



Driving Innovation Outcomes:

Using the CRC Program to face Australia's major challenges

Pre-Budget Submission
2012 – 2013

October 2011

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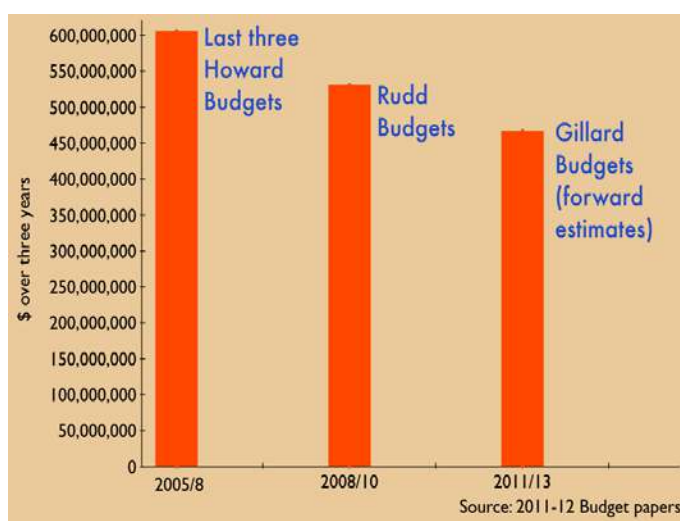
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1. Executive Summary

The CRC Association is proposing a whole-of-government approach to cooperative research, with a much needed update of the Cooperative Research Centres (CRC) Program. Through this update the CRC Association is seeking to help build national capacity to improve productivity through enhanced innovation. The update involves positive design improvements to the CRC Program with an additional commitment of \$250 million over five years. The additional commitment will be about half of 1% of the expected \$50 billion that the Australian Government will invest in innovation over this period.

The Gillard Government has a good record of funding innovation, but the support has favoured early stage research. The Prime Minister has told industry that the Government is determined to see it through times when many industry sectors are under pressure. The Government will be “driven by our long term vision of a new technology, clean energy, high skill, high wage economy” (Gillard, 2011). Yet, collateral issues from previous budget decisions are frustrating this approach. Cooperative Research Centres (CRCs) form a key element in the process of uptake of public sector research by industry, as acknowledged by “Venturous Australia: building strength in innovation” (Cutler Review 2008). The review “emphasised the value of collaboration for productivity and recommended the maintenance of a portfolio of collaboration and linkage programs and the reconfiguration of the CRC Program **with additional funding**”. Yet, CRC Program funding will decline by more than 20% (see Figure below) since 2006-08 and the number of CRCs has declined even more from above 75 to below 45 (CRC Directory 2011).



What is the problem?

This CRC Association submission addresses a three-part problem involving CRCs: (i) the innovation conundrum, (ii) R&D priorities, and (iii) CRC Program issues.

(i) The innovation conundrum

This conundrum involves a mix of issues, including: productivity, innovation, research & development and public sector R&D. Australia's national productivity has been

falling for a decade or more (Eslake and Walsh, 2011). This trend needs to be urgently reversed and government policies and programs can play a central role. Indeed, CRCs are already recognised as playing a central role in contributing to productivity improvements through enhanced innovation (Cutler Review 2008). CRCs perform this role by identifying specific pathways from discovery research through to specific usages, in order to maximise impacts and benefits from their research. For each CRC, this approach is documented in detail as part of an Impact Tool required as part of their application.

The Gillard Government is committed to supporting industry as it faces increased pressures from current events. However, the program support for this correct policy position is thin. The government has a substantial opportunity to strengthen economic performance through greater

support of later-stage research and more development. Funding for pure basic and strategic basic research has been increased through ARC (by 40%) and NH&MRC (by 118%) (DIISR 2011), creating the expectation of more substantial community benefit. However, there is decreased funding for the activities that will specifically generate direct community benefit from R&D. The Commercial Ready program was dismantled early in the period of the Rudd Government. CRC Program funding has been reduced by at least 20%.

(ii) R&D priorities

Current national priorities are apparent and being addressed by Federal program funding in various areas, but are not being effectively supported by the national research effort in a way that maximises community benefit. Collaborative research solutions can play a central role in delivery of results against national priorities. Introduction of CRC models for delivery of these research components, benefits and outcomes will help to alleviate this situation if a small portion of the program funding is applied to a dedicated CRC in the relevant fields. This approach follows a tried and true method which has been used successfully in defence, through establishment of the Defence Materials Technology Centre. CRC style models have also been adopted in various areas such as creation of the National ICT Centre of Excellence (NICTA) and the Biotechnology Centre of Excellence (Australian Stem Cell Centre). Now there is an opportunity to increase the effectiveness of programs such as the Australian Government's "Clean Energy Future" for Australia.

(iii) CRC Program issues

Changes are required in the operation of the CRC Program to help it build capacity for an updated remit:

- additional CRC funding for government priorities (see point ii above)
- moving CRC funding to the same status as other funding for universities
- remove 15 year arbitrary life of CRCs to allow consideration of all CRC applications on a competitive basis
- two stage selection process to reduce the entry barrier for CRCs and encourage more industry participation and more applications
- enable the CRC Committee to negotiate 'sustaining phase' with long running CRCs
- re-engage the Australian Chief Scientist on the CRC Committee
- re-badging of the CRC Program linked to innovation

New approach

The CRC Association recognises that a new approach is required, if CRCs are to play their central role in Australia's innovation system. CRCs are not the only funding mechanism that encourages a collaborative approach, but they are the **only mechanism** that engages multiple research and industry participants at a scale focused on **delivering specific outcomes** against Australia's major national challenges. The other mechanisms are project based mechanisms with a much more limited scale of collaboration that does not substitute for the role of CRCs.

The CRC Program needs to be re-branded and revitalized to clearly focus its task on national challenges. **Re-branding to become 'Cooperative Innovation Centres'** will focus all efforts under the CRC Program on the national task of innovation to support productivity growth. All the current dimensions of the CRC Program can be included in this national innovation task, whether they are focused on productivity in industry, public good for maintaining national heritage or social sciences and humanities research to build Australian cultural capacity. An essential part of the re-branding

will be to **permanently increase base funding for the CRC Program** to allow it to fulfil this new broader mission. Various other aspects of the CRC Program will need to be adjusted to support this new mission, and these elements are described in more detail below, but a key change will be to **re-engage the Chief Scientist** as a member of the CRC Committee, to ensure that the direction of the program fits with current national priorities.

The government should take the opportunity available through CRCs to nominate specific priorities for cooperative research contributions to national challenges. Multiple reviews and practical examples have demonstrated strong evidence that a cooperative approach is the most efficient and effective means of delivering research results to address national challenges. Adjusting the CRC Program to take a **whole of government approach** will help to address the difficult national challenges that Australia currently faces. The whole of government approach has already been used to assist with defence related priorities. The experience with the **Defence Materials Technology Centre** shows that the CRC Program can deliver better outcomes than otherwise would have been the case if the same dollars were managed within a line Department without the necessary skills and systems. Now there is an opportunity to assist with other national priorities, for instance, through national priority CRCs in, for instance: Clean Technology Innovation, Carbon Farming and Biodiversity. Funding for these three national priority CRCs could come from a small re-allocation of funds already available in national programs.

Increased CRC Program Funding

The cut to funding of the CRC Program has resulted in a reduction of the success rate of CRC applications to just above 10%. This level of success frustrates one of the key mechanisms that makes CRCs so successful. Industry has provided on average about 20% of CRC resources (O’Kane Review 2008), much of this contribution as highly critical untied cash funding. Cash funding from industry in many CRCs has approximately matched the level of CRC grant. Industry wants an effective CRC Program and the last four years of reduced funding is hitting at the viability of the Program, and industry’s commitment to being involved. Industry can’t spend two years participating in a bid and putting their dollars on the table with only a 10% funding success rate.

The table on page 20 seeks funding to increase from \$150M pa to around \$250M pa through an evenly staged set of changes. Additional funding for ‘national priority CRCs’ would involve additional money allocated from programs developed by other areas of government on top of this base funding level. The total (budget) cost of this change would be around \$257M over 4 years. With average annual grants for CRCs of around \$4Mpa (allowing for modest inflation since the commencement of the CRC Program) this would allow for an additional 25 CRCs in the system, moving from the current number (approx 45) to a total of 80 CRCs.

2. A Collaborative Australia is an Innovative Australia is a Productive Australia¹

Innovation is the process by which an idea or invention is translated into a good, a service or a process of demonstrable value. Innovation is key to lifting Australia’s national productivity and to meeting the myriad challenges of the future. Innovation takes time, investment and cooperation. Innovation is a process which cannot readily be switched on and off.

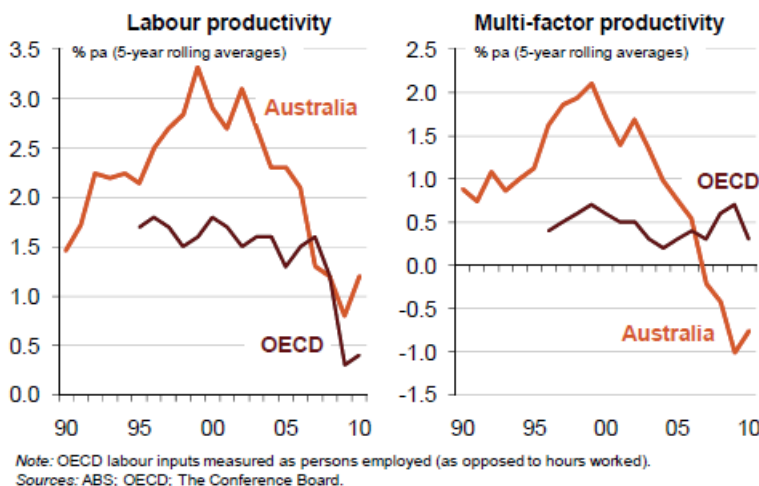
¹ This section draws heavily on the Grattan Institute’s February 2011 review of “Australia’s Productivity Challenge” by Saul Eastlake and Marcus Walsh.

CRCs perform a key role in linking discovery research to innovation and productivity. They identify specific pathways from discovery research through to specific usages, in order to maximise impacts and benefits from their research. This approach is documented in detail as part of an Impact Tool required from all CRCs as part of their application. It means that CRCs always work towards a goal that is planned in cooperation with industry and end-users **prior to funding approval**. The CRC Program is internationally admired because it took a unique approach of developing multidiscipline collaboration between multiple industry and research organisations to address identified end-user challenges.

Productivity “isn’t everything, but in the long run it’s nearly everything”

Paul Krugman (1992)
Nobel Prize-winning
economist

Australia’s productivity is a problem. Multi-factor productivity growth has sharply declined from a peak of over 2% in the second half of the 1990s to a negative rate in the second half of the 2000s. This is a stark difference to the OECD as a whole, where the long-term average has not deviated much from 0.4%. Labour productivity has also fallen well below historical levels placing significant pressure on industry in a context where other factors are making international competitiveness difficult (see Figure below).



While productivity is a major factor determining long-term prosperity, Australian national living standards have not yet been adversely affected by this decline. The enormous improvement in Australia’s terms of trade in the past decade and the country’s success in avoiding a recession due to the GFC have meant that Australia can still talk about its robust economic position. But many Australians have felt significant pain as various sectors suffer from

reduced international competitiveness, including manufacturing, tourism and some other services. The government has recognised these symptoms of productivity decline by referring to the patchwork economy. For instance, Federal Treasurer Wayne Swan has attributed job losses at Qantas and steel maker OneSteel to Australia's patchwork economy (according to news.com.au 16 August 2011).

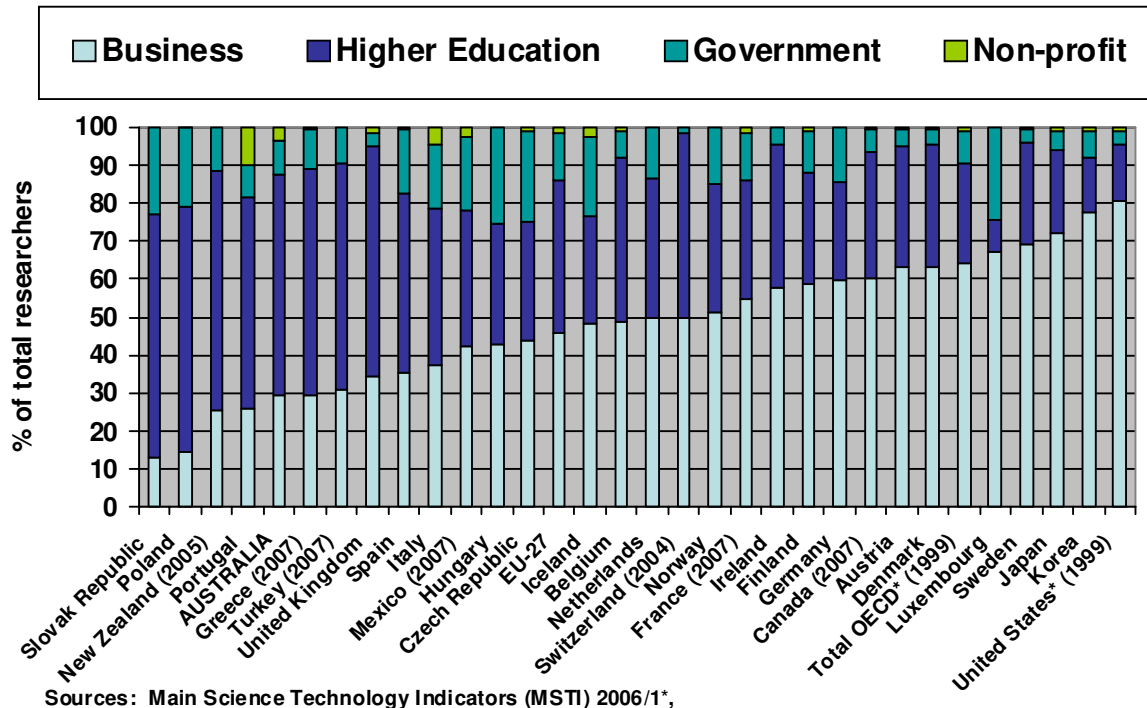
Economists generally agree that Australia faces a major challenge to again lift productivity growth. The OECD’s Jonathan Coppel pointed out in a speech to the 2010 Growth Summit that key drivers of productivity improvement for Australia should be innovation and infrastructure (Coppel, 2010). In its review of Australia’s productivity challenge, the Grattan Institute pointed to improved innovation performance as being among four policy priorities to reverse the decline:

1. A re-invigorated economic reform agenda;
2. Improvements in education and training;
3. Better infrastructure; and
4. Improving Australia’s innovation effort.

“Productivity is the prime determinant in the long run of a nation’s standard of living, for it is the root cause of per capita national income.”

Michael E. Porter (1991)

The Cooperative Research Centres (CRCs) are a significant mechanism for Government to ensure that research and development leads to innovation in Australia’s economy. CRCs are the only means by which engagement between academics, industry, State and Federal government agencies and the international scientific community can be brought together in a specifically directed common effort to promote innovation. CRCs are the only Australian Government vehicle that provides the necessary scale and time to address major innovation challenges in a specifically directed way.



The Federal government is investing record amounts in Research, Development and Innovation: some \$9.4 billion in 2011-12. CRCs represent 1.76% of that investment. They represent a key component in that “end-users” of research and research providers must work together in a Cooperative Research Centre to achieve outcomes. This is particularly important to Australia because of our relatively low proportion of PhD-level trained researchers working in industry. In the OECD, only the Slovak Republic, Poland, New Zealand and Portugal have a lower proportion of their doctorate-level trained workers working in businesses. Almost 60% of those with doctoral training in Australia work in the Higher Education Sector, about double the OECD average. If highly trained researchers aren’t working in industry, it is very important that they are engaged with industry – collaboration between the Higher Education Sector and businesses should be a prime objective of innovation policy in Australia. There were 1487.6 equivalent full-time student load (EFTSL) of students working for their PhD, Masters by Research or other formal postgraduate qualifications through CRCs during 2009-2010, of these 1219.2 were working for their PhD. CRC postgraduates make up about 6% of Australia’s total and train with strong industry input and are intended to graduate “industry-ready”.

Innovation is much more successful with rich collaboration. But Australia is a relatively low collaborating place.

The Cooperative Research Centres Association argues that it is vital to ensure the effective use of that \$9.4 billion by adequate investment in the “innovation” end of the spectrum. In the last few years there has been a widening gap between basic and early stage research in Australia and the

applied, innovation stage. In addition, there has been a trend to shorter and smaller grants and away from medium-longer term investment on a scale to ensure industry change and productivity improvement. We therefore argue that Australia is not optimizing its investments in research, development and innovation by a tendency to skew those investments to early stage work. To improve outcomes from Federal research, development and innovation investment, government should closely consider the issues of scale, timeframe and industry linkage.

Too much of Australia's intellectual wealth is wasted on the peer review process to determine distribution of small grants to academics. It takes a "program" of activities to achieve innovation, not an individual "project". However, the largest proportion of our National grant funds is distributed as "project" funds. This skews Australia's system to early stage research and publication over innovation. Consequently, Australia ranks well in measures of academic performance like journal publications, but much worse in measures of innovation like triadic patents and firms bringing new products to market.

"In the long history of humankind (and animal kind, too) those who learned to collaborate and improvise most effectively have prevailed."

Charles Darwin
(1809-1882)

Innovation takes time. The average time to delivery of an innovation has been shown as 9 years. According to the Allen Consulting Group study of the Economic Impact of the CRC Program, "the average time, between the foundation of a CRC and the commencement of the twenty-five measured economic impacts identified in this study, is nine years". The timeframe for Cooperative Research Centres (usually funded in seven-year blocks) is realistically matched to the time it takes for innovation.

Australia has only a small proportion of our research workforce working in business. A large majority of PhD-level trained workers in Australia work in academia compared with many other OECD countries. The consequence is that we tend to have a low level of academic-industry collaboration. Government has responded by new mechanisms to encourage further collaboration between these two sectors including significant additional investments through the Australian Research Council's "Linkage" grants program; development of the NH&MRC's partnership programs and Enterprise Connect. While these initiatives are to be applauded, we argue that, in general, they lack the scale, timeframe and flexibility to have the transformative impact required. CRCs continue to occupy a separate and important place in the innovation system in Australia.

3. The Role of CRCs in Australia's Innovation System

Cooperative Research Centres represent a very small but important part of the Australian Innovation System. In the 2011-2012 Federal Budget, CRCs represent less than 2% of total Government expenditure on innovation. Despite the relatively small investment by the Federal government, CRCs outperform due to a number of factors, including:

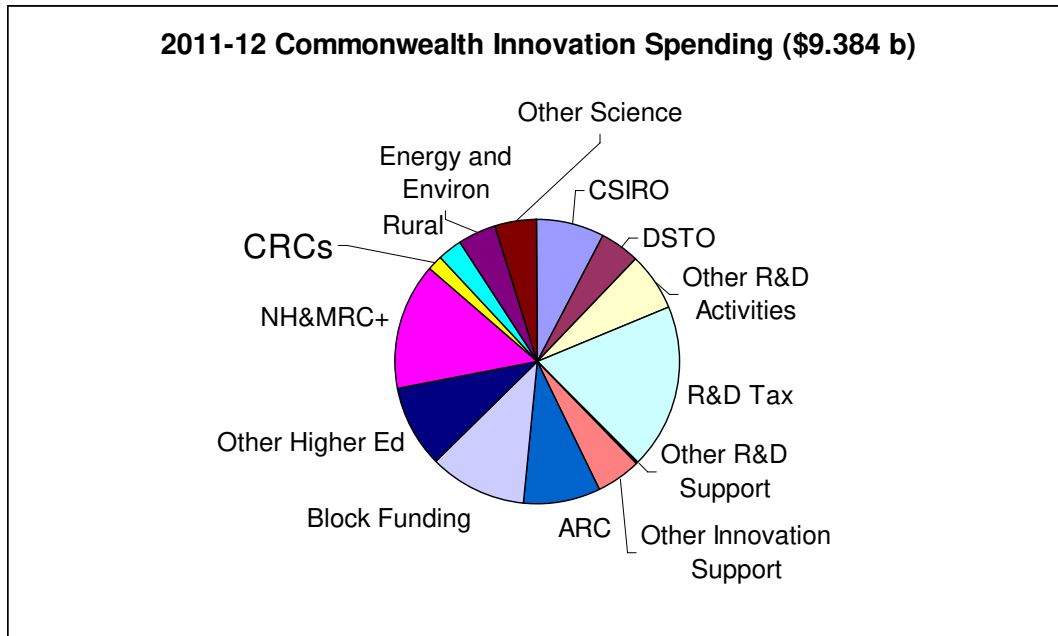
- **Significant industry co-investment.** To achieve Federal support, CRC bidders need to demonstrate strong commitment from their industry to co-invest in research. This means at least matching Commonwealth funding as per the CRC funding rules but typically, the level of commitment by all participants is significantly higher.

- **A meaningful timeframe.** By committing for a longer funding term of 7 to 10 years, the Commonwealth gains a similar commitment from an industry. This is an important design feature of the Program and a significant differentiator from other research, development and innovation programs. It provides a level of funding certainty to research providers and the flexibility and opportunity for the CRC to follow-up on productive research areas.
- **End-user drive.** The work pursued by a Cooperative Research Centre is determined by the end-users of the R&D, working with researchers in the field. Again, this is a significant differentiator from most other Commonwealth supported innovation programs. Putting end-users of research in the “driver’s seat” in research management ensures that successful research is quickly adapted and adopted into industry. It also assists in making the critical decisions on when to give up on certain lines of research – forcing early failure of non-productive research is critical to a well-managed system. Of course, research that does not proceed past the idea and experimental stage has no direct impact on the economy or the lives of Australians.

This is not to criticise basic research. Fundamental knowledge and the continuing expansion of our knowledge base are critically important. But for a National Innovation Policy to be effective there must be effective methods for translating knowledge to innovation. Australia’s innovation system does not cater sufficiently for bridging the gap between ideas and innovation. Researchers are naturally inclined towards moving on to new discoveries rather than the “99% perspiration” aspect of the innovation spectrum, which is necessary if an idea is to be realized as of some value to our economy, environment or society. Because CRCs are governed by a Board dominated by end-users, they are not satisfied by discovery, only by delivery of a new product or process.

Researcher incentives can be a barrier to broader community innovation. Indeed, incentives in the Australian innovation system are *counterproductive* to delivery of meaningful national impacts. University researchers are generally recognized and rewarded on the basis of discovery, not on the delivery of actual outcomes. Journal papers are considered the “currency” of the University research community and this can pose a problem when in a country like Australia, such a large proportion of the research community is in the higher education sector because this incentive causes overemphasis on discovery as opposed to delivery. High quality academic journal papers are justified by, say, discovery of a new drug candidate for disease control. However to deliver community benefit from such a discovery, there must be incentives for undertaking necessary drug trials and eventually the more mundane work associated with product registration so that the new drug can be used by society. A similar situation exists for many environmental products, animal and plant drugs and pesticides.

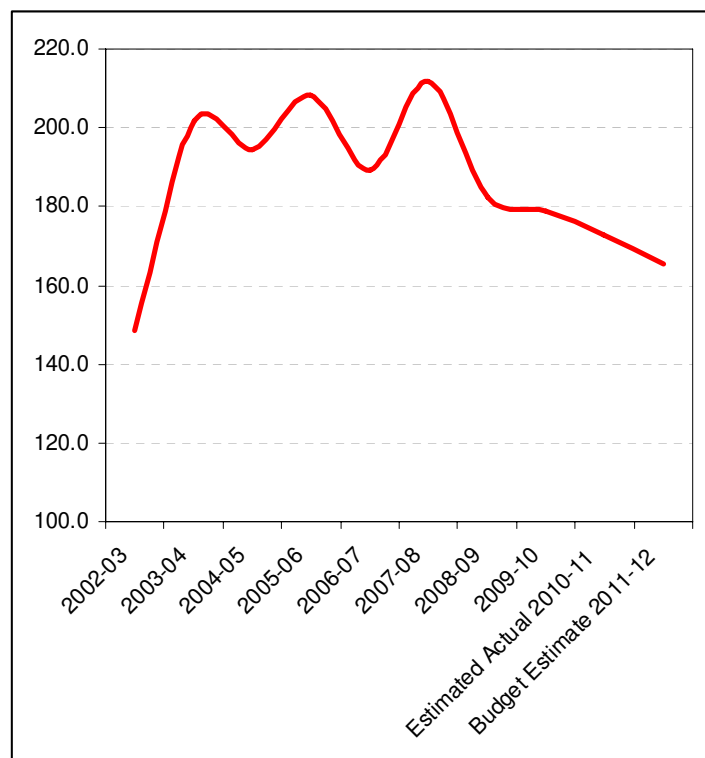
Put simply, researchers that have the track record to gain access to funding from the Australian Research Council and the National Health and Medical Research Council often lack the motivation, incentives or even skills to take their important work through to final implementation in the community. A Cooperative Research Centre provides an important means to bridge that gap and get discoveries or knowledge into the hands of those that can achieve innovation.



1. At \$165.2 million in 2011-12, the CRC Program represents 1.76% of Commonwealth spending on Innovation (Source: Commonwealth Budget papers, Portfolio Statements).

The CRC Program has been examined closely in a large number of reviews and studies, summarized below. Each of the reviews has tended to affect change in the Program guidelines to emphasize particular areas. However, there is one common conclusion from all the reviews: there is no doubt at all that the CRC Program continues to delivered significant benefits to Australia.

GDP has been positively impacted by the Program, even taking account of the counterfactual use of Program funds. Significant economic, environmental and societal benefits have been delivered. In addition, CRCs provide an important source of trained researchers for Australia, currently accounting for about 6% of postgraduate funding. CRCs generally require both an industry and academic supervisor and provide important training within an industry context. The orientation of postgraduate training in CRCs is towards either industry employment or towards public sector research oriented to industry and community needs. Given Australia's need to increase the proportion of researchers working in industry, CRC training is an important part of national capacity building.



4. Cooperative Research Centres' Budget Dilemma

The Cooperative Research Centres Program has been losing ground in two ways. First, actual and "real" dollar funding of the Program has fallen by more than 20% since 2007 (DIISR 2011). Second, relative to other parts of the Australian Innovation System, the CRC Program share has dropped from 3.2% in 2007-08 to 2.1% in 2009-10. A further fall is planned under current budget forecasts to 1.7% in 2011-12. The reduction in CRC Program funding is in contrast to overall innovation funding in Australia, which has increased to a record \$9.4 billion in the 2011-12 budget.

The impact on the number of Cooperative Research Centres has been even more dramatic. The number of CRCs has fallen from more than 70 to less than 45 currently (CRC Directory 2010-11).

The desirability of the CRC model for an industry sector has not dropped and we are experiencing continued strong underlying interest in participating in a CRC. In addition, new groups have become eligible to apply for a CRC. The current guidelines have been broadened, flowing from the O'Kane Review, and now encourage the humanities and arts to apply. This increased competition has occurred simultaneously with the substantial decrease in funding. The consequent success rate of 13% (4 of 30) applications in the 2010 13th selection round is unlikely to be improved in the 2011 14th selection round, with 26 applications lodged at the time of writing.

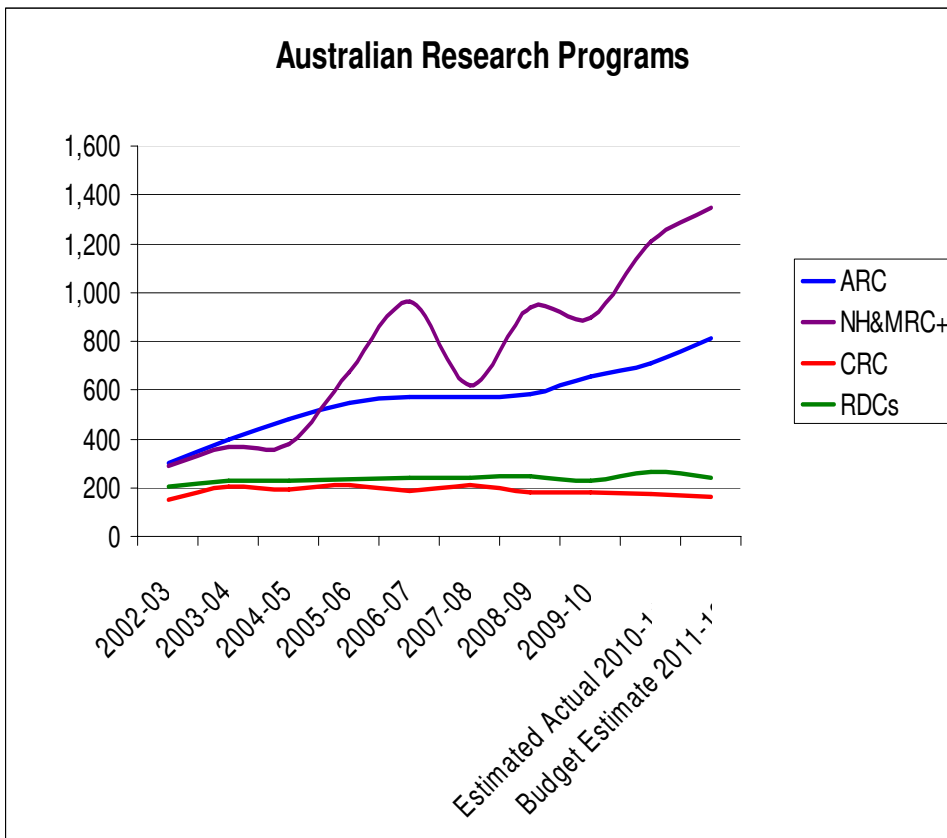
The Australian Research Council has argued that researcher interest in applying for funds falls away at success rates lower than 20%. No equivalent data exists for CRCs where an application is a major undertaking involving multiple parties including industry. It is reasonable to assume that industry has a lower tolerance level to low success rates than researchers in the higher education sector who are expected to apply for research funding as part of their job. We argue later in this submission that the cost and complexity of applying for CRCs funds can be reduced, saving significant industrial and University research time, cost and energy. But the headline low success rate of CRC applications is still likely to form a perception barrier for industry participation.

Increasing the base funding of the CRC Program will allow the government and community to reap a dividend in terms of additional leveraged contributions to research. Each CRC grant leverages additional funding from industry as a pre-condition of a successful application. In addition, existing public sector research capabilities are re-oriented to the needs of industry and other end-users. The CRC Program grant provides only 25% to 33% of the overall resources of the average CRC. Therefore, for its relatively small contribution by way of CRC grant, the government receives a major dividend equivalent to between 66% and 75% of the overall resources of the project. This submission argues that an addition of \$100M pa (phased in over 4 years) will be sufficient to maintain industry commitment to the CRC Program. This additional investment is likely to leverage near matching cash funding from industry, based on previous experience and re-orient other public sector research resources equivalent to about twice this amount.

In addition to spontaneous CRC applications, the CRC Program provides Government with the opportunity to prioritise major research initiatives to the current needs of Australian society. This is not the case with other research funding programs. Appropriately, most priorities in the business research sector are determined by businesses; in the higher education sector by researchers. However, the Nutbeam Report on the *Review of Public Health Research Funding in Australia* (2009) noted that the Committee had "received robust feedback indicating disappointment that NHMRC

has not responded adequately to recommendations from the Wills and Grant Reviews of the NHMRC – both of which recommended an increase in priority driven and strategic research with the greatest potential to contribute to improved population health. For many, this would require a proportionately increased investment in public health funding by NHMRC, and this has not been achieved.”

It is important in an innovation system that both “science push” and “community pull” factors play a part in funding decisions. The observations of the Nutbeam Review indicate that even the Australian government can have minimal impact on other granting programs. A decade after the Wills Review, there is a strong feeling in the sector that the NH&MRC has not given sufficient priority to the research with the greatest potential to contribute to improved population health. During that decade, the CRC Program has conducted seven funding rounds, each with the opportunity for direct, transparent Ministerial priority-setting.



The CRC Association argues that Government should exercise its ability to set priorities in order that the Innovation System is responsive to community issues. An example is the funding of the Young People, Technology and Wellbeing CRC and the Mental Health CRC in the 2010 funding round following public concern that the community needed to do more in mental health. However, without additional funds, there is little or no room to even fund either the government’s priorities or spontaneous end-user derived bids.

As an example, Australia faces significant challenges in terms of energy use and carbon footprint which will require engagement of the research community in a sustained collaborative effort focused on national benefits. Current efforts in this area are focused on short-term, grant funding of researchers.

In this submission, the Cooperative Research Centres Association argues that the Australian Government should seize the opportunity to drive innovation outcomes through small enhancements to the CRC Program that will deliver major payoffs to the nation. Funding focused collaboration to achieve a defined outcome is often more likely to produce significant outcomes than the equivalent funding spent through short-term grants. Innovation requires much more than

generating and basic testing of hypotheses. There are many barriers to new services and ideas making an impact that are of little or no interest to academic researchers. If a sector is highly regulated, capital-intense or simply conservative it may be necessary to put intense effort into these areas to realise innovation. The Australian Innovation System should allow for a multiplicity of approaches. In the past decade, however, researcher-generated science “push” factors have been favoured to a much greater extent than end-user driven “pull” factors.

5. Suggested Design Changes to the CRC Program

We argue that three areas of enhancement to the CRC Program will greatly improve the ability of the Program to contribute to meeting major challenges for Australia, these being:

1. Boosting base funding to the CRC Program by \$100million per annum phased in over 4 years;
2. Using the CRC Program as means of delivering outcomes from new program funding such as the Biodiversity Fund and the Clean Technology Fund under the Government’s Clean Energy Future Package; and
3. Introducing a series of design elements to increase the effectiveness of the CRC Program by:
 - a. Increased funding of specific government priorities (as per 2. above);
 - b. Linking Australia’s top academic researchers with large outcome-focused programs by removing the inequity between Category 1 and Category 4 under the Government’s Block Funding for Universities;
 - c. Removing the 15-year barrier to a CRC’s life, and the consequent over-emphasis on new CRCs, to purely merit-based selection;
 - d. Improving selection efficiency through a two-phase selection round;
 - e. Providing the CRC Committee and CRCs with the flexibility to negotiate a “sustainability phase” arrangement; and
 - f. Placing Australia’s Chief Scientist on the CRC Committee to ensure scientific excellence and coherence between CRC funding and current national research and innovation priorities.

By committing to these three areas of enhancement, the Australian Government would ensure that a portion of funds already set aside for facing up to Australia’s major challenges are managed in such a way that they have the best possible chance of delivering major outcomes. The proven capacity of the CRC Program to deliver innovation against major outcomes over two decades, is an important asset at the disposal of the Commonwealth and should be used more often. The experience with the Defence Materials Technology Centre shows that the CRC Program can deliver better outcomes than otherwise would have been the case if the same dollars were managed within a line Department without the efficiency of common skills and systems.

Small Increase in Base Funding

The CRC Program has lost significant ground in funding since 2007. The number of CRCs that can be supported by the Program has declined dramatically. Competition for CRCs has become intense and success rates to gain a CRC are now even lower than for blue-sky ARC Discovery Grants, which is a major disincentive for researcher and industry participation in the Program. The CRC Program needs a base funding boost to ensure its continued viability in attracting industry support. Under the current forward estimates, the CRC Program will end up with roughly the same dollar amount of

funding in 2014/15 as it had in 1995/96. Allowing for inflation this means that the innovation buying power of the CRC Program has decreased dramatically. A commitment of an additional \$250 million over the forward estimates period will ensure the CRC Program remains a major agent of change in Australia. The annual equivalent of this increase would be around 1.0% of **annual** Federal spending on innovation. This small additional commitment needs to be continued as part of the base funding of the CRC Program in order to be effective.

Removing Inequity

By removing a major barrier to involvement of the country's top academics in large-scale industry-focused research, the Government can unlock a significant intellectual asset at no cost. Australia has a disproportionate number of researchers working in universities. We must link those researchers with industry to maximise outcomes for the country – part of the *raison d'être* for initiation of the CRC Program by the Hawke Government in 1990. But universities naturally look to maximize monetary returns from their intellectual assets and, therefore, encourage top researchers towards programs that qualify as "Category 1" under the University Block Funding Scheme. The current situation is an anomaly having unintended negative consequences: by participating in a CRC, research funders can have their funding turned from "Category 1" to "Category 4", and a major barrier is immediately erected to the participation of top researchers. Removal of this barrier can be achieved at no cost to Government.

Removing Arbitrary Barriers

The introduction of a 15-year limit on the life of a CRC at the last Review has had unintended consequences. It has dramatically increased the emphasis on "transition out" of the CRC Program, with particular emphasis on sourcing funding from other Australian government departments. Taxpayers of course expect that long-term research be supported by Government, and the bottom-up approach of researchers trying to source funding from a variety of government departments is highly unproductive. The US Government addresses this issue by mandating 2.5% of government department budgets be spent through prioritized Small Business Industrial Research Grants (SBIR) – a better "top-down" approach that ensures a whole-of-government approach to long-term R&D is achieved.

"Sustainability Phase" Arrangements

If the Australian Government took a more proactive approach to naming and funding priority areas for Cooperative Research Centres, there would be an immediate improvement in the productive use of academic and industry time and effort in seeking Government support. The CRC Committee already comprises experienced innovation experts. We submit that, if empowered to do so, the CRC Committee could achieve better results for Australia through negotiating with the research sector to meet certain government priorities than through simply judging a competitive process. A better managed process of competition and negotiation would be more productive and achieve better outcomes than the present arrangements.

Re-badging

We submit that our recommendations, if adopted, would result in the CRC Program becoming a major driver of innovation in the most challenging areas Australia faces. We suggest that, in order to recognise this potential and to institute the changes suggested, above, it is timely to consider re-badging the CRC Program in order to generate greater contemporary ownership. Moving to rename the program as the 'Cooperative Innovation Centres' Program would redirect its focus to the new remit.

Detailed Implementation

The following discussion provides more detailed explanation of some of these changes.

Remove the disadvantage to the CRC Program on the Australian Competitive Grants Register

Many of Australia's top academic researchers are discouraged by their employers from becoming involved in the CRC Program. The reason is both simple and an anomaly in the innovation system. Universities received 'block funding' whose amount is derived from their success in achieving other sources of funding. CRCs fall into "Category 4" whereas other sources of competitive funding fall into "Category 1" and thereby provide a higher return on investment to universities.

The CRC Association argues that this classification is anti-collaborative. It discourages research funders from collaborating with other funders through a Cooperative Research Centre. For example, if a Rural R&D Corporation invests in, say, salinity research at a university directly; the university will ultimately receive additional Federal support through the block funding arrangements at the level of "Category 1". However, if the same investment was made through a CRC, which might give linkages to public and private agronomists and extension personnel and thereby significantly increase adoption of research, the university will only receive the significantly lower return of "Category 4" from the Block Funding Scheme.

Similarly, funding from the Australian Coal Association Research Program and the Workers Compensation Dust Diseases Board of NSW Research Grants Scheme received by a university generates Category 1 Block Funding. But if those two schemes, hypothetically, decided to collaborate through a CRC, the university would derive the lower Category 4 returns. Given Australia's critical need to have university researchers better linked to industry, this anti-collaborative outcome should be done away with.

After consultations with the Department of Innovation, Industry, Science and Research (DIISR), the CRC Association understands that the vastly different returns to universities from "Category 1" versus "Category 4" funding are a matter of negotiation between the Department and universities. We request that DIISR seek to negotiate a more equitable outcome in the next negotiating opportunity by seeking to remove the difference in university rewards between the two categories.

The CRC Program is also one of the most intensely competitive R&D schemes in Australia. Its absence from the Australia Competitive Grants Register is an anomaly that should be corrected. There is no cost to Government for doing so.

Return to CRC selection based purely on merit

The introduction of a 15-year limit on the life of a CRC at the last Review has had unintended consequences. It has dramatically increased the emphasis on “transition out” of the CRC Program, with particular emphasis on sourcing funding from other Australian Government Departments. Taxpayers of course expect that long-term research be supported by Government, and the bottom-up approach of researchers trying to source funding from a variety of government departments is highly unproductive. The US Government addresses this issue by mandating 2.5% of government department budgets be spent through prioritized Small Business Industrial Research Grants (SBIR) – a better “top-down” approach that ensures a whole-of-government approach to long-term R&D is achieved.

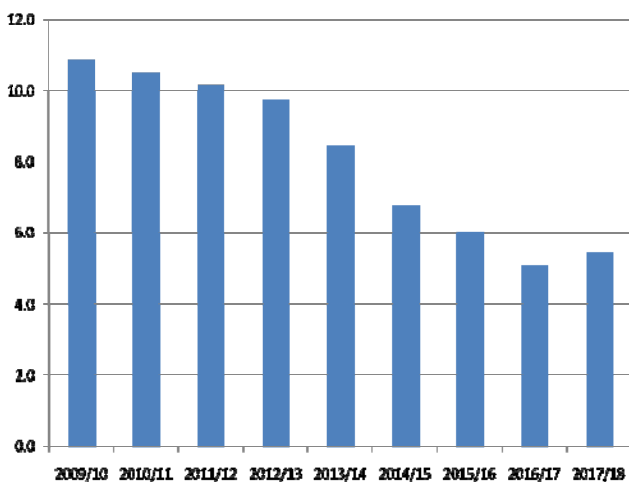
Whilst it is understandable that the Department of Innovation wishes to exit CRCs from the system, the current system does not maximise the opportunity for a CRC to move to a more sustainable basis. Later in this submission, we argue that the CRC Committee should be empowered to negotiate a sustainability phase for a CRC where appropriate. Imposing an arbitrary 15-year limit on support imposes a significant risk that important work cannot be supported by the Australian Government. The following issues need to be considered:

- Significant sector-changing innovation takes time and scale. The Allen Consulting Group (2005) showed that major innovations from CRCs take an average of nine years to deliver.
- CRCs, like all organisations, change over time. It is often the case that very significant expansion of a CRC takes place in terms of numbers of businesses and organisations joining a CRC during its term or during a new bidding process. The 15-year time limit introduces a major disincentive for them to do so.
- The time-limit has the potential to introduce “churn” at the expense of experience. The average age of CRCs will fall considerably under the policy, reducing the overall program management experience in the sector (see chart below).
- It can be difficult to tell what a “new” CRC is. The policy introduces an incentive for an existing CRC to make efforts to change simply for the sake of change. It is much better to

“What it boils down to is one per cent inspiration and ninety-nine per cent perspiration.”

Thomas Edison
(1847-1918)

leave the judgment of whether a CRC has “had its time” to the CRC Committee.



Implement a two-stage application process to cut the cost of bidding for a CRC

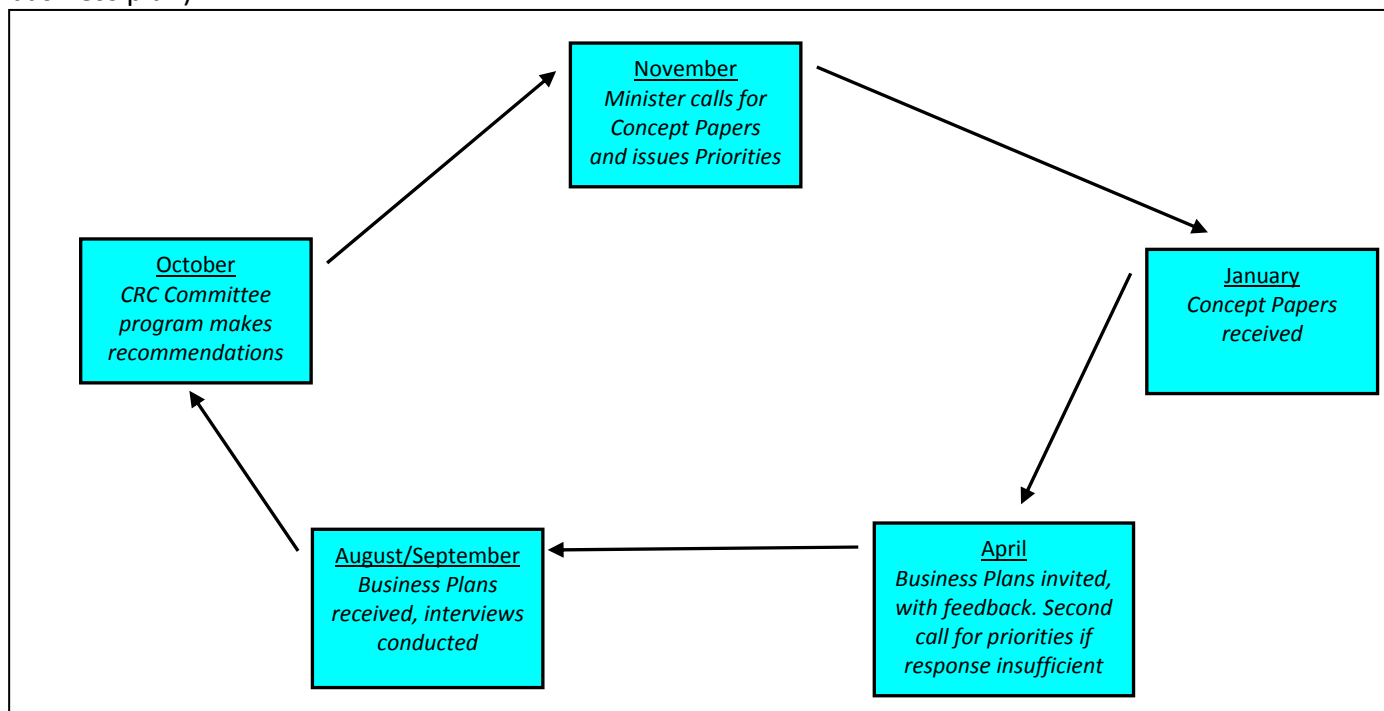
The time, cost and effort of bidding for a CRC are significant and provide a disincentive to participation, particularly to small business and emerging industries. Despite this, the CRC Program remains intensely competitive because it is higher attractive to both industry and research providers. In the 2010 funding round 30 applications were received, 14 short-listed

and 4 funded, none at the level requested. In 2011, 26 applications have been received at the time of writing.

Most bidders indicate that the Impact Study required for a CRC bid requires about one full-time-equivalent to complete in the six months leading to bid submission. The CRC Committee must process this mass of work knowing that less than half the applications will even receive an interview and less than a quarter will receive a funding offer.

The CRC Association would like to see the CRC Program selection process move to a two-phase application process whereby the first phase is relatively simple and low-cost. CRC Association believes a five-page concept paper, with the focus on the needs of end-users and desired outcomes should be sufficient for the CRC Committee to make an initial decision. The CRC Committee should be empowered to provide meaningful feedback on the applications in order that the applicants can make significant adjustments if required.

The second-phase of applications should comprise no more than double the anticipated number of CRCs that can be funded in a year (that is, if the Committee has sufficient budget to recommend 3-5 applications to the Minister, a maximum of 10 Concept Papers should be invited to provide a full business plan).



Provide the CRC Committee and CRCs with the flexibility to negotiate a “sustainability phase” arrangement

In recent years, the CRC Program has placed increasing emphasis on transition out of the Program. The CRC Association believes this emphasis has become destructive of good collaboration. We believe that DIISR is justified in seeking investment from Australian government departments. However, our observation is that researchers have become overly distracted from important work by trying to satisfy CRC Program demands to find this investment.

“Transition” out of the CRC Program has become a major issue in planning and selection of CRCs. We believe this is unhealthy during discussion of long-term R&D initiatives. Many areas require long-term Government investment.

The CRC Association believes a better alternative to the current arrangements is to empower the CRC Committee to negotiate flexible means of exiting from the CRC Program. Some CRCs can bridge to private or alternative public means of support, but to do so in the atmosphere of a highly competitive funding round is not ideal. Potential investors will sometimes refuse to engage further if the prospect of continued CRC Program funding remains.

Therefore, we propose that the CRC Committee has the option available to recommend to the Minister extensions, wind-downs or partial funding as a result of Reviews. For example, if a CRC puts a viable plan to bridge across to fully-private funding through a, say, three-year extension at a lower level of funding, there are significant advantages in the CRC Committee recommending such a proposal to the Minister without the need for the CRC to enter a subsequent funding round. The pressure and distraction of a funding round can be sufficient to destroy or significantly reduce the likelihood of a CRC successfully bridging to alternative funding sources.

As a consequence of these factors, competition to gain a CRC has become intense, with a very low success rate in the 2010 funding round of only 13% (four CRCs, two new and two extensions of 30 applications). Applying for a CRC is a significant enterprise, costing in the order of \$250,000. A CRC application cannot simply be tweaked and resubmitted in a later funding round, as each relies on a large multiparty agreement over a long period of time before submission.

Australia's Chief Scientist should sit on the CRC Committee.

In the past, Australia's Chief Scientist has sat on the CRC Committee. Indeed, during establishment of the CRC Program, the Chief Scientist chaired the CRC Committee. We believe it was the practice of subsequent Chief Scientists to sit on the CRC Committee until the immediate past Chief Scientist.

The CRC Program is an important source of linkages between components of Australia's Innovation System. The Program runs across the interests of many sections of Government. The CRC Association believes Australia's Chief Scientist has an important role overseeing scientific activities in a whole-of-government manner and should therefore have a role on the CRC Committee.

6. 2011-12 Budget Specifics

This submission proposes additional funding for the CRC Program of \$257 million to the end of the forward estimates. This amount is proposed in dollars of the 2011-12 budget year and would need to be indexed in order to maintain the research purchasing power of the CRC Program. In recognition of the requirements for Federal budget control and in anticipation of the need to gear up new proposals, we submit that additional base funding be phased in over 4 years: \$25M, \$50M, \$75M, \$100M, over the forward estimates on top of the current allocations.

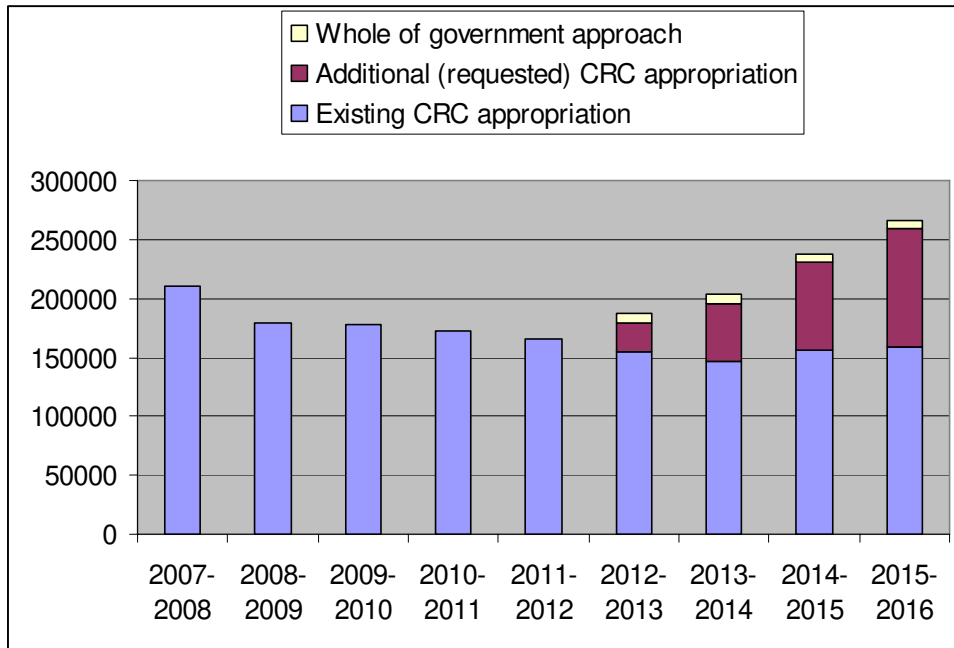
In addition to the base funding increase, we propose re-allocation of funding from the Clean Energy Future Program, where the Australian Government is planning important investments in developing clean technologies and in protecting and enhancing our unique biodiversity. Funding for these initiatives has already been put aside under the CEF program, with a \$200 million Clean Technology Fund to be administered by the Department of Innovation, Industry, Science and Research and a \$946 million Biodiversity Fund to be administered by the Department of Sustainability, Environment, Water, Population and Communities. We suggest that a small portion of each of these commitments be managed through the CRC Program to provide the outcome focus, scale and leverage warranted for such important initiatives (these particular funds are named as examples only – CRC Association suggests that Government consider across the board whether a CRC might be an effective means of delivering on major challenges).

| \$'000 (2011-12 dollars) | Current year | Budget | | | |
|---|--------------|-----------|-----------|-----------|-----------|
| | 2011-2012 | 2012-2013 | 2013-2014 | 2014-2015 | 2015-2016 |
| Cooperative Research Centres Program | 165,725 | 154,795 | 146,094 | 155,568 | 158,679 |
| Clean Technology Innovation Program Priority CRC ² | | 2,857 | 2,857 | 2,857 | 2,857 |
| Carbon Farming Priority CRC ³ | | 2,871 | 2,871 | 2,871 | 2,871 |
| Biodiversity Priority CRC ⁴ | | 1,351 | 1,351 | 1,351 | 1,351 |
| Additional CRC program funds | | 25,000 | 50,000 | 75,000 | 100,000 |
| | | 186,874 | 203,173 | 237,647 | 265,758 |

² Funding of \$200 million over five years (2012/13 to 2017/18) has already been appropriated through the Clean Energy Future Program. Committing 10% of this fund to a CRC would come at no additional cost to Government and spread the \$20 million over a further two years.

³ Funding of \$201 million over six years (2012/13 to 2018/19) has already been appropriated through the Clean Energy Future Program. Committing 10% of this fund to a CRC would come at no additional cost to Government and spread the \$20.1 million over a further year.

⁴ Funding of \$946 million over six years (2012/13 to 2018/19) has already been appropriated through the Clean Energy Future Program. Assuming that 10% (\$94.6 million) of this funding is devoted to innovation, committing 10% of these innovation funds to a CRC would come at no additional cost to Government and spread the \$9.46 million over a further year.



The chart above illustrates how the approach outlined in this submission would restore CRC Program funding. The funding would allow a greater number of companies and NGOs to engage with Australia's academic talent to greatly enhance the process of innovation. Because CRCs represent only a small proportion of total government expenditure on innovation, the CRC Association submits that the restoration of the Program should be possible within the existing or a slightly expanded innovation budget.

The CRC Association would welcome the opportunity to discuss our submission further with government officials.

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8. Opportunities for funding CRC research at whole-of-government level

(Note that these programs are used for illustrative purposes only to demonstrate the potential benefits of a whole-of-government approach to the CRC Program. These could work in a similar way to the *Defence Materials Technology Centre*, which is funded by the Defence Department and numerous additional partner organisations but managed as a CRC through the CRC Program within the Department of Industry, Innovation, Science and Research. The CRC Program is an attractive model and has been copied by other countries – Australia should look to using the model to a greater degree).

| Possible funding source | Budgeted Amount | CRC Opportunity |
|--|---|--|
| Clean Technology Innovation Program (http://www.innovation.gov.au/Industry/CleanEnergyFuture/Pages/CleanTechnologyInnovationProgram.aspx) | \$200 million over 5 years (2012-13 to 2017-18) through the Clean Energy Future Program | Committing 10% of this fund to a CRC in an area of priority nominated by the Program would come at no additional cost to Government. Applications for a <i>CRC for Low Carbon Living</i> , an <i>Australian Power CRC</i> and a <i>Designing Better Cities and Regional Centres CRC</i> are all currently being considered by the CRC Selection Committee. If those applications were aligned with the Clean Technology Innovation Program and were deemed competitive, perhaps one or all could be funded through this source? |
| Carbon Farming Initiative (http://www.daff.gov.au/climatechange/cfi) | \$201 million over 6 years (2012-13 to 2018-19) through the Clean Energy Future Program | Committing 10% of this fund to a CRC in an area of priority nominated by the Program would come at no additional cost to Government |
| Biodiversity Conservation (http://www.environment.gov.au/biodiversity/conservation/index.html) | \$946 million over 6 years (2012-13 to 2018-19) | Assuming that 10% (\$94.6 million) of this funding is devoted to innovation, committing 10% of those innovation funds to a CRC would come at no additional cost to Government. An application for a <i>CRC for Securing & Rebuilding Biodiversity</i> is currently being considered by the CRC Selection Committee. If that application was deemed competitive, perhaps it could be funded through this source? |
| Mental Health | \$2.3 billion | The CRC Program already funds two Mental Health CRCs. A fraction of these additional funds could be used to support either the existing CRCs or new CRCs in priority area(s) nominated by the Program and would come at no additional cost to Government. Applications for a <i>CRC for Living with Autism Spectrum Disorders</i> , a <i>CRC for Telehealth and Telecare</i> and a <i>CRC for Social Inclusion</i> are currently being considered by the CRC Selection Committee. If those applications were aligned with mental health and deemed competitive by the Selection Committee, perhaps one or all could be funded through this source? |

| | | |
|---|--|---|
| Water | Water for the Future (SEWPAC) \$12.9 billion over 10 years | This initiative is largely related to investment in infrastructure however the intent of the program is “ <i>to provide farmers and communities with more confidence to plan for a future with less water, to put water use on a sustainable footing, to enhance irrigation productivity, and to improve river and wetland health</i> ”. Given the current lack of research in this space and across the Murray Darling, a diversion of some funds (5%) towards research to inform infrastructure investment would seem sensible. |
| Regional Australia | Regional Development Australia Fund (Dept of Regional Australia) ~\$1billion | Similar to ‘Water for the Future’, this initiative is largely focused at infrastructure investment. Collaborative research in this space would guide better infrastructure investment and support RDA with the necessary data to plan for the future. |
| National Strategic Rural R&D Investment Plan (NSRRDIP) released by the Minister in June 2011 (http://www.daff.gov.au/agriculture-food/innovation/council) | Source of investment not clear | If funding is available under the NSRRDIP, a proportion of the funds could be used for current agricultural CRC applications if those applications were deemed competitive. Those agricultural CRC applications in the current CRC selection round are for the: <ul style="list-style-type: none"> • <i>Plant Biosecurity CRC</i> • <i>Cotton Regions CRC</i> • <i>Forestry CRC</i> • <i>Beef Genetic Technologies CRC</i> • <i>Invasive Animals CRC</i> |