



What do we get out of CRCs?

THE CRC for Eye Research and Technology was established in 1991 as one of the first fifteen CRCs. Receiving \$13.3 million in 1991 and \$17.2 million of Commonwealth funds in 1997, CRCERT established itself as a premier centre in international eyecare.

In the latest round of CRC funding, CRCERT became the foundation for a new CRC. The Vision CRC received the largest ever CRC grant of \$32 million, and is the world's largest vision correction research centre, with over 30 international groups participating.

What do CRCs offer Australia for such investment? In the windup of CRCERT, we looked at what had been achieved over the 12 years of the centre.

The primary benefit of CRCs – profitable links between research and industry

A major criticism of Australian scientific endeavours is that ideas and inventions developed here are lost to overseas interests, with little or no benefit returning to Australia. A second major criticism is that Australian researchers are isolated from the needs and demands of industry.

The CRC program is a unique Australian innovation designed specifically to attack these problems, and it has done so with tremendous success. CRCs are bringing research and industry together in creative and cost-effective collaborations to develop new products and opportunities of immense value. CRCs are also enhancing Australian interaction with international research organisations.

Importantly, the CRC Program, by providing CRCs with the equity to enable them to retain ownership of intellectual property, ensures that the rewards for these developments are returned to Australia.

The attraction of industry funds also means more efficient use of taxpayers' funds. The average leverage on Commonwealth funds is around three times, and is often much higher. For example, from 1991-2002 CRCERT attracted \$85 million from industry, and total resources of \$175 million, from a CRC grant of \$17.5 million. This represents a leverage of 10 times the original CRC funding.

■ CRCERT established linkages with an enormous range of world-leading research, education and industry organisations, growing from 20 linkages in 1991, to 110 in 2003

■ CRCERT brought significant benefits to its participants, particularly for the host institution the University of New South Wales. Since 1991, UNSW has benefited from over \$23 million of CRCERT-funded resources; including postgraduate and undergraduate support, research expertise, and library and equipment resources. UNSW has also directly received over \$11 million from CRCERT activities; including grants and research quantum returns.

Enhancement of industry outcomes

Another reason the Commonwealth government introduced CRCs was to address concerns that there was no ready uptake by Australian industry of university and CSIRO R&D. CRCs bring researchers and industry closer together and demonstrate to industry the tangible benefits of R&D, by involving industry in research at a core level.

CRCs also contribute to industry development through the establishment of independent companies. It is estimated that each CRC will spin-off one to two companies in a 14-year cycle.

CRCERT was successfully spun off or helped to develop major enterprises, which are taking their place in international public health and industry, including the following:

■ International Centre for Eyecare Education is taking a leading role in global efforts to eliminate avoidable blindness. Since 1998 ICEE has provided 40,000 people with eyecare, trained over 200 eyecare personnel and 30 trainers, and helped to establish 50 clinics and 3 optometry schools

■ VisionCare NSW delivers 80,000 pairs of spectacles each year to low-income earners through the NSW Government Spectacle Program, and with ICEE has helped to established over 60 clinics for delivery of eyecare in NSW Aboriginal Medical Services

■ Institute for Eye Research is a major participant and supporter of Australian eyecare research and education, employing more than 70 staff. The toric lens developed by IER in collaboration with Ocular Sciences Inc is the fastest growing contact lens in this market

■ BioCure Inc is a company spun off by CRCERT, CIBA Vision, Novartis and the IER to develop non-ophthalmic applications of collaborative IP. Biocure recently received approval from the US Food and Drug Administration for a product used to treat non-operable tumors

Improvement of research outcomes

Increasingly, the key to successful research and product outcomes is proving to be collaboration between different disciplines. CRCs create the ideal structure for this essential collaboration to take place. In addition, CRCs support a long-term commitment to research, which underpins strategic development and the real possibility of commercial outcomes.

CRCERT developed seminal understanding of ocular processes, and designed breakthrough products. Achievements include:

■ The CRCERT/CIBA collaboration developed a highly oxygen permeable soft contact lens suitable for extended wear. The Focus Night and Day lens, launched internationally in 1998, has revolutionised the vision correction market

■ CRCERT developed an implantable contact lens, which will provide a permanent yet reversible method of vision correction, offering many advantages over refractive surgery

■ CRCERT developed polymer gels suitable for replacing the hardened lens in an ageing eye, and a supplementary lens, which corrects long or short-sightedness. The combination of these lenses will offer total and continuous vision correction for ageing eyes and those with cataracts

■ CRCERT improved understanding of ocular infection and inflammation, and also developed promising strategies to prevent bacterial colonisation of contact lenses and other biomaterials

Changing the researchers

Employers and government have expressed the need for graduates experienced in industry. The unique CRC educational environment is producing such graduates, with the majority obtaining employment in industry and applied research institutions. CRCs are also changing the mentality of institutional researchers so that many are now involved in spin-off companies and commercial opportunities.

The CRC Program is accomplishing great things for Australia. With currently 71 centres, all making achievements like CRCERT, both Australian science and industry is receiving significant benefits from this innovative and effective program.

■ **The CRC for Eye Research and Technology/Vision CRC**

CSRP: Taking care of business ... and the environment

THE Cooperative Research Centre for Sustainable Resource Processing (CSRP) was officially launched in Perth in December last year. The centre was established to find better technological solutions for the elimination of waste and emissions in the minerals sector's mining and manufacturing cycle, while enhancing business performance and meeting community expectations at the same time.

The CSRP participants and the federal and state governments have committed \$90.6 million in funding to the CSRP over the next seven years for research programs. The CSRP participants are CSIRO minerals, Curtin University, Alcoa, the University of Queensland, the University of Sydney, Rio Tinto, Xstrata, Newmont, WMC Resources, ANSTO, OneSteel, Rocla, Central TAFE (WA) and associate participants including Kwinana Industry Council, Tesla, URS, Ausmelt, Environment Australia, Hatch, Minerals Council of Australia and NSW Minerals Council.

CSRP's aim

CSRP chief executive officer Stevan Green believes the centre provides an integrated and coordinated approach to help industry, government and research institutions rise to the challenge of creating a more sustainable future.

"Australia has vast mineral resources

which have been critical to its growth and development over the past century," Green said.

"However, the minerals industry, government and Australians in general recognise that if mining is to remain viable it must become even more sustainable by meeting greater environmental, business and public scrutiny."

CSRP's goal is to find new technological solutions for progressively and systematically eliminating waste and emissions in the minerals cycle while at the same time enhancing business performance and meeting community expectation. Key themes will be effective resource utilisation and materials efficiency, minimising energy consumption and greenhouse gas emissions, reducing process waste and enhancing co-product values, reducing water consumption and impacts and improving the control of minor (potentially harmful) elements and their dispersion.

How CSRP will achieve its aim

The centre will develop a rigorous strategic analysis of the minerals and metals processing sector, from a total systems perspective, so that innovative talent and resources can be focused on the high leverage points. There will be a strong initial focus on those technical solutions and practices that can contribute the most to lifting the eco-efficiency of current operations. The centre

will capture regional synergies in the resource processing-intensive areas of Australia, such as Kwinana and Gladstone, and will improve the overall environmental performance of complex metallurgical supply chains. It will develop technologies to facilitate breakthroughs in capturing value from the sector's high volume waste streams, controlling harmful emissions and providing step improvements in the most energy and water intensive processes.

The centre will co-operate with other centres of excellence on broader technical issues such as regional hydrology, mine rehabilitation, the future of fossil fuels, renewable energy and sequestration of carbon dioxide. It will make an implicit contribution to important community issues and will co-operate with those organisations who are dealing directly with the social and political dimensions of sustainability.

In addition, through the education program the CSRP expects to sponsor more than 50 postgraduate students and is looking ahead at attracting some of our brightest high school students to the minerals industry. Many observers have highlighted the developing problem of a shortage of young people choosing to begin a career in the mining, minerals and resources processing industry. Therefore, a series of programs targeting teachers – who carry enormous influence with students in the process of choosing a career path

– have been put in place. These programs include various teacher professional development activities, teacher excursions and tours.

The research programs

The research program structure for the centre has been devised with active involvement of industry partners around four programs to ensure a flow of short, medium and long-term outputs.

Program one's principal aim is to develop a shared understanding of the implications of sustainable development for minerals and metals processing, together with appropriate tools for measuring and tracking improvements.

The aim of program two is to improve the eco-efficiency of existing minerals processing and metals production operations through improvements in energy and water usage as well as environmental impact-reduced processing residues and management of minor elements and wastes.

Program three seeks to enhance the overall eco-efficiency of resource processing regions and complex material supply chains, while program four is concerned with the development of new technologies that enable breakthroughs to be made towards zero net waste and emissions in minerals processing and metals production.

■ **The Cooperative Research Centre for Sustainable Resource Processing**

