

CSIRO Operational Plan

2006-07

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



Executive Summary: 2006-07 Operational Plan

The 2006-07 Operational Plan is the last in the set of Operational Plans within the 2003–07 CSIRO Strategic Plan framework. This strategy remains based upon six 'key messages': **greater focus** on major scientific challenges and opportunities for Australia with a strong **outward-looking** emphasis, **stronger partnerships** with universities, other science agencies and industry with a '**service from science**' culture, a **unified One-CSIRO**, making full use of our collective strengths and **growing our impact and relevance** in service to the nation.

The 2006-07 plan builds on the ongoing evolution of the organisation; accordingly, this Plan's structure has been reorganised to reflect that the Science Investment Process' primary unit of investment are Themes of activity.

This document highlights – and focuses upon - the activities and outcomes that the organisation is planning for 2006-07 as a direct result of the Theme-based investments made through our new Science Investment Process. The Themes described within the Plan were designed in response to the 'Broad Direction Setting' statement which outlines the medium to long term view of the desired outcomes for the organisation. (A copy of the Broad Direction Setting statement is available as Appendix A.)

In summary, the 2006-07 Operational Plan is about 'sticking to the game plan' (the 03/07 Strategic Plan), with a focus on: continuing to develop – and deliver – quality science and innovative solutions in the core of our business; ensuring Flagships go from strength-to-strength; and successfully embedding new enterprise-wide processes (SIP,BETR, RSS and PLI) – all with appropriate good governance, sound performance management, modest growth in revenue with a balanced budget, improved customer satisfaction and continually enhancing our occupational health and safety results. Recognising the uncertainty and concern that change brings for many staff, we will also strive to move with appropriate speed, communicate effectively, and support our staff in these times of transition.

Figure 1, at the end of this Executive Summary, links our 'intensity of effort' in 2006-07 to the objectives delineated in our 03-07 Strategic Plan.

CSIRO's Roles in the National Innovation System

The broad capability based in our six and a half thousand people, resourced through a budget of close to one billion dollars, delivers outputs and outcomes through five core roles in the NIS, closely aligned to National Research Priorities.

In this document, each of the 124 themes in the 'engine room' of our business delivers against one or more of these roles, which are:

- Addressing major national challenges and opportunities, through harnessing the breadth and depth of our expertise
- Similarly, creating new, or significantly transforming industries to increase the competitiveness and sustainability of Australian industry
- Delivering incremental innovation to improve the efficiency and competitiveness of existing industries
- Providing fact-based solutions which meet community needs and knowledge that informs governments policy
- Advancing the frontiers of science, an essential component of maintaining long-term capability and contribution

Through the broad-based capability based in our 19 operating units, we also deliver in a number of important 'satellite' roles of value to Australia, viz:

- Supporting the development of more than 500 postgraduate students and over 250 post-doctoral fellows
- Outreach and Education programs serving scholars and their teachers
- Managing major National Collections (eg the National Insect Collection, the National Herbarium)
- Scientific publishing services (eg scientific journals, technical books and CDs)
- Providing specialised consulting and technical services

Flagships

As a major strategic initiative that aims to make a sustained and longer-term contribution to national economic and social growth and sustainability, closely aligned to the National Research Priorities, in 2006-07 the Flagships will continue to build on the strong progress achieved to date in focusing and harnessing our world class science, through partnerships, in pursuit of challenging objectives. Largely undertaken, in partnerships, through our three Groups of divisions/business units, the increased level of overall Flagship funding, to over \$200m in 2006-07, will enable increased activity in Flagship research programs, viz:

- The Energy Transformed Flagship identifies optimum energy pathways and conducts research into low emission electricity, transport and distributed energy. Through its road-mapping and Energy Futures scenario work, it will also help guide Australia's energy future into the rest of the 21st century. Its goal is to help halve our greenhouse gas emissions by 2050 and help double the efficiency of the nation's new energy generation, supply and end use, and to position Australia for a future hydrogen economy.
- The Preventative Health Flagship aims to improve the health and wellbeing of Australians and save health costs through research into the prevention and early detection of chronic diseases. 2006-07, for example, will see research advances in new biomarkers for early stage colorectal cancer progress to commercialisation; integrating hitherto seriously disparate health data sets for improved national health outcomes will also advance apace.
- The Water for a Healthy Country Flagship is integrating knowledge across science disciplines to help equip Australia's industry and natural resource decision-makers and managers with the knowledge needed to substantially increase the benefits Australia gains from its water resources. 2006-07 will substantially progress, for example, the Water Resources Observation Network (WRON) as our first ever, integrated and interoperable map of water quality, availability and use across Australia.
- The Food Futures Flagship is continuing to focus on transforming the international competitiveness of, and adding \$3 billion annually to, the Australian agrifood sector by the application of frontier technologies – such as advanced genetics, breed engineering, and innovative processing - to high potential industries.
- The Light Metal Flagship is focusing the nation's long-term R&D efforts on high-value light metals – aluminium, titanium and magnesium; 2006-07 will see exciting new magnesium processing technology progressing to the advanced industrial pilot stage. The Flagship's vision is to reduce the energy required to make light metals, reduce full-cycle environmental impact, enhance asset productivity and manufacturing technologies, and help establish new industries for Australia.
- The Wealth from Oceans Flagship is working to help position Australia as an international benchmark in the delivery of economic, social and environmental wealth based on leadership in understanding ocean systems and processes. In 2006-07 we will develop further, through co-sponsored partnership and R&D provider alliances, productive tools to manage the impact of climate variability on climate-sensitive industries; we will also be progressing, for example, advanced technologies to laboratory prototype stage for oil and gas sub-sea floor production.

Agribusiness

The deep, world-regarded Agribusiness Group capabilities add value to a spectrum of industries that are based on the production and use of materials derived from plant and animals, with close to 2100 staff and a turnover of over \$310m (in 2005-06). The ability to integrate across the industry value chain is a key differentiator for the Group. In 2006-07, and beyond, the Group will be further developing and implementing its strategy into the wider Bioscience/Bioeconomy domains. Focus areas that will be further developed, harnessing a one-CSIRO approach, are the environment, preventative human health, food, fibre and advanced materials. This will build on CSIRO's existing strengths in bioscience, materials conversion and our ability to take a whole-of-value chain approach. Biosecurity continues to be of increasing concern to Australians and the Group will continue to play a significant role in protecting Australia from invasive species, or activities, that threaten industries, the environment and human health.

Information, Manufacturing & Minerals

The IMM Group's overall staff complement is approximately 2000, with a 2005-06 turnover of approximately \$345m. In 2006-07 the Group will continue to focus on helping create new industries, especially through ICT-enabled and medical and health technologies, tackling the technological challenges of discovery of mineral resources under deep cover, and delivering competitive advantage to the manufacturing, finance and mineral processing industries through specialist consultancy and contract research services. It will also continue to seek to transfer novel and environmentally sustainable technologies through the development and application of physical, mathematical and information sciences and engineering. These objectives will be enhanced by appropriately focusing on major, cross-disciplinary initiatives such as the Light Metals Flagship, Synchrotron Science, Counter-Terrorism and the Large Data Sets Major Program. Our work, through the ATNF, is increasing our understanding of the universe and its origins, and will build through new science developments such as the Extended Technology Demonstrator (xNTD) and the Square Kilometre Array (SKA) project.

Sustainable Energy & Environment

The Group has six major aims in 2006–07. Most importantly, the increasing profile of energy issues in Australia demands that we offer a more effectively integrated and comprehensive R&D portfolio, to meet the twin needs of security in energy supply and reductions in the greenhouse gas emissions that are causing climate change. Second, we will be boosting our climate R&D through a partnership with the Bureau of Meteorology and Australian universities to build an Earth System Simulation capability for Australia. Third, our efforts in water will be particularly focussed on developing with our partners the Australia-wide Water Resources Observation Network (WRON). Further, we are looking to the refinement of a marine ecosystem management strategy framework for use by policy makers and management authorities. Fifth, our efforts in urban sustainability will take a substantial step forward, as new water- and energy- related capabilities from the IMM Group are integrated with our Divisions. Finally, the exciting joint activity with our Agribusiness colleagues in CSIRO's \$50m, agricultural sustainability capability will begin to bear fruit during the year. Currently the SEE Group has approximately 1600 staff and a 2005-06 turnover close to \$260m.

Frontier Science and Capability Development

This initiative will continue to sustain and help further develop CSIRO's relevance and impact through identifying the need for, and the provision of seed funding to, developing new research capability to address frontier science opportunities. The program is intended to help build research capacity and networks faster than a single Division can by seed-funding high potential impact but high uncertainty multi-Divisional projects, with examples ranging from environmental nanovectors to genomic and metabolic modelling for controlled biological change, and from new materials for renewable energy to human decision-making in complex system modelling.

Supporting the Research Enterprise: implementing strategic change initiatives

2006–07 will see the adoption of a unified, one-CSIRO approach to the delivery of research support across the majority of administrative functions, with the full implementation of the Research Support Services review.

Supporting this approach will be the replacement of the numerous information systems currently in use with the first phase implementation of a single enterprise-wide information system (SAP). In addition, we will continue to look for opportunities for greater efficiencies and cost reductions through national procurement contracts and other related initiatives.

Governance and Risk Management

The last three years has seen a major and positive shift in CSIRO's governance processes, including the effective consideration and management of key risks. This will continue into 2006-07, where the major risks relate to change program implementation, particularly to the SAP enterprise-wide information systems (BETR) project and corresponding reputational and brand-related risks.

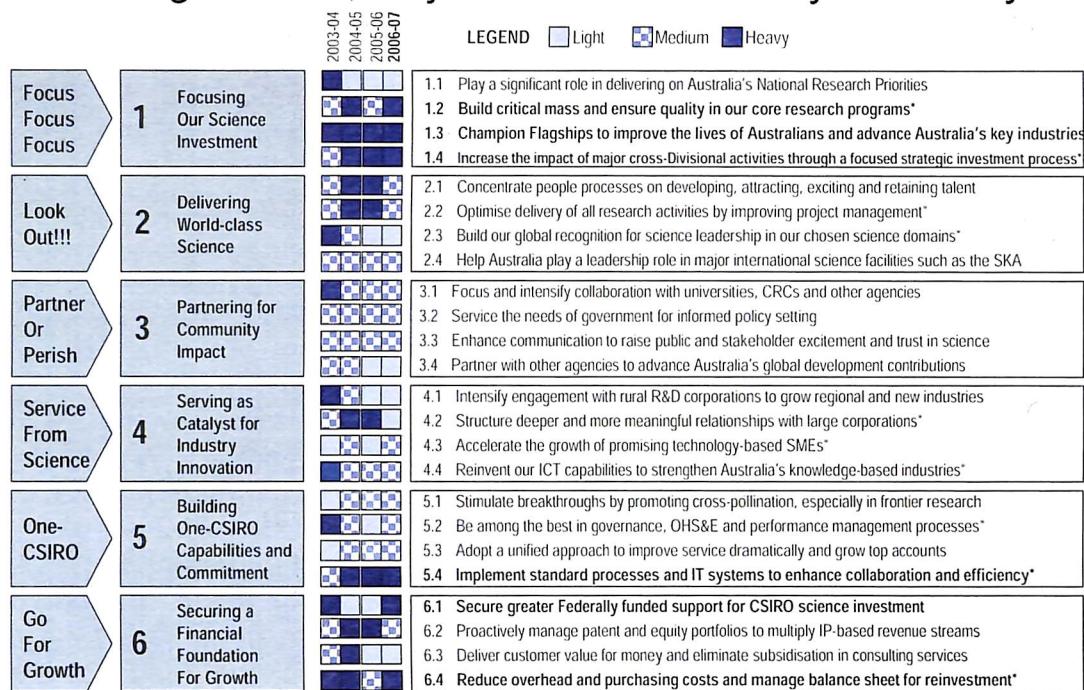
Our performance management and reporting framework – encompassing both science excellence and path to market – with a focus on impact (itself to be quantitatively reviewed as part of the TFA submission), will be further embedded across the enterprise.

Financials

With respect to the year-on-year growth in revenue, appropriation funding in 2006-07 is expected to rise by 2.2% to just over \$607m and total revenue from external sources to rise by 5.8% to \$361m, giving a total increase in revenue of 3.5% to \$968m.

A breakeven financial result has been budgeted for 2006-07 in accordance with government budget guidelines and Strategic Plan estimates. In arriving at this position management has taken a conservative approach to key budget variables such as the level of IP/Royalty income (budgeted at approximately the same rate as expected for 2005-06, taking no account of any 'RIPPER' revenues), RSS savings (where our budgeting assumes all first year savings will be offset by implementation costs) and other external revenue normally associated with sale of stock, rent and miscellaneous revenues, which have been budgeted at a rates \$7m lower than projected for 2005-06. The breakeven result for 2006-07 also assumes a funded contingency reserve of \$5m.

Strategic Goals, Objectives and Intensity of Activity



* In light of current priorities the Intensity of Activity on these Objectives in 2006-07 has been adjusted from the level anticipated in the Strategic Plan 2003-2007

Figure 1: Strategic Goals, Objectives and intensity of Activity

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Chief Executive's Foreword

CSIRO plays a unique and significant role in the Australian Innovation System, particularly in conducting large-scale, multidisciplinary research focused on major national challenges and opportunities. We are an organisation of enormous and diverse capability, with a proud record of achievement over 80 years. This Operational Plan for 2006–07 reflects our continuing commitment to build and apply our capabilities in ways that deliver real benefits for Australia.

Looking back – a brief reflection on 2005–06

Over the past 12 months we have maintained our focus on the implementation of our 2003–07 Strategic Plan. We have made significant progress across the key areas articulated in that Plan, particularly in relation to our integrated program of change initiatives, while maintaining, and growing, the quality and impact of our core business. All this has only been possible through the splendid efforts of our staff, right across the board.

- We have continued our program of independent reviews of Divisions to assess and benchmark the quality and vitality of CSIRO's science base, and of our scientific outputs. The overarching conclusion, from these reviews, and those conducted in the previous year, is that our science is in really good health, and equally importantly, that the outputs of our research are delivering substantial impact across the board. (Our soon-to-be-published Annual Report for 2005–06 provides a good selection of illustrative examples of the scope and diversity of our science outputs; from new ocean and climate change forecasting tools to novel biodegradable polymers for medical applications, and from new techniques for improving effectiveness of oil and gas exploration to new methods for boosting Australia's prawn and salmon production.)
- Over the past year (2005) our published journal articles have increased 5%, to 1945, and our journal publications, conference proceedings, published technical reports and books/chapters in books together have grown 13%, to 4655 ; since 2002 our publications p.a. per research scientist have grown by almost 40%, to 2.92.
- Averaging one a month in 2005, CSIRO scientists' papers in the prestigious journal Nature (and its affiliates) represents a new benchmark for us. Our average citation rate (an important measure of science quality) increased from 9.87 to 10.46 over this past year (double the world average increase), and remains second only to ANU in Australia. We also delivered well over 10 000 client reports, 30% more than in the previous year.
- On the basis of our published outputs we now rank in the top 1% of the world's science institutions in 13 of 22 research fields, for example from astronomy to materials science, and from environment/ecology to agricultural science.
- Flagships are now a working reality. With over 250 industry partners and research institution collaborators across Australia already involved in the Program, with funding of around \$170 million in 2005–06 (up from \$80 million in 2003–04), the Flagships are delivering strongly on their challenging long-term goals. These goals are closely aligned with the Government's National Research Priorities and draw heavily on CSIRO's unique capability to assemble large, multidisciplinary research teams to tackle major issues, and opportunities, in health, water, energy, and the creation of new industries and jobs. An external review, chaired by Dr Robin Batterham, of Flagships' progress to date was undertaken during June 2006 and will be a major component of CSIRO's 2007 Triennium funding submission. Whilst full details of the Review are not yet available for release, the Review Panel have strongly endorsed the Flagship model and have concluded that the Flagships are delivering powerful scientific solutions to national problems.
- Over the past year we conducted the first round of our new Science Investment Process(SIP) in which we undertook a detailed, whole-of-CSIRO analysis of our entire science portfolio against a robust set of criteria, and made investment decisions in seeking to maximise the relevance and impact of our science.
- Five new spinout companies were formed during the year taking the market value of our spinout portfolio to record levels. We also generated record revenues from our Intellectual Property assets of \$37.1M – that's 82% year-on-year growth, up from \$9.3M in 2000/2001, invested back into our science.
- Considerable progress has been made in our efforts to improve our efficiency and effectiveness in the delivery of research support services (RSS) across the organisation. Planning and

development for the implementation of 'one-CSIRO' enterprise-wide support in the areas of finance, human resources, information services, legal, and commercialisation, are nearing completion.

- Good progress has also been achieved in building the foundations and underlying business processes to be implemented as part of the Business Enabling Technology Review (BETR) which will see the implementation in 06/07 of standard information systems in CSIRO.
- We have increased our level of engagement and consultation with senior leaders, enterprise wide, through 'Strategy in Action' workshops aimed at improving understanding of, and commitment to, our strategy across the organisation.
- Our Program Performance Framework - utilising the dual 'lenses' of science quality and path to market/impact – is now well embedded across the organisation and, in this regard, almost 90% of our Research Themes met their Annual Performance Goals, an increase of 10% from 2004–05.
- Our total external revenue grew by 8.4%, to \$341.1M, in 2005–06. This represents 36.5% of our total revenue for the year (\$935.1M).
- Due to improved financial discipline, and the good external earnings growth, we returned a 'bottom line' \$300K surplus – a considerable improvement on the approved budget deficit of -\$14.7M for the year and our -\$9.2M deficit last year (2004–05).
- In the domain of Occupational Health and Safety (OHS) we have continued to make good progress. We are now a leader in government agencies and on a par with many top industrial organisations, for example: our premium rate for ComCare, as a percentage of payroll, is now 0.7% which compares with 1.77% for all Commonwealth agencies; similarly our Lost Time Injury Frequency Rate (which is the number of injuries involving lost time from work greater than or equal to one full day or shift per million hours worked) is 3.6 which compares to 12.0 in Commonwealth agencies.

All in all, therefore, we have continued to make really solid progress across the range of dimensions against which our performance can be tracked. There are, however, still some areas where we face challenges and need to improve our performance, namely in business development and customer service, communication, and in our ability to operate in a matrix environment, effectively harnessing the enormous power of our diverse capability and experience base. We have put in place mechanisms by which we intend to continue to make progress across these domains in 2006–07.

Looking Forward

The coming year will see the culmination of our 2003–07 Strategic Plan. Many of the foundation elements we have developed over the past three years will be in place, providing a strong base for the development of our next Strategic Plan, for the period 2007–11.

For the year ahead particular attention at the enterprise level will be paid to:

- continuing to deliver high quality scientific outputs in the core of our business, and ensuring their effective take up
- developing and finalising our 2007–11 CSIRO Strategic Plan and the related Triennium Funding Agreement submission (including a comprehensive review of achievements over the last Triennium)
- implementing a series of coordinated, science-related activities to increase the profile of our science, both internally and externally, with a particular focus on further building competence and capability in early career researchers, especially at the postgraduate and postdoctoral levels
- completing the first full cycle of Divisional science reviews, and the effective implementation of approved actions arising from these reviews
- implementing the Theme-level investment decisions resulting from the first round of the Science Investment Process, as well as some process improvements; and undertaking the second round of SIP, incorporating Flagship themes, to deliver a single CSIRO science priority-setting process
- focusing on rejuvenating our approach to, and results from, our Business Development initiatives
- fully implementing enterprise-wide research support services (RSS) in the areas of finance, human resources, information services, legal, commercialisation, and property and facilities

- implementing the first phase of the Business Enabling Technology Review (BETR), which will provide a common, enterprise-wide platform to deliver standard and streamlined information systems across the organisation
- implementing our Project Leadership initiative (PLI), building on a solid current base, aimed at developing best practice project leadership skills throughout the organisation

Theme-level details and corresponding goals for the 2006–07 year are documented in this Operational Plan.

I look forward to working with members of the CSIRO Board, our customers, staff and other key stakeholders as together we continue to work on our Core Purpose, to "...deliver great science and innovative solutions for industry, society and the environment."

Geoff Garrett
Chief Executive
June 2006

Part A – Governance, Planning and Performance

Introduction and Context

The *Science and Industry Research Act 1949* requires CSIRO to formulate an annual Operational Plan, that sets out:

- the strategies the Organisation proposes to pursue
- the activities the Organisation proposes to carry out
- the resources the Organisation proposes to allocate to each activity during the year, giving effect to the relevant Strategic Plan.

The Act further requires that the Plan be submitted for approval by the CSIRO Board before the commencement of the financial year. For further information on CSIRO Governance, including Planning, and Performance Measurement Framework see Appendix B.

The Plan is organised as follows:

- Part A provides an enterprise level overview of the Organisation's roles, strategy and governance.
- Part B describes the goals and activities planned for 2006-07 in relation to CSIRO's research Themes¹ and capabilities.
- Part C focuses on organisational functions undertaken to support the conduct of research.
- Part D provides a convenient overview of organisation-wide resource allocation and planned financial performance.

CSIRO's Roles

Public research organisations contribute to national wellbeing different ways. For CSIRO, the focus is on delivering scientific solutions direct to Australian industry and communities, while building Australia's science base. By specifying our roles and functions explicitly, CSIRO is able to build cohesive research teams, prioritise funds across our portfolio and demonstrate the benefits science brings to Australia.

Creating clarity around our responsibilities is an important first step towards ensuring that the 6,500 scientists and staff within CSIRO are able to focus their activities where they will have the greatest impact. Clarity around CSIRO's roles is also important in facilitating collaboration with other players in the Australian innovation system.

By answering a number of questions we identify five core roles, a number of satellite roles and two enabling functions for CSIRO:

- What is the value of the role to Australia?
- Is CSIRO the best party to fulfil the role?
- What is the relative long-term benefit of the role to Australia?
- How would CSIRO prioritise and allocate resources to the role?
- What is the opportunity cost for investing (or not investing) in the role?
- How important is the role in delivering on CSIRO's existing core activities?

CSIRO's roles can be represented simply as a house (Figure 2), with CSIRO's core roles illustrated at the centre of the diagram, surrounded by a number of satellite roles. Enabling functions are represented as the roof and floor of the house, highlighting the support they provide to the other roles. Detailed descriptions of the roles are provided in Appendix C.

¹ The 'Theme' concept is introduced and explained in Section 3.2

- implementing the first phase of the Business Enabling Technology Review (BETR), which will provide a common, enterprise-wide platform to deliver standard and streamlined information systems across the organisation
- implementing our Project Leadership initiative (PLI), building on a solid current base, aimed at developing best practice project leadership skills throughout the organisation

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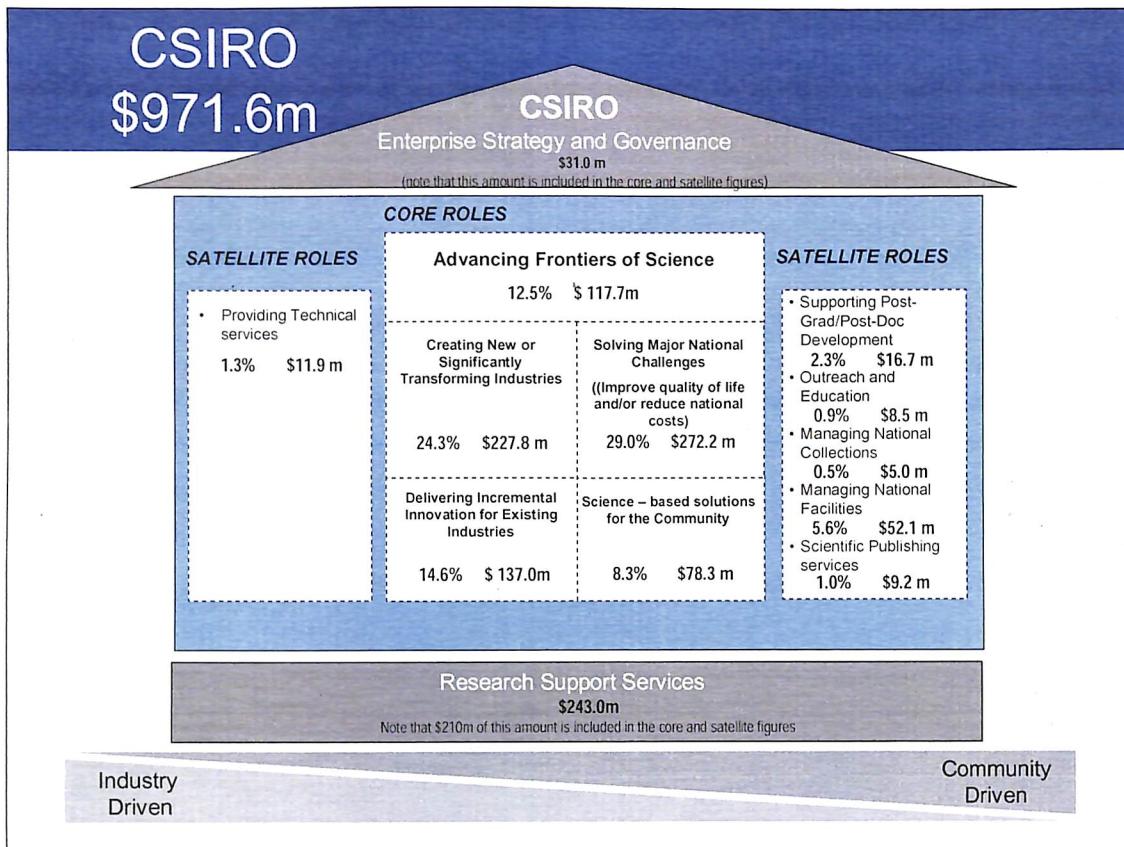


Figure 2: CSIRO Roles – The figures in this diagram for core and satellite roles include corporate overheads that are written back to Themes. The figures for support roles includes, corporate overheads written back to Themes and other support costs directly funded.

While none of our core roles exists in isolation and there are no sharp boundaries between roles, the distribution of resources between roles can be estimated and is currently as indicated in Figure 2.

As CSIRO confronts new challenges and opportunities, and as expectations from Australian communities change, the investment mix will necessarily shift. A clear understanding of current resource allocation by role allows an informed and transparent investment appraisal process.

Only by determining the appropriate balance between our diverse activities will CSIRO deliver effectively on its ultimate role: to provide outcomes that enhance the lives of all Australians over the long-term.

Governance

CSIRO is an Australian Government statutory authority constituted and operating under the provisions of the *Science and Industry Research Act 1949*. Reporting, accountability and other rules for CSIRO's operations are set out in the *Commonwealth Authorities and Companies Act 1997*.

Under the *Science and Industry Research Act*, the primary functions of the CSIRO Board are to ensure the proper and efficient performance of the functions of the organisation; to determine the policy of the organisation with respect to any matter; and to give directions to the Chief Executive. The role of the Board is described in detail in the Board Charter. In summary, the Board is responsible to the Australian Government for the overall strategy, governance and performance of CSIRO.

The Chief Executive is responsible to the Board for the overall development of strategy, management and performance of CSIRO, and for complying with the formal directions provided by the Board. These are documented and updated annually. The Chief Executive is supported by an Executive Team and Executive Management Council.

The Executive Team consists of the Chief Executive and Deputy Chief Executive, three Group Executives representing CSIRO's high-level research groups and six corporate Executive Directors,

with responsibility for Finance & Governance, People & Culture, Business Services, Business Development, Communication and Leadership & Cross-Organisational Development respectively.

The Executive Management Council incorporates the Executive Team along with the Chiefs of CSIRO's 19 research Divisions, the Directors of CSIRO's six Flagship Programs and the General Managers of select corporate groups. For further information on CSIRO Governance, including Planning, and Performance Measurement Framework see Appendix B.

Risk Management

CSIRO is a large and complex organisation undergoing a significant program of strategic change within an environment characterised by a range of factors such as

- rapid globalisation of industry,
- the emergence of explicit national innovation strategies by developing nations such as Brazil, Russia, India and China, and
- changing investment priorities within Australia's own innovation system.

The key strategic challenge facing CSIRO over the course of 2006-07 will continue to be its ability to remain focused on the execution of its strategic objectives while remaining agile enough to respond to internal feedback on the traction and impact of those activities and key developments in the external environment. The activities and processes described in this plan together with the commitment its staff give CSIRO the confidence this challenge can be addressed.

The organisation's strategy and the operational activities outlined in this plan are underpinned by a comprehensive risk assessment and management framework. An overview of the organisation's current risk profile is presented in Appendix D of this plan. Risks are classified according to strategic and operational characteristics with the former actively examined and monitored by the Executive and the Board as a whole. Operational risks are reviewed by the Risk Assessment & Audit Function and monitored by the line management and the Board Audit Committee. It is important to note that this is a dynamic process with risk rankings and categorisations reviewed and adjusted on a regular basis.

Strategy Implementation and Major Change Projects

CSIRO's strategy revolves around building world class teams, focusing on high priority research areas, ensuring effective knowledge transfer and deepening our one CSIRO culture. To further these goals, CSIRO is implementing six major strategic change projects as illustrated in Figure 3.

The major strategic change initiatives moved from planning to implementation during 2005-06. The Strategic Change Program Office was formed to coordinate the various change initiatives under single governance structure, the Strategic Program Oversight Committee. In 2006-07 the focus will remain on implementation with refinement of the Science Investment Process (SIP), delivery of the first phase of BETR systems, the next stages of RSS implementation, integrated change management and training to support rollout of the change initiatives.

Science Investment Process: The first Strategic Science Investment (SIP) cycle began in the second half of 2005, with the resulting investment decisions for the 2006-07 financial year made available at the end of January 2006. A post-implementation review of the first SIP cycle (SIP I) is currently underway, along with planning for the next SIP cycle (SIP II – for financial year 2007-08).

Research Support: Research Support Services (RSS) has been conducted in two stages. Stage 1 was completed in December 2005 culminating in the delivery of the RSS Implementation Plan. Stage 2 is about enacting the plan following a phased approach, with the first phase (Finance, Contract Administration, Commercialisation and Legal) launching in July 2006, and the second phase (People & Culture and Information Services) in September 2006. Property and Facilities will follow in March 2007.

BETR: The main focus of the BETR project is to provide CSIRO with the tools to implement standard processes and IT systems across the organisation. This will work as an enabler for Research Support Services (RSS), Science Investment Process (SIP) and Project Leadership Initiative (PLI) by providing a common system to support their process changes. The BETR project has now completed the blueprint phase and is progressing into realization, with initial systems to "go-live" on 4 December 2006.

Project Leadership: Project Leadership (PLI) has developed a framework and approach to project management that addresses the variety of needs and flexibility requirements of projects, project

leaders and their stakeholders. In the next year PLI will begin to implement this framework, and will develop and implement a range of processes, tools and support mechanisms that facilitate good project leadership practices.

National Research Flagships: The National Research Flagships initiative is described in Part B1 of this Plan.

Delivery for Client Impact: Our primary purpose is providing science solutions to meet the needs of our external stakeholders. As such, we will continue to evaluate and improve on how we build relationships with, and deliver maximum benefit to, our many customers and diverse stakeholders.

Change management activities have been undertaken in parallel with the change projects. The Change Partner Network supports the strategic change program on the ground in Divisions and Flagships. Several change partner workshops have been held during the year, and this network has been enlisted to assist in rolling out communications initiatives such as the RSS Strategy Map. The Enterprise Feedback Network (EFN) is providing feedback on the progress of the change program. This feedback is used to continually improve our communication and change management efforts.

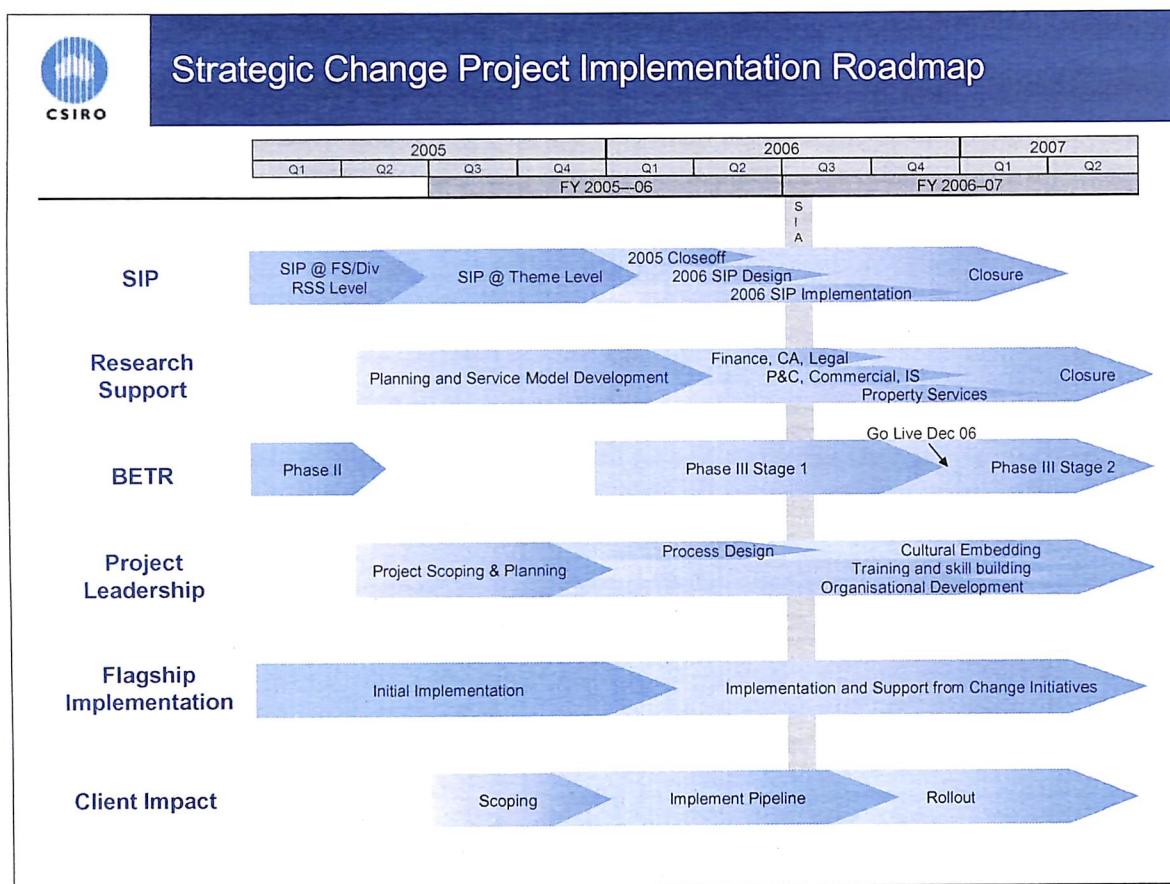


Figure 3: Strategic Implementation Roadmap

Science Investment and Planning

Themes, Streams and Projects

CSIRO's research is organised into **Themes, Streams and Projects**. This classification method has been adopted across the organisation to ensure the alignment of individual projects with high level strategic goals and to monitor progress toward these goals through the **Program Performance Framework**.

A Theme refers to a major area of research that is directed towards a clear and measurable strategic goal. For example, the Goal for the Colorectal Cancer Theme in the Preventative Health Flagship Program is to reduce colorectal cancer incidence by 10% and increase 5-year survival from around 63% to 70% by 2020 through prevention and early diagnosis. Increasingly, individual Themes draw on capabilities drawn from across the organisation and external partners. In addition to the Theme

information available in this plan, a detailed description of each Theme is available in a separate Theme Portfolio document.

A Stream represents a collection of related projects that address a particular aspect of the Theme Goal. For example, the Colorectal Cancer Theme Goal is pursued through three streams of activity: Developing protective foods; Developing novel diagnostics; and Developing policies and guidelines. Each Stream has an explicit medium-term Stream Objective supported by specific annual performance goals.

A Project is the core unit of research activity and budgetary control. For example, the Developing novel diagnostics Stream in the Colorectal Cancer Theme consists of numerous projects such as *Novel protein scaffolds* that is delivering protein structures and scaffolds for measurement of key markers of the disease and *Abnormal methylation for prognosis and early diagnosis of Colorectal Cancer* that is mapping methylation of DNA as an additional potential marker. Individual projects are required to have a project plan in accordance with CSIRO's project management policy.

The basic Theme level information in the CSIRO Operational Plan is supplemented by a Theme Portfolio document that provides information on the rationale for investment in each Theme together with details of Divisional participation, Stream Objectives and Annual Performance Goals. A list of Research Themes is provided in Appendix E.

Research capability and delivery mechanisms

As described above, Themes represent the portfolio of outcomes toward which CSIRO's investment is directed. The conduct of research activities, and the delivery of outputs which contribute to the achievement of these outcomes, draws on the scientific and related capabilities of CSIRO and its research partners.

Each of CSIRO's research Divisions has a number of core capabilities built on particular disciplinary skills, facilities and relationships. Application of these capabilities is often focussed around the research needs of a particular group of clients. While Divisions provide a home for the development and nurture of these capabilities, one of CSIRO's great strengths is in drawing together the diverse range of capabilities across Divisional boundaries. The Flagship Programs are prime examples of this "One-CSIRO" approach.

In order to build a more competitive and effective capability in Food Science and Forestry Research, CSIRO has entered into formal joint venture arrangements with the Victorian Government (creating Food Science Australia) and with the New Zealand forest research agency Scion (creating Ensis).

There are numerous other collaborative mechanisms in place for research delivery, the most significant of which is CSIRO's participation in Cooperative Research Centres (CRCs). CSIRO is the largest single participant in the CRC program. CSIRO continues to be committed to the CRC Program and during 2005-06 was a participant in 48 of the 71 currently active CRCs. Of these 48, CSIRO was a core participant in 45 CRCs, a supporting participant in two CRCs and an affiliate participant in the other. CSIRO's lifetime involvement in the CRC Program equates to participation in over 160 CRCs and over \$1 billion in total CSIRO investment.

Science Assessment Review Process

During 2006-07 CSIRO will implement the final year (of the first cycle) of the Divisional science assessment reviews in line with its Triennium Funding Agreement for 2004-07. This process involves peer review of the Divisions Science Capabilities by independent experts, from both Australia and overseas. The review process and findings are a leading example for seeking a robust, rigorous and independent process of assessment involving national and international scientific experts. The first two years of the cycle have confirmed that CSIRO's research capabilities, as a mission driven organization, are appropriately aligned against the two dimensional criteria of research community impact and industry/community impact as depicted in Appendix F. The final year of the cycle will provide the complete foundation of 'externally assessed' research capability for further strengthening CSIRO's world class scientific status. The process has been well received by Government and is closely aligned with the broader and evolving Research Quality Framework.

The keystone of the review process is the testing by the external review panel of each Division's self-assessment of its capabilities and the relationship with both the underpinning science-base and the outcome-oriented applications (themes). Each of the research group entries in Part B of this plan outlines Divisional capabilities and their ratings as per the review process, where a Division is yet to be reviewed a Divisional self assessment is provided. The assessment ratings use a scale from Benchmark to Weak, and are given for the research community and industry / community impact positions. See Appendix G for definitions of the rating system.

Findings of these reviews are provided to the CSIRO Board, along with Divisional management's response plans, with a follow up on post review implementation due 12 months later.

The Divisions to be reviewed in 2006-07 are Plant Industry, Australia Telescope National Facility, Textile and Fibre Technology, Forestry and Forest Products (ensis), ICT Centre, Petroleum Resources.

The Science Investment Process

CSIRO adopts a systematic and deliberate approach to managing its research portfolio to:

- focus CSIRO skills and energies on the most important issues for Australia;
- continue to increase the impact and relevance of CSIRO science;
- maintain an appropriate balance between all the roles and responsibilities of CSIRO; and
- ensure the wise investment of taxpayers' dollars (our appropriation funding)

The approach is comprised of two major components. In the first phase, the senior executives of the organisation, taking into consideration a large array of internal and external factors, translate CSIRO's Strategy into medium term investment priorities. These medium term investment priorities are outlined in a broad direction setting document, a copy of which is provided at Appendix A. Divisions, Groups and Flagships then respond to these high level directions through an iterative process to give effect to required directional shifts and deliver specific outcomes through Themes, Streams, Projects and Capability development. Details of the 'relevance and impact' criteria used to guide the decision making process are set out in Appendix H.

Performance Measurement and Reporting

As a statutory commonwealth agency, CSIRO operates within the Government's formal "outcome-outputs" resourcing framework (see Appendix B). This outcome-output structure will be reviewed during the year and revised consistent with developments in the strategic planning process and negotiations with government over CSIRO's next strategic funding agreement.

To help maintain our focus on delivery and execution, and to underpin accountability for performance, the Executive Team (ET) and CSIRO Board will regularly consider an Organisational Performance Report that consists of the components illustrated in Figure 4. For further information on CSIRO Governance, including Planning, and Performance Measurement Framework see Appendix B.

Summary of Performance Issues, Exceptions and Responses

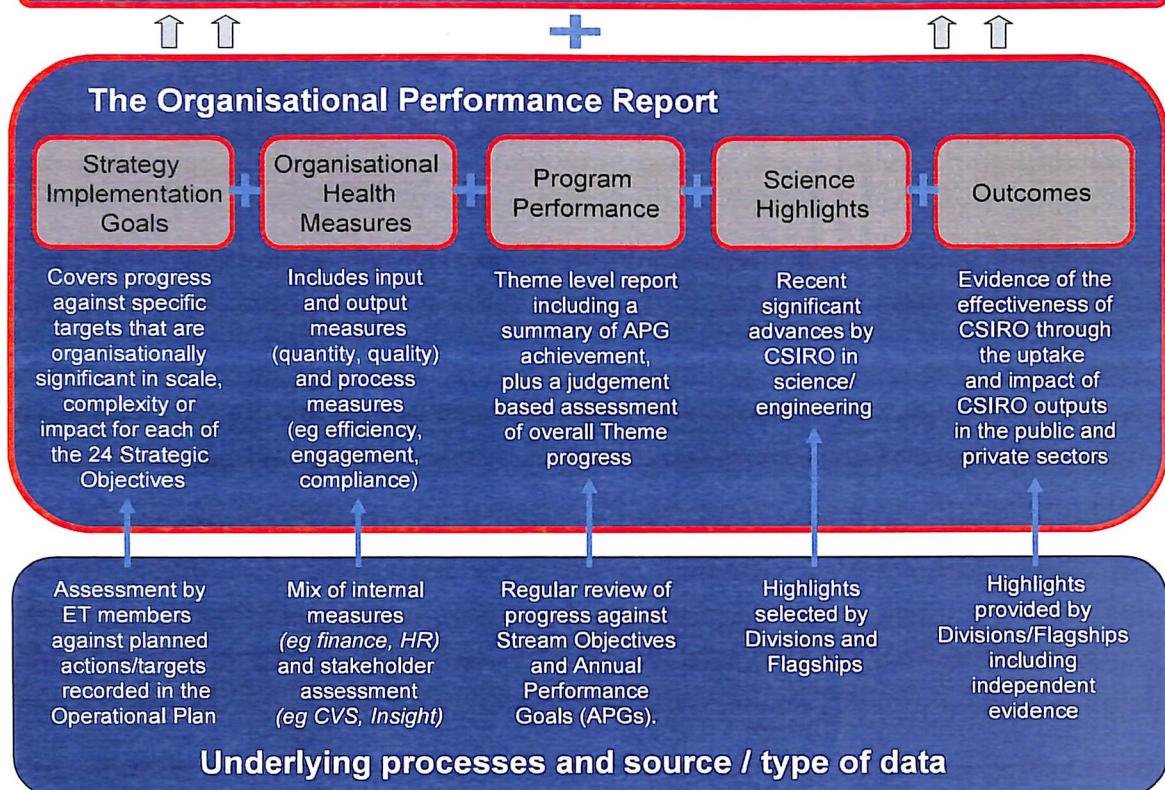


Figure 4: CSIRO's Performance Measurement Framework

Alignment to National Research Priorities

CSIRO is committed to the Government's National Research Priorities (NRPs) and has incorporated an explicit objective in its Strategic Plan which states that CSIRO will play a significant role in delivering on Australia's National Research Priorities. CSIRO's commitment is about focusing its contribution to the NRPs across its science portfolio not only for level of investment but evidence of impact. CSIRO produces an annual NRP Progress Report detailing investment and impact alignment across the Divisions, Flagship Program, the Emerging Science Initiative, Major Cross Divisional Programs and other key activities.

CSIRO planned Divisional alignment against National Research Priorities is illustrated in Figure 5, as is the Flagship alignment in Figure 6 following.

A full list and descriptions of the National Research Priorities is included at Appendix I.

Figure 5 – CSIRO Divisional Alignment to the National Research Priorities

Summary of Planned Divisional investments in the National Research Priorities (2006-07)

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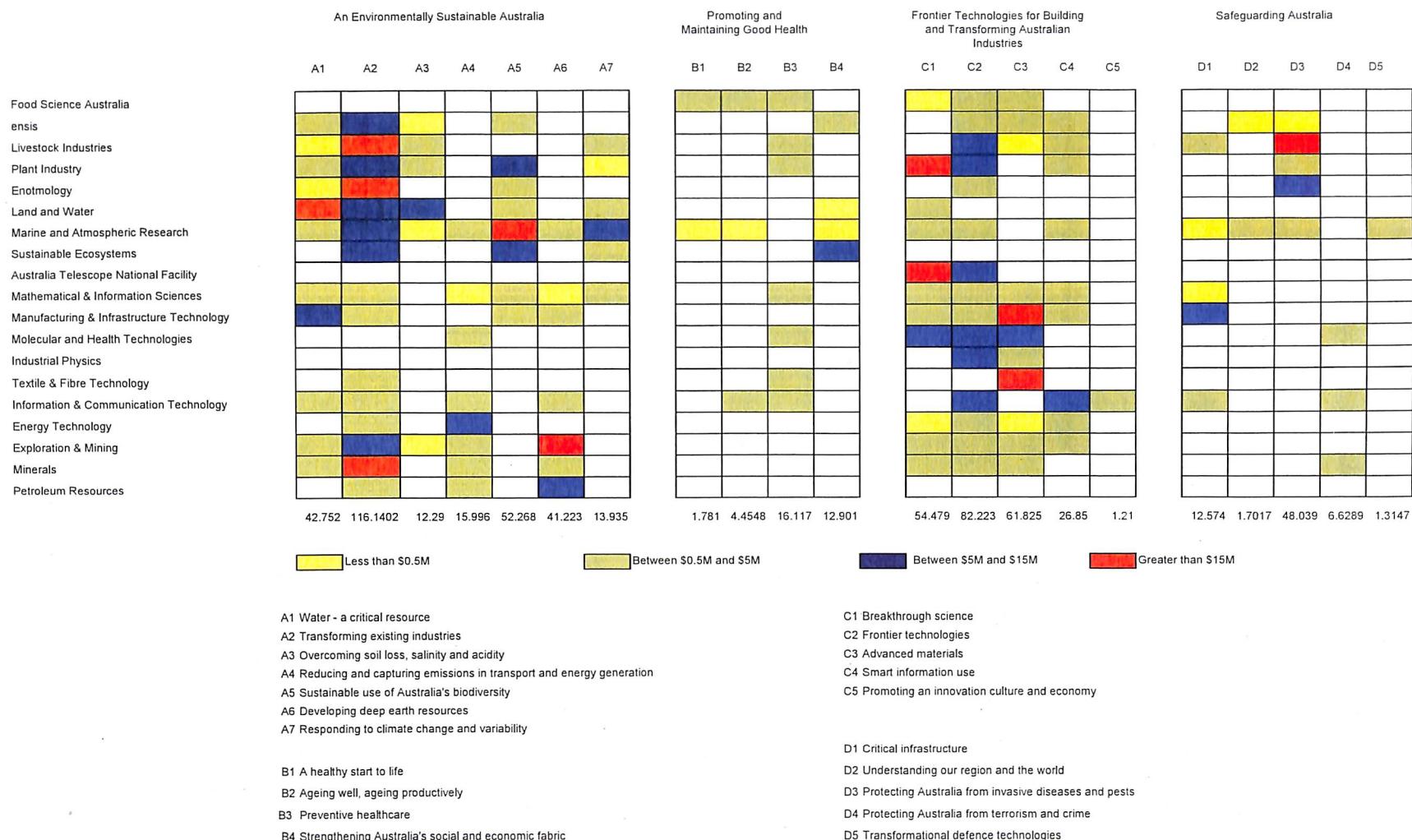
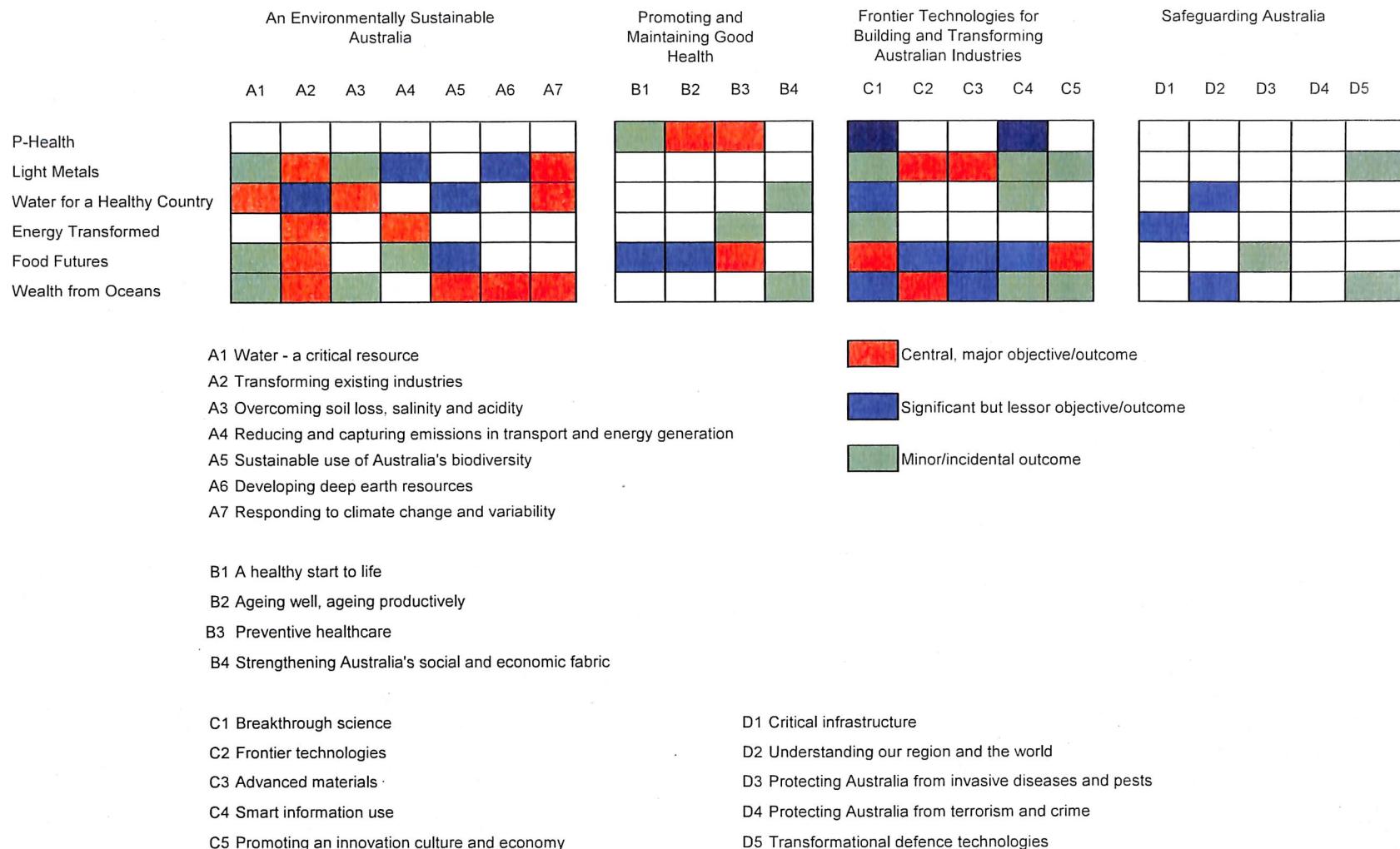


Figure 6 – CSIRO Flagship Alignment to the National Research Priorities (2006-07)



Part B – CSIRO's Research Themes and Capabilities

B1 – National Research Flagships

Executive Responsibility: Ron Sandland

Overview

The National Research Flagships are partnerships involving CSIRO, other leading scientists, research institutions, Government agencies, commercial companies and selected international partners that aim to make a sustained contribution to Australia's economic growth and social wellbeing and environmental sustainability. They focus CSIRO's and its partners' research efforts and resources on major issues of longer-term national importance, closely aligned with the National Research Priorities.

Partnerships are essential to ensure that the Flagships bring the full range of multidisciplinary capability to bear on national problems, and to ensure that research outputs are translated into real outcomes in the Australian economy, community and environment.

There are currently six Flagship programs: Energy Transformed; Food Futures; Light Metals; Preventative Health; Water for a Healthy Country; and Wealth from Oceans.

Governance of the Flagship initiative is in the hands of the Flagship Oversight Committee (FOC). Chaired by the Deputy Chief Executive, the FOC includes all three Group Executives, the Executive Director Business Development, the Chief Finance Officer, the Executive Director Leadership & Cross-Organisational Development, the Chief of Staff Business Services and the General Manager, Flagship Implementation. It meets at least four times a year to:

- ensure that Flagship research portfolios are appropriately aligned with long-term Flagship goals
- ensure that the Flagships' research portfolios are appropriately balanced and aligned with the Organisation's strategic research initiatives
- ensure that research in the Flagships remains of the highest quality
- review the performance of the Flagships against their annual performance plans.

Each Flagship also has an advisory committee, whose role is to provide advice to the Flagship Director about maximising the effectiveness of the R&D portfolio and about technology transfer opportunities and options.

Reflection on 2005-06 and Plans for 2006-07

2005-06 was a year of consolidation and progress for the Flagships. It was a year in which some substantial research and partnership advances were made.

The latter part of the year was focused on the preparation for, and conduct of, a review of the Flagship initiative. Required by the government funding decision that provided an additional \$305m to the Flagships between 2004-05 and 2010-11, the review will be conducted in late June early July 2006 and concentrate on:

- the appropriateness of the Flagships' goals and the linkages between the research portfolios and the achievement of those goals
- progress made to date in establishing the initiative, generating research and technological outputs and in developing appropriate research and delivery partnerships
- Flagship governance.

The Flagship Collaboration Fund began to make its presence felt during the year. Despite some initial delays, several clusters began operations in the second half of the financial year. In April 2006, the Flagship Oversight Committee approved the development of a second round of clusters to commence operations in 2006-07. Several Flagship Visiting Fellows made significant contributions to the Flagships during 2005-06, and a small number of project agreements were executed.

Tom Hatton succeeded Colin Creighton as Director of the Water for a Healthy Country Flagship in March 2006.

The main focus of the Flagship initiative during 2006-07 will be on the ongoing pursuit of the Flagships' research and delivery goals. The increase in overall Flagship revenue to \$210m in 2006-07 will enable more intense activity in existing research programs (some showing significant refocusing

following Flagship Oversight Committee and Science Investment Process decisions) and the addition of some new focuses. For example:

- Energy Transformed will replace its Intelligent Transport Systems stream with a new stream in Alternative Transport Fuels
- Preventative Health will conduct some preliminary studies around the feasibility of a proposed Gut Health theme
- Food Futures will conduct similar work around a new Supply Chain theme
- Water for a Healthy Country will begin work on the Water Resources Observation Network.

The Collaboration Fund will sponsor many of the interactions involved in bringing non-CSIRO partners into the Flagships during 2006-07. The round 1 clusters will all achieve full operational status during 2006-07, and the round 2 clusters are expected to be operating effectively by December 2006. Under the collaboration fund visiting Fellows will continue to make significant contributions, and a number of Flagship Collaboration Fund projects (estimated at about 12) will be conducted throughout the course of the year.

Corporately, the initiative will respond to the recommendations from the Flagship review panel, which is expected to report in late July or August.

In addition, the Organisation will fully integrate the Flagship investment process with the Science Investment Process to deliver a single CSIRO priority-setting process for 2007-08.

Strategy Implementation Goals: Flagship Programs

Strategic Plan Objective		Strategy Implementation Goals for 2006-07
1.3 Champion Flagships to improve the lives of Australians and advance Australia's key industries		Implement CSIRO's agreed responses to the recommendations of the review of the Flagships initiative
3.1 Focus and intensify collaboration with universities, CRCs and other agencies		<p>Fully invest the \$11m available from the Collaboration Fund for 2006/07 during the year.</p> <p>Ensure that all round 1 and round 2 clusters are operational by 31 December 2006.</p>

Flagship Initiative Resources

Flagship Resources (\$m)				
Year	New Appropriation (BAA2)*	Redirected Appropriation	External ** (Including in-kind)***	Total (Including in-kind)***
2006-07	38.5	132.5	69.4	240.4
2005-06	35.0	110.0	42.2	187.2
2004-05	30.0	87.7	27.1	144.8
2003-04	20.0	54.3	6.4	80.7

*Funding provided to CSIRO for the Flagship Initiative under the second "Backing Australia's Ability" program.

** To reflect the full impact of the Flagship Program external revenue includes revenue earned by the Food Science Australia and ensis Joint Ventures. For accounting reasons these revenues are accounted for in the Joint Ventures and are not recorded as revenue by CSIRO.

***Estimated in-kind of \$15.3m and \$29.7m included with External revenue for 2005-06 and 2006-07 respectively. 2005-06 in-kind consists of \$3.8m relating to the Flagship Collaboration Fund, and \$11.5m other in-kind.

2006-07 in-kind consists of \$13.8m relating to the Flagship Collaboration Fund, and \$15.9m other in-kind.

Note: Flagship figures include Flagship Directors and Implementation Office, but do not include allocation of other Corporate Support Costs. Funding details for individual Flagships are included in the Financial Tables in Part D.

Flagship Themes: Planned Activities and Outputs by CSIRO Roles

Energy Transformed Flagship (Director: John Wright)

Revenue --- 2005-06 - \$35.8m (Actual)*

2006-07 - \$37.3m (Budget)*

Mission: "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 future hydrogen economy."

SIP No.	Theme Name	Budget 06-07	Activities and Outputs for 2006-07						Core Roles			Satellite Roles		
			STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech	
1016	Energy Futures	\$2.9m	Roadmap to develop low emission energy sector New tools and modelling capability for long range techno-economic scenarios		X									
1017	Low Emission Electricity	\$18.8m	Production of hydrogen from high temperature reactor at National Solar Energy Centre Pilot plant commissioned for Post Combustion Capture of CO ₂ Increasing the scale of sequestration studies with the CO ₂ CRC Matching energy storage to renewables to reduce the impact of intermittency Gas separation membrane development for next generation clean coal technologies		X					X				
1018	Low Emission Transport	\$6.1	High performance batteries/capacitors Better performance hybrid power-train Preliminary fuels calculator			X								
1019	Low Emission Distributed Energy	\$7.5m	The distributed local supply of Hydrogen will encourage fuel supply diversification and new businesses. New DSM aggregations businesses will start and DE energy supply companies will be created. Distributed source of Hydrogen to minimise asset investment and encourage uptake of H ₂ as a fuel. Reduction of Co ₂ emissions by utilisation of waste heat Preparing a viable infrastructure for the control and management of DE devices and DSM The provision of a consumer focussed energy consumption control system will bring benefits to consumers who face rising electricity costs. Hi efficiency fuel cell electrolysis Complex system science and aggregation algorithms for DE control		X					X				

* Including estimated in-kind of \$1.2m and \$2.7m for 2005-06 and 2006-07 respectively

Food Futures Flagship (Director: Bruce Lee) Revenue --- 2005-06 – \$33.1m (Actual)* 2006-07 – \$42.5m (Budget)*

Mission: To transform the international competitiveness and add \$3B annually of value to the Australian agrifood sector by the application of frontier technologies to high-potential industries

SIP No.	Theme Name	Budget 06-07	Activities and Outputs for 2006-07	Core Roles					Satellite Roles					
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1020	Advanced Genetics	\$10.5m	Adding high value traits to commodity cereal grains to provide higher profitability and health attributes to Australian grains.	X										
			Create differentiated grain, food and aquafeed products that deliver benefits for human health and feeds		X									
			Healthier Foods and grains.			X								
			Sustainability of aquafeeds.			X								
			Generating a sustainable source of omega-3 oils by transferring a complex genetic pathway to terrestrial plants from micro organisms.					X						
1021	Breed Engineering	\$8.4m	Boost the value of Australia's animal-based food industries for beef and for seafood by 2013 through application of breed engineering and leading edge animal management technologies.	X										
			The quality of food produced from aquaculture species will be increased through integrated studies of quantitative genetics and food science			X								
			Value will be captured through improved management of the resource base of the beef production enterprise, including optimisation of herds (eg movement control) leading to sustainable land use.				X							
			Testis cell transfer techniques refined through the use of enriched donor stem cells.					X						
1022	Innovative Processing	\$11.3m	Application of novel separation and advanced processing technologies for bioactive and physically functional food ingredients and 'preserved fresh' food industries.	X										
			to add value to agricultural raw materials via the development of nutritionally and functionally enhanced ingredients and preserved foods through processing technologies		X									
			Food ingredients with health benefits			X								
			Creating employment in the rural sector; improved health and well being of Australians by consumption of fresher, safer functional foods.				X							
			Improved economic viability and sustainability of rural & regional Australia through value addition to agricultural resources; export income for Australia					X						
			Development of new ingredients and products with specific functionalities and architectures by using a food material science approach.						X					
			Development of novel separation technologies through cluster activities							X				

* Including estimated in-kind of \$1.0m and \$6.6m for 2005-06 and 2006-07 respectively

SIP No.	Theme Name	Budget 06-07	Activities and Outputs for 2006-07						Core Roles		Satellite Roles			
			Producing safer and fresher refrigerated and shelf stable foods through pressure processing technology	Developing post graduate/post doc opportunities through the separations cluster; scientific publications;	Enhanced role for Australia as a supplier of bioactives				X		X			
1023	Quality biosensors	\$5.1m	develop a biosensor and improve use of current sensor technologies to understand, measure and optimise flavour throughout the wine value chain to meet consumer appeal and improve the competitiveness of the wine industry	Provide information to wine growers to enable more efficient growth of higher quality grapes for wine making.	deliver a transduction technology, which makes the activation of biological receptors readable by an instrument		X							
1024	Supply Chain Improvement and Integration	\$0.6m	Through utilisation of value chain technologies, and improved value chain integration, increase international competitiveness	Improved logistics and operations management for enhanced value chain efficiency.	Technologies for reduced environmental impact in the value chain.		X		X		X			
			Technologies for improved preservation & security of foods in the value chain.	Creating employment in the food and service provider sectors				X						

Light Metals Flagship (Director: Raj Rajakumar)

Revenue --- 2005-06 – \$28.4m (Actual)*

2006-07 – \$33.2m (Budget)*

Mission: 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

SIP No.	Theme Name	Budget 06-07	Activities and Outputs for 2006-07	Core Roles				Satellite Roles				
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF
1000	Aluminium and Magnesium Manufacturing	\$3.1m	Adoption of an LMF technology for production parts achieved.	X								
1001	Alumina	\$7.0m	Technical feasibility established for new processes for high silica bauxite, organics removal and bauxite residues.	X								
1002	Aluminium	\$7.8m	LMF outputs adopted in full-scale demonstration electrolytic cells. Completed plant trials of feasibility of one other LMF technology. Demonstrate the feasibility of a novel, alternate low temperature process for aluminium production	X	X				X			
1003	Magnesium	\$2.5m	Cost competitiveness and technical feasibility of LMF carbothermic processes established at proof of concept stage. Demonstrate yield and quality of magnesium using a radical shock quenching process or metal solvation process.	X						X		
1004	Titanium	\$8.9m	Agreement with external parties to construct a pilot plant for metal production based on LMF technologies for commercial purity titanium or titanium alloys. Feasibility of producing semi-fabricated and fabricated parts using novel powder metallurgical processes established.	X								

* Including estimated in-kind of \$2.1m and \$3.9m for 2005-06 and 2006-07 respectively

Preventative Health (Director: Richard Head)

Revenue --- 2005-06 – \$28.4m (Actual)*

2006-07 – \$33.2m (Budget)*

Mission: 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 chronic diseases

SIP No.	Theme Name	Budget 06-07	Activities and Outputs for 2006-07	Core Roles					Satellite Roles					
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1025	Colorectal Cancer (CRC)	\$15m	Early detection of CRC: Complete early cancer marker identification			X								
			CRC prevention through food and lifestyle: Elucidate relationship between food, bacteria and colon biochemistry		X									
			Extracting disease biomarker information from complex gene expression datasets: Assess biological significance of markers implied from statistical analysis.					X						
1026	Neurodegenerative Disease	\$1.6m	Early detection of Alzheimer's Disease (AD): Establish patient cohorts via Collaboration cluster			X								
			New prevention strategies: physical chemistry of AD neurotoxicity.			X								
			Use of structural biology to infer chemical mechanisms as basis for discovery of new preventative strategies: Folding of A peptide in AD					X						
1027	Health Data and Information	\$8.1m	Privacy-preserving, secure linkage and analysis of disparate health data sets to generate new information for research, improved patient management & policy guidance: Proof of concept on cross-state data.			X								
			Development of technologies to securely link & analyse dispersed data sets for improved health outcomes: Proof of concept with multi-state colorectal cancer data.				X							
1028	Cardiovascular disease (CVD)	\$2.3m	Identification and validation of new bioactives that may prevent or delay the onset of CVD. (including hypertension)			X								
1029	Gut Health	\$0.8m	Complete scoping study of prevention opportunities in gut health.			X								
			Commence prevention research in priority area from above (e.g. diarrhoea, diagnosis of inflammatory bowel disease).			X								

* Including estimated in-kind of \$2.6m and \$4.6m for 2005-06 and 2006-07 respectively

Water for a Healthy Country (Director: Tom Hatton) Revenue --- 2005-06 – \$31.8m (Actual)* 2006-07 – \$44.5m (Budget)*

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

SIP No.	Theme Name	Budget 06-07	Activities and Outputs for 2006-07	Core Roles					Satellite Roles					
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1005	Southwestern WA	\$6.7m	Strategic options for irrigation water able to be traded with Perth			X								
			Integrated end use and demand management model for Perth				X							
			Drainage and salinity management options for Wheatbelt landholders					X						
1006	Urban Waterscapes	\$7.6m	Advanced materials design specifications for improved water recycling – support for the Advanced Membrane Cluster.	X										
			Assessment of climate change implications for future water use in Sydney		X									
			Integrated simulation of end use demand and supply at city scale											
			Community acceptance and attitudinal model for urban water recycling i					X						
1007	Great Barrier Reef Catchments	\$4.1m	Grazing land management options to reduce sediment and nutrient loss			X								
			Best practice models for floodplain restoration in the Wet Tropics				X							
			Water benefits model integrating economic performance with water quality improvements					X						
1008	River Murray Region	\$8.4m	Integrated Basin water balance and benefit assessment tools			X								
			Interoperable biophysical models for assessing natural resource plans				X							
			Testing decision theory in hydro-econometric models for enhanced water trading					X						
1009	Australian Water Systems	\$2 m	Knowledge diffusion and research adoption strategies for irrigation industry		X									
			Pan-Australian forecast and projection scheme for seasonal rainfall			X								
			Community negotiation tools and processes for decisions on water sharing				X							
			Methods and dialogue to reconceptualise institutional and legal frameworks for water management arrangements					X						
1010	WRON	\$9.3m	Sensor test bed installed in key demonstration catchment providing real time monitoring and assessment data integration	X										
			WRON model interoperability standards V1			X								
			WRON National Dam Levels product released with historical data accessible nationwide					X						

* Including estimated in-kind of \$4.6m and \$5.6m for 2005-06 and 2006-07 respectively

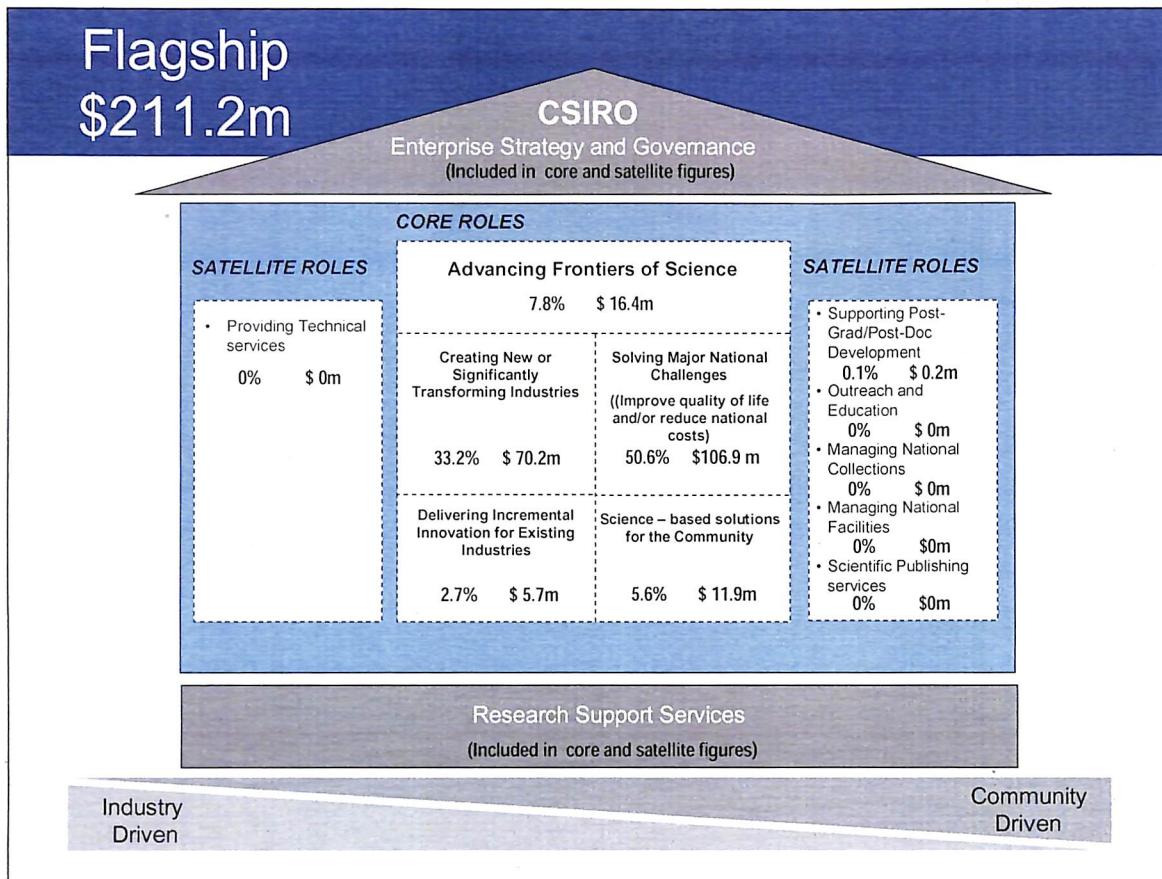
Wealth from Oceans (Director: Craig Roy) Revenue --- 2005-06 – \$31.3m (Actual)* 2006-07 – \$39.5m (Budget)*

Mission: 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.

SIP No.	Theme Name	Budget 06-07 *	Activities and Outputs for 2006-07	Core Roles					Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF
1063	Ocean System Prediction and Responses – 'The Springboard'	\$13.2m	Operational ocean forecasting system (BlueLink)			X						
			Predicting seabed responses to climate change			X						
			Biogeochemical ocean modelling and prediction			X						
1064	Ocean Based Forecasts of Australian Climate – 'Oceans to Rain'	\$4.9m	Predictive tools to manage the impact of climate variability on climate-sensitive industries	X								
			Improved ability to predict and understand key ocean drivers of climate variability			X						
			Predict marine responses to climate change			X						
1065	Ocean Based Industry Development and Growth – 'Blue GDP'	\$9.8m	Development of electromagnetic techniques for deep marine oil and gas exploration	X								
			Partnerships for engineering, manufacture and field deployment of seabed technology	X								
			Seabed Minerals Map for Australia to encourage and stimulate a seafloor minerals industry	X								
			Lab scale prototypes for oil and gas sub-seafloor production technology			X						
			Novel adhesives isolated and characterised from marine organisms				X					
1066	Ocean Based Regional Development and Growth – 'The Marine Nation'	\$6m	Management strategy evaluation framework developed for multiple use management through regional studies (e.g. NSW, Ningaloo)		X							
			National tool kit for assessing marine ecosystem health			X						

* Including estimated in-kind of \$4.0m and \$6.3m for 2005-06 and 2006-07 respectively

Investment Summary by CSIRO Role – Flagships



Comments:

- 2006/07 is the first year that Flagships have been reported separately. Previously Flagship funding was allocated to and reported against host divisions.

B2 – Agribusiness Group

Overview

The CSIRO Agribusiness Group serves large and vital sectors of Australian industry, as well as pursuing a range of community objectives. These are outlined as follows:

- The Group's capabilities add value to the spectrum of industries that are based on the production and use of materials derived from plants and animals. The ability to integrate across the industry value chain is a key differentiator of the Group. We can design and optimise raw materials, develop production processes for industries that are based on materials of biological origin as well as new materials, and understand the determinants of consumer behaviour. These industries are substantial employers, major wealth-generators and exporters, and mainstays of regional Australia. The Group's impact extends to the knowledge-intensive service providers that work with these industries internationally.
- The bioscience capability of the Group has an impact well beyond the industries described above. These platforms are aligned with the bioscience revolution that is driving knowledge creation, innovation and growth of new enterprises internationally.
- The Group contributes to human health, particularly through the Preventative Health Flagship. The emphasis is on early detection of disease and predisposition to disease, allied with the maintenance of health through protective strategies, rather than treatment.
- The Group plays a major role in biosecurity; protecting Australia from exotic invasive species that threaten industries, the environment and human health.
- The Group provides scientific foundations for policy development by Governments in a wide range of areas, for example food safety, nutrition, biosecurity, pest and disease control, land use and the application of biotechnology.

Key components of the Group

The Agribusiness Group includes the following Divisions, Joint Ventures and Flagships:

Divisions	Entomology Plant Industry	Livestock Industries Textile and Fibre Technology
Joint Ventures	Food Science Australia – A joint venture with the Victorian Government	Ensis – CSIRO's forestry and forest products research is conducted within Ensis, a joint venture with New Zealand's Forest Research
Flagships	Food Futures	Preventative Health

Reflections on 2005-06

In line with Broad Directions set as part of the Science Investment Process, the Group is looking to extend its core bioscience skills beyond the Agribusiness domain and into the wider Bioscience/Bioeconomy areas. The Group has begun to examine possibilities of applying capabilities, such as biological material conversion and manufacturing, with similar and complementary skills across CSIRO. Further integration of the Group's science into the Flagships has also occurred and will continue into 2006-07, as will cross-Divisional research initiatives. The Executive Team-initiated 2005-06 review of CSIRO's work in Agricultural Sustainability promises to provide a significant opportunity to make a major impact in future years and will include work conducted in the Agribusiness Group Divisions/Joint Ventures of Ensis, Entomology, Plant Industry and Livestock Industries.

Communication and consultation of these key changes in research direction has occurred during 2005-06. This includes consultation with Sector/Flagship Advisory Councils, key Research and Development Corporations and the Commonwealth Department of Agriculture, Forestry and Fisheries. This will continue into the upcoming year.

Advances have been made through the year in the development of collaborations and joint approaches. These include

- AgResearch New Zealand Ltd (Livestock Industries).

- Centre for Medical Bionics (Textile and Fibre Technology).
- A joint venture between the Grains Research and Development Corporation (GRDC).
- Biogemma and the Food Futures Flagship.
- A restructured Graingene alliance (Plant Industry).
- The Crop Biofactories initiative with the GRDC (led by Entomology with Plant Industry and Molecular and Health Technologies).
- Monash and Melbourne Universities (Food Science Australia).
- Food Science Australia is undergoing continuing discussions with Western Australia, South Australia and Queensland for further joint ventures with these States.
- CSIRO has also been accepted as a full member to the Agricultural Research Western Australia (ARWA) Board, without being a formal part of the venture.
- On July 1 2005, CSIRO's forest industries-facing research was fully incorporated into Ensis, its joint venture with the New Zealand Crown Research Institute, Scion. During the year, Ensis has worked on integration across the two organisations and this will continue into 2006-07.

The CSIRO Total Wellbeing Diet Book has been an outstanding success with over 500,000 copies sold in Australia and continued listing in the national book best seller lists. This shows the enormous public need for reliable information. The book has been released internationally, including New Zealand and the United Kingdom.

There have also been some key staff changes in the Agribusiness Group during 2005-06:

- Group Executive, Agribusiness – Alastair Robertson
- Chief Executive, Ensis joint venture - Larry Little
- Director, Ensis Investment – Rick Ede
- Chief, Textile and Fibre Technology – Nigel Johnson
- Chief Executive, Food Science Australia – Anthos Yannakou

Science review recommendations have been, and continue to be, implemented in Food Science Australia and Entomology. Recommendations from the Livestock Industry's review have commenced implementation and will continue into 2006-07.

Plans for 2006-07

The Agribusiness Group capabilities add value to a spectrum of industries that are based on the production and use of materials derived from plants and animals. The ability to integrate across the industry value chain is a key differentiator of the Group. During 2006-07 the Agribusiness Group will continue to focus on a number of major initiatives and collaborations, including:

- The further development and implementation of its strategy into the wider Bioeconomy/Bioscience domains. Focus areas will be developed via a one-CSIRO approach that builds on our existing strengths in bioscience, materials conversion and our ability to take on a whole of value chain approach. The broad areas of focus that will be considered as part of the CSIRO Science Investment Process are:
 - Preventative Human Health – with potentially increased activity into addressing obesity
 - Food – with a larger emphasis on food and health, and properties to improve satiety
 - Biomaterials – covering novel materials from biological systems and processes
 - Environment – bedding down the new Agricultural Sustainability Initiative
- As part of the Groups Bioeconomy/Bioscience strategy, Flagships will be further developed through additional integration of the Group's science, particularly at the boundary interfaces between the Food Futures and Preventative Health Flagships.
- CSIRO, though Food Science Australia and the Preventative Health and Food Futures Flagships, with the Australian Nuclear Science and Technology Organisation will explore opportunities to develop new food products that have enhanced taste, texture and health-improving qualities.

- The Flagship Collaboration Fund will continue to build our relationships with external collaborators. During 2006-07, the Food Futures Flagship will establish two clusters on the following topics:
 - Olfactory pattern recognition with ANU and Monash University
 - Food bioactives with Monash University and the University of Melbourne
- A Collaboration Fund Cluster focused on detecting and preventing Alzheimer's disease will be set up with the Preventative Health Flagship, University of Melbourne, Edith Cowan University, the Neurosciences Australia Ltd and the Mental Health Research Institute of Victoria.
- A joint collaborative project will be established between Livestock Industries and AgResearch New Zealand Ltd.
- Textile and Fibre Technology will seek to build relationships and collaborate with Deakin University in the areas of electrospinning and biomedical technologies.
- CSIRO, through the Preventative Health Flagship and the Human Nutrition Centre, with the University of South Australia, will undertake the national physical activity and nutrition survey for children for the Commonwealth Department of Health and Ageing.
- Food Science Australia, a Joint Venture between CSIRO and the Victorian Department of Primary Industries, will seek further partnerships with other States (Queensland and Western Australia). The CSIRO Human Nutrition Unit will also be formally integrated into the Joint Venture.
- Opportunities for CSIRO to work with Agricultural Research Western Australia (ARWA) will be explored through our participation as an ARWA Board Member. ARWA is an unincorporated Joint Venture between Curtin University of Technology, the Department of Agriculture, Murdoch University and the University of Western Australia.
- Ongoing political and public issues associated with the use of genetically modified produce are likely to continue. The Group has substantial expertise and investment in Agricultural Biotechnology and the need to make informed statements about our work and the wider arena will continue.
- The outstanding success of the CSIRO Total Wellbeing Diet demonstrates the public need for reliable information on nutrition. A second book on this topic will be released towards the end of 2006 and provide the public with further information.

Key operational issues for the Group include:

- The development of an alternative business model for the Australian Animal Health Laboratory (AAHL) National Facility being developed in consultation with DAFF and DEST to broaden the scope of AAHL and improve the accessibility of the facility to others requiring containment facilities.
- Implementation of the recommendations from the Executive Team-initiated CSIRO Agricultural Sustainability Review across CSIRO, which includes the Agribusiness Divisions of Plant Industry, Livestock Industries, Entomology and Ensis.
- Divisional Science Reviews will continue into 2006-07 with the reviews of Plant Industry and Textiles and Fibre Technology. Once these have been conducted, agreed recommendations will be implemented.

Strategy Implementation Goals: Agribusiness Group

Strategic Plan Objective	Strategy Implementation Goals for 2006-07
1.1 Play a Significant Role in Delivering on Australia's National Research Priorities	Continue to reorganise Agribusiness towards outcomes rather than industry productivity research
1.2 Build Critical Mass and Ensure Quality in our Research Programs	Implement recommendations of Divisional Science Reviews
1.3 Champion Flagships to improve the lives of Australia's and Advance Australia's Key Industries	Continue to actively integrate the Groups science into Flagships
1.4 Increase the Impact of Major Cross-Divisional Activities through a	Further build the Groups Strategy into the wider biosciences/bioeconomy

focused Strategic Investment Process	
2.3 Build our Global Recognition for Science Leadership in our Chosen Science Domains	Bring together and leverage bioscience skill base in CSIRO
3.2 Service the Needs of Government for Informed Policy Setting	Continue the development of the capacity to provide policy advice on genetically modified products
4.1 Intensify Engagement with RDCs to Grow Regional and New industries	Continue building high level strategic discussion with RDCs
6.1 Secure Greater Federally Funded Support for CSIRO Science Investment	Participate with external parties in the development of NCRIS proposals for the 2006 round, particularly capabilities 2 and 8.
6.3 Deliver Customer Value for Money and Eliminate Subsidisation in Consulting Services	Monitor and improve Groups performance in the CVS, particularly with regard to RDC's (see 4.1), and eliminate subsidisation of research consulting services

Agribusiness Group Themes: Planned Activities and Outputs by CSIRO Roles

Revenue -- 2005-06 – \$295.2m (Actual) 2006-07 – \$290.5m (Budget)

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1072	Wood Quality Solutions	8.75m (4.05m ^a)	Ensis	Quality trading of wood		X								
				Forest biorefineries		X								
				Decision support tools and rapid quality assessment technologies			X							
				Wood phenomics and biomolecular design of products				X						
				Wood quality testing and machines										X
1073	Forest Benefits	14.6m (6.06m ^a)	Ensis	Validated models to support industrial plantations and environmental forests		X								
				Forests as carbon sinks and for water quality and quantity			X							
				Extending forests into new areas.				X						
				Forests for landscape restoration				X						
				Developing the 'virtual' forest					X					
1074	Development of Improved Germplasm and Breeding Decision Support Tools	10m (4.6m ^a)	Ensis	New high quality trees for new products		X								
				New trees for salinity and drought			X							
				New trees for farmland and landscape restoration				X						
				Discovery of wood quality genes and SNPs					X					
				Supply of improved seeds and seedlings										X
1075	Forest Protection	9.9m (1.7m ^a)	Ensis	Decision support tools for pests.		X								
				Biological control of buddleia		X								
				Models of bushfire behaviour for safety			X							
				Community resilience to bushfires and other forest hazards				X						
				Models of fire under extreme conditions					X					
				Vulnerability of ecosystems to pests						X				
				Forest health diagnostic services										X

^aFigure in parentheses represents CSIRO component of the overall expenditure in the Joint Venture which is indicated by the non bracketed figure.

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1076	Smart Products	15.3m (4.6m ^a)	Ensis	New products for the wood and paper industry					X					
				Decreasing the time to market for new wood products					X					
				Combinational materials and printable electronics						X				
				Performance testing of wood and paper materials										X
1077	Emerging biological threats and invasive species	9.6m	Ento	Strategies for prioritisation of biosecurity issues						X				
1078	Biological Drivers for Agricultural Sustainability	12.3m	Ento	Sustainable pest management options for agricultural sustainability					X					
				Methods for control of cane toads						X				
				Termite management						X				
1079	Invertebrate Biodiversity Assets and Informatics	3.4m	Ento	Increase cross-linkages between collections by involvement in CERF bids						X				
1080	Building Bioindustries with Synthetic Biology	11.3m	Ento	Crop biofactories					X					
				Synthetic biology – Developing cross divisional linkage through Emerging science initiative							X			
1030	Processing Innovation and Food Quality	20.3m (4.9m ^a)	FSA	Enhanced extraction and separation processes for foods					X					
				Develop, adapt, optimise & transfer new processing technologies for foods						X				
				Enhance OH&S and reduce labour costs during processing						X				
				Transport and packaging systems to maximise food quality at point of use						X				
				Model heat transfer during combined pressure & thermal processing							X			
				Develop post-grads & post-docs for the food industry							X			

^aFigure in parentheses represents CSIRO component of the overall expenditure in the Joint Venture which is indicated by the non bracketed figure.

Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles	Satellite Roles				
				STI	IEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1031	Food and Health	8.7m (2.8m ^a)	FSA	Develop delivery systems for water soluble bioactives	X									
				Food ingredients with enhanced and reliable functionality		X								
				Understand and control food microstructure and its stability				X						
				Develop post-grads & post-docs for the food industry					X					
1032	Integrated Food Safety	11.6m (3.2m ^a)	FSA	Innovative approaches to inactivate microorganisms and maintain quality	X									
				Hurdles and processes to enhance through chain food safety		X								
				Understand the development of emerging hazards eg antibiotic resistance in food borne pathogens.			X							
				Ensuring safe and nutritious foods for Australians				X						
				Understand microbial ecology in food using a systems biology approach					X					
				Provide expert food safety advice for the food industry and government						X				
1033	Obesity and Health	11.9m (3.7m ^a)	HN	Provide substantiation base for an Australian functional foods industry		X								
				Substantiate food bioactives that mitigate against chronic diseases			X							
				Translate science so Australians can achieve a healthy lifestyle				X						
1043	Enabling Technology: Transforming the Business Enterprise	6.5m	LI	Integrated on-farm "smart" systems		X								
				Decision support systems (DSS) to modify production practices			X							
				Reducing biosecurity risks through application of satellite data				X						
				Building sensor network applications for animal industries						X				
1044	Ensuring Product Integrity and Market Access	34.1m	LI	Reduced reliance on chemicals for control of endemic diseases		X								
				Bio-engineered vaccines for poultry and pig diseases			X							
				Reducing biosecurity risks through diagnosis & alternative therapies/vaccines				X						
				Understanding the basis for zoonotic disease					X					
				Control of cane toads						X				
				RNAi							X			

^aFigure in parentheses represents CSIRO component of the overall expenditure in the Joint Venture which is indicated by the non bracketed figure.

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1045	Understanding and Transforming the Animal and its Products	16.4m	LI	Advanced reproduction techniques		X								
				New bioactives and biomaterials		X								
				Application of quantitative genetics			X							
				New gene markers to enhance existing marker suites			X							
				Gut health for human and animal populations				X						
				Nutrigenomics					X					
				Epigenetics					X					
				Anaerobic microbial ecosystem dynamics					X					
				Deliver draft ovine genome map					X					
1046	Achieving Industry Sustainability	6.1m	LI	Behavioural tests for assessing animal temperament			X							
				Improving saline lands				X						
				Developing scientific measures for animal welfare					X					
				Epigenetics					X					
1047	Diagnosis Surveillance and Response	13.6m	LI	Developing and maintaining emergency animal disease diagnostic and response capacity			X							
				Pen-side and screening assays for major exotic diseases				X						
				Training in exotic disease diagnosis						X				
				Technical advice to government and industry								X		
				Import/export testing									X	
1038	New Horizons in Plant Science	10.2m	PI	Epigenetic control of gene expression					X					
				Manipulating plant reproductive and development biology					X					
				PhD and post-doctoral training						X				

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

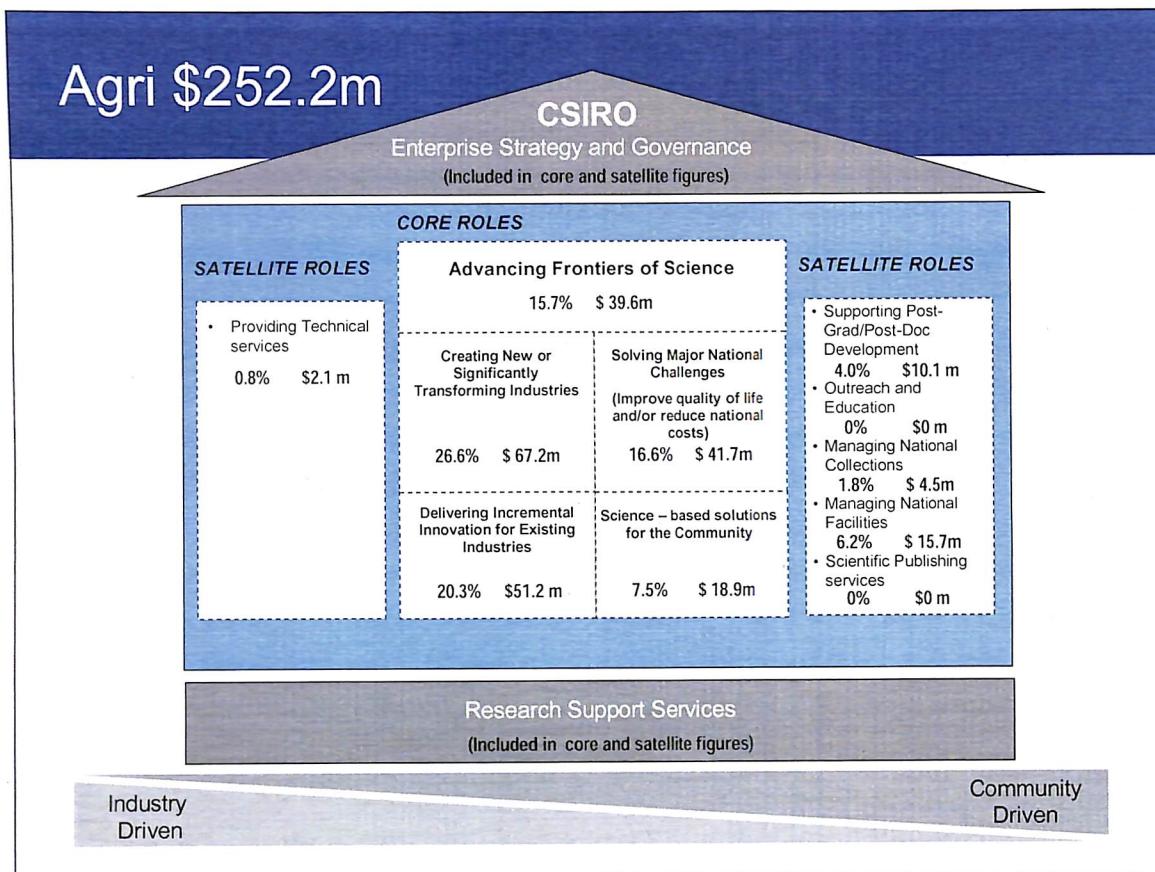
SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles	Satellite Roles				
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1039	Advanced genetics delivering quality crops for health and consumer choice	13.3m	PI	Flavour control & manipulation in horticultural crops		X								
				High value specialty grains		X								
				Novel grain products contributing to improved community health			X							
				Engineering of novel metabolic pathways				X						
				PhD and post-doctoral training						X				
1040	Plant Fibre and Biofactories for New Agricultural & Industrial Products	17.6m	PI	World-leading cotton industry through improved fibre and yield		X								
				Novel crops producing renewable biomaterials		X								
				Reduced environmental impact of cotton industry			X							
				Engineering of novel metabolic pathways — Sugar.				X						
				PhD and post-doctoral training						X				
1041	Designing Crops and Pastures for Australian Environmental Challenges	19.6m	PI	Development of quality crops for the high rainfall zone		X								
				New high yielding crops with biotic tolerances		X								
				New crop varieties with marked temperature and drought tolerances			X							
				Molecular analysis of insect and rust resistance and root-soil interactions in plants				X						
				PhD and post-doctoral training						X				
1042	Sustainable Agriculture and Conservation of Biodiversity	20.9m	PI	Cropping systems for the high rainfall zone		X								
				Decision support systems for effective mixed farm management		X								
				Strategies for revegetation & remnant vegetation management			X							
				Web-based identification tools for biodiversity conservation management				X						
				Novel approaches to weed control through plant reproductive control					X					
				PhD and post-doctoral training						X				
				Effective curation of Australian National Herbarium							X			

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07	STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1034	Increasing the Demand for Australian Merino Wool	15.6m	TFT	Production of wool with improved textile properties	X										
				Platform technologies enabling commercialisation of a range of wool products in international markets.		X									
				Establishment of Australian Wool Textile Training Centre.								X			
1035	Increasing the Demand for Australian Cotton through Post Harvest R&D	2.2m	TFT	A quality management system for the Australian Cotton Classing Industry, including novel instrumentation.			X								
1036	Advanced Materials - Biomedical and Electroactive Fibres	3.9m	TFT	Production methods for CNT yarns and sheets suitable for industrialisation	X										
				Biotextiles for nerve repair, wound healing and tissue replacement.								X			

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

Investment Summary by CSIRO Role – Agribusiness Group



Comparison to 2005/06:

- New or Transformed Industries increased by 5.6%.
- Major National Challenges increased by 5.5%.
- Incremental Innovation decreased by 5.8%.
- Technical Services decreased by 3.2%.
- National Facilities reduced by 5.6% due to a change in Livestock Industries' categorisation of work. Previously all work in AAHL was classed as National Facilities however now only the management of AAHL is captured in this role.
- Minor changes in other roles.

Research Units and Capabilities – Agribusiness Group

Ensis (CEO: Larry Little)

Mission: Leading science to transform and enhance the economic, environmental and social benefits from forests and forest industries and delivering new knowledge and high-value applied solutions through our, global network of specialists and multi-disciplinary teams.

Total Budgeted Revenue: approx. \$60m (\$23.2m[^]) (2006-07) Total Staff: 320 (148)^{^^} FTE (Jun06)

Capability (Research staff) *	Status	Trajectory
Risk Management (32)	(s) ** Feb-06	This has been an area of growth in Ensis capability and now faces the challenges of increasing competition. Ensis will respond by extending into new areas (particularly around economic risks) and integrate our water relations and remote sensing competencies to grow.
Forest Production Systems (163)	(s) ** Feb-06	Ensis will migrate elements of this capability into focusing on non-wood values and risk management.
Non-wood values of forestry (43)	(s) ** Feb-06	This has been an area of growth in Ensis capability and faces the challenges of increasing competition. Ensis will respond by extending into economic modelling and social impacts of forestry while deepening our capability through refocusing our forest production systems capability.
Imaging (29)	(s) ** Feb-06	Ensis will invest and develop in this growth area.
Process and material knowledge (88)	(s) ** Feb-06	Ensis will refocus elements of this capability into areas such as the bioeconomy, biofibres and biorefinery approaches.

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

** Currently Ensis is undergoing a mapping of its capabilities and as such it is premature for any ranking. This is the first time a mapping has been done across the Joint Venture as a whole.

[^] The staff numbers in each capability area represent head count, not FTEs. These are for the Joint Venture as a whole.

^{^^}Figure in parentheses represents CSIRO component of the Effective Full Time (EFT) numbers in the Joint Venture which is indicated by the non bracketed figure.

Entomology (Chief: Joanne Daly)

Mission: We generate economic, social and environmental benefits for all Australians through our research into invertebrates and invasive species and their management.

Total Budgeted Revenue: \$36.5m (2006-07)

Total Staff: 239 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Plant biosecurity solutions (62.4 FTE)	Benchmark (f)-Feb 05	Grow capability and increase investment in Biological Threats by increasing engagement in Federal Government projects, RDCs, CRCs, NCRIS and Australian Biosecurity System
Species interactions (33.7 FTE)	Benchmark (s)-Feb 05	Build cross linkages with industry and Divisions Refocus and review in terms of Sustainability Review
Biodiversity and evolution (23.1FTE)	Strong (f)-Feb 05	Build cross linkages with other collections through CERF bids and Collections Review (2006). Engage capability in delivery to conservation policy Refocus capability through amalgamation of streams into one Theme
Invertebrate molecular pathways (82.7 FTE)	Benchmark Favourable (f)-Feb 05	Grow capability and increase investment in Emerging Science area, MXD, Flagships Develop capability as a cross divisional initiative with CMHT and build partnership with ANU

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

Food Science Australia (CEO: Anthos Yannakou)

Mission: To undertake and transfer strategic research on food, nutrition and food systems: For the competitive advantage of Australia's food industry and economic growth; For the health and well being of the Australian public; and To assist the Australian Government in the pursuit of its duties in these areas

Total Budgeted Revenue:\$52.9m (\$21.6m)^ (2006-07) Total Staff: 230 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Ingredients Functionality (64 FTE)	Favourable (f)-April 05	Strengthen by developing partnerships with selected universities
Processing Innovation (62 FTE)	Strong (f)-April 05	Maintain – (Grow imaging expertise)
Supply Chain Performance (25 FTE)	Strong/benchmark (f)- April 05	Maintain
Integrated Food Safety (36 FTE)	Strong/benchmark (f)-April 05	Increase in public health diet and exercise
Nutrition (60 FTE)	(f) Benchmark – April 05	Increase

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

^^Figure in parentheses represents CSIRO component of the overall expenditure in the Joint Venture which is indicated by the non bracketed figure.

Livestock Industries (Chief: Shaun Coffey)

Mission: CSIRO Livestock Industries provides research solutions enable Australia's livestock and allied industries to be globally competitive.

Total Budgeted Revenue: \$83.1m (2006-07)

Total Staff: 418 FTE (Jun06)

Capability (Research FTE)*	Status Research	Status Industry/Community	Trajectory
Emergency disease preparedness (60.6 FTE) Aquatic animal disease Diagnosis of infectious disease New & emerging zoonotic diseases	(f) Jan/Feb06 Strong/ Favourable Strong Favourable	(f) Jan/Feb06 Strong/ Favourable Benchmark Benchmark	Maintain capability in support of national facility role, seeking to establish a sustainable funding model for future support Reduce overall capacity in aquaculture, focus on diagnostic capability for aquatic diseases
Diagnosis and prevention of endemic disease (58 FTE) Intensive Extensive	(f)-Jan/Feb06 Benchmark/ Strong Favourable	(f) Jan/Feb06 Strong Favourable	Maintain capability in avian and porcine diseases with a focus on avian influenza Reduce overall efforts in endemic infectious disease research in ruminants, maintain capacity in parasitology.
Livestock management (50 FTE) Integrated on-farm systems Integrated livestock business systems Ecohealth Enhanced on-farm productivity	(f) – Jan/Feb06 Strong (s) - Dec05 Strong/ Favourable Strong/ Favourable Favourable	(f) – Jan/Feb06 Favourable (s)-Dec05 Strong/ Favourable Strong Favourable	Maintain capability through partnership with ICT Centre in priority area of sensor networks Reduce selected areas of integrated on-farm systems Focus ecohealth efforts on Agricultural Sustainability initiative
Genomics and gene delivery (71.5 FTE) Molecular genetics Product quality Genetic approaches to disease resistance Quantitative genetics Advanced reproduction	(f) – Jan/Feb06 Benchmark/ Strong Benchmark/ Fav. Strong (s) - Dec05 Tenable Favourable	(f)-Jan/Feb06 Benchmark Favourable/ Tenable Strong (s)-Dec05 Favourable /Tenable Favourable	Grow a gut health group through the redirection of microbiology skills from food safety and enhanced on-farm productivity, and engagement of CEO Science Fellow Grow bioinformatics capability through recruitment (application of external funding)
Market-driven consumer demand (37.5 FTE) Novel bioactives Welfare Food safety	(f) – Jan/Feb06 Strong Favourable Favourable	(f) – Jan/Feb06 Favourable Strong/ Favourable Favourable	Reduce food safety in line with outcomes of Science Review and industry consultation Maintain novel bioactives capability but increasingly through interaction with Food Futures Flagship and other partners Maintain efforts to better position animal welfare group in national welfare debate

(f)-date indicates a formal ranking by Divisional Science Review Team and the date of review. Most capabilities fall under this category

(s) indicates a current self-assessment where the Science Review Team did not rank a sub-capability

Plant Industry (Chief: Jeremy J Burdon)

Mission: CSIRO Plant Industry carries out research in the plant sciences to build a vibrant bioeconomy through making Australia's agri-food, fibre and horticultural industries more profitable, global and sustainable. A major focus is on developing novel products, improving production efficiency and reliability while maintaining the natural resource base.

Total Budgeted Revenue: \$90.5m (2006-07)

Total Staff: 572 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Gene discovery & utilisation (221 FTE)	Favourable (s)-Mar06	Realignment of effort with modest reductions in some areas and modest increase in investment in micro RNAs and biofactories science and in state-of-the art equipment particularly in microscopy and other imaging technology. We aim to maintain our current level of effort in bioinformatics despite reductions in ESA appropriation funding.
Host-pathogen genetics (38 FTE)	Favourable (s)-Mar06	Modest reduction through increasing focus on specific issues of major industry concern
Nutritional modification of crops (60 FTE)	Favourable (s)-Mar06	Focused modest rebuilding of specific capabilities and skills to reflect tighter specific focus; increasing linkage with processing industries; jointly with FF Flagship
Integrated crop management systems (102 FTE)	Favourable (s)-Mar06 [but partly involved in Agricultural Sustainability review]	Focus on significant industry-changing approaches through significant partnerships in agricultural sustainability; appropriation support steady. We will maintain our enhanced biometrics capability to optimise experimental design and analysis of data.
Plant-soil interaction s (20 FTE)	Favourable (s)-Mar06	Appropriation investment held steady; seeking greater broader partnership base from industry and further internal focus
Biodiversity assessment (49 FTE)	Favourable (s)-Mar06 [but partly involved in Agricultural Sustainability review]	Modest reduction overall but also modest growth in areas associated with strong interest in novel conservation and restoration strategies and use of Biological collections information. Growth to be funded largely from external sources
Organoleptics (9 FTE)	Favourable (s)-Mar06	Aim to continuing strengthening by developing greater industry involvement in novel varieties and approaches; jointly with FF Flagship

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects), exclusive of Flagship Theme investments

CPI external research review will be held in October 2006.

(s) indicates a current self-assessment

Textile and Fibre Technology (Chief: Nigel Johnson)

Mission: Using our capabilities in fibrous, bio-polymeric and flexible materials, to stimulate international demand for Australia's natural fibres, to create new commercial opportunities based on advanced fibrous structures and materials, and to provide innovative fibre and textile solutions across a broad spectrum of Australia's needs.

Total Budgeted Revenue: \$25.5m (2006-07)

Total Staff: 163 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Advanced Fibrous Materials (33 FTE)	Science Review scheduled for late 2006-07	Grow, subject to sourcing additional external revenues
Fibrous Bio-Polymer Science (19.5 FTE)		Maintain, but increase involvement in activities outside the traditional textile fibre field.
Textile Formation and Product Development (37 FTE)		Maintain, but increase activities related to creating fibrous structures and products aimed at high value, technical uses.
Instrument and Machine (11 FTE)		Maintain, and seek to contribute to needs of other units.
Textile Treatments / Polymer Surface Chemistry (9 FTE)		Maintain, but increase activities exploiting nanoscience advances in the fibre and textile domains.
Environment (4 FTE)		Maintain pending the results of new Division Strategy and Divisional Science Review

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

B3 – Information, Manufacturing and Minerals Group

Group Executive: *Michael Barber*

Overview

The Information, Manufacturing and Minerals (IMM) Group contains the core of CSIRO's research focus in the ICT, astronomy, services, health, manufacturing, minerals, chemicals and infrastructure sectors. The focus of the operational units in the IMM group is to:

- Understand the universe and its origins;
- Provide innovative mathematical and ICT tools and processes for industry and the community;
- Stimulate and support the creation of sustainable value from Australia's minerals resources over the full market value chain;
- Maximise value to the manufacturing, security and infrastructure sectors by developing and transferring innovative transformational technologies across the sectors including water and energy;
- Develop new materials and products for application in the health and chemical industries.

Prime objectives of the IMM group are to create new industries, and maximise job creation and exports through the development and transfer of novel technologies through the application of physical, mathematical and information sciences and engineering. The IMM Group will exploit the cross-discipline expertise across the full value chain to achieve these objectives, particularly through focussing on a number of major cross-discipline initiatives including the Light Metals Flagship, the Synchrotron Science, Counter-Terrorism and Large Data Sets Major Programs, and new science developments such as the Extended Technology Demonstrator (xNTD) and the Square Kilometre Array (SKA).

Key components of the Group

The Group is represented by:

Divisions	<ul style="list-style-type: none">• Australian Telescope National Facility• Mathematical and Information Sciences• Information and Communication Technology Centre• Exploration and Mining	<ul style="list-style-type: none">• Minerals• Manufacturing and Materials Technology• Industrial Physics• Molecular Science
Flagships	<ul style="list-style-type: none">• Light Metals	
Major Initiatives	<ul style="list-style-type: none">• SKA and xNTD• Large Data Sets• Minerals Down Under	<ul style="list-style-type: none">• Synchrotron Science• Counter Terrorism

Reflection on 2005-06

Efforts to commercialise the groups' science resulted in some significant successes such as the:

- Establishment of new companies AviPep, Advanced Polymerik, DataTraceDNA and Funnelback (Panoptic), Intalysis (Low Frequency Microwave Moisture Analyser)
- The transfer of our Virtual Critical Care technology from the Advanced networking research program to Telstra
- Intellection successfully raising capital from two of Australia's leading Venture Capital firms

Significant effort was invested in major new initiatives and external science collaborations:

- New major initiatives Minerals Down Under (MDU), Terabyte Science, Counter-Terrorism and Sensor & Sensor Networks were all officially established

- Successful installation and commissioning of the Commercial Prototype Air Cargo Scanner at a new Australian Customs facility at Brisbane International Airport.
- A successful project on 'Land Use, Land Use Change and Forestry' (LULUCF) for the New Zealand Ministry of Environment leading to a proposed continental scale national carbon accounting style program for New Zealand.
- Partner with MIT to assist NASA in the development of robotic technology for a return to the moon and Mars
- Formalisation of the planning for the Waterford Minerals and Chemistry Precinct (with Curtin University and the WA State Government)
- Renewal of the AJ Parker CRC for a third 7 year period.
- Collaboration established with Ian Wark Research Institute (Uni SA) in ionic liquids research.

The IMM group saw some changes in key personnel and divisional structure during the year which included:

- The transition of Michael Barber to Group Executive with Rod Hill moving to Executive, Business Development;
- Peter Lilly commenced as Chief of Division for CEM during May 2006.
- The new CSIRO division of CMHT was formed in July 2005. The merger was designed to bring together molecular biologists with chemists to develop new technologies from these scientific capabilities.

The Divisions of Exploration and Mining (CEM), Minerals (CM), Molecular and Health Technologies (CMHT), Manufacturing and Materials Technology (CMMT) and Mathematical and Information Sciences (CMIS) all completed science reviews in 2005/2006.

Plans for 2006-07:

The group will continue to invest and focus on a number of major initiatives and collaborations during 2006-07, including:

- Significant ramp-up in activity on SKA development path, with CSIRO activity on the extended New Technology Demonstrator (NTD and xNTD) systems providing fundamental technology.
- Minerals Down Under will focus on industry to deliver new engagement models for the minerals domain and to create a vibrant portfolio of projects that will transform the MDU's vision into action.
- Establish the Tasmanian ICT innovation Centre in Hobart with a focus on delivering outcomes for Tasmanian industry in 2 key areas that align with our flagship programs.
- Successful development and operation of a pilot plant for the TiRO process for the production of titanium metal.
- Integration of the capabilities within the Divisions of CMMT and CIP in line with the Science Investment Process recommendations.
- Development of a CSIRO materials science capability including the Advanced Materials Network.
- A Memorandum of Understanding between CMIS and Chinese State Bureau of Surveying and Mapping (SBSM) is expected in mid June 2006.
- Enhance collaboration in Qld via CMIS co-location with CLW, Qld Department of Natural Resources and Mines and Qld Environmental Protection Agency at the CSIRO Long Pocket site, for the Water for A Healthy Country Flagship's Water Resource Observation Network (WRON) Theme.
- Second stage funding for the e-Health research Centre with the Queensland Government and plan a national e-Health research capability.
- Establish a significant collaborative research program between CSIRO, NICTA and DSTO to improve the effectiveness and outcomes of teams interacting over distances.
- Collaboration with Monash University focused on the manufacturing sector.
- Enhance collaborative minerals relationships with Ian Wark Research Institute, Monash University and the University of Melbourne, while establishing strategic relationships at least two major companies in the Australian minerals industry.

The group will continue to develop commercial opportunities for technologies such as:

- The implantable contact lens, a low shrink monomer (which has application as a dental composite), security packaging for pharmaceuticals, Molsar software (to Biorad) and recombinant collagen.
- The Air Cargo Scanner will be the focus of a Rapid commercialisation process.

Key operational activities for the group will include:

- Conducting a science review of the ATNF and implementing the outcomes of the science reviews for the Divisions of CEM and CMIS.
- Build the business case with the Queensland State Government for infrastructure development at QCAT to accommodate growth in ICT and MDU.
- CMIS to move into new purpose built accommodation on Clayton Campus.

Strategy Implementation Goals: IMM Group

Strategic Plan Objective	Strategy Implementation Goals for 2006-07
1.2 Build Critical Mass and Ensure Quality in our Research Programs	Implement the recommendations from the Divisional Science Reviews for CEM, CMIS and CMHT. Development of an integrated CSIRO materials science capability
1.4 Increase the Impact of Major Cross-Divisional Activities through a focused Strategic Investment Process	Commence the work program of the Minerals Down Under MXDP, in particular new engagement models. Expand the activities of the Terabyte Science Theme for funding as an MXDP in the 2007/08 SIP process.
2.1 Concentrate People Processes on Developing, Attracting, Exciting and Retaining Talent	Support PLI by piloting the new approach to Project Management in the Cross-Divisional ICT Mining and Automation Theme.
2.4 Help Australia Play a Leadership Role in Major International Science Facilities such as the SKA	Consolidate the xNTD project as the world-leading development project for key SKA Focal Plane Array Technology. Enhanced engagement with Commonwealth and WA State Government to put Australia in best possible position to secure SKA site. Contribute to the commissioning of the Australian Synchrotron through to opening in April 2007
3.1 Focus and Intensify Collaboration with Universities, CRCs and Other Agencies	Enhance relationships with the Australian Stem Cell Centre through CRC for Polymers. Grow Minerals-related collaborations with Ian Wark Research Institute, Melbourne Uni, Monash Uni Manufacturing collaboration with Monash Uni
3.2 Service the Needs of Government for Informed Policy Setting	Implement the recommendations from the Manufacturing Roadmap.
4.2 Structure Deeper and More Meaningful Relationships with Large Corporations	Maintain and grow focus on key large corporate clients including Boeing and Orica.
4.3 Accelerate the Growth of promising Technology-based SMEs	CMHT will contribute to a successful and growing Australian biomaterials industry
4.4 Reinvent our ICT Capabilities to Strengthen Australia's Knowledge-based Industries	Establish in Queensland a Centre of Excellence in Mining Automation (e-Mining Centre). Deliver ICT strategic input into the Water Resources Observation Network
5.1 Stimulate Future Breakthroughs by Promoting Cross-Pollination, especially in Frontier Research	Deliver emerging science capabilities through the ESI's for Hierarchical Materials, Synchrotron Science and Synthetic Enzymes. Establish the Advanced Materials Network
6.1 Secure Greater Federally Funded Support for CSIRO Science Investment	Strategic input to the development of the investment proposals for NCRIS and coordination with overall CSIRO Strategy in National Facilities
6.2 Proactively Manage Patent and Equity Portfolios to Multiply IP-based Revenue Streams	Air cargo scanner commercialisation arrangements established (RIPPER)

IMM Group Themes: Planned Activities and Outputs by CSIRO Roles

Revenue -- 2005-06 – \$361.6m (Actual) 2006-07 – \$355.4m (Budget)

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1011	Synchrotron Science	1.1m	IMM Group	Development of a new synchrotron science community in CSIRO building on 6 new post doc positions, to build linkages with the Australian Synchrotron and in particular research groups at Monash and Melbourne Universities Establishment of CSIRO as Operator of the Australian Synchrotron if successful in the tender process				X					X	
1048	Counter Terrorism Initiative	2.2m	IMM Group	Scanning technologies for air cargo containers and luggage Real-time bioterrorism surveillance using multivariate time series Threat Assessment methodologies Detection of abnormal behaviour to combat terrorism management of bioterrorist induced outbreaks of diseases and biological warfare agents ad hoc indoor positioning and monitoring network development for emergency personnel		X			X					
1067	National Facility Operations	14.3m	ATNF	Continue to operate the world's most productive radio telescopes in the southern hemisphere									X	
1068	Technologies for Radio Astronomy	6m	ATNF	Deliver 7mm astronomy system Install first stage of Compact Array Broadband Backend Commission high-speed fibre links for data transfer & demonstrate real-time VLBI correlation Commission ATCA Ka-band spacecraft tracking system for NASA				X					X	
1069	Astrophysics	4.4m	ATNF	New tests of general relativity Study formation & evolution of galaxies Survey molecules & pulsars in the heart of the Milky Way Wide area surveys of hydrogen in the Milky Way disk and halo Study of star-formation				X						
1070	The xNTD and SKA Phase 1	4.7m	ATNF	Identify technology choice and preferred design and scope for xNTD/SKA1				X						

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles			Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech	
1071	Gemini & SKA Major National Research Facility Administration	5.3m	ATNF	Contract and theme will conclude in 2007								X			
1057	eHealth	6.7m	ICT Centre	Development of patient-specific computer models for tubular organs in the human body from multi-dimensional medical images					X						
				Development of a second generation system for integrating health data from distributed heterogeneous databases and extending this to at least 2 states.						X					
				Complete application capable of optimising human senses for visualising and interpreting complex information and making best use of human capabilities.						X					
1058	eResearch	5.4m	ICT Centre	Establish a major national research platform for both networking research and supporting collaborative applications					X						
1059	e-Technology	7.5m	ICT Centre	Create the next generation technologies in wireless communications, search and machine vision					X						
1060	ICT for Safeguarding Australia	4.2m	ICT Centre	New technologies for millimetre-wave imaging					X						
				Long stand-off distance detection of explosives for port security						X					
				Spectroscopy characteristics of bio-weapons at Terahertz							X				
1061	Mining ICT and Automation	6.9m	ICT Centre – joint with E&M	Improved automation of mining to create the person-less mine to increase safety and efficiency					X						
				Increasing long wall mine operating efficiencies						X					
				Operator assisted underground explosive loading						X					
				Create tools to improve exploration and extraction of deep earth resources						X					
1062	Sensors and Sensor Networks	6.2m	ICT Centre	New sensor networking technology for large-scale networks.					X						
				Developing tools to handle large numbers of asynchronous streaming data.					X						
				Networking technologies for underwater communications.					X						
				Large-scale sensor networks deployed in diverse environments to monitor and control our water resources, energy usage and improve the sustainability of animal farming						X					

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07	Core Roles	Satellite Roles									
					STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1081	NanoScale Manufacturing	8.85m	CIP	Long term goal to create new elaborate transformation industries to boost Australian export revenue by at least 5% e.g. controlled release rate chromate-free corrosion inhibitors for coatings	X										
				Develop replacement materials, devices and manufacturing processes for existing industries to improve global competitiveness and meet changing legislative requirements.		X									
				Develop the next generation of advanced materials					X						
1082	Enabling Physics for Flagships and the National Innovation System	0.0m^	CIP	Develop supporting technologies for a new Australian titanium initiative.	X										
				Solve the crucial, physics-based problems facing the Flagships			X								
1083	Facility Management	9m	CIP	Prepare the optical fabrication activity for spin out. Continuing to oversee the management of CDSCC			X								X
1084	Biotechnology and Health Informatics	5.7m	CMIS	Establishing a major collaboration in pharmacogenomics	X										
				Validation of biomarkers for colorectal cancer			X								
1085	Decision Technologies	6.5m	CMIS	With key finance sector companies develop and validate risk estimation systems. Modify and apply to other sectors.		X									
1086	Environmental Informatics	4.5m	CMIS	Develop methods for cost-effective design, implementation and management of environmental monitoring systems for reporting at regional, state and continental scales			X								
				Development of cost-effective community based monitoring programs of waterways			X								
				Methods for improved depiction of uncertainty enabling risk informed decisions			X								
				New tools for integrating processes and information across multiple space-time scales for planning purposes			X								
1087	Terabyte Science	1.5m	CMIS	New tools and capability in data and model assimilation			X								
				Identify research options in systems biology					X						

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

^This Theme's entire revenue is with Flagships. Refer Appendix D for investment of Themes across Divisions

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07	STI	IEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
Activities and Outputs for 2006-07										Core Roles	Satellite Roles				
1088	Australian Biotech Growth Partnerships	12.8m	CMHT	Outcomes: New biotech processes and products to significantly enhance the value of our Australian biotech partners	X										
				ESI projects: Synthetic enzymes, Synchrotron science, Nanolitre protein crystallisation, Complex Systems Science					X						
1089	Biomaterials and Regenerative Medicine	7.9m	CMHT	New materials for applications as bioactive and biodegradable scaffolds for controlled growth of cells (including stem cells) and tissues.					X						
1090	Transformational products through Electroactive Materials	11.4m	CMHT	High-throughput Material Science.					X						
1091	Nanobiotechnology; Biologically inspired nanoscale materials for sensing and delivery	7.9m	CMHT	With DSTO, develop materials, sensors and systems for chem/bio threat mitigation via PACCT			X								
				ESI- Hierarchical Materials; develop high throughput techniques for materials discovery				X							
				Design and develop nanomaterials with in-built biological functionality					X						
1102	Process Technologies	7m	CMMT	Proof of concept of low energy pipelining based on hybrid materials	X										
				Demonstrate use of chaotic advection to dramatically increase efficacy of heat transfer in mixing viscous fluids		X									
				Demonstrate jet pump technology for compression of supersonic wet gas streams to recover stranded gas			X								
				Develop terfonel_D films with magneto-restrictive materials properties for self sensing					X						

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1103	Manufacturing Technologies for Transport	10.7m	CMMT	Develop pilot scale Ti-sheet from powder technology					X										
				Transform high temperature/multi operation forming of Mg to single operation low temperature forming through development of new alloy						X									
				Produce scaled up low cost permanent mould process for Mg production							X								
				Demonstrate self-healing in a commercial light alloy									X						
1104	Sustainable Polymeric Materials	11.6m	CMMT	Discover scientific basis for triggered biodegradability of natural polymers					X										
				Proof of concept of use of nano-particles to create transparent and heat reflective material						X									
				Development of combinatorial methods for polymer composites								X							
1105	Security: Infrastructure & Public Safety	16.5m	CMMT	Develop non degrading , halogen replacement fire retardants for polymers and timbers					X										
				Develop integrated engineered systems of materials , devices and intelligence to improve Australia's resilience to terrorist activities, major accidents and incidents						X									
				Develop detection methods at sub 10 molecules sensitivity								X							
1106	Industrial Research Services		CMMT	To ensure high quality products through rigorous testing of manufactured products to Australia/international standards														X	
1053	Wealth from Australian Ores	8.7m	CM	Proof of concept for reprocessing bauxite residue					X										
				Pilot demonstration novel value-added iron ore agglomeration product						X									
				Proof of concept for options to process low grade Australian nickel ores and high impurity Australian iron ores							X								
				Proof of concept of the use of XRD and synchrotron radiation to study in-situ mineral reactions under extreme conditions (Bayer processing)								X							
1054	Mineral processes for Australia	15m	CM	Synergistic solvent extraction implementation consolidated					X										
				SAG mill monitoring implementation consolidated						X									
				Assessment of the potential to use ionic liquids to commercially produce and refine metals									X						

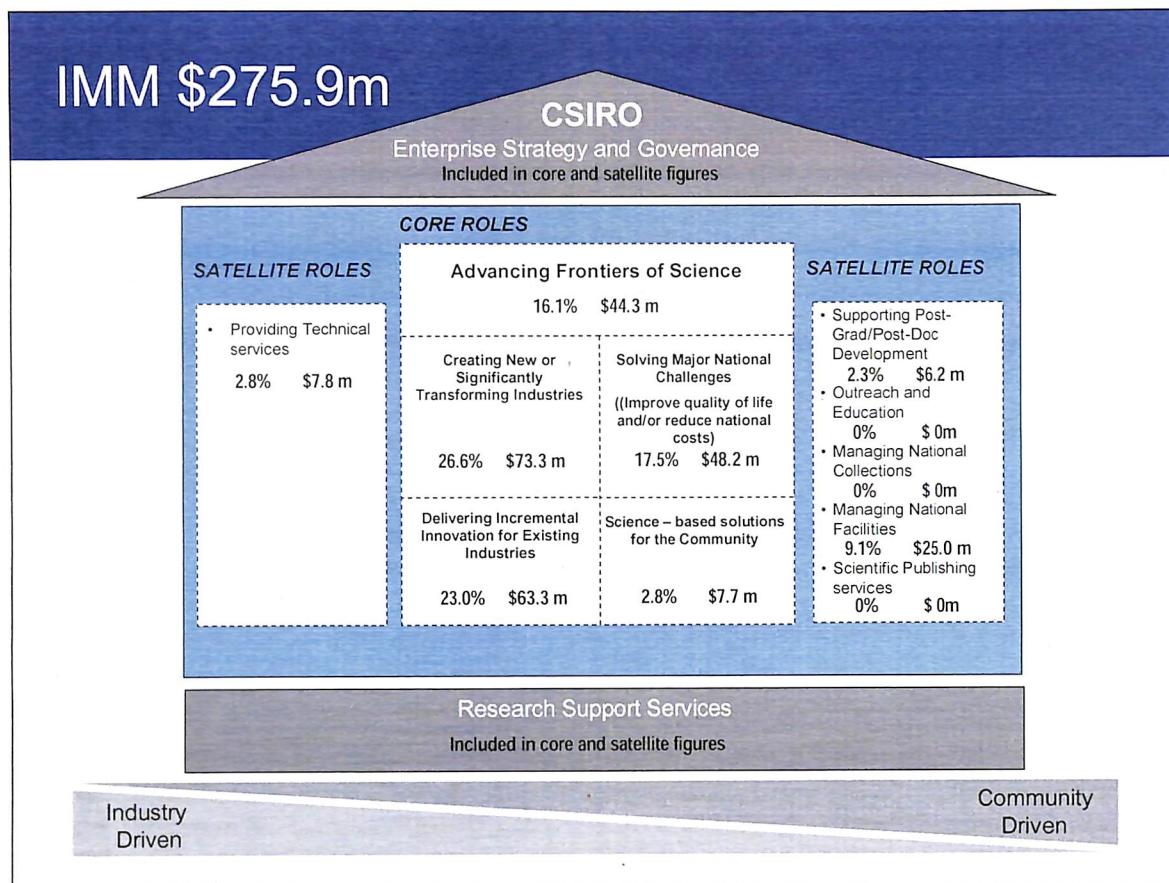
* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1055	Instrument Systems for On-Line Analysis	4.8m	CM	Air cargo scanner commercialised Formal productisation capability established	X		X							
1107	Computational Geoscience for Predictive Discovery	8.2m	CEM	Addition of reactive transport into existing coupled deformation/fluid flow/thermal service, operating on desktop and HPC. Commitment for the State Geological Surveys to establish the SEEGrid production services. Collaborative research with UWA on benchmarking new algorithms for thermal feedback in geomechanical modelling for lithospheric-scale models. Provision of computational simulation services to more than 10 client companies generating targeting outcomes.	X			X						X
1108	Deposit Assessment for Mining	4.1m	CEM	New techniques for remote 3D image acquisition and processing. New automated coal grain analysis and interpretation. Development of a stand-alone software package for disparate data interpretation. New methods for interpreting geophysical borehole logs for coal quality estimation. New developments in the application of 3D images. New understanding and modelling of mining induced rock fracture mechanisms.	X									
1109	Discovery Technologies	5.5m	CEM	Expertise and impetus for a socially responsible seafloor mining industry. Application of hyperspectral characterisation to Ni, Fe and Au industries. Production of the first minerals map of Australia's maritime territories. Remotely sensed environmental monitoring for Al, Fe, Ni and mineral sands mining and processing. Extreme chemistry and synchrotron science experimental work. Leading proponent of a NCRIS National Core Logging Facility.	X			X						X
1110	Exploration and Mining Services	0.2m	CEM	Support the application of a new mining method called Longwall Top Coal Caving. Support longwall automation in the underground coal industry. Apply developed IP and know-how from our research projects to the mining industry problems.	X			X						X

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1111	Near Surface Exploration	4.4m	CEM	Initial detailed investigations on use of biota for exploration in covered terrains in the northern Yilgarn Craton	X									
				Operational techniques for objective logging of regolith.		X								
				Enhanced perceived prospectivity of western Yilgarn Craton.			X							
				Using airborne geophysical data for enhanced biodiversity conservation over a Living Murray "icon" site.				X						
				New techniques in micro-analysis of minerals.					X					
				Application of microbiology to understanding metal mobility.					X					
1112	Sustainable Mining Systems	8.3	CEM	Longwall top coal caving mining method.	X									
				New rock cutting methods (SMARTCUT)		X								
				Large open pit design criteria.		X								
				Mining at depth conditions prediction methods (COSFLOW)			X							
				Social impacts of mining for long term sustainability			X							
				Subsidence reduction.				X						
				Mine ground water control.				X						
				Mine methane capture and utilisation (VAMCAT).				X						
				Continuing activities to support the development of deep sea mining system.					X					
				Input to National Standard development.									X	
1113	Minerals Down Under	9.3	CEM	Establish in Queensland a Centre of Excellence in Mining Automation (the e-Mining centre)	X									
				Secure a minesite partner for demonstrating ROES	X									
				Trial microtunneller as a new drilling tool		X								
				Develop smart lightweight fibre composite for application in the drilling industry		X								
				Establish SEEGRID as national standard for interoperability between all precompetitive data			X							
				Understand iron ore formation processes			X							
				Design technology for underground sand mining				X						

Investment Summary by CSIRO Role – IMM Group



Comparison to 2005/06:

- New or Transformed Industries decreased by 3.3%.
- Major National Challenges increased by 4.5%.
- Incremental Innovation decreased by 3.0%.
- Minor changes in other roles.

Research Units and Capabilities – IMM Group

Australia Telescope National Facility (Chief: Brian Boyle)

Mission:

- To operate and develop the Australia Telescope as a national research facility for use by Australian and international researchers.
- To exploit the telescope's unique southern location and technological advantages to maintain its position as a world-class radio astronomy observatory.
- To further the advancement of knowledge.

Total Budgeted Revenue: \$32.7m (2006-07)

Total Staff: 139 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Telescope Operations (61 FTE)	Benchmark (s)	Maintain capability underpinning productivity from current facilities while redirecting resources over time to operation of new facilities in WA.
Receiver Technology (29 FTE)	Benchmark (s)	Maintain support for current facilities and grow by seeking external instrumentation contracts.
Signal Processing (19 FTE)	Benchmark (s)	Grow, particularly in areas relevant to focal plane array and other technologies relevant to the next generation telescopes such as xNTD and SKA.
cm-wave Astronomy (14 FTE)	Benchmark (s)	Maintain, with possibly a small short-term decrease to facilitate growth in mm astronomy.
mm-wave Astronomy (4 FTE)	Strong (s)	Grow to fully exploit window of opportunity provided by new mm systems on Compact Array and Mopra, which offer a unique view of the universe until ALMA starts operations (expected in 2009).

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

ICT Centre (Chief: Alex Zelinsky)

Mission: Innovative ICT to transform Australian Industries

Total Budgeted Revenue: \$47.4m (2006-07)

Total Staff: 224 (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Antennas & Propagation (20)	Benchmark (s)	Maintain
Communications & signal processing (20)	Benchmark (s)	Maintain
Distributed Intelligence (15)	Developing (s)	Grow capacity and depth
Human factors (20)	Favourable (s)	Develop strength to support collaborative research
Information Retrieval (20)	Benchmark (s)	Maintain a key strength
Medical Imaging (17)	Favourable (s)	Develop
Millimetre – wave techniques (10)	Favourable (s)	Maintain
Multimedia (10)	Favourable (s)	Maintain
Network Science (15)	Favourable (s)	Develop depth
Robotics (25)	Benchmark (s)	Grow capacity by recruitment.
Security and Privacy (12)	Developing (s)	Develop capability – critical to a large proportion of projects in networking, e-Health, Sensors and Sensor Networks, ICT of r Safeguarding Australia
Web Services (20)	Favourable (s)	Maintain

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

Industrial Physics (Chief: Calum Drummond)

Mission: We apply our specialised knowledge of physical science to create value for Australia through the formation of new industries and enterprises, by enhancing the performance of existing industries and by underpinning elements of the National Innovation System.

Total Budgeted Revenue: \$27.1m (2006-07)

Total Staff: 142 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Nano science (17 FTE)	Benchmark/Strong (f) – Mar 05	All CIP Capabilities are currently under review as part of the consideration of the Materials Science Capabilities in CMIT and CIP. The Capability and Theme plans are yet to be developed for 2006-07
Intell. Sensing Systems (14 FTE)	Strong (f) – Mar 05	
Superconductivity (16 FTE)	Benchmark (f) – Mar 05	
Surface Science (23 FTE)	Strong (f) – Mar 05	
Electrical Machines (9 FTE)	Strong (f) – Mar 05	
Other (20 FTE)	Benchmark (f) – Mar 05	

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

Mathematical and Information Sciences (Chief: Murray Cameron)

Mission: We deliver impact for information-intensive industries through productive partnerships and research excellence in the mathematical sciences.

Total Budgeted Revenue: \$26.1m (2006-07)

Total Staff: 141 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Computational Mathematics (20 FTE)	Strong (s)-Mar06	Plans to grow both quality and capacity in this capability - particularly through terabyte science.
Mathematical & Statistical modelling & Inference (56 FTE)	Favourable (s)-Mar06	Positive trajectory with a number of cross stream strategic activities providing critical mass.
Image Segmentation & Classification (12 FTE)	Strong (s) – Mar06	Expect level trajectory while consequences of changes in staffing equilibrates
Simulation & Optimisation (16 FTE)	Strong (s) – Mar06	Potentially positive trajectory with a number of key results in adaptive supply networks ...
Quantitative Risk Management (15 FET)	Tenable (s) – Mar06	Positive trajectory as strong local status and industry impact is translated to the international research community.

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

Molecular and Health Technologies (Chief: Graeme Woodrow)

Mission: We will transform industries and improve health and wellbeing by delivering creative molecular technologies

Total Budgeted Revenue: \$55.2m (2006-07) Total Staff: 300 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Biomaterials (24.8 FTE)	Favourable (f)-Oct05	Grow in line with Biomaterials Theme
Product Security (7.0 FTE)	Strong (f)-Oct05	Grow in line with Electroactive Materials Theme
Bioactive Molecules (27.6 FTE)	Tenable (f)-Oct05	Reduce capability and re-align with Biomaterials and Australian Biotech Growth Partnerships (ABGP)
Industrial Biotechnology (13.0 FTE)	Favourable (f)-Oct05	Maintain and focus capability in line with the Building Bioindustries XDT
Diagnostic Markers (21.2 FTE)	Favourable (f)-Oct05	Reduce capability and marry with materials to create a nanobiotech capability.
Nanostructured Materials (16.0 FTE)	Strong (f)-Oct05	Increase capability and increase interactions across CSIRO
High Performance Polymers (15.7 FTE)	Benchmark (f)-Oct05	Grow in line with Electroactive Materials Theme
Advanced Composites (9.8 FTE)	Favourable (f)-Oct05	Significantly reduce/phase out capability and transfer skills to Electroactive Materials Theme
Protein Engineering (27.4 FTE)	Benchmark (f)-Oct05	Maintain capability but redirect from diagnostics into Nanobiotechnology and AGBP Theme
Biomarkers and Proteomic Technologies (21.6 FTE)	Weak (f)-Oct05	Significantly reducing this capability area and marrying it with materials to create Nanobiotechnology Theme
Protein Science and Therapeutic Design (50.0 FTE)	Strong (f)-Oct05	Maintain capability but re-align with Australian Biotech Growth Partnerships Theme

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

Manufacturing and Materials Technology (Chief: Vicki Tutungi)

Mission:

Create impact in manufacturing industry through the innovative design and development of polymeric, metallic and adaptive materials

Total Budgeted Revenue: \$74.3m

Total Staff: 442 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Urban Systems Integration (76 FTE)	Strong (f)- Oct 05	Transferred to the Sustainable Energy and Environment Group.
Fire Science (41 FTE)	Benchmark (f)-Oct 05	Maintain but focus on understanding the interactions between surface chemistry , micro flammability and material performance as an underpinning capability of advanced materials and finalise the move out of fire modelling
Thermal and Fluid Dynamics (26 FTE)	Strong-plus (f)-Oct 05	Maintain the capability with focus on synergy of low friction materials and fluid dynamics for petroleum and minerals industries. Grow micro fluidics capability to support nano-manufacturing devices and identify science collaborators to move capability to benchmark
Metallurgy (51 FTE)	Strong-plus (f)-Oct 05	In conjunction with Monash and light metals flagship create integrated Benchmark capability.
Manufacturing Infomatics (31 FTE)	Favourable-plus Oct 05	Transfer to the Sustainable Energy and Mathematics and Mathematical and Information Sciences
Optics & Diffraction (19 FTE)	Benchmark (f)-Oct 05	Expand capability through greater interaction with Synchrotron Science MXDP (and ESI) and terabyte Science MXDP- link to security
Ionic & Electronic Materials (11 FTE)	Strong-minus (R) Strong(I)-Oct 05	This capability is in the main moving to CET
Nanostructured Materials (50 FTE)	Strong (R) Benchmark (I) - Oct 05	Critical capability to advance materials. Expand with particular emphasis on combinatorial methods
Interfacial Science (36 FTE)	Strong-plus (f)-Oct 05	As part of the focus on advanced materials Expand in conjunction with CSIRO (ESI-Hierarchical materials) and International partners (TNO on self repair) both in commitment and quality
Sensing and Interpretation (26 FTE)	Favourable (f)-Oct 05	Strengthen the science quality through internal collaborations (Terabytes Science and Sensor and Sensor Networks) .
Combinatorial Methods and Multi-Scale Modelling (10)	New	Develop this new advanced modelling capability in conjunction with CIP to underpin focus on advanced materials

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

Minerals (Chief: Bart Follink)

Mission: to double Australia's wealth from world-class minerals processing by 2020 while drastically reducing environmental impact.

Total Budgeted Revenue: \$50.1m (2006-07) Total Staff: 289 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Alumina production technologies (35 FTE)	Strong (f)-Apr 05	Maintain but with increased environmental emphasis
Hydrometallurgy (25 FTE)	Favourable (f)-Apr 05	Maintain but with increased focus on modelling and collaboration with CLW on bioleaching
High temperature processing (29 FTE)	Strong (f)-Apr 05	Maintain but with increased emphasis on cross-discipline applications; e.g., use of biomass and waste processing
Mineral beneficiation/iron ore processing (34 FTE)	Favourable (f)-Apr 05	Maintain but increased emphasis on automating characterisation and linking of characterisation with downstream processing performance
Material characterisation (25 FTE)	Benchmark (f)-Apr 05	Slight growth through QEMScan at Waterford and increased synchrotron and neutron beam applications
Computational and physical modelling (17 FTE)	Strong (f)-Apr 05	Grow through capability development in multi-scale modelling, large eddy simulation and CFD-based process control
On-line analysis (34 FTE)	Strong (f)-Apr 05	Slight growth through enhancing capability to convert instrumentation concepts to market-ready products ('productisation')
Light metals production technology (27 FTE)	Strong (f)-Apr 05	Slight growth through LMF; increased effort in ionic liquids electrochemistry both internally and through collaborations.

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current

Exploration and Mining (Chief: Peter Lilly)

Mission: CEM develops technologies to find and mine Australian coal and mineral ores.

Total Budgeted Revenue: \$42.5m (2006-07) Total Staff: 195 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Computational Geoscience (22 FTE)	Favourable to Strong (s=March 2006)	Maintaining capability and developing status to Strong to Benchmark in areas such as computational simulation of geological processes, data standards and interoperability and geophysical inversion. Transfer some capability to commercial entity at conclusion of CRC.
Ore Systems (14 FTE)	Favourable (s=March 2006)	Growing capability in key commodity areas (Ni, Cu-Zn), marine geoscience and by rebuilding capability in geochemical characterization through collaborative links with major infrastructure centres (e.g., Synchrotron, John de Laeter Centre).
Spectral Sensing (12 FTE)	Strong (s=March 2006)	Maintaining capability through commercialization of mature technologies and developing new platforms
Regolith Geoscience (13 FTE)	Strong to Benchmark (s=March 2006)	Some diversification in capabilities (microbiology, biogeochemistry, geophysics), but total effort set to decrease in medium term as CRC partnership ceases
Mining Geoscience (22 FTE)	Favourable to Strong (s=March 2006)	Maintaining capability, with increasing status through moderate growth in medium term in 3D imaging and analysis and in microseisms.
Sustainable Mining Systems (28 FTE)	Strong to Benchmark (s=March 2006)	Growth of R & D capabilities through (a) long-term strategic alliances with major mining companies;(b) increased international linkages; (c) promoting commercial activities in: (i) ground monitoring systems and (ii) with mining equipment manufacturers
Mining Automation, ICT & Autonomous Systems (16 FTE)	Strong to Benchmark (s=March 2006)	Growth by developing new partnerships, increased international links and opportunities and increasing commercialization of research outcomes.

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

NB Formal ranking being undertaken through Divisional Science Assessment Review, June 2006

(s) indicates a current self-assessment

B4 – Sustainable Energy and Environment Group

Group Executive: Steve Morton

Overview

By taking a systems perspective, the SEE Group aims to deliver capability in describing, modelling, managing, and predicting how industries, regional economies, entire ecosystems, and human communities can work best within the context of environmental and energy issues affecting Australia.

The future of Australia, the Asia-Pacific region, and indeed of the whole world, is being re-shaped by the forces of ongoing technological revolution, trade reform, energy demand, natural resource quality and security, greenhouse gas emissions, climate change and variability, biosecurity concerns, poverty alleviation and cultural disharmony. A positive CSIRO response to the interplay of these challenging forces involves effective and innovative deployment of knowledge. By capitalising on systems thinking, new enabling technologies in the mathematical and information sciences, and integration of biogeochemical and social sciences, sustainability science will contribute significantly to new industries, new employment opportunities, and new capabilities for managing natural and man-made systems. In the next decade, SEE sustainability science expressed through Team Australia partnerships will underpin a dynamic Australian economy and determine our future standard of living, while conserving intergenerational equity.

The prime objectives of the SEE Group are to:

- conduct leading edge R&D to underpin the development of the Australian economy by ensuring the well-being of its people through the provision of knowledge, ideas, and innovations that lead to
- new industries and technologies,
- delivery of clean and competitive energy,
- better environmental health, and
- new ways of managing complex systems.
- enhance our capacity to develop path-breaking solutions by operating at the interfaces of the biological and physical disciplines, the social sciences, economics and the information sciences.

Key components of the Group

The Sustainable Energy and Environment Group comprises the following five Divisions and three Flagships:

Divisions	Energy Technology Land & Water Marine & Atmospheric Research	Petroleum Resources Sustainable Ecosystems
Flagships	Energy Transformed Water for a Healthy Country	Wealth from Oceans

Reflection on 2005-06

Prior to the implementation of the Science Investment Process, the Group had already taken several steps to focus its capabilities:

- in environmental biotechnology, effort was centred in CSIRO Entomology by transfer of staff from Land and Water and Sustainable Ecosystems;
- in farming systems, R&D was focussed in CSIRO Sustainable Ecosystems by transfer from Land and Water;
- CSIRO Land and Water's theme redesign was endorsed and built on by the outcomes of the inaugural Science Investment Process;
- CSIRO Marine and Atmospheric Research came into being in a successful merger; this Division, too, redesigned into a new set of Themes;
- CSIRO Sustainable Ecosystems underwent significant staff redeployments.

The three Flagship programs each developed further plans for investment in the first round of the Science Investment Process, including some refocusing:

- Energy Transformed decided on early exit from Intelligent Transport Systems, while continuing to invest substantially into post-combustion capture of CO₂;
- Water for a Healthy Country has assembled plans for a new Theme to develop a Water Resources Observation Network;
- Wealth from Oceans has built its fourth Theme in sustainable marine resource use.

Significant effort was invested in major external science partnerships, in most cases with active involvement of our Flagships:

- CSIRO Marine and Atmospheric Research continued developing a partnership with the Bureau of Meteorology for co-development of an Australian Community Climate and Earth System Simulator, the next generation of climate modelling;
- CSIRO Marine and Atmospheric Research and the Bureau of Meteorology have also advanced during the year towards agreement to bring their climate and atmospheric scientists together into a Joint Centre;
- the Western Australian Energy Research Alliance continued to develop R&D partnerships in oil and gas, with CSIRO Petroleum Resources a major contributor;
- CSIRO Energy Technology has led development of a substantial proposal to the Low Emissions Technology Demonstrator Fund, in partnership with the private sector;
- CSIRO Marine and Atmospheric Research remained a key player in development of the multi-million dollar Western Australian Marine Science Institution;
- The group has submitted cross-Divisional proposals to the Australian Government's important Commonwealth Environmental Research Facility;

The most notable key staff transition for the group for 2005-06 was Tom Hatton replacing Colin Creighton as Director of the Water for a Healthy Country Flagship.

Science Reviews for CSIRO Marine and Atmospheric Research, Sustainable Ecosystems, and Land and Water revealed generally satisfactory quality; with recommendations currently being implemented.

Plans for 2006-07

The SEE Group will focus on six areas of growth in 2006-07. The areas listed below outline the broad issues and high-level CSIRO activities, further information on the activities and outputs in these areas is available in the Theme tables in the following pages.

Energy

We need to help Australia achieve the goals of reliable supplies, competitive prices and low emissions from fossil fuels and hybrid renewables. New investment will focus on three fields.

Energy security: Australia will remain dependent on coal for stationary energy generation and significant export income; it will face increasing reliance on imported oil supplies; and its abundant natural gas for exports will be a significant generator of wealth. R&D challenges exist right along the gas and oil value-chain from exploration to processing and transport.

Post combustion capture: As carbon constraints grow, coal-fired power plants with operating lives out to 2050 are at risk of becoming stranded assets. A major thrust is to develop a demonstration program of the capture of CO₂ from dilute flue gases, with the potential of making conventional coal-fired power almost emission free in the short to medium term.

Geosequestration: The most likely option for storage of CO₂ is its sequestration in stable deep seams. There are many hurdles needing to be jumped before implementation.

Climate

The issue is climate change, and concomitant change in climate variability, forced by human-induced global warming. Present organisation and resourcing of climate science in Australia will be inadequate to deliver scientific answers to the big questions now being asked. Hence, CSIRO will

work in partnership with the Bureau of Meteorology and Australian Universities to build a national Earth System Simulation capability for Australia. The climate science is essential to underpin mitigation and adaptation for systems facing climate variability.

Water

Australian governments face a massive challenge to uphold the National Water Initiative, our national blueprint for water reform. Key to improved management of water resources is an information system that tells us how much water we have now and expect to have in the future, who is using it, and how it is being traded. CSIRO will lead the design and establishment of a national Water Resources Observation Network, a distributed information system for acquiring, storing and interpreting data and forecasts pertinent to water resource management. The Network will enable governments, investors and the community to: elucidate water losses; anticipate changes in water availability; and evaluate environmental flow allocation and regulation.

Coasts

Coastal assets have huge value to Australians. If we can manage the coastal zone better, by even a small increment, massive economic benefit could accrue. As 86% of Australians live in the coastal zone, and virtually everyone celebrates it, there is also massive social benefit to be captured by managing coastal resources better. CSIRO is developing leadership in coastal zone management, and a strategy for linking its various R&D efforts. The objective is to develop a cogent strategy for resourcing and organising its research relating to this national priority issue. The initiative will develop carefully during this period.

Oceans

Australia's marine ecosystems appear to be relatively healthy compared to those in other parts of our region and the world, providing us with the chance to use them wisely. Marine policy is moving rapidly away from managing individual elements towards management of multiple use impacts on whole ecosystems. CSIRO has developed a management strategy evaluation framework to tackle these issues; the framework will be enhanced to enable rapid uptake and use by policy makers and management authorities.

Sustainable cities

Sustainable development of urbanising landscapes is one of the key challenges for Australia. Solutions are required to the problems that characterise much of the nation's rapidly expanding urban footprint. Poor integration of water, transport and energy infrastructure will have decadal level consequences for the economy. Hence, the Group is taking on leadership across CSIRO in bringing biophysical science, social science, engineering and natural resource management to bear upon questions of urban system design.

More generally across the group:

- Work will continue to ensure the smooth operation of our three Flagships and the delivery of substantial results. The major issues still requiring attention are now confined to communications and business development.
- It is expected that a Joint Centre in climate and atmospheric research, in partnership with the Bureau of Meteorology, will come into being during the period.
- Effort will continue to be invested in developing external partnerships with the WA Energy Research Alliance, with the WA Marine Science Institution, with an emerging alliance called Agriculture Research Western Australia, and with Universities and Government in Queensland.
- A set of cross-Divisional themes in Agricultural Sustainability will be implemented early in 2006-07.
- Development of a more deeply integrated set of Themes addressing energy and reduction in greenhouse gas emissions will take place.
- Work will continue with development of our coastal initiative, A Vital Coastal Australia, as a cross-Divisional program. It is hoped that this effort will be boosted through the Commonwealth Environmental Research Facility.
- We anticipate development and implementation of research programs that will deliver directly to policy and management on issues of coasts, social and economic integration, marine biodiversity, tropical landscapes and the Great Barrier Reef through the Commonwealth

Environmental Research Facility, and its subset the Marine and Tropical Science Research Facility.

- We expect to wind up the Climate Cross-Divisional Program, while ensuring continuation of key activities, such as maintenance of networks, through CSIRO Marine and Atmospheric Research. Emphasis will be placed during the year on ensuring coordination of our work in climate impacts and adaptation.

Strategy Implementation Goals: SEE Group

Strategic Plan Objective	Strategy Implementation Goals for 2006-07
1.1 Play a Significant Role in Delivering on Australia's National Research Priorities	Work with agencies through NCRIS and other processes to develop an integrated marine observing system (IMOS). Water Resources Observation Network instituted. Post-combustion capture research to play a significant role in delivering on NRP 1.4. Comprehensive, domain-wide strategy for future energy R&D with stakeholder buy-in.
1.2 Build Critical Mass and Ensure Quality in our Research Programs	Complete the implementation of the outcomes from the CMAR, CLW, CSE and CET science reviews.
1.3 Champion Flagships to improve the lives of Australian's and Advance Australia's Key Industries	Fostering of further growth in the engagement of CSIRO Divisions with the Energy Transformed, Wealth from Oceans, and Water for a Healthy Country Flagships.
1.4 Increase the Impact of Major Cross-Divisional Activities through a focused Strategic Investment Process	Increased focus and coordination in the energy and climate, agricultural (Agricultural Sustainability), urban (Sustainable Cities), coastal (AVCA) and water (WRON) domains through cross Divisional alignment and collaboration.
3.1 Focus and Intensify Collaboration with Universities, CRCs and Other Agencies	Implement the joint centre with the Bureau of Meteorology. Agreement of research programs with partners in the Western Australia Marine Science Institution. Development of the first CO ₂ sequestration pilot in Australia in partnership with the CO ₂ -CRC. Continue to build on collaborations with State and Territory governments, universities and industry to develop tropical science and indigenous research facilities. Intensify collaborations with universities and other agencies through the eWater CRC and CRC LEME.
3.2 Service the Needs of Government for Informed Policy Setting	Deliver research outcomes for utilisation in policy development on natural resource management through participation in the Commonwealth Environmental Research Facility and the Marine and Tropical Science Research Facility.
4.2 Structure Deeper and More Meaningful Relationships with Large Corporations	Continue to develop with Murrumbidgee Irrigation Limited science opportunities at the CSIRO Land and Water Griffith lab. Deepen relationships with BP, BHP, Orica and SKM and continue to build on existing relationships through WAERA. Focus low emission clean coal technologies for engagement with the coal industry's Coal 21 Fund and the LETDF.
5.1 Stimulate Future Breakthroughs by Promoting Cross-Pollination, especially in Frontier Research	Participate actively in development of sensor technologies for environmental monitoring.

SEE Group Themes: Planned Activities and Outputs by CSIRO Roles

Revenue -- 2005-06 – \$247.5m (Actual) 2006-07 – \$264.5m (Budget)

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles			
				STI	IEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1094	Complex System Science	1.9m	CMAR	A set of new Divisional projects, identified with a CSS stream and participating in knowledge exchange across the CSS network,					X					
1095	Climate, Weather and Ocean Prediction	10.4m	CMAR	In partnership with the BoM and Australian Universities, commence development of 'ACCESS'. Deliver a first-generation ocean forecasting capability to the BoM and the Royal Australian Navy.		X								
1096	The Living Atmosphere	11.3m	CMAR	New roles in 3 Flagships: pHealth (air pollution & weather exposure), Energy Transformed (wind power / alternative fuels & geo- sequestration), Light Metals (environmental performance		X								
				Atmospheric measurements of CO2 geo-sequestration commenced (Otway Basin) with the Greenhouse Gas Technologies CRC.			X							
				New detection methods trialled.				X						
1097	Marine Ecosystems and Resources	18m	CMAR	Improved tools and approaches for the sustainable management of Australia's marine resources and ecosystems particularly for the Commonwealth governments \$220m fisheries restructuring package.			X							
1098	Integrated Coastal and Ocean Management	10.8m	CMAR	Improved tools for assessment, prediction and management of Australia's coastal marine ecosystems - WA, Tasmania, NSW.		X								
1099	Marine National Facility	8.9m	CMAR	A strategic action plan to assure the continuing excellence of Australia's national research fleet.							X			
				Nine voyages led by Australian scientists to conduct ocean based research in support of National Research Priority Goals.							X			
1012	Resilient Regions and Communities	11.1m	CSE	Indigenous engagement facility developed and new relationships with northern indigenous organisations developed and strengthened		X								
				Development of the Community Partnership Initiative to deliver natural resource governance knowledge			X							
				Complex Systems Science ,particularly as it applies to urban and regional systems and dynamic resilience of landscapes				X						

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1013	Sustainable Rural Livelihoods	12.9m	CSE	Building on sugar and viticulture experience to deliver value chain research to new agri industries	X									
				Linking decision support to climate across scales; farming systems to adaptive governance			X							
				Integration and intervention science for rural livelihoods				X						
1014	Healthy Ecosystems	9.8m	CSE	Research to underpin vegetation managm't in NSW and Aust; delivered to NSW Environmental Trust			X							
				Frameworks developed for rewards for biodiversity conservation in pastoral environments				X						
				Further exploring the application of mathematical modelling to spatial biological issues					X					
1015	Investing in Sustainability	3.2m	CSE	Integration of CMIT and CSE capacity in urban systems to achieve cross-scale urban research and knowledge applications from single buildings to urban regions				X						
				Dev of experimental economics capacity, particularly its application in social & economic integration					X					
1101	Future Cities	5.7m	CSE	Develop improved framework and tools for the lifecycle and automated eco-efficiency assessment of buildings and infrastructure	X									
				Development of prototype urban sustainability frameworks and National LCI database for materials eco-labelling and building design			X							
				Risk management models for urban bushfires				X						
				Incorporation of human health considerations into urban development					X					
1117	Vital Coast Aust	0.2m	CLW	Scoping for this potential theme will continue throughout 2006-07			X							
1118	Agriculture, Water and Environment	8m	CLW	Improved management of waste streams for the winery industry			X							
				Further development of irrigation in Northern Australia				X						
				Water a critical resource -identifying water savings					X					
				Tools to link on-farm actions with catchment response.						X				
				New modelling methods to link climate forecast and uncertainty to irrigation system operation							X			
1119	Environmental Biogeochemistry (Centre for Environmental Contaminants Research)	8.6m	CLW	Develop new chelate patents			X							
				Promote adoption of the rapid chelex column method for trace metal bioavailability in waters'				X						
				Advance research on contaminant science in terrestrial systems for regulatory controls					X					
				Produce a national atlas of acid sulfate soils						X				
				Revision of national Sediment Quality Guidelines						X				
				Establish environmental nanovectors and synchrotron science ESI activities.							X			

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles							
									STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub
1120	Water Resources	6.4m	CLW	Increased confidence on the risks to water resources in the MDB from land use and climate change					X									
				Specification of opportunities to restore ecosystem health in saline floodplains					X									
				Assessments of water savings opportunities for Perth's water supply					X									
				Evaluation of engineering solutions for dryland salinity in WA					X									
				Evaluation of the most effective ways to reach river salinity targets in the Lower Murray Region					X									
				Establishment of new water isotope measurement facilities						X								
1121	Rivers and Coasts	7.4m	CLW	Develop and improve methods which identify the sources, pathways and fluxes of sediment, nutrients and pollutants within and between aquatic and terrestrial ecosystems					X									
				Identify the key sources and transport mechanisms of pollutants to the Great Barrier Reef Lagoon					X									
				Develop methods to measure the success or otherwise of national investment in catchment improvement through the National Heritage Trust and National Action Plan for Water Quality and Salinity					X									
				Continue to provide direct advice to ~20 catchment management authorities concerning diffuse pollutant movement and related control measures						X								
				Develop new techniques to identify the sources of carbon in aquatic food webs						X								
1122	Society, Economy and Policy	2.8m	CLW	Application of ARCWIS Water Cultures Model to alternative novel urban water systems					X									
				Improving benefit cost methodology for planning long term water source development					X									
				Integrating economic analysis with simple river accounting models to provide operational rules that will assist in salinity management						X								
				Application of ARCWIS water recycling attitude behaviour model to the development of water recycling schemes in stressed communities (Goulburn NSW)							X							
				Understanding the influence of time perception on key long term economic decisions through integrated psychological and experimental economic measurement								X						
				Provide spatial, economic and social expertise to develop integrated assessments of alternative policy scenarios													X	

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1123	Environmental Sensing, Prediction and Reporting	9.6m	CLW	Operational Great Barrier Reef Water Quality Remote Sensing System		X								
				Water Resources Interoperability standards developed for eWater delivery into WRON.		X								
				NSW Decision support toolkit produced in TIME modelling environment			X							
1124	Urban and Industrial Water	6.6m	CLW	Supporting water harvesting via new subsurface industry recently emerged from UIW research	X									
				Extending the use of reactive transport models for managing recharge and contaminant exposure pathways		X								
				Guidelines for Indirect potable reuse			X							
				Defining the role of biofilms in disinfectant decay in pipelines			X							
				Indirect potable and non-potable reuse				X						
				New analytical techniques for differentiating industrial from natural contaminants					X					
1049	Advanced Coal Technologies	2.3m	CET	Complete the integration of kinetic models based on high pressure/temperature coal reactions into gasification model	X									
				The Energy Futures Forum final report delivered in December 2006 becomes a springboard to new commercial opportunities with States and industry and new international research collaborations.		X								
				Completion of first stage performance benchmarks for new gas separation membranes in cLET programs	X									
1050	Hydrogen and Renewables	3m	CET	Produce first solar thermal hydrogen from CSIRO membrane reactor at NSEC		X								
				Establish first Australian laboratory for lifetime performance measurement of organic photovoltaic devices	X									
				Develop the computational models to calculate the spectra of theoretical dyes for application in solar cells					X					
1051	Distributed Energy and Storage	0.9m	CET	First working demonstration of the use of multi agent systems techniques to optimise electrical loads and generators at the CSIRO Energy Centre	X									
				Complete the first phase of a new program to integrate energy storage with renewable energy to reduce the impact of intermittency of electricity production		X								
				Modified molecular chemistry of ionic liquids enables energy storage devices to operate over full temperature range				X						

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

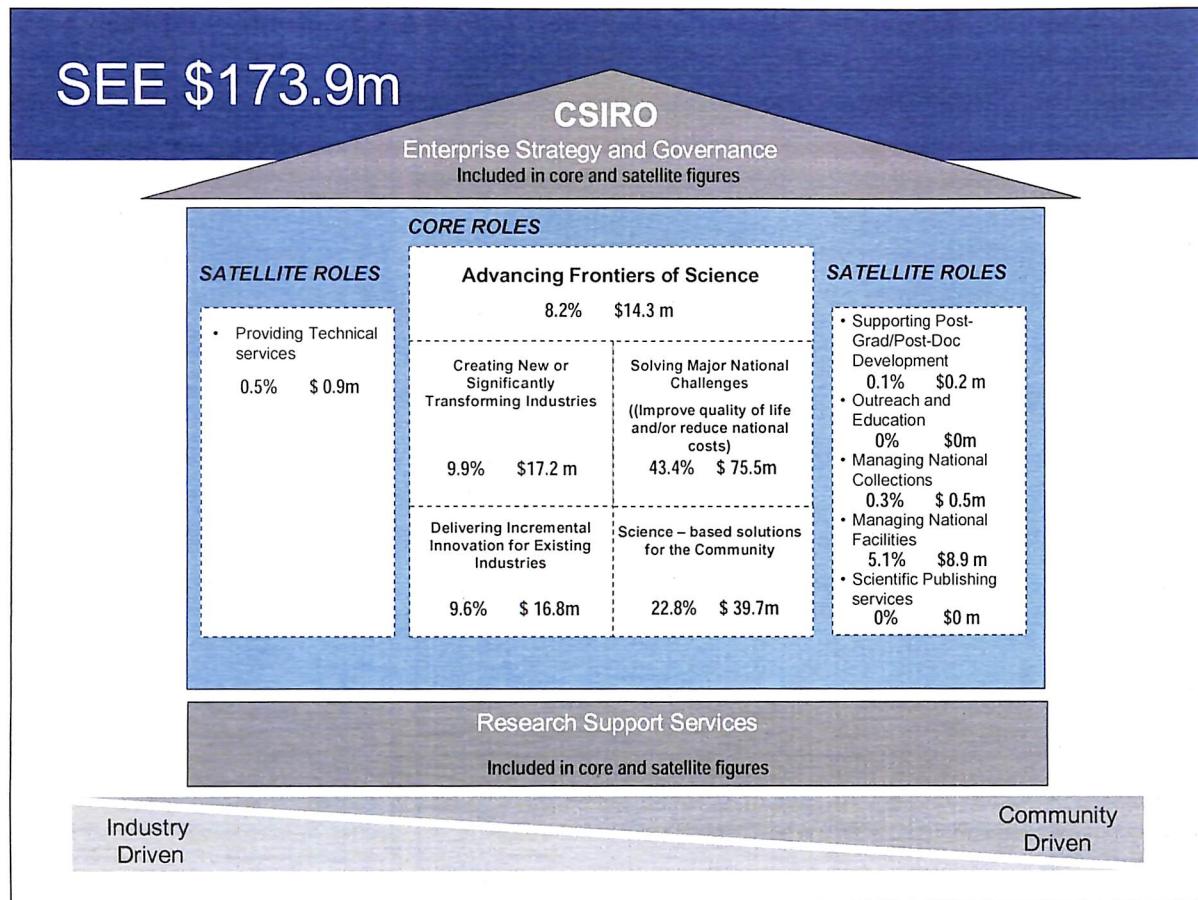
SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07					Core Roles		Satellite Roles			
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech
1127	Improving Existing Energy Infrastructure	6.3m	CET	Apply the science outcomes of the Flagship program on sequestration in coal to regional studies in conjunction with the CO2CRC		X								
				Complete next stage of a coal industry led program to fully adopt the instrumentation and control technologies developed with ACARP over the last five years		X								
				Commence two major post combustion CO2 capture projects with industry partners and state/Federal governments	X									
				Establish the air quality impact of ethanol in fuel				X						
1092	Maximising Australia's Oil Self-Sufficiency	11.2m	CPR	Geobiology: Interaction of microbes in the deep biosphere with mineral forming and oil-alteration processes	X									
				Near well bore reservoir tool prototype field trial		X								
				Hydrate nucleation product tests for pipeline flow assurance		X								
				Seabed response to climate change			X							
				Submarine groundwater discharge/subsidence risk maps for Gippsland			X							
				Digital rocks – pore-scale modelling of recovery processes				X						
				Nanosensor trials for hydrocarbon seep/spill identification				X						
				Industry short courses in exploration and appraisal technology					X					
				Data-bases of regional hydrodynamics										X

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

SIP No.	Theme Name	Budget 06-07 *	Host	Activities and Outputs for 2006-07							Core Roles		Satellite Roles			
				STI	IEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub	Tech		
1093	Growing Australia's Methane Economy	5.1m	CPR	Developing new approaches to the conversion of natural gas to hydrogen and liquid fuels	X											
				Improved reservoir stimulation technologies supporting more cost effective extraction of coal seam gas for Eastern Australia		X										
				Developing reservoir modelling and monitoring technology for potential geological storage sites for carbon dioxide (includes both saline formations and coal)			X									
				Planning for Australia's first CO2 geological storage demonstration project (CO2CRC) to commence in 2007. (Curtin are doing the hack work on modelling the pilot with				X								
				Assessment of methods for up-scaling pore-scale properties to predict macro-scale gas reservoir properties					X							
				Isolation and optimisation of growth conditions of methane producing archaea in Australian coals					X							
				Specialised geomechanical testing services for the coal mining industry											X	

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions). Exclusive of Flagship investments

Investment Summary by CSIRO Role – SEE Group



Comparison to 2005/06:

- Major National Challenges increased by 9.6%.
- Incremental Innovation decreased by 6.7%.
- Minor changes in other roles.

Research Units and Capabilities – SEE Group

Marine and Atmospheric (Chief: Greg Ayers)

Mission: To understand and predict human impact on atmospheric, climate and marine systems and the impact of these systems on the lives of Australians in order to provide advice and applications for the benefit of Australia.

Total Budgeted Revenue: \$88.7m (2006-07) Total Staff: 479 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Aquaculture (19.0 FTE)	Strong (f) July 05	Maintain capability in this area and continue active collaborations (particularly with other CSIRO Divisions)
Ocean & Atmosphere Dynamics (81.4 FTE)	Strong (and upwards, trending towards benchmark in some areas) (f) July 05	Strengthen and extend this capability, in particular through ACCESS partnership with Bureau of Meteorology. High level capability is required to replace senior staff members who have moved into research management roles.
Atmospheric & Marine Biogeochemistry (97 FTE)	Varies from favourable (air quality assessment) to strong (Marine biogeochemistry) to benchmark (Greenhouse observation & modelling) (f) July 05	Maintain capability in this area with some investment needed in cutting edge atmospheric instrumentation.
Impact & Risk Assessment (14.0 FTE)	Benchmark (f) July 05	Extend climate impacts capability to work being done in fisheries and marine ecosystems areas.
Multiple Use Management Strategy Evaluation (43.2 FTE)	Strong to benchmark (f) July 05	Maintain expertise in MSE, risk management and multiple use management. Complementary expertise in social sciences will be developed through partnerships.
Marine Ecosystem Characterisation, Assessment & Prediction (82.84 FTE)	Strong (f) July 05	This is a stable, established capability. A focus for ongoing development is enhanced integration across ecological disciplines and with cognate disciplines. There will also be some rebalancing between observational and modelling capabilities
Marine Genetics & Genomics (10 FTE)	Strong (s)	This is an emerging capability that the Division has developed for the application of advanced molecular and quantitative genetics to marine species.

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

Sustainable Ecosystems (Chief: Andrew Johnson)

Mission: By understanding the connections between natural, agricultural, industrial and urban ecosystems and economic and social processes, and by building effective partnerships, we will underpin Australia's journey towards sustainability.

Total Budgeted Revenue: \$47.2m (2006-07)

Total Staff: 278 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Ecology (85 FTE)	Strong (f) Oct 05	Consolidate on 2005-06 recruitments, numbers remain steady. Invest in strategic partnerships
Farming Systems (85 FTE)	Strong (f) Oct 05	Slight decline in response to Agricultural Sustainability initiative savings, and shift in skill base towards integration
Economic and Social Science (69 FTE)	Favourable (f) Oct 05	Injection of science leadership and underpinning capacity to lift status. Encourage linkages with disciplinary partners
Systems Integration (26 FTE)	Strong (f) Oct 05	Stable staff numbers, but increasing focus for a number of staff working across disciplines.

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

Land & Water (Chief: Rob Vertessy)

Mission: We undertake world-class research and technology diffusion that positions Australia as the acknowledged leader in land and water resource management

Total Budgeted Revenue: \$65.8m (2006-07)

Total Staff: 390 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Hydrology (97 FTE)	Strong (s)	Will grow in quality through 2006-07, attaining benchmark status in 3 years.
Sediment, Water Quality and Aquatic Ecology (80 FTE)	Strong (s)	Will grow in quality through 2006-07, attaining benchmark status in 3 years.
Soil Quality (40 FTE)	Strong (s)	Will grow in size and quality through 2006-07, principally through induction of the Environmental Water Theme from CET, effective July 1, 2006.
Remote Sensing (17 FTE)	Benchmark (s)	Will grow slightly through WfHC Flagship under WRON theme.
Spatial Science (17 FTE)	Strong (s)	Will grow slightly through WfHC Flagship under WRON theme.
Economics (11 FTE)	Strong (s)	Maintain level of investment but grow quality to benchmark over next three years.
Social Science (12 FTE)	Benchmark (s)	Maintain level of investment.
Climate Science (2 FTE)	Strong (s)	Maintain level of investment; main inputs to come from CMAR.
Software Engineering (10 FTE)	Benchmark (s)	Will grow slightly through WfHC Flagship under WRON theme and via the eWater CRC.
Urban Water (50 FTEs)	Strong (s)	Will grow slightly through WfHC Flagship under Urban Waterscapes theme and via the induction of CMIT Future Cities Theme staff, effective July 1, 2006.

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

Energy Technology (Chief: David Brockway)

Mission: To drive Australia's sustainable energy future through scientific excellence and innovation.

Total Budgeted Revenue: \$33.8m (2006-07)

Total Staff: 153 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Chemistry process optimisation (49 FTE)	Benchmark - Strong (s)-March 06	Grow capabilities applied to post combustion capture of CO2; maintain in other areas. Capability recognises the pilot facilities of NSEC, PCC pilot plant, Pressurised Entrained Flow Reactor (gasification), syngas process and separation (cLET)
Energy management, conversion and storage (34 FTE)	Favourable (s) March 06	Grow through external engagement
Energy distribution and control systems (6 FTE)	Favourable (s) March 06	Grow through external engagement
Prototype energy systems (5 FTE)	Favourable (s) March 06	Maintain and identify niche applications
Coal preparation and instrumentation (9 FTE)	Benchmark – Strong (s) March 06	Maintain and leverage industry engagement
Integrated energy and economic systems modelling (5 FTE)	Benchmark – Strong (s) March 06	Diversify and increase national (State Govt) and international engagement, building on Energy Futures
Quantification of emissions from energy cycles (19 FTE)	Strong (s) March 06	Maintain. Extend collaboration with a focus on future energy technology and fuel emissions

* Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

Petroleum Resources (Chief: Beverley Ronalds)

Mission: To deliver science and solutions vital to maintaining a globally competitive and sustainable Australian energy industry, with a primary focus on oil and gas.

Total Budgeted Revenue: \$27.1m (2006-07)

Total Staff: 104 FTE (Jun06)

Capability (Research FTE)*	Status (#)	Trajectory
Petroleum Geoscience (46 FTE)	Favourable July 2004**	A modest increase, particularly in partnership with WA-ERA, with a focus on younger, high profile talent
Petroleum Geo-Engineering (37 FTE)	Benchmark July 2004**	A modest increase, particularly in partnership with WA-ERA, with a focus on younger, high profile talent
Natural Gas Processing (5.4 FTE)	Favourable July 2004**	Strong growth anticipated, especially in Perth, with a mix of research leaders and younger staff.

*Approx number staff in the 'Research' Functional Areas (Scientist/Engineer, Consulting, Management, Projects)

** inferred from CPR Science Review July 2004

(f)-date indicates a formal ranking by a Divisional Science Review Team and the date of review.

(s) indicates a current self-assessment

B5 – Frontier Science and Capability Development

Executive Responsibility: *Geoff Garrett*

Overview

Frontier science and capability development are key factors for sustaining and enhancing CSIRO's relevance and impact.

- Careful attention must be given to the development of new scientific capabilities that will be critical in future applications.
- In order to perform world competitive science, CSIRO must have world competitive scientists. Exceptional scientists ensure CSIRO's future and enhance our ability to increase both the relevance and impact of our work through the increase in quality of research results.

The purpose of this Program is to build competitive research capabilities and advance the frontiers of science by:

- Identifying and seed-funding the establishment of new capabilities in CSIRO;
- Attracting and developing high-quality, early- and mid-career scientists who have the potential to become leading scientists
- Fostering collaboration with Australian universities; and,
- Forming science networks across CSIRO.

When identifying and seed-funding the establishment of new capabilities in CSIRO the focus is significant problems in frontier science – those with the potential for major impact. The program is intended to build research capacity and networks faster than a single Division could by seed-funding high potential impact but high uncertainty multi-Divisional projects.

As well as establishing a new capability, success would result in:

- Major scientific impact through advancing the frontiers of science;
- Options for developing the resulting knowledge/IP that are likely to lead to substantial economic, environmental or social impact; and,
- Links between researchers within CSIRO and between CSIRO and Australian and international researchers.

Early career scientists will be recruited through the CSIRO Postdoctoral Fellow Scheme; mid-career scientists will be recruited through the CE's Science Leaders Scheme. Both schemes are talent driven and target people who have already demonstrated their potential to develop into science leaders.

Reflection on 2005-06 and Plans for 2006-07

CSIRO's capabilities, and gaps in capabilities, were discussed as part of the Science Investment Process in 2005. One learning from this process is a need to strengthen the formal consideration of capabilities and their development in SIP during 2006.

An inaugural set of 6 emerging science projects began in 2005-06. The stretch and challenge in these projects is not as substantial as was hoped for when the Program was being developed in 2004. Consequently, in 2006-07 planning workshops will be initiated in areas identified through the broad direction setting stage of SIP (the biology – materials interface and very large scale environmental sensor networks, for example) and there will be more active guidance toward large stretch, high potential impact projects.

The CE's Science Leaders Scheme was inaugurated in 2005-06. Exploration of the best approaches to engage Divisions in this Scheme will continue in 2006-07.

A coordinating activity, the Science Front, will be introduced in 2006-07 to provide additional support to current activities aimed at promoting science excellence. The Science Front will emphasise the role of creative front line research and will increase science exposure and interaction across CSIRO.

Strategy Implementation Goals: Frontier Science and Capability Development

Strategic Plan Objective	Strategy Implementation Goals for 2006-07
1.2 Build critical mass and ensure quality in our core research programs	Complete the remainder of the Divisional Science Reviews. (RS)
2.1 Concentrate people processes on developing, attracting, exciting and retaining talent	Double the number of post-doctoral fellows beyond the 04-05 target of 300 using Divisional targets and other drivers.(RS) Establish corporate PhD program. (RS) Develop a Science Talent Program. (GG)
5.1 Stimulate breakthroughs by promoting cross-pollination, especially in frontier research	At least five cross-CSIRO emerging science proposals funded for a proof-of-principle research phase (GG)

Frontier Science and Capability Development Themes: Planned Activities and Outputs by CSIRO Roles

SIP No.	Theme Name	Budget 06-07 *	Activities and Outputs for 2006-07	Core Roles					Satellite Roles				
				STI	IIEI	MNC	SSC	AFS	Post	Edu	MNC	MNF	Pub
1114	Frontier Science Initiation	1.67m	Introduce coordinated initiatives (workshops, forums) to promote a higher level of scientific interaction across CSIRO.					X					
1115	Frontier Science Seed Funding	3.60m	Planning workshops will be initiated in areas identified in the broad direction setting stage of SIP as well as more active guidance toward large stretch, high potential impact projects					X					
1116	Science Capability Development	8.22m	Appointment of at least 20 top class post doctoral fellows and continuation of the CEO Leaders Scheme.						X				

* Total budgeted Theme revenue 2006-07 (all sources, all Divisions)

KEY – **STI** - Creating New or Significantly Transformed Industries; **IIEI** – Delivering Incremental Innovation for Existing Industries; **SMNC** – Solving Major National Challenges; **AFS** – Advancing the Frontiers of Science; **Post** – Supporting Post-Gradu/Post-Doc Development; **Edu** – Outreach and Education; **MNC** – Managing National Collections; **MNF** – Managing National Facilities; **Pub** – Scientific Publishing Services; **Tech** – Providing Technical Services. Further information on the CSIRO Role House at Appendix C.

Part C – Supporting the Research Enterprise

Overview

CSIRO is a large and diverse organisation, with talented staff and diverse array of facilities at 57 sites across Australia focused on delivering research outcomes for the nation. In order for our research centred aspirations to be realised CSIRO needs high quality support functions and enterprise governance arrangements.

The organisations strategic and operational performance is overseen by the Executive Team which is chaired by the CEO. A standing agenda ensures regular review of operational performance (research delivery, financial and commercial), developments including progress against the strategic plan and risk assessment and audit. Corporate Groups enable the delivery of the organisations strategic and operational objectives.

Some restructuring of Corporate Groups during 2005-06 was required to match the evolving operational needs of the organisation and to accommodate changes resulting from the review of research support services. The key changes include the formation of a dedicated Business Development group, with the Business Service group gaining oversight of functions such as Property and Facilities, Information Technology and Information Services.

The current configuration and broad responsibilities of Corporate Groups is as follows:

Office of the Chief Executive

Provide effective leadership of the organisation; maintain critical external relationships; sustain the impact and scale of CSIRO's science base through optimising the science investment portfolio while contributing effectively to Australia's science innovation policy.

Business Services

Oversight of Commercialisation and Equity Management; Property and Facilities; CSIRO Information Technology; Information Services; Legal and contract administration.

Communications

Actively promote and enhance the reputation and influence of CSIRO through managing internal and external stakeholders so as to create an environment in which CSIRO is able to achieve its strategic objectives.

Finance and Governance

Includes responsibilities for Finance, Risk Assessment and Audit, Operational Performance and Governance and Policy.

People and Culture

Manage the organisations major change initiatives and people services while enabling the development of high performing teams that work across boundaries so that CSIRO becomes a research enterprise with global reach.

Business Development

Facilitate relationship building between research functions and customers, intermediaries and capital providers who will use and implement the outcomes of the research.

Reflection on 2005-06 and Plans for 2006-07

Applying the lessons learnt from the earlier implementation of an enterprise approach to IT services, CSIRO reviewed and commenced to reorganise its support services from the current Divisional and Corporate based models to an enterprise-wide Research Support Services (RSS) model, with the aim of delivering a consistent level of service and support for research across the enterprise, while reducing overheads through efficiency gains. Current projections indicate that the efficiencies gained through the implementation of RSS will reduce FTE's by about 180, with the financial savings being returned for allocation through the Science Investment Process. In order to further improve the delivery of support services the Business Enabling Technologies Review (BETR) project also

commenced implementation in 2005-06, with the aim of providing phase one of an effective enterprise-wide business software platform by the end of calendar year 2006.

The implementation of the RSS and BETR change projects during 2005-06 has seen significant changes in the line management responsibilities of some members of the Executive Team and a broadening of the responsibilities of the Corporate Groups to include the enterprise-wide management of the support functions. Phase one of the RSS implementation will be operational for the Finance, Contract Administration, Commercialisation and Legal Services functions by July 2006. The People and Culture and Information Services functions will be operational by September 2006, with the Property and Facilities coming on line by March 2007.

While the migration of line management for the support functions to corporate groups will be complete by March 2007, approximately 60% of RSS staff will remain physically within the business units, focussing on the needs of the respective business unit.

Strategy Implementation Goals: Corporate Groups and RSS

Strategic Plan Objective	Strategy Implementation Goals for 2006-07
1.1 Play a significant role in delivering on Australia's National Research Priorities	Demonstrate leadership in refining and focusing Australia NRPs in Minister Bishops upcoming review. (RS)
1.2 Build critical mass and ensure quality in our core research programs	Finalise remaining Divisional Science Assessment Reviews. (RS) Conduct science investment processes to ensure appropriate investment in core research. (RS)
1.3 Champion Flagships to improve the lives of Australians and advance Australia's key industries	Refocus Flagship communication on science achievements rather than on future plans. (RS) Launch Flagship Collaboration Fund.(RS) Continue FOC governance model and integrate with SIP.(RS) Undertake a review of the Flagship initiative.(RS) Implement an integrated Flagship marketing and communication strategy to engage, inform and enthuse internal and external stakeholders (government, research community and the public) about Flagship progress and achievements.(DS)
1.4 Increase the impact of major cross-Divisional activities through a focused strategic investment process	Review science investment process and modify design to address; known issues unable to be resolved in the first round and incorporation of relevant input from post implementation review (RS) Implement enhanced investment process, continuing to improve the relevance and impact of CSIRO's entire portfolio as well as increasing the number and impact of cross divisional initiatives (RS)
2.1 Concentrate people processes on developing, attracting, exciting and retaining talent	Undertake second phase of Strategy-in-Action workshops across CSIRO to enhance senior staff alignment with the strategic directions of the Organisation. (ME & AJ) Develop new HR system for succession management, career planning, people components of capability planning. (ME & AJ) Develop a performance management strategy and support systems, better suited to an organisation of high performing individuals and teams. (ME & AJ)
2.2 Optimise delivery of all research activities by improving project management	Design, develop and deliver initiatives to embed quality project leadership and management practices. (ME & AJ)
2.3 Build our global recognition for science leadership in our chosen science domains	Science Health Report to include qualitative (and quantitative) analysis of scientific outputs. (RS) Through science investment process ensure investment support / build relevant world class science initiatives (and their subsequent benefit for Australia). (RS) Major university partnerships. (RS)
2.4 Maximise Australia's chances of hosting major international science facilities such as the SKA	Deliver CSIRO as Operator of the Australian Synchrotron, and assist in the delivery of Australia as the preferred site for the SKA. (RH) Lead the development and implementation of a National Facilities Management Strategy for CSIRO. (RH) Establish "learning by doing" relationship offices in India and China, and consider medium-terms uses of Montpellier. (RS)

Strategic Plan Objective	Strategy Implementation Goals for 2006-07
3.1 Focus and intensify collaboration with universities, CRCs and other agencies	Successful implementation of Flagship Collaboration Fund Further develop the broader collaborative partnership model.(RS) Finalise the Collaborating with Universities 2005 Report, reporting on the major activities already underway as well as those proposed in the 2004 report.(RS) Develop and implement strategies to improve relationships.(NP)
3.2 Service the needs of government for informed policy setting	Foster CSIRO links with federal and State government departments and agencies to provide effective scientific support for the development of policy and to influence science and innovation policy and promote a broader understanding within CSIRO of the mechanisms available to do this. (GG)
3.3 Enhance communication to raise public and stakeholder excitement and trust in science	Articulate the preferred brand position for CSIRO in line with developing organisational strategies. (RS) Define clear messages, strategies and actions for each stakeholder group and cascade the preferred messages and strategies to the top 300 (via ET, EMC and SIA workshops). (RS) Develop a model to guide media engagement for senior management and scientists by encouraging more public engagements (via media interviews, conferences etc). Maximise the opportunities for CSIRO spokespeople through the delivery of media training and other communication support. (RS) Develop models to guide the Organisation's (i) input into requests for policy development; and (ii) participation in parliamentary and other government committees.(RS) Develop an effective issues management model for each identified area of priority (in relation to science and organisational issues).(RS) Deliver the results of regular stakeholder research to identify the attitudes and needs of stakeholder segments and develop communication strategies for each to support CSIRO's initiatives (this is also relevant to strategic objectives 3.1, 3.2, 3.4, 4.2).(RS)
3.4 Partner with other agencies to advance Australia's global development contributions	Partner to establish CSIRO's presence in China and India. (RS)
4.1 Intensify engagement with rural research and development corporations to grow regional and new industries.	Develop and implement strategies to improve relationships and grow business engagement (RH)
4.2 Structure deeper and more meaningful relationships with large corporations	Develop and implement strategies to improve relationships and grow business engagement.(RH)
4.3 Accelerate the growth of promising technology based SME's	Develop and implement strategies to grow business engagement. (RH)
5.2 Be among the best in governance, OHS&E and performance management processes	Board/ ET/ EMC engagement around the development of the 2007-11 Strategic Plan (GG) Develop and implement initiatives to reduce musculoskeletal injuries across CSIRO, improve environmental performance and waste management and minimise risks (ME & AJ) Further develop Operational Plan and associated Performance Reporting(MW)
5.3 Adopt a unified approach to dramatically improve service and grow top accounts	Develop and implement an Enterprise approach to customer service and business development. (RH)
5.4 Implement standard processes and IT systems to enhance collaboration and efficiency	Continue to enhance delivery of a unified web presence for CSIRO (RS) Implement RSS as per Steering Committee Report and SPOC directions (AJ) Complete Phase 1 Implementation of BETR (AJ, MW) Complete planning for Phase 3 implementation of BETR (AJ, MW)
6.1 Secure greater Federally funded support for CSIRO science investment	Undertake CSIRO lapsing program review including completion of CSIRO impact study (MW). Complete the TFA negotiation for 2007-10 (GG) Develop relationships to secure championship of CSIRO and its positions

Strategic Plan Objective	Strategy Implementation Goals for 2006-07
	across political parties and at all levels of Government and build on the unique strengths of CSIRO and create community interest, excitement and understanding of its work (RS)
6.2 Proactively manage patent portfolio to multiply IP-based revenue streams	Continue with Support for CSIRO RIPPER activities (NP).
6.4 Reduce overhead and purchasing costs and manage balance sheet for reinvestment	Develop a communication "community of practice" which facilitates the integration and rationalisation of communication services across CSIRO. (RS) Create a one-CSIRO finance function that provides high quality, standardised services throughout CSIRO at a lower cost (MW). Extend implementation of enterprise wide procurement contracts to include teleconferencing , freight, data storage, desktop and mid range servers (MW). Deliver savings from RSS implementation (AJ)

Corporate Group Functions: Activities and Outputs by CSIRO Roles

Office of the Chief Executive (Chief Executive: Geoff Garrett, Deputy Chief Executive: Ron Sandland)

The mission of the Office of the Chief Executive is to:

- Provide an effective leadership, governance and strategy framework for the Organisation
- Ensure effective management of critical external relationships
- Provide effective oversight and leadership for the Flagship initiative
- Ensure the sustained impact and scale of CSIRO's science base
- Optimise CSIRO's science investment portfolio
- Contribute effectively to Australia's science innovation policy
- Ensure the effective implementation of CSIRO's operational development and change initiatives.

Total Budgeted Revenue: \$15.9^m (2006-07) \$17.3m (2005-06)

Total Staff: 18 FTE (June 06)

Function/ Theme Name	Budget 06-07 *	Enterprise Strategy and Governance	Research Support Services	Scientific Publishing Services
Strategic Management	4.3m	Continued effective operation of the OCE and the Executive Team Continued successful integration of Flagships into CSIRO Provide high quality advice, coordination and secretariat support Support and enhance the governance of the organisation and its relationship with key stakeholders. Appropriate assessment and monitoring of Flagship risk profile Building and maintain external support for the Flagship initiative Contribute to the government's development of science, technology and innovation policies such that they acknowledge CSIRO's strategic role in the wider innovation system	Full implementation of the Flagship Collaboration Fund, ensure that the fund is operating effectively	n/a

Function/ Theme Name	Budget 06-07 *	Enterprise Strategy and Governance	Research Support Services	Scientific Publishing Services
Science Planning and Investment	2.5m	Modify Science Investment Process based on post implementation review Facilitate science investment process and decisions for 2007-08 incorporating Flagship investment process Organise and conduct ET processes through which priority investment decisions are made	n/a	n/a
Strategy Development	0.7m	Drawing on appropriate internal and external stakeholder engagement, develop CSIRO Organisational strategy for 07-11 Ensure active interaction between CSIRO Strategy Development and the TFA process	n/a	n/a
CSIRO Publishing ²	n/a		n/a	Operate a successful, profit making scientific publishing operation

² CSIRO Publishing is operated as a separate profit centre. It employs approximately 62 FTE staff.

[^] Include \$8.4m for CSIRO Discovery and CSIRO Education

Business Development (Executive Director: Rod Hill)

Total Budgeted Revenue: \$2.4m (2006-07) \$3.0m (2005-06)

Total Staff: 22 FTE (June 06)

Function/ Theme Name	Budget 06-07 *	Enterprise Strategy and Governance	Research Support Services
Business Development	2.4m	<p>Enterprise strategy for business development and customer relationship management.</p> <p>Strategy for the management of National Facilities.</p>	<p>Improved BD across Divisions, Flagships and MXDPs as evidenced by:</p> <ul style="list-style-type: none"> • Implementation of the BD components of BETR. • Market intelligence and pipeline data available across the Enterprise. • Development and implementation of a Key Relationship Management strategy. • Development of a strategy for the coordination of BD, marketing and communications. • Development and implementation of a strategy to improve the culture of customer service. • Successful Industry Roadshows and other marketing activities. <p>CSIRO successful in tendering for Operator of the Australian Synchrotron.</p> <p>Progress with the selection of Australia as the site for the SKA</p>

* Total budgeted revenue 2006-07 (all sources)

Business Services (Executive Director: Nigel Poole)

Mission: To deliver effective commercial services to the Organisation, and to lead in information management, generation of IP returns, and good governance

Total Budgeted Revenue: \$152.4m (2006-07) \$125.7m (2005-06)

Total Staff: 377 FTE (June 06)

Function/ Theme Name	Budget 06-07 *	Enterprise Strategy and Governance	Research Support Services
Commercialisation and Equity Management (Including Exec Director) #	3.3m	Deliver improved outcomes from commercialisation including IP income and assessment of national benefit	Implement RSS business case
Property #	67.5m	Provide effective and efficient Property and Facilities Management services, including implementation of the revised Property Capital Infrastructure Plan.	Implement RSS business case
CSIRO Information Technology	70.3m	Implement recommendations of the IT Review	Deliver improved service levels
Information Services #		Deliver the next stage of the integrated library and records function	Commence implementation of RSS business case
Legal #	8.5m	n/a	Capture benefits from RSS implementation
Contract Administration #	2.6m	Create an integrated function with BETR and other RSS functions, especially legal and finance	Ensure RSS model intact and operating

* Total budgeted revenue 2006-07 (all sources)

These functions are included in the CSIRO Research Support Services major change program.

Communications (Reporting to the Deputy Chief Executive)

Mission: By understanding CSIRO's audiences, we make it easy to communicate one-CSIRO science and value(s)

Total Budgeted Revenue: \$5.0m (2006-07) \$4.8m (2005-06)

Total Staff: 31 FTE (June 06)

Function/ Theme Name	Budget 06-07 *	Enterprise Strategy and Governance	Research Support Services
Reputation Management	5.0m	<p>Delivery of an articulated brand strategy for CSIRO.</p> <p>Define clear messages, strategies and actions for each of the eight stakeholder groups.</p> <p>Development of a model to guide media engagement for all senior managers including media protocols and media training.</p> <p>Develop an effective issues management model for each stakeholder group.</p> <p>Develop an engagement strategy with government.</p>	n/a

* Total budgeted revenue 2006-07 (all sources)

These functions are included in the CSIRO Research Support Services major change program.

Finance and Governance (Executive Director: Mike Whelan)

Mission: To provide CSIRO with high quality and cost effective finance, planning and evaluation, governance and assurance services.

Total Budgeted Revenue: \$21.3m (2006-07) \$14.0m (2005-06)

Total Staff: 39 FTE (June 06)

Function/ Theme Name	Budget 06-07 *	Enterprise Strategy and Governance	Research Support Services
Finance #	\$18.7m	<p>Support the integration of Strategic Investment and budget processes.</p> <p>Improve capital planning processes and achieve greater alignment with the Strategic Investment process.</p>	<p>Create a one-CSIRO finance function that provides high quality, standardised services throughout CSIRO at a lower cost.</p> <p>Support process and system changes associated with BETR project implementation</p> <p>Extend coverage of CSIRO enterprise wide procurement contracts</p>
Governance and Policy	\$0.2m	Support implementation of Uhrig governance reforms with respect to development of statements of expectation and intent and annual compliance reporting	<p>Support development of RSS governance framework</p> <p>Develop revised delegation framework to support RSS and BETR implementation</p>
Risk Assessment & Audit	\$1.2m	Completion of RA&A Operational Audit Plan, providing assurance that Organisational strategies, risks and key controls are managed effectively	Assessment of control framework arising from establishment of Service Centres and implementation of SAP enterprise systems within the BETR project
Operational Performance	\$0.6m	<p>Co-ordinate development of CSIRO Operational Plan and associated performance reporting to Board and Executive Team</p> <p>Prepare Performance section of CSIRO Annual Report</p> <p>Manage 'Impact Review' as input to CSIRO Lapsing Program Review</p> <p>Assist Executive Director Finance and Governance with development of CSIRO input to Triennium Funding negotiations</p>	n/a
Executive Director	\$0.6m	<p>Undertake Impact Review of CSIRO research activities</p> <p>Undertake lapsing program review and coordinate CSIRO TFA bid process</p> <p>Integrate Strategy Development with CSIRO TFA bid process</p>	Support implementation of RSS and BETR enterprise change projects

* Total budgeted revenue 2006-07 (all sources)

These functions are included in the CSIRO Research Support Services major change program.

People and Culture (Executive Directors: Michael Eyles and Andrew Johnson (acting))

Mission:

To develop high performing teams that work across boundaries so that CSIRO becomes a research enterprise with global reach.

Total Budgeted Revenue: \$25.4m (2006-07)

\$12.2m (2005-06)

Total Staff: 66 FTE (June 06)

Function/ Theme Name	Budget 06-07 *	Enterprise Strategy and Governance	Research Support Services
Organisational Development, Leadership and Culture	0.5m	<p>Develop HR system requirements for enterprise-wide succession and capability management and career planning.</p> <p>Design and implement performance management strategy and systems appropriate for an organisation of high performing individuals and teams.</p>	n/a
Management of Major Change Programs – BETR, RSS and PLI (including internal communications)	9.7m	<p>Direct the organisational major change programs, primarily focusing on BETR, RSS and PLI.</p> <p>Chair the strategic program oversight committee (SPOC), ensuring that synergies are driven between programs, that programs perform individually and collectively, and that the organisation's change readiness is improved.</p> <p>Develop a suite of tools to effectively communicate change initiatives.</p> <p>Ongoing development and maintenance of feedback mechanisms, including the enterprise feedback network.</p>	<p>Assisting the implementation of the RSS project through the Enterprise RSS transition team</p>
People Services #	14.9m	n/a	<p>Delivery of consistent, efficient and effective enterprise wide services aligned with strategy.</p> <p>Improve the safety of the working environment and care for the natural and built environment.</p>

* Total budgeted revenue 2006-07 (all sources)

These functions are included in the CSIRO Research Support Services major change program.

Part D – Resources

Financials

The 2006-07 Operational Plan is the last in the set of Operational Plans that seek to give effect to the organisation's strategic aspirations as set out in the 2003-07 CSIRO Strategic Plan.

Total CSIRO revenue forecast in 2006-07 is approximately \$110m less than that outlined in the strategic plan. This variance is made up of CSIRO's share of revenues associated with major joint ventures (\$28m) and the value of flagship investment made in the form of "in kind" (\$29m) which are not reported as CSIRO revenues in this plan, the impact of the transfer of the National Measurement Laboratory to the Industry portfolio (\$14m), leaving a revenue gap between the two plans of approximately \$39m.

The source of the revenue gap is split between appropriation (\$14m – due to differences in flagship appropriation revenue ramp up) and external revenue (\$25m – generally the result of lower than planned level of IP/Royalty income).

With respect to the year on year growth in revenue, appropriation funding in 2006/07 is expected to rise by 2.2% to just over \$607m and total revenue from external sources to rise by 5.8% to \$364m giving a total increase in revenue of 3.9% or \$972m.

A breakeven financial result has been budgeted for 2006-07 in accordance with government budget guidelines and strategic plan estimates. In arriving at this position, management has taken a conservative approach to key budget variables such as the level of IP/Royalty income (budgeted at approximately the same rate as the expected 2005/06 outcome and takes no account of any RIPPER revenues), RSS savings (budget assumes all year 1 savings will be offset by implementation costs) and other external revenue (normally associated with sale of stock, rent and miscellaneous revenues which have been budgeted at a rate \$7m lower than projected for 05/06). The breakeven result also assumes a fully funded contingency reserve of \$5m.

Total salary growth at 4.6% reflects minimal change in staffing numbers and the effect of the agreed 4% Enterprise Agreement wage rise (effective 1/7/06). Travel expenditure has been budgeted to fall in part as a result of the completion of the roll out of an enterprise video conferencing network. Minimal allowance has been made for growth in other costs, as a function both of the continued roll out of enterprise wide procurement contracts and tighter controls more generally on operating expenditure.

With the introduction of enterprise support services through the RSS Project, the budgets for several corporate areas change significantly this year as many divisional support costs are now recorded as corporate support costs. For example, from this year:

- all financial support costs are recorded in the Finance and Governance budget;
- all HR support costs are recorded in the People and Culture budget;
- all legal costs are recorded in the Business Services budget; and
- information management costs (ie. libraries and records) are recorded within CSIRO IT budget.

Total capital spending has been capped at \$80m which is line with the projected level of depreciation in 2006/07. The operational plan outlines the breakdown of this proposed capital spend at a high level as work continues on the specific divisional allocations for some asset classes. CSIRO is making a significant investment in implementing the SAP enterprise systems platform this year with capital costs of \$13.6m. SAP will replace all current business systems in use within CSIRO. Also, \$12m will be spent on upgrading IT infrastructure in areas such as networks and storage capacity. These investments effectively reduce the capital spend available this year in other asset categories such as property and scientific equipment. A higher level of spending will be resumed in these areas next year.

Financial tables

- 1a. Budgeted Income Statement for period ended 30 June - Summary
- 1b. Budgeted Income Statement for period ended 30 June - Analysis of Expenses
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6. Flagships

1a. Budgeted Income Statement for period ended 30 June – Summary

Total CSIRO

	Actuals 2005/06	Budget 2006/07 ¹	Change	CSIRO Group Budget ² 2006-07	Strategic Plan 2006-07	Variance CSIRO Group to Strategic Plan
	\$k	\$k	%	\$k	\$k	%
REVENUE:						
Co-investment	210,136	235,571	12.1			
Consulting & Services	61,901	64,954	4.9			
Co-investment, Consulting & Services	272,037	300,525	10.5	328,225	362,000	10.3
IP, Royalties etc	37,068	37,241	0.5	37,241	73,000	96.0
Research and Services	309,105	337,766	9.3	365,466	435,000	19.0
Other External	24,411	17,229	-29.4	17,229	9,000	-47.8
Interest	7,625	9,446	23.9	9,446	0	-100.0
Total External	341,142	364,441	6.8	392,141	444,000	13.2
Appropriation (Internal Funding)	593,928	607,167	2.2	607,167	632,000 ³	4.1
Total External and Internal Revenue	935,070	971,608	3.9	999,308	1,076,000	7.7
TOTAL REVENUE	935,070	971,608	3.9	999,308	1,076,000	7.7
EXPENSES:						
Salaries	562,295	583,876	3.8	583,876		
Travel	37,628	35,272	-6.3	35,272		
Other Operating	256,662	272,241	6.1	272,241		
Depreciation & Amortisation	79,430	81,175	2.2	81,175		
Expenditure funded by JV External Revenue				27,700		
TOTAL EXPENSES	936,014	972,563	3.9	1,000,263	1,076,000 ⁴	7.6
Revenue from sales of assets	1,247	955	-23	955	0	-100
Operating result	303	0	-100.0	0	0	-100

Notes

1. Budget 2006-07 represents 2006-07 budget as per Unibis as at July 2006.
2. CSIRO Group Budget includes \$27.7m in external revenue budgeted as CSIRO's share of external revenues derived from the Food Science Australia (\$14.5m)
3. Appropriation of \$632m comprises \$573m in baseline appropriation, \$9m in new appropriation and \$50m potential appropriation (as per Strategic Plan 2003-07)
4. The Strategic Plan records total expenses of \$1,110m minus \$34m in overhead savings = \$1,076m.

1b. Budgeted Income Statement for period ended 30 June - Analysis of Expenses

Total CSIRO

	Actuals 2005/06 \$k	Budget 2006/07 \$k	Change %
ANALYSIS OF EXPENSES			
Salaries	562,295	583,876	3.8
Travel	37,628	35,272	-6.3
Laboratory & Workshop Supplies	37,651	52,508	39.5
Contract R&D	28,697	39,846	38.8
Communications		0	
Telecommunications	9,773	10,118	3.5
Postage & Freight	3,204	3,046	-4.9
Computing / IT Costs	28,744	24,496	-14.8
Repairs & Maintenance	16,937	14,079	-16.9
Property	26,873	27,457	2.2
Library	10,175	9,216	-9.4
Joint Venture Contributions	19,838	23,056	16.2
Depreciation & Amortisation	79,430	81,175	2.2
Recruitment & Relocation	4,136	4,653	12.5
Advertising & Promotion	1,929	1,817	-5.8
Cleaning	5,295	5,053	-4.6
Security	1,794	1,829	2.0
Consultants	2,084	1,423	-31.7
Grants & Contributions	10,438	9,121	-12.6
Legal	7,615	8,928	17.2
Motor Vehicles	6,243	6,327	1.3
Operating Leases	692	583	-15.7
Office Supplies & Printing	7,401	7,791	5.3
Utilities	17,346	18,189	4.9
Entertainment	1,218	1,207	-0.9
Training	8,625	9,352	8.4
Patents	6,316	5,720	-9.4
Insurance	3,088	3,937	27.5
Investment Writedown	0	0	-
Bad Debts	268	36	-86.4
Internal Lease	0	0	-
Other	-9,720	-17,549	-80.5
TOTAL EXPENSES	+ 936,014	972,563	3.9

2. Budgeted Balance Sheet as at 30 June

Total CSIRO

	Actuals 2005/06 \$k	Budget 2006/07 ¹ \$k	Change %
CURRENT ASSETS:			
Cash	153,328	131,313	-14.4
Trade Debtors	52,442	46,162	-12.0
Work in Progress	15,417	15,688	1.8
Other Receivables	21,422	19,292	-9.9
Inventory	1,063	1,018	-4.2
Total Current Assets	243,672	213,474	-12.4
NON CURRENT ASSETS:			
Land & Buildings	1,046,371	1,030,039	-1.6
Plant, Equipment & Intangibles	239,194	272,961	14.1
Other Investments	34,728	36,228	4.3
Total Non Current Assets	1,320,293	1,339,228	1.4
TOTAL ASSETS	1,563,965	1,552,702	-0.7
LIABILITIES:			
Trade Creditors	27,102	27,074	-0.1
Accrued Expenditure	22,904	20,850	-9.0
Deferred Revenue	51,764	41,251	-20.3
Finance Leases	76,200	71,931	-5.6
Employee Provisions	179,649	186,514	3.8
Other Payables	40,393	36,364	-10.0
TOTAL LIABILITIES	398,011	383,984	-3.5
NET ASSETS	1,165,954	1,168,718	0.2
EQUITY			
Accumulated Results Operations	457,126	457,126	0.0
Reserves	708,828	711,592	0.4
TOTAL EQUITY	1,165,954	1,168,718	0.2

Notes

1. Budget 2006-07 represents 2006-07 budget as per Unibis as at July 2006.

3. Financial Summary by Division 2006-07a

Notes	Internal Funding			External Revenue			Total Revenue			Ext Revenue/Total Revenue			Expenditure			P&L on Sale of Assets			Operating Result			
	Actuals 2005/06	Budget 2006/07	change	Actuals 2005/06	Budget 2006/07	change	Actuals 2005/06	Budget 2006/07	change	Actuals 2005/06	Budget 2006/07	change	Actuals 2005/06	Budget 2006/07	change	Actuals 2005/06	Budget 2006/07	change	Actuals 2005/06	Budget 2006/07	change	
	\$k	\$k	%	\$k	\$k	%	\$k	\$k	%	\$k	\$k	%	\$k	\$k	%	\$k	\$k	%	\$k	\$k	%	
Forestry incl Ensis	1	19,449	20,068	3.2	6,250	1,407	-77.5	25,699	21,474	-16.4	24	7	-73.1	26,051	19,332	-25.8	-57	-178	-84.1	-450	1,964	536.8
Entomology		21,386	21,589	1.0	15,905	14,981	-5.8	37,291	36,570	-1.9	43	41	-4.0	36,481	36,574	0.3	47	4	-91.4	857	0	-100.0
Food Science Australia	2	22,052	21,632	-2.0	0	0	-	22,052	21,632	-2.0	0	0	-	21,725	21,292	-2.0	1	0	-100.0	338	340	0.6
Livestock - AAHL		18,781	19,109	1.7	12,705	13,812	8.7	31,485	32,921	4.6	40	42	4.0	32,921	32,921	0.0	0	0	-	-1,436	0	-100.0
Livestock excl AAHL		35,725	34,080	-4.6	13,588	16,661	22.6	49,313	50,740	2.9	28	33	19.2	47,380	50,740	7.1	4	0	-100.0	1,937	0	-100.0
Human Nutrition		8,721	8,772	0.6	4,035	3,311	-17.9	12,755	12,082	-5.3	32	27	-13.4	11,048	11,982	8.5	0	0	-	1,708	100	-94.1
Plant Industry		48,928	49,628	1.4	39,746	40,845	2.8	88,674	90,473	2.0	45	45	0.7	88,435	90,422	2.2	83	50	-39.8	321	101	-68.6
Textile & Fibre Technology		14,606	13,833	-5.3	11,029	11,700	6.1	25,635	25,533	-0.4	43	46	6.5	25,399	26,524	4.4	-29	0	100.0	207	-991	-578.4
Agribusiness		189,657	188,710	-0.5	103,257	102,716	-0.5	292,914	291,426	-0.5	35	35	0.0	289,440	289,788	0.1	9	-124	-153.1	3,483	1,513	-56.5
Aust Telescope National Facility		21,938	21,941	0.0	11,600	11,275	-3.2	33,538	33,216	-1.0	35	34	-1.9	33,087	32,875	-0.6	28	-86	-407.9	478	256	-36.6
Exploration & Mining		20,966	22,564	7.6	17,250	19,960	15.7	38,216	42,524	11.3	45	47	4.0	37,666	42,024	10.7	58	0	-100.0	308	500	62.6
Information & Communication Technology		31,940	36,921	15.6	12,599	10,480	-16.8	44,538	47,401	6.4	28	22	-21.8	44,172	46,306	4.8	9	0	-100.0	375	1,095	191.8
Industrial Physics		18,259	17,212	-5.7	10,907	9,900	-9.2	29,166	27,111	-7.0	37	37	-2.4	29,043	28,514	-1.8	-2	0	100.0	120	-1,403	-1266.5
Manufacturing & Infrastructure Technology		56,100	39,215	-30.1	26,491	17,871	-32.5	82,591	57,085	-30.9	32	31	-2.4	81,998	62,055	-24.3	-152	0	100.0	442	-4,969	-1225.5
Mathematics & Information Sciences		15,563	18,777	20.6	7,953	9,081	14.2	23,517	27,858	18.5	34	33	-3.6	22,519	27,352	21.5	-5	0	100.0	993	506	-49.0
Minerals		30,725	31,160	1.4	20,013	18,910	-5.5	50,738	50,070	-1.3	39	38	-4.2	47,303	50,070	5.8	-10	0	100.0	3,425	0	-100.0
Molecular and Health Technologies		38,028	37,647	-1.0	23,562	17,460	-25.9	61,589	55,107	-10.5	38	32	-17.2	54,835	56,423	2.9	-4	0	100.0	6,751	-1,317	-119.5
Information, Manufacturing & Minerals		233,518	225,435	-3.5	130,374	114,937	-11.8	363,892	340,372	-6.5	36	34	-5.7	350,922	345,618	-1.5	-78	-86	-9.8	12,892	-5,332	-141.4
Energy Technology		23,134	23,521	1.7	7,605	9,900	30.2	30,739	33,421	8.7	25	30	19.7	30,115	33,421	11.0	-93	0	100.0	531	0	-100.0
Land & Water		38,399	45,160	17.6	22,648	29,062	28.3	61,047	74,222	21.6	37	39	5.5	61,753	74,023	19.9	50	15	-69.9	-657	214	132.5
Marine and Atmospheric Research		48,024	50,861	5.9	28,528	30,960	16.7	74,552	81,821	9.8	36	38	6.3	75,473	81,821	8.4	-22	0	100.0	-943	0	100.0
Petroleum Resources		15,281	16,257	6.4	8,658	10,827	25.0	23,939	27,084	13.1	36	40	10.5	20,651	26,754	28.3	-10	0	100.0	3,079	330	-89.3
Sustainable Ecosystems		31,100	38,189	22.8	14,848	17,914	20.6	45,949	56,103	22.1	32	32	-1.2	45,456	56,103	23.4	208	0	-100.0	701	0	-100.0
Oceanographic Research Vessel		6,207	5,640	-9.1	3,974	3,254	-18.1	10,182	8,895	-12.6	39	37	-6.3	9,185	8,895	-3.2	-33	0	-100.0	1,030	0	-100.0
Sustainable Energy & Environment		162,147	179,629	10.8	84,261	101,917	21.0	246,407	281,546	14.3	34	36	5.9	242,834	281,017	15.7	167	15	-91.0	3,741	544	-85.5
Total Three Groups		585,322	593,773	1.4	317,891	319,570	0.5	903,213	913,343	1.1	35	35	-0.6	883,196	916,423	3.8	98	-195	-298.6	20,115	-3,275	-116.3
Corporate Allocations (incl Enterprise Programs)		-25,290	-16,171	36.1	0	19,500	-	-25,290	3,329	113.2	0	566	-	1,542	11,120	621.1	0	0	-	-26,632	-7,791	71.0
Total Divisional		560,032	577,602	3.1	317,891	339,070	6.7	877,923	916,672	4.4	36	37	2.2	884,738	927,543	4.8	98	-195	-298.6	-6,717	-11,066	-64.7
Capital Program		61,723	62,540	1.3	6,393	4,642	-27.4	68,116	67,181	-1.4	9	7	-26.4	72,085	67,181	-6.8	1,281	1,150	-10.2	-2,689	1,150	142.8
Discovery Centre		1,932	1,800	-6.8	248	295	19.1	2,180	2,095	-3.9	11	14	23.9	2,390	2,095	-12.3	-160	0	100.0	-371	0	100.0
High Performance Scientific Computing		4,134	3,902	-5.6	297	410	38.2	4,431	4,312	-2.7	7	10	-42.0	4,336	4,312	-0.5	0	0	-	95	0	-100.0
Publishing		169	0	-100.0	8,314	8,704	4.7	8,483	8,704	2.6	98	100	2.0	7,777	8,004	2.9	0	0	-	705	700	-0.7
Education Programs		3,231	3,278	1.5	4,144	3,429	-17.3	7,374	6,706	-9.1	56	51	-9.0	7,301	6,706	-8.1	0	0	-	74	0	-100.0
Flagship Collaboration & Support		16,125	19,009	17.9	2	0	-100.0	16,127	19,009	17.9	0	0	-100.0	8,714	19,009	118.2	0	0	-	7,413	0	-100.0
SAP Implementation		0	7,500	-	0	0	-	0	7,500	-	0	0	-	365	7,500	1957.3	0	0	-	-365	0	100.0
CSIRO IT		50,103	62,726	25.2	11	0	-100.0	50,114	62,726	25.2	0	0	-100.0	49,061	62,726	27.9	32	0	-100.0	1,085	0	-100.0
Corporate Activities		57,245	79,956	39.7	1,685	2,891	71.6	58,930	82,847	40.6	3	3	22.1	59,721	78,632	31.7	-4	0	100.0	-795	4,215	630.4
Corporate Funds		0	0	-	2,160	5,000	131.5	2,160	5,000	131.5	100	100	0.0	293	0	-100.0	0	0	-	1,867	5,000	167.8
Total Other		194,662	240,711	23.7	23,252	25,371	9.1	217,914	266,082	22.1	11	10	-10.6	212,042	256,166	20.8	1,149	1,150	0.1	7,021	11,065	57.6
Sub-total		754,693	818,313	8.4	341,143	364,441	6.8	1,095,837	1,182,754	7.9	31	31	-1.0	1,096,780	1,183,709	7.9	1,247	955	-23.4	303	0	-100.0
Corporate Support Offset		-160,766	-211,145	-37.3	0	0	-	-160,766	-211,145	-31.3	0	0	-	-160,766	-211,145	-31.3	0	0	-	0	0	-
Total CSIRO		593,927	607,167	2.2	341,143	364,441	6.8	935,070	971,609	3.9	36	38	2.8	936,014	972,564	3.9	1,247	955	-23.4	303	0	-100.0

Notes

1. CSIRO is party to a 50/50 joint venture (Ensis) involving the Division of Forestry & Forest Products and Scion (a New Zealand Government company). For accounting reasons, CSIRO's share of the joint venture external revenues (\$13.2m for 2006-07) is accounted for within the joint venture and not recorded as revenue by CSIRO. The joint venture external revenue will be included in CSIRO 'Group' revenue. The joint venture gross profit margin of \$6.2m is reflected as a cost recovery adjustment to expenditure.

2. CSIRO is party to a 85/15 joint venture (Food Science Australia - FSA) involving the Division of Food Science & Technology and the Victorian Government. For accounting reasons, CSIRO's share of the joint venture external revenue (\$14.5m for 2006-07) is accounted for within the joint venture, with CSIRO recording its share of joint venture profit in form of equity. The joint venture external revenue will be included in CSIRO 'Group' revenue. The joint venture gross profit margin of \$340k is reflected as a cost recovery adjustment to expenditure.

4. Corporate Support Services - Total Expenditure Budget 2006-07

		Actuals 2005/06 ¹ \$k	Budget 2006/07 \$k
Corporate Support Services			
Chief Executive Office			
Chief Executive Office	Geoff Garrett	701.0	353.7
Strategy Development	Geoff Garrett	419.0	193.0
EMC	Geoff Garrett	293.0	183.0
CSIRO International	Geoff Garrett	812.0	987.0
Science Team	Geoff Garrett	870.0	805.2
Discovery Centre		2,227.0	2,095.0
Education Programs		6,407.3	6,356.5
DCE Office	Ron Sandland	747.8	646.9
Board/Corporate Executive	Ron Sandland	967.0	967.0
Executive Salaries	Ron Sandland	2,143.0	2,127.5
Science Investment Process	Ron Sandland	893.0	825.1
Science Policy	Ron Sandland	330.0	330.0
Strategic Transitions	Ron Sandland	516.0	-
Business Development	Rod Hill	3,025.5	2,392.2
People and Culture	Peter May	12,190.1	25,366.5
Finance and Governance	Mike Whelan	14,046.0	21,277.0
Business Services	Nigel Poole		
Executive/Commercialisation/Legal		5,723.0	14,654.8
Buildings' Depreciation, Repairs and Maintenance ³		67,684.5	65,405.5
CSIRO IM&T (includes BETR)		50,103.0	70,342.0
Property & Security , Limestone Site Services		2,243.3	2,047.3
Communications	Donna Staunton	4,881.6	5,007.3
Group Executives			
Agribusiness	Alastair Robertson	1,263.9	1,245.3
Sustainable Energy & Environment	Steve Morton	1,822.8	1,501.6
Information, Manufacturing & Minerals	Michael Barber	1,144.0	1,014.9
Total Corporate Support Expenditure		181,453.8	226,124.3

Notes

1. 2005-06 Actuals has been restated in the 2006/07 structure for comparative purposes.
2. The Increase in 2006/07 Budget over 2005/06 Actuals is mainly a result of the inclusion of RSS Transfers.
3. This item was not included in Corporate Support Services in 2004-05 Operational Plan.
4. CSIRO IT 2006-07 Budget includes SAP Implementation \$7.5m.

5a. Capital Expenditure 2006-07

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	Land and Buildings			Plant & Equipment			Intangibles			Total		
	Actuals 2005/06	Budget 2006/07	Change %	Actuals 2005/06	Budget 2006/07 ³	Change %	Actuals 2005/06	Budget 2006/07	Change %	Actuals 2005/06	Budget 2006/07 ³	Change %
	\$k	\$k	%	\$k	\$k	%	\$k	\$k	%	\$k	\$k	%
Forestry incl Ensis	0	0	-	603	330	-45.3%	0	0	-	603	330	-45.3%
Entomology	7	0	-100.0%	1,326	590	-55.5%	0	0	-	1,333	590	-55.7%
Food Science Australia	46	0	-100.0%	787	355	-54.9%	0	0	-	833	355	-57.4%
Human Nutrition	0	0	-	264	360	36.6%	0	0	-	264	360	36.6%
Livestock - AAHL	7,192	0	-100.0%	493	770	56.3%	0	0	-	7,684	770	-90.0%
Livestock excl AAHL	0	0	-	728	0	-100.0%	0	0	-	728	0	-100.0%
Plant Industry	47	0	-100.0%	2,110	1,155	-45.3%	0	0	-	2,158	1,155	-46.5%
Textile & Fibre Technology	0	0	-	884	410	-53.6%	0	0	-	884	410	-53.6%
Agribusiness	7,292	0	-100.0%	7,194	3,970	-44.8%	0	0	-	14,486	3,970	-72.6%
Aust Telescope National Facility	0	0	-	3,085	1,600	-48.1%	0	0	-	3,085	1,600	-48.1%
Exploration & Mining	0	0	-	979	580	-40.7%	0	0	-	979	580	-40.7%
Information & Communication Technology	54	0	-100.0%	1,439	505	-64.9%	0	0	-	1,493	505	-66.2%
Industrial Physics	0	0	-	823	425	-48.3%	0	0	-	823	425	-48.3%
Manufacturing & Infrastructure Technology	172	0	-100.0%	3,421	1,210	-64.6%	0	0	-	3,593	1,210	-66.3%
Mathematics & Information Sciences	0	0	-	192	130	-32.3%	0	0	-	192	130	-32.3%
Minerals	367	0	-100.0%	4,178	1,320	-68.4%	0	0	-	4,545	1,320	-71.0%
Molecular and Health Technologies	0	0	-	5,572	1,310	-76.5%	0	0	-	5,572	1,310	-76.5%
High Performance Super Computer	0	0	-	301	0	-100.0%	0	0	-	301	0	-100.0%
Information, Manufacturing & Minerals	592	0	-100.0%	19,989	7,080	-64.6%	0	0	-	20,582	7,080	-65.6%
Energy Technology	0	0	-	2,520	560	-77.8%	0	0	-	2,520	560	-77.8%
Land & Water	16	0	-100.0%	3,570	900	-74.8%	0	0	-	3,586	900	-74.9%
Marine and Atmospheric Research	0	0	-	2,260	1,100	-51.3%	0	0	-	2,260	1,100	-51.3%
Petroleum Resources	0	0	-	664	480	-27.7%	0	0	-	664	480	-27.7%
Sustainable Ecosystems	0	0	-	1,432	480	-66.5%	0	0	-	1,432	480	-66.5%
Murray-Darling	0	0	-	0	0	-	0	0	-	0	0	-
Oceanographic Research Vessel	0	0	-	175	165	-5.8%	0	0	-	175	165	-5.8%
Sustainable Energy & Environment	16	0	-100.0%	10,621	3,685	-65.3%	0	0	-	10,637	3,685	-65.4%
Total Three Groups	7,900	0	-100.0%	37,805	14,735	-61.0%	0	0	-	45,705	14,735	-67.8%
Capital Program	37,599	34,100	-9.3%	0	0	-	0	0	-	37,599	34,100	-9.3%
Discovery Centre	0	0	-	136	50	-63.3%	0	0	-	136	50	-63.3%
Publishing	0	0	-	37	10	-73.0%	0	0	-	37	10	-73.0%
Education Programs	0	0	-	102	30	-70.6%	0	0	-	102	30	-70.6%
CSIRO IT	1,749	0	-100.0%	2,010	12,870	540.4% ¹	244	0	-100.0%	4,003	12,870	221.5%
SAP Implementation	0	0	-	0	0	-	11,245	13,600	20.9%	11,245	13,600	20.9%
Corporate Activities	0	0	-	18	705	3738.8%	0	1,000	-	18	1,705	9184.0%
Strategic Asset Contingency	0	0	-	0	10,000	- ²	0	0	-	0	10,000	-
Other	39,348	34,100	-13.3%	2,303	23,665	927.5%	11,490	14,600	27.1%	53,141	62,365	17.4%
Sub-total	47,248	34,100	-27.8%	40,108	38,400	-4.3%	11,490	14,600	27.1%	98,845	87,100	-11.9%
TOTAL CSIRO	47,248	34,100	-27.8%	40,108	38,400	-4.3%	11,490	14,600	27.1%	98,845	87,100	-11.9%

Notes:

1. Plant and Equipment includes IT infrastructure.
2. The 2006-07 Plant and Equipment budget includes \$10m for the Strategic Asset Contingency.
3. The 2006-07 Plant and Equipment budget is based on budget bids for 2006/07 (not yet approved).

5b Approved major Capital Items

Division	Description	Budget 2006/07 \$k
Land & Buildings > \$1M		
Priority Procurement Programs:		
Capital Program	CMins Waterford Alterations and Extensions incl. Infrastructure and Consolidation (PWC & Partt approved) (\$13.5M)	4,909
Capital Program	CMIS Replacement Long Term Accommodation Clayton (\$5.5M)	3,252
Capital Program	CMIT North Ryde Fire Technology Facility (\$18.5M)	2,607
Capital Program	Urrbrae (SA) Building 3 Refurbishment and refit (\$6.0M)	2,172
Capital Program	FSA Cannon Hill – Interim Compliance and Consolidation Works (noting delay to S/E Qld consolidation) (\$3.0M)	1,880
Capital Program	CMAR Hobart Refurb Phase 1 (only ICTC accommodation and urgent services upgrade works) (\$2.3M)	1,700
Capital Program	CLW Black Mountain Christian/Butler Buildings Consolidation and Selective Refurbishment (\$2.7M)	1,437
Capital Program	CMAR Cleveland – Interim Works (noting delay to S/E Qld consolidation) (\$1.5M)	1,436
Capital Program	Floreat Park - Upgrade Services (\$1.5M)	1,249
Capital Program	CMIT – Relocation from Hightett to Clayton – Phase 1 selected components (\$4.0M)	1,200
Plant & Equipment > \$500k		
Livestock Industries	454 Hi-Throughput DNA genome sequencer	650
Livestock Industries	FACSAria Cell Sorting System	600
Plant Industry	Cryo-analytical Scanning Electron Microscope with X-ray Analysis Unit	700
Entomology	Expansion of the Australian National Insect Collection	500
Industrial Physics	Scanning Electron Microscope	800
Land & Water	High precision, duel inlet, light isotope mass spectrometer	780
ICT Centre	110GHz Vector Network Analyser	750
Molecular & Health Technologies	X-ray detector, x-ray generator	600
Molecular & Health Technologies	Automated Synthesizer (most likely from Chemspeed, Basel, Switzerland)	500
Molecular & Health Technologies	Ion trap mass spectrometer and an accompanying HPLC system	550
ATNF	ATCA Broadband	2,740
Intangibles > \$500k		
SAP Implementation		13,600

Notes:

1. The 2006-07 Plant and Equipment budget is based on budget bids for 2006/07 (not yet approved) and excludes externally funded assets.

6. Flagships

Internal Funding (BAA2)				Internal Funding				External (Including In-Kind) ²				Total Revenue				Total Expense (Including In-Kind)				
	Actuals 2005/06 \$k	Budget 2006/07 ¹ \$k	change %		Actuals 2005/06 \$k	Budget 2006/07 \$k	change %		Actuals 2005/06 \$k	Budget 2006/07 \$k	(% External)		Actuals 2005/06 \$k	Budget 2006/07 \$k	change %		Actuals 2005/06 \$k	Budget 2006/07 \$k	change %	
Food Futures	5,335	5,053	-5.3		21,534	24,343	13.0		5,077	15.9	13,131	30.9	158.6	31,946	42,527	33.1		31,522	42,527	34.9
Energy Transformed	5,080	4,897	-3.6		20,576	23,592	14.7		4,428	14.7	8,786	23.6	98.4	30,084	37,275	23.9		30,033	37,275	24.1
Light Metals	4,163	4,142	-0.5		16,787	19,953	18.9		6,131	22.6	9,133	27.5	49.0	27,081	33,228	22.7		24,650	33,228	34.8
Preventative Health	3,912	3,898	-0.4		15,639	18,782	20.1		5,055	20.5	9,635	29.8	90.6	24,606	32,315	31.3		24,582	32,315	31.5
Water for Healthy Country	4,435	5,077	14.5		18,117	24,458	35.0		10,777	32.3	15,000	33.7	39.2	33,329	44,535	33.6		30,957	44,535	43.9
Wealth from Oceans	4,271	4,433	3.8		17,388	21,359	22.8		10,689	33.0	13,731	34.7	28.5	32,348	39,523	22.2		32,435	39,523	21.9
																	0			
Flagship Collaboration	7,804	11,000	41.0											7,804	11,000			1,079	11,000	
Total CSIRO	35,000	38,500	10.0		110,041	132,487	20.4		42,157	22.5	69,416	28.9	64.7	187,198	240,403	28.4		175,258	240,403	37.2

* Flagship figures include Flagship Directors and Implementation Office

1. BAA2 funding for 2006-07 is \$40m. The budgeted underspend of \$1,500k recognises delays in the finalisation of some contracts from the first round of Flagship Collaboration Fund clusters.

2. Estimated In-Kind of \$15.3m and \$29.7m included with External Revenue for 2005-06 and 2006-07.

Part E – Appendices

- Appendix A: Broad Direction Setting statement September 2005
- Appendix B: CSIRO Governance, Planning, and Performance Measurement Frameworks
- Appendix C: CSIRO Roles
- Appendix D: Organisational Risk Profile
- Appendix E: List of Research Themes
- Appendix F: Completed CSIRO Divisional Science Reviews
- Appendix G: Science Assessment Review - Capability Rating definitions
- Appendix H: Science Investment Process
- Appendix I: Nation Research Priorities

Appendix A: Broad Direction Setting statement September 2005

Science Investment Process

Broad Direction Setting

Introduction

The breadth and complexity of challenges and opportunities facing society require us to make carefully considered choices of where to focus our research capability to maximise our contribution to society. The modest size of the Australian innovation system also requires tough decisions on where to invest finite research resources while maintaining the quality and distinctiveness of our science in a globally competitive environment.

CSIRO is taking a long term perspective of global science trends and national research priorities, and considering our investment priorities in this context. Key global science drivers/trends have been identified and will provide a series of platform capabilities applicable across multiple areas of our research over the next 5 years and well beyond. These include, in particular:

- Transformational biology involving the assembly of substantial interdisciplinary teams of biologists, mathematicians, physical scientists, engineers and computer specialists to undertake biological research, linking large amounts of data about biological networks, at the molecular and cellular levels, through to populations and ecosystems, leading to increasingly quantitative and predictive frameworks.
- Advanced materials as supported, for example, by developments in nano-science or by new capabilities in combinatorial and high through-put materials science, providing dramatic increases in the efficiency at which new materials are discovered, processed and their utility optimised.
- Large scale sensor networks which see the convergence of micro- and nano-devices, wireless communications and information technologies. These will deliver cost effective ways to support wider deployment of large scale networks of increased spatial and temporal resolution and accuracy. An example application of these networks will be in the investigation of the dynamics of environmental processes to provide data for credible ecological forecasting and prediction and step-changes in natural resource management.

The Executive Team's Broad Direction Setting process has adopted a "precautionary principle" in 2005, recognising that we are working with a new process, but at the same time has provided an indicative set of priorities and challenges with which Group Executives, Flagship Directors and Chiefs can shape a Theme-based response to these longer term priorities.

CSIRO has a strong and credible science base which must be maintained. The proposed changes in focus and emphasis are designed to build on existing capabilities and position our science for the future.

The dual "lenses" of relevance and impact are being applied to the ways in which CSIRO can respond to community and industry challenges to benefit society. In support of these decisions, input from government, industry and the community has been considered and indeed will continue to be considered through appropriate consultation and feedback, as our Science Investment Process develops further and matures.

Consistent threads throughout the ET's discussion, and in the assessment of outcomes, have been:

- Prominence of the need to harness cross-CSIRO capability (scale and assembly of complementary capabilities), leveraging the significant strategic differentiation from cross-discipline and cross-boundary activities in line with our chosen strategic direction, as articulated in our 03/07 Strategic Plan

- Support for excellence and talent through identification of track record
- An Australian focus to major "BHAG"-like challenges and opportunities and our differentiated capabilities/capacity to deliver against these
- Adoption of a 5+ year perspective; we are setting the scene for our next strategic planning cycle, culminating in the delivery of our 2007-2012 Strategic Plan in late 2006.
- Challenging existing business models for engagement with our industry and community partners in light of the impact delivered - currently and potentially -to those sectors
- Recognition of the core (and other) roles CSIRO plays (as described in "the house") and the appropriate migration over time to higher impact activities.

This document is a summary of the key outcomes of the Broad Direction setting process. It provides a basis for discussions between Group Executives, Chiefs and Leadership Teams, and as such does not seek to convey the substance of the detailed discussions and assessment of all indicators supporting a criteria-based view of investment choices. It is important feedstock to the refinement of our Theme-based investment proposals and the investment recommendations coming forward into the next phase of the Science Investment Process in late November 2005.

Flagships

CSIRO remains committed to grow the National Flagship Programs to 30-40% of the organisation's appropriation funding, and build its collaborative linkages facilitated by the wise investment of the Flagship Collaboration Fund.

In identifying the total Flagship funding envelope and priorities within it, for 2006-07, guidance is provided to development of the theme portfolio, involving close partnerships between the Flagship Directors and Chiefs.

- The target funding envelope for 2006/07 will be \$158.1 million of our appropriation, an increase of \$30.1m or 24% over 2005/06. This includes the collaboration fund investment of \$12m in 2006/07.
- This increase is to be primarily directed towards broadening and deepening Divisional involvement in Flagships, including the incorporation of ICT and mathematical sciences - as key enabling and cross-cutting platforms - into the portfolio where their contributions are clearly directed at the Flagship goals.
- Flagship theme development will need to observe the directional signals from the broad direction setting workshop as reflected in the following paragraphs.
- The Flagship Oversight Committee will develop a recommended investment in Flagship theme portfolios facilitated by Flagship Director, Chief and Group Executive consultations
- The Executive Team will determine individual Flagship funding based on the themes presented and forward plans (including roadmaps), performance to-date, FOC's recommendations and alignment with the thematic investment criteria.

Environment

Australians have stewardship of a beautiful, diverse and frequently unique environment. At the same time the cumulative consequences of the last 200 years of development of natural resources leaves us with a legacy of environmental challenges. A positive CSIRO response to these challenges must involve systems understanding, development and application of new technologies and careful balancing of economic development with environmental sustainability.

Firstly, therefore, our R&D needs to contribute new capabilities for managing natural and man-made systems for sustainability. Nobody else will look after the natural assets that give us our sense of being Australian; nobody else in the world will undertake the R&D necessary for their maintenance. Second, our R&D must simultaneously aim at supporting the development of production sectors that are dependent upon those natural assets, so as to minimise their adverse environmental footprints.

In firmly supporting the maintenance of our investment in environmental R&D, ET noted the following points:

- A desire to achieve even greater impact by not only defining problems but also providing solutions across the spectrum of individual resource managers to the policy domain.
- Support for continued development of partnerships and strong relationships with resource users and managers to create desired impact.

ET suggested the following developments:

- Careful consideration of how best to make our contributions in this policy-sensitive domain
- Even greater efforts to integrate with agricultural R&D to reduce environmental impacts, and better inform Natural Resource Management more broadly
- Further development of large-scale sensor networks for application in integrated environmental management, such as in water resource and ocean observing systems.

Plant based agriculture

CSIRO plays an important role in the National Innovation System, having particular capability in modern bioscience and its application to plant based industries. The bio/life science revolution has significant relevance for Australia and the world, and CSIRO has had considerable impact in this area due to its world-class capabilities, quality of its science and the high level of adoption by industry.

However, a careful rethink is needed about the way in which CSIRO best enhances and engages its capability in support of existing agribusiness industries and their necessary migration to new and emerging bio-based businesses. This has begun to be articulated in the Group's strategic intent by focusing on the broader 'bioeconomy' which covers not only traditional food and fibre commodity production but significantly enhanced opportunities offered by modern bioscience for the production of higher value materials and chemicals across various and wide ranging industries.

Specifically, going forward, there will be a need to:

- Place a greater emphasis on matching agricultural productivity with environmental sustainability and its use of valuable natural resources such as water and land.
- Focus on differentiated agricultural products and/or raw materials directed towards higher utility in the value chain.
- Recognise the close relationship of food production with nutrition and longer, healthier and more productive lives of Australians.
- Focus on enhanced investment in the critical and cross cutting area of biosecurity in relation to supply chain integrity, biological diversity and the security of Australia from external invasive species.
- Reduce over time research supporting small incremental changes in agriculture.

To achieve this goal we will continue to build our systems biology capability through greater collaboration and integration with ICT, mathematics and engineering capabilities. While overall resource levels in the area are envisaged to remain constant, investment in plant and forest based agriculture is likely to decrease as the outputs manifest themselves in a number of other areas (for example , further processing, manufacturing, health and the environment). Specific areas of increase in this domain are anticipated to come through growth in the Food Futures and P- Health Flagships.

Animal agriculture

The general recommendations for plant based agriculture are also pertinent to animal agriculture. This area is similarly sensitive to the significant opportunities from the modern quantitative bioscience capabilities across CSIRO which can be leveraged for Australia to compete in the broader bioeconomy. This will be achieved through:

- Redirection towards greater bioscience capability and capacity in animal science
- research to reduce regional biosecurity risks around animal agriculture

- systems biology approaches to new animal based functional materials and chemicals for the wider industry
- research to reduce the environmental impact of animal agriculture and better utilise scarce natural resources.
- alignment of animal based foods with increased knowledge of diet, nutrition and health.

To achieve these goals, building our systems biology approach will require greater collaboration and integration with ICT, mathematics and other related capabilities. Whilst overall investment in the traditional livestock domain will decrease over time, it is envisaged that outputs of animal based science outlined above will manifest themselves through other areas eg food, health and the environment. Specific areas of growth in these domains are also envisaged to come through growth in the Food Futures and P-Health Flagships.

Food, Fibre and Textile manufacturing

Consistent with the framework of the precautionary principle operating in the 2005/06 Science Investment Process round, investment in Fibre and Forestry will be maintained while strategies are being developed over the next 12 months as new leadership teams and structures establish themselves.

Food is an area with increasing significance for Australia and the world. Of particular importance is the relationship between food, diet and health and the relevance of diet in mitigating obesity and preventing or protecting against certain chronic diseases. CSIRO has significant capabilities in materials and biology which both have impact in this domain.

It was felt that whilst no additional appropriation investment would be targeted at this area, there would be an increase in the proportion of CSIRO activity as it integrates capabilities in other areas and with even greater support from industry partners. Specific areas of growth will also come through an increased focus on value-add products through growth in the Food Futures and P-Health Flagships as well as in applications of biosecurity.

Human Health

While it was recognised that this area is very important to our national interests and the vital role R&D plays, there were issues raised concerning the impact and scale of our activities in the context of the large body of expertise and prevailing medical and therapeutic research residing in other agencies both here in Australia and overseas. It was felt that continued focus on areas of strength is required to maximise impact.

With many other R&D players locally and internationally supported by huge investments from the major pharmaceutical companies involved, it is considered that our world class structural biology skills be redeployed to further develop our bioscience and materials platforms.

Therefore our efforts in drug discovery should be exited over an appropriate timescale.

Our central focus in the area should be preventative health, which will be increased in the portfolio.

- The portfolio should also maintain work in diagnostics, vaccines and materials for medical devices.
- Health informatics remains an important area.
- The P-Health Flagship should be increased but its portfolio must be even more focused.

Overall investment in the areas is to be maintained or grown modestly facilitated by the P-Health Flagship.

Chemicals and Materials

This is an important contributor to the Australian manufacturing industry and an area (particularly in polymers) where CSIRO has had success in the past and has excellent capability and capacity across a number of Divisions. Materials research is widely acknowledged as one of the current "hotspots" of science and as a result, there is

considerable competition world wide for breakthroughs in this domain. Australia and CSIRO have to carefully select and focus on areas of high potential. We need to;

- Better integrate, coordinate and refocus of our materials capability across the breadth of CSIRO to leverage our advantage in the confluence of physics, biology and chemistry
- Review and improve the delivery mechanisms.

It is likely that overall investment in the area will increase due to application of materials capabilities and platforms from other areas, subject to the outcomes from our Manufacturing Review.

Security is an issue which spans a large number of the impact areas discussed, from instrumentation to biosecurity. ET continued to support our current coordinating response to the Safeguarding Australia National Research Priority through the Secure Australia MXDP. Investment levels are dependent upon collaboration with other members of the NIS.

Minerals and Metals

Clearly, this domain forms a critical part of Australia's economy; its role in maintaining our balance of trade is pivotal. R&D has had a significant role in supporting this success.

At present the industry is enjoying record profits as a result of the resources boom. Our relationship with this truly global industry is at a watershed and we need to continue to develop new business models with early engagement, higher levels of transformational R&D in the portfolio and higher levels of industry investment to ensure higher levels of Australian capture of benefits.

It was decided to do further work on the implications of different models for industry engagement prior to any decision to change investment levels in the minerals and metals domain.

Energy

Energy is a key determinant of Australia's future economic growth. On a world scale, Australia has abundant reserves of coal and natural gas, although our oil reserves are declining. We have among the lowest energy costs in the developed world - but we also have the highest greenhouse emissions per GDP for what we produce. Recognising this, energy reform is high on the agendas of both Federal and State Governments.

Major elements of CSIRO's research focus beyond exploration and extraction include raising the efficiency of clean coal electricity generation technologies to develop low-emission energy technologies and systems that lead to the widespread use of hydrogen as an energy carrier across the economy. This will require transformational science in areas as diverse as coal gasification, membrane gas separation and gas processing leading eventually to large scale hydrogen production along with capture and sequestration of CO₂ to provide low emissions electricity.

ET recognised the following points:

- Solutions to challenges in energy extraction, generation and processing inevitably involve substantial capital expenditure and engineering constraints through infrastructure development
- The policy environment must be carefully taken into account
- There are many public and private interests world-wide making far greater investments than CSIRO in energy R&D; hence, our distinctiveness and competitiveness must be carefully examined, particularly in energy generation, conversion and renewables.

ET concluded the following:

- We should maintain our investment in research into upstream exploration, extraction and processing of coal, gas (methane economy) and oil
- We should maintain our investment in electricity generation, distribution, and end use efficiency, subject to performance, and our commitment to longer-term transformational

science through the Energy Transformed Flagship contributing to the development of the hydrogen economy.

- We should reduce our effort in intelligent transport systems
- We should reduce our effort in renewable energy restricting our activities to those in which we have competitive advantage and can have significant impact

Information and Communication

Information and Communications Technology(ICT) is central to the development and growth of all industry sectors. However, in delivering to the information and communication industry (ICI) per se, it is clear that global competition is intense and scale is a factor. It is recognised in Australia that a number of universities and other research agencies (e.g. NICTA) are very active in this sector. To support continued productivity growth more broadly, we in CSIRO will:

- Focus progressively our ICT efforts in applications that link with other industry and community areas, building particularly on CSIRO's expertise and domain knowledge in other key sectors.
- Shift away from the current approximate 50:50 ratio of generic ICT research:other industry by increasing support of applications in other sectors.
- Deploy additional resources in line with increased demand for ICT input from close partnerships in other sectors.
- Our core leadership advantage in wireless is recognised and will continue to be supported.

The net effect will be to decrease our specific contribution to generic ICI products and services, but increase more our ICT contributions in other areas. It is anticipated that during the process of Theme development within a number of Divisions, ICT requirements will be explicitly identified and developed in partnership with the ICT Centre and others contributing to ICT initiatives.

As previously mentioned, the Flagships in particular will present important growth opportunities here. A similar philosophy also applies to more broadly leveraging our capabilities in mathematical analysis, modelling and simulation and large data set management.

Radio Astronomy

The importance of Radio Astronomy as a leading science initiative in Australia was recognised. Support of the Australian Telescope National Facility (ATNF) as a research facility, and the world class research that CSIRO undertakes using the ATNF, are intimately interlinked

The Square Kilometre Array (SKA), and its forerunner the xNTD, are seen as key planks of Australia's determination to remain at the forefront of radio astronomy. It was noted that progressing the SKA proposal will require significant input from existing resources, and if ultimately successful, additional investment.

Equipment & Instruments

Elaborately Transformed Manufactures (a term that covers for example fabricated metal products, machinery, cars, planes) has one of the highest growth rates in the economy and continually demands technology innovation. CSIRO can contribute to this innovation, however we must recognise the massive investments being made globally by others (e.g. in the automotive industry). Therefore in areas where we are non-competitive or have little chance of impact, we will reduce investment, and where we remain active to meet local industry demand, we will seek greater co-investment and early partnering.

Therefore in developing themes in this area, it will be important to:

- Focus and bring greater coherence to our existing R&D
- Demonstrate our distinctiveness and impact

- Clearly identify the partnerships and business models through which technology uptake will occur

A small sub-set of this sector is instrumentation. Measurement and instruments are central to our research, and sometimes offer an opportunity for commercial development. There is increased integration in our investment in instrumentation, recognising that servicing our science need does not always translate to success in the market place. Whilst niche opportunities may present themselves it is anticipated that we will maintain our overall appropriation investments in this small element of this sector, with possible increased levels of co-investment.

Infrastructure; and Commercial and Community Services

Each of these sectors represent major components of the Australian economy with significant potential for innovation through science and technology, but there is significant competition overseas. However in the absence of a unifying and clear national challenge there was uncertainty as to CSIRO's relevance and impact.

In the absence of a full analysis, it was agreed to exercise the precautionary principle and maintain current investment levels pending a review of each area within the next few months. Infrastructure Services will be included in the scope of the existing review of manufacturing and will be included for consideration for the forthcoming CMIS Science Review.

In the interim, in developing theme proposals for these sectors it will be important to:

- Focus and bring greater coherence to our existing R&D
- Demonstrate our distinctiveness and impact
- More clearly identify the pathways by which technology uptake would occur
- Identify how existing capabilities (e.g. in mathematics) might be applied to other sectors

In particular for financial services, the impact of supporting this sector needs to be balanced against the opportunity costs of using our valuable mathematical skills to support other initiatives across the organisation, particularly in the context of the many other players supporting developments here and internationally.

In Summary

CSIRO has a strong and credible science base which must be maintained. The proposed direction settings are designed to build on our existing strengths and take advantage of global advances in science areas such as the biosciences, ICT and materials sciences to open up new opportunities for CSIRO.

The following sets the longer term priorities and challenges with which Group Executives, Chiefs and Flagship Directors can shape a Theme-based response.

- Increase flagship funding in 2006/07 to \$158.1 million of our appropriation, an increase of \$30.1m or 24% over 2005/06.
- Systems biology, sensors and materials science were identified as broad platforms that will grow and contribute to many priority areas
- Strengthen our research on the environmental challenges facing Australia, including sensor networks for integrated environmental management
- Greater emphasis on matching agricultural productivity with environmental sustainability, reducing research supporting small changes in productivity
- Refocus on differentiated agricultural products of higher value
- Restrict our research in health to preventative health, including the relationship of food with nutrition and healthier lives for all Australians.
- Enhance our investment in biosecurity and continue our support of broader security issues.
- Maintain investments in Forestry and Fibre research as new leadership teams and structures establish themselves.
- Materials research is a "hotspot" in which we have areas of competitive advantage and we will refocus elements of our physics, biology and chemistry to grow this area
- Further work on the business model and industry engagement is required before any change to investment levels in the minerals and metals area
- Maintain our investment in research into upstream exploration, extraction and processing of coal, gas and oil
- Maintain our investment in electricity generation, distribution, and end use efficiency; and commit to longer-term transformational science through the Energy Transformed Flagship
- Reduce our effort in intelligent transport systems and restrict our activities in renewable energy to those in which we have competitive advantage
- Broaden our ICT efforts in applications that support other industry and community areas, growing investment in areas of increased demand and reducing generic ICT research, except in areas of world leadership, e.g. wireless.
- Our capabilities in mathematics will be more broadly and deeply integrated with science delivering to CSIRO priority areas including Flagships.
- It was agreed to maintain the current level of investment in both the ATNF and our astronomy research, noting a successful SKA proposal will require additional investment.
- Elaborately Transformed Manufactures; Infrastructure; and Commercial and Community Services are major components of the Australian economy. We will review our existing R&D over the next few months, noting the importance of demonstrating our distinctiveness and impact.

Appendix B: CSIRO Governance, Planning, and Performance Measurement Frameworks

Governance

CSIRO's Governance Framework (see Figure 7) brings together all of the external and internal elements of the governance of the organisation. It is designed to improve transparency and understanding among people both within and outside the organisation about governance in CSIRO.

Overarching elements		Enabling elements		
<i>External and legislative</i>	<i>Internal</i>	<i>Directing</i>	<i>Controlling and managing</i>	<i>Assuring</i>
SIR Act 1949	CSIRO Board	Policy Framework	Primary Processes	Performance Measurement Framework
CAC Act 1997	Board Committees	Code of Conduct	Enabling Processes	Science Assessment Reviews
Other legislation	Board Directions to Chief Executive	Service Charter		
Commonwealth		Strategic Plan		
State/Territory		Science Investment Process		
Minister	Executive Team (ET)	Operational Plans/Budgets		Accountability Checklist
Parliament	Executive Management Council (EMC)			CSIRO Risk Assessment and Audit
Triennium Funding Agreement	Management and Advisory Committees			ANAO external audit
Statements of Expectation and Intent	Authorities and Delegations Framework			Other government audits/reviews
National Research Priorities	Enterprise Agreement			
Department of Education, Science and Training	Associated Entities			
Department of Finance and Administration				

Figure 7: The CSIRO Governance Framework

In 2005-06, CSIRO's governance structure was assessed against the recommendations of the Australian Government's Review of the Corporate Governance of Statutory Authorities and Office Holders (the Uhrig review). As a result of this assessment, the government confirmed that CSIRO was an agency best suited to being a statutory authority with a governing board. Annual Statements of Expectation and Intent have also been introduced between the Minister and CSIRO Board to improve transparency by clarifying government expectations of the board and organisation – these are made public every year.

As a statutory commonwealth agency, CSIRO operates within the Government's formal "outcome-outputs" resourcing framework, as depicted in Figure 8 below. This outcome-output structure will be reviewed during the year and revised consistent with developments in the strategic planning process and negotiations with government over CSIRO's next strategic funding agreement.

Outcome
The application or utilisation of the results of scientific research delivers <ul style="list-style-type: none"> – Innovative and competitive industries – Healthy environment and lifestyles – A technologically advanced society
Outputs
Research Products and Services for Information Technology, Manufacturing and Services
Research Products and Services for Sustainable Minerals and Energy
Research Products and Services for the Environment and Natural Resources
Research Products and Services for Agribusiness and Health

Figure 8: CSIRO's Outcome-Outputs Framework as described in the Portfolio Budget Statements. (to be reviewed in 2006-07)

Planning

As illustrated in Figure 9 below, this CSIRO Operational Plan provides a one-year whole-of-CSIRO view of how CSIRO is organised to deliver on the strategic goals and objectives articulated in the CSIRO Strategic Plan for 2003-2007. It describes specific initiatives and activities for the coming year, and provides details of the allocation of resources across these activities and functional groups. This broad whole-of-CSIRO view is supported by more detailed planning that takes place across the Organisation.

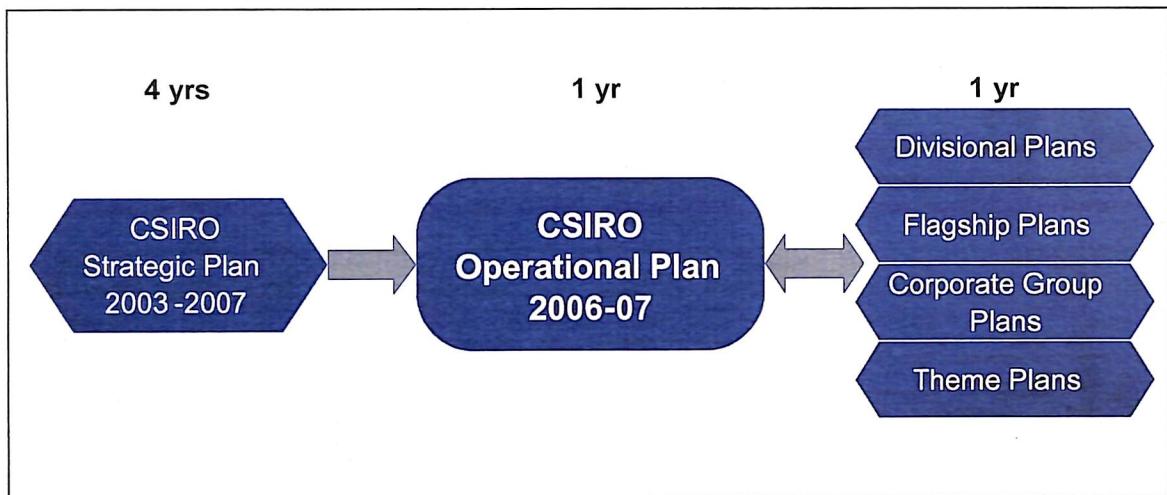


Figure 9: Relationship between CSIRO Plans

Performance Measurement Framework

To help maintain our focus on delivery and execution, and to underpin accountability for performance, the Executive Team (ET) and CSIRO Board will regularly consider an Organisational Performance Report that consists of the following components:

Strategy Implementation Goals: Strategy Implementation Goals are assigned to members of the Executive Team and can be found in the relevant team entries throughout the Plan.

Organisational Health Measures: These capture quantitative information on the CSIRO's performance across a range of important processes – monitoring trends over time and performance against specific targets (where relevant). The organisational health measures include measures of financial performance, scientific output and quality, stakeholder relationships, people management and operational performance.

Program Performance: CSIRO's Program Performance Framework serves two complementary purposes. Its strategic planning elements (themes, streams, research and engagement goals, roadmaps) provide a common language for describing and organizing research activities, reinforce goal-oriented planning and assist prioritization decisions at a range of levels. Its performance assessment elements (scoring of annual performance goals, assessment of theme/stream progress, management response) promote focus on progress toward clearly articulated goals and objectives.

Science Highlights: These reflect CSIRO's commitment to the conduct of excellent science and celebrate the excitement that comes with providing novel Sciences and Technology solutions to industry, community or environmental problems and through expanding the frontiers of knowledge

Outcomes: As our 'Purpose' and 'Outcome' statements indicate, CSIRO is successful when research results are applied by our stakeholders in ways that deliver impacts across the 'triple bottom line'. The effectiveness indicators shown in Figure 10 below represent the specific types of economic, social and environmental impacts achieved through the adoption of CSIRO outputs. CSIRO's Annual Report provides many examples of outputs and their associated outcomes described in these terms.

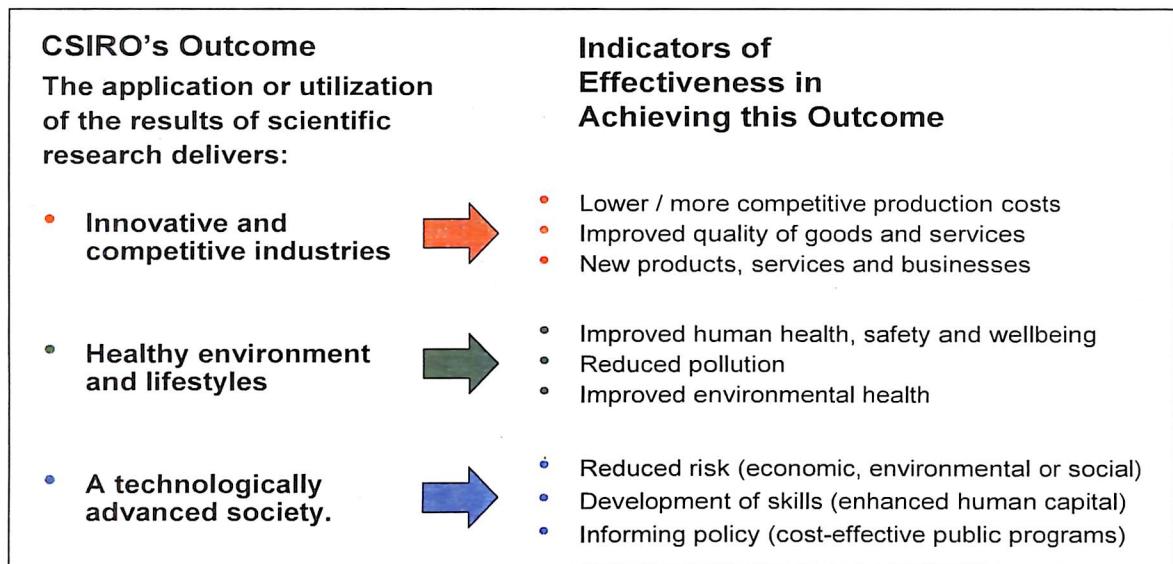
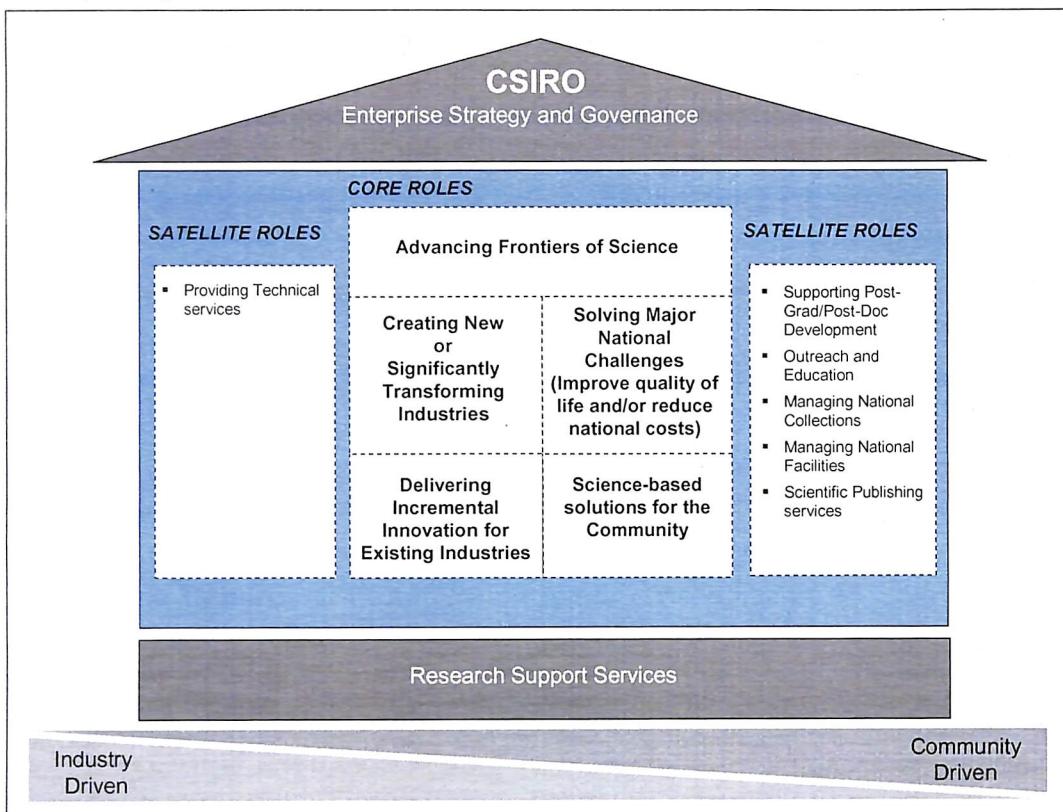


Figure 10: CSIRO Outcomes – the economic, social and environmental impacts

Appendix C: CSIRO Roles

The house shows the continuum at CSIRO between industry driven activities (left side of the house) and community driven activities (right side of the house). The strength and effectiveness of each role supporting the house contributes to the ability of CSIRO to deliver for the public good.



Five core roles for delivering impact

The core roles are the principal means by which CSIRO delivers impact for Australia. They are areas in which CSIRO is (or has the potential to be) distinctive and can deliver high value for Australia. At CSIRO there are currently five core roles.

1. Science-based solutions for the community. Few other organisations are able to conduct targeted community-interest research with a national perspective, and deliver it locally. Through this role, CSIRO provides advice, information, research, and specific community solutions to inform and protect society and the environment. Through this role, CSIRO builds connections with communities and industry and informs Government policy.

2. Delivering incremental innovation for existing industries. For many companies, the difference between success and failure may be a few points of profit margin. Applied R&D can give an important

boost to industry profitability and sustainability. At the same time, financial pressures from the day-to-day operations of a business can make it hard for companies to justify significant in-house R&D. This is especially true for Australia's numerous small and medium enterprises.

CSIRO helps solve this problem by delivering incremental innovation to improve the efficiency, effectiveness and competitiveness of existing industries. CSIRO's skill base, capability set, infrastructure, client focus, track record, relationships and reputation are distinctive in delivering in this role.

3. Solving major national challenges. Within Australia, CSIRO is unique in the breadth and depth of our expertise and in our ability to perform research focused on solving major national challenges. This research is important for CSIRO and for Australia, and represents CSIRO's third core role.

The national (as opposed to regional or local) nature of CSIRO, together with its collaborative and multidisciplinary culture, makes solving major national challenges a critical role for the enterprise. If CSIRO did not participate in this role, many of these challenges would continue unchecked.

4. Creating new or significantly transforming industries. There are not many organisations in Australia with the scale necessary to perform the sort of R&D that leads to the creation or transformation of industries. By sustaining high-risk, long-term projects in partnership with business, CSIRO is able to lead outcome-focused, R&D intensive, mission directed strategic research aimed at creating the next generation industries, products, services and businesses.

CSIRO's scale and long-term perspective is the key to its differentiation and ability to perform this role. Only a small number of other organisations, consortia or government bodies could lead such projects and ensure delivery. In this role, CSIRO aims to increase the competitiveness and sustainability of Australian industry through dramatic innovations.

5. Advancing frontiers of science. Paradigm-shifting science aimed at advancing fundamental scientific understanding takes place within all of CSIRO's core roles. Indeed, some of CSIRO's biggest scientific breakthroughs have come from work being driven through other roles.

Research aimed at advancing fundamental scientific understanding is vital in its own right. It helps to maintain world-class scientific skill in Australia; it is critical for maintaining connectivity with the international research community and for creating options for advancing new application areas in the long-term.

This role balances high risk in terms of project success rate with the high returns that successful projects generally provide, and develops world-class scientific talent in Australia. It also has the potential to generate new science, technical platforms, capabilities and intellectual property. Frontier science is important to the sustainability of all our other core roles.

Satellite roles enhance core roles

CSIRO performs ancillary or "satellite" roles related to our core science activities

Outreach and Education - Promoting the importance of science and its application to students, parents, teachers and the Australian community has long been one of CSIRO's great strengths. CSIRO is strongly positioned to help create a knowledgeable society, by raising scientific literacy so the community can engage with major issues related to science.

Management of National Facilities - Accessing world-class infrastructure is important in many areas of research. Retaining core capabilities for Australia requires Australians host and run key facilities. CSIRO fulfils this role by managing the Australian Animal Health Laboratory, the Australian Telescope National Facility, and the CSIRO National Facility Vessel Southern Surveyor.

Scientific Publishing Services - A reflection of CSIRO's longstanding commitment to knowledge diffusion and technology transfer, CSIRO Publishing operates as an independent entity, publishing science and technology books, journals, papers, and technical reports. With a global reputation for quality products and services, CSIRO Publishing has approximately \$9 million in annual turnover and is profitable.

Support for Post-Grad/Post-Doc Development - Supporting undergraduates, post-graduates, and post-doctoral researchers helps to boost the calibre of researchers working in the Australian community. CSIRO gives young researchers experience in technology transfer and uptake, which is important for Australia's future innovation capacity.

Management of National Collections - The creation, enhancement and maintenance of National Collections is a service for the present and future of Australian science. Notable CSIRO collections include Plant Industry's Herbarium; Forestry and Forest Products Wood Collection; Atmospheric Research's Cape Grim air samples; Entomology's Insect collection; Molecular Science's Compound Collection; Marine Science's Fish Collection; and Sustainable Ecosystem's Australian National Wildlife Collection.

Providing Technical Services - We offer industry, the community and government access to deep scientific knowledge not available through private sources. In many cases, these services fill an important market gap, assisting where a market for the service required does not yet exist, has not adequately developed or is not economically viable due to Australia's

relatively small scale. This role is particularly important for small and medium enterprises, which are often unable to develop the services they need in-house.

Enabling functions underpin all of CSIRO's roles

Certain supporting activities enable CSIRO to fulfil our other roles. In CSIRO the two most important enabling functions are as follows.

Providing Research Support Services - CSIRO currently spends a great deal on the provision of research support services. These functions include laboratory management and support, corporate finance and accounting, corporate property management, payroll and human resources benefit administration, CSIRO communications, procurement, and management of IT systems.

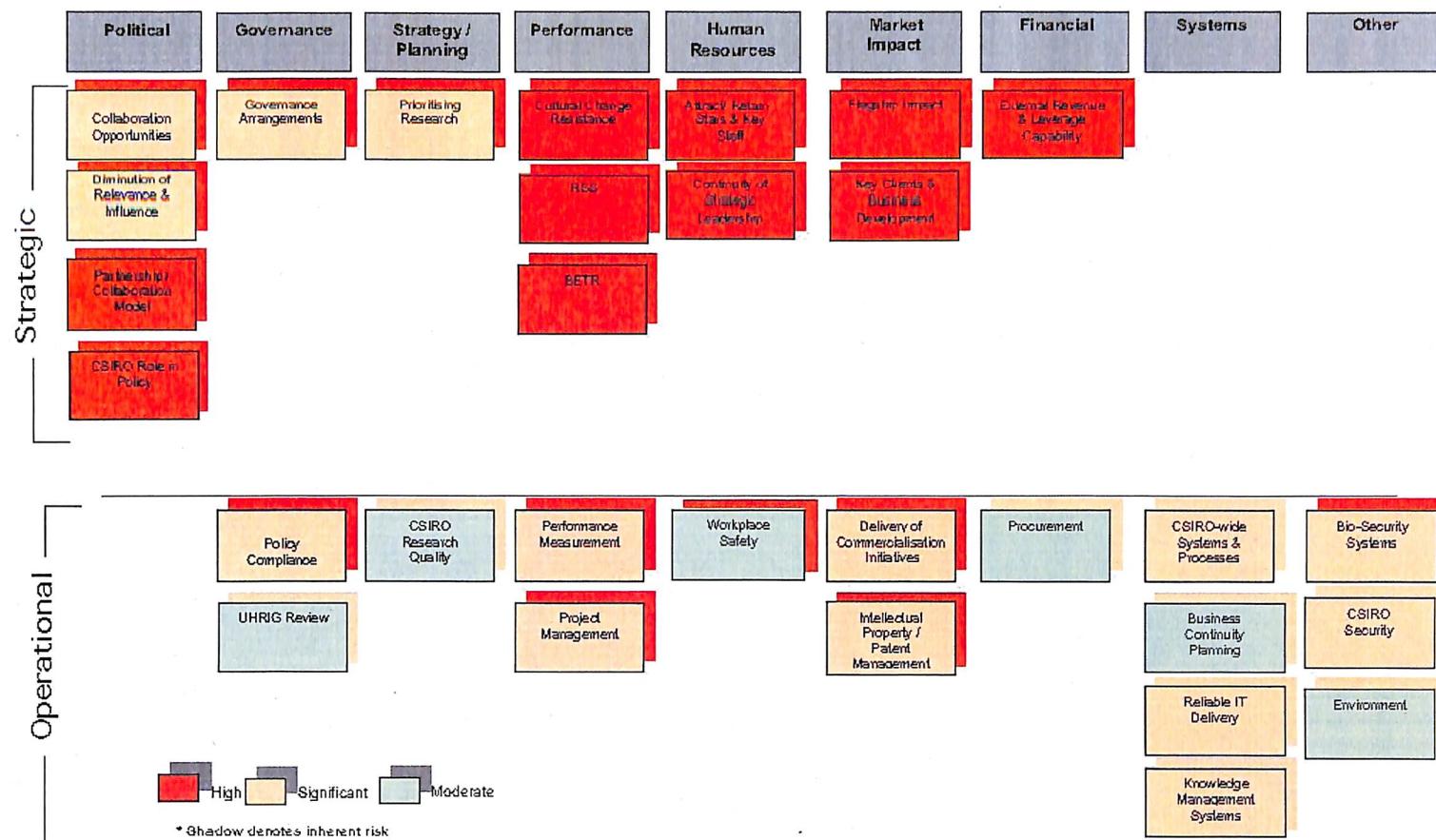
Enterprise Strategy and Governance - Ensuring a well-communicated and understood strategic and operational framework exists helps CSIRO staff fulfil their duties and helps external organisations interact more effectively with us. CSIRO must invest in effective strategy and governance to ensure appropriate processes are in place for strategic direction setting and to guide key management decisions.

CSIRO Organisational Risk Profile		Commercial-in-Confidence
1.0 INTRODUCTION <p>The Organisational Risk Profile has been updated as per discussions held with the individual Executive owners and comments made during the last ERAC and Audit Committee Meetings (January 24th & February 21st respectively). A summary of the main changes since the profile was presented to the Board on 22 June 2005 are:</p> <ul style="list-style-type: none">• <i>New high risk:</i> BETR Implementation• <i>New high risk:</i> RSS Implementation• <i>New significant risk:</i> Knowledge Management Systems • <i>CSIRO Role in Policy :</i> Risk rating changed from significant to high risk• <i>Prioritising Research:</i> Risk rating changed from high to significant• <i>Cultural Change Resistance:</i> Renamed, previously Delivering Change Initiatives• <i>Attract / retain stars & key staff:</i> Merged two risks 'Attain / retain scientific & other stars' and 'Key Staff'.• <i>Continuity of Strategic Leadership:</i> Renamed, previously Strategic Leadership. Risk rating changed from significant to high risk• <i>Key Clients & Business Development:</i> Renamed previously 'Key Clients and External Revenue'• <i>Reliable IT Delivery:</i> Risk rating changed from moderate to significant• <i>Partnership Collaboration Model:</i> Risk rating changed from significant to high• <i>Delivery of Commercialisation Initiatives:</i> Assessed risk reduced to significant		

CSIRO Organisational Risk Profile

Commercial-in-Confidence

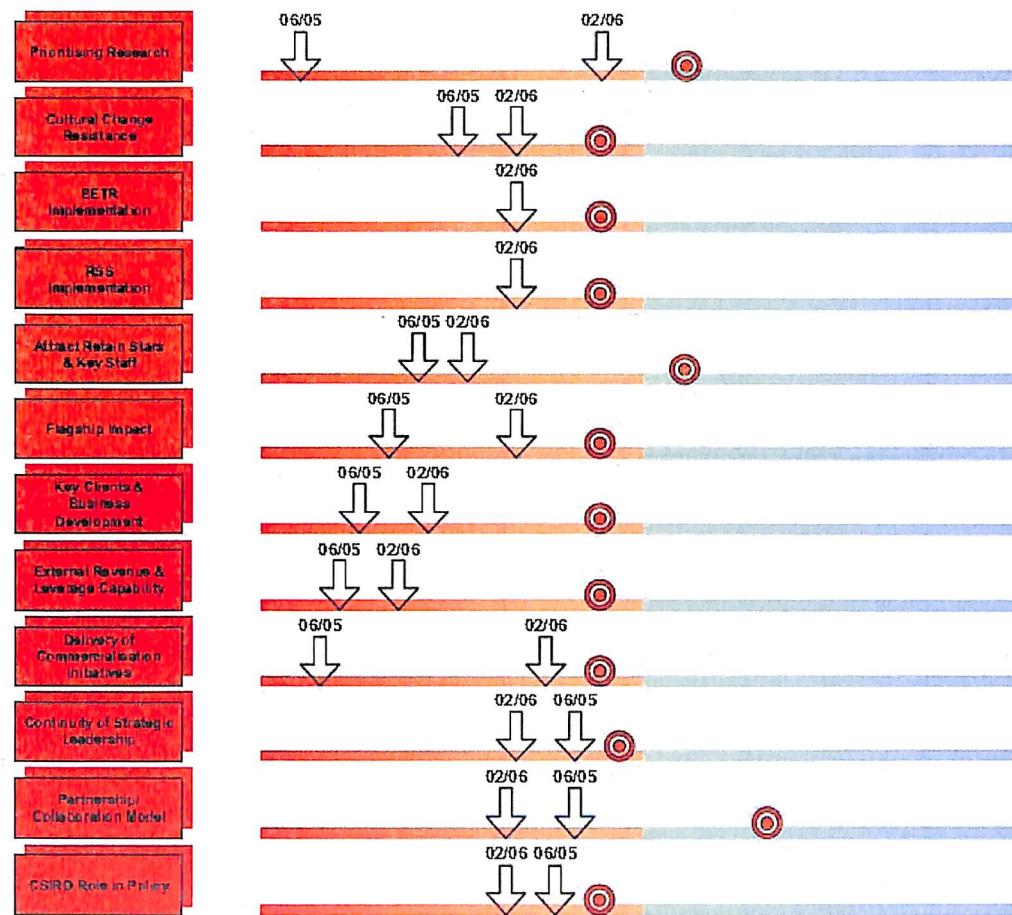
2.0 ORGANISATIONAL RISK PROFILE



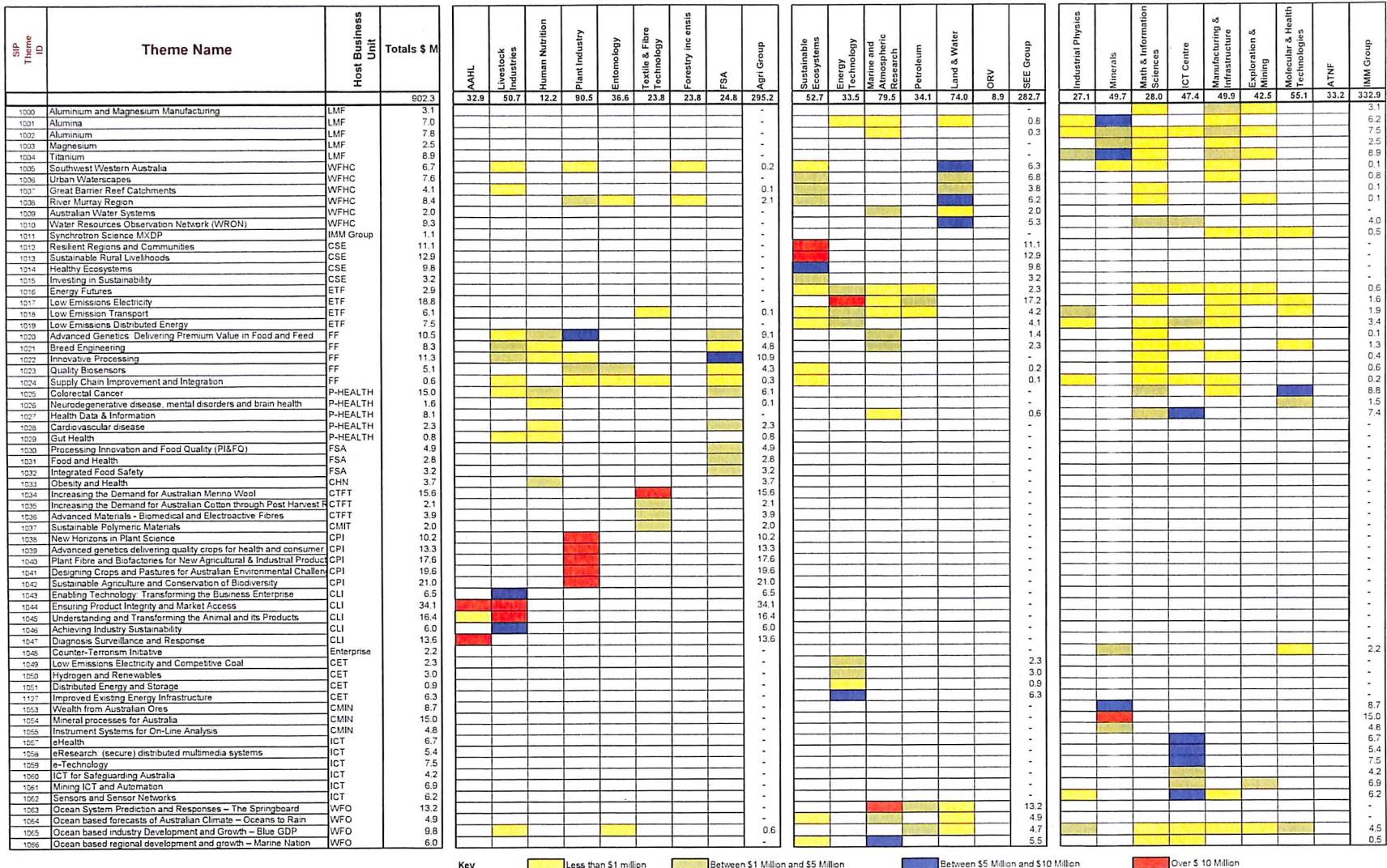
CSIRO Organisational Risk Profile

Commercial-in-Confidence

HIGH RISK TIMELINE



Appendix E: List of Research Themes



SIP Theme The Flagships *

Energy Transformed 06/07		
1017	Low Emissions Electricity	\$18.8
1018	Low Emission Transport	\$6.1
1019	Low Emissions Distributed Energy	\$7.5
Food Futures 06/07		
1020	Advanced Genetics: Delivering Premium Value in Food and Feed	\$10.5
1021	Breed Engineering	\$8.3
1022	Innovative Processing	\$11.3
1023	Quality Biosensors	\$5.1
1024	Supply Chain Improvement and Integration	\$0.6
Leading the Light Metals Age 06/07		
1000	Aluminum and Magnesium Manufacturing	\$3.1
1001	Alumina	\$7.0
1002	Aluminium	\$7.8
1003	Magnesium	\$2.5
1004	Titanium	\$8.9
Preventative Health 06/07		
1025	Colorectal Cancer	\$15.0
1026	Neurodegenerative disease, mental disorders and brain health	\$1.6
1027	Health Data & Information	\$6.1
1028	Cardiovascular disease	\$2.3
1029	Gut Health	\$0.8
Water for a Healthy Country 06/07		
1005	Southwest Western Australia	\$6.7
1006	Urban Waterscapes	\$7.6
1007	Great Barrier Reef Catchments	\$4.1
1008	River Murray Region	\$8.4
1009	Australian Water Systems	\$2.0
1010	Water Resources Observation Network (WRON)	\$9.3
Wealth from Oceans 06/07		
1063	Ocean System Prediction and Responses – The Springboard	\$13.2
1064	Ocean based forecasts of Australian Climate – Oceans to Rain	\$4.9
1065	Ocean based industry Development and Growth – Blue GDP	\$9.8
1066	Ocean based regional development and growth – Marine Nation	\$6.0

Energy Transformed 05/06		
	Energy Futures	\$2.3
	Low Emission Electricity	\$18.2
	Low Emission Transport	\$7.4
	Low Emission Distributed Energy	\$4.0

Food Futures 05/06		
	Advanced Genetics	\$10.1
	Breed Engineering	\$6.4
	Innovative Processing	\$8.4
	Quality Biosensors	\$4.3
	Consumer Engagement	\$0.7

Leading the Light Metals Age 05/06		
	Alumina	\$5.6
	Aluminum Metal Production	\$6.5
	Magnesium Metal Production	\$2.5
	Aluminum and Magnesium Manufacturing	\$2.2
	Titanium	\$7.1

Preventative Health 05/06		
	Colorectal Cancer	\$12.6
	Neurodegenerative Diseases	\$1.5
	Cardiovascular Disease/Inflammatory Diseases	\$2.8
	Environment and human health	\$0.5
	Health Data Integration	\$3.2

Water for a Healthy Country 05/06		
	Great Barrier Reef Catchments	\$5.5
	River Murray Region	\$8.1
	Urban Waterscapes	\$4.4
	Southwestern WA	\$6.3
	Water Knowledge	\$2.9

Wealth from Oceans 05/06		
	Ocean System Prediction and Responses – 'the Springboard'	\$11.9
	Ocean Based Forecasts of Australian Climate – 'Oceans to Rain'	\$4.0
	Ocean Based Industry Development and Growth – 'Blue GDP'	\$4.9
	Ocean based regional development and growth – 'Marine Nation'	\$3.7

Energy Transformed 04/05		
	Energy Futures	\$3.0
	Low Emissions Electricity	\$12.4
	Low Emissions Transport	\$6.5
	Low Emissions Distributed Energy	\$4.2

Food Futures 04/05		
	Advanced Genetics	\$10.2
	Breed Engineering	\$8.0
	Bioactive Separation	\$2.7
	High Pressure Processing (HPP)	\$2.4
	Quality Biosensors	\$4.1
	Consumer Acceptance	\$0.7

Leading the Light Metals Age 04/05		
	Alumina	\$5.2
	Aluminium Metal Production	\$5.9
	Magnesium Metal Production	\$3.1
	Magnesium/Aluminium Fabrication	\$1.7
	Titanium	\$7.3

Preventative Health 04/05		
	Colorectal Cancer	\$14.0
	Cardiovascular/Inflammatory Disease	\$3.1
	Neurodegenerative Disease	\$1.4
	Environment and Human Health	\$0.4
	Health Data Integration	\$2.6

Water for a Healthy Country 04/05		
	Great Barrier Reef Catchments	\$3.6
	Urban Waterscapes	\$4.9
	River Murray System	\$6.9
	Southwest Western Australia	\$6.2
	Integrating and Supporting Research Theme	\$4.7

Wealth from Oceans 04/05		
	Ocean System Prediction and Responses – 'the Springboard'	\$11.6
	Ocean Based Forecasts of Australian Climate – 'Oceans to Rain'	\$5.3
	Ocean Based Industry Development and Growth – 'Blue GDP'	\$1.1
	Ocean Based Regional Development and Growth – 'Marine Nation'	\$1.5

SIP Theme Agribusiness Group*

Agribusiness Group 06/07**		Agribusiness Group 05/06		Agribusiness Group 04/05	
1072	Wood Quality Solutions	\$4.1		Wood Quality Solutions	\$2.8
1073	Forest Benefits	\$6.1		Improved Germplasm	\$5.5
1074	Development of Improved Germplasm and Breeding Decision Support Tools	\$4.6		Smart Products	\$5.3
1075	Forest Protection	\$1.7		CFPP Business Units	\$2.0
1076	Smart Products	\$4.6		Precision Plantation Solutions	\$3.5
				Commercial Environmental Forestry	\$3.1
				FirePAK	\$2.7
				CFPP Business Units	\$1.0
				Other CFP Initiatives	\$10.1
Entomology 06/07**		Entomology 05/06		Entomology 04/05	
1077	Emerging biological threats and invasive species	\$9.6		Securing agriculture against biological threats	\$14.7
1078	Biological Drivers for Agricultural Sustainability	\$12.3		Protecting ecosystem function, biodiversity and water quality	\$13.6
1079	Invertebrate Biodiversity Assets and Informatics	\$3.4		Developing innovative bio-industries	\$7.8
1080	Building Bioindustries with Synthetic Biology	\$11.3			
Food Science Australia 06/07**		Food Science Australia 05/06		Food Science Australia 04/05	
1030	Processing Innovation and Food Quality (PI&FQ)	\$4.9		Processing Innovation and Food Quality	\$17.9
1031	Food and Health	\$2.8		Healthy Foods	\$8.6
1032	Integrated Food Safety	\$3.2		Integrated Food Safety	\$8.4
1033	Obesity and Health	\$3.7		Other Initiatives - Capability Building	\$4.5
Livestock Industries 06/07**		Livestock Industries 05/06		Livestock Industries 04/05	
1043	Enabling Technology: Transforming the Business Enterprise	\$6.5		Achieving Environmental Sustainability and Social Acceptance	\$11.1
1044	Ensuring Product Integrity and Market Access	\$34.1		Enabling Technology Innovation	\$9.9
1045	Understanding and Transforming the Animal and its Products	\$16.4		Ensuring Product Integrity and Market Access	\$30.8
1046	Achieving Industry Sustainability	\$6.0		Achieving Environmental Sustainability and Social Acceptance	\$21.5
1047	Diagnosis Surveillance and Response	\$13.6		Other Initiatives - Diagnosis, Surveillance & Response Group	\$5.0
Plant Industry 06/07**		Plant Industry 05/06		Plant Industry 04/05	
1038	New Horizons in Plant Science	\$10.2		Advanced Gene Technologies for New Agricultural & Industrial Products	\$17.8
1039	Advanced genetics delivering quality crops for health and consumer choice	\$13.3		Quality, Differentiated Food for Health and Market Access	\$36.3
1040	Plant Fibre and Biofactories for New Agricultural & Industrial Products	\$17.6		Plant Fibre and Biofactories for New Agricultural & Industrial Products	\$24.4
1041	Designing Crops and Pastures for Australian Environmental Challenges	\$19.6		Restructured Agriculture and Biodiversity Sustainability	\$7.1
1042	Sustainable Agriculture and Conservation of Biodiversity	\$21.0		Australian National Herbarium Collection and Services	\$2.2
Textile and Fibre Technology 06/07**		Textile and Fibre Technology 05/06		Textile and Fibre Technology 04/05	
1034	Increasing the Demand for Australian Merino Wool	\$15.6		Develop Market Led Consumer Products Made from Australia's Natural Fibres	\$12.2
1035	Increasing the Demand for Australian Cotton through Post Harvest R&D	\$2.1		Increase Efficiency of Processing and Trading Australia's Natural Fibres	\$8.8
1036	Advanced Materials - Biomedical and Electroactive Fibres	\$3.9		Other Initiative - Investigate the potential for flexible electronics as a platform in te	\$1.6
				Other Initiatives - Assisting Australian Small to Medium Sized Enterprises	\$2.0

**2006-07 figures are not directly comparable for Divisional Themes, as they are now exclusive of Flagship Investment.

*Divisional budgets as published in the 2005-06 CSIRO Operational Plan and the 2004-05 CSIRO Operational Plan respectively.

SIP Theme Information, Manufacturing and Minerals Group*

Australia Telescope National Facility 06/07**	
1067	National Facility Operations
1068	Technologies for Radio Astronomy
1069	Astrophysics
1070	The xhNTD and SKA Phase 1
1071	Gemini & SKA Major National Research Facility Administration

Exploration and Mining 06/07**	
1107	Computational Geoscience for Predictive Discovery
1108	Deposit Assessment for Mining
1109	Discovery Technologies
1110	Exploration and Mining Services
1111	Near Surface Exploration
1112	Sustainable Mining Systems
1113	Minerals Down Under

ICT Centre 06/07**	
1057	eHealth
1058	eResearch (secure) distributed multimedia systems
1059	e-Technology
1060	ICT for Safeguarding Australia
1061	Mining ICT and Automation
1062	Sensors and Sensor Networks

Industrial Physics 06/07**	
1081	NanoScale Manufacturing
1082	Enabling Physics for Flagships and the National Innovation System
1083	Facility Management

Manufacturing and Infrastructure Technology 06/07**	
1102	Process Technologies
1103	Manufacturing Technologies for Transport
1104	Sustainable Polymeric Materials
1105	Security, Infrastructure & Public Safety
1106	CMIT Industrial Research Services

Mathematical and Information Sciences 06/07**	
1084	Biotechnology and Health Informatics (BHI)
1085	Decision Technologies (DT)
1086	Environmental Informatics (EI)
1087	Terabyte Science – Delivering knowledge from large datasets

Minerals 06/07**	
1053	Wealth from Australian Ores
1054	Mineral processes for Australia
1055	Instrument Systems for On-Line Analysis

Molecular and Health Technologies 06/07**	
1088	Australian Biotech Growth Partnerships
1089	Biomaterials and Regenerative Medicine
1090	Transformational products through Electroactive Materials
1091	Nanobiotechnology, Biologically inspired nanoscale materials for sensing and deliv.

Australia Telescope National Facility 05/06	
	National Facility Operation
	Technologies for radio astronomy
	Astrophysics
	Other Initiatives

Exploration and Mining 05/06	
	Computational Geoscience for Predictive Discovery
	Exploration Through Cover
	Discovery Technologies
	Rock Mass Characterisation
	Mining ICT and Automation
	Mining Systems
	Mining & Sustainable Development
	Other Initiatives – Minerals Down Under
	Other Initiatives – QCAT 3

ICT Centre 05/06	
	Autonomous Systems
	Information Engineering
	Networking Technologies
	Wireless Technologies
	Other Initiative – e-Health Research Centre

Industrial Physics 05/06	
	Nanoscale manufacturing
	Physical Security & Public Safety
	Enabling Physics for Flagships & the National Innovation System
	Other Initiative – Facility Management

Manufacturing and Infrastructure Technology 05/06	
	Manufacturing in a Carbon Constrained Future
	Adaptive Extreme Process Technologies 'AdEPT'
	Manufacturing Technologies for Transport
	Innovative Material, Polymer and Composite Technologies (IMPACT)
	Safeguarding Technologies
	Future Cities
	Other Initiatives - Industrial Research Consultancy Services (IRCS)

Mathematical and Information Sciences 05/06	
	Biotechnology & Health Informatics
	Environmental Informatics
	Decision Technologies

Minerals 05/06	
	Value Adding to Australia's Minerals
	Sustainable Processing of Minerals
	Advanced Technology Platforms for the Minerals Industry
	Australia Leading the Light Metals Age

Molecular and Health Technologies 05/06s	
	Part A – Molecular Science
	Bioactive Molecules
	Biomaterials
	Diagnostic Markers
	Product Security
	Industrial Biotechnology
	High Performance Polymers
	Nano-structured Materials
	Part B – Health Sciences & Nutrition (Parkville)
	Protein-based Diagnostic Technologies
	Rational Drug Design

Australia Telescope National Facility 04/05	
	Technologies for Radio Astronomy
	Astrophysics
	National Facility Operations
	Other initiative - Gemini Subscription

Exploration and Mining 04/05	
	New Deep Mineral Resources
	Commercial Products for Mineral Resource Characterisation
	Sustainable Mining of Mineral Resources
	Other Initiatives - Minerals and Energy in Society

ICT Centre 04/05	
	Networked Information Systems
	Wireless and Antenna Futures
	Networking for the Information Economy
	Information Agility
	Autonomous Systems
	e-Health
	Other Initiatives - QeHRC

Industrial Physics 04/05	
	Clean Energy
	Physical Security
	Frontier Industrial Technologies
	Aerospace Systems
	Other Initiatives - Light Metals Flagship Program
	Other Initiatives - Instrumentation Program

Manufacturing and Infrastructure Technology 04/05	
	Manufacturing in a Carbon-Constrained Future
	Efficiency and Intensification in the Process Industries
	Manufacturing New Generation Transport Vehicles
	Revitalising Product Manufacturing
	Safe and Secure Australia
	Smart Infrastructure
	Sustainable and Competitive Cities
	Other Initiatives - Industrial Research and Consulting Services - IRCS

Mathematical and Information Sciences 04/05	
	Biotechnology and Health Informatics
	Environmental Monitoring for Management
	Decision Making for Industrial Processes & Business Services
	Other Initiatives - Software consulting and support

Minerals 04/05	
	Value Adding to Australia's Minerals
	Sustainable Processing of Minerals
	Advanced Technologies for Mineral Process Design and Control
	Australia Leading the Light Metals Age

Molecular Science // Health Sciences and Nutrition 04/05	
	Molecular Science 04/05
	Health Through Medical Devices
	Parasite Control
	Security
	Elaborately Transformed Manufactures
	Other Initiatives - Future Capabilities

Health Sciences & Nutrition 04/05

Dietary & Lifestyle Strategies for the Control of Obesity & Obesity-related Condition

Protein-based Diagnostic Technologies

Rational Drug Design

Flagship/ESF Initiatives outside Divisional Themes

**2006-07 figures are not directly comparable for Divisional Themes, as they are now exclusive of Flagship Investment.

* Divisional budgets as published in the 2005-06 CSIRO Operational Plan and the 2004-05 CSIRO Operational Plan respectively

SIP Theme Sustainable Energy & Environment Group*

Energy Technology 06/07**		
1049	Low Emissions Electricity and Competitive Coal	\$2.3
1050	Hydrogen and Renewables	\$3.0
1051	Distributed Energy and Storage	\$0.9
1127	Improved Existing Energy Infrastructure	\$6.3

Land and Water 06/07**		
1117	A Vital Coastal Australia	\$0.2
1118	Agriculture, Water and Environment	\$8.0
1119	Environmental Biogeochemistry (Centre for Environmental Contaminants Research)	\$5.6
1120	Water Resources	\$6.4
1121	Rivers and Coasts	\$7.4
1122	Society, Economy and Policy	\$2.8
1123	Environmental Sensing, Prediction and Reporting	\$9.6
1124	Urban and Industrial Water	\$3.8

Marine and Atmospheric Research 06/07**		
1094	Complex System Science (CSS)	\$1.9
1095	Climate, Weather and Ocean Prediction (CWOP)	\$10.4
1096	The Living Atmosphere (TLA)	\$11.3
1097	Marine Ecosystems and Resources (MER)	\$18.0
1098	Integrated Coastal and Ocean Management (ICOM)	\$10.8
1099	Marine National Facility (Satellite Role)	\$8.9

Petroleum Resources 06/07**		
1092	Maximising Australia's Oil Self-Sufficiency	\$11.2
1093	Growing Australia's Methane Economy	\$5.1

Sustainable Ecosystems 06/07**		
1012	Resilient Regions and Communities	\$11.1
1013	Sustainable Rural Livelihoods	\$12.9
1014	Healthy Ecosystems	\$9.8
1015	Investing in Sustainability	\$3.2
1101	Future Cities	\$5.7

**2006-07 figures are not directly comparable for Divisional Themes, as they are now exclusive of Flagship Investment.

Energy Technology 05/06		
	Low Emissions Electricity and Competitive Coal	\$13.4
	Renewables and Hydrogen	\$5.7
	Distributed Energy and Storage	\$7.1
	Energy and Environment	\$6.6

Land and Water 05/06		
	Agriculture, Water and Environment	\$18.0
	Environmental Biogeochemistry	\$7.7
	Water Resources	\$8.9
	Rivers and Coasts	\$10.7
	Society, Economy and Policy	\$4.7
	Environmental Sensing, Prediction and Reporting	\$10.2
	Urban and Industrial Water	\$5.3

Marine and Atmospheric Research 05/06		
	Part A – Marine Research	
	Managing Multiple Uses (of the marine environment)	\$14.8
	Sustainable Fisheries	\$16.2
	Sustainable Aquaculture Production	\$4.8
	Climate Processes and Prediction	\$7.0
	Marine Environment Prediction	\$8.6
	Part B – Atmospheric Research	
	Climate and Weather Prediction	\$11.8
	Environmental Monitoring & Prediction	\$10.3
	Other Activity – Earth Observation Centre/COSSA	\$4.5
	Other Activity – Complex systems Science	\$1.7

Petroleum Resources 05/06		
	Maximising Australia's Oil Self Sufficiency	\$17.8
	Growing Australia's Methane Economy	\$6.8

Sustainable Ecosystems 05/06		
	Resilient Regions and Communities	\$11.8
	Sustainable Rural Livelihoods	\$17.4
	Healthy Ecosystems	\$11.1
	Investing in sustainability	\$3.9

Energy Technology 04/05		
	Low Emissions Electricity and Competitive Coal	\$10.3
	Renewables and Hydrogen	\$2.1
	Distributed Energy and Storage	\$7.5
	Energy and Environment	\$8.8

Land and Water 04/05		
	Water Allocation and Quality	\$16.0
	Urban Water Re-use	\$1.5
	Land Use Options	\$25.8
	Environmental Contamination	\$9.4
	Triple Bottom Line Land and Water Management Options	\$9.5

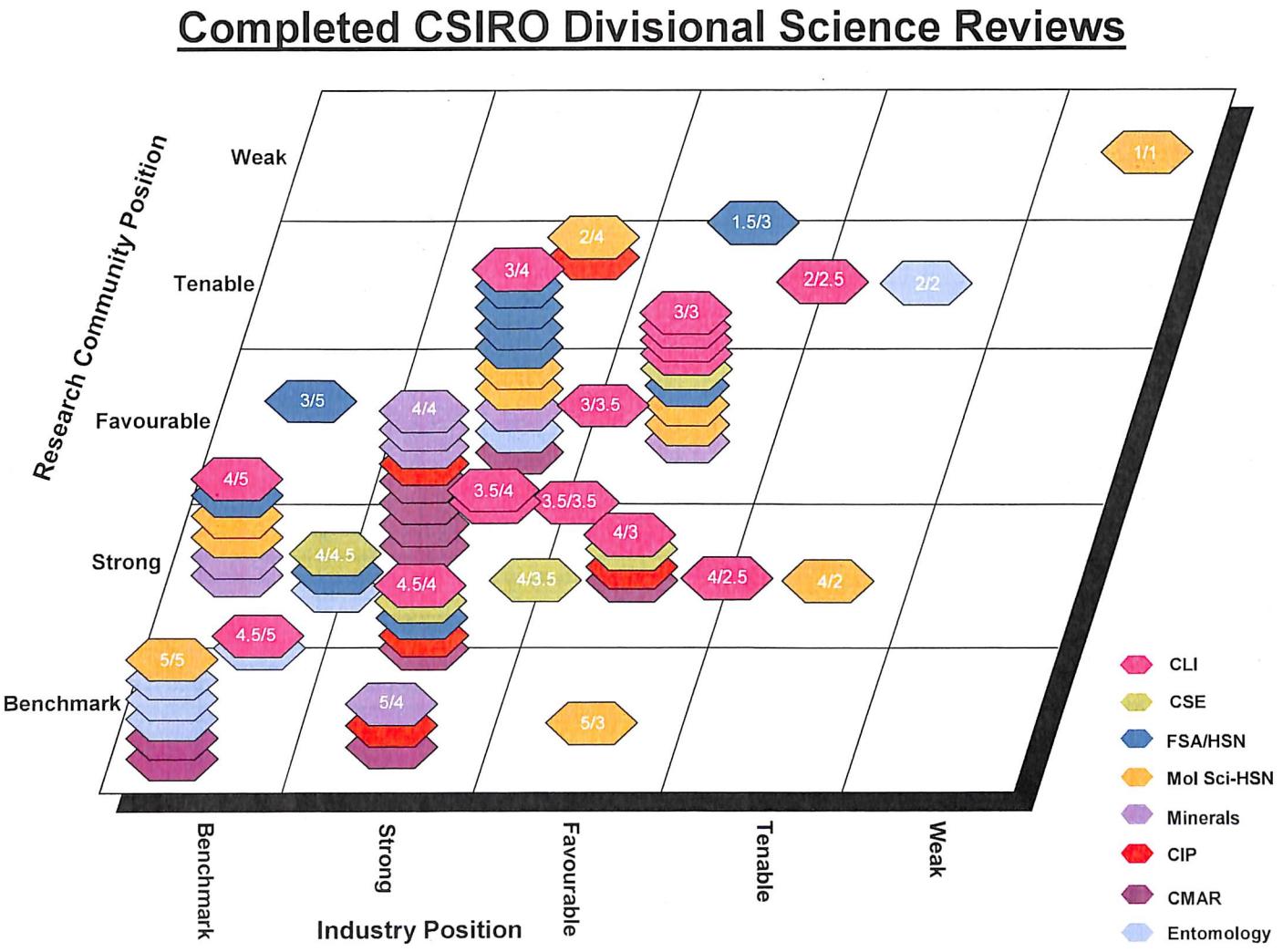
Marine Research // Atmospheric Research 04/05		
	Marine Research 04/05	
	Managing Multiple Uses	\$13.4
	Sustainable Fisheries	\$17.8
	Sustainable Aquaculture Production	\$5.2
	Climate Processes and Prediction	\$4.9
	Marine Environment Prediction	\$7.0
	Other Initiatives - National Collections	\$0.6
	Other Initiatives - National Facility Southern Surveyor	\$9.6
	Atmospheric Research 04/05	
	Climate and Weather	\$9.4
	Air Quality and Health	\$4.2
	Atmosphere and Earth Observation	\$10.5
	Other Initiatives - Complex Systems Science Directorate	\$1.6

Petroleum Resources 04/05		
	Maximising Australia's Oil Self Sufficiency	\$14.6
	Supporting Australia's Gas Future	\$7.9

Sustainable Ecosystems 04/05		
	Healthy Regions and Communities	\$10.2
	Prosperous Rural Enterprises	\$14.5
	Sustaining Biodiversity and Ecosystem Services	\$10.6
	National Options for Long-term Sustainability	\$3.8
	International Partnerships for Sustainability	\$2.6
	Healthy Urban Ecosystems	\$1.2
	Other Initiatives - Social and Economic Integration Directorate	\$0.9
	Other Initiatives - Realising Impact Through Innovation – RITI	\$1.0
	Other Initiatives - The Australian National Wildlife Collection – ANWC	\$0.5

*Divisional budgets as published in the 2005-06 CSIRO Operational Plan and the 2004-05 CSIRO Operational Plan respectively

Appendix F: Completed CSIRO Divisional Science Reviews



Appendix G: Science Assessment Review - Capability Rating definitions

CSIRO SCIENCE ASSESSMENT REVIEWS

Scientific / Technical Competitive Position

This is a "double ladder" - leadership and recognition in the international research community as well as ability to provide the scientific/technical means for leadership for those organisations adopting and using CSIRO's research results. It has been constructed this way to reflect CSIRO's role.

Research community position

Benchmark	Sustained scientific leader – well recognised in the international research community for this.
Strong	Able to set and sustain new scientific/technical directions within the international research community.
Favourable	Able to maintain a good position in the international research community "pack"; not a scientific leader except in developing niches (not mainstream areas).
Tenable	Not able to set or sustain independent scientific/technical directions – a sense of being continually a follower.
Weak	Declining quality of scientific/technical output compared with other research groups. Often a short term "fire-fighting" focus.

Industry / community impact position

Benchmark	Research results used to set the pace and direction of technically-based commercial, environmental, community or policy development – recognised in industry or community for this.
Strong	Research results able to be used by organisations to distinguish themselves from peers or competitors.
Favourable	Research results able to be used by organisations to improve their position relative to peers or competitors.
Tenable	Research results able to be used by organisations to maintain, but not improve, their position relative to peers or competitors. Research results not able to be used to differentiate organisations from their peers or competition.
Weak	Research results not able to be used by organisations to even maintain their position relative to peers or competitors.

Appendix H: Science Investment Process

Relevance and Impact criteria were developed to assist the Executive Team in making decisions through both the Broad Direction Setting and Theme Review phases of the Science Investment Process. The criteria are applied slightly differently in each of the phases, as outlined in the following tables.

Broad Direction Setting - The BDS criteria provide a basis for asking critical questions about CSIRO's remit, roles and future direction. For example: should CSIRO be engaged in the area of research (relevance), what is the likelihood of adoption (impact), how competitive is CSIRO's research? (impact)

Relevance	<ul style="list-style-type: none"> Value from R&D Size of Area (industry / market size, growth rate, employment, export etc) Addressable benefit to Australia (social, economic, environmental) CSIRO should be engaged Fit with CSIRO role vs other members of NIS Responsive to National Research Priorities Relevance of R&D (Science and Technology is a key component)
Impact	<ul style="list-style-type: none"> Likelihood of adoption State of "receptor" system Willingness of partners / receivers of technology R&D productivity / potential CSIRO research competitiveness (now and future networks)

Theme Review Phase - The criteria for the Theme review have been split into two groups, or lenses, distinguishing between those indicators or measures that are objective in nature and those that are more subjective (requiring greater judgment). All criteria are important, but it was felt important to acknowledge the different natures.

Relevance	<ul style="list-style-type: none"> Prioritisation Significant potential capturable benefit for Australia (Industry / Community) Aligned with NRP or stated Government / industry priority area Delivery of Science and Technology is key to outcome 	<ul style="list-style-type: none"> Judgment / Balance Builds important capability in CSIRO with broad applicability (including Intellectual Asset / IP) Results in valuable additional benefits (eg reputational enhancement, Australian global positioning) Top leadership commitment Aligned with CSIRO strategy (CSIRO role in NIS)
Impact	<ul style="list-style-type: none"> Distinctive (and differentiated) science (Science Quality) Theme (researcher's) track record of delivery (last 5 years including delivery of scientific outcomes) Clear community / industry delivery pathway (including IP / Knowledge diffusion pathway) 	<ul style="list-style-type: none"> Science "hotspot" Appropriate leadership capacity (Divisional performance and competencies) Staff "achievability" (Recruitment / refocussing) Appropriate investment level Level of technical uncertainty Level of other risks – Political, Legal, Cultural, reputation

Appendix I: National Research Priority Areas and Priority Goals

A. An Environmentally Sustainable Australia

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

A1. Water – a critical resource

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

A2. Transforming existing industries

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

A3. Overcoming soil loss, salinity and acidity

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

A4. Reducing and capturing emissions in transport and energy generation

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

A5. Sustainable use of Australia's biodiversity

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

A6. Developing deep earth resources

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

A7. Responding to climate change and variability

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

B. Promoting and Maintaining Good Health

Promoting good health and well being for all Australians

B1. A healthy start to life

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

B2. Ageing well, ageing productively

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

B3. Preventive healthcare

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

B4. Strengthening Australia's social and economic fabric

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

C. Frontier Technologies for Building and Transforming Australian Industries

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

C1. Breakthrough science

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

C2. Frontier technologies

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

C3. Advanced materials

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

C4. Smart information use

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

C5. Promoting an innovation culture and economy

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

D. Safeguarding Australia

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

D1. Critical infrastructure

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

D2. Understanding our region and the world

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

D3. Protecting Australia from invasive diseases and pests

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

D4. Protecting Australia from terrorism and crime

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

D5. Transformational defence technologies

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



Your CSIRO

Australia is founding its future on science and innovation. Its national science agency, CSIRO, is a powerhouse of ideas, technologies and skills for building prosperity, growth, health and sustainability. It serves governments, industries, business and communities across the nation.

Contact Us

Phone	1300 363 400 +61 3 9545 2176
Email	enquiries@csiro.au
Web	www.csiro.au