Facility

- CSIRO will receive \$150 million over four years to build and operate a state-of-the-art blue-water research vessel to replace the RV *Southern Surveyor*. The new vessel will be commissioned in 2012–13 and will provide a major boost to marine research in Australia.

Management of collections

- A new collection manager was appointed in the ANIC.
- A specimen database in the ANWC, with linkage to other Australian fauna collections, has been improved.
- Investigations of the processes and technical aspects used for microphotography in the ANFC, including shared knowledge from curators of the other National Collections, are leading to the development of a more efficient and appropriate microphotography system.
- Value has been added to the ANH collections by capturing all flowering plant specimens data. This ensures the correct and accurate identification of specimens, and accurate geographic and other relevant data, and is important for the delivery of robust, reliable, high-quality information.

Scientific contributions of CSIRO's National Research Infrastructure

National Research Facilities

The Australian Animal Health Laboratory

AAHL has focused on significant emerging and emergency diseases of national and international concern. Bringing together diverse capabilities and utilising its unique bio-containment facilities, AAHL focused on the global avian influenza pandemic, an outbreak of Hendra virus in Australia, Nipah virus outbreaks in Bangladesh, the Ebola Reston outbreak in the Philippines and the recent human influenza (swine flu) global outbreak. Research at AAHL has assisted in managing the risks from these disease outbreaks through improved diagnostics for more effective tests, a better understanding of host pathogen relationships, the development of a new process in the post-mortem of horses suspected of Hendra virus infection and the role of bats in harbouring animal and human pathogens.

Australia Telescope National Facility

The Australian Square Kilometre Array Pathfinder (ASKAP) is a program within CSIRO to build a world-class radio telescope in the mid-west of Western Australia. It will be built on the Australian candidate site for the International Square Kilometre Array (SKA) project. The ASKAP facility will redefine the state-of-the-art for radio astrophysics by providing the fastest survey capability of any radio telescope world-wide when it begins operation in 2012. The ASKAP science program will be informed by advice from the international astronomy community. CSIRO ATNF's call for Expressions of Interest for ASKAP Survey Science Projects, issued in November 2008, produced 38 submissions, originating from 24 institutions in ten different countries and representing 354 unique authors. This response demonstrates the potential of ASKAP to deliver transformational science.



An artist's impression of the ASKAP at the Murchison Radioastronomy Observatory. Photo: Swinburne Astronomy Productions, design data provided by CSIRO.

Marine National Facility, *Southern Surveyor*

CSIRO was granted time aboard the MNF research vessel *Southern Surveyor* to undertake the first regional scale study of carbonate chemistry over much of the Great Barrier Reef. This work sets a benchmark for predicting how the reef will respond to future carbon dioxide emissions. The resilience of coral reef ecosystems to these changes is a major area of concern, as altered biodiversity could have an impact on the social and economic benefits derived from the reef.

A voyage by the MNF with researchers from the University of New South Wales investigated the ecological impact of the East Australian Current (EAC) cold core eddies off the city of Newcastle in central NSW, an area recognised as a significant nursery for NSW fisheries. The voyage studied the biological significance of the eddies and the distribution of scalps, a type of zooplankton that is a critical feed source for fish. The current strength of the EAC has increased, resulting in the Tasman Sea warming by over two degrees in the past century. The coastal eddies it forms can contain dramatic concentrations of the late stage larvae of fishes that are sought commercially. These eddies are likely to be crucial for our fisheries and can also affect marine parks.



Deploying an instrument designed to monitor the distribution and variation of water temperature, salinity, and density. It was used to collect water samples at specific depths. Photo: Bob Beattie

National Biological Collections

Australian National Insect Collection

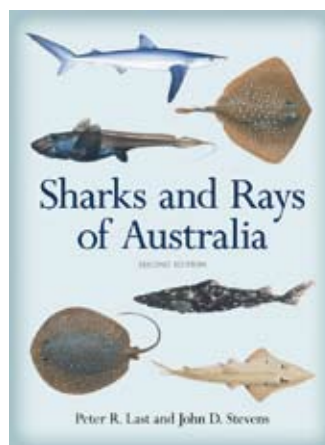
Researchers from the Australian National Insect Collection (ANIC) have contributed to the majority of chapters in the second volume on beetles for the international prestigious series *Handbook of Zoology*. This second beetle handbook is a state-of-the-art reference book for zoology, covering short introductory chapters on recent changes in beetle classification and morphology with accounts of 80 families and higher classificatory units of beetles. This current state of beetle taxonomy is evidenced with information on the morphology of adults and larvae comprehensively illustrated, as well as distribution, biology and ecology.

Australian National Wildlife Collection

Do species always originate through geographical isolation splitting an ancestral species into two? Australian parrots of the Crimson Rosella group were thought to be a rare exception to that 'rule'. Recent Australian National Wildlife Collection (ANWC) research suggested a more conventional process with a twist. Geographical isolation is still operating and the birds are at an intermediate snapshot in the process. By highlighting how ancient landscapes and recent climatic changes have eroded geographic and genetic information relevant to reconstructing the group's history, the paper also paved the way for the Crimson Rosella to be a new, uniquely Australian model of avian evolution.

Australian National Fish Collection

Shark and ray specimens, images, genetic tissues and radiographs from the Australian National Fish Collection (ANFC) have been used to produce the second edition of *Sharks and Rays of Australia* (2009). This book is an essential reference for professional and recreational fishermen, divers, naturalists, students, fish and conservation biologists, and anyone interested in sharks and rays. The new edition documents advances, including 29 species recently discovered in Australian waters and formal descriptions of more than 100 new species.



Cover of the second edition of *Sharks and Rays of Australia* by Peter Last and John Stevens. Illustrations by Roger Swainston and design by James Kelly.

Australian National Herbarium

Lantana is one of the world's most serious environmental weeds. It infests millions of hectares globally, causing a major loss of biodiversity. Researchers from the Australian National Herbarium (ANH), studying the population genetics, DNA sequencing and morphology, to search for genetic variation and the origins of Australian lantana, have discovered that it originated from the Caribbean and Venezuela. To date, biocontrol agents have been sourced from other areas, such as Mexico and Brazil. The outcomes of this research will inform future biocontrol strategies to improve chances of controlling this weed.

Awards and Honours

Outstanding performance in research is also recognised by various international and national award schemes. Here are just a few examples of awards and honours that are a further demonstration of our effectiveness in research and its application in industry and the community.

Order of Australia

Officer (AO)

Dr Bruce Hobbs (retired, Exploration and Mining) for service to science, particularly in the field of structural geology, as a leader in the development of innovative research centres and mineral exploration technologies.

Member (AM)

Dr Colin Wrigley (retired, Plant Industry) for service to primary industry, particularly to grain science as a researcher, and to the development of methods for improving wheat quality.

Medal (OAM)

Dr Richard Schodde (Sustainable Ecosystems) for service to science, particularly in the field of ornithology.

Public Service Medal (PSM)

Dr Tom Hatton (Water for a Healthy Country Flagship) for outstanding public service in leading ground breaking research into current and future water availability and management in Australia.

Prime Minister's Award for Excellence in Public Sector Management

The National Research Flagships program was awarded a *2008 Prime Minister's Award for Excellence in Public Sector Management* from the Institute of Public Administration Australia (IPAA). The recipients were the then Chief Executive, Dr Geoff Garrett; Deputy Chief Executives, Dr Alastair Robertson and Mr Mike Whelan; former Deputy Chief Executive, Dr Ron Sandland; Mr Graham Thompson; and Mr John Williams. The IPAA Awards are Australia's top awards for public sector management.

Australian Museum Eureka Prizes 2008

Dr Peter Caccetta and **Ms Suzanne Furby** (Mathematical and Information Sciences),

Dr John Raison (Sustainable Ecosystems) and **Mr Jan Skjemstad** (Land and Water) won the *Sherman Eureka Prize for Environmental Research* from the Australian Museum for developing a world-class, world-first National Carbon Accounting System to monitor and predict greenhouse emissions.

Dr Mike Pook (Marine and Atmospheric Research) was part of the **team** that won the *Water Innovation and Research Prize*. The group were awarded the prestigious prize for discovering a pattern of Indian Ocean temperatures that led to drought seasons over Australia, Indonesia, and Africa.

Sir Ian McLennan Achievement for Industry Award

This award was established by the former CSIRO Advisory Council in 1985 to recognise outstanding contributions by CSIRO scientists to Australian industry.

The winner was **Dr Frank de Hoog** of Mathematical and Information Sciences for his innovative research into key processes in the manufacturing and mineral processing industries.

Other National and International Awards

Dr Elise Bekele (Land and Water) and **team** were awarded the *Australian Water Association's 2008 WA Water Research Merit Award* for the Floreat Managed Aquifer Recharge project.

Dr Justin Boyle and **team** (ICT Centre) won a *Queensland iAward* for the patient admissions prediction system.

The **CO2CRC Otway Project team** (Energy Transformed Flagship, Petroleum Resources and Marine and Atmospheric Research) received a *Gold Award* from Schlumberger for its teamwork, value creation and innovation. The team also received the *STAR Award* and an *Innovation Award* from the Minister for Innovation, Industry, Science and Research in recognition of outstanding efforts in developing new business opportunities and engagement with small to medium enterprises.

CSIRO was awarded a *Performance Excellence Award* by Boeing for 2008. The specific example of breakthrough technology used to demonstrate excellence was the chemical reactivation technology for aerospace coating systems developed by **Dr Stuart Bateman and team** (Materials Science and Engineering).

Dr Amgad Elmahdi (Land and Water) was awarded the *International Commission on Irrigation and Drainage WatSave Award 2008* and also received the *WatSave Young Professionals Award* for his water saving contribution on 'Water Banking: A Conjunctive Water Use Management Approach for Water Saving and Improved Productivity and Environmental Performance' by the International Commission on Irrigation and Drainage.

Dr Tony Farmer, Dr Trevor McAllister and Dr Tony Murphy (Materials Science and Engineering) were awarded the *Alan Walsh Medal for Service to Industry* by the Australian Institute of Physics for their research on how to apply the PLASCON process to destroy hazardous ozone-depleting chemicals such as chlorofluorocarbons.

Dr Chris Gunn (ICT Centre) and **team** were awarded the *ACT iAward* by the Australian Information Industry Association iAwards for the RIDES tele-health system.

Dr Voytek Gutowski and team (Materials Science and Engineering) won the *Banksia Eco-Innovation Award*, under the patronage of the

Australian Prime Minister, for the development of an emission-free, environmentally sustainable powder coating system for heat-sensitive materials like plastics. Dr Gutowski and team also won the *Society of Plastic Engineers Process Innovation Award* for the development of zero-waste technology for plastics surface finishing and the *Triennial Society of Plastic Engineers – Plastics Innovation Award* for outstanding innovations in the plastics industry from 2005–08.

Dr Peter Lilly (Minerals Down Under Flagship) received the *Beryl Jacka Award* from the Australasian Institute of Mining and Metallurgy for his extraordinary and sustained service to the Institute and its members. Dr Lilly also received the *Sir Willis Conolly Memorial Medal for 2008* from the Institute. The medal is awarded to a person who, through their ability to communicate, has advanced the professionalism, the industry or the management of science, engineering and technology.

Dr Beverley Ronalds (Petroleum Resources) and **Dr Alex Zelinsky** (ICT Centre) were named by Engineers Australia in the *Top 100 Most Influential Engineers in Australia*.

Dr Philip Valencia and team (ICT Centre and Livestock Industries) won a *Queensland iAward* for their work on virtual fencing.

Dr David Yeates (Entomology) was awarded the *Australian Entomological Society's 2008 Mackerras Medal*. The Mackerras Medal is the Australian Entomological Society's highest award and is given every two years to a member of the Society under 50 years of age who has demonstrated excellence in entomology.

CSIRO Chairman's Medal

The *Chairman's Medal* honours the most exceptional research in CSIRO and is awarded to the scientist or team whose research is of national or international importance in advancing scientific knowledge, technology application or commercialisation.

The Murray-Darling Basin Sustainable Yields

Project Team (Water for a Healthy Country Flagship, Land and Water, and Marine and Atmospheric Research) won the *2008 Chairman's Medal* for research that has delivered the most comprehensive and complex whole-of-basin water assessment ever undertaken in Australia. This knowledge is fundamental to the sustainable management of one of Australia's most important regions, the Murray-Darling Basin.

The winners of the *Chairman's Medal* were:

The Team (Seminal and significant contributors):

Dr Tom Hatton (Team Leader), Mr Mark Alcorn, Ms Jenet Austin, Ms Kate Austin, Dr Brian Barnett, Mrs Janice Bathols, Mr Heinz Buettikofer, Dr Francis Chiew, Dr Peter Cook, Dr Richard Cresswell, Dr Russell Crosbie, Ms Sue Cuddy, Dr Carl Daamen, Mr Andrew Davidson, Mr Phillip Davies, Ms Rose Davis, Mr Trevor Dowling, Dr Ray Evans, Dr Richard Evans, Ms Kathryn Farry, Ms Dianne Flett,

Mr Andrew Freebairn, Dr Andrew Frost, Mr Simon Gallant, Dr Juan Pablo Guerschman, Ms Rachael Gilmore, Dr Anthony Goode, Mr Paul Harding, Mr Mick Hartcher, Dr Peter Hill, Ms Linda Holz, Dr Donna Hughes, Mr Craig Johansen, Dr Phillip Jordan, Mr Durga Kandel, Mr Scott Keyworth, Dr Mac Kirby, Dr Dewi Kirono, Dr David Lemon, Ms Nicola Logan, Mr Yi Lui, Mr Mohammed Mainuddin, Dr Nick Marsh, Mr Steve Marvanek, Mr James McCallum, Mr Craig McKay, Mr Geoff McLeod, Ms Linda Merrin, Dr Brad Neal, Mr Steve Page, Dr Zahra Paydar, Mr Jorge Pena-Arancibia, Mr Jean-Michel Perraud, Dr Geoff Podger, Dr David Post, Dr Nick Potter, Dr Ian Prosser, Mr Bai Qifeng, Mr Arthur Read, Dr Stuart Richardson, Dr Tony Sheedy, Mr Garry Swan, Mr Jin Teng, Dr Albert Van Dijk, Dr Jai Vaze, Dr Neil Viney, Mr Jamie Vleeshouwer, Dr Vic Waclawik, Dr Quan Jun Wang, Dr Glen Walker, Dr Wendy Welsh, Mr Paul Wettin, Dr Ang Yang, Dr Bill Young and Dr Lu Zhang.

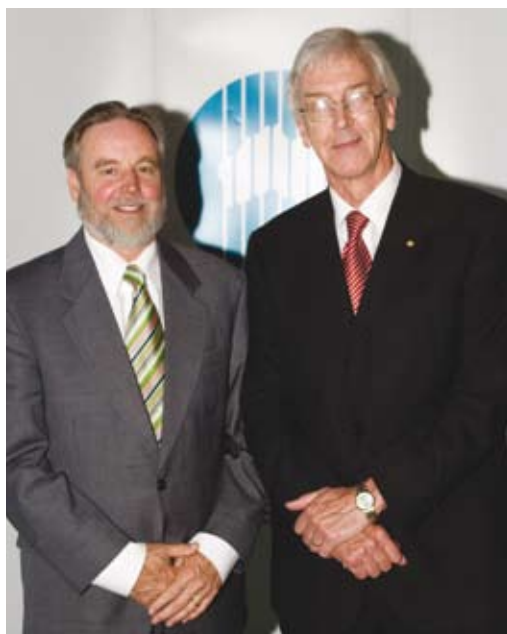


Winners of the Chairman's Medal from L to R: Mr Scott Keyworth, Dr John Stocker (Chairman), Dr David Post, Dr Glen Walker, Dr Bill Young, Dr Geoff Podger, Dr Tom Hatton, Dr Albert van Dijk, Mr Richard Evans (Sinclair Knight Merz) and Dr Geoff Garrett, AO (former Chief Executive).
Photo: Christian Pearson, Misheye Photography

The CSIRO Medal for Lifetime Achievement

The CSIRO Medal for Lifetime Achievement is awarded to individuals who have a record of sustained and meritorious achievement over a prolonged period of CSIRO service.

Dr John K Wright (Energy Transformed Flagship) was awarded the medal for raising the profile of CSIRO's commitment to energy research and development, and taking a leading role in the development of Australia's energy future.



Winner of the CSIRO Lifetime Achievement Medal, Dr John K Wright (left) with Dr Geoff Garrett, AO (former Chief Executive). Photo: Christian Pearson, Misheye Photography

Fellows of Societies

Dr Francis Chiew and **Dr Blair Nancarrow** (Land and Water) were named as biennial medallists of *Modelling and Simulation Society of Australia and New Zealand Inc* for outstanding contributors to modelling and simulation over a sustained period and who have a record of service to the Society. Medallists automatically become Fellows of the Society.

Dr Jeffrey Ellis (Plant Industry) was elected as Fellow of the *Royal Society*.

Dr Rob Fitzpatrick (Land and Water), **Dr Catherine Foley** and **Dr Anita Hill** (Materials Science and Engineering) were elected as Fellows of the *Australian Academy of Technological Sciences and Engineering*.

Dr Jay Guo (ICT Centre) was elected as Fellow of the *Institution of Engineering and Technology*.

Dr Mike McLaughlin (Land and Water) was elected a Fellow of the *American Society of Agronomy* and Fellow of the *Soil Science Society of America*.

Dr Mike Raupach (Marine and Atmospheric Research) and **Dr Peter Waterhouse** (Plant Industry) were elected as Fellows of the *Australian Academy of Science*.

Dr Angelica Vecchio-Sadus (Minerals) was elected as a Chartered Fellow of the *Safety Institute of Australia*.



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Part two – Governance

Management and Accountability

Part two: Governance Management and Accountability

CSIRO has a comprehensive set of processes to support the effective governance, management and accountability of the Organisation, which comply with CSIRO's enabling legislation and government policy.

Legislation and government policy

CSIRO is an Australian Government statutory authority constituted and operating under the provisions of the *Science and Industry Research Act 1949* (SIR Act).

CSIRO's primary functions are:

- to carry out scientific research
 - to assist Australian industry and to further the interests of the Australian community
 - to contribute to national and international objectives and responsibilities of the Australian Government
- to encourage and facilitate the application and use of the results of CSIRO scientific research.

Secondary functions include international scientific liaison, training of research workers, publication of research results, technology transfer of other research, provision of scientific services and dissemination of information about science and technology.

The Organisation has power to do all things necessary or convenient to be done for or in connection with the performance of its functions.

Reporting, accountability and other rules for CSIRO's operations are set out in the *Commonwealth Authorities and Companies Act 1997* (CAC Act).

In October 2008, CSIRO submitted an annual Compliance Report to the government regarding the Organisation's compliance with the CAC Act and its financial sustainability.

General policies of the Australian Government that applied to CSIRO in 2008–09 under Section 28 of the CAC Act are: Commonwealth Fraud Control Guidelines; Australian Government Foreign Exchange Risk Management Guidelines; and Outsourcing of IT Infrastructure Services. In addition, CSIRO has

complied with the Commonwealth Procurement Guidelines as they apply to CSIRO.

The Quadrennium Funding Agreement 2007–08 to 2010–11 between CSIRO and the government includes the principles of quadrennium funding, resourcing of outputs, performance reporting and other matters agreed by the parties.

Further information on CSIRO's governance arrangements can be found at:

www.csiro.au/governanceoverview

Responsible Minister

In 2008–09, the Minister responsible for CSIRO was Senator the Honourable Kim Carr, Minister for Innovation, Industry, Science and Research.

The Minister and the CSIRO Board signed the Public Research Agency Charter in November 2008. The Charter provides guidance to CSIRO and its researchers when engaging in public debate.

Under the SIR and CAC Acts, the Minister has power to:

- add to the purposes for which CSIRO may carry out scientific research (SIR Act section 9)
- provide to the CSIRO Board in writing, directions and guidelines with respect to the performance of the functions, or the exercise of the powers, of the Board or of the Organisation (SIR Act section 13).

Ministerial directions and notifications

On 4 August 2008, the Minister directed the CSIRO Board to implement and comply with the Australian Government Employment Bargaining Framework and Supporting Guidance.

During 2008–09, 14 notifications under Section 15 and 16 of the CAC Act were made to the Minister. These related to participation in partnerships, joint ventures or similar arrangements, the commencement of business activity, share transactions, the disposal of a business and the modification of existing contractual arrangements.

CSIRO Board

CSIRO is governed by a Board which is responsible to the Australian Government for the overall strategy, governance and performance of the Organisation.

The CSIRO Board comprises the Chief Executive and nine part-time, non-executive members including the Chairman. All non-executive members are appointed by the Governor-General. The Chief Executive is appointed by the CSIRO Board, in consultation with the Minister.

The CSIRO Board has permanent committees to assist in the execution of the Board's responsibilities:

- Board Audit Committee
- Board Commercial Committee
- Board Remuneration Committee.

A Board Endowment Committee was also established in mid-2009. Newly appointed Board members are informed of their responsibilities and rights through a formal induction process. In the pursuit of their duties, Board members may take such independent professional advice as is considered necessary, and have complete access to senior management. The Board regularly reviews its operations and performance. A Board Performance Assessment was undertaken during the third quarter of the 2008–09 financial year, facilitated by an external consultant. The Board Committees assess their performance at least once per year and report the outcomes to the Board.

Disclosure of interests by Board members and the Chief Executive are made in accordance with the SIR Act and CAC Act, as appropriate.

Details of the 2008–09 Board members, including qualifications and terms of appointment are on pages 63–64. Details of remuneration, membership of Board Committees and attendance at meetings are shown on pages 125–127 in the Financial Statements. The Board Charter and membership profiles are available at:

www.csiro.au/boardoverview

CSIRO Executive Management

The Chief Executive conducts the affairs of the Organisation in accordance with the strategy, plans and policies approved by the Board and the Board Directions to the Chief Executive. These Directions were reviewed in December 2008. The Chief Executive is supported by the Executive Team.

The Executive Team is assisted by a number of Management and Advisory Committees, including the Science Oversight Committee, Commercial Executive (ComEx) Committee, the Health, Safety and Environment Committee, the Capital Asset Management Committee, and the Enterprise Risk Advisory Committee.

The Executive Management Council of senior managers provides a forum for sharing and discussing issues relating to the management and future strategy for CSIRO.

Strategies, policies and plans

The 2007–2011 CSIRO Strategic Plan sets out the Organisation's broad vision for the future. The Strategic Plan, together with the Science Investment Process, directs the development of the annual CSIRO Operational Plan.

Further details on the Science Investment Process are provided on page 61.

CSIRO has a comprehensive set of organisational policies and an effective framework for the exercise of delegations and authorities. All staff must comply with the CSIRO Code of Conduct.

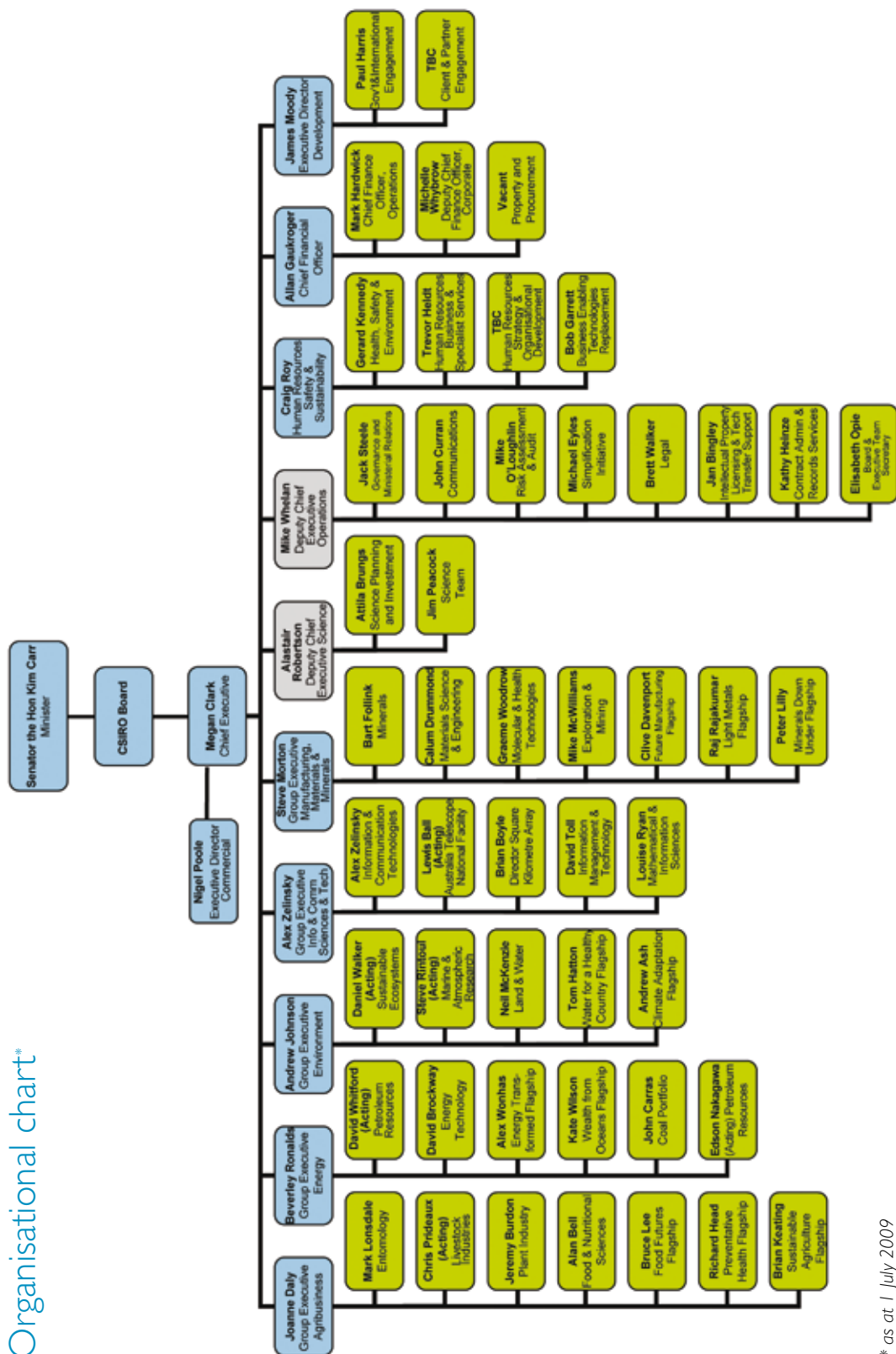
In 2008–09, the Board endorsed the CSIRO Environmental Sustainability Strategy and approved two key policies:

- Health, Safety and Environmental Sustainability
- External Engagement

A range of operational policies and procedures were also reviewed and introduced this year including:

- Advanced Ministerial Notification
- Early Intervention (Health and Safety)
- IT Security
- Credit Card

Organisational chart*



* as at 1 July 2009

Science Investment Process

CSIRO invests in science and support projects through a systematic and robust science investment process that increases linkages across the Organisation, builds on our distinctive cross-disciplinary strengths and encourages a longer-term perspective towards science planning.

Science investment decisions are based on the criteria of **relevance** and **impact**.

Relevance criteria establish that:

- the proposed investment is appropriate to our roles in the broader innovation system and aligned with Australia's National Research Priorities
- CSIRO has the capability to tackle the research challenge
- science and technology is a key component of the solution to the problem.

Impact criteria establish that:

- there is an identifiable pathway for research outputs to be taken through to delivery and adoption
- the investment represents a productive application of scarce resources
- CSIRO is competitive in the delivery of this research output and an efficient and effective provider in the research field.

The key steps in the science investment process include:

Broad direction setting – An annual examination and re-calibration of our longer-term strategy and current research portfolio and capability development initiatives. It considers advice from internal and external sources and changes to the internal and external environment. It provides guidance to the Organisation on the direction and timing of investment shifts, the specific role CSIRO should play, and the science and capability areas requiring additional investment.

Enterprise level balancing – An examination and balancing of portfolio and capability priorities from an enterprise-wide perspective.

Performance and investment appraisals – A rolling program of portfolio and capability (Divisional) appraisals that monitor progress and assess the level of ongoing investment in research Themes and capability development initiatives.

Advisory mechanisms

CSIRO's Sector Advisory Councils provide advice on the high-level strategic directions for R&D for their sector. The Councils comprise external representatives from industry and other stakeholder interest and cover energy and transport; environment and natural resource management; health; information, communication and services; manufacturing; and mineral resources sectors.

There are also Advisory Committees for each of the National Research Flagships.

Details of the Sector Advisory Councils and Flagship Advisory Committees can be found at: www.csiro.au/SAC and www.csiro.au/FAC

Performance measurement and reporting

CSIRO's performance measurement framework is designed to assist management and staff to understand and improve the Organisation's performance and to ensure external reporting and accountability requirements are met. It aligns performance and accountability with the Organisation's strategic objectives. More information on the performance framework is given on page 6. Detail of CSIRO's performance in 2008–09 is given in Part One – Performance on pages 2–56.

A program of externally-led Science Assessment Reviews ensures that the quality and relevance of its science base is maintained. Five Science Assessment Reviews were undertaken in 2008–09. Further details are shown on pages 75–76.

Risk management

CSIRO's risk management framework sets out the responsibilities of the Board and management and aims to integrate risk management into organisational planning

and performance management processes. CSIRO's risk profile is regularly updated. Risk mitigation strategies are in place at the enterprise level and include, in appropriate circumstances, insurance to transfer the financial impact of risk. Accountability for identifying and managing risk rests with all individuals across all areas of CSIRO.

External audit and internal controls

Assurances about the Organisation's financial state of affairs, compliance issues and control environment are provided through a comprehensive range of processes including the internal Risk Assessment and Audit, Fraud Control and Security functions.

External audit is provided by the Australian National Audit Office (ANAO).

CSIRO maintains a Whistleblower Scheme and uses mechanisms such as Control Self-Assessment Questionnaires signed by senior managers to provide additional assurance.

CSIRO complies with Commonwealth Fraud Control Guidelines. An updated Fraud Control Plan was promulgated in November 2008.

The CSIRO Corporate Security Plan was updated in February 2009 following a review of new and emerging risks, which included an evaluation of security risks identified in 2005. The review took into account the changes to Government security policy, emerging threats identified by the Australian Security Intelligence Organisation and criminal threats identified by the Australian Federal Police.

Administrative law: freedom of information

The *Freedom of Information Act 1982* requires each Australian Government agency to publish a statement setting out the general right of access

to documents. This statement is available in Appendix 3, page 142. There were 21 requests for information under the FOI Act during 2008–09.

Privacy legislation

CSIRO provides information as required to the Privacy Commissioner under section 36 of the *Privacy Act 1988*. No investigations were undertaken during 2008–09. See Appendix 3, page 142.

Board membership 2008–09



Chairman
Dr John Stocker AO
BMedSc MBBS PhD
FRACP FTSE
Company Director
28 June 2007 – 27 June
2010



Deputy Chairman
Professor Suzanne Cory AC
BSc MSc PhD FAA FRS
Director The Walter
and Eliza Hall Institute of
Medical Research
26 June 2002 – 25 June
2009



Chief Executive
Dr Megan Clark
BSc(Hons) PhD DSc
FTSE GAICD
Chief Executive
1 January 2009 – 31
December 2014



Dr Geoff Garrett AO
BA(Hons) MA PhD
8 January 2001 – 31
December 2008

Members



Ms Mary Boydell
BCom
Company Director
26 June 2009 – 25 June
2014



Professor Ian Chubb AC
MSc DPhil Oxon, Hon
DSc Flinders
Vice-Chancellor and
President
The Australian National
University
7 August 2008 – 6 August
2012



Dr Terry Cutler
BA(Hons) PhD FAIM
FAIPA
Principal
Cutler and Company
Pty Ltd
25 July 2002 – 24 July 2012



Dr Eileen Doyle
BMath(Hons) MMath
PhD FAICD
Company Director
15 February 2006 – 14
February 2011

Commonwealth Disability Strategy

CSIRO recognises the importance of the Commonwealth's Disability Strategy. CSIRO is committed to identifying areas for improvement to meet its obligations under the Act. CSIRO's performance against the indicators issued by the Office of Disability during 2008–09 is detailed in Appendix 4, page 143.



Mr Brian Keane
FAICD
Company Director
30 July 2003 – 29 July 2008



The Honourable John Kerin AM
BA BEc(Hons) DScAgr
(UNE) Hon DSc (UWA)
Hon DLitt (UTas)
Company Director
3 October 2008 – 2
October 2011



Ms Deborah O'Toole
LLB
Company Director
16 April 2003 – 15 April
2008
1 May 2008 – 30 April
2011



Mr Douglas Rathbone AM
DipChemEng BCom
Nufarm Ltd
Managing Director and
Chief Executive
26 September 2007 – 25
September 2010



Professor Alan Robson AM
BAgrSc PhD FTSE FAIAS
Vice-Chancellor
University of Western
Australia
30 July 2003 – 29 July 2008



Professor Tom Spurling AM
BSc(Hons) PhD
Research Professor
Swinburne University of
Technology
1 May 2008 – 30 April 2012

Executive Team membership 2008–09



Dr Megan Clark
BSc(Hons) PhD DSc FTSE
GAICD
Chief Executive (from
January 2009)



Dr Geoff Garrett AO
BA(Hons) MA PhD
Chief Executive (till
December 2008)



Dr Alastair Robertson
BSc(Hons) PhD FRSC
CChem FIFST
Deputy Chief Executive
Executive Director, Science
Strategy and Investment



Mr Mike Whelan
BEc
Deputy Chief Executive,
Operations



Dr Joanne Daly
BSc(Hons) PhD PSM
Group Executive,
Agribusiness



Dr Michael Eyles
BSc(Hons) PhD
Executive Director,
Leadership and
Organisation
Development (till
December 2008)



Mr Allan Gaukroger
BA FCPA
Chief Finance Officer



Dr Andrew Johnson
BAgrSc(Hons) PhD MPA
(Harvard)
Group Executive,
Environment



Dr James Bradfield Moody
BInfoTech(Hons) BEng
(Elec) PhD
Executive Director,
Development (from May
2009)



Dr Steve Morton
BSc(Hons) PhD
Group Executive,
Manufacturing, Materials
and Minerals



Mr Nigel Poole
LLB BCom FAICD
Executive Director,
Commercial



Dr Beverley Ronalds
BE(Civil)(Hons) MSc PhD
FIEAust FICE FTSE FAICD
Group Executive, Energy



Mr Craig Roy
BSc MSc MBA
Executive Director,
Human Resources, Safety
and Sustainability



Dr Alex Zelinsky
BMaths(Hons) PhD FTSE
FIEE FAICD FIEAust
Group Executive,
Information and
Communication Sciences
and Technology

Executive team profiles are available at:
www.csiro.au/executiveteam

Health and safety

2

Governance

CSIRO is committed to the health and safety of its staff and recognises the importance of positive interventions aimed at improving staff health and safety. CSIRO acknowledges its responsibilities under Section 74 of the *Occupational Health and Safety Act 1991*.

visitors and the communities in which we work. It reinforces our HSE Strategic goal of 'Striving for Zero Harm' to our people, the environment and the communities in which we operate.

CSIRO has complied with Section 74 of the *Occupational Health and Safety Act 1991*.

Health, Safety and Environmental Sustainability Policy

An updated CSIRO Health, Safety and Environmental Sustainability (HSES) Policy was launched in early 2009. It reflects our commitment to ensuring the safety and wellbeing of our staff,

Health and safety management arrangements

- completed on time in agreement with management, staff and the Staff Association
- the CSIRO HSES Annual Report 2008 was completed. The report records the achievements, activities and performance which meet our HSE strategic goals, building our safety culture, including recognition of our environmental and social responsibilities. This report can be viewed at: www.csiro.au/HSEReport

Initiatives undertaken during the year to ensure the health, safety and welfare at work of employees and contractors

- implementation and completion of CSIRO's health and safety leadership training with all executives
- commencement of phase two of health and safety leadership training, which will equip the next level of leaders to take a higher profile in growing the Organisation's *Zero Harm* culture
- safety contact program commenced for executives to encourage engagement with staff on health and safety matters
- implementation of an Early Intervention Procedure designed to provide support to staff experiencing early-stage injury symptoms. This support enables early intervention to prevent injuries deteriorating further and increases the likelihood of full recovery
- training for managers and staff who manage or engage contractors. The program highlights the specific HSE requirements necessary for safe completion of contracted works within CSIRO
- the implementation of a new Staff International Travel System has enhanced the capability of identifying staff who may be or who have travelled to trouble spots linking in with the Department of Foreign Affairs and Trade's 'Smartraveller' system of travel advisories
- staff involvement in the Global Corporate Challenge, a health and wellbeing initiative developed to encourage staff to maintain the long-term commitment and motivation needed to bring about positive, habitual change in fitness levels
- a breaks and exercise software program has been installed on staff PCs to assist in reducing risk of musculoskeletal injuries at PC workstations

Health and safety outcomes

- increased awareness of roles and responsibilities for executives and senior leaders as a result of the HSE leadership training
- enhanced staff accessibility to early medical treatment as part of the early intervention program, minimising the risk of injuries becoming more severe
- improved staff engagement and feedback through the safety contacts program
- overall improvement in health and safety performance, recognised in reduced injuries, illnesses and the workers compensation premium
- better understanding of how to manage contractors through a training program explaining how to better manage contractors for safe work

Statistics of any accidents or dangerous occurrences during the year including those that required the giving of notice under section 68 (see Figure 2.1)

- During 2008–09, the lost time injury frequency rate (LTIFR) increased to 1.5 from 0.7 in 2007–08. The majority of the lost time injuries (11 of 15) relate to body stressing type injuries which are being addressed through our Musculoskeletal Management Strategy.
- The Medical Treatment Frequency rate (MTFR) has improved to six in 2008–09 from ten in 2007–08 meaning that less people have been injured to the extent that they need medical treatment for their injuries.
- The number of workers compensation claims shows a significant reduction from 117 in 2007–08 to 64 in 2008–09. Part of this improvement can be attributed to the introduction of the early intervention program designed to prevent relatively minor injuries going on to develop a more disabling stage.
- The ratio of near miss reporting to injury reporting has increased from 39 per cent in 2007–08 to 71 per cent in 2008–09, reflecting a growing awareness among supervisors and staff of the value of reporting and rectifying risks before people get injured.
- During 2008–09, 46 Notifiable Incidents were reported to Comcare. This is an increase of 17.5 per cent compared to the 2007–08 period. Several of the incidents involved electrical work and contractors. An electrical safety improvement team has been formed and has identified key root causes and mitigating steps to be deployed to address these causes.

Details of any investigations conducted during the year that relate to undertakings carried on by the employer, including details of all notices given to the employee under section 29, 46 or 47 during the year

- Comcare conducted two investigations of incidents from 2007 during the reporting year which were completed to their satisfaction.
- No Provisional Improvement Notices were served on CSIRO by Health and Safety Representatives.
- No Prohibition or Improvement Notices were served on CSIRO.

Figure 2.1: CSIRO's injury frequency rates June 2005 to June 2009



¹Definitions:

MTRF is the number of compensation claims per million hours worked plus the number of injuries requiring medical treatment.

LTIFR is the number of incidents involving lost time from work greater than or equal to one full day or shift per million hours worked

CSIRO's health and safety performance compares favorably with other Australian Government agencies. This is reflected in our workers' compensation premium (Table 2.1).

CSIRO's premium rate, determined on four year injury and claims performance, is one of the lowest amongst all agencies.

Table 2.1: CSIRO's workers' compensation premium

| Premium rate (% of payroll) | 2005–06 | 2006–07 | 2007–08 | 2008–09 | 2009–10 |
|--------------------------------|---------|---------|---------|---------|---------|
| CSIRO | 0.77% | 0.83% | 0.68% | 0.53% | 0.37% |
| All agencies | 1.77% | 1.77% | 1.55% | 1.36% | 1.25% |

Environmental performance

2

Governance

Contribution to Environment Protection and Biodiversity Conservation

CSIRO has a strong association over its 80-plus year history with the development of industry, agriculture, environment and social aspects of Australia's history. As a community leader and Australian Government agency, CSIRO has an obligation, both statutorily through the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and morally, to protect and maintain biodiversity and heritage within its control.

Contribution to Ecologically Sustainable Development

CSIRO contributes to Ecologically Sustainable Development (ESD) through its research activities and operations. For example, research activities within the Energy Transformed Flagship program include the development of technologies that reduce the environmental impact of electricity generation; improve energy efficiency in buildings; and the development and utilisation of alternative energy sources. The Sustainable Cities and Coasts research theme, within the Climate Adaptation Flagship, undertakes research into the management of urban climate change risks, with the aim to develop tools that will assist in integrated urban planning, design and development.

Other CSIRO research activities contribute to ESD through programs that:

- improve the sustainable use of natural, built and human resources
- improve the management of native plant ecosystems, including the conservation of flora and fauna biodiversity
- reduce greenhouse gas emissions, while increasing carbon storage and increasing sustainable food production.

The effects of CSIRO's actions on the environment

CSIRO's operations consume energy, water and material resources during the pursuit of its research outcomes. Although CSIRO has implemented site-based environmental management systems to reduce its environmental impact, an Environmental Sustainability Strategy (ESS) was developed during 2008–09 to specifically focus on reductions in waste generation and consumption of energy and water.

CSIRO's electricity and gas consumption for 2008–09 is estimated at 645 Terajoules (TJ), which is three per cent lower compared to 2007–08 (see Table 2.2). Electricity consumption increased marginally, while gas consumption decreased by 11 per cent over the same period. Over the past five years, energy consumption has decreased by nine per cent, with a seven per cent decrease in electricity consumption and a 14 per cent decrease in gas consumption.

Table 2.2: CSIRO electricity and gas consumption (2004–05 to 2008–09) (TJ)

| | 2004–05 | 2005–06 | 2006–07 | 2007–08 | 2008–09 |
|------------------|---------|---------|---------|---------|---------|
| Electricity (TJ) | 468 | 445 | 445 | 431 | 436* |
| Natural gas (TJ) | 242 | 248 | 227 | 234 | 209* |

* estimated based on available consumption data

Currently, CSIRO procures 15 per cent GreenPower through its main electricity contract, equating to approximately 12.5 per cent GreenPower across the Organisation. Under the ESS, procurement of GreenPower is expected to increase a further 20 per cent, to ultimately account for a total 35 per cent of procured electricity.

In the past five years, CSIRO has gradually decreased its greenhouse gas emissions (see Table 2.3) due to electricity consumption through utilisation of gas, site consolidation and smaller site-specific initiatives, such as installation of automated lighting and building optimisation.

During 2008–09, CSIRO sites consumed approximately 734 megalitres (ML) of potable water (see Table 2.4). The impact of the drought, particularly in Victoria and south-east Queensland has driven water reductions at a number of sites, with the requirement for water management plans by local water authorities. Improved data analysis showed that CSIRO recorded a four per cent increase in water consumption for 2008–09, attributed to several Western Australian and Victorian sites. However, water consumption has trended downwards by 22 per cent over the past five years. Planned sub-metering will enhance data accuracy.

Minimising CSIRO's impact on the environment

During 2008–09, CSIRO embarked on a challenging seven-year Environmental Sustainability Strategy (ESS). The high-level goals to be achieved by 2015 are carbon neutrality, to halve mains water consumption and halve waste generation. The goals will be achieved through initiatives that reduce demand and utilise alternative sources, utilisation of CSIRO research, staff engagement and improvements to procurement practices. The outcome of the ESS will enable CSIRO to demonstrate leadership in environmental sustainability associated with its operations.

A comprehensive audit program across 28 CSIRO sites has commenced to identify the Organisation's major sources of energy, water consumption and waste generation. In addition, the installation of energy and water sub-meters and intelligent software is underway to enable building optimisation and close to 'real-time' monitoring of consumption to enhance staff awareness of consumption trends through increased access to environmental data.

For the first time, a detailed analysis of CSIRO's air travel profile and associated greenhouse gas

Table 2.3: CSIRO greenhouse gas emissions (2004–05 to 2008–09)

| | 2004–05 | 2005–06 | 2006–07 | 2007–08 | 2008–09 |
|---|---------|---------|---------|---------|---------|
| Electricity Source (ktCO ₂ e) ⁺ | 135 | 129 | 125 | 119 | 119* |
| Natural Gas Source (ktCO ₂ e) | 16 | 16 | 15 | 16 | 11* |

⁺kilotonnes carbon dioxide equivalent

* estimated based on available consumption data

Table 2.4: CSIRO water consumption (2004–05 to 2008–09)

| | 2004–05 | 2005–06 | 2006–07 | 2007–08 | 2008–09 |
|-------------------|---------|---------|---------|---------|---------|
| Water volume (ML) | 939 | 823 | 837 | 708 | 734* |

* estimated based on available consumption data

emissions was undertaken. This has enabled the identification of staff who undertook significant air travel. It is recognised that air travel is a necessary activity where face-to-face meetings are required. However, webcams have been provided to nominated staff as an alternative to air travel, with the aim to reduce greenhouse gas emissions.

New CSIRO facilities are built with consideration for ecologically sustainable design principles, including building design, energy and water efficiency, and landscaping.

CSIRO has implemented mechanisms for reviewing and increasing the effectiveness of the above measures. Progress towards achievement of the ESS goals is monitored via several mechanisms. These include reports to senior management and the Board Audit Committee regarding progress. In addition, an ESS Steering Committee will be established to monitor progress and a number of performance indicators will be implemented to monitor CSIRO's environmental sustainability performance.

Heritage protection

The CSIRO Heritage Strategy is used as the basis for the management of actions and activities associated with CSIRO's heritage. During the financial year, heritage assessments were performed on Cleveland (QLD), Rockhampton (QLD), and Merbein (VIC). The Chiswick Field Station at Armidale (NSW), which has had Indigenous cultural sites identified was subject to a heritage conservation management plan, and the Yalanbee field station at Bakers Hill (WA) also had Indigenous sites identified, which are being registered prior to the land's divestment.

The pastoral lease property acquired in Murchison (WA) for the siting of the Murchison Radioastronomy Observatory comprises pastoral station buildings of WA State heritage value. A management plan is being prepared to preserve those heritage values.

Collaboration and Partnering

2

Governance

University collaboration

CSIRO has extensive collaborative relationships and arrangements with universities both in Australia and overseas.

We support the training of future researchers as a means of building Australia's scientific capability and capacity. CSIRO shares research infrastructure to maximise the efficiency and impact of its use, and collaborates extensively in delivering science-based solutions that increase Australia's competitive advantage.

Some examples of collaboration include:

- CSIRO staff supervise, co-supervise and/or sponsor nearly 700 postgraduate students in conjunction with Australian universities.
- 2,750 of CSIRO's 6,510 staff are currently located on, or directly adjacent to, university campuses, providing the means for sharing infrastructure and improving opportunities for increased collaboration.
- Through the Flagship Collaboration Fund, CSIRO committed to the investment of \$15 million in research conducted by more than 30 universities. This complements and contributes to CSIRO's Flagship research, delivering to identified national research priorities.
- In May 2009, the Australian Government announced \$80 million of new funding for the National Centre for Square Kilometre Array (SKA) Science which will provide supercomputing infrastructure for the Australian SKA Pathfinder (radio astronomy) project. This will be hosted by the Western Australian Interactive Virtual Environments Centre, a partnership between CSIRO and Western Australian universities.
- Other Federal Budget announcements included additional funding for the Synchrotron, European Molecular Biology Laboratory and the *Atlas of Living Australia*, all research infrastructure partnerships between CSIRO and Australian universities.

Cooperative Research Centres

Since the commencement of the Cooperative Research Centre (CRC) Program in 1991, there has been a total of ten CRC selection rounds, resulting in the establishment of 168 CRCs, of which CSIRO has been a participant in a total of 125 and has invested over \$1.2 billion.

As at 1 July 2009, CSIRO is a participant in 27 of the 51 currently active CRCs at a cost of \$50 million, achieving a co-investment of \$28 million per annum as external revenue.

CSIRO engages in CRCs to build critical mass in research ventures which tackle clearly articulated major challenges for end users and Australia. It is an essential requirement for CSIRO's participation that the CRC program embraces and delivers on medium to long-term end user driven collaborative research, end-user focused education, small to medium enterprise engagement and strategies to build their innovation and R&D capacity, and the utilisation of the research activities to achieve impact.

CSIRO is also a participant in six submissions invited to participate in Stage 2 of the Round 11 funding program, including one new CRC for Deep Exploration Technologies, and five extensions for existing CRCs: Antarctic Climate and Ecosystems; Greenhouse Gas Technologies; Fire (ex-Bushfire); Invasive Animals; and Poultry.

The CRC program facilitates partnerships with 33 universities in 26 Centres to deliver research outputs best achieved with cross-organisational collaboration.

Customer engagement

During 2008–09, CSIRO strengthened its commitment to working effectively with clients and partners, and adopted a new aspiration: 'Our partners describe working with us as a pleasure'. This aspiration has been supported by a new Board-endorsed External Engagement

Policy which, with associated standards and procedures, will provide a transparent framework for engagement, for both our staff and partners.

Over the past 12 months new or significantly expanded strategic partnerships were also developed with BHP Billiton, Rio Tinto, AusAID and Qantas.

Government engagement

A critical aspect of CSIRO's relationship with Government is as a trusted source of scientific information and advice to inform policy. In 2008–09, CSIRO engaged with the government as follows:

- CSIRO executives attended meetings on key policy issues with federal ministers and parliamentarians and with senior staff from relevant government departments. These policy issues included climate change, the environment, renewable energy, water management in the Murray-Darling Basin, the national broadband network and agricultural sustainability.
- CSIRO was included in the Australian Government's Community Cabinet Series, with a Cabinet meeting held at the CSIRO Energy Centre in Newcastle in September 2008, followed by a Ministerial tour of the facilities.
- CSIRO made 49 submissions to government inquiries and reviews (both federal and state). CSIRO officers also attended 24 hearings associated with parliamentary inquiries.
- Four 'Science for Breakfast' briefings were held at Parliament House. These events were accompanied by briefings to departments and individual parliamentarians. An additional bipartisan climate science briefing was also provided.

CSIRO's global reach

CSIRO is an active member of the global research community and sees its international engagement as a vital part of delivering impact from science. Over the last decade, CSIRO has averaged almost 700 collaborative activities each year with international partners in approximately 70 countries.

Aligned with its 2007–2011 Strategic Plan, CSIRO has a four year international strategy that focuses on:

- **Talent:** development opportunities for our staff outside Australia, and opportunities to attract, retain and engage staff from the global talent pool.
- **Impact:** internationally significant projects aligned with, and supporting, national needs.
- **Networks:** participation in global networks to share research infrastructure and relevant knowledge and intellectual property.

The strategy also focuses on enhancing CSIRO's engagement with China, India, North America and Europe. Highlights during the reporting year include:

- CSIRO staff supervised over 40 Chinese PhD students as part of bilateral staff exchange programs.
- A major new joint Australia–China Research Centre for Wireless Communications was established at the CSIRO ICT Centre in Marsfield.
- Collaborative projects between CSIRO and CSIR India continued in priority areas such as water and sustainable agriculture.
- A new joint scholarship program between CSIRO and the Australian–American Fulbright Commission was created, bringing top American PhD students to Australia to work with the National Research Flagships.

- CSIRO's engagement with the European Commission's Framework Programme of major multi-national collaborative research projects was expanded.
- The commencement of the CSIRO–AusAID Research Alliance.

Indigenous Engagement Strategy

During 2008–09, CSIRO's Indigenous Engagement Steering Committee made headway in the delivery of its Indigenous Engagement Strategy through a series of Roundtable discussions nationally with Indigenous leaders. The following activities were initiated.

Science opportunities: The first CSIRO National Indigenous Science and Research Roundtable was held in Broome in July 2008, to discuss the strategic options for Indigenous engagement both from non-Indigenous and Indigenous perspectives. A ten-point plan was published, which included enhancing advisory mechanisms and ethical standards for engagement. This plan directed the focus of the next Roundtable in the series in Mildura in November 2008, which discussed 'water and climate change science and Indigenous futures'. A Roundtable focusing on Indigenous health was held in August 2009.

Indigenous engagement employment: One new Indigenous staff member was employed in 2008, based in Sydney. Two Indigenous cadets were also engaged, along with an Indigenous PhD student on a scholarship joint agreement with the University of Queensland. An Indigenous Employment Strategy was completed in July 2009.

Education and outreach: Utilising CSIRO's Scientists in Schools program, CSIRO Science Education had promising discussions with the Sustainable Indigenous Livelihoods Focal Project leader, to link the program in with case studies on Indigenous communities within the project.

In Queensland, a pilot project to develop Indigenous education pathways in science began, with similar discussions taking place with Tagai College in the Torres Strait.

Cultural learning and development: CSIRO's Indigenous Engagement 'Impact Discussion Series' continued in major capital cities, with staff facilitating discussions on the national challenges facing Indigenous Australia. Strategic cultural awareness programs were also held in Melbourne, Brisbane and Cairns.

An Indigenous Research Engagement Interim Protocol was developed that sets out behaviours that CSIRO expects of researchers working with Indigenous peoples and communities, and a working group was established to develop an Indigenous Intellectual Property Protocol.

In May 2009, an inaugural workshop for the delivery of Indigenous communications took place in Canberra.

Capability Development and Assessment

The quality of CSIRO's research is critical to the Organisation's reputation and impact. CSIRO must therefore continue to develop and maintain high-quality research capabilities (including world-class scientists and facilities and collaborative relationships).

Divisions are the 'home' of CSIRO research staff and facilities. Their primary role is to develop, maintain and deploy CSIRO's world-class research capabilities. Divisions manage professional development, staff succession and staff wellbeing. They are also responsible for deploying staff and resources to research Themes. Individual Themes regularly draw on staff and resources from one or more Divisions and develop research capability through challenging research. Themes and Divisions are jointly responsible for the development of around 110 research capabilities.

In addition to the development of capability through the activities of research Themes, there are additional direct investments in capability development at both the Division and whole-of-enterprise levels. Direct capability investments include:

- **Transformational Capability Platforms** – described below
- **Divisional Capability Development Funds** – which are designed to provide Divisions with greater flexibility to explore opportunities to initiate new capability areas or to extend existing capabilities into new areas of potential impact
- **Science Team programs** – which also encourage, promote and support science excellence through the development of scientists and communication of science.

Transformational Capability Platforms

Transformational Capability Platforms (TCPs) enable CSIRO to remain at the forefront of international science in the critical areas of transformational biology; advanced materials;

computational and simulation sciences; and sensors and sensor networks technologies.

The TCPs are cross-organisational, applicable across multiple areas of CSIRO research, and underpin sustained high-impact for the Organisation. They are aimed at enabling a step-change in CSIRO's research capabilities on a scale and scope beyond what is possible for individual Business Units. Funding is used to accelerate capability development and establish CSIRO science networks to foster connectivity and integration.

The progress of the TCPs in 2008–09 has been good and funding will be increased in 2009–10 to \$30 million.

Science Assessment Reviews

To ensure that the quality and relevance of its science base is maintained at a high level, CSIRO conducts a rolling cycle of Science Assessment Reviews. This robust, rigorous and independent assessment process involves a review of each Division's research capabilities by independent experts, from both Australia and overseas. Results of the reviews are considered and responded to by senior research leaders and implementation of the recommendations is monitored by the Executive.

A second round of reviews commenced in late 2008 and is due for completion in 2011. Five reviews were undertaken in 2008–09 with a further five planned for 2009–10. The following outlines the results of the reviews.

CSIRO Minerals

CSIRO Minerals was reviewed in November 2008. The Australian and international review committee visited laboratories and scientists in Melbourne and Perth. From the nine research capability groups that were reviewed, the On-Line Analysis, Fluids Process Modelling and Gold Hydrometallurgy Groups were highlighted as demonstrating outstanding performance and attributed with high international standing in their respective areas.

The committee was impressed with the enthusiasm of the staff and with the younger postdoctoral and PhD students with whom they interacted. The committee recommended that the Division further build upon its growing network of collaborations with key stakeholders, such as the Wark Research Institute in Adelaide. This recommendation resulted in CSIRO Minerals developing a strategy for increased engagement with a number of key research institutions in the minerals field, nationally and overseas.

CSIRO Materials Science and Engineering

CSIRO Materials Science and Engineering was reviewed in February 2009. Seven capability groups were reviewed for their research quality and industry impact. A benchmark rating (the highest possible rating) was awarded to the Integrated Nanoscience Group for their research quality. The panel acknowledged that the Division will continue to create 'world-class innovation for the benefit of Australia with global reach'. It was also noted that a number of customers regarded the Division as a 'national treasure'.

The panel encouraged increased interaction with Universities via research students. The New Horizons building, a building adjoined and operated with Monash University, will become a facilitator for collaboration and increasing the number of research students. In addition, the Division will implement a capability development fund in 2009–10, which will be used in part to increase the number of research students co-supervised by Divisional staff.

CSIRO Energy Technology and CSIRO Petroleum Resources

A review of CSIRO's overall Energy domain was conducted by two panels of Australian and international scientific experts in March 2009. The process incorporated Science Assessment Reviews of CSIRO Energy Technology and CSIRO Petroleum Resources. The review was positive

about the direction, impact and science quality of CSIRO's energy research activities. The review panels found that the Energy Group had clear strategic direction, that high-quality research capabilities were utilised to address the strategy, and that the portfolio showed a good balance appropriate to Australia's needs. The panels recommended several research areas for growth, including geothermal, coal seam methane and the intelligent grid.

Food Science Australia / Human Nutrition

A panel of Australian and international experts reviewed Food Science Australia in May 2009. The review panel strongly supported CSIRO's decision to create a new Division to integrate its capability in food and nutritional sciences. The panel recommended that a Chief with strong science credentials and vision be appointed. Other key recommendations were to: recruit new science leaders to address gaps and the uneven quality of leadership across capability groups; strengthen existing capability and access new capability in areas such as human genomics and proteomics; attract, retain and promote top younger scientists; and increase utilisation and leverage of the commercial-scale pilot plant facility at Werribee.

A new CSIRO Division of Food and Nutritional Sciences (FNS) was launched on 1 July 2009, integrating all capabilities previously in Food Science Australia and CSIRO Health and Nutrition. An international search for a Chief was initiated. The FNS capability development plan for 2009–10 includes the appointment of four senior scientists in areas of need identified by the review panel and provision of additional funding for overseas travel of early and mid-career scientists. There has also been a commitment to review the usage and cost structure of the Werribee pilot plant with a view to expanding its availability to industry.

People Management

Human Resources provides support and leadership on people issues to leaders and staff across CSIRO. The goal is to develop high-performing teams working across the Organisation's boundaries. There are two key themes to this work: nurturing CSIRO's innovative culture by fostering a safe environment where innovation, collaboration, flexibility and performance flourish; and, working effectively and efficiently by using common systems, structures and improved processes to support CSIRO's operations. Services are delivered through a 'shared' service model.

Enterprise agreement

A new Enterprise Agreement 2008–2011 came into effect on 3 December 2008. It was developed in consultation with the CSIRO Staff Association, the Australian Manufacturing Workers Union and the Electrical Trades Union of Australia.

The Agreement supports CSIRO's pursuit of its strategic goals of nurturing its innovative culture and working effectively and efficiently. It provides industry-leading pay and conditions of employment, including new provisions to enhance individual and team performance, creativity and innovation, and initiatives to improve CSIRO's environmental sustainability. The Agreement is fair, competitive and sustainable and will benefit staff and CSIRO.

CSIRO's values compass

The CSIRO values compass was introduced in 2009 to further evolve our culture, to support the execution of CSIRO's strategy.

This represents CSIRO's framework of purpose, strategy, standards, values and organisational culture. Its introduction aims to promote further alignment of decision-making, performance and behaviour standards across the Organisation,

while also moving towards achieving our strategic goals. The principles of CSIRO values-based management will, over time, become embedded in systems, processes and decision-making, including those related to recruitment, performance, staff development and rewards.

Staff surveys

Throughout 2008–09, staff were surveyed using a range of polls and face-to-face feedback meetings, in addition to a series of site visits by the new Chief Executive. This extensive and direct engagement, in conjunction with other mechanisms for feedback, has been used to finetune the implementation and delivery of CSIRO's strategy.

In response to a staff survey in late 2007, actions have been taken at both the Business Unit and Organisation level to improve performance in the areas identified by staff. There has been a significant increase over the last two years in support for our organisational direction, for the Flagships and how we work together across the Organisation. These are all essential components of our strategy and remain key elements of our Strategic Plan 2007–2011. Our work-related organisation and efficiency, and opportunities for innovation in the workplace, are areas where we will strive to do better.

Learning and leadership development

The Learning and Leadership Development team continued to enhance the curriculum of programs on offer, with a focus on skills to support CSIRO's functions. The key senior leadership program, *Leading the Research Enterprise*, was delivered to a group of 20 leaders. A cross-Divisional mentoring program commenced in Victoria and Western Australia to develop CSIRO early-career scientists and postdoctoral fellows and complements other existing support.

In 2009, two world-class scientists joined our CEO Science Leaders Scheme: Dr Rachael Caruso and Dr Kostya Ostrikov. They joined the group of 13 existing CEO Science Leaders, ensuring CSIRO performs world-class research.

Our Distinguished Visiting Scientist Scheme provides support for leading researchers in their field to come and work in CSIRO, normally for a period of six to twelve months. During this period they carry out an agreed research program with a CSIRO team and deliver a number of seminars. During 2008–09, 15 Distinguished Visiting Scientists received sponsorship to work in CSIRO.

A number of award schemes operate across the Organisation. The prestigious Julius Career Award is aimed at early to mid-career scientists and the Newton-Turner Career Award is aimed at furthering the careers of exceptional senior scientists in CSIRO.

Staff demographics

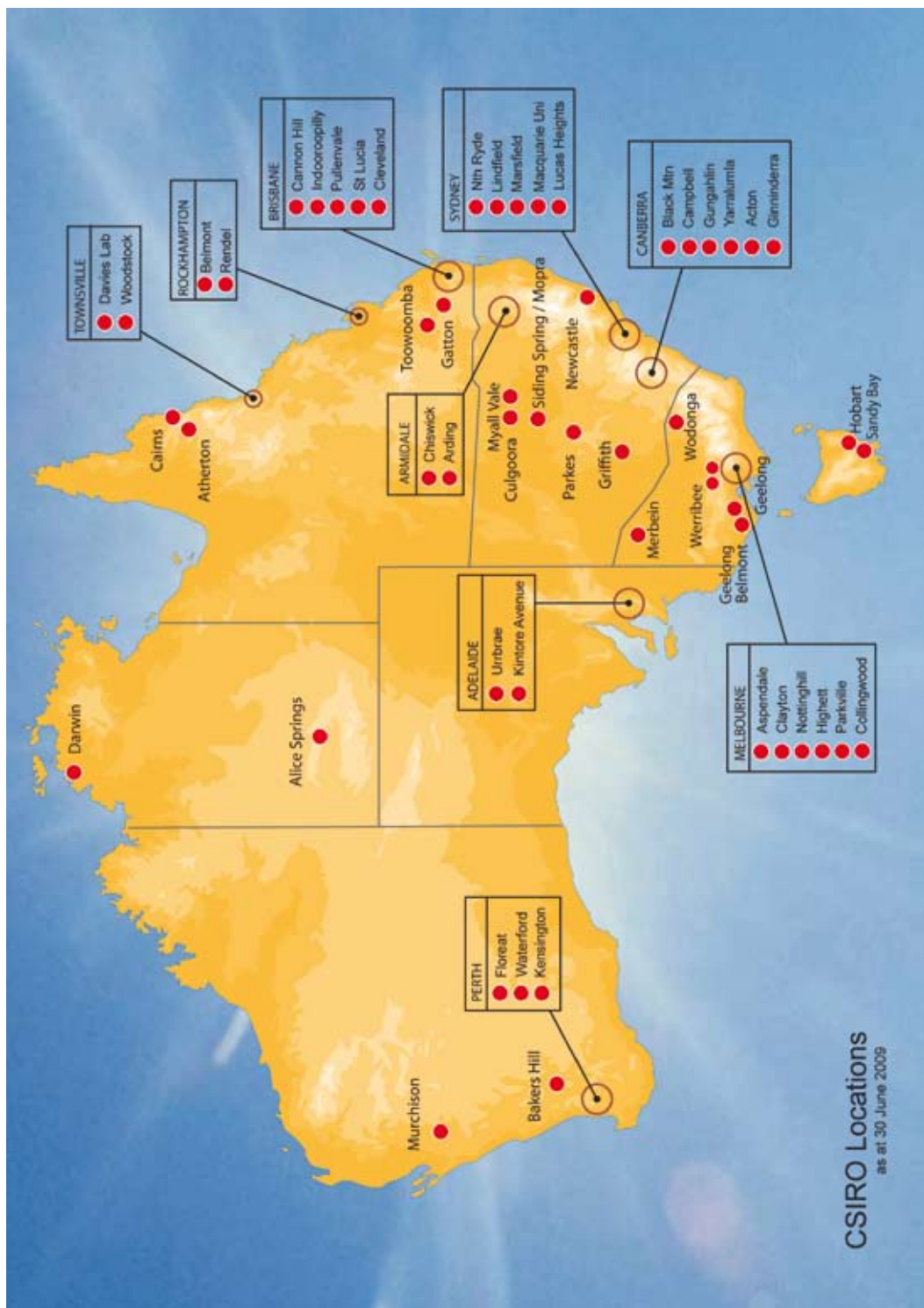
CSIRO staff are employed under section 32 of the *Science and Industry Research Act 1949*. At 30 June 2009, CSIRO had a total of 6,510 staff, which has an equivalent full-time (EFT) of 5,866. Table 2.5 shows the number of staff employed in different job categories, called principal functional areas.

The total number of staff increased by 87 (1.3 per cent) over the last 12 months. While some restructuring has occurred, the number of Research Scientists increased by 110 (six per cent), with changes in other functional areas of less than one per cent. The proportion of female staff in CSIRO has increased from 38.2 per cent to 39.4 per cent since 2004–05 and the proportion of female research staff has increased from 18.4 per cent to 23 per cent over the same period.

Table 2.5: Staff numbers (headcount) as at 30 June

| Principal functional area | 2004–05 | 2005–06 | 2006–07 | 2007–08 | 2008–09 | Female % |
|--|--------------|--------------|--------------|--------------|--------------|-----------|
| Research Scientist | 1,623 | 1,630 | 1,688 | 1,727 | 1,837 | 23 |
| Research Management | 213 | 187 | 188 | 194 | 176 | 7 |
| Research Consulting ¹ | | 33 | 28 | 29 | 26 | 19 |
| Research Projects | 2,375 | 2,358 | 2,199 | 2,246 | 2,215 | 41 |
| Technical Services | 640 | 622 | 581 | 542 | 545 | 14 |
| Senior Specialists | 41 | 38 | 25 | 13 | 13 | 15 |
| Communication and Information Services | 438 | 439 | 384 | 402 | 407 | 63 |
| General Services | 81 | 87 | 75 | 66 | 51 | 53 |
| Administrative Support | 1,047 | 1,041 | 1,046 | 1,082 | 1,112 | 74 |
| General Management | 118 | 123 | 117 | 122 | 128 | 27 |
| | 6,576 | 6,558 | 6,331 | 6,423 | 6,510 | 39 |

¹The principal functional area of Research Consulting was first reported in 2005–06.





Using CSIRO's Australia Telescope Compact Array and Parkes dish, astronomers have created a detailed image of the energy from a supermassive black hole at the centre of an enormous galaxy, Centaurus A, which emits a radio glow covering an area 200 times bigger than the full moon. This composite image shows the size of the glow compared to the full moon and will help scientists to better understand black holes. Photo: Shaun Amy



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Part three – Financial Statements



INDEPENDENT AUDITOR'S REPORT

To the Minister for Innovation, Industry, Science and Research

Scope

I have audited the accompanying financial statements of Commonwealth Scientific and Industrial Research Organisation for the year ended 30 June 2009, which comprise: a Statement by the Board Members and Chief Executive; Income Statement; Balance Sheet; Statement of Changes in Equity; Cash Flow Statement; Schedules of Commitments and Contingencies; and Notes to and Forming Part of the Financial Statements, including a Summary of Significant Accounting Policies.

The Responsibility of the Members of the Board for the Financial Statements

The members of the Board are responsible for the preparation and fair presentation of the financial statements in accordance with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997*, including the Australian Accounting Standards (which include the Australian Accounting Interpretations). This responsibility includes establishing and maintaining internal controls relevant to the preparation and fair presentation of the financial statements that are free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit. I conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. These auditing standards require that I comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Commonwealth Scientific and Industrial Research Organisation's preparation and fair presentation of the financial statements in order to

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design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Commonwealth Scientific and Industrial Research Organisation's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the members of the Board, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Independence

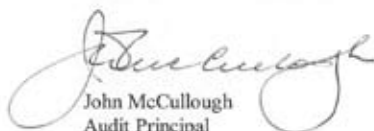
In conducting the audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the requirements of the Australian accounting profession.

Auditor's Opinion

In my opinion, the financial statements of the Commonwealth Scientific and Industrial Research Organisation:

- (a) have been prepared in accordance with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997*, including the Australian Accounting Standards; and
- (b) give a true and fair view of the matters required by the Finance Minister's Orders including the Commonwealth Scientific and Industrial Research Organisation's financial position as at 30 June 2009 and its financial performance and cash flows for the year then ended.

Australian National Audit Office



John McCullough
Audit Principal
Delegate of the Auditor-General

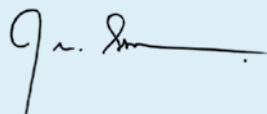
Canberra
31 August 2009

**COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
STATEMENT BY BOARD MEMBERS AND CHIEF EXECUTIVE**

In our opinion, the attached financial statements for the year ended 30 June 2009 are based on properly maintained financial records and give a true and fair view of the matters required by the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997*.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Organisation will be able to pay its debts as and when they become due and payable.

This Statement is made in accordance with a resolution of the Board Members.



John W Stocker
Chairman of the Board
27 August 2009



Megan Clark
Chief Executive and Board Member
27 August 2009



Allan Gaukroger
Chief Financial Officer
27 August 2009

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
INCOME STATEMENT

For the period ended 30 June 2009

| | Notes | 2009 \$'000 | 2008 \$'000 |
|---|-------|------------------|------------------|
| INCOME | | | |
| Revenue | | | |
| Revenues from Government | 3.1 | 668 120 | 663 160 |
| Sale of goods and rendering of services | 3.2 | 347 877 | 290 069 |
| Interest | 3.3 | 5 000 | 7 280 |
| Rents | 3.4 | 7 387 | 6 891 |
| Royalties | 3.5 | 15 948 | 9 726 |
| Other revenues | 3.6 | 232 587 | 27 195 |
| Total Revenues | | 1 276 919 | 1 004 321 |
| Gains | | | |
| Net gain from sale of property, plant and equipment | 3.7 | 17 163 | 4 748 |
| Net gain from sale of equity investments and intellectual property | 3.8 | 8 449 | 71 945 |
| Other fair value gain | 3.9 | - | 10 817 |
| Net foreign exchange gains | 3.10 | 319 | - |
| Total Gains | | 25 931 | 87 510 |
| TOTAL INCOME | | 1 302 850 | 1 091 831 |
| EXPENSES | | | |
| Employee benefits | 4.1 | 639 241 | 596 971 |
| Suppliers | 4.2 | 424 460 | 357 394 |
| Depreciation and amortisation | 4.3 | 87 965 | 76 794 |
| Finance costs | 4.4 | 2 979 | 3 038 |
| Write-down and impairment of assets | 4.5 | 21 295 | 6 192 |
| Net foreign exchange losses | 4.6 | - | 160 |
| Other expenses | 4.7 | 4 838 | 3 162 |
| TOTAL EXPENSES | | 1 180 778 | 1 043 711 |
| | | 122 072 | 48 120 |
| Share of net operating surplus/(deficit) of joint venture accounted for using the equity method | 10 | (71) | (436) |
| Surplus | | 122 001 | 47 684 |

The above Statement should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
BALANCE SHEET
As at 30 June 2009

| | Notes | 2009 \$'000 | 2008 \$'000 |
|---|-------|------------------|------------------|
| ASSETS | | | |
| Financial Assets | | | |
| Cash and cash equivalents | 5 | 164 156 | 98 536 |
| Trade and other receivables | 6 | 166 843 | 70 911 |
| Investments | 7 | 62 453 | 118 615 |
| Total financial assets | | 393 452 | 288 062 |
| Non-Financial Assets | | | |
| Land and buildings | 8 | 1 333 237 | 1 324 262 |
| Plant and equipment | 9 | 298 107 | 260 688 |
| Investments accounted for using the equity method | 10 | 543 | 614 |
| Investment properties | 11 | 41 340 | 48 540 |
| Intangibles | 12 | 26 513 | 26 752 |
| Properties held for sale | 13 | 56 760 | 69 126 |
| Inventories | 14 | 1 276 | 1 093 |
| Other non-financial assets | 15 | 31 064 | 32 696 |
| Total non-financial assets | | 1 788 840 | 1 763 771 |
| TOTAL ASSETS | | 2 182 292 | 2 051 833 |
| LIABILITIES | | | |
| Payables | | | |
| Suppliers | 16 | 94 383 | 81 915 |
| Other payables | 17 | 134 870 | 95 154 |
| Total payables | | 229 253 | 177 069 |
| Interest Bearing Liabilities | | | |
| Leases | 18 | 63 636 | 67 798 |
| Deposits | 19 | 5 687 | 11 950 |
| Total interest bearing liabilities | | 69 323 | 79 748 |
| Provisions | | | |
| Employee provisions | 20 | 191 073 | 185 432 |
| Total provisions | | 191 073 | 185 432 |
| TOTAL LIABILITIES | | 489 649 | 442 249 |
| NET ASSETS | | 1 692 643 | 1 609 584 |
| EQUITY | | | |
| Contributed equity | | 7 670 | - |
| Assets revaluation reserves | | 1 093 712 | 1 099 423 |
| Other reserves | | (30 331) | 10 570 |
| Retained surplus | | 621 592 | 499 591 |
| TOTAL EQUITY | | 1 692 643 | 1 609 584 |
| Current assets | | 420 099 | 272 362 |
| Non-current assets | | 1 762 193 | 1 779 471 |
| Current liabilities | | 411 628 | 364 340 |
| Non-current liabilities | | 78 021 | 77 909 |

The above Balance Sheet should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
STATEMENT OF CHANGES IN EQUITY

As at 30 June 2009

| | Retained Surplus | | Asset Revaluation Reserves | | Other Reserves | | Contributed Equity/Capital | | Total Equity | |
|--|------------------|----------------|----------------------------|----------------|----------------|----------------|----------------------------|----------------|----------------|----------------|
| | 2009 \$'000 | 2008 \$'000 | 2009 \$'000 | 2008 \$'000 | 2009 \$'000 | 2008 \$'000 | 2009 \$'000 | 2008 \$'000 | 2009 \$'000 | 2008 \$'000 |
| Opening balance | 499 591 | 451 907 | 1 099 423 | 709 411 | 10 570 | 6 993 | - | - | 1 609 584 | 1 168 311 |
| Income and expenses | | | | | | | | | | |
| Revaluation of land and buildings | | | - | 390 012 | | | | | - | 390 012 |
| Impairment of land and buildings | | | (9 926) | - | | | | | (9 926) | - |
| Revaluation of plant and equipment | | | 4 215 | - | | | | | 4 215 | - |
| Net change in fair value gain/(loss) of available for sale investments | | | | | (41 417) | 3 577 | | | (41 417) | 3 577 |
| Realisation of fair value loss on sale and impairment of available for sale investment | | | | | 516 | - | | | 516 | - |
| Subtotal income and expenses recognised directly in equity | - | - | (5 711) | 390 012 | (40 901) | 3 577 | | | (46 612) | 393 589 |
| Surplus/(deficit) for the period | 122 001 | 47 684 | | | | | | | 122 001 | 47 684 |
| Total income and expenses | 122 001 | 47 684 | (5 711) | 390 012 | (40 901) | 3 577 | | | 75 389 | 441 273 |
| Transactions with owners | | | | | | | | | | |
| Contributions by owners | | | | | | | | | | |
| Equity injection | | | | | | | 7 670 | - | 7 670 | - |
| Closing balance | 621 592 | 499 591 | 1 093 712 | 1 099 423 | (30 331) | 10 570 | 7 670 | - | 1 692 643 | 1 609 584 |

The above Statement should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
CASH FLOW STATEMENT
For the period ended 30 June 2009

| | Notes | 2009 \$'000 | 2008 \$'000 |
|--|-------|------------------|------------------|
| OPERATING ACTIVITIES | | | |
| Cash received | | | |
| Receipts from Government | | 668 120 | 663 160 |
| Goods and services | | 567 638 | 343 663 |
| Interest | | 4 351 | 6 897 |
| Net GST received | | 7 898 | 10 306 |
| Total cash received | | 1 248 007 | 1 024 026 |
| Cash used | | | |
| Employees | | 629 216 | 590 445 |
| Suppliers | | 446 929 | 360 476 |
| Finance costs | | 2 785 | 3 038 |
| Deposits | | 6 279 | 4 916 |
| Total cash used | | 1 085 209 | 958 875 |
| Net cash from (used by) operating activities | 21 | 162 798 | 65 151 |
| INVESTING ACTIVITIES | | | |
| Cash received | | | |
| Proceeds from sale of property, plant and equipment | | 42 399 | 11 779 |
| Proceeds from sale of equity investments and intellectual property | | 11 281 | 7 605 |
| Total cash received | | 53 680 | 19 384 |
| Cash used | | | |
| Purchase of property, plant and equipment | | 151 056 | 110 765 |
| Purchase of equity investments | | 2 970 | 1 489 |
| Selling costs | | 340 | 588 |
| Total cash used | | 154 366 | 112 842 |
| Net cash from (used by) investing activities | | (100 686) | (93 458) |
| FINANCING ACTIVITIES | | | |
| Cash received | | | |
| Contributed equity | | 7 670 | - |
| Total cash received | | 7 670 | - |
| Cash used | | | |
| Other cash used | | 4 162 | 4 205 |
| Total cash used | | 4 162 | 4 205 |
| Net cash from (used by) financing activities | | 3 508 | (4 205) |
| Net increase/(decrease) in cash held | | 65 620 | (32 512) |
| Cash and cash equivalents at the beginning of the reporting period | | 98 536 | 131 048 |
| Cash and cash equivalents at end of the reporting period | 5 | 164 156 | 98 536 |

The above Statement should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
SCHEDULE OF COMMITMENTS
As at 30 June 2009

3

Financial Statements

| | 2009 \$'000 | 2008 \$'000 |
|---|------------------|------------------|
| BY TYPE | | |
| Capital commitments payable | | |
| Land and buildings ¹ | 59 187 | 9 545 |
| Plant and equipment ² | 13 256 | 2 900 |
| Investments ³ | 3 432 | 1 389 |
| Total capital commitments payable | 75 875 | 13 834 |
| Other commitments payable | | |
| Operating leases ⁴ | 347 908 | 354 679 |
| Research and development commitments ⁵ | 545 284 | 307 523 |
| Other commitments ⁶ | 12 265 | 13 025 |
| Total other commitments payable | 905 457 | 675 227 |
| Commitments receivable | | |
| Research and development commitments ⁵ | (339 446) | (236 074) |
| Other receivables ⁶ | (11 389) | (12 403) |
| Total commitments receivable | (350 835) | (248 477) |
| Net commitments by type | 630 497 | 440 584 |
| BY MATURITY | | |
| Capital commitments payable | | |
| One year or less | 65 974 | 13 262 |
| From one to five years | 9 901 | 572 |
| Total capital commitments payable | 75 875 | 13 834 |
| Operating lease commitments payable | | |
| One year or less | 39 565 | 33 740 |
| From one to five years | 126 551 | 121 715 |
| Over five years | 181 792 | 199 224 |
| Total operating lease commitments payable | 347 908 | 354 679 |
| Other commitments payable | | |
| One year or less | 365 943 | 199 224 |
| From one to five years | 191 606 | 121 311 |
| Over five years | - | 13 |
| Total other commitments payable | 557 549 | 320 548 |
| Commitments receivable | | |
| One year or less | (219 808) | (150 608) |
| From one to five years | (129 253) | (95 197) |
| Over five years | (1 774) | (2 672) |
| Total commitments receivable | (350 835) | (248 477) |
| Net commitments by maturity | 630 497 | 440 584 |

SCHEDULE OF COMMITMENTS (cont)

1. Land and building commitments are outstanding contractual payments for buildings under construction.
2. Plant and equipment commitments are for the purchase of plant and equipment.
3. Investment commitments are commitments for additional contributions to equity investments.
4. Operating leases are effectively non-cancellable and comprise:

| Nature of lease | General description of leasing arrangement |
|---|--|
| Leases for office and scientific research accommodation | Lease payments are subject to annual increase in accordance with the terms of agreement eg. upward movements in the Consumer Price Index. The accommodation leases are still current and each may be renewed at the Organisation's option. |
| Leases for motor vehicles | No contingent rentals exist. There are no purchase options available to the Organisation. |
| Leases for computer equipment | The lessor provides computer equipment designated as necessary in the supply contract for a general period of 2–3 years. |

5. Research and development commitments payable and receivable are Agreements Equally Proportionately Unperformed for research and development contracts.
6. Other commitments payable and receivable are for services and property leases respectively.
7. Commitments are GST inclusive where relevant.

The above Schedule should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
SCHEDULE OF CONTINGENCIES
As at 30 June 2009

| | Notes | Guarantees | | Claims for Damages or Costs | | Total | |
|--|-------|----------------|----------------|-----------------------------|----------------|----------------|----------------|
| | | 2009 \$'000 | 2008 \$'000 | 2009 \$'000 | 2008 \$'000 | 2009 \$'000 | 2008 \$'000 |
| Contingent assets | 22 | | | | | | |
| Balance from previous year | | - | - | 4 817 | 4 817 | 4 817 | 4 817 |
| New | | - | - | - | - | - | - |
| Re-measurement | | - | - | - | - | - | - |
| Assets recognised | | - | - | (4 817) | - | (4 817) | - |
| Expired | | - | - | - | - | - | - |
| Total contingent assets | | - | - | - | 4 817 | - | 4 817 |
| Contingent liabilities | 22 | | | | | | |
| Balance from previous year | | - | - | 250 | 250 | 250 | 250 |
| New | | - | - | - | - | - | - |
| Re-measurement | | - | - | - | - | - | - |
| Liabilities recognised | | - | - | - | - | - | - |
| Obligations expired | | - | - | - | - | - | - |
| Total contingent liabilities | | - | - | 250 | 250 | 250 | 250 |
| Net contingent assets/(liabilities) | | | | | | (250) | 4 567 |

Details of each class of contingent liabilities and contingent assets, including those not included above because they cannot be quantified, are shown in Note 22: Contingent Liabilities and Assets.

The above Schedule should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS
For the period ended 30 June 2009

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COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS
For the year ended 30 June 2009

Note 1 Summary of Significant Accounting Policies

1.1 Basis of Preparation of the Financial Report

The Financial Statements and notes are required by Clause 1(b) of Schedule 1 to the *Commonwealth Authorities and Companies Act 1997* and are a general purpose Financial Report.

The continued existence of the Organisation in its present form and with its present programs is dependent on Government policy and on continuing appropriations by Parliament for the Organisation's administration and programs.

The Financial Statements and notes have been prepared in accordance with:

- Finance Minister's Orders (FMOs) for reporting period ending on or after 1 July 2008
- Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The Financial Report has been prepared on an accrual basis and is in accordance with the historical cost convention, except for certain assets at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position.

The Financial Report is presented in Australian dollars and values are rounded to the nearest thousand dollars unless otherwise specified.

Unless an alternative treatment is specifically required by an accounting standard or the FMOs, assets and liabilities are recognised in the Balance Sheet when and only when it is probable that future economic benefits will flow to the Organisation and the amounts of the assets or liabilities can be reliably measured. However, assets and liabilities arising under agreements equally proportionately unperformed are not recognised unless required by an Accounting Standard.

Unless alternative treatment is specifically required by an accounting standard, income and expenses are recognised in the Income Statement when, and only when, the flow, consumption or loss of economic benefits has occurred and can be reliably measured.

1.2 Significant Accounting Judgements and Estimates

In the process of applying the accounting policies listed in this note, the Organisation has made the following judgements that have the most significant impact on the amounts recorded in the financial statements:

- The fair value of land and buildings classified as 'properties held for sale' and 'investment properties' has been taken to be the market value of similar properties as determined by an independent valuer.
- The fair value of land which will continue to be used for research activities, and buildings held for specialised purposes and where there is no readily available market price, fair value has been taken to be 'existing use value' and 'depreciated replacement cost' respectively, as determined by the Organisation's registered valuer.

- The fair value of plant and equipment has been taken to be the 'depreciated replacement cost' as determined by an independent valuer.
- The fair value of investments in unlisted companies is based on the generally accepted valuation guidelines 'International Private Equity and Venture Capital Valuation Guidelines'.
- Gains or losses arising from changes in fair value are recognised in reserves or equity with the exception of impairment. Investments in listed companies have been assessed for impairment and the decline in fair value does not represent impairment, hence the total decline in fair value is recognised directly in reserves or equity.

1.3 Changes in Australian Accounting Standards

Adoption of new Australian Accounting Standard requirements

No accounting standard has been adopted earlier than the application date as stated in the standard. The Organisation has reviewed the new standards, amendments to standards and interpretations issued by the Australian Accounting Standards Board that are applicable to the current period, and considers that none of these have had a material financial impact on the Organisation.

Future Australian Accounting Standard requirements

Of the new standards, amendments to standards and interpretations issued by the Australian Accounting Standards Board that are applicable to future periods, the following have been identified as those which may impact the Organisation in the period of initial application. They are available for early adoption at 30 June 2009, but have not been applied in preparing these financial statements.

Revised AASB 101 Presentation of Financial Statements (2007), AASB 2007 – 8 Amendments to Australian Accounting Standards arising from AASB 101 and AASB 2007-10 Further Amendments to Australian Accounting Standards arising from AASB 101 – introduce the term total comprehensive income, which represents changes in equity during a period other than those changes resulting from transactions with owners in their capacity as owners. Total comprehensive income may be presented in either a single statement of comprehensive income (effectively combining both the income statement and all non-owner changes in equity in a single statement) or, in an income statement and a separate statement of comprehensive income. Revised AASB 101, which becomes mandatory for the Organisation's 30 June 2010 financial statements, is expected to have an impact on the presentation of the financial statements. The Organisation has not yet determined the potential effect of the revision to AASB 101.

AASB 2008-5 Amendments to Australian Accounting Standards arising from the Annual Improvements Project and AASB 2008-6 Further Amendments to Australian Accounting Standards arising from the Annual Improvements Project – affect various AASBs resulting in minor changes for presentation, disclosure, recognition and measurement purposes. These amendments will become mandatory for the Organisation's 30 June 2010 financial statements. The Organisation has not yet determined the potential effect of these revisions.

Australian Interpretation (AI) 17 Distributions of Non-cash Assets to Owners and 2008-13 Amendment to Australian Accounting Standards arising from AASB Interpretation 17 Distributions of Non-cash Assets to Owners – provides guidance in respect of measuring the value of distributions of non-cash assets to owners. AI 17 will become mandatory for the Organisation's 30 June 2010 financial statements. The Organisation has not yet determined the potential effect of the Interpretation.

1.4 Consolidation

The Organisation has investments in a number of unlisted companies over which it has control. These companies have been established for the purpose of commercialisation of the Organisation's intellectual property and the provision of specific services to owners.

The Organisation's policy is to make an assessment each financial year as to whether these companies have a material impact on the Organisation's financial statements that would require the Organisation to prepare consolidated financial statements in accordance with AASB 127 *Consolidated and Separate Financial Statements*.

For the year ended 30 June 2009, the Organisation assessed the impact of these companies on the financial position and operating result of the Organisation as being immaterial. Consequently, the Organisation has not prepared consolidated financial statements.

The Organisation's investment in these unlisted controlled companies has been classified as available for sale investment and accounted for in accordance with AASB 139 *Financial Instruments: Recognition and Measurement*. Refer accounting policy Notes 1.13.

1.5 Revenue

Revenue from sale of goods is recognised when:

- the risks and rewards of ownership have been transferred to the buyer
- the seller retains no managerial involvement nor effective control over the goods
- the revenue and transaction costs incurred can be reliably measured
- it is probable that the economic benefits associated with the transaction will flow to the Organisation.

Revenue from rendering of services (eg. contract research and development services) is recognised by reference to the stage of completion of contracts at the reporting date. The revenue is recognised when:

- the amount of revenue, stage of completion and transaction costs incurred can be reliably measured
- the probable economic benefits with the transaction will flow to the Organisation.

The stage of completion of contracts at the reporting date is determined by reference to the proportion that costs incurred to date bear to the total costs of the transaction. The balances of contract research and development activities in progress are accounted as either contract research work in progress (Note 15), being the gross unbilled amount expected to be collected from clients for contract research and services performed as at 30 June 2009, or contract research revenue received in advance (Note 17), where revenue for contract research and services received and/or billed exceeded revenue earned.

Receivables for goods and services, which have 30 day terms, are recognised at the nominal amounts due less allowance for impairment. Collectability of debts is reviewed at balance date. Allowances are made when collectability of the debt is no longer probable.

Interest revenue is recognised using the effective interest method as set out in AASB 139 *Financial Instruments: Recognition and Measurement*.

Royalty revenue is recognised on an accrual basis in accordance with the substance of the relevant royalty agreements.

Revenue from legal settlement related to intellectual property is recognised on an accrual basis in accordance with the substance of the relevant licencing agreements.

Revenues from Government

Funding received from the Australian Government Department of Innovation, Industry, Science and Research (appropriated to the agency as a CAC Act body payment item for payment to the Organisation) is recognised as Revenue from Government unless they are in the nature of an equity injection.

1.6 GainsResources Received Free of Charge

Resources received free of charge are recognised as revenue when and only when the fair value can be reliably determined and the services would have been purchased if they had not been donated. Use of those resources is recognised as an expense.

Contributions of assets at no cost of acquisition or for nominal consideration are recognised as gains at their fair value when the asset qualifies for recognition, unless received from another Government Agency or Authority as a consequence of a restructuring of administrative arrangements.

Resources received free of charge are recorded as either revenue or gains depending on their nature.

Sale of Assets

Gains from disposal of non-current assets are recognised when control of the asset has passed to the buyer.

1.7 Transactions with the Government as OwnersEquity Injections

Amounts that are designated as equity injections for a year are recognised directly in contributed equity in that year.

1.8 Research and Development Expenditure and Intellectual Property

All research and development costs, including costs associated with protecting intellectual property (eg. patents and trademarks) are expensed as incurred.

1.9 Employee Benefits

Liabilities for services rendered by employees are recognised at the reporting date to the extent that they have not been settled.

Liabilities for 'short-term employee benefits' (as defined in AASB 119) and termination benefits due within twelve months are measured at their nominal amounts. The nominal amount is calculated with regard to the rates expected to be paid on settlement of the liability.

All other employee benefit liabilities are measured at the present value of the estimated future cash outflows to be made in respect of services provided by employees up to the reporting date.

Leave

The liability for employee benefits includes provisions for annual leave, long service leave and severance payments. No provision has been made for sick leave as all sick leave is non-vesting and the average sick leave taken in future years by employees is estimated to be less than the annual entitlement for sick leave.

The leave liabilities are calculated on the basis of employees' remuneration at the estimated

salary rates that applied to the time the leave is taken, including the Organisation's employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The liability for long service leave has been determined by reference to the work of an actuary as at 30 June 2009. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Separation and redundancy

Provision is made for separation and redundancy benefit payments. The Organisation recognises a provision for termination when it has developed a detailed formal plan for the terminations and has informed those employees affected that it will carry out the terminations.

Superannuation

Employees of the Organisation are members of the Commonwealth Superannuation Scheme (CSS), the Public Sector Superannuation Scheme (PSS), or the PSS accumulation plan (PSSap).

The CSS and PSS are defined benefit schemes for the Australian Government. The PSSap is a defined contribution scheme.

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course. This liability is reported by the Department of Finance and Deregulation as an administered item.

The Organisation makes employer contributions to the employee superannuation schemes at rates determined by an actuary to be sufficient to meet the cost to the Government of the superannuation entitlements of the Organisation's employees. The Organisation accounts for the contributions as if they were contributions to defined contribution plans.

The liability for superannuation recognised as at 30 June represents outstanding contributions for the final fortnight of the year.

1.10 Workers' Compensation

The Organisation's workers' compensation liability is covered by the premium paid to the Commission for the Safety, Rehabilitation and Compensation of Commonwealth Employees 'Comcare' and no additional provision for liability is required.

1.11 Insurance

As part of its risk management strategy, the Organisation has insured for risks through the Australian Government's insurable risk managed fund 'Comcover'.

1.12 Cash and Cash Equivalents

Cash and cash equivalents includes notes and coins held and any deposits in bank accounts with an original maturity of 4 months or less that are readily convertible to known amounts of cash and subject to insignificant risk of change in value. Cash is recognised at its nominal amount.

1.13 Financial Assets

The Organisation classifies its financial assets in the following categories:

- 'available for sale' financial assets
- 'loans and receivables'.

The classification depends on the nature and the purpose of financial assets and is determined at the time of initial recognition.

Financial assets are recognised and derecognised upon 'trade date'.

Effective Interest Method

The effective interest method is a method of calculating the amortised cost of a financial asset and of allocating interest income over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset, or, where appropriate, a shorter period.

Income is recognised on an effective interest rate basis.

Available-for-Sale Financial Assets

Available-for-sale financial assets are non-derivatives that are either designated in this category or not classified in any of the other categories. They are included in non-current assets unless management intends to dispose of the asset within 12 months of the balance sheet date.

Available-for-sale financial assets are recorded at fair value. Gains and losses arising from changes in fair value are recognised directly in the reserves (equity) with the exception of impairment losses. Interest is calculated using the effective interest method and foreign exchange gains and losses on monetary assets are recognised directly in profit or loss. Where the asset is disposed of or is determined to be impaired, part (or all) of the cumulative gain or loss previously recognised in the reserve is included in the operating result for the period.

The Organisation has investments in a number of unlisted start-up companies over which it has significant influence or control. These companies have been established for the purpose of commercialisation of the Organisation's intellectual property (refer accounting policy note 1.4).

The Organisation also has some investments in companies which have long since initial start-up been sold to third parties and subsequently listed on the Australian Stock Exchange.

The Organisation's investments in listed and unlisted companies are accounted for in accordance with AASB 139 *Financial Instruments: Recognition and Measurement*, and have been designated as 'available-for-sale' financial assets.

Fair value of investments in listed companies

The fair value of investments in listed companies has been determined by reference to their closing bid price at the reporting date.

Fair value of investments in unlisted companies

The fair value of investments in unlisted companies where there is no readily available market pricing for the equity instruments, fair value has been determined by applying valuation techniques in line with the generally accepted valuation guidelines 'International Private Equity and Venture Capital Valuation Guidelines (AVCAL)'.

Where recent transactions for the unlisted companies' equity have taken place, these equity transaction prices are used to value the Organisation's investment.

For unlisted companies that have not had any recent equity transactions, other AVCAL valuation techniques are used, such as discounted cash flows and share of net assets, and which reflect appropriate risk adjustments in each case, based on market comparisons, financial performance of the unlisted companies and financial forecasts.

In addition, independent valuations are performed as at reporting date for unlisted companies that are considered to have a material impact on the Organisation's investment portfolio.

Investments in special purpose entities are valued at cost since a reliable estimate of fair value cannot be established. These entities have been set up primarily to gain access to research facilities/networks, or to provide services to owners, hence there is no 'active market' for these equity investments. Additionally, the Organisation is a long-term shareholder and is unlikely to dispose of its interest in these investments.

Loans and Receivables

Trade receivables, loans and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'loans and receivables'. They are included in current assets, except for maturities greater than 12 months after the balance sheet date. These are classified as non current assets. Loans and receivables are measured at amortised cost using the effective interest method less impairment. Interest is recognised by applying the effective interest rate.

Impairment of Financial Assets

Financial assets are assessed for impairment at each balance date.

Financial assets held at amortised cost – if there is objective evidence that an impairment loss has been incurred for loans and receivables, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows discounted at the asset's original effective interest rate. The carrying amount is reduced by way of an allowance account. The loss is recognised in the Income Statement.

Available-for-sale financial assets – if there is objective evidence that an impairment loss on an available-for-sale financial asset has been incurred, the amount of the difference between its cost, less principal repayments and amortisation, and its current fair value, less any impairment loss previously recognised in expenses, is transferred from equity to the Income Statement.

Available-for-sale financial assets (held at cost) – if there is objective evidence that an impairment loss has been incurred the amount of the impairment loss is the difference between the carrying amount of the asset and the present value of the estimated future cash flows discounted at the current market rate for similar assets.

1.14 Financial liabilities

Financial liabilities are recognised and derecognised upon 'trade date'.

Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

1.15 Acquisition of Assets

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where applicable.

Assets acquired at no cost or for nominal considerations are initially recognised as assets and revenues at their fair value at the date of acquisition.

1.16 Property, Plant and Equipment

Asset Recognition Threshold

Purchases of property, plant and equipment are recognised initially at cost in the Balance Sheet, except for purchases costing less than \$3 000, which are expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

The initial cost of an asset includes an estimate of the cost of dismantling and removing the item and restoring the site on which it is located.

Revaluations

Following initial recognition at cost, property, plant and equipment, including assets under finance leases are carried at fair value less accumulated depreciation and accumulated impairment losses. Valuations are conducted with sufficient frequency to ensure the carrying amount of assets do not differ materially from the assets' fair value as at reporting date. The regularity of valuation depends upon the volatility of movements in the market values for the relevant assets.

Revaluation adjustments are made on a class basis. Any revaluation increment is credited to equity under asset revaluation reserve, except to the extent that it reverses a previous revaluation decrement of the same asset class that was previously recognised through operating result. Revaluation decrements for a class of assets are recognised directly through operating result except to the extent that they reverse a previous revaluation increment for that class.

Any accumulated depreciation as at the revaluation date is restated proportionately with the change in the gross carrying amount of the asset so that the carrying amount of the asset after revaluation equals its revalued amount.

Fair value for each class of asset is determined as follows:

Land, which will continue to be used for research activity, is valued by the Organisation's registered valuer at 'existing use value'. Existing use contemplates the continued use of the asset for the same application as at the date of valuation, having regard to the asset's capacity to continue contributing to the value of the Organisation and the locations/attributes required by the Organisation, but ignoring alternative uses.

Buildings and leasehold improvements, which will continue to be used for research activities, are valued by the Organisation's registered valuer at their depreciated replacement cost using current building prices to arrive at current gross replacement cost less accumulated depreciation having regard to the age, condition and suitability for research and development activities. Building valuations include plant, fit-outs, fixtures and fittings, which form an integral part of buildings.

Properties identified for sale and investment properties are valued by independent valuers as at reporting date.

Property, plant and equipment which are purchased from contract research funds and where the control and subsequent sale proceeds are refunded to contributors under the terms of the agreements, are expensed during the year of purchase. Separate records for these assets are maintained and disclosed in Note 24.

Depreciation and Amortisation

Depreciable property, plant and equipment assets are written-off to their estimated residual values over their estimated useful lives to the Organisation using, in all cases, the straight-line method of depreciation. Leasehold improvements are depreciated on a straight-line

basis over the lesser of the estimated useful life of the improvements or the unexpired period of the lease.

Depreciation/amortisation rates (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate.

Depreciation rates applying to each class of depreciable asset are based on the following useful lives:

| | 2009 | 2008 |
|--------------------------------------|----------------|----------------|
| Buildings on freehold land | 30 to 50 years | 30 to 50 years |
| Leasehold improvements | Lease term | Lease term |
| Passenger vehicles | 7 years | 7 years |
| Agricultural and transport equipment | 3 to 20 years | 3 to 20 years |
| Computing equipment | 2 to 5 years | 2 to 5 years |
| Scientific equipment | 5 to 20 years | 5 to 20 years |
| Furniture and office equipment | 5 to 15 years | 5 to 15 years |
| Workshop equipment | 20 to 25 years | 20 to 25 years |
| Research vessel | 25 years | 25 years |
| Australia Telescope | 15 to 58 years | 15 to 58 years |

Impairment

All assets were assessed for impairment at 30 June 2009. Where indications of impairment exist, an impairment adjustment is made if the asset's recoverable amount is less than its carrying amount.

The recoverable amount of an asset is the higher of its fair value less costs to sell and its value in use. Value in use is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows, and the asset would be replaced if the Organisation were deprived of the asset, its value in use is taken to be its depreciated replacement cost.

1.17 Investment Properties

Investment properties, includes land and buildings held either to earn rental income or for capital appreciation or for both, but not for sale in the ordinary course of business, use in the production or supply of goods and services or administrative purposes. Investment property is measured at fair value with any change therein recognised in the operating result. When the use of an investment property changes such that it is reclassified as Property, Plant and Equipment, its fair value at the date of reclassification becomes its cost for subsequent accounting.

1.18 Intangibles

The Organisation's intangibles comprise internally developed and acquired software for internal use. These assets are carried at cost, less accumulated amortisation and impairment losses, except where the estimated cost of software is less than the \$250 000 threshold, which are expensed in the year of acquisition.

Software is amortised on a straight-line basis over its anticipated useful life. The useful lives of the Organisation's software are 2 to 10 years (2007–08: 2 to 10 years).

All software assets were assessed for indications of impairment as at 30 June 2009.

1.19 Inventories

Inventories held for sale represent books, CD-ROMs and videos of publishing and media products. They are valued at the lower of cost and net realisable value.

1.20 Consumable Stores

Stocks of consumable stores, which are not held for resale, are expensed in the year of purchase. These stores mainly consist of fuel and lubricants, chemical supplies, maintenance materials and stationery. The total value is not considered material in terms of total expenditures or total assets.

1.21 Leases

A distinction is made between finance leases and operating leases. Finance leases effectively transfer from the lessor to the lessee substantially all the risks and rewards incidental to ownership of leased non-current assets. An operating lease is a lease that is not a finance lease. In operating leases, the lessor effectively retains all such risks and benefits.

Where a non-current asset is acquired by means of a finance lease, the asset is capitalised at either the fair value of the lease property or, if lower, the present value of minimum lease payments at the inception of the contract and a liability recognised at the same time and for the same amount.

The discount rate used is the interest rate implicit in the lease. Leased assets are amortised over the period of the lease. Lease payments are allocated between the principal component and the interest expense.

Operating lease payments are expensed on a straight-line basis which is representative of the pattern of benefits derived from the leased assets.

1.22 Foreign Currency Transactions

Transactions denominated in a foreign currency are translated at the exchange rate prevailing at the date of the transaction. Foreign currency receivables and payables are translated at the exchange rates prevailing at balance date. Foreign currency translation gains and losses are recognised in the operating result. The Organisation has not entered into specific forward exchange contracts during the reporting period.

1.23 Taxation/Competitive Neutrality

Taxation

In accordance with Section 53 of the *Science and Industry Research Act 1949*, the Organisation is exempt from all forms of Australian taxation except fringe benefits tax (FBT) and the goods and services tax (GST). The Organisation pays applicable taxes in overseas countries.

Revenues, expenses and assets are recognised net of GST:

- except where the amount of GST incurred is not recoverable from the Australian Taxation Office
- except for receivables and payables.

Competitive neutrality

The Australian Government *Competitive Neutrality Guidelines for Managers* require government bodies to operate with no net competitive advantages over private sector competitors. For the Organisation, Competitive Neutrality policy is applied to consulting and

services. Neutrality is achieved by incorporating tax equivalence and rate of return components in pricing of these services.

1.24 Joint Ventures

Joint venture operations—Cooperative Research Centres (CRCs)

The proportionate interest in CRCs regarded as joint venture operations are disclosed in the financial statements under appropriate headings. Their primary source of funding is from the Australian Government and funding is progressively drawn down over the life of the CRCs and distributed to participants such as CSIRO and Universities for research and development work. CSIRO's contributions to the CRCs are expensed as incurred and funds received from CRCs are recognised as revenue to the extent that work has been performed in the Income Statement. The Organisation is a participant to 27 CRCs and the names of these CRCs are disclosed in Note 23.

Joint venture entities—unincorporated (Refer Note 10)

Murray Darling Freshwater Research Centre (MDFRC)—The Organisation's 36.6% interest in the MDFRC is accounted for using the equity method.

Food Science Australia (FSA) – The Organisation's 85% investment in FSA was accounted for using the equity method in prior years. However, in 2007–08 the equity method was discontinued because the carrying amount of this investment has been reduced below zero due to its share of FSA's accumulated losses.

1.25 Borrowing Costs

All borrowing costs are expensed as incurred.

1.26 Contingent Liabilities and Contingent Assets

Contingent Liabilities and Contingent Assets are not recognised in the Balance Sheet but are reported in the relevant schedules and notes. They may arise from uncertainty as to the existence of a liability or asset, or represent a liability or asset in respect of which the amount cannot be reliably measured. Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

1.27 Properties held for sale

Non-current assets, such as land and buildings that are expected to be recovered primarily through sale rather than through continuing use are classified as held for sale. Immediately before classification as held for sale, the assets are remeasured in accordance with the Organisation's accounting policies. Thereafter, generally the assets are measured at the lower of their carrying amount and fair value less cost to sell. Impairment losses on initial classification as held for sale and subsequent gains or losses on re-measurement are recognised in the Income Statement. Gains are not recognised in excess of any cumulative impairment loss.

Note 2 Events After Balance Sheet Date

Since balance date the fair value of the Organisation's total investment in listed companies has increased by \$20 million (ie. from \$35.6 million as at 30 June 2009 to \$55.6 million as at 19 August 2009). This is due to an increase or volatility of market prices of investments since the reporting date. At the time of completion of this note, the Organisation is not aware of any other significant events occurring after the reporting date.

| Note 3 | Income | Notes | 2009 | 2008 |
|------------|--|-------|----------------|----------------|
| | | | \$'000 | \$'000 |
| | Revenue | | | |
| 3.1 | Revenue from Government | | | |
| | Department of Innovation, Industry, Science and Research | | | |
| | CAC Act body payment item | | 668 120 | 663 160 |
| 3.2 | Sale of goods and rendering of services | | | |
| | Provision of goods – related entities | | 7 | 30 |
| | Provision of goods – external parties | | 14 891 | 8 086 |
| | Total sale of goods | | 14 898 | 8 116 |
| | Rendering of services – related entities | | 136 731 | 103 956 |
| | Rendering of services – external parties | | 196 248 | 177 997 |
| | Total rendering of services | | 332 979 | 281 953 |
| | Total sale of goods and rendering of services | | 347 877 | 290 069 |
| | Cost of goods sold – inventories only | | 998 | 1 040 |
| 3.3 | Interest | | | |
| | Bank and term deposits | | 5 000 | 7 280 |
| 3.4 | Rents | | | |
| | Rental income | | 7 387 | 6 891 |
| 3.5 | Royalties | | | |
| | Royalties | | 15 948 | 9 726 |
| 3.6 | Other revenues | | | |
| | Legal settlement | | 205 228 | - |
| | Vehicle contributions – staff | | 62 | 73 |
| | Sale of primary produce | | 1 259 | 2 066 |
| | FSA cost recovery, except employee costs | | 10 177 | 10 779 |
| | Capital contributions | | 5 375 | - |
| | Education programs and subscriptions | | 4 881 | 3 439 |
| | Other | | 5 605 | 10 838 |
| | Total other revenues | | 232 587 | 27 195 |

| Note 3 | Income (cont) | Notes | 2009 \$'000 | 2008 \$'000 |
|-------------|---|-------|----------------|----------------|
| | Gains | | | |
| 3.7 | Net gain from sale of property, plant and equipment | | | |
| | Land and Buildings | | | |
| | Proceeds from sale | | 38 493 | 10 996 |
| | Less, Carrying value of assets sold | | (21 184) | (5 346) |
| | Selling expenses | | (322) | (534) |
| | Net gain | | 16 987 | 5 116 |
| | Plant and equipment | | | |
| | Proceeds from sale | | 1 007 | 783 |
| | Less, Carrying value of assets sold | | (826) | (1 151) |
| | Selling expenses | | (5) | - |
| | Net gain/(loss) | | 176 | (368) |
| | Total net gain from sale of property, plant and equipment | | 17 163 | 4 748 |
| 3.8 | Net gain from sale of equity investments and intellectual property | | | |
| | Proceeds from sale of equity investments | | 3 413 | 69 217 |
| | Proceeds from sale of intellectual property | | 7 818 | 5 984 |
| | Total proceeds from sale | | 11 231 | 75 201 |
| | Less, Carrying value of assets sold | | (2 770) | (3 201) |
| | Selling expenses | | (12) | (55) |
| | Total net gain from sale of equity investments and intellectual property | | 8 449 | 71 945 |
| 3.9 | Other gains | | | |
| | Change in fair value of revaluation of investment properties | | - | 10 817 |
| 3.10 | Net foreign exchange gains | | | |
| | Non-speculative | | 319 | - |

| Note 4 | Expenses | Notes | 2009 | 2008 |
|------------|--|-------|----------------|----------------|
| | | | \$'000 | \$'000 |
| 4.1 | Employee benefits | | | |
| | Wages and salaries | | 489 750 | 461 962 |
| | Superannuation—defined contribution plans | | 80 673 | 76 737 |
| | Leave and other entitlements | | 79 428 | 64 626 |
| | Separation and redundancy | | 7 411 | 14 338 |
| | | | 657 262 | 617 663 |
| | Less, Recovery of employee expenses from Food Science Australia joint venture | | (18 021) | (20 692) |
| | Total employee benefits | | 639 241 | 596 971 |
| 4.2 | Suppliers | | | |
| | Provision of goods – related entities | | - | 461 |
| | Provision of goods – external parties | | 82 477 | 73 568 |
| | Rendering of services – related entities | | 18 165 | 9 092 |
| | Rendering of services – external parties | | 308 086 | 258 020 |
| | Operating lease rentals: | | | |
| | Minimum lease payments | | 13 747 | 13 486 |
| | Workers' compensation premiums | | 1 985 | 2 767 |
| | Total supplier expenses | | 424 460 | 357 394 |
| 4.3 | Depreciation and amortisation | | | |
| | <i>Depreciation</i> | | | |
| | Plant and equipment | | 29 870 | 29 702 |
| | Buildings and leasehold improvements | | 55 611 | 45 931 |
| | | | 85 481 | 75 633 |
| | <i>Amortisation</i> | | | |
| | Intangibles – computer software | | 2 484 | 1 161 |
| | Total depreciation and amortisation | | 87 965 | 76 794 |
| 4.4 | Finance costs | | | |
| | Finance leases | | 2 979 | 3 038 |

| Note 4 | Expenses (cont) | Notes | 2009 \$'000 | 2008 \$'000 |
|---------------|---|-------|----------------|----------------|
| 4.5 | Write-down and impairment of assets | | | |
| | Assets write downs from: | | | |
| | Bad debts | | 103 | 207 |
| | Increase/(decrease) in allowance for impairment | | 728 | (116) |
| | Impairment of available for sale investments | | 13 753 | - |
| | Impairment loss on revaluation of properties held for sale | | 6 195 | - |
| | Impairment of intangible assets | | - | 6 101 |
| | Net realisation of fair value loss reserve on available for sale investments | | 516 | - |
| | Total write-down and impairment of assets | | 21 295 | 6 192 |
| 4.6 | Net foreign exchange losses | | | |
| | Non-speculative | | - | 160 |
| 4.7 | Other expenses | | | |
| | Contribution to FSA joint venture loss | | 4 838 | 3 162 |
| Note 5 | Cash and cash equivalents (current) | | | |
| | Cash at bank and on hand | | 89 156 | 28 536 |
| | Term deposits | | 75 000 | 70 000 |
| | Total cash and cash equivalents | | 164 156 | 98 536 |
| | Total cash includes deposits held on behalf of third parties totalling \$5 687 104 (2008 \$11 950 000). | 19 | | |

Note 6
Trade and other receivables

| | Notes | 2009 \$'000 | 2008 \$'000 |
|---|-------|----------------|----------------|
| Goods and services | | 84 459 | 63 097 |
| GST receivable from the ATO | | 46 | 1 748 |
| Interest | | 578 | 1 303 |
| Loans | | 1 470 | 1 400 |
| Other receivables | | 81 900 | 4 245 |
| Total trade and other receivables (gross) | | 168 453 | 71 793 |
| Less, Allowance for impairment – goods and services | | (1 610) | (882) |
| Total trade and other receivables (net) | | 166 843 | 70 911 |

Receivables are represented by:

| | | |
|--|----------------|---------------|
| Current | 166 843 | 69 511 |
| Non current | - | 1 400 |
| Total trade and other receivables (net) | 166 843 | 70 911 |

Receivables are aged as follows:

| | | |
|----------------------------------|----------------|---------------|
| Not overdue | 158 705 | 59 739 |
| Overdue by: | | |
| Less than 30 days | 3 410 | 9 105 |
| 30 to 60 days | 3 845 | 1 343 |
| 61 to 90 days | 595 | 632 |
| More than 90 days | 1 898 | 974 |
| Total receivables (gross) | 168 453 | 71 793 |

The allowance for impairment is aged as follows:

| | | |
|---------------------------------------|--------------|------------|
| Overdue by: | | |
| 61 to 90 days | - | 89 |
| More than 90 days | 1 610 | 793 |
| Total allowance for impairment | 1 610 | 882 |

Note 6

Trade and other receivables (cont)

Notes

Reconciliation of the allowance for impairment:

| Movements in relation to 2009 | Goods and services \$'000 | Total \$'000 |
|------------------------------------|------------------------------|-----------------|
| Opening balance | 882 | 882 |
| Increase recognised in net surplus | 728 | 728 |
| Closing balance | 1 610 | 1 610 |

Movements in relation to 2008

| | | |
|------------------------------------|------------|------------|
| Opening balance | 998 | 998 |
| Decrease recognised in net surplus | (116) | (116) |
| Closing balance | 882 | 882 |

Note 7

Investments (non-current)

At fair value classified as available for sale investments

1.13

Shares (or equity interest)

| | 2009 \$'000 | 2008 \$'000 |
|--------------------------|----------------|----------------|
| Listed companies | 35 607 | 78 372 |
| Unlisted companies | 26 846 | 40 243 |
| Total investments | 62 453 | 118 615 |

| | Notes | 2009 \$'000 | 2008 \$'000 |
|---------------|---|------------------|------------------|
| Note 8 | Land and Buildings (non-current) | | |
| | Freehold land – fair value | 367 102 | 367 915 |
| | Buildings on freehold land | | |
| | – fair value | 1 692 411 | 1 672 960 |
| | – accumulated depreciation | (1 052 372) | (1 007 316) |
| | | 640 039 | 665 644 |
| | – work in progress | 67 880 | 29 714 |
| | Total building on freehold land | 707 919 | 695 358 |
| | Leasehold improvements | | |
| | – fair value | 232 145 | 222 549 |
| | – accumulated depreciation | (86 450) | (80 277) |
| | Total leasehold improvements | 145 695 | 142 272 |
| | Buildings under finance lease | | |
| | – fair value | 179 208 | 179 115 |
| | – accumulated amortisation | (66 687) | (60 398) |
| | Total building under finance lease | 112 521 | 118 717 |
| | Total land and buildings | 1 333 237 | 1 324 262 |

A total impairment loss of \$9.9 million was debited to the asset revaluation reserve by asset class and included in the equity section of the balance sheet. No other indicators of impairment were found for land and buildings.

| | | | |
|---------------|--|----------------|----------------|
| Note 9 | Plant and Equipment (non-current) | | |
| | Plant and equipment | | |
| | – fair value | 673 834 | 598 025 |
| | – accumulated depreciation | (415 186) | (369 264) |
| | | 258 648 | 228 761 |
| | – work in progress | 34 097 | 25 187 |
| | Total plant and equipment | 292 745 | 253 948 |
| | Research vessel | | |
| | – fair value | 15 591 | 13 881 |
| | – accumulated depreciation | (10 904) | (8 971) |
| | Total research vessel | 4 687 | 4 910 |
| | Plant and equipment under finance lease | | |
| | – fair value | 2 335 | 3 882 |
| | – accumulated amortisation | (1 660) | (2 052) |
| | Total plant and equipment under finance lease | 675 | 1 830 |
| | Total plant and equipment | 298 107 | 260 688 |

All revaluations are conducted in accordance with the revaluation policy stated in Note 1. Plant and equipment were revalued as at 30 June 2009. The Australian Valuation Office conducted the revaluation. A revaluation increment of \$4.2 million (2008: nil) for plant and equipment was credited to the asset revaluation reserve by asset class and included in the equity section of the balance sheet. No indicators of impairment were found for plant and equipment.

Notes 8 – 9 Land, Buildings and Plant and Equipment (cont)

(a) Reconciliation of the Opening and Closing Balances of Land and Buildings, Plant and Equipment (2008–09)

| | Land | Buildings | Total Land & Buildings | Plant & Equipment | Total |
|--|----------------|----------------|------------------------------|----------------------|------------------|
| | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 |
| As at 1 July 2008 | | | | | |
| Gross book value | 367 915 | 2 104 338 | 2 472 253 | 640 975 | 3 113 228 |
| Accumulated depreciation/ amortisation and impairment | - | (1 147 991) | (1 147 991) | (380 287) | (1 528 278) |
| Net book value as at 1 July 2008 | 367 915 | 956 347 | 1 324 262 | 260 688 | 1 584 950 |
| Additions | 5 240 | 76 100 | 81 340 | 63 942 | 145 282 |
| Reclassification | (5 200) | (1 498) | (6 698) | (42) | (6 740) |
| Revaluations and impairments through equity | (835) | (9 091) | (9 926) | 4 215 | (5 711) |
| Depreciation/amortisation expense | - | (55 611) | (55 611) | (29 870) | (85 481) |
| Disposals | (18) | (112) | (130) | (826) | (956) |
| Net book value as at 30 June 2009 | 367 102 | 966 135 | 1 333 237 | 298 107 | 1 631 344 |
| Net book value as at 30 June 2009 represented by: | | | | | |
| Gross book value | 367 102 | 2 171 644 | 2 538 746 | 725 857 | 3 264 603 |
| Accumulated depreciation, amortisation and impairment | - | (1 205 509) | (1 205 509) | (427 750) | (1 633 259) |
| Net book value as at 30 June 2009 | 367 102 | 966 135 | 1 333 237 | 298 107 | 1 631 344 |

Notes 8 – 9 Land, Buildings and Plant and Equipment (cont)

(b) Reconciliation of the Opening and Closing Balances of Land and Buildings, Plant and Equipment (2007–08)

| | Land | Buildings | Total Land & Buildings | Plant & Equipment | Total |
|--|----------------|----------------|------------------------------|----------------------|------------------|
| | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 |
| As at 1 July 2007 | | | | | |
| Gross book value | 170 145 | 1 836 329 | 2 006 474 | 608 308 | 2 614 782 |
| Accumulated depreciation/ amortisation and impairment | - | (1 008 452) | (1 008 452) | (373 177) | (1 381 629) |
| Net book value as at 1 July 2007 | 170 145 | 827 877 | 998 022 | 235 131 | 1 233 153 |
| Additions | - | 52 226 | 52 226 | 54 358 | 106 584 |
| Reclassification | (67 450) | (1 689) | (69 139) | 2 052 | (67 087) |
| Revaluations and impairments through equity | 265 643 | 124 369 | 390 012 | - | 390 012 |
| Depreciation/amortisation expense | - | (45 931) | (45 931) | (29 702) | (75 633) |
| Disposals | (423) | (505) | (928) | (1 151) | (2 079) |
| Net book value as at 30 June 2008 | 367 915 | 956 347 | 1 324 262 | 260 688 | 1 584 950 |
| Net book value as at 30 June 2008 represented by: | | | | | |
| Gross book value | 367 915 | 2 104 338 | 2 472 253 | 640 975 | 3 113 228 |
| Accumulated depreciation, amortisation and impairment | - | (1 147 991) | (1 147 991) | (380 287) | (1 528 278) |
| Net book value as at 30 June 2008 | 367 915 | 956 347 | 1 324 262 | 260 688 | 1 584 950 |

| | Notes | 2009 \$'000 | 2008 \$'000 |
|----------------|--|----------------|----------------|
| Note 10 | Investments accounted for using the equity method | | |
| | Murray-Darling Fresh Water Research Centre | 543 | 614 |

Murray-Darling Fresh Water Research Centre (MDFRC)

The Murray-Darling Fresh Water Research Centre is a collaborative joint venture for the purpose of Murray-Darling Basin freshwater research and the generation of knowledge required to ensure the sustainable management of water and associated environmental resources of the Murray-Darling Basin.

The Organisation's 36.59% (2008 36.59%) investment in MDFRC is accounted for using the equity method. In accordance with the joint venture agreement, the operating surplus/(deficit) was shared by participants in the joint venture. The Organisation's share of MDFRC's operating deficit was \$55 348 (2008 \$9 000 deficit).

| | | |
|---|------------|------------|
| Carrying amount at beginning of the financial year | 614 | 639 |
| Share of MDFRC's net operating surplus/(deficit) for the year | (55) | (9) |
| Adjustment based on audited accounts | (16) | (16) |
| | (71) | (25) |
| Carrying amount of investment in MDFRC as at 30 June | 543 | 614 |

The following is a summary of the financial performance and position of MDFRC:

| | Total Revenues \$'000 | Net Operating deficit \$'000 | Total Assets \$'000 | Total Liabilities \$'000 | Net Assets \$'000 |
|-------------|-----------------------------|---------------------------------------|---------------------------|--------------------------------|-------------------------|
| 2009 | | | | | |
| MDFRC | 10 156 | (151) | 4 585 | 3 101 | 1 484 |
| 2008 | | | | | |
| MDFRC | 5 476 | (25) | 4 461 | 2 782 | 1 679 |

| | Notes | 2009 \$'000 | 2008 \$'000 |
|----------------|--|----------------|----------------|
| Note 11 | Investment Properties (non-current) | | |
| | Investment properties – fair value | 1.17 | |
| | | 41 340 | 48 540 |
| | Reconciliation of the opening and closing balances of investment properties | | |
| | As at 1 July | 48 540 | 37 723 |
| | Change in fair value | - | 10 817 |
| | Reclassification to property held for sale | (7 200) | - |
| | Net book value as at 30 June | 41 340 | 48 540 |

As at 30 June 2009 investment properties comprise a property that is leased to third parties. The lease contains an initial non-cancellable period of ten years. No contingent rents are charged. Rental income from investment properties was \$2.37million (2008 \$2.13 million). No separate record was maintained on direct operating expenses including repairs and maintenance for those investment properties.

| | | | | |
|----------------|------------------------------------|------|---------------|---------------|
| Note 12 | Intangibles (non-current) | | | |
| | Computer software – at cost | 1.18 | | |
| | Internally developed – in use | | 26 665 | 422 |
| | Acquired software – in use | | - | 243 |
| | Acquired software – in progress | | - | 4 698 |
| | Internally developed – in progress | | 2 771 | 21 827 |
| | | | 29 436 | 27 190 |
| | Accumulated amortisation | | (2 923) | (438) |
| | Total intangibles | | 26 513 | 26 752 |

(a) Reconciliation of Opening and Closing Balances for Intangibles (2008–09)

| | Internally developed software | Acquired software | Total |
|--|-------------------------------|-------------------|---------------|
| | \$'000 | \$'000 | \$'000 |
| As at 1 July 2008 | | | |
| Gross book value | 22 249 | 4 941 | 27 190 |
| Accumulated amortisation and impairment | (235) | (203) | (438) |
| Net book value as at 1 July 2008 | 22 014 | 4 738 | 26 752 |
| Movements: | | | |
| Additions by purchase or internally developed | 2 244 | - | 2 244 |
| Reclassification | 4 698 | (4 698) | - |
| Amortisation | (2 443) | (40) | (2 483) |
| Net book value as at 30 June 2009 | 26 513 | - | 26 513 |
| Net book value as at 30 June 2009 represented by: | | | |
| Gross book value | 29 193 | 243 | 29 436 |
| Accumulated amortisation and impairment | (2 680) | (243) | (2 923) |
| Net book value as at 30 June 2009 | 26 513 | - | 26 513 |

(b) Reconciliation of Opening and Closing Balances for Intangibles (2007–08)

| | | | |
|--|---------------|--------------|---------------|
| As at 1 July 2007 | | | |
| Gross book value | 29 352 | 4 415 | 33 767 |
| Accumulated amortisation and impairment | (2 130) | (122) | (2 252) |
| Net book value as at 1 July 2007 | 27 222 | 4 293 | 31 515 |
| Movements: | | | |
| Additions by purchase or internally developed | 4 026 | 526 | 4 552 |
| Transfer | (2 052) | - | (2 052) |
| Amortisation | (1 081) | (81) | (1 162) |
| Impairment | (6 101) | - | (6 101) |
| Net book value as at 30 June 2008 | 22 014 | 4 738 | 26 752 |
| Net book value as at 30 June 2008 represented by: | | | |
| Gross book value | 22 249 | 4 941 | 27 190 |
| Accumulated amortisation and impairment | (235) | (203) | (438) |
| Net book value as at 30 June 2008 | 22 014 | 4 738 | 26 752 |

| | Notes | 2009 \$'000 | 2008 \$'000 |
|---|---|----------------|----------------|
| Note 13 | Properties Held for Sale (current) | | |
| | Properties held for sale | 1.27 | 56 760 |
| | Reconciliation of the opening and closing balances of properties held for sale | | 69 126 |
| | As at 1 July | 69 126 | 4 405 |
| | Additions | 985 | - |
| | Reclassification | 13 898 | 69 126 |
| | Disposals | (21 054) | (4 405) |
| | Impairment loss on revaluation | (6 195) | - |
| | Net book value as at 30 June | 56 760 | 69 126 |
| <p>Balance at 30 June 2009 represents properties identified as surplus to the Organisation and classified as 'held for sale'. These properties have been valued by independent valuers. They are expected to be sold in the market and settled within the next 12 months. Net gain on the sale of properties 'held for sale' is included in Note 3.7. An impairment loss of \$6.2 million on the remeasurement of properties held for sale to the lower of their carrying amount and fair value cost to sell, has been recognised in the Income Statment.</p> | | | |
| Note 14 | Inventories Held for Sale (current) | | |
| | Books and media products – at lower of cost and net realisable value | 1.19 | 1 276 |
| | | | 1 093 |
| Note 15 | Other Non-Financial Assets (current) | | |
| | Contract research work in progress – at cost | 1.5 | 25 550 |
| | Prepaid property rentals | | - |
| | Other prepayments | | 479 |
| | Total other non-financial assets | | 5 514 |
| | Total other non-financial assets | | 31 064 |
| | No indicators of impairment were found for other non-financial assets | | 6 783 |
| Note 16 | Suppliers (current) | | |
| | Trade creditors | | 94 383 |
| | Settlement is usually made net 30 days. | | 81 915 |

| | Notes | 2009 \$'000 | 2008 \$'000 |
|----------------|---|----------------|----------------|
| Note 17 | Other Payables (current) | | |
| | Accrued wages and salaries | 11 954 | 7 336 |
| | Contract research revenue received in advance | 81 876 | 67 238 |
| | Revenue received in advance other | 7 616 | 8 876 |
| | Other creditors and accrued expenses | 26 546 | 8 542 |
| | Amount owing to FSA joint venture | 6 878 | 3 162 |
| | Total other payables | 134 870 | 95 154 |
| Note 18 | Leases | | |
| | Finance leases | 63 636 | 67 798 |
| | Total finance leases | 63 636 | 67 798 |
| | Payable: | | |
| | Within one year | | |
| | Minimum lease payments | 6 574 | 6 943 |
| | Deduct: future finance charges | (2 633) | (2 781) |
| | Total payable within one year (current) | 3 941 | 4 162 |
| | In one to five years | | |
| | Minimum lease payments | 24 379 | 24 871 |
| | Deduct: future finance charges | (9 230) | (9 759) |
| | Total payable in one to five years | 15 149 | 15 112 |
| | In more than five years | | |
| | Minimum lease payments | 55 370 | 61 453 |
| | Deduct: future finance charges | (10 824) | (12 929) |
| | Total payable in more than five years | 44 546 | 48 524 |
| | Total finance leases recognised on the balance sheet | 63 636 | 67 798 |

Finance leases exist in relation to certain buildings and major equipment assets. The leases are non-cancellable and for fixed terms ranging from 2 to 25 years. The Organisation guarantees the residual values of all assets leased. There are no contingent rentals. The interest rate implicit in the leases averaged 4% (2008 4%). The lease liabilities are secured by the lease assets.

| | Notes | 2009 \$'000 | 2008 \$'000 |
|----------------|--|----------------|----------------|
| Note 19 | Deposits (current) | | |
| | Deposits | 5 687 | 11 950 |
| | Deposits represent monies held on behalf of the following third parties: | | |
| | Cooperative Research Centres | 290 | 3 271 |
| | National Aeronautical Space Agency (NASA) | - | 1 354 |
| | Lower Emissions Energy Centre | 1 754 | 5 034 |
| | Others | 3 643 | 2 291 |
| | Total deposits | 5 687 | 11 950 |
| Note 20 | Employee Provisions | | |
| | Annual leave | 52 385 | 53 279 |
| | Long service leave | 123 995 | 115 639 |
| | Severance pay | 5 367 | 3 427 |
| | Redundancy | 9 326 | 13 087 |
| | Total employee provisions | 191 073 | 185 432 |
| | Current | 172 747 | 171 159 |
| | Non-current | 18 326 | 14 273 |
| | Total employee provisions | 191 073 | 185 432 |

The classification of current employee provisions includes amounts for which there is not an unconditional right to defer settlement by one year, hence in the case of employee provisions the above classification does not represent the amount expected to be settled within one year of reporting date. Employee provisions expected to be settled in twelve months from the reporting date are \$17.6 million (2008 \$15.1 million).

| | Notes | 2009 \$'000 | 2008 \$'000 |
|---|--------------------------|----------------|----------------|
| Note 21 | Cash Flow Reconciliation | | |
| (a) Reconciliation of cash and cash equivalents as per Balance Sheet to Cash Flow Statement | | | |
| Cash and cash equivalents as per: | | | |
| Cash Flow Statement | | 164 156 | 98 536 |
| Balance Sheet | 5 | 164 156 | 98 536 |
| Difference | | - | - |
| (b) Reconciliation of operating result to net cash from operating activities | | | |
| Operating surplus/(deficit) | | 122 001 | 47 684 |
| Depreciation and amortisation | | 87 965 | 76 794 |
| Net write down and impairment of assets | | 21 295 | 6 192 |
| (Gains)/loss from sale of property, plant and equipment | | (17 163) | (4 748) |
| (Gains)/loss from sale of equity investments and intellectual property | | (8 449) | (71 945) |
| Change in fair value of investment properties | | - | (10 817) |
| Unrealised foreign exchange movements | | - | (28) |
| (Increase)/decrease in trade and other receivables | | (97 564) | (11 006) |
| (Increase)/decrease in inventories | | (183) | (18) |
| (Increase)/decrease in other non-financial assets | | 1 633 | (10 306) |
| (Increase)/decrease in GST receivable | | 1 702 | (1 748) |
| Increase/(decrease) in employee liabilities | | 5 641 | 6 734 |
| Increase/(decrease) in supplier payables | | 12 468 | 26 545 |
| Increase/(decrease) in other payables | | 39 715 | 17 515 |
| Increase/(decrease) in GST payable | | - | (781) |
| Increase/(decrease) in deposits-liabilities | | (6 263) | (4 916) |
| Net cash from operating activities | | 162 798 | 65 151 |

Note 22
Contingent Liabilities and Assets
Quantifiable Contingencies
Contingent assets

Under the terms of a commercial transaction agreement, the Organisation has a receivable asset, to be received at a future date upon the conditions of the agreement being met. At this stage, it is too early to determine whether the conditions of the agreement will be met and predict when the amount will be received.

The Organisation's net share of the contingent asset

Contingent liabilities

Estimated legal claims arising from employment, motor vehicle accidents, commercial and patent disputes. The Organisation has denied liability and is defending the claims. The estimate is based on precedent in such cases.

Total net contingent asset/(liability)

| 2009 \$'000 | 2008 \$'000 |
|----------------|----------------|
| - | 4 817 |
| (250) | (250) |
| (250) | 4 567 |

Unquantifiable contingencies

CSIRO is currently involved in legal proceedings in the US and Australia related to a wireless local area network (WLAN) patent which it owns and wishes to license broadly. The proceedings are additional to proceedings recently settled by CSIRO, and include an action under which declarations of non-infringement and patent invalidity against CSIRO have been sought. CSIRO has counter-claimed for infringement. The proceedings are in various phases. If successful, CSIRO expects to receive significant revenue which would exceed the associated legal costs. At this stage, the revenue and costs are considered unquantifiable.

Note 23**Joint Ventures – Cooperative Research Centres (CRCs)**

CSIRO was a party to 27 CRCs during 2008–09.

All CRCs have been classified as joint venture operations as the purpose is for the pursuit of collaborative scientific research where participants share in the scientific outcomes and outputs of the CRCs. In the event that CRC research results in a move to commercialisation, a separate legal entity is established and CSIRO's share of the new entity is treated either as subsidiary, joint venture or associate in the balance sheet as appropriate.

CSIRO's total cash and in-kind contribution (eg. staff and use of assets) to CRCs from its own resources was \$50.1 million (2008 \$51.5 million). Contributions made by CSIRO are expensed as incurred and these are included in the Income Statement.

No contingent liabilities were reported by the CRCs in which CSIRO is a participant.

CSIRO is a participant in the following CRCs as at 30 June 2009:

| <u>Name of CRC</u> | <u>Termination date</u> |
|---|--------------------------------|
| Advanced Manufacturing CRC | 30 June 2014 |
| Australian Seafood CRC | 30 June 2014 |
| Bushfire CRC | 30 June 2010 |
| CAST CRC | 30 June 2012 |
| Cotton Catchments Communities CRC | 30 June 2012 |
| Advanced Automotive Technology CRC | 30 June 2012 |
| Advanced Composite Structures CRC | 30 June 2010 |
| Forestry CRC | 30 June 2012 |
| Polymers III CRC | 30 June 2012 |
| Cancer Therapeutics CRC | 30 June 2014 |
| eWater CRC | 30 June 2012 |
| Future Farm Industries CRC | 30 June 2014 |
| Invasive Animals CRC | 30 June 2012 |
| Parker CRC | 30 June 2012 |
| Sheep Industry Innovation CRC | 30 June 2014 |
| Vision CRC | 30 June 2010 |
| Australian Biosecurity CRC | 30 June 2010 |
| National Plant Biosecurity CRC | 30 June 2012 |
| Antarctic Climate and Ecosystems CRC | 30 June 2010 |
| Greenhouse Gas Technologies CRC | 30 June 2010 |
| Irrigation Futures CRC | 30 June 2010 |
| Sugar Industry Innovation through Biotechnology CRC | 30 June 2010 |
| Sustainable Resource Processing CRC | 30 June 2010 |
| Australian Poultry Industries CRC | 30 June 2010 |
| Beef Genetic Technologies Ltd | 30 June 2014 |
| CRC for Biomarker Translation Ltd | 30 June 2012 |
| Desert Knowledge CRC | 30 June 2010 |

Note 24

Resources made available to the Organisation and not included in the Balance Sheet

| | Land | Buildings | Plant and Equipment | Total |
|-------------------------------------|---------------|-----------|---------------------|---------------|
| | \$'000 | \$'000 | \$'000 | \$'000 |
| At cost or fair value | 12 075 | 50 | 26 381 | 38 506 |
| Accumulated depreciation | - | - | (25 860) | (25 860) |
| Net value as at 30 June 2009 | 12 075 | 50 | 521 | 12 646 |
| Net value as at 30 June 2008 | 12 075 | 50 | 2 984 | 15 109 |

The above assets are made available to the Organisation at little or no cost in accordance with formal agreements with contributors. They have either been purchased out of contract research monies and expensed in the year of purchase in accordance with accounting policy Note 1.6, or made available to the Organisation at little or no cost. The assets include vehicles, computers and scientific equipment.

These assets are controlled and accounted for in the contributors' books and any proceeds from their disposal are refundable to the contributors in accordance with formal agreements on equity share and there are some restrictions on how these assets are operated. The fair value of in-kind contributions of these assets could not be reliably determined and therefore is not brought to account in the Income Statement.

Note 25

Monies Held in Trust

Monies held in trust represented by cash, deposits and investments for the benefit of the Organisation, which are not included in the Balance Sheet are:

The Australia National Wildlife Collection (ANWC) – established to maintain over 80 000 specimens of Australian wildlife collection, including a comprehensively documented collection of Australian-New Guinean birds in the world.

409

392

The Sir Ian McLennan Achievement for Industry Award – established to award outstanding contributions by the Organisation's scientists and engineers to national development.

246

271

The Elwood and Hannah Zimmerman Trust Fund – established to fund weevil research and the curation of the Australian National Insect Collection (ANIC) weevil collection.

2 006

2 150

The Schlinger Trust – established to research the taxonomy, biosystematics, general biology and biogeography of Australasian Diptera conducted by the Australian National Insect Collection.

2 286

1 761

Total monies held in trust as at 30 June**4 947****4 574**

Movement summary of monies held in trust:

| | ANWC \$'000 | McLennan \$'000 | Zimmerman \$'000 | Schlinger \$'000 | Total \$'000 |
|---------------------------------------|----------------|--------------------|---------------------|---------------------|-----------------|
| Balance as at 1 July 2008 | 392 | 271 | 2 150 | 1 761 | 4 574 |
| Receipts during the year | - | - | - | - | - |
| Interest and distribution | 17 | 10 | 166 | 558 | 751 |
| Expenditure | - | (35) | (310) | (33) | (378) |
| Balance as at 30 June 2009 | 409 | 246 | 2 006 | 2 286 | 4 947 |

Note 26**Collections**

The Organisation has a number of collections used for scientific research. These collections have been established over time and cover an extensive range of evolution and change in species. The collections are irreplaceable, bear scientific and historical value and are not reliably measurable in monetary terms. Therefore, the Organisation has not recognised them as an asset in its financial statements.

The main collections held by the Organisation are:

- **Australian National Herbarium (ANH)**
The ANH is one of the largest plant collections in Australia with approximately one million preserved plant specimens. It is unique among the Australian Herbaria in having a national focus for its collections, acquisition and research programs.
- **Australian National Insect Collection (ANIC)**
The ANIC has over 11 million specimens and is the largest research collection of Australian insects and related organisms in the world.
- **Australian National Wildlife Collection (ANWC)**
The ANWC, with over 80 000 specimens, holds land vertebrate collections, including the most comprehensively documented collections of Australian–New Guinean birds in the world.
- **Australian National Fish Collection (ANFC)**
The ANFC, also known as the ‘ISR Munro Ichthyological Collection’, houses more than 80 000 registered adult and 40 000 registered larval specimens of almost 3 000 species from Australasia, Asia, Antarctica, and the Sub Antarctic Islands. It is among Australia’s most diverse ichthyological collections and contains one of the largest collections of sharks, rays and deepwater fishes in the Southern Hemisphere.

Other collections include, but are not limited to, the Australian Tree Seed Collection, CSIRO’s Dadswell Wood Collection, CSIRO’s collection of Living Microalgae and Wood Inhabiting Fungi Collection.

Note 27 Remuneration of Auditors

Financial statement audit services are provided to the Organisation by the Auditor-General

The fees for auditing services provided was
No other services were provided by the Auditor-General.

| 2009 | 2008 |
|---------|---------|
| \$ | \$ |
| 323 000 | 263 000 |

Note 28 Remuneration of Board Members

Remuneration and superannuation benefits received or due and receivable by full-time and part-time Board Members, excluding the Chief Executive Officer were:

Board Members' remuneration

Payments to superannuation funds for Board Members

Total remuneration

| | |
|----------------|----------------|
| 473 753 | 423 153 |
| 42 588 | 37 628 |
| 516 341 | 460 781 |

The remuneration of the Chief Executive Officer, who is also a Board Member of the Organisation, is reported under Note 29 Remuneration of Senior Executives.

The number of Board Members whose total remuneration fell within the following bands were:

| \$ | Number | Number |
|------------------|-----------|----------|
| Nil – 14 999 | 3 | 1 |
| 15 000 – 29 999 | 1 | - |
| 30 000 – 44 999 | - | 1 |
| 45 000 – 59 999 | 6 | 6 |
| 60 000 – 74 999 | 1 | - |
| 75 000 – 89 999 | - | 1 |
| 90 000 – 104 999 | 1 | - |
| Total | 12 | 9 |

Note 29 Remuneration of Senior Executives

The aggregate amount of total remuneration of senior executives is shown below.

The aggregate amount of separation and redundancy/termination benefit payments during the financial year to Senior Executives is shown below.

| \$ | \$ |
|------------|------------|
| 11 991 907 | 11 419 198 |
| - | - |

Note 29**Remuneration of Senior Executives (cont)**

The number of Senior Executives, who received or were due to receive total remuneration of \$130 000 or more.

During 2008–09, those positions were: the Chief Executive and other members of the Executive Team (12), Chiefs of Divisions (14), joint venture Chief Executive Officer (1) and Flagship Directors (10), a total of 37 positions.

| \$ | 2009 Number | 2008 Number |
|-------------------|----------------|----------------|
| 130 000 – 144 999 | 2 | - |
| 145 000 – 159 999 | - | 1 |
| 160 000 – 174 999 | - | 1 |
| 175 000 – 189 999 | 1 | 1 |
| 190 000 – 204 999 | - | - |
| 205 000 – 219 999 | 1 | 2 |
| 220 000 – 234 999 | 1 | 1 |
| 235 000 – 249 999 | 1 | 1 |
| 250 000 – 264 999 | 2 | 1 |
| 265 000 – 279 999 | - | 2 |
| 280 000 – 294 999 | 2 | 2 |
| 295 000 – 309 999 | 2 | 4 |
| 310 000 – 324 999 | 6 | 4 |
| 325 000 – 339 999 | 4 | 4 |
| 340 000 – 354 999 | 2 | 5 |
| 355 000 – 369 999 | 2 | 3 |
| 370 000 – 384 999 | 5 | - |
| 385 000 – 399 999 | 2 | 1 |
| 400 000 – 414 999 | 1 | - |
| 415 000 – 429 999 | - | - |
| 430 000 – 444 999 | - | - |
| 445 000 – 459 999 | - | - |
| 460 000 – 474 999 | 1 | - |
| 475 000 – 489 999 | - | - |
| 490 000 – 504 999 | 2 | 2 |
| 520 000 – 534 999 | - | - |
| 535 000 – 549 999 | - | - |
| 595 000 – 609 999 | - | 1 |
| Total | 37 | 36 |

Note 30**Meetings of the CSIRO Board and Board Committees**

During the financial year, eight Board meetings, six Board Audit Committee meetings, four Board Remuneration Committee meetings and twelve Board Commercial Committee meetings were held. The number of meetings attended by each of the Board member was as follows:

| Board Member | Board | | Board Audit Committee | | Board Remuneration Committee | | Board Commercial Committee | |
|--------------------|---------------------------|-----------------|---------------------------|-----------------|------------------------------|-----------------|----------------------------|-----------------|
| | Number eligible to attend | Number attended | Number eligible to attend | Number attended | Number eligible to attend | Number attended | Number eligible to attend | Number attended |
| | as a member | | as a member | | as a member | | as a member | |
| M S Boydell | — | — | — | — | — | — | — | — |
| I Chubb | 8 | 3 | — | — | 4 | 2 | — | 1 |
| M Clark | 3 | 4 | — | 2 | — | 2 | — | 6 |
| S Cory | 8 | 7 | — | — | 4 | 4 | — | — |
| T A Cutler | 8 | 8 | 6 | 4 | — | — | 12 | 12 |
| E J Doyle | 8 | 7 | — | 2 | 4 | 4 | 12 | 10 |
| G G Garrett | 5 | 5 | 3 | 3 | 1 | 1 | — | 7 |
| B F Keane | — | — | 1 | 1 | — | — | 1 | 1 |
| Honourable J Kerin | 7 | 7 | 3 | 3 | — | — | — | 1 |
| D J Rathbone | 8 | 4 | 6 | 5 | — | — | — | — |
| D M O'Toole | 8 | 7 | 6 | 6 | — | — | — | 1 |
| A D Robson | — | — | — | — | — | — | — | — |
| J W Stocker | 8 | 8 | 6 | 6 | 4 | 3 | 12 | 11 |
| T H Spurling | 8 | 7 | — | — | — | — | 12 | 10 |

Note 31**Related Party Disclosures**

Board Members – The Board Members of the Organisation during the financial year were:

J W Stocker (Chairman)
 S Cory (Deputy Chairman)
 M Clark (Chief Executive - from January 2009)
 G G Garrett (Chief Executive – to December 2008)
 E J Doyle
 B F Keane
 D J Rathbone
 D M O'Toole
 A D Robson
 T A Cutler
 T H Spurling
 I Chubb
 The Honourable J Kerin
 M S Boydell

Remuneration – the aggregate remuneration of Board Members is disclosed in Note 28.

Board Members' interest in contracts

Since 1 July 2008, no Board Member of CSIRO has received or become entitled

Note 31**Related Party Disclosures (cont)**

to receive a benefit, other than a benefit included in the aggregate amount of remuneration received or due and receivable shown in Note 28 by reason of a contract made by CSIRO with the Board Member or with a firm of which the Board Member is a member or with a company in which the Board Member has a substantial financial interest.

This information relates to the period 1 July 2008 to 30 June 2009.

Other transactions of Board Members – related entities

Ms M S Boydell is the Chairman of the Gladstone Area Water Board, Chairman of the Rural Industries Research and Development Corporation, a Director of Energex Ltd, Commissioner of the Queensland Water Commission, and a member of the Australian Government Department of Agriculture, Fisheries and Forestry Audit Committee. During the 2008–09 financial year, Ms Boydell was also a Director of South East Queensland Water Corporation Ltd, a Director of BSES Ltd and a Board Member of the South East Queensland Bulk Water Supply Authority. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Professor I Chubb is the Vice-Chancellor of the Australian National University and the Chair of the International Alliance of Research Universities. He is also a member of the Group of Eight Universities, Australia; Freie University Advisory Board, Berlin; and Global Foundation Advisory Board. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Professor S Cory is Director of the Walter and Eliza Hall Institute of Medical Research and Professor of Medical Biology at the University of Melbourne. She is also a Director of Bio21 Australia Ltd and a member of the Council of the Cancer Council Victoria. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Dr T A Cutler is the Principal of Cutler & Company, a consultancy in information and communications technology. He is also a Director of Multimedia University (Universiti Telekom Sdn. Bhd.) Malaysia; MSC Technology Centre Sdn Bhd, Malaysia; Chunky Move, and was a Director of the Churchill Club Ltd. He is a member of the International Advisory Panel, Multimedia Supercorridor, Malaysia and Design Research Institute Advisory Board RMIT; and was a member of the Innovation Economy Advisory Board, Victoria. Dr Cutler is a member of the Advisory Board to the Australian Biological Resources Study (ABRS) and Chairman of Pharmacy Australia Centre of Excellence (PACE) Precinct, Brisbane. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Dr E J Doyle is Chair of Port Waratah Coal Services and the Hunter Valley Research Foundation. She is also a Director of OneSteel; Hunter Medical Research Institute, State Super Financial Services; Ross Human Directions Ltd; and Steel & Tube Ltd, New Zealand. She is a Conjoint Professor at the University of Newcastle Graduate School of Business. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and

Note 31**Related Party Disclosures (cont)**

conditions and there is no personal benefit to the CSIRO Board Member.

Mr B F Keane is the Principal of Brian Keane and Associates, a management and insurance consulting firm. While on the Board of CSIRO during the 2008–09 financial year he was a Director of NIB Holdings Ltd; Law Cover Pty Ltd (NSW Solicitors Professional Indemnity Fund); Hollard Insurance Company; and Aurora Energy Pty Ltd. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

The Honourable Mr John Kerin is Chair, Interim Advisory Committee to the Australian Weed Research Centre. He is Chair of the CRC for Tropical Savannas Management; member of the Board of Governors and Chair NSW and ACT Committees of The Crawford Fund; a member of the Board for Southern Rivers Catchment Management Authority; and a member of the Audit Committee of the Board, Southern Rivers Catchment Management Authority. Mr Kerin is also a Board Member of the Clunies Ross Foundation. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Ms D M O'Toole is the Chief Financial Officer of Queensland Rail and a former Director of Norfolk Group Ltd. She was a member of the Queensland Biotech Advisory Council and is a member of the Advisory Committee for the Banking and Finance School of the Queensland University of Technology. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Mr D J Rathbone is Managing Director and Chief Executive of Nufarm Limited. He is also a Director of the Children's Cancer Centre Foundation, Royal Children's Hospital, Victoria. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Professor T H Spurling is the Chief Executive Officer of the Cooperative Research Centre for Wood Innovations and a Research Professor in the Faculty of Life and Social Sciences, Swinburne University of Technology, Victoria. He is also a Director of IWM Centre Management Ltd; Wood Shapes Pty Ltd (until 19 June 2008); a member of the interim Board of the International Radio Astronomy Research Centre; and Chairman of the Board of Advanced Molecular Technologies Pty Ltd. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Dr J W Stocker is the Chairman of Sigma Pharmaceuticals Ltd and the Australian Wine Research Institute Ltd. He is also a Director of Telstra Corporation Ltd, Nufarm Ltd, Circadian Technologies Ltd (until 14 November 2008) and a Principal and Director of Foursight Associates Ltd. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Dr G G Garrett has no involvement in related entities.

Note 31 Related Party Disclosures (cont)

Dr M Clark is a member of the St Vincent's Hospital Foundation Board, a member of the Prime Minister's Science, Engineering and Innovation Council, and a member of the Automotive Industry Innovation Council. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

| Note 32 | Financial instruments | Notes | 2009 \$'000 | 2008 \$'000 |
|--|---|--------------|------------------------|------------------------|
| (a) Categories of financial instruments | | | | |
| | Financial assets | | | |
| | Available for sale financial assets | | | |
| | Investments | 7 | 62 453 | 118 615 |
| | Loans and receivables | | | |
| | Cash at bank | 5 | 89 156 | 28 536 |
| | Term deposits | 5 | 75 000 | 70 000 |
| | Receivables for goods and services | 6 | 84 459 | 63 097 |
| | Loans receivables | 6 | 1 470 | 1 400 |
| | Other receivable | 6 | 82 478 | 5 548 |
| | Carrying amount of financial assets | | 395 016 | 287 196 |
| | Financial liabilities | | | |
| | Finance lease liabilities | 18 | 63 636 | 67 798 |
| | Trade creditors | 16 | 94 383 | 81 915 |
| | Research revenue received in advance | 17 | 81 876 | 67 238 |
| | Deposits | 19 | 5 687 | 11 950 |
| | Other creditors | 17 | 52 994 | 27 916 |
| | Carrying amount of financial liabilities | | 298 576 | 256 817 |
| (b) Net income and expense from financial assets | | | | |
| | Cash at bank and term deposits | | | |
| | Interest revenue | 3.3 | 4 930 | 7 269 |
| | Interest revenue loans receivable | 3.3 | 70 | 11 |
| | Net gain from financial assets | | 5 000 | 7 280 |
| (c) Net income and expense from financial liabilities | | | | |
| | Finance Leases | | | |
| | Interest expense | 4.4 | 2 979 | 3 038 |
| | Net loss from financial liabilities | | 2 979 | 3 038 |
| (d) Fair value of financial instruments | | | | |

A comparison between the fair value and carrying amount of the Organisation's financial assets and liabilities is not disclosed because the Organisation considers that the carrying amounts reported in the balance sheet are a reasonable approximation of the fair value of these financial assets and liabilities.

Note 32 Financial instruments (cont)**(e) Credit risk**

The Organisation is exposed to minimal credit risk as the majority of loans and receivables are cash or amounts owed by the Australian Tax Office in the form of a Goods and Services Tax refund.

The maximum exposure to credit risk is the risk that arises from potential default of a debtor. This amount is equal to the total amount of trade and other receivables of \$168.5 million (2008 \$71.8 million). The Organisation has assessed the risk of the default on payment and has allocated \$1 610 000 (2008 \$882 000) to an allowance for impairment account.

The Organisation manages its credit risk by undertaking background and credit checks prior to allowing a debtor relationship. In addition, the Organisation has policies and procedures that guide employees to apply debt recovery techniques. The Organisation holds no collateral to mitigate against credit risk.

Credit risk of financial instruments not past due or individually determined as impaired:

| | Notes | Not past due nor impaired 2009 \$'000 | Not past due nor impaired 2008 \$'000 | Past due or impaired 2009 \$'000 | Past due or impaired 2008 \$'000 |
|---------------------------------------|-------|---|---|---|--|
| Cash at bank | 5 | 89 156 | 28 536 | - | - |
| Term deposits | 5 | 75 000 | 70 000 | - | - |
| Receivables for goods and services | 6 | 74 711 | 51 043 | 9 748 | 12 054 |
| Loans receivables | 6 | 1 470 | 1 400 | - | - |
| Other receivable | 6 | 82 478 | 5 548 | - | - |
| Investments | 7 | 62 453 | 118 615 | - | - |
| Total | | 385 268 | 275 142 | 9 748 | 12 054 |

Note 32 Financial Instruments (cont)**(e) Credit risk (cont)****Ageing of financial assets that are past due but not impaired for 2009:**

| | 0 to 30 days \$'000 | 31 to 60 days \$'000 | 61 to 90 days \$'000 | 90+ days \$'000 | Total \$'000 |
|------------------------------------|---------------------------|----------------------------|----------------------------|-----------------------|-----------------|
| Receivables for goods and services | 3 410 | 3 845 | 595 | 1 898 | 9 748 |
| Total | 3 410 | 3 845 | 595 | 1 898 | 9 748 |

Ageing of financial assets that are past due but not impaired for 2008:

| | 0 to 30 days \$'000 | 31 to 60 days \$'000 | 61 to 90 days \$'000 | 90+ days \$'000 | Total \$'000 |
|------------------------------------|---------------------------|----------------------------|----------------------------|-----------------------|-----------------|
| Receivables for goods and services | 9 105 | 1 343 | 632 | 974 | 12 054 |
| Total | 9 105 | 1 343 | 632 | 974 | 12 054 |

(f) Liquidity risk

The Organisation's financial liabilities are payables, finance leases and other interest bearing liabilities. The exposure to liquidity risk is based on the notion that the Organisation will encounter difficulty in meeting its obligations associated with financial liabilities. This is highly unlikely due to Australian Government funding and internal policies and procedures put in place to ensure there are appropriate resources to meet its financial obligations.

The Organisation manages its budgeted funds to ensure it has adequate funds to meet payments as they fall due. In addition, the Organisation has policies in place to ensure timely payments are made when due and has no past experience of defaults.

Note 32 Financial Instruments (cont)

(f) Liquidity risk (cont)

The following table illustrates the maturities for financial liabilities for 2009:

| | On demand \$'000 | Within 1 year \$'000 | 1 to 5 years \$'000 | > 5 years \$'000 | Total \$'000 |
|---|------------------------|----------------------------|---------------------------|------------------------|-----------------|
| Finance lease liabilities | - | 6 574 | 24 379 | 55 370 | 86 323 |
| Trade creditors | - | 94 383 | - | - | 94 383 |
| Research revenue received in advance | - | 81 876 | - | - | 81 876 |
| Deposits | 5 687 | - | - | - | 5 687 |
| Other creditors | - | 52 994 | - | - | 52 994 |
| Total | 5 687 | 235 827 | 24 379 | 55 370 | 321 263 |

The following table illustrates the maturities for financial liabilities for 2008:

| | On demand \$'000 | Within 1 year \$'000 | 1 to 5 years \$'000 | > 5 years \$'000 | Total \$'000 |
|---|------------------------|----------------------------|---------------------------|------------------------|-----------------|
| Finance lease liabilities | - | 6 943 | 24 871 | 61 453 | 93 267 |
| Trade creditors | - | 81 915 | - | - | 81 915 |
| Research revenue received in advance | - | 72 334 | - | - | 72 334 |
| Deposits | 11 950 | - | - | - | 11 950 |
| Other creditors | - | 15 484 | - | - | 15 484 |
| Total | 11 950 | 176 676 | 24 871 | 61 453 | 274 950 |

Note 32 Financial instruments (cont)**(g) Market risk**

The Organisation holds basic financial instruments that do not expose the Organisation to certain market risks except for equity price risk for its available for sale equity investments. See Note 7.

Interest rate risk

The only interest-bearing items on the balance sheet are finance leases. They all bear interest at a fixed interest rate and will not fluctuate due to changes in the market interest rate.

Equity price risk

Equity price risk arises from changes in market prices of listed equity investments that the Organisation has designated as 'available for sale' financial instruments. See Note 7.

Sensitivity analysis

The Organisation's listed equity investments are listed on the Australian Securities Exchange (ASX). For such instruments classified as available for sale, a 10% increase in the ASX All Ordinary Index at the reporting date would have increased equity by \$3 560 000 (2008 an increase of \$7 837 000). An equal change in the opposite direction would have decreased equity by \$3 560 000 (2008 a decrease of \$7 837 000). The analysis is performed on the same basis for 2008.

Currency risk

In accordance with Australian Government policy, the Organisation is prohibited from entering into foreign currency hedges.

The Organisation's exposure to foreign exchange risk on sales and purchases that are denominated in currencies other than Australian dollar is not considered material. At any point in time the Organisation's foreign currency risk exposure is not material.

Note 33 Reporting of Outcomes and Outputs

(a) Reporting of outcome

The Organisation's outputs contribute to a single outcome:

Australia has strong capability in scientific research and development that delivers ongoing economic, social and environmental benefits and provides science and technology solutions relevant to current and emerging national challenges and opportunities.

(b) Net cost of outcome delivery

| | 2009 \$'000 | 2008 \$'000 |
|--|------------------|------------------|
| Total expenses | 1 180 849 | 1 043 711 |
| Other external revenues: | | |
| Sale of goods and rendering of services – to related entities | 94 787 | 103 986 |
| Sale of goods and rendering of services – to external entities | 253 090 | 186 083 |
| Interest | 5 000 | 7 280 |
| Net gains from sale of assets | 17 163 | 4 748 |
| Donations | - | 1 |
| Rents | 7 387 | 6 891 |
| Royalties | 15 948 | 9 726 |
| Net gains from sale of investments | 8 449 | 71 945 |
| Other fair value gain | - | 10 817 |
| Sale of primary produce | 1 259 | 2 065 |
| Other | 231 647 | 24 693 |
| Total other external revenues | 634 730 | 428 235 |
| Net cost of outcome | 546 119 | 615 476 |

Note to accompany the following table:

During the 2008–09 financial year, the Organisation applied the same methodology as 2007–08 for the allocation of corporate costs to enable a more accurate pricing of outputs. This methodology involves management estimation and decision as to the most appropriate choice of cost drivers such as staff numbers, floor space and divisional function per output.

(c) Major Organisational Assets and Liabilities by Outcomes

The Organisation only has one Outcome and all assets and liabilities are attributed to that Outcome.

Note 33 Reporting of Outcomes and Outputs (cont)

(d) Major Organisational Revenues and Expenses by Output Groups

| | Science and Technological Solutions | | | | Science and Technology Infrastructure and Outreach | | | | Total | |
|---|-------------------------------------|----------------|----------------|----------------|--|----------------|-------------------------------------|----------------|-----------|-----------|
| | Output 1 | | Output 2 | | Output 3 | | Output 4 | | | |
| | National Research Flagships | | Core Research | | Education and Scientific Publishing | | National Facilities and Collections | | | |
| | 2009 \$'000 | 2008 \$'000 | 2009 \$'000 | 2008 \$'000 | 2009 \$'000 | 2008 \$'000 | 2009 \$'000 | 2008 \$'000 | | |
| Operating Expenses | | | | | | | | | | |
| Employee benefits | 256 126 | 222 459 | 338 956 | 336 208 | 10 799 | 13 012 | 33 360 | 25 292 | 639 241 | 596 971 |
| Suppliers | 125 401 | 128 096 | 240 721 | 193 492 | 16 391 | 8 183 | 41 947 | 27 623 | 424 460 | 357 394 |
| Depreciation and amortisation | 30 599 | 24 874 | 48 776 | 45 626 | 1 849 | 1 080 | 6 741 | 5 214 | 87 965 | 76 794 |
| Finance costs | 1 070 | 1 031 | 1 611 | 1 746 | 64 | 45 | 234 | 216 | 2 979 | 3 038 |
| Write-down and impairment of assets | 7 412 | 1 856 | 11 802 | 3 975 | 448 | 81 | 1 633 | 280 | 21 295 | 6 192 |
| Other | 26 | 1 089 | 4 877 | 1 959 | 1 | 47 | 5 | 227 | 4 909 | 3 322 |
| Total operating expenses | 420 634 | 379 405 | 646 743 | 583 006 | 29 552 | 22 448 | 83 920 | 58 852 | 1 180 849 | 1 043 711 |
| Funded by: | | | | | | | | | | |
| Revenues from Government | 269 995 | 258 617 | 325 726 | 357 304 | 5 424 | 5 621 | 66 975 | 41 618 | 668 120 | 663 160 |
| Sale of goods and services | 122 635 | 92 108 | 197 767 | 173 777 | 10 321 | 9 987 | 17 154 | 14 197 | 347 877 | 290 069 |
| Royalties | 659 | 435 | 15 111 | 9 185 | 177 | 105 | 1 | 1 | 15 948 | 9 726 |
| Net gains from sale of assets | 6 936 | 1 852 | 8 368 | 2 558 | 138 | 40 | 1 721 | 298 | 17 163 | 4 748 |
| Gains on sale of investments, IP and realisation of fair value gain reserve | 2 214 | 31 720 | 5 641 | 45 248 | 45 | 689 | 549 | 5 105 | 8 449 | 82 762 |
| Other | 9 072 | 10 044 | 227 906 | 24 052 | 5 897 | 4 465 | 2 418 | 2 369 | 245 293 | 40 930 |
| Total operating revenues | 411 511 | 394 776 | 780 519 | 612 124 | 22 002 | 20 907 | 88 818 | 63 588 | 1 302 850 | 1 091 395 |

The Organisation's outcomes and outputs are described in Note 33 (a).



| | |
|--|-----|
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Part four – Appendixes

Appendix I: Flagship Collaboration Clusters*

Round I clusters

| Flagship | Cluster name | Cluster leader(s) | Other partners |
|--------------------|---|---|---|
| Energy Transformed | National Hydrogen Materials Alliance | Dr Andrew Dicks, University of Queensland (UQ) | University of New South Wales (UNSW), University of Wollongong, University of Sydney, Queensland University of Technology (QUT), RMIT University, Australian National University (ANU), Curtin University of Technology (CUT), Monash University, Griffith University, Newcastle University, Australian Nuclear Science and Technology Organisation (ANSTO) |
| Food Futures | Concentration and separation of bioactives in food science | Dr Muthupandian Ashokkumar, University of Melbourne and Professor Milton Hearn, Monash University (merged) | No other partners |
| Food Futures | Learning the principles of olfactory pattern recognition from invertebrates | Professor Mandyam Srinivasan, UQ (moved from ANU) | Monash, ANU |
| Light Metals | Australian Partnership in Light Metals Research | Professor David St John, CAST Cooperative Research Centre (CRC) and Professor Barry Muddle, Monash University | Australian Research Council Centre of Excellence, UQ, Deakin University, Swinburne University |

* as at 1 July 2009

| | | | |
|-----------------------------|--|---|--|
| Preventative Health | Detecting and preventing Alzheimer's disease | Professor David Ames, University of Melbourne | Edith Cowan University, Mental Health Research Institute, Neurosciences Australia |
| Water for a Healthy Country | CLAMMecology (Coorong, Lower Lakes and Murray Mouth) | Dr Mike Geddes, University of Adelaide | Flinders University, South Australian Research and Development Institute (SARDI) |
| Wealth from Oceans | Human uses and impacts on Ningaloo reef | Professor Neil Loneragan, Murdoch University | ANU, CUT, Edith Cowan University, Sustainable Tourism CRC, University of Western Australia (UWA), UQ |

Round 2 clusters

| Flagship | Cluster name | Cluster leader(s) | Other partners |
|-----------------------------|--|---|---|
| Food Futures | Redesigning grain polysaccharides | Professor Mike Gidley, UQ | University of Adelaide, University of Melbourne |
| Water for a Healthy Country | Advanced membrane technologies for water treatment | Professor Stephen Gray, Victoria University | UNSW, University of Melbourne, RMIT University, Monash University, UQ, CUT, University of South Australia, Murdoch University |
| Wealth from Oceans | Subsea pipelines for reliable and environmentally safe development | Professor Mark Cassidy, UWA | CUT, Flinders University, Monash University, University of Sydney, UQ |

Round 3 clusters

| Flagship | Cluster name | Cluster leader(s) | Other partners |
|---------------------|--|---|--|
| Energy Transformed | The 'intelligent grid' – modelling distributed generation and interruptible load | Professor Stuart White, University of Technology Sydney | University of South Australia, UQ, CUT, QUT |
| Light Metals | Breakthrough technology for primary aluminium | Professor Geoff Brooks, Swinburne University | Auckland University, Wollongong University, UNSW, UQ |
| Preventative Health | The ASPREE healthy ageing cohort biobank | Professor John McNeil, Monash University | University of Melbourne, University of Tasmania, ANU, Ludwig Institute for Cancer Research |

Round 4 clusters

| Flagship | Cluster name | Cluster leader(s) | Other partners |
|----------------------|--|---|---|
| Climate Adaptation | Human health and climate change adaptation | Professor Anthony Capon, ANU | To be confirmed |
| Climate Adaptation | Regional adaptation to climate change – a case study in south-east Queensland | Professor Jan McDonald, Griffith University | Griffith University, UQ, University of Sunshine Coast |
| Minerals Down Under | Future sustainability of Australia's mineral industry | Professor David Brereton, University of Queensland | University of Technology Sydney, Curtin University of Technology, Central Queensland University, Australian National University |
| Minerals Down Under | Preconcentration and agglomeration to enhance heap leaching of nickel laterite | Professor John Ralston, University of South Australia | University of South Australia, UQ, University of Melbourne, University of British Columbia |
| Future Manufacturing | Sensor systems for analysis of aquatic environments | Professor Justin Gooding, UNSW | To be confirmed |
| Preventative Health | STroke imAging pRevention and Treatment (START) | Professor Geoffrey Donnan, University of Melbourne | To be confirmed |
| Wealth from Oceans | Institutional and social barriers to science impact | Professor David Wood, CUT | To be confirmed |

Appendix 2: Service Charter

CSIRO's Service Charter describes the standards of service we aim to deliver to our customers and our commitment to ensuring that these standards are maintained.

In summary:

- we believe our customers and partners are essential to our success
- we maintain relevance in our work through input from the public, government, industry and the research community
- we communicate with our customers in a courteous, helpful and professional manner
- we respect our customers' confidentiality
- we evaluate our services to ensure the highest standards.

Our full Service Charter is available on our website: www.csiro.au/servicecharter

CSIRO welcomes your feedback on our performance. Please contact the CSIRO officer with whom you have been dealing or CSIRO Enquiries, who can direct your feedback to the relevant person.

CSIRO Enquiries:

Bag 10, Clayton South, VIC 3169

Phone: 1300 363 400

Fax: +61 3 9545 2175

Email: enquiries@csiro.au

Appendix 3: Administrative Law

4 Appendixes

Freedom of information

The *Freedom of Information Act 1982* (FOI Act) provides the public with a general right of access to documents held by Australian Government agencies including CSIRO. The general right is limited by exceptions to protect essential public interests or the privacy or business affairs of those who give information to the agency.

The following information is provided in compliance with section 8 of the FOI Act:

- the functions and powers of CSIRO are set out on page 58
- information about CSIRO's procedures for external consultation can be found at www.csiro.au/SAC and www.csiro.au/FAC
- CSIRO holds the following categories of documents:
 - corporate records including documents relating to government, policy, finance, personnel, business development, commercialisation, communication, real property, intellectual property and education
 - business unit records including documents relating to scientific research and technology transfer
- members of the public may obtain access to scientific and technical publications from CSIRO Publishing (www.publish.csiro.au). CSIRO administrative manuals are available from the Freedom of Information Officer.

Part V of the FOI Act confers a right to request amendment of a document to which lawful access has been granted, where the applicant claims that information in the document:

- relates to his or her personal affairs
- is incomplete, incorrect, out-of-date or misleading
- has been used, is being used, or is available for use by the agency or Minister for an administrative purpose.

In the year to 30 June 2009, CSIRO received 21 requests for information under the FOI Act and no requests for amendment in relation to documents provided under the Act.

Archives, privacy, administrative decisions

CSIRO maintains an archives collection which includes records dating from the establishment in 1926 of the Council for Science and Industrial Research, the predecessor of CSIRO. Certain CSIRO records are held by Australian Archives. Disposal arrangements for CSIRO records are made in accordance with the provisions of the *Archives Act 1983*. Access to records over 30 years old is provided in accordance with that Act.

The *Privacy Act 1988* provides for Information Privacy Principles (IPPs) and National Privacy Principles (NPPs). In the year to 30 June 2009, the Privacy Commissioner did not undertake any investigations under section 36 of the *Privacy Act 1988* in relation to CSIRO.

The *Administrative Decisions (Judicial Review) Act 1977* (ADJR Act) enables a person aggrieved by certain classes of administrative decisions made by Australian Government agencies, including CSIRO, to obtain reasons for or to challenge those decisions. In the year to 30 June 2009, CSIRO received no challenges or requests for statements of reasons under the ADJR Act.

Contact

All enquiries under the above legislation (including FOI requests) should be directed to:

Freedom of Information Officer and Privacy Officer
CSIRO, PO Box 225, Dickson ACT 2602
Phone: 02 6276 6123
Fax: 02 6276 6437
Email: rosemary.caldwell@csiro.au

Appendix 4: Commonwealth Disability Strategy

For the purposes of the Commonwealth Disability Strategy (CDS), CSIRO's 'Role' is that of an 'Employer'. Activities relevant to the Strategy form part of CSIRO's Workplace Diversity Plan.

During 2008, qualitative research in the form of interviews and focus groups and quantitative research in the form of analysis of CSIRO data and policies was undertaken. The research was then aggregated to identify the diversity priorities

for CSIRO, along with recommendations for future action. A new Diversity Plan was developed, which will respond to key diversity issues within the Organisation. Key areas for action are diversity leadership, indigenous employment, education and awareness raising, and selection and recruitment.

Performance against the indicators issued by the Office of Disability is detailed in Appendix table 4.1

Appendix table 4.1: Disability strategy performance

| Performance indicator | Actions 2008–09 |
|--|--|
| Employment policies, procedures and practices comply with the requirements of the <i>Disability Discrimination Act 1992</i> . | Policies and practices are in a routine maintenance phase and are reviewed at least annually. Reviews of the CSIRO policies by Aequus Partners indicated compliance with the <i>Disability Discrimination Act 1992</i> . |
| Recruitment information for potential job applicants is available in accessible formats on request. | All web authors comply with the Web Content Accessibility Guidelines. The establishment of a dedicated team of recruitment specialists ensures consistency of presentation and accessibility. Additional resources were made available for staff and potential employees with hearing disabilities. |
| Agency recruiters and managers apply the principle of 'reasonable adjustment'. | CSIRO policy encourages managers to make adjustments to accommodate the needs of staff with a disability so that they can satisfy the inherent requirements of the job. |
| Training and development programs consider the needs of staff with disabilities. | Development programs are conducted at venues that cater to the needs of participants with disabilities. Web training resources are being reviewed to ensure suitability for all staff. |
| Training and development programs include information on disability issues as they relate to the program. | There are various CSIRO supported programs which provide information on disability issues. These include Contact Officer Training courses and information sessions, programs for CSIRO conducted by Diversity@Work and information materials and presentations by the Diversity Contact Officer Network. Material on the CSIRO Intranet has been updated and includes information on diversity issues, such as new resources for the hearing impaired. |
| Complaints/grievance mechanisms, including access to external mechanisms, in place to address issues and concerns raised by staff. | CSIRO has well-developed and publicised internal mechanisms for resolving complaints both formally and informally. In the formal stages, matters involve investigation by an independent investigator. There is also scope to refer the matter to the Human Rights and Equal Opportunity Commission. There have been no instances of complaints based on disability issues. |

Appendix 5: Consultancy Services

CSIRO's policy on selection and engagement of consultants is based on the principles of:

- value for money
- open and effective competition
- ethics and fair dealing
- accountability and reporting
- national competitiveness and industry development
- support for other Australian Government policies.

These principles are included within CSIRO's Procurement Policy and Procedures.

CSIRO engages individuals and companies to provide professional services, taking account of the skills and resources required for the task, the skills available internally and the cost-effectiveness of these options.

CSIRO spent \$736,652 (including goods and services tax (GST)) on consultancies during 2008–09 (\$740,830 in 2007–08). There were 24 consultancies let during the year with the total whole-of-life value of \$1,634,572 (including GST) (\$850,311 in 2007–08). The following table provides details of consultancy services let by CSIRO during 2008–09 with a contract value, GST inclusive, of \$10,000 or more.

Notes to table:

| Reason code | Reason for consultancy |
|------------------|--|
| IS | Need for independent study/evaluation. |
| PA | Need for professional assistance to manage and facilitate change and its consequence. |
| SS | Specialist skills were not otherwise available. |
| Procurement code | Procurement method |
| PM | An existing panel member – this category includes standing offers, common use arrangements and approved supplier panels. |
| OT | Tenders sought from the market place (Request for Proposal, Request for Tender, Expressions of Interest). |
| ST | Tenders being sought from suppliers who have pre-qualified through some form of previous competitive process. |
| RQ | Purchasing thresholds consistent with CSIRO's minimal standards. |
| EX | Exemption arrangement such as sole supplier, pre-eminent expertise, or urgency and/or practicality. |

| Registration number | Consultant | Nature and purpose of consultancy | Estimated total life cost of consultancy \$ (GST inclusive) | Reason for consultancy | Procurement method |
|---------------------|--|---|---|------------------------|--------------------|
| 2008/07/01 | Leslie Consulting | Independent validation of the commercial opportunity for the Dragline Swing Automation Project. | 33,352 | IS | EX |
| 2008/07/02 | Upfront Management | Advice regarding strategic commercial options for genetically modified input trait technology, in relation to outputs of the Grain Protection Genes, CSIRO/Grains Research and Development Corporation joint venture. | 105,000 | SS | EX |
| 2008/07/03 | InAvanti | Provide professional expert advice to the CSIRO Commercial Executive Committee. | 110,000 | SS | EX |
| 2008/07/05 | ACIL Tasman | Provide strategic advice to the Preventative Health Flagship. | 13,200 | SS | EX |
| 2008/07/07 | Consulting and Implementation Services Pty Ltd | Provide independent advice and assistance with the development of a Niche Manufacturing Flagship Strategy. | 20,240 | IS | RQ |
| 2008/07/08 | BBWorld | Advise on eResearch and supercomputer needs for the Australian Square Kilometre Array Pathfinder. | 20,000 | IS | EX |
| 2008/08/02 | Dr Beverly Hart | Produce an eResearch Strategy document. | 35,000 | SS | EX |
| 2008/09/01 | Australian Graduate School of Management | The consultant designed and delivered elements of CSIRO's senior leadership development program, Leading the Research Enterprise. | 111,650 | SS | RQ |
| 2008/11/01 | Gerald Morvell | Assist with a government submission in the solar energy domain. | 33,000 | IS | EX |
| 2008/11/02 | Grahame Cook Consulting Pty Ltd | Independent review and analysis of CSIRO policy and strategy relating to the government domain. | 55,000 | PA | EX |
| 2008/12/01 | Croft IP Pty Ltd | Provide professional and expert advice to the CSIRO Commercial Executive Committee. | 50,000 | SS | EX |
| 2008/12/02 | Kirin Corporation Pty Ltd | Provide professional and expert advice to CSIRO in relation to Australian Growth Partnerships. | 22,000 | IS | RQ |

| Registration number | Consultant | Nature and purpose of consultancy | Estimated total life cost of consultancy \$ (GST inclusive) | Reason for consultancy | Procurement method |
|--|---------------------------------|--|---|------------------------|--------------------|
| 2008/12/03 | RL Sandland Consulting Services | Provide advice regarding commercialisation of the Predictive Mineral Discovery CRC. | 15,400 | IS | EX |
| 2009/02/01 | McLennan Magasanik Associates | Validation and analysis to identify methods to exploit IP generated from CSIRO's investment in the Ventilation Air Methane Catalytic Combustion Gas Turbine. | 20,000 | IS | EX |
| 2009/03/01 | Buchan Consulting | Provide independent and confidential expert advice to assist in benchmarking CSIRO's corporate and Divisional communication function. | 33,000 | IS | RQ |
| 2009/03/01 | KPMG | Evaluate performance of the CSIRO Board. | 33,000 | IS | RQ |
| 2009/03/02 | Energetics Pty Ltd | Advice/assistance regarding the National Electricity Market tender. | 35,200 | SS | RQ |
| 2009/04/01 | Coffey Environments Pty Ltd | Auditing of energy, water and waste across CSIRO. | 775,480 | IS | OT |
| 2009/04/02 | Innovation Venture Partners | Review of funding schemes to support activities of the WA Geothermal Centre of Excellence. | 33,000 | IS | EX |
| 2009/04/03 | BJH Consulting | Undertake a brief for the estimation of the economic and wider impact of IVEC from 2000–09. | 14,250 | IS | RQ |
| 2009/06/01 | BJH Consulting | Assist with the development of an implementation plan for the National Square Kilometre Array Science Centre. | 26,400 | IS | EX |
| 2009/06/02 | Mainstream Solutions | Assist with the development of an implementation plan for the National Square Kilometre Array Science Centre. | 25,000 | IS | EX |
| Total value of consultancies below \$10,000 | | | \$15,400 | | |
| Total value of consultancies let during 2008–09 | | | \$1,634,572 | | |



INDEPENDENT AUDITOR'S REPORT

To the Trustee of the Science and Industry Endowment Fund

Scope

I have audited the accompanying financial statements of Science and Industry Endowment Fund for the year ended 30 June 2009, which comprise: a Statement by the Trustee; Income Statement; Balance Sheet; Statement of Changes in Equity; Cash Flow Statement; and Notes to and forming part of the Financial Statements, including a Summary of Significant Accounting Policies.

The Responsibility of the Trustee for the Financial Statements

The Trustee is responsible for the preparation and fair presentation of the financial statements in accordance with the Australian Accounting Standards (which include the Australian Accounting Interpretations). This responsibility includes establishing and maintaining internal controls relevant to the preparation and fair presentation of the financial statements that are free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit. I have conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. These auditing standards require that I comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Science and Industry Endowment Fund's preparation and fair presentation of the financial statements in order

GPO Box 707 CANBERRA ACT 2601
19 National Circuit BARTON ACT
Phone (02) 6203 7300 Fax (02) 6203 7777

to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Science and Industry Endowment Fund's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the Trustee, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Independence

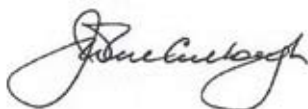
In conducting the audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the requirements of the Australian accounting profession.

Auditor's Opinion

In my opinion, the financial statements of the Science and Industry Endowment Fund:

- (a) have been prepared in accordance with the Australian Accounting Standards (which include the Australian Accounting Interpretations); and
- (b) give a true and fair view of the matters required by the Australian Accounting Standards (which include the Australian Accounting Interpretations) including the Science and Industry Endowment Fund's financial position as at 30 June 2009 and its financial performance and cash flows for the year then ended.

Australian National Audit Office



John McCullough
Audit Principal
Delegate of the Auditor-General

Canberra
16 September 2009

SCIENCE AND INDUSTRY ENDOWMENT FUND STATEMENT BY TRUSTEE

In our opinion, the attached financial statements for the year ended 30 June 2009 have been prepared based on properly maintained financial records and in accordance with Australian Accounting Standards and other mandatory financial reporting requirements in Australia, and give a true and fair view of the financial position of the Fund as at 30 June 2009 and of its performance for the year then ended.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Fund will be able to pay its debts as and when they become due and payable.



Megan Clark
Chief Executive

15 September 2009



Allan Gaukroger
Chief Financial Officer

15 September 2009

SCIENCE AND INDUSTRY ENDOWMENT FUND INCOME STATEMENT

For the year ended 30 June 2009

| | Notes | 2009 \$ | 2008 \$ |
|-------------------------------------|-------|---------------|----------------|
| INCOME | | | |
| Revenue | | | |
| Interest | | 33 742 | 36 903 |
| Total Revenue | | 33 742 | 36 903 |
| Gains | | | |
| In-kind contributions received | 4 | 10 760 | 7 782 |
| Total Gains | | 10 760 | 7 782 |
| TOTAL INCOME | | 44 502 | 44 685 |
| EXPENSES | | | |
| Scientific research grants | | 18 817 | 45 666 |
| Bank fees | | 29 | 45 |
| In-kind expenses: | | | |
| – advertising and approval fees | 4 | 4 340 | 3 982 |
| – accounting, secretarial and audit | 4 | 6 420 | 3 800 |
| TOTAL EXPENSES | | 29 606 | 53 493 |
| Net surplus/(deficit) | | 14 896 | (8 808) |

The above statement should be read in conjunction with the accompanying notes.

SCIENCE AND INDUSTRY ENDOWMENT FUND
BALANCE SHEET
As at 30 June 2009

| | Notes | 2009 \$ | 2008 \$ |
|--------------------------------|-------|----------------|----------------|
| ASSETS | | | |
| Financial assets | | | |
| Cash | 5 | 527 313 | 506 051 |
| Interest receivable | 6 | 11 281 | 17 647 |
| Total assets | | 538 594 | 523 698 |
| LIABILITIES | | | |
| Payables | | | |
| Awards | | - | - |
| Total liabilities | | - | - |
| NET ASSETS | | 538 594 | 523 698 |
| EQUITY | | | |
| Contributed equity | | 200 000 | 200 000 |
| Accumulated surpluses | | 338 594 | 323 698 |
| Total equity | | 538 594 | 523 698 |
| Current assets | | 538 594 | 523 698 |
| Non-current assets | | - | - |
| Current liabilities | | - | - |
| Non-current liabilities | | - | - |

The above statement should be read in conjunction with the accompanying notes.

SCIENCE AND INDUSTRY ENDOWMENT FUND
STATEMENT OF CHANGES IN EQUITY
For the year ended 30 June 2009

| | Accumulated Surpluses | | Contributed Equity | | Total Equity | |
|---------------------------------|-----------------------|---------|--------------------|---------|--------------|---------|
| | 2009 | 2008 | 2009 | 2008 | 2009 | 2008 |
| | \$ | \$ | \$ | \$ | \$ | \$ |
| Opening balance | 323 698 | 332 506 | 200 000 | 200 000 | 523 698 | 532 506 |
| Net Operating surplus/(deficit) | 14 896 | (8 808) | - | - | 14 896 | (8 808) |
| Closing balance at 30 June | 338 594 | 323 698 | 200 000 | 200 000 | 538 594 | 523 698 |

The above statement should be read in conjunction with the accompanying notes.

SCIENCE AND INDUSTRY ENDOWMENT FUND
STATEMENT OF CASH FLOWS
For the year ended 30 June 2009

| | Notes | 2009 \$ | 2008 \$ |
|---|-------|----------------|-----------------|
| OPERATING ACTIVITIES | | | |
| Cash received | | | |
| Interest | | 40 108 | 34 491 |
| Total cash received | | 40 108 | 34 491 |
| Cash used | | | |
| Grants | | 18 817 | 45 666 |
| Other | | 29 | 45 |
| Total cash used | | 18 846 | 45 711 |
| Net cash from/(used by) operating activities | 7 | 21 262 | (11 220) |
| Net increase/(decrease) in cash held | | 21 262 | (11 220) |
| Cash at the beginning of the reporting period | | 506 051 | 517 271 |
| Cash at the end of the reporting period | | 527 313 | 506 051 |

The above statement should be read in conjunction with the accompanying notes.

SCIENCE AND INDUSTRY ENDOWMENT FUND
NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS
For the year ended 30 June 2009

Note 1 Summary of Significant Accounting Policies

1.1 Basis of Preparation of the Financial Statements

The financial report is required by section 10 of the *Science and Industry Endowment Act 1926* and is a general purpose financial report that has been prepared in accordance with Australian Accounting Standards, Australian Accounting Interpretations, and other authoritative pronouncements of the Australian Accounting Standards Board.

The financial statements have been prepared on an accrual basis and are in accordance with the historical cost convention. No allowance is made for the effect of changing prices on the results or the financial position.

Assets and liabilities are recognised in the Balance Sheet when and only when it is probable that future economic benefits will flow and the amounts of the assets or liabilities can be reliably measured.

Revenues and expenses are recognised in the Income Statement when and only when the flow or consumption or loss of economic benefits has occurred and can be reliably measured.

1.2 Cash

For the purpose of the Statement of Cash Flows, cash includes cash at bank and deposits at call. They are readily convertible to cash.

1.3 Revenue

Interest revenue is recognised on a proportional basis taking into account the interest rates applicable to the financial assets.

1.4 Resources Received Free of Charge

Services received free of charge are recognised as gains when and only when a fair value can be reliably determined and the services would have been purchased if they had not been donated. Use of those resources is recognised as an expense.

1.5 Financial Instruments

Accounting policies for financial instruments are stated in Note 8.

Note 2 Contingencies and Commitments

No contingent liabilities and commitments exist as at 30 June 2009.

Note 3 Principal Activity

The Fund was established under the *Science and Industry Endowment Act* 1926 with the Trustee of the Fund being the CSIRO Chief Executive. An appropriation of 100 000 pounds was received at the time the fund was established. The funds were invested and have subsequently earned interest over time.

The principal activity of the Science and Industry Endowment Fund is to provide assistance to persons engaged in scientific research and in the training of students in scientific research.

Note 4 In-kind Contributions

| | 2009 \$ | 2008 \$ |
|---|---------------|--------------|
| Estimated value of resources provided free of charge by CSIRO or ANAO are as follows: | | |
| – accounting and secretarial services | 3 420 | 2 700 |
| – advertising and approval fees | 4 340 | 3 982 |
| – financial statement audit services provided free of charge by the Auditor-General | 3 000 | 1 100 |
| | 10 760 | 7 782 |

Note 5 Cash (current)

| | | |
|--------------------|----------------|----------------|
| Cash at bank | 27 313 | 4 747 |
| Deposits – at call | 500 000 | 501 304 |
| | 527 313 | 506 051 |

Note 6 Receivables (current)

| | | |
|--|---------------|---------------|
| Interest receivable | 11 281 | 17 647 |
| | 11 281 | 17 647 |
| Gross receivables are aged as follows: | | |
| Not overdue | 11 281 | 17 647 |

Note 7 Cash Flow Reconciliation

Reconciliation of operating surplus/(deficit) to net cash from/(used by) operating activities:

| | 2009 \$ | 2008 \$ |
|---|---------------|-----------------|
| Operating surplus/(deficit) | 14 896 | (8 808) |
| Changes in assets and liabilities | | |
| (Increase)/decrease in receivables | 6 366 | (2 412) |
| Increase/(decrease) in payables | - | - |
| Net cash from/(used by) operating activities | 21 262 | (11 220) |

Note 8 Financial Instruments

The aggregate net fair value of cash, deposits at call, and receivables disclosed in the Balance Sheet are their total carrying amounts. Credit risk is minimal as all cash and deposits are held with reputable financial institutions.

Interest Rate Risk – Average rate of return on cash and short term deposits was 6.44% (2008 6.99%). A change of 100 basis points in interest rates would have increased or decreased the Fund's cash by \$5 266 (2008 \$5 100).

Indexes

Acronyms

| | |
|-----------------------|--|
| AAHL | Australian Animal Health Laboratory |
| ACCESS | Australian Community Climate Earth Science Simulator |
| ADJR Act | <i>Administrative Decisions (Judicial Review) Act 1977</i> |
| AGP | Australian Growth Partnerships |
| ANAO | Australian National Audit Office |
| ANFC | Australian National Fish Collection |
| ANH | Australian National Herbarium |
| ANIC | Australian National Insect Collection |
| ANSTO | Australian Nuclear Science and Technology Organisation |
| ANU | Australian National University |
| ANWC | Australian National Wildlife Collection |
| ARPANSA | Australian Radiation and Nuclear Safety Agency |
| ATNF | Australia Telescope National Facility |
| BCC | Board Commercial Committee |
| BDS | Broad Direction Setting |
| CAC Act | <i>Commonwealth Authorities and Companies Act 1997</i> |
| CDS | Commonwealth Disability Strategy |
| ComEx | Commercial Executive |
| CO₂ | Carbon Dioxide |
| CRC | Cooperative Research Centre |
| CREST | Creativity in Science and Technology |

| | |
|-----------------|--|
| CSIR | Council for Scientific and Industrial Research |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| CSIROSEC | CSIRO Science Education Centre |
| CSM | Coal Seam Methane |
| DDA Act | <i>Disability Discrimination Act 1992</i> |
| DE | Distributed Energy |
| EAC | East Australian Current |
| EFT | Equivalent Full-Time |
| EMC | Executive Management Council |
| EPBC Act | <i>Environmental Protection and Biodiversity Conservation Act 1999</i> |
| ESD | Ecologically Sustainable Development |
| ESI | Emerging Science Initiative |
| ESS | Environmental Sustainability Strategy |
| ETF | Energy Transformed Flagship |
| FNS | Food and Nutritional Sciences |
| FOI Act | <i>Freedom of Information Act 1982</i> |
| GHG | Greenhouse Gas Emissions |
| GRA | Global Research Alliance |
| HSE | Health, Safety and Environment |
| HSES | Health, Safety and Environmental Sustainability |
| ICT | Information and Communication Technologies |
| IEEE | Institute of Electrical and Electronics Engineers |
| IP | Intellectual Property |

| | | | |
|----------------|--|----------------|---|
| IPCC | Intergovernmental Panel on Climate Change | SIR Act | <i>Science and Industry Research Act 1949</i> |
| LTIFR | Lost Time Injury Frequency Rate | TCP | Transformational Capability Platforms |
| MIPs | Molecular Imprinted Polymers | VIC | Victoria |
| MTFR | Medical Treatment Frequency Rate | WA | Western Australian |
| NCAS | National Carbon Accounting System | WLAN | Wireless Local Area Networks |
| NCRIS | National Collaborative Research Infrastructure Strategy | WQIP | Water Quality Improvement Plan |
| NICNAS | National Industrial Chemicals Notification and Assessment Scheme | | |
| NIS | National Innovation System | | |
| NPF | Northern Prawn Fishery | | |
| NRP | National Research Priorities | | |
| NSW | New South Wales | | |
| OCE | Office of the Chief Executive | | |
| OECD | Organisation for Economic Cooperation and Development | | |
| PCC | Post Combustion Capture | | |
| PMF | Performance Management Framework | | |
| PNG | Papua New Guinea | | |
| PPF | Program Performance Framework | | |
| QLD | Queensland | | |
| R&D | Research and Development | | |
| SA | South Australia | | |
| SAC | Sector Advisory Council | | |
| SIEF | Science and Industry Endowment Fund | | |
| SIP | Science Investment Process | | |

Glossary

Intellectual Property

Inventions: This is the number of inventions where one or more patent/applications are current. Accordingly an invention might include a granted patent that is near the end of its life (e.g. 20 years), or it might include a provisional patent application that has only recently been filed. Furthermore, one invention might relate to a patent application in one country only, or it might relate to over 20 patents/applications in different countries covering the one invention.

New inventions: This is the number of new inventions where an application (normally an Australian provisional application) is filed for the first time to protect that invention. A major implication of filing that provisional application is that it provides the applicant with an internationally recognised priority date. A small percentage of CSIRO's new inventions are filed as US provisional applications.

PCT applications: International PCT (Patent Cooperation Treaty) applications are a 'temporary' phase in any international patenting process and these have a life span of 18 months. This type of application is very common in major international corporations and is used by CSIRO when it considers its invention may have wide commercial application. In view of the 18-month time span, it is reasonable to approximate that two-thirds of the reported number were filed in the previous 12-month period.

Granted patents: Once a patent application has been examined and satisfies various patentability criteria it becomes a granted patent. It remains a granted patent until the end of the patent period (normally 20 years) provided renewal fees are paid.

Live patent cases: A live patent case is where either a patent application or a granted patent exists. It does not include cases that have lapsed, expired or been withdrawn. Applications may include provisional applications, PCT applications, and applications pending in Australia or foreign jurisdictions.

Publications

Journal articles: Includes journal articles and other items published as part of a journal (for example, an editorial or book review).

Conference papers: Includes published conference papers, abstracts or edited proceedings.

Technical reports: Includes individually authored chapters as well as whole reports that are subject to peer review and usually publicly released.

Books and chapters: Includes monographs, complete or individual chapters, usually published by a commercial publisher.

Client reports: Includes whole reports and individually authored chapters produced under collaborative or contractual arrangements. Client reports are often confidential and are not publicly released.

Student supervision and sponsorship

Sponsored students: Students are deemed to be sponsored if they receive a full or partial scholarship paid from CSIRO funds to pursue a research project leading to a PhD or Honours/Masters degree. This excludes CSIRO employees, whose study expenses are considered to be 'training and development'.

Supervised students: Students are deemed to be supervised if they have a CSIRO staff member appointed officially by the University as the supervisor for their research project. Normally, CSIRO staff are joint supervisors in conjunction with a university academic.

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