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CSIRO Briefing

July 2016

Content

Pages 4 – 28 redacted pursuant to s 47C

CSIRO at a Glance

Our history

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

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

Today, CSIRO is a trusted source for creative ideas and practical technologies to deliver impact for the nation. It seeks to be a valuable partner with strong international relationships.

Our purpose

CSIRO's purpose is defined through the functions it undertakes` for the benefit of Australia, which are set down in the *Science and Industry Research Act (1949)*. They are:

- To carry out scientific research for any of the following purposes:
    - Assisting Australian industry;
    - furthering the interests of the Australian community;
    - contributing to the achievement of Australian national objectives or the performance of the national and international responsibilities of the Commonwealth;
    - any other purpose determined by the Minister;
- To encourage or facilitate the application or utilisation of the results of such research.

What we do

CSIRO carries out scientific research in areas including energy, climate, water, biodiversity, oceans, digital and data, health, mining, manufacturing, food, agriculture, biosecurity and natural resources. We seek to make a difference and generate impact by focusing on the nation's big challenges and opportunities. Our research delivers:

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

CSIRO conducts these through three Lines of Business:

- CSIRO Impact Science (nine Business Units) – **see Brief 10**
- CSIRO Services – **see Brief 11**

- CSIRO National Facilities and Collections – **see Brief 12**

These are all supported by the Enterprise Support Services – **see Brief 13**.

General facts

- CSIRO works across multiple sectors - agriculture and primary industry, minerals and resources, energy, environment, manufacturing, digital and data, and also radioastronomy. CSIRO's application science is primarily applied and practical, but underpinned with strong science understanding.
- CSIRO is funded by both government appropriation and by revenues that CSIRO earns – 2014-15 total revenues were $1,230m; this included appropriation of $745m.
- CSIRO's 2015-16 Portfolio Budget Statements (PBS) reflect a consolidated position for the entities of CSIRO, SIEF, WLAN and Fundación. In the 2015-16 Budget, CSIRO's appropriation revenue increased from $745.3 million in 2014-15 to $749.7 million: an increase of $4.4 million over 2014-15.
- CSIRO's consolidated total operating expenditure budget for 2015-16 was $1,277.1 million. This is an increase of $14.9 million above the 2014-15 actual result of $1,262.2 million.
- The original 2015-16 Budget reflects a decreased external revenue budget of $462.2 million compared to the 2014-15 actual result ($482.4 million), which is consistent with the current economic environment.
- CSIRO works extensively with industry: we work with approximately 2,250 industry clients per annum, including 500 major Australian companies, more than 1,200 Australian SMEs and more than 450 multinationals (approximate figures, over 4 years period).
- Between 2010 - 2014, CSIRO produced on average 6 per cent of Australia's research publications, with Australia representing 3.4 per cent of global research publications, while maintaining a relatively high citation impact over this period. CSIRO is also a major contributor to Australian publications in some key areas, producing 19 per cent of Australian publication output in Agricultural Sciences; 18.5 per cent in Space Sciences; 18 per cent in Geosciences; 17 per cent in Environment/Ecology, 13 per cent in Plant and Animal Sciences; and 11 per cent in Materials Science.
- Based on Thomson-Reuters 'Essential Science Indicators', CSIRO is currently ranked in the top one per cent of institutions worldwide in 15 of 22 research fields covering all the sciences and social science. The 15 fields are: Agricultural Sciences, Biology & Biochemistry, Chemistry, Clinical Medicine, Computer Science, Engineering, Environment/Ecology, Geosciences, Materials Science, Microbiology, Molecular Biology & Genetics, Physics, Plant & Animal Science, Social Sciences – General and Space Science.
- CSIRO remains the largest single participant in the Cooperative Research Centre (CRC) Program. The Cooperative Research Centres Programme was officially launched in 1990 with the first CRCs established in 1991. Since then, 211 CRCs have been funded by the Australian Government, with 33 currently operating. CSIRO has participated in 144 CRCs and we are currently active in 16. CSIRO's direct contribution to CRCs in 2014-15 was $12.5 million.
- CSIRO continues to strengthen existing research relationships and forge new links globally. In 2014, 52 per cent of CSIRO's scientific publications were co-authored with an international author. The top ten countries with which CSIRO co-publishes are, in descending order, the USA, China, England, Germany, France, Canada, the Netherlands, New Zealand, Italy and Japan. Joint publications with institutes in China have increased seven-fold between 2005 and 2014. Over the same period joint publications with USA institutions more than doubled.
- Through CSIRO Services and other parts of the organisation, CSIRO offers some 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 patent filing enterprise and as at March 2016 CSIRO held approximately 3,636 granted and pending patents, trademarks, designs and plant varieties registrations.
- The total value of CSIRO's equity portfolio as at 31 December 2015 was $22.7 million across listed and unlisted companies. Based on our shareholdings, this translates into a market capitalisation of approximately $557 million.
- CSIRO hosts National Research Facilities on behalf of the nation (the Australian Animal Health Laboratory, the Australia Telescope National Facility, the Marine National Facility and the Pawsey Supercomputing Centre). CSIRO also manages six national reference collections, the Australian National Insect Collection, Australian National Herbarium, the Australian National Fish Collection, the Australian National Algal Culture Collection, the Australian National Wildlife Collection, the Tree Seed Centre, as well as the Atlas of Living Australia (ALA). CSIRO also maintains over 20 smaller collections of interest that contribute to the discovery, inventory, understanding and conservation of Australia's biological diversity.
- CSIRO manages on behalf of the Australian and US Governments the NASA-owned Canberra Deep Space Communications Complex (CDSCC) at Tidbinbilla.
- CSIRO Enquiries handles over 25,000 contacts from key customers every year.
- CSIRO Publishing provides peer reviewed research outcomes to customers in over 120 countries and provides free access to its journals to a further 100 countries in the developing world.

Science Alignment with the National Science and Research Priorities

During 2014-15, the government announced a set of nine National Science and Research Priorities (SRPs). For each of these priorities, a number of Practical Challenges have been identified and an analysis of national capability was undertaken. The National Science, Technology and Research Committee is in the process of assessing existing research against the SRPs.

As part of CSIRO's input into this process, CSIRO has supported the Chief Scientist through conducting a bibliometric analysis of Australian national output of scientific publications in each of these Practical Challenges. That analysis has also permitted an analysis of CSIRO's contribution to the national capability in each of these Practical Challenges/Science and Research Priorities. The logic of using bibliometric analysis is that it uses scientific publication output as a surrogate measure for level of research activity and outputs. Whilst this assumption can be questioned, the bibliometric analysis is currently the best available dataset that reads onto this question – pending additional analysis assembled by the Chief Scientist. This analysis shows the following:

- CSIRO is a significant (well above proportionate level) player in 6 of the 9 National SRPs – see below.
- For two of these – Energy and Advanced Manufacturing – Australian R&D is a relatively low proportion of total global R&D in these priority areas and CSIRO's significantly-sized involvement is critical.
- CSIRO is not a significant player in the Health Science and Research Priority – note that Australian activity is high in the health area generally, with Australian output a very significant proportion of global output (about three-fold higher than total output proportionately).

	Australian Output in this SRP		**CSIRO Publication Output in this SRP**	
National SRP (Roll-up of values from Practical Challenges, removing any	**% of Australian total output in**	**Australian total output as % of**	**% of CSIRO's total publications that**	**% of Australian Output in this**

duplication between Practical Challenges)	this SRP	World output in this SRP topic	are in this SRP	SRP, that involves CSIRO
Food	**8.1%**	**4.3%**	**20.5%**	**15%**
Soil & Water	**9.5%**	**5.5%**	**25.9%**	**16.1%**
Transport	2.4%	2.8%	2.3%	5.7%
Cybersecurity	4.2%	2.5%	3.5%	5.1%
Energy	**2.2%**	**3.0%**	**4.6%**	**12.6%**
Resources	**4.6%**	**6.8%**	**11.5%**	**15%**
Advanced Manufacturing	**7.2%**	**1.9%**	**12%**	**10%**
Environmental Change	**3.2%**	**5.1%**	**9.6%**	**18%**
Health	4.9%	9.2%	0.8%	1%

Science Alignment with Industry Sectors

The Industry Growth Centre Initiative is an industry-led approach to focus science and research in key areas with the aim of delivering commercial outcomes. This initiative covers six industry sectors:

- Food and Agribusiness
- Mining Equipment, Technology and Services
- Medical Technologies and Pharmaceuticals
- Oil, Gas and Energy Resources
- Advanced Manufacturing
- Cybersecurity

CSIRO's output in terms of these sectors in Australian research is as follows (using publications as a metric for output).

Food and Agribusiness

In terms of research publications, CSIRO is Australia's largest producer and contributing to 16 per cent of Australian output in Food and Agribusiness. This sector represents a significant proportion (15 per cent) of CSIRO R&D activities. CSIRO's research is of outstanding quality in Australia and is 88 per cent more cited than the world average. CSIRO is ranked 1st in Australia by patent output.

Mining Equipment, Technology and Services

CSIRO is Australia's largest producer of research publications and represents 14 per cent of the country's total output. The sector represents 9 per cent of the CSIRO's total output. CSIRO research in this sector is strong and is 48 per cent more cited than the global average. The organisation is ranked 3rd in Australia by patent output.

Medical Technologies and Pharmaceuticals

This is a minor sector for CSIRO and the organisation is not highly ranked in terms of Australian publication output. CSIRO is ranked 3rd in Australia by patent output, despite this being a minor field for CSIRO and a major one for Australia.

Oil, Gas and Energy Resources

Whilst this sector is a relatively minor area for CSIRO (3 per cent), the organisation's contribution to Australian output is the largest (13 per cent). Therefore, CSIRO's contribution to this sector is critical. CSIRO's research in this sector is of strong quality and is 52 per cent more cited than the world average. It is ranked 1st in Australia by patent output.

Advanced Manufacturing

CSIRO is the fourth largest producer of Advanced Manufacturing research publications in Australia and represents 10 per cent of the country's output. This sector represents a significant proportion (11 per cent) of CSIRO's R&D activities. CSIRO's research quality is of a good quality, being 46 per cent more cited than the world average.

Cybersecurity

CSIRO is the seventh largest producer of Cybersecurity research publications in Australia, with 6 per cent of the country's output. This sector represents 4 per cent of CSIRO's R&D activities. The organisation's Cybersecurity output is of a good quality, being 35 per cent more cited than the world average.

Science Quality and Connections

The quality and relevance of CSIRO's science and scientific outputs are critical to the organisation's reputation and the impact of its work. They also reflect the contribution that CSIRO makes to the Australian national research and development (R&D) output.

CSIRO contributions to overall Australian R&D outputs

As reported in the 2014/15 Science Health and Excellence Report, CSIRO staff represent 3.0 per cent of Australia's total research workforce and 5 per cent of Australia's research workforce in the non- business sector (i.e. Higher Education, Government and private non-profit sectors). CSIRO produces 6 per cent of Australia's research publications - and 0.2 per cent of publications worldwide. CSIRO is the largest filer of Australian provisional patents and is ranked the 25th largest PCT patent application filer amongst government and research institutes worldwide.

CSIRO is a key contributor to Australian output in some specialised areas

CSIRO produces over 10 per cent of Australian research publications in the following research fields.

- Agricultural Sciences – 19 per cent
- Space Sciences – 18.5 per cent
- Environment/Ecology – 17 per cent
- Geosciences – 18 per cent
- Plant and Animal Science – 13 per cent
- Materials Science – 11 per cent

Connections and Collaboration

CSIRO's international and domestic collaboration rates are 52 per cent and 61 per cent, respectively. This is based on CSIRO publications produced jointly with one or more external institutions. The USA is CSIRO's most frequent international collaborator, followed by China and England. The Group of Eight Universities are CSIRO's most dominant domestic collaborators.

Network analysis shows CSIRO's place in Australia's research ecosystem by analysing the relationship among research producers, as measured through their collaborative publications. In Australia, CSIRO is the

most central institutional ‘node’ in Agricultural Science, Environment/Ecology, Geosciences, Plant & Animal Sciences, Chemistry and Materials Science based on publication network analysis.

Overall, CSIRO is ranked as the 8th highest Australian institutional ‘node’. The overall analysis includes the very large medical sciences, to which CSIRO is a small contributor.

Quality

Overall, CSIRO’s publication performance is very strong.

Citations are recognised as a measure of utility, peer interest and academic impact of research publications. CSIRO publications for the period 2010-14 were 48 per cent more cited than the world average. It is possible to rank publications globally by the numbers of citations they receive, so the most outstanding research will appear in the top 1 per cent or 5 per cent of publications ranked by citations. Clearly, on average, the world has 1 per cent of its research in the top 1 per cent by citations and 5 per cent in the top 5 per cent by citations; if an institution has a higher proportion of research in the top 1 per cent or 5 per cent, they are ahead of the game. CSIRO has nearly 3 per cent of its research in the top 1 per cent of global publications and 10 per cent of its research in the top 5 per cent of global publications. Therefore, CSIRO has nearly three times the global average share of publications in the top 1 per cent and twice the global average share in the top 5 per cent of research.

When citation measures are examined for 22 research fields, CSIRO results are above the world average in 21 fields and the Australian average in 16 fields.

Some recent research achievements

- Hendra virus – procedures developed and implemented for field diagnosis and management of infection of horses and humans. A horse vaccine, Equivac® HeV, developed as part of the collaboration between the Australian Animal Health Laboratory (AAHL), Pfizer Animal Health, the Uniformed Service University of Health Sciences (USU) and the Henry M. Jackson Foundation for the Advancement of Military Medicine (HJF) was commercially released in early November 2012 and is a world-first commercial vaccine for a Bio-Safety Level-4 disease agent. This vaccine enables commercial and private equine activities to continue with minimal negative impact by increasing personal safety for horse owners, vets and others regularly interacting with horses. It also enhances security for the Australian horse industry and reduces time spent in quarantine. The vaccine has reduced costs attributed to future disease response and containment and minimised the chances of the Hendra virus mutating and spreading more readily between horses or from human to human.
- Global Initiative for Honey bee Health - this project started by attaching 'backpacks' or tiny little radio frequency identification (RFID) tags to honey bees in the hope of understanding what is driving Colony Collapse Disorder – a condition decimating wild and farmed bee populations across the globe. This swarm sensing technology became the catalyst for the CSIRO led Global Initiative for Honey bee Health, an international collaboration of researchers, beekeepers, farmers, industry, and technology companies, spanning six continents, aimed at better understanding what is harming bees and finding solutions to help secure crop pollination, launched in August 2015. The GIHH is aimed at gathering the data to help tackle the worldwide issue of honey bee health decline. Integral to the research effort are the tiny Radio –frequency identification sensors that are expertly fitted to the bees, hence "bees with backpacks", and when connected with Intel technology, provide vital information about what stress factors impact bee health. The initiative will see 5000 honey bees in Hobart tagged with these 2.5 millimetre square tags, which will record their movement in what is known as swarm sensing. It's the first time such a large scale use of these tags and data recorders has ever been achieved.
- CSIRO developed Zebedee, a handheld laser scanner which generates 3D maps of challenging environments in the time it takes to walk through them. CSIRO teamed up with global distributor 3D Laser Mapping to license the low-cost Zebedee technology to UK start-up GeoSLAM in order to offer the world's first mobile handheld laser mapping system together with a cloud-based 3D mapping service to the international market. Zebedee (commercially available through GeoSLAM as ZEB1) consists of a lightweight laser scanner and inertial measurement unit and enables a use to generate a 3D map simply by walking through a desired location. Following this success, Surph's up! 'SurphSLAM powered by GeoSLAM' has been released using our 3D SLAM software providing a real-time high accuracy 3D mapping system. The Zebedee system is now being used by more than 25 multinational organisations for efficiency and productivity gains.
- CSIRO, in collaboration with Bureau of Meteorology, developed and delivered cutting-edge Australian climate change projections that can be used to assess potential impacts and adaptation options. The projections provide new insights into regional and seasonal changes in climate that would affect natural resource management. As part of this project a sophisticated Climate Change in Australia website www.climatechangeinaustralia.gov.au was launched on 27 Jan 2015. The website provides data are on a 5 km grid over Australia and for over 400 sites, giving unprecedented access to information at a scale relevant to impact assessment. Australia's 56 regional natural resource management groups are currently using this climate projection information to support local adaptation responses to climate change. For the first time, decision makers have access to consistent and locally-relevant climate projections through the web portal, and capacity-building activities have enabled uptake of the best available regional information to inform their priorities and investment decisions. Stakeholder thinking is moving from identifying the problem to implementing solutions. This includes identification of areas suitable for biosequestration of carbon, areas at risk of reduced biodiversity, areas to be protected for migration corridors, areas where fuel load may change, and areas where ecosystem services are at risk. A number of Australian state governments have used sea-level rise projections to 2100 to create setback benchmarks for coastal development.

- Longwall Automation Technology. CSIRO has secured ongoing international sales of its innovative longwall automation technology, which increases productivity and improves safety in mines. Licensed to five global companies, the technology has emerged as an essential component of modern automated longwall mining operations with two-thirds of all Australia's longwall underground operations already using it. It is delivering productivity improvements of up to 10 per cent with net industry benefits over the technology lifetime estimated to exceed $790M. Recently, CSIRO successfully generated the first on-face longwall profile in China using this technology.
- The *Australian National Outlook*, a new initiative by CSIRO, explores over 20 possible futures for Australia out to 2050 against the backdrop of the past 40 years to identify key future global drivers and assess how these may impact our country. The first *National Outlook* seeks to provide a better understanding of Australia's physical economy, with a particular focus on understanding two aspects: the water-energy-food nexus and the prospects for Australia's materials- and energy-intensive industries, which account for one quarter of economic value and employment but around three quarters of our use of energy, water and minerals.
- The nationally-significant Flinders and Gilbert Resource Assessment, funded by the Australian Government Department of Infrastructure and Regional Development, has been delivered and launched by then Deputy Prime Minister Truss. The study identified the opportunities for water and agricultural development in the catchments of the Flinders and Gilbert Rivers, as well as developing rapid assessment methods which can now readily be applied elsewhere across northern Australia. The Assessment has provided valuable insights for policy makers considering development options in the north. Specifically it has informed government decisions to increase water allocations by 610 GL, creating $30m in water assets and opportunity for major irrigation developments. In the Flinders catchment, it created certainty for 10,000-20,000 ha of additional irrigation agriculture with farm dams and, in the Gilbert catchment, created certainty for 20,000-30,000 ha of additional irrigation agriculture with in-stream dams.
- Medical Developments International (MDI) is an Australian company that manufactures Penthrox, commonly known as the 'green whistle'. Penthrox is used by medical practitioners, the defence forces, ambulance and surf lifesaving services to administer emergency pain relief. With plans to export overseas, MDI set out to develop a smarter, more cost-effective production process for manufacturing the drug methoxyflurane – the pain-relieving ingredient used in Penthrox. Working with MDI we developed a process that significantly reduces the cost of producing methoxyflurane, and provides more consistent results. MDI has gained regulatory approval for the sale of Penthrox in European and UK markets [redacted] s47C, s47, s47G(1)(a) [redacted]
- Cardihab - Cardiac rehabilitation (CR) improves cardiac patient outcomes while reducing hospital readmissions, however some patients do not complete cardiac rehabilitation due to difficulties in attending traditional, centre-based rehabilitation programs. Cardihab is a home-based online program (via a smartphone application or web browser) for cardiac patients that provides clinicians with the ability to remotely deliver a scientifically validated, comprehensive Phase 2 CR program based on the Australian Cardiovascular Health and Rehabilitation (ACRA) guidelines. In a world first randomised controlled trial, CSIRO and Queensland Health researchers demonstrated that remote delivery of CR improves patient uptake, adherence and completion while significantly reducing the number of centre visits and delivering equivalent clinical outcomes when compared to traditional, centre-based Phase 2 rehabilitation programs. Cardihab has now participated as a spin out in the HCF Slingshot incubation program and seeking seed funding.
- The cotton breeding research in CSIRO Agriculture continues to have local and international impact. The international launch of the Bollgard 3 cotton variety was held in Narrabri in February 2016. This cotton variety has a third Bacillus thuringiensis (Bt) protein to kill heliothis larvae. Monsanto and Cotton Seed Distributors are currently hosting a series of field days across Australia. Thanks to our

breeding effort, Australia has the highest cotton yields in the world, exporting $2.7 billion of cotton each year. Bollgard 3 will continue to help to increase profits and sustainability of the cotton industry.

- Germany's biggest brewery group, Radeberger has just launched the world's first gluten-free barley beer, Pionier made possible by CSIRO Agriculture's barley grain, Kebari™. After many years of work using conventional plant breeding methods we have reduced the gluten content of Kebari™ barley to such minuscule amounts that it meets the World Health Organisation's recommendation for classification as gluten-free. Kebari™ barley was developed through the Coeliac Friendly Cereals project, co-funded by CSIRO and The Grains Research and Development Corporation.
- Finding more sustainable ways to produce steel will help to underpin the long-term future of Australia's main exports: iron ore and coking coal. To meet this challenge, CSIRO and partners Arrium and BlueScope have invested in about a decade of collaborative R&D to develop a new technology for blast furnaces called Dry Slag Granulation (DSG). DSG is an efficient new process that reuses the waste and heat generated in the iron smelting process and turns it into valuable by-products. It has the potential to transform the metal and cement industries. In the past 2 years, collaboration with Beijing MCC Equipment Research and Design Corporation to test the technology at industrial scale has enabled a major step towards bringing the technology to market and achieving its productivity and environmental goals. Global industry adoption of the DSG process would see annual savings in the order of 60 billion litres of water, 800 petajoules of heat energy and 60 million tonnes of greenhouse gas emissions.
- Water is a precious resource around the world. Mining is often water intensive and is estimated to generate hundreds of millions of tonnes of wastewater each year in Australia alone. Therefore, the efficient treatment of mine, mineral processing and industrial wastewaters for reuse or environmental discharge constitutes a major and international challenge. CSIRO's technology licensed to Virtual Curtain Limited now offers an alternative to many current, less cost-effective technologies, by removing metal contaminants, reducing sludge by 90 per cent and safely discharging large volumes of rainwater-quality water. Commercial implementation has already occurred at mine sites in Australia and China.

Regional assets

- CSIRO is strongly committed to research for and in regional Australia; there are 18 sites located in regional Australia and three Business Units represented in regional Australia.
- CSIRO is aligning its regional resources to strategic priorities and industry demands.

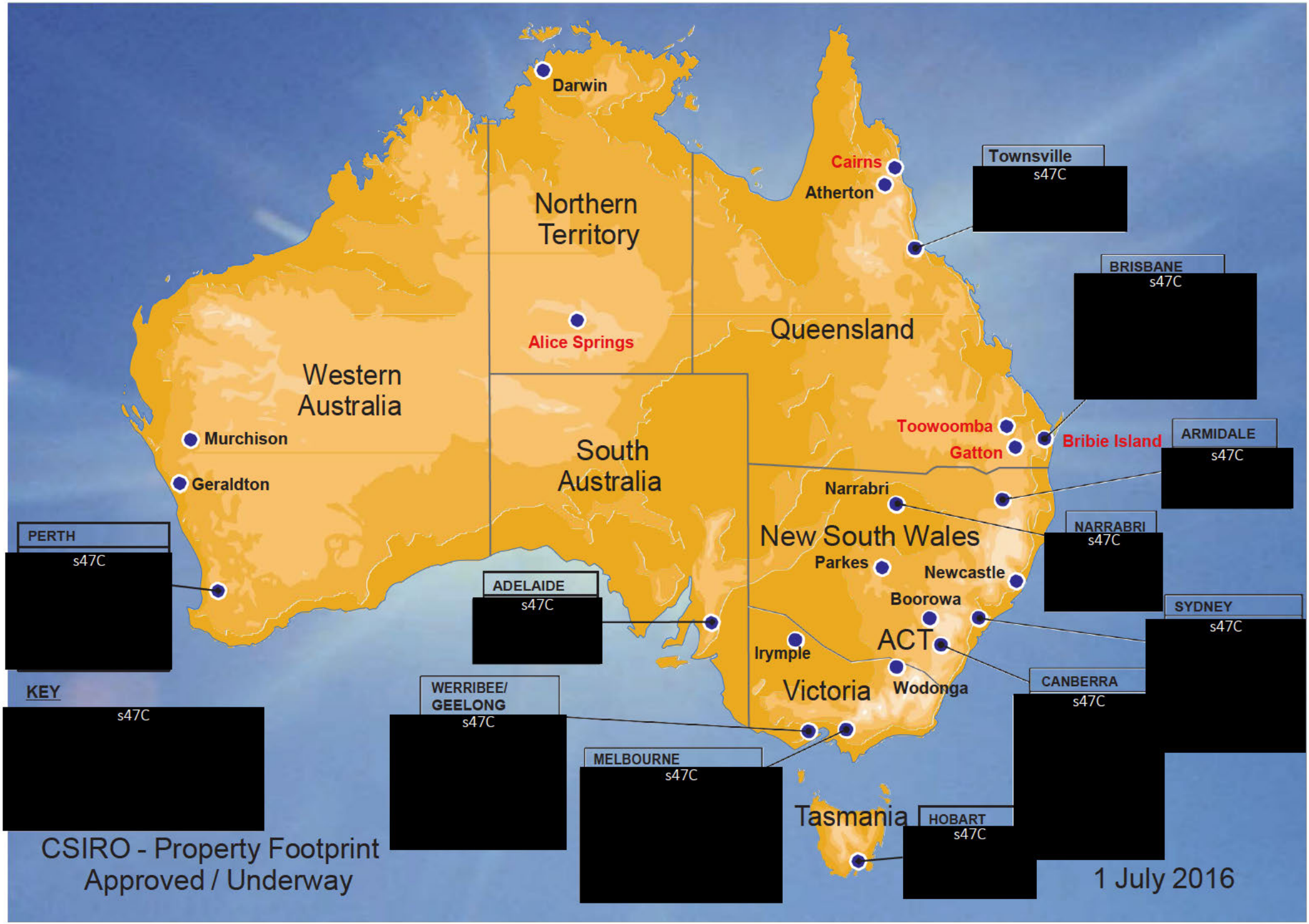
Staffing

- CSIRO currently has approximately 5,614 staff (as at 30 June 2016) in more than 50 sites across Australia. While overall staff numbers have decreased in the last ten years, the percentage of research scientists has increased from 25 per cent in 2005 to 28 per cent in 2016 (figures as at 30 April 2016).
- CSIRO has a presence at another 22 Australian sites either through short term tenure or hosted arrangements. CSIRO also has a site in Montpellier, France and access to a research partner site in Chile as well as use of a number of other international facilities. Approximately 53 per cent of CSIRO staff are co-located on or adjacent to university campuses.[1]
- In 2014-15 CSIRO jointly supervised 771 honours, masters and postgraduate students. These included 621 PhD students. We also supported 303 post-doctoral fellows.

[1] CSIRO staff is defined as all CSIRO Officers (i.e. indefinite and term staff only). It does not include CSIRO Affiliates and casual staff.

- s47C [redacted]

- The CSIRO Consultative Council was established by the *Science and Industry Research Amendment Act 1978* to consider and report to the Board on matters affecting or of interest to CSIRO officers including matters referred to the Council by the Board. The first formal meeting of the Consultative Council took place in 1979 when the Science and Industry Research (Consultative Council) Regulations came into effect. Meetings are normally scheduled at six monthly intervals. The Consultative Council currently comprises a Chairperson appointed by the CSIRO Board as a representative of the management of CSIRO (Dr Larry Marshall); up to seven other management members also appointed by the Board; (Mr Craig Roy, Mr Trevor Heldt and Ms Sue Davidson); five union representatives – two from the CSIRO Staff Association (Dr Michael Borgas, President and Dr Sam Popovski, Secretary), two additional representatives from the CSIRO Staff Association who are nominated by the Union to attend prior to each meeting; and one representative from the Australian Manufacturing Workers' Union (Ms Anne Donnellan). Dr Michael Borgas is also Deputy Chairperson of the Consultative Council.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CSIRO - Property Footprint
Approved / Underway
1 July 2016

Statutory Framework and Governance

Statutory Framework

CSIRO is an Australian Government statutory authority constituted and operating under the *Science and Industry Research Act 1949* (SIR Act). Accountability and other rules for CSIRO's operation are set out in the *Public Governance, Performance and Accountability Act 2013* (PGPA Act). CSIRO is classified as a Corporate Commonwealth Entity under the PGPA Act.

CSIRO sits within the Industry, Innovation & Science portfolio of the federal Government.

Functions

CSIRO's primary functions are:

- to carry out scientific research
- to assist Australian industry
- to further the interests of the Australian community
- to contribute to the achievement of Australian national objectives or the performances of the national and international responsibility of the Commonwealth
- to encourage or facilitate the application or utilisation of the results of such research.

Our secondary functions include scientific services and managing research facilities, international scientific liaison, training research workers, publishing research results, and disseminating information about science and technology.

Powers

CSIRO has power to do whatever is necessary or convenient for the performance of its functions. In particular, it may:

- arrange for research and other work to be undertaken outside CSIRO
- form partnerships or companies
- make its discoveries and inventions available for fees, royalties or other consideration
- pay bonuses to staff for discoveries or inventions and
- charge fees for research, facilities or services provided to others.

Governance

The Minister

The Minister currently responsible for CSIRO is the Hon. Christopher Pyne MP, Minister for Industry, Innovation and Science.

The Minister responsible for CSIRO has the power to give directions and guidelines to the CSIRO Board (SIR Act s13). The Minister can also notify general policies of the government to the Board. The previous Minister, the Hon. Ian Macfarlane MP, provided a 'Statement of Expectations' to the CSIRO Board on 23 February 2015 (*refer attachment 1*). The Board through the Chairman responded with a 'Statement of

Intent' that advised the Minister how CSIRO would meet his expectations (*refer attachment 2*).

The Minister is kept informed about CSIRO by the Chairman, the Chief Executive and senior executives of CSIRO through written briefs, ministerial notifications and regular meetings.

CSIRO also keeps the Minister's Department informed of developments in the organisation.

Under the PGPA Act, CSIRO must notify the Minister in writing of significant matters and provide details for the Minister to table in Parliament of company and share transactions.

CSIRO Board (see also *brief 4*)

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

The functions, powers and operations of the CSIRO Board are established under the SIR Act (Part III). In brief, the Board is responsible to the Commonwealth Government for the overall strategy, governance and performance of the Organisation. The Board has the power to do all things necessary for the performance of its functions.

The role of the Board is set out in detail in the CSIRO Board Charter.

The role and membership of the Board is further explained in ***brief 4*** – *CSIRO Board and Membership*.

The CSIRO Board has permanent committees to assist in the execution of its responsibilities. These are the CSIRO Board Audit and Risk Committee and the CSIRO Board People, Health and Safety Committee.

There are a further two advisory committees that report to the Board, these are established under s24 of the SIR Act and are the Australia Telescope Steering Committee, and the Marine National Facility Steering Committee.

Chief Executive and Management

The powers of the Chief Executive are described in the SIR Act (Part IIA). The Chief Executive conducts the affairs of the Organisation in accordance with the strategy, plans and policies approved by the Board, and the Board Directions to the Chief Executive (refer to ***brief 5***).

The Chief Executive is supported by an Executive Team as detailed in the organisational chart (see ***brief 6***).

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CSIRO Operating Model

The CSIRO Operating Model explains how CSIRO operates. It is designed to support the successful execution of CSIRO's strategy and the delivery of CSIRO's goals. It defines the roles, relationships and accountabilities of leaders and business units in CSIRO. It contains CSIRO's processes for planning, investment, review and reporting, and the CSIRO Policy Framework.

The Operating Model, including the Organisational structure, was revised on 1 July 2014 to support the new lines of business model.

Planning, Investment, Review and Reporting

CSIRO's planning, investment and review processes are designed to deliver on CSIRO's functions in alignment with the CSIRO Strategy, including aligning CSIRO's science capability and investment with the planned Strategy outputs and outcomes, and to measure and report on its performance.

The overall system of planning, investment and performance management includes:

- setting out the broad objectives and strategies of the Organisation in the CSIRO Strategy and the CSIRO Corporate Plan
- guiding specific shifts in the direction and timing of investment through our investment process based on six criteria including triple bottom line impact for the nation, customer need and market attractiveness, CSIRO's competitiveness in the field, business performance, financial return, and whole of life investment required
- determining annual priorities for enterprise-level activities, and setting out resourcing and performance targets in the annual CSIRO Corporate Plan (a rolling four year plan), approved by the Board
- establishing internal budgets based on our direct appropriation funding and expected external revenue from participating in other government programs, research contracts with Australian and overseas entities and the licensing of our intellectual property
- providing regular progress reports to the Executive Team and Board to assist with their decision-making and governance responsibilities
- independent external reviews of CSIRO's Business Units on a rolling 3-4 year basis
- commissioning of additional strategic reviews on an 'as-needs' basis
- publically reporting performance against our strategic and operational objectives and targets in the CSIRO Annual Report.

These processes are informed by the National Facility Committee and other advisory mechanisms which provide independent strategic advice to CSIRO on the national challenges and opportunities of broad sectors of the Australian economy, society or environment in which CSIRO is involved and provide guidance on how CSIRO might address these needs.

The Advisory Committees comprise external representatives from industry and other stakeholders.

The CSIRO planning and performance framework, including the advisory mechanisms were revised in 2014-15 to align with the requirements of the PGPA Act and the new Operating Model.

Policy Framework

The Operating Model includes CSIRO's Policies, Standards and Procedures. These enterprise documents provide a common operating framework and are mandatory across CSIRO. The policy statements cover CSIRO's commitments in relation to:

- Science and delivery
- People
- Governance
- Risk
- Health, Safety, Environmental Sustainability and the Community

There is also a Board policy on:

- Freedom to Conduct CSIRO Research and Technology Transfer.

The policy statements are at *Attachment 3*.

All staff must comply with the CSIRO Code of Conduct.

External audit and internal control

Assurances about the Organisation's financial state of affairs, compliance issues and control environment are provided through a comprehensive range of processes including the role of the Internal Audit, Risk, Legal, Fraud Control and Security units, system design and monitoring, compliance reporting, and the operations of a Public Interest Disclosure Scheme.

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

Attachments

1. Statement of Expectations
2. Statement of Intent
3. CSIRO Policy Statements

Attachment 1

Statement of Expectations

23 February 2015

Mr Simon McKeon AO
Chairman
Commonwealth Scientific and Industrial Research Organisation
PO Box 225
DICKSON ACT 2601

Dear Mr McKeon

I am writing to outline my expectations of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to assist with the Government's commitment to the effective governance and performance of its agencies, guided by the *Public Governance, Performance and Accountability Act 2013* (the PGPA Act).

In writing this Statement of Expectations, I acknowledge the functions of CSIRO as set out under the *Science and Industry Research Act 1949* (the SIR Act). It is imperative that, in exercising its functions and meeting its legislated requirements, CSIRO take into account the Government's broad policy framework and what I see as key priorities.

As you are aware, the Government is committed to fostering a strong science and research base as a foundation for a competitive Australia. Science and research are central to driving innovation and technology development and for enhancing productivity and ensuring a strong future for Australian industry. Indeed, the functions of CSIRO include, inter alia, carrying out scientific research to assist Australian industry.

It is timely, given your recent appointment of Dr Larry Marshall as Chief Executive, to outline my key priorities for CSIRO reflecting the Government's broader Economic Action Strategy. The Economic Action Strategy is refocussing governance, revitalising Australian business and entrepreneurial drive and equipping our economy for the challenges ahead. Key priorities are listed below.

<u>Policy Priorities</u>

- I expect the Board to ensure that CSIRO takes an active role in advancing the Industry Innovation and Competitiveness Agenda. This Agenda aims to achieve: a lower cost, business friendly environment; a more skilled labour force; better economic infrastructure; and an industry policy that fosters entrepreneurship. As part of this Agenda, I am establishing industry growth centres to lift competiveness, reduce regulatory burden, improve collaboration between industry and researchers and to improve our supply chains and SME involvement in key industry sectors, initially covering:
    - food and agribusiness;
    - mining equipment, technology and services;
    - medical technologies and pharmaceuticals;
    - oil, gas and energy resources; and
    - advanced manufacturing.

- As part of our policy priorities, a key focus will be ensuring the Commonwealth's $9.2 billion per year investment in research furthers the interests of the Australian community and maximises our commercial return.

- With these priorities in mind, I expect CSIRO to deliver world class research, both to focus its scientific research on areas where it has a competitive edge, in terms of excellence and scale, and to encourage the application and adoption of this research, especially where it can drive improvements in Australia's economic competitiveness.

Partnerships and collaboration

- I look forward to CSIRO continuing to provide input and information to Government and ensuring that advice to Government supports the development of evidence-based policy. I particularly look forward to CSIRO supporting me in my role as Deputy Chair to the Prime Minister of the Commonwealth Science Council (CSC).

- I also expect CSIRO to engage with the Chief Scientist of Australia, including through its membership of the National Science, Technology and Research Committee (NSTRC).
    - This will be important as we finalise our strategic priorities for science and research and how the CSIRO is best placed to contribute to these areas of national priority.

- In advancing the Government's agenda, I expect CSIRO to collaborate with universities, other publicly funded research agencies, medical research institutes and industry, to achieve common objectives.
    - In particular, CSIRO should not rely entirely on its own resources but should also use national and international collaboration to increase the capacity and responsiveness of the nation's overall ability to translate research into outcomes.

- I expect CSIRO to work in partnership with business to identify and develop the science to address industry problems and to underpin Australia's aim of increased competitiveness. The knowledge and ideas of its researchers can substantially improve the productivity of industry and businesses. CSIRO and business should therefore work together to continue growth in the knowledge-based sectors, with a particular emphasis on translating research into commercial outcomes. I expect CSIRO to engage with those industries where CSIRO's capability and intellectual property can help them to become globally competitive and in particular, create new businesses.

Science assets and staff

- I expect CSIRO to comply with the principles of the Commonwealth Resource Management Framework as specified in the PGPA Act and to give effect to the governance, performance and accountability requirements covered by the Act applicable to a corporate entity.

- Consistent with the SIR Act, CSIRO should prevent unnecessary overlap and promote the most effective use of available facilities and staff.

- CSIRO should maximise use of its national scientific facilities and collections by Australian and international researchers, including by encouraging industry access to relevant facilities.
    - In encouraging such access, CSIRO has a role to play in communicating and educating business about the benefits such infrastructure can provide.

- Consistent with your legislative functions, I expect CSIRO to promote careers in science and provide a career path for research and technical staff. In particular, CSIRO should invest in industry relevant research training. I also expect CSIRO to encourage engagement between researchers and business, including by facilitating mobility between CSIRO and other research organisations and industry. I expect CSIRO to encourage its researchers to be entrepreneurial by providing training and appropriate incentives, together with an intellectual property and research translation framework to support realisation of commercialisation outcomes. I expect CSIRO to support risk-taking, as part of resilient strategies to solve the big problems facing Australia, within the context of maintaining good governance and learning from failure.

- In particular, I expect that CSIRO will identify and take, where practicable, opportunities to create and support new companies to commercialise CSIRO discoveries and expertise.

Communication with my Office and Department

I look forward to CSIRO working closely with the department. Aside from regular meetings between you and me, I expect there to be regular meetings between the senior executives of CSIRO and the department. I am keen to promote the scientific work of CSIRO and encourage you to work with my department in meeting this objective.

I expect CSIRO to keep me and my department informed, in a timely and accurate way, of significant issues relating to the health and work of the organisation. I also expect CSIRO to provide input and information to the department as required to ensure that advice to my office and the Government canvasses relevant issues and sensitivities and reflects a portfolio response. I expect CSIRO to provide copies of ministerial briefings and correspondence to the relevant areas of my office and my department, in parallel. Further, I expect CSIRO to provide prior notice, to my office and my department, of significant announcements and events that are likely to attract media attention.

In accordance with the PGPA Act, I expect CSIRO to develop an annual corporate plan and to provide that plan to me, as the responsible portfolio Minister, and the Minister for Finance. In developing the corporate plan, I expect the Board to consult with me and my department, and to take into account the priorities and policies of the Government, especially as articulated in this Statement of Expectations.

I look forward to receiving your response outlining how the Board proposes to deliver on these priorities.

Yours sincerely

Ian Macfarlane

Attachment 2

Statement of Intent

The CSIRO Board welcomes the Minister's Statement of Expectations of 23 February 2015.

The Statement of Expectations reflects our shared commitment to supporting world class research in order to achieve impacts from the application of the research outcomes, including for the benefit of Australian industry, national economic competitiveness and Australian wellbeing.

CSIRO developed its 2015-20 Strategy in concurrence with your Statement. The Strategy responds to national and global trends that require the nation to accelerate the pace of innovation driven by science and technology. The Strategy provides an integrated plan for CSIRO to conduct its functions under the *Science and Industry Act 1949* to respond to the imperative that science and technology is used in the Australian economy to lift innovation, productivity and competitiveness.
In conducting its functions CSIRO will ensure that its practices and processes comply with the *Public Governance, Performance and Accountability Act 2013* and that internal processes to support governance accountability and performance obligations under the Act are in place.

Policy priorities including Partnerships and Collaboration

The Vision for the Strategy is that CSIRO acts as Australia's innovation catalyst to significantly boost Australia's innovation performance.

Focusing the Strategy upon innovation is a key element of CSIRO's response to the Australian Government's *Industry Innovation and Competitiveness Agenda*, including to use science and technology to achieve commercial outcomes that lift innovation, help successful Australian businesses grow, and boost Australia's productivity and exports.

CSIRO will focus its efforts on *creating value for our customers through innovation which delivers positive impact for Australia*. CSIRO will work to encourage the application and adoption of its research output to improve Australia's competitiveness, both by working directly with business to translate research into commercial outcomes as well as indirectly, through informing policy formation. CSIRO will continue to ensure that our brand is a guarantee of the highest quality scientific standards and trusted advice.

The Strategy articulates actions to ensure that CSIRO creates deeper innovation relationships with its customers and collaborates with partners to provide the best solutions for CSIRO's customers; and to take a global outlook to national benefit through connection to global science and new customers and markets for Australian innovation. CSIRO will continue to conduct large scale applied programs that address national challenges but will increasingly source and integrate capability from outside CSIRO. For the purpose of delivering value to customers and creating innovation, CSIRO will collaborate with our partners including universities to bring the best capability to bear and to build global connections and market vision. In this process CSIRO will continue to grow its activity as a national collaborator, connector and trusted advisor, through collaborating more intensively both externally and internally. CSIRO will strive to increase the mobility and exchange of people and knowledge between universities, industry and publicly-funded bodies. The Strategy also outlines that as a contribution to the development of an innovation capable workforce, CSIRO will increase its direct engagement in education from school programs through to Post-Doctoral level. This will include activities aimed at closing the gap in Aboriginal and Torres Strait Islander achievement and employment in science, technology, engineering and mathematics (STEM).

The accelerated program of translation of research into the market will require CSIRO to embrace measured commercial risks, striving to act more entrepreneurially and with greater agility, to retain its standing and reputation in the fast paced global environment. As one avenue of delivering national benefit, CSIRO will increase its activity towards supporting the establishment and early-stage development of new spin-off companies from appropriate technology opportunities. CSIRO will work to put into place funding mechanisms to support this avenue of commercialisation, which requires a more advanced level of technology readiness. CSIRO is initiating an innovation program to identify ideas with high potential

commercial value, to develop entrepreneurial skills and provide a range of new opportunities for collaboration in building new ventures.

CSIRO will continue to work closely with the Chairs of the Industry Growth Centres and the Department in support of the formation of these Centres, including through membership of CSIRO's advisory committees and hosting Centre activities at CSIRO facilities. With CSIRO's current research investment profile being predominantly aligned to these industry sectors, the Strategy actions to accelerate delivery of research-based technology products and services will support increased competitiveness and productivity in these sectors.

CSIRO will continue to provide specialist knowledge and advice for the purpose of the development of evidence based policy, across a broad range of science and policy domains. It will be a privilege for CSIRO to continue to provide support for the Commonwealth Science Council; as well as to engage with the Chief Scientist of Australia through the National Science, Technology and Research Committee.

The Strategy recognises the need for CSIRO to expand its global presence and linkages in overseas markets, including to build connections with emerging markets of national importance as well as to maintain relevance and competitiveness.

An important function that CSIRO contributes to the Australian R&D system is to manage the National Facilities and Collections. CSIRO will manage this infrastructure and biological collections to support delivery of impact to the Australian people, environment, research and industry. CSIRO will also develop, through the merger with the National ICT Australia, a digital innovation hub focused on data that will be critical for industry, government and research transformation across multiple sectors.

Planning and Reporting and Communication

CSIRO's performance expectations and progress in delivery of the Strategy will be published annually in the Corporate Plan and Annual Report. CSIRO will measure its performance through the metrics of the impact return on its investment in research, customer satisfaction, revenue supporting CSIRO's research from industry and international sources; collaboration levels, and licensing of its intellectual property; people (diversity and inclusion, and health and safety); and investment in future science and technology.

CSIRO will ensure that you and your office are kept informed of significant activities in a timely manner, including through regular briefings on major issues considered by the Board and regular meetings with the Chief Executive. CSIRO will comply with the requirements under the *Public Governance, Performance and Accountability Act 2013* for an annual Corporate Plan. The Chief Executive will continue to ensure appropriate and timely communication arrangements with your Portfolio Secretary and Department are in place.

The Board and management of CSIRO will continue to fulfil their duties to the Organisation and the Australian Government responsibly and to act at all times in the national interest. CSIRO aspires to the science that we do, working with our partners and collaborators, being translated to impact for the future of Australia, supporting the Australian community and delivering a national benefit.

Eileen Doyle
Deputy Chairman, CSIRO Board
24 August 2015

Attachment 3

CSIRO Policy Statements

CSIRO Science & Delivery Policy

CSIRO is committed to conducting world class scientific and industrial research consistent with its roles and functions as outlined in the *Science and Industry Research Act 1949.*

We prepare for Australia's long term needs and respond with agility to today's national imperatives.

We focus on the most pressing challenges and opportunities facing Australia, leveraging scale and extensive cross-organisational capability to deliver deep science and innovative solutions for the economy, society and the environment.

In pursuit of these objectives we build strong and enduring national and international partnerships with government, industry, academic and community stakeholders to enhance Australia's capability, capacity and flexibility to deliver impact. We are recognised for our ability to manage major national facilities and collections for Australia's research community and beyond.

We are an impartial, authoritative and respected source of independent science based information for the community and government. Our science education and outreach programs bring a sense of excitement and inspiration to Australia's youth.

We are committed to developing, implementing and maintaining practices to ensure we:

- prioritise our research investments on the most important areas of national interest
- are creative and innovative in the conduct of science and technology and effective in its transfer to adoption and impact for the long term interest of Australia
- apply high standards for the responsible conduct of scientific research
- maintain our reputation for integrity and scientific impartiality and independence
- publish quality scientific information based on robust peer review, in papers, reports and otherwise
- provide independent, expert, technical advice to government and community as appropriate to inform relevant policy processes and program activities
- build and maintain high-quality research infrastructure, including national scientific facilities, collections, and major national and international data repositories and enable access to such facilities on an appropriate basis
- engage actively and constructively with appropriate research and technology transfer clients, partners and potential users of our scientific research and other services
- choose and scope project outcomes consistent with our strategy and manage research in a manner which encourages collaboration and delivers projects on time, on budget and on specification
- value and manage relationships nationally and internationally with government, industry, research organisations and universities, and the end users of research
- respect the intellectual property rights of others and use intellectual property rights strategically to achieve our purpose
- agree commercial terms with clients and partners consistent with enterprise strategy and the nature of transaction.

Our staff will conduct and apply their research with honesty and integrity, and with respect for human research participants, animals and the environment.

Our success will be measured by the lasting benefits delivered to Australia and the world.

Dr Larry Marshall
Chief Executive

CSIRO People Policy

CSIRO is committed to developing and supporting its people and fostering a work environment where innovation, collaboration and performance flourish.

Our capacity to deliver great science and innovative solutions depends on our people.

Our multidisciplinary approach and focus on science and engineering excellence and delivering results are a key strength of the Organisation.

We recognise the community's expectation that CSIRO will continue to develop Australia's scientific intellectual capital and to apply that capital in the best interests of Australia.

We are committed to enhancing our culture, work environment, systems and processes to ensure we:

- comply with all relevant people legislation, policies, procedures, agreements and other relevant requirements including the Public Research Agency Charter with CSIRO
- clearly articulate our values and our behavioural expectations, and incorporate these into our systems and practices and our interactions with government, industry and stakeholders
- treat our people with respect, in an equitable manner and act with integrity, honesty and openness
- support flexibility, inclusiveness and diversity in our workforce ensuring that our people feel valued for their unique contributions
- support, reward and recognise behaviour and achievement that advances science, improves organisational performance and enhances CSIRO's reputation
- build on the capability and excellence of our workforce through proactive recruitment and retention strategies, an emphasis on career and personal development
- establish a work environment and conditions that motivate people to strive to achieve their full potential.

Consistent with CSIRO's Values Compass, all people who work at CSIRO will perform their duties with professionalism and integrity and act at all times in a manner that maintains and enhances the reputation of CSIRO.

We aspire to provide a workplace that promotes world class team performance and creativity enriched by the passion our people have towards enhancing the future of Australia.

Dr Larry Marshall
Chief Executive

CSIRO Governance Policy

CSIRO is committed to conducting the affairs of the Organisation with integrity and in the national interest consistent with the functions of CSIRO as set out in the *Science and Industry Research Act* 1947, the *Public Governance, Performance and Accountability Act 2013* and other relevant legislation.

CSIRO recognises that within these legislative boundaries there is a need to maintain an operating model that supports individual creativity and flexibility and allows people to readily work together and across boundaries. The CSIRO operating model aims to ensure that all staff clearly understand their roles and responsibilities and those of others in the Organisation, as well as the Organisation's key policies so that they can interact more effectively with external clients and partners.

Staff members are encouraged to exercise their judgement in fulfilling their duties and to act responsibly within the direction and policies articulated by the Organisation. This autonomy is an important source of organisational strength, as all staff members have a continuing responsibility to be personally and professionally accountable for their decisions and actions.

All CSIRO staff members are expected to act in good faith and in the best interests of CSIRO, act with care and diligence, comply with CSIRO's Code of Conduct, and avoid any real or apparent conflicts of interest.

Staff in management roles are expected to lead by example and establish practices which achieve the aims of CSIRO and ensure compliance with the Organisation's standards.

CSIRO is committed to develop, implement and maintain governance arrangements to ensure we:

- fulfil the functions of the Organisation and the expectations of the Australian Government
- comply with legislation and Government policy
- conduct our activities in a manner that reflects our values and builds our reputation as a valued and trusted partner
- provide effective leadership and articulate clear roles and responsibilities
- instil proper accountability for our actions and behaviours
- maintain the integrity of our scientific research and commercial, financial and other practices
- facilitate well informed, transparent and responsible decision making
- effectively deploy and manage resources to deliver planned outcomes
- operate efficient and effective scientific and research support processes and systems
- systematically and regularly evaluate, measure and review performance.

Responsible governance will enable us to deliver on our commitments and to always act in Australia's long term interest.

Dr Larry Marshall
Chief Executive

CSIRO Risk Policy

CSIRO is committed to the effective management of risks.

The identification and management of risk is central to delivering the functions of CSIRO and benefits to Australia. This includes understanding scientific, financial, commercial and legal, health & safety, environmental, and reputational risks.

Effective management of risk is vital to successfully capturing the opportunities created through scientific research and delivering on our purpose as an Organisation.

Effective and appropriate risk management practices should be designed to assist CSIRO staff to achieve the Organisation's objectives, and to contribute to the continuous improvement of the Organisation.

Risks faced by CSIRO should be managed on an enterprise basis. The management of risk is the responsibility of all managers and staff.

We will maintain a consistent framework for identifying, assessing, ranking and managing risks and capturing opportunities.

Risk controls will be put in place to manage these risks to an acceptable level. These controls will be regularly reviewed for their effectiveness and improved where necessary.

Risk management performance will be monitored, evaluated and reported.

By actively identifying and managing risks we aim to increase our effectiveness as an organisation and provide greater certainty and confidence for the Government, staff members, collaborators, partners, and other stakeholders in the community about CSIRO's operations.

Dr Larry Marshall
Chief Executive

CSIRO Health, Safety, Environmental Sustainability and Community Policy

"Striving for Zero Harm"

CSIRO is committed to safeguarding the health, safety and wellbeing of our people, our partners and the communities in which we operate. Health, safety and environmental sustainability are fundamental to the way we operate. People are at the heart of CSIRO's capacity to deliver great science and innovative solutions for industry, society and the environment.

CSIRO aspires to Zero Harm to our people and the environment. We are committed to develop, implement and maintain systems and processes to ensure we:

- uphold our value of a genuine commitment to safety and environment and to improve the health of our people
- establish clear leadership accountabilities for safety and environmental sustainability
- comply with all relevant legislation, policies, procedures, standards, licence conditions and other relevant requirements, and go beyond compliance to achieve the aims of this policy
- identify, assess and manage risks to prevent injuries to our people and harm to the environment
- consult with staff and encourage initiatives that contribute to a safer, cleaner and environmentally sustainable working environment
- report and investigate all injuries, illnesses, near misses and environmental incidents
- seek ways to promote and improve the health of our people and support people in making healthy choices
- establish and achieve challenging environmental sustainability goals including energy efficiency and water usage
- conduct our scientific research in a manner that supports environmental sustainability
- measure, evaluate and report our performance progress against set targets and established policies, procedures and systems
- respect traditional rights and culture of indigenous people
- work with government, industry and other stakeholders to address Australia's sustainability challenges.

We know we are successful when our people arrive home safe and healthy and we are valued for our contribution to sustainable development for Australia and our global future.

Dr Larry Marshall
Chief Executive

Freedom to Conduct CSIRO Research and Technology Transfer Policy

The CSIRO Science and Delivery policy states CSIRO is committed to conducting world class scientific and industrial research consistent with its roles and functions as outlined in the *Science and Industry Research Act 1949*.

The purpose of the Freedom to Conduct CSIRO Research and Technology Transfer policy is to ensure that CSIRO does not enter into arrangements which might constrain CSIRO's ability to perform its functions.

It is CSIRO policy that:

Statement 1. CSIRO must not enter into arrangements which constrain CSIRO's current or future ability to perform its functions, including its ability to conduct scientific research, transfer technology, collaborate, form commercial relationships, communicate research findings and inform public policy.

Constraint arrangements are considered inappropriate if they would limit in any way CSIRO's capability to create benefits for Australia by preventing CSIRO, or significant parts of the Organisation, from conducting research or technology transfer in particular areas of science or technology.

Statement 1(A) Exceptions to Policy Statement 1 require review and approval by the Chief Executive or delegate.

In undertaking that review the Chief Executive or delegate must take into consideration Policy Statement 1 and the following principles:

a. a constraint may be appropriate where the constraint implements a bona fide commercial interest of a contractual counterparty (ie the other party to the contract) and:
    i. does not extend, either in its time period or scope, beyond what would reasonably be necessary to create an incentive for the counterparty to invest in the research or put the results of the research into practice for the benefit of Australia; and
    ii. in cases that relate to intellectual property exclusively licensed to a counterparty, CSIRO retains a freedom to operate licence for its own research activities.

b. a constraint may be appropriate where the constraint is necessary to implement an arrangement under which CSIRO would complement the research or technology transfer role of one or more other entities; the time period of the constraint is short and its scope narrow; and the arrangement would make it possible for CSIRO to generate substantial benefits for Australia which would otherwise be unavailable.

Statement 1(B) Constraints imposed on CSIRO which are explicitly or implicitly ethical in nature must not be accepted without the specific approval of the Chief Executive, who should consult the Board on sensitive matters.

For the purposes of this policy, ethical constraints are those based on the moral, religious, political or philosophical considerations of the other party.

They do not include constraints embodied in laws which apply to CSIRO (such as restraints on human cloning or the creation of genetically modified organisms – see Policy Statement 1(C)).

An ethical constraint must not be accepted by a delegate even if it would not directly affect work intended to be done under the relevant contract, grant or other arrangement.

Statement 1(C) Constraint arrangements may be appropriate if the constraint is:

i. consistent with, and does not extend beyond, any legislative prohibition which applies to CSIRO, or
ii. part of a Government regulatory process, or
iii. directed by the Minister.

This policy applies to:

- Research contracts and collaborations,
- Technology transfer and commercialisation agreements,
- Joint ventures,
- Acceptance of grants, gifts, and bequests, and
- All other arrangements between CSIRO and outside entities.

Dr Larry Marshall
Chief Executive

CSIRO Board and Membership

Overview

The CSIRO Board (Board) is responsible to the Government for the overall strategy, governance and performance of CSIRO.

Under the *Science and Industry Research Act 1949*, the Board has the following functions and powers:

1. The functions of the Board are:
    a. to ensure the proper and efficient performance of the functions of the Organisation
    b. to determine the policy of the Organisation with respect to any matter
    c. to give directions to the Chief Executive under subsection 10A(3), and
    d. such other functions as are conferred on it by this Act.
2. The Board has power to do all things necessary or convenient to be done for or in connection with the performance of its functions.

The Board meets formally six times per calendar year and comprises a non-executive Chairman, up to eight other non-executive Members and a full-time Chief Executive. The non-executive members are eminent Australians drawn from the business and research community. All members, except the Chief Executive, are appointed by the Governor-General.

Current Board members (as at 30 June 2016) are:

	PERIOD OF CURRENT TERM
Chairman (*appointed 15 October 2015 and commenced duties 19 November 2015*) Mr David Thodey	15/10/2015 to 14/10/20
Deputy Chair Ms Shirley In't Veld *Independent Non-Executive Director of Asciano Ltd*	28/06/15 to 27/06/20 *28/06/12 to 27/06/15*
Chief Executive Dr Larry Marshall	01/01/15 to 31/12/16
Members	
Mr Hutch Ranck	05/05/16 to 04/05/18 *01/05/11 to 31/04/16*
Mr Brian Watson	14/09/15 to 13/09/20
Dr Peter Riddles	24/04/14 to 23/04/17
Prof. Edwina Cornish	26/11/15 to 25/11/20
Prof Tanya Monro	25/02/16 to 24/02/21
Dr Michele Allan	05/05/16 to 04/05/19
Mr David Knox	05/05/16 to 04/05/19

The Board operates partly through committees that are responsible for particular areas. The standing committees are:

- The **CSIRO Audit and Risk Committee** which assists CSIRO and its Board in key governance areas of risk management, internal control and compliance.
- The **CSIRO People, Health and Safety Committee** which assists the CSIRO Board to fulfil its governance responsibilities in relation to Chief Executive recruitment and performance, Board member nominations, Enterprise Agreement, Executive succession, remuneration, and health and safety.

The Board and its committees operate in accordance with a written charter, approved by the Board and consistent with CSIRO's enabling legislation as follows:

Roles of Board and Chief Executive

The Board is responsible to the Commonwealth Government for the overall strategy, governance and performance of CSIRO. The functions of the Board are:

a. to ensure the proper and efficient performance of the functions of the Organisation;

b. to determine the policy of the Organisation with respect to any matter;

c. to give directions to the Chief Executive; and

d. such other functions as are conferred on it by the *SIR Act 1949*.

The Board has the power to do all things necessary or convenient to be done for or in connection with the performance of its functions [SIR Act s12].

The Board, as the accountable authority for CSIRO, also has a range of duties under the PGPA Act.

The Board has articulated how it will fulfil its functions and duties in more detail in the CSIRO Board Charter.

The SIR Act specifies that the affairs of CSIRO shall be conducted by the Chief Executive subject to any policies determined by the Board and any directions given to the Chief Executive by the Board (SIR Act s10A).

The Board works with and through the Chief Executive and management of CSIRO to ensure the Organisation fulfils its functions.

The Chief Executive is responsible to the Board for the overall development of strategy, management and performance of CSIRO. The Chief Executive manages the Organisation in accordance with the strategy, plans and policies approved by the Board to achieve the Organisation's objectives.

Board Priorities

With CSIROs 2015-20 Strategy in effect from 1 July 2015 the Board is currently concentrating on the implementation of the Strategic Plan.

The Board has determined the strategic actions of CSIRO as:

- Customer first - to ensure CSIRO creates deeper innovation relationships with its customers and prioritises the highest value investments.
- Collaboration hub - to integrate the best solutions for CSIRO's customers, increase flexibility and enhance Australia's innovation performance.
- Global outlook, national benefit - to deliver connectivity to the global science, technology and innovation frontier and new customers and markets for Australian innovation and for national benefit.

- Breakthrough innovation - to increase capacity to help reinvent existing industries, and create new industries for Australia and deliver public good.
- Excellent science - to ensure CSIRO is creating breakthrough technology and knowledge, and is a trusted advisor for Australia.
- Deliver above commitments - to enhance CSIRO's agility, financial sustainability and capacity to respond at the speed of business.
- Inclusion, trust and respect - to fully enable and support the innovation capacity of CSIRO's creative people and teams to take risk and deliver to customers.
- Health, safety and environment - to enhance staff safety and wellbeing and to further CSIRO's aspiration towards zero harm.

These strategic actions are considered vital to Australia and consistent with the Organisation's continued commitment to delivering national benefits.

During 2015-16, the Board, working with management, has overseen fundamental changes to the operations of the Organisation, including the expansion of CSIRO's Research Program; the building of science excellence and preparedness including through e-Research strategies; the emphasis on collaboration through alliances with industry (including SMEs), government and other partners; the development and delivery of research precincts and major research infrastructure; the strengthening of governance practices and initiatives designed to make CSIRO an innovation organisation; and raising CSIRO's profile as a trusted advisor to government, industry and the public.

Board Member Profiles

Mr David Thodey

Mr Thodey commenced a five year term as Chairman of the CSIRO Board in November 2015.

Mr Thodey came to CSIRO from Telstra where he joined in April 2001 as Group Managing Director of Telstra Mobiles and in 2002 was appointed Group Managing Director Telstra Enterprise and Government. He became Chief Executive Officer (CEO) and Executive Director of Telstra in May 2009 until he formally retired from the CEO position on 30 April 2015 and left Telstra on 21 August 2015.

Prior to Telstra, Mr Thodey's 22 year career at IBM comprised a number of senior marketing and sales positions including Chief Executive Officer of IBM Australia/New Zealand.

He is an experienced board chairman and director. In January 2013, Mr Thodey joined the Board of the GSM Association, the global body of carriers and related companies that supports the standardisation and deployment of mobile technology around the world. Former board memberships include co-chair of the Infrastructure and Investment Taskforce of the B20 leadership group, and Chairman of IBM ANZ, TelstraClear, Information Technology (IT) Skills Hub, Industry Groups and Basketball Australia.

Mr Thodey has extensive information and communications technology (ICT), digital business and data services experience. ICT and digital services are relevant to enabling all the Industry Growth Centres. Mr Thodey's over 20 years' experience working in Asia is pertinent to both CSIRO and the Industry Growth Centres.

Mr Thodey holds a Bachelor of Arts in Anthropology and English from Victoria University, Wellington, New Zealand. He attended the Kellogg School of Management postgraduate General Management Program at Northwestern University in Chicago, USA.

Ms Shirley In't Veld

Ms In't Veld has been an Independent Non-Executive Director of Asciano Ltd since November 1, 2010. She is Chairperson of the Sustainability Committee of Asciano, and is a Council member of the Australian Institute of Company Directors (WA) and the SMART Infrastructure Facility (University of Wollongong).

Shirley In't Veld was the Managing Director of Verve Energy for five years, relinquishing her position in April 2012.

Prior to her position at Verve Energy, Ms In't Veld was Vice President Primary Business Development with Alcoa, and from 2001–2004 she was the Managing Director of Alcoa Australia Rolled Products, based in Geelong, Victoria. Ms In't Veld commenced her career as a commercial lawyer with Mallesons and has also held senior legal, commercial and marketing positions with WMC Resources Ltd, Bond Corporation and BankWest.

Ms In't Veld has held industry group representation positions as a board member of the Energy Supply Association of Australia and as a council member with the Packaging Council of Australia and the Aluminium Council of Australia, and has been a board member with the Co-operative Research Centre for Landscape Evolution in Mineral Exploration (CSIRO) and the Association of Mining and Exploration Companies in WA (AMEC).

Ms In't Veld received her Bachelor of Laws (Hons) and Bachelor of Commerce in 1978 from Melbourne University.

Dr Michele Allan

Dr Michele Allan has an academic background in biomedical science, management and law. Dr Allan is a past executive director and non-executive director of Patties Foods Limited and was previously a non-executive director of the Dairy Research & Development Corporation, Forest and Wood Products Australia, Ruralco Holdings Limited Tasmania Fruit & Vegetable Taskforce, Tasmanian Irrigation Pty Ltd, Callaghan Innovation, William Angliss Catering & Hospitality TAFE College and Grape and Wine Research and Development Corporation. Current board positions include Innovation Australia, Food Innovation Australia Limited, Apple and Pear Australia Ltd, Grain Growers Limited, Cooperative Research Centre Hearing, Nuffield Australia and member of the CRC Advisory Committee. She is Chancellor Charles Sturt University and Grains and Legumes Nutrition Council, and a Fellow of the Australian Institute of Company Directors. Dr Allan is also Chair of the Remuneration Committee.

Prof Edwina Cornish

Professor Edwina Cornish AO, is Provost and Senior Vice-President of Monash University. She brings vast experience in the interface between government, research, science and the higher education sector, and is an experienced board member with strong business, industry and financial skills. Professor Cornish played a key role in building one of Australia's first biotechnology companies, Florigene Limited, which developed and successfully commercialised the world's first genetically modified flowers under her leadership. In 2014 she was made an Officer of the Order of Australia, in part for her advances in biotechnology and horticultural genetic modification.

Mr David Knox

David Knox is an oil and gas industry executive and former Chief Executive Officer and Managing Director of Santos Limited from 2008 -2015. David was previously Managing Director for BP Developments in Australasia from 2003 to 2007. He has worked for BP in the United Kingdom and Pakistan, and has held management and engineering positions at ARCO and Shell in the USA, Netherlands, the United Kingdom and Norway. David is originally from Edinburgh, Scotland and has a BSc Hons in Mechanical Engineering and an MBA. He is a fellow of ATSE, and FIEAust. David is a council member of RiAus and a board member for the Adelaide Botanic Gardens and the Adelaide Festival.

Prof Tanya Monro

Professor Tanya Monro is Deputy Vice Chancellor: Research and Innovation and ARC Georgina Sweet Laureate Fellow, University of South Australia. Tanya received a Royal Society University Research Fellowship, University of Southampton, was the Inaugural Director: Institute for Photonics and Advanced Sensing, and the ARC Centre of Excellence for Nanoscale BioPhotonics, University of Adelaide. Tanya's awards include: Eureka Prize for Excellence in Interdisciplinary Scientific Research, the Bragg Gold Medal (best Physics PhD in Australia), South Australia's "Australian of the Year", Scopus Young Researcher of the Year, South Australian Scientist of the Year, and the Prime Minister's Malcolm McIntosh Prize for Physical Scientist of the Year. Tanya is Fellow of the Australian Academy of Science (AAS), the Australian Academy of Technological Sciences and Engineering (ATSE). She is a board member on the Prime Minister's Commonwealth Science Council, the AAS National Committee for Physics and the South Australian Economic Development Board.

Mr Hutch Ranck

Mr Ranck has over three decades of diverse business experience both as a senior executive and as a board member.

Mr Hutch Ranck is a Director of Elders Limited and Bush Heritage Foundation.

Mr Ranck retired as Managing Director of DuPont (Australia) and Group Managing Director of DuPont ASEAN in May 2010.

In his 31 years with DuPont Mr Ranck has led businesses in ANZ and Asia Pacific in Agriculture, Pharmaceuticals, and Industrial Chemicals.

In the last 10 years Mr Ranck has served as a director in a variety of organisations including the Business Council of Australia, APVMA, an Australian Government Statutory Authority, the Chemical and Plastics Association (PACIA) and the Crop Chemical Association (Crop Life).

From 2000 until 2010 Mr Ranck was a member of the Prime Minister's Science, Engineering and Innovation Council.

Mr Ranck was awarded a: Bachelor of Science in Economics in 1971 from the University of Pennsylvania – Wharton School, USA. In 2000, he was awarded a Centenary Medal.

Mr Ranck is a Fellow of the Australian Institute of Company Directors. He was appointed to the CSIRO Board in May 2011.

Dr Peter Riddles

Dr Riddles has worked as a consultant to industry and government since 2006 on building science and technology capabilities for economic development (presently working in Canada and California) and as a professional director and advisor to companies where science-innovation is the core business

Dr Peter Riddles has extensive board and governance experience of organisations in the private and public sector where innovation and science are the core business, which includes considerable experience in global innovation systems.

Dr Riddles studied as a scientist at the University of Queensland, Stanford University and the University of Cologne and enjoyed a career at CSIRO between 1985 and 1999 where the last position was as Executive Director of the Bioactive Molecules Initiative (a multi-divisional program).

From 2000 to 2007, Dr Riddles worked with universities in establishing and modernising technology transfer including as GM at IMBcom Pty Ltd (at the University of Queensland) and Director, Griffith Enterprise (at Griffith University).

Dr Riddles experiences include 10 years collectively on the IR&D Board, the Innovation Australia Board, and Member and/or Chair of the Biological Sciences and the Innovation Grants Committees.

Mr Brian Watson

Mr Watson is an experienced board member and chairperson. His expertise is in private equity investment activities, the provision of corporate advisory services related to the private equity sector, and the finance sector. He holds a Bachelor of Commerce degree from the University of Melbourne.

Mr Watson is Executive Chairman of Georgica Associates Pty Limited, an independent private equity investment management firm. Prior to establishing Georgica Associates in 2002, he spent 16 years with JP Morgan & Co in a number of senior roles, including Global Head of Equity

Capital Markets and Global Head of Private Equity, Chairman of JP Morgan Australia from 2000-2001 and Managing Director of JP Morgan Partners (JPMP) Australia from 1999-2002.

Prior to joining JP Morgan in 1986, Mr Watson worked as Treasurer of Woodside Petroleum (1979-86) and held various positions in the finance section of the Oil and Gas Division of the Broken Hill Proprietary Co. Limited (1973-79).

Mr Watson is currently on the boards of MeeMeep Pty Ltd and Victorian International Container Terminal Ltd; a Board member and Chair of the Finance and Investment Committee of Berry Street Victoria, Victoria's largest child and family welfare organisation; and member of the Melbourne Grammar School Foundation Board. Formerly he was a member of the Board of Guardians of the Future Fund from 2006 to 2012; Chairman of the Australian Government's Pooled Development Funds Registration Board (2002-2007), Deputy Chair of the Innovation Australia Board (2006-2007) and member of the board of the Australian Stem Cell Centre (2002-2008). Mr Watson also chaired the Government's Venture Capital Industry Review in 2005.

Dr Larry Marshall

Dr Marshall is a scientist, technology innovator and business leader with a wealth of experience in creating new value and impact with science. He was born in Sydney and received his PhD in physics at Macquarie University then left Australia in 1988.

He began his career in the USA where he pioneered a new field in semiconductor lasers and non-Linear optics most notably creating the eyesafe laser which enabled wide use of lasers without eye hazard, and a Newhouse generation of optical parametric oscillators creating tuneable solid state green, blue and UV laser sources. He created the first solid-state ophthalmic laser curing blindness in diabetics and enabled his first IPO in 1996. He worked closely with his PhD examiner at Stanford, licensing several technologies and spinning out students and startups from their prestigious labs.

Prior to joining CSIRO, Larry had 25 years' experience as an international technology entrepreneur. He has over 100 peer reviewed publications and conference papers, holds 20 patents and has founded six successful United States companies in biotechnology, photonics, telecommunications and semiconductors.

He has been a passionate supporter of Australian innovation since the 90s, and has helped both sides of government to improve Australia's innovation performance, including giving up his career in the US to take up the leadership of CSIRO which he believes is the fulcrum to pivot Australia's economy.

Board Directions to the Chief Executive

Introduction

CSIRO is a body corporate constituted and operating under the Science and Industry Research Act 1949 (SIR Act) [external link] and a corporate Commonwealth entity operating under *Public Governance, Performance and Accountability Act 2013 (PGPA Act) [external link]*.

The main purpose of this instrument is to set out the formal directions given by the Board of CSIRO to the Chief Executive of CSIRO under the SIR Act.

The directions are also intended to harmonise the requirements of the SIR Act and the PGPA Act so that CSIRO will be governed seamlessly and be fully compliant with the requirements of both Acts.

Directions to the Chief Executive

By a resolution of the Board of Commonwealth Scientific and Industrial Research Organisation (CSIRO) dated 1 July 2015, pursuant to subsection 10A(3) and paragraph (1c) of section 12 of the Science and Industry Research Act 1949 (SIR Act), the following directions were given to the Chief Executive of CSIRO. The directions remain in force until amended or revoked by the Board of CSIRO.

The Chief Executive of CSIRO must:

1. General

1.1 Assist Role of the Board

(a) assist the Board and its committees to fulfil the functions and duties of the Board and their respective Charters by:

i. providing high quality management reports, discussion papers and proposals as required, including on the focus areas identified from time to time by the Board and those needed for the annual programs of work (Forward Planner) set by the Board and its committees;

ii. ensuring matters presented to the Board for decision are supported by reliable and competent information and advice so the Board may exercise due diligence and care [PGPA Act s25] and make decisions in the best interest of CSIRO;

iii. alerting the Board of possible events and changes that might affect the direction and operations of the Organisation including emerging risks and opportunities;

iv. reporting regularly against the strategies and plans approved by the Board, including the Corporate Plan (from 2015-16 financial year), and related performance measures, to ensure that the Board and its committees are kept properly informed about progress and promptly advised of any departures from plans or policies; and

v. offering proposals for improvement in Board operations and the working relationship with management.

(b) facilitate communication between Board Members, Board Committee members, senior managers of CSIRO and the internal and external auditors of CSIRO in order to promote good governance, with particular reference to the duties of the Board under the PGPA Act.

1.2 Governance

(c) with the Board, govern CSIRO in a way that:

i. promotes the proper use and management of public resources for which CSIRO is responsible; and

ii. promotes the achievement of the purposes of CSIRO (i.e. functions of CSIRO in SIR Act s9); and

iii. promotes the financial sustainability of CSIRO.

In making decisions in relation to (i to iii), must take into account the effect of those decisions on public resources generally. [PGPA Act s 15]

proper, when used in relation to the use or management of public resources, means efficient, effective, economical and ethical.

1.3 Personal Duties

(d) give written notice to the Board of all direct or indirect pecuniary interests the Chief Executive has or may have in any business or in any body corporate carrying on a business [SIR Act s10F] and notice of any material personal interest in a matter that relates to the affairs of CSIRO [PGPA Act s29]. This may include a standing notice of the nature and extent of the interest.

2. Direction

2.1 Strategy development and implementation

(a) in close consultation with the Board, prepare and submit for consideration and approval by the Board a draft Corporate Plan [PGPA Act s35] for an agreed planning period setting out:

i. the broad objectives of CSIRO in performing its functions;

ii. a broad outline of the policies and strategies to be pursued by CSIRO to achieve those objectives;

iii. the activities CSIRO proposes to carry out; and

iv. the resources CSIRO proposes to allocate to each such activity.

The plan must cover CSIRO and any subsidiaries. [PGPA Act s35(5)]

(b) ensure the Corporate Plan sets out how the activities of CSIRO will contribute to achieving the key priorities and objectives of the Australian Government as related to the purpose of CSIRO; and ensure the Plan complies with the prescribed Rules [PGPA Act s34 & s35].

(c) give the Corporate Plan to the responsible Minister and the Finance Minister, following approval by the Board, in accordance with the prescribed Rules [PGPA Act s35(c)].

(d) ensure the strategy and operations of CSIRO are informed by effective advisory mechanisms and when issued, the Ministerial Statement of Expectations for CSIRO.

(e) encourage CSIRO leaders to cooperate with others to achieve common objectives, where practicable [PGPA Act s 17]; and ensure CSIRO cooperates with other organisations [SIR Act s10] in the coordination of scientific research, with a view to:

i. the prevention of unnecessary overlapping; and

ii. the most effective use of available facilities and staff.

(f) conduct an annual review of the approved Corporate Plan with the Board.

(g) ensure the effective governance, communication and delivery of the approved Corporate Plan.

(h) submit more detailed strategies and investment proposals, preferably at the concept stage, to support delivery of the Corporate Plan to the Board for advice, endorsement or approval as

appropriate. This includes all matters which would have a material impact on the Organisation.

Material matters include matters involving a major, long term research, relationship or financial commitment; a major change in CSIRO's research priorities and capacity; high enterprise level residual risk; and matters potentially outside of the policies and strategies of the Board. Examples include industry and international strategies, new policy proposals to the Government and internal portfolio investment cases.

Resource allocation and efficient use of public resources

(i) prepare budget estimates for approval by the Board for each reporting period, and for any other periods directed by the Finance Minister, and give the estimates to the Finance Secretary once approved by the Board [PGPA Act s36(1)].

(j) ensure the budget estimates fairly present the estimated financial impacts of CSIRO's activities for the reporting period or other period, and comply with Finance Secretary Directions [PGPA Act s36(2)].

(k) when imposing requirements on others in relation to the use or management of public resources for which CSIRO is responsible, take into account:

i. the risks associated with that use or management; and

ii. the effects of imposing those requirements [PGPA Act s 18].

3. Transformation

3.1 Operations

(a) ensure CSIRO has an effective Operating Model that:

- adopts best practice;
- embeds productivity- related metrics;
- delivers sustainable efficient, effective and timely business operations and services;
- is fit for service with sufficient flexibility for a dynamic environment;
- incorporates a continuous improvement program; and
- supports the execution of CSIRO's 2015-19 Strategy.

(b) ensure the Board is consulted on:

- organisational structure, including the senior executive structure immediately below the Chief Executive, the portfolio responsibilities of members of the Executive Team, and the structure of business units;
- selection of people to fill these positions and the overall balance of the Executive Team including skill mix and diversity;
- succession planning for senior executive positions.

3.2 Capability

(c) ensure that CSIRO's organisational capability:

- delivers world class scientific research and delivers valued impacts for our customers;
- incorporates mechanisms to reward and recognise our scientist where world class impacts are delivered;
- is maintained and enhanced through programs to attract, develop, motivate and retain the right people, including succession planning.

(d) ensure a cohesive, healthy and safe working environment in which teamwork, creativity and innovation flourish; and in which staff are treated with equity and respect, act with integrity, honesty and openness, and may contribute effectively to the achievement of CSIRO's purpose and objectives.

(e) ensure staff consultation, in accordance with the Enterprise Agreement, and through the Consultative Council [SIR Act s56].

(f) encourage and foster effective communication processes.

3.3 Policies

(g) formulate for Board approval a Policy Framework and the policies necessary to ensure that CSIRO achieves its objectives and complies with all applicable laws and Government policies and directives.

(h) maintain a complementary set of more detailed standards, procedures and guidelines to be approved by the Chief Executive or Senior Managers in accordance with the Policy Framework.

(i) in complying with Directions 3(g) & 3(h), ensure that policies (including policies embodied in resource allocation decisions) relating to CSIRO's scientific research and technology transfer activities [SIR Act s9(1)(a) and (b)] are so expressed that they can be reported for purposes of SIR Act s51:

- as at the start of each reporting period; and
- as developed during the reporting period.

3.4 Processes – Systems of Internal Control and Risk

(j) must establish and maintain:

- an appropriate system of managed risk that supports and encourages the exploration and advancement of scientific research;
- an appropriate system to identify and manage strategic and operational risks [PGPA Act s 16(a)]; and
- an appropriate system of internal control for CSIRO [PGPA Act s 16(b)].

(m) implement measures directed at ensuring compliance with all applicable laws and Government policies and directives, including the Commonwealth Procurement and other Rules [PGPA s16(b)] and CSIRO's policies, standards and procedures; and implement and maintain systems to identify and address breaches in such matters.

(n) implement and maintain systems, including suitable induction and staff education, to ensure CSIRO's statutory obligations and policies, standards and procedures are understood and complied with, including the CSIRO Code of Conduct.

(o) promote CSIRO's values and the CSIRO Code of Conduct, and provide guidance to CSIRO and its researchers when engaging in public debate.

3.5 Delegations and Authorities

(p) ensure that delegations [SIR Act s10J(1)] and authorities [SIR Act s10A(4)] by the Chief Executive and delegations by the Board [SIR Act s22A] are appropriate and are properly documented in the CSIRO Delegations and Authorities Manual, and that:

i. all delegations to eligible persons and committees of eligible persons are approved by the Board [SIR Act s10J(2)];

ii. the Delegations and Authorities Framework is presented to the Board annually for (re)confirmation;

iii. ensure CSIRO does not enter into major transactions unless and until relevant approvals have been given in accordance with the **Chief Executive and Board Major Transactions Threshold Table**, as approved by the Board; and

iv. at each Board meeting a report is provided on:

- transactions entered by the Chief Executive
- matters notified to Minister

unless those matters have been separately reported to the Board in accordance with Direction 3(p) (iii) and Direction 4(j).

4. Assurance

4.1 Compliance

(a) conduct the affairs of CSIRO in accordance with the requirements of all applicable laws and regulations including the SIR Act and PGPA Act and prescribed Rules, the applicable policies of the Government, and the policies of CSIRO.

(b) ensure that CSIRO performs its functions in accordance with:

i. the Corporate Plan and other plans approved by the Board for the relevant period; and

ii. the policies of the Organisation, including:

- CSIRO Freedom to Conduct CSIRO Research and Technology Transfer Policy, as approved by the Board in November 2006; and
- CSIRO Science and Delivery; People; Governance; Risk; and Health, Safety, Environmental Sustainability and Community Policies, as approved by the Board in February 2010.

(c) ensure that any policies of the Government notified to CSIRO are carried out in relation to CSIRO and any subsidiary of CSIRO, so far as practicable [PGPA Act s22].

(d) ensure that any directions or guidelines given to the CSIRO Board by the Minister are complied with [SIR Act s13].

(e) ensure, as far as practicable, that none of CSIRO's subsidiaries does anything that the CSIRO does not itself have power to do [PGPA Act s86].

(f) report regularly to the Board on compliance with policies approved by the Board and to the Board Audit and Risk Committee and Board People, Health and Safety Committee on compliance with standards and procedures as relevant to the Charters of those committees.

4.2 Financial management

(g) ensure that all banking, borrowing and investment by CSIRO is properly conducted and authorised in accordance with the PGPA Act and prescribed Rules [PGPA Act s54, s57, s59].

(h) ensure that accounts and records are kept that properly record and explain the transactions and financial position of CSIRO and in a way that:

- enables the preparation of the financial statements required by the PGPA Act; and
- allows those financial statements to be conveniently and properly audited in accordance with the PGPA Act [PGPA Act s41].

(i) ensure that the granting of indemnities, guarantees or warrantees by CSIRO, and the obtaining of insurance by CSIRO, complies with the PGPA Act and prescribed Rules [PGPA Act s61 & s62].

4.3 Duty to inform and Ministerial notifications

(j) keep the Board and the Minister informed of the activities of CSIRO and its subsidiaries, give the Board and the Minister reasonable notice of significant issues that affect CSIRO, and notify the Board and the Minister of significant events [PGPA Act s19].

(k) give the Board and the Minister or the Finance Minister in a timely way any reports, documents and information in relation to those activities as that Minister requires [PGPA Act s19(b)].

(l) ensure information on company and share dealings, as set out in PGPA Act s72 and prescribed Rules, is provided to the Minister in order to cause a notice of the event to be tabled in each House of the Parliament as soon as practicable after the event occurs.

(m) keep the Board informed of any non-compliance with the PGPA Act or events which may materially affect CSIRO's financial sustainability.

5. Performance

(a) implement processes to properly record and explain, and measure and assess, the performance of CSIRO [PGPA s37-39].

(b) prepare an annual performance statement, in accordance with the PGPA Act, for consideration by the Board and inclusion in the annual report [PGPA s37-39]; and have the report available for examination by the Auditor-General, if required [PGPA s40].

(c) ensure that the financial statements of CSIRO and any subsidiary of CSIRO are:

- prepared in accordance with the PGPA Act and prescribed Rules and present fairly CSIRO's financial position, financial performance and cash flows [PGPA s42 & 44].
- audited by the Auditor-General [PGPA Act s42-44].

(d) prepare for consideration by the Board an Annual Report in accordance with s51 of the SIR Act and Division 6 of the PGPA Act and prescribed Rules by 31 August immediately following the end of the reporting period for CSIRO; and following approval of the annual report by the Board, give the annual report to the Minister on or before 31 October immediately following the end of the reporting period which is the subject of the report [SIR Act s51 & PGPA Act s46].

(e) prepare any other performance and compliance as required by the Government in a timely and accurate manner for approval by the Board.

Notes:

- Reporting period is period of 12 months commencing 1 July each year.
- Rules means Rules (legislative instruments) prescribed under the PGPA Act by the Finance Minister. References in the above Directions to the PGPA Act includes the related Rules, when prescribed.
- Under PGPA Act s102, the Rules may cover:
  (a) ensuring or promoting the proper use and management of public resources;
  (b) ensuring or promoting proper accountability for the use and management of public resources;
  (c) grants and procurement;
  (d) risk oversight and management;
  (e) managing appropriations;
  (f) reporting periods;
  (g) performance.

Executive Team Profiles and Organisational Chart

Profiles

Dr Larry Marshall, Chief Executive, joined CSIRO as Chief Executive in January 2015. Prior to this Dr Marshall had 25 years experience as an international technology entrepreneur, holds 20 patents, and has founded six successful United States companies in biotechnology, photonics, telecommunications and semiconductors. Dr Marshall was born in Sydney and he received his initial and post graduate education at Macquarie University. He was a cadet scientist at the Defence Science and Technology Organisation and began his career as an engineer with a PhD in Physics. Dr Marshall is a scientist, a technology innovator and business leader with a wealth of experience in developing and applying science.

Mr Craig Roy, Deputy Chief Executive, has key responsibilities which include CSIRO Agriculture and Food, Organisational Strategy Performance and Innovation, Human Resources, Business Development and Commercial, Global, Organisational Development and Change, and Communications. Mr Roy also oversees the organisations' portfolio of science technology and investment that deliver impact in areas such as: mining, agriculture, food, manufacturing, digital economy, energy, water, oceans and biosecurity Mr Roy is a Co-Chair of the CSIRO-Chinese Academy of Science Joint Steering Committee and an international member of Thailand's National Science and Technology Development Agency's International Advisory Committee. Mr Roy is a Board member of the Australian National Commission of UNESCO; and of the University of Technology, Sydney (UTS) Vice-Chancellor's Industry Advisory Board. Mr Roy is a Fellow of the Australian Institute of Company Directors and previously served as an officer of the Royal Australian Navy.

Ms Hazel Bennett, Chief Finance Officer, commenced in this position in November 2011 and is responsible for ensuring the ongoing financial sustainability of CSIRO by providing robust, risk-based commercial investment and financial management frameworks for application to Executive, CSIRO Board and line management decision-making. She also has responsibility for the delivery of advice, services and support across the Health Safety and Environment, Business & Infrastructures Services, Administration Services and Ministerial & Parliamentary functions. Prior to joining CSIRO, Ms Bennett was an Executive Director in Austrade leading the division responsible for delivering all financial, information technology, information management and strategic planning solutions and services, and previously was a Partner with Deloitte Consulting.

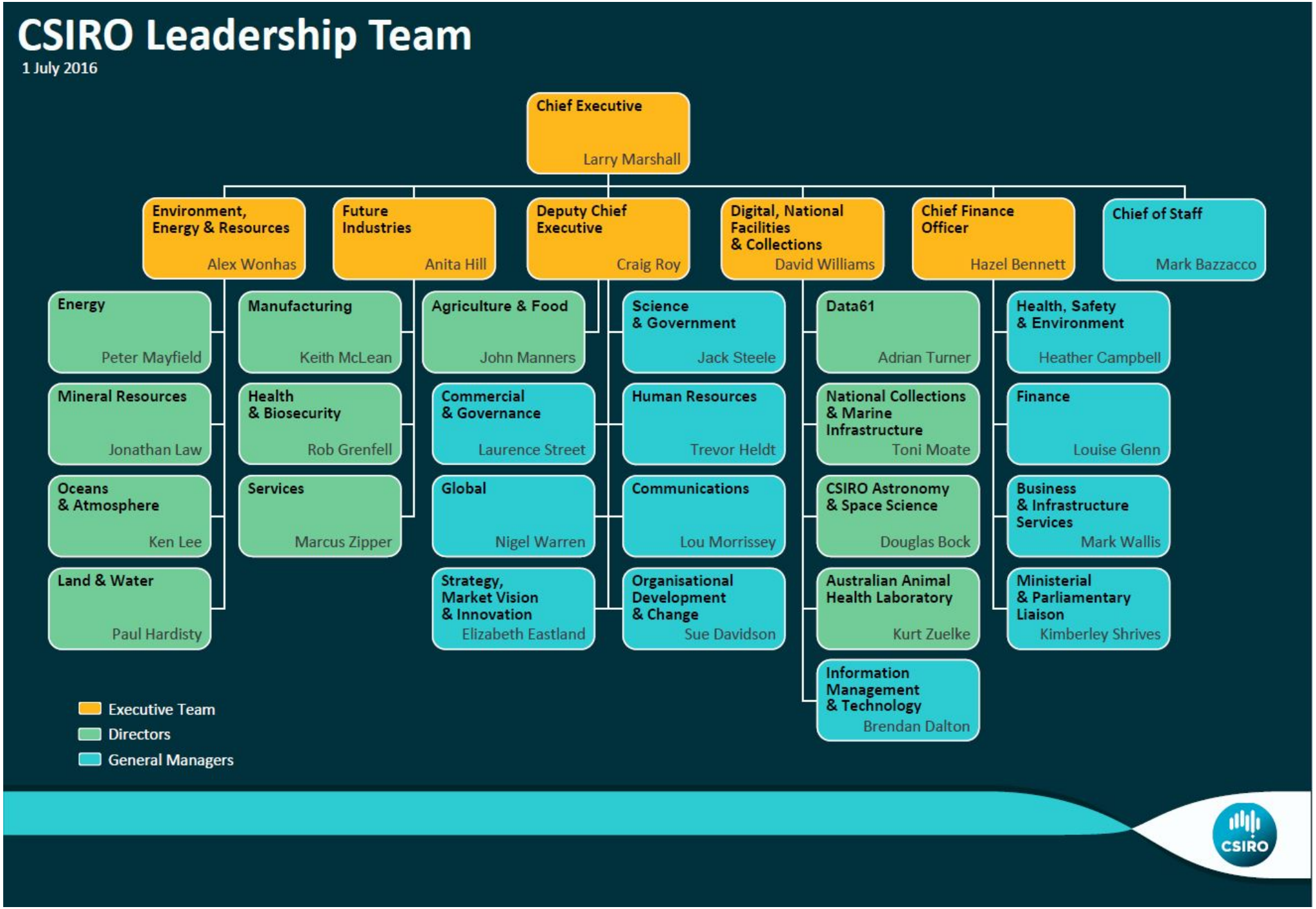
Dr Anita Hill, Executive Director: Future Industries is responsible for overseeing the strategic direction and investment across Manufacturing, Health & Biosecurity, and CSIRO Services which includes Education and Outreach, Publishing, Futures, SME Engagement, and Infrastructure Testing. Dr Hill is a Fellow of the Academy of Technological Sciences and Engineering (ATSE) and is past Chair of the Victorian Division. Dr Hill is a Member of the Australian Institute of Company Directors and has served on a number of boards and advisory committees including National Centre of Excellence in Desalination, Victorian Centre for Sustainable Chemical Manufacturing, The Wark (University of South Australia), Institute for Frontier Materials (Deakin), Membrane Society of Australasia (Founding Board Member), International Advisory Board of the ARC COE Electromaterials Science, University of Queensland AIBN Scientific Advisory Committee, Australian-American Fulbright Selection Committee, and Australian Synchrotron Scientific Advisory Committee. Dr Hill earned her PhD, MSc, and BSE degrees in Materials Science and Mechanical Engineering at Duke University.

Dr Dave Williams, Executive Director: Digital, National Facilities and Collections, is building the world's leading data-focused research, development and digital capability, and leading CSIRO's research in astronomy, National Research Collections, the Australian Animal Health laboratory, the Marine Research Vessel and Information Management and Technology services. Prior to his CSIRO role, Dr Williams was the Chief Executive of the United Kingdom Space Agency. From June 2010 he was also the Chairman of the 20 nation European Space Agency from June 2012. David holds BSc degree and a PhD from the University of Reading. He has previously worked at the University of Reading, in industry, the Natural Environment Research Council, the British National Space Centre and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). David has been a Member of the Global Climate Observing Committee, was elected a Member of the International Academy for Astronautics in 2012, and is now a non executive director of AARNET.

Dr Alex Wonhas, Executive Director: Environment, Energy and Resources, commenced in this position in April 2014. Dr Wonhas joined CSIRO as the Energy Flagship Director in August 2009, bringing with him significant strategic experience in the resources and energy sectors. Dr Wonhas joined CSIRO directly from McKinsey & Company, where he was an Associate Principal. Dr Wonhas also serves on a range of energy-related advisory committees and boards including the Australian National Low Emissions Coal Council, the Energy and Minerals Institute of the University of Western Australia, and the Federal Government's Energy White Paper Reference Group. Dr Wonhas has been instrumental in shaping a number of nationally and internationally relevant projects. He has overseen the development of the Australian National Outlook 2015, which has developed the first fully integrated economy, energy, food and water projections for Australia in a global context. He has also been the driving force behind the establishment of the Future Grid Forum, which brought together over 100 key stakeholders from industry and government across the whole electricity value chain with the aim of increasing the productivity of our electricity system. He is also the Executive Team member with responsibilities for CSIRO's operation in Chile.

CSIRO Leadership Team

1 July 2016

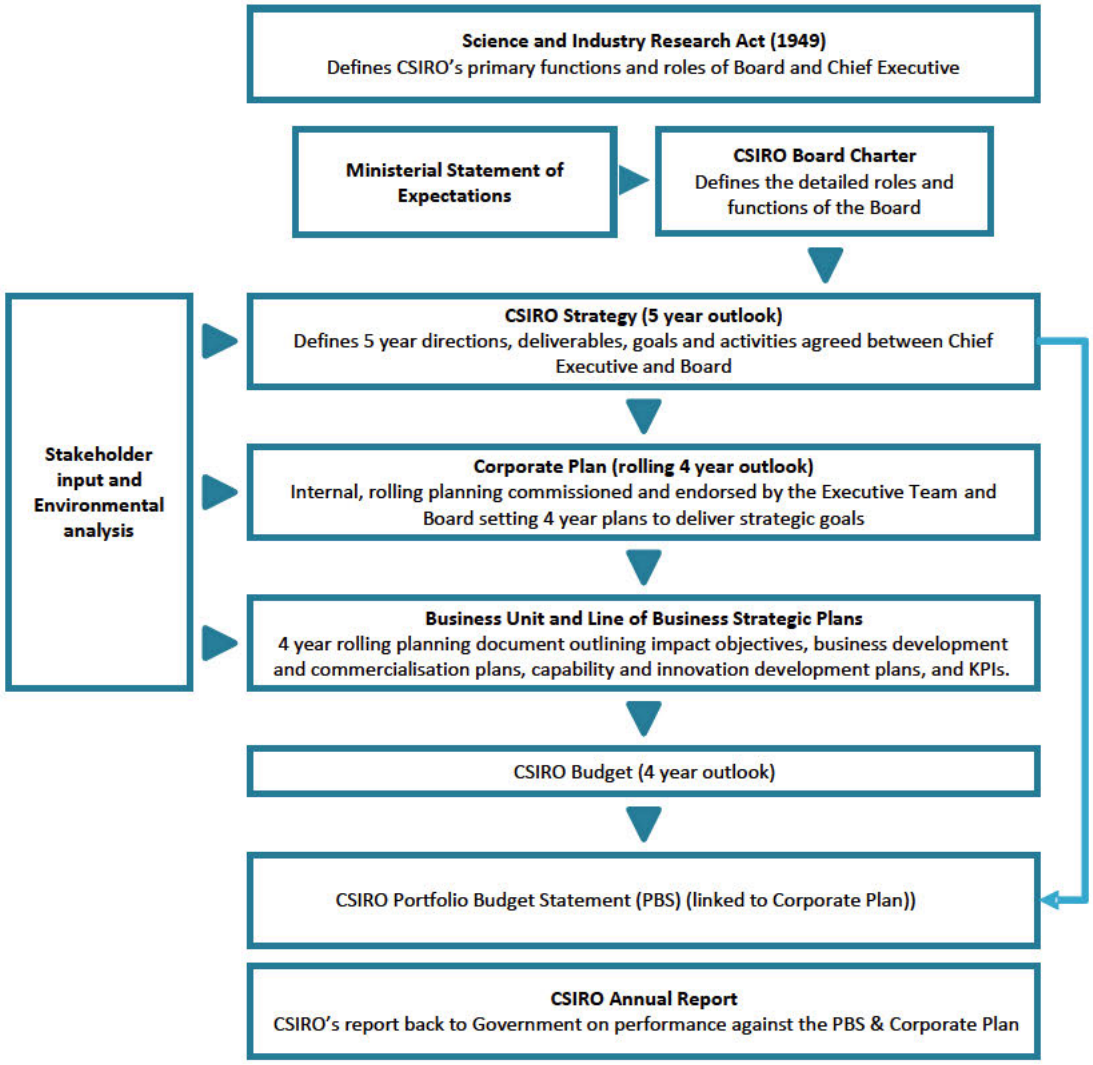


CSIRO Planning, Performance and Reporting

As a mission-driven research organisation established under *the Science and Industry Research Act (1949)*, CSIRO is focused on delivering great science and innovative solutions with relevance and impact in areas of importance for Australia.

The diagrams below provide an overview of the main elements of CSIRO's strategic planning, structure, and the performance measures that translate from the CSIRO Strategic Plan to individual staff performance.

CSIRO's key planning documents are the CSIRO Strategy 2015-2020 (refer to ***brief 9***), the CSIRO Corporate Plan (a rolling four year plan) and the CSIRO portion of the relevant Portfolio Budget Statement. The CSIRO Corporate Plan and the Portfolio Budget Statement are statutory requirements under the PGPA Act and also form part of CSIRO's planning and performance expectations. Actual performance against these expectations are reported in the CSIRO Annual Report.



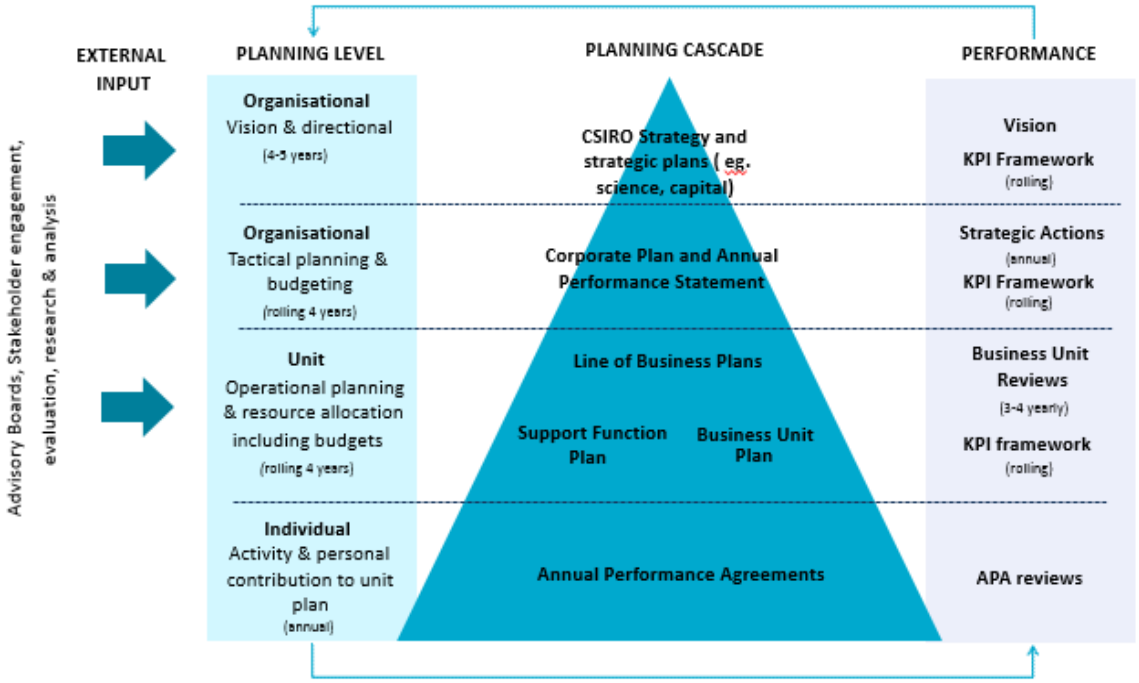
The planning & prioritisation and review processes play a central role in the translation of CSIRO Strategy into funding decisions. These decisions trigger further detailed planning and result in the articulation of performance expectations at a variety of levels in the form of a corporate plan – including changes to specific lines of business, enterprise-support services, Business Units and Programs.

Regular reports to the Executive Team and CSIRO Board assist them in their decision making and governance responsibilities by keeping them informed of progress and issues arising from the array of planning, monitoring and appraisal processes. This includes Key Performance Indicator (KPI) reporting which monitors the organisation's performance against its Strategic Plan. KPIs and their targets are established by the Executive and approved by the Board each year. Performance against KPIs are assessed and reported to the Board. The assessment of performance against KPIs and broader strategy objectives forms the basis of a component of Executive annual bonuses.

CSIRO Planning and Performance Framework

CSIRO has a Key Performance Indicator (KPI) framework as illustrated below.

CSIRO Planning and Performance Framework (May 2016)



Business Unit Reviews

CSIRO is committed to maintaining a focus on the impact of its science, and aims to maximise the likelihood of achieving the planned outputs and outcomes of Business Units through a program of assessment by external, expert review committees.

The Business Unit Strategy, including the current portfolio of research and external engagement activities, are examined and the feasibility of the planned outputs, outcomes and impacts are assessed. In doing this the focus is on:

- whether the right research challenges are being tackled to enable the outcome and output objectives to be met
- whether CSIRO and its research collaborators have, or can build, competitive research capabilities for tackling these particular challenges and sufficient capacity for timely delivery

- the path to impact, covering issues such as engagement with likely delivery partners for the outputs and strategies for addressing barriers to adoption and use of research results.

All Business Units were reviewed at least once by the end of 2012, with the exception of Biosecurity and Digital Productivity which both commenced operation in late 2012. The next round of reviews will commence again in 2017 with Business Units being reviewed on a 3-4 yearly basis.

Business Unit Strategic Advisory Committees

Business Unit Strategic Advisory Committees involve external stakeholders knowledgeable about the areas in which the Business Units operate. They support the Director to maximise the effectiveness of the portfolio to achieve its goals.

Public Governance, Performance and Accountability Act

The Public Governance, Performance and Accountability Act 2013 (PGPA Act) consolidates the governance, performance and accountability requirements of the Commonwealth into a single piece of legislation, setting out a framework for regulating resource management by Commonwealth entities. The Act was enacted on 1 July 2013 with specific planning and performance requirements being phased in over the next 2-3 years. CSIRO's Planning and Performance Framework will be updated as these new requirements are introduced.

A key focus of the PGPA Act is to improve the standard of planning and reporting for Commonwealth entities, especially in relation to the management of their affairs and the delivery of programmes and services to the public. A strong performance management framework, with a focus on reporting results, is critical to achieving this goal. The proposed enhanced Commonwealth performance framework will only apply to Commonwealth entities. CSIRO is a Corporate Commonwealth entity and complies with the PGPA Act.

Security and Fraud Control

Background

CSIRO operates as a Corporate Commonwealth entity under the *Public Governance, Performance and Accountability Act Cth 2013* (PGPA Act) and as such is required to comply with section 10 of the *Public Governance, Performance and Accountability Rule 2014* (PGPA Rule) which sets out the Australian Government's expectations in relation to effective fraud control which includes managing the risk and incidents of fraud. CSIRO is also required to adhere to the obligatory elements of the Commonwealth Fraud Control Framework 2014 ('Framework') which the Fraud Rule/PGPA Rule comprises. Other elements of the Framework, such as the Fraud Policy and Fraud Guidance, whilst not mandatory for CSIRO, are considered fraud control best practice which CSIRO endeavours to apply.

Whilst not required to apply the Protective Security Policy Framework (PSPF), without direction from our Minister or by issue of a Government Policy Order, CSIRO has committed to implementing the framework as best practice and as an added assurance to Government, industry and stakeholders. s47C

CSIRO continues to work closely with national security agencies to improve the Organisational security posture s47C
This has included establishing access to secure online communications platforms which significantly improves CSIROs ability to rapidly respond to Government enquiries, access reporting and Cabinet related information, discuss sensitive matters securely and reduces the risk of information compromise by decreasing the volume of hardcopy material.

Access to sensitive Cabinet documents relevant to CSIRO require an appropriate level security clearance. s47C

Major security issues and fraud matters for 2015-16

During 2015-16, the CSIRO Security and Fraud Control team (S&FC) have not substantiated any instances of suspected fraud or major security incidents. One matter of fraud investigated during FY12-13 was successfully prosecuted in December 2015 and CSIRO is currently undertaking recovery action of the outstanding debt.

s47C

CSIRO Strategy 2015-20

Overview

The previous 2011-15 Strategy focused on CSIRO's role as a national collaborator, connector and trusted advisor and laying the foundations for a more global role, it extended earlier strategic plans that focussed on building specific roles of CSIRO science excellence and preparedness, mission directed, multi-disciplinary and large scale.

The 2020 Strategic Plan continues the evolutionary journey for CSIRO and builds on our strengths in science excellence and mission directed research whilst also looking forward to 2020 and beyond. It will be implemented over five years whilst also aligning with our 10 year capital plan and longer term science direction setting.

The CSIRO Strategy 2015-20 is an ambitious plan to deliver differentiated and sustainable value to the nation. The vision is for CSIRO to be Australia's innovation catalyst: boosting Australia's innovation performance

The CSIRO Strategy 2015-20 is based on eight strategic actions:

1. **Customer First** - to ensure CSIRO creates deeper innovation relationships with its customers and prioritises the highest value investments.
2. **Collaboration Hub** - to integrate the best solutions for CSIRO's customers, increase flexibility and enhance Australia's innovation performance.
3. **Global Outlook, National Benefit** - to deliver connectivity to the global science, technology and innovation frontier and new customers and markets for Australian innovation and for national benefit.
4. **Breakthrough Innovation** - to increase capacity to help reinvent existing industries, and create new industries for Australia and deliver public good.
5. **Excellent Science** - to ensure CSIRO is creating breakthrough technology and knowledge, and is a trusted advisor for Australia.
6. **Deliver above commitments** - to enhance CSIRO's agility, financial sustainability and capacity to respond at the speed of business.
7. **Inclusion, trust and respect** - to fully enable and support the innovation capacity of CSIRO's creative people and teams to take risk and deliver to customers.
8. **Health, safety and environment** - to enhance staff safety and wellbeing and to further CSIRO's aspiration towards zero harm.

The strategy is based on foresighting, research and analysis of global and national trends, as well as the findings of a national consultation activity that engaged with more than 3,000 people within CSIRO, business, academic and the community during 2015.

This strategy is underpinned by CSIRO's annual investment decision making to support alignment to strategic priorities. The 2015-20 CSIRO Strategic Plan received CSIRO Board approval on 18 June 2015, along with the 2015-16 CSIRO Corporate Plan through which the implementation of the strategy commenced.

The CSIRO Board is currently engaged in a series of strategic discussions to ensure new members have a shared understanding of the strategy and can support its delivery.

CSIRO Impact Science

Overview

Within the 'Impact Science' Line of Business:

- CSIRO's research is conducted through Business Units which integrate the full continuum of capability, science and project delivery to deliver impact, and work across all 'horizons' of research.
- The Business Units are the primary delivery vehicle and our impact focus areas, responsible for developing, funding, monitoring and meeting an impact goal supported by a portfolio of Impact pathways.

The Impact Science Line of Business comprises the following business units:

- **Agriculture and Food**. The Agriculture and Food Business Unit research improves the productivity, profitability and sustainability of Australia's agricultural sector including cropping, livestock production, aquaculture and horticulture. With our customer and partners, we deliver transformative technologies, management and knowledge systems to stabilise food security and primary production systems in our region and globally. This research now spans from farm to fork with the inclusion of the food and bioproducts capability from the Food and Nutrition Business Unit which merged with the Agriculture Business Unit on 1 July 2016.

- **Data61**. In August 2015 the merger of CSIRO's Digital Productivity Business Unit and NICTA was formalised, creating Data61 the largest digital innovation network in Australia. Building a better, more impactful digital capability for Australia will be a key focus for CSIRO over the period of its 2015-2020 strategy and Data61 will lead this initiative across the organisation to form the cornerstone of CSIRO's digital strategy. Data61 will to harness the start-up culture of NICTA and multidisciplinary strength of CSIRO to address key challenges of our increasingly interconnected, digitised and automated world by delivering better digital services for government, accessible health for our communities and competitive advantages from digital technologies in our industries, and by harnessing the power of digital to boost CSIRO's overall impact.

- **Energy**. The Energy Business Unit delivers technology options and science that will enhance Australia's economic competitiveness and regional energy security while enabling the transition to a lower emissions energy future. The business unit addresses the Australian challenges associated with global transformations in the energy resource, electricity and transport sectors. This includes the impact of sector changes on energy demand and technology selection and adaptation to the Australian market of global developments in clean fossil energy, onshore gas and renewable energy.

- **Health and Biosecurity**. The Health and Biosecurity Business Unit is working to protect and enhance Australia's health, social, environmental and economic wellbeing in the face of increased healthcare pressures and global biosecurity threats. Formed 1 July 2015, Health and Biosecurity has developed an innovative one-Health business model that integrates scientific capability and knowledge in health, social and economic sciences together with specialist data analytics and digital technology skills to develop and deploy new smart technologies for prediction, detection, surveillance, diagnosis and response to achieve improved health and biosecurity outcomes. Health and Biosecurity works closely together with AAHL, Food and Nutrition and Biomedical Manufacturing to integrate and deliver CSIRO's differentiated health science, ecology and biosecurity capabilities to tackle some of Australia's most vexing human, animal, plant and environmental challenges.

- **Land and Water**. The Land and Water Business Unit delivers the innovation and knowledge needed to underpin the sustainable management of our land, water, and ecosystem biodiversity assets. Through an integrated systems research approach we provide the technologies and information required by industry, government and Australian and international communities to manage, protect and restore natural and built environments. The Business Unit addresses challenges such as: water availability issues related to population growth, increasing urbanisation and significantly increased food production in the context of a highly variable climate; water quality issues affecting urban, industrial and natural environments; water sharing concerns: balancing the water needs of the environment with those of agriculture and industry; the impacts of land, water and ecosystem resource management on biodiversity; the liveability, productivity and resilience of cities and towns; the development of climate sensitive practices that optimise agricultural productivity while minimising impacts on soil, water and ecosystems; and helping our communities, ecosystems, cities and industries adapt to climate change and variability.

- **Manufacturing**. The Manufacturing Business Unit is developing scientific and engineering solutions to enable manufacturers to secure a competitive and sustainable future which contributes strongly to national productivity, economic growth and societal wellbeing. In particular, the Business Unit will support the metals, chemicals, carbon fibre, cotton, biomedical and biotechnology industries. It will address the significant challenges Australian manufacturers face including economic and structural changes and intense global competition from emerging nations as well as help companies build competitive sustainability in areas of high-value added advanced manufacturing.

- **Mineral Resources**. The Mineral Resources Business Unit works with industry and collaborators to grow Australia's resource base, increase productivity and drive environmental performance by delivering science and technology options that enable flow-on benefits to the wider national economy. It also provides critical scientific analysis that underpins a growing national dialogue on how resources impact society and the environment. The Business Unit addresses the key challenges along the whole of the minerals value chain from the declining quality or grade of current deposits, reduced rates of discovery of new resources and productivity pressures, to safety and environmental concerns, and shifting social expectations.

- **Oceans and Atmosphere**. The Oceans and Atmosphere Business Unit provides the knowledge to support sustainable development of Australia's coastal regions, enhance its resilience to changes in ocean, weather, climate and atmospheric conditions, support environmentally sound industrial development, and our ability to respond to and recover from natural and anthropogenic hazards. It will enhance Australia's prosperity and wellbeing through research underpinning the sustainable economic, social and environmental use of Australia's marine estate, and management of the atmospheric environment.

Key Performance Indicators*

- Evidence of economic, social and environmental impacts through demonstrated uptake and adoption of research outputs (demonstrated by case study impact assessment and other evaluations).
- Maintain or increase the number of refereed publications.
- Maintain customer satisfaction.
- Awareness of science by CSIRO stakeholders.
- Maintain or improve science excellence in CSIRO research capabilities and the impact of their research outputs as assessed through a rolling program of rigorous peer review.
- Utilisation and success of science outreach programs (proportion of uptake within the target groups and participant feedback).

*Note: *These KPIs are from the CSIRO Portfolio Budget Statement, Program 1.1. A set of robust indicators that show how each of the Business Units is responding to the CSIRO Strategy 2020.*

CSIRO Services

Overview

CSIRO Services* delivers effective and efficient businesses to enable innovation. We invigorate Australia's scientific literacy and boost innovation in industry. Each service enables customers to capture value from CSIRO and other institutions' research.

CSIRO Services businesses:

- have an overarching growth mission for revenue, reach and impact
- create significant economic impact by supporting enhanced productivity, innovation and collaboration
- attract private sector investment from large corporations and start-ups
- support CSIRO's overall statutory functions, mission and strategy
- serve as an easy entry point to introduce industry partners to working with CSIRO.

CSIRO Services include the following business areas:

- **Education and Outreach.** CSIRO Education and Outreach provides science, technology, engineering and mathematics (STEM) programs and resources for teachers and students. We deliver resources, careers education, special events and community engagement activities around the country. We run the CSIRO Discovery Centre in Canberra which supports CSIRO's communication and education activities by promoting our research. (For further details on CSIRO Education refer to ***brief 22***.)

- **CSIRO Publishing.** CSIRO Publishing is Australia's leading publisher of quality scientific, technical and health journals, books, multimedia and magazines. We also publish a range of publications for kids including books and the Double Helix magazine which helps engage children in science from a young age. (For further details on CSIRO Publishing refer to ***brief 22***.)

- **CSIRO Futures.** CSIRO Futures provides professional advisory services to large industry, government and peak body clients. We help clients create sustainable growth and competitive advantage by harnessing science, technology and innovation that disrupt markets and create new businesses, products and services. CSIRO Futures recently released its Australia 2030 report which uses a scenarios-based approach to help business and government to plan today's innovation investments to meet future opportunities and challenges.

- **Infrastructure Technologies.** Infrastructure Technologies offers an extensive range of independent testing, assessment and consulting services that support the development of better building products and systems. This service contributes to a safer and more resilient nation by using science methods to test the conformity of products against Australian Standards in Australia's $300B building and construction sector. Our services include material performance, fire testing, acoustics and hydraulics testing.

- **SME Connect.** SME Connect provides advice to Australian SMEs on accessing research capability and project funding support, through its roles as an Industry Partner in the Innovation Connections element of the Department of Industry, Innovation and Science Entrepreneurs' Programme, and as the manager of the STEM⁺ Business Fellowship Program on behalf of the Science and Industry Endowment Fund. (For further details on SME Connect refer to ***brief 17***.)

*Note: *CSIRO Services is part of Program 1.1 in the CSIRO Portfolio Budget Statement.*

CSIRO's National Facilities and Collections

CSIRO hosts science-ready national research infrastructure for use by Australian and international researchers (including CSIRO researchers) and is building the world's leading data-focused research, development and digital capability to advance Australia.

National Research Infrastructure:

There are two main types of national research infrastructure:

- Large-scale specialised infrastructure and equipment (eg telescopes, the research vessel).
- Scientific collections that are an important resource for conservation and research.

National facilities are vastly different in purpose, scale and mode of use but share the same objective: efficient, effective provision of scientific infrastructure to the wider community.

The National Facilities and Collections include:

- **Australian Animal Health Laboratory (AAHL).** AAHL helps protect Australia's multi-billion dollar livestock and aquaculture industries, and the general public, from emerging infectious disease threats. It plays a vital role in maintaining the health of Australia's animals, the international competitiveness of Australian agriculture and trade, the well-being of Australians and the quality of our environment.
- **Australian Telescope National Facility (ATNF including the global Square Kilometre Array (SKA).** The ATNF is comprised of a number of world-class radio astronomy observatories that support Australia's research in radio astronomy and can be used by researchers from institutions all over the world. ATNF manages the Murchison Radio-astronomy Observatory (MRO) where the SKA telescope infrastructure in Australia is to be centred. This international project is a strategic priority for ATNF.
- **Canberra Deep Space Communications Centre.** The Canberra Deep Space Communication Complex is one of three Deep Space Network stations around the world providing continuous, two-way radio contact with spacecraft exploring our solar system and beyond. It is managed by CSIRO on behalf of the United States National Aeronautics and Space Administration (NASA).
- **Marine National Facility.** Australia's Marine National Facility supports Australian scientists and their international collaborators to carry out world-class, blue-water research that addresses national challenges in oceanography, climatology, fisheries, marine ecosystems, environmental science and geosciences.
- **Pawsey Supercomputing Centre.** The Pawsey Centre hosts the supercomputing facilities and expertise to support the Square Kilometre Array pathfinder research, geosciences and other high-end science as well as delivering and supporting world-class advanced ICT infrastructure.
- **National Research Collections Australia (NRCA including the Atlas of Living Australia (ALA)).** CSIRO is the custodian of a number of collections of animal and plant specimens that contribute to national and international biological knowledge. Together, they constitute a vast storehouse of information about Australia's biodiversity and underpin a significant part of the country's taxonomic, genetic, agricultural and ecological research - making these vital resources for conservation and the development of sustainable land and marine management systems. NRCA includes: the Australian National Insect Collection; the Australian National Wildlife Collection; the Australian Tree Seed Centre; the Australian National Fish Collection; the Australian National Algae Culture Collection; the Australian National Herbarium; and the ALA. The ALA provides free, online access to a vast repository of information about Australia's amazing biodiversity and supports research, environmental monitoring, conservation planning, education, and bio-security activities.

Key performance indicators*

- Utilisation of the National Research Infrastructure and Collections (such as research days, observation time or operation time, access to and downloads of digital information, visitor days, the number of loans and/or online resources accessed).
- National Research Infrastructure maintained and operated to appropriate standards (qualitative indicator).
- Maintain or increase the proportion of collections available to researchers and the public, including digitised and non-digitised collections.
- Demonstrated response to national events by providing science-ready facilities in support of CSIRO and external party research (this is a qualitative indicator with narrative responses expected).

*Note: *These KPIs are from the CSIRO Portfolio Budget Statement, Program 1.2. A set of robust indicators for each that show how each of the DNFC Business Unit's is responding to CSIRO Strategy 2020 is in development.*

CSIRO Enterprise Support Services

The Enterprise Support Services include the following business units:

- **Board, Governance and Legal** supports the operations of the CSIRO Board and Executive Team, and provides audit, risk, enterprise legal and policy services.
- **Business Development and Commercial** provides business development, commercial, legal, contract management and intellectual property services.
- **Business and Infrastructure Services** manages the CSIRO property portfolio, provides procurement services, coordinates CSIRO's environmental sustainability initiatives and leads CSIRO's Security and Fraud Control activities.
- **Communication** provides advice and assistance in communications, both internal and external.
- **Finance and Services** provides direction and support on financial issues, project support, billing and payments to leaders and staff.
- **Global** provides leadership of a global strategy, coordination of enterprise priorities and support to business unit level activities.
- **Health, Safety and Environment** supports the health, safety and wellbeing of CSIRO staff, subcontractors and visitors.
- **Ministerial and Parliamentary Liaison** manages and supports CSIRO's relationship with its Minister, and engagement with Parliament and the portfolio department.
- **Human Resources Business Services** provides support and leadership on people issues to leaders and staff.
- **Human Resources Strategy** provides HR strategy and support
- **Information Management and Technology** provides IT, eResearch, recordkeeping and library services.
- **Organisational Development** provides enterprise level learning and development and change management services.
- **Science and Government** undertakes science health reporting and Research Office activities and support for key government engagement activities.
- **Strategy, Market Vision and Innovation** undertakes strategic planning, impact planning, performance reporting and reviewing, industry roadmap coordination, collaboration initiatives and enterprise innovation programs.

The Enterprise Support Services function provides high quality, streamlined support services aligned to lines of business within a consistent framework whilst enabling greater centralisation, standardisation and consolidation across all support functions within a strong, integrated support function environment, to deliver Research Support Services through four key delivery mechanisms:

a. Enterprise wide – advisory focused services;

b. In-business – support delivered by site based teams and staff located within individual Business Units.

c. Back office and Service Centre – single point of contact for high volume, largely transaction focused activities including 'Help Desk' environments;

d. Self Services – oversight and delivery of processes and systems accessed by staff on a 'self delivery' basis.

CSIRO's vision for our enterprise support services is prioritising and delivering efficient and effective support and service delivery to research programs and sites in a way which provides clear, easy to navigate support service to frontline research teams.

CSIRO Interactions with its Minister, Portfolio, other Government Departments and Agencies and the Parliament

Arrangements for interaction with the Minister's office

The Chief Executive and the Chairman of the CSIRO Board meet with the Minister in order to discuss matters of interest and any current issues.

CSIRO provides day to day services to the Minister's office (briefing, ministerial correspondence, responses to questions, etc.) in consultation with the office and the portfolio department. CSIRO also provides input, through the portfolio department, to Cabinet documents for the Minister.

The principal contact points in CSIRO for the Minister and his Office staff, as appropriate are:

Chairman Mr David Thodey	Mobile: s 47F [redacted] Email: [redacted]
Deputy Chairman Ms Shirley In't Veld	Mobile: [redacted] Email: [redacted]
Chief Executive Dr Larry Marshall	Phone: [redacted] Mobile: [redacted] Email: [redacted]
Chief Finance Officer Ms Hazel Bennett	Phone: [redacted] Mobile: [redacted] Email: [redacted]
Manager, Ministerial & Parliamentary Liaison Ms Kimberley Shrives	Phone: [redacted] Mobile: [redacted] Email: [redacted]

On all matters relating to ministerial documents and for information about CSIRO activity and contacts:

CSIRO Ministerial and Parliamentary Liaison Office

Manager	
Ms Kimberley Shrives	(details listed above)
Senior Advisor	Phone: s 47F
Dr Grant Farrell	Mobile: [redacted]
	Email: [redacted]
Office Manager	Phone: [redacted]
Mrs Karen O'Rourke	Email: [redacted]
Liaison Officer	Phone: [redacted]
Mrs Tracey Cootes	Mobile: [redacted]
	Email: [redacted]
Liaison Officer	Phone: [redacted]
Mr John Quantrill	Mobile: [redacted]
	Email: [redacted]
Administration Assistant	Phone: [redacted]
Ms Julie Stewart	Email: [redacted]

On all matters relating to media releases and media enquiries:

A/g General Manager, Communication	Phone: [redacted]
Ms Lou Morrissey	Mobile: [redacted]
	Email: [redacted]
Manager, Media Liaison	Phone: [redacted]
Mr Huw Morgan	Mobile: [redacted]
	Email: [redacted]

Coordination and cooperation within the portfolio

CSIRO works closely with the portfolio department to ensure that each is able to provide the best possible support to the Minister and the Minister's office. In addition to these operational matters, CSIRO engages with the portfolio department on a broader range of issues, recognising that CSIRO research and expertise has relevance for many of the portfolio's responsibilities and CSIRO's direct interest in matters relating to innovation and research policy. This includes input to and comment on Cabinet documents where CSIRO's research may be of relevance. In addition, CSIRO is closely engaged with the portfolio department on budget matters where decisions and submissions are frequently required on a portfolio basis.

Other Government Departments and Agencies

CSIRO research also contributes to the government's work across a range of portfolios and the organisation engages actively with other departments and agencies in informing policy development (where relevant) and by undertaking directly contracted research. Refer to ***brief 15*** for further information.

The Parliament

CSIRO regularly makes submissions to Commonwealth and state government parliamentary inquiries. In 2015, CSIRO made 14 submissions to Federal parliamentary inquiries about: health policy, administration and expenditure, Australia's future in research and innovation, agriculture and agribusiness in the Indo-Pacific region, the impact of Supertrawlers, agricultural innovation, the use of smoke alarms to prevent deaths, non-conforming building products, the Australian Radiation Protection and Nuclear Safety Amendment Bill 2015, the Medical Research Future Fund Bill 2015, the threat of marine plastic pollution in Australia, development of the Commonwealth Performance Framework, stormwater resource in Australia, and opportunities for expanding aquaculture industry in Northern Australia.

CSIRO also provides witnesses or private briefings to Parliamentary Committee hearings associated with those inquiries, with five appearances in 2014, and eleven appearances in 2015. These have included inquiries into health policy, administration and expenditure, Australia's future in research and innovation, agriculture and agribusiness in the Indo-Pacific region, agricultural innovation, the use of smoke alarms to prevent deaths, non-conforming building products, the Australian Radiation Protection and Nuclear Safety Amendment Bill, the threat of marine plastic pollution in Australia, opportunities for expanding aquaculture industry in Northern Australia, Wind Turbines, and Landholders Rights to Refuse (Gas and Coal).

To engage with a wider parliamentary audience, CSIRO held two Parliamentary briefing sessions in Parliament House in 2015. These are designed to communicate CSIRO's latest research to interested politicians and staff and provide an opportunity for further direct dialogue between elected representatives and science experts. These sessions often lead to individual briefings for politicians, invitations to further brief specific Committees and increased engagement with government departments. Topics covered in 2015 were Unlocking the potential of northern Australia and the Australian National Outlook Report.

Every year, CSIRO distributes a Parliamentary Pack to all members of Parliament. The Parliamentary Pack includes information on CSIRO's activities and sites by electorate and State and briefs on recently delivered high impact research. The last Pack was delivered in January 2015 with the 2016 Pack currently being prepared for delivery in August 2016.

Informing government policy

Overview

As Australia's national science agency, CSIRO is the government's primary supplier of research and other science and technology services. The government also calls upon CSIRO for information and advice.

CSIRO engages with government in various ways:

- as part of the Australian Government, as a statutory authority within the Industry, Innovation and Science portfolio, reporting to the responsible Minister
- engaging with government departments and the Parliament to provide input into policy development, and assist with policy and program implementation and evaluation
- in other contractual and client relationships with governments (Commonwealth, state and overseas).

CSIRO helps service the government's need for informed policy development including participation in meetings between CSIRO officers and departmental secretaries, other agency heads and departmental staff. This role is central to CSIRO's values and strategy of being a trusted advisor to government and the community at large on the major issues facing the nation and the globe.

CSIRO has many client and contractual relationships with governments including co-investment and contract research, with revenue from Commonwealth and state government agencies being the largest single source of external revenue (57 per cent of external revenue). On a contractual basis, CSIRO is also a R&D delivery arm for many government initiatives, for example the multi-million dollar Transport Network Strategic Investment Tool (TRANSIT), developed by CSIRO to analyse the most efficient and effective transport options for agriculture, a part of the delivery of the Northern Australia White Paper.

CSIRO officers serve on various government advisory committees and may be seconded to task forces or government agencies needing to draw upon their expertise.

The following list illustrates the full variety of mechanisms through which CSIRO informs policy development, implementation and evaluation:

- briefing Cabinet and relevant ministers
- supporting ministerial councils and their committees
- briefing parliament/parliamentary committees (***refer to brief 14***)
- high level meetings between the Chief Executive, other senior officers and departmental secretaries and deputy secretaries
- high level linkages with government departments through, for example, CSIRO's business unit Advisory Councils, the Strategic Leadership Groups developing Industry Action Agendas and more informal arrangements
- the Chief Executive's membership of the National Science, Technology and Research Committee (NSTRC) and supporting the Minister's participation in the Commonwealth Science Council
- participation in Interdepartmental Committees (IDCs) and supporting portfolio participation
- arranging workshops and seminars involving participation by government departments
- making submissions to government, parliamentary and other inquiries, including those of state governments
- staff secondments to secretariats, taskforces, departments and agencies

- providing advice to other organisations engaged in the policy process
- developing joint advice e.g. with other publicly-funded research agencies
- responding to requests for information and briefing from individual politicians
- regular briefings in Parliament House, that inform parliamentarians about CSIRO's research
- involvement in Science meets Parliament, organised by Science and Technology Australia (formerly the Federation for Australian Scientific and Technological Societies, FASTS) with over 35 CSIRO staff attending each year.

An overview of CSIRO work relevant to four particular policy areas is provided below.

Industry Growth Centres

The Industry Growth Centres Initiative was announced in October 2014 as a key element of the Government's Industry Innovation and Competitiveness Agenda policy. The Industry Growth Centres are intended to lift competitiveness and productivity by focusing on areas of competitive strength to help Australia transition into smart, high value and export focused industries.

The six industry sectors identified under this program are:

- Advanced Manufacturing
- Food and Agribusiness
- Medical Technologies and Pharmaceuticals
- Mining Equipment, Technology and Services
- Oil, Gas and Energy Resources
- Cybersecurity (co-chaired by Mr Adrian Turner)

$188.5 million over the four years from 2015-16 to 2018-19 has been budgeted by government to the Industry Growth Centres. s47C

CSIRO is engaging with the Industry Growth Centres through engagement with the Department and through engagement with the Industry Growth Centre Chairs:

- Dr Marshall has also had discussions with Mr John Grill, Chair of the Industry Growth Centres Advisory Committee, about the program and engagement of CSIRO with the Industry Growth Centres program.
- CSIRO has a point person who worked closely with the former Minister's Office and with the Department (through the General Manager, Growth Centres Branch, Sectoral Growth Policy Division) for overall coordination and implementation purposes.
- As the individual Chairs have conducted their consultation processes leading to establishing their Centres, CSIRO staff have been involved in a number of those Centre consultation meetings
- Each Industry Growth Centre Chair is in communication with Business Unit Directors and the Chairs are being invited (and in several cases, are already) to join Business Unit Advisory Committees.
- The Chairs have been in discussions with the Department and with CSIRO in relation to their location. In a number of cases, the Industry Growth Centre will have a presence on a CSIRO site. For example, the Food and Agriculture Industry Growth Centre will be centred at CSIRO's Werribee site and the Advanced Manufacturing Industry Growth Centre plans to have locations at CSIRO's Lab22 Innovation Centre at Clayton and several of the Industry Growth Centres are planning to be connected to CSIRO's QCAT facility at Pullenvale, Queensland.
- Early in the process Mr Grill asked that CSIRO provide a proposal for a networking functionality that would be suitable for networking of the Industry Growth Centres. CSIRO is financially supporting a

project being conducted by NICTA to develop a new app for putting capability requirements out to the innovation system marketplace.

White Paper processes

CSIRO had substantial engagement in the development of the Northern Australia and Agricultural Competitiveness White Papers. As well as providing a submission to the Green Paper processes and to the Joint Select Committee on Development of Northern Australia which informed the White Paper processes, CSIRO was engaged with Government Departments (Industry, PM&C, Environment and Agriculture) to provide advice and input throughout the process. This was particularly the case around the $500 million Water Infrastructure Fund which bridges both White papers.

The White Papers include a number of initiatives involving, or with potential to involve CSIRO research:

- $15 million for three water resource assessments to be conducted by CSIRO, in the Mitchell (Qld), West Kimberley (WA) and Darwin (NT) regions, funded through the Department of Agriculture and Water.
- $100 million for Northern Australian beef roads with investment to be informed by a $150,000 project to apply CSIRO's TRANSIT model to identify priorities, funded through the Department of Infrastructure and Regional Development.
- $1 million for expansion of the TRANSIT model to 25 new commodities comprising 97 per cent of the volume of Australia's agricultural production, funded through the Department of Industry, Innovation and Science.
- $200 million for water infrastructure in northern Australia, including initial feasibility assessments of Nullinga Dam (Qld) and Ord Stage 3 (WA/NT). CSIRO is in discussion with the Department of Agriculture around a $5 million project for Nullinga Dam (with Ord Stage 3 assessment likely to be led by Geoscience Australia).
- $10.6 million to support pilot reforms that broaden economic activity on land and demonstrate the benefits of reform to investors, Indigenous Australians and other stakeholders, likely to include a $3 million CSIRO project around economic benefit from Indigenous land use, under discussion with PM&C.$75 million for an industry-led Northern Australia CRC with an initial focus on agriculture, food and tropical medicine. CSIRO was involved in the early stages of the GrowNorth CRC proposal and will be engaged in the process of its further development. It is important to note that a strong linkage of the CRC to Industry Growth Centres is explicit in the White Paper.

The Northern Australia White Paper includes devolution of regulation of aquaculture to state jurisdictions, which may facilitate industry development for our industry partners in this space, hence CSIRO's aquaculture research agenda and its application. CSIRO appeared before the Joint Select Committee on Development of Northern Australia to discuss development of the aquaculture industry on 16 September 2015.

Science Priorities and Practical Challenges

During 2015 the Office of the Chief Scientist's team has been conducting a project to analyse the level of national capability directed towards the nine Science and Research Priorities and the Practical Challenges that comprise those Priorities. CSIRO has been involved in this analysis, including its expenditure in each of the Priority areas.

The financial analysis shows that CSIRO's activities are strongly aligned to the Science and Research Priorities overall: for FY 2014-15, an estimated $855 million of CSIRO's expenditure was directed towards the nine Science and Research Priorities. Whether taken as a proportion of the "Outcome 1" expenditure from the CSIRO budget in the PBS ($1088 million – therefore 78 per cent) or of total CSIRO expenditure ($1261 million, which includes the cost of running the National Facilities for example – therefore 68 per cent), it is very clear that CSIRO is highly aligned to the Priorities.

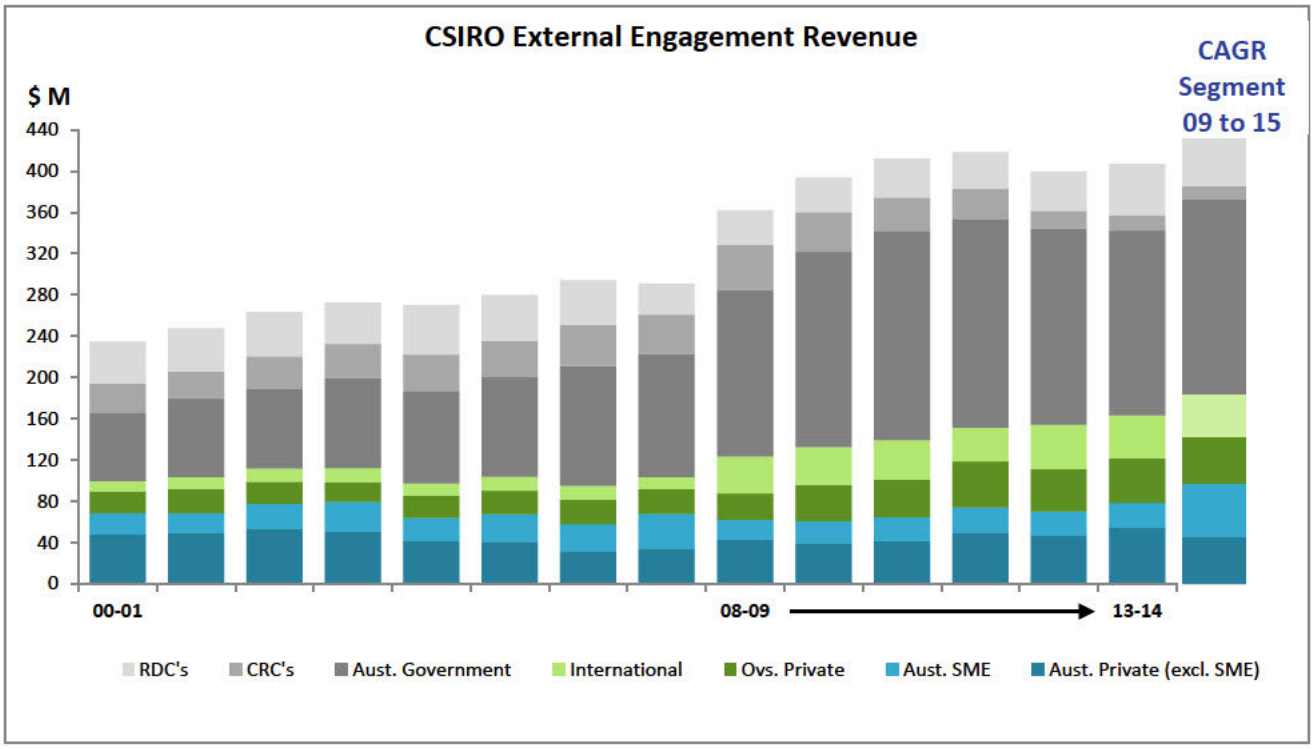
CSIRO has also conducted extensive bibliometric analysis that complements the financial analysis. From that bibliometric analysis, CSIRO's alignment is very strong for the Priorities of: Food, Soil & Water, Energy, Resources, Advanced Manufacturing, and Environmental Change – in each of these cases, CSIRO's output is 10 – 20 per cent of Australian output. With the consolidation of NICTA together with CSIRO to form Data61, the capability of Data61 is similarly getting up to 10 per cent for the Priority of Cybersecurity.

s47C

Engagement with Industry and Partners for Impact

Engagement for Impact

The conduct of excellent science on issues of national priority is fundamental to CSIRO's mission, but is not sufficient for delivering real impact and relevance. Developing strong relationships with potential users and beneficiaries – in both the public and private sectors – is essential to generating positive impact for the nation. It is by working with, through and on behalf of others that results are turned into social, economic and environmental benefits, and it is also the way in which CSIRO leverages its appropriation investment and earns considerable external revenue to maintain and build scientific capability.



Channels to Impact

The mechanisms through which CSIRO delivers impact to end users from research and development (R&D) include:

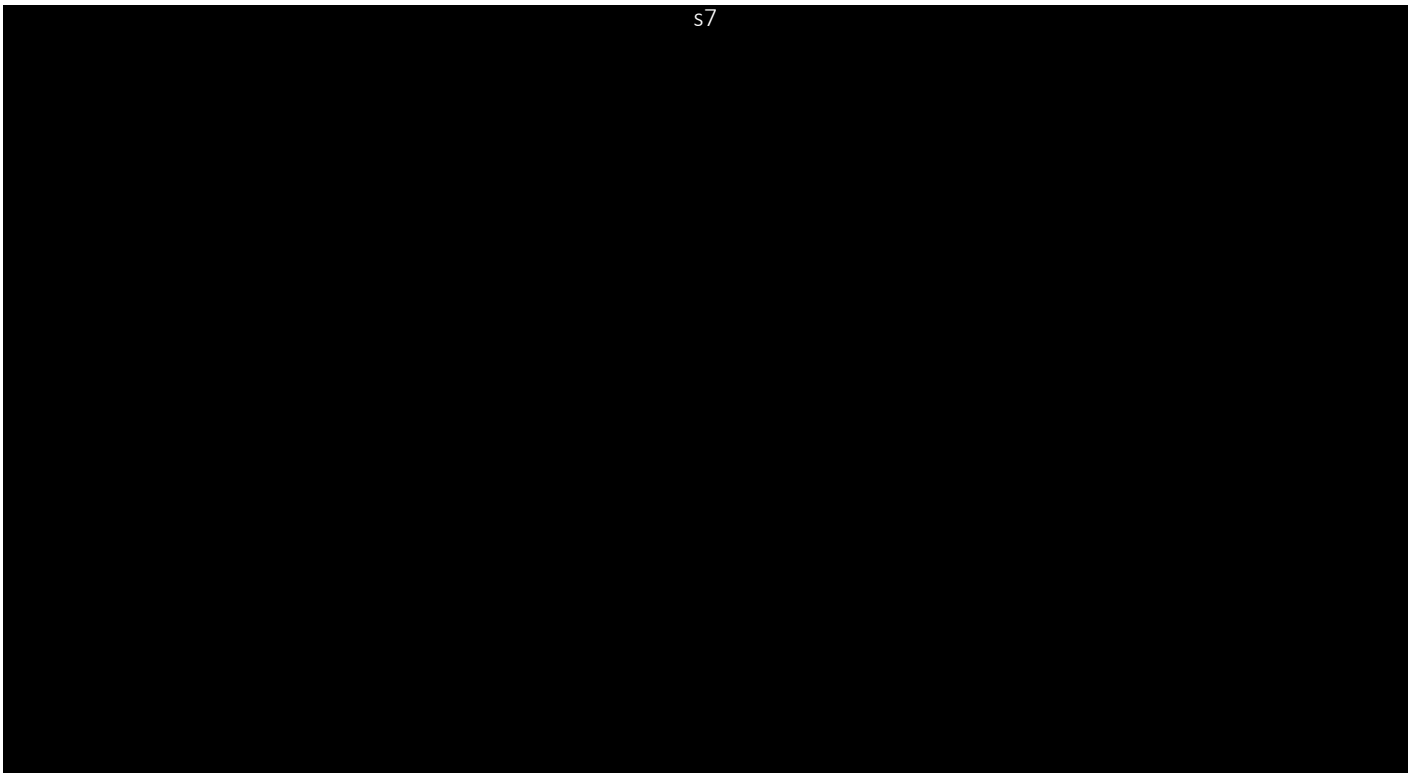
- collaborating on research programs (co-investment with clients and partners)
- conducting contract research, technical services and consulting on a fee for service basis
- publishing the results of research as restricted reports or open source
- providing scientific input into policy
- seconding staff and making other staff transfers
- licensing intellectual property and
- spinning out new companies

Engagement Models

In broad terms, CSIRO's arrangements with its partners and clients fall into the following business models:

- Co-investment
- Consulting & Contract Research
- Intellectual Property and Licensing
- Other external (various sources including revenue from publishing & education, rental & interest gain/loss on sale of asset)

CSIRO often enters into collaborative relationships with enterprises during the research and development process in order to speed the selection and development of technologies. In a number of cases, industry also engages with CSIRO for pre-competitive research and development through an industry association.



Co-investment in Research & Development (R&D) activities with other partners

This is the main method by which CSIRO engages with other parties. CSIRO conducts R&D to a total value of around $400 million per year under co-investment contracts. The co-investor may be either an end user or a research collaborator.

The main investors are Australian governments, contributing approximately 47 per cent of the total co-investment external revenues (Commonwealth government, state and local); Australian private sector (18 per cent); research and development corporations (RDCs) (10 per cent) and Cooperative Research Centres (CRCs) (5 per cent); Overseas Private Entities and other Overseas organisations (e.g.; foreign governments, NGOs) contributing (20 per cent).

Consulting and Contract Research and Testing

CSIRO provided consulting, research and testing services to a total value of $85.5 million in 2014-15. The main client segment using CSIRO's consulting and contract testing services was the Australian Private sector (36 per cent). Other clients of CSIRO's services were the Australian Government (including Federal, state and local Governments) (18 per cent), RDCs (1 per cent), and overseas clients both from private overseas companies (10 per cent) and other international organisations (36 per cent) s47C, s47 [redacted]

Generation of Intellectual Property (IP) revenue derived from pre-existing IP

CSIRO licenses or assigns IP to the private sector and receives license fees, royalties and/or equity. These revenues range from $25 million to $30 million per annum excluding WLAN receipts.

Trusted Advisor

CSIRO plays a leading role in the trusted delivery of scientific evidence, advice and interpretation to the Australian government, public and industry. Being a 'Trusted Advisor' is critical to ensure the success of CSIRO in successfully engaging with government, industry and the community for impact.

Australian Private Sector Engagement: CSIRO and Industry

CSIRO aims to provide competitive technological advantage to established Australian companies and to contribute to the development of new enterprises and industries.

CSIRO is committed to working with businesses operating in Australia, regardless of size, which are or have the capacity to be internationally competitive and have a long-term commitment to operating in Australia (which in turn will replace imports and/or achieve exports). However, the vast majority of Australian businesses are SMEs, for this reason working with SMEs is a key element in delivering CSIRO's role. Given the constraints that SMEs commonly have – financial constraints that mean that many SME firms have difficulty addressing the cost and risk of R&D; time pressure constraints of SMEs management; and often, limited STEM training and experience of company management – it has long been the case that there are barriers to be overcome in the engagement between CSIRO and SME firms. (***See brief 17.***)

CSIRO works with approximately 2,250 industry clients per annum, including 500 major Australian companies, more than 1,150 Australian SMEs and more than 450 multinationals (these are approximate figures, over a 4 years period). CSIRO's industry engagement is also reflected in the revenues: In 2014-15, CSIRO earned approximately $200 million from domestic and overseas private industries and industry associations through co-investment and research consulting services. This included almost $70 million from the Australian private sector, plus $38 million from rural Research and Development Corporations, $9.5 million from involvement in Cooperative Research Centres, and $81.4 million from overseas entities and international. As most of these engagements are on a co-investment model, CSIRO achieved in the order of $350 – 400 million of industry-related research in collaboration with private sector.

Top 10 external revenue in 2014-15 from companies (domestic and overseas)		
1	Cotton Seed Distributors Ltd	s47C, s47
2	National Aeronautics & Space Agency (NASA)	
3	Grains Research & Development Corporation (GRDC)	
4	Bayer CropScience LP	
5	The Boeing Company Inc	
6	Cotton Research & Development Corporation	
7	Meat & Livestock Australia Limited	
8	The Bill & Melinda Gates Foundation	
9	Grape & Wine Research & Development Corporation	
10	BHP Billiton Foundation	

In 2014-15, CSIRO earned in excess of $117 million under co-investment and consulting and contract research and testing contracts with private sector partners and clients, both Australian and International.

National Benefit and working with Overseas Private Sector

International collaboration with the private sector is essential for CSIRO and Australia given that 98 per cent of science and innovation is conducted outside Australia; the percentage of R&D funding within the private sector is accelerating, as is global R&D growth (most significantly within our region, led by China, Japan, Korea and Singapore).

International science and technology activities with the private sector provide access to networks, data and knowledge. It directly enhances Australia's competitiveness through improved access to value chains, and boosts our innovation performance. CSIRO considers each case of international private sector collaboration on its merits to ensure that impact and benefit to Australia results. Over the last decade, CSIRO has increased its engagement with both overseas private and other international organisations. This engagement (as measured in external revenue) has grown by over 12.4 per cent in average since 1997-98.

Benefit to Australia from CSIRO working with overseas companies can take different forms; for example, collaboration with multinational agribusiness corporations may offer the only market opportunity to realise new agricultural and food technologies within Australia. Benefit to Australia may also be realised through access to skills and data sets for application on Australian challenges. (***See also brief 23***).

Public Sector Engagement

Like many large research organisations worldwide, CSIRO's main research partners are from other parts of the public sector (Australian Governments, CRCs and RDCs). In 2014-15, of CSIRO's top 15 accounts, 10

were Australian Government departments or agencies, state departments, RDCs, CRCs, universities or government funded research alliances/centres (see below). Almost all of these revenues were in relation to co-investment in research and development programs.

Top 15 sources of co-investment & research services revenue in 2014-15 ($m)		
1	National Aeronautics & Space Agency (NASA)	s47C, s47
2	Grains Research & Development Corporation (GRDC)	
3	Department of Sustainability Environment Water Population	
4	Department Of Agriculture	
5	Department of Industry	
6	University of Tasmania	
7	Australian Solar Institute Limited	
8	Department of Industry Innovation Climate Change Science Research	
9	Department of Industry and Science	
10	Science and Industry Endowment Fund	
11	AusAID	
12	The University of Queensland	
13	Bayer CropScience LP	
14	Astronomy Australia Limited	
15	The Boeing Company Inc	

State Governments

State governments are a public sector segment that has been targeted by CSIRO, in order to forge closer ties and build collaborative networks. Recently this has resulted in growth with Queensland and Western Australia in particular. The examples below provide a small sample of these networks.

In Queensland, the major joint ventures of CSIRO include the e-Health Research Centre. The e-Health Research Centre is a co-investment between CSIRO and the Queensland Government to develop world-class health information (with increased public access) on prevention, diagnosis, monitoring and treatment of medical conditions.

In Western Australia, CSIRO is a foundation partner in the Western Australia Energy Research Alliance (WA ERA), which also involves the University of Western Australia and Curtin University. In 2004, WA ERA obtained a $20 million grant under the Western Australian Government's major research facilities program and since then WA ERA has worked to conduct research and development in collaboration with Woodside and Chevron. The alliance provides for multiple research projects over an open-ended period, with

Chevron committing to invest s47, s47G(1)(a) . CSIRO also has significant links with the Western Australian Department of Agriculture and Food (DAFWA). The WA Centre for Food and Grain Innovation, a partnership between CSIRO, DAFWA and Curtin University, will be relocating to the $30 million Australian Export and Grain Innovation Centre (AEGIC).

Rural Industry Research and Development Corporations

Rural Industry Research and Development Corporations (RDCs) are well established as partners for CSIRO, with this segment representing around ten per cent of external revenue received by CSIRO (excluding revenue received from Cotton Seed Distributor Ltd.).

Over the period of 6 years, CSIRO has engaged with 13 out of 15 RIRD Corporations.

Engagement with Rural Research & Development Corporations in 2014-15 ($m)		
1	Grains Research & Development Corporation (GRDC)	s47, s47C
2	Cotton Research & Development Corporation	
3	Meat & Livestock Australia Limited	
4	Grape & Wine Research & Development Corporation	
5	Fisheries Research & Development Corporation	
6	Horticulture Australia Limited	
7	Sugar Research & Development Corp (SRDC)	
8	Rural Industries Research & Development Corporation (RIRDC)	
9	Australian Wool Innovation Limited	
10	Forest and Wood Products Australia	
11	Australian Meat Processor Corporation Ltd	
12	Dairy Australia Limited	
13	Australian Pork Limited	

Engagement with Small and Medium Enterprises (SMEs)

Small and Medium Enterprises (SMEs)

CSIRO's charter states that "the primary functions of CSIRO are to conduct scientific research to assist Australian industry and to further the interests of the Australian community". The large majority of Australian owned companies are SMEs, so working with them is a key element in delivering on CSIRO's role. CSIRO works with over 1,200 SMEs each year, earning approximately $56 million in revenue each year. CSIRO largely engages with SMEs through SME Connect, and through CSIRO Business Development & Commercial which manages the Australian Growth Partnerships program.

CSIRO SME CONNECT

www.csiro.au/SME-Engagement

SME Connect was established by CSIRO in 2009 to build real links between SMEs and Australian research organisations. The team provides a single point of contact for Australian SMEs to interact with CSIRO, universities and public research organisations. SME Connect works with SMEs to assist them in identifying opportunities for research to benefit their business, connects them with the best Australian researchers and facilities (not necessarily within CSIRO), participates in project scoping, facilitates access to grants, and oversees the completion of project agreements.

The SME Connect team provides research facilitation services in the Innovation Connections element of the Department of Industry, Innovation and Science Entrepreneurs' Programme, and manages the STEM⁺ Business Fellowship Program on behalf of the Science and Industry Endowment Fund (SIEF). SIEF has provided $7.75 million in funding to support leading Australian SMEs in undertaking two to three year projects with early career researchers from Australian research organisations.

The major focus of SME Connect is to provide solutions tailored to the needs of SMEs rather than marketing technologies developed by research organisations. SME Connect facilitates the close collaboration between companies and researchers, including placement of researchers into companies, to enable the transfer of tacit knowledge between the company and the research organisation. SME Connect also focuses on 'making it easy to do business', with streamlined processes and contracting procedures, but more importantly ensuring both parties have shared expectations in terms of commitment to the project, timescales, finances and intellectual property.

The team has facilitated 206 research projects valued between $30k and $200k in Innovation Connections and predecessor programs. CSIRO has been the research organisation in 109 of these projects and 98 have been delivered by other research organisations.

Whilst the focus of SME Connect is in facilitating commercially focused projects for customer companies, a significant part of the teams' role is advisory. One in 10 company interactions result in a research project, with the remainder requiring advice, which may include connecting to other businesses, specialist advisors or assistance through the Entrepreneurs' Programme. The team engages with over 500 companies every year to explore opportunities for growth.

The team is composed of a director, five Innovation Connections research facilitators (Melbourne (2), Sydney, Newcastle, and Brisbane), a STEM⁺ Business program manager, a business analyst and an

administration officer. Two additional research facilitators are currently being recruited in Adelaide and Canberra. SME Connect is funded by the Department of Industry ($1.54 million pa) through Innovation Connections and by CSIRO (approx. $800k pa, including overheads). The contract with the Department of Industry, Innovation and Science ends on 30 June 2018, with the Department having the option to renew the contract for a further two years to 30 June 2020.

AUSTRALIAN GROWTH PARTNERSHIPS (AGP) – CSIRO BUSINESS DEVELOPMENT & COMMERCIAL

CSIRO has allocated funds to provide investment funding through the Australian Growth Partnerships (AGP) Program to high potential, technology-receptive SMEs so they can access CSIRO research and development capability and intellectual property.

The AGP Program was established in 2007 and was designed to assist SMEs overcome existing technical issues, therefore providing them with an opportunity to significantly accelerate their growth in high impact industries that are aligned with the capabilities of CSIRO's Research Program.

There has been 12 grants since the establishment of the program with a total value of $14.5 million covering a broad range of business. Examples include development of a super-light weight greenhouse gas friendly alternative to cement, a biotechnology company that is developing agents with outstanding potential in the imaging and treatment of cancer, an aquaculture company to fund the development of new marine sensing technology with applications in prawn farming and the production optimisation of eco-friendly export shipping pallets, an Australian healthcare company developing next generation production of the drug methoxyflurane – the pain-relieving ingredient used in Penthrax (commonly known as the 'Green Whistle') and a company addressing the need for an effective and low cost processing solution for extracting nickel from nickel laterite deposits to produce a number of final saleable products.

RESEARCHER PLACEMENT CASE STUDIES

A new pulse for healthy heart materials

CSIRO helped Australian medical device company Admedus to investigate further opportunities for their CardioCel product.

Roesner: Spreading value across the agriculture market

CSIRO helped Roesner, Australia's leading supplier of fertiliser spreaders, to develop a tool that enables them to analyse the effect of the spreader on customer's farms. This is set to add significant value to their business.

Direct Nickel: sets sights on a A$30 Billion industry

CSIRO helped Direct Nickel overcome a technical challenge and set sights on further expansion into the $30 billion per year nickel industry.

Precedence Health Care: Improving care for the chronically ill

A CSIRO assisted Precedence Health Care to develop a new smartphone application that could transform the care of chronically ill people.

Intec: Extracting new metals from waste

CSIRO helped Sydney-based business Intec overcome technical challenges and explore a new opportunity to recycle metals from waste.

Ziltek: cutting through the competition in waste remediation

South Australian SME Ziltek teamed up with CSIRO to develop a handheld soil contamination detector, to underpin their expansion into a new environmental remediation service.

CSIRO's Commercialisation and Technology Transfer

Technology Transfer and Commercialisation

CSIRO's ability to generate real impact and value for the nation is dependent upon effective and efficient disciplines of technology transfer. Without effective transfer, knowledge and capability remains trapped inside the public sector, where it has limited use except for policy and academic purposes.

Much of CSIRO's research and development (R&D) activity is conducted in co-investment business relationships, or technical or consulting services, which involve technology transfer to the partners and clients within those projects. Additionally, arising from its R&D activities (including the co-investment work with partners) CSIRO has developed an intellectual property portfolio that offers a stream of technologies and investment opportunities: CSIRO is Australia's leading patent filing enterprise and as at 30 June 2015 holding approximately 3,865 granted and pending patents, trademarks, designs and plant varieties registrations. To deliver the objective of achieving impact by transferring technologies to parties that aim to build a commercial enterprise around the technology, as well as to return an income stream from the commercial success for reinvestment by CSIRO, CSIRO conducts "commercialisation" activities through a team with specialist capabilities (***refer to brief 21***).

The strategies used in technology transfer via commercialisation include the sale or licensing of intellectual property and new company creation. Technology licensing has been the principal pathway for transfer of CSIRO's intellectual property (with most of CSIRO's licences being non-exclusive), however, the rate of company formation is to be increased as part of Strategy 2020. The creation of new ventures involves working up business cases for spinout companies, establishing management teams, seeking and negotiating terms around investment capital, forming the company and establishing the corporate structure and legal framework around the entity; injection of intellectual property into promising small and medium enterprises (SMEs); managing the resultant equity position; and negotiating exits from shareholdings.

Technology transfer transactions of significant complexity are subject to review and approval by CSIRO's Major Transactions Committee (MTC) and by the CSIRO Board (***refer to brief 19***), in addition to notification to CSIRO's responsible Minister as required by the *Public Governance, Performance and Accountability Act 2013* (PGPA Act).

Company Formation Activities

CSIRO-generated intellectual property and expertise has resulted in more than 150 spin-off companies. The following companies have been formed during the past eleven financial years (2005-06 to 2015-16):

- DataTrace DNA Pty Ltd – a 50:50 joint venture with the ASX-listed company Data Dot Technology Ltd, to develop and market security technology developed by CSIRO.
- Intalysis Pty Ltd – a company formed to market online moisture analysers, particularly for use in mining and minerals processing applications.
- Funnelback Pty Ltd – a company to commercialise search engine technology.
- AviPep Pty Ltd – a company formed to further develop some pharmaceuticals and diagnostics based on protein technology.
- HySSIL Pty Ltd – a company formed to commercialise lightweight, but high strength, concrete technology.
- T-Mag Pty Ltd – a joint venture with three SMEs, formed to commercialise a novel permanent-mould magnesium casting technology developed by CSIRO.

- Carbon Energy Ltd – a 50:50 joint venture with the ASX-listed company Metex Ltd, to develop underground coal gasification technology developed by CSIRO; s47, s47C
- Smart Storage Pty Ltd (trading as Ecoult) – formed to commercialise CSIRO's ultra-battery technology and control systems technology, in a joint project with the Victorian "clean technology" investor CleanTech Ventures.
- Barley Max Enterprise Pty Ltd (now The Healthy Grain Pty Limited) – formed to license and commercialise the BARLEYmax technology, a high fibre natural wholegrain with enhanced nutritional benefits.
- GeoSLAM Pty Ltd – a joint venture formed between CSIRO and 3D Laser Mapping (a leading solutions provider) for existing CSIRO-developed digital laser mapping technology known as Simultaneous Localisation and Mapping (SLAM).
- Cardihab Pty Ltd – a company formed to commercialise cardiac rehabilitation mobile phone based model of care (CardiHab), with a view to using the company for commercialisation of CSIRO's future mobile phone based models of care for chronic disease management.

From time to time, CSIRO also converts running royalty streams in existing licenses into equity positions. As examples, CSIRO took up equity positions in Genetic Solutions Pty Ltd (since merged with Catapult Genetics Pty Ltd), Biota Limited and Phoslock Water Systems Ltd – all of which CSIRO has now exited. A transaction in 2009-10 also saw CSIRO take up an equity position in Benitec Ltd, and a transaction in 2010-11 saw CSIRO sell out of DataTrace Pty Ltd in return for a shareholding in the listed company DataDot Technology Ltd.

CSIRO's ongoing program of exiting our shareholdings is only conducted when an exit from one of our companies can be done so in an orderly manner, for example in the 2009-10 year we exited our shareholdings in a number of companies, s47, s47C Smaller exits have been from:

- Intalysis – in 2010 we sold the company to Thermo Gamma Metrics Pty Ltd, part of Thermo Fisher Inc, a large multinational that plans to use Intalysis as the vehicle for establishing a strong presence in Australia.
- Windlab – in 2009 Windlab requested a share buy-back of 100 per cent of CSIRO's holdings in conjunction with an external capital raising.
- Funnelback – in 2009 we sold the company to Squiz Pty Ltd, a growing Australian SME.

In the 2010-11 financial year, CSIRO sold a portion of our shareholdings in three listed companies; selling 75 per cent of our holdings in Calzada Ltd, approximately 40 per cent of holdings in Starpharma Holdings Ltd, and approximately 60 per cent of the shareholding in DataDot Technology Ltd. During the financial year 2011-12 one unlisted company Hydropem Pty Ltd was deregistered. During the financial year 2012-13 the company Epitactix Pty Ltd was wound up and Clover Corporation Ltd terminated the project. CSIRO redeemed the convertible note of $0.3 million and received an additional $23,000 interest.

In the 2013-14 financial year, four companies, Intellection Holdings Pty Ltd, Advanced Polymerik Pty Ltd, VacTx Pty Ltd and Ausmodel Pty Ltd were wound up and deregistered. CSIRO received a $35,000 capital return from Advanced Polymerik Pty Ltd. During the 2014-15 financial year, two unlisted companies, CO2CRC Technology Pty Ltd and Dunlena Pty Ltd were deregistered and CSIRO sold all shares in unlisted company Advantage Wheats Pty Ltd to existing shareholders for $1.4 million.

During the period 2015-16 financial year, one unlisted company XRT Ltd was deregistered.

Intellectual Property Revenues

Intellectual property revenues are made up of "running royalties" from sales of products that use intellectual property licensed from CSIRO, and "one-off" equity transactions (such as company formations and sales of shares) and sales of intellectual property. The intellectual property and royalties revenue for the financial year ending 30 June 2015 was $60.7 million which included s7 WLAN settlements. This compares to the 30 June 2014 figure of $30 million.

CSIRO Approval Processes for Commercial Transactions

CSIRO's Internal Processes

Business development activities are undertaken within CSIRO Business Units in accordance with CSIRO's commercial policies, principles and standards. The commercial standards set the minimum performance criteria for commercial activities when CSIRO engages with partners and clients in different projects such as:

- significant government initiatives involving significant long-term commitment by CSIRO
- research & collaboration projects with industry or government entities
- research & technology business arrangements (research alliances, joint ventures, research centres or formation/participation in a company) and
- fully paid research service contracts (consultancies and technical testing).

Major Transactions Committee (MTC)

The MTC is a governance sub-committee of the CSIRO Executive Team. The Committee reviews and recommends to the Chief Executive major transactions (commercial, procurement and capital with lifetime value above $5 million or medium/high risk) that require approval by the Chief Executive or the CSIRO Board.

These transactions are ultimately approved under the delegations of the Chief Executive, based on recommendation from the MTC.

The MTC is chaired by the Chief Finance Officer with other members derived from the Executive Team and a number of CSIRO function leaders.

CSIRO Board

Pursuant to its functions and responsibilities laid out in both the *Science and Industry Research Act 1949* (Sec 12) and the *Public Governance, Performance and Accountability Act 2013,* the CSIRO Board considers both commercial policy proposals and specific commercial arrangements.

Major transactions with a total lifetime value exceeding $20 million or with a Residual Risk Rating 'above' 300 require approval from the CSIRO Board. In addition, major government and other programs, alliances and initiatives involving a significant long-term, strategic commitment by CSIRO (e.g. National facilities, international alliances, Precincts, umbrella agreements, tenders and Memorandum of Understanding) that will typically lead to a range of individual transactions are recommended by the MTC and Chief Executive for approval by the Board.

Most of the transactions approved by the Board also require notification to the Minister under the *Public Governance, Performance and Accountability Act 2013*, which is conducted following Board approval (see below).

Ministerial Notifications

Section 19 of the *Public Governance, Performance and Accountability Act 2013* requires CSIRO to notify responsible Minister of significant decisions in relation to the entity or any of its subsidiaries.

Cooperative Research Centres and CSIRO

Overview

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

CSIRO remains the largest single participant in the CRC program. Throughout the life of the program, over 200 CRCs have been established, with 33 currently operating. CSIRO has participated in 144 CRCs and we are currently active in 16. CSIRO's direct contribution to CRCs in 2014-15 was $12.5 million.

Round 18: The Minister for Industry, Innovation and Science, announced the opening of applications for CRCs and CRC Projects (CRC-Ps) on 1 February 2016. CSIRO is a contributor to two and the announcement of successful Stage 1 applications is expected to be made in July 2016.

Round 17: It was announced in the 2014-15 Budget that the Government would achieve savings of $80 million over five years by reducing funding for Cooperative Research Centres and cancelling the round 17 selection process. A review of the CRC Program was conducted in late 2014.

Round 16: CRC bid outcomes for the 16th round were announced on 21 February 2014. Of the seven successful CRC bids (3 new bids and 4 extensions), CSIRO is a contributor to two successful bids, Rail Manufacturing (New) and Cancer Therapeutics (Extension).

Round 15: CSIRO was not a participant in any of the bids for Round 15 of the CRC program.

Round 14: Of the six successful CRCs for Round 14, CSIRO is a contributor to five (four are extensions to existing and one is new): Automotive Australia 2020 CRC; CRC for Low Carbon Living; CRC for Polymers; Invasive Animals CRC and Plant Biosecurity CRC.

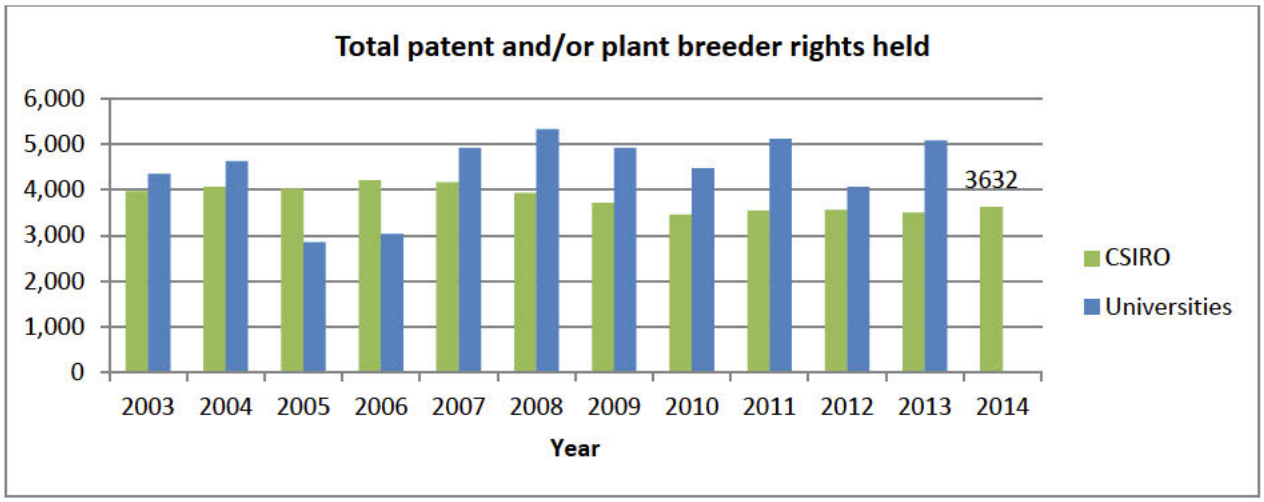
Transfer of CSIRO's Intellectual Property to Industry

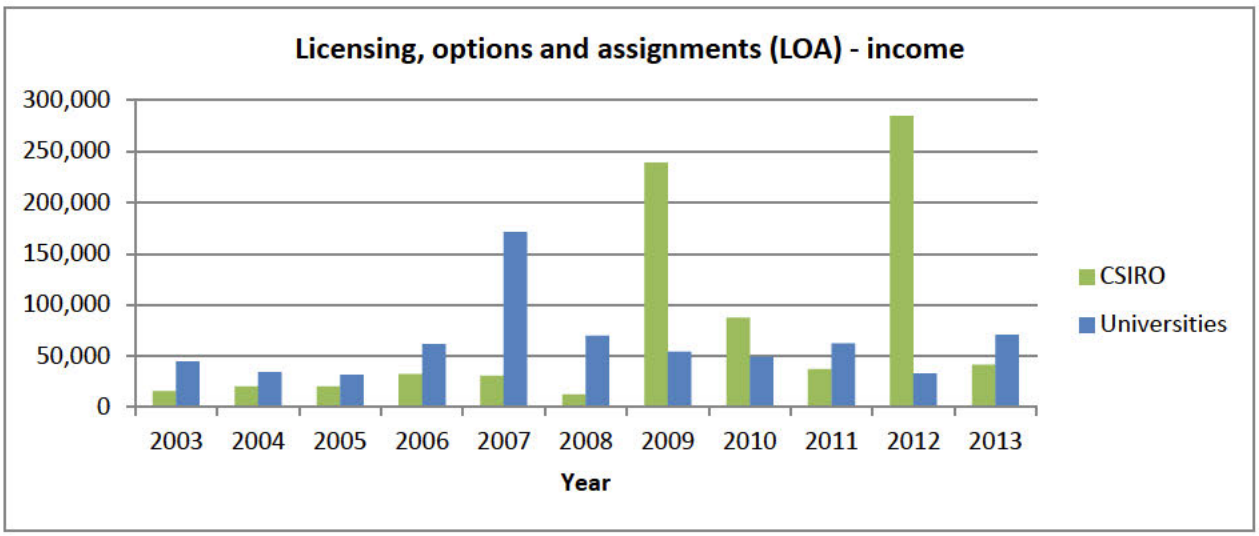
Transfer of CSIRO's Intellectual Property (IP) to Industry

As part of its distinct role, CSIRO develops and maintains valuable stocks of knowledge, holding the largest single IP and patent portfolio in the Australian innovation system. Our primary purpose in generating and transferring this knowledge is to achieve impact. As such, CSIRO seeks to generate benefits for Australia ahead of returns to CSIRO and strives to choose the best transfer path to maximise impact.

CSIRO recently reviewed and streamlined its patent portfolio to include only significant or platform technologies. CSIRO holds more than twice as many patent families in its portfolio as the most patent-intensive 'Group of 8' universities.

As at March 2016 CSIRO held 3636 patents and plant breeder rights.





Source: KCA Commercialisation Metrics Report / NSRC Data 2003-2013

Licensing options and assignments (LOA) income has varied from year to year due to large LOA payments for a handful of successfully commercialised technologies. For instance, in 2009 and in 2012 CSIRO reported significant income from its WLAN technology.

The preferred pathway for commercial use of CSIRO's IP will depend on the nature of the IP, beneficial interests, the relevant sector, the availability of potential licensees and of capital. CSIRO has developed a set of IP Principles aimed at being transparent with collaborators and clients and to facilitate early clarity of IP access rights. *(Refer to the IP Position Statement attached.)*

Licensing decisions may include the following trade-offs which are considered in the context of maximising impact:

- making the IP available to the market on an exclusive basis, or via multiple non-exclusive licenses
- licensing to a large company with an established market position, scale or capability to take the technology to market readiness
- seeking capital partners for the development of a new enterprise to develop the technology, or
- providing IP rights to an existing SME enterprise, to promote the growth of the company.

The broader impact of just CSIRO's recent spin-out companies on the economy has been estimated as follows; Market Cap at 30 June 2015 of $495 million; FY14 revenue: $109 million; Employees: 232.

At 31 December 2015, CSIRO held interests in 31 companies based on IP spun out of our research, with a market value of $22.7 million; including six ASX listed companies, sixteen unlisted companies, eight Special Purpose Vehicle companies and one unlisted Unit Trust.

To increase the resources available to invest in research and for equity reasons, CSIRO normally seeks to generate a return from commercially valuable intellectual property arising from the investment of appropriation funds. The commercial return will often involve licensing of technology and equitable benefit sharing with clients and partners who have been involved in developing the IP.

IP Position Statement: Ten Points to Consider in Generating Impact from Intellectual Capital

IP Position Statement: Ten Points to Consider in Generating Impact from Intellectual Capital

Purpose

Mission directed research organisations like CSIRO aim to drive innovative and useful outcomes for industry, society and the environment through the application of science and research and the widest possible take-up of the potential benefits.

While approaches to the management of intellectual capital will range from institution to institution, we believe there are a number of common elements that are shared across the spectrum of research organisations. With those common elements in mind the purpose of this document is to outline a set of principles that relate to how CSIRO goes about generating impact through the application and licensing of intellectual capital.

Intellectual Capital

Intellectual capital is knowledge that can be converted to beneficial outcomes. There are two types of intellectual capital. The first is the tacit or intangible knowledge embedded in people's powers of creativity, their "know how" and their social networks and trusted relationships. The second is the knowledge which can be codified and "packaged" in one of the several forms of intellectual property rights (IPR). Both types of intellectual capital are used in collaborations and interactions, generating new insights and knowledge.

In CSIRO's case we aim to harnesses this intellectual capital to deliver sustainable impact for Australia and to underpin our global standing in mission-directed research. This in turn assists our ability to attract talent and to exchange knowledge with others within the global innovation system. This underpins research collaborations and partnerships.

Impact

For mission directed research organisations like CSIRO , the work undertaken by researchers and business developers is directed at making a profound difference to people's lives. We seek to achieve this impact by generating and exchanging intellectual capital in all its forms to ensure scientific and technical knowledge is accessible and utilised. The pathways to knowledge and technology transfer are various – conference papers, publications, forums, people exchanges and collaborations, media communications as well as through contractual means such as licensing, spin-outs, and the sale or exchange of rights. All of these paths are valid mechanisms for generating impact and need to be monitored to ensure effectiveness and appropriate use.

Sustainability

While achieving impact through knowledge transfer is a key goal of mission directed research organisations like CSIRO, where the knowledge and technology being transferred has a market application and is expected to generate commercial returns, an equitable return from the commercial exploitation of intellectual capital should be expected. This return may, as appropriate, seek to take into account the research investment made, the intrinsic value of the intellectual property, the additional investment required to realise market returns and the risks in commercialisation. Proceeds from licensing IPR are applied to the advancement of further scientific research, thus underpinning CSIRO's sustainability and the nation's research capabilities.

Intellectual Property Protection and Access Rights

Intellectual property protection and management are tools which are used to achieve desired outcomes. In managing its intellectual capital assets, mission directed research organisations like CSIRO will normally seek to identify and protect intellectual property that will support the achievement of impact and national benefit. This may include protecting intellectual property to facilitate follow on investment in technology

development and adoption, or protecting intellectual property that may be used as a platform to encourage collaboration or to obtain access to other people's important intellectual property.

CSIRO seeks to manage its intellectual property strategically. Protecting our IPR preserves greater choice later on, including the consideration of options for making that IP freely or widely available.

In structuring IP ownership and access arrangements, there is a need to be conscious that in some circumstances legal protection may be obtained for a very broad characterisation of an invention, often significantly beyond the scope of the particular field, problem or application area of the research itself. In structuring these arrangements we will generally seek to ensure that CSIRO and our partners can harness the value of such broad or platform technologies in other application areas for the benefit of Australia.

To promote technology transfer we will facilitate appropriate access to IPR by external parties, consistent with a focus on delivering impact.

In all these endeavours it is important to be principled, responsive, flexible and creative in our dealings with external parties and our collaborators, including dealing with IPR ownership. When developing intellectual property in collaboration with others, we will work with such partners to identify the party that is best placed to manage the IPR in the national interest.

Transparency

We will be transparent in our approach to IP management and policies. Our dealings in IP will be consistent with building our reputation as a high-quality research enterprise which strives to be a valued and highly respected partner in international research relationships. We have obligations to comply with government policies and international protocols including respecting the IP rights of others.

In Summary: Ten Principles for generating impact from Intellectual Capital

1. Our primary purpose in generating and transferring knowledge is to achieve impact.
2. We will strive to choose the best transfer path to maximise impact. These pathways include public dissemination, exclusive or non-exclusive licensing, assignment or reciprocal agreements to increase collaboration and access to third party Intellectual Property Rights (IPR).
3. We seek to ensure that dealings and agreements with third parties appropriately preserve and protect IP, and provide a sound governance framework for IP decision making.
4. Ownership and control of IP should generally vest with the party best placed to manage the intellectual property across the full scope of the technology and its potential utilisation.
5. If we agree to enter into IP co-ownership arrangements, the contract will include a governance framework regulating the exercise of all relevant components of the IP and addressing the allocation of IP costs.
6. Where the IP is expected to generate commercial returns, we generally expect a reasonable and proportionate return in exchange for access rights.
7. We will retain sufficient intellectual property access rights to enable the conduct of further research in accordance with our charter.
8. We respect the IP of others but support the principle of exemptions for research use.
9. We will enforce our IPR and contractual rights in a manner consistent with our statutory charter and roles within the innovation system.
10. In the context of maximising the impact of our research efforts we will endeavour to ensure that intellectual property and knowledge is made available for humanitarian uses and the public good.

In further developing these principles and related protocols we will seek to work with our national and global peers within the research community to promote a common approach to the management of intellectual capital.

CSIRO Community Activities

CSIRO Education and Outreach

CSIRO Education and Outreach raises the awareness of school students, teachers and families to the vital contribution of CSIRO's scientific research to our community and fosters an interest in science careers.

Scientists and Mathematicians in Schools (which CSIRO administers on behalf of the Federal Government) links practising scientists, mathematicians and ICT professionals with teachers and students in primary and secondary schools to bring STEM subjects to life in the classroom. As of the end of March 2016, there were 1915 active partnerships in place in 1290 schools across Australia (13 per cent of Australian schools). Since 2007, there have been 5171 partnerships with the average length of a partnership being 2 - 3 years. Participation by teachers is spread across government, Catholic and independent sectors and includes a fairly even split of primary and secondary schools. STEM professionals come from over 300 organisations including federal, state and local government organisations and the private sector in all states and territories. All but two Australian universities (Bond and Torrens) are involved in the programme.

CSIRO Education manages the BHP Billiton Science and Engineering Awards which are Australia's most prestigious school science awards. They reward young people who have undertaken practical research and engineering projects that demonstrate innovative approaches and thorough scientific and technological procedures. The awards build on CSIRO's Creativity in Science and Technology (CREST) program which supports students and teachers undertaking open-ended science and technology projects.

Sustainable Futures (formerly known as CarbonKids) is a climate science educational program for primary and middle schooling years that combines the latest in environmental science with education in sustainability.

CSIRO also runs astronomy outreach, the cornerstone of which is *PULSE@Parkes* (giving high school students the opportunity to remotely control the iconic 64m Parkes radio telescope). The program also runs outreach workshops for astronomy teachers and students.

CSIRO researchers are also working on developing remote access education programs with funding from the Commonwealth Department of Communications and in partnership with the National Museum of Australia (NMA), and with Australia's Academic and Research Network (AARNet). CSIRO has developed two mobile telepresence robots which are located in the NMA, Canberra. These robots allow people from around Australia to access laser-guided virtual tours of the Museum which NMA has used to deliver robot tours for schools, community groups and libraries around the country. CSIRO has also developed a 3D Online Education initiative demonstrating innovative uses of high-speed broadband and digital technologies in the delivery of learning – particularly in Science, Technology, Engineering and Mathematics (STEM) subjects.

In September 2014 CSIRO and BHP Billiton launched the BHP Billiton STEM Indigenous Education project. The project is being managed by CSIRO and is providing supported pathways that aim to increase Aboriginal and Torres Strait Islander representation in STEM-related professions. Recognising the fundamental importance of Aboriginal and Torres Strait Islander culture and identity in student achievement, a strong cultural, as well as a rigorous academic focus, is guiding the development, implementation and evaluation of the project.

CSIRO Publishing

CSIRO Publishing serves the national and international community by delivering products and services in the science, technical, health and education sectors. It is Australia's most successful scholarly publishing house. CSIRO Publishing operates on a commercial basis within CSIRO.

CSIRO Publishing products include:

- 28 peer-reviewed journals many in partnership with national and international societies.
- 30 – 40 new scientific and technical books annually with a backlist of over 1,200 titles, available in digital and print formats. A new range of children's books launched in 2015.
- Magazines including *Double Helix* targeted at school-age readers, and professional magazines for learned societies.
- From July 2016 CSIRO and Stile Education will deliver interactive online lesson plans for teachers of Grades 5&6 which are consistent with the Australian Curriculum, based on content featured in the Double Helix magazine.
- *Science by Email* and *Maths and Stats by Email*: weekly educational e-newsletters with over 67,000 international subscribers.

CSIRO Alumni

CSIRO Alumni was launched in December 2003. Since then membership has grown to more than 3,500 members. CSIRO Alumni offers former CSIRO staff, Board members, Honorary Fellows and eligible students an opportunity to belong to the extended CSIRO community.

The main purpose of CSIRO Alumni is to maintain an active former employee network to help current and former CSIRO staff make or retain contact with one another, and with CSIRO.

CSIRO Alumni has an online community AxON (www.csiroalumni.org.au) where individuals have a log in and can connect with others through their individual email address, forums etc. Information about CSIRO and upcoming events is posted on the community website with limited active use of the website.

There are two active state committees (WA and NSW) that have monthly meetings and organise events and ongoing networking opportunities. WA has a yearly event (the Brodie-Hall lecture).

The NSW group also own the Alumni Scholarship in Physics which has now been awarded for the second year and is in honour of four CSIRO scientists that passed away a number of years ago.

Victoria hosts approximately three lecture events each year.

Digital Channels

CSIRO websites

CSIRO's main website – CSIRO.au

Our website is our core digital channel and is a one-stop-shop for anyone wanting to know about who we are and what we do. It showcases both our news of the day as well as highlighting the wide scope of our science, providing easy to read information, intuitive navigation, and plenty of prompts to contact us. The new website was launched in March 2015 with fresh design and new content. Additionally CSIRO.au supports outreach activities through:

- The Education portal, which is one of the most popular sections and contains information and activities targeted at teachers, parents and students.

- The Careers portal, which highlights the benefits of work experience placements (high school), scholarships (university) and fellowships (postdoctoral).
- An automated delivery platform for newsletters and subscriptions.
- Connections with our associated websites, like CSIROpedia, the CSIRO blog, and Research.csiro.au, as well as social networking platforms including Facebook, Instagram, Twitter and others.

CSIROpedia – CSIROpedia.csiro.au

Started by CSIRO alumnus, Colin Ward, CSIROpedia brings together a historical record of our people and our achievements since our inception in 1916. Wherever possible, the content has been contributed by scientists themselves, and the site is continually being updated with a wide range of contributions.

CSIROpedia provides a home for information about CSIRO that is no longer current, and thus not presented on our official CSIRO.au website.

The CSIRO blog – Blog.csiro.au

Our blog fills that ever-important middle ground between our website and our social media channels. The CSIRO blog is about getting out our information, but has more scope for integrating rich media with an ability to turn content around quickly. The blog covers a wide range of topics, including Environment, Health, Farming, Space, RV Investigator, Energy, Oceans, Tech and Manufacturing. The blog has more than 3,800 email subscribers who have signed up for either daily or weekly email alerts when new content is published, and posts are broadly promoted across our social media channels, our website, and in our monthly e-newsletter Snapshot.

Research sites – Research.csiro.au

Our suite of project-specific websites, built for large scale work with complex communications requirements. The sites are maintained by participants in the research project, and designed to inform and engage stakeholder groups and specifically targeted audiences.

CSIRO e-newsletters

Snapshot

Snapshot is an e-newsletter sent monthly to 70,000 subscribers, including key stakeholders, customers, industry partners, social media followers, event attendees and others. It covers the big news of the month and consistently achieves a high open rate of around 30 per cent. Anyone can subscribe to Snapshot from the front page of CSIRO.au and the usual opt-out options apply.

CSIRO social media

CSIRO's Facebook page – **Facebook.com/pages/CSIRO/142468583842**

CSIRO launched its Facebook page in October 2009. More than 83,000 people now like CSIRO on Facebook. The page provides a channel to reach a younger audience while demonstrating the breadth of CSIRO's research. Facebook is also used to promote work experience, honours and PhD scholarships as well as post doctoral fellowships.

CSIRO's Twitter feed – **Twitter.com/csironews**

Launched in August 2010, the @CSIROnews Twitter feed allows CSIRO to access and share news and research information with global industry partners, educational and media organisations, peers in the science community and the general public. Nearly 51,000 people follow CSIRO on Twitter. As the world's most popular micro-blogging service, CSIRO's presence on Twitter is essential for its public profile and allows the organisation to instantaneously interact, engage and respond to the breadth of people who take

an interest in CSIRO activities. CSIRO also has dedicated twitter feeds for scientists attending events and conferences (@CSIROevents) an account for CSIRO Education (@CSIROHelix), an account for Data61 (@Data61news), one for its Scientists and Mathematicians in Schools program (@CSIRO_SMiS), and an account for the Australia National Telescope Facility (@CSIRO_ATNF).

CSIRO's Instagram account – Instagram.com/csirogram

CSIRO's Instagram account – @CSIROgram – showcases our science, events and behind the scenes pictures of our staff and facilities. The account is often 'taken over' by our scientists for a week at a time to show snapshots of their daily life at CSIRO.

CSIRO's YouTube channel – **Youtube.com/user/csiro**

CSIRO launched a single branded YouTube channel in May 2009. It has attracted over 4.1 million views and over 8,800 subscribers. The YouTube channel features content about our science and helps support education and recruitment activities, encouraging viewers to explore CSIRO.

CSIRO's LinkedIn company page – **Linkedin.com/company/csiro**

Launched in October 2011, CSIRO's LinkedIn company page provides a professional networking platform to support CSIRO's recruitment search for top quality people. It aims to build brand awareness and reputation among career professionals through coordinated recruitment campaigns and by using targeted video, news and celebrating the successes of our people. Since its launch, it has attracted around 35,400 followers.

CSIRO Visitors Centres

CSIRO has three primary visitor centres: Discovery in Canberra, one at the Canberra Deep Space Communication Complex and the Parkes Visitors Centre at the Parkes Observatory.

CSIRO Discovery supports CSIRO's communication and education activities by promoting our research. This is achieved through a major interactive exhibition at Black Mountain that showcases CSIRO's science and technology.

CSIRO Discovery is also an events and education centre that is designed specifically to inform school children, the community and the Organisation's stakeholders about CSIRO's national role.

Discovery receives 30,000 school children annually from every state and territory in Australia. Many schools make multiple repeat visits to the centre. Discovery's unique and very popular 90 minute minds-on, hands-on program involves the students investigating and evaluating two current research projects. It gives students an insight into the philosophy behind Discovery to showcase CSIRO's work and the value of research to Australian society.

The visitors centre at the Parkes Observatory in New South Wales has approximately 90,000 visitors a year and the Canberra Deep Space Communication Complex near Canberra has approximately 70,000 visitors a year. These centres promote CSIRO's work and activity in the astronomy and space science/tracking sectors, engaging directly with members of the public, as well as supporting school trips and other education and outreach activities. A smaller visitors centre (information boards only) is located at the CSIRO Paul Wild Observatory near Narrabri and hosts approximately 13,000 visitors every year.

CSIRO Enquiries

CSIRO Enquiries connects the Organisation with external stakeholders. It operates a contact centre responding to around 25,000 contacts each year via telephone (45-60 per cent), web and email (40-55 per cent) each year. The Enquiries team provides a necessary first point-of-contact for the general public, students, educators, small-medium enterprises (SMEs), government, industry and other stakeholders.

CSIRO Enquiries records every contact received and categorises them according to topic referred to and the relevant Business Unit the question/contact related to.

Enquiries uses a contact centre system within Salesforce called ServiceCloud and therefore connects with the Client Central database.

The team uses a confluence knowledge tool to store over 5000 information articles, contacts and standard responses.

CSIRO Global

As Australia's national science agency, CSIRO places great importance on international collaboration.

CSIRO's enabling legislation, the *Science and Industry Research Act 1949*, outlines the importance of international engagement for CSIRO being able to fulfil its role for the nation. The Act specifies that CSIRO's functions include: contributing to the achievement of Australian national objectives; contributing to the performance of the national and international responsibilities of the Commonwealth; and acting as a means of liaison between Australia and other countries.

CSIRO is focused on delivering both excellent science and social, economic and environmental impact from this science. Both this science and impact are inherently global and require active international engagement.

Global activity at CSIRO is driven from and by research business units, and spans science collaboration, commercial relationships and transactions, science advocacy, network participation and supporting relevant Australian Government initiatives. All of these activities yield a suite of tangible and intangible benefits to CSIRO and our global engagement agenda. Some of these activities have grown organically from peer-peer contact; however CSIRO contributes strongly to Australia's foreign policy priorities through strategic alliances that deliver global impact, innovation pathways that promote participation in global markets for Australian Industry, and in some cases delivers technically oriented programs for the Department of Foreign Affairs and Trade (DFAT) in-market.

As a relatively small part of a globalising system (at 2015 Australia's gross expenditure on research and development represented approximately <1.5 per cent of the global total), Australian science needs to be connected to peers worldwide to ensure that it is of the highest quality and up-to-date with new knowledge.

Similarly, in seeking to create impact from its science in line with Australia's national interest, CSIRO understands that this requires international awareness and engagement because:

- The Australian community is intricately linked to the broader global population.
- Australian industry operates within the global market and economy.
- Many of the issues facing Australia are global in nature and depend on either cooperation with neighbours or on a global scale (for example, biosecurity, food security, climate adaptation, energy security, space science, marine and fisheries management).

Many international activities are supported and coordinated by Australian Government departments under various bilateral science and technology cooperation agreements and joint consultation processes between the Australian government and its counterparts. Over recent years, CSIRO has seen a marked increase in demand from a wide range of government agencies for information on CSIRO's international scientific engagement as an input to their own areas of policy priority. There has also been an increasing international trend towards the use of science as a tool of diplomacy. CSIRO works closely with its portfolio department the Department of Industry and Science, and with other Australian Government agencies that have an interest in its international activity such as DFAT and Austrade.

Scientific collaborations with scientifically advanced counterparts in developed and developing economies, such as the USA, China, Japan, European nations, Korea and Singapore strengthen our strategic research base. Much of this work is conventional collaboration between scientists, which is still the most common form of international interaction for CSIRO staff.

In addition, during 2015 $81.4 million of external revenue was from international sources, including overseas governments and other non-private organisations.

CSIRO Chile

In 2011, CSIRO was selected by the Chilean government as a partner in the International Center of Excellence in Mining and Mineral Processing (ICE), as part of their development of a number of International Centers of Excellence in several research areas. The ICE's objective is to address the big challenges facing both the Australian and Chilean mining industries. The ICE office was inaugurated in December 2011 in Santiago, and in early 2012 in Antofagasta, Chile.

During 2012, it became clear to all parties that a different operational and governance arrangement was required to deal with a wider operating charter enabling business development beyond the ICE to other mutual interests. As a result, the CSIRO Chile Research Foundation was created in mid 2013, a legal entity with CSIRO as the sole founder. The Foundation is now overseeing research in a range of sectors beyond mining such as aquaculture, agriculture and water resources; and acts as a base into other Latin American markets such as Peru and Colombia.

The Global team

The Global team works closely with CSIRO Business Units to develop strategy, and to identify and prosecute market opportunities. They also have carriage on behalf of CSIRO for the large number of strategic partnerships CSIRO maintains across the globe, such as with the Chinese Academy of Sciences, The US National Laboratories, Fraunhofer Gessellschaft and other key research agencies. In addition, they work closely with DFAT, Austrade and ACIAR and other parts of the globally facing federal government machinery to ensure CSIRO is supporting Australian interests and policy imperatives. Increasingly, the team is the main supporting mechanism for CSIRO's evolving global footprint and offshore operations.

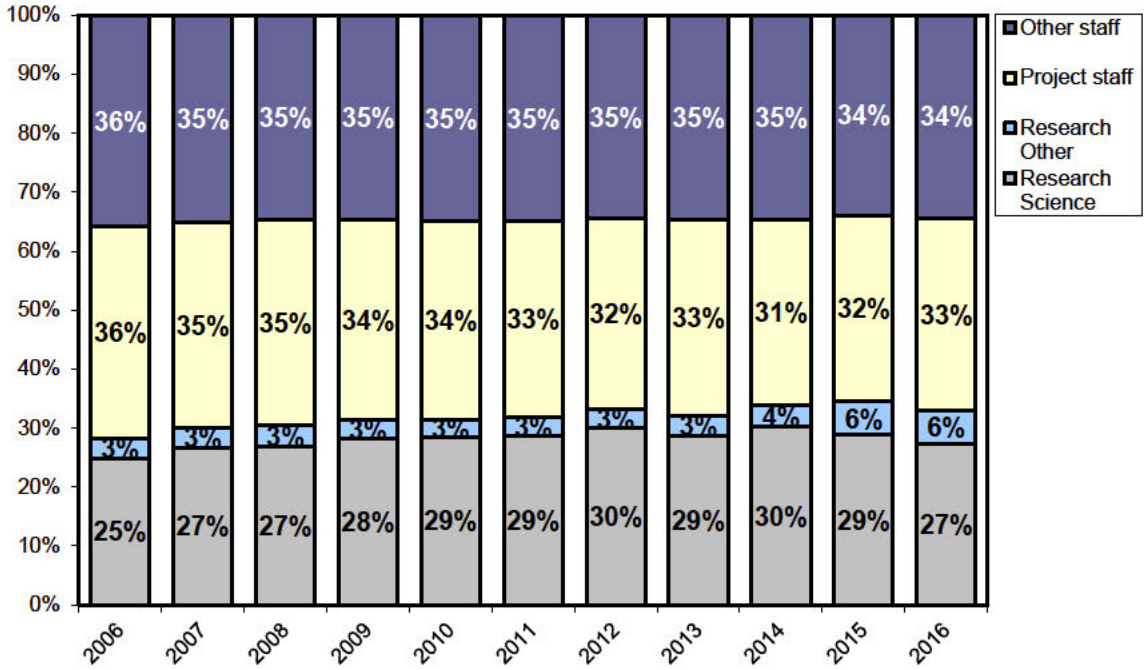
In addition, the team plays a central role in CSIRO's international science and innovation policy and its engagement with multilateral international organisations such as the Organisation for Economic Co-operation and Development (OECD), APEC, ASEAN, the Development Banks and major philanthropic organisations.

CSIRO Staff Profile

CSIRO currently employs approximately 5,614[1] staff (head count as at 1 July 2016) in more than 50 sites across Australia. It is a highly educated workforce employing more than 2000 people with PhDs. Human resource strategies at corporate and business unit levels aim at creating and maintaining a work environment in which employees' full potential is realised and directed to the achievement of CSIRO's objectives.

CSIRO Staffing levels

In recent years CSIRO has sought to maximise the return on its funding allocation by pursuing efficiencies in administration and research support to allow funds to be redirected to core scientific activity. While overall staff numbers have decreased in the last ten years, the combined percentage of staff in the research group has increased from 28 per cent in 2006 to 33 per cent in June 2016. This is illustrated in the following graph.



Note: This graph only includes CSIRO Officers, figures for 2006 to 2015 as at 30 June. Research Other includes research consulting and research management. Project staff are CSIRO officers in the research projects functional area. Other staff includes all remaining functional areas of Technical Services, General Management, Communication & Information, Administrative Services, General Services and Senior Specialists.

[1] Increase from 30 June 2016 figure of 5,367 is primarily due to NICTA staff officially joining CSIRO on 1 July 2016.

Staff numbers – Headcount (All CSOFs)

Date	*Headcount*	*Difference*	*Total turnover*	*Voluntary turnover*
30 June 2016	5367	98	11.7%	5.5%
30 June 2015	5269	-695	16.6%	4.8%
30 June 2014	5964	-513	12.2%	4.8%
30 June 2013	6477	-15	9.1%	4.5%
30 June 2012	6492	-22	10.8%	4.3%
30 June 2011	6514	-166	12.7%	4.5%
30 June 2010	6680	+170	11.9%	4.3%
30 June 2009	6510	+87	11.2%	4.3%
30 June 2008	6423	+92	13.0%	6.9%
30 June 2007	6331	-227	15.9%	6.8%
30 June 2006	6558	-18	14.2%	5.8%

Staff numbers - Full Time Equivalents (All CSOFs)

Date	*Actual FTE counts*	*Difference*
30 June 2016	4863.9	27.6
30 June 2015	4836.3	-586.4
30 June 2014	5422.7	-328.8
30 June 2013	5751.5	+31.8
30 June 2012	5719.7	-60.4
30 June 2011	5780.1	-175.7
30 June 2010	5955.8	+89.7
30 June 2009	5866.1	+97.2
30 June 2008	5768.9	+74.1
30 June 2007	5694.8	-207.8
30 June 2006	5902.6	-43.7

Note: 118 CDSCC staff transferred across to CSIRO with effect 27 February 2010

CSIRO – Research Scientists

Date	*Headcount*	*Difference*	*Total turnover*	*Voluntary turnover*
30 June 2016	1466	-54	14.1%	5.6%
30 June 2015	1520	-278	17.9%	5.3%
30 June 2014	1798	-60	11.7%	4.3%
30 June 2013	1858	-90	7.5%	3.6%
30 June 2012	1948	+83	9.2%	4.3%
30 June 2011	1865	-42	10.4%	4.1%
30 June 2010	1907	+70	9.7%	3.7%
30 June 2009	1837	+110	9.6%	3.8%
30 June 2008	1727	+39	11.4%	5.8%
30 June 2007	1688	+58	11.9%	4.9%
30 June 2006	1630	+7	12.2%	4.7%

CSIRO Workplace Relations

CSIRO staff are covered by two Enterprise Agreements, the CSIRO Enterprise Agreement 2011-2014 and the CSIRO Canberra Deep Space Communication Complex (CDSCC) Enterprise Agreement 2014-2017 (which applies to non-managerial staff at CDSCC, Tidbinbilla).

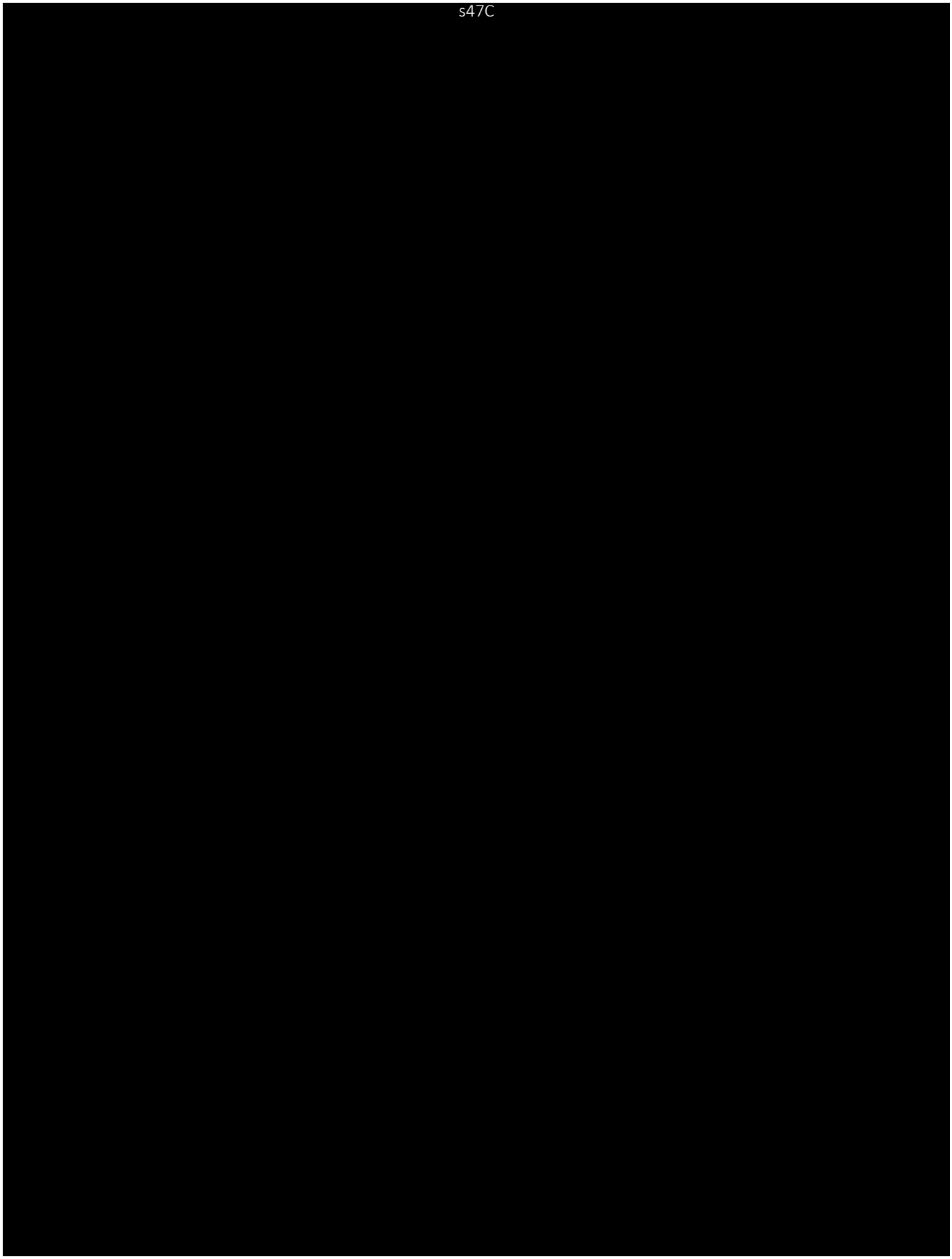
Approximately 50 per cent of CSIRO staff are members of a union, with the majority belonging to the Community and Public Sector Union (known as the CSIRO Staff Association). The Australian Manufacturing Workers Union (AMWU), the Electrical Trades Union (ETU) and Professionals Australia, (formerly the Association of Professional Engineers, Scientists and Managers, Australia) are also parties bound by the CSIRO Enterprise Agreement and CDSCC Enterprise Agreement. These three unions have a small membership comprising trade, engineering and technical staff.

Workplace Bargaining Policy

On 28 March 2014 the Government announced changes to the Australian Government Public Sector Workplace Bargaining Policy (Policy). The Policy replaced the Australian Government Employment Bargaining Framework (AGEBF) and applies to the Australian Public Service (APS) and non-APS Australian Government agencies, including CSIRO. On 15 July 2014 the CSIRO Minister directed the CSIRO Board to apply the new Policy.

On 20 October 2015 the Government announced amendments to the Policy. The revised Policy document called 'Workplace Bargaining Policy' superseded the Australian Government Public Sector Workplace Bargaining Policy and was released on 2 November 2015. The amendments have provided CSIRO with greater flexibility in relation to enterprise bargaining with Agencies now able to offer wage increases averaging up to 2 per cent per annum, e.g. 6 per cent over 3 years.

In accordance with the amendments to the Bargaining Policy, remuneration offers must still be met within existing budgets, and must be affordable. Productivity must be found from removing restrictive content from enterprise agreements.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Canberra Deep Space Communication Complex (CDSCC): Transfer of Business and Enterprise Agreement

The CDSCC and its workforce came under CSIRO's direct management and employment via a transfer of business which took effect from 27 February 2010. At the time of the transfer the CDSCC workforce, excluding members of its management team, were covered by a separate Enterprise Agreement which also transferred to CSIRO. CSIRO has now renegotiated the CDSCC Agreement twice (2011 and 2014). The current Agreement was developed under a previous government policy framework. It came into operation in June 2014 and has a nominal expiry date of 18 June 2017. There are three pay increases available under the CDSCC Agreement of 2.8 per cent per annum.

Preparation and planning is under way for the development of the next CDSCC Agreement.

CSIRO's Indigenous Engagement Strategy

Indigenous Engagement Strategy

CSIRO believes that Indigenous Australians have extraordinary contributions to make to Australia across cultural, economic and scientific domains. Furthermore, CSIRO recognises the social and economic disadvantage experienced by Indigenous Australians and is committed to overcoming the gap between Indigenous and non-Indigenous Australians.

CSIRO initiated its Indigenous Engagement Strategy in July 2007. The Strategy aims to achieve greater Indigenous participation in CSIRO's research and development agenda and activities. This participation will ensure that CSIRO benefits from the insights that Indigenous people can bring to national challenges. It also provides a means of ensuring that CSIRO's activities are as effective as possible in contributing to addressing the challenges and aspirations of Indigenous communities.

The Strategy addresses four areas:

1. **Scientific Opportunities**

   engage in research and projects underpinned by a universally accepted ethical framework, that will impact on the quality of life of Indigenous peoples and thereby all Australians.

   CSIRO conducts research for the benefit of the Australian community. The focus on employment, education and cultural awareness as well as investment in identifying key areas for research contribution to meet the needs of Indigenous communities will ensure that an appropriate proportion of this benefit accrues to Indigenous communities.

2. **Employment**

   to close the gap incrementally of reaching 3 per cent Indigenous employment nationally within CSIRO.

   Indigenous participation as employees in CSIRO is a powerful means of raising the contribution from and to Indigenous people from our research. It will also contribute to tackling the national issue of high unemployment within Indigenous communities.

3. **Education Outreach**

   increase participation and education outcomes of Indigenous children and youth of school age level and beyond within science.

   Education outreach initiatives and opportunities for Indigenous students to undertake science programs will break down the barriers between CSIRO and Indigenous peoples by helping to make science more accessible.

4. **Cultural Learning and Development**

   broaden the knowledge and understanding of Indigenous issues and cultures within CSIRO.

   In order to ensure that CSIRO is a trusted research provider and an employer of choice by Indigenous peoples, the organisation must be able to demonstrate an understanding and empathy of Indigenous issues and values. A cultural learning program and an ethics framework that reflects, acknowledges and respects Indigenous values are therefore high priorities.

Reconciliation Action Plan (RAP)

- CSIRO's first RAP has been reviewed and revised following feedback from the Indigenous SAC, IEIC, Aboriginal and Torres Strait Islander staff and Reconciliation Australia.
- The draft RAP has been endorsed by Reconciliation Australia and will be presented at the June 2016 Executive Team meeting and subsequent Board meeting.
- It is expected that the launch will occur in the latter half of 2016.

Indigenous Strategic Advisory Council (Indigenous SAC)

The Indigenous SAC is an external body that meets twice per year. Its current members are Professor Mick Dodson, ANU (Chair), Professor Cindy Shannon, UQ Jason Field and Phil Duncan. The Indigenous SAC provides strategic advice to CSIRO in relation to its ongoing work in engagement and partnering with Aboriginal and Torres Strait Islander peoples and communities and the activities that CSIRO is undertaking to improve outcomes for Aboriginal and Torres Strait Islander people.

Indigenous Engagement Implementation Committee (IEIC)

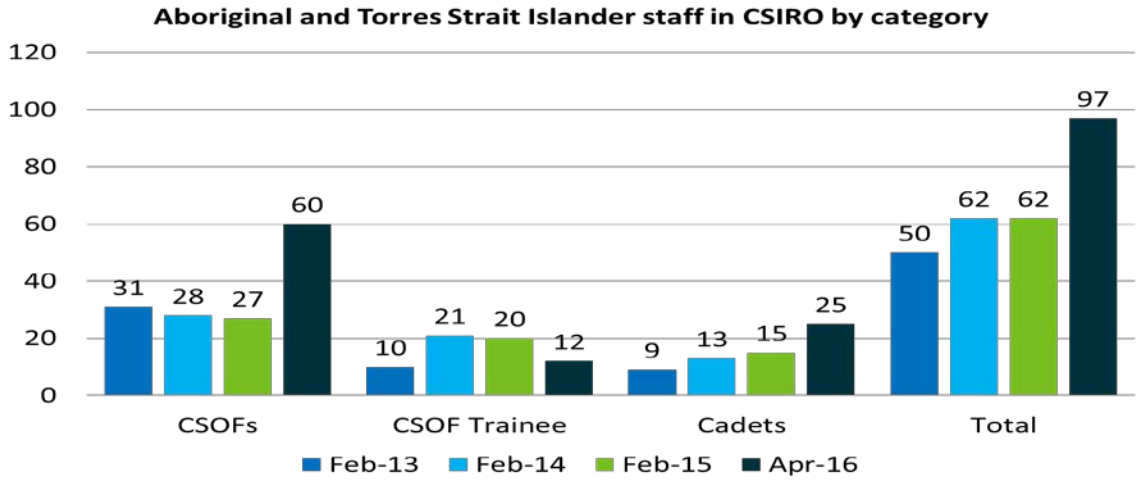
The IEIC is the internal CSIRO committee charged with ensuring that CSIRO's Indigenous Engagement Strategy is being delivered. The IEIC reports to a member of CSIRO's Executive Team (Dave Williams) and its membership includes representatives from all CSIRO business units including Digital, National Facilities and Collections, Services, Communication, Human Resources and Business & Infrastructure Services.

Office of Indigenous Engagement

- The Office of Indigenous Engagement (OIE) provides support and advice to CSIRO staff in developing or maintaining engagement with Aboriginal and Torres Strait Islander scientists, communities and companies. Following the 2014 restructure, the OIE is now housed within the Land & Water business unit, and is located at the Ecosciences Precinct, Dutton Park, Brisbane.
- The Office of Indigenous Engagement is made up of Dan Metcalfe (Manager – part time), Donna Smith (Senior Indigenous Engagement Officer) and Tanya Bougoure (Indigenous Engagement Officer).

Employment

- CSIRO employs 97 staff who identify as Aboriginal and/or Torres Strait Islander (1.8 per cent of our total staff numbers). This comprises:
    - 25 cadets (completing an undergraduate degree and undertaking a 12 week work placement with CSIRO each year)
    - 12 trainees (undertaking a Cert 3 or 4 while working for CSIRO for up to 2 years)
    - 60 CSOF staff (term and indefinite appointments). This includes 5 staff with PhDs and one staff member completing a PhD.



Cultural awareness

The Office of Indigenous Engagement has developed a range of resources to assist in building the capacity of CSIRO staff to engage and partner better with Aboriginal and Torres Strait Islander people, and improve outcomes for Aboriginal and Torres Strait Islander people. In addition to this, CSIRO's cultural awareness program is currently being revised to ensure that it meets the needs of staff.

Business engagement

- Key partnerships exist with indigenous businesses and communities through Land & Water, Oceans & Atmosphere, Health & Biosecurity, Astronomy & Space Science, Education Services teams.
- Approximately $14 million in current projects with, or for, Aboriginal and Torres Strait Islander communities and organisations across northern Australia.
- CSIRO has confirmed that it is working towards meeting the Commonwealth government's target that three per cent of all purchases would be made with Aboriginal and Torres Strait Islander owned businesses.
- CSIRO awarded a cleaning contract to PSG Holdings (an Indigenous business) in October 2015 for all CSIRO sites located in Western Australia, South Australia and Northern Territory. The contract has a term of three years with a further extension option for three years. The contract is estimated at $5.1 million per year.

Examples of CSIRO work with Aboriginal and Torres Strait Islander people and communities

- Staff from the Minerals and Manufacturing business units at Clayton have partnered with the Yulendj Indigenous Engagement Unit at Monash University in relation to the provision of academic mentoring to Aboriginal and Torres Strait Islander science/technology students who are in the third or final year of their undergraduate degree or the first year of their postgraduate degree. This commenced in early 2016 and will also be available internally to CSIRO cadets across Australia.
- Fisheries management traditionally involves balancing commercial gain and sustainability, but for Indigenous communities cultural and lifestyle factors can be just as important and these factors are more difficult to measure. The Torres Strait tropical rock lobster fishery has many stakeholders, including non-Indigenous commercial fishers and Indigenous fishers who fish for subsistence through to commercial reasons. Often research into fisheries management has focused on commercial businesses and overlooked the unique characteristics of Indigenous fishers.
- The Oceans and Atmosphere business unit brought together a range of sophisticated methods, from mathematics and modelling to social science interviews, to allow managers to understand the potential trade-offs when making a management decision that affects not only a resource but also the people who depend on it. We have developed an objective scientific approach that reflects the importance of cultural considerations in Indigenous communities. It also takes into account these communities are often driven by considerations that are not economic.
- The Manufacturing business unit are conducting a long term study monitoring whether emissions from industry are impacting on the rock art (petroglyphs) in the Burrup Peninsula.
- The Land and Water business unit has helped Dhimurru Aboriginal Corporation establish a fire and biodiversity monitoring program within the Dhimurru IPA. Recently, CSIRO staff have participated in an Indigenous Ranger workshop on fire in the Laynhapuy Homelands in Arnhem Land in the Northern Territory. The workshop aimed to provide rangers with information and advice to help them manage fire in the Dhimurru and Laynhapuy Indigenous Protected Areas (IPAs). The program is based on twenty-six sites representing different vegetation types, and aims to document biodiversity patterns and trends in relation to fire. The plots were first sampled in 2012.
- The Energy business unit is working with eight remote Aboriginal communities to identify ways to improve energy efficiency and health and comfort levels in enterprise buildings (eg art centres).
- CSIRO staff in the Manufacturing business unit worked with the Hermannsburg (NTARIA) community in the Northern Territory to develop a joint project. The project would enable the communities to receive

training, support and advice in developing a community owned and operated business growing native food products. The project would also include a component regarding improving education outcomes for Aboriginal and Torres Strait Islander people.

Indigenous Land Use Agreements (ILUA)

- CSIRO is a signatory to the ILUA with the Wajarri Yamatji people, Traditional Owners of the land that the Murchison Radio-astronomy Observatory (MRO) is on.
- The agreement was signed in 2009 and details a range of activities including procurement and employment to benefit the Traditional Owners and expectations in relation to access to and work being undertaken on this site.
- A new ILUA is currently under negotiation and this will cover an expanded geographical area and scope of work.
- The Department of Industry, Innovation and Science is leading this work with input from CSIRO Astronomy & Space Science.

Indigenous STEM education program

- Funded by the BHP Billiton Foundation and managed by Therese Postma, Education Services, CSIRO (not OIE).
- Aimed at increasing participation and achievement of Aboriginal and Torres Strait Islander students in science, technology, engineering and mathematics (STEM). There are six elements to the program that caters to Aboriginal and Torres Strait Islander students as they progress through primary, secondary and tertiary education, and into employment.

Indigenous Science book

An Indigenous Science book is being developed as part of CSIRO's Science and Solutions for Australia series (which currently includes Water, Climate Change, Biodiversity and Oceans). The book would provide:

- Insights into developing partnerships and engaging with Aboriginal and Torres Strait Islander people.
- Examples of work being undertaken in the science sector by, with and for Aboriginal and Torres Strait Islander people and communities.
- Information regarding Indigenous science and knowledge, western science and show the benefits gained when these are linked.
- Identify ways in which Indigenous science and partnerships can be facilitated to develop lasting science and solutions for Australia.

Other activities

Jack Cusack Memorial Lecture

- The Jack Cusack Memorial Lecture series commemorates the valuable contributions made by expert botanist, Jack Cusack, to CSIRO's research in the Top End and has been held annually in NAIDOC Week since 2011.

Finances

The Portfolio Budget Statements for 2016-17 provide the consolidated budgeted financial statements for CSIRO and its controlled entities (Science and Industry Endowment Fund (SIEF), WLAN Services Pty Ltd and the Fundación CSIRO Chile Research) showing that the organisation is budgeted to run at a loss across the budget and forward estimates period.

In 2016-17 to 2019-20, the CSIRO parent entity has been provided with approval to deliver an operating loss which includes the impact of escalating depreciation expense particularly relating to assets for which capital was previously provided by the Government through the Education Investment Fund (EIF) and the National Collaborative Research Infrastructure Strategy (NCRIS), and arising from the revaluation of CSIROs property portfolio. CSIRO has also been provided with approval for the operating losses of the SIEF which reflect the timing difference between incoming funds to SIEF and outgoing expenditures on SIEF grants.

REVENUE

Over recent years, the funding mix of CSIRO has remained relatively constant with the level of direct Government appropriation investment at 60.7 per cent in 2007-08 and 2014-15. Further details of the history of this ratio and the related revenue data is shown in ***Table 1***.

Whilst total external revenue of the CSIRO parent entity has increased by $53.8 million between 2007-08 and 2014-15, the total co-investment and consulting (C&CS) revenue grew from $290.0 million (67.7 per cent of total external revenue) to $425.1 million in 2012-13 (83.0 per cent of total external revenue) but fell back to $373.4 million (76.9 per cent of total external revenue) in 2014-15. This 12.2 per cent decline in C&CS revenue over the last two financial years correlates with an 18.6 per cent reduction in headcount from 6,473 at 1 July 2013 to 5,269 to 30 June 2015. With an increase in IP revenue of $13 million s7 [redacted] total revenue in 2014-15 is reported to be only $22.3 million below budget.

There has been some change in the source of C&CS revenue over this period. The proportion of total external revenue (before WIP / Deferred Revenue adjustment) received from indirect Government sources such as federal departments, state governments, rural development corporations (RDCs), cooperative research centres (CRCs) and other government agencies has increased from 43.8 per cent in 2007-08 to 47.1 per cent of total external revenue in 2014-15. Over the same period, the level of revenue received from the Australian private sector has fallen from 15.9 per cent to 14.3 per cent of external revenue and the level of revenue received from overseas sources has increased from 8.2 per cent to 16.7 per cent of total external revenue. The changes reflect in part the research strategy of CSIRO over the same period which was to focus the investment of direct Government appropriation funds into larger scale, longer term strategic research programs aimed at addressing major national challenges. These programs have tended to attract relatively greater external revenue investments from government departments and agencies.

The level of revenue generated from intellectual property sales and licensing s7 [redacted] fell from 19.1 per cent to 7.4 per cent of total external revenue (before WIP / deferred revenue) in the period 2007-08 to 2014-15. Further details of the movement in external revenue mix can be found in ***Table 2***.

In the 2011-12 Federal Budget the Government committed $3 billion to CSIRO in its Quadrennial Funding Agreement (QFA) which was an increase of 8.5 per cent (or $234 million including some lapsing, program-specific funding) over the total appropriation received over the previous four years. Whilst the appropriation increase was modest, CSIRO's budget and forward estimates showed an aggressive 33.7 per cent growth in total external funding through the QFA period (to $2.4 billion) above the equivalent amount

received in the previous four years s7 With slower than expected actual results in the first three years of the QFA period, CSIRO's total external revenue through the 2011-12 to 2014-15 period was $2.20 billion representing growth of 8.8 per cent over the preceding four year period.

In 2014-15, external revenue was $482.4 million for CSIRO consolidated. Through the 2016-17 Federal Budget, the CSIRO consolidated external revenue budget is projected to be $583.5 million in 2018-19.

2016-17 Budget [CSIRO parent entity]

CSIRO's budget in 2016-17 reflects the integration of NICTA into the parent entity for the first time. NICTA is reported as a separate entity in CSIRO's 2016-17 Portfolio Budget Statements under Program 1.1: Research – Science, Services and Innovation Fund.

CSIRO's C&CS budget in 2016-17 is $411.7 million against the 2015-16 forecast of $392.1 million, representing 5 per cent growth. IP revenue is budgeted at $40.2 million which is a decrease to the latest 2015-16 forecast of $60.5 million (which however includes $31.5 million of WLAN revenue which is non-recurring).

Total external revenue is projected to be $490.0 million, representing a 1.1 per cent increase against the 2015-16 forecast results of $484.3 million and representing a 2.3 per cent increase against the 2014-15 results of $478.8 million.

Labour costs in 2016-17 are budgeted at $734.3 million including an increase to underlying salary of $16.0 million compared to 2015-16 forecast reflecting an average labour cost per FTE growth rate of 2% per annum included in the modelling. Depreciation costs are budgeted at $167.7 million which is stable with 2015-16.

CSIRO is budgeted to deliver a deficit of $42.1 million in 2016-17.

s47C

2015-20 Strategy Budget

Over the budget and forward estimate period, CSIRO's (parent entity) total revenue is forecast to increase from the 2014-15 actual result of $1,230.5 million to $1412.1 million in 2019-20 (14.7 per cent increase over the period). The increase also reflects the impacts of the integration with NICTA, additional government funding for initiatives under the National Innovation and Science Agenda, and cessation of the four year Research saving measure applied from 2014-15 to 2017-18.

The strategy budget places a strong focus on growing revenue with Australian and international companies at a competitive market price which provides a greater margin on direct costs for CSIRO. An increased surplus through improved pricing (up to $25.0 million additional revenue by 2019-20), together with savings from the Enterprise Support Service areas (up to $10.0 million per annum in 2018-19 onwards) and reduction in operating expenditure by the science areas (up to $20.0 million in 2015-16 but reducing to $15.0 million per annum by 2018-19) will fund specific strategic initiatives underpinning the successful delivery of the strategy (refer ***brief 9***).

Sustainable Funding Issues

CSIRO is used to managing the costs of delivering science according to the level of appropriation and external revenue available to it. Since 2009-10, CSIRO has delivered a positive financial position from its core operations before taking into account non-operating items (such as equity impairments, the impact of the movement in government bond rates on the employee leave liability, redundancy costs and other gains and losses on sale of assets) and the 'unfunded' component of its depreciation expense.

In addition to fluctuations in the level of appropriation and external revenue (of the nature of 'business as usual' matters), there are four key issues compromising CSIRO's financial sustainability:

1. 'Unfunded' depreciation s47C
2. operating cost of the National Facilities held by CSIRO on behalf of the Nation
3. operating and maintenance costs of CSIRO's large and ageing property portfolio
4. insufficient capital funding to undertake the essential property consolidation and redevelopment program, and fund scientific plant and equipment (including IT assets) at benchmark levels.

'UNFUNDED' DEPRECIATION

s47C

[redacted]

OPERATING COST OF THE NATIONAL FACILITIES

National Facilities owned and operated by CSIRO on behalf of the nation comprise the Australia Telescope National Facility (ATNF), the Marine National Facility (MNF) and the Australian Animal Health Laboratory (AAHL). Despite being only around a 10 per cent user of the ATNF (which will include the new Australian Square Kilometre Array Pathfinder facility in Western Australia) and around a 22 per cent user of the MNF (which includes the new research vessel RV *Investigator*), CSIRO has historically absorbed the operating costs of the National Facilities as an integral part of its expenditure on science delivery.

s47C [redacted]

s47C [redacted]

Marine Research Vessel

In the 2012-13 Budget, CSIRO received $12.1 million to support the operations of the new marine research vessel at sea during its 12 month sea trials through the warranty period. In the 2014-15 Budget, the Government provided in the order of $20 million per annum to fund the vessel for 180 days at sea on an ongoing basis.

s47C [redacted]

[redacted]

Australian Animal Health Laboratory (AAHL)

AAHL came into operation in 1984 with appropriation of $7.8 million which was provided through a 50-50 split between CSIRO and the Department of Agriculture. The 2014-15 total budget expenditure for AAHL is $54.7 million; $7.8 million is funded by the Department of Agriculture to deliver specific activities underpinning the science capability relating to biosecurity, and a further $4.9 million is received from other customers. s47C [redacted]

PROPERTY OPERATING COSTS

In December 2011, CSIRO undertook a comprehensive asset condition report across the entire property portfolio. This report highlighted that 83 per cent of CSIRO buildings are past their mid-life refit, with 52 per cent of that being >30 years old and 40 per cent being >40 years (i.e. 25 per cent of the entire portfolio is >40 years old). s47C [redacted]

CAPITAL FUNDING

Since 30 June 1999, CSIRO's appropriations have been calculated on an accrual basis designed to contribute to the full cost of the organisation's operations including non-cash expenses (primarily depreciation). This funding covers both operating and capital expenditure.

In previous funding arrangements, non-cash expenses were ignored and the replacement and acquisition of non-financial assets were funded by separate appropriation. This means that although CSIRO's non-financial assets on hand at 30 June 1999 were already partly depreciated, there has never been a cash flow from Government to CSIRO to provide funds for that element of the replacement cost of CSIRO's assets.

At 30 June 1999, CSIRO had $963 million of accumulated depreciation ($645 million relating to property and $317 million relating to plant & equipment).

s47C [redacted]

CSIRO has a long term Property Strategy which has the aim to support and enable the delivery of CSIRO's core science activities whilst optimising the whole of life costs and improving the efficiency of property management through the consolidation, co-location and modernisation of CSIRO's property portfolio. In

line with the strategy, CSIRO is delivering 'tranches' of capital works as funding becomes available, generally through the sale of significant property assets.

[redacted] $195.6 million on a consolidation of four ACT sites into refurbished accommodation at its Black Mountain site and construction of a new building to house a significant proportion of science staff at the site who are currently in ageing facilities. [redacted] $32.0 million to relocate remaining staff from its Highett site to Clayton and to establish the Factories of the Future Innovation Centre for Advanced Manufacturing at Clayton (now called Lab 22). [redacted]

s47C

[redacted]

Table 1: CSIRO (consolidated) revenue since 1996 in $m

Revenue Type	96-97[4]	97-98[4]	98-99[4]	99-00[1, 4]	00-01[1, 4]	01-02[1, 4]	02-03[1, 4]	03-04[4]	04-05[2, 4]	05-06[4]	06-07[4]	07-08[4]	08-09[3]	09-10[4]	10-11[4]	11-12[4,3]
Appropriation	444.5	466.8	475.4	500	496.7	509.6	532.1	568.6	577.1	593.9	610.1	663.2	668.1	704.9	720.4	724.9
External	244.7	249.7	252.9	278.1	274.3	347.1	310.3	335.3	323.3	363.6	363.2	428.6	634.8	459.3	497.8	747.2
Total Income	689.2	716.5	728.3	778.1	771.0	856.7	842.4	903.9	900.4	957.5	973.3	1,091.8	1,302 9	1,164.2	1,218.2	1,472.1
% External	35.5%	34.8%	34.7%	35.7%	35.6%	40.5%	36.8%	37.1%	35.9%	38.0%	37.3%	39.3%	48.7%	39.5%	40.9%	50.8%

Revenue Type	12-13[4]	13-14[4]	14-15[5]	15-16[6]	16-17[6]	17-18[6]	18-19[6]	19-20[6]
Appropriation	733.8	778.2	745.3	750.3	787.3	796.8	831.9	841.2
External	506.5	461.3	482.4	548.5	500.0	520.3	568.6	583.5
Total Income	1,240.3	1,239.4	1,227.7	1298.7	1287.2	1317.1	1400.5	1424.8
% External	40.8%	37.2%	39.3%	42.2%	38.8%	39.5%	40.6%	41.0%

Notes:

1. Appropriation adjusted for the Capital Usage Charge (CUC) discontinued after 2002-03.
2. External earnings dip in 2004-05 is due to the transfer of the National Measurements Laboratory and the transfer of activities to the Ensis Joint Venture.
3. s7 [redacted]
4. Actual Results sourced from historical CSIRO Annual Reports.
5. Figures from CSIRO 2014-15 Financial Statements.
6. Estimates from PBS 2016-17

Table 2: CSIRO (parent company) revenue by revenue type for the period 2005-2006 to 2013-14

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12		2012-13	2013-14[4]	2014-15
Revenue Source	**$m**	**$m**	**$m**	**$m**	**$m**	**$m**	**$m**		**$m**	**$m**	**$m**
Co-Investment, Consulting and Services											
Australian Private Sector	67.6	58	68.2	62.1	61.0	65.0	74.2		70.1	78.5	69.4
Australian Government	96.5	116	119.5	161.4	189.3	202.7	201.8		190.3	179.3	181.1
Rural Industry R&D Corporations	44.3	43.2	30.2	33.8	33.5	37.7	35.0		38.4	50.2	38.1
Cooperative Research Centres	35.2	39.8	38.2	43.6	38.8	32.3	30.0		16.9	14.7	9.5
Overseas entities and international	36.4	37.2	35.3	61.5	71.6	74.5	77.5		84.3	84.7	81.4
WIP / Deferred Revenue Adjustment	-8.0	-8.5	-1.4	-14.5	-13.6	5.9	-7.6		25.1	-13.0	-6.1
Total Co-investment, Consulting and Services	**272.0**	**285.7**	**290.0**	**347.9**	**380.4**	**418.1**	**410.9**		**425.1**	**394.4**	**373.4**
Intellectual Property - Royalty and Licence Revenue[3]	**32.4**	**30.6**	**81.7**	**229.6**	**46.7**	**29.2**	**278.5**		**37.5**	**29.1**	**60.8**
Other External Revenue	**43.9**	**44.5**	**41.3**	**31.3**	**28.2**	**47.9**	**61.3**		**44.1**	**43.2**	**44.6**
Gain/(Loss) on sale of assets	**15.5**	**2.7**	**4.8**	**25.6**	**3.9**	**4.9**	**0.4**		**0.0**	**0.0**	**0.0**
Other fair value gains and reversals	**-**	**0.1**	**10.8**	**0.3**	**-**	**0.1**	**-**		**5.5**	**0.0**	**6.7**
Total External Revenue	**363.8**	**363.6**	**428.6**	**634.7**	**459.2**	**500.2**	**751.0**		**512.2**	**466.7**	**485.5**
Revenue from Government	**593.9**	**610.1**	**663.2**	**668.1**	**704.9**	**720.4**	**724.9**		**733.8**	**778.2**	**745.3**
Total Revenue	**957.7**	**973.7**	**1,091.8**	**1,302.7**	**1,164.1**	**1,220.6**	**1,476.0**		**1,246.0**	**1,244.9**	**1,245.3**

Notes:

1. CSIRO does not currently forward budget by source of revenue. Refer *Table 1* for annual estimates of total external revenue for 2011-12 through the forward years. The totals will be attributed to revenue types as actual results are established.

[redacted] s7

4. Table figures sourced from historical CSIRO Annual Reports.

Science and Industry Endowment Fund

The Science and Industry Endowment Fund (SIEF) was established by the *Science and Industry Endowment Act, 1926* (SIE Act). It was initially seeded with an appropriation by Parliament of £100,000 from consolidated revenue. On 20 October 2009, the then Minister for Innovation, Industry, Science and Research announced the "rejuvenation" of the SIEF through an initial gift of $50 million to the SIEF by CSIRO. CSIRO has made an additional two gifts of $50 million each, bringing the total contribution to $150 million since 2009. These three gifts were made from the proceeds of licences and settlement agreements entered into by CSIRO for its fast wireless local area network (WLAN) technology.

Until the 2009 gift to the SIEF, its investment priorities (as reflective of the SIE Act) were to provide assistance to people engaged in scientific research and for the training of students in scientific research. The injection of the new monies into the SIEF, made pursuant to a Deed of Gift dated 15 October 2009, provided the opportunity to extend the reach of the SIEF and diversify its support for a range of research activities which fall outside the mainstream and address present and future major challenges. The SIEF investment Portfolio is available at www.sief.org.au. Additionally, there are five factors which affect the allocation of funding under the SIEF:

- Funding from the SIEF is a decision of the Trustee, upon advice from an Advisory Council; the Trustee does so in accordance with fiduciary duties as Trustee.
- The SIEF Trustee needs to comply with the Deed of Gift in relation to the funds provided by CSIRO in 2009-10.
- The SIEF Trustee needs to ensure that expenditure falls within the purpose of the SIEF and is also consistent with the taxation status of the SIEF.
- Under current arrangements with the government, the CSIRO Gift Funds are disbursed at a maximum rate of $25 million per annum and must be expended (including any interest earned) within 10 years of the final Gift from CSIRO.
- The SIEF has existing commitments with recipients for funding for specific projects and activities. These commitments are in relation to approximately $173 million of funds, with approximately $111 million already disbursed and the remaining expenditure being scheduled to occur over future financial years.

As at end April 2016, $33 million of interest has been earned on the investment.

The SIEF has been endorsed by the Australian Tax Office as a Charitable Fund with tax exempt status.

Relationship with CSIRO

CSIRO has several separate roles with respect to the SIEF. These roles are clearly defined and separate, with careful governance in place to ensure there is no conflict between the roles.

Legal/legislative relationship between SIEF and CSIRO

CSIRO's predecessor, the CSIR, was established in the same year as the SIEF. The SIE Act makes it clear that the SIEF is separate from CSIRO. However, it also contemplates a close relationship with CSIRO as it vests the SIEF in the Chief Executive of CSIRO as Trustee.

Pursuant to section 10A of the *Science and Industry Research Act 1949* (SIR Act), the Trustee may be directed by the CSIRO Board in exercising the powers conferred on them in that role, as follows:

> 10A(3) The Chief Executive shall, in conducting any of the affairs of the Organisation and in exercising any powers conferred on the Chief Executive by this Act or the regulations or by the *Science and Industry Endowment Act 1926*, act in accordance with any policies determined, and any directions given, by the Board.

The section makes it clear that the Board can only give directions which are consistent with the purposes set out in the SIE Act. These include any conditions which may have been imposed in relation to gifts to the SIEF.

As part of the CSIRO Board oversight of the SIEF, the Trustee, together with the Advisory Council, hold a joint meeting with the CSIRO Board annually. It is the CSIRO Board that appoints the members of the SIEF Advisory Council.

CSIRO as Donor

CSIRO has a clearly defined role as Donor to the SIEF. The Deed of Gift defines CSIRO's rights and obligations as Donor, and the Trustee's rights and obligations in relation to the use of the monies gifted by CSIRO to the SIEF.

CSIRO as Service Provider

Pursuant to the Deed of Gift, the Trustee has engaged CSIRO to provide support services to the SIEF to assist with the administration and management of the gifted monies (and potentially any other assets of the Fund). A Services Agreement formalises CSIRO's role as Fund Administrator.

CSIRO as fund recipient

As part of the National Innovation System (NIS), CSIRO is eligible to apply for funding from SIEF under the same conditions and selection criteria as other members of the NIS.

Grants to date

Since its rejuvenation in 2009, the SIEF has to date committed to the support of science through grants to the following:

- $2 million to Macquarie University for the CSIRO Macquarie University Chair in Wireless Communication over seven years
- $20 million to support scholarships and fellowships across the National Innovation System, covering all scientific disciplines but with a focus in ICT, Mathematics and Engineering
- $7.9 million for the *STEM⁺Business Fellowships* program
- A total of approximately $77 million to 17 Research Projects across a range of scientific disciplines and involving around 65 different collaborators
- $12.4 million co-investment towards the development of the Australian Resource Characterisation Facility (ARCF) as part of the Perth Resources Precinct
- $10 million co-investment towards the development of the Biomedical Materials Translational Facility (BMTF) as part of the Clayton Materials and Manufacturing Precinct
- $18 million co-investment towards development of the Centre for Genomics, Metabolomics and Bioinformatics (CGMB) and a new life sciences building on the CSIRO Black Mountain campus, as part of the Canberra National Agricultural and Environmental Sciences Precinct
- $10 million to support projects undertaken by Publically Funded Research Agencies (PFRAs) at the Australian Synchrotron
- $6 million to support finalisation of the Australian Square Kilometre Array pathfinder (ASKAP) project
- $25 million over 5 years for the Experimental Development program.

Governance

The Trustee

The Trustee of the SIEF is the Chief Executive of CSIRO. The Trustee has primary responsibility for the administration and investment of the SIEF. The Trustee is required to exercise discretion in accordance with the terms of the Deed of Gift, the SIE Act and other applicable legislation, as well as fiduciary duties implicit in the role of Trustee.

The Trustee attends the meetings of the Advisory Council, at which there is a standing item for a consultative discussion between the Trustee and the members of the Council.

The Advisory Council and Expert Panels

The Advisory Council was established in October 2009 by the CSIRO Board Endowment Committee, at the request of the Trustee. The primary role of the Advisory Council is to assist the Trustee in the determination of application of SIEF monies which aligns with the SIEF's objectives. The strategic objectives and research direction of the SIEF are described on the SIEF's website.

The Advisory Council must have no fewer than five members, with a majority of members who are not employed by CSIRO. The Trustee is not a member of the Council but has a right to attend any meeting and to be heard at such meetings. Meetings of the Advisory Council are held three times per year, or as required, to provide advice to the Trustee on the application of the SIEF to specific research projects, to develop and consider research initiatives and direction of the SIEF and associated issues.

An Expert Panel undertakes assessment of expressions of interest and applications for Research Projects lodged with the SIEF, as well as reviewing Progress Reports. The Expert Panel is currently comprised of two Advisory Council members and three appropriately qualified external members. Independent peer reviewers are engaged in the assessment of progress for research projects. Independent peer reviewers are also engaged during assessment of applications in the Scholarship and Fellowship Programs.

An Undergraduate Degree Scholarships Selection Panel, comprised of an Advisory Council member and two independent experts in the science education field, provides advice on matters relating to Undergraduate Degree Scholarships.

These Panels report to the Advisory Council, which in turn makes recommendations to the Trustee, usually in consultation with the Trustee during the regular Advisory Council meetings.

Recently two new programs have been added to the SIEF Portfolio:

- **STEM$^+$Business Fellowships** – Early Career Researchers (ECR), research organisations and Australian SME businesses will work together to develop innovative commercial solutions that build Australia's national competitiveness. This Program provides long-term, in-firm placement of R&D capability as well as providing practical experience in industry for ECRs, thus creating and sustaining a cohort of developing researchers capable of addressing national challenges. The SIEF STEM$^+$ Business Fellowship Program is facilitated by CSIRO's *SMEconnect* team on behalf of the SIEF Trustee.
- **Experimental Development Program** (EDP) - This program is designed to address a significant gap in current funding options available for progressing technology development to a stage suitable for attracting commercial investment and market uptake. Funding will be provided to support activities that translate research for commercial impact, move discoveries along the pathway to commercialisation, accelerate commercialisation and entrepreneurial activities, and reduce risks for future commercial investors. Applications will be reviewed by a Panel, Chaired by a member of the SIEF Advisory Council, which includes independent experts with domain and commercialisation experience. The Panel will make recommendations to the Trustee.

CSIRO as SIEF Administrator

CSIRO provides assistance to the Trustee by providing the following support services under a Services Agreement: financial management of SIEF assets; processes associated with proposal development and research direction; legal advice and contracts; management of assessment of expressions of interest and applications; administration of grants; receipt of reports; managing compliance of funding agreement obligations by recipients; administration and management of the SIEF to ensure its compliance and audit obligations; and secretariat support to the Trustee and the Advisory Council.

The Services Agreement provides that the Trustee will obtain quarterly reports on the financial management of the SIEF assets and on other matters associated with the administration of the SIEF. These management reports are shared by the Trustee with the Advisory Council. The CSIRO Board also receives annual management reports, in its general oversight role of the management of the SIEF by the Trustee and with regard to the provision of services to the SIEF by CSIRO.

Consolidation of Accounts

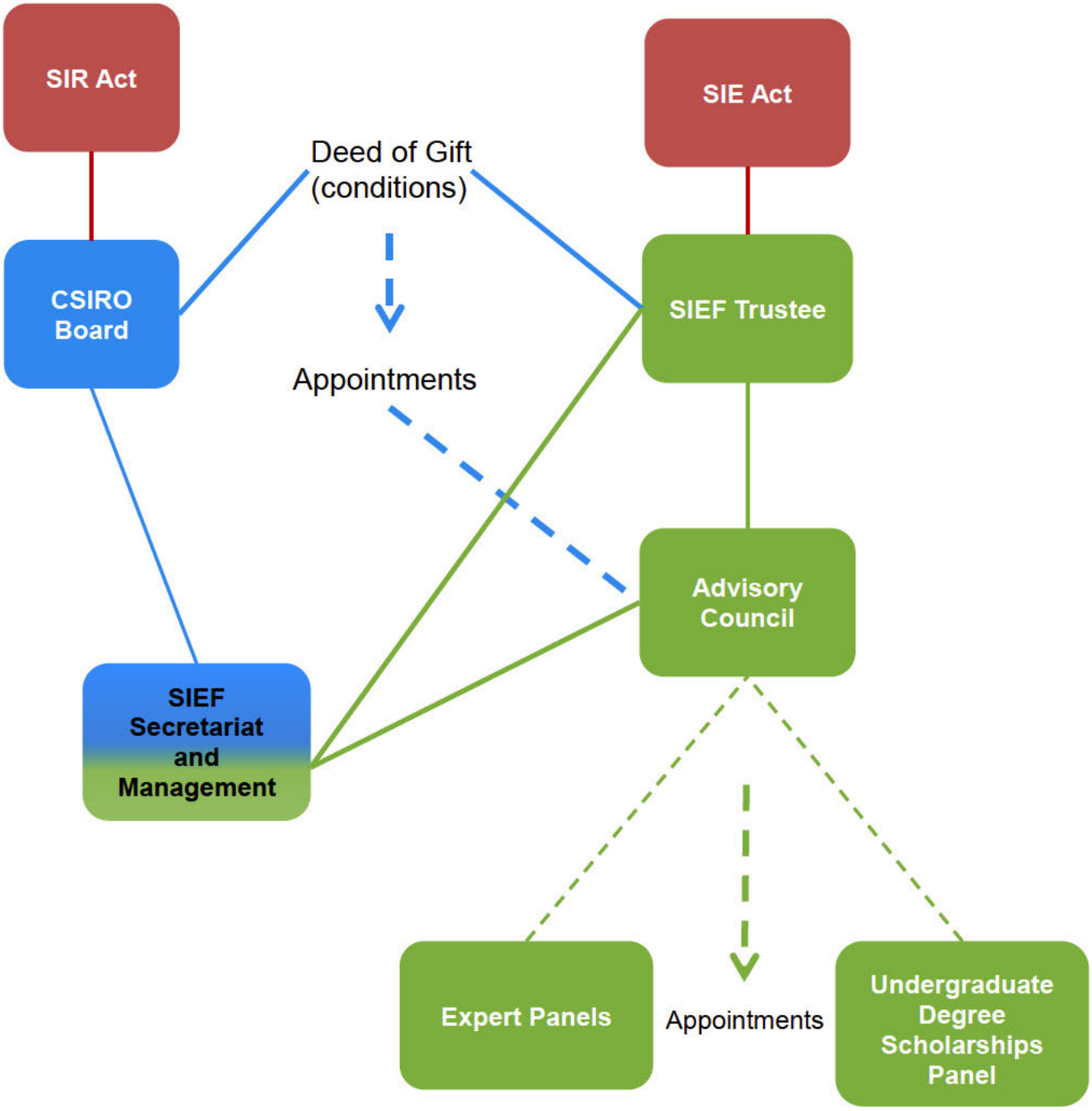
The SIEF's Annual Report, including financial statements, are annexed to the CSIRO Annual Report. Since financial year 2009-10, the SIEF's accounts are also consolidated with those of CSIRO under the relevant Australian Accounting Standard. The SIEF remains a separately constituted trust for statutory purposes under the SIE Act. SIEF accounts are annually audited by the ANAO independently from CSIRO.

ANAO Performance Audit of the Administration of the SIEF

In July-December 2015 the Australian National Audit Office (ANAO) undertook a performance audit to assess the effectiveness of the administration of CSIRO's Gift to the Fund. As required by the *Auditor-General Act 1997*, the ANAO report was tabled in the Parliament (February 2-16) and a copy of the audit was provided to the responsible Minister (the Minister for Industry Innovation and Science).

The report concluded that CSIRO's Gift to the Fund has generally been well administered. In particular, the approach to designing the arrangements for managing the Gift was sound, and for the most part, these arrangements, including the processes for administering financial assistance from the Gift, have been operating as intended. The Report suggested that in order to enable better assessments of the Fund's performance and achievements, CSIRO and the Trustee should develop more qualitative and outcomes focused performance measures, and consider undertaking a formal evaluation – this formal evaluation is currently underway.

Governance Structure



Membership

Trustee

Dr Larry Marshall

Advisory Council

Chair

Professor Alan Robson, former Vice Chancellor University of Western Australia

Members

Professor Margaret Sheil, Provost of the University of Melbourne

Professor Tom Spurling, Swinburne University of Technology

Mr Nigel Poole, General Manager, University of NSW Business School

Dr Peter Riddles, Industry and Government consultant and CSIRO Board member

Dr Ezio Rizzardo, Honorary Fellow, CSIRO Manufacturing

Expert Panel – Research Projects program

Chair

Professor Tom Spurling, Swinburne University of Technology

Members

Dr Ezio Rizzardo, Honorary Fellow, CSIRO Manufacturing

Professor Oliver Mayo, University of South Australia, former CSIRO Chief and current CSIRO Fellow

Dr Trevor Powell, former Geoscience Australia Deputy CEO & Chief of Spatial Sciences

Professor Elaine Sadler, Professor of Astrophysics, School of Physics University of Sydney

Emeritus Professor John McKenzie, former Deputy Vice Chancellor (Research) Melbourne University (resigned)

Undergraduate Degree Scholarship Selection Panel

Chair

Professor Margaret Sheil, Provost of the University of Melbourne

Members

Dr Terry Lyons, Associate Professor, Science Education, Queensland University of Technology

Professor David Symington, Adjunct Professor – School of Education, Deakin University

Expert Panel – Experimental Development program

Chair

Dr Peter Riddles, Industry and Government consultant and CSIRO Board member

Members

At least one additional member of the Advisory Council

2-4 independent experts

Advisory Council Members Profiles

Emeritus Professor Alan Robson (Chairman, Advisory Council) AM, CitWA, BAgrSc *Melb*., PhD *W.Aust*., FTSE,FACE, FACEL, FAIAS, Hackett Professor of Agriculture

Professor Robson served as Vice-Chancellor of The University of Western Australia from 2004-2011, following more than a decade as Deputy Vice Chancellor and Provost (since 1993).

Professor Robson was Chair of the Group of Eight (2007-2010), Deputy Chair of the Council of the National Library (1998-2005), Deputy Chair of Universities Australia (2009-2011), a member of the Western Australian Science Council (2003-2009) and the CSIRO Board (2003-2008).

He has also held the positions of Foundation Director of the Cooperative Research Centre for Legumes in Mediterranean Agriculture (CLIMA), Dean of the Faculty of Agriculture, Head of the School of Agriculture and Professor of Agriculture (Soil Science) at The University of Western Australia. He is currently the Hackett Professor of Agriculture.

Professor Robson was Foundation Chair of the Grain Legumes Research Council, Deputy Chair Research Grants Committee of the Australian Research Council and a Member of the Committee for University Training and Staff Development (1998-1999), the Australian Teaching and Learning Committee (2000-2004) and the Board of Directors of the Australian Universities Quality Agency. In 2001 Professor Robson chaired the Ministerial Taskforce on Structures, Services and Resources Supporting Government Schools. In 1989, Alan Robson was a member of a three person committee to review agricultural and related education in Australia. He has also been a member of review panels in Denmark, India and Canada.

In 1987, Professor Robson was elected as a Fellow of the Australian Academy of Technological Sciences and Engineering. Subsequently he was awarded the Australian Medal of Agricultural Science. In 2003, Professor Robson was made a Member of the Order of Australia, and awarded a Centenary Medal and in 2009, a Citizen of Western Australia.

Professor Margaret Sheil (Member, Advisory Council) is currently Provost of the University of Melbourne, having been appointed on 30 April 2012. She is a Fellow of the Australian Academy of Technological Sciences and Engineering, a Fellow of the Royal Australian Chemicals Institute and an inaugural Fellow of the Australian and New Zealand Society from Mass Spectrometry.

Professor Sheil was a member of the Cooperative Research Centres Committee, the Prime Minister's Science Innovation and Engineering Council, the National Research Infrastructure Council.

From 2007-2012 she was Chief Executive Officer of the Australian Research Council and from 2002 to 2007 she was Deputy Vice-Chancellor (Research) at the University of Wollongong (UOW) where she was previously Dean of Science and a Professor of Chemistry.

Professor Tom Spurling AM, BSc (Hons) PhD (Member, Advisory Council) is a Board member of CSIRO and is Professor, Innovation Studies in the Centre for Transformative Innovation, Faculty of Business and Law, Swinburne University of Technology, Victoria. He is also a member of the Board of the International Radio Astronomy Research Centre and a Director of Advanced Molecular Technologies Pty Ltd.

Professor Spurling is a former scientist and research leader with CSIRO with nearly 40 years of experience in the areas of physical chemistry and industrial technology. He was formerly Director of the Industrial Research Institute at Swinburne University of Technology and Chief Executive Officer of the Cooperative Research Centre for Wood Innovations.

He was a member of the Prime Minister's Science, Engineering and Innovation Council from 2005 to 2007.

In June 2008, Professor Spurling was appointed as a Member of the Order of Australia for services to chemical science through contributions to national innovation policies, strategies and research, and to the development of professional scientific relationships within the Asian region.

Mr Nigel Poole (Member, Advisory Council) is the General Manager of the UNSW Business School. Prior to joining UNSW in 2016, Mr Poole was the Chief Operating Officer at the National Measurement Institute, the peak body for physical, chemical, biological and legal measurement in Australia. Mr Poole worked at CSIRO from 2002 until 2013 and at various times had responsibility for commercialisation of new technology and formation of start-ups, legal and intellectual property, information management and technology, contract administration, major client relationships, and property services. He led the major patent licensing and litigation programme in the US which delivered the funding for the rejuvenation of the Science and Industry Endowment Fund in 2009.

Prior to CSIRO Mr Poole was previously Group Director, Corporate Development at Goodman Fielder Ltd, a senior consultant at McKinsey & Company, and an investment banker in both New Zealand and the United Kingdom. He has degrees in Law and Economics from the University of Otago in New Zealand and is a Fellow of the Australian Institute of Company Directors.

Dr Peter Riddles (Member, Advisory Council) has worked as a consultant to industry and government since 2006 on building science and technology capabilities for economic development (presently working in Canada and California) and as a professional director and advisor to companies where science-innovation is the core business

Dr Peter Riddles has extensive board and governance experience of organisations in the private and public sector where innovation and science are the core business, which includes considerable experience in global innovation systems.

Dr Riddles studied as a scientist at the University of Queensland, Stanford University and the University of Cologne and enjoyed a career at CSIRO between 1985 and 1999 where the last position was as Executive Director of the Bioactive Molecules Initiative (a multi-divisional program).

From 2000 to 2007, Dr Riddles worked with universities in establishing and modernising technology transfer including as GM at IMBcom Pty Ltd (at the University of Queensland) and Director, Griffith Enterprise (at Griffith University).

Dr Riddles experiences include 10 years collectively on the IR&D Board, the Innovation Australia Board, and Member and/or Chair of the Biological Sciences and the Innovation Grants Committees.

Dr Ezio Rizzardo (Member, Advisory Council) is a CSIRO Honorary Fellow in CSIRO Manufacturing. He graduated with First Class Honours in Applied Organic Chemistry from the University of NSW and was awarded a PhD in Organic Chemistry by the University of Sydney in 1969 for his studies on the photochemistry of organic nitro compounds with John Pinhey. He joined David Solomon's group at CSIRO in 1976 after postdoctoral work on the synthesis of biologically active compounds with Richard Turner at Rice University (Houston), Sir Derek Barton at the Research Institute for Medicine and Chemistry (Boston), and Arthur Birch at the Australian National University (Canberra). At CSIRO he turned his attention to polymer science and has led research teams in the fields of Free Radical Polymerization, Polymeric Biomaterials and Engineering Polymers, and was the inaugural Director of the Cooperative Research Centre for Polymer Blends. His principal research interests are in the development of methods for understanding and controlling polymerization processes so as to produce polymers of better-defined structure and properties.

Dr Rizzardo is co-author of some 200 journal papers, which to date have received over 13,000 citations, and 42 worldwide patents. He is an Honorary Professorial Fellow, The University of Melbourne and an Adjunct Professor, Monash University. He is a Fellow of both the Australian Academy of Science and the Australian Academy of Technological Sciences and Engineering, and was elected Fellow of the Royal Society (FRS) in 2010. He is the recipient of the Australian Polymer Medal, the CSIRO Chairman's Medal and CSIRO Medal for Lifetime Achievement 2009 as well as the Australian Government's Centenary Medal for contributions to society and polymer science. He was named a Luminary of Australian Chemistry by the RACI 2011, is ranked 18th in the list of the world's top 100 chemists (Thomson Reuters, 2011), and is the Joint recipient of the Australian Prime Minister's Prize for Science 2011.

CSIRO Research Office and competitive funding programs

Research Office

CSIRO's 2020 strategy clearly commits us to increase the value from our investments in future science – a key strategy measure. It also commits us to focusing our science for impact and ensuring the highest quality scientific standards.

The CSIRO Research Office is one mechanism for ensuring the alignment of corporately funded programs to deliver against the Excellent Science element of the strategy.

Guided by the CSIRO Science Council*, the office manages a suite of strategically focussed competitive funding schemes that support the excellence of our science and its translation to impact in areas that are directly aligned to the strategies of CSIRO's businesses. The office also coordinates major external grant and award opportunities to enhance CSIRO's scientific reputation and support collaborative relationships.

The office also partners with other CSIRO support functions in supporting the development of our early and mid-career researchers.

The office, as part of the Science and Government team, provides support to the Science Council to make recommendations and provide advice to the Executive in relation to a range of matters science matters including development and management of Future Science Platforms and scientific capital priorities.

* The Science Council comprises the Science Directors of CSIRO Business Units and is chaired by the General Manager, Science and Government.

Grants and Awards

The current grant and award activities managed by the office under the Research-Plus (formerly OCE science) scheme are:

1. Internal competitive funding schemes aimed at enhancing the science strength of the organisation including postdoctoral fellowships, postgraduate awards and science leadership fellowships.
2. Internal awards focussed on development of early, mid and late career researchers and on supporting scientists returning from parental leave.

The office also:

1. Manages, under contract to the Science and Industry Endowment Fund, the operational processes of that fund.
2. Manages relationships, processes and compliance with major external funding bodies such as the Australian Research Council, NH&MRC, ATSE, Academy of Science and DFAT.
3. Coordinates CSIRO applications for external awards and prizes to ensure quality, compliance and increase successful outcomes.

This suite of activities will evolve as implementation of the 2020 strategy progresses. The Research Office has capability to operate multiple competitive awards and grant schemes with varying requirements, criteria and processes, as well as providing coordination to maximise participation and minimise timing, process and design conflicts.

Legacy CSIRO schemes

The *Flagship Collaboration Fund* has been a highly successful activity to promote collaboration across the national and international innovation systems to bring capability at scale to bear on the impact challenges addressed by the previous CSIRO Flagships. The scheme has operated across two strategy periods and involved over 80 different research institutions. With recent substantial structural reorganisation, and the renewed focus on collaboration with Universities, it is appropriate to reconsider the best use of these funds.

Flagship Collaboration Fund new investments were suspended in 2014 while the review of CSIRO's competitive funding schemes was undertaken. All prior and current funding commitments under legacy schemes are being honoured and, in 2016-17, a revised suite of programs will be established to support strategic collaboration under the 2020 strategy Collaboration Hub action.

Science and Industry Endowment Fund (SIEF)

SIEF is an independent fund under the trusteeship of the Chief Executive. It is managed operationally by CSIRO under contractual arrangements with the trustee. The Research Office provides this service.

Property Management

Overview

CSIRO has a complex property portfolio of owned and leased facilities that comprises approximately 1,000 buildings spread over 59 sites across Australia. An additional 22 locations are occupied under hosted, short term lease or other arrangements. The integration of NICTA into CSIRO has seen the number of properties rise by 5.

The CSIRO property portfolio is the third largest in the Commonwealth behind the Department of Defence and Defence Housing Australia.

The gross book value of CSIRO's property portfolio was $2.93 billion as at 31 May 2016. The written down value, as at 31 May 2016, is $416.8 million for land and $1.1 billion for buildings.

Property repairs and maintenance costs for 2015-16 are projected to be $30.0 million as of 30 June 2016, representing approximately 1.6 per cent of CSIRO's total expenditure, which equates to approximately 1.0 per cent of the asset replacement value.

The benchmark standard for repairs and maintenance of technical and science related accommodation is 2-2.5 per cent of asset replacement value, however CSIRO has not been able to commit this level of funds without compromising its science capability.

CSIRO manages the estate through a strategic enterprise property team, supported by four regional property services teams across Australia.

Property strategy

CSIRO has a long term Property Strategy which has the aim to support and enable the delivery of CSIRO's core science activities whilst optimising the whole of life costs and improving the efficiency of property management through the consolidation, co-location and modernisation of CSIRO's property portfolio.

With the globalisation of science and technology, research and development communities in countries like Australia must work more closely together to maintain quality, scale, and relevance. Although virtual collaboration is critical, there is emerging evidence globally that co-locating expertise - where researchers operate across organisational boundaries - creates a talent pool with the capacity to resolve complex challenges. These co-locations create multiplier benefits in the ability to attract researchers and collaborations.

In its 2011-15 strategy CSIRO identified its intention to support precincts of global, national, and regional standing and scale. This is also reflected in CSIRO's Strategy 2020. Precincts, concentrations of research and development capability with a strong collaborative culture, will build on and amplify the strengths of Australia's national innovation system to address the nation's and the world's emerging complex science challenges. Precincts will expand and deepen Australia's national and global partnerships involving universities, state and federal governments, and industry by:

- providing the scale and incentives to attract world class people, funding, facilities, and global partnerships
- helping to build relationships with commercial enterprises due to the concentration of capabilities
- housing a high proportion of world class researchers in the domain

- facilitating a more creative and culturally attuned innovation ecosystem.

CSIRO has identified five innovation precincts in Australia with the potential to achieve global standing and scale (co-location in precinct clusters with more than 3000 people and more than $1billion in capital and facilities). These are: Canberra Precinct: Natural and Environmental Sciences; Brisbane Precinct: Ecosciences; Perth Precinct: Resource Sciences; Clayton Precinct, Melbourne: Manufacturing and Materials Sciences; and Parkville Precinct, Melbourne*:* Human Life Sciences.

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CSIRO has also identified its intention to support innovation precincts of national standing and scale. These precincts may grow to a standing and scale of global significance over time or through concerted effort by the partners (including state governments). These precincts are: Sydney: Digital Services; Hobart: Marine and Atmospheric Sciences; Adelaide: Food, Health and Nutrition; Townsville: Tropical Innovation; and Newcastle: Energy Technology. CSIRO is a significant owner and/or contributor to all of the above.

Property Developments

In line with the Property Strategy, CSIRO is delivering 'tranches' of capital works as funding becomes available.

The main emphasis of the first tranche is at Black Mountain, Clayton and Parkville, as summarised below.

BLACK MOUNTAIN

To maintain a competitive science capability on this site, CSIRO has commenced construction of a new 16,000 m^2 office / laboratory facility that will provide specialist laboratory facilities, optimise space utilisation and reduce ongoing operational expenditure.

CSIRO relocated the staff and activities from the Campbell site in March and April 2016. There are also plans to further consolidate other property holdings in the ACT by relocating staff from Yarralumla and Crace to the Black Mountain site. The government approved cost of the ACT Site Consolidation project is $195.6 million.

In addition, it is planned to redevelop the secondary specialist areas such as glasshouses to improve the efficacy of the science and optimise the energy efficiency and sustainability of these assets. This will also enable CSIRO to further engage with its science collaboration partners on the same precinct site.

CLAYTON

The first tranche of relocation activity has been achieved with the construction and launch of CSIRO's Lab 22 Innovation Centre in November 2015 and the consolidation of Highett capability to Clayton in December 2015.

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Property Consolidation and Disposal

A CSIRO site rationalisation and consolidation program began in 1989 when CSIRO consisted of 104 sites. Today CSIRO has 59 sites in Australia. Many CSIRO sites are now on or in close proximity to universities and State government research facilities, resulting in benefits from research collaborations, partnering and reduced operational costs by shared site expenditure.

The Commonwealth Property Disposals Policy requires approval from the Special Minister for State representing the Minister for Finance and Deregulation prior to the divestment of land. Current property disposal activities include:

- Belmont (Victoria) – the property was sold through a recent tender process. Settlement of the sale will occur late in the 2016/17 financial year, once remediation of the site is complete.
- Highett (Victoria) – CSIRO is currently undertaking a site clean-up and demolition project which includes the removal of all buildings within the Highett site and the safe removal of any hazardous materials. This includes finalising the due diligence work in preparation for the disposal of the property in 2016. The property is of interest to the Bayside City Council and the local community regarding the remnant woodland trees on the site and the opportunity to provide public open space in any redevelopment of the site.

Other Capital Works

An internally funded rolling Capital Re-Investment Plan is managed by CSIRO's Property Services. There is no direct allocation of Commonwealth funds for CSIRO's Capital Works Program but funding is provided through the annual appropriation which funds a certain level of depreciation expense as a proxy for capital re-investment.

Major capital project activities are listed below.

Australian SKA Pathfinder project (ASKAP)

- This major initiative is based in Western Australia and involves the installation of 36 antennae and infrastructure to support ASKAP. Land acquisition, environmental (EPBC Act) approvals and native title have been addressed. New support facilities at Murchison Radio-telescope Observatory (MRO) and Geraldton in Western Australia have been completed. Telescope construction is managed by CSIRO Astronomy and Space Science Division (CASS) who are leading the overall development of the project.

Clayton Utilisation Improvement Project

- This project involves the reorganisation of accommodation at the Clayton site to improve utilisation of the existing facilities as well as reorganise Business Unit groupings within the facilities following amalgamations and regrouping. The work will extend across the site and involve the majority of existing groups on the site.

Princes Wharf 3 and 4 repairs

- The wharves at Hobart, Princes Wharf 3 and Princes Wharf 4 were constructed in the 1930s and circa 1962 respectively. Whilst some superficial repairs have been carried out on the wharves in the past,

further work was undertaken of Wharf 4 to support the *RV Investigator* in mid-2014 including installation of shore power facilities. A contract was let in September 2015 to undertake repair works to Wharf 3 (which supports a main building) with works to be undertaken between September 2015 and September 2016. Wharf 4 investigations indicate a full wharf replacement is necessary to support the Research Vessel in the long term. Design and budget planning is underway.

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HIGHER EDUCATION ENDOWMENT FUND (HEEF)/EDUCATIONAL INVESTMENT FUND (EIF) AND OTHER GOVERNMENT GRANT PROJECTS

A number of collaborative (HEEF/EIF) initiatives are underway with Universities and other Government collaborators, as follows:

- EIF - The Indian Ocean Marine Research Centre (IOMRC) is being developed with the University of Western Australia, Australian Institute of Marine Science and WA Fisheries (CSIRO $10 million capital contribution for 35 personnel and equipment) - completion due mid 2016; and

- EIF - Agricultural Education Building has been constructed by the University of New England at Armidale Chiswick, NSW (CSIRO $3 million capital contribution and $500,000 equipment contribution to the shared teaching and research facility including teaching labs, research labs, research and admin offices and a multi-discipline Zoology Teaching Museum and learning Resource Centre). Completion due mid-2016.

CSIRO sites in Australia and staff headcount as at 30 June 2016

STATE	SITE	Total
Australian Capital Territory (ACT)	Acton	37
	Black Mountain	797
	Canberra City	155
	Crace	52
	Ginninderra	6
	Tidbinbilla	89
	Yarralumla	97
ACT Total	7 sites	**1233**
New South Wales (NSW)	Armidale (Chiswick)	37
	Eveleigh (ATP)	294
	Griffith	1
	Kensington UNSW	71
	Lindfield	65
	Lucas Heights	42
	Marsfield	225
	Myall Vale	69
	Narrabri	19
	Newcastle	131

STATE	SITE	Total
	North Ryde	258
	Parkes	20
	Yanco	2
NSW Total	13 sites	**1234**
Northern Territory (NT)	Alice Springs	4
	Darwin	16
NT Total	2 sites	**20**
Queensland (QLD)	Atherton	16
	Bribie Island	12
	Cairns	10
	Coopers Plains	12
	Dalby	1
	Dutton Park	231
	Gatton	9
	Herston – RBWH	44
	Pullenvale	229
	Spring Hill	24
	St Lucia	149
	Toowoomba	16
	Townsville ATSIP	48
	Woodstock	5
QLD Total	14 sites	**806**
South Australia (SA)	Adelaide K. Ave	72
	Adelaide (SAHMRI)	28
	Waite Campus	210
SA Total	3 sites	**310**
Tasmania (TAS)	Hobart	299
	Sandy Bay	53
TAS Total	2 sites	**352**
Victoria (VIC)	Aspendale	97
	Clayton	708
	Clayton NHC	33
	Clayton North	94
	Clayton Wgtn Rd	41
	Docklands	2
	Geelong AAHL	237
	Geelong, Waurn Ponds	64
	Irymple - DPIV	3
	Parkville	71
	Werribee SnydRD	79
	West Melbourne	49

STATE	SITE	Total
	Wodonga	**6**
VIC Total	13 sites	**1484**
Western Australia (WA)	Floreat	167
	Geraldton	17
	Kensington	217
	Murchison	5
	Waterford	51
WA Total	5 sites	**457**
CSIRO Total	**59 sites**	**5896**