



Snapshot

www.csiro.au



CSIRO's purpose

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

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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.

Over 6 500 staff in 17 research Divisions and two joint ventures located across 57 sites throughout Australia and overseas, carry out research and development in fields of economic, social and environmental importance. These include:

- agriculture
- the environment
- information and communication technologies
- health
- advanced materials and manufacturing
- minerals and energy
- services
- transport and infrastructure.

Australians in the 21st century aspire to healthy lifestyles and environments, knowledge they can use, better jobs and competitive industries. CSIRO has taken this challenge to heart. We listen carefully to what our customers and other stakeholders tell us, we study global trends, we seek the most suitable partners and then focus the best scientific skills and facilities on the issues. We are committed to seeing our science pay off for Australians and our industries.

CSIRO's rich history shapes our future direction. The Organisation's vision, mission and core beliefs have been built-up over the last 80 years and flow through everything we do. At the same time, in response to some important challenges now facing Australia, we





have embarked upon a new era at CSIRO. Only our unrelenting focus on improving the quality of our science and the impact of our outputs will ensure our relevance for years to come. We are reinventing ourselves as a research enterprise with global reach. We demand of ourselves science excellence, business excellence and operational excellence.

CSIRO's strength lies in building expert teams to tackle complex problems. We have the breadth, skills, diversity, infrastructure, perspective and partners to deliver research outcomes of truly national significance and impact. We support a 'Team Australia' approach to help the nation punch above its weight in the global competitiveness contest.

This *Snapshot* booklet is a brief guide to CSIRO. It outlines our goals, our Organisation, business units and some facts. Examples of our scientific achievements and recent activities are detailed in our *Annual Report*, or on our website.

I hope *Snapshot* conveys to you a sense of the enthusiasm, energy, commitment and strategic vision with which we are helping to build Australia's knowledge base for sustainable success in the 21st century.

Geoff Garrett
Chief Executive
April 2006

Some facts

Research and outputs

- CSIRO ranks in the top one per cent of world scientific institutions in 12 of 22 research fields (based on the Institute for Scientific Information data on total citations of publications, as at 30 June 2005)
- CSIRO produced over 4 000 scientific publications in 2005, and also transfers know-how through over 8 000 client reports, and around 240 media releases annually, plus secondments, industry workshops, seminars and specialist publications
- CSIRO leads six National Research Flagships that bring focus and scale to research addressing some of Australia's most important and complex challenges and opportunities
- CSIRO is the largest single participant in the Cooperative Research Centre (CRC) Program (participating in 48 of the 68 centres, as at March 2006)
- worldwide, CSIRO is involved in over 700 current or recently completed research activities, working with leading scientific organisations and firms in the United States, Japan and Europe, and with developing countries, especially in Asia
- CSIRO offers more than 50 specialised technical and analytical services. These include analyses for air pollutants and satellite imaging of natural resources through to fire testing of materials and diagnosis of exotic animal diseases
- CSIRO is Australia's leading patenting enterprise, holding over 3 900 granted or pending patents
- more than 90 spin-off companies are based on CSIRO generated intellectual property and expertise.



National facilities

- CSIRO hosts three major National Research Facilities (the Australian Animal Health Laboratory, the Australia Telescope, the Marine National Facility – Research Vessel *Southern Surveyor*) and over 30 other research facilities such as the Riverside Life Sciences Centre in Sydney, CSIRO Discovery centre in Canberra and the Australian Resources Research Centre in Perth
- CSIRO manages 11 national reference collections including: the Australian National Fish Collection, the Australian National Insect Collection, the Australian National Herbarium, the Australian National Wildlife Collection, the National Tree Seed Collection and the Scientific Marine Data Collection.

Our budget

- in 2005–06 total forecast revenue is approximately \$934 million
- in 2005–06 CSIRO will receive Parliamentary appropriation funding of \$594 million
- 84 per cent of CSIRO's total expenditure is directed towards the priority goals associated with the National Research Priorities
- in 2005–06 CSIRO is forecast to generate approximately \$345 million in external research and services earnings for research, specialised consultancy and other services, including IP licensing. This revenue is derived from the Australian private sector, Federal and State governments, the Rural Industry R&D Corporations and international companies and organisations.

Our staff

- as at January 2006, CSIRO has 6 502 staff located across 57 sites throughout Australia and overseas
- 61 per cent of staff hold university degrees, including more than 2 000 doctorates and 470 masters
- in collaboration with university colleagues, our staff currently supervise or co-supervise 538 postgraduate research students, approximately 25 per cent in collaboration with CRCs

Science communication and education

- stories involving CSIRO science are reported in around 12 000 news or feature items every year in print, radio and television and involve Australian and international media
- CSIRO Enquiries, our central telephone and email contact point, handles over 35 000 enquiries a year (1300 363 400, enquiries@csiro.au)
- CSIRO Education involves over 700 000 students, parents and teachers each year in activities that encourage appreciation of science. CSIRO jointly produces SCOPE, a science TV program, which has a viewing audience of over 400 000 each week. There are nine CSIRO Science Education Centres across the nation that provide hands-on classes for more than 260 000 students each year. These workshops are both in the Centres, and through each Centre's *Lab on Legs* travelling program operating throughout Australia. CSIRO's Double Helix Science Club offers two magazines – *The Helix* (circulation 13 000) and *Scientriffic* (circulation 12 000), as well as events and activities for members. CSIRO Education also offers a range of other programs for students and teachers
- the Discovery centre in Canberra is CSIRO's showcase. Visitors can explore an interactive exhibition or make use of the modern events facilities. Discovery's education program gives children a chance to explore real research issues in a scientific setting complete with working laboratories
- CSIRO Publishing produces books and CD-ROMS as well as journals in partnership with the Australian Academy of Science and other scientific societies.

Our strategy

Over the next decade we will take on, through our Flagship initiative, the biggest and most challenging issues facing the nation. Through vibrant partnerships with effective knowledge transfer to industry and communities we will help drive business activity, exports and social benefits. We will help advance the pace of commercialisation. And through unremitting excellence in both science and in the business of doing science, we will remain one of the world's pre-eminent science organisations.

Through science and imagination our people will help create the sort of place for Australia that Australians want – a source of innovative, sustainable solutions, ideas and technologies to the world, booming knowledge exports, industrial and environmental innovation and rejuvenation, new jobs, new industries and fresh opportunities.

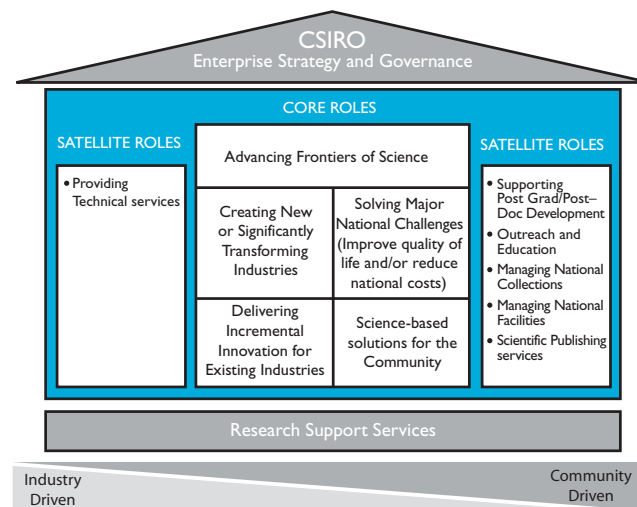
Our strategy for the next decade is based upon six key messages: **greater focus** on major scientific challenges and opportunities for Australia with a strong **outward-looking** emphasis, **stronger partnerships** with universities, other science agencies and industry with a **'service from science'** culture, a **unified One-CSIRO**, making full use of our collective strengths and **growing our impact and relevance** in service to the nation.

We are on a journey from being an Australian research institution to a research enterprise with global reach. The journey builds on our rich history and represents a long-term commitment. The period 2004–07 is focusing on **delivery** and **execution** realising many of the aspirations and commitments we have made over the previous three years.

Global and national trends in innovation have important implications for CSIRO as a research enterprise. Many major economies are making significant strategic investments in their National Innovation Systems (NIS). As the pace and competitiveness of innovation increase globally,

CSIRO's contribution to Australia's challenges and opportunities through multidisciplinary, strategic science becomes more important than ever.

To this end CSIRO's roles are captured in the 'house' diagram:



CSIRO's 'Role House'

Core roles

CSIRO's core roles are as follows:

- 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 Government policy
- advancing the frontiers of science, an essential component of maintaining long-term capability.

Satellite roles

CSIRO also performs a number of satellite roles that deliver value to Australia; these roles currently include:

- supporting the development of postgraduate students and post-doctoral fellows
- Outreach and Education programs (eg Double Helix, CSIROSECs)
- managing national collections and facilities (see page 6 for details)
- scientific publishing services (eg scientific journals, technical books and CDs)
- providing consulting and technical services (eg fire testing, building and construction, quarantine testing, fish diseases).

Enabling functions

Certain enabling functions are necessary to enable the Organisation to deliver on its core and satellite roles, in CSIRO the two most important enabling functions are:

- providing Research Support Services (eg Human resources, Communications, Finance, Information Technology/Services)
- Enterprise Strategy and Governance (eg Executive management and CSIRO Board).

CSIRO's research

CSIRO's research is focused and delivered in three major areas:

- Priority-driven core research
- National Research Flagships
- The Emerging Science Initiative

Priority-driven core research

Our priority-driven core research delivers world-class science outcomes across our core science capability (see Divisional listing pages 18–23). It includes a number of major cross-Divisional activities, including Climate, Secure Australia and Information and Communications Technology. We will continue to focus and build critical mass in areas of national significance.

National Research Flagships

The National Research Flagships are a strategic initiative that aims to make a sustained contribution to national economic and social growth and sustainability. Flagships are founded on our 'Team Australia' philosophy. They focus and harness our world-class science through partnerships to advance Australian industry and society.

The Flagships – Energy Transformed, Food Futures, Light Metals, Preventative Health, Water for a Healthy Country, and Wealth from Oceans – are closely aligned to the National Research Priorities and will deliver scientific solutions important to six of Australia's most pressing national objectives:

The **Energy Transformed Flagship** identifies optimum energy pathways and conducts research into low emission electricity, transport and distributed energy. It will guide Australia's energy future into the 21st century and beyond. Its goal is to halve greenhouse gas emissions by 2050 and double the efficiency of the nation's new energy generation, supply and end use, and to position Australia for a future hydrogen economy.

The **Food Futures Flagship** is focused on transforming the international competitiveness of, and adding \$3 billion annually to, the Australian agrifood sector by the application of frontier technologies to high potential industries.



The **Light Metals Flagship** is focusing the nation's long-term R&D efforts on high-value light metals – aluminium, titanium and magnesium. Its vision is to reduce the energy required to make light metals, reduce full life-cycle environmental impact, enhance asset productivity and manufacturing technologies, and help establish new industries for Australia.

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.

The **Water for a Healthy Country Flagship** is integrating knowledge across science disciplines to 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.

The **Wealth from Oceans Flagship** aims 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.

The Emerging Science Initiative

The Emerging Science Initiative (ESI) is working at the cutting-edge of technologies for the future in areas of frontier research that will be absolutely vital to our future prosperity. It will be these technologies that will underpin our long-term portfolio of skills and capabilities in emerging areas of critical science.

The ESI focuses our science investment and promotes cross-pollination between CSIRO Divisions for the synergy required to achieve these breakthrough science goals.

ESIs will play an important role in enhancing CSIRO's reputation for scientific excellence and in strengthening our links with international science.

The initiative aims to develop capabilities in topics ranging from environmental nanovectors to genomic and metabolomic modelling for controlled biological change, and from new materials for renewable energy to human decision-making in complex system modelling.

Sectors – links to industry

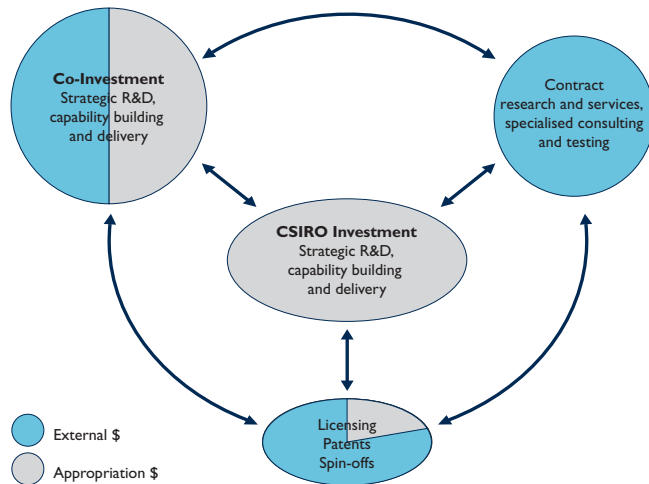
We plan our research and set priorities in consultation with Sector Advisory Councils (SACs) who represent industry and other stakeholder interests.

These Councils cover energy and transport; environment and natural resource management; health; information, communication and services; manufacturing; and mineral resources.



How we do business

CSIRO has found that the most productive developments come from close working relationships based on mutual understanding. We aim to meet business and technological needs. We strive to deliver value from the investment, at all stages of research, development and commercialisation. We work with large and small, public and private companies. We provide a range of partnering and technology transfer arrangements, all of which can be tailored to suit the requirements of individual organisations. These are best represented by the **CSIRO Investment Model**:

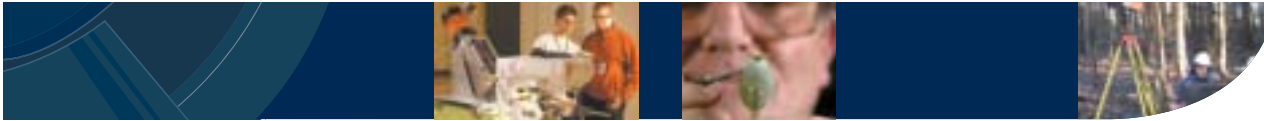


CSIRO works actively with our key partners and customers to develop and support relationships best suited to achieving mutual goals. We support our relationships in a range of ways including: partnering at both strategic and transactional levels; the formation of multi-disciplinary customer teams; and dedicated account managers located within a customer's or partner's business when warranted by the scale and scope of the relationship.

CSIRO globally

Consistent with the Australian Government's aid and trade objectives, CSIRO is involved in over 700 research activities, working with leading scientific organisations across the globe. CSIRO has worked in more than 80 countries with partners and customers ranging from foreign governments, small companies to large multi-nationals and international foundations. CSIRO also works with developing countries, particularly in the Asia-Pacific region, delivering more than 300 development projects in over 60 countries, with collaborations involving 40 research institutions, foundations and aid agencies. The projects range from improved catchment management to land mine detection and increased forest productivity to systems implementation.

CSIRO has joined with eight other leading international science organisations to form the Global Research Alliance in an attempt to leverage our combined capabilities to target the current United Nations' Millennium Goals in water, energy, health, transport and the digital divide.



What we do – is deliver benefits to the economy, society and the environment

We strive to deliver value to our clients at all stages of research, development and commercialisation. By ensuring that our science is relevant and has impact, we expect our partnerships and capacity to invest in new research to grow.

The outputs which we provide to our stakeholders include:

- new/improved technology and management systems
- new/improved intermediate and final products
- ‘catalyst’ services and advice for policy development and business
- new knowledge and skills.

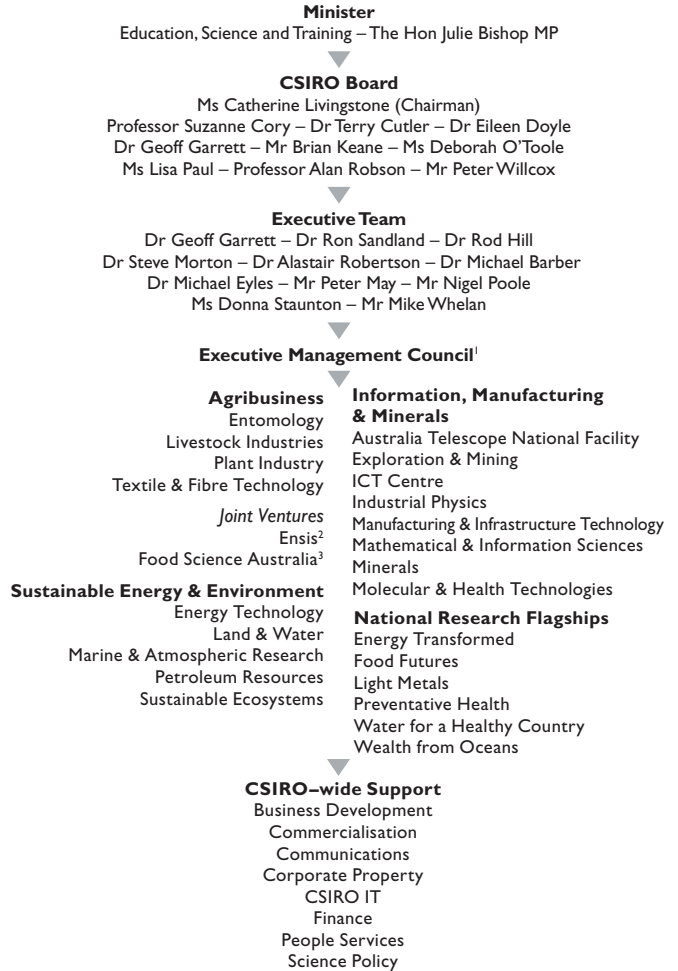
These in turn contribute to outcomes which centre around building/sustaining:

- innovative and competitive industries
- a technologically advanced society
- healthy environments and lifestyles.

This is achieved by delivering a range of public and private benefits across the ‘triple bottom line’ of economic, social and environmental benefits, for example:

- lower/more competitive production costs
- improved quality of goods and services
- new products, services and businesses
- reduced risk
- skills developed (enhanced human capital)
- improved human health, safety and wellbeing
- informing policy (cost-effective public programs)
- reduced pollution
- improved environmental health.

CSIRO – organisational structure



¹ The Executive Management Council comprises members of the Executive Team, all Divisional Chiefs, Flagship Directors and a number of other Senior Managers

² joint venture in Forestry and Forest Products R&D with New Zealand’s Crown Research Institute Scion Australasia Ltd

³ joint venture with the Victorian Government



CSIRO's Divisions and Joint Ventures 2005–06

Agribusiness

Entomology generates economic, social and environmental good for Australia through advanced research into insects and their allies. The Division's scientists target invasive weeds and pests to secure the nation's agriculture. This research will help farmers to enhance their production by developing safe management techniques for invasive pests and improving product quality. Entomology explores the role of insects and other invertebrates in supporting sustainable natural, rural and urban environments. In collaboration with industry, Entomology uses insects to explore fundamental biological processes and to develop innovative industrial and environmental technologies.

👤 267 ██████████ \$35M

Livestock Industries (incorporating the Australian Animal Health Laboratory) provides research solutions to enable Australia's livestock and allied industries to be globally competitive. The Division's research portfolio includes technology for farm and business systems, management of risks posed by animal disease to trade and production, increasing the value of livestock and environmental impacts of livestock production.

👤 472 ██████████ \$80M

Plant Industry works to build on its position of plant science excellence that is strongly connected to the industries, business chains and the community it serves. It targets and develops research opportunities that benefit agribusiness at the higher value end of national and international markets while developing an integrated approach to maintaining the resource base including biodiversity.

👤 634 ██████████ \$88M

Textile and Fibre Technology is recognised as one of the leading textile research centres in the world, with programs on wool, cotton and a range of new materials. The Division operates over two sites, with a multi-fibre research, development and innovation facility, located in Geelong, Victoria and an advanced materials laboratory at Clayton, Melbourne.

👤 170 ██████████ \$26M

Joint ventures

Ensis, the joint forces of CSIRO and Scion[†], conducts research that improves the management and productivity of both Australia and New Zealand's forests and the quality and value of forest products.

Ensis has the capacity to integrate research and development across the entire forest products cycle. Established infrastructure and diversity of skills means large expert teams can be formed to tackle complex problems and deliver science-based services and solutions.

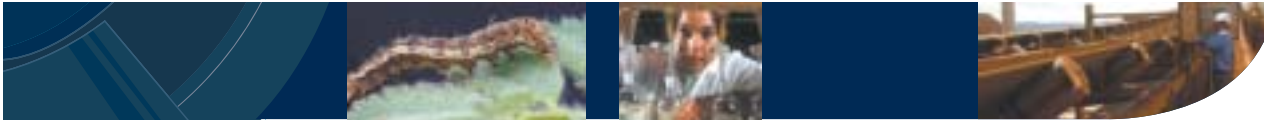
👤 188 ██████████ \$34M

[†] joint venture in Forestry and Forestry Products R&D with New Zealand's Crown Research Institute Scion Australasia Ltd

Food Science Australia is a joint venture of CSIRO and the Victorian Government. It has become one of the world's largest food and nutrition research organisations, with the July 2005 integration of the research capabilities of CSIRO Human Nutrition. Food Science Australia's researchers use specialised facilities to develop innovative food processes and safe, value-added products. CSIRO Human Nutrition delivers research that improves human and community health while enhancing the competitiveness of the Australian food industry.

👤 348 ██████████ \$50M





Information, Manufacturing and Minerals

The **Australia Telescope National Facility** operates world-class radio telescopes (available to Australian and international researchers) to support research in radio astronomy, one of the major fields of modern astronomy.

The ATNF also coordinates Australia's involvement in the Square Kilometre Array (SKA) project, in which institutions from 17 countries are collaborating to build a €1 billion international radio telescope.

 163  \$30M

Exploration and Mining works to ensure the future sustainability of the Australian resources sector. Exploration research enhances predictive targeting of ores through computational geoscience, mineral expression and characterisation of the regolith, ore systems genesis and spectral sensing technologies. Mining research focuses on deposit assessment, information communication systems, automation, cutting and drilling technologies, mine design, mine environment monitoring, waste mitigation and stakeholder engagement to improve productivity, safety and sustainability.

 199  \$36M

The **ICT Centre** is a leading and integral component of Australia's ICT research infrastructure, driving national productivity, delivering public good outcomes and creating wealth. The Division undertakes research focused on wireless technologies, information engineering, networking technology, e-health and autonomous systems in partnership with Flagships and other delivery domains, with particular emphasis on delivering solutions for health, mining, public security and the environment.

 226  \$41M

Industrial Physics develops new physics-based technologies for the aerospace, energy, environment, security and manufacturing industries, through the application of specialised knowledge of

physical science. With a focus on materials science, the emphasis is on the development of advanced materials, sensors and sensor systems with applications in a broad range of fields. Developments are focusing on areas at the confluence of physics, biology and chemistry, leveraging the breadth and depth of expertise in CSIRO.

 160  \$29M

Manufacturing and Infrastructure Technology works with Australian and global manufacturing and infrastructure industries to develop and commercialise innovative materials, processes, and products. Specialised laboratory and testing facilities provide research and consulting and testing services to international standards.

 485  \$82M

Mathematical and Information Sciences provides expertise in statistical, mathematical and computational science.

Using its research skill base, the Division solves problems for customers in business services, industrial processing, health, biotechnology and environmental monitoring. It creates tools and analysis methods that improve decision-making and information delivery.

The Division's research themes are Biotechnology and Health Informatics, Decision Technologies and Environmental Informatics.

 155  \$23M

Minerals works closely with the mineral processing and metal production industries to boost productivity and improve profitability, while reducing environmental impact. Its research and development activities span the entire chain of minerals processing, from hydrometallurgy and high-temperature processing to on-line analysis and control. The Division applies its expertise to a range of areas including alumina production, light metals production, gold, iron ore processing and the treatment of industrial waste streams.

 299  \$50M

Molecular and Health Technologies is a new Division arising from the merger of CSIRO Molecular Science and CSIRO Health Sciences and Nutrition. The result is an integration of chemistry and biology skills creating unique and diverse capabilities and facilities applied to complex problems in health and materials science.

👤 324 ██████████ \$54M

Sustainable Energy and Environment

Energy Technology research and development plays an essential role in realising the ultimate objective of near zero emissions from energy use. Our research ranges from low-emissions technologies for fossil fuel use and efficient coal production to renewable energy systems and the use of hydrogen in the energy cycle. We also specialise in distributed energy generation, energy storage and reducing the environmental consequences of energy use.

👤 162 ██████████ \$33M

Land and Water, through its science and partnerships, plays a powerful role in bringing the nation closer to an environmentally sustainable and economically viable future. Its research activities reflect national and international priorities. The Division is finding new ways to use less water in agriculture and other industries, to re-use or recycle urban and industrial waters and wastes, while also protecting our rivers, catchments and groundwater reserves.

👤 473 ██████████ \$64M

Marine and Atmospheric Research provides modelling, measurement and analysis of climate, marine, and earth systems. The Division's research provides world-class scientific advice for the use and conservation of the atmosphere and Australia's oceans, seas, estuaries and dependent industries. The Division also oversees the management of the Marine National Facility – Research Vessel *Southern Surveyor*.

👤 536 ██████████ \$88M

Petroleum Resources provides premium quality research and technology based industrial solutions to the rapidly evolving needs of the energy sector. Future issues of significant priority include gas-to-liquids technology, geothermal energy, the hydrogen economy and reducing the environmental impacts of petroleum use. Ongoing consultation with industry and government guides the Division in developing programs to help improve exploration success, understand and manage petroleum reservoirs and increase the efficiency of production operations.

👤 118 ██████████ \$26M

Sustainable Ecosystems research supports healthy rural and urban communities, landscapes that sustain viable enterprises and management that protects biodiversity. The Division focuses on the complex challenges of social, economic, cultural and environmental sustainability. Through its core capabilities in ecology, agricultural systems, complex systems science, and social and economic integration, the Division delivers scientific knowledge for the healthy future of Australia and our region.

👤 314 ██████████ \$46M

Key

👤 Staff numbers as at January 2006

\$ Total budgeted revenue for 2005–06

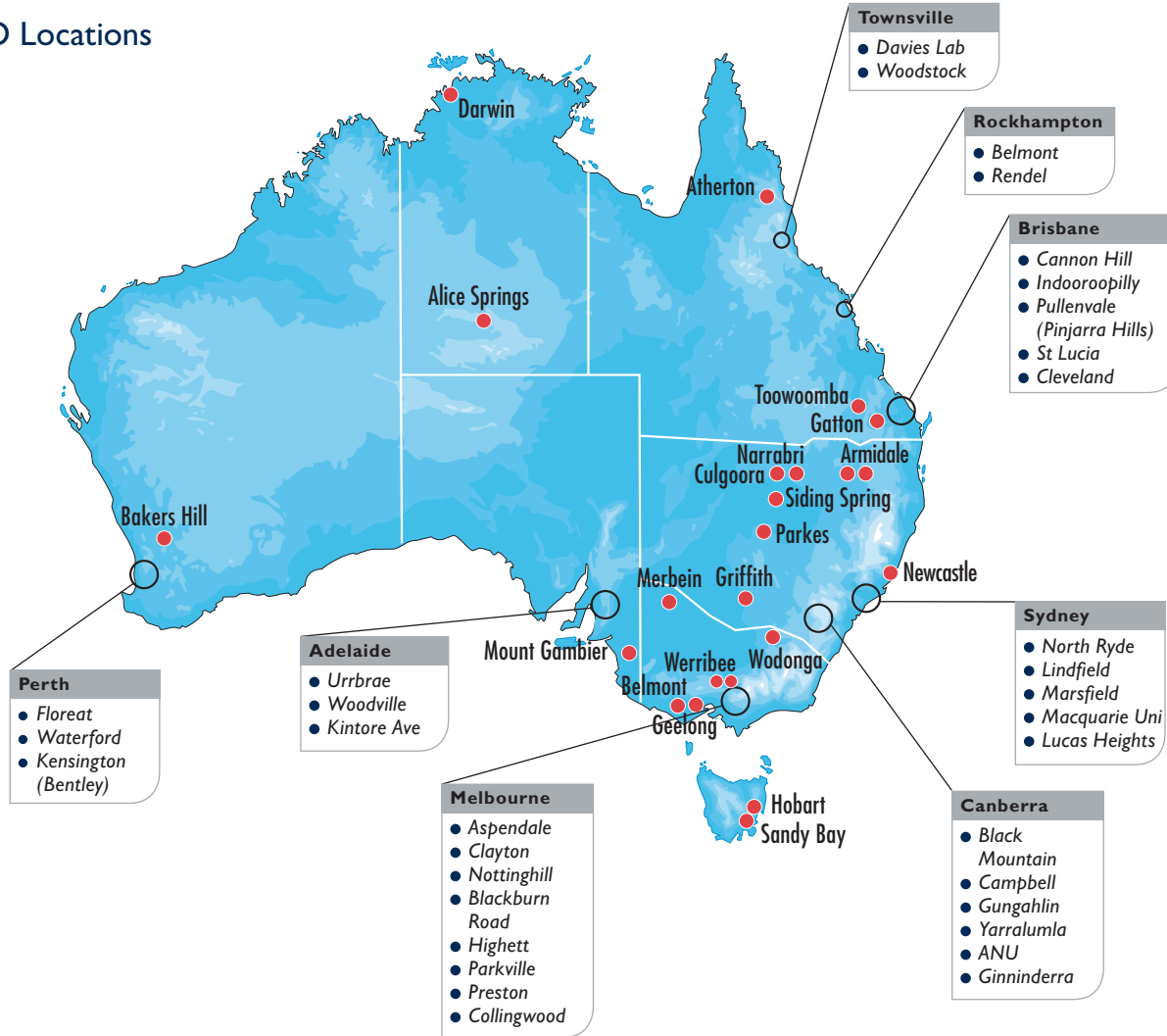
Notes:

Figures shown above do not include approximately 800 staff in corporate and CSIRO-wide support roles. Figures shown above do not include revenue associated with our capital programs, CSIRO Publishing, CSIRO Education and other multi-disciplinary research programs.

Flagship staff numbers and revenue have been included in Divisional figures.

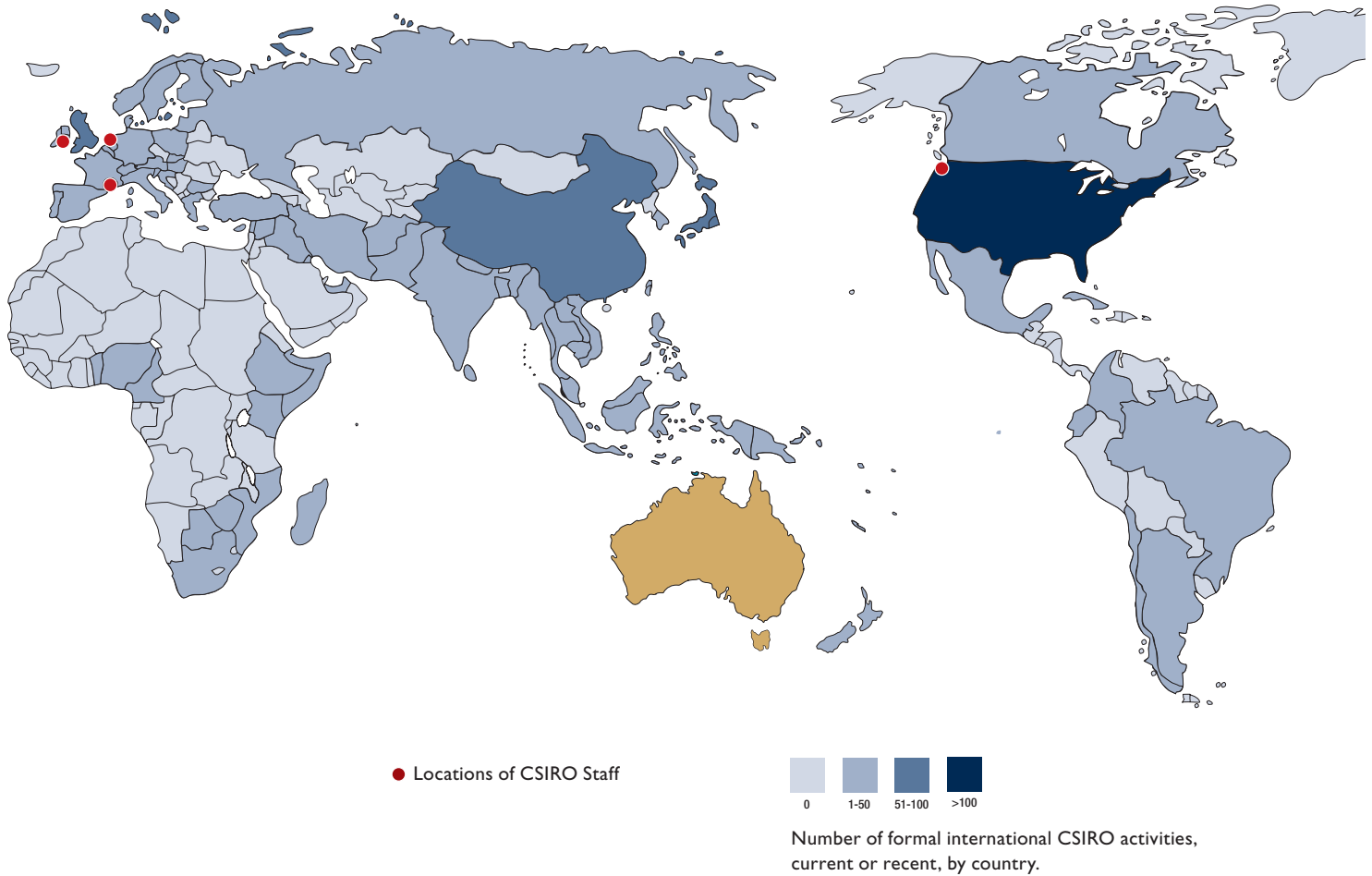


CSIRO Locations





CSIRO International Activities





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