SECURING OUR FUTURE THROUGH RESEARCH & DEVELOPMENT

A roadmap to increase R&D investment to 4% of GDP

The Greens aim to increase Australia's investment in research and innovation to 4% of GDP. Our research investment plan will help deliver a highly skilled workforce, vital research infrastructure and incentives for business to participate. We will increase funding, improve access to information, foster national and international collaboration, protect our key research institutions and deliver the research and innovation Australia needs to remain competitive.

> A ROAD MAP TO INCREASE R&D INVESTMENT TO 4% OF GDP BY 2030

Science is vital to our wellbeing. Knowing more about the world around us enriches us as a species but also gives us the tools to solve some of the world's most pressing problems. Curiosity-driven research and public good science are vital. Science should also be a career for life, where our best and brightest feel that Australia is a secure place to work.

Australia has a strong history of science and innovation. We have all benefitted from life-saving discoveries made by Australia's outstanding researchers. As we move into an increasingly complex and resource constrained future, our national wellbeing will become ever more dependent on further advances. Australia is in the perfect position to become a leader in the global transition to knowledge-based economies. To do so, we need a robust and nimble research sector.

Australia currently invests about 2.2% of GDP in science, research and innovation from both private and public sources, the equivalent of about $900 per person per year. This is well behind regional competitors Korea (4.3) and Japan (3.6), behind the United States (2.7), and even further behind other world leaders such as Israel (4.1), Finland (3.2) and Sweden (3.2). Australian investment in research and innovation ranks only 13th among OECD member countries, significantly below the OECD average. Worst of all, our public sector investment has been in decline because of cuts by the old parties. Recent announcements by the government only go some way to repairing the damage.

The Greens believe that we need a strong research sector in Australia to help move away from the industries of the past, and to deliver the jobs of the future. This will mean ensuring that every dollar spent on research is spent well, and that our great public research agencies (like the CSIRO, Universities and Medical Research Institutes) work together with each other, with industry and with international partners. We must increase our investment in research and target that investment strategically. We must deliver a stable and dependable funding environment to free our researchers from a rolling funding shortfall.

In doing so it is also critical that we maintain our strengths. The recent job cuts at CSIRO highlight the damage being done from the combined weight of cuts to government funding and a new "industry focused" entrepreneurial orientation for the CSIRO driven by the government and Chief Executive.

The Greens will increase Australia's investment in science, research and innovation to 3% of GDP by 2025 and aim to get it to 4% of GDP by 2030.

We will deliver this increase through smart and effective programs designed to maximise the return on our investment. Over the coming years our research investment plan will help deliver a highly skilled workforce, vital research infrastructure and incentives for business to participate. We will increase funding, improve access to information, foster national and international collaboration, protect our key research institutions and deliver the research and innovation Australia needs to remain competitive in an increasingly competitive world.

Our roadmap to put us on the path to 4% of GDP by 2030 includes:

- A 'Protecting Science' package, consisting of a combined $847.9 million boost to the Australia Research Council, National Health & Medical Research Council, Cooperative Research Centres
- Restoring funding to the CSIRO and prevent job cuts ($306.5m);

Printed and authorised by Senator Richard Di Natale, Parliament House Canberra ACT 2600.

- Funding for indirect costs associated with research ($201.2m);
- Further steps towards default 5 year grants in ARC and NHMRC;
- Reverse short-sighted Government cuts to the Sustainable Research Excellence program and boost university research ($1,306 m);
- Investment in critical infrastructure via Innovation and Science Australia ($422.6m);
- Investment in strategic opportunities for international collaboration ($43.4m);
- Additional funding for the Future Fellowships scheme to attract and retain top research talents ($297.2m);
- Open Access Publishing of Government funded research ($197.7m);
- Support for women in science ($213.7m);
- Supporting collaborative health research centres to translate the research discoveries into clinical practice ($171.9m);
- Support the ongoing development of the Medical Research Future Fund; and
- Reverse cuts to R&D offsets ($690m)

Our commitment to 3% R&D is also supported by our commitment to reverse cuts to universities and boost base funding by 10%. This puts Australia on the path to reaching an R&D investment of 3% of GDP by 2025, if not earlier.

The Greens will also maintain funding for other national research agencies and programs not mentioned in this document. Our plan not only presents a strategic approach to research investment that will deliver long term benefits for our community, but also will engage with a community that will understand and engage with this exciting transformative venture.

In addition to Greens initiatives for increased investment in agricultural research and development, these initiatives will provide an additional $5 billion investment in research and development over the forward estimates.

The plan will be funded from announced revenue measures, including the abolition of fossil fuel subsidies. Abolishing one such subsidy alone, the fuel tax credit rebate, would save the budget at least $4.5 billion a year. Instead of propping up the industries of the past, the Greens will redirect that money to securing our future.

In accordance with standard federal Budget costing arrangements, costs here are presented over the forward estimates period. However, the Greens understand that much science & research funding needs to be planned over much longer time frames. Wherever possible, the Greens commit to securing funds for science & research well past the usual Federal Budget planning cycle.

> RESTORE CSIRO FUNDING

The CSIRO is Australia's premier research institution and has a proud history of invention, innovation and pure and applied research in the national interest. Government funding cuts and poor executive leadership have put the CSIRO in crisis with more than 250 jobs on the chopping block.

The Greens want to see new leadership at the CSIRO and would restore government funding to prevent current and future job cuts.

The Greens will invest an additional $306.5 million over the forward estimates in the CSIRO.

> PROTECTING SCIENCE AND RESEARCH - A $847.9 MILLION FUNDING BOOST

Australia's economic future is as a knowledge and innovation economy. We need a serious investment in the research and innovation that will deliver us the jobs of the future. As part of our Protecting Science and Research package, the Greens will commit $847.9 million to help drive Australia's evolution from the lucky country to the smart country.

We acknowledge the rhetorical commitment the government has made to science and innovation and in some cases has repaired some of the damage such as the threats to critical infrastructure funding, but they have also undermined support for pure and basic research by their reorientation towards industry collaboration and their ongoing funding cuts.

Every scientist knows that carrying out exciting research requires commitment and stability. We see investing in science as a way of permitting our talented scientists and engineers to try to solve the hard problems, in climate change, in agriculture, in health. It will also give scientists the confidence that they can stay in Australia, knowing funding is secure for the long term. Funding cannot continue in the "start-stop" way that both the Howard, Rudd/Gillard and then the Abbott/Turnbull governments have tried over the past 20 years; it just will not work.

Our Projecting Science and Research package will also spearhead a move towards a five year funding cycle, to provide increased certainty for research grant recipients, but we see this as the beginning of a far more secure commitment to long term funding for the most important scientific problems facing Australia.

- An additional $345.5 million will be provided to the Australian Research Council to be awarded as competitive grants in accordance with identified national priorities over the next 4 years. This is in addition to the Greens' commitment to secure the existing and projected ARC funding.

- An additional $345.5 million will be provided to the National Health and Medical Research Council to be awarded as competitive grants in accordance with identified national priorities over the next 4 years. This is in addition to the Greens' commitment to secure the existing and projected NHMRC funding.
- An additional $138.2 million will be allocated to fund Cooperative Research Centres in accordance with identified national priorities over the next 4 years. This is in addition to the Greens' commitment to secure the existing and projected CRC funding.

> LONGER-TERM AND BETTER FUNDING ARRANGEMENTS

The Greens understand the frustration many researchers feel with existing grant application requirements and processes. We also understand that the current process can mean significant job insecurity, especially for early- and mid-career researchers. The Greens would promote two key reforms:

The ARC and NHMRC would be asked to develop 'proven capacity' guidelines to guide the distribution of their Future Science funds. Researchers and organisations with 'proven capacity' in their fields would be eligible to apply for funding to allow them to continue research in that field. This would not only relieve experienced researchers of the need to spend resources on repeated project-based grants, but it would also provide more secure employment and better pathways for early- and mid-career researchers, including for those researchers who may be less likely to secure ARC/NHMRC funding in their own right;

The ARC and NHMRC would be asked to do further work in considering the impacts of moving to a default 5-year grant term. Whilst the Greens support the principle of longer funding cycles, and although the Parliamentary Budget Office has advised it would have no meaningful impact on the federal Budget, we would seek advice from the sector as to any impact it would have on the number of successful grants awarded and on the sector more broadly.

> SUSTAINABLE UNIVERSITY RESEARCH

The Greens will commit $1.306 billion to reverse Government cuts to our most successful University research.

Australian governments have a long history of supporting research in this country. The previous government put in place a National Research Investment Plan that argued for ongoing and predictable funding for core research and innovation programs. The plan stated that Australia's research investment needs to provide a strong, sustainable capability in basic and applied research that can increase productivity and address Australia's key challenges. We supported the plan and the establishment of the Sustainable Research Excellence (SRE) program. The then Labor government, despite their own advice, promptly slashed the plan by $499 million. These cuts were described by Australia's elite research institutes as ill-conceived, short-sighted and would lead to research jobs and programs being lost, often to other countries with far-sighted research investment plans.

The Turnbull-Abbott government then made further cuts to SRE funding and have subsequently abolished the program, rolling a number of research programs together.

The Greens will reverse these funding cuts to university research as soon as possible, injecting $1.306 billion over the forward estimates to restabilise this important funding stream.

The Greens understand that funding needs to be holistic, supporting all capital, maintenance and operating costs. Our commitment to the university research will help to cover the indirect costs of research, such as administration, equipment and staff, and enable our top-tier researchers to concentrate on the important work at hand. However the Greens also understand that more systemic changes need to be made to the way that indirect research costs are funded.

> $200 MILLION TO PHASE IN 'INDIRECT COST' FUNDING REFORMS

The infrastructure funding landscape can be complex. When researchers at universities, research institutes and hospitals receive external grants from providers such as the NHMRC and ARC, the funding usually only covers the direct research costs but does not cover indirect costs. These indirect costs include things like rent, electricity, heating, facilities management, administration, HR and can amount to as much as 60% of any direct research dollar.

Funding for indirect costs may be covered by various auxiliary schemes but these apply to only some researchers, in some circumstances, some of the time. There is a fundamental difficulty in research funding system where direct research costs are paid by one agency and the indirect costs are paid for by another agency. It is time these complexities were removed from research funding and grants were rationalised.

The Greens will commit $201.2 million to begin phasing in funding reforms that will progressively address the gap between direct and indirect funding.

Australia's national wellbeing depends on research and innovation, and it is research that provides us with our best hope of long-term industrial diversification and economic transformation.

> BOOSTING RESEARCH INFRASTRUCTURE

National collaborative research infrastructure is necessary to deliver high quality research and innovation outcomes, to improve national wellbeing and to enable Australian researchers to address key challenges. It is internationally acknowledged that major national research infrastructure, equipment like the synchrotron and the square kilometre array, have a scale and cost that cannot be funded by business or individual research organisations, but require government investment, coordination and support.

Since 2001, the Australian Government has provided a series of funding programs for large-scale research infrastructure that were broadly successful and enjoyed community support. However, these until recently these arrangements were precarious, and under both the Coalition and Labor, have been "start/stop" and inconsistent. Uncertainty about future funding for research infrastructure, particularly the funding for operating costs and specialist staff retention, creates management difficulties and places Australia at risk of losing the highly-skilled workforce required for the operation of sophisticated facilities.

We welcome the government's recent decision to finally put critical research infrastructure on a more secure footing and will support that commitment. However the Greens believe more needs to be done to ensure research infrastructure is maintained, adequately supported and importantly expanded.

The Greens will commit an additional $422.6 million to be directed by Innovation and Science Australia to continue the roll out and ongoing support of critical research infrastructure facilities in Australia.

Further funding to Innovation and Science Australia will provide certainty to advanced research and innovation sectors in Australia by delivering nationally-coordinated, long-term, dedicated operating-cost funding for existing infrastructure, as well as exploring new opportunities for advanced large scale collaborative research facilities. The Greens understand that infrastructure funding needs to be planned over a period of ten to fifteen years, not two years, and would continue to fund the Innovation and Science Australia over the longer term to guarantee stable and efficient use of our national facilities.

> AUSTRALIAN SCIENCE IN A CHANGING WORLD

Australia cannot undertake science in isolation. Enhanced strategic ties to the knowledge produced elsewhere are essential in order to capture the benefits and advantages for Australia. If we do not network on an international scale, our best and brightest scientists will take their ideas overseas and stay there, and conversely we will not have access to world-leading thinkers working together with us.

The global scientific landscape is rapidly evolving, with much of the best research moving East and South. Australia has a closing window of opportunity to build on previous strengths and to forge new links with emerging R&D powerhouses in Asia and elsewhere. While other countries are responding to these changes with deliberate action, the Australian Government's flagship program for strategic international science collaboration was terminated by Labor in June 2011 and the current government has only begun to repair the damage with its commitment to a global innovation strategy.

The Greens will commit an additional $43.4m over the next 4 years towards strategic opportunities for international collaboration to bring funding in the area up to almost $80 million.

This will enable greater support for:

- early to mid-career researchers to establish partnerships with international leaders in their field, building the networks Australia needs for future innovation;
- Collaborative innovation projects to deliver industry and economic benefit for Australia through research links with overseas companies and facilities;
- Strategic partnerships determined by existing government priorities and cooperation agreements, supplementing and aligned with existing bilateral strategic partnership for India and China and the landing pads identified in the innovation strategy;

By providing our best and brightest scientists with the opportunities to work with the best in their field, these programs will forge international links that will last a life time and deliver maximum returns on Australia's scientific investment.

> FUTURE FELLOWSHIP SCHEME

The Greens will commit an additional $297.2 million to funding the Future Fellowships program for a further 4 years. Strategic and sustained investment in research programs like Future Fellowships leads to an increased domestic research capacity that enhances productivity and helps us address national challenges. The Future Fellowships programs provide salary grants to mid-career researchers over four years, to support them in undertaking research critical to our nation, be that medical innovation, engineering breakthroughs or strategies to address climate change.

Investment should be made with a view to sustaining the long term viability of Australia's research and innovation capability. Funding for core research and innovation programs should be ongoing and predictable.

The Greens will maintain the current Future Fellowship funding and commit an additional $297.2 million over the forward

estimates. This program provides opportunities for outstanding Australian researchers to perform research of critical national importance in Australia. By providing incentives to attract and keep our best and brightest researchers based in Australia, we are building and sustaining the high level workforce and capabilities to ensure the health and vitality of our research and innovation sector into the future. Our commitment to fund the program for a further three years is the next important step to building a stable sustainable Fellowship scheme.

Previous Future Fellowships have contributed significant productivity gains for Australia and have attracted world class researchers to work in our labs. The Greens believe the Future Fellowships program should be cemented into the Australian research fabric to allow our mid-career researchers the flexibility and opportunity to excel at home.

> SUPPORTING WOMEN IN SCIENCE & RESEARCH

Women account for more than half of all undergraduate students in Australia, but are consistently underrepresented at the higher levels of the academy.

This underrepresentation becomes even more pronounced in the science, technology and innovation fields, including researchers working at the CSIRO and the fellowships designed to attract world-class researchers and world-class research leaders to key positions.

With many women leading their fields in science & research, it is vital that women's place in Australia's future is secured. Some of the barriers facing women are not unique to the science & research community, but can be exacerbated by the precarious employment status that often comes with grant-based funding. By failing to retain more women in the fields of science and technology, Australia is losing the benefit of a significant proportion of our expertise. We need to develop career pathways that can accommodate competing demands, so as to retain the knowledge and skills of women and carers as they move through different periods of their working and personal lives.

The Greens will commit $50 million per year in grants to research and innovation organisations to help them develop strategic programs designed to help retain female workers and carers as they manage competing demands on their time. These programs may include part-time fellowships, childcare support, family friendly facilities or increased technical support while on maternity leave.

Organisations may also use the funds to undertake a review of their operations, designed to identify localised barriers to the retention of women in their employment, and to develop best practise policies that will generate positive organisational cultures which create contemporary and equitable workplaces that value diversity.

The Greens understand that Australia needs a highly skilled workforce that can rapidly adapt to meet future challenges, and that means we must learn to better retain our investment in human capital. The Greens will help the research community develop career pathways that accommodate women and carers as they manage their work-life balance.

> OPEN ACCESS PUBLISHING

Over $7 billion worth of research in Australia each year is paid for by taxpayers through government-funded grants. The results of this research are published in peer-reviewed papers in scientific journals that are often hidden behind pay-walls. The Greens believe the results of publicly funded research should be widely available so that the maximum benefit can be gained from the knowledge created.

There are clear moves towards open access publishing both in Australia and internationally. From January 2013 the Australian Research Council has required that any publications arising from an ARC supported research project must be deposited into an open access institutional repository within 12 months of publication; the National Health and Medical Research Council has a similar policy. These moves mirror trends with other international research funding agencies such as the US National Institutes of Health, the Wellcome Trust and the UK Medical Research Council.

The Greens will commit $197.7 million over the forward estimates to drive the development and implementation of a national program of open access publishing. We will work with major academic institutions, research bodies and publishing houses to make additional funding available to cover the fees associated with publication of research arising from an ARC or NHMRC supported project. This will help ensure that publically funded research is freely available to researchers, business and the wider community.

By pursuing a broad policy of open access to publicly funded research, we can better capture the true benefits of Australia's significant investment, and build a solid foundation for an innovation economy into the future.

> MEDICAL RESEARCH FUTURE FUND

The Greens supported the establishment of the Medical Research Future fund which when fully capitalised at $20 billion a year will contribute $1 billion per annum to health and medical research, over the forwards it's is expected to contribute an additional $800 million to innovation.

The 2013 McKeon Review reported obstacles to taking health and medical research innovation from breakthrough to commercial success. One of the major reasons Australia lags in research commercialisation is the lack of government funding to support translation of research into commercial products.

In the health and medical research commercialisation process, funding is required at three key stages—preclinical, early clinical and late clinical. Funding shortfalls during the first two stages have such a negative impact they are colloquially known as the twin 'valleys of death'. Targeted government support at these two points that leverages matching support from private sources is critically needed.

The Greens want to see the MRFF support commercialisation and believe it should be an important element of the Australian Medical Research and Innovation Strategy that is currently being developed and will guide the MRRF Board in its investment decisions.

> BETTER SUPPORT INTEGRATED HEALTH RESEARCH CENTRES

The Greens acknowledge the government's move to increase collaboration in the medical research sector through Advanced Health Research and Translation Centres. However the Greens believe there is a need for greater support for collaboration.

The Greens will commit $171.9 million for the NHMRC to support the AHRTC scheme.

The last decade has seen a major shift towards collaborative research, especially in health. Innovation is more likely to occur in a research cluster, where a network of complementary participants drives a faster flow of ideas. Research clusters support multidisciplinary team building, attract high-calibre researchers, and facilitate rapid multilateral exchange of information.

A similar integration of healthcare and research leads to better health outcomes. In the US, the top 16 hospitals all contain academic health research capacity; in fact John Hopkins research hospital is so successful it is the third most cited institution in the world.

There are currently few health research collaboration centres of this type in Australia and the Greens understand that we need an injection of strategic research infrastructure that will help drive collaboration, increase productivity and improve health outcomes for the community.

The Greens will provide enough funds for 4 AHRTCs each with $12 million a year for four years to be funded. However, the final disbursements of the funds will be up to the NHMRC.

The centres should be new, innovative and flexible bodies that bring together many players in different ways. We anticipate that they will attract the best groups from universities and institutes, hospitals, industry, CRCs and the CSIRO.

> REVERSING R&D TAX OFFSET CUTS

Government incentives to business to invest in research and development are critical to driving Australian innovation.

That is why the government cut of 1.5% to R&D tax offsets are so short sighted. The measures are yet to be legislated, but the government has booked the saving in the Budget. We will continue to oppose the legislation and would reverse the cuts which are worth $690 million over the forwards.

Printed and authorised by Senator Richard Di Natale, Parliament House Canberra ACT 2600.