Budget 2018 confirms that the case for funding science is being heard in Canberra.

Science and research are integrated in the national objectives laid down in the treasurer's speech: to create jobs, boost health and improve the liveability of communities.

Many of the measures appear to have origins in proposals advanced by the science community.

Read more: ***Infographic: Budget 2018 at a glance***

Lessons from Budget 2018

What lessons can we take from this year's outcome? After two years in Canberra, I haven't discovered a magic key to the Federal coffers. But here are my general observations.

Intrinsic value is not sufficient

We can't assume that the broad public support for science will translate into support for specific proposals unless we do the work to explain the benefits, including more jobs and better health.

Being intrinsically valuable is not sufficient. Clarity about what we can deliver is essential when science is competing with spending proposals with obvious and immediate benefits – like more hospital beds.

Read more: ***Science isn't broken, but we can do better: here's how***

Politicians need help

It helps to remember that most politicians aren't experts in science policy. I've wrestled for years with the term "national research infrastructure". People I talk to outside the research sector simply don't understand it. A small change to saying "national research facilities" turns the lights on.

Show outcomes

It's important for politicians to see the outcomes of public investment. They see the dollar figures in the budget papers but they don't necessarily connect the research breakthroughs they read about in the newspapers years later to the programs that made them possible. It is important to help local members, irrespective of their party, recognise the impact of previously funded programs working for Australians.

Review and communicate

Take stock of progress and give credit to what has been achieved to date before heading back into the arena for the next round. As custodians of public funds, researchers should be proud to share their achievements with the taxpayers who ultimately make them possible.

Read more: ***Science Meets Parliament doesn't let the rest of us off the hook***

We're all in this

Finally, I've always found politicians to be far more receptive to funding proposals when they see commitment from other quarters. It's not just the Commonwealth that needs to step up. It's business. It's state and territory governments. It's philanthropists.

If we reach out widely, we can strengthen our advocacy with new allies, and at the same time, help government to focus on the things that only government can do.

Below I highlight some key areas funded through Budget 2018.

Key science and technology items in Budget 2018, from the Australian Academy of Science.

National facilities

I welcome the emphasis on national-scale research facilities: I was Chair of the taskforce that delivered the 2016 National Research Infrastructure Roadmap .

This year's budget invests $1.9 billion over 12 years, adding to the $1.5 billion over ten years committed to the National Collaborative Research Infrastructure Strategy (NCRIS) in 2015.

As shown below, $393.3 million is allocated in the next five years.

I am encouraged that the government has committed to review the investment plan every two years, in recognition of the importance of keeping this discussion firmly on the national agenda.

In addition to these funds, the budget acts on an urgent priority flagged in the Roadmap – high performance computing. $70 million for the Pawsey Supercomputing Centre in Perth adds to the $70 million previously committed to the National Computational Infrastructure in Canberra.

This builds on the $119 million announced for the European Southern Observatory in the previous budget.

National missions

A second notable feature is the follow-through on the national missions proposed in the Innovation and Science Australia (ISA) 2030 Plan

.

The ISA mission to preserve the Great Barrier Reef is supported by $100 million in new investment for coral reef research and restoration projects, as part of a $500 million package a nnounced last month

.

The ISA mission to harness precision medicine and genomics to make Australia the healthiest nation in the world is backed with $500 million over the next ten years from the Medical Research Future Fund.

Read more: ***Four ways precision medicine is making a difference***

A scaffold for the genomics revolution was provided by the Australian Council of Learned Academies (ACOLA) in the recent Precision Medicine Horizon Scanning report , commissioned by the Commonwealth Science Council.

A forthcoming Horizon Scanning report, on artificial intelligence , will likewise inform the $30 million commitment to AI and machine learning in the 2018 budget. The funding includes a national ethics framework for AI – a welcome development that will position Australia well in the global AI standards debate.

More broadly, the budget acts on priorities that scientists have championed for years.

There is $41 million for a National Space Agency, including a $15 million fund for International Space Investment.

Over four years, $36 million will be provided for the Antarctic science program.

An amount of $4.5 million over four years is aimed to encourage more women into STEM education and careers, including a decadal plan for women in science.

With a focus on GPS technology, $225 million is allocated over four years to improve the accuracy of satellite navigation, and $37 million over three years for Digital Earth Australia. The goal of this funding is to make satellite data accessible for research, regional Australia and business.

There is also $20 million for an Asian Innovation Strategy, including an extension of the Australia-India Strategic Research Fund for four years.

Business innovation

In the business arena, changes to address integrity and additionality (that is, driving R&D to levels beyond "business as usual") in the Research and Development Tax Incentive (RDTI) will reduce by an estimated $2.4 billion the money the scheme delivers to industry.

As one of the authors of the "3Fs" review of the RDTI – with Bill Ferris and John Fraser – I support the rebalancing of Australia's business innovation budget. We are a global outlier in our heavy reliance on the indirect pull-through achieved through the tax system, instead of mission-driven direct investment.

With money recouped from the RDTI, scientists and research-intensive businesses should be making the case for more and better-targeted programs. Work remains to be done.

Alan Finkel does not work for, consult, own shares in or receive funding from any company or

organisation that would benefit from this article, and has disclosed no relevant affiliations beyond their academic appointment.

Authors: Alan Finkel, Australia's Chief Scientist, Office of the Chief Scientist

Read more http://theconversation.com/budget-2018-when-scientists-make-their-case-effectively-politicians-listen-96124