



**“ISA’s 2030 Strategic Plan: Innovation must become the core of national priority settings”**

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**QUT Institute for Future Environments - QUT Grand Lecture Challenge**

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**\*\*\*Check against delivery\*\*\***

Thank you for the invitation to speak here this afternoon and hello to those who are watching via livestream. QUT’s Institute for Future Environments is an outstanding example of a transdisciplinary research and innovation institute that brings together hundreds of researchers and students to collaborate on large-scale projects relating to our natural, built and digital environments.

These projects are of national significance; the outcomes that result from the Institute demonstrates our nation’s enduring research strengths, the entrepreneurial spirit of researchers, and the power of collaboration and innovation to address the social and economic challenges that are facing Australia. I am very pleased to have this opportunity. I would also like to acknowledge ISA Board member, Professor Bronwyn Harch who as many of

you know is Executive Director of the Institute for Future Environments. And you can blame Bronwyn for having to put up with me today!

In my view, innovation **must** become the core of national priority settings.

Looking towards 2030, innovation will be integral to the expansion of Australia's economy, keeping our workforce strong, and addressing societal challenges. Innovation is the key to a sustainable prosperity less dependent upon the performance of our commodities exports and historically favourable terms of trade, and more widely driven by the development and commercialisation of our own ideas and inventiveness. As an enterprising and ambitious country, **standing still is not an option.**

This afternoon I am going to talk about our – the Innovation and Science Australia Board's – strategic report to Government entitled: "*Australia 2030 Prosperity through Innovation*", and it's recommendations to Government to ensure innovation is at the forefront of national priority settings.

## **ISA's 2030 PLAN: OVERVIEW AND PRIORITIES**

Innovation and Science Australia is an independent statutory board, comprised primarily of private innovation practitioners, and tasked with advising Government on how to lift Australia's innovation performance out to 2030. So what would success look like in 2030? The ambition and vision for our plan is for Australia to be an international leader in innovation by 2030, known and respected for the excellence of its research, science and commercialisation, with plentiful and meaningful jobs in a fair, inclusive and healthy economy and society.

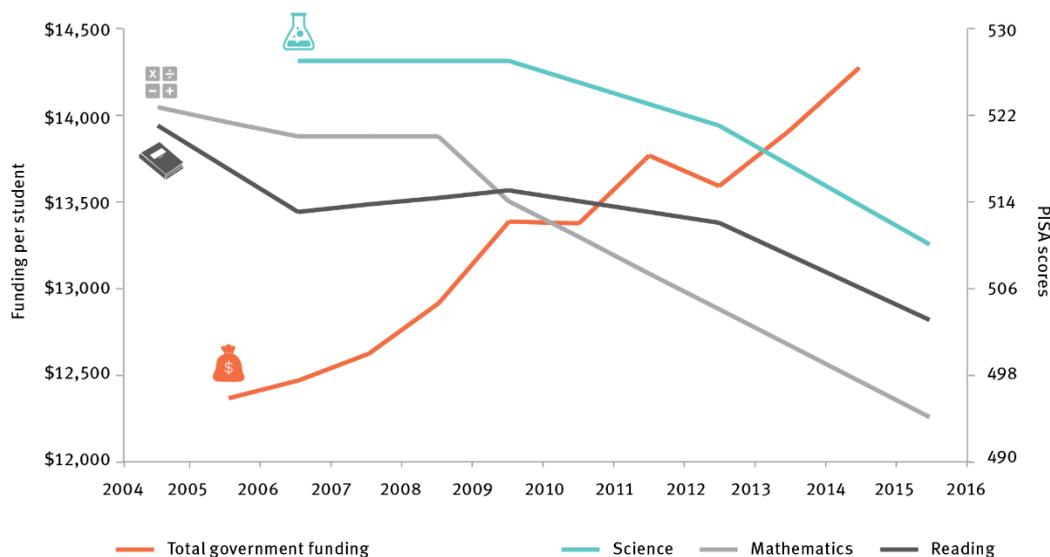
To get there by 2030 our strategic plan calls out 5 imperatives to be tackled if Australia is to close the present considerable gap in innovation performance between it and key competitor nations. We make 30 recommendations to deal with these imperatives, some of which I will describe in the time available today.

## IMPERATIVE 1: EDUCATION

The nation will only achieve the potential economic and social prosperity envisaged in the Plan if we are able **to equip our kids with skills relevant to the jobs of 2030.**

In our conversations around the ISA board table we sometimes refer to education as setting the “speed limit” for our economy. Yet just at the time when Australia needs to accelerate its innovation performance, and raise its economic speed limit, we are falling behind our global peers, particularly in student performance in science, mathematics and literacy.

### SLIDE 1 – Education reform



*[School education funding and outcomes, 2004-05 to 2015-16]*

The data shows that while Australia has pockets of excellence in our education system, overall results in science, maths and literacy have declined in the last decade, despite increases in funding. **This must be reversed.**

Therefore ISA's recommendations focus on changes necessary in secondary school curricula, quality of teaching, and student performance. We focus on increasing teacher quality and training, noting for example that 40 percent of maths teachers are teaching "out of field" i.e. without any formal maths knowledge or training.

And given that digital literacy will be just as important in future work as basic literacy and numeracy, we support increased emphasis on STEM subjects with an expanding role for the STEM Partnerships Forum, bringing industry and education leaders together to lift student understanding and awareness of the relevance of STEM skills to a wide range of careers.

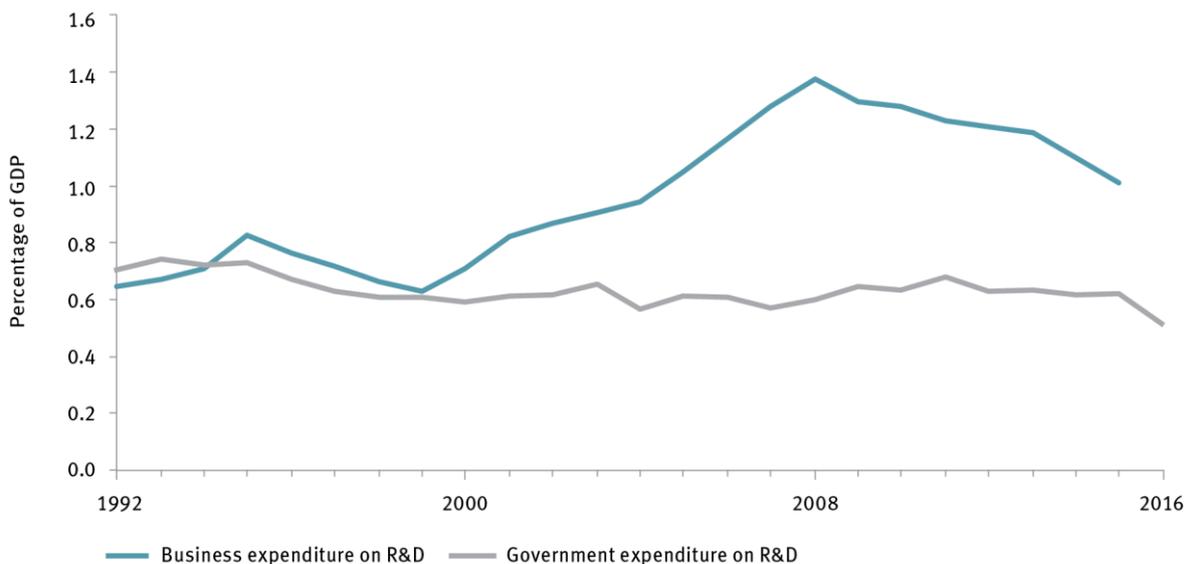
The changing nature of work in the future means that reskilling and life-long training and learning will be essential to establish a competitive workforce and

to maintain a fair and inclusive society out to 2030 and beyond. The Plan therefore recognises and recommends the urgent need to restore and enhance the reputation and capability of the vocational education training (VET) sector.

## **IMPERATIVE 2: INDUSTRY**

**We need to ensure Australia’s ongoing prosperity by stimulating high-growth firms and raising productivity.**

### **SLIDE 2 – Business expenditure of R&D in decline**



*[Australian business and government research and development expenditure, 1992-2016]*

Australian business simply isn’t investing in innovation at the rate seen in the business communities of our competitor nations. And, more alarmingly, the

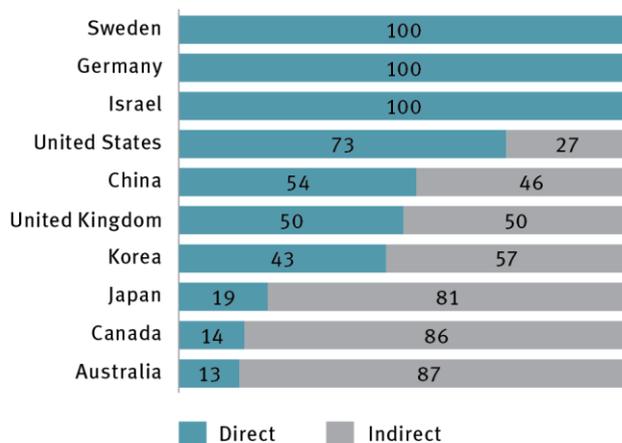
trend in this investment has been falling since the GFC. BERD – the acronym for Business Expenditure on Research & Development – reached a highpoint of 1.3 percent of GDP in 2008, but fell to 1 percent in 2015-16. In the same year, BERD was at 3.6 percent of GDP in Israel, and around 2 percent of GDP in both Germany and the USA. The reversal of this downward trend in R&D spending by business is a top priority in the Plan and our recommendations include changes to the indirect tax and other direct incentives to propel business investment in R&D and innovation. We need BERD to expand significantly, with something closer to 1.7% of GDP being, a reasonable aim by 2030.

To achieve this goal, our Plan includes a number of recommendations aimed at encouraging start-ups and scale-ups. This includes improved design of existing research and development incentives (tax based, grants based and co-investments) ..... incentives to drive a greater bang for the government's buck and to make sure they are readily accessible to growth oriented companies, big and small.

For example, how do we get more companies like Melbourne based TEXTOR TECHNOLOGIES, which we feature as a case study in our plan. This company

has been described as an “An overnight success after its first 10 years”, by a CSIRO colleague recently. Once a struggling small manufacturer, it is now supplying its clever moisture absorption fabrics for many hundreds of millions of nappies produced by Kimberley Clark in facilities here and worldwide. Textor worked with CSIRO to develop novel fabrics. I recently visited Textor’s upgraded Tullamarine factory, a state-of-the-art, automated facility. These innovations have transformed Textor into a healthcare and hygiene leader, exporting across the Asia Pacific. The business has grown by 300 percent, and has opened up a multinational textile value chain. Its innovation in products and advanced manufacturing process have enabled more jobs not less; existing staff were retrained to perform higher value roles and expansion in exports is enabling new jobs to be sustainably created.

**SLIDE 3 – Overreliance on RDTI**



*[Percentage of direct vs indirect government funding for business research and development, 2013]*

The ISA Board notes that Australia's reliance on indirect tax based incentives is out of step with other more innovative nations. (e.g.) Australia has only 13 percent of its business incentives in direct measures compared to Sweden, Germany and Israel at 100 percent, US 73 percent and the UK at 50 percent.

One key area where direct support should be expanded is in facilitating exports by Australian firms. Exports are a strong proxy for innovative and competitive performance and our plan therefore calls for an expansion of Austrade's EMDG program. Indeed, approximately 50 percent of the SME's in the EMDG program are achieving better than 20 percent per annum growth in employees and sales. With consumer households in Asia expected to double from 600 million today to 1.2 billion by 2030, we believe there is a large multiplier opportunity to be supported by this recommendation.

An example of an EMDG recipient is Quickstep. Quickstep's advanced process technologies provide its customers with lower cost manufacturing solutions for niche volume production. EMDG has encouraged them to attend key

international tradeshows. In addition to manufacturing parts for the JSF program, Quickstep is now also supplying parts for the C-130J Super Hercules aircraft program. Quickstep partners with some of the world's largest aerospace and defence organisations, including the U.S. Department of Defense, Lockheed Martin, Northrop Grumman, BAE Systems and Thales. They have won the National Defence Innovation Award and the Premier's NSW Export Award for Manufacturing.

A further key recommendation relates to the fact that competing in the global innovation economy also requires access to the best talent available. As a small part of the global community, Australia can't expect to find all of this talent within its own shores. It is therefore vital we have an immigration policy that can attract and retain world class talent for our innovation system. Reducing immigration of such talent will not lead to more jobs for Australians – if anything it will do the opposite: highly skilled migrants are “job multipliers” – developing skills and creating new jobs that we simply couldn't do alone.

As such, we welcome and commend the Government's recent announcement of the Global Talent Scheme to stimulate talent attraction and skilled

migration. We are pleased to see that the Government has listened to concerns about some of the recent changes to Australia’s migration system that might detract from our ability to supply the skills our economy needs to grow to its full potential. And we look forward to seeing the pilot roll out from July this year.

### **IMPERATIVE 3: GOVERNMENT**

**Government must become a catalyst for innovation and be recognised as a global leader in innovative service delivery.**

ISA believes Australian governments can and should make greater strategic use of their role in the economy to stimulate innovation amongst SMEs and high growth firms. The plan recommends that 33 percent of government procurement contracts should be awarded to SMEs by 2022 (measured in dollar value) and it recommends Governments should accelerate the trial of innovative new approaches to supporting SMEs and high growth firms, such as a “government as a first customer” program.

Defence of course has the huge potential to be a pathfinder for driving spill-overs from major projects such as shipbuilding. Our report pushes for even

stronger efforts in this regard and also endorses the recent DSTG allocation of \$1.6 billion funding for encouraging early stage development by researchers and SME's of novel solutions to future ADF requirements.

Australian governments are also sitting on a stockpile of rich data assets. We need to get better and faster at making high value data available, so that third party users can harness it to create new insights and services.

High quality curated data is also an essential ingredient for AI and the efficiency of its algorithms. This carries implications and opportunities for almost all industries, from transport to healthcare and education. And so we have recommended that the Government's forthcoming Digital Economy Strategy paper should prioritise development of an advanced capability in AI and machine learning to ensure Australia remains globally competitive.

All too often the focus in the public debate on innovation is only on how Governments **invest** in supporting innovation, rather than how they themselves **innovate**.

We need a public service with contemporary skills, broad experience and an open culture. We also need to rethink the way the public service is organised, so public servants can work more effectively in cross-agency teams, rather than the current default model of policy and service silos. Such a public service could then be fit for purpose to drive greater innovation in a transformed digital economy.

Therefore, the Plan calls for a review of the Australian Government Public Service to enable a greater role and capability for innovation in policy development, implementation and service delivery. (Recommendation No 18).

#### **IMPERATIVE 4: RESEARCH AND DEVELOPMENT**

**We need a significant improvement in collaboration for commercialisation.**

Australian researchers produce world class knowledge and ideas. But we badly lag our competitor nations in commercialising this intellectual property. The level of collaboration between business and researchers is also lagging our competitors, e.g. the contribution of Australian industry to higher education R&D is just 5%, and below the OECD average. We need to quickly reduce the intellectual and physical gulfs between industry and research institutions, **and**

**drive collaboration that leads to commercialisation.** The single largest Government incentive for business R&D, the RDTI, neither encourages nor requires any collaboration. Our recommendations include a new incentive to be included in the RDTI; a special collaboration premium tax offset for incremental expenditure undertaken by business with universities like QUT and PFRA's in technology and product development.

The fantastic talent we have in PhD students is not being taken up by Australian business to the extent that is seen in our competitor nations. For example, recent data shows that for business researchers per thousand employed by industry we sit 21<sup>st</sup> out of 36 comparable nations. We need more businesses to reach out to our universities and other publicly funded research organisations including CSIRO and the MRI's. We need a ramp up in the exchange among universities and businesses and we believe a collaboration premium will provide an additional boost to this. These joint initiatives produce great outcomes for businesses and their bottom lines, for universities and their researchers, and most importantly for the nation and our innovation system as a whole. Indeed, boosting this dynamic, and unlocking the economic and social value of our best ideas both at home and through our exports to the world, is critical to lifting our innovation potential.

A great example of an initiative that supports industry-research collaboration is the **CRC Programme**; which is a merit-based grants programme that brings together industry, universities and research organisations to conduct and commercialise leading-edge research.

Let me mention a wonderful Brisbane based example: the **Wound Management CRC** was set up in 2010 to conduct leading-edge collaborative research with the aim of improving the lives of people suffering from wounds. Chronic wounds are estimated to affect more than 433,000 Australians and cost the health system over \$2.85 billion a year. Patients can suffer for years, even decades, and this costly chronic health problem leads to many avoidable amputations. One of the many causes of this silent epidemic is that patients must navigate a complicated, fragmented system where not all health professionals use routine best practice to get their patient's wounds treated. The Wound Innovation CRC research has led to the development of The Wound Innovations clinic, which is applying technology developed by the CRC to transform the lives of Australian wound patients. The Wound Innovations clinic in Brisbane draws together a pool of specialist wound healing talent, now accessible to all Australians through videoconferencing facilities.

Participants in the Wound Management CRC include the University of Western Australia, Curtin University of Technology, **Queensland University of Technology**, 3M Australia and Ego Pharmaceuticals.

In addition, we have reaffirmed the need for Government to establish secure, long-term funding for national research infrastructure, which is a key foundation for our innovation system. This is in accordance with the recommendations of the 2016 National Research Infrastructure Roadmap, which was developed under the expert guidance of my colleague and ISA Deputy Chair, Chief Scientist Dr Alan Finkel.

We have also recommended that the government release an Australian Innovation Precincts Statement to help shape their involvement in the emergence of local clusters of innovation around the country. One of the case studies highlighted in the report shows a glimpse of where we need to head. It tells the story of the Geelong Future Economy Precinct. In five years since the shut-down of the auto industry, the precinct has created well over 1000 jobs in advanced manufacturing, with a particular specialisation in carbon fibre technology. It brings together pioneering companies including Carbon Nexus, CleanTeq, LeMond Composites and Carbon Revolution, and is anchored by

Deakin University. Carbon Revolution supplies Ford USA with all of its carbon fibre wheels for the Mustang range. And I understand they are also now supplying Ferrari. The company is also developing products for the aviation sector where strength with lower weight is the holy-grail.

I'd like to take this opportunity to put a spotlight on Universities Australia's recently launched Clever Collaborations report, which makes the case for introducing greater incentivisation for Australian businesses to collaborate with our world-leading universities. This report is a practical step in the right direction to facilitate collaboration through providing businesses with a listing of the best pathways to approach every Australian university.

### **So to IMPERATIVE 5: CULTURE AND AMBITION**

I have made a career of investing in talented Australians, both in the NFP world and in the corporate world .....People who have gone on to achieve incredible things. I know ability is not the barrier to Australians succeeding globally.

Where I see a big gap between Australia and the world's leading innovation nations is in the level of our aspiration, and our willingness to tackle very big problems, at a global scale.

To help build a culture that inspires Australians to take on some of the really big challenges and to proudly celebrate our own outstanding science and innovation, the Plan recommends a program of National Missions - large scale ambitions catalysed by governments that address audacious challenges.

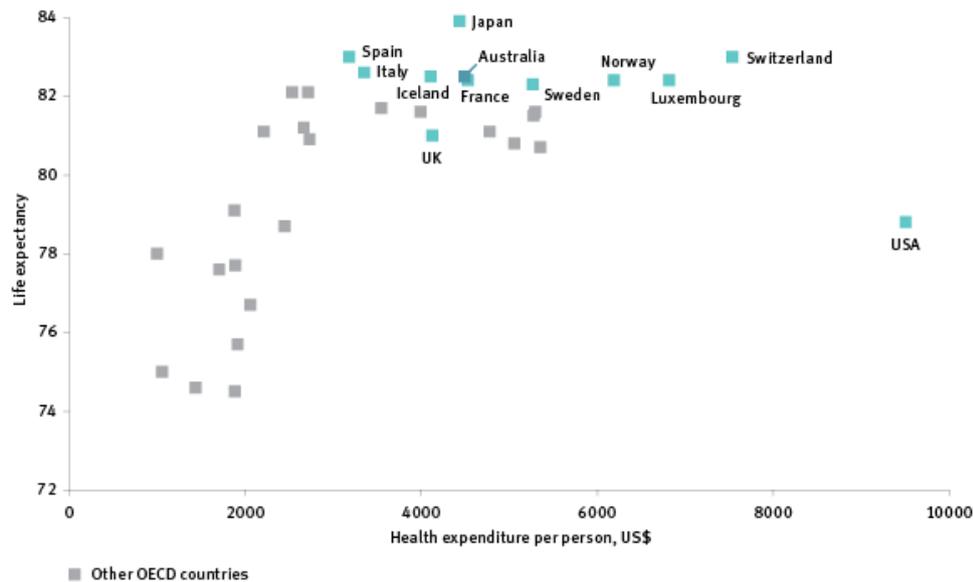
Australia has a grand tradition of such visionary projects, for example the Snowy Mountains Scheme and SKA telescope and more recently the pursuit of quantum computing led by our 2018 Australian of the Year Professor Michelle Simmons. Such a program would invigorate the public's excitement and imagination for science and innovation, and inspire our best thinkers and entrepreneurs to solve our greatest challenges.

We are recommending that the first such National Mission should be to use genomics and precision medicine to assist Australia becoming the healthiest nation on Earth. This will entail the expansion and integration of genomics and precision medicine capability into our national health and medical system. It is a grand project. This mission would sequence the genomes of selected patient groups, including families with a history of cancer, children with rare diseases, and people with chronic disease. It would lead to better health outcomes, new and earlier diagnosis, improved prevention and more targeted and

personalised care. In doing so, we can be a world leader in intelligent, efficient and cost effective health delivery.

An example of what that kind of advanced healthcare looks like is helpful: The Garvan Institute in Sydney is trialling a program for sequencing the genomes of individuals with rare conditions. A couple of years ago, seven year old Alan with a rare blood disorder was admitted to the trial. His condition had rapidly deteriorated and he was critically ill in hospital. Working through the weekend, researchers at the Institute used his sequenced genome to pinpoint the genetic variation responsible for his condition. That allowed them to scan medical literature and find a new drug on trial in the US to treat patients with this same variation. Alan was out of danger in a week. Within six months, he was well enough to go to school for the first time, and able to ride a bike like other kids.

## SLIDE 4 – Can we be the healthiest nation on the planet?



*[Life expectancy vs health expenditure per person]*

Stories like this are a reminder that we already have a good healthcare system – we are already in the top half dozen of OECD nations in terms of life expectancy, and at reasonable cost per capita. But why not aim to be great, rather than just good? Why not have a crack at becoming number 1? ..... to become the healthiest nation on the planet. I'd call that a challenge worth taking on.

## SLIDE 5 – Is this worth saving?



*[COSMOS – issue 78 – Autumn 2018]*

Our plan also highlights other candidate national missions including a “Save the Reef” mission:

To undertake the world’s largest reef restoration and adaptation program to optimise the chances for the survival and adaptation of the Great Barrier Reef beyond 2030. This could inspire the very best from our scientists and innovators.

The GBR is a global icon and crucially important environmental habitat, bringing in an estimated \$6.4 billion each year to the economy and supporting 64,000 full time jobs.

The GBR is an incredibly complex ecosystem and with water temperatures forecast to increase above coral thresholds irrespective of the RCP outcomes, deploying interventions requires breakthroughs in both technique and scale of development and impact.

Australia has made substantial forward commitments to the GBR, including the Reef 2050 Plan, which provides a strong base for this mission. But that Plan has so far focused on managing direct threats e.g. crown-of-thorns starfish and land-based run-offs. It has not previously proposed any response to the recent dramatic death by bleaching of up to 50% of the corals. Our national mission will complement the Reef 2050 Plan's emphasis on threat reduction by introducing a targeted restoration and adaptation strategy ..... to create a possible recovery and protection strategy for the reef beyond 2030. It is ambitious and experimental and will build on Australia's world-leading science capability and marine research infrastructure, particularly in tropical marine science.

In January, we were pleased to see the Prime Minister announce a \$60 million reef investment package which included the \$6 million scoping of a major

research and development program, The Reef Restoration and Adaption Program, (RRAP). This 18 months design and scoping phase of the RRAP will be led by The Australian Institute of Marine Science (AIMS) and the CSIRO. They have partnered with the Great Barrier Reef Foundation, the Great Barrier Reef Marine Park Authority, James Cook University, Queensland University of Technology and the University of Queensland Australia to implement the Program.

This world-first program is a collaboration of our nation's leading experts in reef ecology, water and land management, engineering and innovation. The program's researchers are currently evaluating existing reef research and technology from Australia and the rest of the world, to identify the methods that could feasibly be further developed and deployed at the scale needed to protect and restore The Great Barrier Reef.

The aim is to create a suite of targeted reef restoration and adaption measures that can be modelled and deployed, if and when the community decides intervention is needed. Such measures could include assisted evolution of coral species able to adapt to warming water temperatures, next generation

corals for tomorrow's reefs through selective breeding and related technologies.

Coral bleaching is a global issue. The resulting reef-saving technology could also be commercialised for use in other coral reefs around the world, helping to cement Australia's international reputation for innovation and new technologies.

These are precisely the sorts of outcomes that National Missions can create; taking on almost impossible challenges and demonstrating the potential of Australian innovation and science to make our world a better place.

## **CONCLUSION**

Our Report is a report to Government; but its recommendations address all sectors of the economy and all of our citizenry. Ultimately it is a plan for the sort of society and economy all Australians can aspire to by 2030. It is a plan to create more and better jobs, noting that fast-growing companies that innovate, export and scale are responsible for virtually all new net jobs in the

economy. And it is a plan to spread the benefits of innovation widely, including giving all Australians the benefits of a world leading healthcare system.

The Report lays out a roadmap for Government action, for implementation of all 30 recommendations by 2022 and for periodic 4 yearly assessments of progress. We have selected 17 domestic and international metrics against which to measure our innovation performance in this journey out to 2030. In only 5 of these 17 measures do we presently rank in the top quartile of nations. So we do have a long way to go.

Nonetheless, I believe our recommended suite of reforms and actions will enable Australia to extend its world record run of 26 years unbroken GDP growth and become a top tier innovation nation by 2030.

We all need to be bold and ambitious in our support of innovation as a way of life in Australia. Innovation will be critical to the economic and social outcomes that produce the Australia of 2030; accordingly government innovation policy should occupy a prominent role in our politics, our broader public discourse,

and must become the core of national priority settings. So please speak up;  
your voices are important.

**Thank you.**