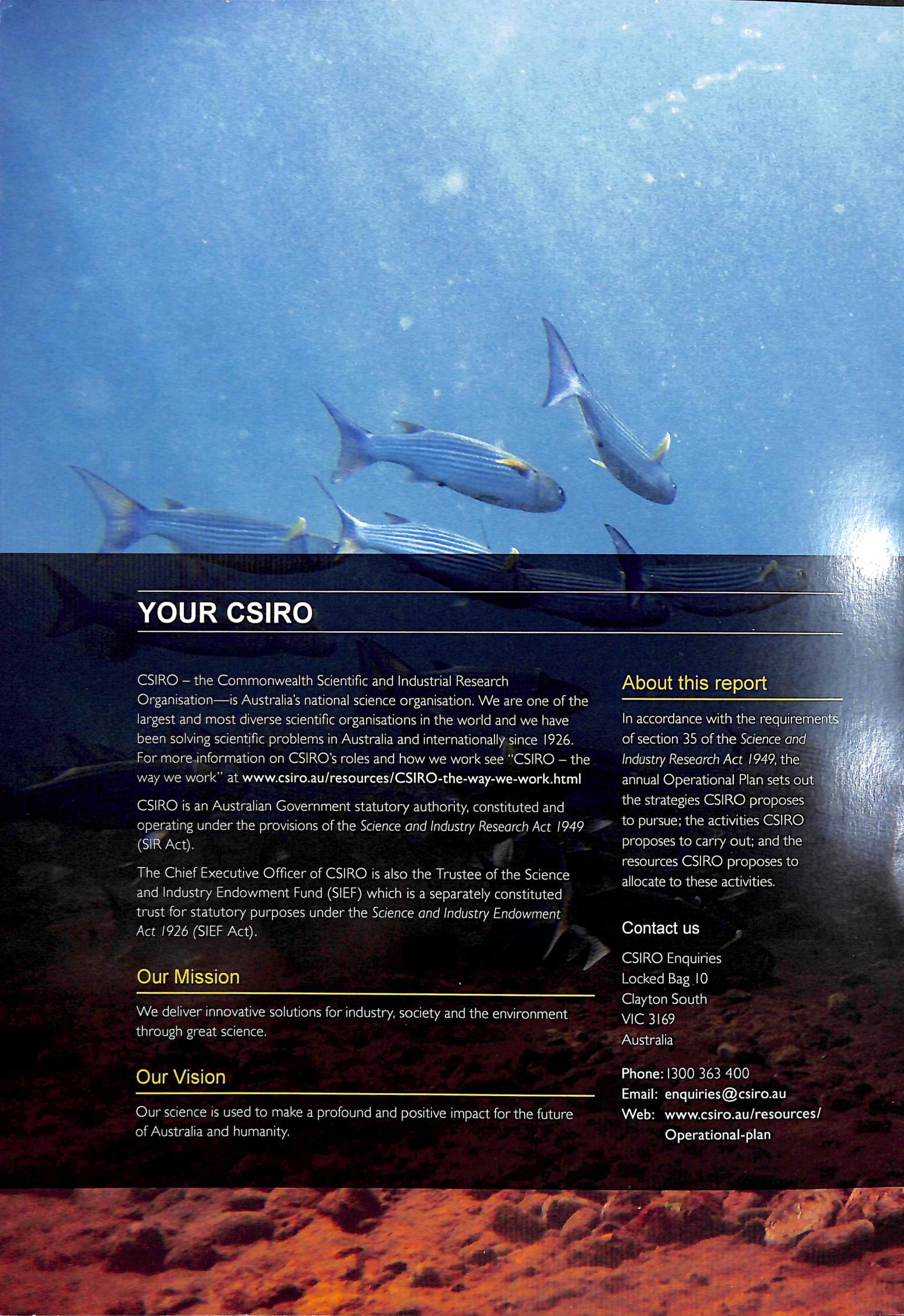


## CSIRO Operational Plan 2011–12



## YOUR CSIRO

CSIRO – the Commonwealth Scientific and Industrial Research Organisation—is Australia's national science organisation. We are one of the largest and most diverse scientific organisations in the world and we have been solving scientific problems in Australia and internationally since 1926. For more information on CSIRO's roles and how we work see "CSIRO – the way we work" at [www.csiro.au/resources/CSIRO-the-way-we-work.html](http://www.csiro.au/resources/CSIRO-the-way-we-work.html)

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

The Chief Executive Officer of CSIRO is also the Trustee of the Science and Industry Endowment Fund (SIEF) which is a separately constituted trust for statutory purposes under the *Science and Industry Endowment Act 1926* (SIEF Act).

### Our Mission

We deliver innovative solutions for industry, society and the environment through great science.

### Our Vision

Our science is used to make a profound and positive impact for the future of Australia and humanity.

### About this report

In accordance with the requirements of section 35 of the *Science and Industry Research Act 1949*, the annual Operational Plan sets out the strategies CSIRO proposes to pursue; the activities CSIRO proposes to carry out; and the resources CSIRO proposes to allocate to these activities.

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# CONTENTS

Chief Executive's Foreword	2
CSIRO's Recent Achievements	4
<b>I. Our Commitment</b>	<b>5</b>
Planning and Reporting on Performance	5
CSIRO Values	6
<b>2. Our Strategy</b>	<b>7</b>
Strategic Objectives	8
Tracking our Strategy	9
Strategy Implementation	10
<b>3. CSIRO Activities and Resourcing</b>	<b>13</b>
CSIRO's Research Portfolios	14
CSIRO's Divisions	16
CSIRO's Enterprise Groups	19
Staff by Functional Area	20
Image Credits	21



**The 2011–12 Operational Plan supports the delivery of CSIRO's 2011–15 strategy.**

**This plan builds on a decade of achievement which has seen CSIRO position itself as Australia's leading large-scale, multidisciplinary, mission-directed science and technology organisation.**

## CHIEF EXECUTIVE'S FOREWORD



CSIRO's priority is Australia, but we must think, act and excel on the global stage.

National debates highlight that the Australian community is looking to CSIRO for trusted scientific advice on which it can make informed choices about Australia's future.

A challenge like responding to climate change is very real for people concerned about our capacity as a nation to maintain the international competitiveness of our industries, whilst protecting the environment and our way of life.

To respond to such challenges will require all the creativity and innovation we can muster.

As Australia's national research organisation, and individually as scientists, our role is to deliver innovative solutions for industry, society and the environment through great science.

We are well placed to fulfil that role:

- We have secured our next four years of funding, with a record \$3 billion from Government.
- We have the highest level of Government, industry and community support that we have had in many years.
- We are a trusted organisation with a proud track record of success.
- Globally we are recognised as one of the world's top applied research organisations.

Importantly, we continue to demonstrate the relevance of our scientific excellence by facilitating its application and delivering positive and profound economic, social and environmental benefits.

In this context, this plan outlines our strategic objectives and how we will achieve them. It sets out our activities, resourcing and performance measures for 2011–2012.

In the coming year and beyond, our work will include building an integrated national picture of carbon, water and land use; maintaining Australia's bio-security; enhancing national productivity and supporting the growth of the digital economy; and addressing the key national and global challenges of food security, clean energy, climate change and preventative health.

Success will depend on how well we nurture and develop our people. We are committed to building an enhanced innovative culture based on leadership, empowerment, diversity, teamwork and resilience.

Our shared commitment to CSIRO's values of integrity of excellent science, trust and respect, initiative to explore, delivering on commitments and to safety and sustainability, defines us as an Organisation. It provides confidence to our investors, our research partners and importantly to the Australian community.

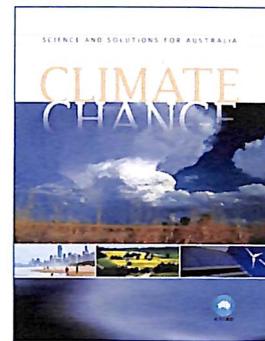
Over the coming year I expect to see exciting progress towards building the capacity of the Flagships, gaining support for global and national precincts, enhancing strategic partnerships, identifying better ways to operate as one organisation, and equipping our staff to inform national debates. We will continue to strive towards 'Zero Harm' to our people and the environment.

I encourage everyone to read this plan, to understand the roles we play and the breadth and importance of the work we are doing, and to discuss how we can work better together to deliver on our commitments.



Megan Clark  
Chief Executive

As Australia's national research organisation and individually as scientists our role is to deliver innovative solutions for industry, society and the environment through great science.



## CSIRO'S RECENT ACHIEVEMENTS

### Food for the Future

#### 1// BARLEY Max™

CSIRO's new BARLEYmax™ is a natural wholegrain barley with enhanced nutritional benefits. This 'supergrain' contains twice the dietary fibre of regular grains, four times the resistant starch and has a low glycemic index. With a pleasant 'nutty' taste, a range of products made from BARLEYmax™ are now available on supermarket shelves across Australia, with more products to come.

#### 2// The Perfect Prawn

CSIRO scientists, in collaboration with the Australian prawn industry, have developed a new prawn that is producing record yields providing a major boost for the local prawn industry and consumers wanting to buy Australian seafood. With around 50 per cent of all prawns in Australia currently imported, its high yields will play an important role in securing food supplied, both in Australia and globally.

### Helping to reducing greenhouse gases

#### 3// UltraBattery

CSIRO's UltraBattery is a hybrid car battery that lasts four times longer, costs 70 per cent less and produces 50 per cent more power than conventional batteries. In a UK trial a hybrid electric test vehicle clocked up 160,000 km (100,000 miles) using the UltraBattery.

#### 4// Lightweight Concrete Reduces Greenhouse Gases

A new lightweight, environmentally friendly geopolymers concrete uses 27 per cent less embodied energy, produces 50 per cent less carbon emissions and lessens the impact on the environment by 22 per cent compared to an equivalent Portland cement product. Geopolymer products are also lightweight, fire-, blast- and acid-resistant, extremely strong and can also be used as an adhesive.

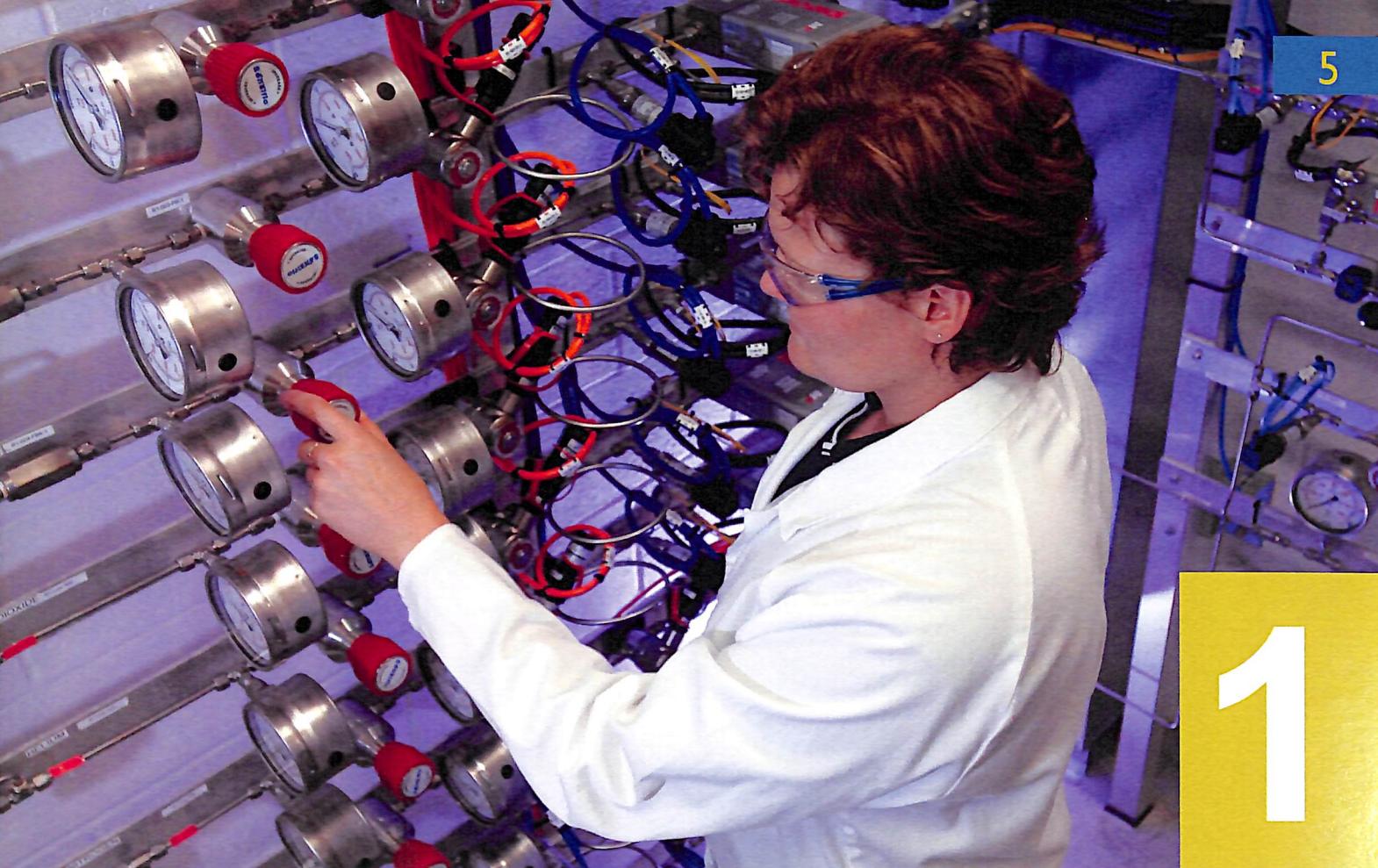
### Sharing Knowledge with the Community

#### 5// 'Energymark' to reduce power bills

CSIRO is working with and helping households and communities to reduce their carbon footprint and lower energy use through community programs such as Energymark. On average participants saved up to 20 per cent on their energy bills and reduced their carbon footprint by 25 per cent.

#### 6// Climate Change Book

*Climate Change: Science and solutions for Australia* provides the community with the latest information on climate change science and potential adaptation and mitigation responses in non-technical language.



## OUR COMMITMENT

CSIRO is an Australian Government statutory authority within the Innovation, Industry, Science and Research Portfolio, operating under the provisions of the *Science and Industry Research Act 1949*. CSIRO receives approximately two-thirds of its operating revenue in appropriation funding through the Federal Budget.

Our commitment to the parliament and people of Australia set out in the 2011–12 Portfolio Budget Statements (PBS)<sup>1</sup>, is to contribute to the following outcome:

Innovative scientific and technological solutions to national challenges and opportunities to benefit industry, the environment and the community, through scientific research and capability development, services and advice.

### Planning and Reporting on Performance

CSIRO is accountable for the appropriate, effective and efficient use of the resources entrusted to the Organisation. The major components of CSIRO's planning framework are illustrated in Figure 1, page 6.

The Strategic Plan describes a pathway for CSIRO to cement its role in the National and Global Innovation Systems. It is supported by a Quadrennium Funding Agreement (QFA) between CSIRO and the Government.

The Strategic Plan conveys the broad objectives for the Organisation and sets out the broad policies and strategies to be pursued to achieve those objectives. The Operational Plan is the annual representation of the Strategic Plan and describes the priority actions required for successful implementation of the strategy each year.

<sup>1</sup> The relevant section of the Portfolio Budget Statements can be viewed at [www.innovation.gov.au](http://www.innovation.gov.au). The Outcome is the formal legal statement of the purpose for which funds are appropriated to CSIRO.

The QFA outlines several principles in relation to the agreed level and use of CSIRO's appropriation and external revenues over the strategic planning period. The PBS are the annual representation of the QFA and describe the program of activities that CSIRO will undertake to achieve its outcome.

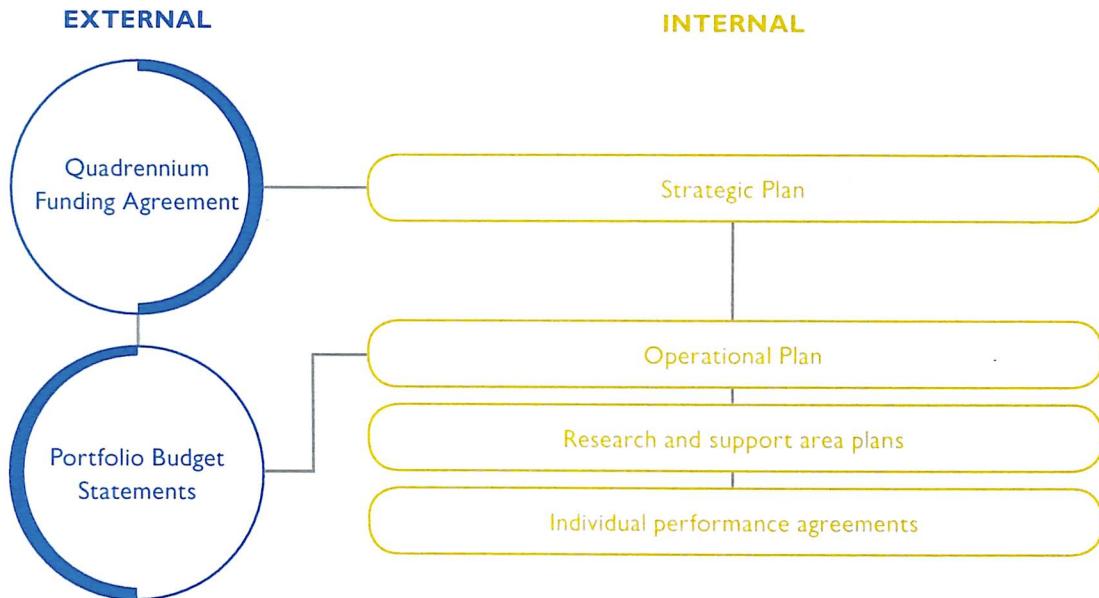
Each year, CSIRO reports its performance in an annual report to Parliament. The annual report includes reporting against:

- deliverables and key performance indicators in the Portfolio Budget Statements
- the implementation of strategic priorities identified in the Operational Plan.

CSIRO also monitors its performance throughout the year with:

- regular reports to the Executive Team and Board to assist with their decision-making and governance responsibilities
- detailed planning and review processes operating at a range of levels, including research portfolios and Divisions, functional areas, and individuals.

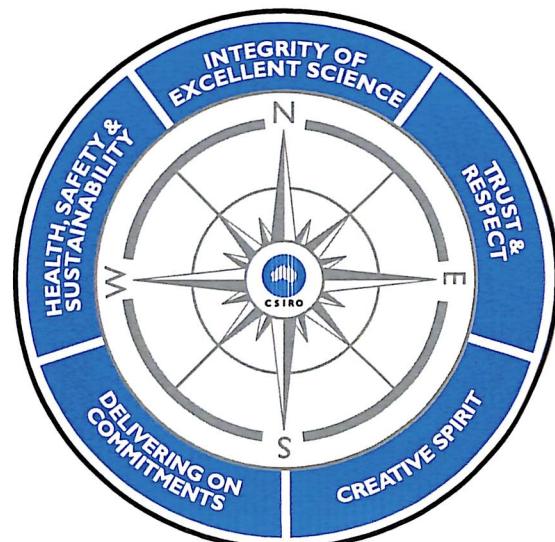
**Figure 1: Key Planning Documents**



## CSIRO Values

The Values Compass depicts the five value statements that guide our planning, behaviour, decisions and actions.

- Embracing **scientific excellence** and working together ethically and with **integrity** in everything we do.
- Building **trust and respect** each day with our communities, partners and colleagues, knowing that with trust comes **accountability**.
- Igniting our **creative spirit**, exploring new horizons and creating an environment where innovation thrives.
- Consistently **delivering on our commitments**. 'Do what we say we will do.'
- Striving towards a **healthy, safe and sustainable future**.





## OUR STRATEGY

In June 2011, a new Strategic Plan was approved by the CSIRO Board.<sup>2</sup> The strategy embraces the Organisation's distinct role as a large scale, mission-directed, multidisciplinary science and technology organisation, a connector of the National Innovation System, and as a trusted science advisor on the big issues facing the nation.

CSIRO's strategy positions the Organisation to play an active role in Australia's innovation agenda, address national and global research challenges, and contribute to Australia's productivity and competitiveness. It seeks to attract the best and brightest minds to work collaboratively nationally and internationally, and to conduct world-class research that fuels the innovation system with new knowledge and ideas.

Through the National Research Flagships, CSIRO concentrates on strategic research and knowledge and technology transfer with the potential to deliver major long-term social, economic and environmental benefits to Australia. Our strategy is to grow Flagships as the key mechanism for achieving outcomes relevant to the National Research Priorities and the National Innovation Priorities.

The capacity to deliver profound impact through the Flagships is underpinned by investing in capabilities that build strength in areas of national need, ensuring that Australia has the knowledge and skills required to respond to national and international challenges.

CSIRO will also amplify its impact by building and supporting connections between government, industry and academia across the National Innovation System. We will work with our partners to build precincts of global scale, standing and scope and foster deep collaborations across Australia and the world. CSIRO will also enhance its role as a trusted advisor to the nation in critical areas of challenge and opportunity.

<sup>2</sup> [www.csiro.au/resources/StratPlan11-15](http://www.csiro.au/resources/StratPlan11-15)

## Strategic Objectives

### **Strategic Objective 1**

#### National Flagships

Focus and increase the Organisations resources invested in delivering profound impact in response to national challenges and opportunities through the National Research Flagships Program.

### **Strategic Objective 2**

#### Science Excellence and Preparedness

Invest in people and infrastructure to maintain and develop national scientific breadth and depth in support of delivering profound impact and scientific preparedness.

### **Strategic Objective 3**

#### Deep Collaboration and Connection

Build deep connections with and among the best partners in Australia and the world to complement our science capability and accelerate impact delivery.

### **Strategic Objective 4**

#### Innovation Organisation

Boost our capacity to operate as one organisation to respond to the changing nature of science, deliver profound impact and build capability for the future.

### **Strategic Objective 5**

#### Trusted Advisor

Play a leading role in the trusted delivery of scientific evidence, advice and interpretation to the Australian Government, public and industry.

## Tracking our Strategy

Multiple lines of evidence will be used to monitor overall achievement of our strategy, including reporting against the Enterprise Strategy Measures.

### Enterprise Strategy Measures

#### Impact

1. Develop measures in 2011–12 for benchmarking our performance for delivery of triple-bottom-line impact through evaluating realised benefits. Be recognised as one of the top three global applied science organisations by 2014–15 for impact delivery as measured against our 20 global peers.
2. Develop future impact pipelines for at least 80 per cent of the Flagships Portfolio by June 2012; evaluate potential triple-bottom-line value for at least 50 per cent of the Flagship future pipeline by June 2013 and 80 per cent by June 2014. Deliver Flagships goals at a rate meeting's or exceeding initial time to goal expectations.
3. Baseline customers' 'willingness to recommend' in 2011–12 and improve our performance year-on-year over the strategy.
4. Increase the community awareness of impact derived from CSIRO activities from the established baseline of 50 per cent (2010–11) to 75 per cent by 2014–15.

#### Science

5. Science quality is maintained or improved in Environment and Ecology, Agricultural Sciences, Plant and Animal Sciences, and Geosciences as measured through benchmarking against global peers (science productivity, citations per paper, collaboration). CSIRO maintains breadth in at least 14 fields in the top 1 per cent globally based on ISI/Thomson Reuters total citation data.
6. Progress towards establishing precincts of global standing in the Plant and Agricultural Sciences, Resource Sciences, Environmental Sciences, Materials and Manufacturing Sciences and Human Life Sciences meets Precinct Development Plans by 2014–15.

#### People

7. No fatalities or major injuries of CSIRO people. Lost Time Injury Frequency Rate (LTIFR) and Medical Treatment Frequency Rate (MTFR) improves year-on-year and is in the top quartile of like organisations by 2014–15.
8. Awareness of CSIRO's Values increases from the established baseline of 73 per cent (2010–11) to 95 per cent in 2011–12. A baseline for the use of Values in guiding behaviours and decision-making is established by June 2012 and improves year-on-year over the strategy period.

#### Resources

9. CSIRO's financial, operating and capital management performance meets approved annual budget.
10. Direct investment of CSIRO resources towards major national challenges and opportunities through the National Research Flagships increases to 65 per cent by 2014–15.

## Strategy Implementation

It is not intended to address all aspects of the strategy in the same depth each year. The aim is progressively to plan and implement – and to embed in ‘business as usual’ – the processes and practices needed to ensure that we deliver on our Strategic Objectives over the life of the full strategy period. Each successive annual Operational Plan will identify a small number of high priority areas that require focused executive action for successful strategy implementation.

## Key Executive Actions 2011–12

### Strategic Objective 1—National Flagships

Focus and increase the Organisation’s resources invested in delivering profound impact in response to national challenges and opportunities through the National Research Flagships Program.

1. Develop investment cases for new Flagships in Biosecurity and Digital Productivity, secure stakeholder support with a view to commencing, as appropriate, the Flagships in 2012–13.
2. Implement first key initiatives from a finalised strategic plan for the ‘Integrated Carbon Pathways’ project.
3. Map our intended future Flagship impact and establish routine evaluation processes, using common methodologies across the Flagship’s portfolio.

### Strategic Objective 2 —Science Excellence and Preparedness

Invest in people and infrastructure to maintain and develop national scientific breadth and depth in support of delivering profound impact and scientific preparedness.

4. Develop an integrated program to drive our global science standing, which includes attracting, developing and retaining world-class people.
5. Refresh the long-term capital investment strategy and obtain approval by the CSIRO Board.
6. Establish a shared science and impact vision for Global Precincts (including science focus; partners; funding options) and establish internal governance arrangements to support CSIRO investments.
7. Evaluate options for a coordinated national approach to national biological collections and seek support for integration of our major biological collections within a wider vision of a Canberra Precinct.
8. Develop and commence implementation of enterprise-level research data management processes and systems aligned with CSIRO’s e-Research and e-Enablement strategy.

### Strategic Objective 3 — Deep Collaboration and Connection

Build deep connections with and among the best partners in Australia and the world to complement our science capability and accelerate impact delivery.

9. Grow national and international alliances with major industry, government and community partners in 2011–12 especially in domains critical to the delivery of Flagship’s goals.
10. Execute strategies to improve relations and expand collaborations with five key international and ten key national research partners.



- 
- 11. Support Australia's bid for the Square Kilometre Array (SKA) and evaluate (and execute as appropriate) options for CSIRO's level of involvement, noting the SKA site decision is due early 2012.
  - 12. Review and refresh our partner alliances and science directions for regional sites.
- 

#### **Strategic Objective 4 — Innovation Organisation**

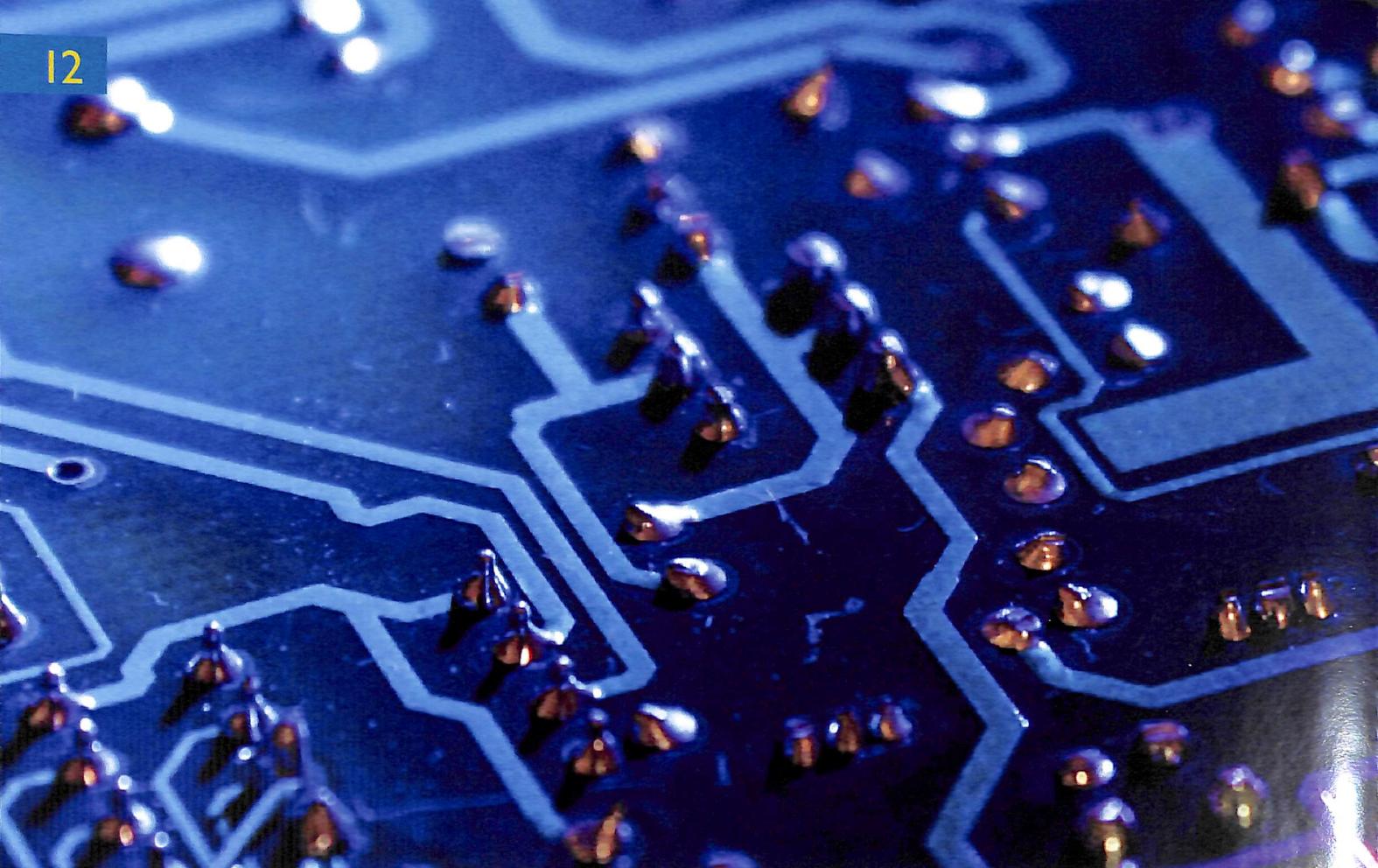
**Boost our capacity to operate as one organisation to respond to the changing nature of science, deliver profound impact and build capability for the future.**

- 13. Further develop and apply an Innovation Maturity Model to understand the key drivers of innovation in a CSIRO context, baseline our existing maturity and identify key improvement opportunities.
  - 14. Review and realign (as appropriate) our Learning and Development curriculum and service offering, to ensure it prepares our people to deliver against CSIRO's distinctive role.
  - 15. Further develop and implement strategic workforce capability plans for all our Divisions using a One-CSIRO approach.
  - 16. Actively manage CSIRO's financial position to achieve a non-consolidated underlying operating and capital result consistent with the Board approved budget.
  - 17. Implement the Health, Safety and Environment 2011–15 Strategy across the Organisation as we continue to build towards a 'Zero Harm' culture.
- 

#### **Strategic Objective 5 — Trusted Advisor**

**Play a leading role in the trusted delivery of scientific evidence, advice and interpretation to the Australian government, public and industry.**

- 18. Develop and execute a systematic engagement strategy across CSIRO's impact domains including CSIRO position statements on national interest issues (e.g. climate change) and emergency response issues (e.g. biosecurity).
  - 19. Revitalise CSIRO branding and marketing strategies (with associated co-branding options) and run three to five consumer orientated campaigns to increase awareness of CSIRO.
  - 20. Execute a strategy to use social media tools to communicate with selected key audiences.
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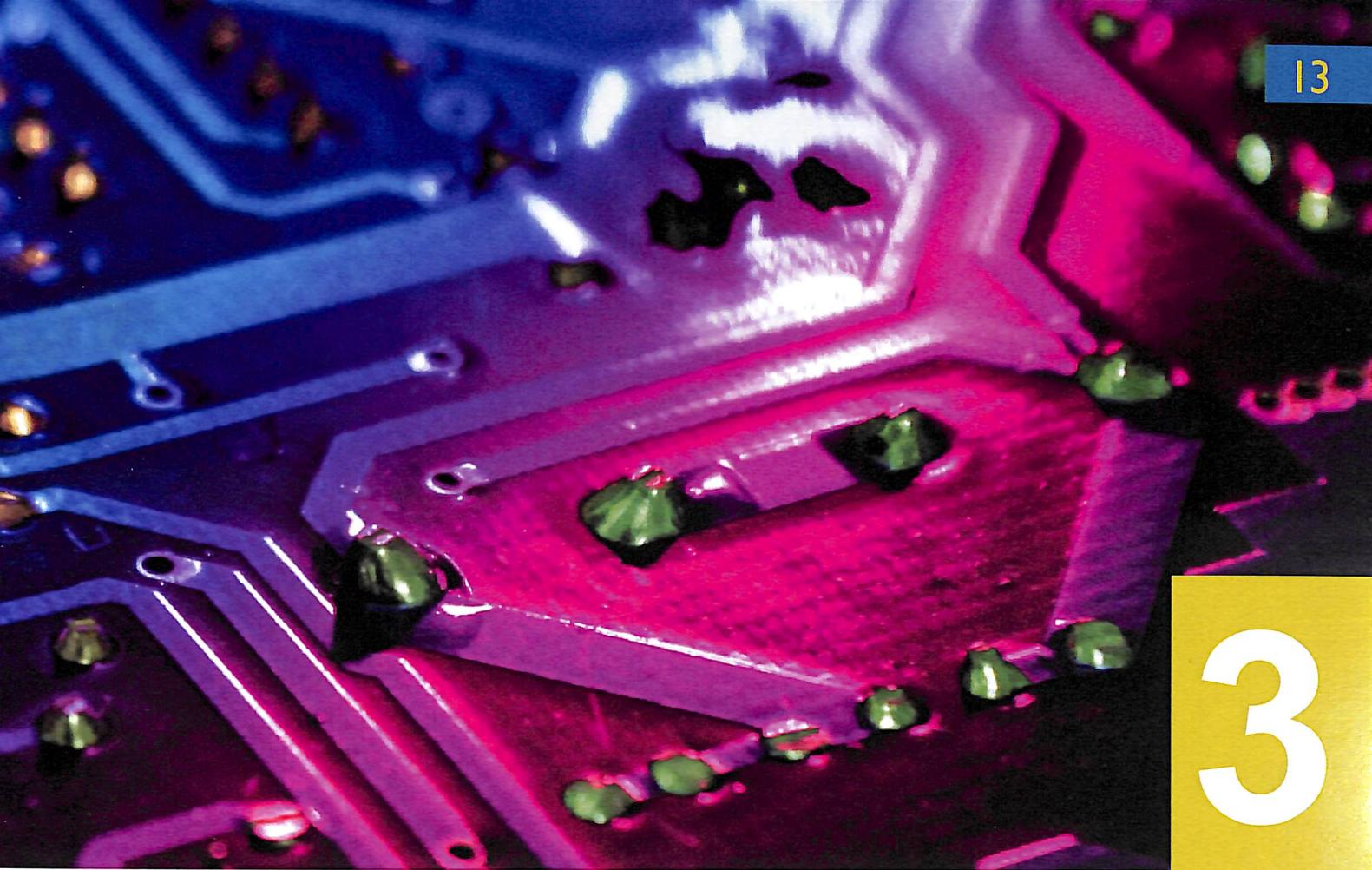


## CSIRO Activities

This section provides an overview of the activities that CSIRO undertakes to fulfil its mission and deliver on its commitment to the parliament and people of Australia and a summary of the planned allocation of resources to these activities through CSIRO's science investment process.

### Science and Industry Endowment Fund

The Science and Industry Endowment Fund (SIEF) is a separately constituted trust under the Science and Industry Endowment Act 1926 and makes strategic investments in scientific research that address issues of national priority for Australia. The Chief Executive of CSIRO is the Trustee of the Fund. The total budget for the Fund in 2011–12 is \$18.7 million.



## CSIRO ACTIVITIES AND RESOURCING

### Research Portfolios

**National Research Flagships \$539.6m**

**Enterprise Portfolios \$403.9m**

Portfolios are made up of a number of Themes which conduct research projects directed towards clear and specific strategic goals. Portfolios, including National Research Flagships, are the way we organise our research to deliver impact for Australia, working across our Divisions. Research portfolios define the problem(s) to be addressed by our science, together with the strategy for delivering outcomes and impact.

### National Research Infrastructure

**\$109.0m**

CSIRO has stewardship of two types of National Research Infrastructure – the National Facilities and the National Biological Collections. Together these provide world-class infrastructure and unique resources to Australia's researchers on a shared basis.

### Capability Development

**\$177.9m**

CSIRO Divisions are the creators and custodians of scientific capabilities. They deploy, or allocate, capabilities to meet the objectives of Portfolios. Divisions develop and deliver the science to solve problems defined at the Portfolio level. In addition to the allocation of capability to Portfolios, CSIRO also allocates resources directly to capability development through the funding of Transformational Capability Platforms; Capability Themes and the Science Team program.

### Enterprise Support

Enterprise Functions provide skills and services that complement our science. Working in partnership with other operating units, they provide business services and infrastructure, manage our business processes and systems, lead the development of policy, standards and procedures, monitor performance against standards and facilitate the development of enterprise strategy. The costs of enterprise support are included within the above program budgets.

### Outreach and Education Programs

**\$23.8m**

Through the science outreach programs, CSIRO promotes the importance of science and its application to students, parents, teachers and the Australian community. The outreach programs include the CSIRO Discovery Centre, CSIRO Education Programs and CSIRO Publishing. CSIRO also supports undergraduates, postgraduates and postdoctoral researchers to boost the calibre of researchers working in the Australian community.

## CSIRO's Research Portfolios

Research Portfolio	Budget (\$m) <sup>3</sup>	Aim
<b>National Research Flagships</b>		
Climate Adaptation Flagship	44.0	Equip Australia with practical and effective adaptation options to climate change and variability and in doing so create \$3 billion per annum in net benefits by 2030.
Energy Transformed Flagship	44.0	Develop, demonstrate and ensure deployment by 2020 of integrated low carbon pathways for Australia and alternative stationary and transport energy solutions that realise a reduction of Australia's carbon dioxide emissions by >20 million tonnes per annum by 2030 and by >50 million tonnes per annum by 2050.
Food Futures Flagship	42.3	To transform the international competitiveness and add \$3 billion annually of value to the Australian Agrifood sector by the application of frontier technologies to high potential industries.
Future Manufacturing Flagship	66.4	To secure a competitive and sustainable future for Australian manufacturing by creating \$2 billion annually in additional value and increasing resource efficiency by 30 per cent by 2030.
Minerals Down Under Flagship	87.9	To help the Australian minerals industry exploit new resources with an in-situ value of \$1 trillion by 2030, and to more than double the size of the associated services and technology sector to \$10 billion a year by 2015.
Preventative Health Flagship	30.7	To improve the health and wellbeing of Australians and save \$2 billion in annual direct health costs by 2020 through the prevention and early detection of chronic diseases.
Sustainable Agriculture Flagship	64.8	To secure Australian agricultural and forest industries by increasing productivity by 50 per cent and reducing net carbon emissions intensity by at least 50 per cent between now and 2030.
Water for a Healthy Country Flagship	93.3	To provide Australia with solutions for water resource management, creating economic gains of \$3 billion per annum by 2030, while protecting or restoring our major water ecosystems.
Wealth from Oceans Flagship	66.2	To provide Australia with the knowledge and tools to protect coastal and ocean environments, increase their value to society and create a net economic benefit of \$3 billion per annum by 2020.

<sup>3</sup> Proposed Total Research Investment for 2011–12.

Research Portfolio	Budget (\$m) <sup>3</sup>	Aim
<b>Enterprise Portfolios</b>		
Advanced Coal Technologies	47.5	By 2020 to increase Australian mineable coal resources by ten billion tonnes (25 per cent) adding more than \$1.5 trillion dollars in value, while at the same time contributing ten per cent of Australia's greenhouse gas reduction target through fugitive emissions control. To provide the technology pathways to reduce greenhouse gas emissions from fossil energy use by 90 per cent by 2050 in order to reach Australia's 2050 target.
Astronomy and Space Science	18.2	To operate a world-class National Facility for radio astronomy for the Australian and international astronomical community, supported by leading-edge technical innovation and world leading astrophysical research.
Biodiversity	11.7	Provide the data, tools and integrating knowledge to underpin a collective national effort to help halt biodiversity decline in Australia by 2020 and reverse this decline by 2035.
Digital Productivity and Services	37.2	Improve the productivity of Australia's digital economy and unlock the value of the National Broadband Network, through more efficient and innovative service delivery to create \$5 billion in added value per annum for the Australian economy.
Ecosystem Sciences	22.9	Integrate diverse biological sciences from the level of the gene to the ecosystem to deliver knowledge for biosecurity and bioindustries.
Food and Nutritional Sciences	31.4	To develop safe, sustainable, effective and healthy foods, diets and lifestyle strategies to help prevent, manage or delay the onset of obesity and diabetes, contain healthcare costs and improve productivity.
Livestock Industries	42.1	Provide research solutions to enable Australia's livestock and allied industries to be globally competitive, and address the challenges of food security on a national and international basis.

<sup>3</sup> Proposed Total Research Investment for 2011–12.

Research Portfolio	Budget (\$m) <sup>3</sup>	Aim
Marine and Atmospheric Research	38.4	To enable Australia to manage its activities in the interests of sustainable national, regional, and global earth systems through advancing understanding of atmospheric, climate, and marine systems and their interactions with human activities. (Budget includes \$8.3m for Integrated Marine Observing System).
Materials, Science and Engineering	38.1	The goal is to support and create globally competitive Australian companies in the biomedical and chemical sector to manufacture new products and devices for the emerging market for improved health and wellbeing.
Petroleum and Geothermal	35.0	Support Australia and the world's transition to a safer, cleaner and secure energy future, with an emphasis on gas as the transition fuel and on the demonstration of geothermal energy use in Australia.
Plant Industry	81.4	To develop new fundamental and applied scientific solutions to ensure a viable and internationally competitive plant-based agricultural and forestry sector for Australia that has a long-term sustainable future in the face of climate change and intense global competition.

## CSIRO's Divisions

Division	Full time equivalent <sup>4</sup>	Description
Astronomy and Space Sciences (CASS)	135	CASS provides radio astronomy and space tracking facilities to CSIRO and Australia. The building of the ASKAP survey radio telescope dominates the capability development activities of CASS. Capabilities required include antenna design, signal processing, data transport, advanced computing and observatory operations.
Earth Science and Resource Engineering (CESRE)	298	CESRE provides technologies that support sustainable development of Australia's energy and mineral resources. In 2011–12, CESRE aims to sustain its existing capability through a focus on reduced turnover, improved succession planning and strategic recruitment. There will be continued focus on new science and engineering initiatives in, for example, computational geophysics and fugitive methane detection.

<sup>3</sup> Proposed Total Research Investment for 2011–12.

<sup>4</sup> Source: CSIRO Capability Inventory 2011

Division	Full time equivalent <sup>4</sup>	Description
Ecosystem Sciences (CES)	452	CES conducts research and development across a range of landscapes, targeting social, economic and environmental sustainability. Activities for CES include restructuring CES research programs around a capability model consolidating Canberra based staff onto Black Mountain and building alliances with University partners.
Energy Technology (CET)	156	CET develops technologies that will reduce greenhouse gas emissions and contribute to a secure and sustainable Australian energy future. This year CET will increase capability in the scientific fields of solar-thermal, integration of large-scale storage technologies and energy management. Improvements will also be made in the disciplines of project management and systems engineering.
Food and Nutritional Sciences (FNS)	209	FNS conducts food and nutrition research to support the health and wellbeing of the Australian community, and the sustainability and viability of the Australian food industry. Focus for this year is on leadership training and succession planning and developing a vision for a merger with Livestock Industries. There will be a continued emphasis on developing expertise in genomics and nutritional genomics, statistics and bioinformatics to improve food as a health delivery mechanism.
ICT Centre (ICT)	234	The ICT Centre is CSIRO's national research hub for innovative information and communication technologies. The ICT Centre's focus for capability development is to give researchers time, between 20 and 50 per cent, to work on approved projects relevant to long-term science. Key capability areas include interoperability, customer centre service delivery, delivery technologies and trust base collaboration.
Land and Water (CLW)	349	CLW develops new measurement and prediction systems for assessing the availability and condition of land and water resources, to facilitate effective decision-making by government, industry and the community. This year's highest priority is to upgrade laboratories and reduce CLW's environmental footprint. Other developments include: the need for more strategic alliances with universities, attracting capability leaders, keeping pace with developments in eResearch.
Livestock Industries (CLI)	228	CLI provides research in animal science and animal biosecurity to enable Australia's livestock and allied industries to be globally competitive. In 2011–12 CLI will continue to develop and maintain critical capability. It will develop strategic visions for a new CSIRO Division comprising the current CLI and Food and Nutritional Sciences (CFNS) and a new National Research Flagship in biosecurity.

<sup>4</sup> Source: CSIRO Capability Inventory 2011

Division	Full time equivalent <sup>4</sup>	Description
Marine and Atmospheric Research (CMAR)	393	CMAR advances Australian climate, marine and earth systems science to help Australians better understand and manage effects on the Earth's systems. The capability objective for CMAR is to improve its modelling and integration capabilities. In 2011–12 CMAR will reshape the capability base to increase capacity in high priority areas; develop individual scientists and retain key scientists; establish communities of practice and science symposia and strengthen key national and international relationships through exchange and training programs.
Materials Science and Engineering (CMSE)	591	CMSE creates world-class innovation in materials science and engineering to serve our community by helping transform Australian manufacturing. CMSE continues to embed the changes to capability that occurred from the merger with CMHT in July 2010. In 2011–12, emphasis is on filling capability gaps in the design of new materials through the use of high throughput methods, biology, theory and an understanding in quantum phenomena.
Mathematics, Informatics and Statistics (CMIS)	160	CMIS develops and applies innovative mathematical and statistical sciences so that CSIRO can deliver high quality solutions to Australia's challenges. This year CMIS will increase the size and quality of capabilities through strategic recruitment and relationship building and increase scientific output through establishing a new Flagship and overcoming the challenge of fragmentation for CMIS staff.
Plant Industry (CPI)	447	CPI aims to breed better plants and build knowledge of plants and their environment to improve Australia's plant-based industries. The main aim for capability development is ensuring that CPI can support CSIRO activities across a range of Portfolios. Emphasis is on developing skills to ensure the uptake/development of novel technologies and through skills in agronomy and conservation that farming systems of the future are sustainable.
Process Science and Engineering (CPSE)	241	CPSE develops and applies scientific and industrial research capability to support the growth and competitiveness of Australian minerals and related process industries, and related Australian technology and services sectors. Capability focus is to continue to develop and enhance understanding at a (near) molecular scale of fundamental physicochemical interactions that are driving the performance and efficiencies of existing and novel industrial processes.

<sup>4</sup> Source: CSIRO Capability Inventory 2011

## CSIRO's Enterprise Groups

Enterprise Group	Budget (\$m) <sup>5</sup>	Description
Development Group	5.3	The Development Group identifies future business opportunities pipeline and broadens enterprise horizons through strategic international and national relationships. The group focuses on developing strong and enduring relationships that enable the creation and uptake of CSIRO's science and technology.
Finance, Property and Procurement	133.7	The Finance group ensures that CSIRO meets its financial obligations, operates within budget and supports the maintenance and purchasing of facilities and equipment.
Information Management and Technology	78.2	The Information Management and Technology (IM&T) group delivers up-to-date, quality information technologies and library services that support CSIRO's research activities and enterprise support functions.
Operations and Governance Group	68.0	The Operations and Governance Group provides CSIRO with essential business support services to ensure we meet our legal obligations and have in place the correct policies and procedures to operate as an effective organisation.
Science, Strategy and People	27.6	The Science, Strategy and People group supports CSIRO through a diverse set of activities that are targeted at: the safety and health of our people; operating with environmental sustainability; supporting our people and our leaders to perform at their best; supporting enterprise strategy development and execution; targeting our science investments to the highest priorities; and measuring, reviewing and reporting our performance, delivery of impact, and progress against strategy and operational support goals.

<sup>5</sup> Proposed Total Research Investment for 2011–12.

## Staff by Functional Area

CSIRO looks to its staff to support its values and to work together in a collaborative and positive way to achieve the Organisation's aims. CSIRO seeks to attract the best minds and be a place where people want to work, where people are challenged and supported to achieve their full potential.

CSIRO staff are employed under section 32 of the *Science and Industry Research Act 1949*. The following table shows the number of staff employed in different job categories.

### Staff by Functional Area

Functional Area <sup>6</sup>	ASL*
Research Scientists / Engineers	1824
Research Management	165
Research Consulting	38
Research Projects	1837
Senior Specialists	12
Technical Services	600
Communication and Information	288
General Services	31
Administrative Services	895
General Management	136
<b>Total</b>	<b>5826</b>

\* Average Staffing Level

<sup>6</sup> Research Scientists and Engineers – Staff members who conduct scientific research.

Research Management – Staff members who initiate, develop, lead and promote CSIRO's research capability.

Research Consulting – Staff members who initiate and deliver research services for industry.

Research Projects – Staff members who perform scientific or associated work, under the broad direction of research scientists/engineers or research managers, usually by assisting with the planning and completion of the more practical aspects of the work.

Senior Specialists – Staff members whose specialist skills are in high market demand.

Technical Services – Staff members who provide scientific or engineering services.

Communication and Information – Staff members who provide information, editorial or industry liaison services either within or outside CSIRO.

General Services – Staff members who provide routine site maintenance activities.

Administrative Services – Staff members who provide administrative and management services to support the effective provision of research and development activities.

General Management – Staff members who manage corporate resources or corporate policy development, facilitate the strategic development of organisational capability, and/or create opportunities, matching CSIRO's capabilities to client needs.

Page	Image Details
Cover	CSIRO's new solar tower at CSIRO's National Solar Energy Centre, Newcastle. <b>Photo:</b> John Marmaras; New Holland Honeyeater on Banksia. <b>Photo:</b> Leo Berzins; Mr Nick Rigopoulos and Dr Donavan Marney with a sample of the fire resistant cable. <b>Photo:</b> Mark Fergus; Canola Field. <b>Photo:</b> Carl Davies
Contents	Yellowstripe scad, one of Australia's 33,000 data-based species (minus microbes), the highest national total reported during the global Census of Marine Life. <b>Photo:</b> William White
Foreword	Dr Megan Clark, Chief Executive Officer CSIRO. <b>Photo:</b> Carl Davies
Page 4	BARLEYmax is low GI and has twice the dietary fibre and four times the resistant starch of current grains. <b>Photo:</b> Carl Davies; The Ultrabattery can be used in hybrid electric vehicles or to smooth the intermittency of solar or wind-generated power. <b>Photo:</b> CSIRO; CSIRO's Energymark initiative is getting people talking and taking action. <b>Photo:</b> iStock; CSIRO's new book provides the latest information on climate change – the greatest ecological, economic, and social challenge of our time. <b>Photo:</b> CSIRO; Geopolymer technology - environmentally friendly concrete. <b>Photo:</b> Lawrence Cheung; Black tiger prawn. <b>Photo:</b> Darren Jew.
Page 5	Dr Valerie Sage working at SynCat, CSIRO's Synfuel and Catalysis Research Facility. <b>Photo:</b> Darryl Peroni
Page 7	CSIRO Researcher with an expendable bathy thermograph or XBT used to monitor upper ocean conditions for changes in temperature and salinity. <b>Photo:</b> CSIRO Marine and Atmospheric Research
Page 13	Circuit board. <b>Photo:</b> iStock

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**Your CSIRO**

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