

Securing Australia's Future Program: A Progress Report

February 2016

1. The Securing Australia's Future Program

The *Securing Australia's Future* (SAF) Program comprises a series of strategic research projects funded by the Australian Research Council and delivered to the Australian Chief Scientist.

It is coordinated by the Australian Council of Learned Academies (ACOLA), which is the interdisciplinary research forum for the four Learned Academies for Australia: the Australian Academy of Science, the Australian Academy of the Humanities, the Academy of the Social Sciences in Australia and the Academy of Technology and Engineering.

For the *Securing Australia's Future* program, the Academies are working together to deliver evidence-based research to support policy development in areas of importance to Australia's future. The first tranche of projects was agreed in 2012 and additional projects have been agreed over time.

The program has used research concepts and methodologies drawn from across the range of academic disciplines to help address fundamental issues involved in positioning Australia for its future. It is focused on the medium and the long-term and also on the pathways that need to be built to that future from the present.

Securing Australia's Future is a response to global and national changes and the opportunities and challenges in particular of an economy in transition. Productivity and economic growth will result from an increased understanding of how to best stimulate and support creativity, innovation and adaptability; an education system that values the pursuit of knowledge across all domains, including science, technology, engineering and mathematics; and an increased willingness to support change through effective risk management.

The initial research topics identified were:

- Australia's comparative advantage
- STEM: Country comparisons
- Smart engagement with Asia: leveraging language, research and culture
- The role of science, research and technology in lifting Australian productivity
- New technologies and their role in our security, cultural, democratic, social and economic systems
- Engineering energy: unconventional gas production

In July 2014 two new research topics commenced:

- Australia's agricultural future
- Delivering sustainable urban mobility

During 2015 three new research topics were added:

- Translating research for economic and social benefit - country comparisons
- Capabilities for Australian enterprise innovation
- Business diasporas in Australia: maximising people to people links with Asia

Securing Australia's Future is governed for ACOLA by a Program Steering Committee (PSC). The PSC is responsible for the overall quality of the program including via a peer review process. Fellows of the four Learned Academies comprise the PSC.

The current members of the PSC are:

- Professor Michael Barber FAA FTSE (Chair)
- Mr Dennis Trewin AO FASSA (Deputy Chair - Research)
- Professor James Angus AO FAA
- Dr John Burgess FTSE
- Professor Bruce Chapman AM FASSA
- Professor Ruth Fincher AM FASSA
- Professor Paul Greenfield AO FTSE
- Professor Lesley Head FAHA
- Professor Peter McPhee AM FAHA FASSA
- Professor Stephen Powles FAA FTSE
- Dr Susan Pond AM FTSE
- Professor Graeme Turner FAHA

The projects completed to date are listed in the following box and all are available on the ACOLA website. The Expert Working Group Chairs for each project are provided in parentheses.

Securing Australia's Future: Completed Research Projects

- Australia's comparative advantage (Professor Glenn Withers, AO FASSA)
- STEM: Country comparisons (Professor Simon Marginson FASSA)
- Smart engagement with Asia: Leveraging language, research and culture (Professor Ien Ang FAHA)
- The role of science, research and technology in lifting Australia's productivity (Dr John Bell FTSE)
- Technology and Australia's future (Professor Robin Evans FTSE, Professor Robert Williams FAA)
- Engineering energy: unconventional gas production (Professor Peter Cook CBE FTSE)
- Australia's agricultural future (Dr Joanne Daly FTSE)
- Delivering Sustainable Urban Mobility (Dr Bruce Godfrey FTSE)
- Translating research for economic and social benefit: country comparisons (Dr John Bell FTSE)

2. SAF Project Coverage

The broad scope of each of the first five completed projects is as follows, in order of completion:

STEM: country comparisons

A vibrant capacity in Science, Technology, Engineering and Mathematics (STEM) is pivotal to increasing our nation's productivity. Building on recent research commissioned by Australia's Chief Scientist to identify STEM skills shortages, this project critically examines existing solutions to the STEM skills shortage in comparable countries and ascertains which, if any, of those solutions can be usefully applied to the formation and maintenance of a STEM skills

workforce and proposes a set of options for increasing Australia's productivity and international competitiveness.

Engineering energy: unconventional gas production

Energy needs will require us to keep turning to opportunities for alternative sources such as shale oil gas and coal seam gas. As technology and geological knowledge continues to advance, and the consequent economics of extracting unconventional natural gas become more feasible, Australia could be in a position to produce unconventional gas. This demanded a comprehensive look at the scientific, social, cultural, technological, environmental and economic issues surrounding the reality of alternative energy sources such as unconventional gas.

The role of science, research and technology in lifting Australian productivity

Through the identification of opportunities for applying knowledge and skills in science and research across a range of industries and sectors including private and public enterprises, this project examines ways to enhance innovation, creativity and productivity in the Australian workforce and business practices in order to drive Australia's prosperity.

Smart engagement with Asia: Leveraging language, research and culture

The depth of Australia's linguistic and inter-cultural competence will be a determining factor in the future success of developments in innovation, science and technology, research capacity, international mobility, trade relations and economic competitiveness. In the medium to longer term, the Asia Pacific region will be a principal focus, presenting major challenges and opportunities economically, socially and culturally, for our national security interests.

Australia's agricultural future

Agriculture is an important part of the Australian economy and an area of significant comparative advantage. Agriculture can post major successes in developing and adopting innovations and new technologies particularly in dry land cropping, pasture-based production systems and biosecurity arrangements that protect against pest and disease incursions. The essence of our comparative advantage is our reputation as a producer of clean, green, safe, affordable, sustainable and ethical food and other agricultural products. Optimising production whilst maintaining our unique capacity and reputation both nationally and internationally is the critical challenge that is explored by this study.

3. Australia's comparative advantage

One of the latest projects completed to date is *Australia's Comparative Advantage* (ACA). It examines the opportunities and challenges of an economy in transition, which is a key issue for Australia as it faces a rapidly changing global environment. This multidisciplinary research program identifies Australia's unique strengths and comparative advantages; establishes which contexts and policy settings encourage creativity, adaptability and

innovation; and explores the natural, social, geographical, economic, cultural and scientific attributes and capabilities needed to thrive as a nation.

With this coverage it provides a broader framework for positioning the preceding specific projects, which provide detailed content and coverage of particular areas that underpin our national achievement. For this reason, it is helpful to look further at its conclusion.

When considering what the future may bring, a key finding of the ACA report was the imperative that we understand that thinking that tomorrow will be more of the same as today is not good enough. All major possibilities need to be contemplated. In choosing how we face that unknown, and in some cases, unknowable future, a broad approach is necessary to make sure that the foundations with which we will face the new challenges are enhanced for whatever may come.

According to this report, Australia faces challenges of great importance, but these are challenges that this project finds can be met. In the view of this report, building comparative advantage will require a commitment both to ongoing institutional reform and to investing in our future capabilities as a nation.

Natural advantage sectors will contribute substantially given Australia's unique endowments in this area, and the ACA report itself provides detailed examination of the agriculture and mining sectors in this respect. The report and its supporting studies indicate how focus on new food opportunities such as in high value added organic farming or new mining prospects such as growth in natural gas production illustrate how natural advantage can be furthered for the future.

These sectors can usefully be complemented by comparative advantage developed in sectors such as advanced manufacturing and in service industries such as health, education and financial services, which are also examined in detail in the report and in the background work that was undertaken for the project.

Within the broad sectors, areas such as robotics, mobile and consumer devices, and cloud services are identified as especially promising illustrations of the opportunities for focus within advanced manufacturing. In health, aged care and treatment for chronic diseases are seen as particular examples illustrating where comparative advantage could be pursued further for the future, as are areas such as vocational education and training, off campus delivery and research partnerships in education.

In finance, Australian, comparative advantage in superannuation and pension fund management, banking services, financial management and funds management are likewise identified as illustrating the future promise for comparative advantage within sectors.

Such examples indicate concretely how Australia can indeed reposition itself for the future with intelligent focus and supportive policy.

The ACA report concludes that institutions and culture must be configured to support this process of building and realizing comparative advantage, including through Australia's rather distinctive deployment of major public-private partnership systems, and that better leadership, management and the encouragement of innovation and entrepreneurship will be key to success.

In all the above-mentioned illustrations the importance and centrality of knowledge/ideas need to be explicitly recognised in the associated structures and policies.

The project found evidence that the Australian public is increasingly willing to commit to and support such ways forward. Explanation and leadership is needed for this vision to realise its potential, but the Australian community has the capacity to understand what is needed to inform and support that process.

Building comparative advantage is not simply addressing a list of policies or proposals but ensuring that a broad-based foundational approach to the Australia of the future is understood and at the heart of decision-making and debate. Australia does well at many things but that is no guarantee of future success. If we want the country to be the best it can be, we will have to build that future.

This ACA report affirms that pursuing both institutional changes in political, legal, market and cultural arrangements alongside investment in skills, infrastructure and innovation will see long-lasting benefits to growth and living standards. These initiatives will develop the national capacity to realise comparative advantage and compete well in a changing global environment, and to do so both equitably and sustainably.

4. Australian Science Policy

With a foundation of appropriate structures and institutions, national priorities are then an issue for policy. Such priorities are the pillars that are built on the foundations laid across the economy and society.

One key priority area is science and innovation, as stressed in the *Australian Comparative Advantage* Report as well as in the reports on:

- The role of science, research and technology in lifting Australian productivity;
- STEM: country comparisons.

Behind these in turn the ACOLA report on *Smart engagement with Asia: leveraging language, research and culture* shows how complementary skills and understanding are needed to drive science and innovation.

The reports for specific sectors also illustrate how a science and innovation priority is essential to:

- *Engineering energy: unconventional gas production*; and
- *Australia's agricultural future*

Complementing these reports to the Chief Scientist of Australia has been the emergence of a clear strategy for science and innovation, as recommended in the Chief Scientist's Submission to the Senate Inquiry into the Australian Innovation System of July 2014.

On 26 May 2015, a statement by the Prime Minister, Minister for Education and Training and the Minister for Industry and science affirmed the Coalition Government's commitment to a strategic approach to science and innovation of this kind.

Sources:

Material in this Progress Report outline is taken directly from the ACOLA website documentation for the *Securing Australia's Future* program plus the Chief Scientist's website and the Prime Minister's website.

Links:

ACOLA Securing Australia's Future Program

<http://www.acola.org.au/index.php/projects/securing-australia-s-future>

Chief Scientist's Submission on Australia's Innovation System

<http://www.chiefscientist.gov.au/2014/07/senate-inquiry-submission-australias-innovation-system/>

Prime Minister's Media Release on National Science and Research Priorities

<http://www.pm.gov.au/media/2015-05-26/national-science-and-research-priorities>