

# SUBMISSION



To the Senate Standing Committee  
on Education, Employment and  
Workplace Relations

**INQUIRY INTO THE EFFECTS OF  
CLIMATE CHANGE ON TRAINING  
AND EMPLOYMENT NEEDS.**

29 August 2009



**The CRC Association**

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**To the Senate Standing Committee on  
Education, Employment and Workplace Relations**

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**Submitted by**

**THE COOPERATIVE RESEARCH CENTRES ASSOCIATION INC.**

**29 August 2008**

## 1. INTRODUCTION

The Cooperative Research Centres Association Inc. (CRCA) welcomes the inquiry of the Senate Standing Committee on Education, Employment and Workplace Relations into the effects of climate change on training and employment needs. Through 18 years experience in collaborative research, focused on issues of national importance and driven by the needs of the industry partners, the members of the CRCA are ideally positioned to provide an authoritative comment on this topic. Many of the existing 49 CRCs are involved in research relevant to the issue of climate change, and the CRCA would be happy to facilitate (at the discretion of the Committee) presentations by a number of CRCA members to a public hearing in order to provide the Committee with further information and insights pertinent to the inquiry's Terms of Reference.

## 2. THE CRC ASSOCIATION

The CRCA is the representative body for the organisations operating within the Australian Government's Cooperative Research Centres (CRC) Program. The purpose of the CRCA is to promote science in general, with a particular focus on the future growth of the CRC Program.

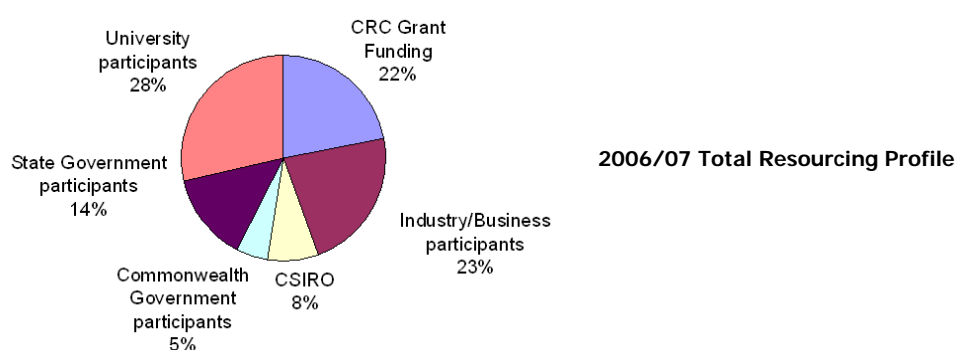
The CRCA is an independent body, funded by fees paid through voluntary membership. The CRCA Constitution states that only bodies classified as "Cooperative Research Centres" by the Australian Government are eligible to be members of the CRCA. The current membership comprises all 49 CRCs.

## 3. THE CRC PROGRAM

The CRC Program was established in 1990 by the Hawke Government with the aim of changing the culture of industry to shift from looking to specific short term problem solving research, to taking a longer term, strategic approach to investment in research.<sup>1</sup> Over the course of its 18 year existence the CRC Program has met that aim and improved the effectiveness of Australia's research effort through bringing together researchers in the public and private sectors with the end users. The CRC Program links researchers with industry and government with a focus towards research application. The close interaction between researchers and the end users is the defining characteristic of the Program. Moreover, it allows end users to help plan the direction of the research as well as to monitor its progress.

Since the commencement of the Program, there have been ten CRC selection rounds, resulting in the establishment of 168 CRCs over the life of the Program that have operated across Manufacturing, ICT, Mining & Energy, Agriculture & Rural Based Manufacturing, Environment, and Medical Science & Technology sectors.

Reflecting its broad areas of activity, the CRC Program draws funding and in-kind resources from a wide range of sources. Displayed below is the resourcing profile for CRCs in 2006-07.



<sup>1</sup> Myers, Rupert. *Changing Research Culture, Australia - 1995*. Report of the CRC Programme Evaluation Steering Committee, Aust Gov't Publishing Service, Jul 1995.

### 3.1 THE PERFORMANCE OF THE CRC PROGRAM

The conventional definition of a CRC is *“a company formed through a collaboration of businesses and researchers. This includes private sector organisations (both large and small enterprises), industry associations, universities and government research agencies such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and other end users. This team of collaborators undertakes research and development leading to utilitarian outcomes for public good that have positive social and economic impacts.”*<sup>2</sup> However this definition only tells a part of the story. As the Program has grown and matured, further benefits have emerged, including:

- CRCs assemble multidisciplinary teams from across research providers to address end user driven research. They collaborate across all sectors (Industry, Academia, State Government, Consumers and Industry Associations) and create a critical mass in their field.
- CRCs provide companies, including multinationals, with the unique and attractive proposition of being able to deal through one organisation (the CRC) that can assemble the best teams in the Australia to develop the technology that the company needs, managing the process professionally to deliverables and gearing it with funds from the Commonwealth and research providers who are sharing the risks, and the returns.
- CRCs are managed to deliver impacts not just papers, and are held to account to deliver.
- The stability of funding provides certainty for the research partners in particular and also for the end-user partners.
- The overall activities are actively managed by the CRC management team and Board to maximise the national benefits. This includes terminating, redirecting or accelerating projects in a way that is not part of the culture of most other programs.
- CRCs provide a mechanism for realising unanticipated commercial opportunities, i.e. in cases where technologies have applications beyond the interests of the commercial partners, the CRC can pursue these through the creation of spin off companies, licenses etc.
- CRCs play an important role in bridging the gap between discovery research funded by NHMRC and ARC grants and the requirements of industry for commercialisation-ready innovations.
- CRCs encourage innovation through their interaction and reach with SMEs (for example, the CRC for Spatial Information interacts directly with over 55 SMEs).
- A CRC is neutral and un-aligned and so can provide a central focus from which grows collaboration.
- CRCs provide research management skills and discipline. This helps ensure the research is managed to a high standard.
- CRCs foster “hands-on” learning. Although they are heavily focused on postgraduate education, and thereby providing training for very highly skilled professionals, CRCs are involved, to differing extents, at all levels of the education and training system.

In the 2006 study on the economic impacts of the CRC Program commissioned by the Australian Government<sup>3</sup>, fifty examples were included of economically quantifiable beneficial applications of CRC research. In these solid, quantified examples, only the clearly measurable components of the outcomes were included in the calculation of the net economic impact of the Program. Looking only at these clearly quantifiable impacts, the study showed that as a result of each dollar invested in the CRC Program, Australian Gross Domestic Product is cumulatively \$1.16 higher than it would otherwise have been (had the money instead been used for tax reductions) and Total Consumption is cumulatively \$1.24 higher

<sup>2</sup> [www.crc.gov.au](http://www.crc.gov.au)

<sup>3</sup> [https://www.crc.gov.au/HTMLDocuments/Documents/PDF/CRC\\_Economic\\_Impact\\_Study\\_Final\\_121006.pdf](https://www.crc.gov.au/HTMLDocuments/Documents/PDF/CRC_Economic_Impact_Study_Final_121006.pdf)

than it would otherwise have been (had the money instead been used for tax reductions). It is important to note that Gross Domestic Product and Total Consumption are two critical indicators of the economic welfare of the Australian community rather than being measures of the private returns to CRC participants.

Since its inception the CRC Program has been regularly and meticulously reviewed (most recently by Professor Mary O'Kane who's report "Collaborating to a Purpose – Review of the Cooperative Research Centres Program") was delivered on 20 July 2008 to the Minister for Innovation, Industry, Science and Research, Senator Kim Carr. The success of the Program has been recognised not only within Australia but also internationally as the CRC Program has been researched, emulated and even copied by a number of other nations.

#### **4. THE INVOLVEMENT OF CRCs IN CLIMATE CHANGE RESEARCH**

The work undertaken through CRCs is driven by the research needs of the funding partners. While all activities must fundamentally fit within Australia's National Research Priorities, they will focus upon a particular issue that the end-users wish to have addressed. Often these will relate to an emerging issue to which the collaborative partners desire to have a leading edge approach.

The growing recognition and acceptance of Climate Change as a real issue has led to many CRCs having a strong focus on elements particular to the sector within which they operate. This point was referenced in the recently released Garnaut Climate Change Review Draft Report (pg 409), viz:

*"Currently in Australia, the cooperative research centres are the most direct approach to encouraging collaboration in early research. Many of these centres, particularly those in the mining and energy sector and the manufacturing sector, undertake collaborative research in areas that are potentially relevant to climate change mitigation: advanced automotive technology, construction innovation, sustainable resource processing, coal in sustainable development and greenhouse gas technologies."*<sup>4</sup>

#### **5. OBSERVATIONS**

The perspectives of CRCs are relevant to this inquiry due to the close involvement with research relating to climate change. The CRC for Greenhouse Gas Technologies (CO2CRC) is one CRC with a major focus on issues relating to climate change. The CO2CRC is particularly focused on carbon capture and storage (CCS) technologies, and in particular geosequestration of greenhouse gasses. Earlier this year the Hon. Martin Ferguson, Minister for Resources and Energy, opened their geosequestration project site at the Otway basin in Victoria. The experiences of the CO2CRC with regard to the effects of climate change on training and employment needs can be seen as microcosm of the experiences of other CRCs.

Deployment of CCS as a mitigation option is highly dependant on earth science and chemical engineering skills, however currently there is a world wide shortage in these skills. In particular, there are few graduates coming out of Australian universities with degrees and skills related to science and chemical engineering. This lack of trained people will inhibit the extent that Australia will be able to use this key mitigation option to decrease its emissions.

While people are being trained in this area, particularly through the likes of the CO2CRC, the skill set is the same as that required by the resource sector. This means that people trained in CCS can, and are, diverted to the exploration or production sector where (in the current economic environment) they are offered a higher salary.

People can be brought to Australia to do PhDs in CCS but the very high cost of their foreign student fees is a major inhibitor for a CRC. Bringing them to Australia to work at the post-doctoral level is an option, however again there are extra costs involved with travel etc as compared with taking on an Australian student.

<sup>4</sup> <http://www.garnautreview.org.au/CA25734E0016A131/pages/draft-report->

**CONCLUSION**

Innovation occurs when good ideas are allowed to become reality. But innovation does not happen all by itself. To have innovation, we first need to have innovators, i.e. the people who get those good ideas and can transform them into reality

Addressing issues related to climate change requires innovators skilled in certain fields, particularly in science and engineering. While CRCs make some impact in addressing skills shortages, the outputs are not to the magnitude required; a situation exacerbated by the fact that the skill sets are in high demand in other industries.

This is a long term issue with no easy "quick fixes". We just have to raise the profile and standing of science and engineering in the schools so that the students start coming through, which will take some time. In the meantime we should also encourage the development of "industry-ready" graduates such as those that emerge through the CRC Program. Retaining them in climate change research is another issue altogether.